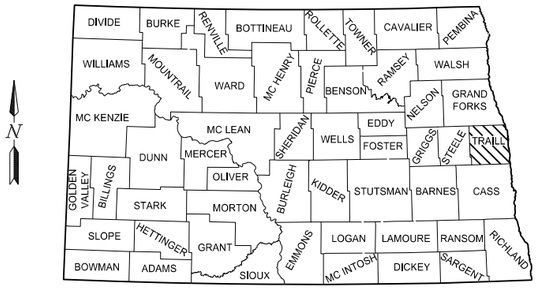
	STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
	ND	SC-4924(055)	20205	1	1

JOB #25

TRAILL COUNTY, NORTH DAKOTA
PLANS FOR FEDERAL AID PROJECT
SC-4924(055)

FHWA LIMITED INVOLVEMENT
TRAILL COUNTY HIGHWAY 5 (CMC 4924)
TRAILL COUNTY HIGHWAY 9 (CMC 4924)
TRAILL COUNTY HIGHWAY 14
HOT BITUMINOUS OVERLAY & INCIDENTALS



STATE COUNTY MAP

GOVERNING SPECIFICATIONS

Standard Specifications for Road and Bridge Construction
adopted by the North Dakota Department of Transportation October 2008;
Standard Drawings currently in effect; and other Contract Provisions submitted herein.

PROJECT LENGTH

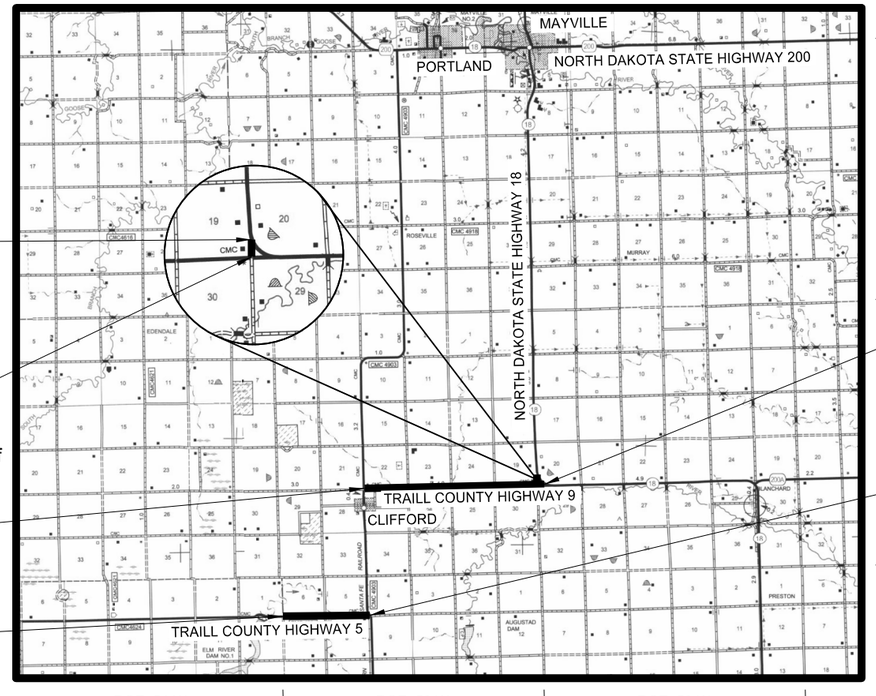
Project	Gross Miles	Net Miles
SC-4924(055) ~ Co Hwy 5	1.953	1.953
SC-4924(055) ~ Co Hwy 9	4.214	4.214
SC-4924(055) ~ Co Hwy 14	0.234	0.234
Total	6.401	6.401

DESIGN DATA

Traffic ~ SC-4924(055)	Average Daily			Est. 30th Max. Hr.
	Passenger	Trucks	Total	
Current Traffic ~ Hwy 9 2013	275	60	335	34
Forecast Traffic ~ Hwy 9 2033	305	65	370	37
Current Traffic ~ Hwy 5 2013	240	25	265	27
Forecast Traffic ~ Hwy 5 2033	260	30	290	29

Design Speed: 55 MPH
Minimum Sight Dist. for Stopping: 495 Feet

Project is located on Traill County Highway 5 (CMC 4924) approximately 3 miles South of Clifford, ND; Traill County Highway 9 (CMC 4924) approximately 0.5 miles North of Clifford, ND; and Traill County Highway 14 approximately 0.5 miles North and 4 miles East of Clifford, ND.



COUNTY HIGHWAY 14
END PROJECT SC-4924(055)
(NON-PARTICIPATING)
Sta. 412+45 = A Point Approximately
16 Feet West and 1,240 Feet North
of the Southeast Corner of Sec. 19,
Twp. 145 N., Rge. 53 W.

COUNTY HIGHWAY 14
BEGIN PROJECT SC-4924(055)
(NON-PARTICIPATING)
Sta. 400+12 = A Point Approximately
12 Feet North of the Southeast Corner of
Sec. 19, Twp. 145 N., Rge. 53 W.

COUNTY HIGHWAY 9
BEGIN PROJECT SC-4924(055)
Sta. 113+40 = A Point Approximately
32 Feet East of the Southeast Corner of
Sec. 21, Twp. 145 N., Rge. 53 W.

COUNTY HIGHWAY 5
BEGIN PROJECT SC-4924(055)
Sta. 10+00 = A Point Approximately
44 Feet West and 1 Feet South
of the Southwest Corner of Sec. 6,
Twp. 144 N., Rge. 53 W.

COUNTY HIGHWAY 9
END PROJECT SC-4924(055)
Sta. 335+90 = A Point Approximately
1,230 Feet East and 85 Feet North
of the Southeast Corner of Sec. 19,
Twp. 145 N., Rge. 53 W.

COUNTY HIGHWAY 5
END PROJECT SC-4924(055)
Sta. 113+10 = A Point Approximately
25 Feet East of the Southeast Corner
of Sec. 5, Twp. 144 N., Rge. 53 W.

PS&E Corrections Made: August 2013
Surveyed & Designed Date: March 2013

This document was originally issued and sealed by Matt Lange, Registration Number PE- 6870, on 09/04/13 and the original document is stored at the office of Kadrmas, Lee & Jackson.

CERTIFICATION

I HEREBY CERTIFY THAT THESE 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 NORTH DAKOTA.

Matt Lange /s/
KADRMAS, LEE & JACKSON, INC.

DATE 09/04/13 REGISTRATION NUMBER PE-6870

1010 4th AVENUE SW
P.O. BOX 937
VALLEY CITY, ND 58072-0937
(701) 845-4980, FAX (701) 845-0252

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SC-4924(055)	2	1

TABLE OF CONTENTS

LIST OF STANDARD DRAWINGS

STANDARD NO.	DESCRIPTION
D-20-1, 2 & 3	NDDOT Abbreviations
D-20-10	NDDOT Utility Company Abbreviations
D-20-20 & 21	Line Styles
D-20-30, 31 & 32	Symbols
D-704-2	Traffic Control for Coring of Hot Bituminous Pavement
D-704-7 & 8	Breakaway Systems for Construction Zone Signs
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 Details and Channelizing Devices
D-704-14	Construction Sign and Barricade Assembly Details
D-704-15, 20, 22 & 26	Construction Sign and Barricade Location Details
D-704-27	Traffic Control Plan for Moving Operations on Conventional Highways (Pavement Marking)
D-704-28	Traffic Control for Mobile Operations
D-704-50	Portable Sign Support Assembly
D-706-1	Type C Field Laboratory
D-760-5	Saw Slotted Rumble Strips at Intersections
D-762-4	Pavement Marking
D-762-6	Short-Term Pavement Marking

SPECIAL PROVISIONS

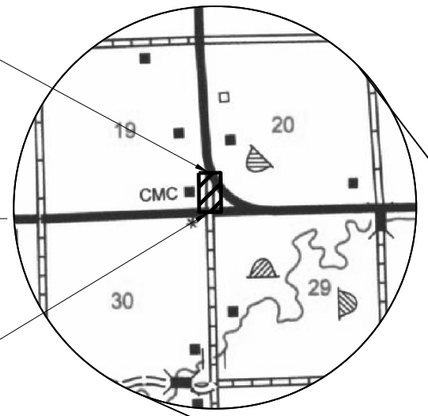
SP#	DESCRIPTION
SP 559(08)	Permanent Pavement Marking Monitoring System
SP 1101(08)	Split Sampling and Testing Requiredments for Aggregate Base
SP 1275(08)	Weather Limitations for Hot Bituminous Mix

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SC-4924(055)	4	1

COUNTY HIGHWAY 14
END PROJECT SC-4924(055)
(NON-PARTICIPATING)
Sta. 412+45 = A Point Approximately
16 Feet West and 1,240 Feet North
of the Southeast Corner
of Sec. 19, Twp. 145 N., Rge. 53 W.

400+00

COUNTY HIGHWAY 14
BEGIN PROJECT SC-4924(055)
(NON-PARTICIPATING)
Sta. 400+12 = A Point Approximately
12 Feet North of the Southeast Corner
of Sec. 19, Twp. 145 N., Rge. 53 W.



2" Hot Bituminous Overlay & Incidentals

3" Hot Bituminous Overlay & Incidentals

4" Hot Bituminous Pavement & Incidentals
(Non-Participating)

113+08 166+50 218+75 271+05 323+14

COUNTY HIGHWAY 9
BEGIN PROJECT SC-4924(055)
Sta. 113+40 = A Point Approximately
32 Feet East of the Southeast Corner of
Sec. 21, Twp. 145 N., Rge. 53 W.

COUNTY HIGHWAY 5
BEGIN PROJECT SC-4924(055)
Sta. 10+00 = A Point Approximately
44 Feet West and 1 Foot South
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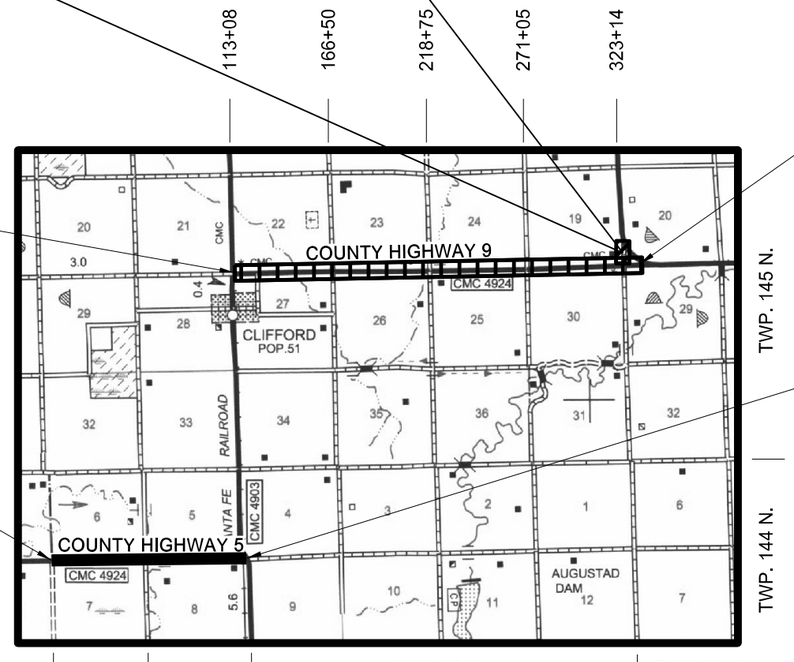
Twp. 144 N., Rge. 53 W.



10+44 61+12 113+08

COUNTY HIGHWAY 9
END PROJECT SC-4924(055)
Sta. 335+90 = A Point Approximately
1,230 East and 85 Feet North
of the Southeast Corner
of Sec. 19, Twp. 145 N., Rge. 53 W.

COUNTY HIGHWAY 5
END PROJECT SC-4924(055)
Sta. 113+10 = A Point Approximately
25 Feet East of the Southeast Corner
of Sec. 5, Twp. 144 N., Rge. 53 W.

N

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Drawing not to scale.

SC-4924(055)
TRAILL COUNTY, NORTH DAKOTA

KLJ

SCOPE OF WORK

DRWN. BY	CHK'D. BY	PROJECT NO.
ZV	AM	14313102

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SC-4924(055)	6	1

PLAN NOTES

100-P01 **CONSTRUCTION ACTIVITIES:** Work activities shall be conducted during daylight hours only and construction activities shall be scheduled to accommodate traffic before dark. Both lanes shall be opened during non-work hours and 1 lane open during working hours.

100-P02 **DIMENSIONS:** Thicknesses shown on the typical sections for surfacing are approximate. It is intended that the plan tonnage provided by the basis of estimate will be used uniformly throughout the project unless otherwise authorized by the engineer.

107-P01 **HAUL ROADS:** The Contractor shall contact the appropriate Tribal, State, County, Township or City officials to determine if there are any No Haul Routes or Restricted Routes prior to preparing a bid for this project. The gross vehicle weight on all county and township roads shall not exceed 80,000 pounds unless approved by the local agency.

107-115 **RAILROAD PROTECTIVE LIABILITY INSURANCE:** This project crosses the BNSF Railway Company at Station 113+10. The type of work that will be performed within the railroad right of way is milling the existing pavement surface and placing hot bituminous pavement. Inquiries for protective liability insurance should be directed to:

Rosa Martinez
Marsh Co.
Texas
214-303-8519

Information on crossing number 071078N may be obtained from the Federal Railroad Administration website: http://safetydata.fra.dot.gov/Officeofsafety/

203-P01 **COMMON EXCAVATION-WASTE:** The location and actual quantity of "COMMON EXCAVATION-WASTE" shall be determined in the field by the Engineer (see Subgrade Repair Detail on Sheet 1 Section 20). The unit price bid for "COMMON EXCAVATION-WASTE" shall govern regardless of the quantity used. An increase or decrease from plan quantity will not be accepted as a reason to negotiate any pay adjustment under this bid item. The bid item "COMMON EXCAVATION-WASTE" may be eliminated at the discretion of the Engineer.

Existing asphalt shall be cut leaving a vertical edge. The cost to cut a vertical edge and remove, load, haul, and dispose of the existing materials off the right-of-way in accordance with all requirements of the North Dakota Department of Health, shall be included in the price bid for "COMMON EXCAVATION-WASTE".

302-P01 **AGGREGATE BASE COURSE CL 5:** A quantity of 94 tons per mile of "AGGREGATE BASE COURSE CL 5" has been provided for patching. The location and actual quantity of "AGGREGATE BASE COURSE CL 5" shall be determined in the field by the engineer (see Subgrade Repair Detail on Sheet 1 Section 20). The unit price bid for "AGGREGATE BASE COURSE CL 5" shall govern regardless of the quantity used. An increase or decrease from plan quantity will not be accepted as a reason to negotiate any pay adjustment under this bid item. The bid item "AGGREGATE BASE COURSE CL 5" may be eliminated at the discretion of the Engineer.

The bid item "AGGREGATE BASE COURSE CL 5" used for patching shall be paid for by the ton. Any costs associated with hauling, placing or compacting shall be included in the bid price "AGGREGATE BASE COURSE CL 5".

401-P01 **FOG COAT:** Pavement placed after September 15 will receive a fog seal with an SS1H or CSS1H emulsified asphalt at a rate of 0.10 gal/sy. The fog seal shall be applied immediately after the final rolling while the pavement is still warm. The bitumen will be paid for at the unit price bid for "SS1H OR CSS1H OR MS1 EMULSIFIED ASPHALT". If the Contractor fails to have bitumen available to provide the fog seal, the Engineer may require the Contractor to cease paving operations and place the wearing course in the next construction season with liquidated damages applied until project completion.

408-P01 **MIX DESIGN:** The Contractor shall develop and submit a mix design for the Superpave FAA 43. The mix design criteria shall meet NDDOT Standard Specification 410.04 A and 410.04 B (Superpave Volumetric Mix Design) with the following revisions:

1) The first and second paragraphs of NDDOT Standard Specification 410.04 A shall be deleted in their entirety. The aggregate source and bitumen target percentage shall be shown on the mix design.

The cost for the mix design work shall be included in the price bid for "SUPERPAVE FAA 43". Additional mix designs shall be provided if there are any changes in aggregate sources, asphalt sources, or operations.

408-P02 **AGGREGATE AND MIX DESIGN PROPERTIES:** The aggregate blend and properties shall meet the requirements outlined in NDDOT Standard Specification 410 Superpave Volumetric Mix Design. The following aggregate and mix design properties are required:

Test	Criteria	Reference
Course Aggregate Angularity	75% min.	NDDOT Field Sampling and Testing Manual
Fine Aggregate Angularity	43% min.	AASHTO T 304
Gyratory Effort, # Gyrations	N_{ini}=7, N_{des}=75, $_{max}$=115	AASHOT R 35
Voids Filled With Asphalt	65-78%	AASHTO M3223, T 166
$\%G_{mm}$ @ N_{ini}	89% max	AASHTO M323, T 166

408-P03 **SUPERPAVE FAA 43:** Pavement surface areas showing signs of failure shall be repaired as per the Subgrade Repair Detail (see Sheet 1 Section 20). Existing irregularities in the roadway surface shall be cleaned, tacked, filled with hot bituminous pavement and compacted in a separate operation. Two hundred (200) tons per lane mile of hot bituminous pavement has been provided for the patching and leveling course and is included in the plan quantity. The patching and leveling course shall be compacted with a minimum of one self-propelled pneumatic roller which shall meet NDDOT Standard Specification 151.02 B. All hot bituminous mix and asphalt cement required for the patching and leveling course shall be measured and paid for by the ton of "SUPERPAVE FAA 43" and "PG 58-28 ASPHALT CEMENT". This shall be considered full payment for performing this work.

The location and actual quantity of Superpave FAA 43 used for subgrade repair and patching will be determined in the field by the Engineer. The unit price bid will govern regardless of quantity used and an increase or decrease in plan quantity will not be accepted as a reason to negotiate any pay adjustment.

The top lift shall be paver laid to a minimum thickness of 1.5". The hot bituminous pavement shall be placed and accepted according to NDDOT Standard Specifications (Section 408).

408-P04 **COMPACTION:** The compaction requirements for the Superpave FAA 43 on County Highway 5, County Highway 14 and the first lift of County Highway 9 shall be as per NDDOT Standard Specification 408.04 I.2 (Ordinary Compaction).

The compaction requirements for the Superpave FAA 43 on the second lift of Highway 9 shall be per NDDOT Standard Specification 408.04 I.3 (Specified Density).

408-P05 **ACCEPTANCE:** Acceptance for Superpave FAA 43 shall be in accordance to Section 408.05 A & B with the following revisions:

- The first paragraph of Section 408.05 shall be removed.
- The beginning of the third paragraph of Section 408.05 A.1 shall be revised to say the following: "If any test in a lot results in the variance of any one or more sieves from the JMF gradation target value by more than the tolerances listed below, a deduction on the entire lot will be applied."

Section 408.05 C does not apply.

All of the hot bituminous pavement used over the entire width of the 1st and 2nd lifts, shall be included in the tonnage quantity when determining the payment adjustment.

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SC-4924(055)
TRAILL COUNTY, NORTH DAKOTA

KLJ

PLAN NOTES

DRWN. BY	CHKD. BY	PROJECT NO.
AM	JL	14313102

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-4924(055)	6	2

PLAN NOTES

411-P01 **MILLING PAVEMENT SURFACE:** The hot bituminous pavement overlay shall require a 75-foot milled transition at the ends of the project and exceptions (see Milled Taper Detail on Sheet 1 Section 20). Payment for milling shall be by the square yard based on the top width of 24 feet. Sloughs if present, will not be measured for payment but shall be incidental to the bid item “MILLING PAVEMENT SURFACE”. The milled material shall become the property of the contractor and shall be disposed of outside the right of way.

411-P02 **TEMPORARY ASPHALT WEDGES:** The Contractor shall place temporary asphalt or milled material wedges at the milled taper locations to allow for the smooth passage of vehicles. All costs for labor, materials, and equipment to install and remove the wedges shall be included in the unit price bid for “MILLING PAVEMENT SURFACE”.

704-P01 **CONSTRUCTION SIGNING:** The Contractor shall furnish the necessary signing as shown on Standard Drawings D-704-15, 20, 22, and 26 under Type A, G, K, N, O, EE and GG as required by construction operations.

The required traffic control signs and devices are included in the “Traffic Control Devices List” and will be measured and paid at the contract unit price for each device. Additional devices required to accommodate the Contractor’s operation shall be the Contractor’s responsibility.

704-P02 **TRAFFIC CONTROL FOR UNEVEN PAVEMENT:** The Contractor has the option of making the paving lanes even at the end of each day's paving operation or signing for the uneven pavement and providing the following devices: Install Uneven Lanes signs (Sign No. W8-11-48) and a supplemental plate (Sign No. W20-52-54), identifying the distance, on the right shoulder (both directions) in advance of the beginning of the uneven pavement and at major intersections. A major intersection shall be defined as a CMC, State, U.S. or Interstate ramp.

Install Do Not Pass signs (Sign No. R4-1-48) on the right shoulder (both directions) between the uneven pavement sign and the beginning of the uneven pavement and at major intersections. Install tubular markers spaced at two times the posted speed limit on the centerline where uneven pavement exists. These traffic control devices shall be left in place until the lanes are even. These signs and tubular markers are included in the Traffic Control Devices List (Sheet 1 Section 100) and will be measured and paid for at the contract unit price for each device. No extra compensation will be allowed for relocation due to work progression.

760-P01 **RUMBLE STRIPS:** Rumble strips, as per Standard Drawing D-760-5, shall be placed at the following intersections:

County Highway 5 / County Highway 16
County Highway 16 / County Highway 9
County Highway 9 / North Dakota State Highway 18

762-P01 **PAVEMENT MARKING EDGE LINES:** A 4-inch white edge line has been added to the quantity to be used throughout the project length. Edge lines shall continue through private and field drives and break for intersections.

762-P02 **SHORT-TERM PAVEMENT MARKING:** The quantity for short term striping is based on three applications for Highway 9, two applications for Highway 5, and one application for Highway 14.

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SC-4924(055)
TRAILL COUNTY, NORTH DAKOTA

KLJ

PLAN NOTES

DRWN. BY	CHKD. BY	PROJECT NO.
AM	JL	14313102

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-4924(055)	8	1

ESTIMATE OF QUANTITIES

SPEC	CODE	ITEM DESCRIPTION	UNIT	COUNTY HIGHWAY 5 (1.953 MILES) PARTICIPATING				COUNTY HIGHWAY 9 (4.214 MILES) PARTICIPATING				COUNTY HIGHWAY 14 (0.234 MILES) NON-PARTICIPATING	TOTAL
				MAINLINE	PATCHING/ LEVEL COURSE	*DRIVES (5/7)	SUBTOTAL	MAINLINE	PATCHING/ LEVEL COURSE	*DRIVES (12/17)	SUBTOTAL	MAINLINE	
103	0100	CONTRACT BOND	L SUM	0.2	-	-	0.2	0.7	-	-	0.7	0.1	1
107	0100	RAILWAY PROTECTION INSURANCE	L SUM	1	-	-	1	-	-	-	-	-	1
203	0113	COMMON EXCAVATION-WASTE	CY	-	146	-	146	-	316	-	316	40	502
216	0100	WATER	M GAL	20	-	-	20	42	-	-	42	23	85
302	0120	AGGREGATE BASE COURSE CL 5	TON	-	184	108	292	-	396	261	657	-	949
302	0407	RESHAPE AGGREGATE BASE COURSE	STA	-	-	-	-	-	-	-	-	12.4	12.4
401	0100	MC70 OR 250 LIQUID ASPHALT	GAL	-	-	-	-	-	-	-	-	824	824
401	0150	SS1H OR CSS1H OR MS1 EMULSIFIED ASPHALT	GAL	1,719	22	70	1,811	6,797	47	338	7,182	395	9,388
401	0160	BLOTTER MATERIAL CL 44	TON	-	-	-	-	-	-	-	-	25	25
408	0445	PG 58-28 ASPHALT CEMENT	TON	223	51	3	277	723	110	14	847	55	1,179
408	0803	SUPERPAVE FAA 43	TON	3,437	781	46	4,264	11,125	1,686	222	13,033	839	18,136
408	9605	CORED SAMPLE-BITUMINOUS PAVEMENT	EA	2	-	-	2	50	-	-	50	3	55
411	0105	MILLING PAVEMENT SURFACE	SY	878	-	-	878	592	-	-	592	-	1,470
702	0100	MOBILIZATION	L SUM	0.2	-	-	0.2	0.7	-	-	0.7	0.1	1
704	0100	FLAGGING	MHR	75	-	-	75	175	-	-	175	-	250
704	1000	TRAFFIC CONTROL SIGNS	UNIT	656	-	-	656	656	-	-	656	56	1,368
704	1052	TYPE III BARRICADE	EA	4	-	-	4	4	-	-	4	6	14
704	1067	TUBULAR MARKERS	EA	-	-	-	-	200	-	-	200	-	200
704	1185	PILOT CAR	HR	35	-	-	35	90	-	-	90	-	125
706	0300	FIELD LABORATORY-TYPE C	EA	0.2	-	-	0.2	0.7	-	-	0.7	0.1	1
709	0701	GEOTEXTILE FABRIC-TYPE R1	SY	-	439	-	439	-	948	-	948	-	1,387
760	0009	RUMBLE STRIPS - INTERSECTION	EA	1	-	-	1	2	-	-	2	-	3
762	0430	SHORT TERM 4IN LINE-TYPE NR	LF	4,876	4,876		9,752	20,098	10,049	-	30,147	2,466	42,365
762	1104	PVMT MK PAINTED 4IN LINE	LF	25,496	-	-	25,496	54,493	-	-	54,493	4,932	84,921

*(Section & Private Drives/Field Drives)

SC-4924(055)
TRAILL COUNTY, NORTH DAKOTA

KLJ

ESTIMATE OF QUANTITIES

DRWN. BY	CHKD. BY	PROJECT NO.
AM	ML	14313102

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SC-4924(055)	10	1

BASIS OF ESTIMATE

TRAILL COUNTY HIGHWAY 5

STA 10+00 TO STA 113+10

MAINLINE		DRIVES			
QUANTITY PER MILE	WIDTH	PRIVATE & SECTION DRIVES (2/3)	FIELD DRIVES (7)	UNIT	DESCRIPTION
75	-	-	-	CY	Common Excavation-Waste for Patching
10	-	-	-	M GAL	Water
94	-	9	9	TON	Aggregate Base Course CL 5 (1.875 Tons/CY)
880	30’	7	5	GAL	SS1H or CSS1H or MS1 Emulsified Asphalt for Tack Coat (0.05 Gal/SY)
1,760	24’	5	3	TON	Superpave FAA 43 (2.0 Tons/CY)
114	24’	0.3	0.2	TON	PG 58-28 Asphalt Cement (6.5% Hot Bit. Pavement)
40	-	-	-	MHR	Flagging
20	-	-	-	HR	Pilot Car
10,560	-	-	-	LF	White Edge Line Pavement Marking Paint (4”)

TRAILL COUNTY HIGHWAY 9

STA 113+40 TO STA 335+90

MAINLINE		DRIVES			
QUANTITY PER MILE	WIDTH	PRIVATE & SECTION DRIVES (4/8)	FIELD DRIVES (17)	UNIT	DESCRIPTION
75	-	-	-	CY	Common Excavation-Waste for Patching
10	-	-	-	M GAL	Water
94	-	9	9	TON	Aggregate Base Course CL 5 (1.875 Tons/CY)
880	30’	7	5	GAL	SS1H or CSS1H or MS1 Emulsified Asphalt for 1st Lift (0.05 Gal/SY)
733	25’	7	5	GAL	SS1H or CSS1H or MS1 Emulsified Asphalt for 2nd Lift (0.05 Gal/SY)
1,396	25’	5	3	TON	Superpave FAA 43 for 1st Lift (2.0 Tons/CY)
1,244	24’	5	3	TON	Superpave FAA 43 for 2nd Lift (2.0 Tons/CY)
91	25’	0.3	0.2	TON	PG 58-28 Asphalt Cement for 1st Lift (6.5% Hot Bit. Pavement)
81	24’	0.3	0.2	TON	PG 58-28 Asphalt Cement for 2nd Lift (6.5% Hot Bit. Pavement)
40	-	-	-	MHR	Flagging
20	-	-	-	HR	Pilot Car
10,560	-	-	-	LF	White Edge Line Pavement Marking Paint (4”)

TRAILL COUNTY HIGHWAY 14

STA 400+12 TO STA 412+45

MAINLINE			
QUANTITY PER MILE	WIDTH	UNIT	DESCRIPTION
100	-	M GAL	Water – Water for Reshaping Roadway
3,520	24’	GAL	MC70 or 250 Liquid Asphalt (0.25 Gal/SY)
909	31’	GAL	SS1H or CSS1H or MS1 Emulsified Asphalt for 1st Lift (0.05 Gal/SY)
777	26.5’	GAL	SS1H or CSS1H or MS1 Emulsified Asphalt for 2nd Lift (0.05 Gal/SY)
106	24’	TON	Blotter Material Class 44 (15 Lbs/SY)
2,351	26.5’	TON	Superpave FAA 43 for 1st Lift (2.0 Tons/CY)
1,234	24’	TON	Superpave FAA 43 for 2nd Lift (2.0 Tons/CY)
153	26.5’	TON	PG 58-28 Asphalt Cement for 1st Lift (6.5% Hot Bit. Pavement)
80	24’	TON	PG 58-28 Asphalt Cement for 2nd Lift (6.5% Hot Bit. Pavement)
10,560	-	LF	White Edge Line Pavement Marking Paint (4”)

PAVEMENT MARKING

DESCRIPTION	UNIT	QUANTITY PER LOCATION
4” Yellow No Passing Zone (Solid Line)		
Sta. 23+98 to Sta. 33+35 RT	LF	937
Sta. 35+60 to Sta. 43+58 LT	LF	798
Sta. 106+44 to Sta. 112+25 RT	LF	581
Sta. 113+48 to Sta. 119+83 LT	LF	635
Sta. 156+56 to Sta. 166+73 RT	LF	1,017
Sta. 169+79 to Sta. 181+32 LT	LF	1,153
Sta. 217+76 to Sta. 220+62 RT	LF	286
Sta. 318+05 to Sta. 322+72 RT	LF	467
Sta. 323+53 to Sta. 327+55 LT	LF	402
Sta. 330+20 to Sta. 335+49 RT	LF	529
Sta. 400+12 to Sta. 412+45 LT	LF	1,233
Sta. 400+12 to Sta. 412+45 RT	LF	1,233
Total	**LF**	**9,271**
4” Yellow Center Lines (10’ Line, 30’ Skip)		
Sta. 10+00 to Sta. 112+25	LF	2,560
Sta. 113+40 to Sta. 335+49	LF	5,560
Total	**LF**	**8,120**
Total Yellow Pavement Marking Paint	**LF**	**17,391**
4” White Edge Lines		
Sta. 10+00 to Sta. 113+10 RT & LT	LF	20,620
Sta. 113+48 to Sta. 335+70 RT & LT	LF	44,444
Sta. 400+12 to Sta. 412+45 RT & LT	LF	2,466
Total White Pavement Marking Paint	**LF**	**67,530**

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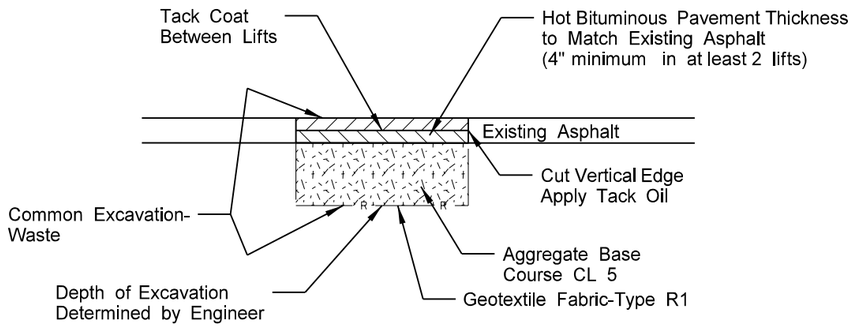
SC-4924(055)
TRAILL COUNTY, NORTH DAKOTA

KLJ

BASIS OF ESTIMATE

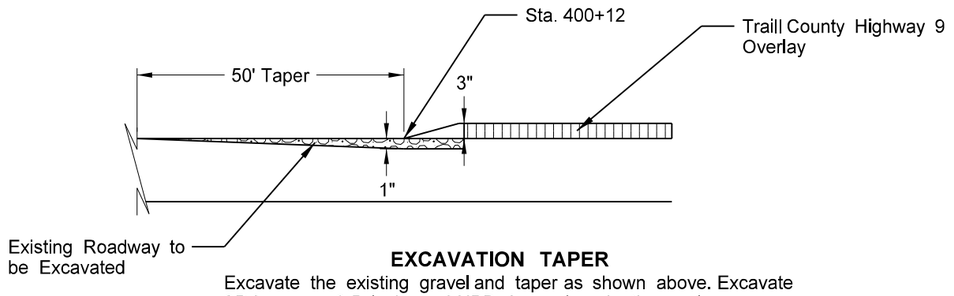
DRWN. BY	CHKD. BY	PROJECT NO.
ZV	ML	14313102

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SC-4924(055)	20	1



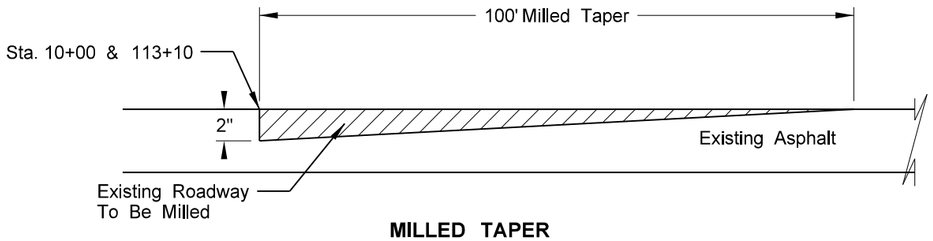
SUBGRADE REPAIR

1.) Subgrade Repair at depths of 1 foot or greater shall be excavated to the full width of the lane and tapered at a ratio of 20:1 on the ends.
2.) Each lift of hot bituminous pavement shall cure overnight before installation of the next course.



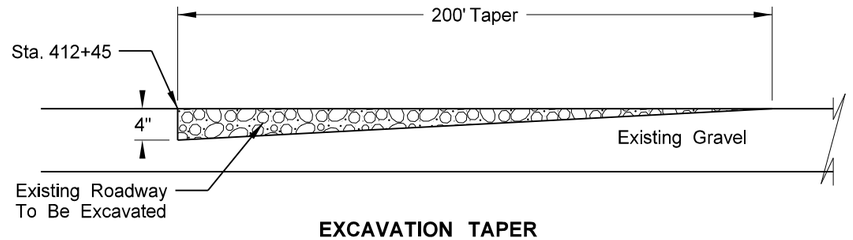
EXCAVATION TAPER

Excavate the existing gravel and taper as shown above. Excavate 25' for every 0.5 inches of HBP. A varying depth wearing course shall be placed matching the roadway surface elevation at the ends of the project. Quantity will be measured in place by the CY and paid for as "COMMON-EXCAVATION WASTE".



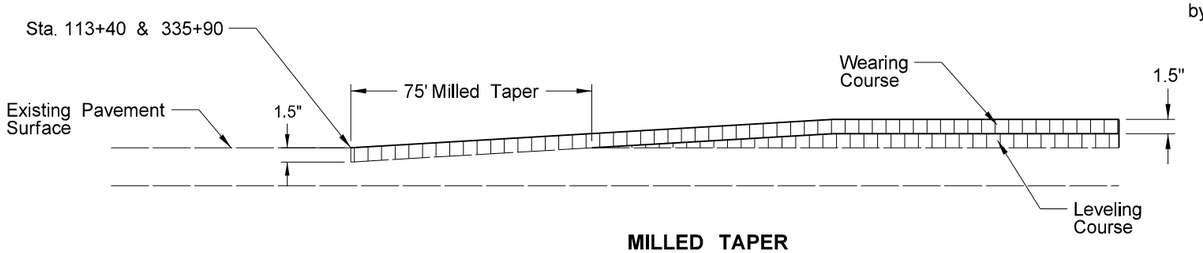
MILLED TAPER

Mill the existing pavement and taper as shown above. 25' for every 0.5 inches of HBP. A varying depth wearing course shall be placed matching the roadway surface elevation at the ends of the project.



EXCAVATION TAPER

Excavate the existing gravel and taper as shown above. Excavate 25' for every 0.5 inches of HBP. A varying depth wearing course shall be placed matching the roadway surface elevation at the ends of the project. Quantity will be measured in place by the CY and paid for as "COMMON-EXCAVATION WASTE".



MILLED TAPER

Mill the existing pavement and taper as shown above. 25' for every 0.5 inches of HBP. A wearing course shall be placed matching the roadway surface elevation at the ends of the project.

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SC-4924(055)
TRAILL COUNTY, NORTH DAKOTA

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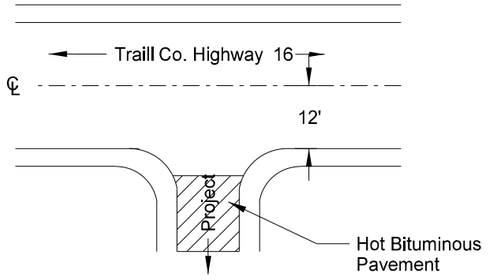
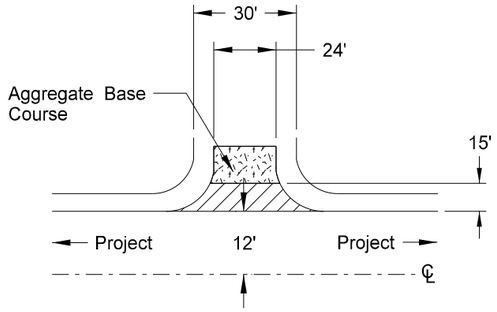
GENERAL DETAILS

DRWN. BY	CHK'D. BY	PROJECT NO.
ZV	ML	14313102

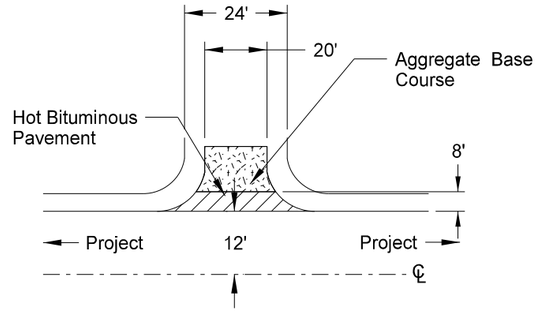
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SC-4924(055)	20	2



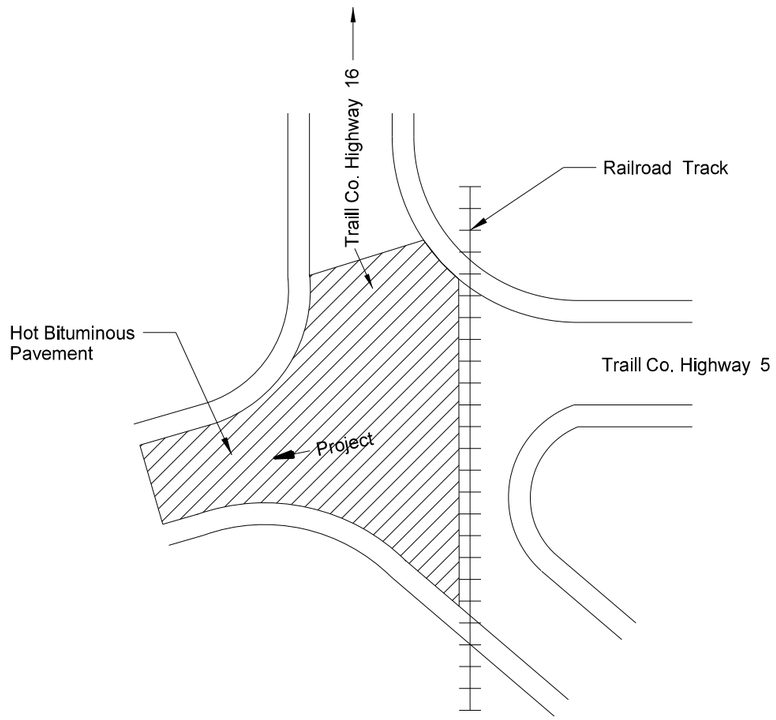
TRAILL CO. HIGHWAY 9
Sta. 113+40



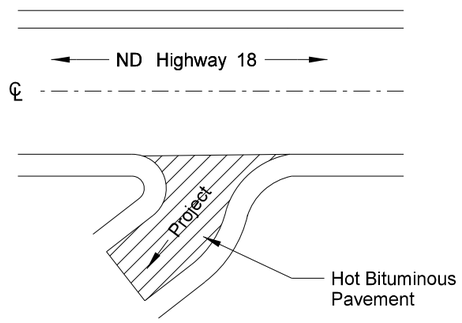
PRIVATE AND SECTION DRIVES



FIELD DRIVES



TRAILL CO. HIGHWAY 16
Sta. 113+10



ND HIGHWAY 9
Sta. 335+90

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SC-4924(055)
TRAILL COUNTY, NORTH DAKOTA

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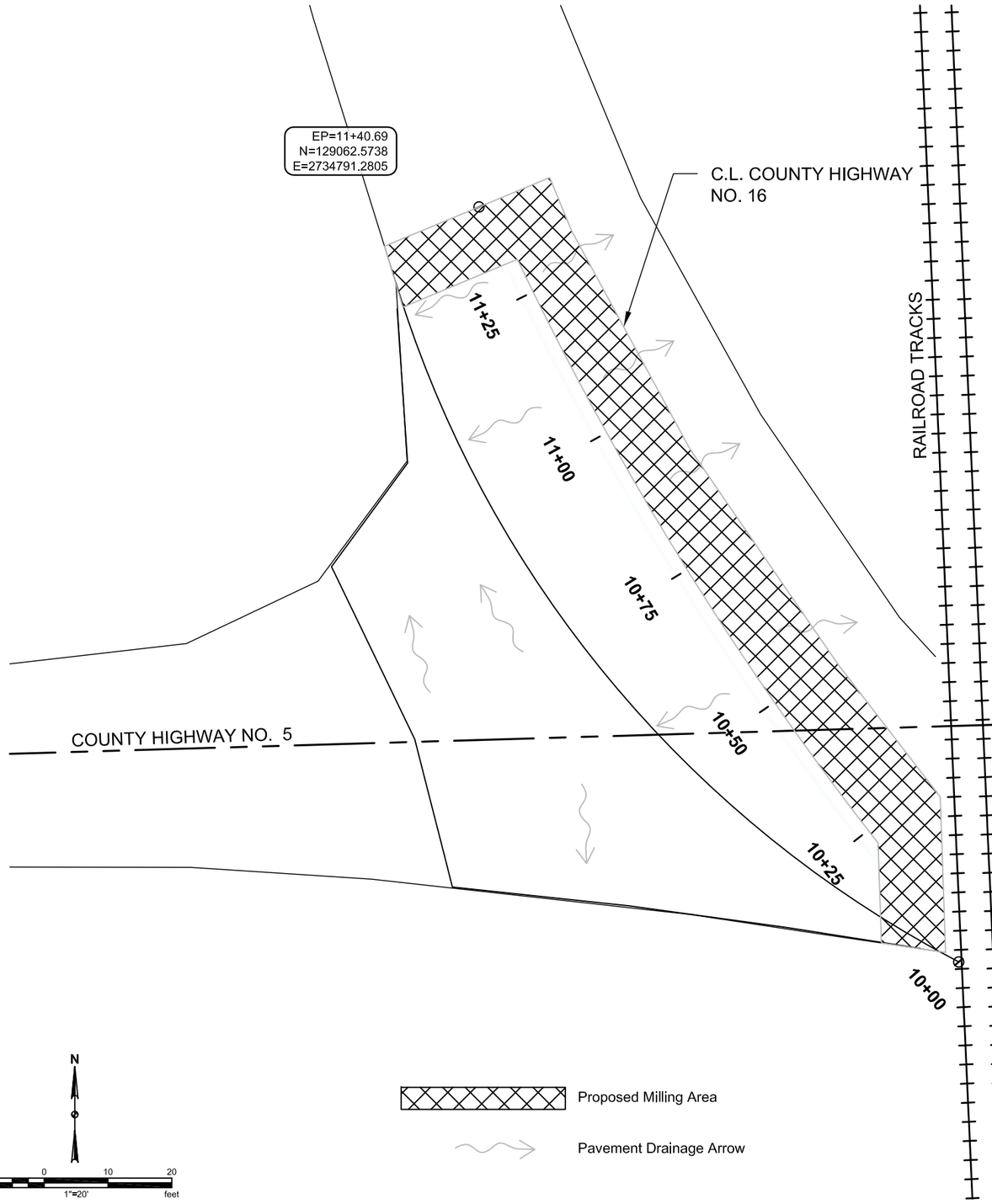
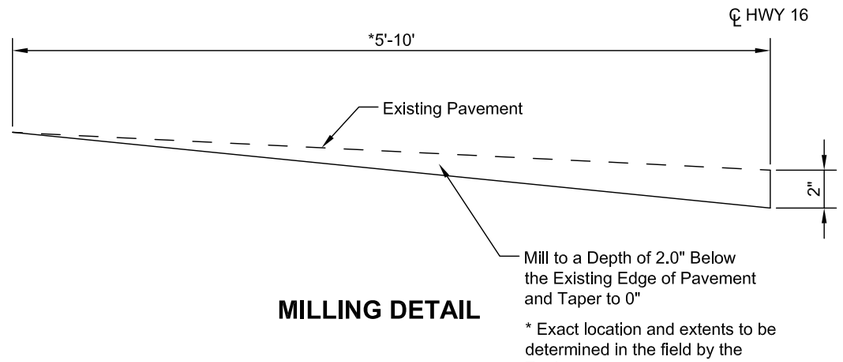
INTERSECTION DETAILS

DRWN. BY	CHK'D. BY	PROJECT NO.
AM	ML	14313102

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SC-4924(055)	20	3





MILLING DETAIL

* Exact location and extents to be determined in the field by the Engineer.

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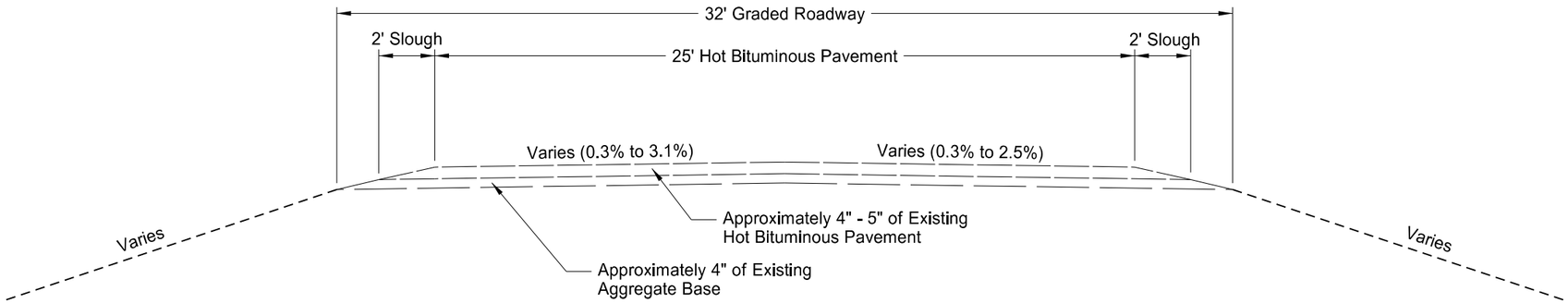
SC-4924(055)
TRAILL COUNTY, NORTH DAKOTA

COUNTY HIGHWAY 5 INTERSECTION DETAIL

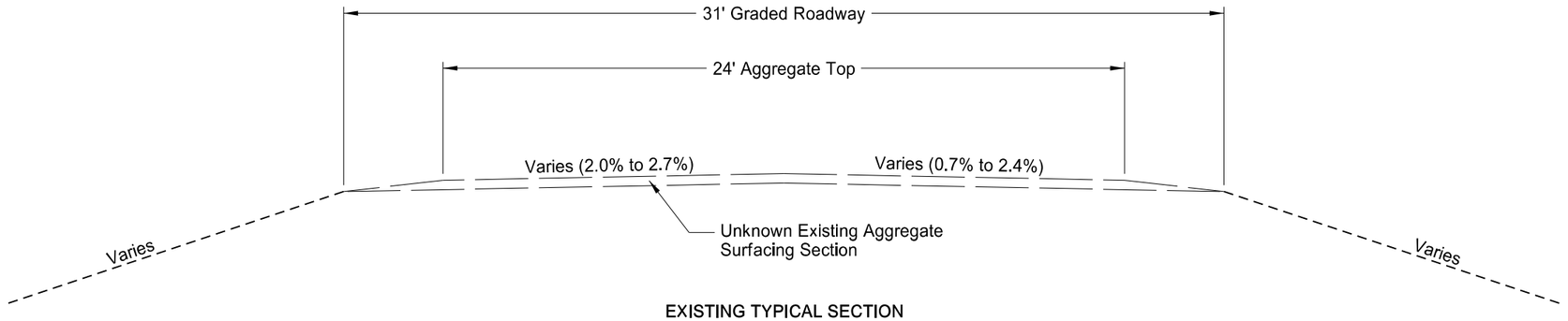
DRWN. BY	CHKD BY	PROJECT NO.
KS	JL	14313102

Aug 29, 2013 - 12:01pm - J:\trans\14313102\CADD\Base\14313102-INTERSECTION DETAIL.dwg

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SC-4924(055)	30	1



EXISTING TYPICAL SECTION
STA 10+00 TO STA 113+10 (COUNTY HIGHWAY 5)
STA 113+40 TO STA 335+90 (COUNTY HIGHWAY 9)



EXISTING TYPICAL SECTION
STA 400+12 TO STA 412+45 (COUNTY HIGHWAY 14)

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SC-4924(055)
TRAILL COUNTY, NORTH DAKOTA

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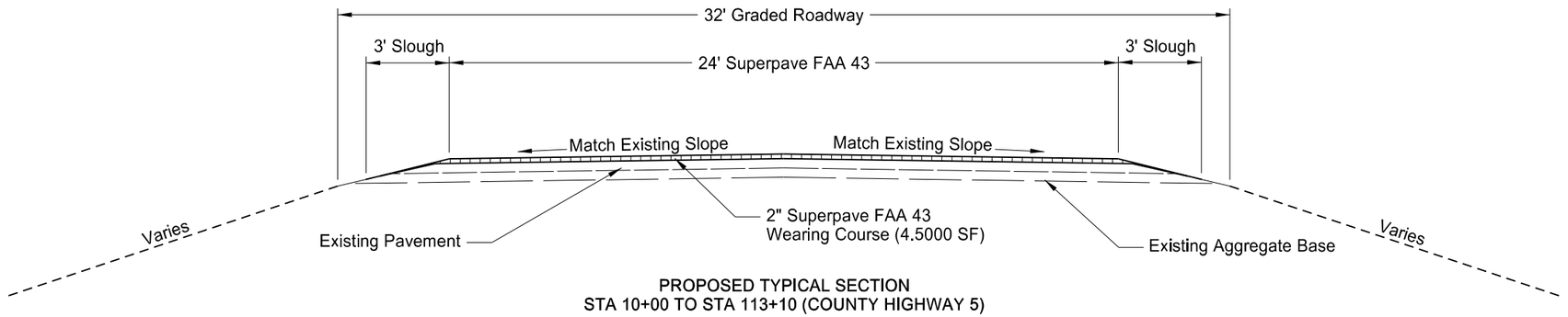
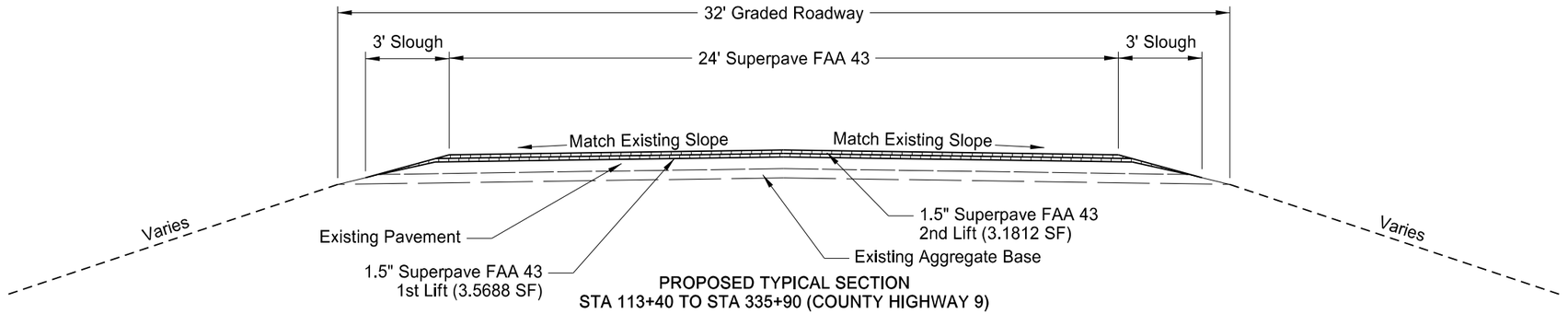
EXISTING TYPICAL SECTIONS

DRWN. BY	CHK'D. BY	PROJECT NO.
ML	JL	14313102

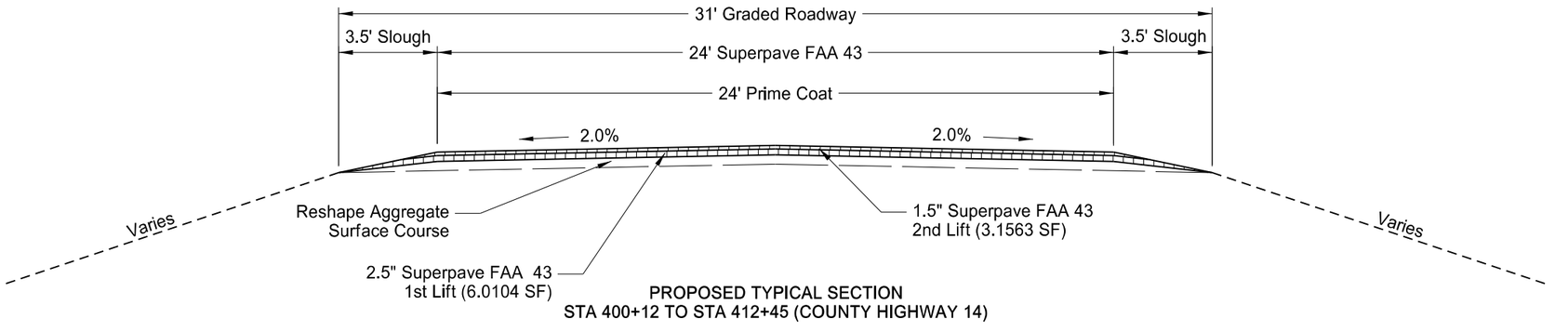
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SC-4924(055)	30	2



PROPOSED TYPICAL SECTION
STA 10+00 TO STA 113+10 (COUNTY HIGHWAY 5)



PROPOSED TYPICAL SECTION
STA 113+40 TO STA 335+90 (COUNTY HIGHWAY 9)



PROPOSED TYPICAL SECTION
STA 400+12 TO STA 412+45 (COUNTY HIGHWAY 14)

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SC-4924(055)
TRAILL COUNTY, NORTH DAKOTA

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PROPOSED TYPICAL SECTIONS

DRWN. BY	CHK'D. BY	PROJECT NO.
ML	JL	14313102

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SC-4924(055)	100	1

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED CO HWY 5 & 9	AMOUNT REQUIRED CO HWY 14	TOTAL AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB-TOTAL
D3-36	36"x6"	STREET NAME SIGN (Sign and installation only)	-	-	-	6	-
G20-1a-60	**60"x24"**	**ROAD WORK NEXT __ MILES**	**4**	**-**	**4**	**34**	**136**
G20-1b-60	60"x24"	WORK IN PROGRESS/ NO WORK IN PROGRESS (Sign and installation only)	-	-	-	26	-
G20-2a-48	**48"x24"**	**END ROAD WORK**	**4**	**-**	**4**	**19**	**76**
G20-4-36	**36"x18"**	**PILOT CAR FOLLOW ME**	**1**	**-**	**1**	**18**	**18**
G20-10-108	108"x48"	CONTRACTOR SIGN	-	-	-	64	-
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**	**-**	**6**	**30**	**180**
G20-55-96	96"x48"	SPEED LIMIT ENFORCED - MINIMUM FEE $80 WHEN WORKERS PRESENT	-	-	-	59	-
M1-1-36	36"x36"	ROUTE MARKER (Post and installation only)	-	-	-	10	-
M1-4-24	24"x24"	ROUTE MARKER (Post and installation only)	-	-	-	10	-
M1-5-24	24"x24"	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	-	-	-	32	-
R1-1a-18	**18"x18"**	**STOP and SLOW PADDLE Back to Back**	**2**	**-**	**2**	**5**	**10**
R1-2-60	60"x60"	YIELD	-	-	-	29	-
R2-1-48	48"x60"	SPEED LIMIT __	-	-	-	39	-
R2-1a-24	24"x18"	MINIMUM FEE $80 (Mounted on Speed Limit post)	-	-	-	10	-
R3-7-48	48"x48"	LEFT or RIGHT LANE MUST TURN LEFT or RIGHT	-	-	-	35	-
R4-1-48	**48"x60"**	**DO NOT PASS**	**2**	**-**	**2**	**39**	**78**
R4-7-48	48"x60"	KEEP RIGHT SYMBOL	-	-	-	39	-
R5-1-48	48"x48"	DO NOT ENTER	-	-	-	35	-
R6-1-36	36"x12"	ONE WAY RIGHT or LEFT	-	-	-	13	-
R7-1-12	12"x18"	NO PARKING	-	-	-	11	-
R10-6-24	24"x36"	STOP HERE ON RED	-	-	-	16	-
R11-2-48	**48"x30"**	**ROAD CLOSED**	**-**	**2**	**2**	**28**	**56**
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	-
W3-1a-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**	**-**	**2**	**35**	**70**
W3-5-48	48"x48"	SPEED REDUCTION AHEAD	-	-	-	35	-
W4-2-48	48"x48"	RIGHT or LEFT LANE TRANSITION SYMBOL	-	-	-	35	-
W5-1-48	48"x48"	ROAD NARROWS	-	-	-	35	-
W5-8-48	48"x48"	THRU TRAFFIC RIGHT LANE	-	-	-	35	-
W5-9-48	48"x48"	ROAD WORK TRAFFIC ONLY DOWN & LT or RT ARROW	-	-	-	35	-
W6-3-48	48"x48"	TWO WAY TRAFFIC SYMBOL	-	-	-	35	-
W8-1-48	**48"x48"**	**BUMP**	**6**	**-**	**6**	**35**	**210**
W8-3-48	48"x48"	PAVEMENT ENDS	-	-	-	35	-
W8-7-48	48"x48"	LOOSE GRAVEL	-	-	-	35	-
W8-9a-48	48"x48"	SHOULDER DROP-OFF	-	-	-	35	-
W8-11-48	**48"x48"**	**UNEVEN LANES**	**2**	**-**	**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**	**-**	**2**	**35**	**70**
W8-55-48	48"x48"	TRUCKS CROSSING AHEAD or __ FT.	-	-	-	35	-
W8-56-48	48"x48"	TRUCKS EXITING HIGHWAY	-	-	-	35	-
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL	-	-	-	35	-
W12-2-48	48"x48"	LOW CLEARANCE SYMBOL	-	-	-	35	-
W13-1-24	24"x24"	__ MPH ADVISORY SPEED PLATE (Mounted on warning sign post)	-	-	-	11	-
W13-4-48	48"x60"	RAMP ARROW	-	-	-	39	-
W14-3-48	48"x36"	NO PASSING ZONE	-	-	-	23	-
W20-1-48	**48"x48"**	**ROAD WORK AHEAD or _FT or _ MILE**	**6**	**-**	**6**	**35**	**280**
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.	-	-	-	35	-
W20-5-48	48"x48"	RIGHT or LEFT LANE CLOSED AHEAD or __ FT.	-	-	-	35	-
W20-7a-48	**48"x48"**	**FLAGGING SYMBOL**	**2**		**2**	**35**	**70**

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED HWY 5 & 9	AMOUNT REQUIRED CO RD 14	TOTAL AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB-TOTAL
W20-7k-24	**24"x18"**	**__ FEET (Mounted on warning sign post)**	**2**	**-**	**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)**	**2**	**-**	**2**	**12**	**24**
W21-1a-48	48"x48"	MEN WORKING SYMBOL	-	-	-	35	-
W21-2-48	48"x48"	FRESH OIL	-	-	-	35	-
W21-3-48	48"x48"	ROAD MACHINERY AHEAD or __ FT	-	-	-	35	-
W21-5-48	48"x48"	SHOULDER WORK	-	-	-	35	-
W21-5a-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED	-	-	-	35	-
W21-5b-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED AHEAD or __ FT.	-	-	-	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	-
W22-8-48	48"x48"	FRESH OIL LOOSE ROCK	-	-	-	35	-

SPEC & CODE

704-1000	**TRAFFIC CONTROL SIGNS**	**TOTAL UNITS**	**1,368**

	DESCRIPTION	QUANTITY CO HWY 5 & 9	QUANTITY CO HWY 14	UNIT	TOTAL QUANTITY
704-0100	**FLAGGING**	**250**		**MHR**	**250**
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**	**8**	**6**	**EACH**	**14**
704-1060	DELINEATOR DRUMS			EACH	
704-1065	TRAFFIC CONES			EACH	
704-1067	**TUBULAR MARKERS**	**200**		**EACH**	**200**
704-1070	DELINEATOR			EACH	
704-1072	FLEXIBLE DELINEATORS			EACH	
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	
704-1185	**PILOT CAR**	**125**		**HR**	**125**
704-3501	PORTABLE PRECAST CONCRETE MED BARRIER			LF	
704-3510	PRECAST CONCRETE MED BARRIER - STATE FURNISHED			EACH	
762-0200	RAISED PAVEMENT MARKERS			EACH	
762-0420	SHORT TERM 4IN LINE - TYPE R			LF	
762-0430	SHORT TERM 4IN LINE - TYPE NR			LF	
762-1500	OBLITERATION OF PVMT MK			SF	
772-2110	FLASHING BEACON - POST MOUNTED			EACH	

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SC-4924(055)

TRAILL COUNTY, NORTH DAKOTA

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TRAFFIC CONTROL DEVICE LIST

DRWN. BY	CHK'D BY	PROJECT NO.
ML	JL	14313102

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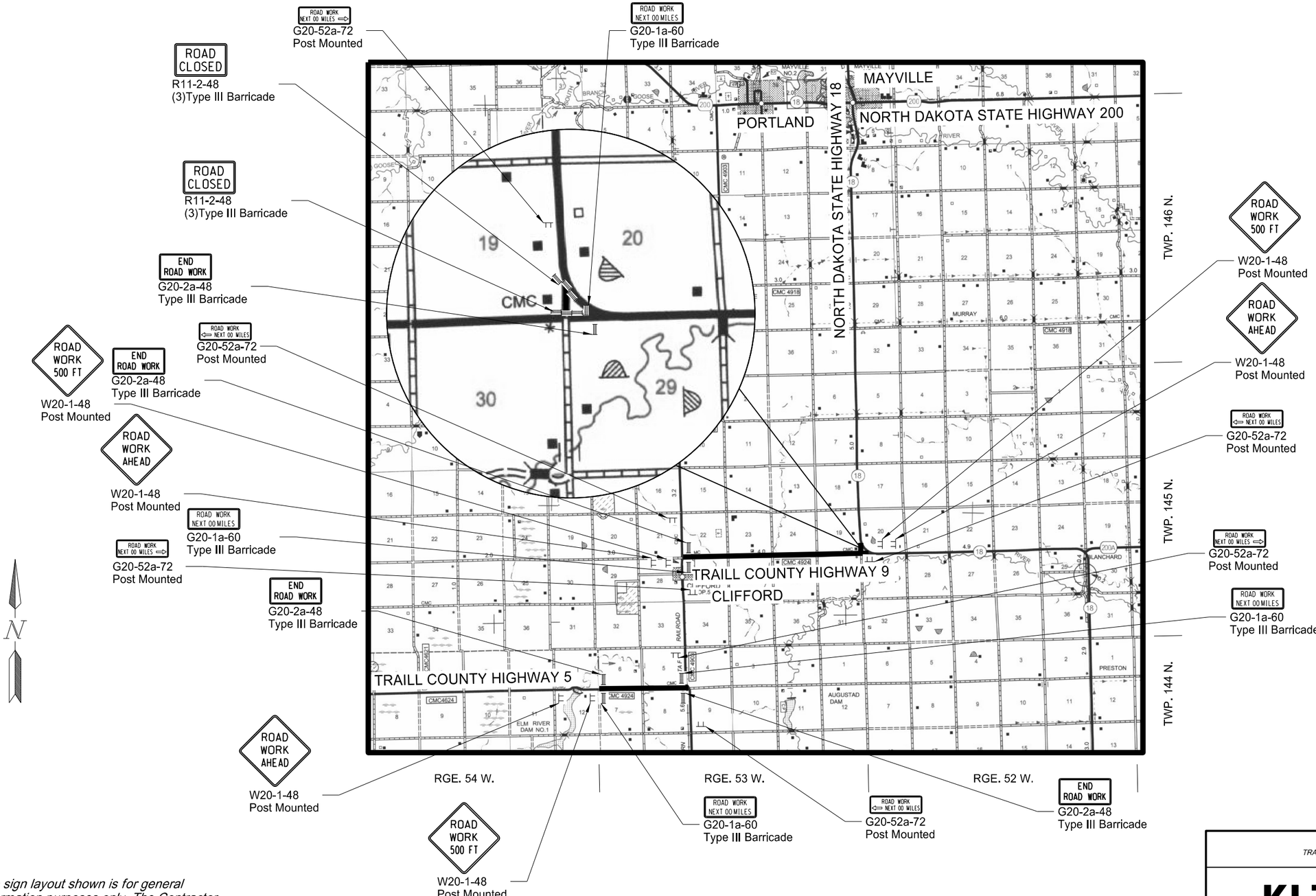
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SC-4924(055)	100	2



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

This document was originally issued and sealed by Matt Lange, Registration Number PE- 6870, on 08/29/13 and the original document is stored at the office of Kadrmas, Lee & Jackson.

SC-4924(055)
TRAILL COUNTY, NORTH DAKOTA

KLJ

TRAFFIC CONTROL SIGNING LAYOUT

DRWN. BY	CHK'D. BY	PROJECT NO.
ZV	AM	14313102

NDDOT ABBREVIATIONS

D-20-1

Abn	abandoned
Abut	abutment
Ac	acres
Adj	adjusted
Aggr	aggregate
Ahd	ahead
ARV	air release valve
Align	alignment
Al	alley
Alt	alternate
Alum	aluminum
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
BLM	Bureau of Land Management
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
FHWA	Federal Highway Administration
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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
06-15-10	
REVISIONS	
DATE	CHANGE
04-20-11 03-15-13	Added Items Added Items

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NDDOT ABBREVIATIONS

D-20-2

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
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
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
NDDOT	North Dakota Department of Transportation
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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
06-15-10	
REVISIONS	
DATE	CHANGE
04-20-11	Added Items
03-15-13	Added Items

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NDDOT ABBREVIATIONS

D-20-3

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
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
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
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
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
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	
06-15-10	
REVISIONS	
DATE	CHANGE
04-20-11 03-15-13	Added Items Added Items

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NDDOT UTILITY COMPANY ABBREVIATIONS

D-20-10

702COM	702 Communications
ACCENT	Accent Communications
AGASSIZ WU	Agassiz Water Users Incorporated
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
BASIN ELEC	Basin Electric Cooperative Incorporated
BEK TEL	Bek Communications Cooperative
BELLE PL	Belle Fourche Pipeline Company
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 PWR ELEC	Central Power Electric Cooperative
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
FALK MNG	Falkirk Mining Company
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
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 WRD	McKenzie County Water Resource District
MCKNZ ELEC	McKenzie Electric Cooperative
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
MRE LBTY TEL	Moore & Liberty Telephone
MOR-GRAN-SOU ELEC	Mor-gran-sou Electric Cooperative
MOUNT-WILLI ELEC	Mountrail-williams Electric Cooperative
MUNICIPAL	City Of '.....'
MUNICIPAL	City Water And Sewer
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
OTTR TL PWR	Otter Tail Power Company
P L E M	Prairielands Energy Marketing
POLAR COM	Polar Communications
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
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
STUT RWU	Stutsman Rural Water Users
T M C	Turtle Mountain Communications
TCI	TCI of North Dakota
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
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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
6-15-10	
REVISIONS	
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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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
4-20-11	
REVISIONS	
DATE	CHANGE

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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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
4-20-11	
REVISIONS	
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Symbols

D-20-30

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
4-20-11	
REVISIONS	
DATE	CHANGE

This document was originally issued and sealed by Roger Weigel, Registration Number PE- 2930 , on 4/20/11 and the original document is stored at the North Dakota Department of Transportation

Symbols

D-20-31

- 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
- Existing Monument Found
- Existing Monument set
- Existing RW Property Monument Found
- Existing RW PropertyMonument set
- Existing Object Marker Type I
- Existing Object Marker Type II
- Existing Object Marker Type III
- Existing Electrical Pedestal
- Existing Telephone Pedestal
- Existing Fiber Optic Telephone Pedestal
- Existing TV Pedestal
- Existing Fiber Optic TV Pedestal
- Existing Fuel Filler Pipes
- Existing Traverse PI Aerial Panel
- Existing Pole
- Existing Power Pole
- Existing Power Pole with Transformer
- Existing Telephone Pole
- Existing Wood Pole
- Existing Post
- Existing Pedestrian Push Button Post
- Existing Control Point CP
- Existing Control Point GPS-RTK
- Existing Control Point TRI
- Existing Reference Marker Point NGS
- Existing Pull Box
- Existing Intelligent Transportation Pull Box
- Existing Water Pump
- Existing Slotted Reinforced Concrete Pipe
- Existing RR Profile Spot
- Existing Fuel Leak Sensors
- Existing Highway Sign
- Existing Miscellaneous Spot
- Existing Lighting Standard Pole
- Existing Traffic Signal Standard
- Existing Transformer
- Existing Large Evergreen Tree
- Existing Small Evergreen Tree
- Existing Large Tree
- Existing Small Tree
- Existing Tree Trunk
- Existing Pad Mounted Traffic Signal Control Box
- Existing Undefined Manhole
- Existing Undefined Pull Box
- Existing Undefined Pedestal
- Existing Undefined Valve
- Existing Undefined Pipe Vent
- Existing Gas Valve
- Existing Water Valve
- Existing Fuel Pipe Vent
- Existing Gas Pipe Vent
- Existing Sanitary Pipe Vent
- Existing Storm Drain Pipe Vent
- Existing Water Pipe Vent
- Existing Weather Station
- Existing Ground Water Well Bore Hole
- Existing Windmill or Tower
- Existing Witness Corner
- Flashing Beacon
- Flagger
- Pipe Mounted Flasher
- Sanitary Force Main with Valve

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
4-20-11	
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Symbols

D-20-32

- 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
- Concrete Monument to Be Set
- RW Property Monument to Be Set
- Object Marker Type I
- Object Marker Type II
- Object Marker Type III
- Caution Mode Arrow Panel
- Back to Back Vertical Panel Sign
- Double Direction Arrow Panel
- Left Directional Arrow Panel
- Right Directional Arrow Panel
- Sequencing Arrow Panel
- Truck Mounted Arrow Panel
- Power Pole
- Wood Pole
- Pedestrian Push Button Post
- Property Corner
- Pull Box
- Intelligent Transportation Pull Box
- Sanitary Pump
- Storm Drain Pump
- Reinforced Pavement
- Reinforced Concrete End Section 15 Inch
- Reinforced Concrete End Section 18 Inch
- Reinforced Concrete End Section 24 Inch
- Reinforced Concrete End Section 30 Inch
- Reinforced Concrete End Section 36 Inch
- Reinforced Concrete End Section 42 Inch
- Reinforced Concrete End Section 48 Inch
- Reinforced Concrete End Section 54 Inch
- Reset Right of Way Marker
- Reset USGS Marker
- Right of Way Markers
- Riser 30 Inch
- Continuous Split Barrel Sample (CSB)
- Flight Auger Sample (FA)
- Split Barrel Sample (SB)
- Thinwall Tube Sample
- Highway Sign
- SNOW GATE 18 FT
- SNOW GATE 28 FT
- SNOW GATE 40 FT
- Standard Penetration Test (N)
- Transformer
- Inclinometer Tube (Incl)
- Underdrain Cleanout
- Excavation Unit
- Water Valve

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
4-20-11	
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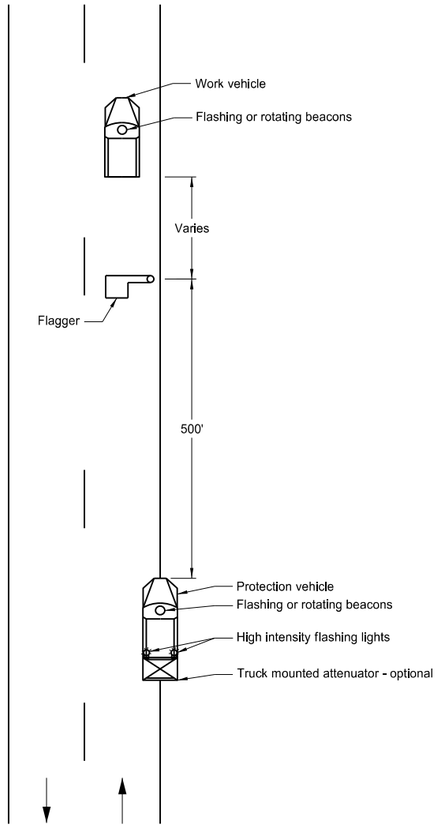
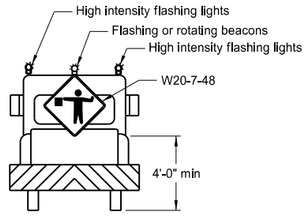
TRAFFIC CONTROL FOR CORING OF HOT BITUMINOUS PAVEMENT

D-704-2

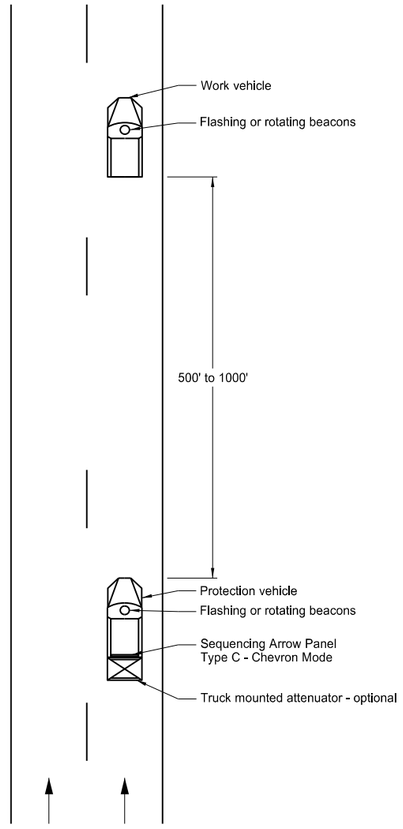
Two Lane, Two Way Roadways

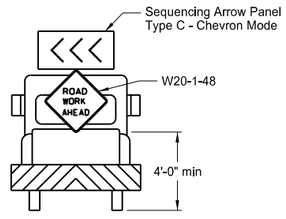




Typical Protection Vehicle

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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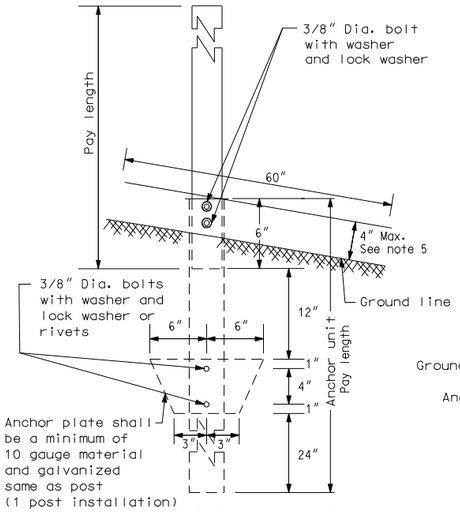
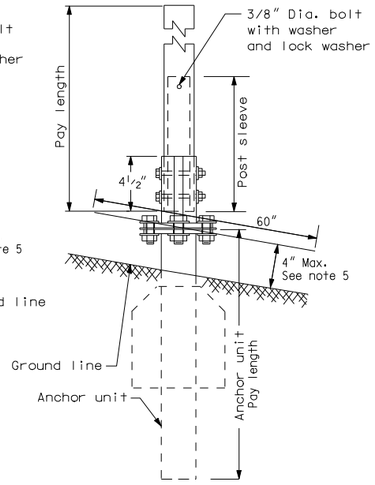
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

PERFORATED TUBE

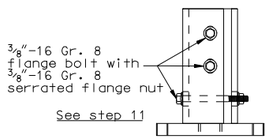
D-704-7

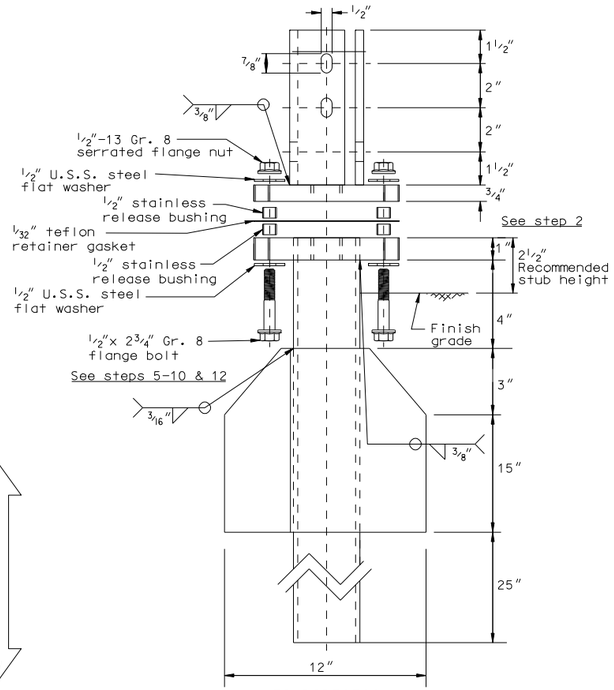


ANCHOR UNIT AND POST ASSEMBLY

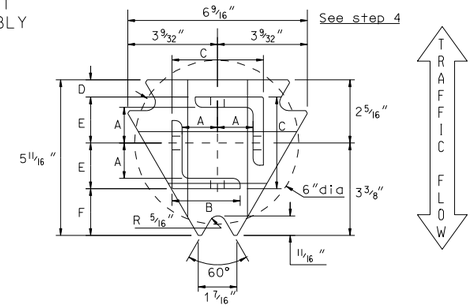


SLIP BASE ANCHOR UNIT AND POST SLEEVE ASSEMBLY





MULTI-DIRECTIONAL SLIP BASE ASSEMBLY

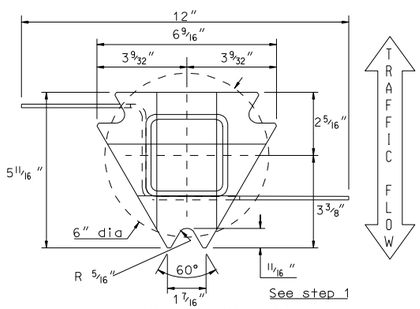


TOP POST RECEIVER

Materials: Plate - ASTM A572 grade 50
Angle receiver - $2\frac{1}{2}$"x $2\frac{1}{2}$"x $\frac{3}{8}$" ASTM A36 structural angle

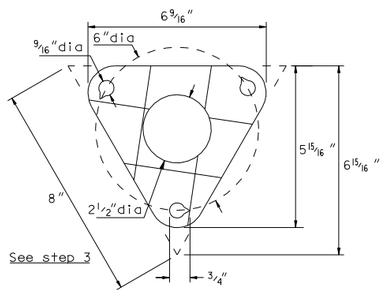
TOP POST RECEIVER DATA TABLE						
Square Post Sizes	A	B	C	D	E	F
2 3/16" x 10 Ga. Square Post	1 9/64"	2 1/2"	3 1/32"	25/32"	1 33/64"	1 7/8"
2 1/2" x 10 Ga. Square Post	1 9/32"	2 1/2"	3 5/16"	5/8"	1 21/32"	1 3/4"

$2\frac{3}{16}$" x 10 gauge may be inserted into $2\frac{1}{2}$" x 10 gauge for additional wind load.



BOTTOM SOIL STUB

Materials: Tube - 3"x 3"x 7 gauge ASTM A500 Gr B tube
Stabilizing Wing - 7 gauge H.R.P.O. ASTM A 569
Plate - ASTM A572 grade 50



BOLT RETAINER FOR BASE CONNECTION

Materials: 1/32" reprocessed Teflon

Notes
1. Slip base bolts shall be torqued as specified by the manufacturer.
2. The $2\frac{3}{16}$" size 10 gauge is shown as 2.19" size on the plans. The $2\frac{1}{2}$" size 10 gauge is shown as 2.51" size on the plans.
3. Anchor for 2", $2\frac{1}{4}$", and $2\frac{1}{2}$" posts.
4. Anchor material shall be 7 gauge H.R.P.O. Commercial quality ASTM A569 and 3"x 3"x 7 gauge ASTM A500 Grade B. Anchor shall have a yield strength of 43.9 KSI and tensile strength of 59.3 KSI. Anchor shall be hot dipped galvanized per ASTM A123/A153. All tolerances on anchor unit and slip base bottom assembly are ± 0.005 unless otherwise noted.
5. 4" vertical clearance of anchor or breakaway base. The 4" x 60" measurement shall be made above and below post location and also back and ahead of post.
6. When used in concrete sidewalk, anchor shall be the same except without the wings.
7. Four post signs shall have over 8' between the first and fourth posts.

MULTI-DIRECTIONAL SLIP BASE ASSEMBLY	
STEP	INSTALLATION PROCEDURE
1.	Install bottom soil anchor stub plumb and squared up with road, with point of plate facing oncoming traffic.
2.	Depth of imbedment to leave $2\frac{1}{2}$" from grade to top of anchor plate.
3.	Place teflon bolt retainer gasket on top of bottom plate (make sure that notches in holes are pointing counter clockwise).
4.	Place top post receiver on to retainer gasket, properly indexed so that angle receivers are squared up with road.
5.	Slide 1 each $\frac{1}{2}$" flat washer on to 1 each inverted $\frac{1}{2}$"-13 gr. 8 flange bolt, followed by 1 each stainless steel release bushing.
6.	Insert above bolt with washer and bushing up through notched points of top and bottom plates, passing through hole in gasket.
7.	Slide second bushing down on to above bolt until it rests on top of gasket followed by second washer.
8.	Complete by threading $\frac{1}{2}$"-13 gr. 8 serrated flange nut snugly down against top of washer.
9.	Repeat steps 5,6,7 & 8 at the two remaining notched triangle points.
10.	Insert sign post into angle receivers on top half until post(s) bottom out. *NOTE: Where higher wind load is desired, insert the next size smaller square post inside bottom of main upright post (Minimum of 48", not to exceed beyond bottom edge of sign).
11.	Secure posts into receivers using 3 each $\frac{3}{8}$"-16 gr. 8 flange bolts and 3 each $\frac{3}{8}$"-16 serrated flange nuts in receiver slots (top 2 bolts should be parallel to highway) do not tighten nuts until all bolts are in place.
12.	After all sub-assembly hardware is tightened, then torque the three $\frac{1}{2}$"-13 nuts to 42 ft-lbs, in a circular pattern until all bolt assemblies reach the required torque. *NOTE: On multi-leg installations, be sure that all anchors are squared and lined up with each other.

Telescoping Perforated Tubes							
Tube Size In.	Wall Thickness In.	U.S. Standard Gauge	Weight Per Foot Lbs.	Moment of Inertia In.^{4}	Cross Sect. area In.^{2}	Section Modulus In.^{3}
1 1/2 x 1 1/2	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2 1/4 x 2 1/4	0.105	12	2.773	0.561	0.695	0.499
2 3/16 x 2 3/16	0.135	10	3.432	0.605	0.841	0.590
2 1/2 x 2 1/2	0.105	12	3.141	0.804	0.803	0.643
2 1/2 x 2 1/2	0.135	10	4.006	0.979	1.010	0.785
4 x 4	0.250	1/4	6.600	3.040	1.940	1.050

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

B - The $2\frac{1}{2}$", 12 gauge posts do not need breakaway bases when placed in standard soils, but require a shim as specified by the manufacturer. The breakaway base is required when the support is placed in weak soils. The Engineer shall determine if the soils are weak. Weak soils are classified as boggy, wet, or loose soil areas.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-21-02	
REVISIONS	
DATE	CHANGE
12-01-04	PE stamp added

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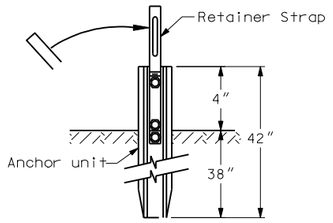
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8

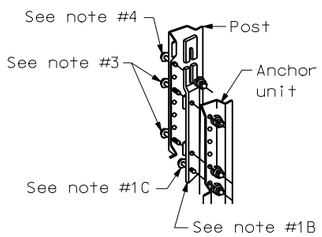
FLANGED CHANNEL



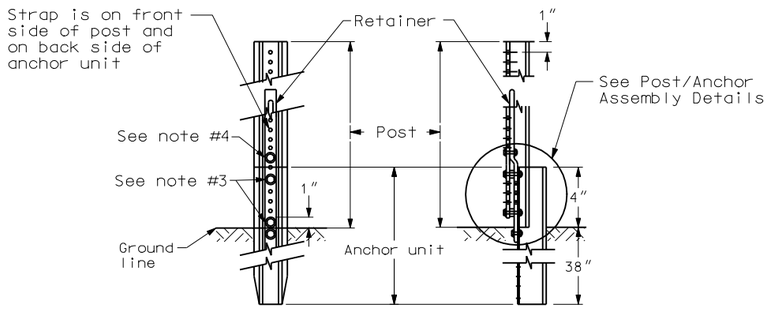
Anchor Unit &
Strap Assembly Detail

STEPS OF INSTALLATION

1. A) Drive anchor unit to within 12″ of ground level.
   B) Proper assembly established by lining up the top 3/4″ slot of retainer spacer strap with top hole of anchor unit.
   C) Assemble strap to back of anchor unit using 3/8″-16 UNC x 2.0″ long bolt, lock washer and nut.
   D) Rotate strap 90° to left.
2. A) Drive anchor unit to 4″ dimension.
   B) Rotate strap to vertical position.
3. A) Place 3/8″-16 UNC x 2″ bolt, lock washer & nut in bottom of sign post to facilitate alignment of sign post with proper hole in anchor unit (this coincides with the bottom 3/4″ slot in the strap).
   B) Alternately tighten two connector bolts.
4. A) Complete assembly by tightening 3/8″-16 UNC x 2″ long retainer bolt (this fastens sign post to retainer spacer strap).
5. The base post, strap & 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.

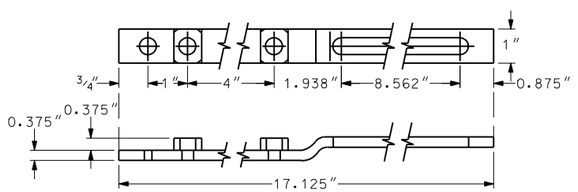


Post/Anchor
Assembly Details



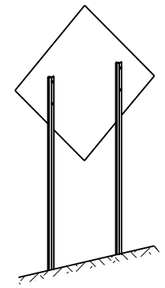
Front View Side View

Sign Post Assembly Detail

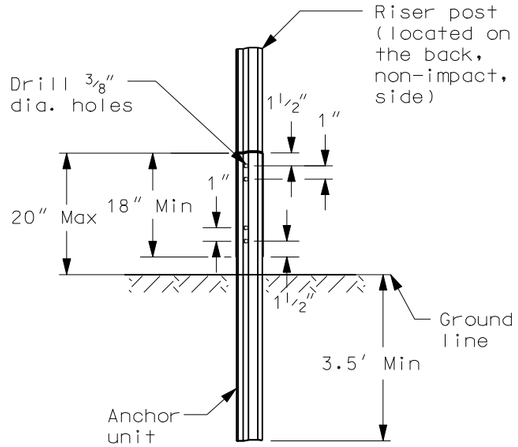


Retainer/Spacer Strap Detail

CHANNEL SIZE IN.	WALL THICKNESS IN.	WEIGHT PER FOOT LBS.	MOMENT OF INERTIA IN.4	CROSS SECT. AREA IN. SQ.	SECTION MODULUS IN.3
1.516 x 3.125"	.116	2.00	.179	.590	.225
1.532 x 3.125"	.124	2.25	.201	.648	.254
1.562 x 3.125"	.132	2.50	.233	.748	.289
1.578 x 3.125"	.140	2.75	.271	.819	.329
1.750 x 3.500"	.150	3.00	.372	.918	.403
1.750 x 3.500"	.175	4.00	.500	1.190	.560



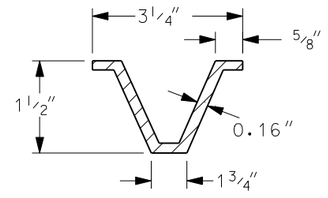
Typical
Installation



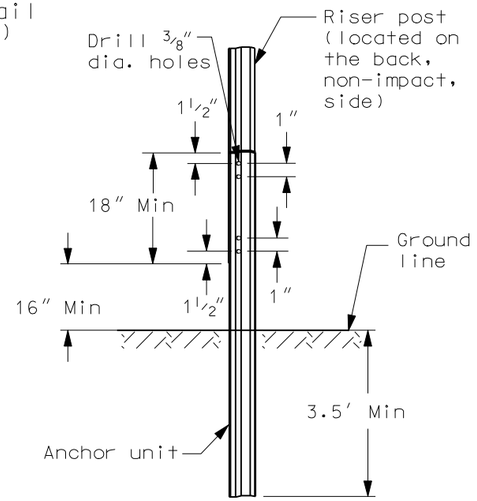
U-Channel Splice
Option 1

3 LB/FT U POSTS

Notes
1. Use 3 lb/ft riser anchor units and risers
2. Driven riser posts shall be at least 7′ long and embedded at least 3.5′.
3. A splice shall overlap a minimum of 18″.
4. Use 4 bolts 5/16″ diameter with washers and nuts. Two at top and two at bottom of splice.
5. Anchor unit for guy wires shall be no more than 4″ above ground and embedded at least 3.5′.



U-Post Detail
(3 lb/ft)



U-Channel Splice
Option 2

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-28-93	
REVISIONS	
DATE	CHANGE
03-07-01	Revised U-post details
11-21-02	Deleted perforated tube
05-08-03	Revised U-Channel splice
12-01-04	PE stamp added
06-29-05	Revised flanged channel note

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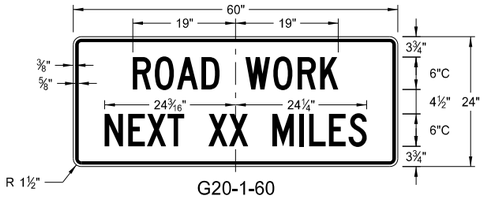
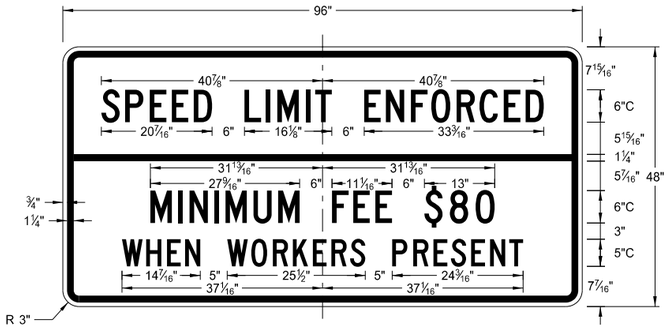
CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS



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

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



G20-55-96
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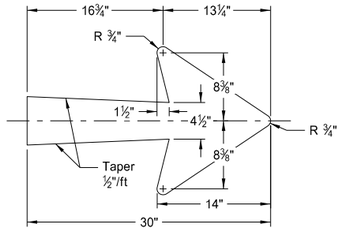
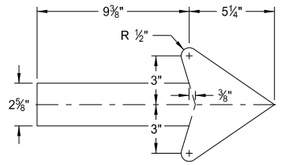
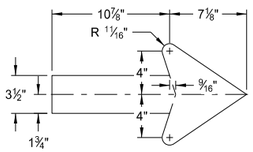


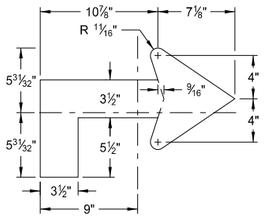
E5-1-48



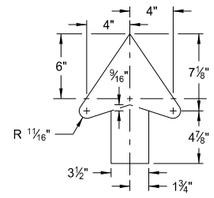
G20-50a-72
G20-52a-72



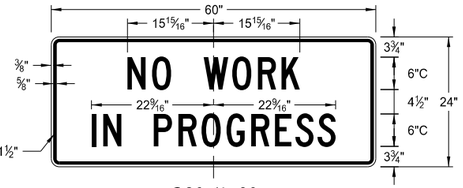
M4-9(L or R)-30
Right or Left



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



M4-9-30
Straight



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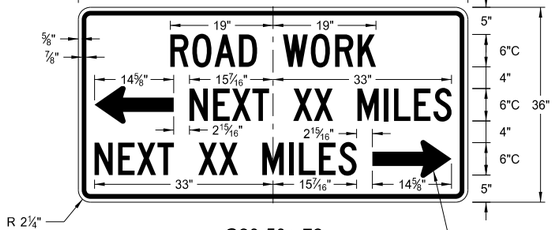

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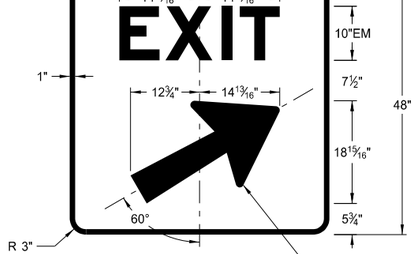
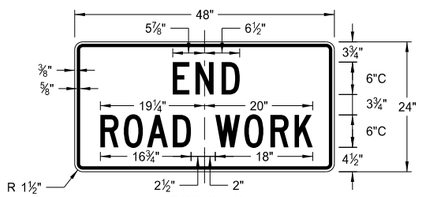


E5-1(L or R)-48
Legend: white
Background: green



G20-2-48
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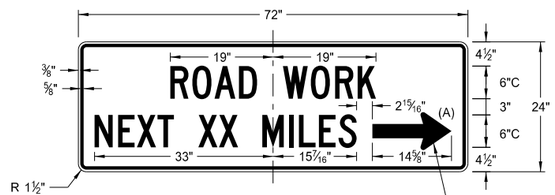
Background: orange



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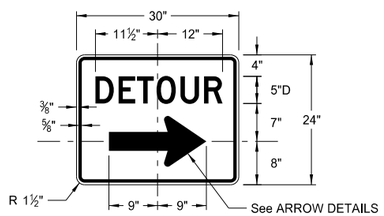

M4-9(L or R)-30 &
M4-9-30
Legend: black (non-refl)
Background: orange

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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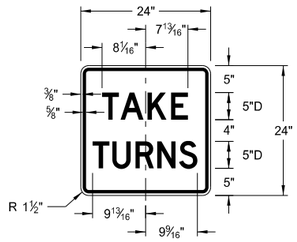
CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS



R1-50-24
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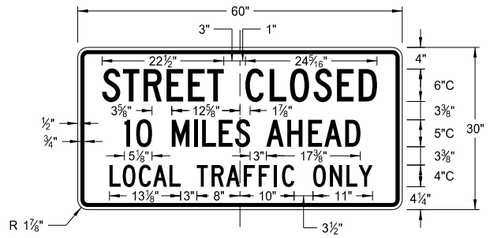
Background: white



R11-3c-60
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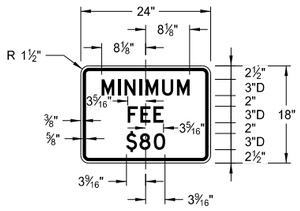
Background: white



R2-1a-24
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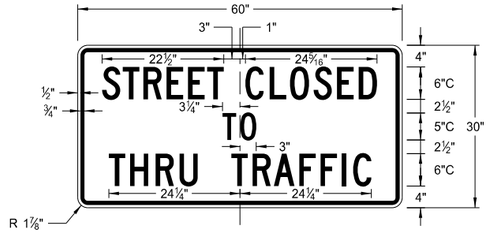

R11-4a-60
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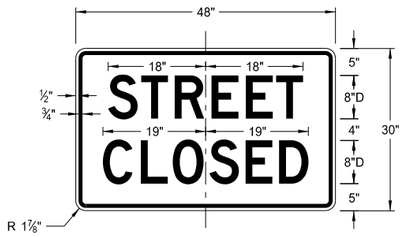

R11-2a-48
Legend: black (non-refl)
Background: white

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8-13-13	
REVISIONS	
DATE	CHANGE

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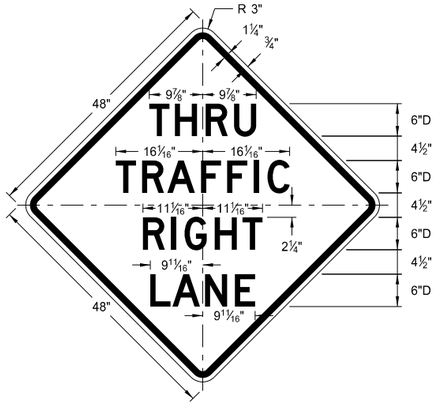
CONSTRUCTION SIGN DETAILS
WARNING SIGNS



W5-8-48
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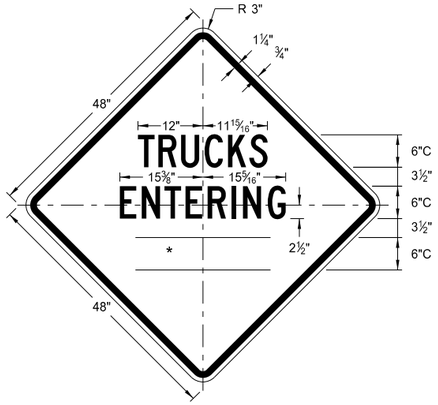
Background: orange



W8-54-48
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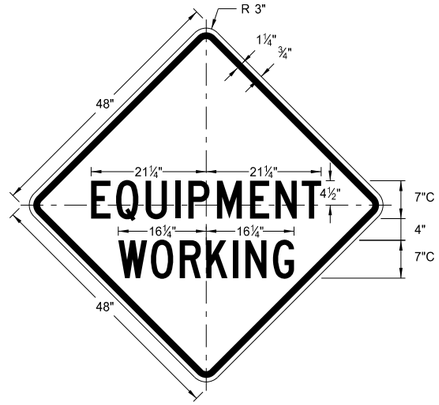
Background: orange



W20-51-48
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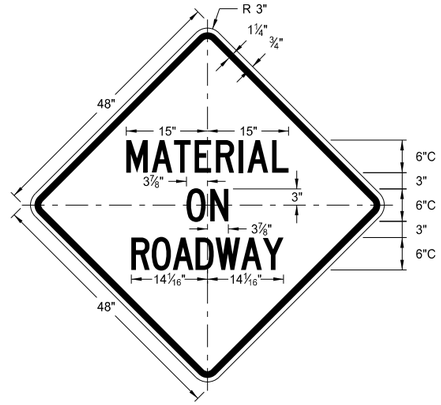
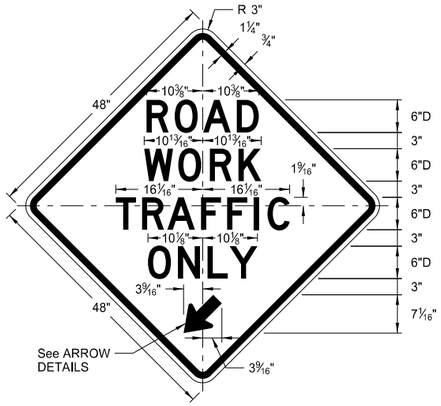
Background: orange



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
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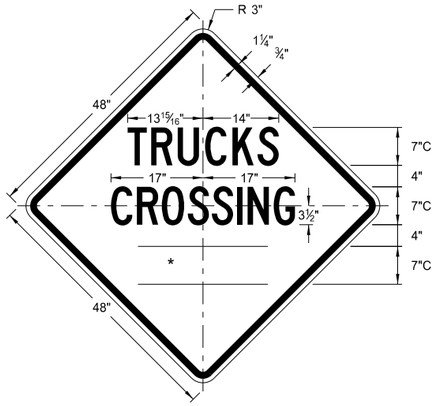
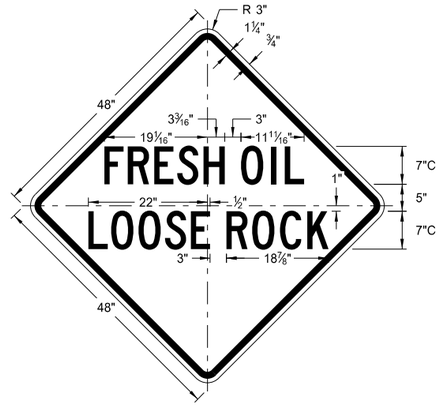
Background: orange



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

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



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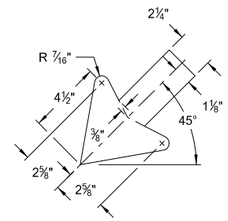
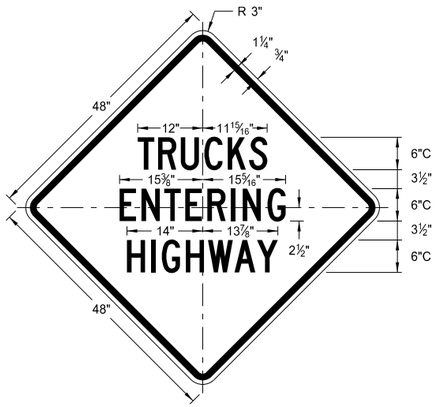


W5-9-48

ARROW DETAILS



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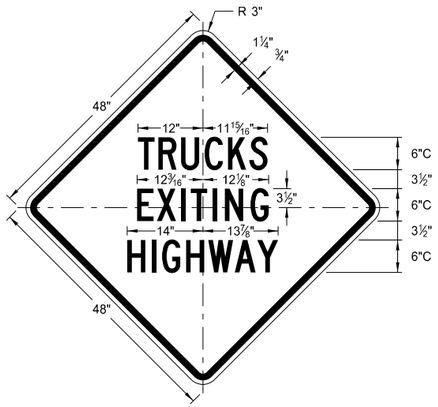

W8-56-48
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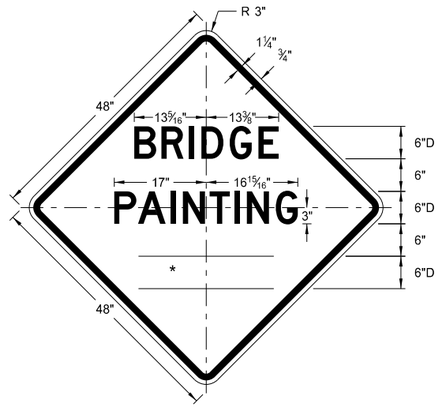
Background: orange



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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE

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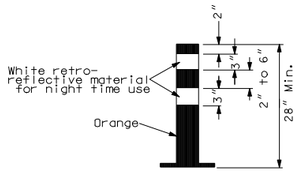
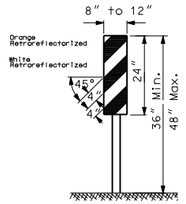
BARRICADE DETAILS AND CHANNELIZING DEVICES



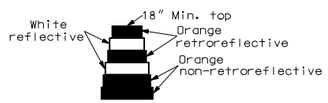
TUBULAR MARKER



VERTICAL PANEL

(Retroreflective sheeting shall be placed on both sides)

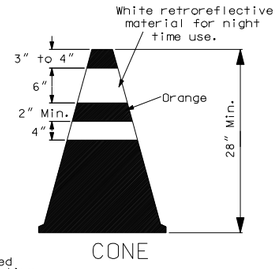
NOTE: Vertical panels used on the expressways or other high speed roadways shall be 12" by 24"



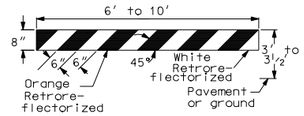
DELINEATOR DRUM

36" Min. height

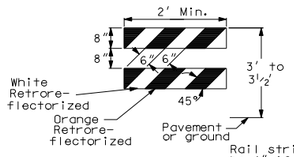
The markings on drums shall be orange and white stripes 4 to 6 inches wide. There shall be at least two orange and two white stripes. Where drums have ribs or indentations, there shall be no retroreflectorized sheeting in this area. This space shall be no more than 2 inches wide. The drum surface shall be prepared as recommended by the sheeting manufacturer before retro reflective sheeting is applied



CONE

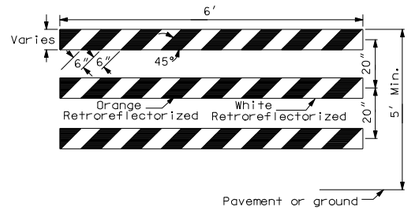


TYPE I BARRICADE



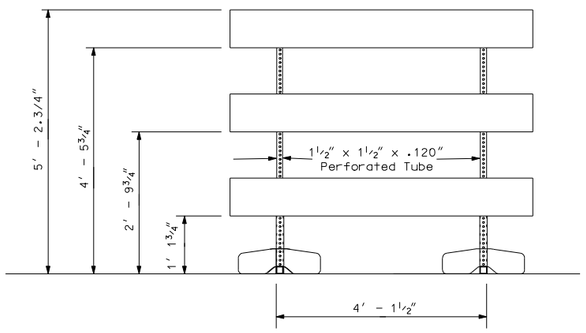
Rail stripe width shall be 4" if barricade length is less than 36".

TYPE II BARRICADE

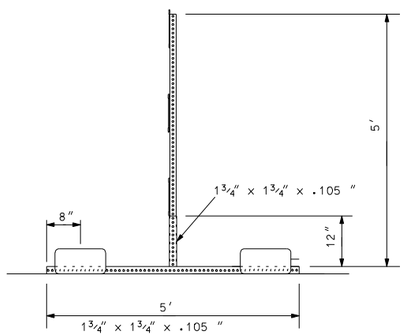


TYPE III BARRICADE

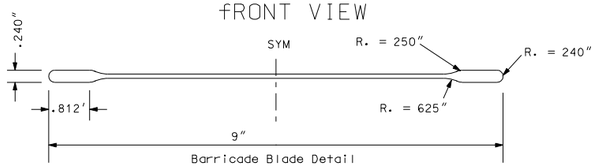
BARRICADES:
Number of retroreflectorized rail faces:
Type I - 2 (One each direction)
Type II - 4 (Two each direction)
Type III- 6 (Three in each direction)



FRONT VIEW



END VIEW



Barricade Blade Detail

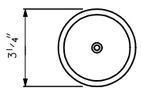
Ballast = 45lb sandbag at the end of each leg.

Barricade blade fastened to vertical supports with 2" corner bolts.

Vertical potion of leg is welded to horizontal portion on all four sides.

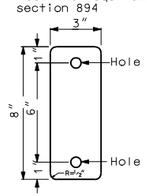
Masts slide inside vertical portion of legs. No bolts or fastenings devices used.

BARRICADE ASSEMBLY DETAIL
(Use when aluminum blade as detailed above)



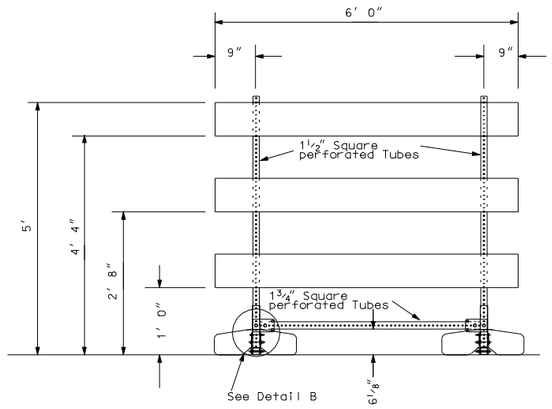
ACRYLIC PLASTIC REFLECTOR

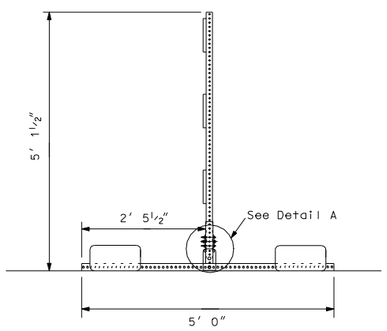
Delineator reflector shall meet the requirements of section 894

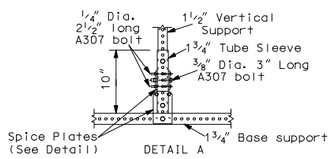


DELINEATOR REFLECTOR

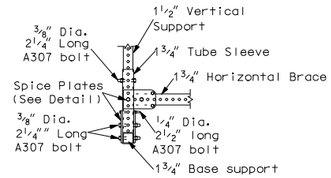
3"x8"- 18 Gauge galvanized steel sheet or 0.080" aluminum plate with white retroreflective sheeting (Type 3A or 3B) as specified in section 894 of the Standard Specifications.



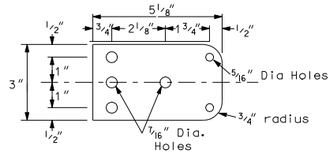




DETAIL A



DETAIL B



SPLICE PLATE

BARRICADE ASSEMBLY DETAIL
(Use when Plastic I-Beam w/ 1½" Hollow Core Flanges or 1" x 8" x72" wood boards.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-1-86	
REVISIONS	
DATE	CHANGE
08-03-87	Type sheeting
10-01-87	Delineator drum note
06-08-88	Barricade type III
06-01-92	General revision
06-10-93	General revision
09-23-93	Vertical panel
06-09-95	Reflective sheeting
03-01-02	Barricade type III assembly details
04-01-02	Type III barricade
12-01-04	PE stamp added
06-29-05	Revised Type II barricade stripe

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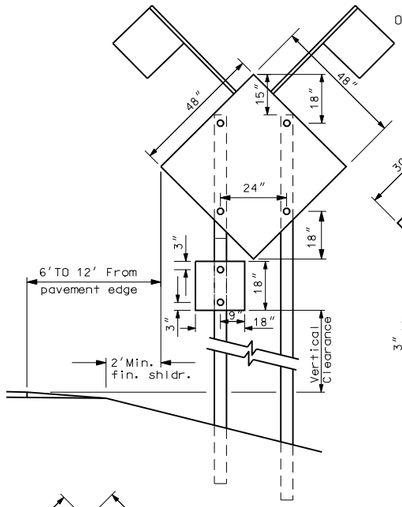
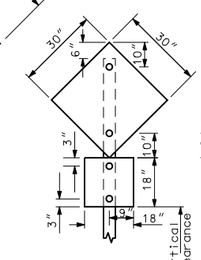
D-704-14

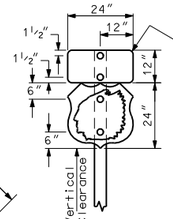
CONSTRUCTION SIGN AND BARRICADE ASSEMBLY DETAILS



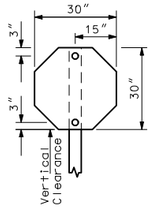
POST MOUNTING
48"x48" Signs



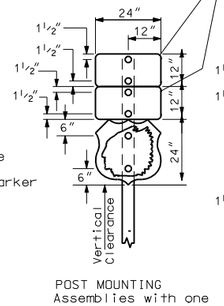
POST MOUNTING
30"x30" Signs



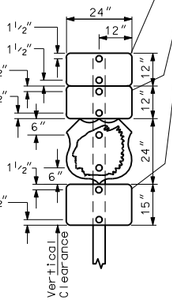
POST MOUNTING
Assemblies with one cardinal direction sign & one route marker



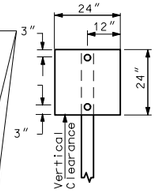
POST MOUNTING
Sign R1-1-30



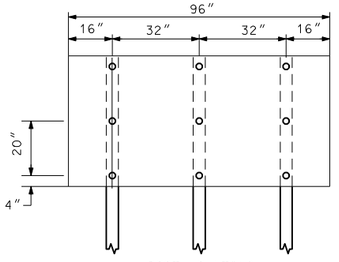
POST MOUNTING
Assemblies with one cardinal direction sign, one detour sign & one route marker



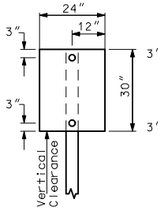
POST MOUNTING
Assemblies with one cardinal direction sign, one detour sign, one route marker & one directional arrow.



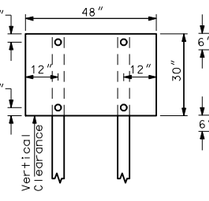
POST MOUNTING
24"x24" Signs



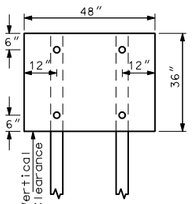
POST MOUNTING
48"x96" Signs



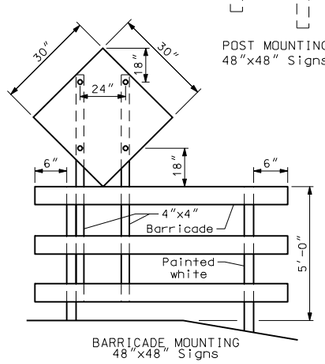
POST MOUNTING
24"x30" Signs



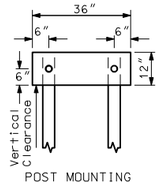
POST MOUNTING
48"x30" Signs



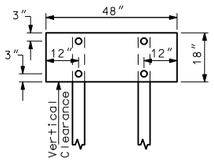
POST MOUNTING
48"x36" Signs



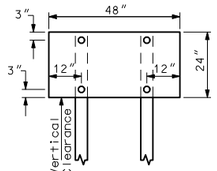
BARRICADE MOUNTING
48"x48" Signs



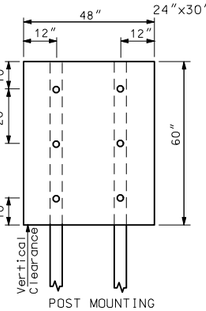
POST MOUNTING
36"x12" Signs



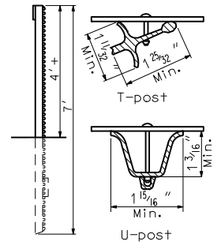
POST MOUNTING
48"x18" Signs



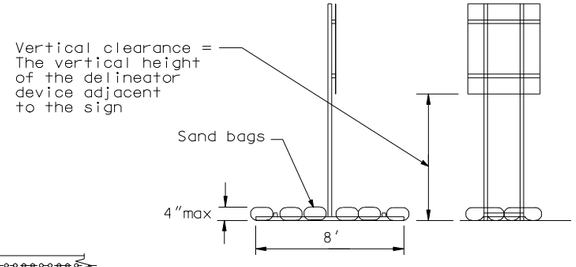
POST MOUNTING
48"x24" Signs



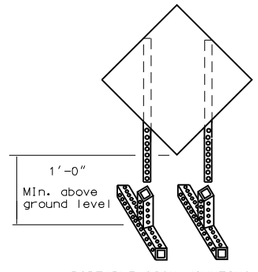
POST MOUNTING
48"x60" Signs



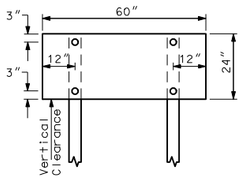
DELINEATOR ATTACHMENT AND POST MOUNTING DETAILS



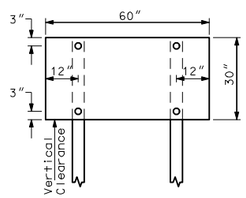
SKID MOUNTED SIGNS



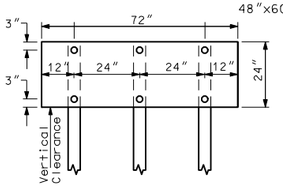
PORTABLE SIGN MOUNTING



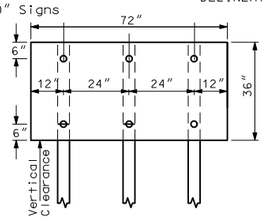
POST MOUNTING
60"x24" Signs



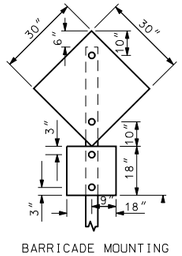
POST MOUNTING
60"x30" Signs



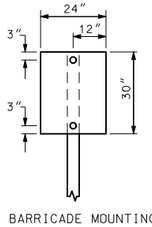
POST MOUNTING
72"x24" Signs



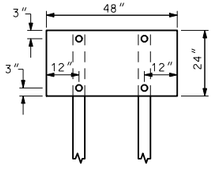
POST MOUNTING
72"x36" Signs



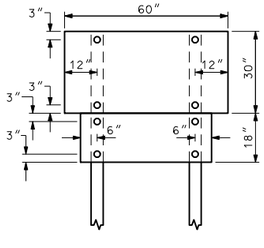
BARRICADE MOUNTING
30"x30" Signs



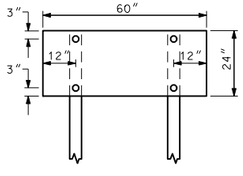
BARRICADE MOUNTING
24"x30" Signs



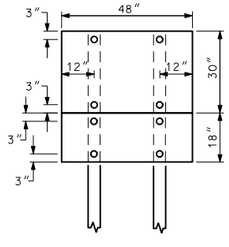
BARRICADE MOUNTING
48"x24" Signs



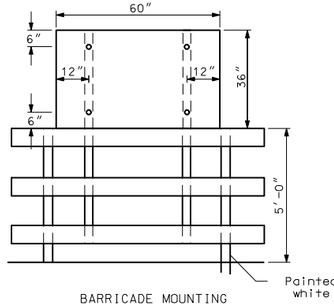
BARRICADE MOUNTING
60"x30" & 48"x18" Signs



BARRICADE MOUNTING
60"x24" Signs



BARRICADE MOUNTING
48"x30" & 48"x18" Signs



BARRICADE MOUNTING
G20-1-60 Signs

NOTES:

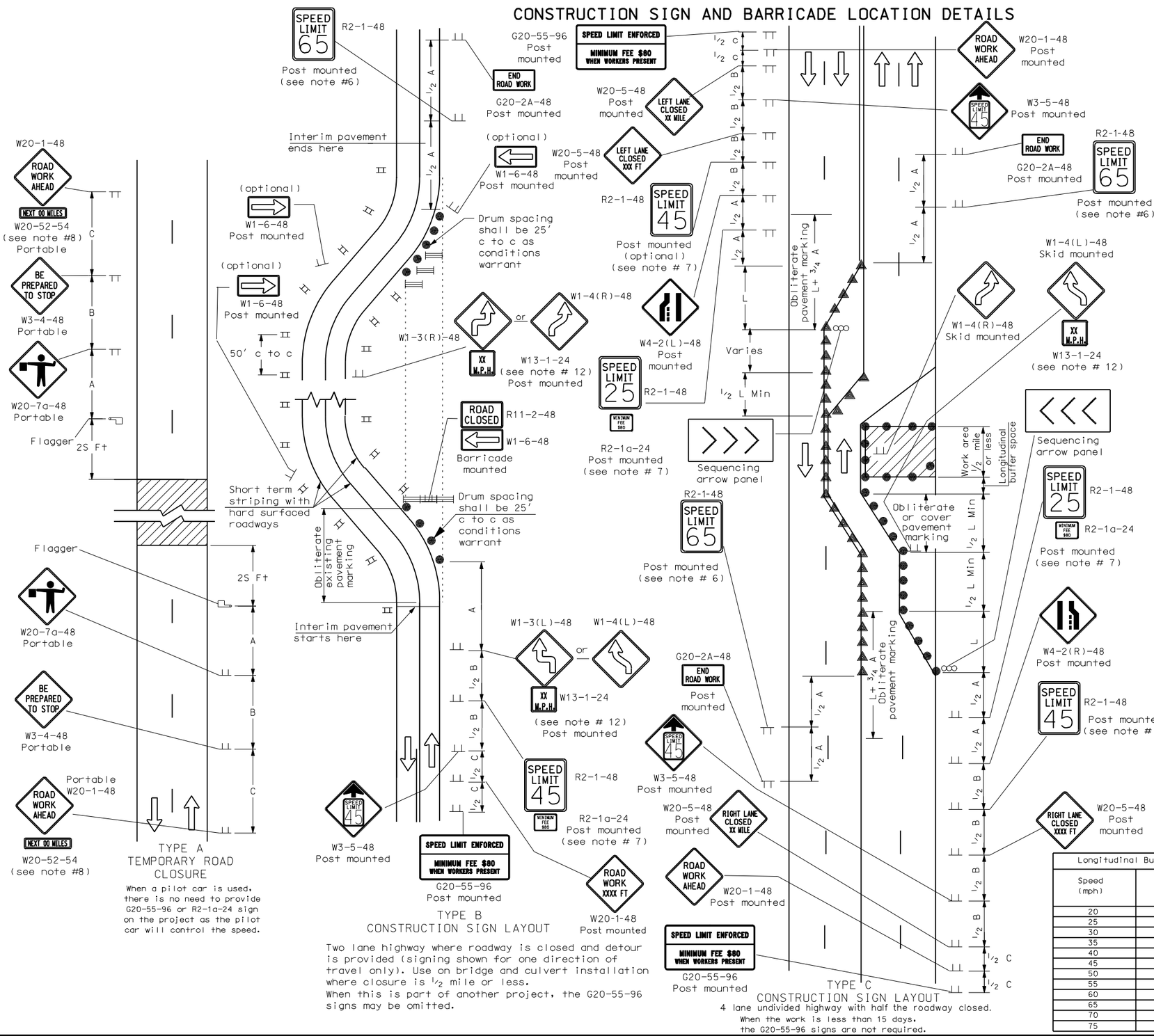
1. Barricade and Sign Supports: Wooden supports shall be painted white. Steel supports shall be galvanized or painted.
2. Barricade Mounting Signs: The bottom of the sign shall be flush with the top of the top rail. Wood sign posts shall be 4"x4" min. SFS or equivalent steel posts. All barricades and barricade mounted signs shall be assembled with 3/8" bolts.
3. Sign Supports: Sign supports shall be 4"x4" min. SFS or equivalent steel post. The anchor for steel supports shall have a stub height of 4" or less. Wood posts more than 4"x4" shall be breakaway. Sign supports shall be imbedded to a sufficient depth so that signs will remain plumb throughout duration of project. It is suggested that wood posts have a min. depth of embedment of 5' and steel posts be embedded a min. 3'-6".
   Material: All signs shall be 0.100" aluminum, 12 gauge steel, 1/2" plywood or other approved material.
   Holes: All holes to be punched round for 3/8" bolts.
4. Alternate Messages: The signs that have alternate messages may have these alternate messages placed on a reflectorized plate without a border and this plate installed and removed as required.
5. Advance Warning Flashing or Sequencing Arrow Panels: The minimum mounting height shall be 7 feet above the roadway to the bottom of the panel, except on vehicle mounted panels which shall be as high as practicable.
6. Delineator Posts: Typical fence post sections are shown in Attachment Details. Other types of metal fence posts may be substituted upon approval of the engineer. These substituted posts shall have reflectors attached similar to the ones shown.
7. Route Marker Auxiliary Signs: The route marker auxiliary signs such as the cardinal direction and directional arrows shall have background colors the same as the route marker they are used with (Interstate route markers, blue background, US and State route markers, white background, Interstate Business loop and spur, green background, and County route markers, blue background).
8. Vertical Clearance: Post mounted signs placed in rural areas shall have a vertical clearance of at least 5 feet measured from the bottom of the sign to the near edge of the driving lane. In business, commercial and residential districts where parking and/or pedestrian movement is likely to occur or where other obstructions to view, the distance between the bottom of the sign to the near edge of the driving lane shall be at least 7 feet. The height to the bottom of secondary signs mounted below another sign may be 1 foot less than the appropriate height specified. Large signs having an area exceeding 50 square feet that are installed on multiple breakaway posts shall be mounted a minimum of 7 feet above the ground.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-1-86	
REVISIONS	
DATE	CHANGE
08-01-88	Sign assembly
05-01-92	Sign assembly
03-30-93	Sign supports note
03-04-96	Sign height
08-15-96	Note 8
07-10-97	Note revision
07-31-98	Note & portable sign
10-01-99	Skid mounted sign
02-07-03	Vertical clearance note
11-30-04	Third post added to some signs
12-01-04	PE stamp added

This document was originally issued and sealed by MARK S GAYDOS, Registration Number PE-4518, on 12/01/04 and the original document is stored at the North Dakota Department of Transportation

CONSTRUCTION SIGN AND BARRICADE LOCATION DETAILS

D-704-15



Notes

1. Variables
   S = Numerical value of speed limit or 85th percentile.
   W = The width of taper.
   L = Minimum length of taper, or S x W for freeways, expressways, and all other roads with speeds of 45 mph or greater, or W x $S^2/60$ for urban, residential, and other streets with speeds of 40 mph or less.
2. Barricade shown to be placed on roadway shall be on a moveable assembly. Sign to be mounted on barricades shall be mounted with the sign bottom on the top of the top barricade bar. Sign shown to be 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. Existing striping shall be removed as required. Delineators will only be used when foreslope is 1V:4H or better and roadway alignment is visible to approaching vehicles. Vertical panels shall be used where roadways has steep slopes and alignment is not visible to approaching vehicles. Delineators and vertical panels shall be installed back to back.
5. 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.
   Type A shall be used on roadways with slow moving traffic speeds and low volume (25 mph and 750 ADT or less).
   Type B shall be used on roadways with moderate traffic speeds and volumes (40 mph and 5000 ADT or less).
   Type C shall be used on roadways with high traffic speeds and volumes (over 40 mph and 5000 ADT).
6. The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
7. 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.
8. Use when work area is 1 mile or longer.
9. 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.
10. Existing speed limit signs within a reduced speed zone shall be covered.
11. Obliterated or covered pavement marking shall be paid for as Obliteration of Pavement Marking. The covering shall be approved by the engineer.
12. Where necessary, safe speed to be determined by the Engineer.
13. The contractor has the option of using portable sign supports in lieu of post mounted sign as shown on the standard drawings as specified in section 704.03 C.

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 I barricade
- Type II barricade
- Type III barricade
- Sign
- Delineator drum
- Cones
- Work area
- Flagger
- Sequencing arrow panel
- Type A delineator or 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

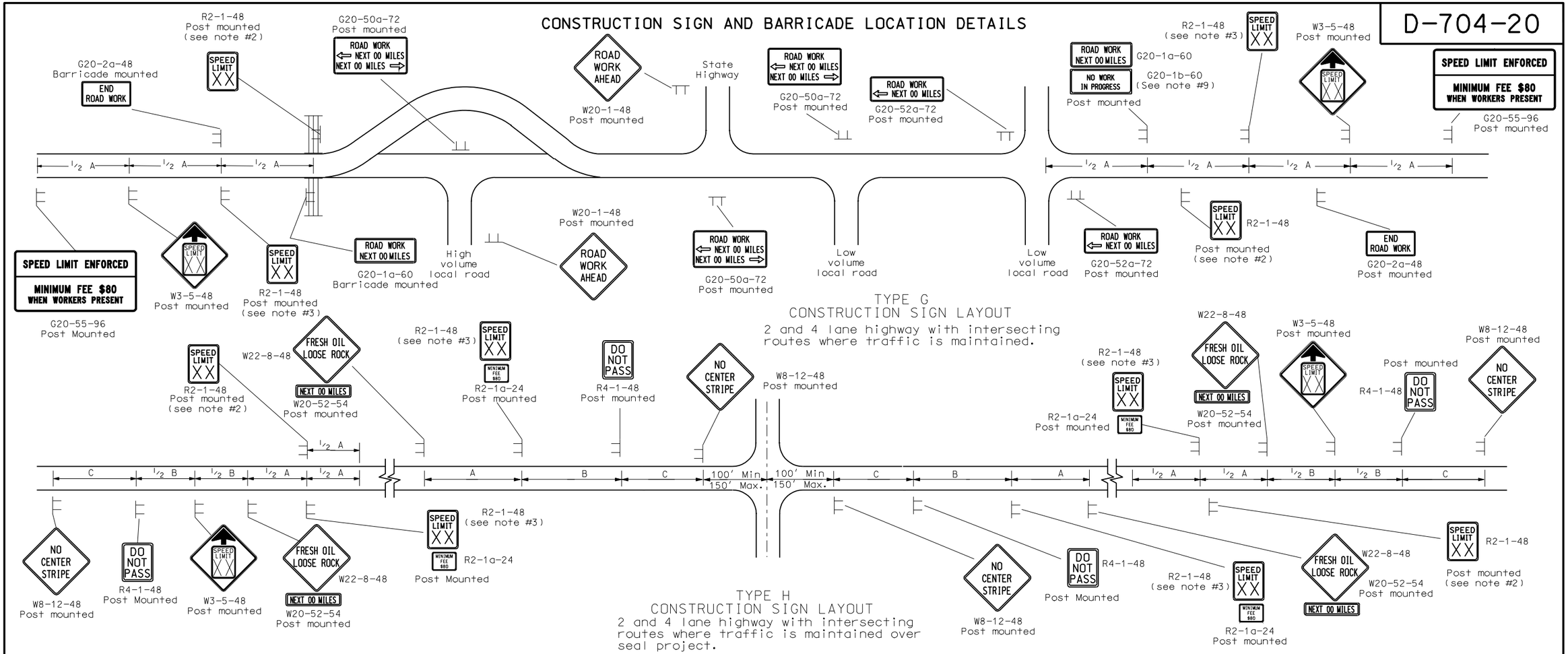
10-1-86

REVISIONS

DATE	CHANGE
01-05-01	Revised note 3
07-19-02	Reversed End Road Work & Speed Signs
07-25-03	Revised R2-1, R2-1a and W20-1
04-01-04	Change Fee Sign, Warning & Buffer Spacing
12-18-03	Relocated reverse curve
12-01-04	PE stamp added
06-29-05	Revised W4-2, Replaced R2-5a with W3-5, Rev. Adv. Warning Table, Rev. Note 7.
07-05-05	Changed W20-7b to W3-4

CONSTRUCTION SIGN AND BARRICADE LOCATION DETAILS

D-704-20



1. Barricade shown to be placed on roadway shall be on a moveable assembly. Sign to be mounted on barricades shall be mounted with the sign bottom on the top of the top barricade bar. Sign shown to be 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. Sign no. R2-1-48, R2-1a-24, R4-1-48, W22-8-48, W20-52-54, and W8-12-48 shall be placed just after all important intersections and every five miles in either direction. Sign no W8-12-48 shall be placed when traffic volumes are 750 ADT or less. No short term markings are placed when this condition exists.
7. The contractor has the option of using portable sign supports in lieu of post mounted sign as shown on the standard drawings as specified in section 704.03 C.
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. The layouts show the signs needed before work begins. The requirements at the actual work areas will require the use of other standards. If the speed limit is reduced in the work areas, the speed limit signs shall have the R2-1a-24 sign placed below.

KEY

Type I barricade	Work area
Type II barricade	Flagger
Type III barricade	Sequencing arrow panel
Sign	Type A delineator or vertical panels back to back
Delineator drum	
Cones	

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

10-1-86

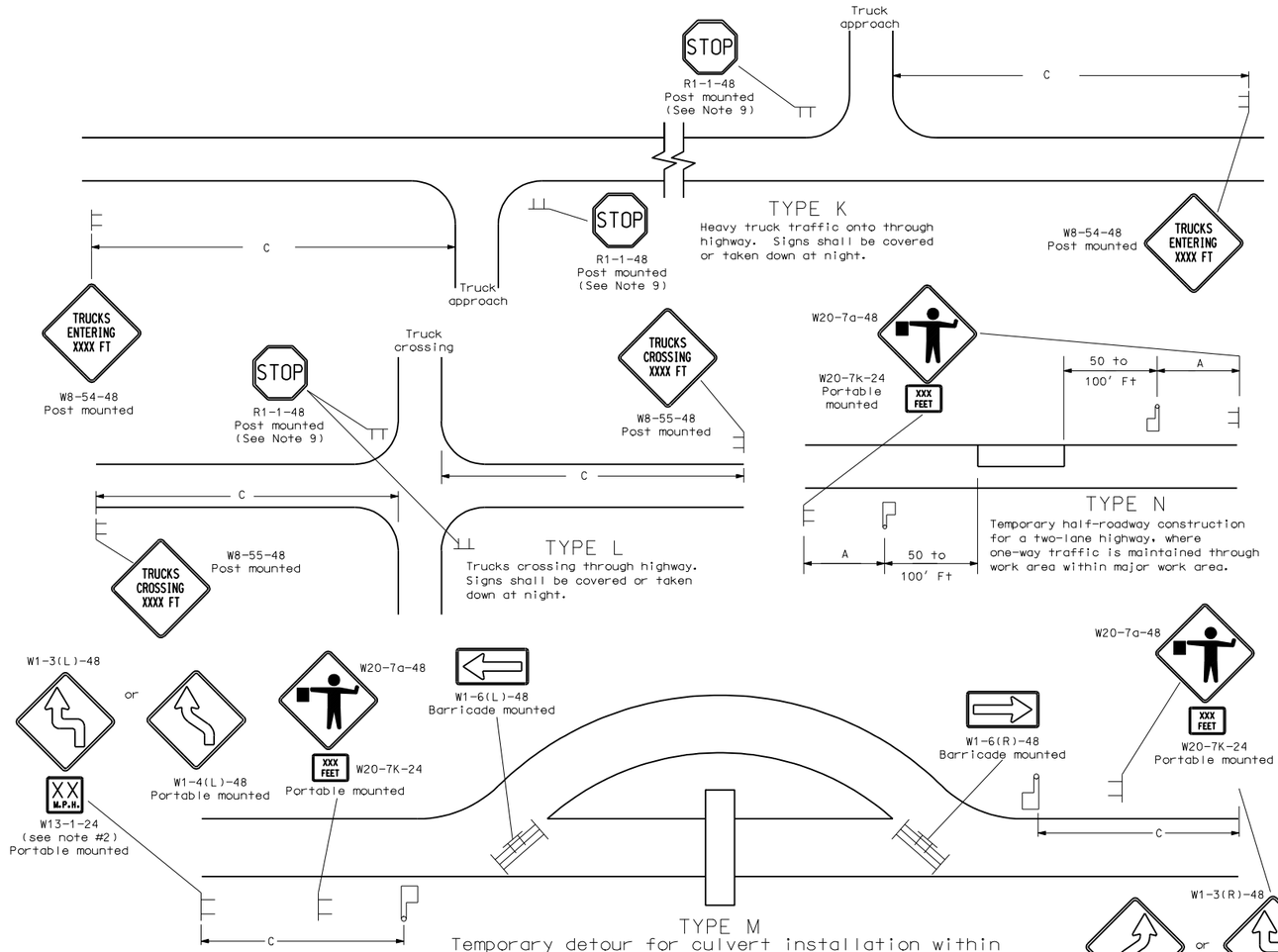
REVISIONS

DATE	CHANGE
08-15-96	Revise flag note
10-01-99	General revisions
10-18-01	Added note 8 & 9
07-19-02	Rev. end road work & speed limit sign
07-25-03	Rev. R2-1a & W20-1
04-01-04	Rev. fee sign & warning sign spacing Rev note 3, add note 10
12-01-04	PE Stamp added
06-29-05	Added W3-5 to Type H and Type G. Rev. Adv. Warning Table. Rev. Note 3
04-05-06	Corrected sign W3-5

This document was originally issued and sealed by MARK S. GAYDOS, Registration Number PE-4518, on 04/05/06 and the original document is stored at the North Dakota Department of Transportation

CONSTRUCTION SIGN AND BARRICADE LOCATION DETAILS

D-704-22



Notes

1. Barricade shown to be placed on roadway shall be on a moveable assembly. on the top of the top barricade bar. Sign shown to be placed on the roadway Sign to be mounted on barricades shall be mounted with the sign bottom 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 $\frac{1}{2}$ 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 sign as shown on the standard drawings as specified in section 704.03 C.
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.

KEY

	Type I barricade		Work area
	Type II barricade		Flagger
	Type III barricade		Sequencing arrow panel
	Sign		Type A delineator or vertical panels back to back
	Delineator drum		
	Cones		

ADVANCE WARNING SIGN SPACING

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

10-1-86

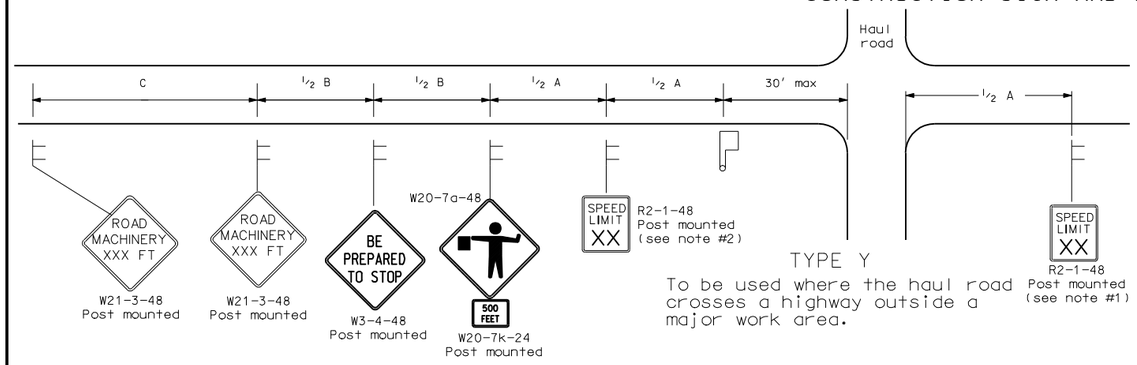
REVISIONS

DATE	CHANGE
09-30-93	General revisions
06-21-95	General revisions
08-15-96	Revise flag note
10-01-99	General revisions
02-02-00	W8-55-48
10-17-02	Deleted Work In Progress Sign
07-25-03	Revised R2-1a
04-01-04	Revised fee sign & Warning sign spacing. Revised note 3
12-01-04	PE stamp added
02-14-05	Added note 9 and revised stop sign size
06-29-05	Rev. Adv. Warning Table. Rev. Note 3

This document was originally issued and sealed by Mark S Gaydos Registration Number PE-4518, on 06/29/05 and the original document is stored at the North Dakota Department of Transportation

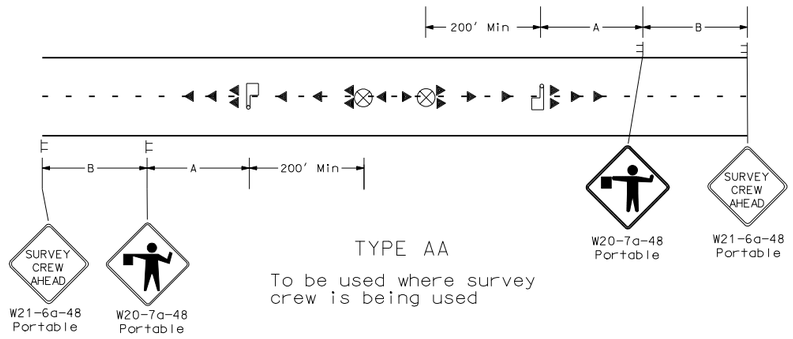
CONSTRUCTION SIGN AND BARRICADE LOCATION DETAILS

D-704-26



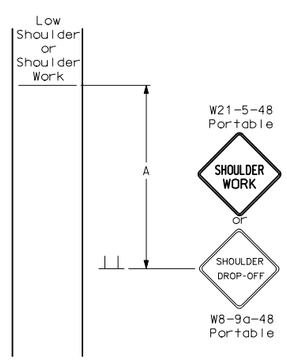
TYPE Y

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



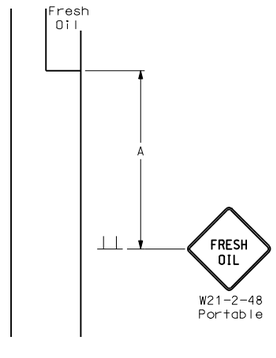
TYPE AA

To be used where survey crew is being used



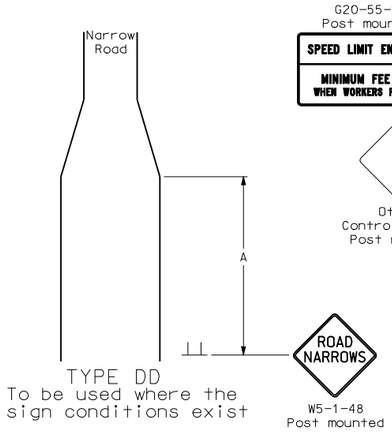
TYPE BB

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



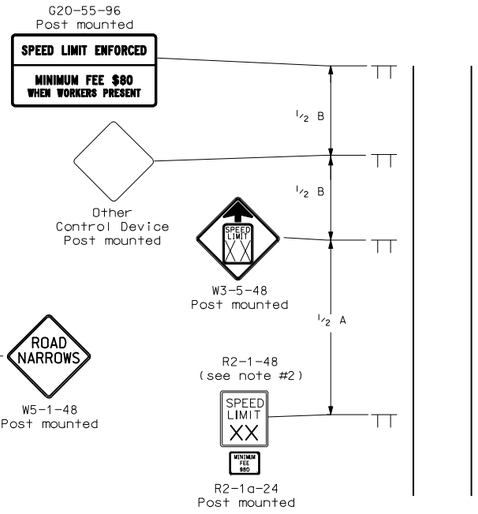
TYPE CC

To be used where the sign conditions exist



TYPE DD

To be used where the sign conditions exist

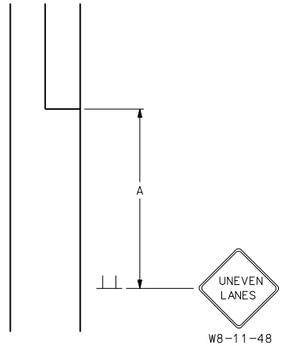


TYPE Z

To be used where speed zone is needed

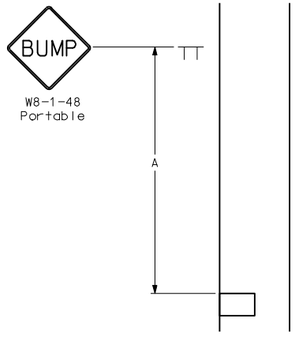
Notes

1. The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
2. The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 mph below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 mph. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit sign shall be placed at 1/2 B.
3. When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
4. Existing speed limit signs within a reduced speed zone shall be covered.
5. The contractor has the option of using portable sign supports in lieu of post mounted sign as shown on the standard drawings as specified in section 704.03 C.
6. G20-55-96 or R2-1a-24 signs are not required if this standard is part of other traffic control layouts, or the work is less than 5 days.



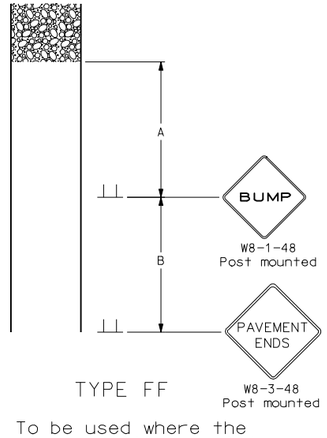
TYPE GG

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

KEY

- Type I barricade
- Type II barricade
- Type III barricade
- Sign
- Delineator drum
- Cones
- Work area
- Flagger
- Sequencing arrow panel
- Type A delineator or vertical panels back to back

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

10-1-86

REVISIONS

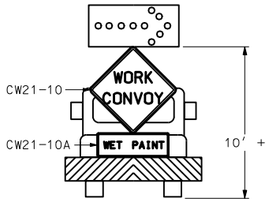
DATE	CHANGE
09-03-96	70 mph
01-31-97	Sign spacing
10-01-99	General Revision
07-19-02	Revised spacing of Speed Limit Signs
01-30-03	Pavement end sign
07-25-03	Revised R2-1a
04-01-04	Rev. fee sign & warning sign spacing. Add note 6
12-01-04	PE Stamp added
06-29-05	Replaced R2-5a with W3-5. Rev. Adv. Warning Table. Rev. Note 2
07-05-05	Changed W20-7b to W3-4

This document was originally issued and sealed by Mark S Gaydos Registration Number PE-4518, on 07/05/05 and the original document is stored at the North Dakota Department of Transportation

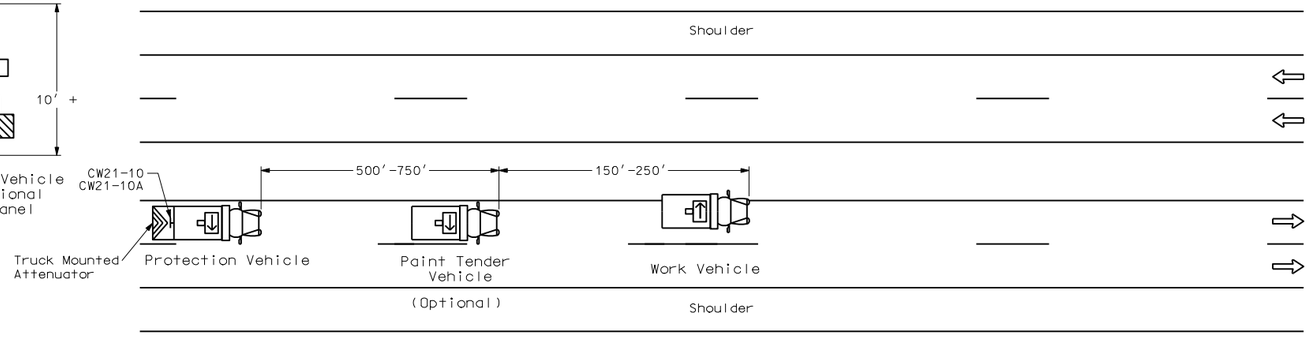
TRAFFIC CONTROL PLAN FOR MOVING OPERATIONS ON CONVENTIONAL HIGHWAYS

(Pavement Marking)

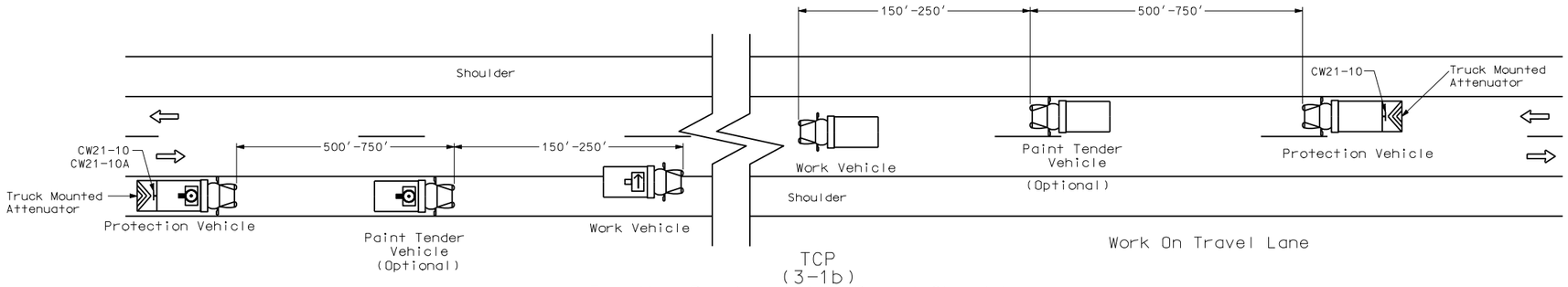
D-704-27



Typical Protection Vehicle
with Right Directional
Flashing Arrow Panel

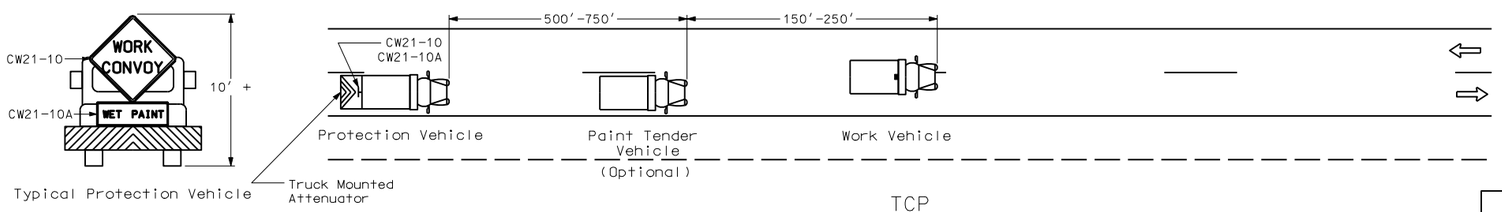


TCP
(3-1a)
Undivided Multi lane Roadway



TCP
(3-1b)

Work On Shoulder — Two-Way Roadway with Paved Shoulders — Work On Travel Lane

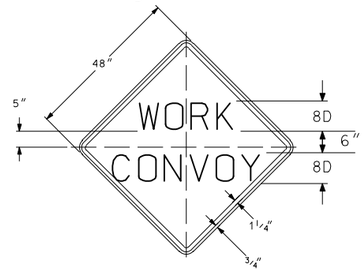


Typical Protection Vehicle

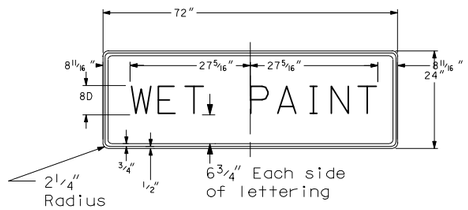
TCP
(3-1c)
Two-Way Roadway without Paved Shoulders

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 contractors expense.
2. All traffic control devices shall be in accordance with the "Manual on Uniform Traffic Control Devices" (MUTCD), latest edition.
3. The use of yellow rotating beacons or strobe lights on vehicles is required unless otherwise stated elsewhere in the plans.
4. Flashing arrow panels shall be Type B or Type C. The panel operation shall be controlled from inside the vehicle.
5. Each vehicle shall have two-way radio communication capability.
6. When work convoys must change lanes, the protection vehicle should change lanes first to shadow other convoy vehicles.
7. Vehicle spacing between the protection vehicle and paint tender 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/or change lanes as they approach the trail vehicle.
8. Sign Colors
   Letters = Black
   Border = Black
   Background = Orange

Sign Details



CW21-10



CW21-10A

KEY

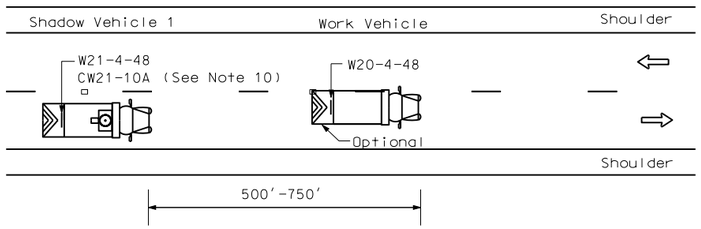
- Truck mounted attenuator
- Flashing arrow panels:
  - Right directional
  - Left directional
  - Double arrow directional
  - Caution Mode

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
01-22-92	
REVISIONS	
DATE	CHANGE
02-24-93	General
03-15-95	General
06-21-95	Remove caution mode
10-01-99	General Revisions
07-25-00	General Revisions
12-01-04	PE Stamp added

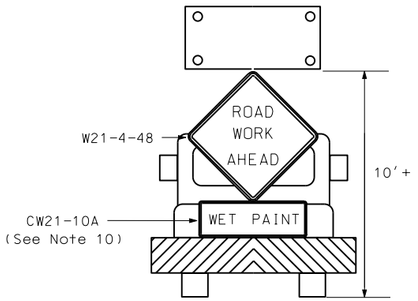
This document was originally issued and sealed by MARK S GAYDOS, Registration Number PE-4518, on 12/01/04 and the original document is stored at the North Dakota Department of Transportation

TRAFFIC CONTROL FOR MOBILE OPERATIONS

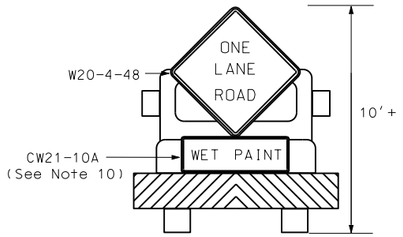
D-704-28



Two Lane Highway
(Work on Travel Lane)

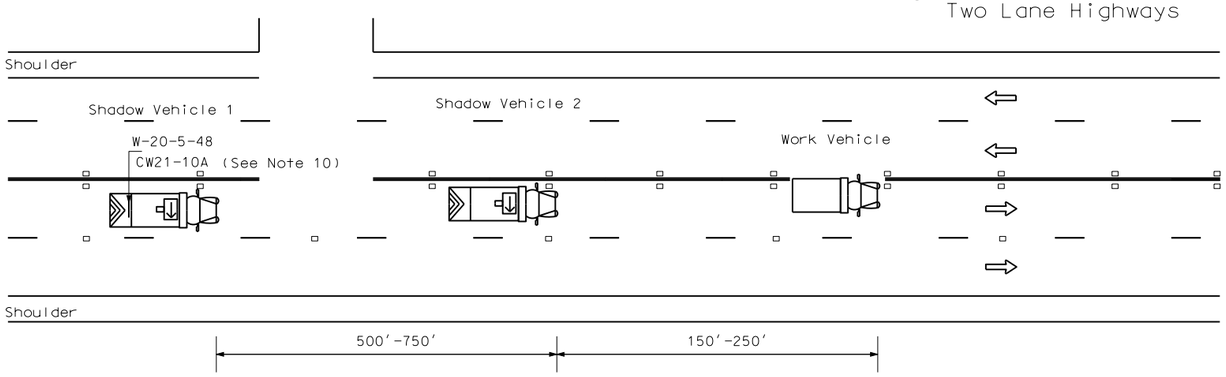


Typical Shadow Vehicle 1
Two Lane Highways



Work Vehicle
Two Lane Highways

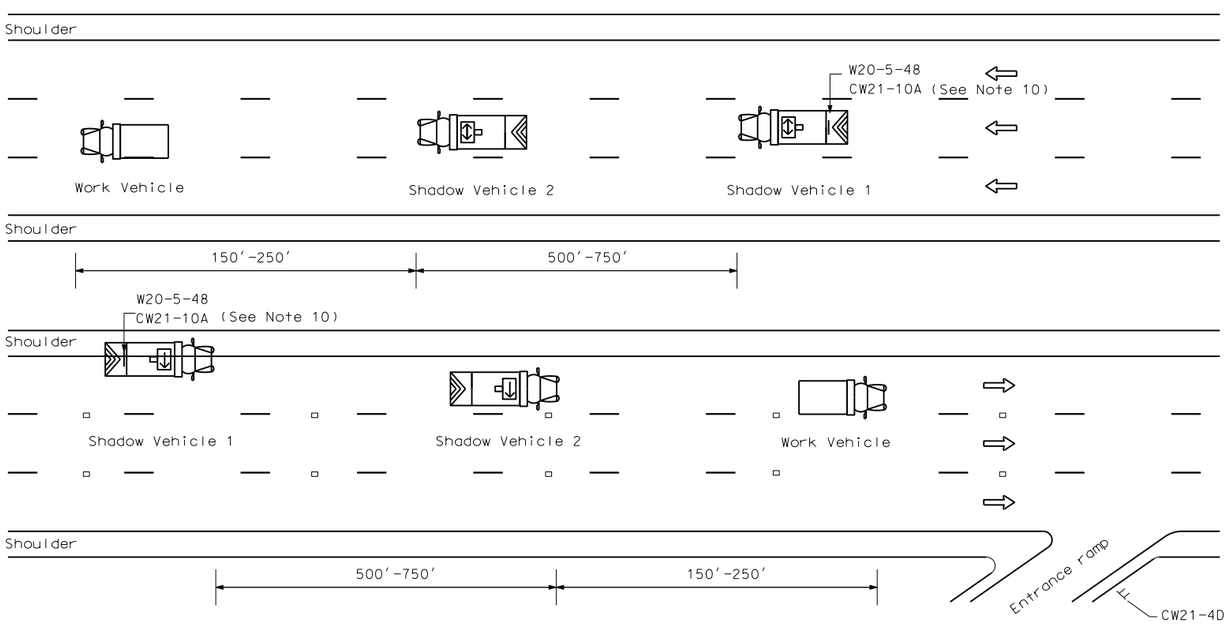
Notes
1. If the contractor chooses to place more vehicles in the convoy than are shown, these vehicles shall have the truck mounted attenuator and shall be at the contractors expense.
2. All traffic control devices shall be in accordance with the "Manual on Uniform Traffic Control Devices" (MUTCD), latest edition.
3. Shadow and work vehicles shall display yellow rotating beacons or strobe lights.
4. Flashing arrow panels shall be Type B. The panel operation shall be controlled from inside the vehicle.
5. Each vehicle shall have two-way radio communication capability.
6. When work convoys must change lanes, the shadow vehicle should change lanes first to shadow other convoy vehicles.
7. Vehicle spacing between 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.
8. Sign Colors
   Letters = Black
   Border = Black
   Background = Orange
9. Shadow vehicle 2 may be used as the paint tender vehicle.
10. Sign CW21-10A shall only be used during a painting operation.
11. On two lane - two way roadways, the work and shadow vehicles should pull over periodically to allow motor vehicle traffic to pass.



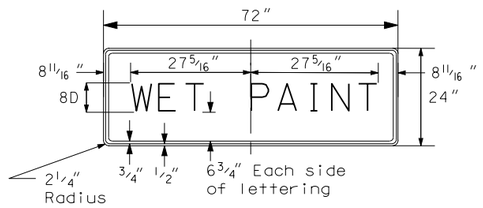
Undivided Multi lane Highway

Sign Details

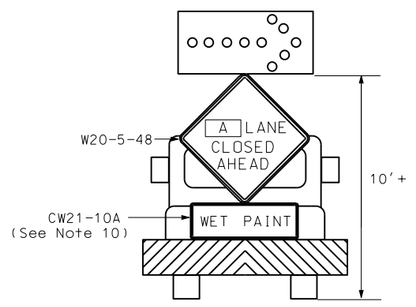
W20-5-48



Divided Multi lane Highway



CW21-10A



Typical Shadow Vehicle 1 & 2
Multi Lane Highways

KEY

A = Left Right Center

Truck mounted attenuator

Flashing arrow panels:

Right directional

Left directional

Double arrow directional

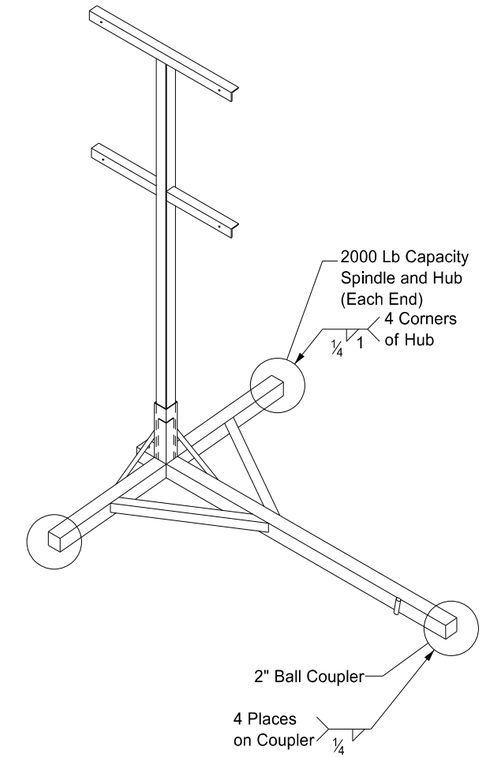
Caution Mode

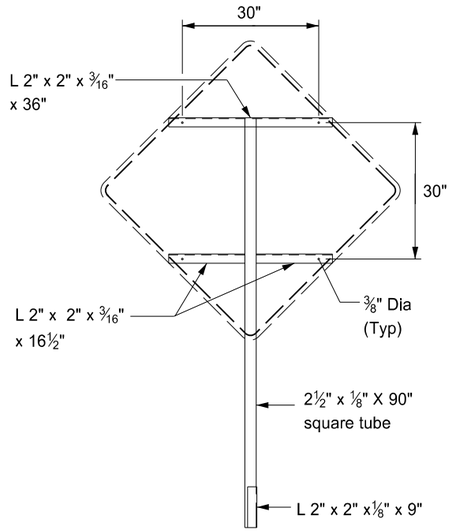
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
01-22-92	
REVISIONS	
DATE	CHANGE
02-24-93	General
06-21-95	Remove arrow panels
06-04-99	W21-4-48 sign
10-01-99	General revisions
07-25-00	General revisions
05-24-02	Major revisions
12-01-04	PE Stamp added

This document was originally issued and sealed by MARK S. GAYDOS Registration Number PE- 4518 , on 12/01/04 and the original document is stored at the North Dakota Department of Transportation

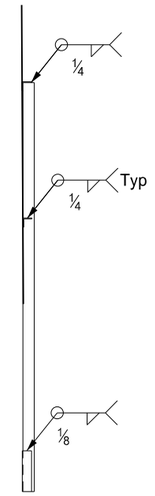
PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50



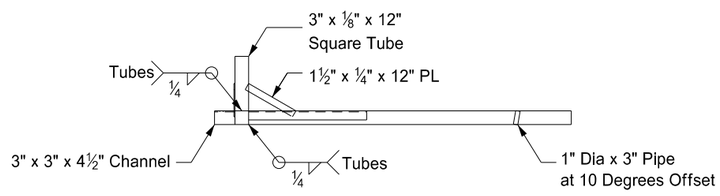


FRONT

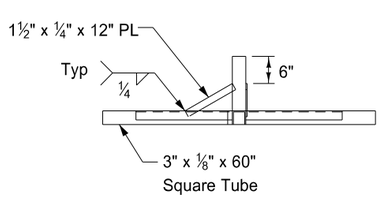


RIGHT

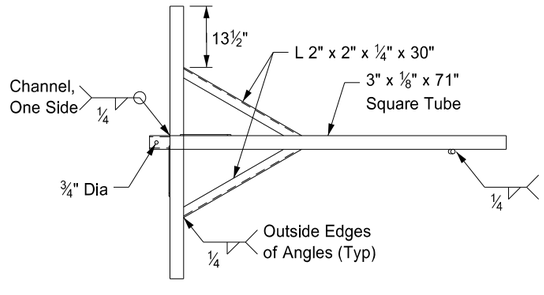
SIGN SUPPORT



FRONT



RIGHT



TOP

TRAILER

Notes:

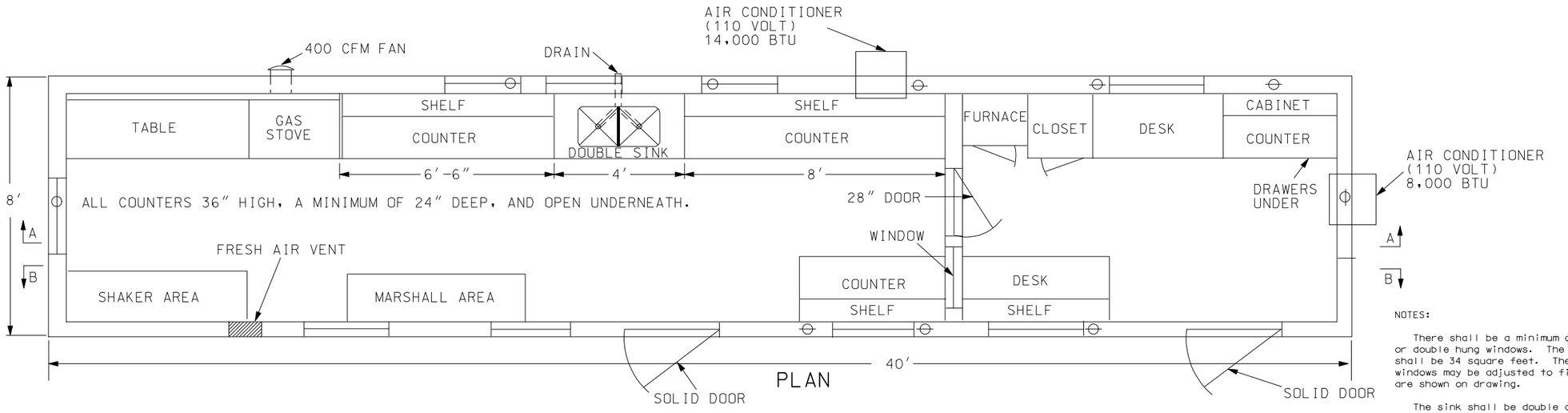
1. The maximum weight of the assembly is 250 pounds.
2. Use a 14" wheel and tire.
3. Automotive and equipment axle assemblies may not be used for trailer-mounted sign supports.
4. Other NCHRP 350 crash tested assemblies are acceptable.

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

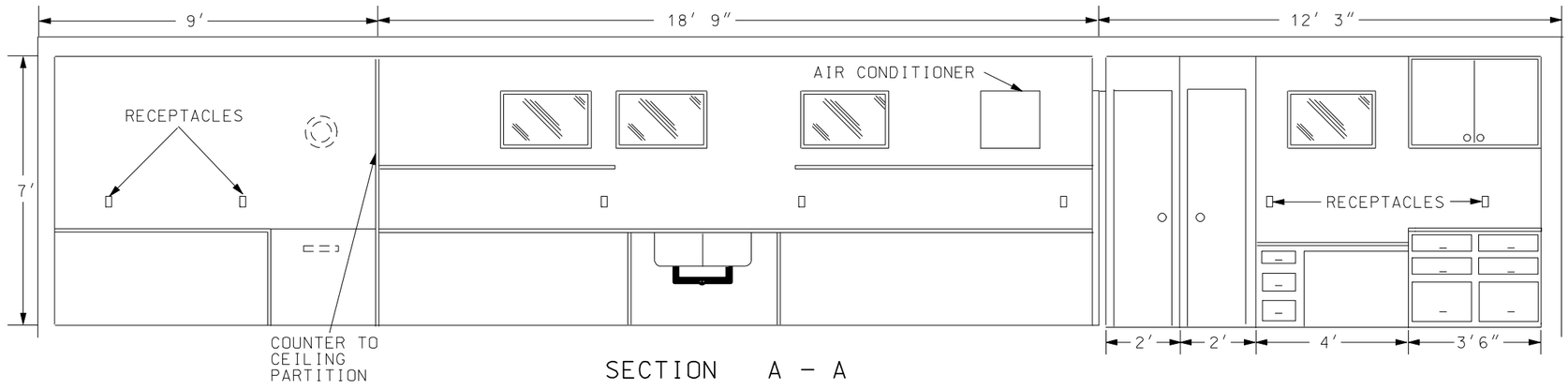
This document was originally issued and sealed by Roger Weigel Registration Number PE- 2930 , on 11/23/10 and the original document is stored at the North Dakota Department of Transportation

TYPE C FIELD LABORATORY

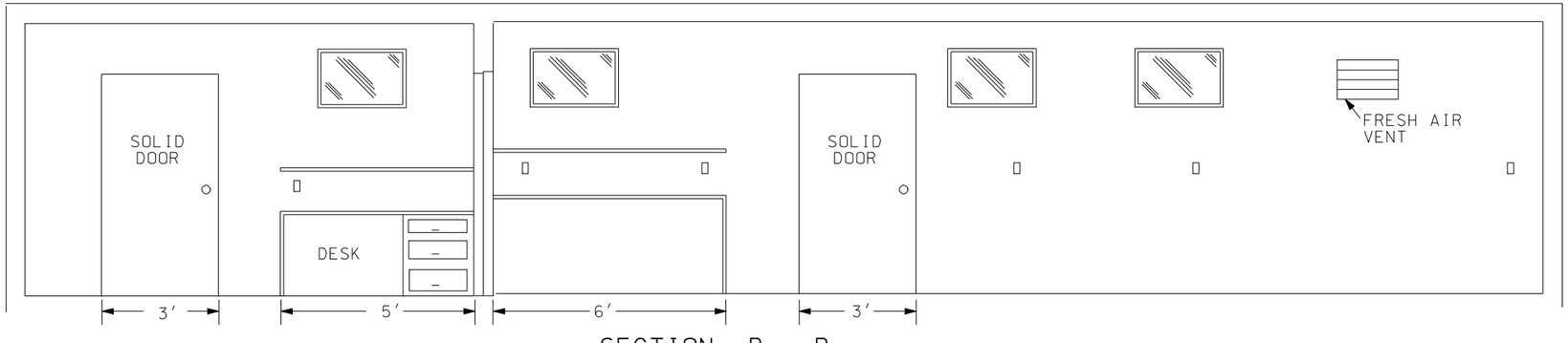
D-706-1



PLAN



SECTION A - A



SECTION B - B

NOTES:

There shall be a minimum of 6 exterior ventilated casement or double hung windows. The minimum total area of opening shall be 34 square feet. The number, size, and location of windows may be adjusted to fit conditions. Suggested locations are shown on drawing.

The sink shall be double compartment stainless steel. Each compartment shall be a minimum of 16"x14"x10" deep. The sink shall be drained to an outside wasteline. A trap is not required. Water service lines shall be copper or plastic having a diameter of ½ inch.

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

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

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

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

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

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

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

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

The floor beneath the marshall area shall be heavily reinforced.

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

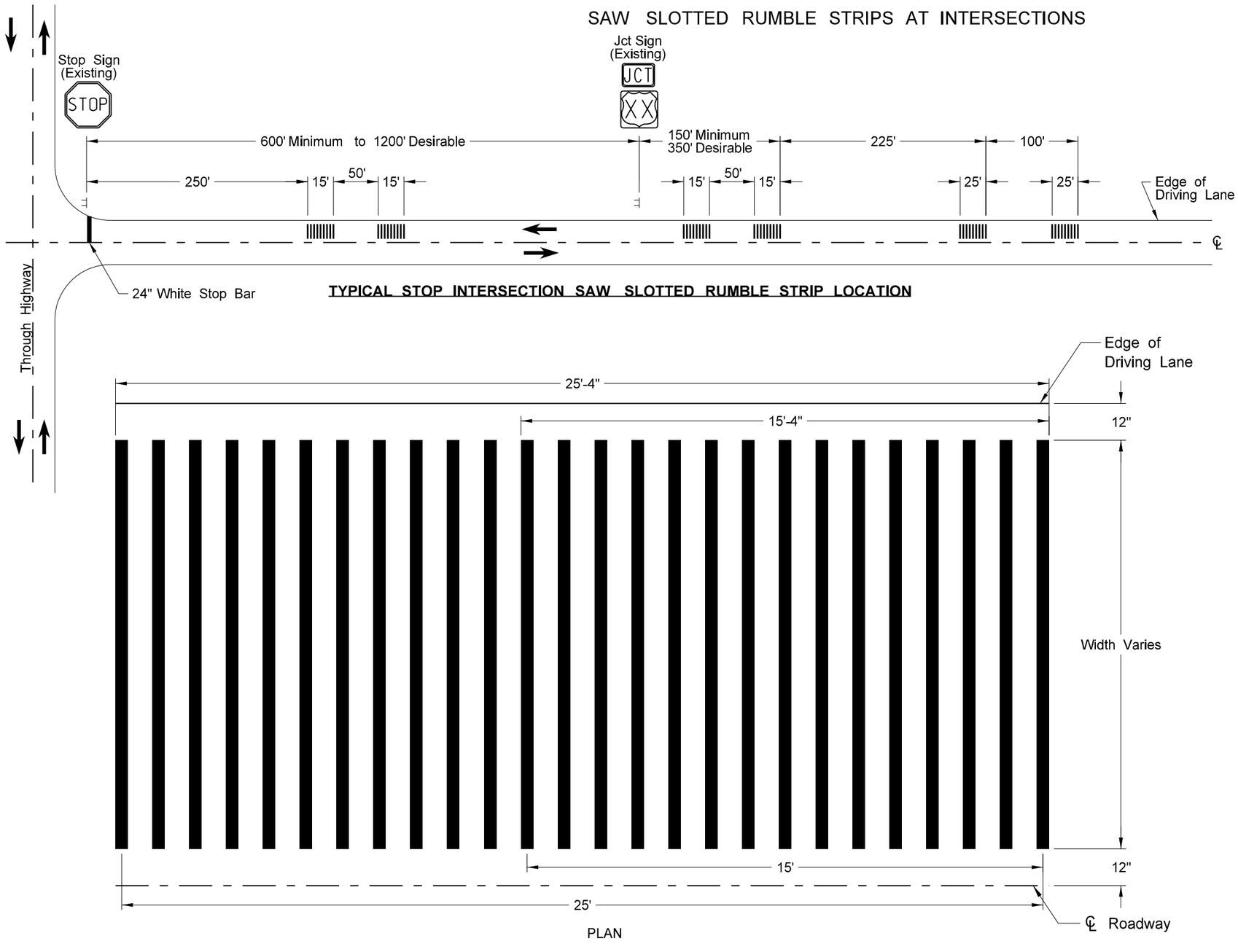
Electrical service entrance shall be wired for 100 amps, and have separate circuits for air conditioners. Convenience outlets shall have a minimum spacing of 4 feet in counter areas.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-1-86	
REVISIONS	
DATE	CHANGE
05-05-88	Drawing and notes
06-20-03	General revisions
12-01-04	PE Stamp added

This document was originally issued and sealed by MARK S GAYDOS, Registration Number PE-4518, on 12/01/04 and the original document is stored at the North Dakota Department of Transportation

SAW SLOTTED RUMBLE STRIPS AT INTERSECTIONS

D-760-5



TYPICAL STOP INTERSECTION SAW SLOTTED RUMBLE STRIP LOCATION

SAW SLOTTED RUMBLE STRIP DETAIL

Notes:

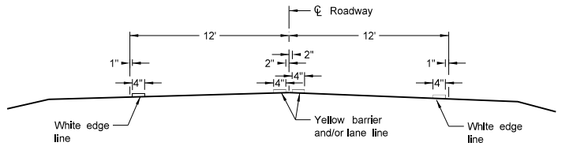
1) Discontinue saw slotted rumble strips near Automated Traffic Recorders (ATR), Weigh In Motion (WIM), and Roadway Weather Information Systems (RWIS). Saw slotted rumble strips shall discontinue 10' before and after any ATR or RWIS system. Saw slotted rumble strips shall be discontinued 300' before and 100' after in the direction of travel for any Weigh In Motion equipment.

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

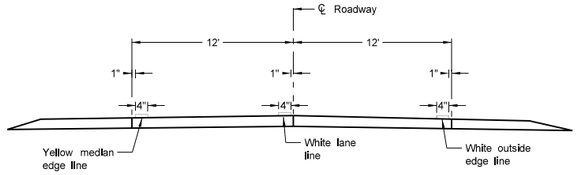
This document was originally issued and sealed by Roger Weigel, Registration Number PE- 2930 , on 9/8/11 and the original document is stored at the North Dakota Department of Transportation

PAVEMENT MARKING

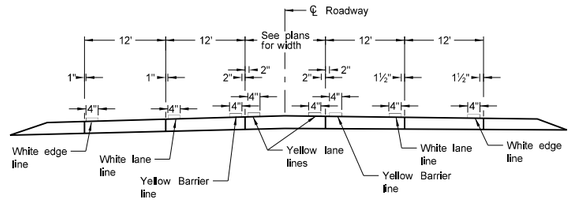
D-762-4



Two Lane Two Way
RURAL ROADWAY



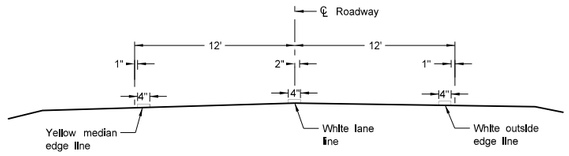
Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



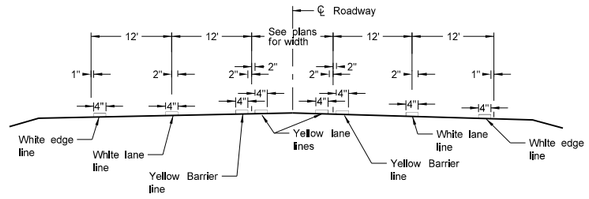
RURAL FIVE LANE ROADWAY
Concrete Section

NOTES:

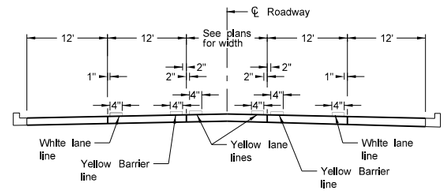
1. Edge lines shall be continued through private drives and field drives and broken for intersections.



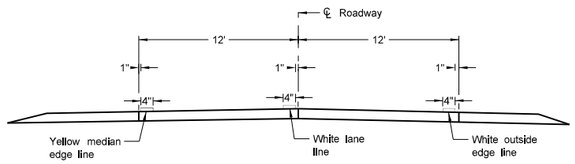
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



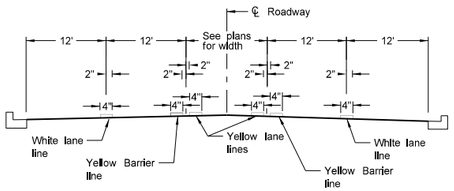
RURAL FIVE LANE ROADWAY
Asphalt Section



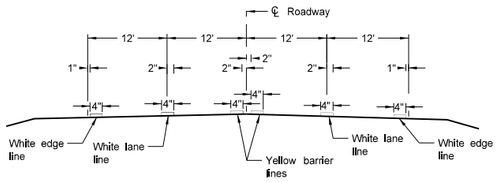
URBAN FIVE LANE SECTION
Concrete Section



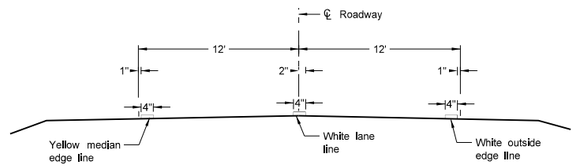
Two Lane Roadway
PRIMARY HIGHWAY
Concrete Section



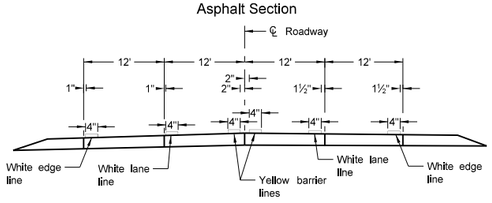
URBAN FIVE LANE SECTION
Asphalt Section



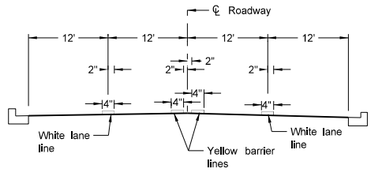
RURAL FOUR LANE ROADWAY
Asphalt Section



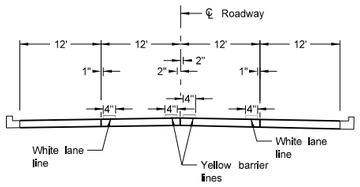
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



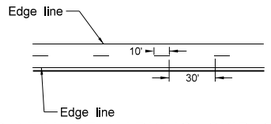
RURAL FOUR LANE ROADWAY
Concrete Section



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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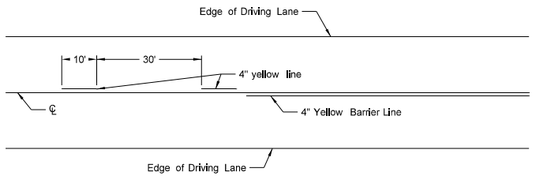
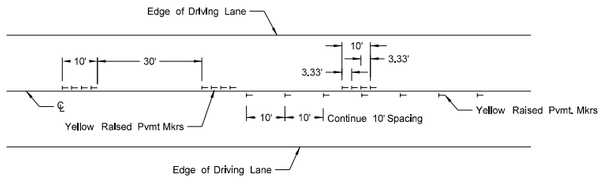
SHORT-TERM PAVEMENT MARKING

D-762-6

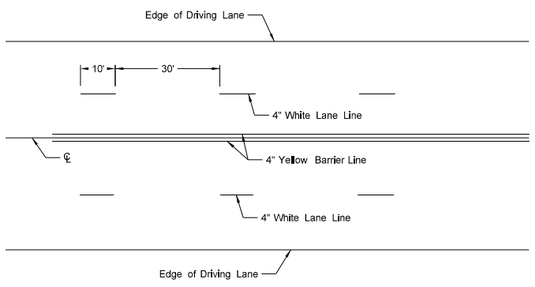


Painted or Tape Lines

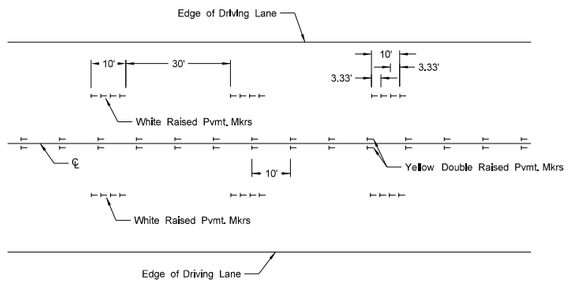


Raised Pavement Markers

TWO-LANE TWO-WAY ROADWAY

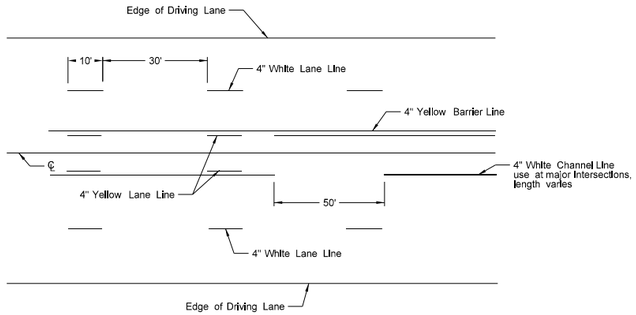


Painted or Tape Lines



Raised Pavement Markers

FOUR LANE ROADWAY



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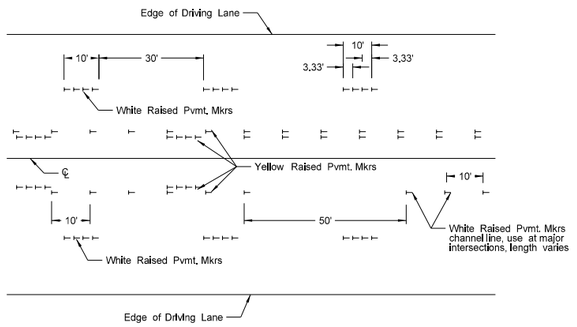
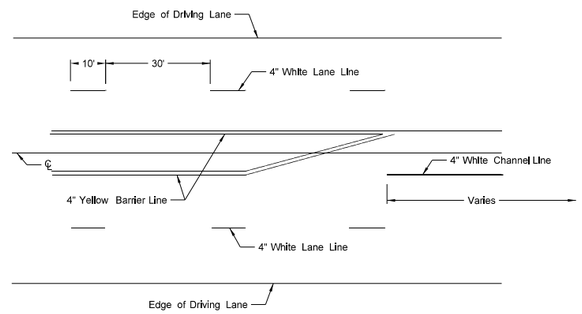
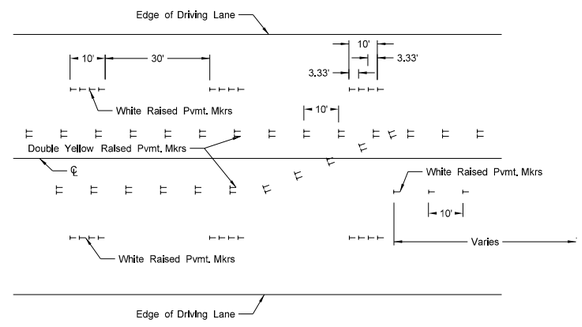


Raised Pavement Markers

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.

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