| DESIGN DATA | | | | |
|---|---|---|---|---|
| Traffic | Average Daily | | | |
| Current 2013 | Pass: 1,225 | Trucks: 305 | Total: 1,530 | |
| | | | | |
| Preventative Maintenance | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| STATE | PROJECT NO. | PCN | SECTION NO. | SHEET NO. |
|---|---|---|---|---|
| ND | SS-8-018(058)074 | 17141 | 1 | 1 |

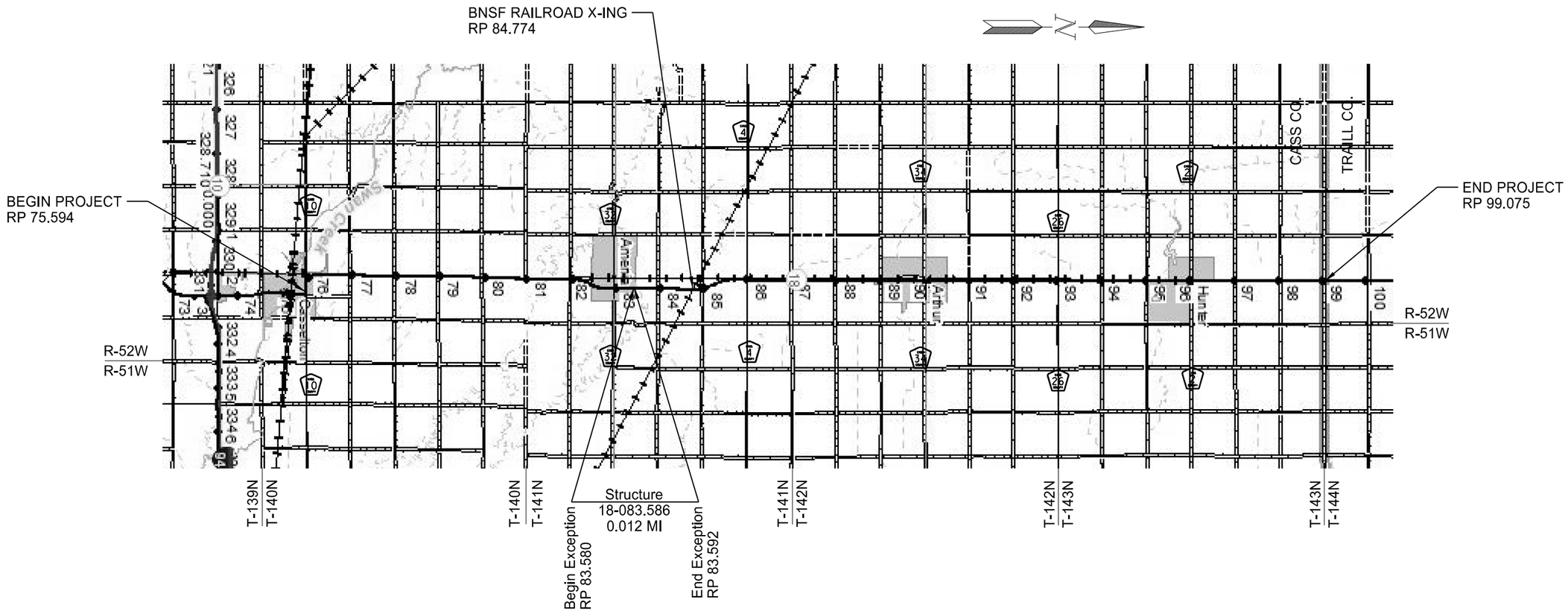
# JOB # 25
# NORTH DAKOTA
# DEPARTMENT OF TRANSPORTATION

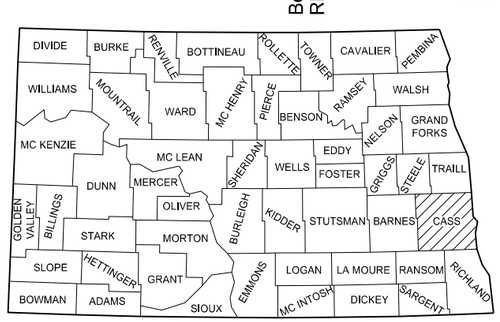
SS-8-018(058)074

FHWA Limited Involvement
Cass County
Casselton North to the County Line
Microsurfacing

GOVERNING SPECIFICATIONS:
Standard Specifications adopted by the North Dakota Department of Transportation October 2008; Standard Drawings currently in effect; and other Contract Provisions submitted herein.

| PROJECT NUMBER \ DESCRIPTION | NET MILES | GROSS MILES |
|---|---|---|
| SS-8-018(058)074 | 23.469 | 23.481 |




STATE COUNTY MAP

DESIGNERS

Duane Carlstrom /s/

APPROVED DATE 09/16/13

Kevin Gorder /s/
NDDOT FARGO DISTRICT
ND DEPARTMENT OF TRANSPORTATION

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

APPROVED DATE 09/16/13

Duane Carlstrom /s/
NDDOT FARGO DIST

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## TABLE OF CONTENTS


| Section No. | Sheet No. | Description |
|---|---|---|
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| 2 | 1 | Table of Contents |
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| 8 | 1 | Quantities |
| 10 | 1 | Basis of Estimate |
| 20 | 1 | General Details |
| 30 | 1-6 | Typical Sections |
| 100 | 1 | Work Zone Traffic Control |
| 120 | 1 | Pavement Marking |


## LIST OF SPECIAL PROVISIONS (SP)

| SP # | Description |
|---|---|
| SP 559(08) | Permanent Pavement Marking Monitoring System |

## LIST OF STANDARD DRAWINGS

| Standard No. | Description |
|---|---|
| D-20-1, 2, 3, 10 | NDDOT Abbreviations and Utility Company Abbreviations |
| D-20-20, 21 | Linestyles |
| D-20-30, 31, 32 | Symbols |
| D-203-6 | Standard 90˚ Flared Intersection |
| D-704-7 | Breakaway Systems for Construction Zone Signs Perforated Tube |
| D-704-8 | Breakaway Systems for Construction Zone Signs |
| D-704-9, 10, 11 | Construction Sign Details |
| 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-760-4 | Rumble Strips Undivided Highways (Shoulders Less Than 4') |
| D-762-1 | Pavement Marking Message Details |
| D-762-3 | Pavement Marking Standard 90 Degree Flare Intersection |
| D-762-4 | Pavement Marking |
| D-762-6 | Short Term Pavement Marking |

# NOTES

## GENERAL NOTES

100-P02 OPERATIONS: Work activities will be conducted during daylight hours only and construction activities will be scheduled to allow sufficient curing time at the end of the day to accommodate normal traffic before dark. Both lanes shall be opened during non-work hours.

107-115 RAILROAD PROTECTIVE LIABILITY INSURANCE: This project crosses the BNSF Railway Company at RP 84.774. The type of work that will be performed within the railroad right of way is microsurfacing. Inquiries for protective liability insurance should be directed to:

Rosa Martinez
Marsh Co.
Texas
214-303-8519

Information on crossing number 092991B may be obtained from the Federal Railroad Administration website:
http://safetydata.fra.dot.gov/Officeofsafety/

107-P01 HAUL ROADS: The Contractor shall contact the appropriate State, County, Township, or City officials to determine if there are any "No Haul Routes" prior to preparing a bid for this project. All roads will not be used as haul roads unless the Contractor obtains written approval from the government agency or agencies and the engineer. The engineer will determine what government agency or agencies approvals and roads are appropriate.

230-P01 SHOULDER PREPARATION: The contractor shall perform shoulder preparation on the existing shoulders within the limits of the microsurfacing and fogging project. A herbicide such as FallowMaster, GlyKamba, or an approved equal is required to be sprayed on the shoulder and slough prior to the microsurfacing/fogging to kill weeds and grass roots. The herbicide shall be mixed and applied in accordance to the manufacturer's recommendations. A surfactant, which includes ammonium sulfate, shall be added to the tank at a minimum rate of 2-1/2 gallons per 100 gallons prior to adding the chemical or water.

The herbicide shall be applied two times, three weeks apart. Spraying shall be completed no more than 30 days prior to the paving operation. The contractor shall be responsible for any damage to adjacent vegetation caused by the spraying operation. The sprayer bar shall be shielded to protect against drift.

Microsurfacing/Fogging will not commence until it is evident that the vegetation of the shoulder is dead and removed. The contractor shall remove all dead vegetation and debris from the shoulders and sloughs.

All costs for the work as described above shall be included in the price bid for the item "Shoulder Preparation". Payment for shoulder preparation shall be at plan quantity unless changes are made in the field.

401-P01 FOG COAT: The approaches, shoulders and shoulder sloughs shall be cleaned and swept prior to fogging and approved by the Engineer.

The approaches, shoulders and shoulder sloughs shall receive a fog coat with SS1H, CSS1H, or MS1 emulsified asphalt (diluted 50/50) at a rate of 0.10 gal per square yard.

401-P02 SS1H OR CSS1H OR MS1 EMULSIFIED ASPHALT: The 12.5' roadway lanes shall have a tack coat applied to it prior to micro-surfacing leveling course. This work shall meet Section 401 of the NDDOT standard specifications.

420-P01 SAND SEAL: The roadway shall be cleaned and swept prior to sealing and approved by the Engineer.

The shoulders shall receive a sand seal with CRS2P at a rate of 0.20 gal per square yard.

The brooming shall be completed with a pick-up street broom.

421-P01 LEVELING COURSE: Work activities include first placing a 5' width rut leveling course in each wheel path and then a 12.5' width wearing course in each lane. There shall be a minimum of 12 hours between different lifts of the micro station. The leveling course shall also be used as a scratch coat used to cover the existing centerline and shoulder rumble strips. All costs for this work shall be included in the prices bid for the Aggregate for Microsurfacing and Asphalt Emulsion for Microsurfacing.

421-P02 CENTERLINE JOINT: A high capacity pull behind air compressor shall be used to clean out the centerline joint for the entire length of roadway and swept prior to completing the leveling course. All costs for this work shall be included in the prices bid for the Aggregate for Microsurfacing and Asphalt Emulsion for Microsurfacing.

421-P03 MATERIALS: All aggregates and emulsified delivered to the self-propelled micro-surfacing mixing machine shall be weighed on a certified scale reviewed by the Engineer. Any partial loads remaining at the end of the day or at the end of the project shall be weighed at a certified scale.

704-P01 TRAFFIC CONTROL FOR MICRO SURFACING, FOGGING, & SAND SEAL: Traffic control for the Micro surfacing, shoulder fogging, & sand seal shall consist of one 6 mile temporary road closure, flagging, and a pilot car. Traffic Control Devices shall comply with the following Standard Drawings:

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# NOTES

1. Standard D-704-15, layout A: For temporary roadway closures just beyond the daily work areas during seal coat operations. Intermediate flagging stations will require signs W20-7a-48 only.
2. Standard D-704-20, layout G: For construction signing during micro surfacing operations.
3. Standard D-704-22, layouts K and L: For trucks hauling material.
4. Standard Drawings D-704-7, 8, 9, 10, 11, 13, and 14 are applicable.
5. Standard D-704-26, layouts EE & GG.

Quantities have been developed based on a six mile limitation for the micro surfacing 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 used. Additional devices required to accommodate the Contractor's operation shall be the Contractor's responsibility.

704-P02 TRAFFIC CONTROL FOR RUMBLE STRIPS: For cutting in centerline rumble strips, the Contractor shall provide traffic control as described below.

Two, D-704-15 Layout Type A, is a minimum. The work zone shall be limited to two and a half miles in length. However, the signs for the next two and a half mile work zone shall be set ahead of the current work zone in the direction the operation is moving. Once the Contractor gets to that point, the original set of signs is removed and reset ahead in the next two and half miles.

This traffic control requires a minimum of 2 flaggers working at all times. Signs cannot be moved by the flaggers. The cost of moving the signs shall not be paid for separately, but included in the price bid for “Traffic Control Signs.” Two D-704-15, Layout Type A, will be paid for.

Standard D-704-27: for striping and fog sealing operations.

Any other method of traffic control must be requested by the Contractor and approved by the Engineer prior to use in the field.

704-P03 MAINTAINING ACCESS: The Contractor shall be responsible for providing access to all residential dwellings, farm operations, and business establishments adjacent to this project. The Contractor also shall be responsible for providing access to all roads which intersect the project.

760-P01 RUMBLE STRIPS: Rumble strips shall not be milled until the 48 hour cure period has taken place of the micro-surfacing.

762-P01 PAVEMENT MARKING: All short term markings and pavement markings painted 4in line will not be measured for payment unless changes are made in the field. Payment for short term markings and pavement markings 4in line will be at plan quantity.

All short term markings shall be placed during daylight hours prior to night fall and opening the lane closure.

762-P02 PAVEMENT MARKING PAINTED: The micro-surfacing and fogging shall be allowed to cure a minimum of 14 days before placing the “Pavement Marking Painted” bid items.

762-P03 PREFORMED PATTERNED PVMT MK-MESSAGE(GROOVED): These shall not be grooved until the 48 hour cure period has taken place of the micro-surfacing.

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# ESTIMATE OF QUANTITIES

| STATE | PROJECT NO. | SECTION NO. | SHEET NO. |
|---|---|---|---|
| ND | SS-8-018(058)074 | 8 | 1 |

| SPEC | CODE | ITEM DESCRIPTION | UNIT | MAINLINE | TOTAL |
|---|---|---|---|---|---|
| 103 | 0100 | CONTRACT BOND | L SUM | 1 | 1 |
| 107 | 0100 | RAILWAY PROTECTION INSURANCE | L SUM | 1 | 1 |
| 230 | 0125 | SHOULDER PREPARATION | MILE | 44.846 | 44.846 |
| 401 | 0150 | SS1H OR CSS1H OR MS1 EMULSIFIED ASPHALT | GAL | 23,778 | 23,778 |
| 420 | 0111 | CRS2P EMULSIFIED ASPHALT | GAL | 1,976 | 1,976 |
| 420 | 0146 | COVER COAT MATERIAL CL 45 | TON | 74.1 | 74.1 |
| 421 | 0011 | AGGREGATE FOR MICROSURFACING TYPE III | TON | 8,822 | 8,822 |
| 421 | 0020 | ASPHALT EMULSION FOR MICROSURFACING | GAL | 272,102 | 272,102 |
| 702 | 0100 | MOBILIZATION | L SUM | 1 | 1 |
| 704 | 0100 | FLAGGING | MHR | 325 | 325 |
| 704 | 1000 | TRAFFIC CONTROL SIGNS | UNIT | 2,250 | 2,250 |
| 704 | 1052 | TYPE III BARRICADE | EA | 2 | 2 |
| 704 | 1067 | TUBULAR MARKERS | EA | 288 | 288 |
| 704 | 1185 | PILOT CAR | HR | 80 | 80 |
| 760 | 0005 | RUMBLE STRIPS - ASPHALT SHOULDER | MILE | 36.838 | 36.838 |
| 760 | 0007 | RUMBLE STRIPS - ASPHALT CENTERLINE | MILE | 18.419 | 18.419 |
| 762 | 0122 | PREFORMED PATTERNED PVMT MK-MESSAGE(GROOVED) | SF | 265 | 265 |
| 762 | 0405 | SHORT TERM 4IN BROKEN LINE-PNT TAPE OR RSD MRK | LF | 110,618 | 110,618 |
| 762 | 0410 | SHORT TERM 4IN LINE NPZ-PN TP OR RS MRK | LF | 82,964 | 82,964 |
| 762 | 1104 | PVMT MK PAINTED 4IN LINE | LF | 302,202 | 302,202 |
| 762 | 1325 | PREFORMED PATTERNED PVMT MK 24IN LINE-GROOVED | LF | 120 | 120 |

| STATE | PROJECT NO. | SECTION NO. | SHEET NO. |
|---|---|---|---|
| ND | SS-8-018(058)074 | 10 | 1 |

## DESIGN CALCULATIONS

Surfacing Quantities:
Mainline: RP 75.594 to RP 99.075 = 23.481 Miles - 0.012 Miles = 23.469 Miles

| Description | Location | Width | Unit/Mile | Total |
|---|---|---|---|---|
| Tack Coat:<br>SS1H or CSS1H Emulsified Asphalt<br>(Based on 0.05 Gal/SY, Apply at<br>0.10 Gal/SY diluted at 50-50) | Mainline | 25' | 734 Gal | 17,226 Gal |
| Leveling Course:<br>Aggregate for Micro-Sufacing Type III<br>(Estimate based on 1.50 Ton/CY & 3/8" thick) | Mainline Rut Filling | 4 @ 4' | 146.7 Ton | 3,442.9 Ton |
| Leveling Course:<br>Asphalt Emulsion for Micro-Surfacing<br>(Based on 13% by weight and 8.43 lbs/Gal) | Mainline Rut Filling | 4 @ 4' | 4,525 Gal | 106,197 Gal |
| Wearing Course:<br>Aggregate for Micro-Sufacing Type III<br>(Estimate based on 1.50 Ton/CY & 3/8" thick) | Mainline | 25' | 229.2 Ton | 5,379.1 Ton |
| Wearing Course:<br>Asphalt Emulsion for Micro-Surfacing<br>(Based on 13% by weight and 8.43 lbs/Gal) | Mainline | 25' | 7,069.1 Gal | 165,905 Gal |

## DESIGN CALCULATIONS

Surfacing Quantities:
Mainline Shoulders and Sloughs

| Description | Location | Width | Length (Miles) | Unit/Mile | Total |
|---|---|---|---|---|---|
| Sand Seal:<br>CRS2P Emulsified Asphalt<br>(Based on 0.20 Gal/SY) | Sections #1 & #7<br>Sections #2, #4, & #6<br>Sections #4 & #5<br>Sections #5 & #6 | 2 @ 8'<br>1 @ 8'<br>1 @ 5'<br>1 @ 10' | 0.444 & 0.293<br>0.186, 0.020, & 0.051<br>0.020 & 0.157<br>0.157 & 0.051 | 1,878 Gal<br>939 Gal<br>587 Gal<br>1,174 Gal | 1,385 Gal<br>242 Gal<br>104 Gal<br>245 Gal |
| Sand Seal:<br>Cover Coat Material Class 45<br>(Based on 15 lb/SY) | Sections #1 & #7<br>Sections #2, #4, & #6<br>Sections #4 & #5<br>Sections #5 & #6 | 2 @ 8'<br>1 @ 8'<br>1 @ 5'<br>1 @ 10' | 0.444 & 0.293<br>0.186, 0.020, & 0.051<br>0.020 & 0.157<br>0.157 & 0.051 | 70.4 Ton<br>35.2 Ton<br>22.0 Ton<br>44.0 Ton | 51.9 Ton<br>9.1 Ton<br>3.9 Ton<br>9.2 Ton |
| Fog Coat:<br>SS1H or CSS1H Emulsified Asphalt<br>(Based on 0.05 Gal/SY, Apply at<br>0.10 Gal/SY diluted at 50-50) | Section #2<br>Section #3 | 1 @ 4'<br>2 @ 4.5' | 0.186<br>22.330 | 118 Gal<br>264 Gal | 22 Gal<br>5,896 Gal |

| PAVEMENT MARKING QUANTITIES | LF/MILE | QUANTITY LF |
|---|---|---|
| SHORT TERM PAVEMENT MARKING | | |
| Top of Microsurfacing Leveling (23.481 mi)<br>4" Yellow ℄ Skips: 10' Line, 30' Skip<br>4" Yellow Barrier Strip | <br>1320<br>990 | <br>30,995<br>23,247 |
| Top Microsurfacing Wearing (23.481 mi)<br>4" Yellow ℄ Skips: 10' Line, 30' Skip<br>4" Yellow Barrier Strip | <br>1320<br>990 | <br>30,995<br>23,247 |
| After ℄ Rumble Strip (18.419 mi)<br>4" Yellow ℄ Skips: 10' Line, 30' Skip<br>4" Yellow Barrier Strip | <br>1320<br>990 | <br>24,314<br>18,235 |
| After ℄ Rumble Strip Fog (18.419 mi)<br>4" Yellow ℄ Skips: 10' Line, 30' Skip<br>4" Yellow Barrier Strip | <br>1320<br>990 | <br>24,314<br>18,235 |
| PERMANENT PAVEMENT MARKING | | |
| Pavement Marking Painted Line (23.481 mi):<br>4" Yellow ℄ Skips: 10' Line, 30' Skip<br>4" Yellow Barrier Strip<br>4" White Edge Line | <br>1320<br>990<br>10560 | <br>30,995<br>23,247<br>247,960 |
| PREFORMED PATT PVMT MK-MESSAGE(GROOVED) | | |
| 2 Railroad Cross & 4 R's (RP 84.774)<br>6 Bands (12' lane) (RP 84.774) | | 121 SF<br>144 SF |

See Section 120, Sheet 1 for additional pvmt. markings.

| RUMBLE STRIPS | Center Line | Shoulder |
|---|---|---|
| RP 76.730 to<br>RP 88.720 = 11.990 Mile | 11.990 Mile | 23.980 Mile |
| RP 90.730 to<br>RP 94.734 = 4.004 Mile | 4.004 Mile | 8.008 Mile |
| RP 96.650 to<br>RP 99.075 = 2.425 Mile | 2.425 Mile | 4.850 Mile |
| TOTAL | 18.419 Miles | 36.838 Miles |

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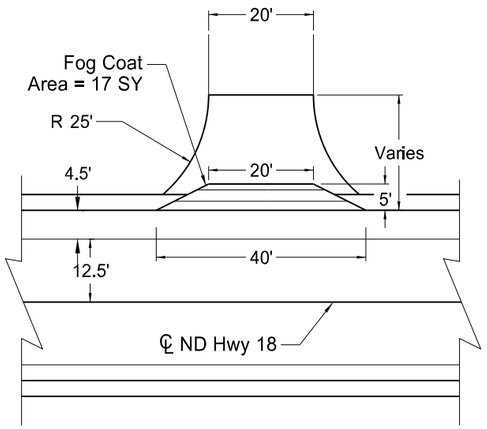
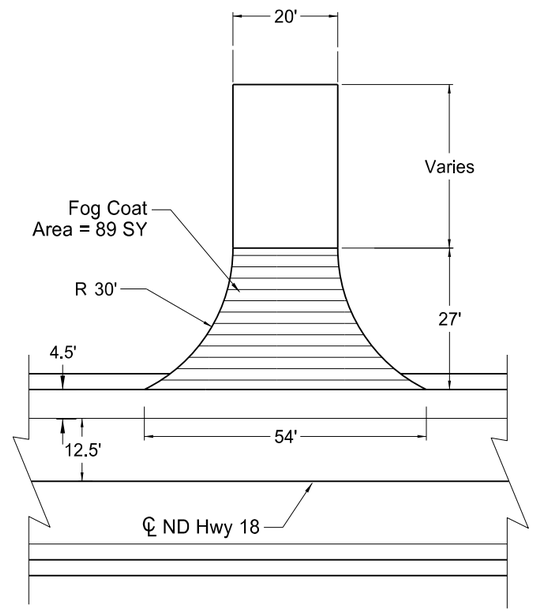
BASIS OF ESTIMATE

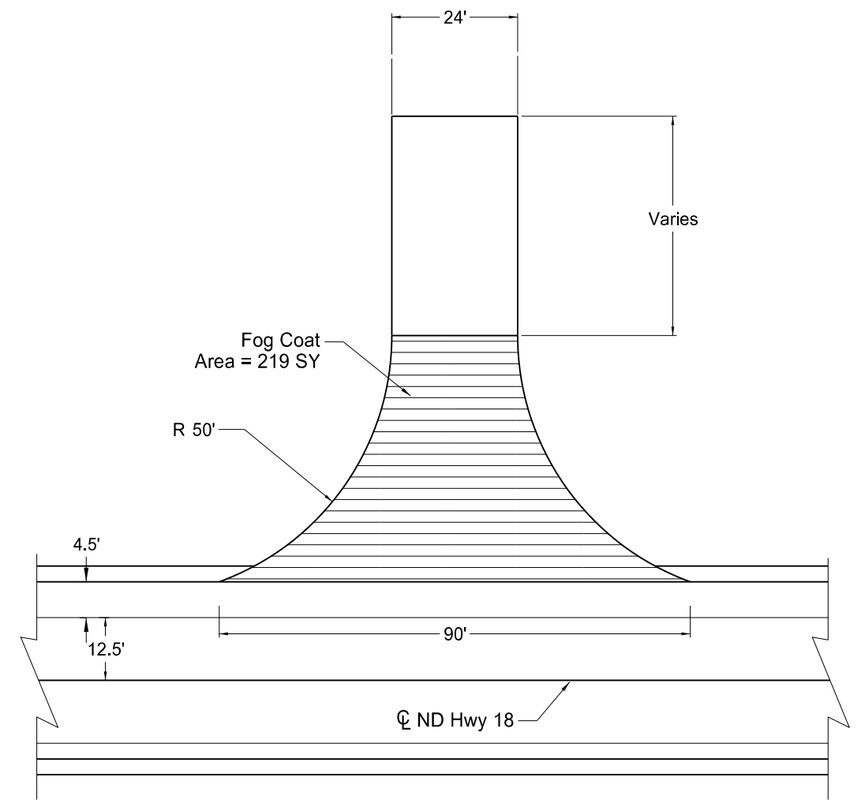
| STATE | PROJECT NO. | SECTION NO. | SHEET NO. |
|---|---|---|---|
| ND | SS-8-018(058)074 | 20 | 1 |



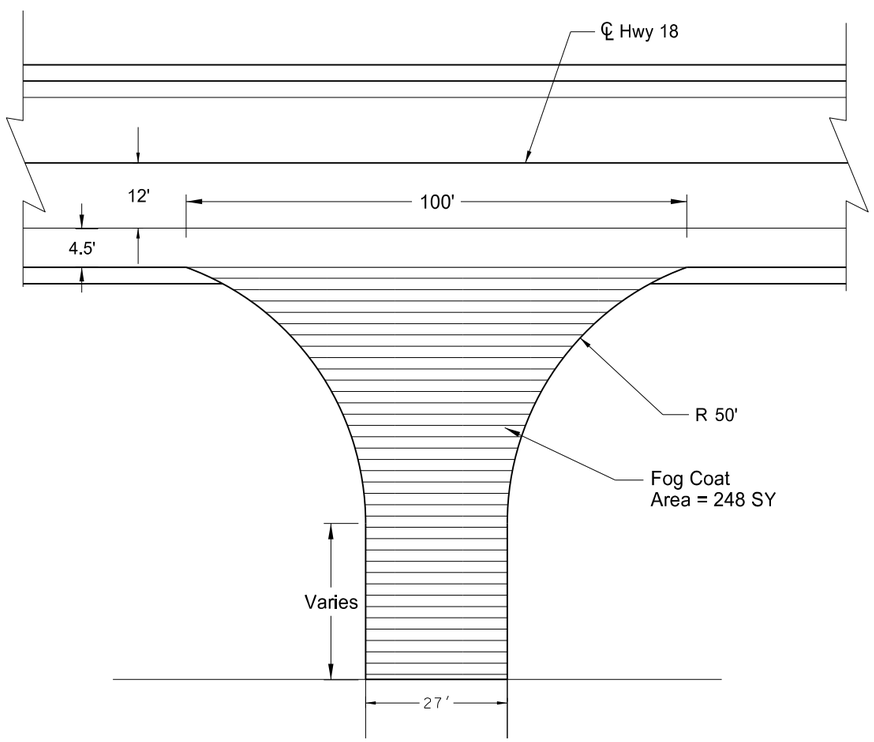

Field Drives




Private Drives




Township and Section Line Roads




Major Highway Intersections

RP 75.829, RP82.020, RP 86.020,
RP 90.016, & RP 93.059

| Additional Quantities | Each | SY | Total SY | Fog Coat: SS1H or CSS1H Emulsified Asphalt @ 0.05 Gal/SY (Apply at 0.10 Gal/SY at 50-50) |
|---|---|---|---|---|
| Field Drives | 38 | 17 | 646 | 33 Gal |
| Private Drives | 21 | 89 | 1,869 | 94 Gal |
| Township and Section Line Roads | 36 | 219 | 7,884 | 395 Gal |
| Major Highway Intersections | 9 | 248* | 2,232 | 112 Gal |

*Quantity includes Fogging Tappers and Turn Lanes

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APPROACH DETAILS

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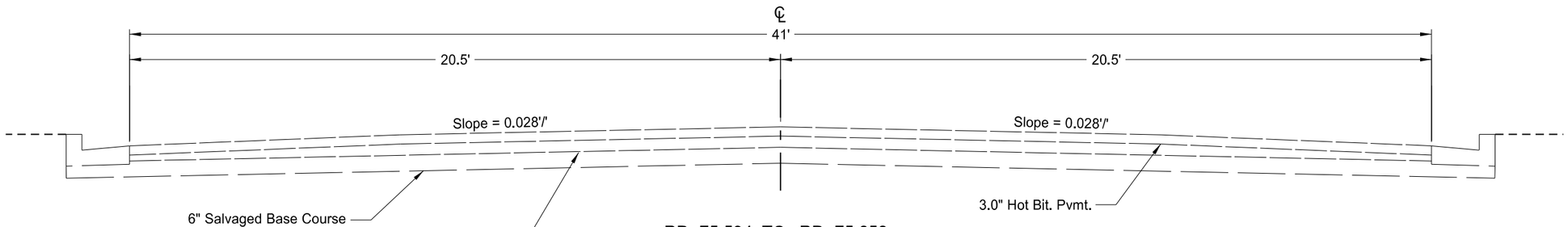
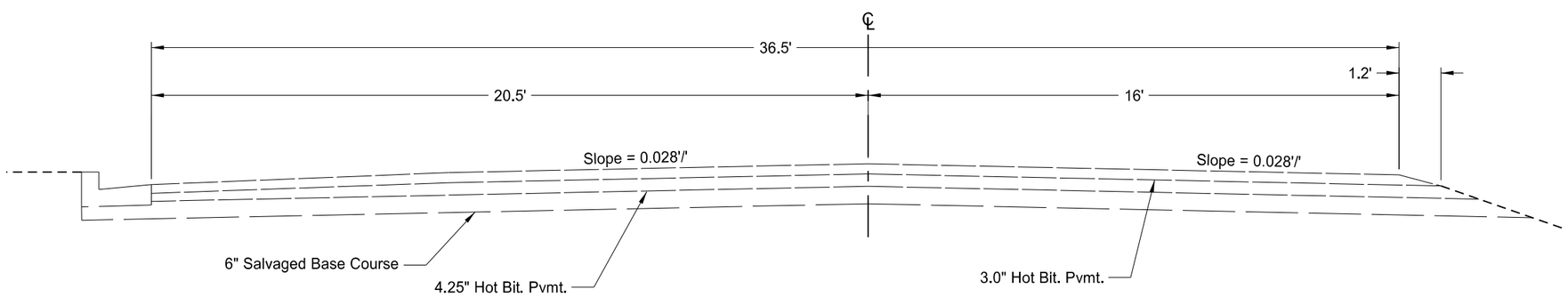



RP 75.594 TO RP 75.658
RP 89.414 TO RP 89.539
RP 89.767 TO RP 90.022
(Section #1)




RP 75.658 TO RP 75.844
(Section #2)

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EXISTING TYPICALS

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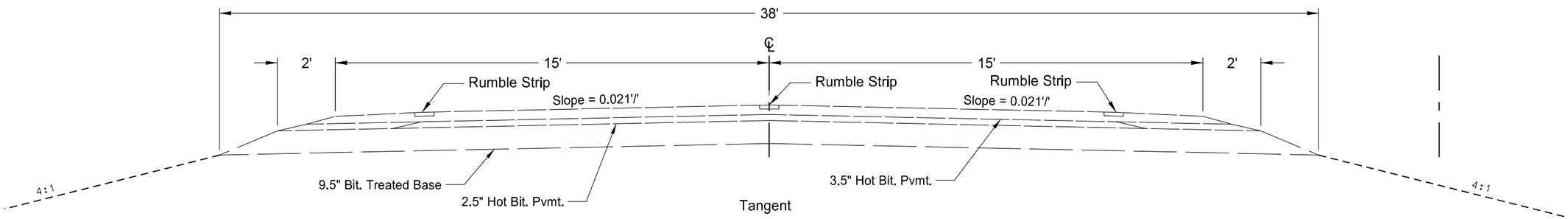
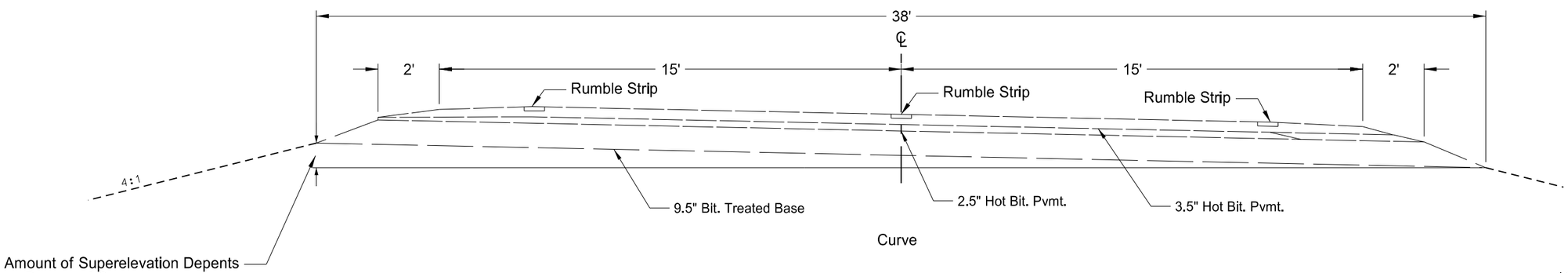
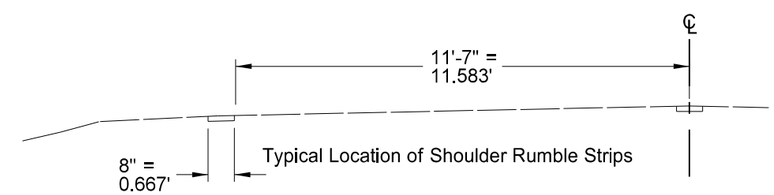


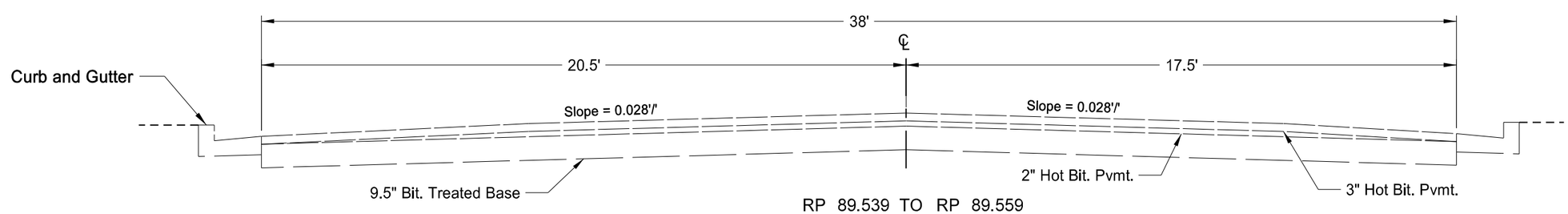

Tangent




Curve

RP 75.844 TO RP 89.414
RP 90.022 TO RP 95.603
RP 95.896 TO RP 99.075
(Section #3)




RP 89.539 TO RP 89.559
(Section #4)

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EXISTING TYPICALS

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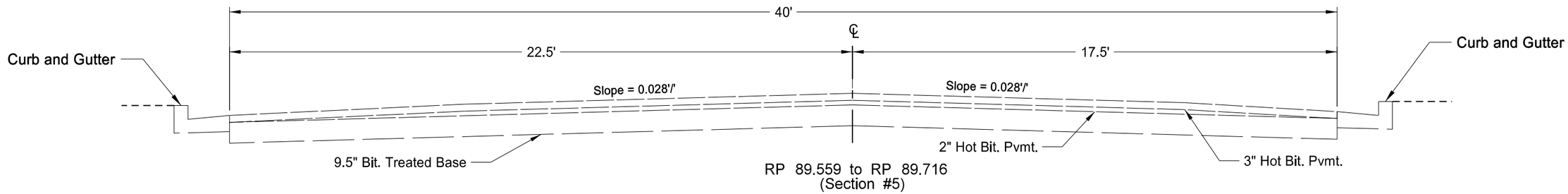
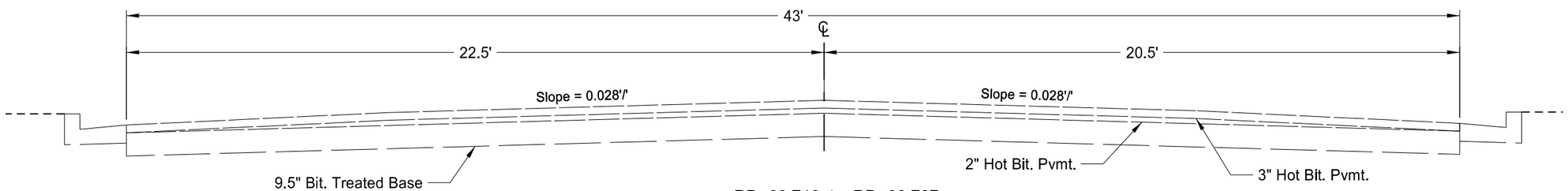
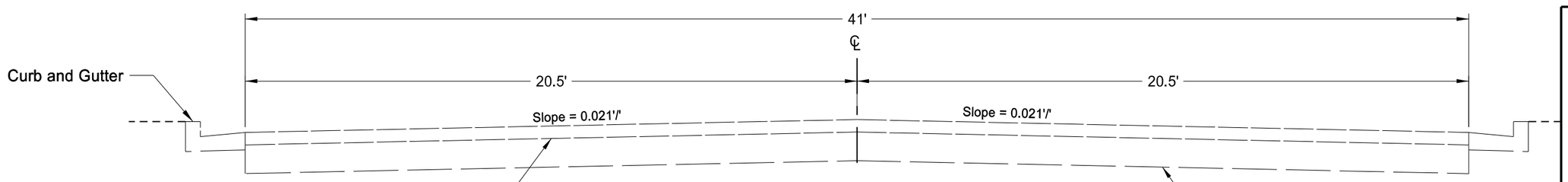
| ND | SS-8-018(058)074 | 30 | 3 |




RP 89.559 to RP 89.716
(Section #5)




RP 89.716 to RP 89.767
(Section #6)




RP 95.603 TO RP 95.896
(Section #7)

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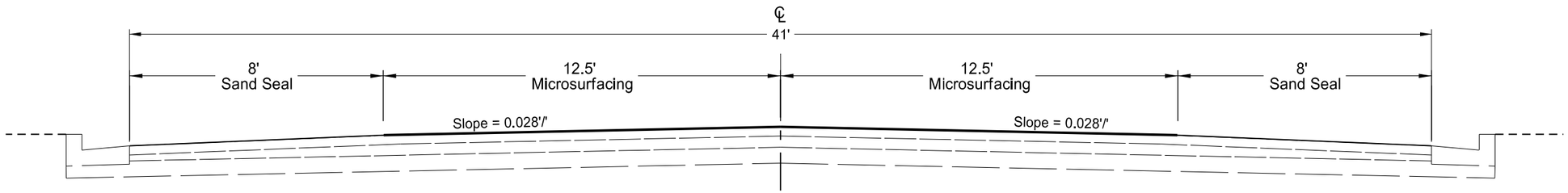
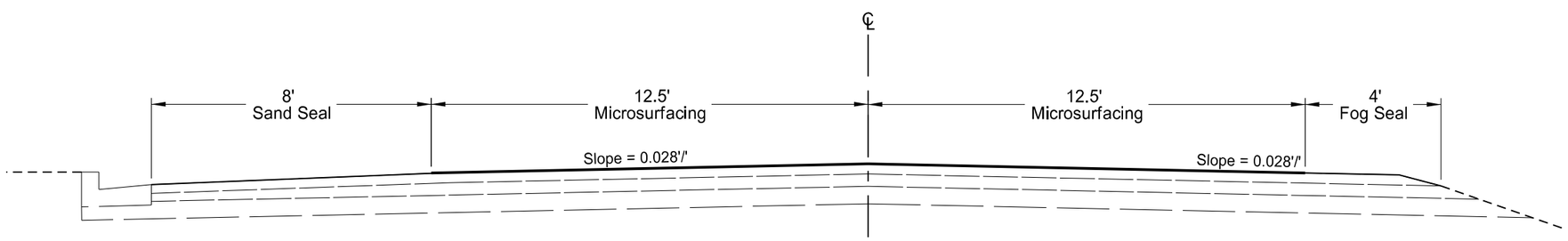
EXISTING TYPICALS

| STATE | PROJECT NO. | SECTION NO. | SHEET NO. |
|---|---|---|---|
| ND | SS-8-018(058)074 | 30 | 4 |




RP 75.594 TO RP 75.658
RP 89.414 TO RP 89.539
RP 89.767 TO RP 90.022
(Section #1)




RP 75.658 TO RP 75.844
(Section #2)

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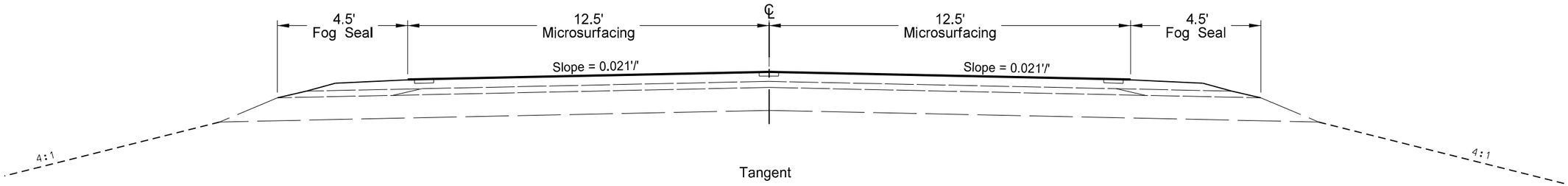
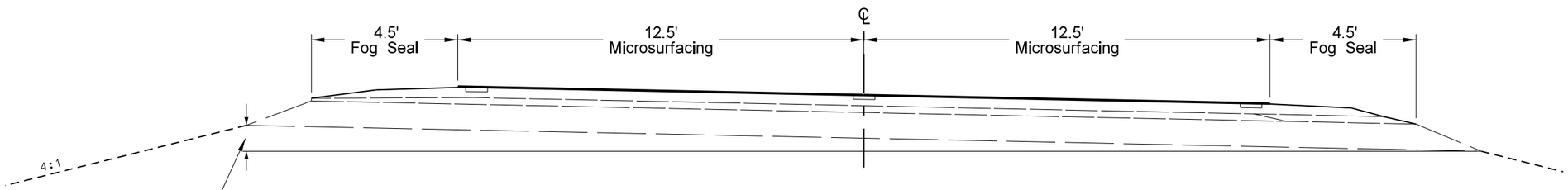
PROPOSED TYPICALS

| STATE | PROJECT NO. | SECTION NO. | SHEET NO. |
|---|---|---|---|
| ND | SS-8-018(058)074 | 30 | 5 |



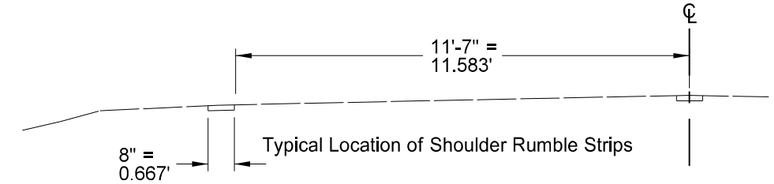

Tangent

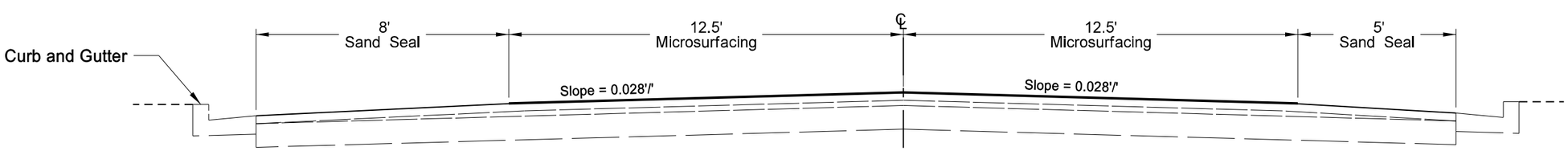



Amount of Superelevation Depents on Degree of Curve

Curve

RP 75.844 TO RP 89.414
RP 90.022 TO RP 95.603
RP 95.896 TO RP 99.075
(Section #3)




RP 89.539 TO RP 89.559
(Section #4)

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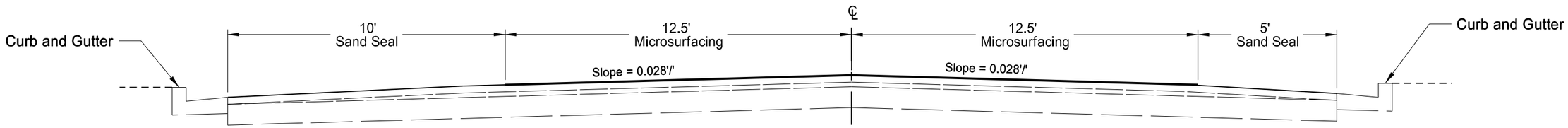
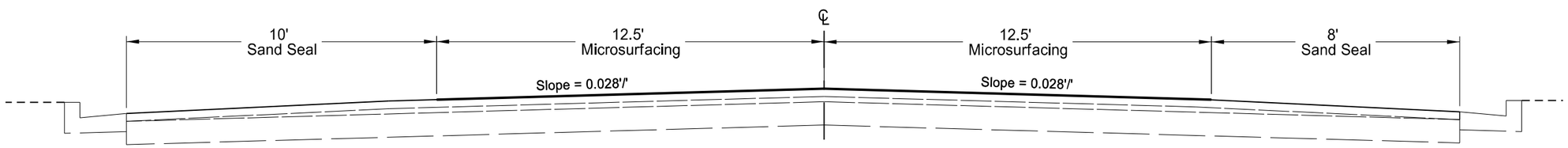
PROPOSED TYPICALS

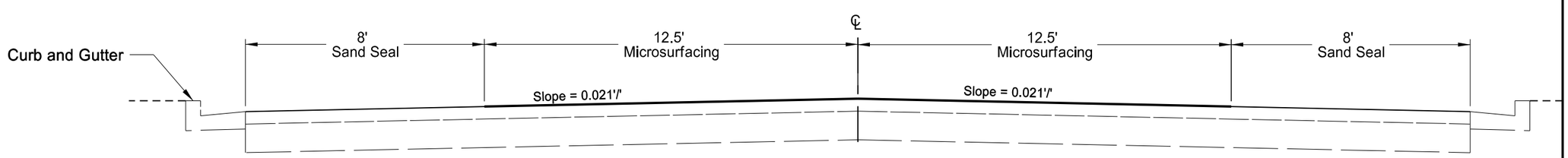
| STATE | PROJECT NO. | SECTION NO. | SHEET NO. |
|---|---|---|---|
| ND | SS-8-018(058)074 | 30 | 6 |




RP 89.559 to RP 89.716
(Section #5)




RP 89.716 to RP 89.767
(Section #6)




RP 95.603 TO RP 95.896
(Section #7)

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PROPOSED TYPICALS

| STATE | PROJECT NO. | SECTION NO. | SHEET NO. |
|---|---|---|---|
| ND | SS-8-018(058)074 | 100 | 1 |

| SIGN NUMBER | SIGN SIZE | DESCRIPTION | AMOUNT REQUIRED | UNITS PER AMOUNT | UNITS SUB TOTAL |
|---|---|---|---|---|---|
| D3-36 | 36"x6" | STREET NAME SIGN (Sign and installation only) | | 6 | |
| **G20-1-60** | **60"x24"** | **ROAD WORK NEXT __ MILES** | **2** | **34** | **68** |
| G20-1b-60 | 60"x24" | WORK IN PROGRESS/ NO WORK IN PROGRESS (Sign and installation only) | | 26 | |
| **G20-2-48** | **48"x24"** | **END ROAD WORK** | **2** | **19** | **38** |
| **G20-4-36** | **36"x18"** | **PILOT CAR FOLLOW ME (Mounted to back of pilot car)** | **1** | **18** | **18** |
| G20-10-108 | 108"x48" | CONTRACTOR SIGN | | 64 | |
| **G20-50a-72** | **72"x36"** | **ROAD WORK NEXT __ MILES RT & LT ARROWS** | **12** | **37** | **444** |
| G20-52a-72 | 72"x24" | ROAD WORK NEXT __ MILES RT or LT ARROW | | 30 | |
| G20-55-96 | 96"x48" | SPEED LIMIT ENFORCED - MINIMUM FEE $80 WHEN WORKERS PRESENT | | 59 | |
| M1-1-36 | 36"x36" | INTERSTATE ROUTE MARKER (Post and installation only) | | 10 | |
| M1-4-24 | 24"x24" | U.S. ROUTE MARKER (Post and installation only) | | 10 | |
| M1-5-24 | 24"x24" | STATE ROUTE MARKER (Post and installation only) | | 10 | |
| M3-1-24 | 24"x12" | NORTH (Mounted on route marker post) | | 7 | |
| M3-2-24 | 24"x12" | EAST (Mounted on route marker post) | | 7 | |
| M3-3-24 | 24"x12" | SOUTH (Mounted on route marker post) | | 7 | |
| M3-4-24 | 24"x12" | WEST (Mounted on route marker post) | | 7 | |
| M4-8-24 | 24"x12" | DETOUR (Mounted on route marker post) | | 7 | |
| M4-9-30 | 30"x24" | DETOUR ARROW RIGHT or LEFT/AHD AND RT or LT | | 15 | |
| M4-10-48 | 48"x18" | DETOUR ARROW RIGHT or LEFT | | 23 | |
| M5-1-21 | 21"x15" | ARROW AHD AND RT or LT(Mounted on route marker post) | | 7 | |
| M5-2-21 | 21"x15" | ARROW AHD UP & RT or LT (Mounted on route marker post) | | 7 | |
| M6-1-21 | 21"x15" | ARROW RT or LT (Mounted on route marker post) | | 7 | |
| M6-2-21 | 21"x15" | ARROW UP & RT or LT (Mounted on route marker post) | | 7 | |
| M6-3-21 | 21"x15" | ARROW AHD (Mounted on route marker post) | | 7 | |
| **R1-1-48** | **48"x48"** | **STOP** | **4** | **32** | **128** |
| **R1-1a-18** | **18"x18"** | **STOP and SLOW PADDLE Back to Back** | **4** | **5** | **20** |
| R1-2-60 | 60"x60" | YIELD | | 29 | |
| **R2-1-48** | **48"x60"** | **SPEED LIMIT __** | **4** | **39** | **156** |
| 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 | | 39 | |
| R4-7-48 | 48"x60" | KEEP RIGHT SYMBOL | | 39 | |
| R5-1-48 | 48"x48" | DO NOT ENTER | | 35 | |
| R6-1-36 | 36"x12" | ONE WAY RIGHT or LEFT | | 13 | |
| R7-1-12 | 12"x18" | NO PARKING | | 11 | |
| R10-6-24 | 24"x36" | STOP HERE ON RED | | 16 | |
| R11-2-48 | 48"x30" | ROAD CLOSED | | 28 | |
| R11-2a-48 | 48"x30" | STREET CLOSED | | 28 | |
| R11-3a-60 | 60"x30" | ROAD CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY | | 31 | |
| R11-3c-60 | 60"x30" | STREET CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY | | 31 | |
| R11-4a-60 | 60"x30" | STREET CLOSED TO THRU TRAFFIC | | 31 | |
| W1-3-48 | 48"x48" | RIGHT or LEFT SHARP REVERSE CURVE ARROW | | 35 | |
| W1-4-48 | 48"x48" | RIGHT or LEFT REVERSE CURVE ARROW | | 35 | |
| W1-4b-48 | 48"x48" | DOUBLE RIGHT or LEFT REVERSE CURVE ARROW | | 35 | |
| W1-6-48 | 48"x24" | LARGE ARROW | | 26 | |
| W3-1-48 | 48"x48" | STOP AHEAD SYMBOL | | 35 | |
| W3-3-48 | 48"x48" | SIGNAL AHEAD SYMBOL | | 35 | |
| **W3-4-48** | **48"x48"** | **BE PREPARED TO STOP** | **4** | **35** | **140** |
| **W3-5-48** | **48"x48"** | **SPEED REDUCTION AHEAD** | **2** | **35** | **70** |
| W4-2-48 | 48"x48" | RIGHT or LEFT LANE TRANSITION SYMBOL | | 35 | |
| W5-1-48 | 48"x48" | ROAD NARROWS | | 35 | |
| W5-8-48 | 48"x48" | THRU TRAFFIC RIGHT LANE | | 35 | |
| W5-9-48 | 48"x48" | ROAD WORK TRAFFIC ONLY DOWN & LT or RT ARROW | | 35 | |
| W6-3-48 | 48"x48" | TWO WAY TRAFFIC SYMBOL | | 35 | |
| **W8-1-48** | **48"x48"** | **BUMP** | **2** | **35** | **70** |
| W8-3-48 | 48"x48" | PAVEMENT ENDS | | 35 | |
| W8-7-48 | 48"x48" | LOOSE GRAVEL | | 35 | |
| W8-9a-48 | 48"x48" | SHOULDER DROP-OFF | | 35 | |
| **W8-11-48** | **48"x48"** | **UNEVEN LANES** | **2** | **35** | **70** |
| W8-12-48 | 48"x48" | NO CENTER STRIPE | | 35 | |
| W8-53-48 | 48"x48" | TRUCKS ENTERING HIGHWAY | | 35 | |
| **W8-54-48** | **48"x48"** | **TRUCKS ENTERING AHEAD or __ FT.** | **2** | **35** | **70** |
| **W8-55-48** | **48"x48"** | **TRUCKS CROSSING AHEAD or __ FT.** | **2** | **35** | **70** |
| W8-56-48 | 48"x48" | TRUCKS EXITING HIGHWAY | | 35 | |
| W9-3a-48 | 48"x48" | CENTER LANE CLOSED SYMBOL | | 35 | |
| W12-2-48 | 48"x48" | LOW CLEARANCE SYMBOL | | 35 | |
| W13-1-24 | 24"x24" | __ MPH ADVISORY SPEED PLATE (Mounted on warning sign post) | | 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** | **16** | **35** | **560** |
| 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** | **8** | **35** | **280** |
| W20-7k-24 | 24"x18" | __ FEET (Mounted on warning sign post) | | 10 | |
| W20-8-48 | 48"x48" | STREET CLOSED | | 35 | |
| W20-51-48 | 48"x48" | EQUIPMENT WORKING | | 35 | |
| **W20-52-54** | **54"x12"** | **NEXT __ MILES (Mounted on warning sign post)** | **4** | **12** | **48** |
| W21-1a-48 | 48"x48" | WORKERS SYMBOL | | 35 | |
| W21-2-48 | 48"x48" | FRESH OIL | | 35 | |
| W21-3-48 | 48"x48" | ROAD MACHINERY AHEAD or __ FT | | 35 | |

| SIGN NUMBER | SIGN SIZE | DESCRIPTION | AMOUNT REQUIRED | UNITS PER AMOUNT | UNITS SUB TOTAL |
|---|---|---|---|---|---|
| W21-5-48 | 48"x48" | SHOULDER WORK | | 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 | |
| | 24"x24" | TAKE TURNS (6" D letters) (Mounted on stop sign post) | | 11 | |

**SPECIAL SIGNS**

**SPEC & CODE**

| | | | |
|---|---|---|---|
| **704-1000** | **TRAFFIC CONTROL SIGNS** | **TOTAL UNITS** | **2250** |

| SPEC & CODE | DESCRIPTION | UNIT | QUANTITY |
|---|---|---|---|
| **704-0100** | **FLAGGING** | **MHR** | **325** |
| 704-1041 | ATTENUATION DEVICE-TYPE B-55 | EACH | |
| 704-1043 | ATTENUATION DEVICE-TYPE B-65 | EACH | |
| 704-1044 | ATTENUATION DEVICE-TYPE B-70 | EACH | |
| 704-1050 | TYPE I BARRICADES | EACH | |
| 704-1051 | TYPE II BARRICADES | EACH | |
| **704-1052** | **TYPE III BARRICADES** | **EACH** | **2** |
| 704-1060 | DELINEATOR DRUMS | EACH | |
| 704-1065 | TRAFFIC CONES | EACH | |
| 704-1067 | TUBULAR MARKERS | EACH | |
| 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 | |
| 704-1095 | TYPE B FLASHERS | EACH | |
| **704-1185** | **PILOT CAR** | **HR** | **80** |
| 704-3501 | PORTABLE PRECAST CONCRETE MED BARRIER | LF | |
| 704-3510 | PRECAST CONCRETE MED BARRIER - STATE FURNISHED | EACH | |
| 762-0200 | RAISED PAVEMENT MARKERS | EACH | |
| 762-0420 | SHORT TERM 4IN LINE - TYPE R | LF | |
| 762-0430 | SHORT TERM 4IN LINE - TYPE NR | LF | |
| 762-1500 | OBLITERATION OF PVMT MK | SF | |
| 772-2110 | FLASHING BEACON - POST MOUNTED | EACH | |

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

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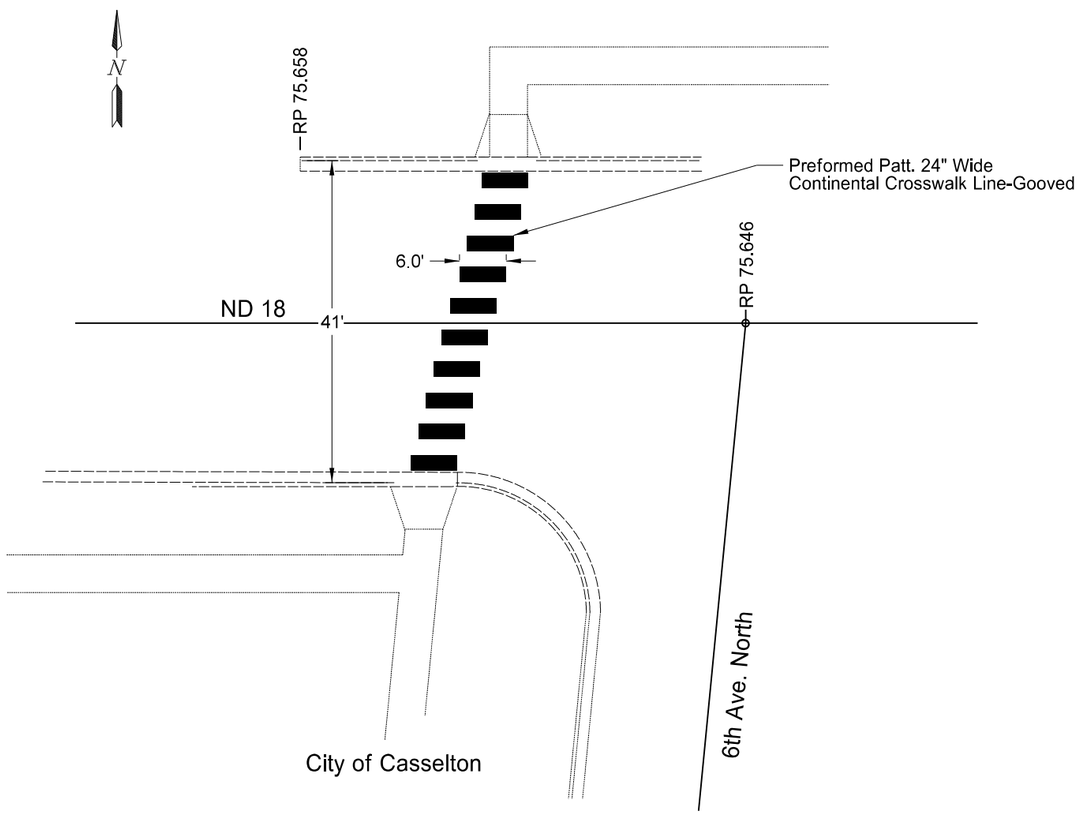
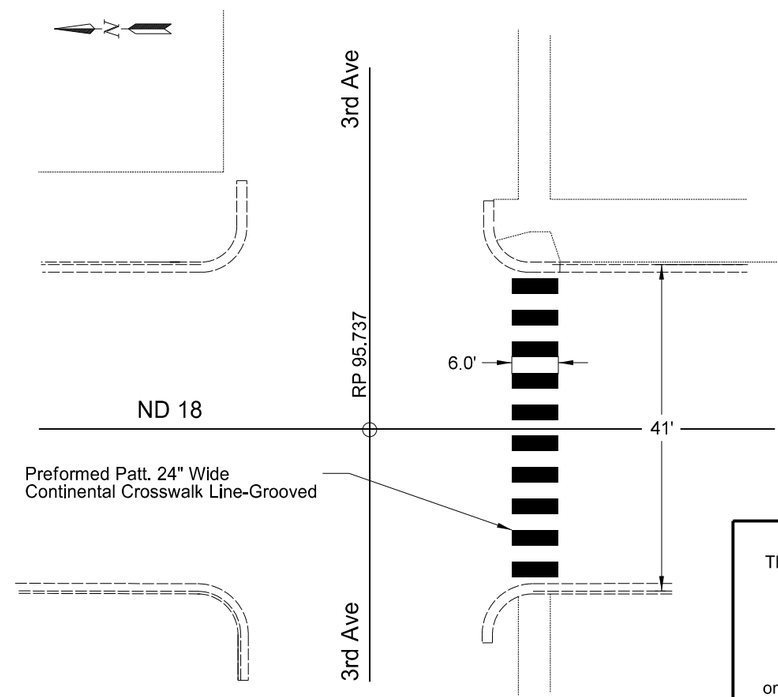
Traffic Control Devices List

| STATE | PROJECT NO. | SECTION NO. | SHEET NO. |
|---|---|---|---|
| ND | SS-8-018(058)074 | 120 | 1 |




762 1325 Preformed Patt. Pvmt. MK-24IN Line-Grooved
24" White Continental Crosswalk Line 60.0 LF
6' Long, 2' Line, 2' Skip




City of Hunter

762 1325 Preformed Patt. Pvmt. MK-24IN Line-Grooved
24" White Continental Crosswalk Line 60.0 LF
6' Long, 2' Line, 2' Skip

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PVMT MARKING LAYOUT

# 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 |
| ADA | Americans with Disabilities Act |
| A | ampere |
| & | and |
| Appr | approach |
| Approx | approximate |
| ACP | asbestos cement pipe |
| Asph | asphalt |
| AC | asphalt cement |
| Assmd | assumed |
| @ | at |
| Atten | attenuation |
| ATR | automatic traffic recorder |
| Ave | Avenue |
| Avg | average |
| ADT | average daily traffic |
| Az | azimuth |
| Bk | back |
| BF | back face |
| Bs | backsight |
| Balc | balcony |
| B Wire | barbed wire |
| Barr | barricade |
| Btry | battery |
| Brg | bearing |
| BI | beehive inlet |
| Beg | begin |
| BM | bench mark |
| Bkwy | bikeway |
| Bit | bituminous |
| Blk | block |
| Bd Ft | board feet |
| BH | bore hole |
| BS | both sides |
| Bot | bottom |
| Blvd | Boulevard |
| Bndry | boundary |
| BC | brass cap |
| Brkwy | breakaway |
| Br | bridge |
| Bldg | building |
| BV | butterfly valve |
| Byp | bypass |
| C Gdrl | cable guardrail |
| Calc | calculate |
| Cd | candela |
| CIP | cast iron pipe |
| CB | catch basin |
| CRS | cationic rapid setting |
| C Gd | cattle guard |
| C To C | center to center |
| Cl or ℄ | centerline |
| Cm | centimeter |
| Ch | chain |
| Chnlk | chain-link |
| Ch Blk | channel block |
| Ch Ch | channel change |
| Chk | check |
| Chsld | chiseled |
| Cir | circle |
| Cl | class |
| Cl | clay |
| Cl F | clay fill |
| Cl Hvy | clay heavy |
| Cl Lm | clay loam |
| Clnt | clean-out |
| Clr | clear |
| Cl&gr | clearing & grubbing |
| Co S | coal slack |
| Comb. | combination |
| Coml | commercial |
| Compr | compression |
| CADD | computer aided drafting & design |
| Conc | concrete |
| Cond | conductor |
| Const | construction |
| Cont | continuous |
| CSB | continuous split barrel sample |
| Contr | contraction |
| Contr | contractor |
| CP | control point |
| Coord | coordinate |
| Cor | corner |
| Corr | corrected |
| CAES | corrugated aluminum end section |
| CAP | corrugated aluminum pipe |
| CMES | corrugated metal end section |
| CMP | corrugated metal pipe |
| CPVCP | corrugated poly-vinyl chloride pipe |
| CSES | corrugated steel end section |
| CSP | corrugated steel pipe |
| C | coulomb |
| Co | County |
| Crse | course |
| C Gr | course gravel |
| CS | course sand |
| Ct | Court |
| Xarm | cross arm |
| Xbuck | cross buck |
| Xsec | cross sections |
| Xing | crossing |
| Xrd | Crossroad |
| Crn | crown |
| CF | cubic feet |
| M3 | cubic meter |
| M3/s | cubic meters per second |
| CY | cubic yard |
| Cy/mi | cubic yards per mile |
| Culv | culvert |
| C&G | curb & gutter |
| CI | curb inlet |
| CR | curb ramp |
| CS | curve to spiral |
| C | cut |
| Dd Ld | dead load |
| Defl | deflection |
| Defm | deformed |
| Deg or D | degree |
| Dlnt | delineate |
| Dlntr | delineator |
| Depr | depression |
| Desc | description |
| Det | detail |
| DWP | detectable warning panel |
| Dtr | detour |
| Dia | diameter |
| Dir | direction |
| Dist | distance |
| DM | disturbed material |
| DB | ditch block |
| DG | ditch grade |
| Dbl | double |
| Dn | down |
| Dwg | drawing |
| Dr | drive |
| Drwy | driveway |
| DI | drop inlet |
| D | dry density |
| Ea | each |
| Esmt | easement |
| E | East |
| EB | Eastbound |
| Elast | elastomeric |
| EL | electric locker |
| E Mtr | electric meter |
| Elec | electric/al |
| EDM | electronic distance meter |
| Elev or El | elevation |
| Ellipt | elliptical |
| Emb | embankment |
| Emuls | emulsion/emulsified |
| ES | end section |
| Engr | engineer |
| ESS | environmental sensor station |
| Eq | equal |
| Eq | equation |
| Evgr | evergreen |
| Exc | excavation |
| Exst | existing |
| Exp | expansion |
| Expy | Expressway |
| E | external of curve |
| Extru | extruded |
| FOS | factor of safety |
| F | Fahrenheit |
| FS | far side |
| F | farad |
| Fed | Federal |
| FP | feed point |
| Ft | feet/foot |
| Fn | fence |
| Fn P | fence post |
| FO | fiber optic |
| FB | field book |
| FD | field drive |
| F | fill |
| FAA | fine aggregate angularity |
| FS | fine sand |
| FH | fire hydrant |
| Fl | flange |
| Flrd | flared |
| FES | flared end section |
| F Bcn | flashing beacon |
| FA | flight auger sample |
| FL | flow line |
| Ftg | footing |
| FM | force main |
| Fs | foresight |
| Fnd | found |
| Fdn | foundation |
| Frac | fractional |
| Frwy | freeway |
| Frt | front |
| FF | front face |
| F Disp | fuel dispenser |
| FFP | fuel filler pipes |
| FLS | fuel leak sensor |
| Furn | furnish/ed |

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

06-15-10

REVISIONS

| DATE | CHANGE |
|---|---|
| 04-20-11 | Added Items |
| 03-15-13 | Added Items |
| 11-01-13 | Added Items |

This document was originally issued and sealed by Roger Weigel, Registration Number PE- 2930, on 11/01/13 and the original document is stored at the North Dakota Department of Transportation

# NDDOT ABBREVIATIONS

D-20-2

| | |
|---|---|
| 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 |
| NE | North East |
| NW | North West |
| NB | Northbound |
| No. or # | number |
| Obsc | obscure(d) |
| Obsn | observation |
| Ocpd | occupied |
| Ocpy | occupy |
| Off Loc | office location |
| O/s | offset |
| OC | on center |
| C | one dimensional consolidation |
| OC | organic content |
| Orig | original |
| O To O | out to out |
| OD | outside diameter |
| OH | overhead |
| PMT | pad mounted transformer |
| Pg | pages |
| Pntd | painted |
| Pr | pair |
| Pnl | panel |
| Pk | park |
| PK | Parker-Kalon nail |
| Pa | pascal |
| PSD | passing sight distance |
| Pvmt | pavement |
| Ped | pedestal |
| Ped | pedestrian |
| PPP | pedestrian pushbutton post |

| | |
|---|---|
| Pen. | penetration |
| Perf | perforated |
| Per. | perimeter |
| PL | pipeline |
| Pl | place |
| P&P | plan & profile |
| PL | plastic limit |
| Pl | plate |
| Pt | point |
| PCC | point of compound curve |
| PC | point of curve |
| PI | point of intersection |
| PRC | point of reverse curvature |
| PT | point of tangent |
| POC | point on curve |
| POT | point on tangent |
| PE | polyethylene |
| PVC | polyvinyl chloride |
| PCC | Portland Cement concrete |
| Lb or # | pounds |
| PP | power pole |
| Preempt | preemption |
| Prefab | prefabricated |
| Prfmd | preformed |
| Prep | preperation |
| Press. | pressure |
| PRV | pressure relief valve |
| Prestr | prestressed |
| Pvt | private |
| PD | private drive |
| Prod. | production/produce |
| Prog | programmed |
| Prop. | property |
| Prop Ln | property line |
| Ppsd | proposed |
| PB | pull box |

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

06-15-10

REVISIONS

| DATE | CHANGE |
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| 04-20-11 | Added Items |
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# NDDOT ABBREVIATIONS

D-20-3

| | |
|---|---|
| Qty | quantity |
| Qtr | quarter |
| Rad or R | radius |
| RR | railroad |
| Rlwy | railway |
| Rsd | raised |
| RTP | random traverse point |
| Rge or R | range |
| RC | rapid curing |
| Rec | record |
| Rcy | recycle |
| 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

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| 04-20-11 | Added Items |
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# NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

D-20-10

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

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

6-15-10

REVISIONS

| DATE | CHANGE |
|---|---|
| 04-20-11 | Added Items |
| 03-15-13 | Added Items |
| 11-01-13 | Added Items, Changed Standard Name to Include Organizations |

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# Line Styles

D-20-20

- 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
- D — Geotextile Fabric Type D
- E — Existing Electrical
- FO — Existing Fiber Optic Line
- FO — Existing TV Fiber Optic
- G — Existing Gas Pipe
- Geo — Geogrid
- OH — Existing Overhead Utility Line
- P — Existing Power
- PL — Existing Fuel Pipeline
- PL — Existing Undefined Above Ground Pipe Line
- R — Geotextile Fabric Type R
- R — Geotextile Fabric Type R1
- REMOVE — Remove Line
- RR — Geotextile Fabric Type RR
- S — Geotextile Fabric Type S
- S — Floating Silt Curtain
- T — Existing Telephone Line
- TV — Existing TV Line
- Void — Existing Assumed Ground (Not Surveyed)
- Void — Tentative Ground Line
- W — 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 | |
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D-20-21

# Line Styles

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

| NORTH DAKOTA DEPARTMENT OF TRANSPORTATION | |
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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 | |
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| | |

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# 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 | |
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| 4-20-11 | |
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| DATE | CHANGE |
| | |

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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
- CSB — Continuous Split Barrel Sample
- FA — Flight Auger Sample
- SB — Split Barrel Sample
- T — Thinwall Tube Sample
- Highway Sign
- SNOW GATE 18 FT
- SNOW GATE 28 FT
- SNOW GATE 40 FT
- N — Standard Penetration Test
- Transformer
- Incl — Inclinometer Tube
- Underdrain Cleanout
- Excavation Unit
- Water Valve

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

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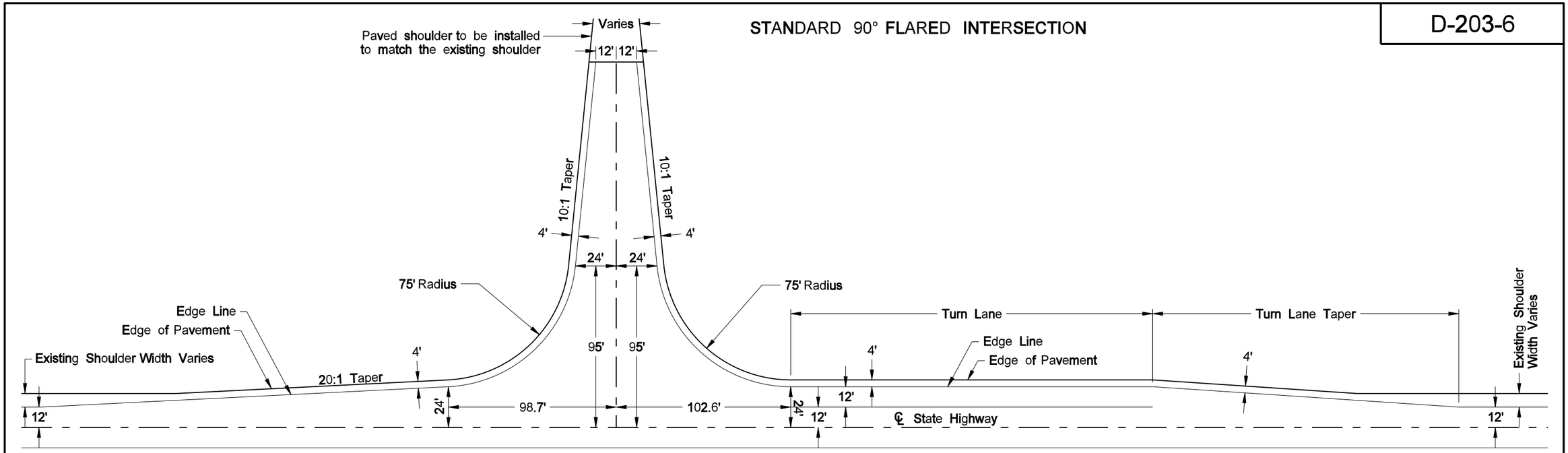
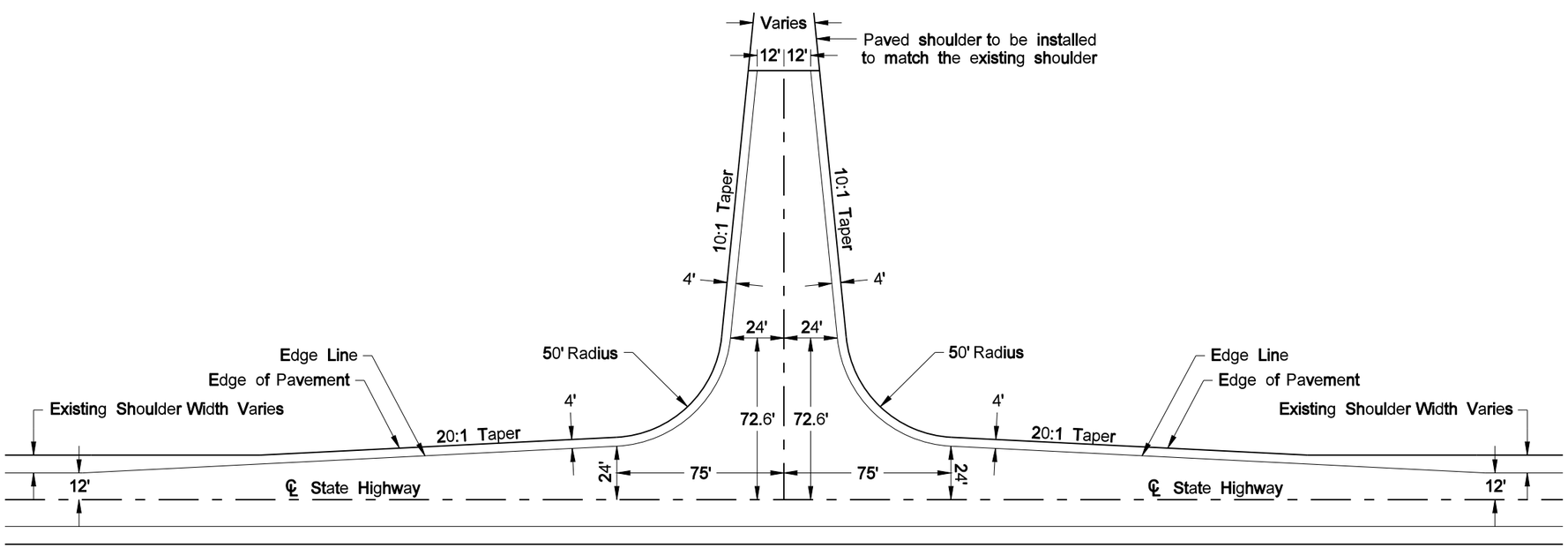
# STANDARD 90° FLARED INTERSECTION

D-203-6




Type B
90° Flared Intersection with Turn Lane




Type A
90° Flared Intersection

| NORTH DAKOTA DEPARTMENT OF TRANSPORTATION | |
|---|---|
| 5-19-09 | |
| REVISIONS | |
| DATE | CHANGE |

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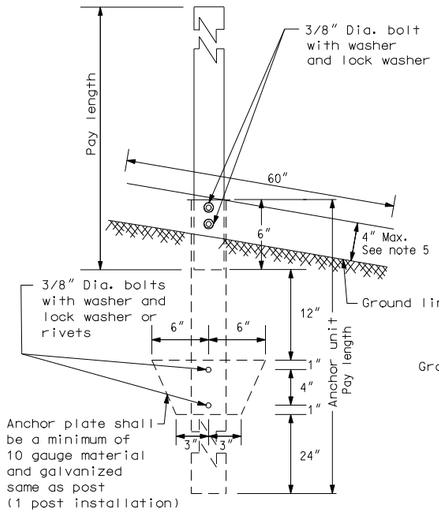
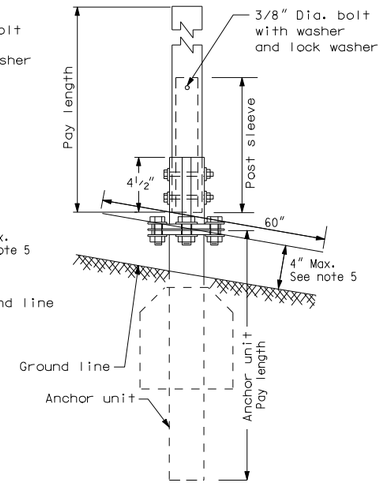
# BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

## PERFORATED TUBE

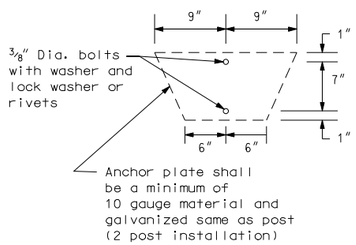
D-704-7

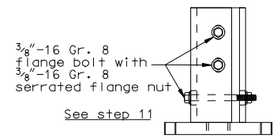


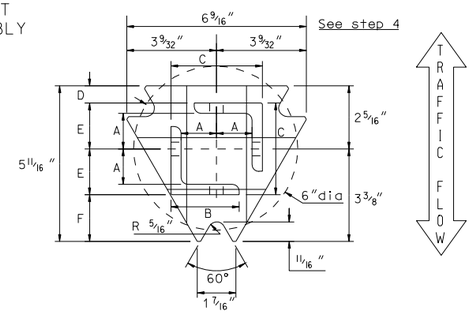

ANCHOR UNIT AND POST ASSEMBLY




SLIP BASE ANCHOR UNIT AND POST SLEEVE ASSEMBLY



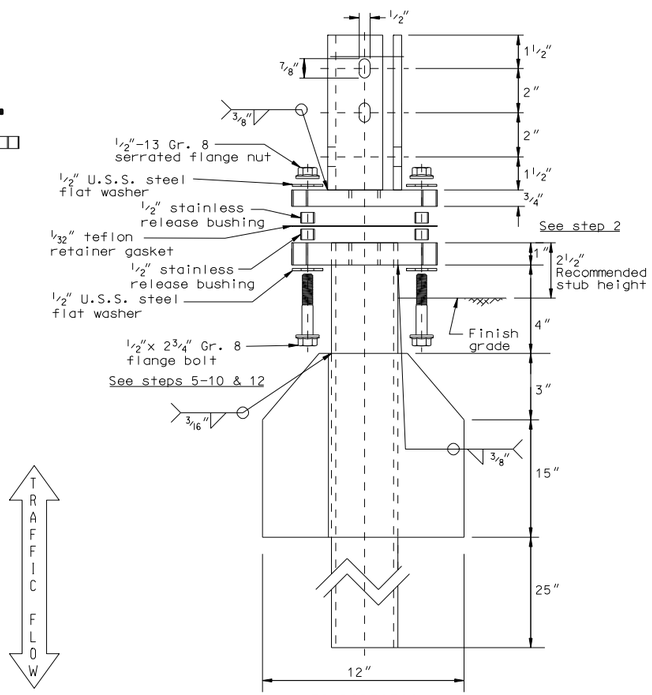




TOP POST RECEIVER

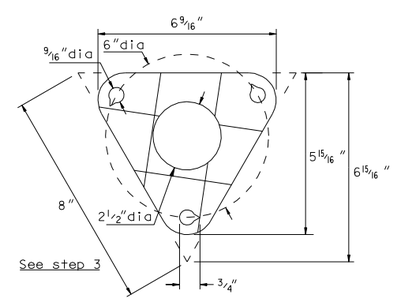
Materials: Plate - ASTM A572 grade 50
Angle receiver - 2 1/2"x 2 1/2"x 3/8" ASTM A36 structural angle

| 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 3/16" x 10 gauge may be inserted into 2 1/2" x 10 gauge for additional wind load.

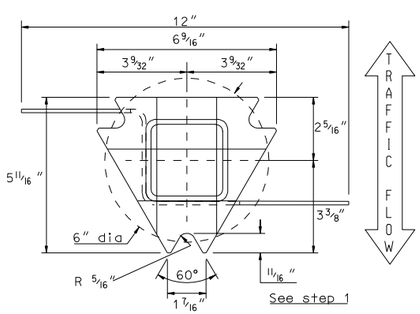



MULTI-DIRECTIONAL SLIP BASE ASSEMBLY




BOLT RETAINER FOR BASE CONNECTION

Materials: 1/32" reprocessed Teflon




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

Notes
1. Slip base bolts shall be torqued as specified by the manufacturer.
2. The 2 3/16" size 10 gauge is shown as 2.19" size on the plans. The 2 1/2" size 10 gauge is shown as 2.51" size on the plans.
3. Anchor for 2", 2 1/4", and 2 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.

| Number of Posts | Telescoping Perforated Tube | | | | | |
|---|---|---|---|---|---|---|
| | Post Size In. | Wall Thickness Gauge | Sleeve Size In. | Wall Thickness Gauge | Slip Base | Anchor Size Without Slip Base In. |
| 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 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.

| 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 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 1/2" flat washer on to 1 each inverted 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 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.<br>*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 3/8"-16 gr. 8 flange bolts and 3 each 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 1/2"-13 nuts to 42 ft-lbs, in a circular pattern until all bolt assemblies reach the required torque.<br>*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 |

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

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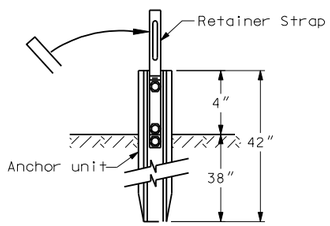
# BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8

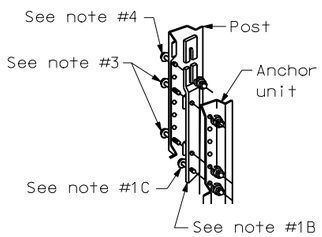
## FLANGED CHANNEL



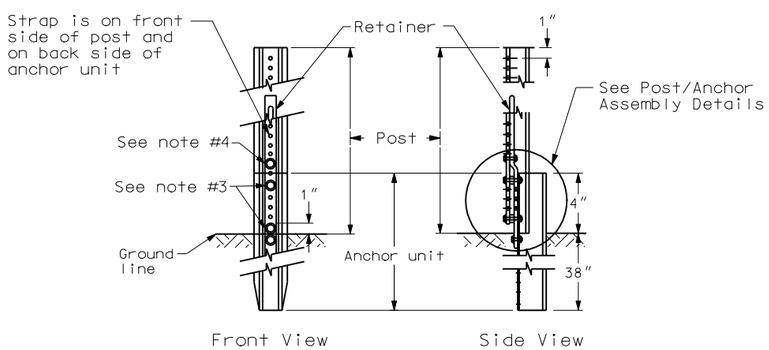

Anchor Unit & Strap Assembly Detail

STEPS OF INSTALLATION

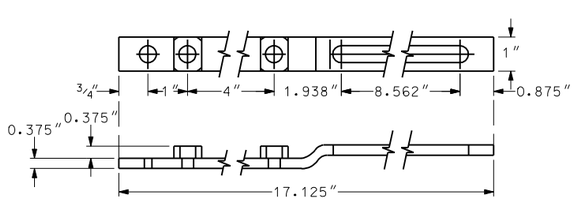
1. A) Drive anchor unit to within 12″ of ground level.
   B) Proper assembly established by lining up the top ¾″ slot of retainer spacer strap with top hole of anchor unit.
   C) Assemble strap to back of anchor unit using ⅜″-16 UNC x 2.0″ long bolt, lock washer and nut.
   D) Rotate strap 90° to left.
2. A) Drive anchor unit to 4″ dimension.
   B) Rotate strap to vertical position.
3. A) Place ⅜″-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 ¾″ slot in the strap).
   B) Alternately tighten two connector bolts.
4. A) Complete assembly by tightening ⅜″-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



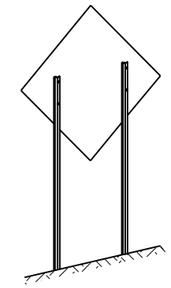

Sign Post Assembly Detail




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 |

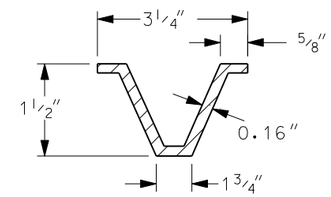
## 3 LB/FT U POSTS



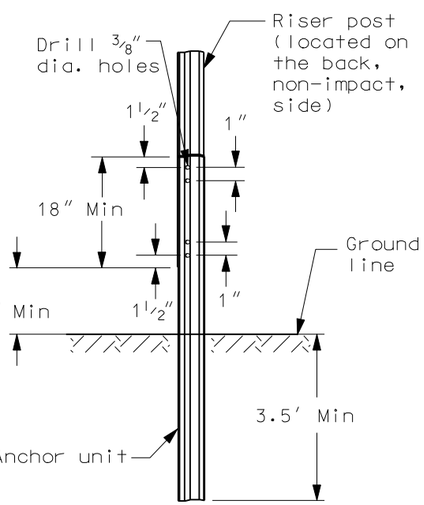
Typical Installation

Notes

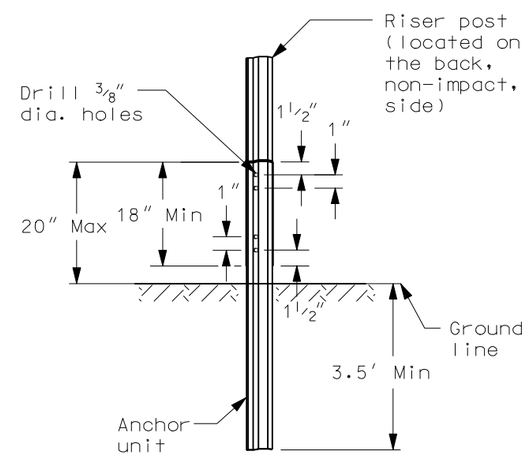
1. Use 3 lb/ft riser anchor units and risers
2. Driven riser posts shall be at least 7′ long and embedded at least 3.5′.
3. A splice shall overlap a minimum of 18″.
4. Use 4 bolts ⅝″ diameter with washers and nuts. Two at top and two at bottom of splice.
5. Anchor unit for guy wires shall be no more than 4″ above ground and embedded at least 3.5′.




U-Post Detail (3 lb/ft)




U-Channel Splice Option 2




U-Channel Splice Option 1

| 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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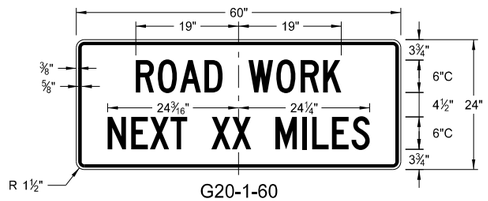
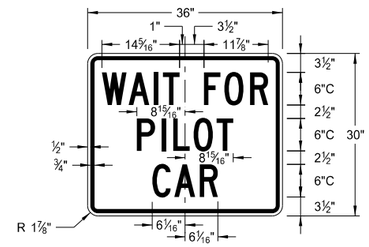
# CONSTRUCTION SIGN DETAILS
## TERMINAL AND GUIDE SIGNS




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




G20-4b-36
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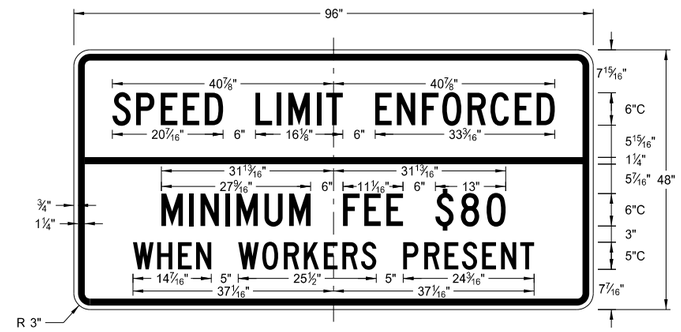
Background; orange




G20-55-96
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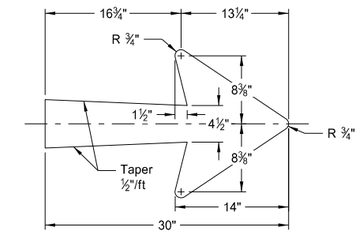
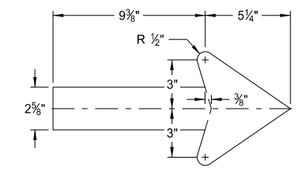
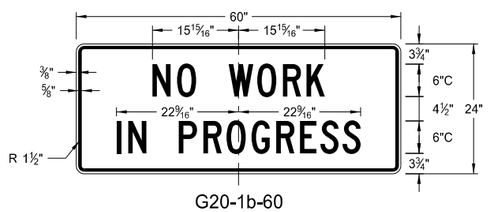
Background: orange



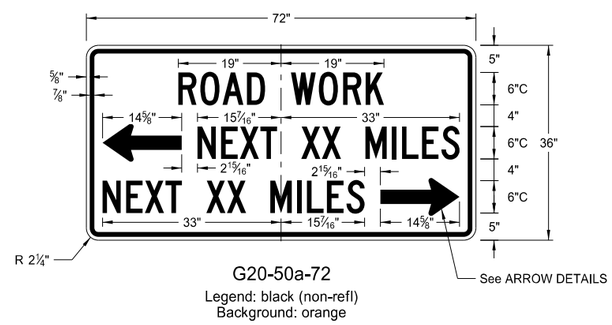

E5-1-48




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




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




G20-50a-72
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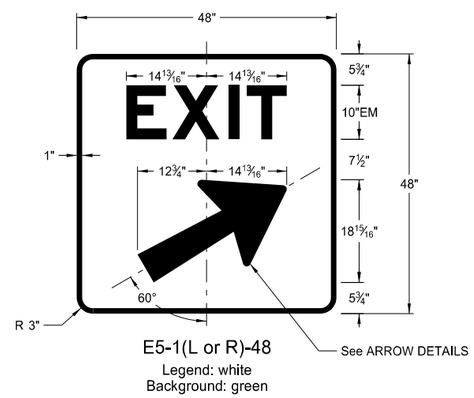
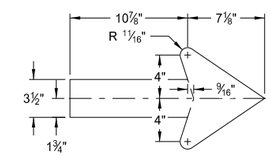
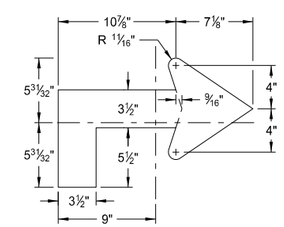
Background: orange



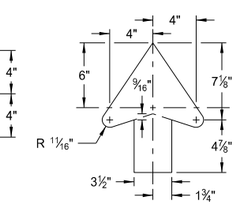

E5-1(L or R)-48
Legend: white
Background: green




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

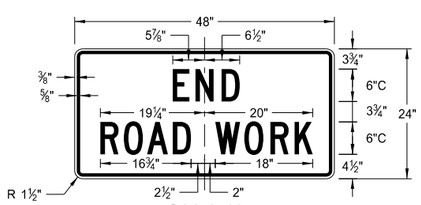



M4-9(L or R)-30
Advanced Right or Left

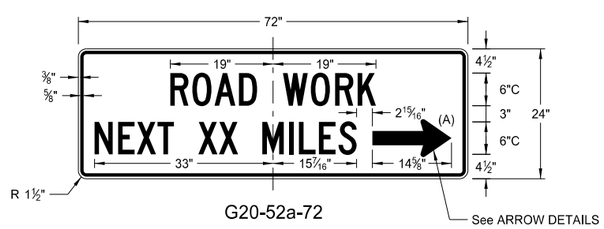



M4-9-30
Straight

ARROW DETAILS




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




G20-52a-72
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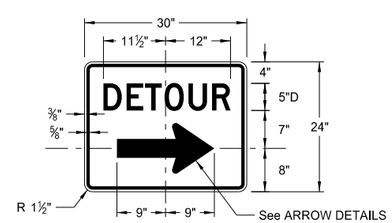
Background: orange




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

NOTES:

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

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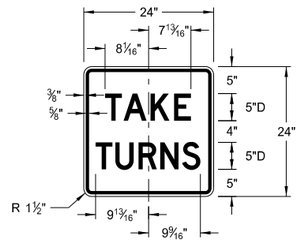
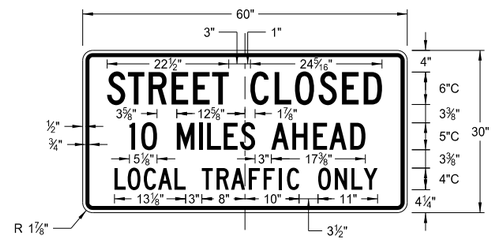
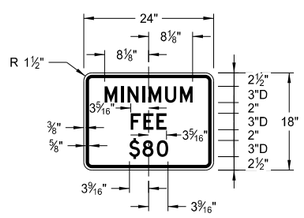
# CONSTRUCTION SIGN DETAILS
## REGULATORY SIGNS



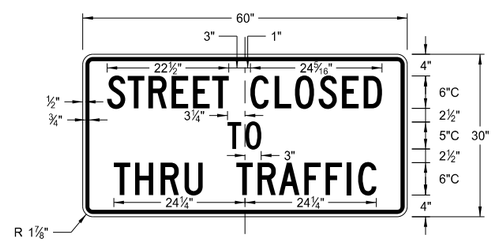

R1-50-24
Legend: black (non-refl)
Background: white




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




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




R11-4a-60
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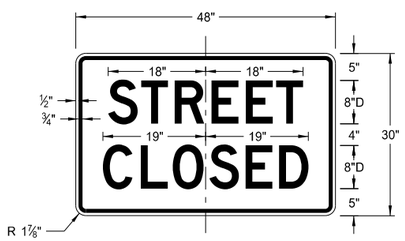


R11-2a-48
Legend: black (non-refl)
Background: white

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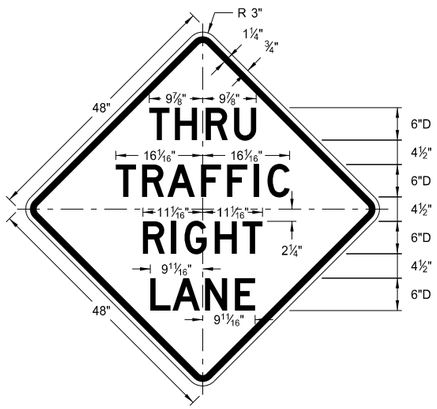
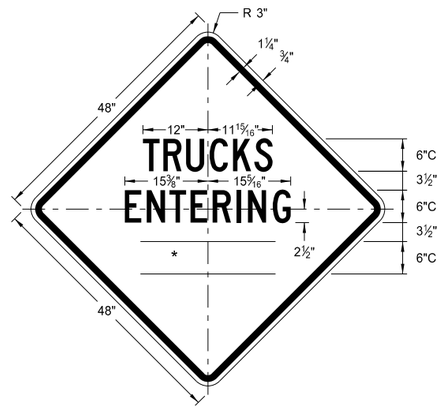
D-704-11

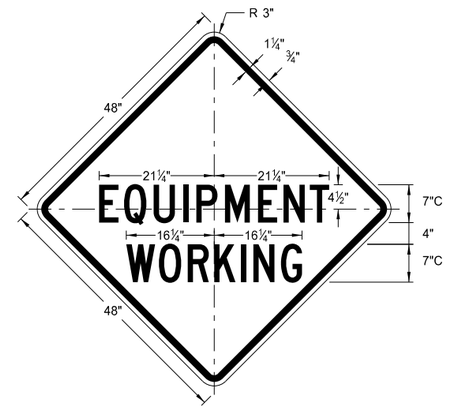
# CONSTRUCTION SIGN DETAILS
## WARNING SIGNS




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




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




W20-51-48
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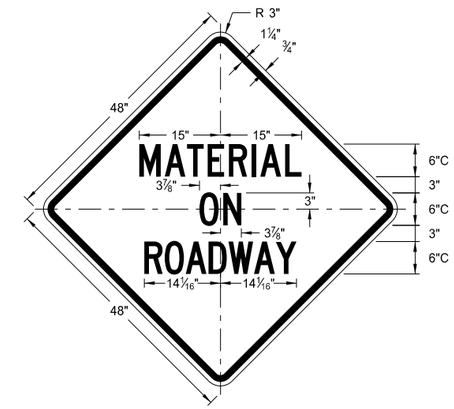
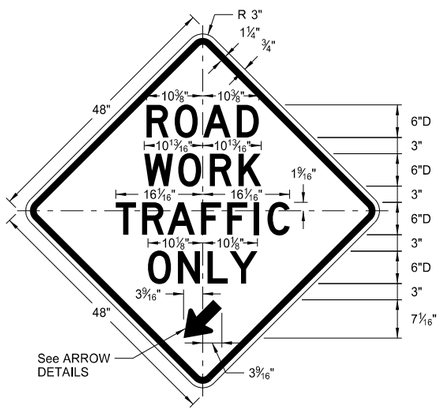
Background: orange



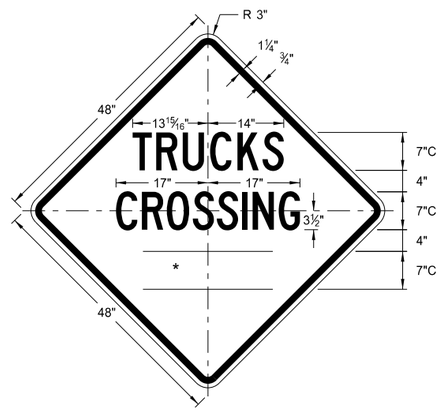

W21-51-48
Legend: black (non-refl)
Background: orange

| 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 |

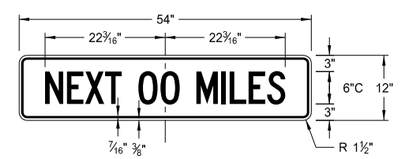
* DISTANCE MESSAGES




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




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




W20-52-54
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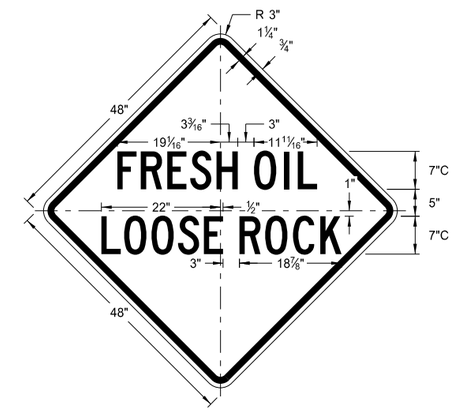
Background: orange




W22-8-48
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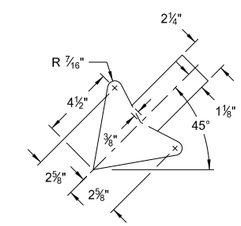
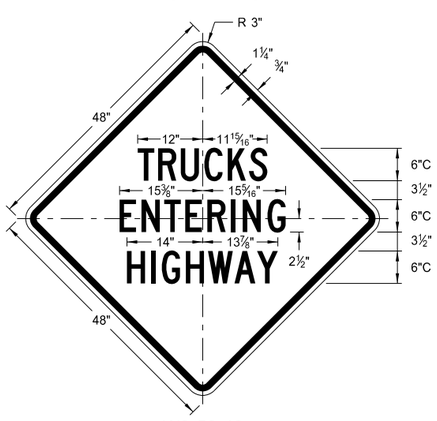
Background: orange

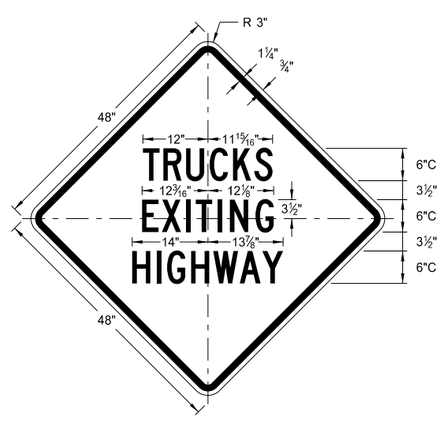



W5-9-48

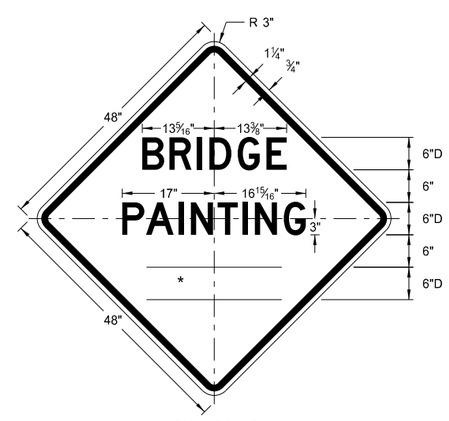
ARROW DETAILS




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




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




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

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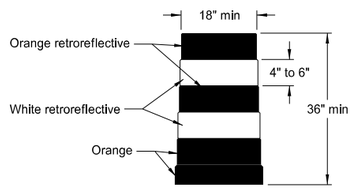
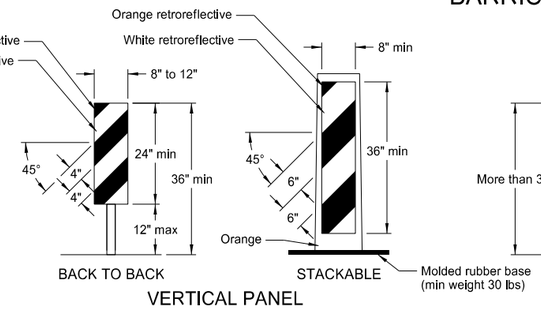
# BARRICADE AND CHANNELIZING DEVICE DETAILS

D-704-13



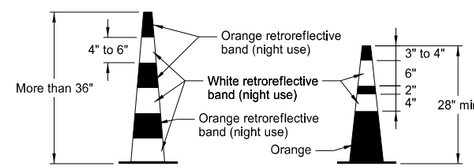

## DELINEATOR DRUM

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



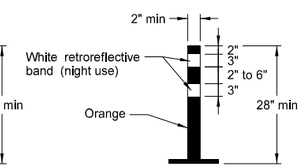

## VERTICAL PANEL

Markings for vertical panels shall be alternating orange and white retroreflective stripes, sloping downward in the direction vehicular traffic is to pass. Retroreflective sheeting shall be placed on both sides of panel and shall have a minimum of 270 square inches of retroreflective area facing vehicular traffic. Where the height of the retroreflective material on the vertical panel is 36 inches or more, a stripe width of 6 inches shall be used.



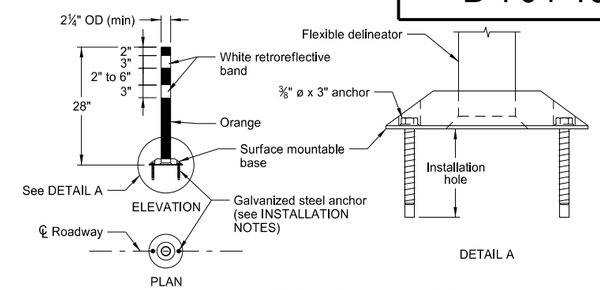

## TRAFFIC CONE

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




## TUBULAR MARKER

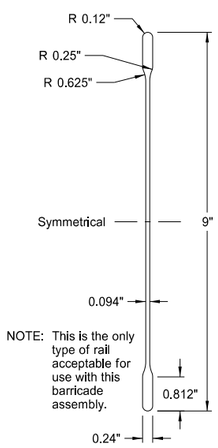
Retroreflectorization of tubular markers more than 42" in height shall be provided by alternating four 4" to 6" wide orange and white stripes with the top stripe being orange.




## FLEXIBLE DELINEATOR

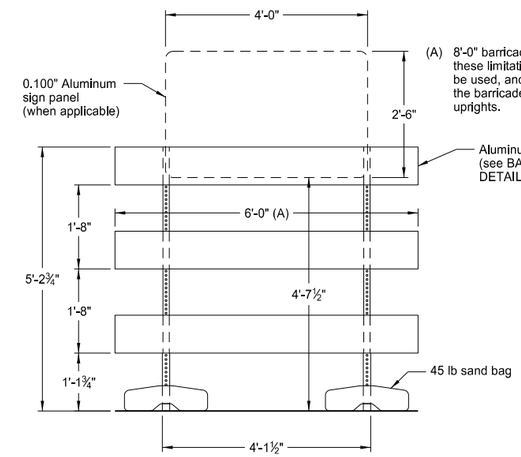
INSTALLATION NOTES:

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



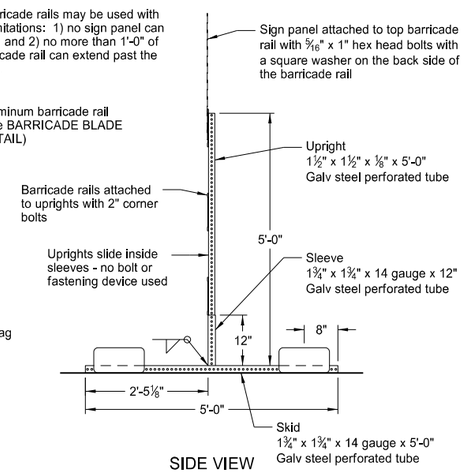

NOTE: This is the only type of rail acceptable for use with this barricade assembly.

## BARRICADE BLADE DETAIL



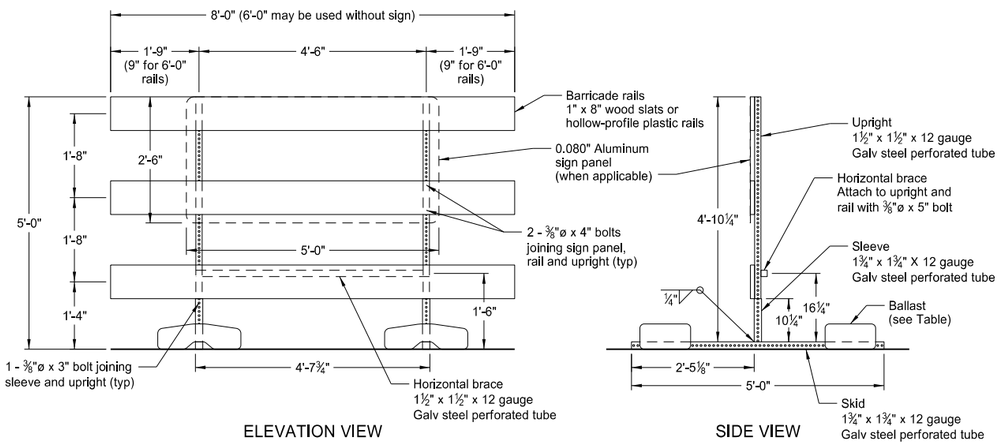

(A) 8'-0" barricade rails may be used with these limitations: 1) no sign panel can be used, and 2) no more than 1'-0" of the barricade rail can extend past the uprights.

## ELEVATION VIEW




## SIDE VIEW

## BARRICADE ASSEMBLY DETAIL
(Aluminum Barricade Rails)

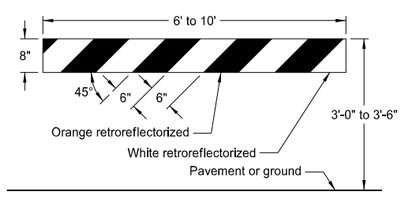



ELEVATION VIEW

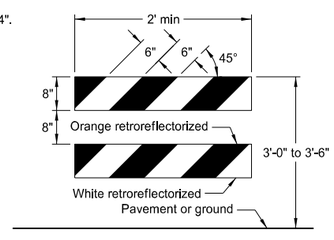
SIDE VIEW

## BARRICADE ASSEMBLY DETAIL
(Wood or Plastic Rails)

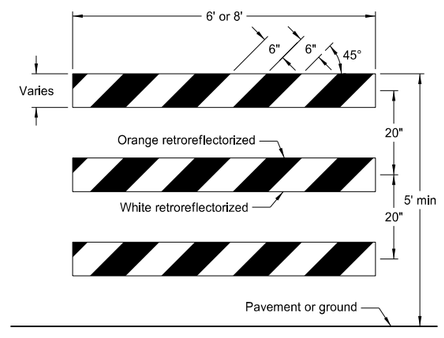
NOTE: Markings for barricades shall be alternating orange and white retroreflective stripes, sloping downward in the direction traffic is to pass. Retroreflective sheeting shall be placed on both sides of the rails and shall have a minimum of 270 square inches of visible retroreflective area facing vehicular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




## TYPE I BARRICADE

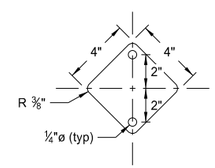


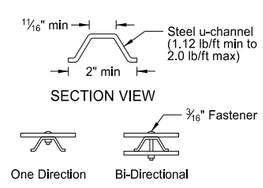

## TYPE II BARRICADE

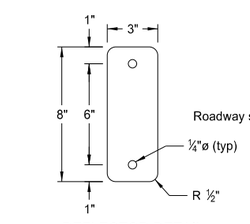



## TYPE III BARRICADE

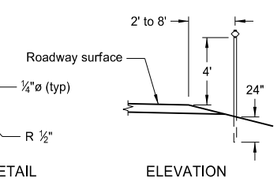
## BARRICADE RAIL DETAILS




REFLECTOR DETAIL




ELEVATION

## DELINEATORS

## MINIMUM BALLAST
(For each side of barricade support)

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

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

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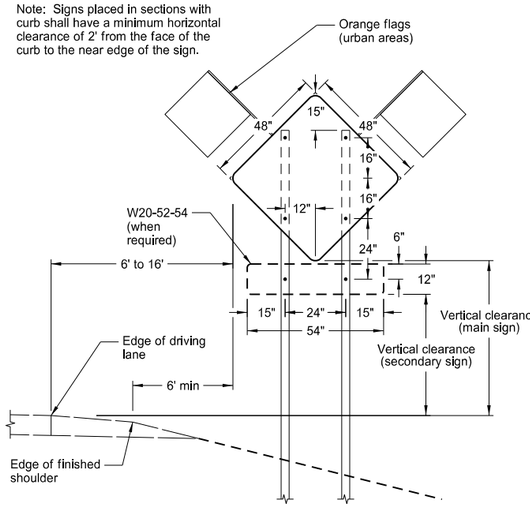
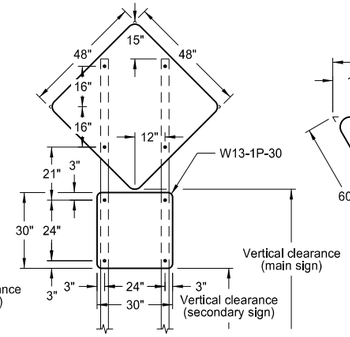
# CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

D-704-14

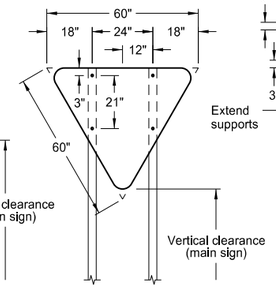
Note: Signs placed in sections with curb shall have a minimum horizontal clearance of 2' from the face of the curb to the near edge of the sign.



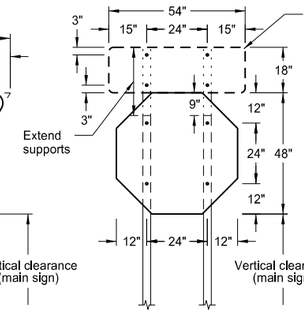

TYPICAL SECTION
(48" x 48" diamond warning sign shown)



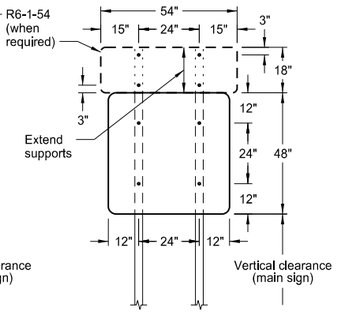

48" x 48" DIAMOND SIGN
(with 30" x 30" secondary sign)



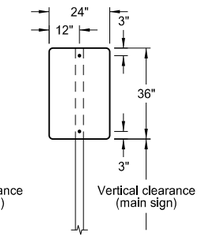

R1-2-60 - YIELD SIGN



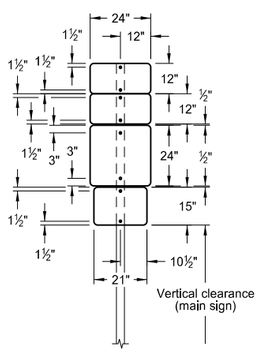

R1-1-48 - STOP SIGN
(with R6-1-54 sign as required)



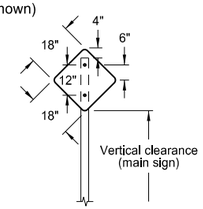

48" x 48" SIGN
(with R6-1-54 sign as required)



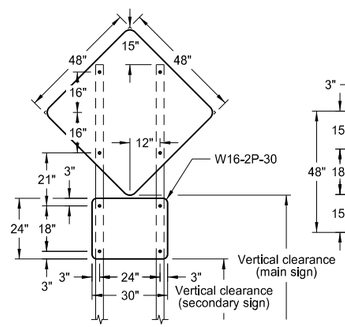

24" x 36" SIGN



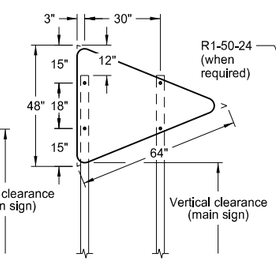

24" x 24"
ROUTE MARKER
ASSEMBLY



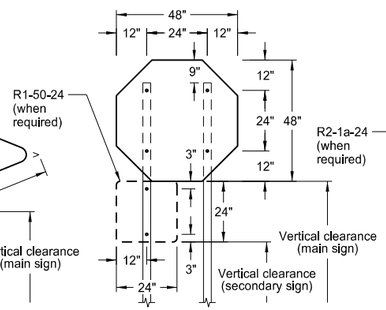

18" x 18"
DIAMOND SIGN



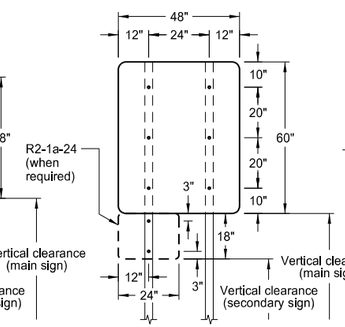

48" x 48" DIAMOND SIGN
(with 30" x 24" secondary sign)



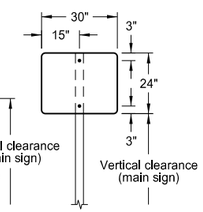

W14-3-64 - PENNANT SIGN



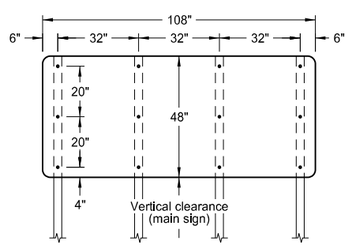

R1-1-48 - STOP SIGN
(with R1-50-24 sign as required)



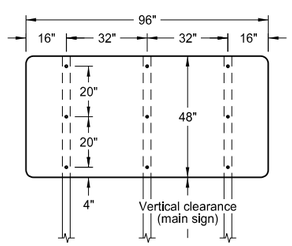

48" x 48" SIGN
(with R2-1a-24 sign as required)



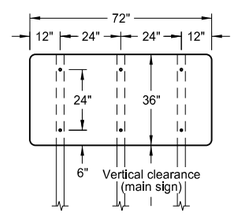

30" x 24" SIGN



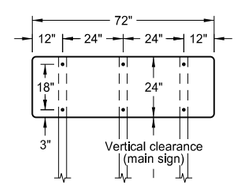

108" x 48" SIGN



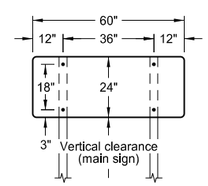

96" x 48" SIGN



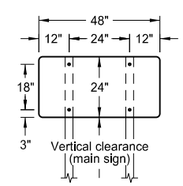

72" x 36" SIGN



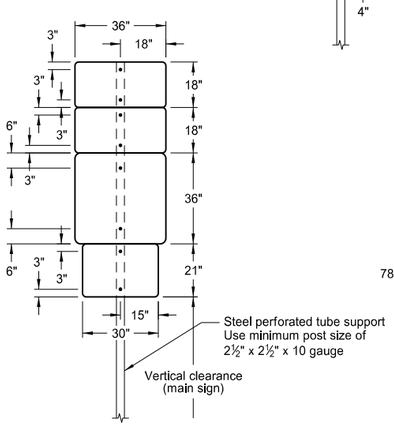

72" x 24" SIGN



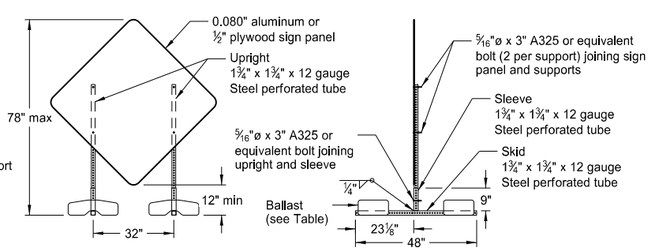

60" x 24" SIGN



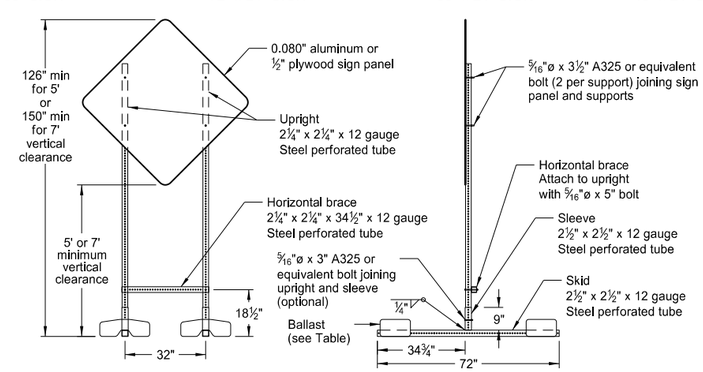

48" x 24" SIGN




36" x 36"
ROUTE MARKER
ASSEMBLY




PORTABLE SIGN SUPPORT
LOW-MOUNTING HEIGHT




PORTABLE SIGN SUPPORT
HIGH-MOUNTING HEIGHT

NOTES:

1. Sign Supports: Supports shall be galvanized or painted. Minimum post sizes are 2.5 lb/ft u-channel or 2" x 2" x 12 gauge steel perforated tube, except where noted. When installing signs on u-channel, the minimum post size for assemblies containing a secondary sign is 3.0 lb/ft. Post sizes are based on a wind speed of 55 MPH.

   Signs over 50 square feet should be installed on 2½" x 2½" perforated tube supports as a minimum.

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

2. Sign Panels: Provide sign panels made of 0.100" aluminum, ½" plywood, or other approved material, except where noted. All holes to be punched round for ⅜" bolts.

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

4. Route Marker Auxiliary Signs: Provide route marker auxiliary signs, such as the cardinal direction and directional arrows, with a background and legend that match the route marker they are used with:

   Interstate - white legend on blue background
   Interstate Business Loop - white legend on green background
   US and State - black legend on white background
   County - yellow legend on blue background

5. Vertical Clearance: Install signs with a vertical clearance of 5'-0" (see TYPICAL SECTION.) In areas where parking or pedestrian movements are likely or the view of the sign may be obstructed, install signs with a vertical clearance of 7'-0" from the top of the curb or from the near edge of the driving lane in absence of a curb.

   The vertical clearance to secondary signs is 1'-0" less than the vertical clearance as stated above.

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

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

   When portable signs are used for 5 days or less, low-mounting height (minimum 12" vertical clearance) sign supports may be used as long as the view of the sign is not obstructed. Time delays caused by unforseen circumstances, such as equipment breakdown, rain, subgrade failures, etc., will not accrue towards the 5 day period. The R9-8 through R9-11a series, W1-6 through W1-8 series, M4-10, and E5-1 may be used for longer than 5 days.

   Signs mounted to the portable sign supports shown in the LOW-MOUNTING HEIGHT and HIGH-MOUNTING HEIGHT Details shall have a maximum surface area of 16 square feet.

MINIMUM BALLAST
(For each side of sign support base)

| Sign Panel Mounting Height (ft) | Number of 25 lb sandbags for 4' x 4' sign panel |
|---|---|
| 1' | 6 |
| 5' | 8 |
| 7' | 10 |

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

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

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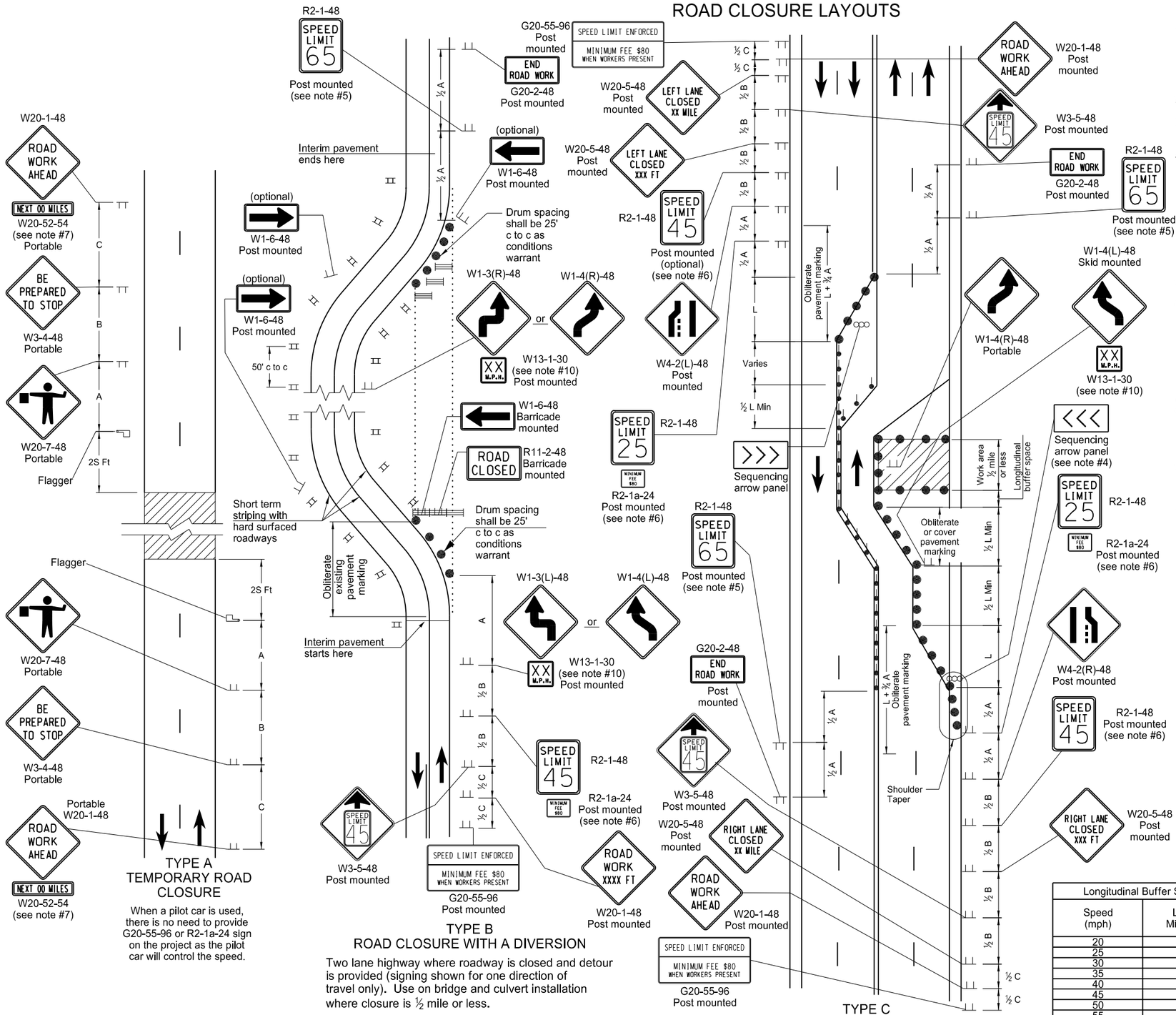
# ROAD CLOSURE LAYOUTS

D-704-15




## TYPE A TEMPORARY ROAD CLOSURE

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

## TYPE B ROAD CLOSURE WITH A DIVERSION

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

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

4 lane undivided highway with half the roadway closed.

Notes

1. Variables
   S = Numerical value of speed limit or 85th percentile.
   W = The width of taper.
   L = Minimum length of taper, or S x W for freeways, expressways, and all other roads with speeds of 45 mph or greater, or W x $S^2/60$ for urban, residential, and other streets with speeds of 40 mph or less.
2. Barricades placed on roadway shall be on a moveable assembly. Signs placed on roadway shall be placed on skid mounted assemblies.
3. Delineator drums, barricades or cones used for tapering traffic shall be spaced at the dimension "S". Delineator drums or cones used for tangents shall be spaced at 2 times dimension "S".
4. Sequencing Arrow Panels
   Panels should normally be placed at the beginning of the taper. Where shoulder width does not provide sufficient room, the panel should be moved closer to the work area so that it can be placed on the roadway surface. See Shoulder Closure Standard Drawing.
   Type A shall be used on roadways with slow moving traffic speeds and low volume (25 mph or less and 750 ADT or less).
   Type B shall be used on roadways with moderate traffic speeds and volumes (40 mph or less and 5000 ADT or less).
   Type C shall be used on roadways with high traffic speeds and volumes (over 40 mph or over 5000 ADT).
5. The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
6. The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 mph below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 mph. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit sign shall be placed at ½ B.
7. Use when work area is 1 mile or longer.
8. When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
9. Existing speed limit signs within a reduced speed zone shall be covered.
10. Where necessary, safe speed to be determined by the Engineer.
11. The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
12. G20-55-96 sign is not required if this standard is part of other traffic control layouts, or the work is less than 15 days.

ADVANCE WARNING SIGN SPACING

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

KEY

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

Longitudinal Buffer Space

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

REVISIONS

| DATE | CHANGE |
|---|---|
| | |

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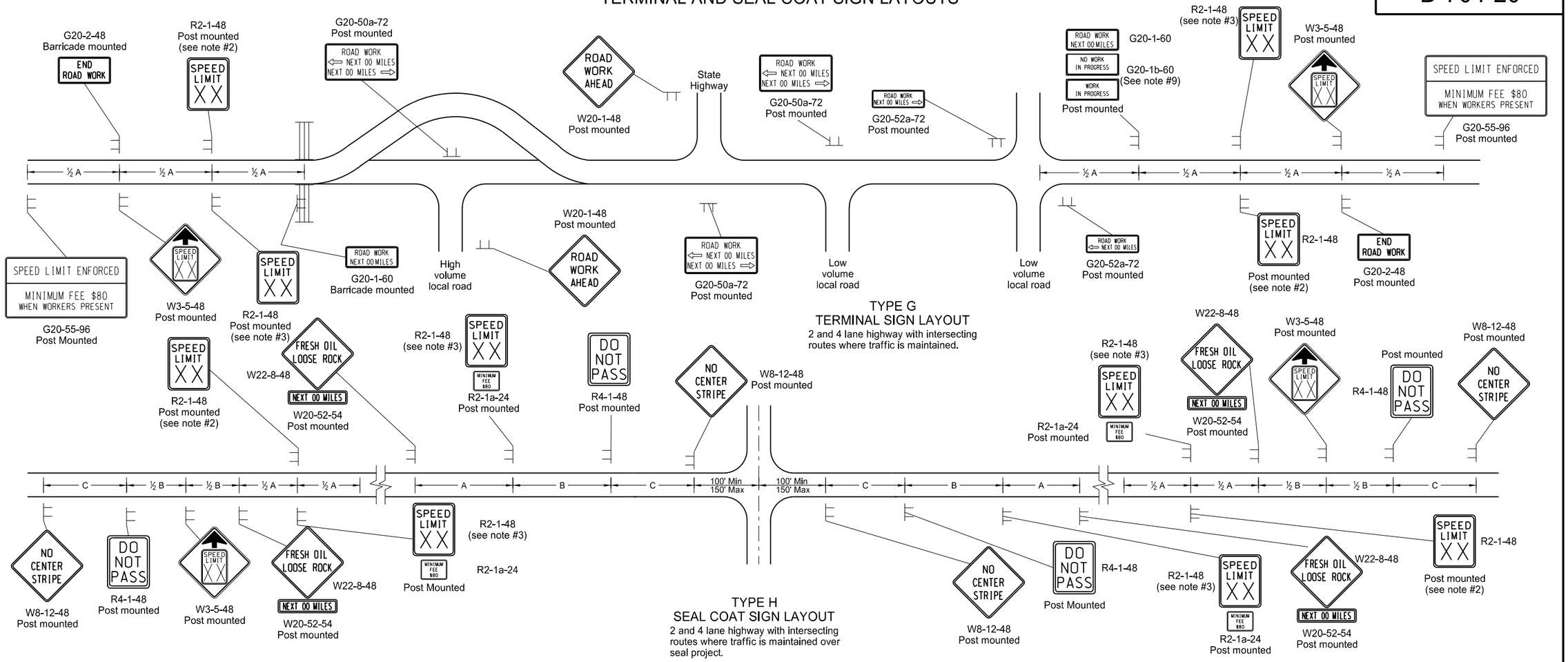
# D-704-20

## TERMINAL AND SEAL COAT SIGN LAYOUTS




### TYPE G
### TERMINAL SIGN LAYOUT

2 and 4 lane highway with intersecting routes where traffic is maintained.




### TYPE H
### SEAL COAT SIGN LAYOUT

2 and 4 lane highway with intersecting routes where traffic is maintained over seal project.

**KEY**

- Type III barricade
- Sign

1. Barricades placed on roadway shall be on a moveable assembly. Signs placed on the roadway shall be placed on skid mounted assemblies.
2. The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
3. The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 MPH below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 MPH. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit sign shall be placed at ½ B.
4. When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
5. Existing speed limit signs within a reduced speed zone shall be covered.
6. On seal projects, signs R2-1-48, R2-1a-24, R4-1-48, W22-8-48 and W20-52-54 shall be placed just after all important intersections and at five mile intervals thereafter. Sign W8-12-48 shall be placed just after all important intersections and at 2 mile intervals thereafter until the short term center line pavement marking is in place. No short term pavement markings are placed when traffic volumes are 750 ADT or less.
7. The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
8. Type H construction sign traffic control shall have the speed limit signs covered or removed once the loose aggregate has been removed.
9. The contractor shall install the G20-1b-60 sign when work is suspended for winter.
10. Other traffic control layouts will be required in the immediate work areas. If the speed limit is reduced in the work area, speed limit signs shall have the R2-1a-24 sign placed below.
11. G20-55-96 sign is not required if work is less than 15 days.

**ADVANCE WARNING SIGN SPACING**

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

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|---|---|
| | |

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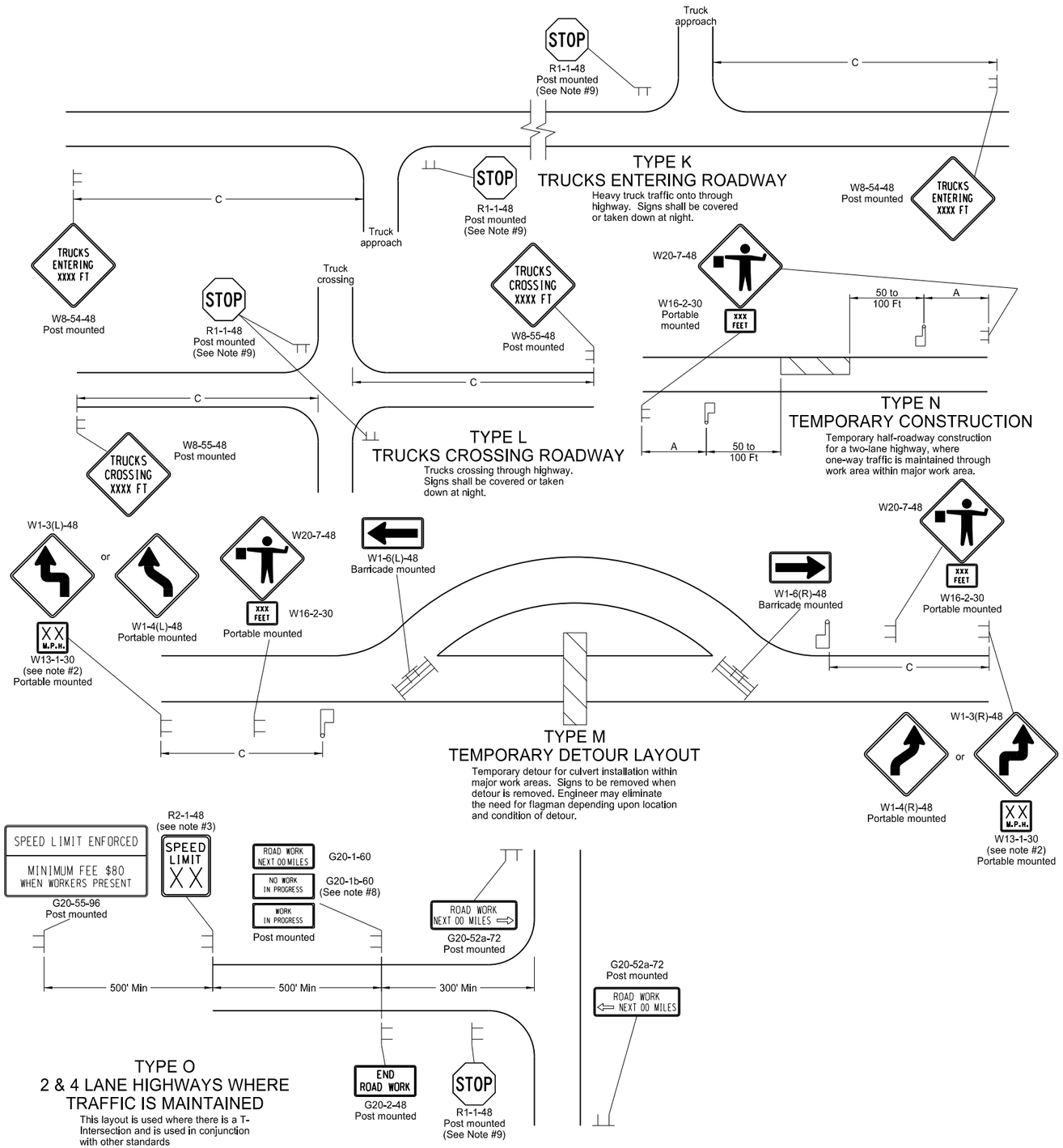
# CONSTRUCTION TRUCK AND TEMPORARY DETOUR LAYOUTS

D-704-22




Notes

1. Barricades placed on roadway shall be on a moveable assembly. Signs placed on the roadway shall be placed on skid mounted assemblies.
2. Where necessary, safe speed to be determined by the Engineer.
3. The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 mph below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 mph. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit sign shall be placed at ½ B.
4. When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
5. Existing speed limit signs within a reduced speed zone shall be covered.
6. Obliterated or covered pavement marking shall be paid for as Obliteration of Pavement Marking. The covering shall be approved by the engineer.
7. The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
8. The contractor shall install the G20-1b-60 sign when work is suspended for winter.
9. If existing stop sign is in place, a 48" stop sign is not required.
10. G20-55-96 sign is not required if this standard is part of other traffic control layouts with this sign or the work is less than 15 days.

KEY

Type III barricade — Work area

Sign — Flagger

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

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| REVISIONS | |
| DATE | CHANGE |

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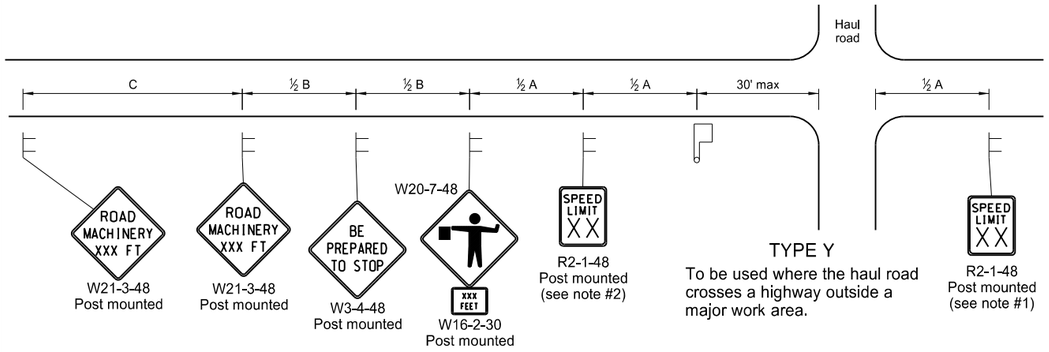
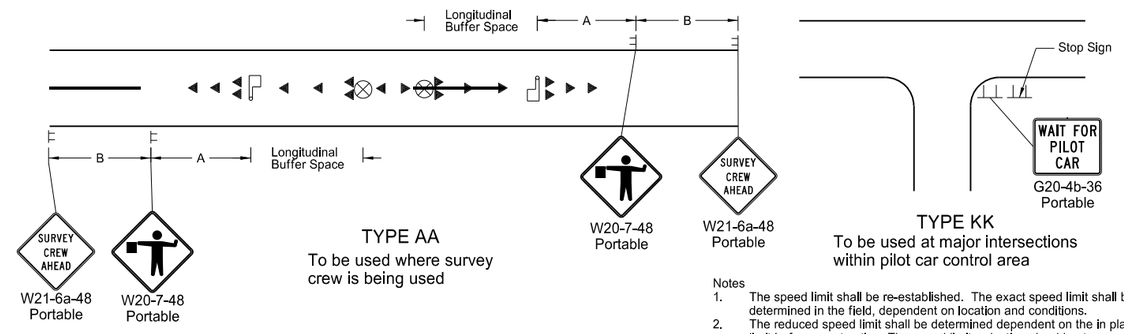
# MISCELLANEOUS SIGN LAYOUTS

D-704-26




TYPE Y

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




TYPE AA

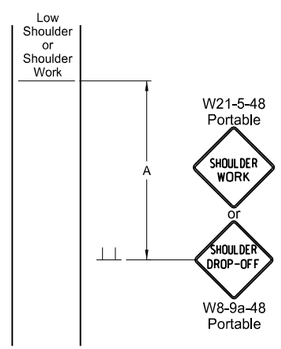
To be used where survey crew is being used

TYPE KK

To be used at major intersections within pilot car control area

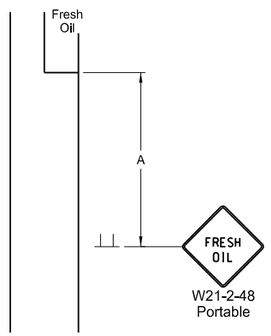
Notes

1. The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
2. The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 mph below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 mph. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit sign shall be placed at ½ B.
3. When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
4. Existing speed limit signs within a reduced speed zone shall be covered.
5. The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
6. G20-55-96 signs are not required if this standard is part of other traffic control layouts, or the work is less than 15 days.
7. When a pilot car operation is used, place a G20-4b-36 "Wait For Pilot Car" sign at major intersections within pilot car control area.



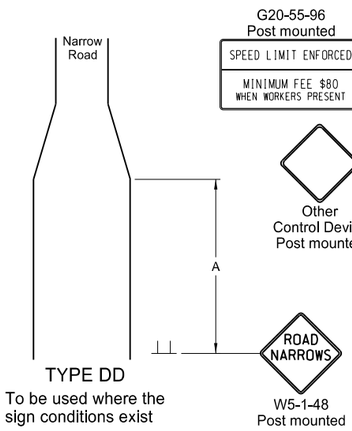

TYPE BB

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



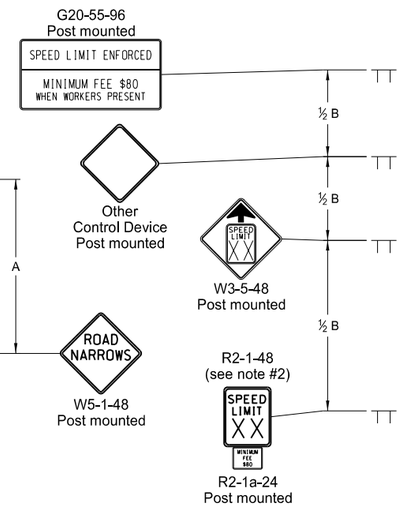

TYPE CC

To be used where the sign conditions exist



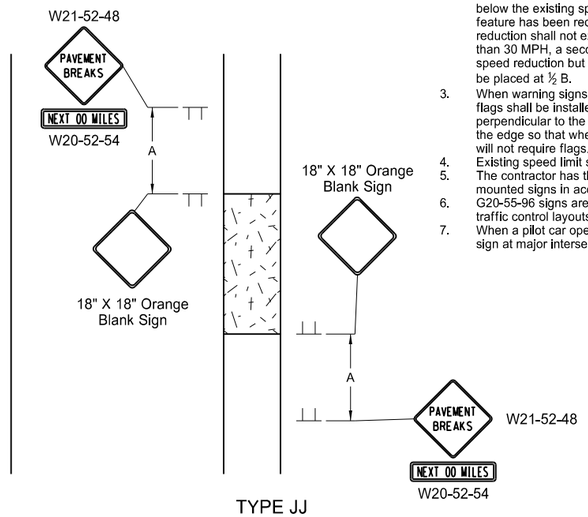

TYPE DD

To be used where the sign conditions exist




TYPE Z

To be used where speed zone is needed

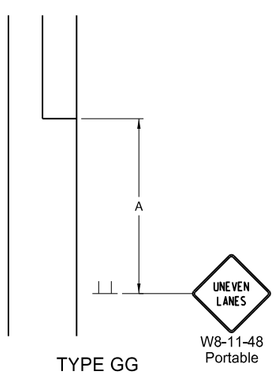



TYPE JJ

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

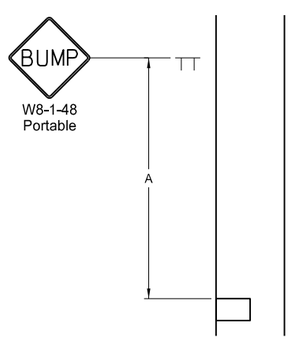
| Longitudinal Buffer Space | |
|---|---|
| *Speed (mph) | Length Min (feet) |
| 20 | 115 |
| 25 | 155 |
| 30 | 200 |
| 35 | 250 |
| 40 | 305 |
| 45 | 360 |
| 50 | 425 |
| 55 | 495 |
| 60 | 570 |
| 65 | 645 |
| 70 | 730 |
| 75 | 820 |

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



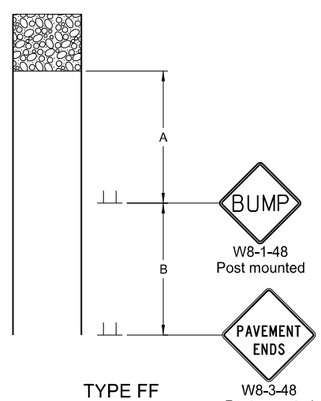

TYPE GG

To be used where a difference of elevation between lanes exist




TYPE EE

To be used where the sign conditions exist




TYPE FF

To be used where the sign conditions exist

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

KEY

Sign — Flagger

Cones

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

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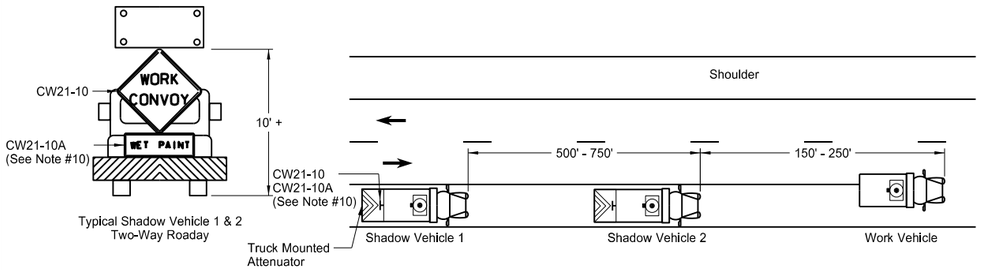
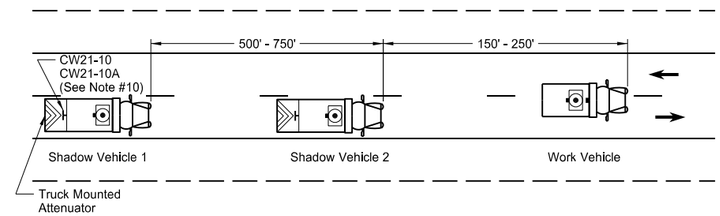
# TRAFFIC CONTROL PLAN FOR MOVING OPERATIONS

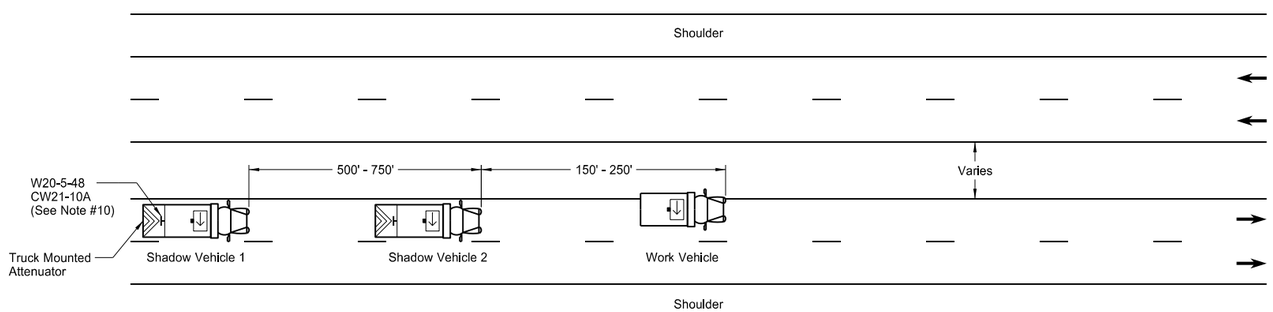
D-704-27




Two-Way Roadway with Paved Shoulders

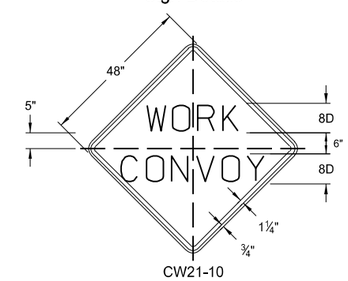



Two-Way Roadway without Paved Shoulders

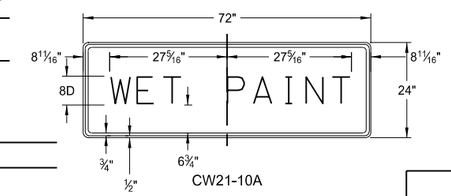



Undivided Multi-Lane Roadway

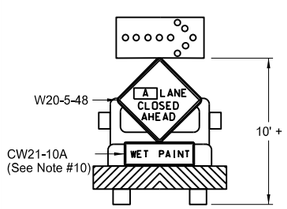
Sign Details




CW21-10

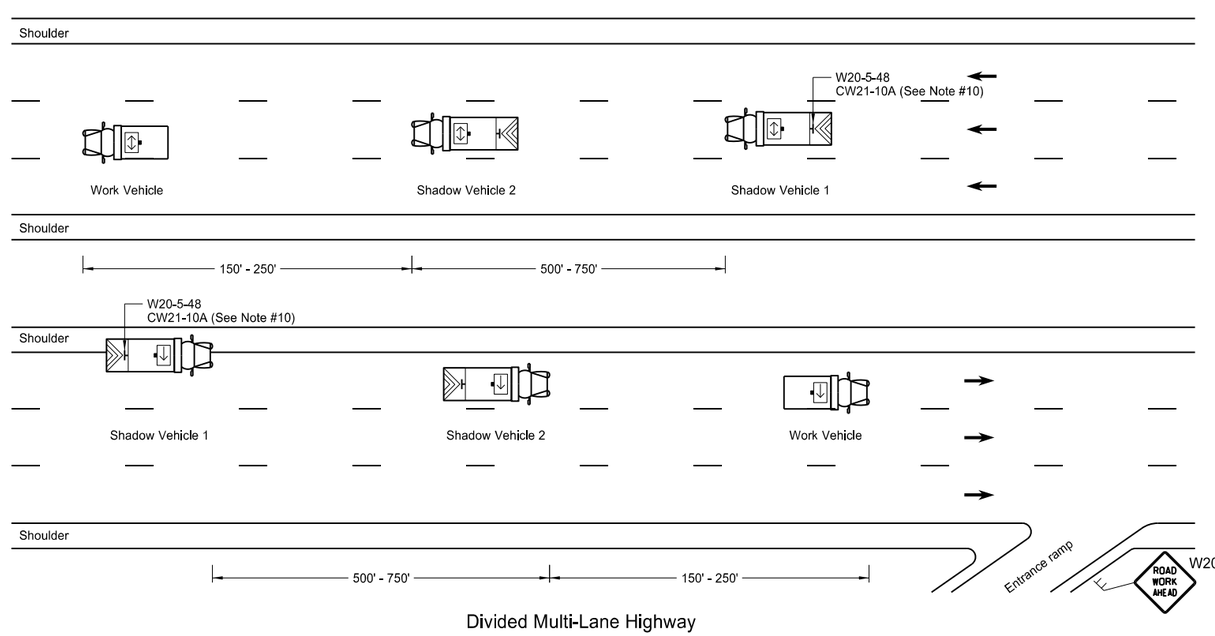



CW21-10A




Typical Shadow Vehicle 1 & 2
Multi-Lane Highways

A = Left Right Center




Divided Multi-Lane Highway

Notes

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

KEY

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

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

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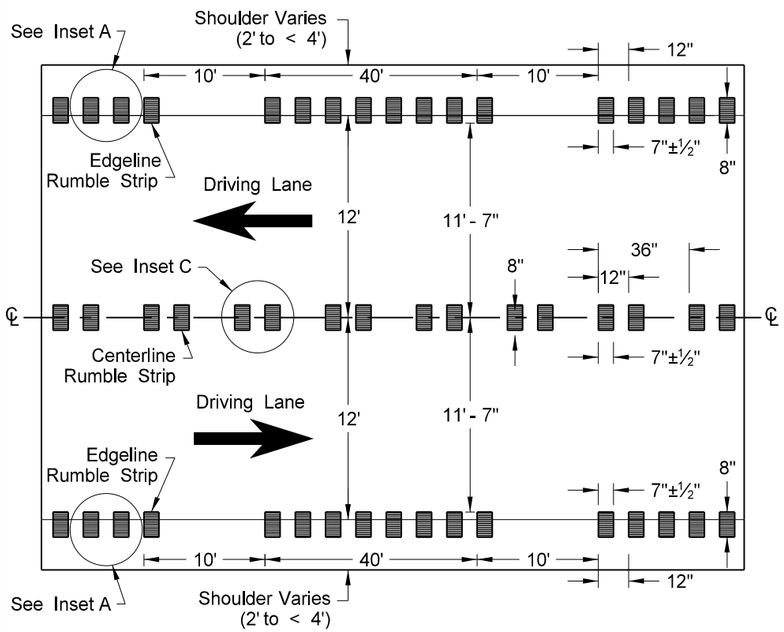
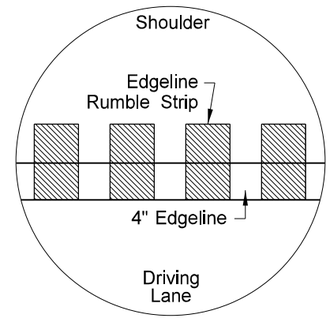
# RUMBLE STRIPS
## UNDIVIDED HIGHWAYS (SHOULDERS LESS THAN 4')

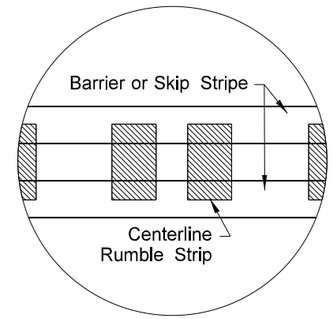
D-760-4



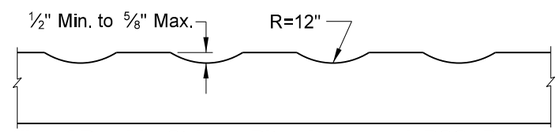

**Undivided Highways (12' Driving Lanes & Shoulders 2' to < 4')**



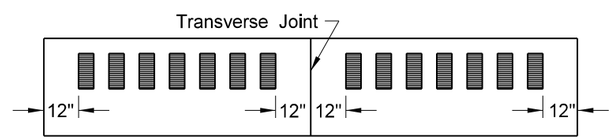

**Inset A - Edgeline Rumble Strip**




**Inset C - Centerline Rumble Strip**




**Profile of Rumble Strips - Bituminous and PCC Pavements**

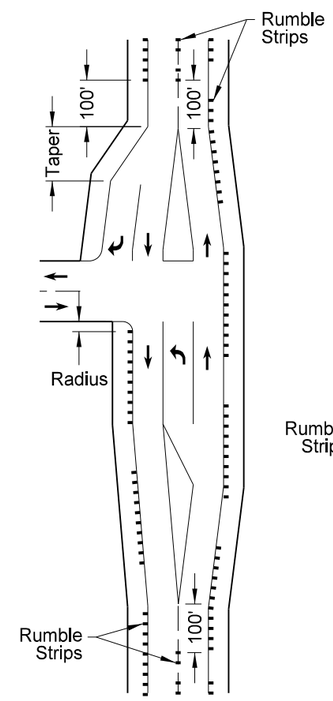



**Discontinue rumble strip approx. 12" on both sides of PCC transverse joint**

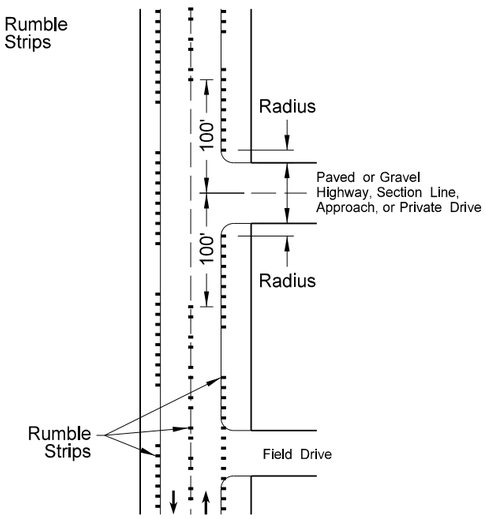
NOTES:

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

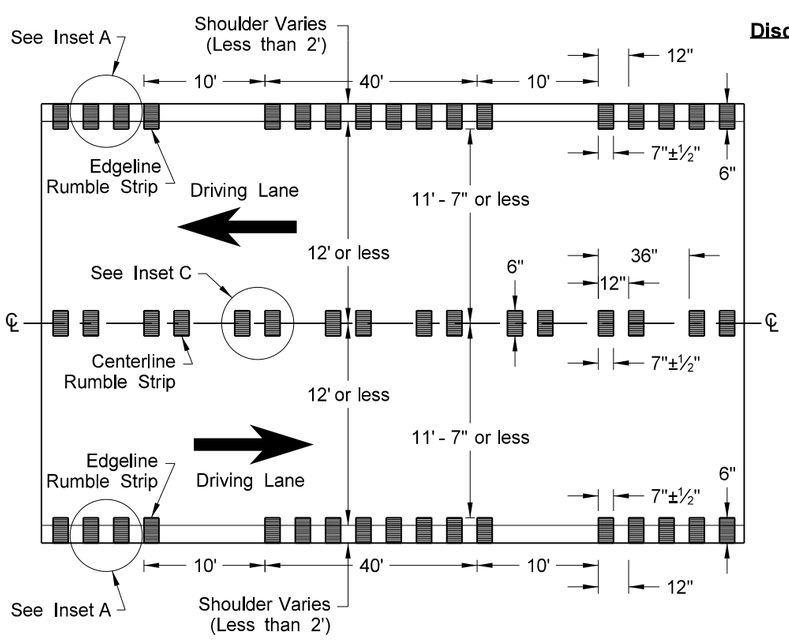
2) Discontinue centerline rumble strips through the entire length of left turn lanes, 100' before left turn lane tapers and median islands, 100' before and after a paved or gravel highway, section line, approach, or private drive.




**Turn Lane**
**(Right & Left)**




**Entrance Roadways**




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

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

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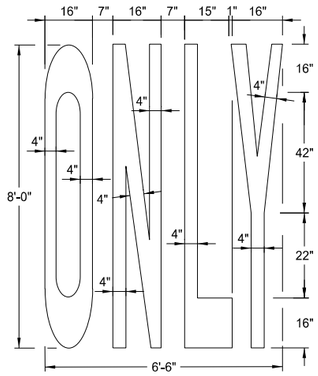
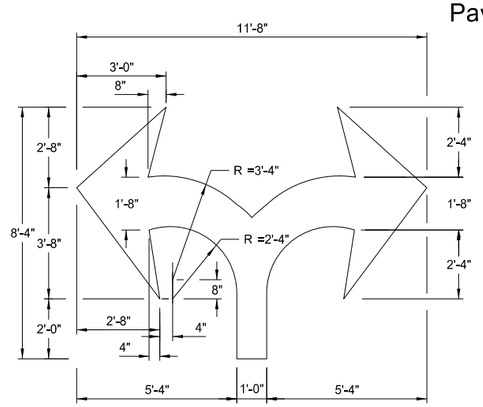
# Pavement Marking Message Details

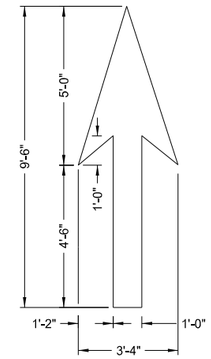
D-762-1



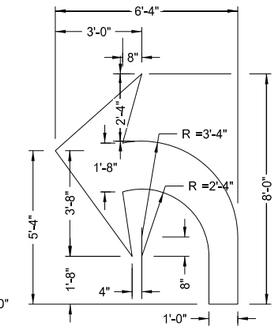

22 S. F.



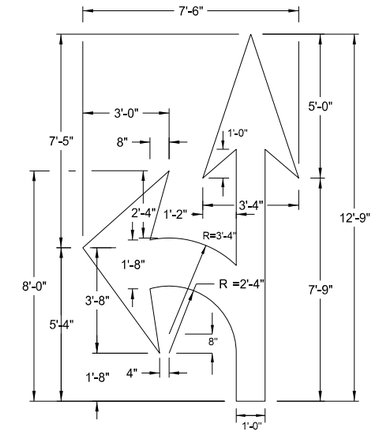

29 S. F.



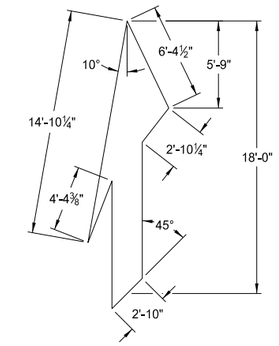

12 S. F.




16 S. F.

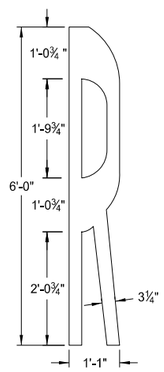



27 S. F.

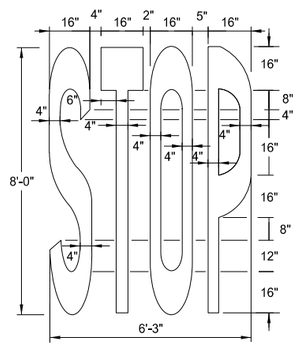



41 S. F.

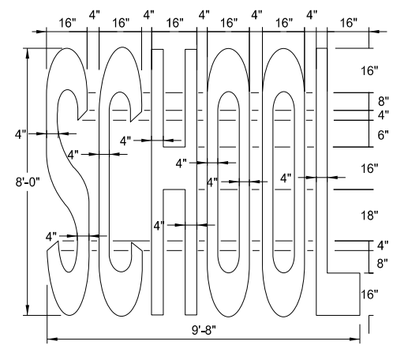
Note:
The merge arrow shall be rotated 20° from the edge of the roadway.



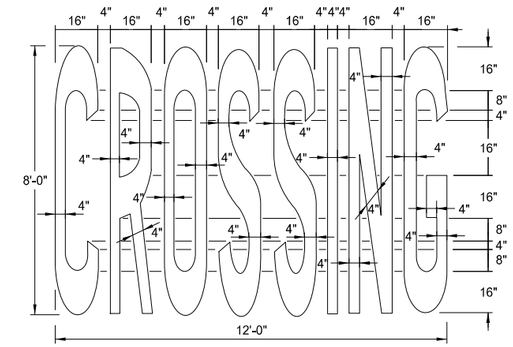

4 S. F.




22 S. F.



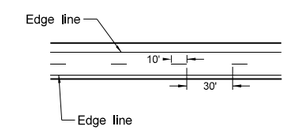

34.5 S. F.



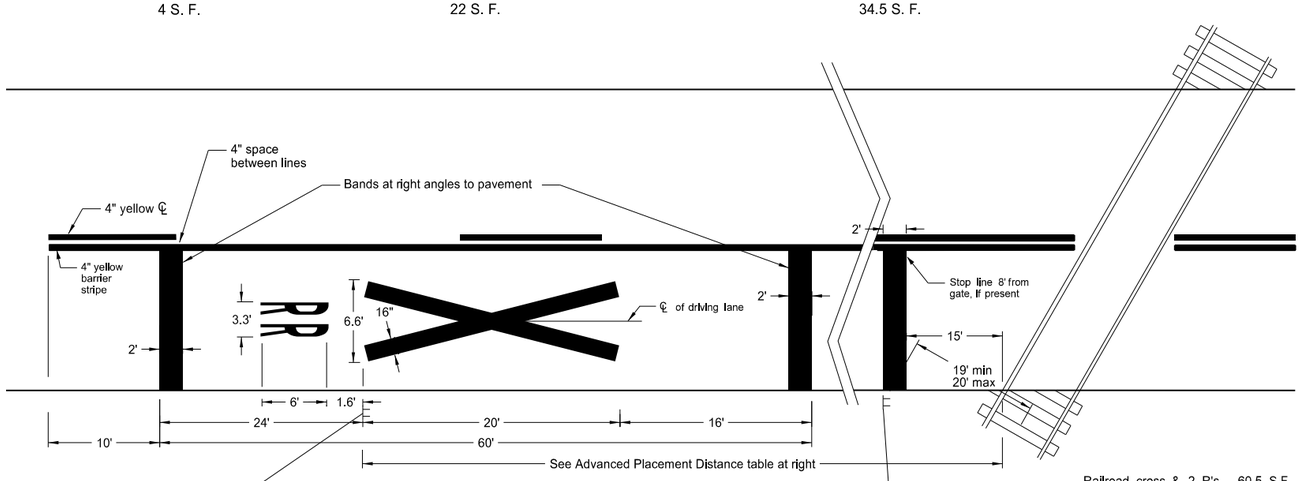

46 S. F.

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

Chevron Crosshatching Table




Centerline Pavement Marking Skip Spacing Detail




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

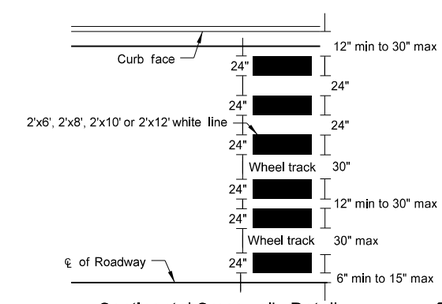
W10-1

See Standard Drawing D-754-81

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

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

R15-1




Continental Crosswalk Detail

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

12-6-11

REVISIONS

| DATE | CHANGE |
|---|---|
| | |

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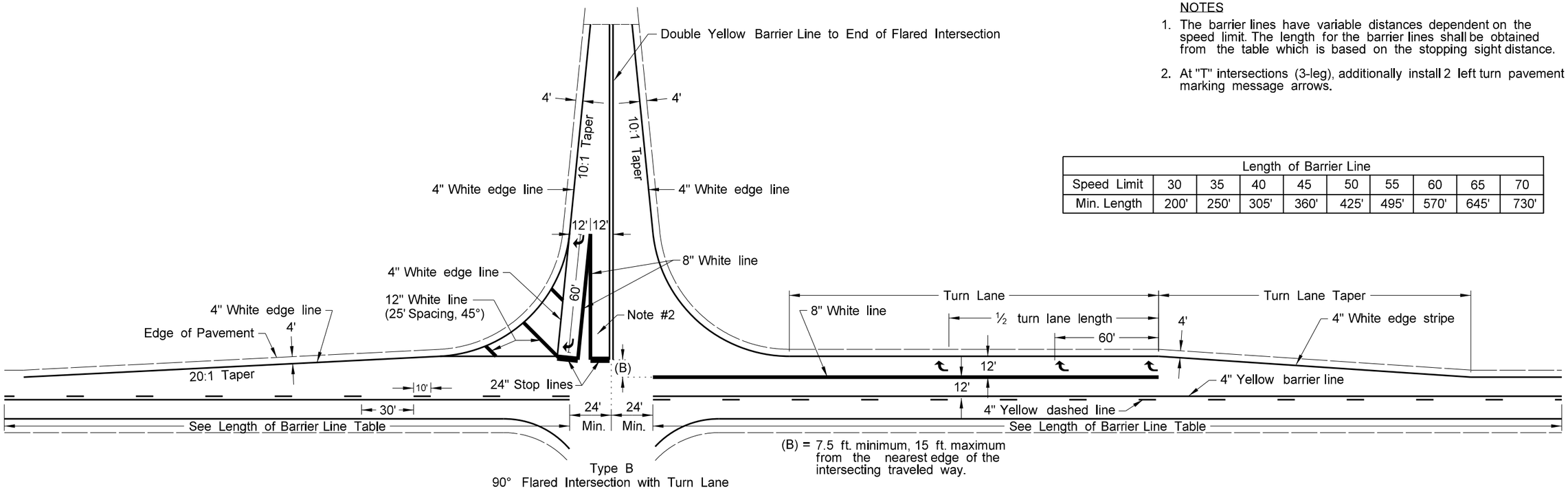
# PAVEMENT MARKING FOR STANDARD 90° FLARED INTERSECTION

D-762-3

NOTES

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

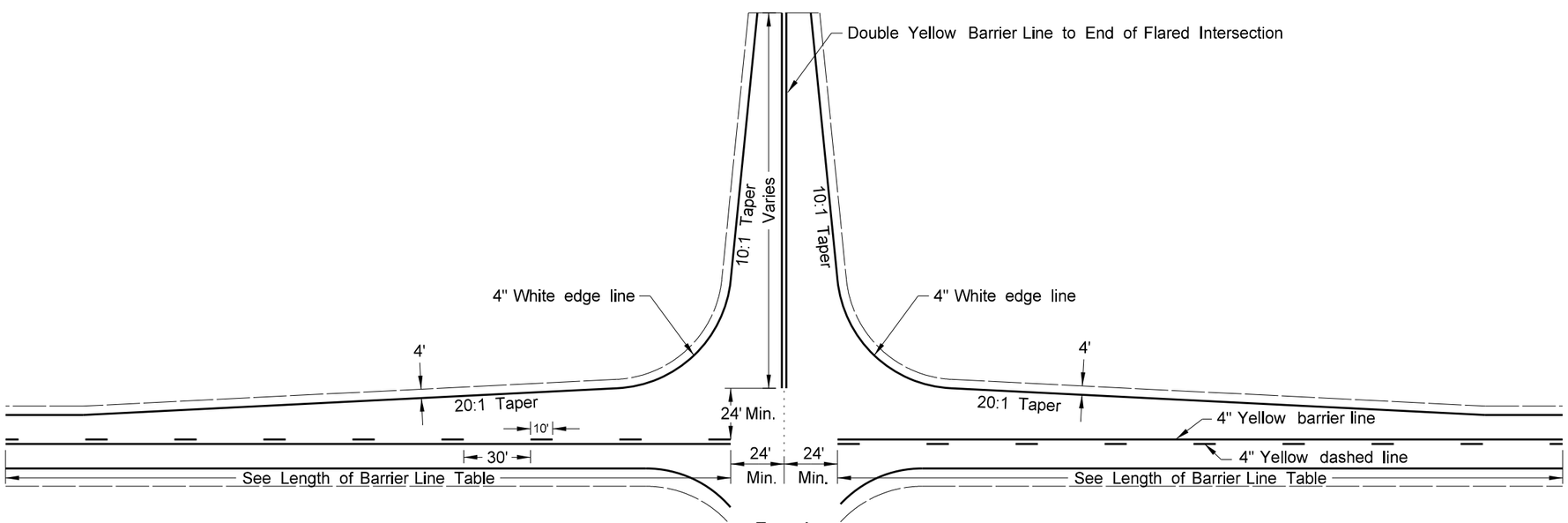
| Length of Barrier Line | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Speed Limit | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 |
| Min. Length | 200' | 250' | 305' | 360' | 425' | 495' | 570' | 645' | 730' |




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

Type B
90° Flared Intersection with Turn Lane

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




Type A
90° Flared Intersection

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

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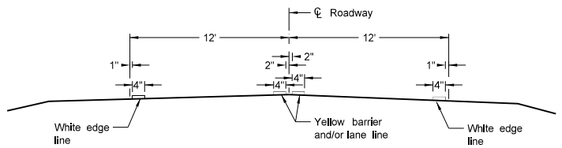
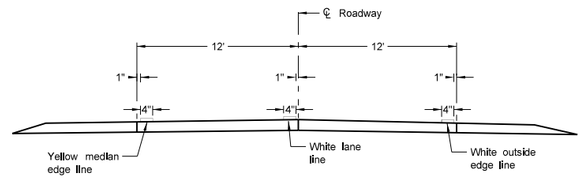
# PAVEMENT MARKING

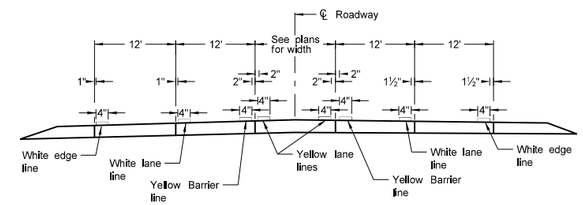
D-762-4



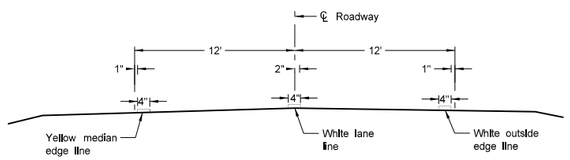

Two Lane Two Way
RURAL ROADWAY



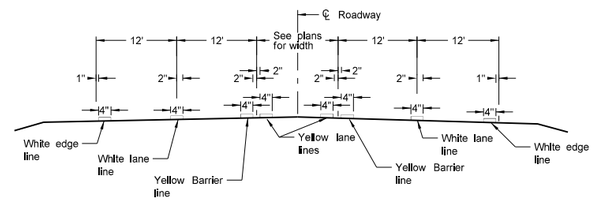

Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



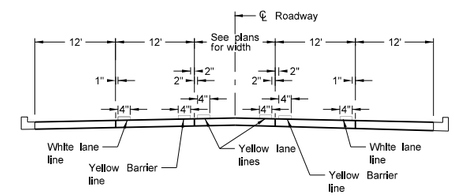

RURAL FIVE LANE ROADWAY
Concrete Section



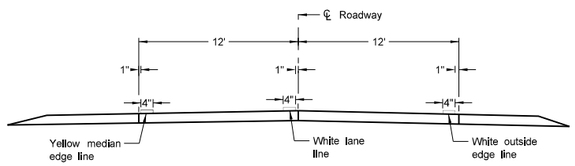

Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



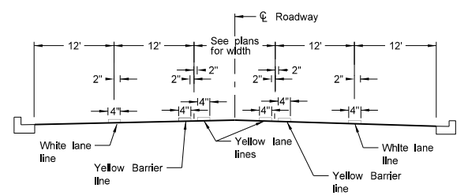

RURAL FIVE LANE ROADWAY
Asphalt Section



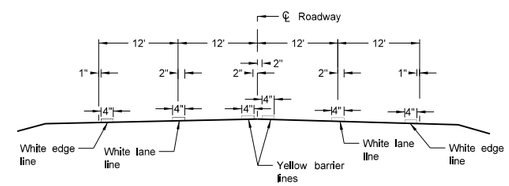

URBAN FIVE LANE SECTION
Concrete Section



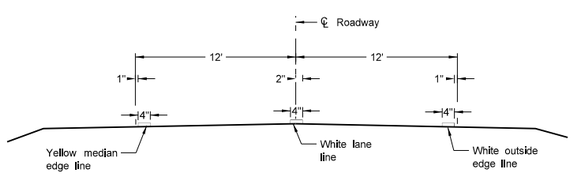

Two Lane Roadway
PRIMARY HIGHWAY
Concrete Section



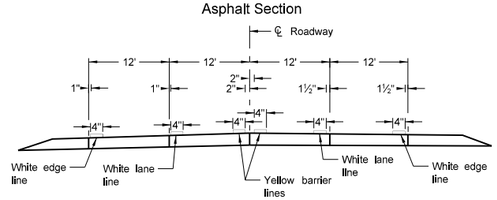

URBAN FIVE LANE SECTION
Asphalt Section



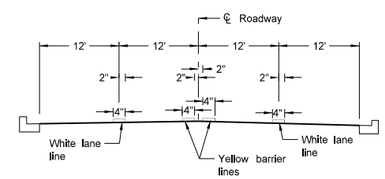

RURAL FOUR LANE ROADWAY
Asphalt Section



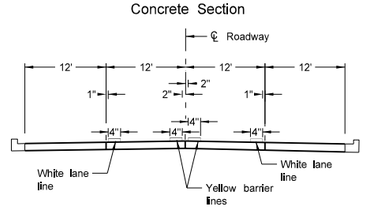

Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



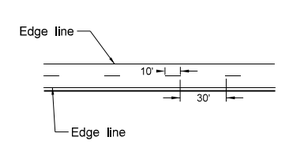

RURAL FOUR LANE ROADWAY
Concrete Section




URBAN FOUR LANE SECTION
Asphalt Section




URBAN FOUR LANE SECTION
Concrete Section




CENTERLINE PAVEMENT MARKING SKIP SPACING DETAIL

NOTES:

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

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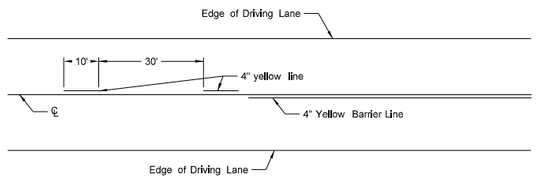
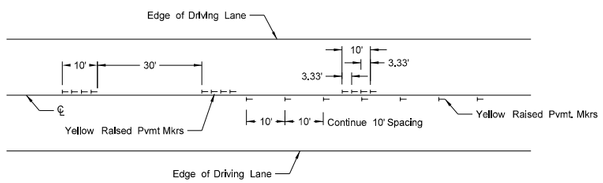
# SHORT-TERM PAVEMENT MARKING

D-762-6

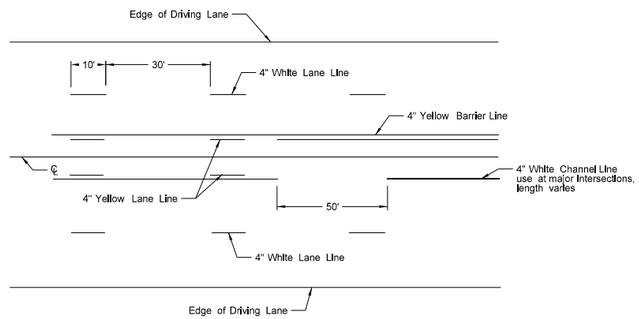



Painted or Tape Lines

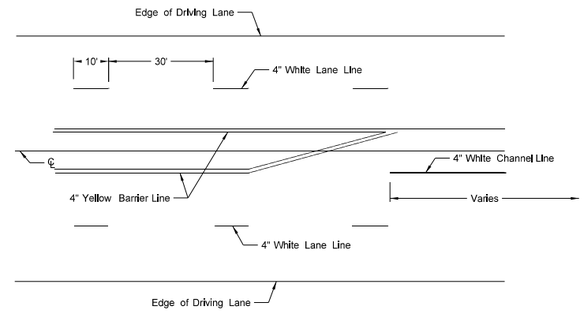



Raised Pavement Markers

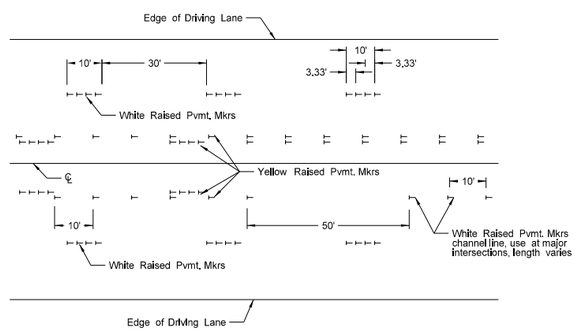
TWO-LANE TWO-WAY ROADWAY




Painted or Tape Lines

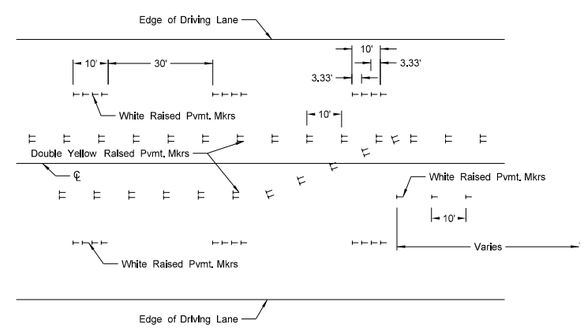



Painted or Tape Lines



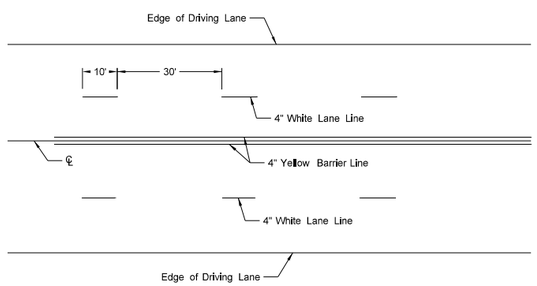

Raised Pavement Markers

FIVE LANE ROADWAY TWO WAY LEFT TURN

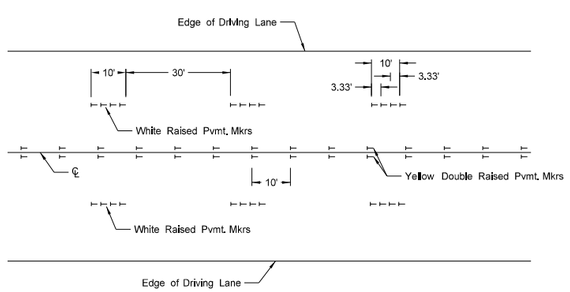



Raised Pavement Markers

FIVE LANE ROADWAY WITH MARKED ISLANDS




Painted or Tape Lines




Raised Pavement Markers

FOUR LANE ROADWAY

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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