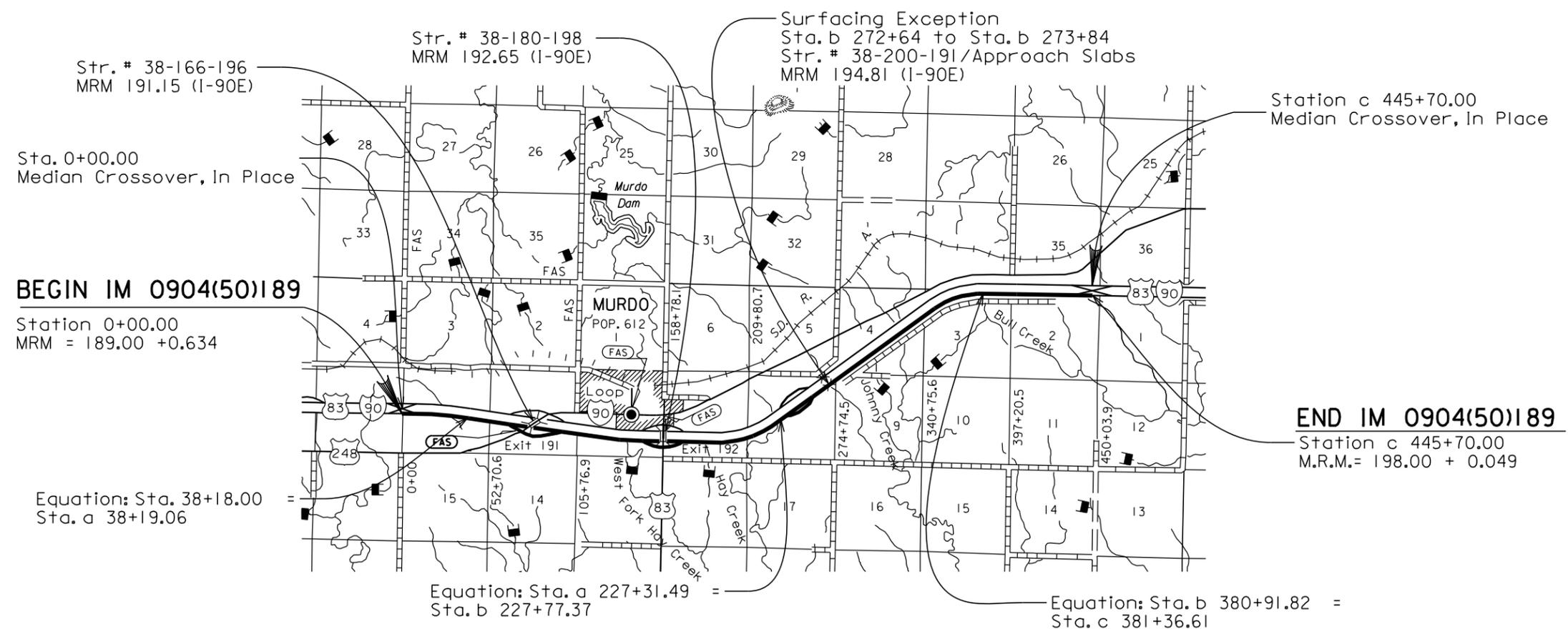


STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0904(50)189	M1	M4

Plotting Date: 07/18/2016

# SECTION M: PAVEMENT MARKING PLANS

- M1 General Layout with Index
- M2 Quantities and Notes
- M3 Pavement Marking Layout
- M4 Pavement Marking Detail



PLOT SCALE - 1:7907.35

PLOTTED FROM - IRPR25291

PLOT NAME - 1

FILE - ... \REGION\PRJ\JONE00GL\TITLE.DGN

**ESTIMATE OF QUANTITIES**

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
633E0010	Cold Applied Plastic Pavement Marking, 4"	2,120	Ft
633E0025	Cold Applied Plastic Pavement Marking, 12"	3,550	Ft
633E1200	Waterborne Pavement Marking Paint with High Grade Polymer, White	646	Gal
633E1205	Waterborne Pavement Marking Paint with High Grade Polymer, Yellow	529	Gal
633E1300	Pavement Marking Paint, White	40	Gal
633E1305	Pavement Marking Paint, Yellow	100	Gal
633E5000	Grooving for Cold Applied Plastic Pavement Marking, 4"	2,120	Ft
633E5010	Grooving for Cold Applied Plastic Pavement Marking, 12"	3,550	Ft
633E5100	Grooving for Durable Pavement Marking, 4"	222,951	Ft

**GENERAL NOTES**

Surface preparation, removal and cleaning work shall be conducted in such a manner as to control and minimize airborne dust and similar debris that may become a hazard to motor vehicle operation or nuisance to property owners.

Work will be allowed only during daylight hours.

All Eastbound and Westbound lanes will be grooved and painted with the project. The truck check pullout areas will be painted through as the normal mainline edgeline.

Eastbound lanes shall have permanent pavement markings installed prior to being opened to traffic.

Westbound lanes shall be sequenced so that any pavement markings removed, shall also be replaced with permanent pavement markings the same day, prior to nightfall if that lane is open to traffic. This work shall start on the median side edgeline.

**GROOVING FOR COLD APPLIED PLASTIC PAVEMENT MARKING, 4" and 12"**

The Contractor shall establish a positive means for the removal of the grinding and/or grooving residue. Solid residue shall be removed from the pavement surfaces before being blown off by traffic action or wind. Residue shall not be permitted to flow across lanes being used by public traffic or into gutter or drainage facilities. Residue, whether in solid or slurry form, shall be disposed of in a manner that will prevent it from reaching any waterway in a concentrated state.

The groove depth shall be 100 mils with a tolerance of + 10 mils.

**COLD APPLIED PLASTIC PAVEMENT MARKINGS**

Cold Applied Plastic Pavement Markings shall be grooved, 3M Series 380 AW or approved equal.

**GROOVING FOR DURABLE PAVEMENT MARKING, 4"**

The groove shall be made using stacked diamond tipped blade cutting heads to prevent damage at the joints.

Grooving for durable pavement markings will replicate the existing 4" pavement marking lines.

Unless otherwise specified in the plans, the Contractor shall groove the surface for pavement markings as specified below:

The grooving shall be completed within the following tolerances:

Depth of groove - Sum of pavement marking thickness and reflective media + 15 mils ±5 mils

Width of groove 5" to 6" ± 1/8"

Length of skip lines 10'-6" ± 3"

Tapers at begin/end lines 6" to 9"

The equipment shall be capable of:

- grooving the total width of the groove in one pass or uniform depths with multiple passes
- grooving without causing damage to the pavement joints or joint sealant material
- providing uniform alignment and depth
- moving continuously to permit a mobile traffic work operation

If damage to joints, joint sealant material, backer rod, etc. occurs, the grooving operation shall be stopped and modifications shall be made to the grooving operation to prevent further damage. Damage caused to joints, the joint sealant material, backer rod, etc. shall be repaired or replaced by the Contractor, as directed by the Engineer. No additional payment will be made for the repair work or any reapplication of the pavement marking in the area of the repair.

The bottom of the groove shall be uniform and free of loose material. The groove shall be flat and of uniform depth for the entire width of the groove.

**PAVEMENT MARKING PAINT WITH HIGH-BUILD ACRYLIC POLYMER**

All materials shall be applied as per manufacturer's recommendations.

This material shall be comprised of a durable high build, low VOC, fast drying, waterborne traffic paint with an acrylic polymer emulsion and with reflective media adhered to the paint. The reflective media shall consist of glass beads as well as bonded core reflective elements.

The bonded core reflective elements shall contain either clear or yellow tinted microcrystalline ceramic beads bonded to the outer surface. All microcrystalline ceramic beads bonded to reflective elements shall have a minimum index of refraction of 1.8 when tested using the liquid oil immersion method.

The initial retro-reflectance shall be at least 350 mcd/ft<sup>2</sup>/fc for white and at least 275 mcd/ft<sup>2</sup>/fc for yellow with the measurements taken within 7 days of application.

**RATES OF MATERIALS FOR HIGH-BUILD ACRYLIC POLYMER PAINT**

Solid 4" line = 27.8 Gals/Mile  
 Glass Beads = 5.3 Lbs/Gal.  
 Composite Reflective Elements = 2.1 Lbs/Gal.

All cost for materials, labor and equipment necessary to furnish and install the pavement markings shall be incidental to the contract unit price per gallon for Waterborne Pavement Marking Paint with High Grade Polymer, White or Yellow.

**TABLE OF PAVEMENT MARKING QUANTITIES**

(Cold Applied Plastic)

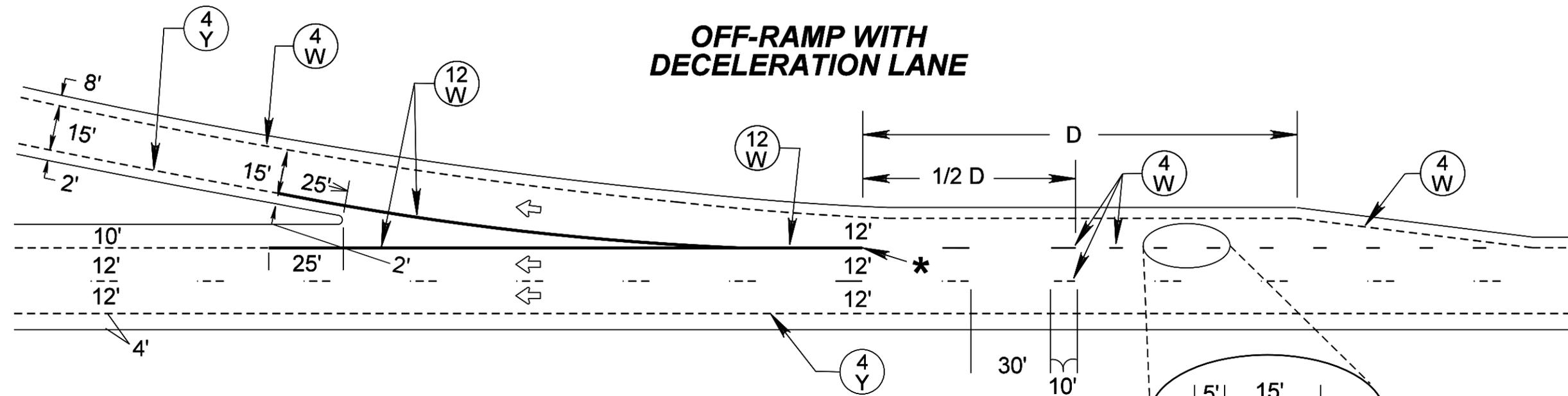
Eastbound	4" White	12" White	Westbound	4" White	12" White	4" Total	12" Total
EXIT 191 off ramp	-	170	EXIT 191 off ramp	-	215	-	385
EXIT 191 off ramp mainline	160	240	EXIT 191 off ramp mainline	160	315	320	555
EXIT 191 on ramp	-	140	EXIT 191 on ramp	-	190	-	330
EXIT 191 on ramp mainline	370	210	EXIT 191 on ramp mainline	370	290	740	500
EXIT 192 off ramp	-	175	EXIT 192 off ramp	-	215	-	390
EXIT 192 off ramp mainline	160	245	EXIT 192 off ramp mainline	160	315	320	560
EXIT 192 on ramp	-	140	EXIT 192 on ramp	-	190	-	330
EXIT 192 on ramp mainline	370	210	EXIT 192 on ramp mainline	370	290	740	500
<b>4" Total</b>	<b>1,060</b>	-	-	<b>1,060</b>	-	<b>2,120</b>	-
<b>12 Total</b>	-	<b>1,530</b>	-	-	<b>2,020</b>	-	<b>3,550</b>

**PERMANENT PAVEMENT MARKING (CITY OF MURDO)**

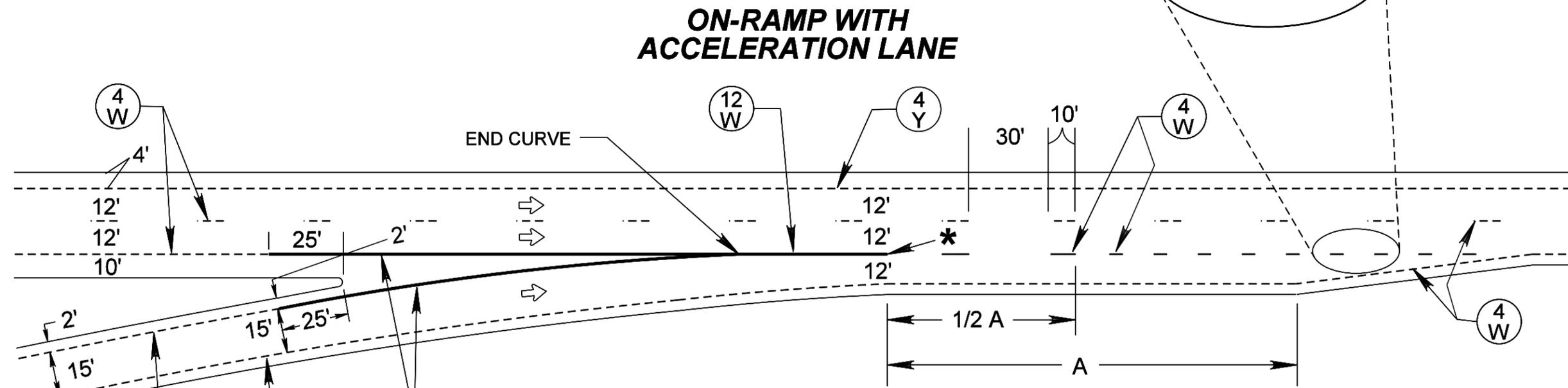
Upon completion of the project, the Contractor will be required to repaint all existing pavement markings through the City of Murdo from SD 248 Mileage Reference Marker 203.87 to 205.50. Pavement markings shall include centerline, edge line, lane lines, turn arrows, School Crossing legend, crosswalk etc. This list is approximate. Additional quantities are included in the Estimate of Quantities to paint the additional pavement markings.

All materials shall be applied as per manufacturer's recommendations.

# PAVEMENT MARKING LAYOUT (TYPICAL)



\* GORE POINT



- - TAPE
- - - - PAINT
- ← - DIRECTION OF TRAFFIC

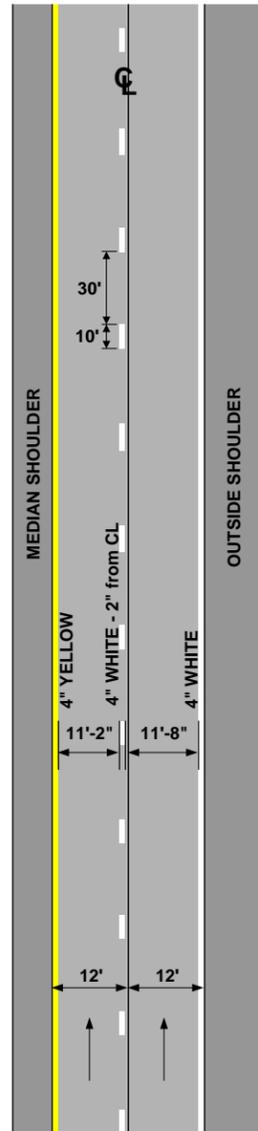
- (4 Y) - 4" Yellow Pavement Marking
- (4 W) - 4" White Pavement Marking
- (12 W) - 12" White Pavement Marking

A = LENGTH OF PARALLEL ACCELERATION LANE  
D = LENGTH OF PARALLEL DECELERATION LANE

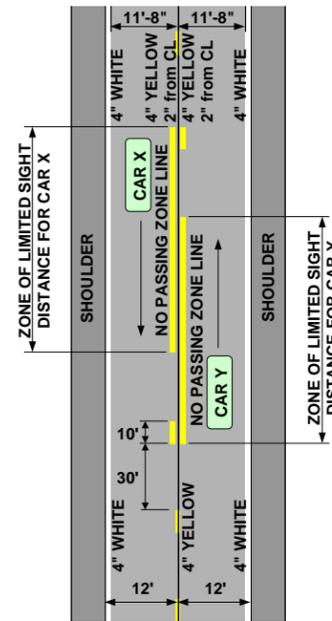
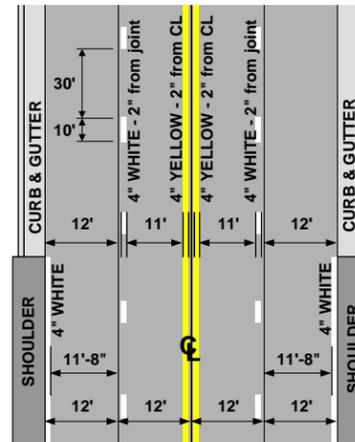
STATE	PROJECT	SHEET	TOTAL
S.D.	IM 0904(50)189	M4	M4

## FURNISHING AND APPLYING PAVEMENT MARKING PAINT DETAIL

**DIVIDED ROADWAY  
(ONE DIRECTION SHOWN)**



**UNDIVIDED ROADWAY**



**PAVEMENT MARKING**

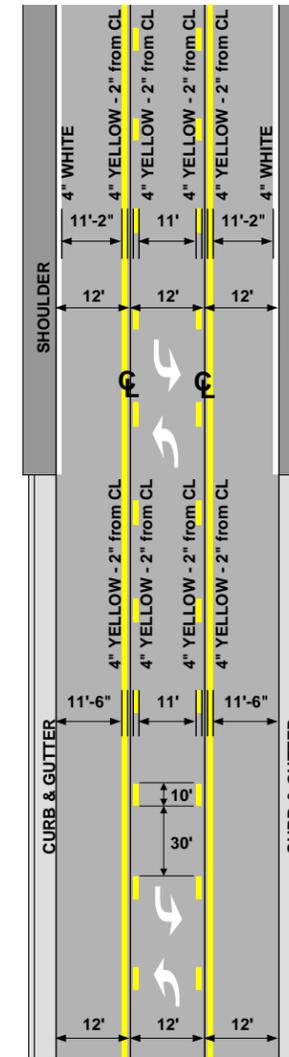
Typical pavement marking as shown on this sheet shall be applied throughout the entire length of undivided roadway.

Traffic Control shall be incidental to the cost of application. The striping and advance or trailing warning vehicle shall be equipped with flashing amber lights and advance warning arrow board.

Application rates shall be as follows:

Four Lane Roadway (Rates for one line)	Two Lane Roadway (Rates for one line)
Solid Yellow Centerline Rate = 16.9 Gals./Pass-Mile	Dashed Yellow Centerline Rate = 4.6 Gals./Pass-Mile
Dashed White Lane Line Rate = 4.6 Gals./Pass-Mile	Solid Yellow Centerline Rate = 16.9 Gals./Pass-Mile
Solid White Edgeline (Not applicable in curb and gutter) Rate = 16.9 Gals./Pass-Mile	Solid White Edgeline Rate = 16.9 Gals./Pass-Mile

**TWO LANE ROADWAY  
WITH CENTER TURN LANE**



**PAVEMENT MARKING**

Typical pavement marking as shown on this sheet shall be applied throughout the entire length of three lane roadway.

Traffic Control shall be incidental to the cost of application. The striping and advance or trailing warning vehicle shall be equipped with flashing amber lights and advance warning arrow board.

Left Arrows, in sets of two, spaced 8' or 16' arrow tip to arrow tip, (when two are required) shall be positioned in the center turn lane at 300' spacing, at a frequency of one set of arrows per block or at existing arrow locations.

Application rates shall be as follows:

Two Lane Roadway with Center Turn Lane (Rates for one line)	
Solid Yellow Centerline	Rate = 16.9 Gals./Pass-Mile
Dashed Yellow Centerline	Rate = 4.6 Gals./Pass-Mile
Solid White Edgeline (Not applicable in curb and gutter)	Rate = 16.9 Gals./Pass-Mile