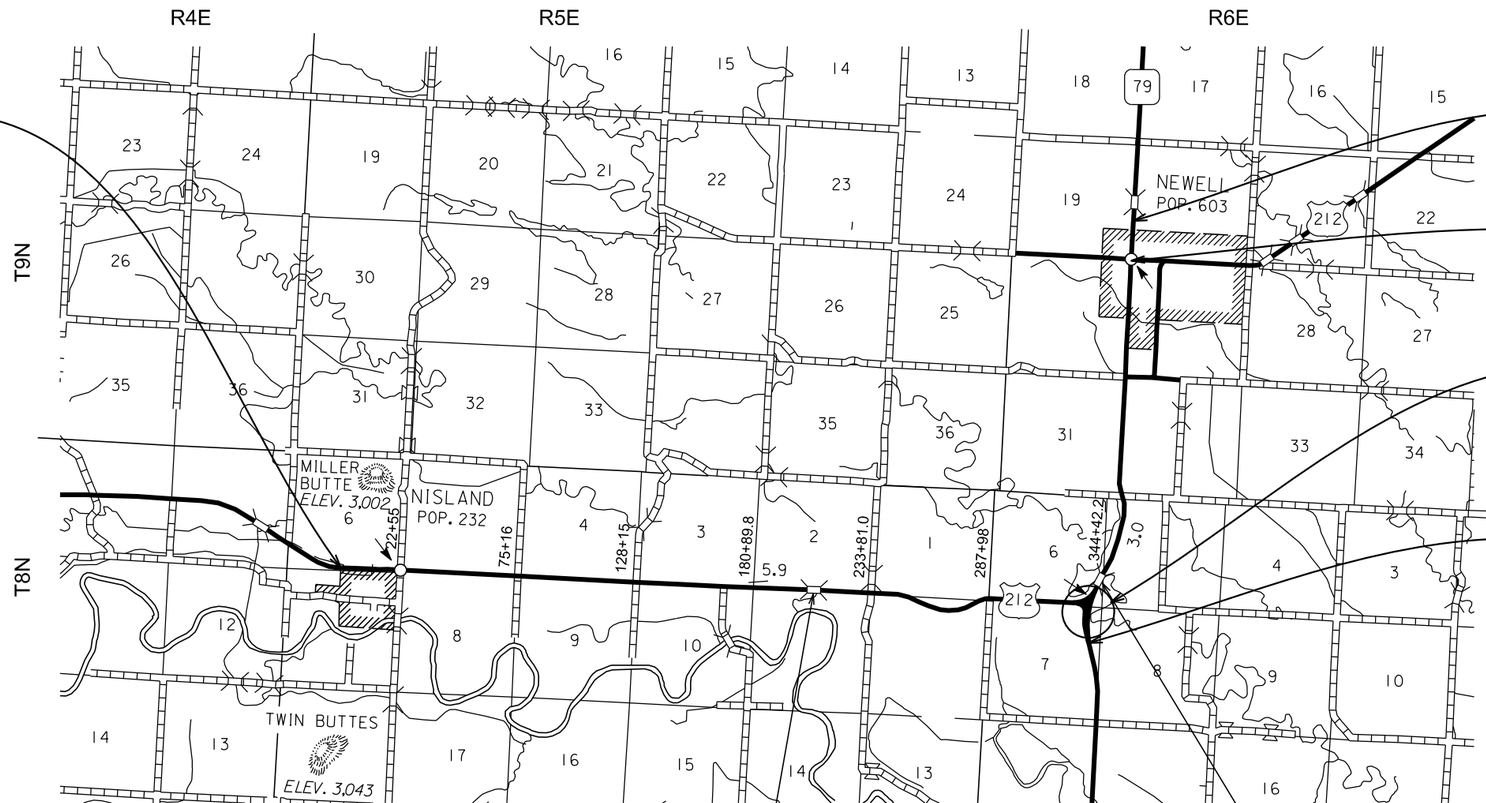
SECTION M: PAVEMENT MARKING PLANS

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-P-PH 0079(87)129 NH 0212(193)28	M1	M14

Plotting Date: 04/10/2024

INDEX OF SHEETS



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SECTION M ESTIMATE OF QUANTITIES

PCN: 06CP

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
633E0210	Preformed Thermoplastic Pavement Marking, 4"	7,934	Ft
633E0225	Preformed Thermoplastic Pavement Marking, 24"	1,675	Ft
633E1200	High Build Waterborne Pavement Marking Paint, White	387	Gal
633E1205	High Build Waterborne Pavement Marking Paint, Yellow	175	Gal
633E5000	Grooving for Cold Applied Plastic Pavement Marking, 4"	7,934	Ft
633E5015	Grooving for Cold Applied Plastic Pavement Marking, 24"	1,675	Ft
633E8000	Curb Painting	1,682	Ft

PCN: 04L0

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
633E1200	High Build Waterborne Pavement Marking Paint, White	42	Gal
633E1205	High Build Waterborne Pavement Marking Paint, Yellow	58	Gal
633E1272	High Build Waterborne Pavement Marking Paint, Arrow	3	Each

PAVEMENT MARKING PAINT

All No Passing Zones will be reviewed prior to the application of any new centerline markings. The Contractor will advise the Engineer a minimum of 3 weeks prior to the application of permanent pavement markings to allow the State to mark the locations of No Pass Zones. State forces will not be available to mark the No Pass Zones from 07-15-2024 to 08-18-2024.

The application of permanent pavement marking will begin no sooner than 7 calendar days following completion of the fog or flush seal. Application of permanent pavement marking will be completed within 14 calendar days following completion of the final surfacing.

Marking 8-inch edge lines and gore areas will require the use of 2 spray nozzles to achieve the required width. Marking 12-inch gore lines will require the use of 3 spray nozzles to achieve the required width.

HIGH BUILD WATERBORNE PAVEMENT MARKING PAINT

All materials will be applied as per manufacturer's recommendations. High build waterborne pavement marking paint will conform to the supplemental specifications for Section 980.1 B.

Reflective media will consist of glass beads.

RATES OF MATERIALS FOR HIGH BUILD WATERBORNE PAVEMENT MARKING PAINT

Solid 4" line = 22.5 Gals/Mile
Dashed 4" line = 7.6 Gal/Mile
Glass Beads = 8 Lbs/Gal

All cost for materials, labor and equipment necessary to furnish and install the pavement markings will be incidental to the contract unit price for the respective High Build Waterborne Pavement Marking Paint items.

RETROREFLECTIVITY FOR PAVEMENT MARKING PAINT

The Department may take retroreflectivity readings on the pavement marking lines after 2 days and within 30 days of the line application using either a portable or mobile retroreflectometer that conforms to 30-meter geometry. If the Department chooses to take retroreflectivity readings, three retroreflectivity readings will be taken on each line at each test location. The three readings will be averaged and become the reading for that test location.

If the Department chooses to take retroreflectivity readings, three readings will be taken on the edge lines and lane lines in the direction of application. For combination solid yellow and skip yellow lines for turn lanes and for centerline markings on two-way roadways, three readings will be taken in one direction, the reflectometer will be turned 180 degrees and three more readings will be taken. The six readings for the centerline markings will be averaged and become the test reading for that test location.

If the Department chooses to take readings, the minimum retroreflectivity values will be 275 mc/m^2/lux for white and 170 mc/m^2/lux for yellow.

PREFORMED THERMOPLASTIC PAVEMENT MARKING

General

- Made of prefabricated retroreflective, resilient thermoplastic material;
- Contains glass beads uniformly distributed through the entire cross-sectional area;
- Capable of being affixed to bituminous or concrete pavement by heating;
- Resistant to deterioration due to exposure to sunlight, water, salt, and adverse weather conditions;
- Under traffic wear, shows no appreciable fading in accordance with the color requirements, lifting, or shrinkage throughout the life of the marking;
- Capable of conforming to pavement contours, breaks, and faults through the action of traffic at normal pavement temperatures;
- Possesses resealing characteristics, such that it is capable of fusing with itself and previous thermoplastic markings when heated; and
- Protected during shipment and in storage.

Apply the preformed thermoplastic pavement marking as recommended by the manufacturer to provide a neat, durable marking that will not flow, distort, or crack due to temperature if the pavement surface remains stable. Use equipment and application methods specified by the manufacturer. Primer as required by the manufacturer will be provided with the material.

Application of the markings will include the use of any manufacturer recommended sealers. Sealers may be required on concrete pavements, inside grooves, or on older asphalt pavements. Prior to placing any markings on new concrete, the Contractor will remove any curing compounds. Removal will be by sandblasting or other standard industry methods.

Any required primers or sealers will be included in the contract unit price for the various preformed thermoplastic pavement marking items.

Provide precut messages and symbols meeting the requirements of the MUTCD and the Standard Signs Manual in custom kits. Use separate pieces or segments to form individual letters or symbols only to the extent supplied by the manufacturer. Provide shapes, sizes, and colors as required by the contract.

Color

- Will meet the color specification limits and luminance factors for Cold Applied Plastic Pavement Marking and Legends (Section 983.2 D, Tables 1 and 2).

Glass Beads

- Ensure the preformed thermoplastic pavement marking contains a minimum 30% intermixed glass beads by weight and a minimum 80% true spheres.
- Ensure preformed thermoplastic pavement markings contain only clear beads.

Skid Resistance

- Ensure the surface of the preformed thermoplastic pavement marking provides a skid resistance value of at least 45 British Pendulum Number (BPN) when tested in accordance with ASTM E303.

Retroreflectivity

- Provide preformed thermoplastic pavement marking meeting the minimum initial pavement marking retroreflectivity values using 30 m geometry and meeting the testing procedures of ASTM E1710:

Minimum Initial Pavement Marking Retroreflectivity		
	White	Yellow
Thermoplastic	400 mcd/sq. ft./ft.	250 mcd/sq. ft./ft.
Thermoplastic, enhanced skid resistance (ESR)	250 d/sq. ft./ft.	150 d/sq. ft./ft.

Thickness

- A longitudinal marking is a minimum 90 mils thick at the edges, and a maximum 125 mils thick at the center of the stripe.
- Transverse markings and symbols are a minimum 125 mils thick at the edges, and a maximum 160 mils thick at the center.

Sample

- Prior to application, the Contractor will provide a sample of the preformed thermoplastic pavement marking to be used on the project to the Region Traffic Engineer for inspection and approval.
- Do not begin application of the preformed thermoplastic pavement marking prior to obtaining the Region Traffic Engineer's approval of the preformed thermoplastic pavement marking material. The Region Traffic Engineer's approval of the preformed thermoplastic pavement marking does not void other preformed thermoplastic pavement marking requirements specified.

GROOVING FOR COLD APPLIED PLASTIC PAVEMENT MARKING

The Contractor will establish a positive means for the removal of the grinding and/or grooving residue. Residue from dry grooving will be vacuumed. Solid residue will be removed from the pavement surfaces before being blown by traffic action or wind. The Contractor will conduct this work to control and minimize airborne dust and similar debris that may become a hazard to motor vehicle operation or nuisance to property owners. Residue from wet grooving will 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, will be disposed of in a manner that will prevent it from reaching any waterway in a concentrated state. The cleaning of the residue for grooving will be to the satisfaction of the Engineer and may require more than one pass to adequately remove material. All costs for removal of grinding and/or grooving residue will be included in the contract unit price per foot for “Grooving for Cold Applied Plastic Pavement Marking” contract items.

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-P-PH 0079(87)129 NH 0212(193)28	M4	M14

TABLE OF PAVEMENT MARKINGS

PCN: 06CP

Hwy	Station to	Station	Length Ft	High Build Waterborne Pavement Marking Paint, White Gal	High Build Waterborne Pavement Marking Paint, Yellow Gal	Preformed Thermoplastic Pavement Marking, 4" White Ft	Preformed Thermoplastic Pavement Marking, 4" Yellow Ft	Preformed Thermoplastic Pavement Marking, 24" White Ft	Grooving for Cold Applied Plastic Pavement Marking, 4" Ft	Grooving for Cold Applied Plastic Pavement Marking, 24" Ft	Curb Painting, Yellow Ft
US 212	1+25	324+00	32275	275	120						
SD 79/US 212	37+00	161+00	12400	112	55						
SD 79/US 212	161+00	184+18	2318			4068	3866	1675	7934	1675	1682
			Totals:	387	175	4068	3866	1675	7934	1675	1682
						7934					

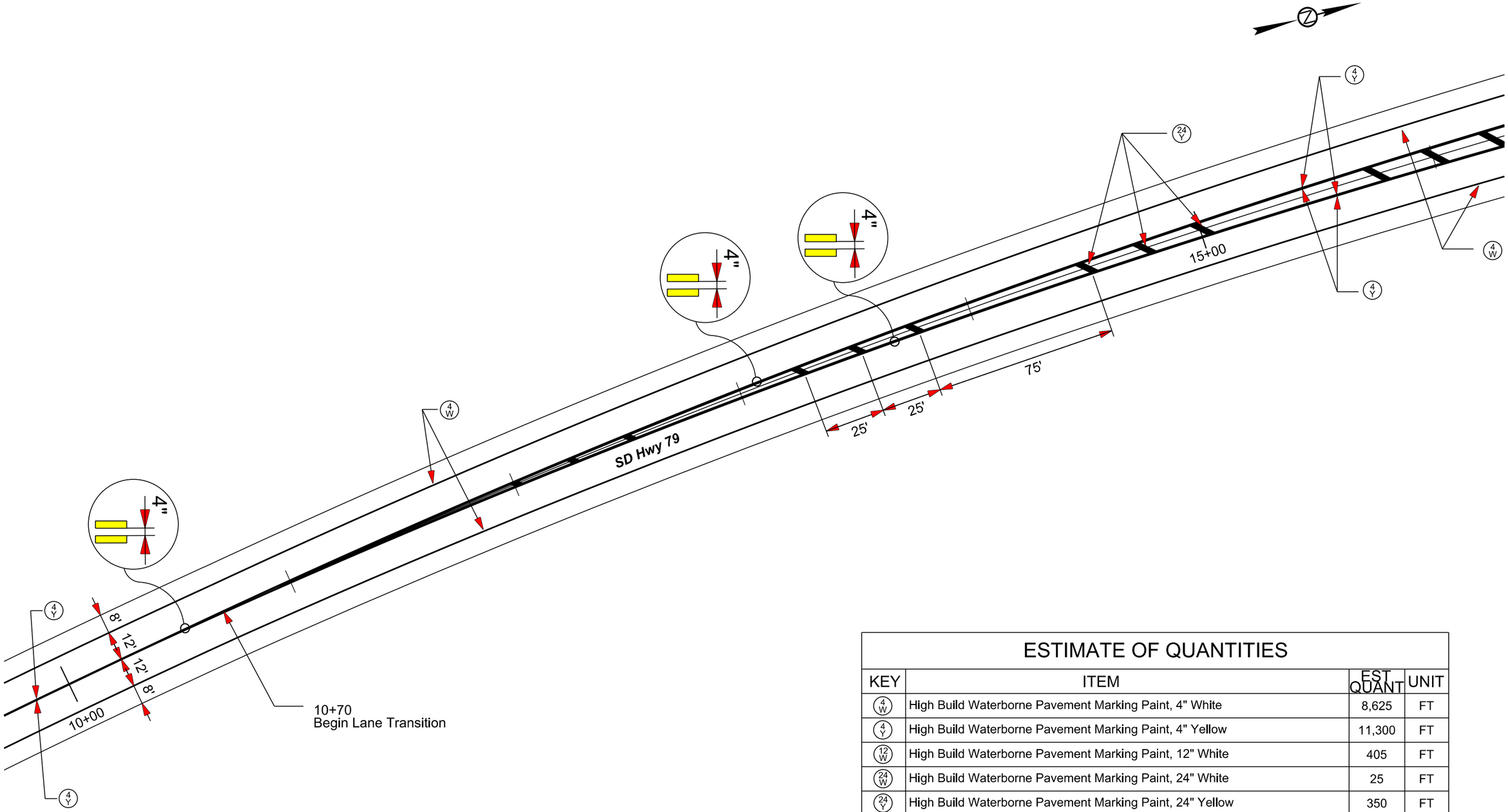
PCN: 04L0

Hwy	Station to	Station	Length Ft	High Build Waterborne Pavement Marking Paint, White Gal	High Build Waterborne Pavement Marking Paint, Yellow Gal	Preformed Thermoplastic Pavement Marking, 4" White Ft	Preformed Thermoplastic Pavement Marking, 4" Yellow Ft	Preformed Thermoplastic Pavement Marking, 24" White Ft	Grooving for Cold Applied Plastic Pavement Marking, 4" Ft	Grooving for Cold Applied Plastic Pavement Marking, 24" Ft	Curb Painting, Yellow Ft
US 212	324+00	332+65	865	11	8						
SD 79/US 212	5+82	37+00	3118	31	50						
			Totals:	42	58	0	0	0	0	0	0
						0					

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-P-PH 0079(87)129 NH 0212(193)28	M5	M14

Plotting Date: 03/20/2024

PAVEMENT MARKING LAYOUT



ESTIMATE OF QUANTITIES

KEY	ITEM	EST QUANT	UNIT
4 W	High Build Waterborne Pavement Marking Paint, 4" White	8,625	FT
4 Y	High Build Waterborne Pavement Marking Paint, 4" Yellow	11,300	FT
12 W	High Build Waterborne Pavement Marking Paint, 12" White	405	FT
24 W	High Build Waterborne Pavement Marking Paint, 24" White	25	FT
24 Y	High Build Waterborne Pavement Marking Paint, 24" Yellow	350	FT
	High Build Waterborne Pavement Marking Paint, Arrow (Left 3)	3	EACH

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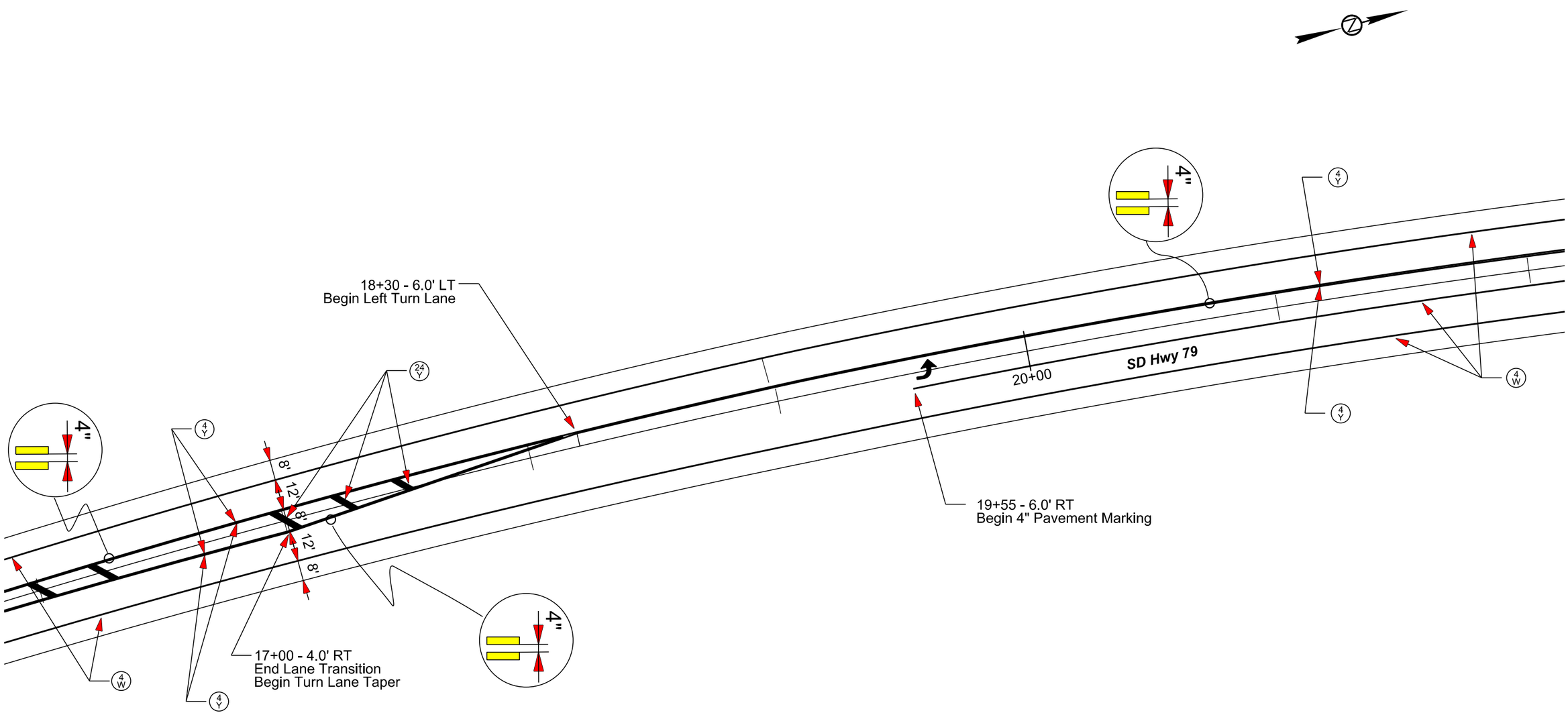
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-P-PH 0079(87)129 NH 0212(193)28	M6	M14

Plotting Date: 03/20/2024

PAVEMENT MARKING LAYOUT



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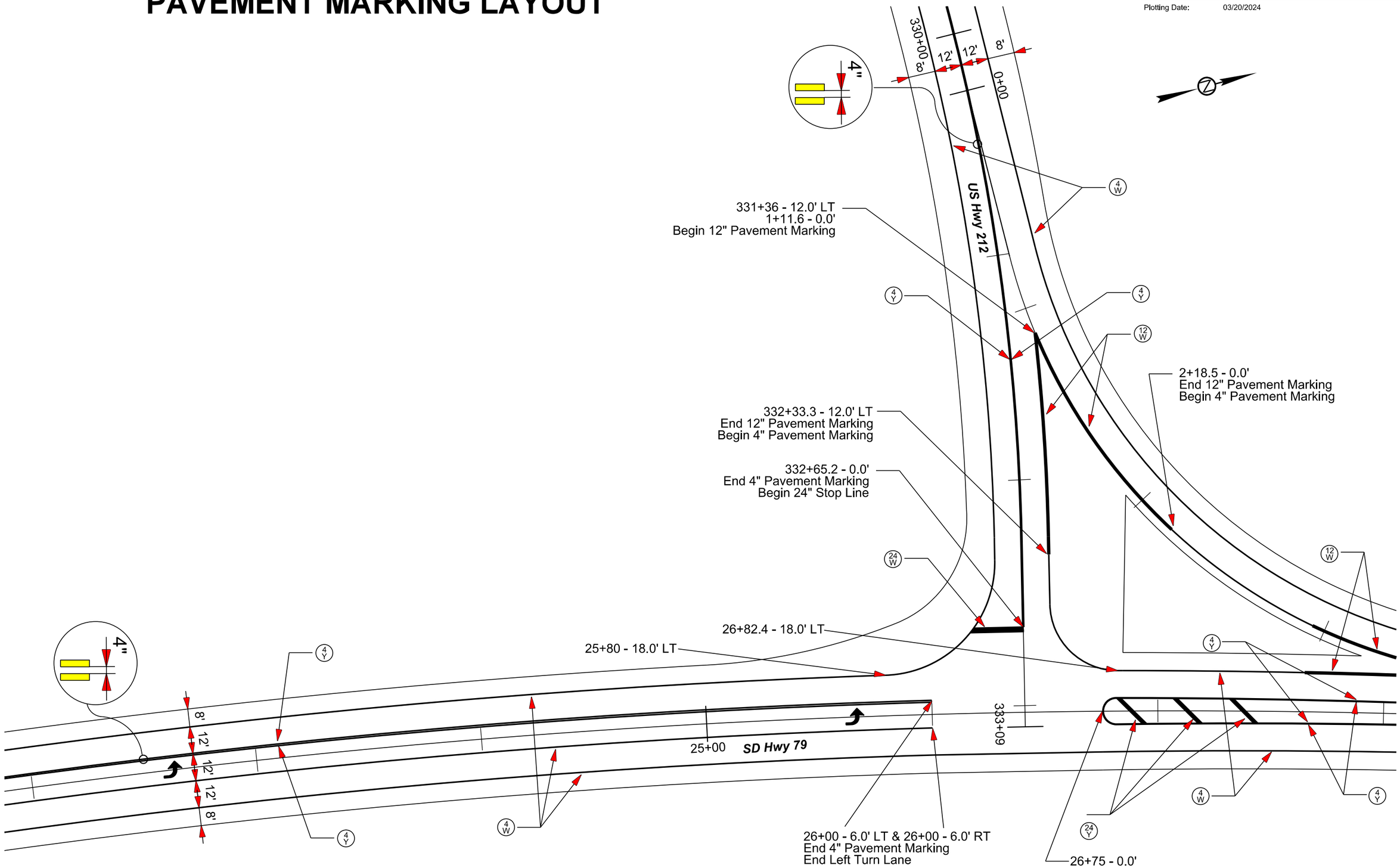
PAVEMENT MARKING LAYOUT

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-P-PH 0079(87)129 NH 0212(193)28	M7	M14

Plotting Date: 03/20/2024



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STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
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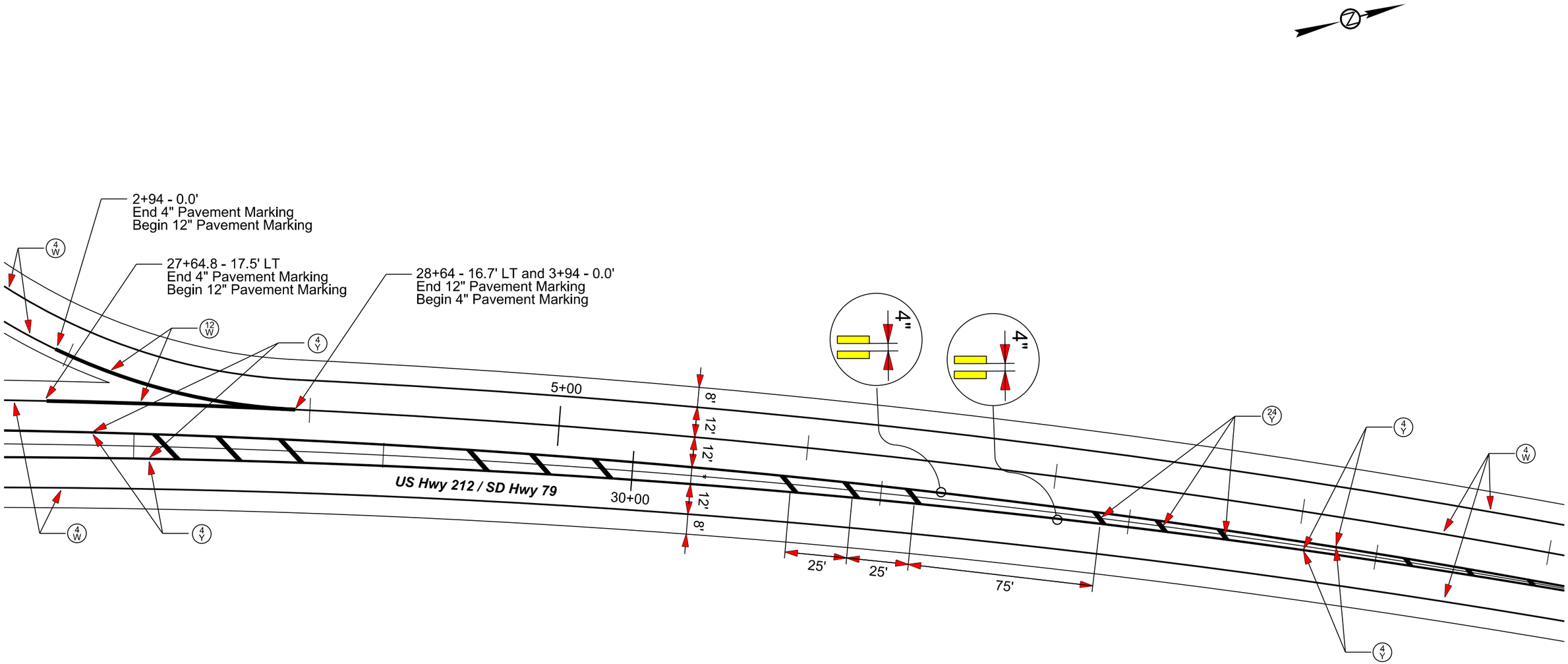
Plotting Date: 03/20/2024

PAVEMENT MARKING LAYOUT



* - Variable Distance

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STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
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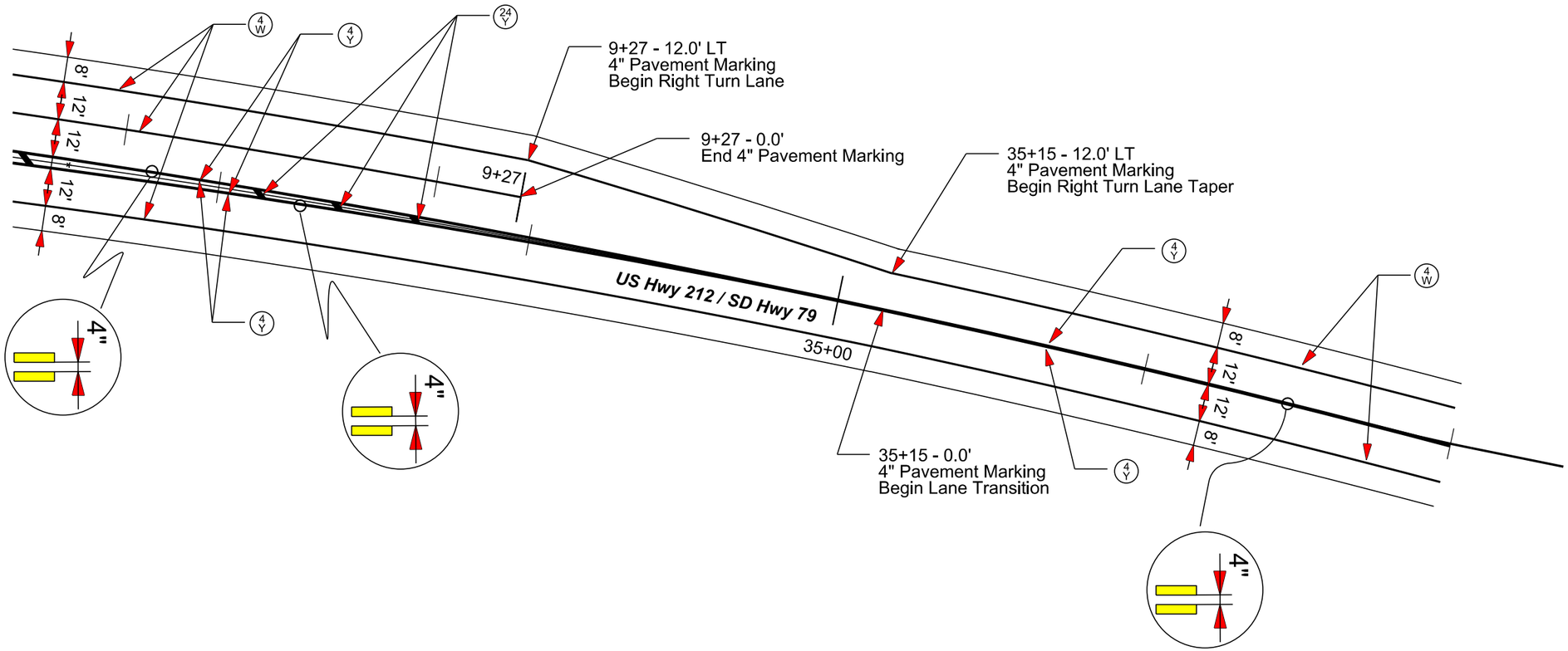
Plotting Date: 03/20/2024

PAVEMENT MARKING LAYOUT



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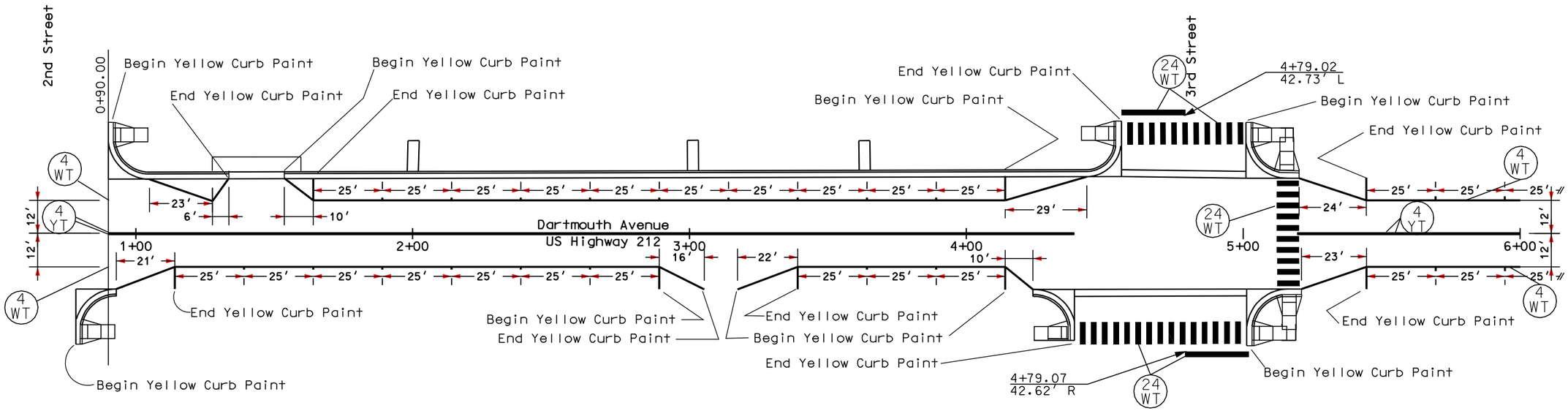
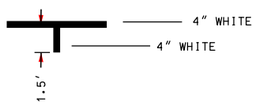
PAVEMENT MARKING LAYOUT



ESTIMATE OF QUANTITIES

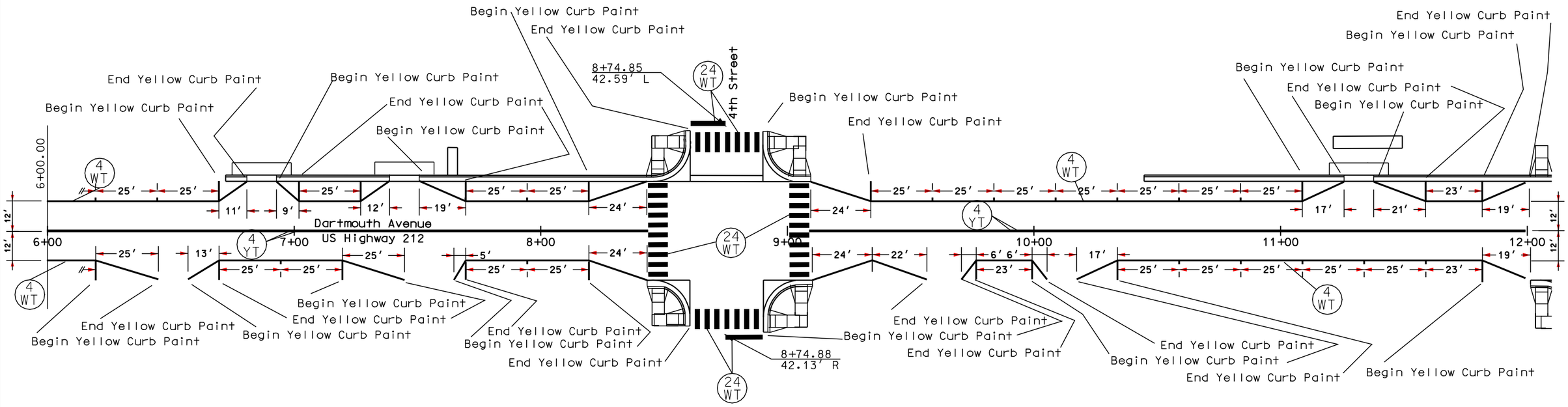
KEY	ITEM	UNIT	QUANTITY
4 WT	PREFORMED THERMOPLASTIC PAVEMENT MARKING, 4" WHITE	FT	912
4 YT	PREFORMED THERMOPLASTIC PAVEMENT MARKING, 4" YELLOW	FT	860
24 WT	PREFORMED THERMOPLASTIC PAVEMENT MARKING, 24" WHITE	FT	336
	GROOVING FOR COLD APPLIED PLASTIC PAVEMENT MARKING, 4"	FT	1772
	GROOVING FOR COLD APPLIED PLASTIC PAVEMENT MARKING, 24"	FT	336
	CURB PAINTING, YELLOW	FT	312



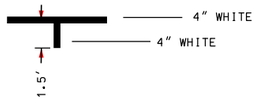
Parking Detail Detail

Centerline Detail

PAVEMENT MARKING LAYOUT



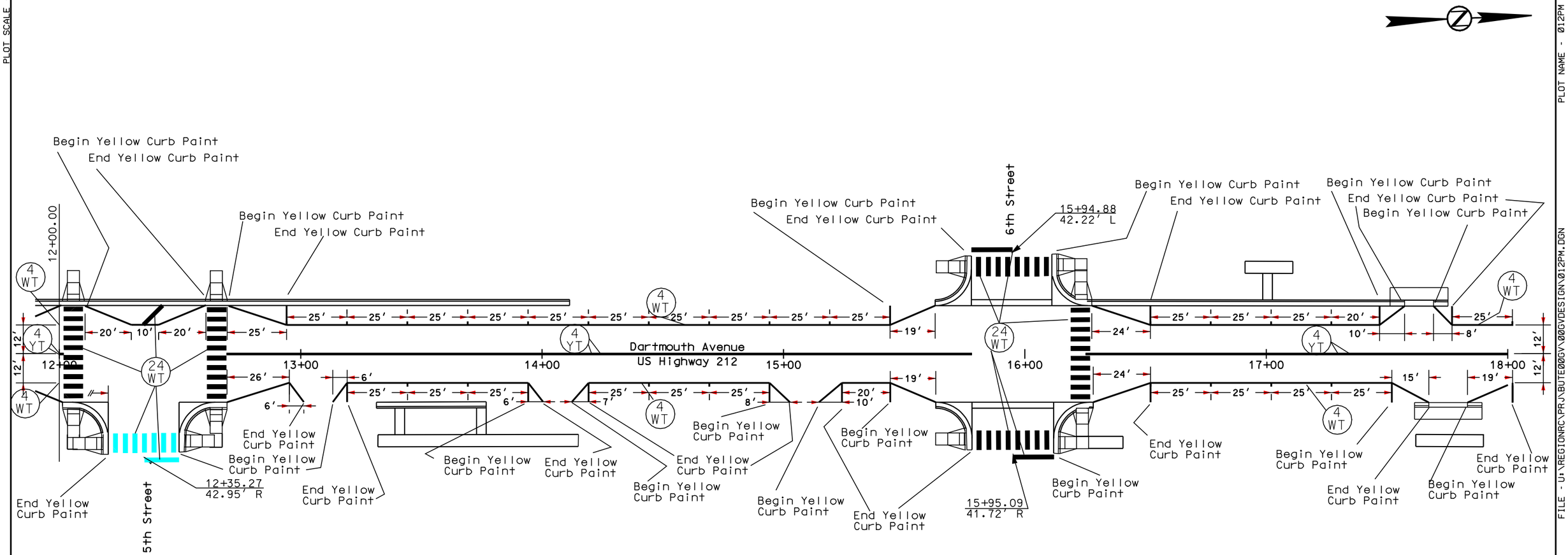
ESTIMATE OF QUANTITIES			
KEY	ITEM	UNIT	QUANTITY
4 WT	PREFORMED THERMOPLASTIC PAVEMENT MARKING, 4" WHITE	FT	1112
4 YT	PREFORMED THERMOPLASTIC PAVEMENT MARKING, 4" YELLOW	FT	1068
24 WT	PREFORMED THERMOPLASTIC PAVEMENT MARKING, 24" WHITE	FT	301
	GROOVING FOR COLD APPLIED PLASTIC PAVEMENT MARKING, 4"	FT	2180
	GROOVING FOR COLD APPLIED PLASTIC PAVEMENT MARKING, 24"	FT	301
	CURB PAINTING, YELLOW	FT	431



Parking Detail Detail

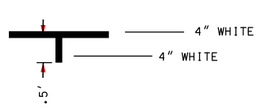
Centerline Detail

PAVEMENT MARKING LAYOUT



ESTIMATE OF QUANTITIES

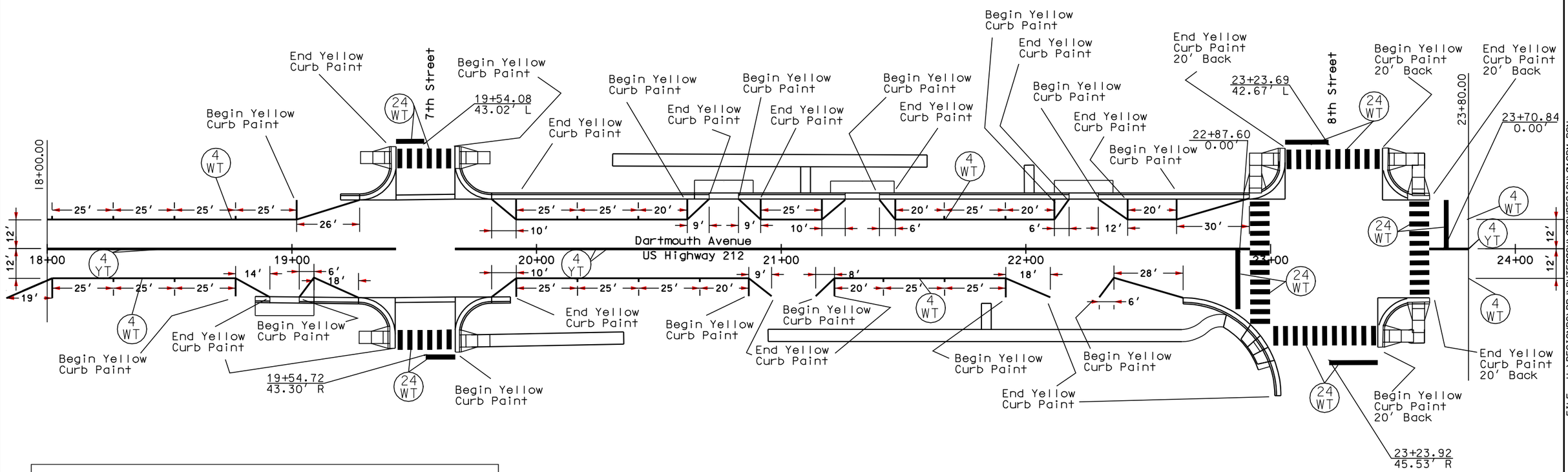
KEY	ITEM	UNIT	QUANTITY
4 WT	PREFORMED THERMOPLASTIC PAVEMENT MARKING, 4" WHITE	FT	1106
4 YT	PREFORMED THERMOPLASTIC PAVEMENT MARKING, 4" YELLOW	FT	974
24 WT	PREFORMED THERMOPLASTIC PAVEMENT MARKING, 24" WHITE	FT	483
	GROOVING FOR COLD APPLIED PLASTIC PAVEMENT MARKING, 4"	FT	2080
	GROOVING FOR COLD APPLIED PLASTIC PAVEMENT MARKING, 24"	FT	483
	CURB PAINTING, YELLOW	FT	398



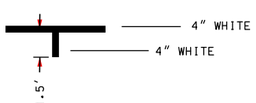
Parking Detail Detail

Centerline Detail

PAVEMENT MARKING LAYOUT



ESTIMATE OF QUANTITIES			
KEY	ITEM	UNIT	QUANTITY
4 WT	PREFORMED THERMOPLASTIC PAVEMENT MARKING, 4" WHITE	FT	938
4 YT	PREFORMED THERMOPLASTIC PAVEMENT MARKING, 4" YELLOW	FT	964
24 WT	PREFORMED THERMOPLASTIC PAVEMENT MARKING, 24" WHITE	FT	555
	GROOVING FOR COLD APPLIED PLASTIC PAVEMENT MARKING, 4"	FT	1902
	GROOVING FOR COLD APPLIED PLASTIC PAVEMENT MARKING, 24"	FT	555
	CURB PAINTING, YELLOW	FT	541



Parking Detail Detail

Centerline Detail

TYPICAL PAVEMENT MARKING LAYOUT

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-P-PH 0079(87)129 NH 0212(193)28	M14	M14

Plotting Date: 03/20/2024

Plot Scale - 1:20.3299

Plotted From - TRRC12216

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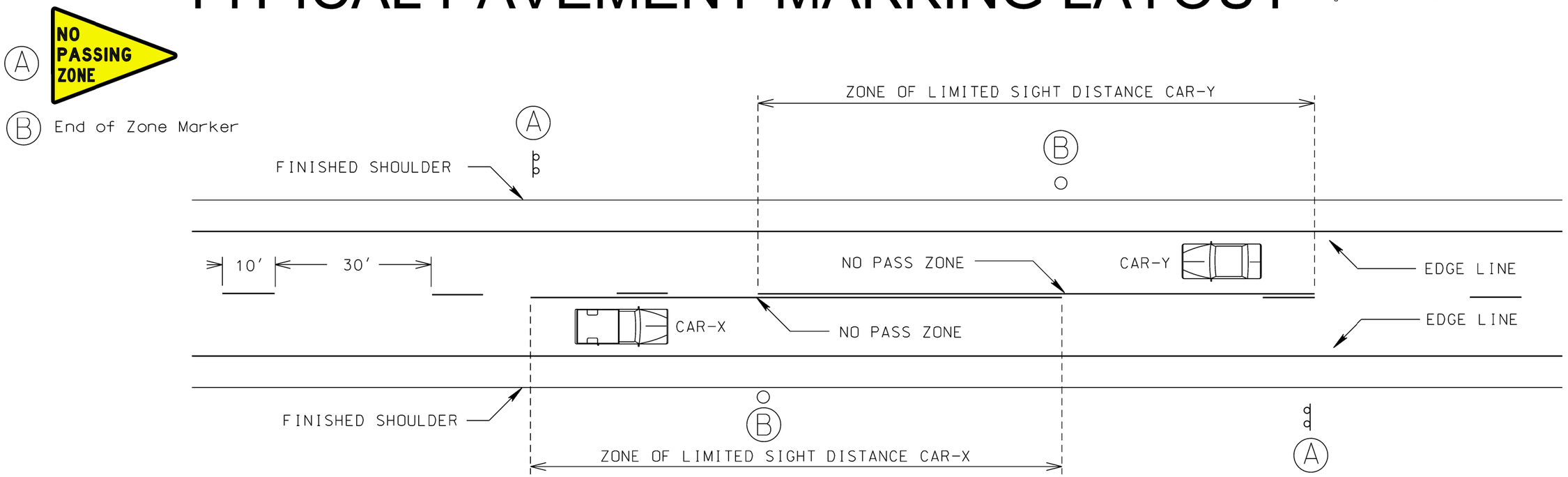

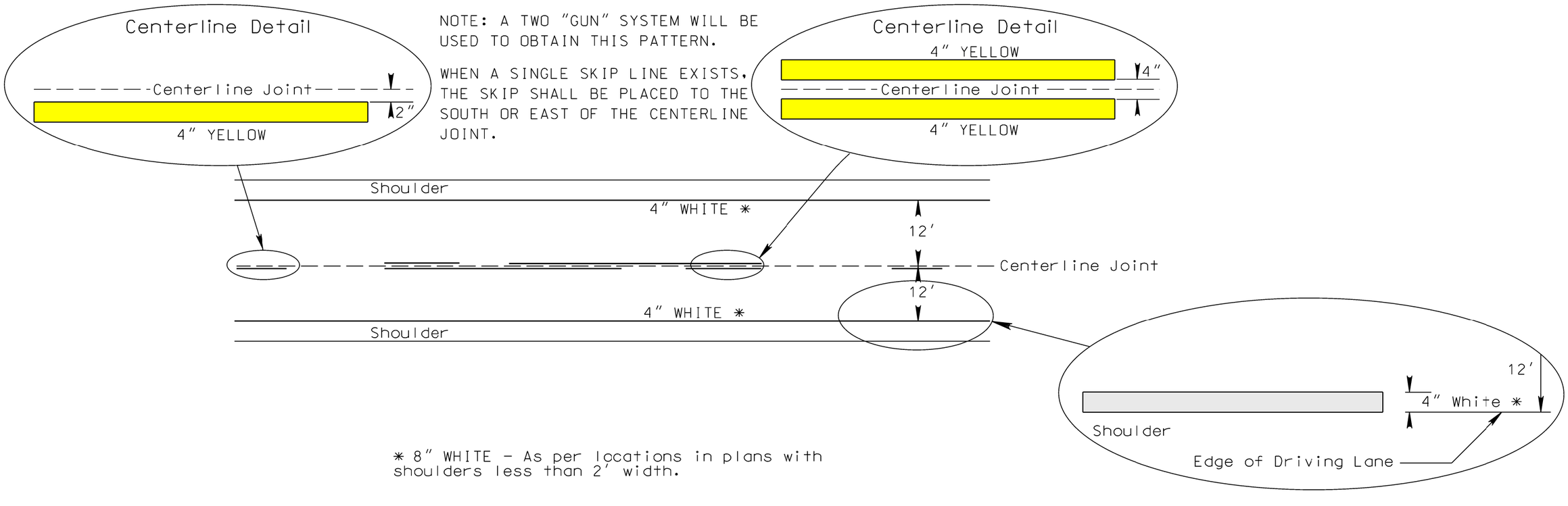

* 8" WHITE - As per locations in plans with shoulders less than 2' width.