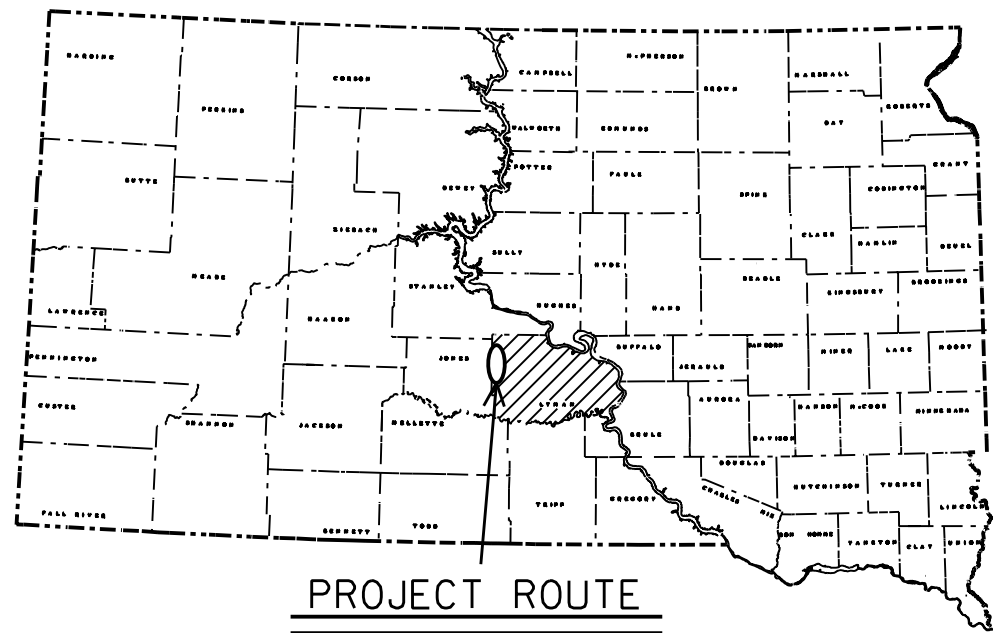


STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	083S-351	1	9

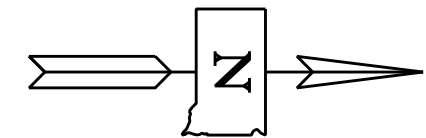
STATE OF SOUTH DAKOTA
DEPARTMENT OF TRANSPORTATION
PLANS FOR PROPOSED
PROJECT 083S-351
U.S. HIGHWAY 83 SBL
LYMAN COUNTY
ASPHALT SURFACE TREATMENT
PCN 11QC

INDEX OF SHEETS

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- 3: TYPICAL SECTION
- 4-5: PLAN NOTES AND RATES OF MATERIALS
- 6: PAINT DETAILS AND SIGN TABULATION
- 7: FIXED LOCATION SIGNS
- 8-9: STANDARD PLATES



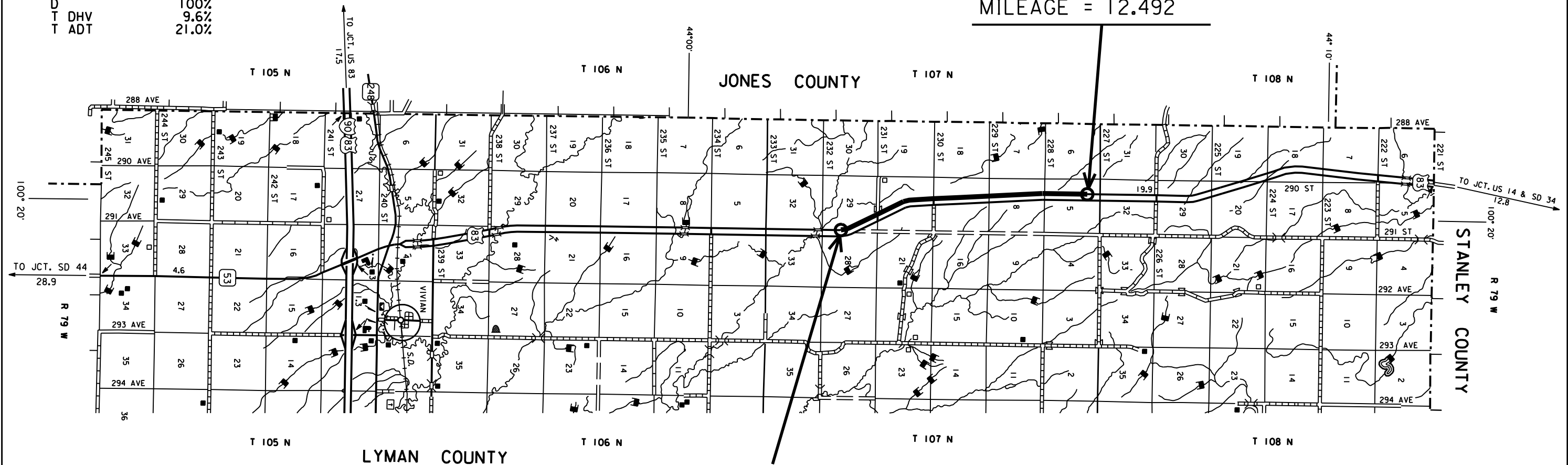
PROJECT ROUTE



DESIGN DESIGNATION

ADT (2009)	985
ADT (2029)	1465
DHV	220
D	100%
T DHV	9.6%
T ADT	21.0%

BEGIN PROJECT
 MRM 100.0 + 0.562
 STATION 343+37.68
 MILEAGE = 12.492



GROSS LENGTH: 22,750.0 FT = 4.309 MILES
LENGTH OF EXCEPTIONS: 000.0 FT = 0.000 MILES
NET LENGTH: 22,750.0 FT = 4.309 MILES

END PROJECT
 MRM 96.0 + 0.253
 STATION 570+87.68
 MILEAGE = 8.183

ESTIMATE OF QUANTITIES

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	083S-351	2	9

ESTIMATED QUANTITIES

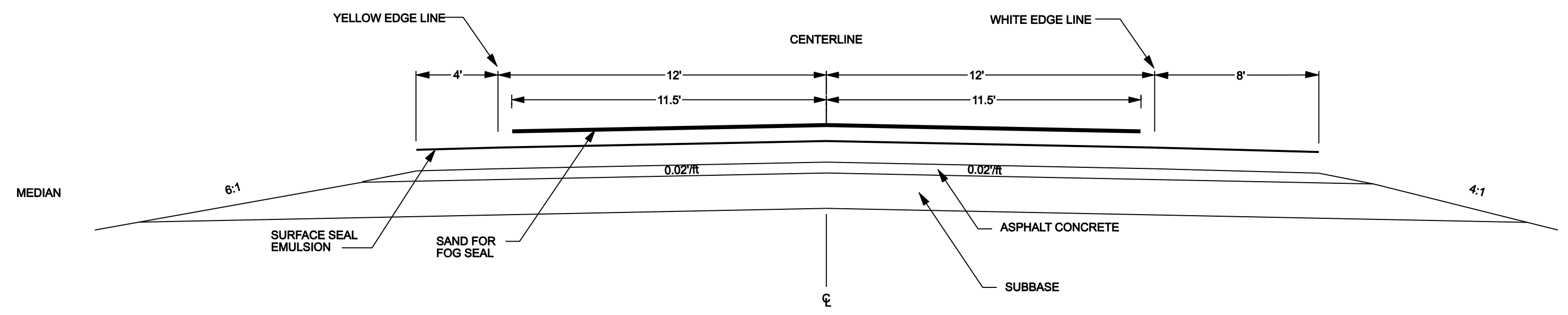
The below quantities are based on the rates shown in the Rates of Materials. This is only an estimate. The actual application rates of materials will be determined by field conditions and by the Manufacturer's recommendations. These rates may vary from the estimated rates stated in the Rates of Materials. The application rates may also be adjusted in the field. Pay quantities will be those actually used even though they may vary significantly from plans estimates.

083S-351 LYMAN COUNTY PCN I1QC

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
330E0520	Modified Emulsion Membrane	22.7	Ton
330E4000	Sand for Modified Emulsion Membrane	17.4	Ton
633E1300	Pavement Marking Paint, White	93.0	Gal
633E1305	Pavement Marking Paint, Yellow	73.0	Gal
634E0010	Flagging	20	Hour
634E0100	Traffic Control	448	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0420	Type C Advance Warning Arrow Panel	1	Each
634E0630	Temporary Pavement Marking	4.309	Mile

TYPICAL SECTION

US 83 SOUTHBOUND LANES



Sta 343+37.68 to 570+87.68

PLAN NOTES & RATES OF MATERIALS

STATE OF SOUTH DAKOTA	PROJECT 083S-351	SHEET NO. 4	TOTAL SHEETS 9
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SPECIFICATIONS

Standard Specifications for Roads and Bridges, 2004 Edition and Required Provisions, Supplemental Specifications and/or Special Provisions as included in the Proposal.

ENGINEER NOTIFICATION

The Contractor is required to notify the Area Engineer at least 10 days prior to beginning work.

MODIFIED EMULSION MEMBRANE

This work shall consist of providing and applying the bituminous surface seal emulsion. Application of the surface seal shall be to the widths specified in the plans. The Contractor will have to consider the width of overlap at centerline to obtain the total width specified. A gap at centerline between passes will not be allowed.

The surface seal emulsion will be applied on an existing Class S asphalt surface, however the south 500 feet of the project surface seal emulsion will be applied on an adjacent existing Superpave asphalt surface for comparison.

The bituminous surface seal emulsion concentrate, in the undiluted state, shall have the following properties:

Saybolt furol viscosity: 77° F (25° C)	20-100 seconds
Residue by distribution or by evaporation:	57 percent, minimum
Sieve test:	0.2 percent, maximum
pH, cationic:	2 to 6.5

The emulsion concentrate, when diluted in the proportion of one part of concentrate to one part of hot water, by volume and ready to apply, shall have the following properties:

Saybolt furol viscosity: 77° F (25° C)	10-50 seconds
Residue from Distillation, or Evaporation:	28 to 42 percent, minimum
Sieve test:	0.1 percent, maximum
Pumping stability test:	pass
Hot water temperature at or above 100 degrees.	

Tests on Residue from Distillation, or Evaporation:

Viscosity at 275° F (135° C) ASTM D-4402	1750 cts max.
Solubility in 1,1,1 trichloroethylene ASTM D-2042	97.5% min.
Penetration ASTM D-5	50 dmm max.
Asphaltenes ASTM D-2007	15% min.
Saturates ASTM D-2007	15% max.
Polar Compounds ASTM D-2007	25% min.
Aromatics ASTM D-2007	15% min.

(1) pH may be used in lieu of the particle charge test which is sometimes inconclusive in slow setting, bituminous emulsions.

(2) Pumping stability is tested by pumping 1 pint, (475 ml) of Seal Emulsion diluted 1 part concentrate to 1 part water, at 77° F (25° C), through a 1/4-inch gear pump operating 1750 rpm for 10 minutes with no significant separation or coagulation.

MODIFIED EMULSION MEMBRANE (CONTINUED)

The emulsion base residue shall contain not less than 18 percent Gilsonite, and will not contain any tall oil pitch. It shall be compatible with asphalt concrete and have a 5-year minimum proven performance record under proposed application conditions.

The Contractor shall furnish Manufacturer's certification that the material is the type, grade, and quality specified for each load of bituminous material delivered. The certification shall show the shipment number, refinery, consignee, destination, contract number, and date of shipment including an authorized supplier employee signature. The Contractor shall submit samples of diluted, ready-to-apply bituminous material as requested by the Owner.

SAND FOR MODIFIED EMULSION MEMBRANE

The Sand for Modified Emulsion Membrane shall be a dry, clean, dust-free slag or sand with a Mohs hardness of 6-8. The material shall be angular and black in color, with Absorption less than 1.0.

The sanding material shall meet the following gradation analysis:

Sieve Size	% Passing
No. 16	99 - 100
No. 30	50 - 80
No. 40	15 - 40
No. 50	4 - 15
No. 80	0 - 4
No. 200	0 - 2

CONSTRUCTION METHODS

The ready to apply surface seal emulsion material shall be obtained by blending the emulsion concentrate and clean water. Mix one part water into one part emulsion concentrate by volume as directed by the Supplier.

The surface shall be thoroughly swept with a rotary power broom and cleaned of all foreign material. Appurtenances immediately adjacent to the surface to be treated shall be protected from the splatter of asphalt. Bridge approach slabs and joints, manhole covers, water shut valves, etc. shall be covered to ensure that liquid asphalt is not applied to them, as directed by the Engineer.

The surface seal emulsion may be applied with modified asphalt distributors. The distributor shall be in good working order and contain no contaminants or diluents in the tank, pump, bars or hoses.

Spreader bar tips must be clean, free of burrs, and of a consistent size to maintain an even distribution of the seal material. Any type of tip or pressure source is suitable that will maintain a predetermined flow rate and constant pressure during the application process. The emulsion pump shall maintain a constant flow through the nozzles during the application process regardless of the speed of the truck.

CONSTRUCTION METHODS (CONTINUED)

The distributor truck shall be equipped with a 12-foot minimum spreader bar with individual nozzle control. It shall be capable of specific application rates in the range of 0.05 to 0.25 gallons per square yard. These rates shall be computer-controlled rather than mechanical. It shall have an easily accessible thermometer that constantly monitors the temperature of the emulsion material. For confined spaces a mini distributor with a 7' spray bar and 22 spray nozzles may be utilized.

In the event there is a temperature problem the distributor must be equipped to effectively heat and mix the emulsion while circulating the emulsion to the required temperature prior to application. Heating and mixing shall be done in accordance with the manufacturer's recommendations. Care shall be taken not to damage the seal by over heating or over mixing the material.

The Contractor shall replace all surface seal emulsion applied to pavements that are determined to be damaged by incorrect handling, mixing, heating or application procedures by the Contractor at no cost to the Owner.

The sanding material shall be added to the surface seal emulsion by means of a drop-type or broadcast sander mounted on the rear of the distributor. The application shall spread the material evenly across the full width of the spray bar and occur prior to the emulsion breaking. The driver must be able to adjust volume and area of distribution during the application process.

Surface seal operations will be permitted only during daylight hours, when conditions are dry and when wind does not adversely affect the spraying operation.

Minimum temperatures and seasonal limitations are as follows:

Air and Surface Temp. (In the Shade and Rising)	Seasonal Limitations
70° F (21 C)	June 1 - Sept. 1

The surface seal shall be applied using equipment as described and in accordance with the manufacturer's recommendations. Apply the emulsion only when the existing surface is clean and dry. Apply dilute bituminous emulsion at a target rate of 0.12 gallons per square yard, but not less than 0.10 nor more than 0.18 gallons per square yard.

The sanding shall be done immediately after application of the surface seal emulsion. The speed of the distributor shall be such that the sanding material shall be applied before the seal begins to break. Apply sand at a target rate of 0.60 pounds per square yard, but not less than 0.50 nor more than 0.75 pounds per square yard.

METHOD OF MEASUREMENT

The quantity of bituminous surface seal emulsion to be paid for will be the number of tons applied and accepted. Water added to the bituminous concentrate will not be measured for payment.

The quantity of Sand for Modified Emulsion Membrane to be paid for will be the number of tons applied and accepted.

PLAN NOTES & RATES OF MATERIALS

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	083S-351	5	9

BASIS OF PAYMENT

Payment for the bituminous surface seal emulsion will be made at the contract unit price per ton, and shall include preparation of the pavement surface. This price will be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the work.

Payment for the Sand for Modified Emulsion Membrane material will be made at the contract unit price per ton. This price will be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the work.

MAINTENANCE OF TRAFFIC

Removing, relocating, covering, salvaging and resetting of existing traffic control devices, including delineation, shall be the responsibility of the Contractor. Cost for this work shall be incidental to the contract unit prices for the various items unless otherwise specified in the plans. Any delineators and signs damaged or lost shall be replaced by the Contractor at no cost to the State.

Storage of vehicles and equipment shall be outside the clear zone and as near as possible to the right-of-way line. Contractor's employees should mobilize at a location off the right-of-way and arrive at the work sites in a minimum number of vehicles necessary to perform the work.

Indiscriminate driving and parking of vehicles within the right-of-way will not be permitted. Any damage to the vegetation, surfacing, embankment, delineators and existing signs resulting from such indiscriminate use shall be repaired and/or restored by the Contractor, at no expense to the State, and to the satisfaction of the Engineer.

All breakaway sign supports shall comply with FHWA NCHRP 350 crash-worthy requirements. The Contractor shall provide post installation details at the preconstruction meeting for all steel post breakaway sign support assemblies.

TRAFFIC CONTROL

All traffic control sign locations shall be set in the field by the Contractor and verified by the Engineer prior to installation.

Fixed location signing placed more than two days prior to the start of construction shall be covered until the time of construction. The cost of materials, labor and equipment necessary to complete this work shall be incidental to other contract items. No separate payment will be made.

TEMPORARY PAVEMENT MARKING

Temporary pavement markings shall be as per the Standard Specifications.

At the end of each day the temporary pavement markings shall be in place and visible. No separate payment will be made at the end of the next day for remarking a stretch that was not evened up with surface seal on the previous day.

TEMPORARY PAVEMENT MARKING (CONTINUED)

Flagger symbol signs (W20-7a) and flaggers, or a shadow vehicle with rotating yellow lights or strobe lights shall be positioned on the roadway shoulder in advance of workers for all directions of traffic during the installation of temporary road markers. The traffic control device used shall be moved to provide proper warning of the work operation. A ROAD WORK AHEAD (W20-1), a Workers symbol sign (W21-1a) or a BE PREPARED TO STOP (W3-4) warning sign shall be mounted on the rear of the shadow vehicle. The method of traffic control used by the Contractor for this work shall be approved by the Engineer.

PERMANENT PAVEMENT MARKING PAINT

Application of permanent pavement marking paint shall be completed within 14 calendar days following completion of the surface seal.

RATES OF MATERIALS

The Estimate of Quantities is based on the following quantities of material per mile on US 83 SBL from MRM 96.000+0.253 to MRM 100.562+0.000 (Station 343+37.68 to Station 570+87.68).

Modified Emulsion Membrane – bituminous surface seal emulsion at the rate of 5.3 tons applied 36 feet wide (Rate = 0.06 gallon per square yard).

The project quantity is based on one 5460 gallon load of undiluted emulsion.

Sand for Modified Emulsion Membrane at the rate of 4.1 tons applied 23 feet wide (Rate = 0.60 pound per square yard).

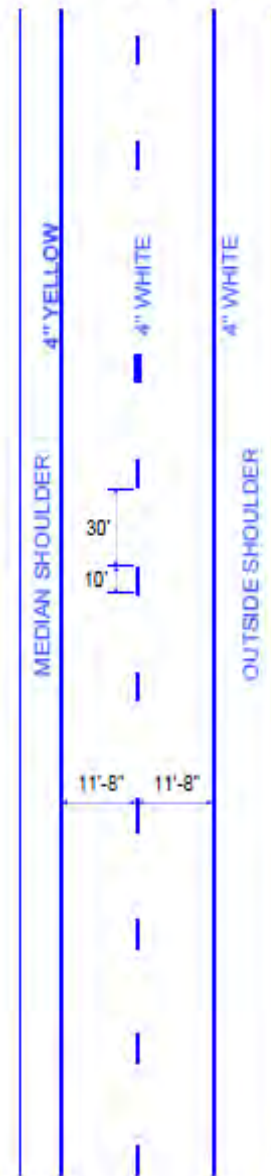
TRAFFIC PAINT DETAILS & SIGN TABULATION

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	083S-351	6	9

TRAFFIC PAINT DETAILS

SIGN TABULATION

DIVIDED ROADWAY (ONE DIRECTION SHOWN)



FURNISHING AND APPLYING PAVEMENT MARKING PAINT

1. Pavement marking paint and glass beads will be furnished and applied by the Contractor. Material shall meet the requirements of Section 980 and 981 of the Standard Specifications.
2. Construction requirements, methods of measurement and basis of payment shall conform to the requirements of Section 833 of the Standard Specifications and the Supplemental Specifications.
3. Approximate paint application rates shall be as follows:

DIVIDED ROADWAY (Rates for one line)	
Solid Yellow Edgeline	Rate = 16.90 Gals./Pass-Mile
Dashed White Centerline	Rate = 4.60 Gals./Pass-Mile
Solid White Edgeline	Rate = 16.90 Gals./Pass-Mile

4. Typical pavement marking as shown on this sheet shall be applied throughout the entire length of divided roadway.
5. Traffic Control shall be incidental to the cost of application. The striper and advance or trailing warning vehicle shall be equipped with flashing amber lights or advance warning arrow panel.

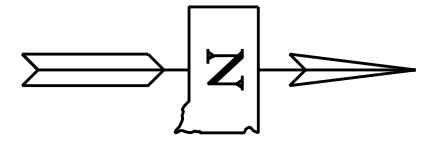
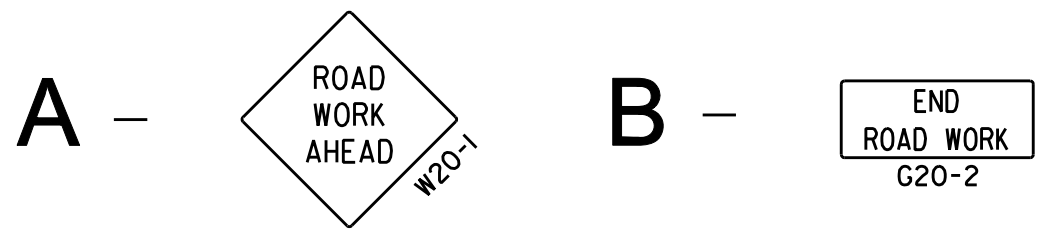
ESTIMATED QUANTITIES	
PAVEMENT PAINT	
WHITE	93 GALLONS
YELLOW	73 GALLONS
TOTAL	166 GALLONS

SIGN CODE	SIGN SIZE	DESCRIPTION	NUMBER REQUIRED	UNITS PER SIGN	UNITS
G20-2	36" x 18"	END ROAD WORK	2	17	34
W4-2	48" x 48"	LEFT OR RIGHT LANE ENDS (SYMBOL)	2	34	68
W20-1	48" x 48"	ROAD WORK AHEAD	5	34	170
W20-5	48" x 48"	LT. OR RT. LANE CLOSED AHEAD	2	34	68
W21-2	36" x 36"	FRESH OIL	4	27	108
TOTAL UNITS					448

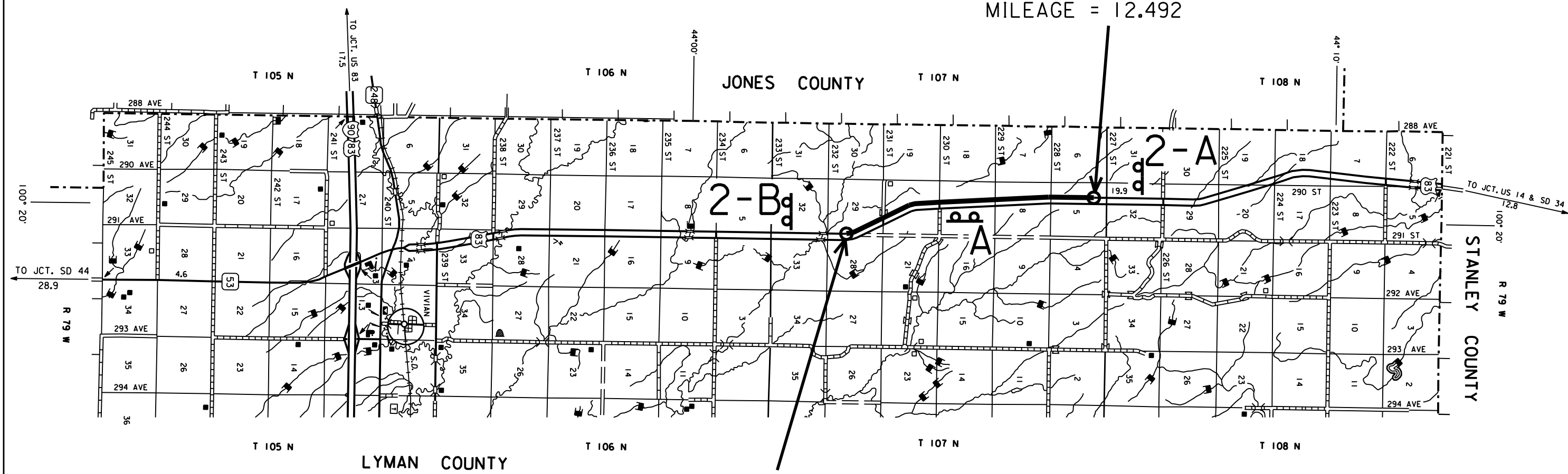
FIXED LOCATION SIGNS

The Contractor shall stake these signs.

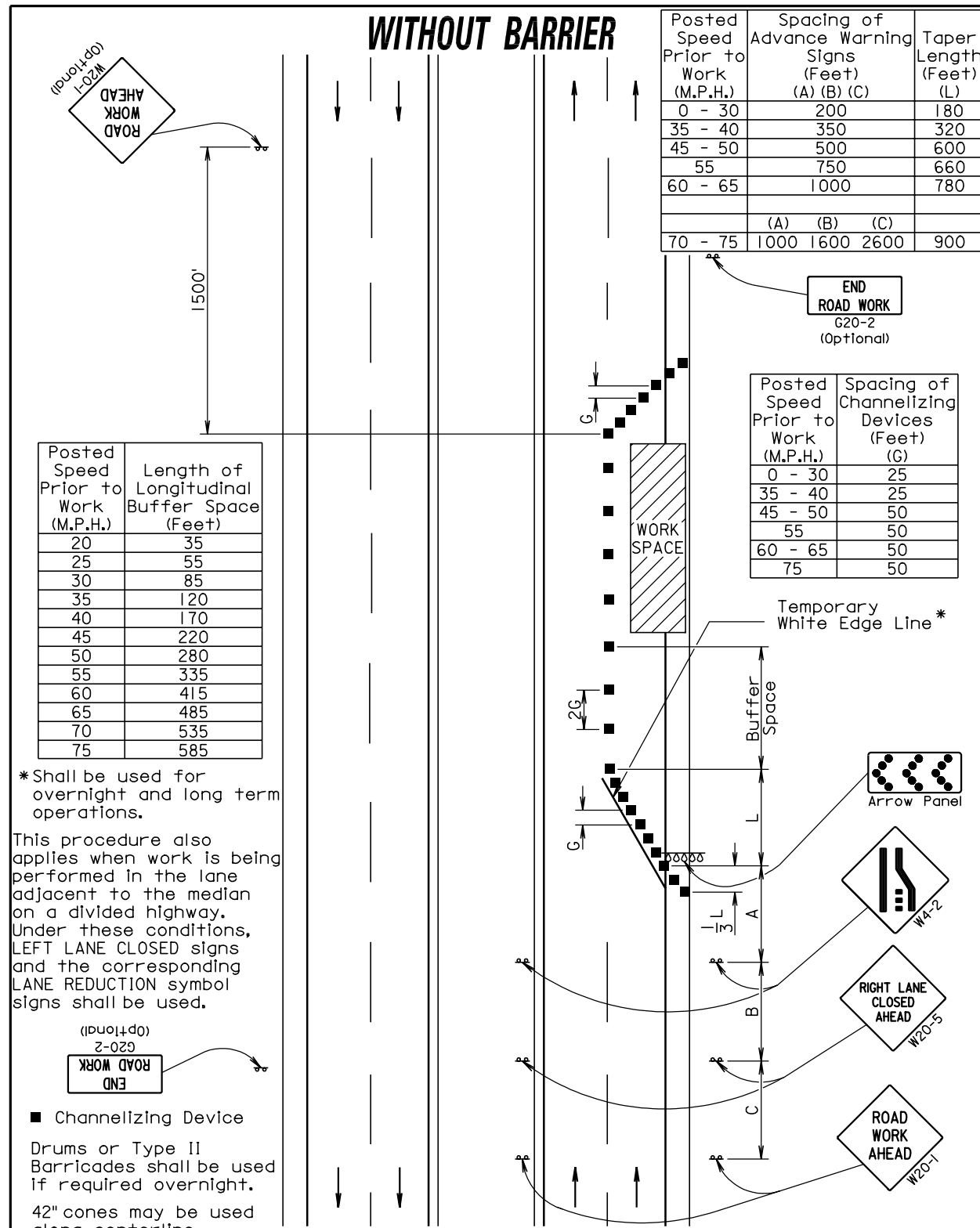
The Engineer must verify the stakes prior to sign installation.



BEGIN PROJECT
 MRM 100.0 + 0.562
 STATION 343+37.68
 MILEAGE = 12.492

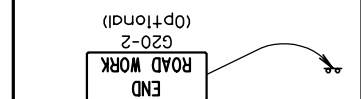


END PROJECT
 MRM 96.0 + 0.253
 STATION 570+87.68
 MILEAGE = 8.183

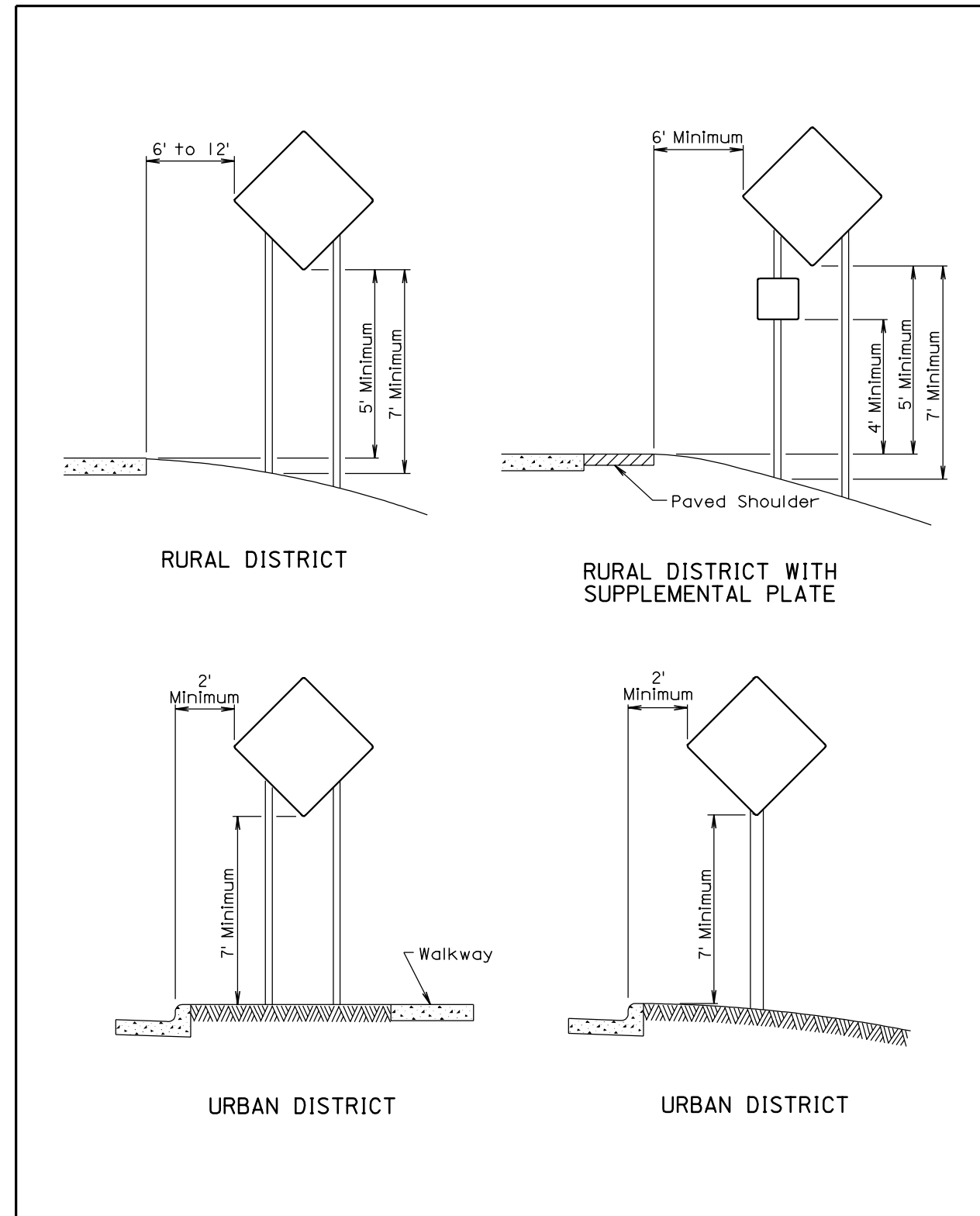


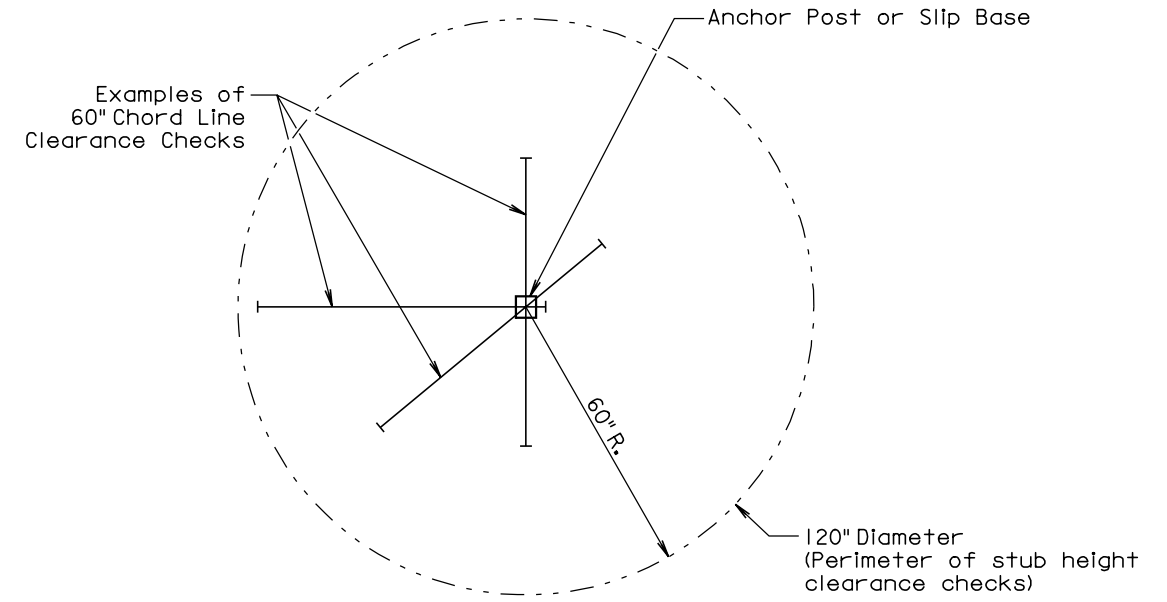
*Shall be used for overnight and long term operations.

This procedure also applies when work is being performed in the lane adjacent to the median on a divided highway. Under these conditions, LEFT LANE CLOSED signs and the corresponding LANE REDUCTION symbol signs shall be used.

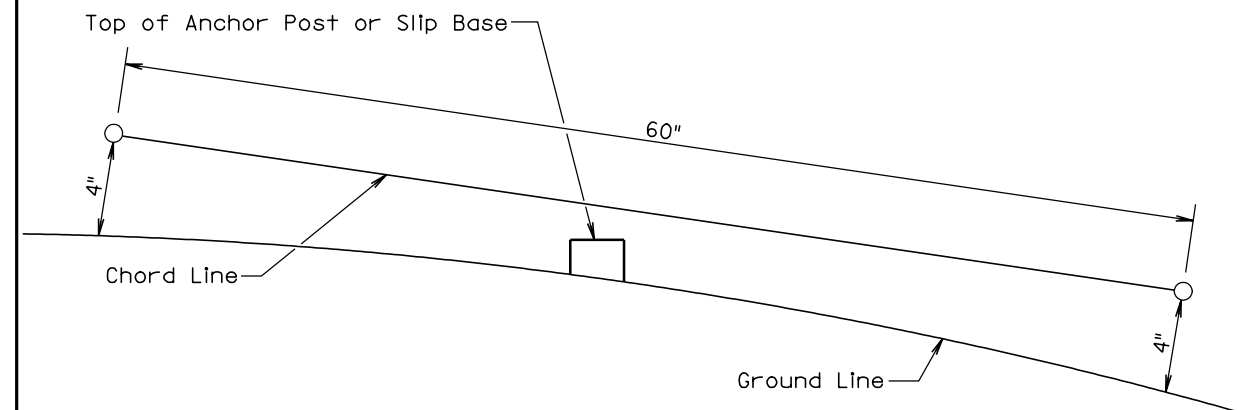


- Channelizing Device
- Drums or Type II Barricades shall be used if required overnight.
- 42" cones may be used along centerline





PLAN VIEW
(Examples of stub height clearance checks)



ELEVATION VIEW

GENERAL NOTES:

The top of anchor posts and slip bases SHALL NOT extend above a 60" chord line within a 120" diameter circle around the post with ends 4" above the ground.

At locations where there is curb and gutter adjacent to the breakaway sign support, the stub height shall be a maximum of 4" above the ground line at the localized area adjacent to the breakaway support stub.

The 4" stub height clearance is not necessary for U-channel lap splices where the support is designed to yield (bend) at the base.

July 1, 2005

Published Date: 1st Qtr. 2010

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BREAKAWAY SUPPORT STUB CLEARANCE

**PLATE NUMBER
634.99**

Sheet 1 of 1