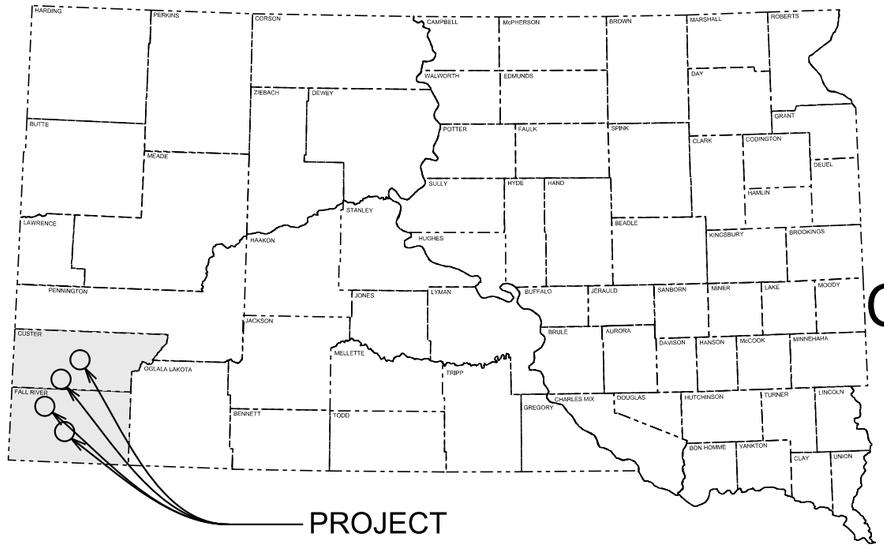


STATE OF SOUTH DAKOTA
DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED

PROJECT NH-P 0043(32)
SD HIGWAYS 71, 89 and 87
US HIGHWAY 18
CUSTER AND FALL RIVER COUNTIES

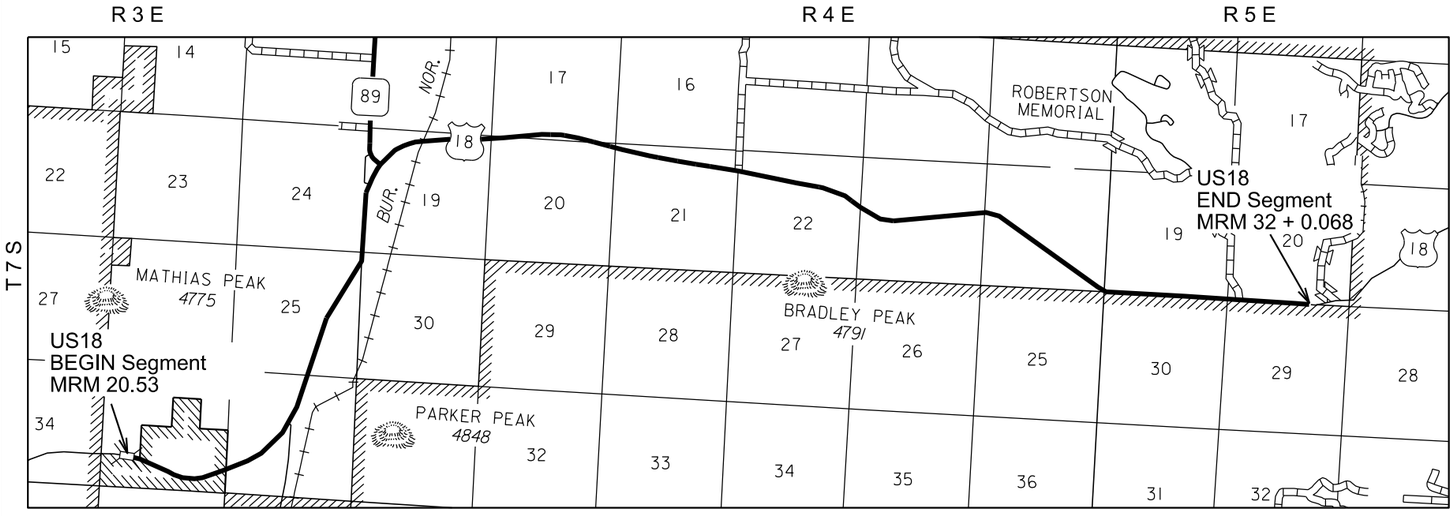
ASPHALT SURFACE TREATMENT
PCN 07KM

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-P 0043(32)	1	18

Plotting Date: 01/21/2021

INDEX OF SHEETS

FALL RIVER COUNTY

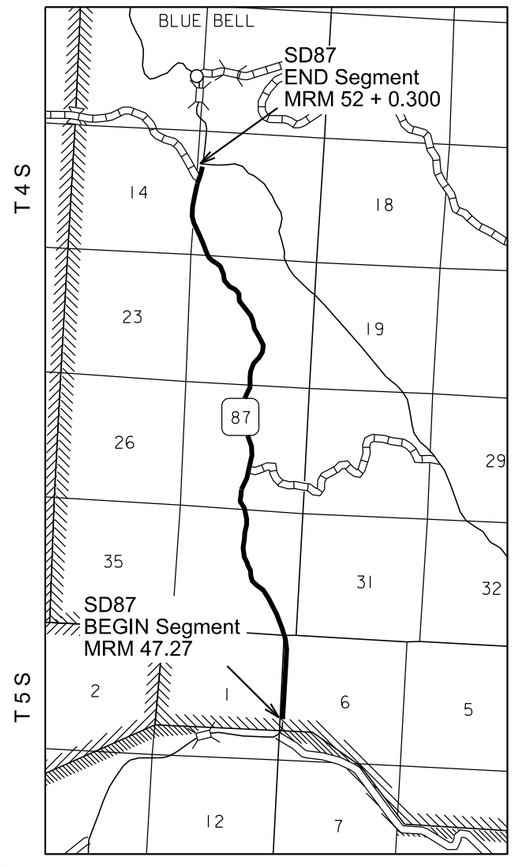


US18
DESIGN DESIGNATION

ADT (2019)	2167
ADT (2039)	2745
DHV	525
D	51%
T DHV	8.1%
T ADT	17.9%
V	65 MPH

GROSS LENGTH	11.528 MILES
LENGTH OF EXCEPTIONS	0.000 MILES
NET LENGTH	11.528 MILES

CUSTER COUNTY



SD87
DESIGN DESIGNATION

ADT (2019)	310
ADT (2039)	377
DHV	62
D	51%
T DHV	1.1%
T ADT	2.4%
V	35 MPH

GROSS LENGTH	5.024 MILES
LENGTH OF EXCEPTIONS	0.000 MILES
NET LENGTH	5.024 MILES

STORM WATER PERMIT

No Permit Required

9

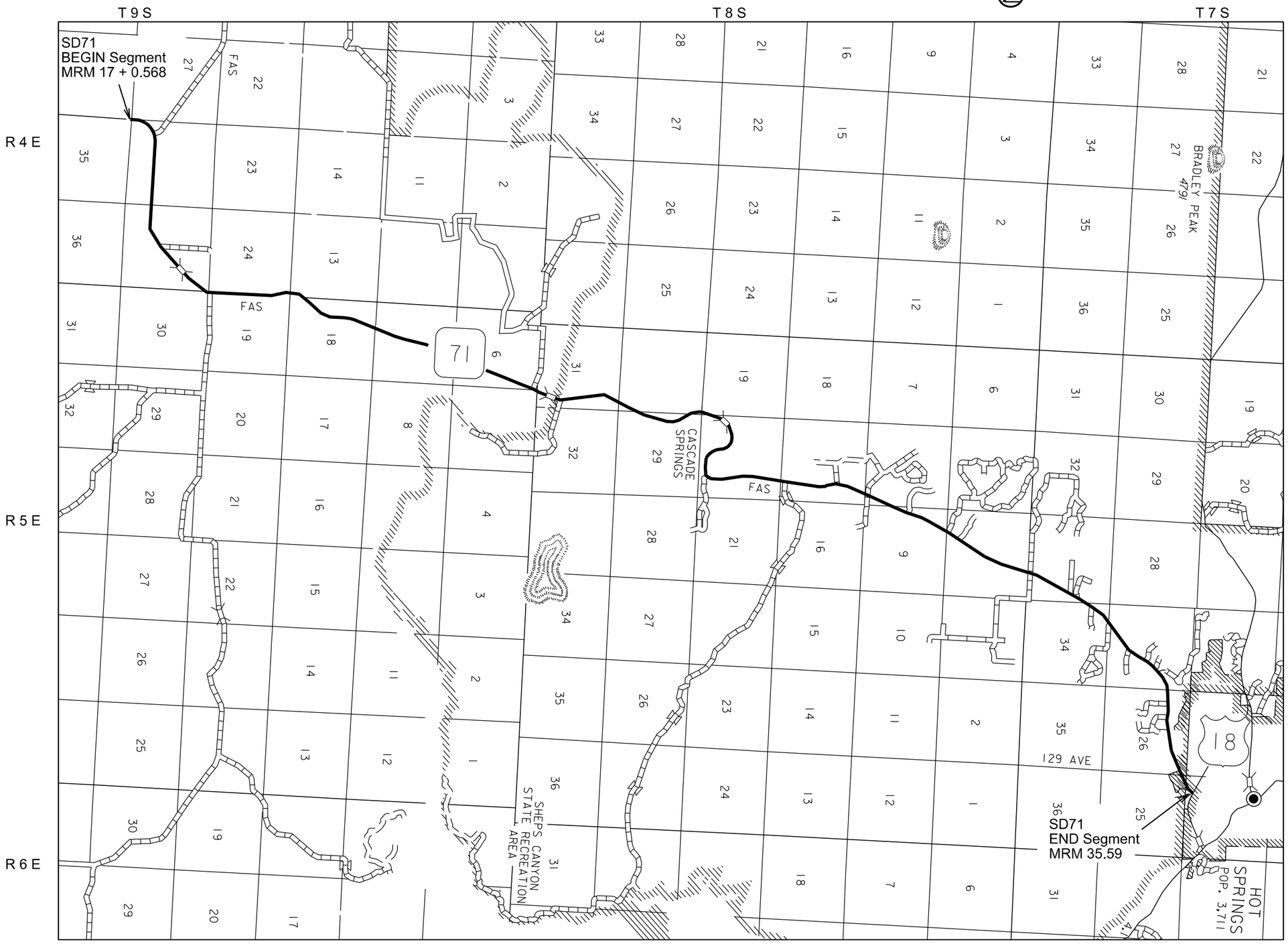
April 14, 2021

Plot Scale - 1:200
Plotted From - TRRC11951
File -

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-P 0043(32)	2	18

Plotting Date: 12/07/2020

FALL RIVER COUNTY



SD 71
DESIGN DESIGNATION

ADT (2019)	414
ADT (2039)	524
DHV	100
D	51%
T DHV	3.2%
T ADT	7.1%
V	65 MPH

GROSS LENGTH	17.573 MILES
LENGTH OF EXCEPTIONS	0.179 MILES
NET LENGTH	17.394 MILES

Plot Scale - 1:200

Plotted From - TRRC11951

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STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-P 0043(32)	3	18

Plotting Date: 12/07/2020

FALL RIVER COUNTY

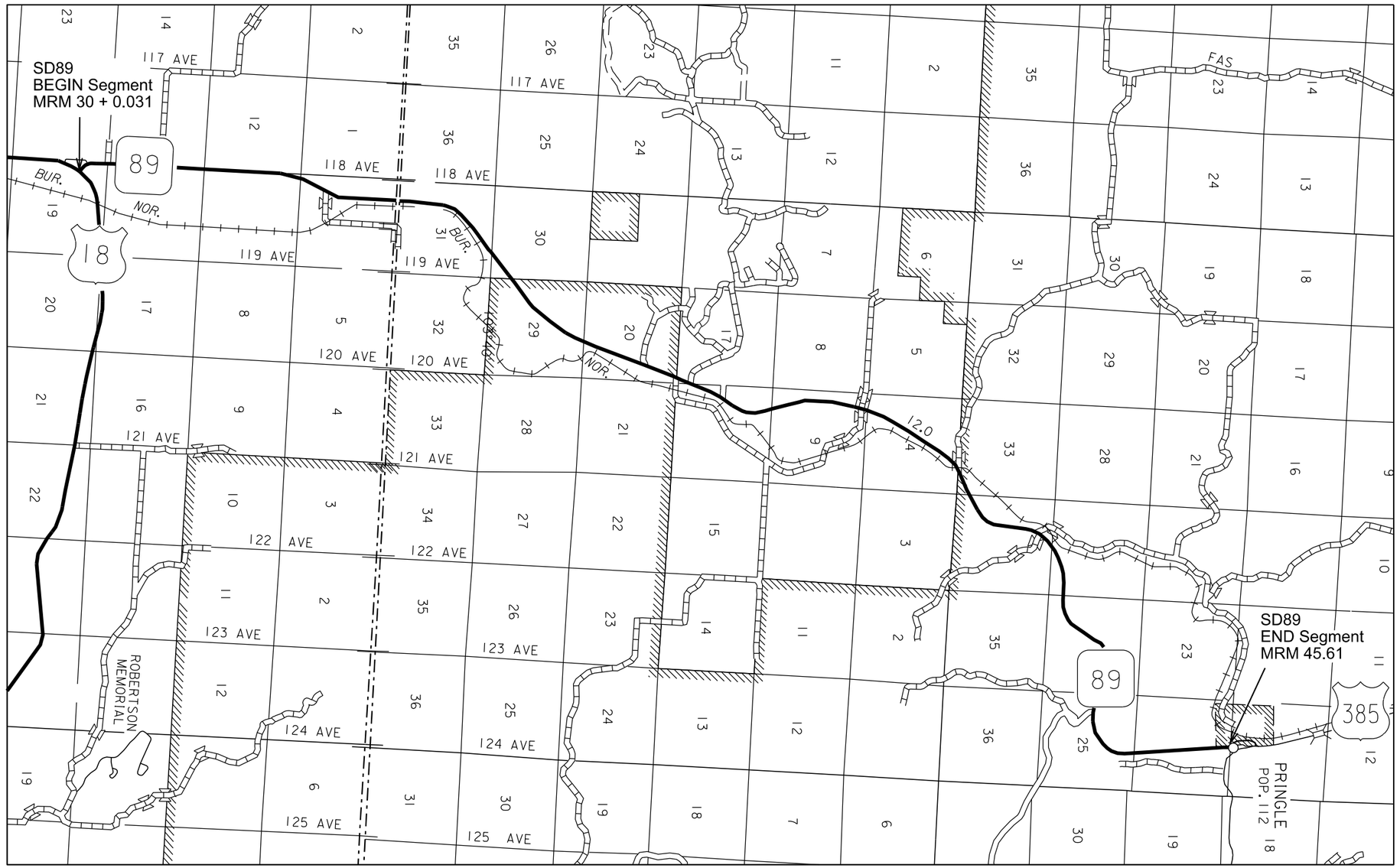
CUSTER COUNTY

T7S T6S T5S

R3E

R4E

R5E



SD 89
DESIGN DESIGNATION

ADT (2019)	918
ADT (2039)	1126
DHV	215
D	51%
T DHV	2.7%
T ADT	6.0%
V	65 MPH

GROSS LENGTH	15.167 MILES
LENGTH OF EXCEPTIONS	0.060 MILES
NET LENGTH	15.107 MILES

Plot Scale - 1:200

Plotted From - TRRC11951

File - ...\2021\07KM_title.dgn

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-P 0043(32)	4	18

Revised 1/25/21 jpr

ESTIMATE OF QUANTITIES

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
330E0300	SS-1h or CSS-1h Asphalt for Fog Seal	223.6	Ton
360E0020	AE150S Asphalt for Surface Treatment	1,341.4	Ton
360E1030	Type 2A Cover Aggregate	3,286.2	Ton
360E1030	Type 2A Cover Aggregate	857.3	Ton
360E1030	Type 2A Cover Aggregate	4,398.1	Ton
360E1030	Type 2A Cover Aggregate	3,558.6	Ton
633E1200	High Build Waterborne Pavement Marking Paint, White	2,741	Gal
633E1205	High Build Waterborne Pavement Marking Paint, Yellow	1,110	Gal
633E5100	Grooving for Durable Pavement Marking, 4"	219,302	Ft
633E6005	Pavement Marking Masking, 5"	5,600	Ft
633E6020	Pavement Marking Masking, 25"	367	Ft
633E6030	Pavement Marking Masking, Arrow	9	Each
633E6040	Pavement Marking Masking, Message	2	Word
634E0010	Flagging	2,700.0	Hour
634E0020	Pilot Car	675.0	Hour
634E0110	Traffic Control Signs	1,746.2	SqFt
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0320	Temporary Flexible Vertical Markers (Tabs)	98.5	Mile

TABLE OF QUANTITIES BY HIGHWAY SEGMENT

	US18	SD87	SD71	SD89		
MRM to	**20.53**	**47.27**	**17 +0.568**	**30 +0.031**		
MRM	**32 +0.068**	**52 +0.300**	**35.59**	**45.61**	**Total**	
Item					**Quantity**	**Unit**
SS-1h or CSS-1h Asphalt for Fog Seal	60.8	15.8	81.3	65.7	**223.6**	**Ton**
AE150S Asphalt for Surface Treatment	364.3	95.1	487.6	394.4	**1,341.4**	**Ton**
Type 2A Cover Aggregate	3,286.2	857.3	4,398.1	3,558.6	**12,100.2**	**Ton**
High Build Waterborne Pavement Marking Paint, White	641	279	977	843	**2,741**	**Gal**
High Build Waterborne Pavement Marking Paint, Yellow	96	247	427	341	**1,111**	**Gal**
Grooving for Durable Pavement Marking, 4"	0	48,115	94,108	77,079	**219,302**	**Ft**
Pavement Marking Masking, 5"	1,912	2,189	1,255	244	**5,600**	**Ft**
Pavement Marking Masking, 25"	120	134	99	14	**367**	**Ft**
Pavement Marking Masking, Arrow	3	4	2	0	**9**	**Each**
Pavement Marking Masking, Message				2	**2**	**Word**
Flagging	700.0	200.0	1,000.0	800.0	**2,700**	**Hour**
Pilot Car	175.0	50.0	250.0	200.0	**675**	**Hour**
Traffic Control Signs	429.4	292.2	534.6	490.0	**1,746.2**	**SQFT**
Traffic Control, Miscellaneous	Lump Sum	Lump Sum	Lump Sum	Lump Sum	**Lump Sum**	**LS**
Temporary Flexible Vertical Markers (Tabs)	23.1	10.0	35.1	30.3	**98.5**	**Mile**

SPECIFICATIONS

Standard Specifications for Roads and Bridges, 2015 Edition and Required Provisions, Supplemental Specifications, and Special Provisions as included in the Proposal.

ENVIRONMENTAL COMMITMENTS

The SDDOT is committed to protecting the environment and uses Environmental Commitments as a communication tool for the Engineer and Contractor to ensure that attention is given to avoid, minimize, and/or mitigate an environmental impact. Environmental commitments to various agencies and the public have been made to secure approval of this project. An agency with permitting authority can delay a project if identified environmental impacts have not been adequately addressed. Unless otherwise designated, the Contractor's primary contact regarding matters associated with these commitments will be the Project Engineer. During construction, the Project Engineer will verify that the Contractor has met Environmental Commitment requirements. These environmental commitments are not subject to change without prior written approval from the SDDOT Environmental Office.

Additional guidance on SDDOT's Environmental Commitments can be accessed through the Environmental Procedures Manual found at: <https://dot.sd.gov/media/documents/EnvironmentalProceduresManual.pdf >

For questions regarding change orders in the field that may have an effect on an Environmental Commitment, the Project Engineer will contact the Environmental Engineer at 605-773-3180 or 605-773-4336 to determine whether an environmental analysis and/or resource agency coordination is necessary.

Once construction is complete, the Project Engineer will review all environmental commitments for the project and document their completion.

COMMITMENT B: FEDERALLY THREATENED, ENDANGERED, AND PROTECTED SPECIES

COMMITMENT B2: WHOOPING CRANE

The Whooping Crane is a spring and fall migratory bird in South Dakota that is about 5 feet tall and typically stops on wetlands, rivers, and agricultural lands along their migration route. An adult Whooping Crane is white with a red crown and a long, dark, pointed bill. Immature Whooping Cranes are cinnamon brown. While in flight, their long necks are kept straight and their long dark legs trail behind. Adult Whooping Cranes' black wing tips are visible during flight.

Action Taken/Required:

Harassment or other measures to cause the Whooping Crane to leave the site is a violation of the Endangered Species Act. If a Whooping Crane is sighted roosting in the vicinity of the project, borrow pits, or staging areas associated with the project, cease construction activities in the affected area until the Whooping Crane departs and immediately contact the Project Engineer. The Project Engineer will contact the Environmental Office so that the sighting can be reported to USFWS.

COMMITMENT E: STORM WATER

Construction activities constitute less than 1 acre of disturbance.

Action Taken/Required:

At a minimum and regardless of project size, appropriate erosion and sediment control measures must be installed to control the discharge of pollutants from the construction site.

COMMITMENT H: WASTE DISPOSAL SITE

The Contractor will furnish a site(s) for the disposal of construction and/or demolition debris generated by this project.

Action Taken/Required:

Construction and/or demolition debris may not be disposed of within the Public ROW.

The waste disposal site(s) will be managed and reclaimed in accordance with the following from the General Permit for Construction/Demolition Debris Disposal Under the South Dakota Waste Management Program issued by the Department of Environment and Natural Resources.

The waste disposal site(s) will not be located in a wetland, within 200 feet of surface water, or in an area that adversely affects wildlife, recreation, aesthetic value of an area, or any threatened or endangered species, as approved by the Environmental Office and the Project Engineer.

If the waste disposal site(s) is located such that it is within view of any ROW, the following additional requirements will apply:

1. Construction and/or demolition debris consisting of concrete, asphalt concrete, or other similar materials will be buried in a trench completely separate from wood debris. The final cover over the construction and/or demolition debris will consist of a minimum of 1 foot of soil capable of supporting vegetation. Waste disposal sites provided outside of the Public ROW will be seeded in accordance with Natural Resources Conservation Service recommendations. The seeding recommendations may be obtained through the appropriate County NRCS Office. The Contractor will control the access to waste disposal sites not within the Public ROW with fences, gates, and placement of a sign or signs at the entrance to the site stating "No Dumping Allowed".

2. Concrete and asphalt concrete debris may be stockpiled within view of the ROW for a period of time not to exceed the duration of the project. Prior to project completion, the waste shall be removed from view of the ROW or buried and the waste disposal site reclaimed as noted above.

The above requirements will not apply to waste disposal sites that are covered by an individual solid waste permit as specified in SDCL 34A-6-58, SDCL 34A-6-1.13, and ARSD 74:27:10:06.

Failure to comply with the requirements stated above may result in civil penalties in accordance with South Dakota Solid Waste Law, SDCL 34A-6-1.31.

All costs associated with furnishing waste disposal site(s), disposing of waste, maintaining control of access (fence, gates, and signs), and reclamation of the waste disposal site(s) will be incidental to the various contract items.

COMMITMENT I: HISTORICAL PRESERVATION OFFICE CLEARANCES

The SDDOT has obtained concurrence with the State Historical Preservation Office (SHPO or THPO) for all work included within the project limits and all department designated sources and designated option material sources, stockpile sites, storage areas, and waste sites provided within the plans.

Action Taken/Required:

All earth disturbing activities require a cultural resource review prior to scheduling the pre-construction meeting. This work includes, but is not limited to: Contractor furnished material sources, material processing sites, stockpile sites, storage areas, plant sites, and waste areas.

The Contractor will arrange and pay for a record search and when necessary, a cultural resource survey. The Contractor has the option to contact the state Archaeological Research Center (ARC) at 605-394-1936 or another qualified archaeologist, to obtain either a records search or a cultural resources survey. A record search might be sufficient for review if the site was previously surveyed; however, a cultural resources survey may need to be conducted by a qualified archaeologist.

The Contractor will provide ARC with the following: a topographical map or aerial view of which the site is clearly outlined, site dimensions, project number, and PCN. If applicable, provide evidence that the site has been previously disturbed by farming, mining, or construction activities with a landowner statement that artifacts have not been found on the site.

The Contractor will submit the cultural resources survey report to SDDOT Environmental Office, 700 East Broadway Avenue, Pierre, SD 57501-2586. SDDOT will submit the information to the appropriate SHPO/THPO. Allow **30 Days** from the date this information is submitted to the Environmental Engineer for SHPO/THPO review.

In the event of an inadvertent discovery of human remains, funerary objects, or if evidence of cultural resources is identified during project construction activities, then such activities will immediately cease and the Project Engineer will be immediately notified. The Project Engineer will contact the SDDOT Environmental Office to determine an appropriate course of action.

SHPO/THPO review does not relieve the Contractor of the responsibility for obtaining any additional permits and clearances for Contractor furnished material sources, material processing sites, stockpile sites, storage areas, plant sites, and waste areas that affect wetlands, threatened and endangered species, or waterways. The Contractor will not utilize a site known or suspected of having contaminated soil or water. The Contractor will provide the required permits and clearances to the Project Engineer at the preconstruction meeting.

COMMITMENT S: FIRE PREVENTION IN THE BLACK HILLS AREA

This project is located within the Black Hills Forest Fire Protection Boundary.

Action Taken/Required:

The Contractor will adhere to the "Special Provision for Fire Plan".

ASPHALT SURFACE TREATMENT RATES OF MATERIALS

AE150S Asphalt for Surface Treatment applied 0.30 gallons per square yard.

Type 2A Cover Aggregate applied 23 pounds per square yard.

SS-1h or CSS-1h Emulsified Asphalt for Fog Seal applied 0.05 gallons per square yard.

SINUSOIDAL CENTERLINE RUMBLE STRIPES

Sinusoidal rumble stripes exist on US18.

The sinusoidal centerline rumble stripes are recessed below the pavement surface, so pavement marking grooving will not be required at these locations. They will receive an asphalt surface treatment to seal the centerline joint and minimize the depth of water held on centerline.

Retroreflectivity readings will not be taken for pavement marking lines in the sinusoidal rumble stripe.

Restriping of pavement markings to meet the specified application rate requirements and to provide a quality retroreflective line will be at the expense of the Contractor with no additional cost to the Department. Sections to be restriped will be determined by the Engineer.

SHOULDER WORK

The Contractor will notify the state at least 4 weeks prior to beginning work to allow the state time to inspect and spray for vegetation. Vegetation and accumulated debris will be removed from the shoulder surface by the Contractor prior to the asphalt surface treatment.

FOG SEAL APPLICATION

The Fog Seal will be applied within 1 to 4 days following the placement of the cover aggregate.

BROOMING

Upon completion of brooming operations a windrow of cover aggregate will not exist along the edge of the roadway. This material will be leveled to match the existing inslopes. Any remaining windrows of cover aggregate will be removed by the Contractor at the Contractor's expense.

TABLE OF PICKUP BROOM LOCATIONS

Hwy.	MRM to	MRM	Description
SD71	26.8	26.9	Curb and Gutter
SD71	34.9	34.9	Maintained Lawn Median Right

TRANSVERSE RUMBLE STRIPS

If transverse rumble strips are located on a segment they will not be disturbed. The Contractor will only apply a fog seal to these rumble strips.

BRIDGES AND APPROACH SLABS

Asphalt surface treatment will not be placed on any bridges or approach slabs along the project. Bridge joints will be covered with an approved masking material to prevent the asphalt surface treatment from coming in contact with the bridge and/or bridge joint. All loose aggregate will be cleaned from the bridge and around the guardrail posts. All costs associated with this work will be incidental to the asphalt surface treatment bid items.

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-P 0043(32)	7	18

Revised 1/25/21 jpr

TABLE OF MATERIAL QUANTITIES

Highway							Total Length	Total Length	Length Exceptions	Net Length	Width	Type 2A Cover Aggregate		AE150S Asphalt for Surface Treatment		SS-1h or CSS-1h Asphalt for Fog Seal	
	MRM to		MRM		Mileage to	Mileage	(miles)	(ft)	(ft)	(ft)	(ft)	(ton)	(tons/mile)	(ton)	(tons/mile)	(ton)	(tons/mile)
SD71	17+	0.568	20.13+	0.116	16.962	19.643	2.681	14156	377	13779	30	528.2	202	58.6	22.4	9.8	3.7
	20.13+	0.116	35.59+	0.000	19.643	34.535	14.892	78630	566	78064	38	3790.4	256	420.2	28.4	70.0	4.7
										Additional Quantities		79.5		8.8		1.5	
					Segment Total		**17.573**			**Segment Total**		**4398.1**		**487.6**		**81.3**	
US18	20.53+	0.000	32+	0.068	20.469	31.997	11.528	60868		60868	42	3266.6	283	362.2	31.4	60.4	5.2
										Additional Quantities		19.6		2.1		0.4	
					Segment Total		**11.528**			**Segment Total**		**3286.2**		**364.3**		**60.8**	
SD89	30+	0.031	45.61+	0.000	0.207	15.374	15.167	80082	315	79767	34	3465.4	229	384.2	25.4	64.0	4.2
										Additional Quantities		93.2		10.2		1.7	
					Segment Total		**15.167**			**Segment Total**		**3558.6**		**394.4**		**65.7**	
SD87	47.27+	0.000	52+	0.300	7.123	12.147	5.024	26527		26527	24	813.5	162	90.2	18.0	15.0	3.0
										Additional Quantities		43.8		4.9		0.8	
					Segment Total		**5.024**			**Segment Total**		**857.3**		**95.1**		**15.8**	
					Total Length		**49.292**										

TABLE OF ADDITIONAL QUANTITIES

SD Highway 71	# of locations	Type 2A Cover Aggregate (tons)	AE150S Asphalt (tons)	Asphalt for Fog Seal (tons)
Intersecting roads paved to the end of the radius	13	37.4	4.1	0.7
Intersecting roads paved to the ROW	2	9.2	1.0	0.2
Field Entrance Pads	13	6.0	0.7	0.1
Mailbox Pullouts	18	26.9	3.0	0.5
Total:		**79.5**	**8.8**	**1.5**

US Highway 18	# of locations	Type 2A Cover Aggregate (tons)	AE150S Asphalt (tons)	Asphalt for Fog Seal (tons)
Intersecting roads paved to the end of the radius	2	5.8	0.6	0.1
Intersecting roads paved to the ROW	3	13.8	1.5	0.3
Field Entrance Pads	0	0.0	0.0	0.0
Total:		**19.6**	**2.1**	**0.4**

SD Highway 89	# of locations	Type 2A Cover Aggregate (tons)	AE150S Asphalt (tons)	Asphalt for Fog Seal (tons)
Intersecting roads paved to the end of the radius	23	66.1	7.3	1.2
Intersecting roads paved to the ROW	2	9.2	1.0	0.2
Field Entrance Pads	0	0.0	0.0	0.0
Mailbox Pullouts	5	7.5	0.8	0.1
Pullouts	1	10.4	1.1	0.2
Total:		**93.2**	**10.2**	**1.7**

SD Highway 87	# of locations	Type 2A Cover Aggregate (tons)	AE150S Asphalt (tons)	Asphalt for Fog Seal (tons)
Intersecting roads paved to the end of the radius	2	5.8	0.6	0.1
Intersecting roads paved to the ROW	0	0.0	0.0	0.0
Field Entrance Pads	5	2.3	0.3	0.0
Pullouts	12	35.7	4.0	0.7
Total:		**43.8**	**4.9**	**0.8**

TABLE OF EXCEPTIONS

Highway	MRM	Structure Number	Length (ft)
SD71	19.68	24236163	377
SD71	24.50	24248119	463
SD71	26.81	24251099	103
SD89	40.12	17206211	208
SD89	40.56	17211208	107
		Total	**1258**

PERMANENT PAVEMENT MARKING – GENERAL NOTES

The Contractor will survey and mark the location of no passing zones prior to covering pavement marking.

The Contractor will repaint all the existing pavement marking paint including centerline, edge line, lane lines, arrows, gore areas, etc. The Contractor will be required to inventory and mark, with appropriately colored tabs, the extent and location of the existing word messages, turn arrows, stop bars, railroad crossings, pedestrian crossings, gore areas, etc. before the markings are obliterated. Locations of pavement marking tape will be masked. The Contractor will provide a copy of the pavement marking inventory to the Engineer. All costs associated with this work will be incidental to the various pavement marking bid items.

Application of permanent pavement marking will begin no sooner than 7 calendar days following completion of the fog seal and will be completed within 14 calendar days following completion of the fog seal.

HIGH BUILD WATERBORNE PAVEMENT MARKING PAINT

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

This material will consist of a durable high build, low VOC, fast drying, waterborne traffic paint with a 100% acrylic polymer (Arkema DT-400, Dow HD-21A, or equivalent). The Contractor will provide certification that the material is one of the following products or an equivalent as approved by the Operations Traffic Engineer:

Diamond Vogel's Waterborne High Build Polymer Marking Paint
Ennis-Flint's High Build Polymer Marking Paint

No further testing of this material will be required. Reflective media consisting of glass beads as well as bonded core reflective elements will be adhered to the paint.

The bonded core reflective elements will contain either clear or yellow tinted microcrystalline ceramic beads bonded to the outer surface. The bonded core reflective elements will provide a 50/50 blend of dry to wet ratio of reflective element. All microcrystalline ceramic beads bonded to reflective elements will have a minimum index of refraction of 1.8 for dry retroreflectivity and 2.4 for wet retroreflectivity when tested using the liquid oil immersion method.

The Department will take retroreflectivity readings on the pavement marking lines no sooner than 3 days and no later than 30 days after the completion of all line applications required for an individual highway route using a portable retroreflectometer conforming to 30-meter geometry. Retroreflectivity readings will be taken on a test location with cleaning being limited to light hand brooming.

Pavement markings not conforming to the retroreflectivity requirements will be removed and replaced. If replacement of markings cannot be applied within the same year, the Contractor will schedule subject work to be completed no later than June 15th in the following year. Upon replacement, the retroreflectivity testing process will be done again requiring new readings.

The Department will randomly select one test location per mile of each edge line including ramps and one test location per mile of centerline (solid and/or skip line will be considered as one centerline). Three retroreflectivity readings will be taken at each test location. The three readings will be averaged and become the reading for that test location.

Initial readings:

Pavement Marking Color	Minimum Value
White	350 mc/m^2/lux
Yellow	275 mc/m^2/lux

All pavement markings not conforming to the requirements provided in these plans will be considered deficient and will be removed and replaced. Additional retroreflectivity readings will be taken by the Department to determine the limits of removal. The removal will be accomplished using suitable sand blasting or grinding equipment unless the Engineer authorizes other means. The removal process will remove at least 90% of the deficient line, with no excessive scarring of the existing pavement. The removal width will be one inch wider all around the nominal width of the pavement marking to be removed. Removal and replacement of the pavement markings will be at the Contractor's expense, with no cost incurred by the State.

High Build Waterborne Pavement Marking Paint applied after October 15 must be formulated as cold-weather waterborne paint. Cold weather waterborne paint will meet the requirements of Section 980.1 B.

RATES OF MATERIALS FOR HIGH BUILD WATERBORNE PAVEMENT MARKING PAINT

Solid 4" line = 27.8 Gals/Mile
Dashed 4" line = 7.6 Gal/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 will be incidental to the contract unit price for the respective High Build Waterborne Pavement Marking Paint items.

GROOVING FOR HIGH BUILD WATERBORNE PAVEMENT MARKING PAINT

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. All costs for removal of grinding and/or grooving residue will be included in the contract unit price per for "Grooving for Durable Pavement Marking" contract item.

Unless otherwise specified in the plans, the Contractor will groove the surface for High Build Waterborne Pavement Marking Paint as specified in these plans and as per the manufacturer's instructions.

The grooving will be completed within the following tolerances:

Description	Specification	Tolerance
Depth of Groove	Marking Thickness[1] + 15 mils	+ 5 mils
Width of Groove	5 to 6 inches	
Length of Skip Lines[2]	10 foot 6 inches	± 3 inch
Tapers at ends of lines	6 to 9 inches	
Between Double Lines	4 inches	± 1/2 inch

[1]Marking thickness will include the thickness of marking material and reflective media.
[2]Additional length may be required as specified in the plans.

The equipment will be capable of the following:

- 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.
- Provide uniform alignment and depth.
- Moving continuously to permit a mobile traffic work operation.

If damage occurs, including, but not limited to, joints, joint sealant material, and backer rod, the grooving operation will be stopped and modifications will be made to the grooving operation to prevent further damage. The Contractor will be required to use specially prepared circular diamond blade cutting heads to prevent damage at the joints. Damage caused will 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.

Grooving on bridge decks will start and stop a sufficient distance from the expansion joints so no damage occurs in these areas. Markings on bridge decks will be surface applied.

PAVEMENT MARKING MASKING

Just prior to beginning the asphalt surface treatment, all pavement marking tape will be covered with an approved pavement marking masking material. The masking will protect the pavement marking tape from oil and aggregates. Tabs will be placed on each masking line to provide a guide for locating the masking material after the surface treatment has been applied. Masking application ahead of the surface treatment will not exceed the amount estimated for the current day's operation. Upon completion of the fog seal, all masking material will be removed and disposed of by the Contractor.

Typical masking products may require multiple layers installed prior to the asphalt surface treatment. The estimated quantity for payment is for one installation even though multiple layers of masking material was installed. Separate measurement and payment for each layer of masking material installed and removed will not be made.

The Contractor will remove and dispose of the masking material after completion of the work.

The traffic control will be the same as what is used for Temporary Flexible Vertical Markers (TABS).

All costs associated with this work will be incidental to the various contract items for Pavement Marking Masking.

TABLE OF PAVEMENT MARKING QUANTITIES

Highway					Total Length	High Build Waterborne Pavement Marking Paint, White	High Build Waterborne Pavement Marking Paint, Yellow	Temporary Flexible Vertical Markers (Tabs)
	MRM to		MRM		(miles)	(Gal)	(Gal)	(Mile)
SD71	17+	0.568	35.59+	0.000	17.573	977	427	35.1
US18	20.53+	0.000	32+	0.068	11.528	641	96	23.1
SD89	30+	0.031	45.61+	0.000	15.167	843	341	30.3
SD87	47.27+	0.000	52+	0.300	5.024	279	247	10.0
					Totals	**2741**	**1111**	**98.5**

TABLE OF PAVEMENT MARKING GROOVING

Hwy.	Begin MRM		End MRM		Description	Grooving for Durable Pavement Marking, 4"
						(Ft)
SD71	17+	0.568	35.59+	0.000	Pavement Marking on Centerline	94108
SD89	30+	0.031	45.61+	0.000	Pavement Marking on Centerline	77079
SD87	47.27+	0.000	52+	0.300	Pavement Marking on Centerline	48115
					Segment Total	**219302**

TABLE OF PAVEMENT MARKING MASKING

Hwy.	Begin MRM	End MRM	Description	Pavement Marking Masking, 5"	Pavement Marking Masking, 25"	Pavement Marking Masking, Arrow	Pavement Marking Masking, Message
				(Ft)	(Ft)	(Each)	(Word)
US18	24	24.3	Turn Lane for SD89	1912	120	3	
SD71	35.1	35.56	Turn Lane for US18	1255	99	2	
SD87	52.2	52.3	Turn Lane for Wildlife Loop Rd.	2189	134	4	
SD89	30.1	30.1	"Stop Ahead" and intersection marking at US18	244	14		2
			Segment Total	**5600**	**367**	**9**	**2**

TEMPORARY FLEXIBLE VERTICAL MARKERS (TABS)

Temporary flexible vertical markers (tabs) will be required on the project.

The total length of no passing zone is estimated at 2.3 miles on US18, 5.0 miles on SD87, 10.6 miles on SD71 and 8.9 miles on SD89.

It is estimated that 14 DO NOT PASS (R4-1) and 14 PASS WITH CARE (R4-2) signs will be required on US18 to mark the no passing zones.

It is estimated that 13 DO NOT PASS (R4-1) and 13 PASS WITH CARE (R4-2) signs will be required on SD87 to mark the no passing zones.

It is estimated that 40 DO NOT PASS (R4-1) and 40 PASS WITH CARE (R4-2) signs will be required on SD71 to mark the no passing zones.

It is estimated that 43 DO NOT PASS (R4-1) and 43 PASS WITH CARE (R4-2) signs will be required on SD89 to mark the no passing zones.

Covers on the tabs will be sufficiently secured to prevent traffic from dislodging the cover and when removed, the covers will be properly disposed of. The Contractor will remove and properly dispose of the tabs after permanent pavement marking is applied. Method of removal will be nondestructive to the road surface and will be accomplished within one week of completion of the permanent pavement marking.

Any temporary flexible vertical markers (tabs) with covers removed before the flush seal will be replaced prior to application of the flush seal. Full reflectivity of all temporary flexible vertical markers (tabs) is required at all times. The Contractor will be required to replace any missing or non-reflective tabs at no additional cost to the State.

Two applications of temporary pavement marking are included in the estimate of quantities for completion of the chip seal and uncovering the temporary flexible vertical markers (tabs) after application of the fog seal.

In the absence of a signed lane closure or pilot car operation, FLAGGER (W20-7) symbol signs and flaggers, or a shadow vehicle with rotating yellow lights or strobe lights will be positioned on the shoulder in advance of workers for both directions of traffic during the installation and removal of the temporary flexible vertical markers (tabs). The traffic control device used will be moved intermittently to provide proper warning of the work operation. A ROAD WORK AHEAD (W20-1) sign, a WORKER (W21-1) symbol sign or a BE PREPARED TO STOP (W3-4) sign will be mounted on the rear of the shadow vehicle. The method of traffic control used by the Contractor for this work must be approved by the Engineer.

TRAFFIC CONTROL – GENERAL NOTES

Existing guide, route, informational logo, regulatory, and warning signs will be temporarily reset and maintained during construction. Removing, relocating, covering, salvaging, and resetting of existing traffic control devices, including delineation, will be the responsibility of the Contractor. Cost for this work will be incidental to the contract unit prices for the various items unless otherwise specified in the plans. Any delineators and signs damaged or lost will be replaced by the Contractor at no cost to the State.

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

If there is a discrepancy between the traffic control plans, standard plates, and the MUTCD – whichever is more stringent will be used, as determined by the Engineer.

Unless otherwise stated in these plans, no work will be allowed during hours of darkness.

All haul trucks will be equipped with a second flashing amber light that is visible from the backside of the haul truck. The costs for the flashing amber lights will be incidental to the various related contract items.

All construction operations will be conducted in the general direction of traffic movement.

Fixed location signing placed more than 4 calendar days prior to the start of construction will be covered or laid down until the time of construction. The covers must be approved by the Engineer prior to installation. The cost of materials, labor, and equipment necessary to complete this work will be incidental to other contract items. No separate payment will be made.

All fixed location signs, sign posts, and breakaway bases will be removed within 7 calendar days following pavement marking.

Traffic will be maintained on the driving lanes. Use of the shoulder as a driving lane will not be permitted. Any damage to the shoulder due to rerouted traffic or Contractor's equipment will be repaired at no expense to the Department.

Operations will be conducted so that the traveling public will not have to wait longer than 15 minutes at the flagger station.

TRAFFIC CONTROL FOR ASPHALT SURFACE TREATMENT

The Contractor will furnish, install, and maintain LOOSE GRAVEL (W8-7) signs with 40 MPH (W13-1P) advisory speed plaques upon start of surface treatment operations at each end of the segment and on either side of intersecting asphalt roads and major intersections as determined by the Engineer. In addition, LOOSE GRAVEL signs with 40 MPH advisory speed plaques will be installed at no more than 4 mile intervals throughout each segment. The 40 MPH advisory speed plaque should not be installed with LOOSE GRAVEL signs in areas where the posted speed limit is less than 40 MPH. LOOSE GRAVEL signs and 40 MPH advisory speed plaques will be covered or removed from view when they are not applicable.

ROAD WORK NEXT XX MILES (G20-1), LOOSE GRAVEL (W8-7), and END ROAD WORK (G20-2) signs are the only signs that need to be mounted on fixed location breakaway sign supports, as shown on the plan layout. ROAD WORK AHEAD (W20-1), FLAGGER (W20-7), ONE LANE ROAD AHEAD (W20-4), and TRUCK CROSSING (W8-6) signs may be mounted on portable supports. Signs mounted on portable supports will be moved as necessary to keep current with the work activities.

Until the end of each day's chip seal operations, at the discretion of the Contractor, additional flaggers and FLAGGER (W20-7) symbol signs will be provided to alert the traveling public entering completed portions of the project to the potential of airborne chips.

The flaggers will provide each motorist with a printed notice on the Contractor's letterhead similar to the one shown below. Cost of the notice will be incidental to other contract items.

"CONTRACTOR'S LETTERHEAD"

THIS HIGHWAY IS BEING RESURFACED WITH A ROCK CHIP SEAL COAT.

THIS TYPE OF CONSTRUCTION HAS THE POTENTIAL OF CAUSING VEHICLE DAMAGE SUCH AS CHIPPED WINDSHIELDS AND BROKEN HEADLIGHTS DUE TO ROCKS BEING THROWN BY HIGH SPEED ONCOMING OR PASSING TRAFFIC.

YOU MAY WISH TO CONSIDER TAKING AN ALTERNATE ROUTE. IF YOU PROCEED, KEEP TO THE RIGHT AND DRIVE 40 MPH OR LESS. ANOTHER FLAGGER AND A PILOT CAR WILL BE ESCORTING YOU AROUND THE OIL SEAL COAT APPLICATION AREA.

THANK YOU.

TRAFFIC CONTROL SIGNS

Sufficient traffic control devices have been included in these plans to sign one workspace on each route. If the Contractor elects to work on additional locations simultaneously, the cost for additional traffic control devices will be incidental to the contract unit price per square foot for “Traffic Control Signs”.

INVENTORY OF TRAFFIC CONTROL DEVICES (US18)

SIGN CODE	SIGN DESCRIPTION	NUMBER	SIGN SIZE	SQFT PER SIGN	SQFT
W3-4	BE PREPARED TO STOP	2	48" x 48"	16.0	32.0
W8-6	TRUCK CROSSING	2	48" x 48"	16.0	32.0
W8-7	LOOSE GRAVEL	8	48" x 48"	16.0	128.0
W13-1P	ADVISORY SPEED (plaque)	8	30" x 30"	6.3	50.4
W20-1	ROAD WORK AHEAD	4	48" x 48"	16.0	64.0
W20-4	ONE LANE ROAD AHEAD	2	48" x 48"	16.0	32.0
W20-7	FLAGGER (symbol)	2	48" x 48"	16.0	32.0
W21-2	FRESH OIL	2	48" x 48"	16.0	32.0
G20-1	ROAD WORK NEXT 12 MILES	2	36" x 18"	4.5	9.0
G20-2	END ROAD WORK	4	36" x 18"	4.5	18.0
		CONVENTIONAL ROAD TRAFFIC CONTROL SIGNS SQFT			429.4

INVENTORY OF TRAFFIC CONTROL DEVICES (SD87)

SIGN CODE	SIGN DESCRIPTION	NUMBER	SIGN SIZE	SQFT PER SIGN	SQFT
W3-4	BE PREPARED TO STOP	2	48" x 48"	16.0	32.0
W8-6	TRUCK CROSSING	2	48" x 48"	16.0	32.0
W8-7	LOOSE GRAVEL	4	48" x 48"	16.0	64.0
W13-1P	ADVISORY SPEED (plaque)	4	30" x 30"	6.3	25.2
W20-1	ROAD WORK AHEAD	1	48" x 48"	16.0	16.0
W20-4	ONE LANE ROAD AHEAD	2	48" x 48"	16.0	32.0
W20-7	FLAGGER (symbol)	2	48" x 48"	16.0	32.0
W21-2	FRESH OIL	2	48" x 48"	16.0	32.0
G20-1	ROAD WORK NEXT 5 MILES	2	36" x 18"	4.5	9.0
G20-2	END ROAD WORK	4	36" x 18"	4.5	18.0
		CONVENTIONAL ROAD TRAFFIC CONTROL SIGNS SQFT			292.2

INVENTORY OF TRAFFIC CONTROL DEVICES (SD71)

SIGN CODE	SIGN DESCRIPTION	NUMBER	SIGN SIZE	SQFT PER SIGN	SQFT
W3-4	BE PREPARED TO STOP	2	48" x 48"	16.0	32.0
W8-6	TRUCK CROSSING	2	48" x 48"	16.0	32.0
W8-7	LOOSE GRAVEL	12	48" x 48"	16.0	192.0
W13-1P	ADVISORY SPEED (plaque)	12	30" x 30"	6.3	75.6
W20-1	ROAD WORK AHEAD	5	48" x 48"	16.0	80.0
W20-4	ONE LANE ROAD AHEAD	2	48" x 48"	16.0	32.0
W20-7	FLAGGER (symbol)	2	48" x 48"	16.0	32.0
W21-2	FRESH OIL	2	48" x 48"	16.0	32.0
G20-1	ROAD WORK NEXT 17 MILES	2	36" x 18"	4.5	9.0
G20-2	END ROAD WORK	4	36" x 18"	4.5	18.0
		CONVENTIONAL ROAD TRAFFIC CONTROL SIGNS SQFT			534.6

INVENTORY OF TRAFFIC CONTROL DEVICES (SD89)

SIGN CODE	SIGN DESCRIPTION	NUMBER	SIGN SIZE	SQFT PER SIGN	SQFT
W3-4	BE PREPARED TO STOP	2	48" x 48"	16.0	32.0
W8-6	TRUCK CROSSING	2	48" x 48"	16.0	32.0
W8-7	LOOSE GRAVEL	10	48" x 48"	16.0	160.0
W13-1P	ADVISORY SPEED (plaque)	10	30" x 30"	6.3	63.0
W20-1	ROAD WORK AHEAD	5	48" x 48"	16.0	80.0
W20-4	ONE LANE ROAD AHEAD	2	48" x 48"	16.0	32.0
W20-7	FLAGGER (symbol)	2	48" x 48"	16.0	32.0
W21-2	FRESH OIL	2	48" x 48"	16.0	32.0
G20-1	ROAD WORK NEXT 15 MILES	2	36" x 18"	4.5	9.0
G20-2	END ROAD WORK	4	36" x 18"	4.5	18.0
		CONVENTIONAL ROAD TRAFFIC CONTROL SIGNS SQFT			490.0

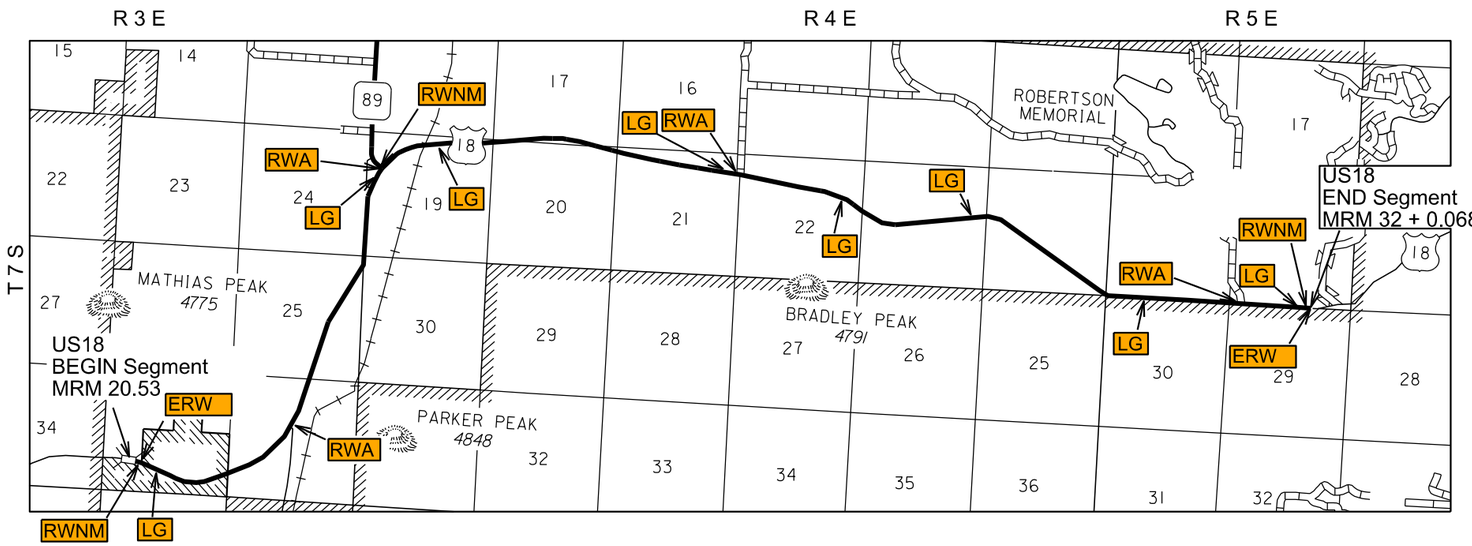
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-P 0043(32)	12	18

Plotting Date: 01/21/2021

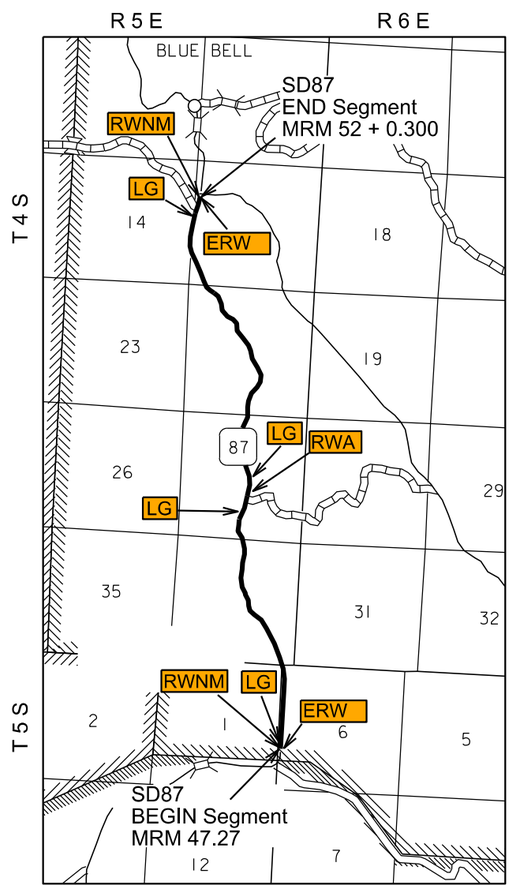
FIXED LOCATION SIGNS

RWNM ROAD WORK NEXT XX MILES
ERW END ROAD WORK
LG LOOSE GRAVEL with advisory speed plaques
RWA ROAD WORK AHEAD

FALL RIVER COUNTY



CUSTER COUNTY

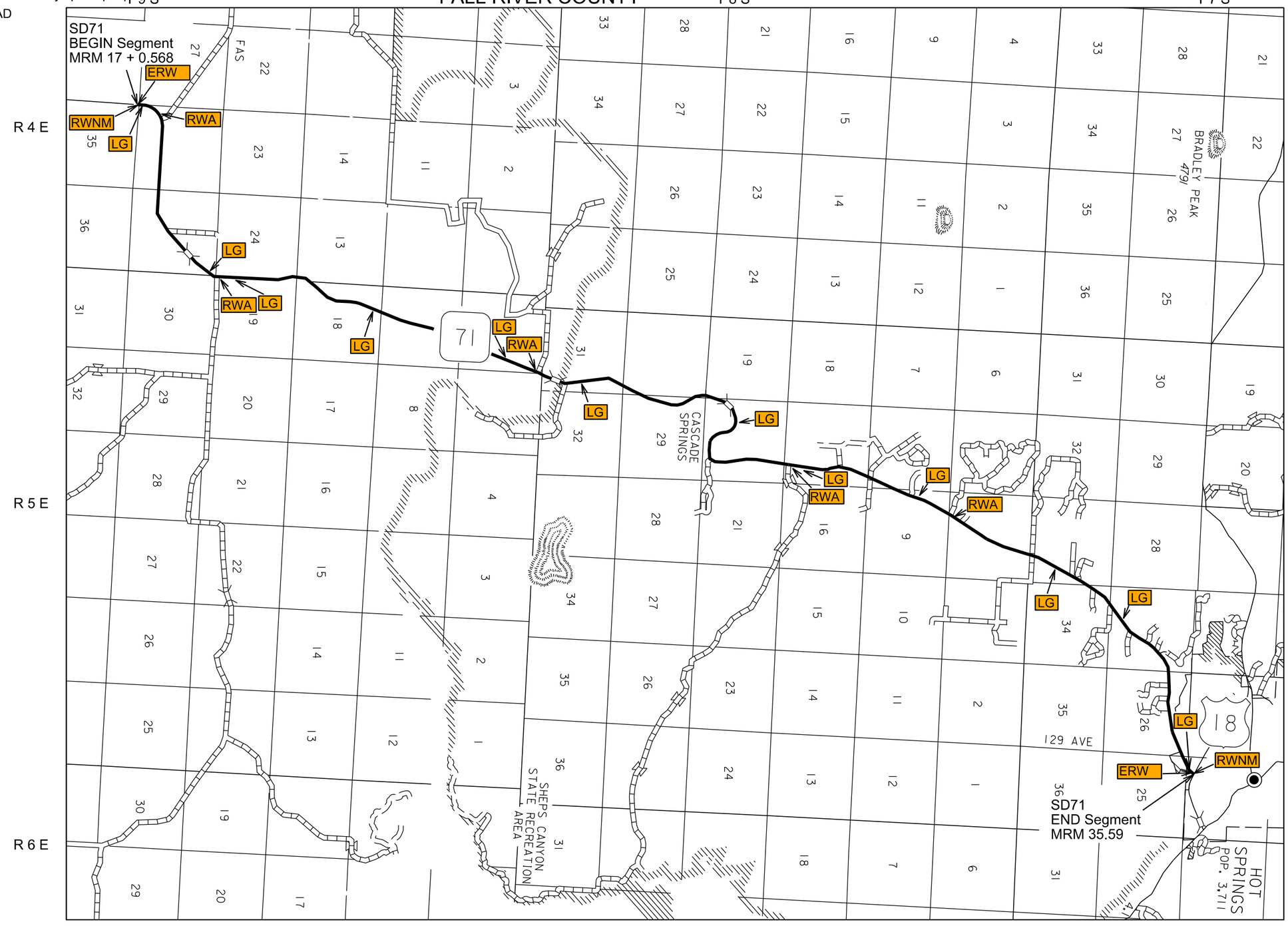


STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-P 0043(32)	13	18

Plotting Date: 01/21/2021

FIXED LOCATION SIGNS

RWNM ROAD WORK NEXT XX MILES
ERW END ROAD WORK
LG LOOSE GRAVEL with advisory speed plaques
RWA ROAD WORK AHEAD



Plot Scale - 1:200

Plotted From - TRRC11951

File - ...\FixedLocationSigns_07KM.dgn

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-P 0043(32)	14	18

Plotting Date: 01/21/2021

RWNM ROAD WORK NEXT XX MILES

ERW END ROAD WORK

LG LOOSE GRAVEL with advisory speed plaques

RWA ROAD WORK AHEAD

FALL RIVER COUNTY

CUSTER COUNTY

T7S T6S T5S

R3E R4E R5E

SD89
BEGIN Segment
MRM 30 + 0.031

SD89
END Segment
MRM 45.61

ROBERTSON MEMORIAL

PRINGLE
POP. 112

Plot Scale - 1:200

Plotted From - TRRC11951

File - ...\FixedLocationSigns_07KM.dgn

TYPICAL PAVEMENT MARKING LAYOUT

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-P 0043(32)	15	18

Plotting Date: 12/27/2019

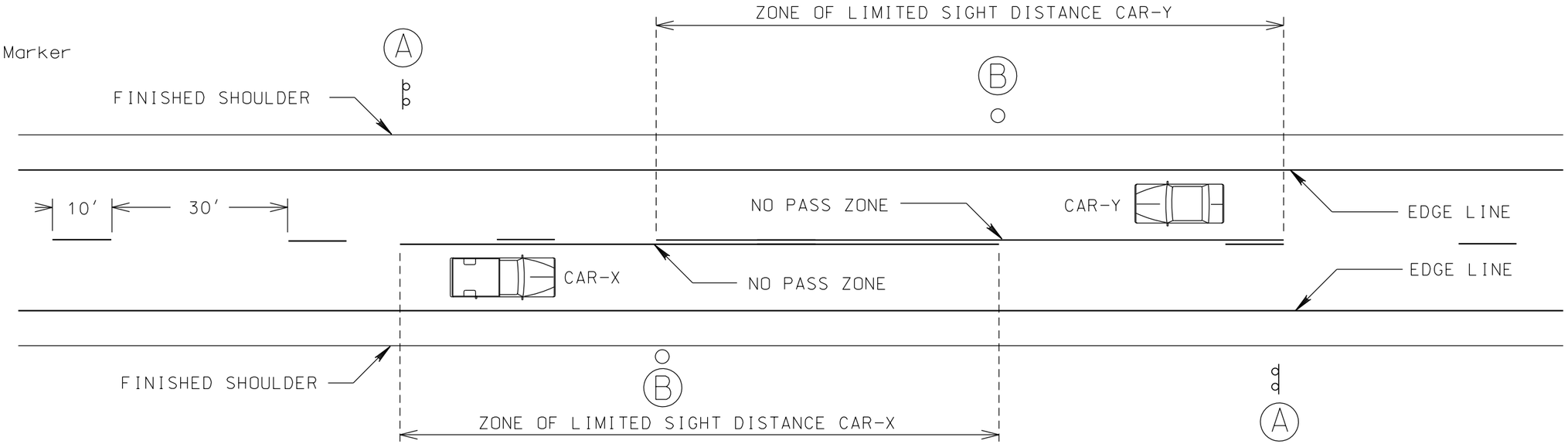
Plot Scale - 1:20

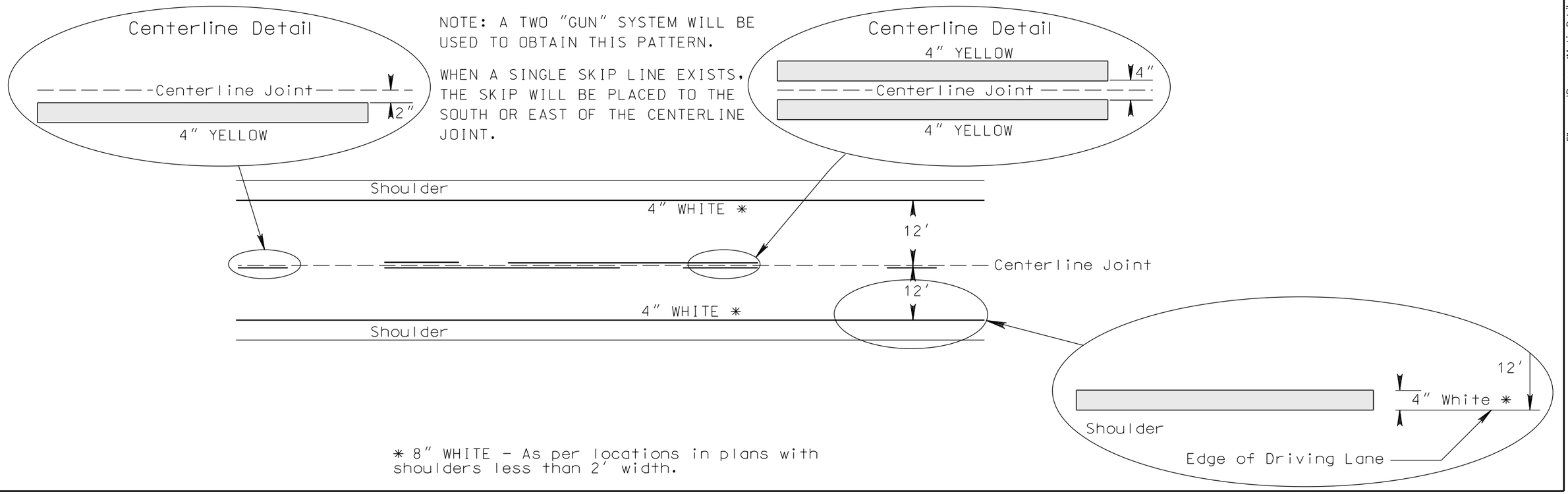
Plotted From - TRRC11951

File - ...\PavementMarkingDetails.dgn

(A) NO PASSING ZONE

(B) End of Zone Marker





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

* Messages on signs will vary depending on the operation being conducted.

Vehicle-mounted signs will be mounted in a manner such that they are not obscured by equipment or supplies. Sign legends on vehicle-mounted signs will be covered or turned from view when work is not in progress.

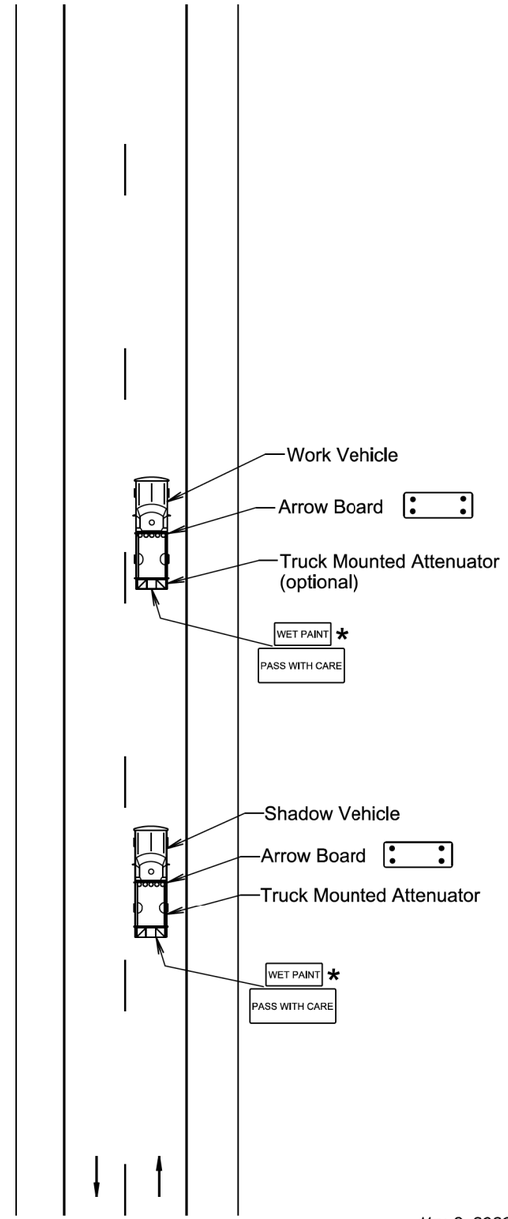
Shadow and Work vehicles will display high-intensity rotating, flashing, oscillating, or strobe lights, flags, signs, or arrow boards.

Vehicle hazard warning signals will not be used instead of the vehicle's high-intensity rotating,flashing, oscillating, or strobe lights.

When an arrow board is used, it will be used in the caution mode. Marching Diamonds are acceptable.

Arrow boards will, as a minimum, be Type B, with a size of 60" x 30".

All costs associated with the traffic control for mobile operation including signs, arrow boards and equipment will be incidental to the contract lump sum price for “Traffic Control, Miscellaneous”.



May 9, 2020

Published Date: 1st Qtr. 2021	SDDOT	GUIDES FOR TRAFFIC CONTROL DEVICES MOBILE OPERATIONS ON 2-LANE ROAD	PLATE NUMBER 634.06
			Sheet 1 of 1

* Messages on signs will vary depending on the operation being conducted.

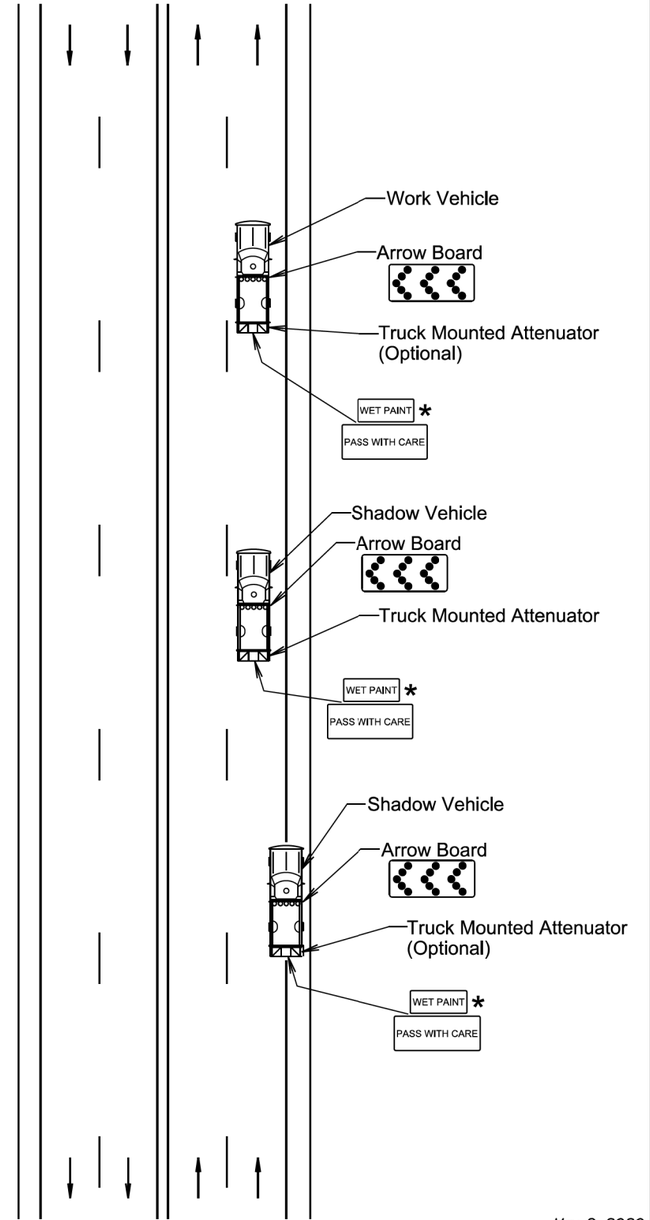
Vehicle-mounted signs will be mounted in a manner such that they are not obscured by equipment or supplies. Sign legends on vehicle-mounted signs will be covered or turned from view when work is not in progress.

Shadow and Work vehicles will display high-intensity rotating, flashing,oscillating, or strobe lights, flags, signs, or arrow boards.

Vehicle hazard warning signals will not be used instead of the vehicle's high-intensity rotating, flashing,oscillating, or strobe lights.

Arrow boards will, as a minimum, be Type B, with a size of 60" x 30".

All costs associated with the traffic control for mobile operation including signs, arrow boards and equipment will be incidental to the contract lump sum price for “Traffic Control, Miscellaneous”.



May 9, 2020

Published Date: 1st Qtr. 2021	SDDOT	GUIDES FOR TRAFFIC CONTROL DEVICES MOBILE OPERATIONS ON 4-LANE DIVIDED	PLATE NUMBER 634.08
			Sheet 1 of 1

Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet) (A)	Spacing of Channelizing Devices (Feet) (G)
0 - 30	200	25
35 - 40	350	25
45	500	25
50	500	50
55	750	50
60 - 65	1000	50

Flagger

Channelizing Device

For low-volume traffic situations with short work zones on straight roadways where the flagger is visible to road users approaching from both directions, a single flagger may be used.

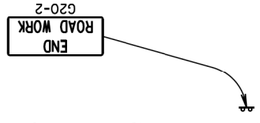
The ROAD WORK AHEAD and the END ROAD WORK signs may be omitted for short duration operations (1 hour or less).

For tack and/or flush seal operations, when flaggers are not being used, the FRESH OIL sign (W21-2) shall be displayed in advance of the liquid asphalt areas.

Flashing warning lights and/or flags may be used to call attention to the advance warning signs.

The channelizing devices shall be drums or 42" cones.

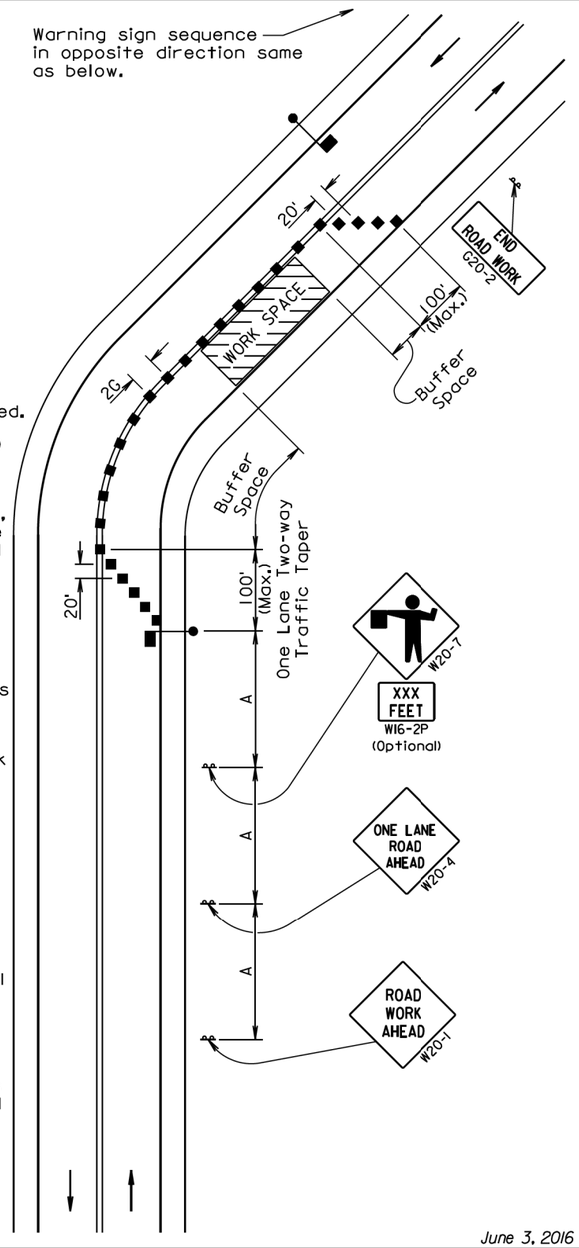
Channelizing devices are not required along the centerline adjacent to work area when pilot cars are utilized for escorting traffic through the work area.



Channelizing devices and flaggers shall be used at intersecting roads to control intersecting road traffic as required.

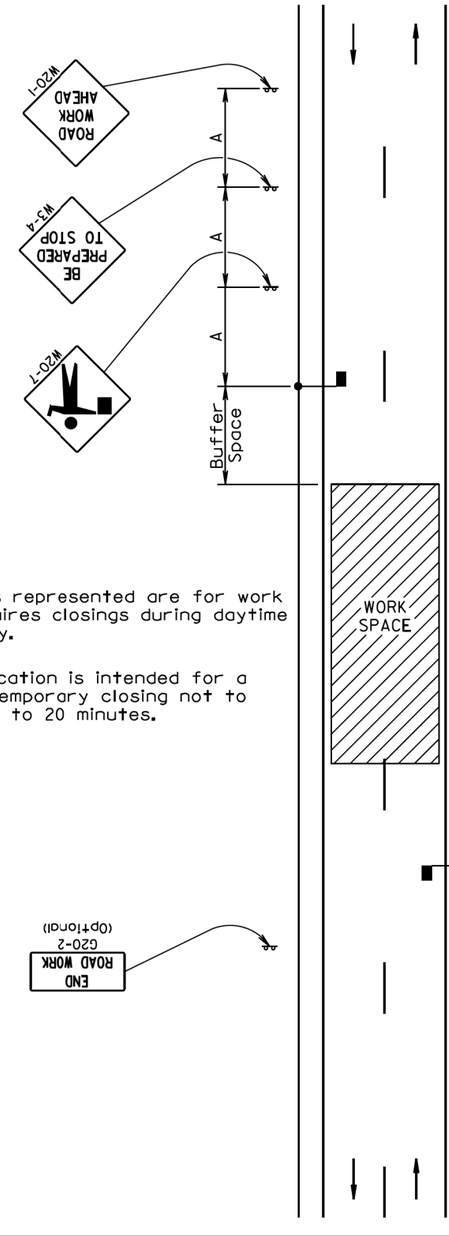
The buffer space should be extended so that the two-way traffic taper is placed before a horizontal or vertical curve to provide adequate sight distance for the flagger and queue of stopped vehicles.

The length of A may be adjusted to fit field conditions.



June 3, 2016

Published Date: 1st Qtr. 2021	SDDOT	GUIDES FOR TRAFFIC CONTROL DEVICES LANE CLOSURE WITH FLAGGER PROVIDED	PLATE NUMBER 634.23
			Sheet 1 of 1

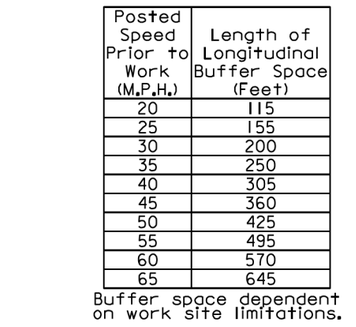


Conditions represented are for work that requires closings during daytime hours only.

This application is intended for a planned temporary closing not to exceed 15 to 20 minutes.

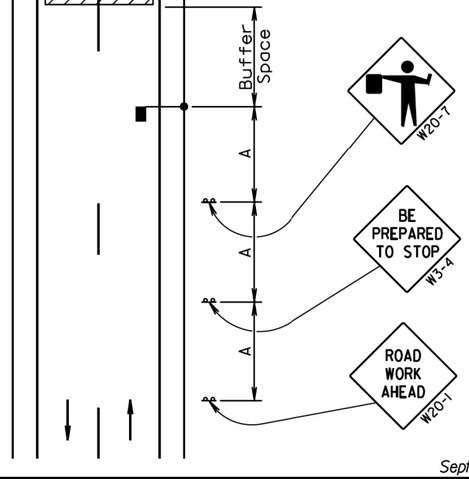
Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet) (A)
0 - 30	200
35 - 40	350
45 - 50	500
55	750
60 - 65	1000

Flagger



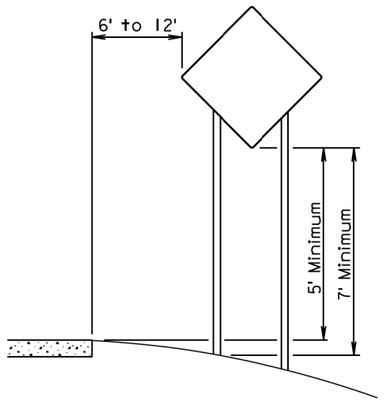
Posted Speed Prior to Work (M.P.H.)	Length of Longitudinal Buffer Space (Feet)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645

Buffer space dependent on work site limitations.

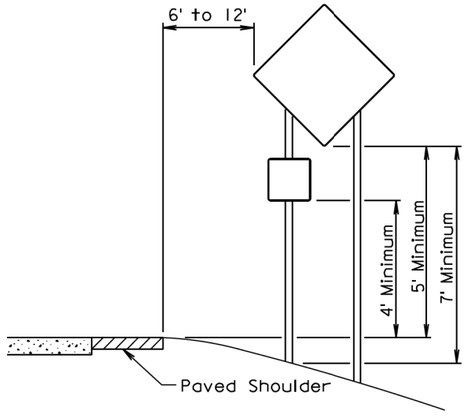


September 6, 2015

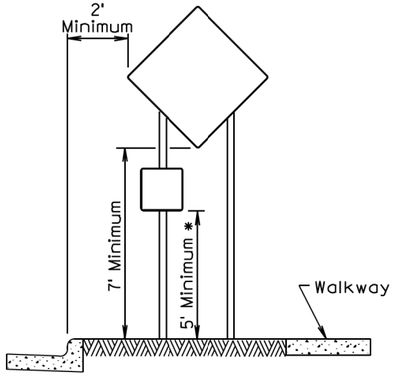
Published Date: 1st Qtr. 2021	SDDOT	GUIDES FOR TRAFFIC CONTROL DEVICES TEMPORARY ROAD WORK	PLATE NUMBER 634.30
			Sheet 1 of 1



RURAL DISTRICT

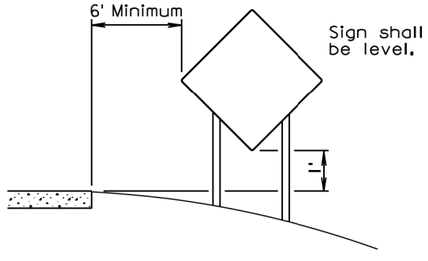


RURAL DISTRICT WITH SUPPLEMENTAL PLATE



URBAN DISTRICT

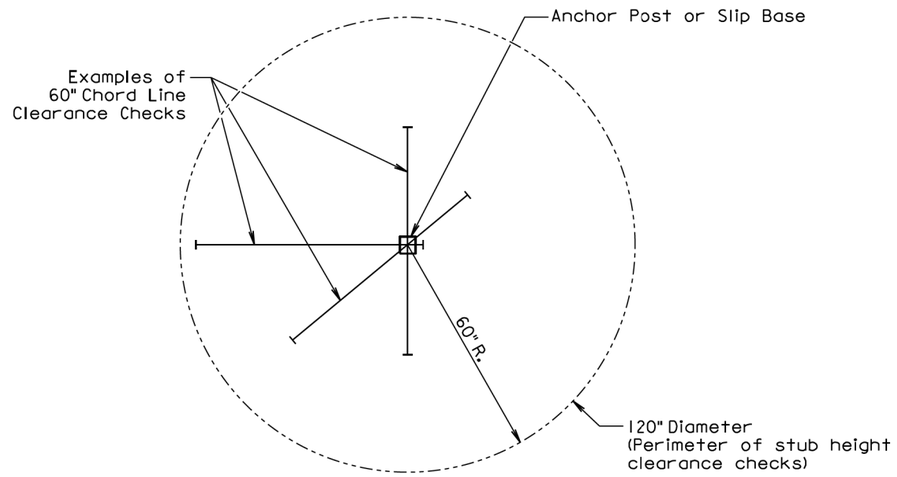
* If the bottom of supplemental plate is mounted lower than 7 feet above a pedestrian walkway, the supplemental plate should not project more than 4" into the pedestrian facility.



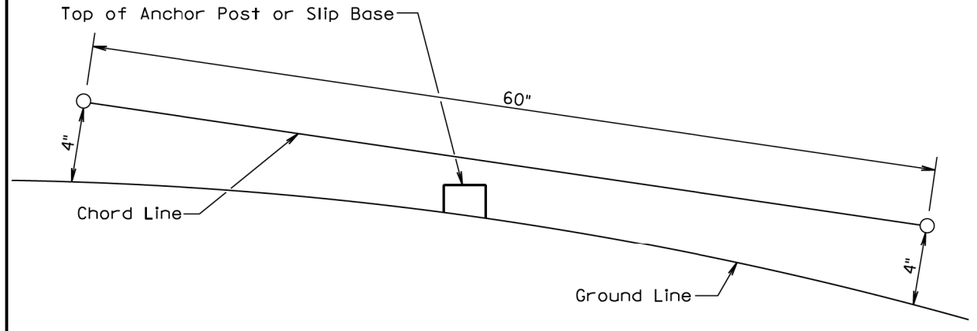
RURAL DISTRICT
3 DAY MAXIMUM
(Not applicable to regulatory signs)

September 22, 2014

Published Date: 1st Qtr. 2021	SDDOT	CRASHWORTHY SIGN SUPPORTS (Typical Construction Signing)	PLATE NUMBER 634.85
			Sheet 1 of 1



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

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