STATE OF SOUTH DAKOTA
DEPARTMENT OF TRANSPORTATION
PLANS FOR PROPOSED

PROJECT PH 0040(314)
SD Highways 34, 44 & 407
US Highways 14A, 18, & 85
HARDING, LAWRENCE,
OGLALA LAKOTA, PENNINGTON
AND FALL RIVER COUNTIES

CENTERLINE RUMBLE STRIPES
PCNs 05X3

INDEX OF SHEETS
Sheets 1: Title Sheet
Sheet 2-5: Estimate of Quantities & Plan Notes
Sheet 6: Pavement Marking Details
Sheet 7: Mobile Operation Traffic Control
Sheet 8: Centerline Rumble Stripe Details
Sheets 9-10: Standard Plates

PCN 05X3
1 US14A, MRM 25.15 + 0.108 to MRM 31.00 + 0.750
2 US14A, MRM 42.42 + 0.119 to MRM 51.00 + 0.200
3 US18, MRM 12.57 + 0.155 to MRM 34.00 + 0.100
4 US18, MRM 89.00 + 0.000 to MRM 102.00 + 0.790
5 US18, MRM 105.00 + 0.713 to MRM 120.98 + 0.000
6 SD407, MRM 0.00 + 0.000 to MRM 1.38 + 0.049
7 US85, MRM 124.79 + 0.075 to MRM 135.00 + 0.000
(No Rumble Stripes Thru Buffalo)
8 SD44, MRM 26.90 + 0.000 to MRM 30.00 + 0.680
9 SD44, MRM 35.00 + 0.636 to MRM 39.19 + 0.121

Storm Water Permit
No Permit Required
Estimate of Quantities

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<th>Bid Item Number</th>
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<td>009E4100</td>
<td>Construction Schedule, Category I</td>
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<td>Traffic Control Signs</td>
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<td>634E0630</td>
<td>Temporary Pavement Marking</td>
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Specifications


Coordination with Other Projects

Asphalt surfacing on project NH-PH 0018(177)104, PCN 02QC is scheduled for the construction season of 2017. The location of this project is US16 MRM 104.2 to 121.2. The Contractor on this project shall coordinate with the Contractor on the asphalt surfacing project, so that the rumble strips can be completed after the asphalt surfacing. The Contractor for the project is Loiseau Construction, Inc., 605-997-2511. All costs associated with this coordination shall be incidental to the various bid items on the project.

A high friction surface treatment on project PH 005W(43), PCN 05H9 is scheduled for the construction season of 2017. The location of this project is US14A MRM 42.5 to 51.2. The Contractor on this project shall coordinate with the Contractor on the high friction surface treatment project, so that work activities do not conflict. The high friction surface treatment will not overlap the rumble strips, so work can be completed before or after the high friction surface treatment installation. The Contractor for the project is unknown at this time. All costs associated with this coordination shall be incidental to the various bid items on the project.

Environmental Commitments

An Environmental Commitment is a measure that SDDOT commits to implement in order to avoid, minimize, and/or mitigate a real or potential environmental impact. Environmental commitments to various agencies and the public have been made to secure approval of this project. An agency mentioned below with permitting authority can influence a project if perceived 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. These environmental commitments are not subject to change without prior written approval from the SDDOT Environmental Office. The environmental commitments associated with this project are as follows:

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 pit, or staging site associated with the project, cease construction activities in the affected area until the Whooping Crane departs and 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.

Construction activities constitute 1 acre or more of earth disturbance.

Commitment H: Waste Disposal Site

The Contractor shall 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) shall 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) shall 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 Project Engineer.

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

1. Construction and/or demolition debris consisting of concrete, asphalt concrete, or other similar materials shall be buried in a trench completely separate from wood debris. The final cover over the construction and/or demolition debris shall consist of a minimum of 1 foot of soil capable of supporting vegetation. Waste disposal sites provided outside of the Public ROW shall be seeded in accordance with Natural Resources Conservation Service recommendations. The seeding recommendations may be obtained through the appropriate County NRCS Office. The Contractor shall control the access to waste disposal sites not within the Public ROW through the use of 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) shall be incidental to the various contract items.

SPECIFICATIONS


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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 not designated within the plans require review of cultural resources impacts. 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 shall arrange and pay for a cultural resource survey and/or records search. 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; however, a cultural resources survey may need to be conducted by a qualified archaeologist.

The Contractor shall provide ARC with the following: a topographical map or aerial view on 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 shall submit the records search or cultural resources survey report and if the location of the site is within the current geographical or historic boundaries of any South Dakota reservation to SDDOT Environmental Engineer, 700 East Broadway Avenue, Pierre, SD 57501-2586 (605-773-3180). 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.

If evidence for cultural resources is uncovered during project construction activities, then such activities shall cease and the Project Engineer shall be immediately notified. The Project Engineer will contact the SDDOT Environmental Engineer in order 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 shall provide the required permits and clearances to the Project Engineer at the preconstruction meeting.

SINUSOIDAL CENTERLINE RUMBLE STRIPES

The Contractor shall demonstrate to the Engineer on an initial 50’ foot test section that the equipment and method will provide the desired ground rumble strip and surface inside each depression. If the desired results are not being provided, as determined by the Engineer, the Contractor shall provide different equipment or methods until satisfactory installation is completed. Any damage to the asphalt concrete shall be replaced by the Contractor at no additional cost to the State.

Rumble stripes shall not be installed on bridge decks and joints to avoid damage in these areas.

Water shall be used with the rumble stripe installation for dust control.

Rumble stripes shall not be installed within 50 feet of any railroad crossings.

SS-1h or CSS-1h Emulsified Asphalt for Flush Seal shall be applied at the rate of 0.05 gallons per square yard.

SINUSOIDAL CENTERLINE RUMBLE STRIPE/ROADWAY CLEANING

The Contractor shall remove all loose material from the driving surface of the roadway on a daily basis. Loose material may be used as fill material adjacent to the paved shoulder. It shall be the Contractor's responsibility to ensure the loose material does not enter any vegetated areas and/or waterways.

All costs associated with this work shall be incidental to the contract unit price per mile for “Grind Sinusoidal Centerline Rumble Stripe in Asphalt”.

SS-1h or CSS-1h Emulsified Asphalt for Flush Seal shall be applied at the rate of 0.05 gallons per square yard.
### TABLE OF MATERIAL QUANTITIES

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<th>MRM to</th>
<th>MRM</th>
<th>Mileage to</th>
<th>Mileage</th>
<th>Grind Sinusoidal Centerline Rumble Stripe in Asphalt Concrete (mile)</th>
<th>SS-1h or CSS-1h Asphalt for Flush Seal (ton)</th>
<th>Waterborne Pavement Marking Paint with High Grade Polymer, Yellow (Gal)</th>
<th>Temporary Pavement Marking (Mile)</th>
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### FLUSH SEAL APPLICATION

The Flush Seal shall be applied the same day the grinding operation is completed and prior to the installation of Temporary Pavement Marking.

### PERMANENT PAVEMENT MARKING – GENERAL NOTES

The Contractor shall survey and mark the location of no passing zones prior to removal of existing pavement markings.

Application of permanent pavement marking may begin 7 calendar days following completion of the flush seal and shall be completed within 14 calendar days following completion of the flush seal.

Striper and advance and trailing warning vehicles shall be equipped with flashing amber or arrow panel warning lights.

### WATERBORNE PAVEMENT MARKING PAINT WITH HIGH GRADE POLYMER

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

This material shall consist of a durable high build, low VOC, fast drying, waterborne traffic paint with a 100% acrylic polymer (Dow DT-400 or Dow HD-21A or equivalent). The Contractor shall 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 shall be adhered to the paint.

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 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 shall be removed and replaced. If replacement of markings cannot be applied within the same year, the Contractor shall 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 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:**

<table>
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<th>Pavement Marking Color</th>
<th>Minimum Value</th>
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<tr>
<td>White</td>
<td>350 mc/m²/lux</td>
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<tr>
<td>Yellow</td>
<td>275 mc/m²/lux</td>
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All pavement markings not conforming to the requirements provided in these plans will be considered deficient and shall be removed and replaced. Additional retroreflectivity readings will be taken by the Department to determine the limits of removal. The removal shall be accomplished using suitable sand blasting or grinding equipment unless the Engineer authorizes other means. The removal process shall remove at least 90% of the deficient line, with no excessive scarring of the existing pavement. The removal width shall be one inch wider all around the nominal width of the pavement marking.
If there is a discrepancy between the traffic control plans, standard plates, and the MUTCD – whichever is more stringent shall be used, as determined by the Engineer.

Traffic shall 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 shall be repaired at no expense to the State.

Lane closure with flaggers shall be used if it is anticipated that the operation will occupy a location for more than one hour and/or is not moving intermittently or continuously. All costs associated with the traffic control for mobile operation including signs, arrow panels and equipment shall be incidental to the contract unit lump sum price for "Traffic Control, Miscellaneous".

**TEMPORARY PAVEMENT MARKING**

Temporary pavement markings for the centerline of the roadway throughout the full length of the project shall meet the requirements of Section 634 of the Specifications.

The Contractor shall use temporary flexible vertical markers (tabs). For routes greater than 2500 ADT the Contractor may use temporary pavement marking paint.

The Contractor shall be responsible for maintaining a visible and reflective centerline throughout the project. Any marking covered or damaged shall be replaced prior to the end of the day. All costs associated with this work shall be incidental to the contract unit price per mile for Temporary Pavement Marking.

On routes > 2500 ADT, The Temporary Pavement Marking operation shall follow the Rumble Stripe grinding operation by no further than 2 miles. Temporary Pavement Markings may be either paint or tabs and shall be applied in accordance with Section 634 of the Specifications. If temporary paint is used, it shall be placed in the same location as the planned Waterborne Pavement Marking Paint.

The following routes have traffic volumes greater than 2500 ADT, so no-passing zones shall be marked in accordance with the specifications:

- US14A, All segments
- US18, MRM 89 to 108
- SD407
- SD44, All segments

All haul trucks shall 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 shall be incidental to the various related contract bid items.

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

The measurement for payment of temporary pavement marking will include one pass after the installation of the flush seal for a total of 1X the segment length.

Temporary Pavement Marking shall be removed upon completion of the work. Temporary Pavement Marking Paint will not require removal provided they meet the requirements for Section 633 of the specifications for permanent pavement marking.

**INVENTORY OF TRAFFIC CONTROL DEVICES**

<table>
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<th>SIGN CODE</th>
<th>SIGN DESCRIPTION</th>
<th>NUMBER</th>
<th>SIGN SIZE</th>
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<td>W3-4</td>
<td>BE PREPARED TO STOP</td>
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<td>48&quot; x 48&quot;</td>
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</tr>
<tr>
<td>W20-1</td>
<td>ROAD WORK AHEAD</td>
<td>2</td>
<td>48&quot; x 48&quot;</td>
<td>16.0</td>
<td>32.0</td>
</tr>
<tr>
<td>W20-7</td>
<td>FLASHER (symbol)</td>
<td>2</td>
<td>48&quot; x 48&quot;</td>
<td>16.0</td>
<td>32.0</td>
</tr>
<tr>
<td>W21-2</td>
<td>FRESH OIL</td>
<td>2</td>
<td>48&quot; x 48&quot;</td>
<td>16.0</td>
<td>32.0</td>
</tr>
<tr>
<td>I22-2</td>
<td>END ROAD WORK</td>
<td>2</td>
<td>36&quot; x 18&quot;</td>
<td>4.5</td>
<td>9.0</td>
</tr>
</tbody>
</table>

**CONVENTIONAL ROAD TRAFFIC CONTROL SIGNS SQFT**

137.0

The Contractor may use DO NOT PASS and PASS WITH CARE signs to mark no passing zones for the following routes that are less than 2500 ADT:
TYPICAL PAVEMENT MARKING LAYOUT

NOTE: A TWO "GUN" SYSTEM SHALL BE USED TO OBTAIN THIS PATTERN.

WHEN A SINGLE SKIP LINE EXISTS, THE SKIP SHALL BE PLACED TO THE SOUTH OR EAST OF THE CENTERLINE JOINT.

CENTERLINE DETAIL

CENTERLINE JOINT

4" YELLOW

CENTERLINE DETAIL

CENTERLINE JOINT

4" YELLOW

4" WHITE *

12'

SOUTH OR EAST OF TEN CENTERLINE JOINT.

ZONE OF LIMITED SIGHT DISTANCE CAR-Y

FINISHED SHOULDER

10' 30'

NO PASS ZONE

CAR-Y

EDGE LINE

FINISHED SHOULDER

ZONE OF LIMITED SIGHT DISTANCE CAR-X

End of Zone Marker

Shoulder

4" WHITE *

12'

CENTERLINE JOINT

Shoulder

4" WHITE *

12'

Centerline Detail

4" YELLOW

CENTERLINE DETAIL

CENTERLINE JOINT

4" YELLOW

4" WHITE *

12'

Centerline Detail

4" YELLOW

4" WHITE *

12'

Shoulder

4" WHITE *

12'

Shoulder

4" WHITE *

12'

Shoulder

4" WHITE *

12'

Edge of Driving Lane

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

Plotting Date: 11/16/2016

Plot Scale - 1:20

Plot Prepared From - trrc11951
Vehicle-mounted signs shall be mounted in a manner such that they are not obscured by equipment or supplies.

Sign legends on vehicle-mounted signs shall be covered or turned from view when work is not in progress.

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

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

Arrow panel shall be used in the caution mode.
Flashing

Arrow panels shall, as a minimum, be Type B, with a size of 60" x 30".
A rumble stripe shall be constructed by grinding continuous sinusoidal indentations in the asphalt concrete. The rumble stripe shall receive a flush seal or asphalt surface treatment as specified in the plans.

A rumble stripe shall not be constructed through intersecting roads. The lengths of the rumble stripe at intersecting roads shall be adjusted as approved by the Engineer.

Prior to constructing the rumble stripe, the Contractor shall submit to the Engineer, for approval, the proposed method of constructing the rumble stripe.

The sinusoidal rumble stripe construction grinding tolerance shall be ±1/8 inch. Measurement of the rumble stripe shall be to the nearest 0.1 inch along the centerline and shall include the rumble stripe on both sides of the centerline as one length. Measurement and payment of the rumble stripe shall include segments without the rumble stripe at intersecting roads. Payment for constructing the rumble stripe shall be at the contract unit price per mile for "Grind Sinusoidal Centerline Rumble Stripe In Asphalt Concrete."
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.

September 6, 2015

Published Date: 4th Oct, 2016
GUIDES FOR TRAFFIC CONTROL DEVICES
TEMPORARY ROAD WORK
Plate Number: 634.30
Examples of 60° Chord Line Clearance Checks

120° Diameter Perimeter of stub height clearance checks

PLAN VIEW
Examples of stub height clearance checks

Top of Anchor Post or Silt Base

60°

Chord Line

Ground Line

ELEVATION VIEW

GENERAL NOTES:
The top of anchor posts and silt 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 channel top splices where the support is designed to yield (bend) at the base.

July 1, 2005

Published Date: 4th Oct. 2016
BREAKAWAY SUPPORT STUB CLEARANCE
PLATE NUMBER 63499