

| STATE OF       | PROJECT              | SHEET | TOTAL  |
|----------------|----------------------|-------|--------|
| SOUTH          |                      |       | SHEETS |
| DAKOTA         | 14A-451 & 090 EF-452 | 1     | 18     |
| Plotting Date: | 04/22/2021           |       |        |



# **INDEX OF SHEETS**

| 1     | General Layout with Index            |
|-------|--------------------------------------|
| 2-7   | Estimate with General Notes & Tables |
| 8-9   | Typical Sections                     |
| 10-14 | Special Details                      |
| 15-18 | Standard Plates                      |

#### ESTIMATE OF QUANTITIES

#### US 14A – PCN i6fu

| BID ITEM<br>NUMBER | ITEM   | QUANTITY | UNIT |
|--------------------|--|----------|------|
| 009E0010           | Mobilization   | Lump Sum | LS   |
| 110E1010           | Remove Asphalt Concrete Pavement                           | 2,576.4  | SqYd |
| 120E0100           | Unclassified Excavation, Digouts                           | 859      | CuYd |
| 260E1010           | Base Course  | 1,125.6  | Ton  |
| 260E1010           | Base Course  | 497.4    | Ton  |
| 320E1200           | Asphalt Concrete Composite                                 | 603.0    | Ton  |
| 320E1200           | Asphalt Concrete Composite                                 | 266.5    | Ton  |
| 320E2000           | Maintenance Patching                                       | 117.0    | Ton  |
| 350E0010           | Asphalt Concrete Crack Sealing                             | 418      | Lb   |
| 633E1220           | High Build Waterborne Pavement Marking Paint,<br>4" White  | 4,175    | Ft   |
| 633E1222           | High Build Waterborne Pavement Marking Paint,<br>4" Yellow | 2,980    | Ft   |
| 634E0010           | Flagging   | 480.0    | Hour |
| 634E0110           | Traffic Control Signs                                      | 274.0    | SqFt |
| 634E0120           | Traffic Control, Miscellaneous                             | Lump Sum | LS   |
| 634E0640           | Temporary Pavement Marking                                 | 5,960    | Ft   |
| 634E1002           | Detour and Restriction Signing                             | 224.0    | SqFt |

#### 090 EF - PCN i6fv

| BID ITEM<br>NUMBER | ITEM   | QUANTITY | UNIT |
|--------------------|--|----------|------|
| 009E0010           | Mobilization   | Lump Sum | LS   |
| 110E1010           | Remove Asphalt Concrete Pavement                           | 41.3     | SqYd |
| 120E0100           | Unclassified Excavation, Digouts                           | 16       | CuYd |
| 260E1010           | Base Course  | 26.0     | Ton  |
| 320E1200           | Asphalt Concrete Composite                                 | 142.2    | Ton  |
| 332E0010           | Cold Milling Asphalt Concrete                              | 2.400    | SqYd |
| 633E1220           | High Build Waterborne Pavement Marking Paint,<br>4" White  | 1.000    | Ft   |
| 633E1222           | High Build Waterborne Pavement Marking Paint,<br>4" Yellow | 1,000    | Ft   |
| 633E5100           | Grooving for Durable Pavement Marking, 4"                  | 2,000    | Ft   |
| 634E0010           | Flagging   | 320.0    | Hour |
| 634E0110           | Traffic Control Signs                                      | 84.5     | SqFt |
| 634E0120           | Traffic Control, Miscellaneous                             | Lump Sum | LS   |
| 634E0420           | Type C Advance Warning Arrow Board                         | 1        | Each |
| 634E0640           | Temporary Pavement Marking                                 | 2,400    | Ft   |

#### 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 B4: BALD EAGLE**

Bald eagles are known to occur in this area.

#### Action Taken/Required:

If a nest is observed within one mile of the project site, notify the Project Engineer immediately so that he/she can consult with the Environmental Office for an appropriate course of action.

## **COMMITMENT C: WATER SOURCE**

The Contractor will not withdraw water with equipment previously used outside the State of South Dakota or previously used in aquatic invasive species waters within South Dakota without prior approval from the SDDOT Environmental Office. Thoroughly wash all construction equipment to prevent and control the introduction and spread of invasive species into the project vicinity.

#### Action Taken/Required:

The Contractor will obtain the necessary permits from the regulatory agencies such as the South Dakota Department of Environment and Natural Resources (DENR) and the United States Army Corps of Engineers (USACE) prior to water extraction activities.

Additional information and mapping of Aquatic Invasive Species in South Dakota can be accessed at: http://sdleastwanted.com/maps/default.aspx.

#### 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.

|  | STATE OF<br>SOUTH<br>DAKOTA | PROJECT              | SHEET | TOTAL |
|--|-----------------------------|----------------------|-------|-------|
|  |                             | 14A-451 & 090 EF-452 | 2     | 18    |

#### 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 will 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**

State Historical Preservation Office (SHPO or THPO) concurrence has not been obtained for this project.

#### 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.

The Contractor is responsible 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".

#### SURFACING THICKNESS DIMENSIONS

The plans shown spread rates will be applied even though the thickness may vary from that shown on the plans.

At those locations where material must be placed to achieve a required elevation, the depth/guantity may be varied to achieve the required elevation.

#### COLD MILLING ASPHALT CONCRETE

Cold milling asphalt will be done according to the typical section. In areas where maintenance patches have raised and/or widened the road, additional asphalt concrete will be milled to provide a uniform surface.

Cold milling asphalt is estimated to produce 100 tons of cold milled asphalt concrete material. The milled asphalt concrete material will become the property of the Contractor.

### **UNCLASSIFIED EXCAVATION, DIGOUTS**

Backfill of digouts will be 12" of Base Course and 6" Asphalt Concrete Composite paid for at the contract unit price per ton.

Asphalt Concrete Composite will be placed in two 3" lifts.

Compaction of Base Course will be to the Satisfaction of the Engineer.

### WATER FOR GRANULAR MATERIAL

Water for Granular Material will be applied at the rate of 10 MGal.per CuYd.

price per ton for Base Course.

#### ASPHALT CONCRETE COMPOSITE

Mineral aggregate will be produced from a ledge rock source.

Mineral aggregate for the Asphalt Concrete Composite will conform to the requirements for Class G, Type 2.

Asphalt for tack SS-1h or CSS-1h will be applied prior the Asphalt Concrete Composite. Asphalt for tack will be applied at a rate of 0.09 gallons per square yard on the existing asphalt surfacing. The Asphalt for tack will be applied for the full width of the bottom layer of Asphalt Concrete Composite plus one-half foot per side beyond the full width.

All other requirements in the Standard Specifications for Asphalt Concrete Composite will apply.

#### **FLUSH SEAL**

Asphalt Patches will require a Flush Seal.

Application of flush seal will be completed within 10 working days following completion of the asphalt concrete surfacing.

Application of flush seal may be eliminated by the Engineer. If the paved surface remains tight, the Engineer will notify the Contractor as soon as possible that the flush seal is unnecessary.

SS-1h or CSS-1h Emulsified Asphalt for Flush Seal at the rate of 3.5 tons/mile applied 28 feet wide (Rate = 0.05 gallon per square yard).

Sand for Flush Seal at the rate of 56.3 ton/mile applied 24 feet wide (Rate = 8 lbs. per square yard).

## MAINTENANACE PATCHING

Materials for Maintenance Patching will conform to the note for Asphalt Concrete Composite found in these plans.

|                 | STATE OF        | PROJECT              | SHEET | TOTAL<br>SHEETS |
|-----------------|-----------------|----------------------|-------|-----------------|
| SOUTH<br>DAKOTA | SOUTH<br>DAKOTA | 14A-451 & 090 EF-452 | 3     | 18              |

All costs for Water for Granular Material will be incidental to the contract unit

#### **ROADWAY CLEANING**

The Contractor will be responsible for removing the router tailings from the roadway surface, including shoulders, intersecting roads, median crossovers, sidewalks, etc. as directed by the Engineer.

#### **CRACK SEALING**

All quantities are based on a factor of 0.4 lbs. of sealant per 1 foot of existing crack. Actual quantities used may vary depending upon the location and width of the existing crack. Rates may vary as directed by the Engineer.

The Typical Reservoir Section will be 3/4 inch wide x 3/4 inch deep.

The use of a squeegee will not be allowed on this project except for locations where the sealant begins to run out of the routed crack due to the grade or superelevation of the road and at locations where cracks are less than 6" apart. The squeegee will be used to push the sealant material back into the crack and remove as much sealant as possible from the roadway surface at these locations.

All other requirements stated in Section 350 of the Specifications will apply.

At locations with multiple cracks less than 6" apart, route only the widest crack. Routing will not be required to seal the remaining cracks. Trace these remaining cracks with sealant and use a squeegee to level and fill.

#### **SEQUENCE OF OPERATIONS**

Contractor requests to deviate from the sequence of operations will be submitted in writing to the Engineer for review. Approval of an alternate sequence of operations will only be allowed when the proposed changes meet with the Department's intent for traffic control and sequencing of the work. An alternate sequence will be submitted for review a minimum of one week prior to potential implementation.

#### ASPHALT REPAIR US 14A – PCN i6fu

- 1. Install Traffic Control Devices
- 2. Remove Asphalt Concrete
- 3. Excavate Digouts
- 4. Place Base Course
- 5. Place Asphalt Concrete Composite
- 6. Perform Maintenance Patching
- 7. Perform Crack Sealing
- 8. Complete Pavement Marking
- 9. Remove Traffic Control Devices

#### . ASPHALT REPAIR 090 EF - PCN i6fv

- 10. Install Traffic Control Devices
- 11. Remove Asphalt Concrete
- 12. Excavate Digouts
- 13. Place Base Course
- 14. Place Asphalt Concrete Composite in Digout areas
- 15. Mill Asphalt Concrete for one-half of width of the repair area
- 16. Place Asphalt Concrete Composite for one-half of width of the repair area
- 17. Mill Asphalt Concrete for remaining half of the repair area
- 18. Place Asphalt Concrete Composite for remaining half of the repair area
- 19. Complete Pavement Marking
- 20. Remove Traffic Control Devices

#### **GENERAL TRAFFIC CONTROL**

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.

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

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, work will not be allowed during hours of darkness.

All haul trucks will be equipped with an additional 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.

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.

The Contractor will furnish, install, maintain, and remove TRUCK CROSSING (W8-6) signs daily. The TRUCK CROSSING signs will be displayed always when haul vehicles are hauling material. When hauling conditions no longer exist, the signs will be covered or removed from view. The exact number and location will be determined during construction. Payment for additional signs will be based on the contract unit price per square foot for Traffic Control Signs.

#### **FLAGGING**

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

#### **TEMPORARY PAVEMENT MARKING**

Temporary Flexible Vertical Markers (Tabs) will be used on the top lift of asphalt surfacing for centerline delineation, lane lines, skips, and as directed by the Engineer. Tabs will be offset 6-inches from the location shown for permanent pavement markings. Centerline will be double yellow lines with tabs spaced at 5' the entire project length.

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 nonreflective tabs at no additional cost to the State.

Quantities of Temporary Pavement Markings consist of:

One pass on top lift of Asphalt Concrete Composite One pass on top of Flush Seal

If the flush seal is eliminated, the application of the temporary pavement marking on top of the flush seal will be eliminated. No adjustment in the contract unit price for Temporary Pavement Marking will be made because of a variation in quantities.

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.

Prior to nightfall, tabs will be required to mark centerline on segments of roadway where existing centerline markings have been removed and new markings have not been installed.

|  | STATE OF<br>SOUTH<br>DAKOTA | PROJECT              | SHEET | TOTAL<br>SHEETS |
|--|-----------------------------|----------------------|-------|-----------------|
|  |                             | 14A-451 & 090 EF-452 | 4     | 18              |

#### ITEMIZED LIST OF TRAFFIC CONTROL DEVICES

#### US 14A – PCN i6fu

|              |                     | CONVENTIONAL ROAD   |           |                  |      |
|--------------|---------------------|---|-----------|------------------|------|
| SIGN<br>CODE | SIGN DESCRIPTION    | NUM BER   | SIGN SIZE | SQFT<br>PER SIGN | SQFT |
| W8-6         | TRUCK CROSSING      | 4   | 48" x 48" | 16.0             | 64.0 |
| W20-1        | ROAD WORK AHEAD     | 4   | 48" x 48" | 16.0             | 64.0 |
| W20-4        | ONE LANE ROAD AHEAD | 4   | 48" x 48" | 16.0             | 64.0 |
| W20-7        | FLAGGER (symbol)    | 4   | 48" x 48" | 16.0             | 64.0 |
| G20-2        | END ROAD WORK       | 4   | 36" x 18" | 4.5              | 18.0 |
|              |                     | CONVENTIONAL ROAD<br>DETOUR AND RESTRICTION 274.0<br>SIGNING SQFT |           |                  |      |

#### US 14A – PCN i6fu – Detour Signing

|              |  | CONVENTIONAL ROAD   |     |              | )     |             |       |
|--------------|--|---|-----|--------------|-------|-------------|-------|
| SIGN<br>CODE | SIGN DESCRIPTION                           | NUM BER   |     | SIGN<br>SIZE |       | sqft<br>Per | SQFT  |
| SPECIAL      | WIDTH RESTRICTION 10 FT WIDE 1 MILES AHEAD | 4   | 96" | х            | ##    | 56.0        | 224.0 |
|              |  | CONVENTIONAL ROAD<br>DETOUR AND RESTRICTION 2<br>SIGNING SQFT |     |              | 224.0 |             |       |

#### 090 EF – PCN i6fv

|              |                                  | CONVENTIONAL ROAD   |           |                  |      |
|--------------|----------------------------------|---|-----------|------------------|------|
| SIGN<br>CODE | SIGN DESCRIPTION                 | NUMBER  | SIGN SIZE | SQFT<br>PER SIGN | SQFT |
| W4-2         | LEFT or RIGHT LANE ENDS (symbol) | 1   | 48" x 48" | 16.0             | 16.0 |
| W8-6         | TRUCK CROSSING                   | 2   | 48" x 48" | 16.0             | 32.0 |
| W20-1        | ROAD WORK AHEAD                  | 1   | 48" x 48" | 16.0             | 16.0 |
| W20-5        | LEFT or RIGHT LANE CLOSED AHEAD  | 1   | 48" x 48" | 16.0             | 16.0 |
| G20-2        | END ROAD WORK                    | 1   | 36" x 18" | 4.5              | 4.5  |
|              |                                  | CONVENTIONAL ROAD<br>DETOUR AND RESTRICTION {<br>SIGNING SQFT |           |                  | 84.5 |

#### **PAVEMENT MARKING PAINT**

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

All No Passing Zones will be reviewed prior to the application of any new centerline markings. The Contractor will advise the Engineer a minimum of 3 weeks prior to the application of permanent pavement markings to allow the State to mark the locations of No Pass Zones. State forces will not be available to mark the No Pass Zones from 07-24-21 to 08-15-21.

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

#### 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 will consist of glass beads.

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 = 22.5 Gals/Mile Dashed 4" line = 6.2 Gal/Mile Glass Beads = 8 Lbs/Gal.

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

#### **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 foot 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 <sup>1</sup> + 15 mils | + 5 mils   |  |  |
| Width of Groove                   | 5 to 6 inches                            |            |  |  |
| Length of Skip Lines <sup>2</sup> | 10 foot 6 inches                         | ± 3 inch   |  |  |
| Tapers at ends of lines           | 6 to 9 inches                            |            |  |  |
| Between Double Lines              | 4 inches                                 | ± 1/2 inch |  |  |

eflective media.

The equipment will be capable of the following:

- with multiple passes.
- sealant material.

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.

| ST       | STATE OF<br>SOUTH<br>DAKOTA | PROJECT              | SHEET | TOTAL |
|----------|-----------------------------|----------------------|-------|-------|
| Si<br>DA |                             | 14A-451 & 090 EF-452 | 5     | 18    |

<sup>1</sup> Marking thickness will include the thickness of marking material and r

<sup>2</sup> Additional length may be required as specified in the plans.

• Grooving the total width of the groove in one pass or uniform depths

Grooving without causing damage to the pavement joints or joint

Provide uniform alignment and depth.

Moving continuously to permit a mobile traffic work operation.

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|-----------|------------------|--------|--------------|----------|-----------|----------------|----------------|----------------|------------|--------|----------|--------------|-----------|------------|------------|
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|           |                  |        |              |          |           |                |                |                |            |        |          |              |           | High Build | High Build |
|           |                  |        |              |          |           |                |                |                |            |        |          |              |           | Waterborne | Waterborne |
|           |                  |        |              |          |           |                |                |                |            |        | Remove   |              |           | Pavement   | Pavement   |
|           |                  |        |              |          |           |                | Asphalt        | Asphalt        |            |        | Asphalt  | Unclassified | Temporary | Marking    | Marking    |
|           |                  |        |              |          |           | Maintenance    | Concrete       | Concrete       | Base       | Base   | Concrete | Excavation.  | Pavement  | Paint, 4"  | Paint. 4"  |
| Repair    |                  |        |              | Width    | Length    | Patching       | Composite      | Composite      | Course     | Course | Pavement | Digouts      | Marking   | White      | Yellow     |
| Type      | MRM + Disp.      | Lane   | Direction    | (Ft)     | (Ft)      | (Ton)          | (Ton)          | (Ton)          | (Ton)      | (Ton)  | (SqYd)   | (CuYd)       | (Ft)      | (Ft)       | (Ft)       |
| Digout    | 23 + 0.980       | DI     | SB           | 7        | 50        | (1017)         | ()             | 13.1           | (1011)     | 24.5   | 38.9     | 13.0         | (         | 70         | (          |
| Digout    | 24 + 0 338       | DI     | NB           | 7        | 50        |                |                | 13.1           |            | 24.5   | 38.9     | 13.0         |           | 70         |            |
| *Digout   | 24 + 0.777       | Both   |              | 24       | 130       |                | 117.0          |                | 218.4      |        | 346.7    | 115.6        | 600       | 280        | 300        |
| *Digout   | 24 + 0.833       | Both   |              | 24       | 540       |                | 486.0          |                | 907.2      |        | 1440.0   | 479.9        | 2240      | 1100       | 1120       |
| Digout    | 25 + 0.196       | DL     | NB           | 7        | 50        |                |                | 13.1           |            | 24.5   | 38.9     | 13.0         |           | 70         | 1          |
| Digout    | 25 + 0.326       | DL     | SB           | 7        | 50        |                |                | 13.1           |            | 24.5   | 38.9     | 13.0         |           | 70         | 1          |
| Digout    | 25 + 0.449       | DL     | SB           | 7        | 125       |                |                | 32.8           |            | 61.3   | 97.2     | 32.4         |           | 145        |            |
| Digout    | 25 + 0.770       | DL     | NB           | 7        | 150       |                |                | 39.4           |            | 73.5   | 116.7    | 38.9         |           | 170        |            |
| Digout    | 25 + 0.976       | DL     | SB           | 7        | 60        |                |                | 15.8           |            | 29.4   | 46.7     | 15.6         |           | 80         |            |
| Digout    | 26 + 0.088       | DL     | SB           | 7        | 110       |                |                | 28.9           |            | 53.9   | 85.6     | 28.5         |           | 130        |            |
| Digout    | 26 + 0.458       | DL     | SB           | 7        | 90        |                |                | 23.6           |            | 44.1   | 70.0     | 23.3         |           | 110        |            |
| Digout    | 26 + 0.539       | DL     | SB           | 7        | 60        |                |                | 15.8           |            | 29.4   | 46.7     | 15.6         |           | 80         |            |
| Digout    | 27 + 0.647       | DL     | SB           | 7        | 50        |                |                | 13.1           |            | 24.5   | 38.9     | 13.0         |           | 70         |            |
| Digout    | 27 + 0.718       | DL     | SB           | 7        | 60        |                |                | 15.8           |            | 29.4   | 46.7     | 15.6         |           | 80         |            |
| Digout    | 28 + 0.112       | DL     | SB           | 7        | 50        |                |                | 13.1           |            | 24.5   | 38.9     | 13.0         |           | 70         |            |
| Digout    | 28 + 0.394       | DL     | SB           | 7        | 60        |                |                | 15.8           |            | 29.4   | 46.7     | 15.6         |           | 80         | <u> </u>   |
|           | -                |        |              |          |           |                |                |                |            | -      | -        |              |           |            | -          |
| Patch     | 27 + 0.686       | Both   |              | 26       | 150       | 24.4           |                |                |            |        |          |              | 680       | 320        | 340        |
| Patch     | 28 + 0.058       | Both   |              | 26       | 220       | 35.7           |                |                |            |        |          |              | 960       | 460        | 480        |
| Patch     | 28 + 0.261       | Both   |              | 26       | 350       | 56.9           |                |                |            |        |          |              | 1480      | 720        | 740        |
|           |                  |        |              |          |           | 117.0          | 603.0          | 266.5          | 1125.6     | 497.4  | 2576.4   | 859          | 5960.0    | 4175.0     | 2980.0     |
| *Longer A | sphalt Repair Lo | cation | s, Asphalt ( | Concrete | e Composi | te and Base Co | urse to be bid | seperately.    |            |        |          |              |           |            |            |

|  | STATE OF<br>SOUTH<br>DAKOTA | PROJECT              | SHEET | TOTAL<br>SHEETS |
|--|-----------------------------|----------------------|-------|-----------------|
|  |                             | 14A-451 & 090 EF-452 | 6     | 18              |

|            | Table         | of Crack S | ealing Qua | antities - U | S14A - PCN    | l i6fu         |   |
|------------|---------------|------------|------------|--------------|---------------|----------------|---|
| Repair     | MRM           | + Disp.    | Lane       | Direction    | Width<br>(Ft) | Length<br>(Ft) | Asphalt<br>Concrete<br>Crack<br>Sealing |
| Crack Seal | 24            | + 0 121    |            | NR           | 22            | 0              | 8.8                                     |
| Crack Seal | <u></u><br>24 | + 0.201    | DL         | SB           | 0             | 36             | 14.4                                    |
| Crack Seal |               | + 0.560    | DL         | SB           | 0             | 52             | 20.8                                    |
| Crack Seal | 25            | + 0.132    | DL         | SB           | 24            | 0              | 9.6                                     |
| Crack Seal | 25            | + 0.152    | <br>DL     | SB           | 0             | 67             | 26.8                                    |
| Crack Seal | 25            | + 0.197    | DL         | SB           | 0             | 22             | 8.8                                     |
| Crack Seal | 25            | + 0.392    | DL         | SB           | 0             | 36             | 14.4                                    |
| Crack Seal | 25            | + 0.409    | DL         | SB           | 0             | 180            | 72                                      |
| Crack Seal | 25            | + 0.687    | DL         | SB           | 0             | 78             | 31.2                                    |
| Crack Seal | 25            | + 0.716    | DL         | NB           | 24            | 0              | 9.6                                     |
| Crack Seal | 25            | + 0.952    | DL         | SB           | 0             | 80             | 32                                      |
| Crack Seal | 25            | + 0.992    | DL         | NB           | 24            | 0              | 9.6                                     |
| Crack Seal | 26            | + 0.214    | Both       | NB           | 0             | 75             | 30                                      |
| Crack Seal | 26            | + 0.264    | DL         | SB           | 0             | 45             | 18                                      |
| Crack Seal | 26            | + 0.749    | DL         | SB           | 0             | 15             | 6                                       |
| Crack Seal | 26            | + 0.752    | DL         | NB           | 0             | 15             | 6                                       |
| Crack Seal | 27            | + 0.008    | DL         | SB           | 0             | 75             | 30                                      |
| Crack Seal | 28            | + 0.887    | Middle     | NB           | 0             | 90             | 36                                      |
| Crack Seal | 28            | + 0.892    | DL         | SB           | 0             | 85             | 34                                      |
|            |               |            |            |              |               |                | 418                                     |

|                | Table of Material Quantities - 090 EF |       |    |       |              |           |       |        |          |           |        |          |              |           |            |            |             |
|----------------|---------------------------------------|-------|----|-------|--------------|-----------|-------|--------|----------|-----------|--------|----------|--------------|-----------|------------|------------|-------------|
|                |                                       |       |    |       |              |           |       |        |          |           |        |          |              |           | High Build | High Build |             |
|                |                                       |       |    |       |              |           |       |        |          |           |        |          |              |           | Waterborne | Waterborne |             |
|                |                                       |       |    |       |              |           |       |        | Cold     |           |        | Remove   |              |           | Pavement   | Pavement   | Grooving    |
|                |                                       |       |    |       |              |           |       |        | Milling  | Asphalt   |        | Asphalt  | Unclassified | Temporary | Marking    | Marking    | for Durable |
|                |                                       |       |    |       |              |           |       |        | Asphalt  | Concrete  | Base   | Concrete | Excavation,  | Pavement  | Paint, 4"  | Paint, 4"  | Pavement    |
|                |                                       |       |    |       |              |           | Width | Length | Concrete | Composite | Course | Pavement | Digouts      | Marking   | White      | Yellow     | Marking, 4" |
| Repair Type    | Highway                               | MRM   | to | MRM   | Lane         | Direction | (Ft)  | (Ft)   | (SqYd)   | (Ton)     | (Ton)  | (SqYd)   | (CuYd)       | (Ft)      | (Ft)       | (Ft)       | (Ft)        |
| Mill & Overlay | 090 EF                                | 52.07 |    | 52.22 | Both         | SB        | 27    | 800    | 2400     | 128.2     |        |          |              | 2400      | 1000       | 1000       | 2000        |
| Digout         | 090 EF                                | 52.2  |    |       | Passing Lane | SB        | 12    | 15     |          | 6.8       | 12.6   | 20       | 7.5          |           |            |            |             |
| Digout         | 090 EF                                | 52.22 |    |       | Both         | SB        | 24    | 8      |          | 7.2       | 13.4   | 21.3     | 8.5          |           |            |            |             |
|                |                                       |       |    |       |              |           |       | Total  | 2400     | 142.2     | 26.0   | 41.3     | 16           | 2400      | 1000       | 1000       | 2000        |

| STATE OF        | PROJECT              | SHEET | TOTAL |
|-----------------|----------------------|-------|-------|
| SOUTH<br>DAKOTA | 14A-451 & 090 EF-452 | 7     | 18    |
|                 |                      |       |       |

# TYPICAL SECTION - US14A - PCN 16FU



|   | STATE OF        | PROJECT              | SHEET | TOTAL |      |
|---|-----------------|----------------------|-------|-------|------|
| П | SOUTH<br>DAKOTA | 14A-451 & 090 EF-452 | 8     | 18    |      |
| 0 | Plotting [      | )ate: 04/22/2021     |       |       |      |
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# CRACK SEALING SHOULDER JOINT ADJACENT TO PCC PAVEMENT

If spalling of the PCC Pavement occurs or the existing sealant is damaged during routing, the Contractor will switch to sawing.

If the exisiting sealant is easily removed during routing, remove and replace the existing sealant.

If the crack is greater than 1/4", routing will not be required. Match the width of the existing crack.





CRACK SEALING FOR CRACKS LESS THAN 3/4" WIDTH (ROUTING REQUIRED)





- Blocking Medium



|   | STATE OF   | FRU            |           | SHEET | SHEETS |
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|   | DAKOTA     | 14A-451 & (    | 90 FF-452 | 11    | 18     |
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# SIGN DETAILS



|   | STATE OF               | PROJECT              | SHEET | TOTAL<br>SHEETS |
|---|------------------------|----------------------|-------|-----------------|
|   | DAKOTA                 | 14A-451 & 090 EF-452 | 13    | 18              |
|   | Plotting Date          | : 04/22/2021         |       |                 |
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|   |                        |                      |       |                 |
| - | Orange (               | Background           |       |                 |
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| N | То Ем                  |                      |       |                 |
|   |                        |                      |       |                 |
|   | <u>Т</u> 6 <i>"</i> ЕМ |                      |       |                 |
|   |                        |                      |       |                 |
| - | White B                | ackground            |       |                 |
| : | Т6"ЕМ                  |                      |       |                 |

<u></u>\_6″ЕМ

<u>Т</u>6"ЕМ

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# DETOUR SIGNING



|                |                      |              | TOTAL  |
|----------------|----------------------|--------------|--------|
| STATE OF       | PROJECT              | SHEET        | SHEETS |
| DAKOTA         | 14A-451 & 090 EF-452 | 14           | 18     |
| Plotting Date: | 04/22/2021           |              |        |
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| WIDTH RESTRICTION                                  |
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| 14A west   |
| MAX 1 Ø FT WIDE<br>1 MILES AHEAD<br>USE ALT. ROUTE |

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| STATE OF        | PROJECT              | SHEET | TOTAL<br>SHEETS |
|-----------------|----------------------|-------|-----------------|
| SOUTH<br>DAKOTA | 14A-451 & 090 EF-452 | 15    | 18              |
| Plotting Date:  | 04/22/2021           |       |                 |
|                 |                      |       |                 |



| Published Date: 2nd Atr. 2021  | S D D O |   |   | M<br>N |
|--|---------|---|---|--------|
| flashing, oscillating,<br>or strobe lights.<br>Arrow boards will, as a<br>minimum, be Type B,<br>with a size of 60" x 30".<br>All costs associated with<br>the traffic control for mobile<br>operation including signs,<br>arrow boards and equipment<br>will be incidental to the contract<br>lump sum price for "Traffic<br>Control, Miscellaneous". |         |   | ţ |        |
| or arrow boards.<br>Vehicle hazard warning<br>signals will not be used<br>instead of the vehicle's<br>high-intensity rotating.   |         | I |   |        |
| Shadow and Work vehicles<br>will display high-intensity<br>rotating, flashing, oscillating,<br>or strobe lights, flags, signs,   |         |   |   |        |
| Vehicle-mounted signs<br>will be mounted in a<br>manner such that they<br>are not obscured by<br>equipment or supplies.<br>Sign legends on vehicle-<br>mounted signs will be<br>covered or turned from<br>view when work is not<br>in progress.  |         |   |   |        |
| <ul> <li>Messages on signs will vary<br/>depending on the operation<br/>being conducted.</li> </ul>  |         | 1 |   |        |
|  |         |   |   |        |



| Work   | Signs<br>(Feet)  | (Feet)  |       | as b | elow. | urection     | i same   |  | • // , /             |
|--|--|---|-------|------|-------|--------------|--|--|----------------------|
| ivi.г.п.)  | (A)  | (0)   |       |      |       |              | -  | //                                     |                      |
| 0 - 30   | 200  | 25  |       |      |       |              | X  |  |                      |
| 35 - 40  | 350  | 25  |       |      |       |              |  | / //                                   |                      |
| 45   | 500  | 25  |       |      |       |              |  | × //                                   | //2                  |
| 50   | 500  | 50  |       |      |       |              | / / .  | $\sim$                                 |                      |
| 55   | /50  | 50  |       |      |       |              | 1 2  | *****                                  |                      |
| For low-with shor<br>oadways<br>o road u<br>directions<br>The ROA<br>WORK s<br>duration<br>For tack<br>when flag<br>FRESH (<br>n advance<br>Flashing<br>may be u<br>advance<br>The char<br>or 42" co | Flagger<br>Channelizing Dev<br>rolume traffic situat<br>t work zones on st<br>s where the flagge<br>sers approaching f<br>a single flagger i<br>AD WORK AHEAD<br>igns may be omitte<br>operations (1 hour<br>and/or flush seal of<br>ggers are not being<br>DIL sign (W21-2) v<br>ce of the liquid asp<br>warning lights and<br>used to call attention<br>warning signs. | vice<br>tions<br>raight<br>r is visible<br>from both<br>may be used.<br>and the END RC<br>ed for short<br>or less).<br>perations,<br>g used, the<br>vill be displayed<br>shalt areas.<br>I/or flags<br>on to the<br>vill be drums | DAD / |      |       |              | A 100' Source Marker 100' Source A Marker 100' Source A Marker 100' Source A Marker 100' A Marker 10 |  | Buffer ce            |
| Channeli<br>along the<br>area whe<br>escorting<br>area.<br>Channeli<br>be used a<br>control in   | zing devices are n<br>e centerline adjace<br>en pilot cars are uti<br>traffic through the<br><u>z-025</u><br><u>X80M 0Y08</u><br><u>ON3</u><br>zing devices and f<br>at intersecting road tra  | ot required<br>nt to work<br>lized for<br>work<br>laggers will<br>ds to<br>ffic as  | ¥.    |      |       | ×.           | A A  | ONE LA<br>ROAL<br>AHEA<br>ROAL<br>WORN | NNE<br>D<br>GED<br>A |
| required.<br>The buffe<br>so that th<br>placed be  | er space should be<br>le two-way traffic ta<br>efore a horizontal o  | e extended<br>aper is<br>or vertical  |       |      |       | <i>.</i>     | <u> </u>   | AHEA                                   | D KR                 |
| distance<br>of stoppe  | for the flagger and<br>d vehicles.   |   |       |      |       |              |  |  |                      |
| fit field co   | onditions.   |   |       | '    |       |              |  |  | January 22, 2021     |
|  |  |   |       |      |       | NITH FI      | LAGGER P   | plate number<br>634.23                 |                      |
| Published Date: 2nd Qtr. 2021 $\left  \begin{array}{c} \bar{o} \\ r \end{array} \right $   |  |   |       |      |       | Sheet I of I |  |  |                      |

| Posted   | Spacing of  | Taper  | Spacir           | ng of  | 1 1    |
|--|---|--|------------------|--------|--------|
| Speed  | Advance Warning   | Length   | Channe           | lizing | I      |
| Prior to   | Signs   |  |                  | ces    |        |
| VVork  | (⊢eet)  | (⊢eet)   | (Fee             | et)    | '      |
| (IVI.P.H.)   | (A)   | (L)  | (G               | )      |        |
| 0 - 30   | 200   | 180  | 25               | 5      |        |
| 35 - 40  | 350   | 320  | 25               | 5      |        |
| 45   | 500   | 600  | 25               | 5      |        |
| 50   | 500   | 600  | 50               | *      |        |
| 55   | 750   | 660  | 50               | (<br>* |        |
| 60 - 65  | 1000  | 780  | 50               | ) *    |        |
| Char<br>A" W<br>Pave<br>The cha<br>cones of<br>42" cone<br>drums s<br>will not b<br>hours.<br>Tempora<br>will be u<br>must rer<br>The leng<br>adjusted | nnelizing Device<br>(hite Temporary<br>ement Marking<br>nnelizing devices v<br>r drums.<br>es may be used in p<br>hown in the taper in<br>be used during night<br>ary pavement mark<br>sed if traffic control<br>main overnight.<br>gth of A and L may<br>t to fit field conditio | vill be 4<br>place of<br>f setup<br>nt time<br>cings<br>l<br>be<br>ns. | 2"<br>f the      |        |        |
| Duhlicha   | nd Nate: 2nd Atr 21   | 021  | S<br>D<br>D<br>O |        | 4-LANE |

t Scale - 1.





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