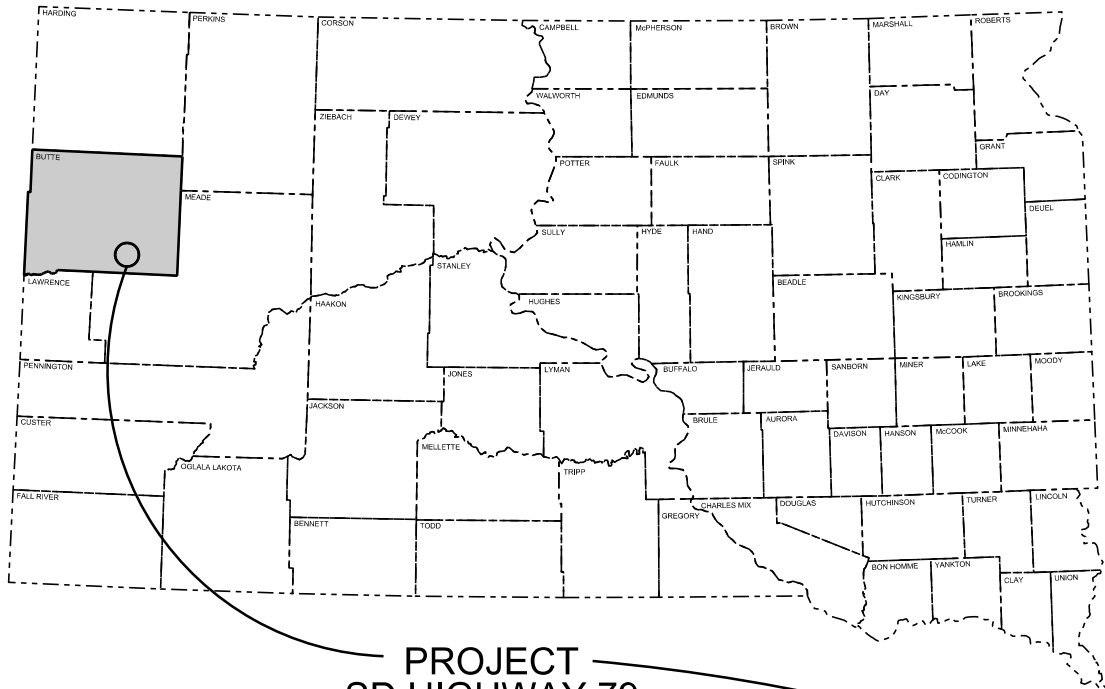


Plot Scale - 1:200

Plotted From - ttrc12808



PROJECT  
SD HIGHWAY 79  
MRM 133.02+0.00 to MRM 133.02+0.030  
US HIGHWAY 212  
MRM 39.00+0.149+0.00 to 39.18+0.027

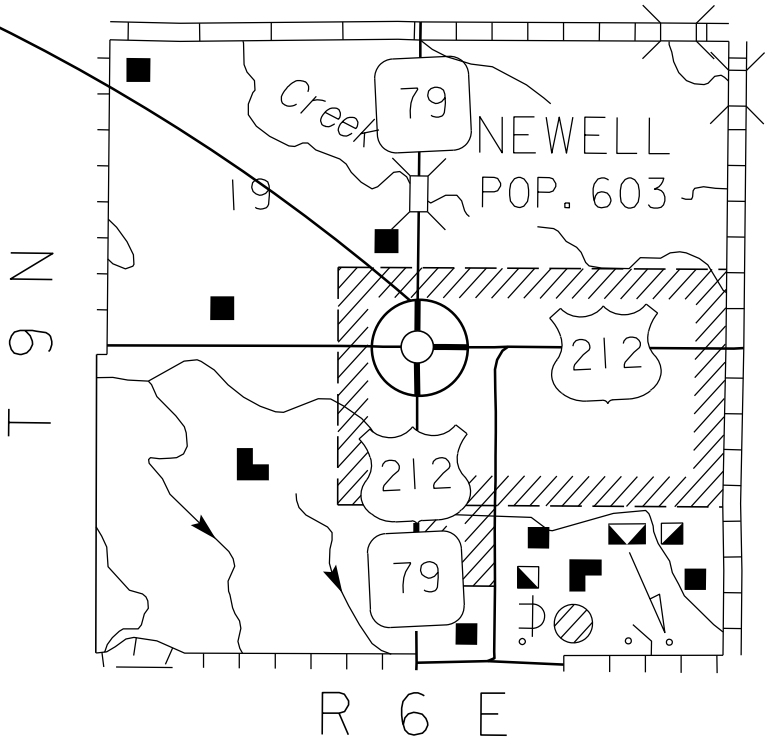
STATE OF SOUTH DAKOTA  
DEPARTMENT OF TRANSPORTATION  
PLANS FOR PROPOSED  
**PROJECTS 079-471 & 212-471**  
**SD HIGHWAY 79 &**  
**US HIGHWAY 212**  
**BUTTE COUNTY**  
  
COLD MILLING ASPHALT CONCRETE AND  
ASPHALT CONCRETE RESURFACING OF INTERSECTION  
  
PCN i4pp & i4q8

| STATE OF<br>SOUTH<br>DAKOTA | PROJECT           | SHEET | TOTAL<br>SHEETS |
|-----------------------------|-------------------|-------|-----------------|
|                             | 079-471 & 212-471 | 1     | 10              |

Plotting Date: 04/20/2017

INDEX OF SHEETS

|                    |   |
|--------------------|---|
| Sheet No. 1:       | Title and Index                           |
| Sheets No. 2 - 6:  | Estimate of Quantities, Notes, and Tables |
| Sheets No. 7 - 8:  | Typical Sections                          |
| Sheets No. 9 - 10: | Standard Plates                           |



DESIGN DESIGNATION

|            |        |
|------------|--------|
| ADT (2016) | 703    |
| ADT (2036) | 792    |
| DHV        | 124    |
| D          | 50%    |
| T DHV      | 12.5%  |
| T ADT      | 27.4%  |
| V          | 30 mph |

STORM WATER PERMIT  
None Required

ESTIMATE OF QUANTITIES

SD 79 – PCN 14pp

| BID ITEM NUMBER | ITEM  | QUANTITY | UNIT |
|-----------------|---|----------|------|
| 009E0010        | Mobilization  | Lump Sum | LS   |
| 009E3320        | Checker   | Lump Sum | LS   |
| 120E0100        | Unclassified Excavation, Digouts                                  | 10       | CuYd |
| 260E1050        | Base Course, Salvaged Asphalt Mix                                 | 20.0     | Ton  |
| 320E1200        | Asphalt Concrete Composite  | 73.0     | Ton  |
| 332E0010        | Cold Milling Asphalt Concrete                                     | 667      | SqYd |
| 633E0030        | Cold Applied Plastic Pavement Marking, 24"                        | 12       | Ft   |
| 633E1205        | Waterborne Pavement Marking Paint with High Grade Polymer, Yellow | 2        | Gal  |
| 633E5015        | Grooving for Cold Applied Plastic Pavement Marking, 24"           | 12       | Ft   |
| 633E5100        | Grooving for Durable Pavement Marking, 4"                         | 300      | Ft   |
| 634E0010        | Flagging  | 100.0    | Hour |
| 634E0110        | Traffic Control Signs   | 77.5     | SqFt |
| 634E0120        | Traffic Control, Miscellaneous                                    | Lump Sum | LS   |
| 634E0640        | Temporary Pavement Marking  | 150      | Ft   |

SD 212 – PCN I4q8

| BID ITEM NUMBER | ITEM  | QUANTITY | UNIT |
|-----------------|---|----------|------|
| 009E0010        | Mobilization  | Lump Sum | LS   |
| 009E3320        | Checker   | Lump Sum | LS   |
| 120E0100        | Unclassified Excavation, Digouts                                  | 20       | CuYd |
| 260E1050        | Base Course, Salvaged Asphalt Mix                                 | 40.0     | Ton  |
| 320E1200        | Asphalt Concrete Composite  | 173.0    | Ton  |
| 332E0010        | Cold Milling Asphalt Concrete                                     | 1,556    | SqYd |
| 633E0030        | Cold Applied Plastic Pavement Marking, 24"                        | 24       | Ft   |
| 633E1205        | Waterborne Pavement Marking Paint with High Grade Polymer, Yellow | 4        | Gal  |
| 633E5015        | Grooving for Cold Applied Plastic Pavement Marking, 24"           | 24       | Ft   |
| 633E5100        | Grooving for Durable Pavement Marking, 4"                         | 700      | Ft   |
| 634E0010        | Flagging  | 100.0    | Hour |
| 634E0110        | Traffic Control Signs   | 137.0    | SqFt |
| 634E0120        | Traffic Control, Miscellaneous                                    | Lump Sum | LS   |
| 634E0640        | Temporary Pavement Marking  | 350      | 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

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 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 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:

- 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”.
- 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.

|                       |                   |       |              |
|-----------------------|-------------------|-------|--------------|
| STATE OF SOUTH DAKOTA | PROJECT           | SHEET | TOTAL SHEETS |
|                       | 079-471 & 212-471 | 2     | 10           |

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.

UTILITIES

The Contractor shall contact the involved utility companies through South Dakota One Call (1-800-781-7474) prior to starting work. It shall be the responsibility of the Contractor to coordinate work with the utility owners to avoid damage to existing facilities.

Utilities are not planned to be affected on this project. If utilities are identified near the improvement area through the SD One Call Process as required by South Dakota Codified Law 49-7A and Administrative Rule Article 20:25, the Contractor shall contact the Project Engineer to determine modifications that will be necessary to avoid utility impacts.

**SURFACING THICKNESS DIMENSIONS**

Plans tonnage shall be applied even though the thickness may vary from that shown in the plans. At those locations where material must be placed to achieve a required elevation, plans tonnage may be varied to achieve the required elevation.

**EXCAVATION OF UNSTABLE MATERIAL**

Included in the Estimate of Quantities are 200 cubic yards of Unclassified Excavation, Digouts per mile for necessary removal of unstable material. Backfill shall be 8” of Base Course, Salvaged Asphalt Mix and 6” Asphalt Concrete Composite paid for at the contract unit price per ton.

**COLD MILLING ASPHALT CONCRETE**

Loose material resulting from the cold milling shall be immediately picked up, and stockpiled for use as Base Course, Salvaged Asphalt Mix. Cold Milling Asphalt Concrete shall be performed as shown in the typical sections and as necessary at the limits of the project or at structures, so that the top mat of the new asphalt surfacing can match existing surface elevations. The cold milling depth shall be transitioned over a distance of 100’ per inch of surfacing depth when matching existing surface elevations.

The milling depths might vary along the transition distance due to irregularities in the surface to obtain smoothness.

The Los Angeles Abrasion Loss value on the aggregate used for the in place asphalt concrete was 25 percent. This value was obtained from testing during construction of the in place asphalt concrete.

The remainder of the salvaged asphalt concrete material shall become the property of the Contractor.

**ASPHALT CONCRETE COMPOSITE**

A Flush Seal will not be required on the asphalt concrete patching.

**CHECKING SPREAD RATES**

The Contractor shall be responsible for checking the Asphalt Concrete Surfacing and Base Course spread rates and take the weigh delivery tickets as the surfacing material arrives on the project and is placed onto the roadway.

The Contractor shall compute the required spread rates for each typical surfacing section and create a spread chart prior to the start of material delivery and placement. The Engineer will review and check the Contractor's calculations and spread charts.

The station to station spread shall be written on each ticket as the surfacing material is delivered to the roadway.

At the end of each day's shift, the Contractor shall verify the following:

- All tickets are present and accounted for,
- The quantity summary for each item is calculated,
- The amount of material wasted if any,

- Each day's ticket summary is marked with the corresponding 'computed by',
- The ticket summary is initialed and certified that the delivered and placed quantity is correct.

All daily tickets and the summary by item shall be given to the Engineer no later than the following morning.

If the checker is not properly and accurately performing the required duties, the Contractor shall correct the problem or replace the checker with an individual capable of performing the duties to the satisfaction of the Engineer. Failure to do so will result in suspension of the work.

The Department will perform depth checks. The Contractor shall be responsible for placement of material to the correct depth unless otherwise directed by the Engineer. If the placed material is not within a tolerance of ±1/4” of the plan shown depth, the Contractor shall correct the problem at no additional cost to the Department. Excess material above the tolerance will not be paid for. Achieving the correct depth may require picking up and moving material or other action as required by the Engineer.

All costs for providing the Contractor furnished checker and performing all related duties shall be incidental to the contract lump sum price for the CHECKER. No allowances will be made to the contract lump sum price for CHECKER due to authorized quantity variations unless the quantities for the material being checked vary above or below the estimated quantities by more than 25%. Payment for the CHECKER shall then be increased or decreased by the same proportion as the placed material quantity bears to the estimated material quantity.

| Table of Material Quantities |              |              |  |  |                                  |                                       |   |  |  |                                  |   |
|------------------------------|--------------|--------------|--|--|----------------------------------|---------------------------------------|---|--|--|----------------------------------|---|
| PCN i4pp                     |              |              |  | Cold<br>Milling<br>Asphalt<br>Concrete | Asphalt<br>Concrete<br>Composite | Unclassified<br>Excavation<br>Digouts | Base<br>Course<br>Salvage<br>Asphalt<br>Mix | Waterborne<br>Pavement<br>Marking<br>Paint with<br>High Grade<br>Polymer<br>Yellow | Grooving<br>for<br>Pavement<br>Marking, 4" | Temporary<br>Pavement<br>Marking | Grooving<br>for Cold<br>Applied<br>Plastic<br>Pavement<br>Marking,<br>24" |
|                              |              |              |  | (SqYd)                                 | (Ton)                            | (CuYd)                                | (Ton)                                       | (Gal)  | (Ft)                                       | (Ft)                             | (Ft)  |
| SD 79                        | 133.02+0.000 | 133.02+0.030 |  | 667                                    | 73                               | 10                                    | 20  | 1.6  | 300  | 150                              | 12  |
| Total                        |              |              |  |  |                                  |                                       |   |  |  |                                  |   |
| PCN i4q8                     |              |              |  |  |                                  |                                       |   |  |  |                                  |   |
| US 212                       | 39.00+0.149  | 39.00+0.189  |  | 889                                    | 100                              | 10                                    | 20  | 2.1  | 400  | 200                              | 12  |
| US 212                       | 39.00+0.189  | 39.18+0.027  |  | 667                                    | 73                               | 10                                    | 20  | 1.6  | 300  | 150                              | 12  |
| Total                        |              |              |  | 1556                                   | 173                              | 20                                    | 40  | 3.7  | 700  | 350                              | 24  |

TRAFFIC CONTROL – GENERAL NOTES

The Contractor shall submit a sequence of operations shall 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 shall be submitted for review a minimum of one week prior to potential implementation.

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

Existing guide, route, informational logo, regulatory, warning signs and delineation shall be temporarily reset and maintained during construction as directed by the Engineer. Removing, relocating, salvaging and resetting of the above items shall be the responsibility of the Contractor.

Non-applicable traffic control devices shall be completely covered or removed during periods of inactivity. Periods of inactivity shall be defined as no work taking place for a period of more than 2 calendar days.

All regulatory signs shall have a minimum mounting height of 5’ in rural locations, even when mounted on portable supports.

All materials and equipment shall be stored a minimum distance of 30’ from the traveled way during nonworking hours.

The Contractor shall provide installation details at the preconstruction meeting for all breakaway sign support assemblies.

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.

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.

Temporary Flexible Vertical Markers (Tabs) shall be used for lane closure tapers or lane shift tapers and shall be installed at 5’ spacing. Tabs used for tapers and shifts will not be measured for payment. All costs associated to furnish, install, maintain (including replacement as required by the Engineer at no added cost to the Department), and remove all markers will be incidental to the contract lump sum price for Traffic Control, Miscellaneous.

Fixed location signing placed more than 4 calendar days prior to the start of construction shall 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 shall be incidental to other contract items. No separate payment will be made.

TEMPORARY PAVEMENT MARKING (PAINT)

Temporary pavement marking paint shall be used on cold milled surfaces. Temporary pavement marking paint shall be used to mark a double yellow centerline and any lane lines for the milled surface. Temporary pavement marking paint shall not be used on the top lift of asphalt concrete.

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 at no cost to the State. All costs for furnishing, applying, and maintaining the temporary pavement marking paint shall be included in the contract unit price per foot for Temporary Pavement Marking.

TEMPORARY FLEXIBLE VERTICAL MARKERS (TABS)

Temporary Flexible Vertical Markers shall be used on the top lift of asphalt surfacing for centerline delineation, any lane lines, and as directed by the Engineer. Tabs shall be offset 6” from the location shown for permanent pavement markings. Tabs shall be installed by the end of each day. Tabs shall be removed the same day that permanent pavement marking is installed.

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 at no cost to the State.

All costs for furnishing, installing, and removing the tabs when no longer needed shall be included in the contract unit price per foot for Temporary Pavement Marking.

OVERWIDTH TRAFFIC

The Contractor shall maintain a minimum width of 16’ at all times, except when milling and paving equipment is working directly adjacent to centerline. The Contractor shall notify the Engineer 5 days prior to the paving and milling operations.

TRAFFIC CONTROL – GENERAL NOTES

Requests to deviate from the sequence of operations shall 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 shall be submitted for review a minimum of one week prior to potential implementation.

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

Existing guide, route, informational logo, regulatory, warning signs and delineation shall be temporarily reset and maintained during construction as directed by the Engineer. Removing, relocating, salvaging and resetting of the above items shall be the responsibility of the Contractor.

Non-applicable traffic control devices shall be completely covered or removed during periods of inactivity. Periods of inactivity shall be defined as no work taking place for a period of more than 2 calendar days.

All regulatory signs shall have a minimum mounting height of 5’ in rural locations, even when mounted on portable supports.

All materials and equipment shall be stored a minimum distance of 30’ from the traveled way during nonworking hours.

|                             |                   |       |                 |
|-----------------------------|-------------------|-------|-----------------|
| STATE OF<br>SOUTH<br>DAKOTA | PROJECT           | SHEET | TOTAL<br>SHEETS |
|                             | 079-471 & 212-471 | 5     | 10              |

The Contractor shall provide installation details at the preconstruction meeting for all breakaway sign support assemblies.

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.

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.

Temporary Flexible Vertical Markers (Tabs) shall be used for lane closure tapers or lane shift tapers and shall be installed at 5’ spacing. Tabs used for tapers and shifts will not be measured for payment. All costs associated to furnish, install, maintain (including replacement as required by the Engineer at no added cost to the Department), and remove all markers will be incidental to the contract lump sum price for Traffic Control, Miscellaneous.

Fixed location signing placed more than 4 calendar days prior to the start of construction shall 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 shall be incidental to other contract items. No separate payment will be made.

ITEMIZED LIST OF TRAFFIC CONTROL DEVICES

PCN i4pp – SD 79

| SIGN<br>CODE                                    | SIGN DESCRIPTION    | NUMBER | SIGN SIZE | SQFT<br>PER SIGN | SQFT |
|---|---------------------|--------|-----------|------------------|------|
| W8-15   | GROOVED PAVEMENT    | 1      | 48" x 48" | 16.0             | 16.0 |
| W20-1   | ROAD WORK AHEAD     | 1      | 48" x 48" | 16.0             | 16.0 |
| W20-4   | ONE LANE ROAD AHEAD | 1      | 48" x 48" | 16.0             | 16.0 |
| W20-7   | FLAGGER (symbol)    | 1      | 48" x 48" | 16.0             | 16.0 |
| G20-2   | END ROAD WORK       | 3      | 36" x 18" | 4.5              | 13.5 |
| CONVENTIONAL ROAD<br>TRAFFIC CONTROL SIGNS SQFT |                     |        |           |                  | 77.5 |

PCN i4qp – US 212

| SIGN<br>CODE                                    | SIGN DESCRIPTION    | NUMBER | SIGN SIZE | SQFT<br>PER SIGN | SQFT  |
|---|---------------------|--------|-----------|------------------|-------|
| W8-15   | GROOVED PAVEMENT    | 2      | 48" x 48" | 16.0             | 32.0  |
| W20-1   | ROAD WORK AHEAD     | 2      | 48" x 48" | 16.0             | 32.0  |
| 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  |
| G20-2   | END ROAD WORK       | 2      | 36" x 18" | 4.5              | 9.0   |
| CONVENTIONAL ROAD<br>TRAFFIC CONTROL SIGNS SQFT |                     |        |           |                  | 137.0 |

COLD APPLIED PLASTIC PAVEMENT MARKING

Cold Applied Plastic Pavement Marking shall be used for the stop bars located at the intersection. The Contractor shall note the original location of the stop bar and replace the marking at that location.

The Contractor shall apply the Cold Applied Plastic Pavement Marking material as per manufacturer’s instructions.

Cold Applied Plastic Pavement Marking shall be placed into recessed grooves on the surface.

GROOVE PAVEMENT FOR PAVEMENT MARKING

The grooving shall be completed within the following tolerance:

Depth of Groove: 100 mils, tolerance of + 10 mils.

The Contractor shall dispose of grooving residue in accordance with Federal, State and Local regulations. No payment will be made for disposal of residue. Disposal of residue shall be incidental to the associated Grooving Pavement bid item.

The Contractor shall establish a positive means for the removal of the grinding and/or grooving residue. Residue from dry grooving shall be vacuumed. Solid residue shall be removed from the pavement surfaces before being blown by traffic action or wind. Residue from wet grooving shall 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, shall 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 residuesshall be included in the contract unit price per foot for Grooving for Cold Applied Plastic Pavement Marking.

WATERBORNE PAVEMENT MARKING PAINT WITH HIGH GRADE POLYMER

Waterborne Pavement Marking Paint with High Grade Polymer shall be used for the double yellow centerline markings on areas receiving asphalt overlay.

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) and with reflective media adhered to the paint. The reflective media shall consist of glass beads as well as bonded core reflective elements.

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 15<sup>th</sup> 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 <sup>2</sup> /lux |
| Yellow                 | 275 mc/m <sup>2</sup> /lux |

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 to be removed. Removal and replacement of the pavement markings shall be at the Contractor’s expense, with no cost incurred by the State.

RATES OF MATERIALS FOR WATERBORNE PAVEMENT MARKING PAINT WITH HIGH BUILD POLYMER

Solid 4” line = 27.8 Gals/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 shall be incidental to the contract unit price per gallon for Waterborne Pavement Marking Paint with High Grade Polymer, White or Yellow.

GROOVING FOR DURABLE PAVEMENT MARKING – CENTERLINE MARKINGS

The Contractor shall establish a positive means for the removal of the grinding and/or grooving residue. Residue from dry grooving shall be vacuumed. Solid residue shall be removed from the pavement surfaces before being blown by traffic action or wind. Residue from wet grooving shall 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, shall 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 shall be included in the contract unit price per foot for Grooving for Durable Pavement Marking, 4”.

Unless otherwise specified in the plans, the Contractor shall groove the surface for Waterborne Pavement Marking Paint with High Grade Polymer as specified in these plans and as per manufacturer’s instructions.

|                       |                   |       |              |
|-----------------------|-------------------|-------|--------------|
| STATE OF SOUTH DAKOTA | PROJECT           | SHEET | TOTAL SHEETS |
|                       | 079-471 & 212-471 | 6     | 10           |

The grooving shall 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 |

<sup>1</sup> Marking thickness shall include the thickness of marking material and reflective media.

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

The equipment shall 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.

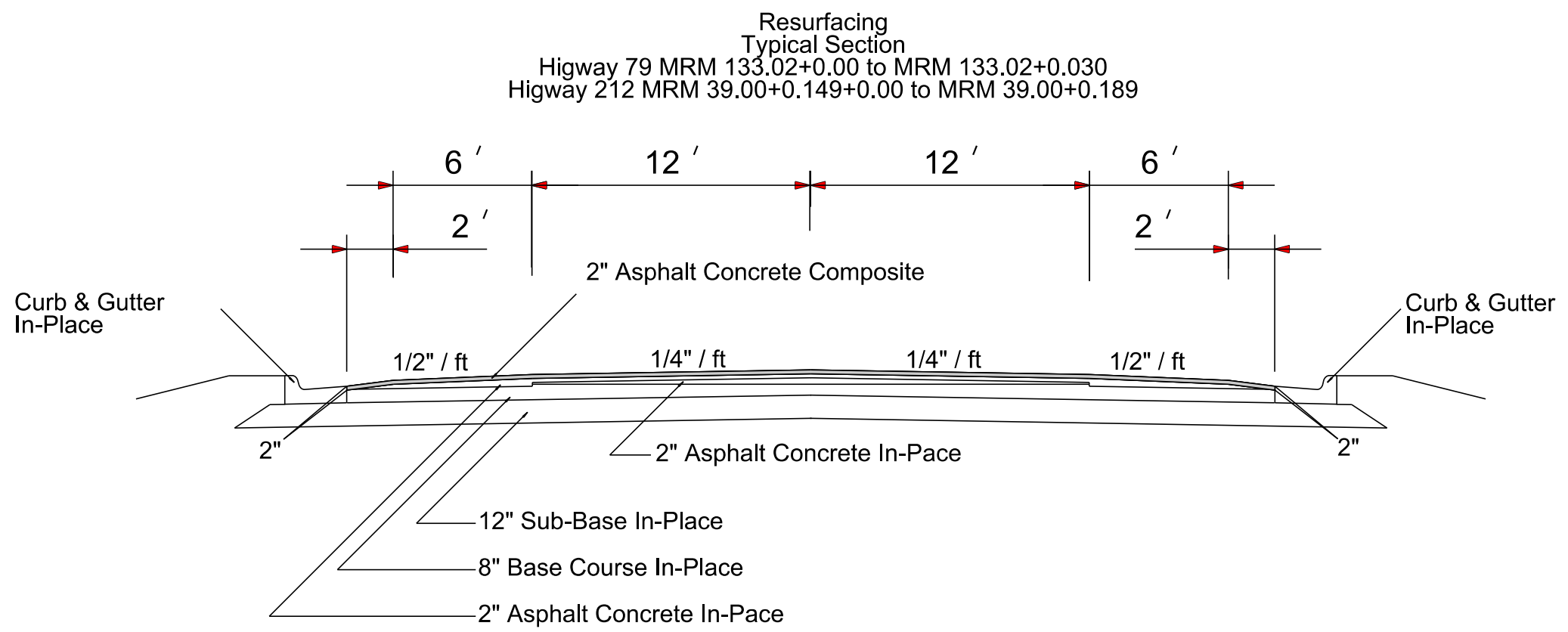
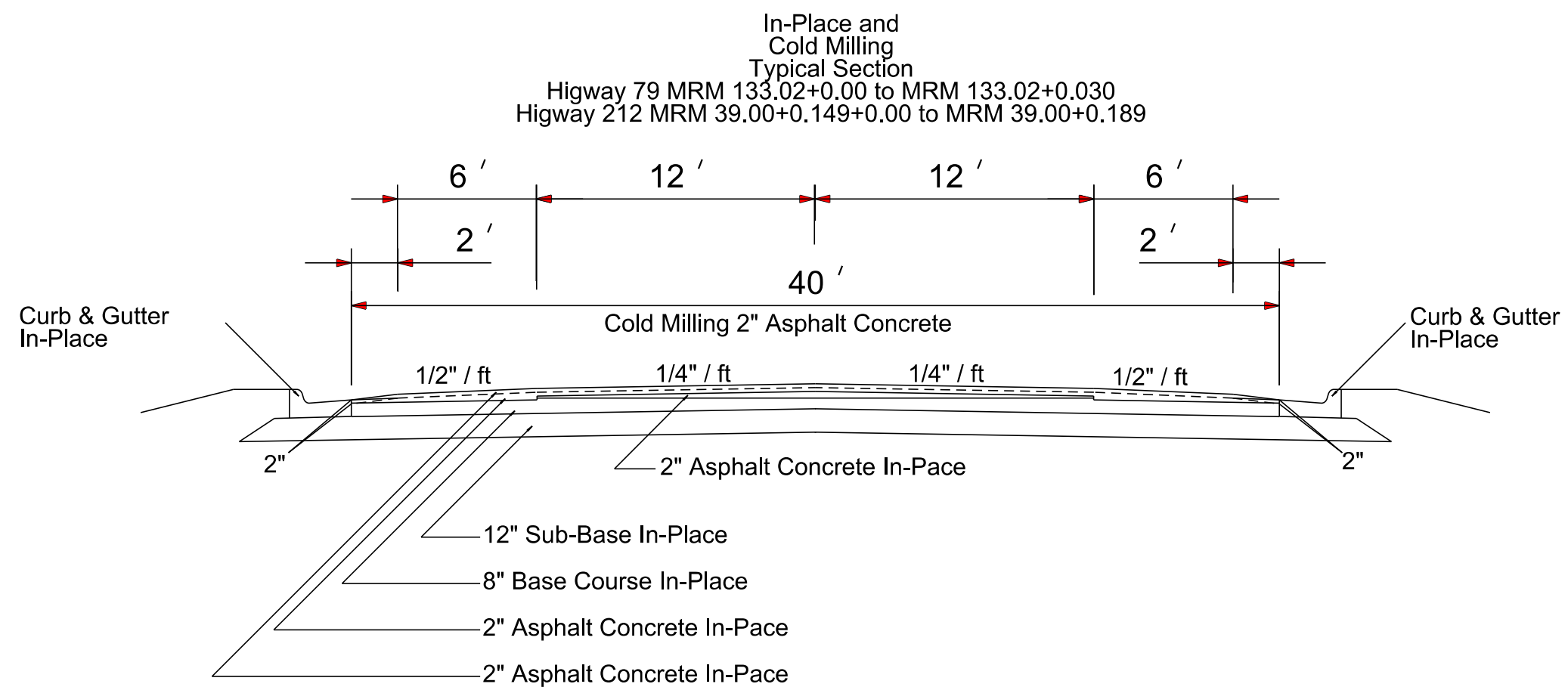
If damage occurs, including, but not limited to, joints, joint sealant material, and backer rod, the grooving operation shall be stopped and modifications shall be made to the grooving operation to prevent further damage. The Contractor may be required to use specially prepared circular diamond blade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

1:6.25  
Plot Scale -  
Plotted From -

# TYPICAL SECTIONS

| STATE OF<br>SOUTH<br>DAKOTA | PROJECT           | SHEET | TOTAL<br>SHEETS |
|-----------------------------|-------------------|-------|-----------------|
|                             | 079-471 & 212-471 | 7     | 10              |

Plotting Date: 04/20/2017



## Plot Scale - 1:6.25

Plotted From - trrc12608

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Diagram illustrating the cross-section of a road construction project, showing the width and material layers.

The total width is 40'.

The width is divided into sections: 8', 12', 12', and 8'.


The material layers are:

- Cold Milling 2" Asphalt Concrete (0.02'/ft)
- 2" Asphalt Concrete
- 14" Base Course, Salvaged
- 2" Asphalt Concrete

The diagram is labeled "C & G" at both ends.

The diagram illustrates a cross-section of a road structure. At the base is a 14" Base Course, Salvaged. Above this are two layers of asphalt concrete: a 2" Asphalt Concrete Composite and a 2" Asphalt Concrete layer. The road has a centerline marked with a vertical line and a 'C' symbol. The width of the road is divided into segments of 8' and 12' on both sides of the centerline. The road surface has a slope of 0.02'/ft. The road is bordered by 'C & G' (Curb and Gutter) on both sides.



 Flagger  
 Channelizing Device

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

Diagram illustrating the layout for a one-lane two-way traffic taper during road work. The diagram shows a two-lane road narrowing to a single lane. Key components include:

- Warning sign sequence in opposite direction same as below.**
- 20'** dimensions for the initial taper sections.
- WORK SPACE** indicated by a hatched area.
- 100' (Max.)** dimensions for the taper sections.
- Buffer Space** indicated by curved arrows.
- One Lane Two-way Traffic Taper** label.
- Signs and their codes:**
  - W20-1** (Diamond): Road Work Ahead
  - W20-4** (Diamond): One Lane Road Ahead
  - W20-2** (Rectangle): Road Work End
  - W16-2P** (Rectangle): XXX FEET (Optional)
- Dimensions A** and **20'** are marked for the taper sections.

June 3, 2016

## GUIDES FOR TRAFFIC CONTROL DEVICES LANE CLOSURE WITH FLAGGER PROVIDED

PLATE NUMBER  
634.23

Sheet 1 of 1

**Published Date: 1st Qtr. 2017**

| STATE OF<br>SOUTH<br>DAKOTA | PROJECT           | SHEET | TOTAL<br>SHEETS |
|-----------------------------|-------------------|-------|-----------------|
|                             | 079-471 & 212-471 | 10    | 10              |

Plotting Date: 04/20/2017

