

# INFORMATIONAL PROPOSAL (For information only, not to be used for bidding)

NEBRASKA DEPARTMENT OF ROADS  
LETTING DATE: February 05, 2015

CALL ORDER: 220            CONTRACT ID: 2555X

CONTROL NO./SEQ. NO.: 22555 /000 PROJECT NO.: STR-680-9(1192)

TENTATIVE START DATE: 04/20/15            CONTRACT TIME: 132 CALENDAR DAYS

LOCATION: I-680, SB I-680 TO WB I-80 BRIDGES, OMAHA  
IN COUNTY: DOUGLAS

BIDDER

- GROUP 1 GRADING
- GROUP 1A MSE WALL
- GROUP 4 CULVERTS
- GROUP 6 BRIDGE AT STA 719+02.70
- GROUP 6A BRIDGE AT STA 719+02.70
- GROUP 6B BRIDGE AT STA 735+84.12
- GROUP 6C BRIDGE AT STA 5517+79.48
- GROUP 7 GUARDRAIL
- GROUP 8C SIGNING
- GROUP 9 BITUMINOUS
- GROUP 10 GENERAL ITEMS

SEE SPECIAL PROVISIONS FOR GROUP TIES

## NOTES

THE TOTAL AMOUNT OF WORK WHICH WILL BE ACCEPTED IN  
THIS LETTING IS LIMITED TO \$\_\_\_\_\_.

THE NUMBER OF \_\_\_\_\_ CONTRACTS WHICH WILL BE  
ACCEPTED IN THIS LETTING IS LIMITED TO \_\_\_\_\_.

## **NOTICE TO ALL BIDDERS**

To report bid rigging activities, call: 1-800-424-9071

The U.S. Department of Transportation (DOT) operates the above toll-free “hotline” Monday through Friday, 8:00 a.m. to 5:00 p.m. eastern time. Anyone with knowledge of possible bid rigging, bidder collusion, or other fraudulent activities should use the “hotline” to report such activities.

The “hotline” is part of the DOT’s continuing effort to identify and investigate highway construction contract fraud and abuse and is operated under the direction of the DOT Inspector General. All information will be treated confidentially and caller anonymity will be respected.

## **LETTING QUESTIONS**

Prior to the letting, any questions pertaining to the Special Provisions or the Plans for this project should be submitted to NDOR in a written format through the Bid Express (BidX) website at <https://www.bidx.com/ne/lettings>. Likewise, NDOR will post answers exclusively to the BidX website. All official answers will be identified as “Authorized by NDOR.” **Questions will not be answered verbally.**

STATE OF NEBRASKA  
DEPARTMENT OF ROADS

Required Provisions Supplemental to the

**Standard Specifications for Highway Construction**

**I. Application**

These contract provisions shall apply to all work performed on the contract by the contractor with his own organization and with the assistance of workmen under his immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.

The contractor shall insert in each of his subcontracts all of the stipulations contained in the Special Provisions and these Required Provisions.

A breach of any of the stipulations contained in these Required Provisions may be grounds for termination of the contract.

**II. Equal Opportunity**

1. **Selection of Labor**

During the performance of this contract, the contractor shall not discriminate against labor from any other state.

2. **Nebraska Fair Employment Practices Act**

The contractor shall not discriminate against any employee or applicant for employment, to be employed in the performance of this contract with respect to his hire, tenure, terms, conditions, or privileges of employment, because of his race, color, religion, sex or national origin. The contractor agrees to post in a conspicuous place or places a notice to be provided by the State Highway Department which sets forth excerpts of the Act.

3. **Nebraska Equal Pay Act**

The contractor shall not discriminate on the basis of sex by paying wages to employees of one sex at a lesser rate than the rate paid to employees of the opposite sex for comparable work on jobs which have comparable requirements. An abstract of the Act is included on the notice which is provided by the State Highway Department.

April 4, 1995

### III. Employment of Labor

#### 1. General

No person under the age of sixteen (16) years, and no one whose age or physical condition is such as to make his employment dangerous to his health or safety, or to the health and safety of others shall be employed on any project. This paragraph shall not be construed to deny the employment of older people or physically handicapped persons, otherwise employable, where such persons may be safely assigned to work which they can ably perform.

No person currently serving sentence to a penal or correction institution shall be employed on any project.

Except as specifically provided under this section, workers who are qualified by training or experience to be assigned to projects of this character shall not be discriminated against on any grounds whatsoever.

#### 2. Payrolls

Payrolls and basic records relating thereto will be maintained during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working on the site of the work.

The contractor's and subcontractor's payroll records shall be available for inspection by authorized representatives of the State Highway Department and authorized representatives of Federal Agencies.

The wages of labor shall be paid in legal tender of the United States, except that this condition will be considered satisfied if payment is made by a negotiable check, on a solvent bank, which may be cashed readily by the employee in the local community for the full amount, without discount or collection charges of any kind. Where checks are used for payment the contractor shall make all necessary arrangements for them to be cashed and shall give information regarding such arrangements.

No fee of any kind shall be asked or accepted by the contractor or any of his agents from any person as a condition of employment on the project.

No laborers shall be charged for any tools used in performing their respective duties except for reasonably avoidable loss or damage thereto.

Every employee on the work covered by this contract shall be permitted to lodge, board and trade where and with whom he elects and neither the contractor nor his agents, nor his employees shall directly or indirectly require as a condition of employment that an employee shall lodge, board or trade at a particular place or with a particular person.

No charge shall be made for any transportation furnished by the contractor or his agents to any person employed on the work.

April 4, 1995

No individual shall be employed as a laborer on this contract except on a wage basis, but this shall not be construed to prohibit the rental of teams, trucks or other equipment from individuals. No such rental agreement, or any charges for feed, gasoline, supplies, or repairs on account of such agreement, shall cause any deduction from the wages accruing to any employee except as authorized by the regulations hereinbefore cited.

#### **IV. Safety and Accident Prevention**

In the performance of this contract, the contractor shall comply with all applicable Federal, State and local laws governing safety, health and sanitation. The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions, on his own responsibility or as the contracting officer may determine, reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.

#### **V. Subletting or Assigning the Contract**

The contractor shall perform with his own organization contract work amounting to not less than 30 percent of the total contract amount except that any items designated in the contract as "Specialty Items" may be performed by subcontract and the amount of any such "Specialty Items" so performed may be deducted from the total contract amount before computing the amount of work required to be performed by the contractor with his own organization.

Any items that have been selected as "Specialty Items" for the contract are listed as such in the Special Provisions found elsewhere in the contract.

No portion of the contract shall be sublet, assigned, or otherwise disposed of except with the written consent of the contracting officer or his authorized representative. Requests for permission to sublet assign or otherwise dispose of any portion of the contract shall be in writing and accompanied by a showing that the organization which will perform the work is particularly experienced and equipped for such work. The contractor shall give assurance that the minimum wage for labor as stated in his proposal shall apply to labor performed on all work sublet, assigned or otherwise disposed of in any way. Consent to sublet, assign or otherwise dispose of any portion of the contract shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract.

April 4, 1995

**SPECIAL PROVISIONS  
FOR  
STATE  
PROJECT NO. STR-680-9(1192)**

**GENERAL CONDITIONS**

Bids for the work contemplated in this proposal form will be received at the office of the Nebraska Department of Roads in Room 104 of the Central Office Building at 1500 Highway 2 at Lincoln, Nebraska, on February 5, 2015, until 1:30 P.M.

- a. Bids submitted by mail should be addressed to the Nebraska Department of Roads, c/o Contract Lettings Section, P.O. Box 94759, Lincoln, NE 68509-4759.
- b. Bids submitted electronically over the internet, shall be submitted using [www.bidx.com](http://www.bidx.com).

The 2007 Edition of the Standard Specifications for Highway Construction, including all amendments and additions thereto effective at the date of the contract, are made a part of these Special Provisions, through reference.

The Required Provisions dated April 4, 1995, are attached to and are a part of this proposal form.

The attention of bidders is directed to the Required Provisions covering subletting or assigning the contract.

The proposal contains a statement that the contractor is complying with, and will continue to comply with, fair labor standards in the pursuit of his business and in the execution of the work contemplated in this proposal.

Fair labor standards shall be construed to mean such a scale of wages and conditions of employment as are paid and maintained by at least fifty per cent of the contractors in the same business or field of endeavor as the contractor filing this proposal.

GROUPS 1, 1A, 4, 6 OR 6A, 6B, 6C, 7, 8C, 9 AND 10 ARE TIED TOGETHER AND BIDDING PROPOSAL FORMS FOR THIS WORK WILL BE ISSUED AND A CONTRACT AWARDED TO A CONTRACTOR WHO IS QUALIFIED FOR BITUMINOUS OR BRIDGE.

GROUP 6A IS AN ALTERNATE FOR GROUP 6. BIDDERS ARE TO SUBMIT THEIR LOWEST BID ONLY.

**STATUS OF UTILITIES**

The following information is current as of December 2, 2014.

Aerial and/or underground utilities may exist within the limits of this project. The Contractor shall determine to their satisfaction the extent of occupancy of any utility facilities located within the project construction areas and the extent of conflict with the proposed work under this contract.

At this time, no utilities have been required to relocate their facilities.

Any utility adjustments or interruption of service for the convenience of the Contractor shall be the sole responsibility of the Contractor.

To arrange for utilities to locate and flag their underground facilities, contact The Diggers Hotline of Nebraska at 1-800-331-5666 or dial 811.

Any work necessary will be concurrent with construction.

### STATUS OF RIGHT OF WAY

The right of way for this project has been acquired and physical possession is held by the State of Nebraska and ready for the Contractor's use, except tracts listed below:

**Unacquired Right-of-Way Tracts as follows:**

Tract Number	Status of Tract	Hearing Date
None	None	None

**Right-of-Way Tracts with Pay Items:**

Tract Number	Pay Items
None	None

- No encroachments on the old right of way.
- Acquisition of right of way is not required for this project.

### SPECIAL PROSECUTION AND PROGRESS (Accommodation of Public Vehicular Traffic)

**I. Peak Hours**

Peak hours for southbound I-680 to westbound I-80 shall be from 6:00 a.m. to 10:00 p.m., Monday through Friday, and from 6:00 a.m. to 11:00 p.m. on Saturday and Sunday. During peak hours all southbound I-680 traffic lanes shall be open to traffic, except as noted in these plans and provisions. All other hours are non-peak.

Peak hours for southbound I-680 to eastbound I-80 shall be from 6:00 a.m. to 10:00 p.m., Monday through Friday, and from 6:00 a.m. to 11:00 p.m. on Saturday and Sunday, except as noted in these plans and provisions. During peak hours all southbound I-680 traffic lanes shall be open to traffic. All other hours are non-peak.

Westbound I-80 shall have peak hours from 6:00 a.m. to 10:00 p.m., Monday through Friday, and from 6:00 a.m. to 11:00 p.m. on Saturday and Sunday. During peak hours all westbound I-80 traffic lanes shall be open to traffic, except as noted in these plans and provisions. All other hours are non-peak.

The southbound Collector-Distributor roadway to Westbound I-80 shall have peak hours from 6:00 a.m. to 9:00 a.m. and 3:00 p.m. to 6:00 p.m., Monday through Friday. During peak hours all southbound Collector-Distributor roadway traffic lanes shall be open to traffic. All other hours are non-peak.

The West Center on-ramp to the southbound Collector-Distributor roadway shall have peak hours from 6:00 a.m. to 9:00 a.m. and 3:00 p.m. to 6:00 p.m., Monday through Friday. During peak hours the West Center on-ramp shall be open to traffic, except as noted in these provisions.

The southbound Collector-Distributor on-ramp to eastbound I-80 shall have peak hours from 6:00 a.m. to 9:00 a.m. and 3:00 p.m. to 6:00 p.m., Monday through Friday. During peak hours the southbound Collector-Distributor on-ramp shall be open to traffic, except as noted in these provisions.

## **II. Westbound I-80 Lane Closures**

The Contractor will be allowed to close a lane of westbound I-80 during non-peak hours to perform the following operations (see **Section VII Procedure for Westbound I-80 Non-Peak Lane Closures**):

1. For specific tasks requiring work immediately adjacent to the traveled lanes, which in the opinion of the Engineer, would constitute a hazard for the traveling public or the construction workers.
2. For the purpose of installing and removing temporary pavement marking.
3. For the purpose of installing and removing concrete protection barriers.
4. For the purpose of delivering material to the work site.

The Contractor will be allowed to close two of the four lanes on the westbound S080 44574L bridge (includes the two lanes from southbound I-680) for an extended period of time to perform the following operations (see **Section VIII Procedure for Westbound I-80 Lane Closures**):

1. Reconstruct pavement approaches and adjacent concrete pavement.
2. Reconstruct concrete barriers and guardrail.
3. Constructing asphalt deck overlay.
4. Installing and removing permanent pavement markings.
5. For the purpose of delivering material to the work site.



### **III. Westbound I-80 Closure**

The Contractor will be allowed to close all lanes of westbound I-80 across the S080 44606L Group 6B bridge and detour traffic to the westbound Collector-Distributor roadway during three weekends to perform the following operations (see **Section IX Procedure for Westbound I-80 Closures**):

1. Installing and removing permanent pavement markings.
2. Reconstruction work associated with the S080 44606L Group 6B bridge.
3. For the purpose of delivering material to the work site.

The inside lane of the three lanes for the northbound I-680 roadway shall be closed in conjunction with the westbound I-80 closure to be a contractor acceleration lane from the S080 46606L Group 6B work.

### **IV. Southbound I-680 to Eastbound I-80**

The Contractor will be allowed to close the inside lane of the southbound I-680 to eastbound I-80 direction during non-peak hours to perform the following operations (see **Section X Procedure for Southbound I-680 to Eastbound I-80 Lane Closures**):

1. For specific tasks requiring work immediately adjacent to the traveled lanes, which in the opinion of the Engineer, would constitute a hazard for the traveling public or the construction workers.
2. For the purpose of installing and removing concrete protection barriers.
3. For the purpose of delivering material to the work site.

### **V. Southbound I-680 to Westbound I-80**

The Contractor shall close the southbound I-680 to westbound I-80 direction, as well as the West Center on-ramp to Southbound Collector-Distributor roadway to traffic, and also close the Southbound Collector-Distributor on-ramp to Eastbound I-80 to traffic in order to perform the following operations (see **Section XI Procedure for Southbound I-680 to Westbound I-80, West Center on-ramp to Southbound Collector-Distributor roadway, and Southbound Collector-Distributor on-ramp to Eastbound I-80 Closures**):

1. Installing and removing permanent pavement markings.
2. Reconstruction work associated with the S680 00017L bridge.
3. For the purpose of delivering material to the work site.

**VI. Southbound Collector-Distributor roadway to Westbound I-80**

The Contractor will be allowed to shift traffic to perform the following operations (see **Section XII Procedure for Southbound Collector-Distributor roadway to Westbound I-80 Temporary Striping**):

1. Install and remove temporary or permanent pavement markings.

**VII. Procedure for Westbound I-80 Non-Peak Lane Closures**

The Contractor shall notify the Engineer in writing of each specific lane closure. Each notification shall describe the work occurring and the approximate time needed for the closure.

The Contractor is required to have a work crew on the site at all times during a non-peak hour lane closure.

A lane closure will not be permitted during inclement weather conditions or during periods of time that atmospheric conditions may constitute a hazard to the traveling public, as determined by the Engineer.

Lane closures for emergency service situations will not be assessed liquidated damages for either peak or non-peak hours.

In cases where multiple liquidated damage charges can be assessed for violations of peak or non-peak hour lane closure requirements, the highest single lane closure assessment charge will be assessed. The closure assessments described in this proposal will be in addition to other liquidated damage assessments described elsewhere in the contract.

**VIII. Procedure for Westbound I-80 Lane Closures**

The Contractor shall notify the Engineer two weeks prior to a westbound I-80 lane closure and prior to all subsequent westbound I-80 lane closures within the project.

The Contractor will coordinate the westbound I-80 lane closures to occur simultaneously between the I-80 bridges, Groups 6B and 6/6A. The Group 6C bridge shall be completed before allowing the southbound I-680 traffic to access westbound I-80.

**IX. Procedure for Westbound I-80 Closures**

The Contractor shall notify the Engineer and the City of Omaha a minimum of two weeks prior to each weekend closing of the westbound S080 44606L bridge and detouring traffic to the westbound collector-distributor roadway. A notification shall again occur 48 hours before the actual closing. If the 48-hour time period falls on a holiday, the notification shall be given 72 hours prior to the actual closing. The Contractor shall contact Public Works Department, City of Omaha, at (402) 444-5950.

These closures shall begin only occur on weekends from Friday at 10:00 p.m. and reopen the following Monday morning at 6:00 a.m. to resume normal operations. A maximum of three weekend closures will be allowed to perform the work.

**X. Procedure for Southbound I-680 to Eastbound I-80 Lane Closures**

The Contractor shall notify the Engineer in writing of each specific lane closure. Each notification shall describe the work occurring and the approximate time needed for the closure.

The Contractor is required to have a work crew on the site at all times during a non-peak hour lane closure.

A lane closure will not be permitted during inclement weather conditions or during periods of time that atmospheric conditions may constitute a hazard to the traveling public, as determined by the Engineer.

Lane closures for emergency service situations will not be assessed liquidated damages for either peak or non-peak hours.

In cases where multiple liquidated damage charges can be assessed for violations of peak or non-peak hour lane closure requirements, the highest single lane closure assessment charge will be assessed. The closure assessments described in this proposal will be in addition to other liquidated damage assessments described elsewhere in the contract.

**XI. Procedure for Southbound I-680 to Westbound I-80, West Center on-ramp to Southbound Collector-Distributor roadway and Southbound Collector-Distributor on-ramp to Eastbound I-80 Closures**

The Contractor shall notify the Engineer and the City of Omaha a minimum of two weeks prior to the closing the southbound I-680 to westbound I-80 roadway, West Center on-ramp to the southbound collector-distributor roadway, and the southbound Collector-Distributor on-ramp to eastbound I-80 roadway. A notification shall again occur 48 hours before the actual closing. If the 48-hour time period falls on a weekend or a holiday, the notification shall be given 72 hours prior to the actual closing. The Contractor shall contact Public Works Department, City of Omaha, at (402) 444-5950.

These closures shall not reopen until westbound I-80 traffic is resuming normal operations.

**XII. Procedure for Southbound Collector-Distributor roadway to Westbound I-80 Temporary Striping**

The existing Southbound Collector-Distributor roadway to westbound I-80 is a multi-lane roadway, except for two separate sections which narrow to a single 16-foot wide ramp with a 4-foot inside shoulder and an 8-foot outside shoulder. Traffic will be shifted to the inside shoulder to allow temporary striping to be constructed which provides a minimum of two lanes through the entire Collector-Distributor ramp. Traffic will also be shifted to the inside shoulder at the end of the project to remove temporary striping and place permanent striping.

The Contractor shall notify the Engineer in writing of each specific lane shift. Each notification shall describe the work occurring and the approximate time needed for the traffic shifts.

## **SPECIAL PROSECUTION AND PROGRESS (Phasing)**

### **I. General**

Phasing, temporary pavement geometrics and pavement marking alignments required for the performance of work are included in the plans. Any modification of these phasing sequences, geometrics or alignments shall require written approval of the NDOR Traffic Engineer, the Roadway Design, and the Project Engineer. Prior to opening a modified phasing sequence to traffic, the NDOR Traffic Engineer and the Roadway Design Division shall be notified.

The Contractor shall be required to have all construction work, including guardrail, completed and have all I-680 and I-80 lanes and ramps open to traffic completed by **Saturday, August 29, 2015**.

### **II. Phasing Overview**

**Phase 1** is the work associated with the S080 46606L Group 6B westbound I-80 bridge. The Contractor will not be allowed to perform any work in other areas which will impact traffic operations associated with this bridge, unless noted elsewhere in this provision. Prior to any work commencing on S080 44606L, the Contractor will perform the striping changes to the ILQ Collector-Distributor ramp to westbound I-80, just north of the L Street Interchange as shown in Phase 1A. The Contractor shall perform the S080 46606L Group 6B bridge work in Phase 1B with all Phases 1A and 1B work to be completed and open to normal traffic by **Wednesday, June 10, 2015**, in order to avoid conflict with the College World Series. During Phase 1 Group 6B bridge construction, the Group 6/6A and the Group 6C bridges shall be open to normal traffic.

The Contractor shall be allowed 3 weekend closures to perform the Phase 1B work and these closures shall only occur from Friday at 10:00 p.m. to the following Monday morning at 6:00 a.m. when I-80 will resume normal operations on the mainline roadway. The Contractor shall be responsible to schedule these weekend closures taking into account weather forecasts for those weekends considered.

If the Contractor finishes the Phase 1B work prior to June 10, 2015, date, the Contractor may immediately begin work on the Group 6/6A and the Group 6C bridges.

**NOTE:** The Contractor shall also begin the work on the southbound I-680 to eastbound I-80 inside foreslope (under the Group 6B I-80 westbound and eastbound structures) to construct interlocking blocks and MSE wall barrier during the Phases 1A and 1B; and this work shall be completed by **Friday, June 19, 2015**. When placing the concrete protection barriers along the inside of the SB I-680 to EB I-80 ramp, the Contractor shall place the concrete protection barriers just off of the inside surfaced shoulder of the ramp; so as not to interfere Project HSIP-680-9(34).

**Phase 2** represents the preparatory work associated with striping changes & barrier placement for Phase 3 construction of the S080 44574L Group 6/6A westbound I-80 bridge. The Contractor will also perform the striping changes to the ILQ Collector-Distributor ramp to westbound I-80 at the West Center Interchange, as shown in the plans. The southbound S680 00017L Group 6C I-680 to westbound I-80 bridge cannot be closed to traffic until the Group 6B bridge work is completed and open to normal traffic.

**Phase 3** represents the construction of the S680 00017L Group 6C southbound I-680 to westbound I-80 bridge (including MSE wall and pavement work) and the construction of the outside portion of the S080 44574L Group 6/6A westbound I-80 bridge (referred to as P-I in Special Plan No. 1). The construction of the Groups 6/6A and 6C bridges are to be performed concurrently. The Group 6C bridge cannot be opened to traffic until Phase 3 and Phase 4 of the Group 6/6A bridge is complete and open to normal traffic.

**Phase 4** represents the inside construction of the S080 44574L westbound I-80 bridge (referred to as P-II in Special Plan No. 1).

**Phase 5** represents the removal of temporary striping and placement of permanent striping on the ILQ Collector-Distributor ramp to westbound I-80.

### III. Phase Descriptions

#### A. Phase 1A

##### Westbound I-80

The Contractor shall perform the necessary striping duties to the Collector-Distributor roadway under the L Street Bridge. See **SPECIAL PROSECUTION AND PROGRESS (Accommodation of Public Vehicular Traffic) Section XII Procedure for Southbound Collector-Distributor roadway to Westbound I-80 Temporary Striping.**

##### Southbound I-680 to Eastbound I-80

The Contractor may begin the work on the southbound I-680 to eastbound I-80 inside foreslope (under the Group 6B I-80 westbound and eastbound structures) to construct interlocking blocks and MSE wall barrier at any time within the project. See **SPECIAL PROSECUTION AND PROGRESS (Accommodation of Public Vehicular Traffic) Section IV Southbound I-680 to Eastbound I-80.**

#### B. Phase 1B

##### Westbound I-80

The Contractor will detour westbound I-80 traffic to the Collector-Distributor roadway with a maximum of three weekend closures to perform the approach work and asphalt overlay to the S080 46606L Group 6B westbound I-80 bridge. See **SPECIAL PROSECUTION AND PROGRESS (Accommodation of Public Vehicular Traffic) Section II Westbound I-80 Lane Closures.**

To and from east side of S080 44606L:

The Contractor's equipment shall enter the work area from the westbound Interstate lane closures and can exit the work area by entering northbound I-680 via an inside lane closure.

To and from west side of S080 44606L:

The Contractor's equipment shall not enter the work area by exiting southbound I-680 and accessing the I-80 work area. Contractor's equipment may exit the work area and enter westbound I-80.

**C. Phase 2**

Southbound I-680

Prior to the Contractor working on the southbound I-680 to westbound I-80 bridge, the Contractor shall complete the following:

1 - Restripe the ILQ Collector-Distributor roadway to westbound I-80 as shown in the plans at the West Center Interchange. See **SPECIAL PROSECUTION AND PROGRESS (Accommodation of Public Vehicular Traffic) Section XII Procedure for Southbound Collector-Distributor roadway to Westbound I-80 Temporary Striping.**

2 - Then close the West Center on-ramp to the southbound Collector-Distributor roadway, southbound Collector-Distributor on-ramp to eastbound I-80, and the southbound I-680 to westbound I-80 roadway. Southbound I-680 traffic shall be detoured to the southbound Collector-Distributor roadway. See **SPECIAL PROSECUTION AND PROGRESS (Accommodation of Public Vehicular Traffic) Section XI Procedure for Southbound I-680 to Westbound I-80, West Center on-ramp to Southbound Collector-Distributor roadway, and Southbound Collector-Distributor on-ramp to Eastbound I-80 Closures.**

**D. Phase 3**

Southbound I-680

The Contractor has options to construct southbound I-680 approaches which provide access for construction equipment:

1 - Construct each approach in phases to allow construction traffic to exit the guardrail median break near Station 5510+00.

2 - Construct the approaches in a manner which allows construction traffic to exit either through the guardrail break near station 5510+00 or by driving down the embankment south of the bridge to via the closed on-ramp to eastbound I-80.

From southbound I-680:

The Contractor's equipment shall enter the work area by using the outside southbound I-680 lane, which will be closed to the public.

To eastbound I-80:

The Contractor's equipment shall access the closed ILQ Collector-Distributor on-ramp to eastbound I-80 by either driving through a break in the median guardrail

near station 5510+00, north of the southbound I-680 bridge work, or by driving down the embankment south of the bridge.

To westbound I-80:

No Contractor equipment will be allowed to directly enter westbound I-80 from the southbound I-680 work zone.

Westbound I-80

The Contractor will shift two lanes of traffic to the inside of the S080 44574L westbound I-80 bridge Group 6/6A and then construct the outside portion of the bridge. See **SPECIAL PROSECUTION AND PROGRESS (Accommodation of Public Vehicular Traffic) Section II Westbound I-80 Lane Closures.**

To and from westbound I-80:

The Contractor's equipment shall enter or leave work areas from the Interstate traffic lanes with adequate deceleration and acceleration length.

**E. Phase 4**

Westbound I-80

The Contractor shall begin the second phase of pavement construction to the westbound S080 44574L bridge Group 6/6A. See **SPECIAL PROSECUTION AND PROGRESS (Accommodation of Public Vehicular Traffic) Section II Procedure for Westbound I-80 Lane Closures.**

Until the Contractor completes the construction to both westbound I-80 bridges, the southbound I-680 to westbound I-80 traffic will remain on the ILQ Collector-Distributor ramp to westbound I-80.

To and from westbound I-80:

The Contractor's equipment shall enter or leave work areas from the Interstate traffic lanes with adequate deceleration and acceleration length.

**F. Phase 5**

The Contractor shall remove the temporary striping and place permanent striping on the ILQ Collector-Distributor ramp to westbound I-80. See **SPECIAL PROSECUTION AND PROGRESS (Accommodation of Public Vehicular Traffic) Section XII Procedure for ILQ Collector-Distributor roadway to Westbound I-80 Temporary Striping.**

**SPECIAL PROSECUTION AND PROGRESS  
(Internal Liquidated Damage)**

The Contractor's failure to have westbound I-80 traffic returned to the mainline roadway by 6:00 a.m. Monday morning of any of the of the three weekend closure periods, as described elsewhere in the proposal, shall result in the assessment of a \$1,735 per peak hour internal liquidated damage assessment. This assessment shall begin at 6:00 a.m. and shall continue per hour until, and including, the hour that I-80 WB traffic is returned to the mainline roadway. This internal liquidated damage assessment has not been provided for in the contract and shall

be in addition to other liquidated damages which are part of the contract. The following formula was used to determine this assessment:

$$\begin{aligned} \text{Cost} &= [(1-\%T)(VPPH)(\$ \text{ Pass}) + (\%T)(VPPH)(\$ \text{ Trucks})] \times D \\ &= [(1-0.14)(2,228)(\$0.23) + (0.14)(2,228)(\$0.44)] \times 3.00 \\ &= [\$440.70 + \$137.24] \times 3.0 \\ &= \$1,733.83 \rightarrow \text{Rounded to } \$1,735 \text{ per peak hour} \end{aligned}$$

Where: %T = percent trucks  
 VPPH = vehicles per peak hour  
 \$ Pass = passenger car factor = \$0.23  
 \$ Trucks = truck factor = \$0.44  
 D = delay (in minutes)

If not due to weather and due to the Contractor's inability to complete the Group 6B work in the three permitted weekends, the Contractor will be granted an additional weekend(s) as needed to complete the Group 6B work prior to the June 10, 2015, completion date for Group 6B. For each additional weekend beyond the three permitted, the Contractor will be assessed a \$40,400 internal liquidated damage assessment. This internal liquidated damage assessment has not been provided for in the contract and shall be in addition to other liquidated damages which are part of the contract. The following formula was used to determine this assessment:

$$\begin{aligned} \text{Cost} &= [(1-\%T)(ADT)(\$ \text{ Pass}) + (\%T)(ADT)(\$ \text{ Trucks})] \times D \\ &= [(1-0.14)(22,280)(\$0.23) + (0.14)(22,280)(\$0.44)] \times 3.00 \times 2.33| \\ &\quad \text{days/weekend} \\ &= [\$4,406.98 + \$1,372.45] \times 3.0 \times 2.33 \text{ days/weekend} \\ &= \$40,398.22 \rightarrow \text{Rounded to } \$40,400 \text{ per additional weekend} \end{aligned}$$

Where: %T = percent trucks  
 ADT = average daily traffic  
 \$ Pass = passenger car factor = \$0.23  
 \$ Trucks = truck factor = \$0.44  
 D = delay (in minutes)

It should be noted that if an additional weekend(s) is required, then both internal liquidated damage assessment (\$1,735/peak hour and \$40,400/additional weekend) shall be applicable for each occurrence.

### **SPECIAL PROSECUTION AND PROGRESS (Coordination with Others)**

The Contractor for project STR-680-9(1192) shall be required to coordinate construction and signing activities with the Contractor's for the following projects:

1. Project IM-80-9(66), CN 22527 1, N-50 to 50<sup>th</sup> Street, Omaha. This project was let to contract in the November 13, 2014, letting and it consists of concrete pavement repair, diamond grinding and crack sealing. The tentative start date for this project is April 13, 2015.



2. Project HSIP-680-9(34), CN22596, SB I-680 to EB I-80 Ramp. This project is scheduled to be let to contract in the December 18, 2014, letting and it consists the placement of a high friction surface treatment on the SB I-680 to EB I-80 Ramp. This ramp is directly under Group 6B S080 44606L Bridge and it is also adjacent to the portion of the STR-680-9(1192) that constructs the barrier wall and interlocking blocks adjacent to an MSE Wall. All work associated with HSIP-680-9(34) will be performed during nighttime non-peak hours. The Tentative Start Date for this project is July 6, 2015.

## ENVIRONMENTAL COMMITMENT

Control No.: 22555

Project No.: ST R-680-9(1192)

Project Name: SB I-680 to WB I-80 Bridge, Omaha

Below are the Conservation Conditions that will be required for this project. All conditions and regulations of any permit obtained for this project will be followed by the Contractor.

### (Responsible Party for the measure is found in parentheses)

The Contractor shall not stage, store, waste or stockpile materials and equipment in undisturbed locations, or in known/potential wetlands and/or known/potential streams that exhibit a clear "bed and Bank" channel. Potential wetland areas consist of any area that is known to pond water, swampy areas or areas supporting known wetland vegetation or areas where there is a distinct difference in vegetation (at lower elevations) from the surrounding upland areas.  
(Contractor, NDOR District)

Contact Person: Justin Williams, Highway Environmental Biologist, (402) 479-3812

### General Conservation Conditions for All Projects

- **Changes in Project Scope.** If there is a change in the project scope, the project limits, or environmental commitments, the NDOR Environmental Section must be contacted to evaluate potential impacts prior to implementation. Environmental commitments are not subject to change without prior written approval from the NDOR Environmental Section. (District Construction, Contractor)
- **Threatened and Endangered Species.** The Contractor shall reference the AGC Endangered Species Guide or the Nebraska Game and Parks Commission website for a reference of federal and state listed species that may occur in the project vicinity prior to starting project construction. These guidance documents can be found at:
  - [http://www.agcne.org/services/es\\_guide.htm](http://www.agcne.org/services/es_guide.htm)
  - [http://outdoornebraska.ne.gov/wildlife/programs/nongame/Endangered\\_Threatened.asp](http://outdoornebraska.ne.gov/wildlife/programs/nongame/Endangered_Threatened.asp)

If federal or state listed species are observed during construction, stop work and contact the NDOR Environmental Section to determine action required prior to resuming work. (NDOR Environmental, District Construction, Contractor)

- **Refueling.** Refueling will be conducted within the confines of the paved roadway surface or within the boundaries of an approved stockpile/staging site. (Contractor)
- **Restricted Activities.** The following project activities shall, to the extent possible, be restricted to between the beginning and ending points of the project, within the right-of-way designated on the project plans.
  - Borrow sites
  - Construction debris waste disposal areas
  - Asphalt plants
  - Haul roads
  - Stockpiling areas
  - Staging areas
  - Material storage sites

Any project related activities that occur outside of the project limits (includes the paved surface and within 12 inches of the paved surface) must be environmentally cleared/permitted with the Nebraska Game and Parks Commission as well as any other appropriate agencies by the Contractor and those clearances/permits shall be submitted to the District Construction Project Manager prior to the start of the above listed project activities. The Contractor shall submit a NDOR Plant Site/Stockpile Site Request Identification and Evaluation Form (DR Form 56) and/or a Borrow Site/Waste Site Request Identification and Evaluation Form (DR Form 119) as appropriate, and include information such as an aerial photo showing the proposed activity site, a plan-sheet or drawing showing the location and dimensions of the activity site, ground photos showing the existing conditions at the proposed activity site, etc. The Contractor must receive Notice of Acceptance from NDOR, prior to starting the above listed project activities. These project activities cannot adversely affect state and/or federally listed species or designated critical habitat. Fill cannot be placed in Wetland, Stream or other Waters of the U.S. without authorization. (NDOR Environmental, District Construction, Contractor)

- **Waste/Debris.** Construction waste/debris will be disposed of in areas or a manner which will not adversely affect state and/or federally listed species and/or designated critical habitat. (Contractor)

Contact Person: Melissa Marinovich, Highway Environmental Biologist, (402) 479-3546

### **Encountering Unexpected Waste**

If contaminated soils and/or water or hazardous materials are encountered, then all work within the immediate area of the discovered hazardous material shall stop until NDOR/FHWA is notified and a plan to dispose of the Hazardous Materials has been developed. Then NDEQ shall be consulted and a remediation plan shall be developed for this project. The potential exists to have contaminants present resulting from minor spillage during fueling and service associated with construction equipment. Should contamination be found on the project during construction, the NDEQ shall be contacted for consultation and appropriate actions to be taken. The Contractor is required by NDOR's Standard Specification Section 107 (Legal Relations and Responsibilities to the Public) to handle and dispose of contaminated material in accordance with applicable laws. (Contractor)

## **Lead Based Paint**

There is potential for lead based paint to be found on the bridge structure S680 0017L. If lead-based paint is being removed in a manner that would create waste debris (i.e., sandblasting, abrasive removal, scraping), the Contractor shall remove the paint in accordance with NDOR's Standard Specification for Highway Construction Section 732 (Lead-based Paint Removal) and Title 128, Rules and Regulation Governing Hazardous Waste Management in Nebraska. The Contractor's implementation plan efforts shall be documented in ECOD. (Contractor)

Contact Person: Danielle Moore, Highway Environmental Biologist, (402) 479-3547

## **SPECIAL PROSECUTION AND PROGRESS (Migratory Birds) (A-42-1112)**

The Department of Roads will, to the extent practicable, schedule the letting of projects such that clearing and grubbing can occur outside of the primary nesting season in Nebraska which has been determined to generally occur between April 1 and September 1. Work on structures, such as but not limited to bridges and culverts, should occur outside the primary swallow nesting season, April 15 to September 30, unless approved methods of avoiding nesting have been taken on the bridge and/or culvert structures. The nesting dates above are a guide only, nesting can occur outside of those dates. Work outside of those dates is not exempt from compliance with the Migratory Bird Treaty Act.

The Contractor shall, to the extent possible, schedule work on structures, such as but not limited to bridges and culverts, and clearing and grubbing activities to occur outside the primary nesting season in Nebraska. However, if circumstances dictate that project construction or demolition must be done when nesting migratory birds may be present, a survey of the number of active nests and species of birds shall be conducted by qualified personnel representing the Contractor, and assisted by the Project Manager (PM), NDOR Environmental Section staff, or the United States Department of Agriculture (USDA) Animal and Plant Health Inspection Service (APHIS) - Wildlife Services Office. If the survey finds that nests will be impacted by the proposed construction, the Contractor may be responsible for delays.

The following guidance is provided for compliance with the Migratory Bird Treaty Act for construction of NDOR projects:

1. The Contractor shall submit a plan to the NDOR regarding how he intends to accomplish bridge demolition or clearing and grubbing of the project to avoid conflict with nesting migratory birds.
2. The Contractor must submit a temporary erosion control plan tailored to fit the plan for clearing and grubbing.
3. If construction operations result in unavoidable conflict with nesting migratory bird's eggs or young, which will result in "taking" nests and their contents, the Contractor should notify the NDOR Project Manager (PM). The PM shall notify the Environmental Section of Planning and Project Development by telephone at 402-479-4766.

4. The NDOR Environmental Section will then determine if assistance in conducting the survey will be provided by the NDOR Environmental Section (if available) or from the USDA APHIS - Wildlife Services Office and arrange for assistance with the survey of nest numbers, bird species, etc. Results of the survey shall be maintained by the NDOR until project completion.
5. If the nesting survey is required, and the project was awarded prior to the nesting season, and the Contractor did not accomplish clearing/grubbing and/or work on bridge/culvert structures outside the nesting season, the Contractor will reimburse the Department of Roads for each survey required at \$1,000 per survey. If the project was awarded during the nesting season, and construction activities are such that clearing/grubbing and/or work on bridge/culvert structures must be accomplished prior to any other activity on the project, then there will be no charge assessed for the initial survey. The Contractor is responsible for removing all trees surveyed, that do not contain active nests, and for taking appropriate measures on bridge/culvert structures, within 3 days of the survey. Reimbursement for additional surveys may be charged if the Contractor fails to remove the trees within 3 days of the survey, and requires an additional survey. Survey reimbursement will be determined on a project specific basis, considering the project timeline and associated activities.
6. If an active nest is found during the survey, the Contractor should do everything possible to restructure his activities and leave the nest undisturbed until the young fledge. Fledging could occur within a week, or up to a month, after the survey depending on the species of bird and whether the nest contained eggs or young. Also depending on the species of bird and their sensitivity to disturbance, a buffer of up to 30 feet surrounding the tree with the active nest could be required.
7. If construction cannot be rescheduled to allow the birds to fledge, and it is determined as an unavoidable "take" circumstance, the Contractor shall stop all work within 30 feet of the active nest and coordinate with the Construction Project Manager to determine how to proceed. The Construction Project Manager will then coordinate with the NDOR Environmental Section and they will facilitate coordination with the US Fish and Wildlife Service and the Federal Highway Administration (for projects using Federal-aid) to determine the appropriate way to address the active nest. No work shall occur within 30 feet of the active nest until US Fish and Wildlife Service coordination is complete and the requirements of the Migratory Bird Treaty Act are satisfied.
8. It is the Contractor's responsibility to schedule his work to accommodate the process of conducting a survey(s) and submitting the necessary documentation if avoidance is not practicable. The Contractor shall be responsible for using any legal and practical method to prevent the nesting of birds in order to prevent the need for any survey and prevent the need for additional surveys. It is understood and agreed that the Contractor has considered in the bid all of the pertinent requirements concerning migratory birds (including endangered species) and that no additional compensation, other than time extensions if warranted, will be allowed for any delays or inconvenience resulting in these requirements.

**STORM WATER DISCHARGES  
(A-43-0408)**

In compliance with the Federal Water Pollution Control Act, authorization to discharge storm water on this project has been granted under National Pollutant Discharge Elimination System (NPDES) General NPDES Permit Number NER110000 for Storm Water Discharges from Construction Sites to Waters of the State of Nebraska. This permit became effective on January 1, 2008.

Contractors are advised that, under the Construction Storm Water General Permit, ***plant sites, camp sites, storage sites, and borrow or waste sites not shown on the plans may be subject to separate NPDES permit authorization requirements for stormwater discharges from those locations.*** Contractors shall be responsible for verifying the need for NPDES permit coverage with the Nebraska Department of Environmental Quality (NDEQ). When required for these locations, the filing of a "Notice of Intent" shall be made by the Contractor directly to the NDEQ.

Additionally, asphalt (SIC Code 2951) or concrete (SIC Code 3273) batch plants that are owned by a private contractor and are operated on a contract-for-service basis to perform work for the Contractor completing the project may be subject to NPDES General Permit Number NER000000 for Industrial Storm Water Discharges. While the plant may be required for completion of the project, it is not under the control of the Department (or other project owner); and the filing of a "Notice of Intent" shall be made by the Contractor directly to the NDEQ.

The NDEQ may be contacted at 402-471-4220 for additional information.

**REQUIRED SUBCONTRACTOR/SUPPLIER QUOTATIONS LIST  
(A-43-0307)**

All bidders must provide to the NDOR the identity of all firms who provided quotations on all projects, including both DBEs and non-DBEs. This information must be on a form provided by the NDOR Contracts Office.

If no quotations were received, the bidder must indicate this in the space provided.

Each bidder will be required to submit one list per letting to cover all projects bid.

**PROPOSAL GUARANTY BID BOND  
(A-43-0307)**

Paragraphs 1.a. and 1.b. of Subsection 102.15 in the *Standard Specifications* are void and superseded by the following:

- a. OPTION 1 - (Project Specific Paper Bid Bond). The Bid Bond shall be executed on an original Department Bid Bond Form, which may be obtained from the Department. The original Bid Bond shall be delivered to the Department with the bid. A reproduction or a copy of the original form will not be accepted and will cause the bid not to be opened and read.

- b. OPTION 2 - (Annual Bid Bond). The Department at its discretion may allow a bidder to place an "Annual Bid Bond" on file with the Department. This bond would cover all projects the bidder bids for a 12-month period shown in the bond. The bidder must indicate in the bid submittal to the Department that their "Annual Bid Bond" applies to the submitted bid. The original Annual Bid Bond shall be executed on the Department of Roads Bid Bond Form, which may be obtained from the Department. A reproduction or a copy of the original form will not be accepted.

### **WORKER VISIBILITY (A-43-0507)**

Pursuant to Part 634, Title 23, Code of Federal Regulations, the following modified rule is being implemented:

Effective on January 1, 2008, all workers within the right-of-way who are exposed either to traffic (vehicles using the highway for purposes of travel) or to construction equipment within the work area shall wear high-visibility safety apparel.

High-visibility safety apparel is defined to mean personal protective safety clothing that:

- 1 - is intended to provide conspicuity during both daytime and nighttime usage, and
- 2 - meets the Performance Class 2 or Class 3 requirements of the ANSI/ISEA 107-2004 publication titled "American National Standards for High-Visibility Safety Apparel and Headwear."

### **VALUE ENGINEERING PROPOSALS (VEP) (A-43-0807)**

Subsection 104.03 in the *Standard Specifications* is amended to include the following:

14. A VEP will not be accepted if the proposal is prepared by an Engineer or the Engineering Firm who designed the contract plans.

### **LEGAL RELATIONS AND RESPONSIBILITY TO THE PUBLIC (A-43-0210)**

Paragraph 4.a. of Subsection 107.01 in the *Standard Specifications* is void and superseded by the following:

4. a. Whenever the Contractor violates any governing Federal, State or Local environmental quality regulation and/or is in noncompliance with any environmental commitment, the violating activity must cease immediately until the appropriate remedy can be determined by: the Engineer, the NDOR

Environmental Section, the Federal Highway Administration (for projects utilizing Federal-aid) and other agencies, as deemed appropriate. The Engineer, with assistance from the NDOR Environmental Section and the FHWA, will provide a written order confirming the appropriate corrective action to the Contractor. Work can resume to normal conditions once the Engineer determines that the violation or non-compliance has been addressed in accordance with the order for corrective action.

Subsection 107.01 in the *Standard Specifications* is amended to include the following two paragraphs:

5. Should the Contractor encounter any previously unidentified hazardous materials, the Engineer shall be promptly notified. The Contractor shall suspend operations in the area involved until such time that arrangements are made for their proper treatment or removal.
6. The Contractor shall prevent the transfer of invasive plant and animal species. The Contractor shall wash equipment at the Contractor's storage facility prior to entering the construction site. The Contractor shall inspect all construction equipment and remove all attached vegetation and animals prior to leaving the construction site.

**SPECIAL PROSECUTION AND PROGRESS  
(Federal Immigration Verification System)  
(A-43-1209)**

The Contractor shall register with and use a Federal Immigration Verification System to determine the work eligibility status of newly hired employees physically performing services within the State of Nebraska. The Prime Contractor shall contractually require every subcontractor to register with and use a Federal Immigration Verification System to determine the work eligibility status of newly hired employees physically performing services within the State of Nebraska.

The Federal Immigration Verification System shall be an electronic verification of the work authorization program of the Illegal Immigration Reform and Immigration Responsibility Act of 1996, 8 U.S.C. 1324a, known as the E-Verify Program. The Contractor may use an equivalent Federal program designated by the United States Department of Homeland Security or other Federal agency authorized to verify the work eligibility status of a newly hired employee. The equivalent program shall comply with the Immigration Reform and Control Act of 1986.

The Prime Contractor shall furnish a letter to the NDOR Construction Division in Lincoln on company letterhead and signed by an officer of the company stating that documentation is on file certifying that the Contractor and all subcontractors have registered with and used a Federal Immigration Verification System. The Contractor shall maintain all records of registration and use for a period of three years and make records available upon request. The Contractor shall contractually require subcontractors to maintain all records for a period of three years and make records available upon request.

Payment will not be made to the Contractor for using the Federal Immigration Verification System or the maintenance of the records. This work shall be subsidiary to the work being performed.

The Contractor's Certification shall become part of the final records of the Contract. The Department considers this document to have direct bearing to the beginning interest date and may affect the amount of interest earned.

### **CONTRACT TIME ALLOWANCE (A-43-0911)**

Paragraph 5. of Subsection 108.02 of the *Standard Specifications* is void and superseded by the following:

5. Each week, the Engineer shall post on the Department's website a report of working days or calendar days charged. The Contractor then has 14 days from the day the Engineer's report is posted to provide a written explanation of why he/she does not concur with the working days or calendar days as assessed.

Paragraph 6.b. of Subsection 108.02 of the *Standard Specifications* is amended to include the following:

- (4) If the time allowance for the contract has been established on a calendar day basis, the Contractor is expected to schedule the work and assign whatever resources are necessary to complete the work in the time allowance provided regardless of the weather. Accordingly, regardless of anything to the contrary contained in these *Specifications*, the Department will not consider delays caused by inclement or unseasonable weather as justification for an extension of the contract time allowance unless:
  - i. the weather phenomena alleged to have contributed to or caused the delay is of such magnitude that it results in the Governor issuing a Disaster Declaration, **and**
  - ii. the weather phenomena alleged to have contributed to or caused the delay can clearly be shown to have directly impacted the work on the critical path identified on the Contractor's schedule.

Paragraphs 10.b. and 10.c. of Subsection 108.02 of the *Standard Specifications* are void and superseded by the following:

- b.
  - (1) If the extra work is not in the original contract, time extensions will be granted by determining the actual time necessary to accomplish the extra work.
  - (2) If the extra work is the result of the addition of additional quantities of existing contract items, time extensions will be granted by either:
    - (i) determining the actual time necessary to accomplish the extra work; or



- (ii) determining the additional time to be granted by comparing the value of the additional quantities of work to the total amount of the original contract when measurement of the actual additional time is not possible or practical.
- (3) In either case, only the time necessary to perform the extra work of the additional quantities of existing contract items when the extra work or the additional quantities of existing contract items are deemed to be the current controlling operation will be granted as a time extension.
- c. Increases in quantities of work associated with traffic control items measured by the day will not be considered for extending the contract time allowance. Overruns of traffic control items that are measured by methods other than time may be considered for extending the contract time allowance, but they must be deemed to be a controlling operation when the overrun of quantities occurs.

**PARTIAL PAYMENT  
(A-43-1110)**

Paragraph 2. of Subsection 109.07 of the *Standard Specifications* is void and superseded by the following:

- 2. When the value of the work completed during a semi-monthly period exceeds \$10,000, the Contractor will receive semi-monthly progress estimates from which the Department shall make such retentions as may be allowed by the contract, provided that the nature and quality of the completed work are satisfactory and provided further that the progress of the work conforms to the requirements of Subsection 108.07.

Paragraph 3.b. of Subsection 109.07 of the *Standard Specifications* is void and superseded by the following:

- b. Under normal circumstances, the Department shall not retain any earnings on a progress estimate. However, the Department reserves the right to retain such amounts as are necessary for material deficiencies, anticipated liquidated damages, unpaid borrow, and for other reasons to protect the Department's interests.

**PARTIAL PAYMENT  
(A-43-0611)**

Paragraph 4. of Subsection 109.07 of the *Standard Specifications* is void and superseded by the following:

4. a. (1) Upon presentation by the Contractor of receipted bills, billing invoices, or such other documentation sufficient to satisfy the Engineer and verify the Contractor's or subcontractor's actual costs for the materials, payments may also be allowed for acceptable nonperishable materials purchased expressly to be incorporated into the work and delivered in the vicinity of the project or stored in acceptable storage places within Nebraska.
- (2) Materials not delivered and stored in the immediate vicinity of or on the actual project site must be clearly marked to identify the project on which they are to be used, must be segregated from similar materials at the storage site, and cannot be included in a supplier's inventory of material available for sale for other purposes.
- (3) All items eligible for partial payment as stored materials must be available for verification, sampling, and measurement.
- b. The amount to be included in the payment will be determined by the Engineer, but in no case shall it exceed 100 percent of the value of the materials documented. This value may not exceed the appropriate portion of the value of the contract item or items in which such materials are to be incorporated, nor shall the quantity in any case exceed the total estimated quantity required to complete the project.
- c. Payment will not be approved when the documented value of such materials amounts to less than \$1,000.00, when the progress of the work is not in accordance with the requirements set forth in Subsection 108.07, or when the material can reasonably be expected to be incorporated into the work and eligible for payment as completed work on a progress estimate within 15 days of being placed into storage.
- d. Deductions at rates and in amounts which are equal to the payments will be made from estimates as the materials are incorporated into the work.
- e. Payment for the materials shall not in itself constitute acceptance, and any materials which do not conform to the specifications shall be rejected in accordance with Subsection 106.05.
- f. The Contractor shall be responsible for all damages and material losses until the material is incorporated into the work and the work is accepted.
- g. Partial payment will not include payment for fuels, supplies, form lumber, falsework, other materials, or temporary structures of any kind which will not become an integral part of the finished construction.

- h. No partial payments will be made on living or perishable plant materials until planted.

**BUY AMERICA  
(A-43-0212)**

Subsection 106.07 in the *Standard Specifications* is void and superseded by the following:

**106.07 -- Buy America**

1. The Buy America rule requires that steel or iron materials be produced domestically, and only those products which are brought to the construction site and permanently incorporated into the completed project are covered. Construction materials, forms, etc., which remain in place at the Contractor's convenience, but are not required by the contract, are not covered.
2. To further define the coverage, a domestic product is a manufactured steel construction material that was produced in one of the 50 States, the District of Columbia, Puerto Rico, or in the territories and possessions of the United States.
3. All manufacturing processes to produce steel or iron materials (i.e., smelting, and any subsequent process which alters the steel or iron material's physical form or shape, or changes its chemical composition) must occur within one of the 50 States, the District of Columbia, Puerto Rico, or in the territories and possessions of the United States, to be considered of domestic origin. This includes processes such as casting, rolling, extruding, machining, bending, grinding, drilling, and coating. Coating includes epoxy coating, galvanizing, painting, and any other coating that protects or enhances the value of the material. The manufacturer shall include a statement on the material test report or certification that all material described above except the coating material is a domestic product.
4. Raw materials used in the steel or iron materials may be imported. All manufacturing processes to produce steel or iron materials must occur domestically. Raw materials are materials such as iron ore, limestone, waste products, etc., which are used in the manufacturing process to produce the steel products. Waste products would include scrap; i.e., steel no longer useful in its present form from old automobiles, machinery, pipe, railroad tracks and the like. Also, steel trimmings from mills or product manufacturing are considered waste. Extracting, crushing, and handling the raw materials which is customary to prepare them for transporting are exempt from Buy America. The use of pig iron and processed, pelletized, and reduced iron ore manufactured outside of the United States may be used in the domestic manufacturing process for steel and/or iron materials.
5. Notwithstanding this requirement, a minimum of foreign steel or iron materials will be permitted if its value is less than one-tenth of one percent of the total contract cost or \$2,500, whichever is greater.

6. Upon completion of all work utilizing steel or iron products, the Prime Contractor shall furnish a letter to the State on company letterhead and signed by an officer of the company stating that documentation is on file certifying that all steel or iron materials brought to the construction site and permanently incorporated into the work complied in all respects with the Buy America requirements.

**BORROW, WASTE, STOCKPILE, AND PLANT SITE APPROVAL  
(A-43-0512)**

Subsection 107.02 in the Standard Specifications is amended to include the following:

4. Site Approval:
  - a. When borrow is obtained from a borrow site or waste excavation is placed at sites which are not shown in the contract, or the Contractor plans to use a plant or stockpile site which is not shown in the contract, the Contractor shall be solely responsible for obtaining all necessary site approvals. The Department will provide the procedures necessary to obtain approvals from the U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, Nebraska State Historical Society, Nebraska Game and Parks Commission, and Nebraska Department of Natural Resources on the NDOR website. The Contractor shall also be responsible for obtaining a Discharge Number from the Nebraska Department of Environmental Quality (NDEQ) that allows work under the current Construction Stormwater Permit. The Contractor shall also be responsible for obtaining any and all other permits required by local governments.
  - b. It is anticipated that it may require 60 calendar days or more for the Contractor to obtain the necessary approvals. The Contractor will not be allowed to begin work at borrow or waste sites until the necessary approvals are obtained. No extension of completion time will be granted due to any delays in securing approval of a borrow or disposal site unless a review of the time frames concludes that there were conditions beyond the Contractor's control.

Paragraph 7. of Subsection 205.02 in the Standard Specifications is void and superseded by the following:

7. Borrow and Waste Site Approval:
  - a. Borrow and waste site approvals shall be in accordance with Section 107.02.
  - b. Material shall not be removed from borrow sites until preliminary cross sections and representative soil samples have been taken by the Engineer. The Contractor shall notify the Engineer a sufficient time in advance of the opening of any borrow site so that cross sections may be taken.

- c. Material shall be removed in a manner that will allow accurate final cross sections to be taken for determining the quantity of excavation. The surfaces of the borrow sites shall be bladed and shaped to drain as shown in the contract or as directed by the Engineer.

**SPECIAL PROSECUTION AND PROGRESS  
(Subletting or Assigning of Contract)  
(A-43-0414)**

Subsection 108.01 in the Standard Specifications is void and superseded by the following:

**108.01 – Subletting or Assigning of Contract**

- 1. a. (1) The Contractor will not be allowed to sublet, assign, sell, transfer, or otherwise dispose of any portion of the contract or any right, title, or interest therein; or to either legally or equitably assign any of the money payable under the contract or the claims without the prior written consent of the Engineer.
- (2) With the Engineer's consent, the Contractor may sublet up to 70 percent of the work.
- (3) Any items designated in the contract as "specialty items" may be performed by subcontract.
- (4) The cost of any subcontracted "specialty items" may be deducted from the total contract cost before computing the percentage of work required to be performed by the Contractor.
- (5) Subcontracts, or transfer of contract, will not release the Contractor of any liability under the contract and bonds.
- b. Certain items of work may be performed without a subcontract. A list of items not requiring a subcontract is available from the Engineer.
- 2. The performance of any work by a subcontractor before the date of authorization by the Department shall subject both the Contractor and subcontractor to the imposition of appropriate sanctions by the Department.
- 3. a. The Contractor's request to sublet work shall be made electronically to the NDR Construction Engineer using project management software identified by the Department. A signed subcontract agreement shall be on file in the Contractor's office when the request is made. The subcontract agreement must provide that the subcontracted work will be completed according to the terms of the contract. The required and Special Provisions contained in the proposal shall be physically included in any subcontract.
- b. **On all Federal-aid projects, a scanned copy (.pdf format) of the signed subcontract agreement shall be included with the subcontracting request.**

**(Federal-aid projects can be identified by inclusion in the Proposal of Form FHWA-1273 (REQUIRED CONTRACT PROVISIONS FEDERAL-AID CONSTRUCTION CONTRACTS)).**

- c. Scanned copies (.pdf format) of all executed subcontracts, written agreements, and/or lease agreements used to meet DBE goals shall be submitted to the NDR Construction Engineer with the subcontracting request. These copies must show labor cost, material prices, overhead and profit.
4. a. Second tier subcontracts will be allowed.
- b. If a DBE firm subcontracts work to another firm, only work subcontracted to another DBE firm can be counted toward meeting a DBE goal.
- c. All requests for second tier subcontracting shall be submitted to and approved by the Prime Contractor before they are forwarded to the NDR Construction Engineer for approval.
5. All subcontract documents relating to the contract shall be maintained during the course of the work and preserved for a period of three years thereafter. These documents shall be available for inspection by authorized representatives of State and Federal agencies. Scanned copies (.pdf format) of the signed subcontract agreements not specifically identified elsewhere in this Subsection shall be furnished to the Department upon request.
6. The Contractor may discuss a proposed subcontract with the Engineer before entering into a signed subcontract agreement, but final approval will not be granted until a formal request and proper certification has been received by the Department.
7. On projects requiring submittal of certified payrolls, all subcontractor payrolls shall be checked by the Contractor before submittal to the Engineer.
8. a. The Prime Contractor, and subcontractors when subletting work to lower tier subcontractors, shall include language which can be identified as a "Prompt Payment Clause" as a part of every subcontract for work and materials.
- b. (1) The language constituting the "Prompt Payment Clause" will require payment to all first tier subcontractors for all labor and materials --- for work completed to date --- within 20 calendar days of receipt of progress payments from the Department for said work. Similar language in a contract between a subcontractor and a lower-tier subcontractor will require payment to the lower tier subcontractor for all labor and materials --- for work completed to date --- within 10 calendar days of receipt of progress payments from the prime Contractor for said work.
- (2) The language constituting the "Prompt Payment Clause" will also stipulate the return of retainage within 30 calendar days after the satisfactory completion of the work by the subcontractor as evidenced by inclusion of the work on a progress payment.

- (3) Additionally, the language constituting the “Prompt Payment Clause” may stipulate the subcontractor’s obligation to return to the Contractor or subcontractor, as the case may be, any overpayments which result from adjustments to measured and recorded quantities as part of the preparation of subsequent progress payments or the final records. Overpayments shall be returned to the Prime Contractor or subcontractor, as the case may be, within 20 calendar days of receiving notice of the adjusted quantities and the amount of the overpayment.
- c. The Prime Contractor of subcontractors, as the case may be, may withhold payment only for just cause and shall not withhold, delay, or postpone payment without first receiving written approval from the Department.
- d. (1) The failure by the Prime Contractor to abide by the agreements identified in the “Prompt Payment Clause” without just cause, including the timely return of retainage, is a material breach of this contract which may result in the Department withholding the amount of payment from the prime Contractor that should have been paid to the subcontractor, termination of this contract, or other such remedy as the Department deems necessary.
- (2) Additionally, the failure of any subcontractor to abide by the agreements identified in the “Prompt Payment Clause” without just cause, including the timely return of retainage to lower tier subcontractors, or by failing to return overpayments in a timely manner when the language permitted in Paragraph 8.b.(3) above is included in the subcontract may result in the Department withholding subcontract approval for other work until the overpayments have been returned.
- 9. a. (1) For Davis Bacon (DBRA)-covered projects and Non-DBRA-covered projects, a Contractor or subcontractor may wish to use another individual owner-operator or trucking company to supplement his or her hauling fleet. (The Department will not recognize multiple individuals claiming to be collectively identified as a single “owner operator.”)
- (2) This supplemental individual or company must either become a subcontractor (first tier or lower tier, as the case may be) or be otherwise documented by the utilizing Contractor or subcontractor by entering into a lease agreement for the trucks and showing the driver (or drivers) from the supplemental company on the Prime Contractor’s or subcontractor’s payrolls in the manner described below.
- (3) Payrolls will only be accepted from the Prime Contractor or approved subcontractors.
- b. (1) If the decision is made to subcontract the hauling, the Prime Contractor must first notify the NDOR Construction Office to request subcontract approval. As part of the subcontract approval process --- at any tier --- the proper certificates of insurance must be provided before approval will be granted.
- (2) Additionally, on DBRA-covered projects, the Prime Contractor must submit payrolls for all subcontractors --- at any tier.

- c. (1) Owner/Operators of trucks hired by a Contractor or subcontractor to supplement his or her hauling fleet are not subject to Davis Bacon wage requirements. However, they must still be shown on a payroll prepared by the Contractor or subcontractor for whom they are working with the notation "owner/operator."
- (2) Any other employees of the "owner/operator" must appear on the certified payroll in complete detail and must be compensated according to the wage rates established for the project.
- d. In the event a Prime Contractor or subcontractor elects to not subcontract the supplemental driver or drivers but instead chooses to "carry the workers/truckers on their payroll," the following requirements must be met:
  - (1) The Prime Contractor's or subcontractor's certified payroll must contain the names of all workers/truck drivers, and the payroll should identify their supervisors (including "owner-operators").
  - (2) Pay checks for the workers/truckers in question must be drawn against the Prime Contractor's or subcontractor's payroll or other account.
  - (3) Owner/Operators need only be identified as such on the payroll. Additional drivers, if any, from the "owner-operator's" company must appear on a payroll in complete detail and be compensated according to the wage rates established for the project.
  - (4) The Prime Contractor or subcontractor must enter into a lease agreement for the trucks driven by such drivers, and the lease agreement must show that the compensation for the leased equipment is on a time basis and not based on the amount of work accomplished. The lease agreements must be available for inspection by NDOR personnel.
  - (5) Any supplemental truckers employed under this arrangement must still carry the minimum automobile liability coverage specified in the contract. It shall be the duty of the Prime Contractor to ensure that the supplemental truckers have such coverage in effect. Evidence of proper insurance must be presented for verification on demand.

**ELECTRONIC SHOP DRAWINGS  
(A-43-0215)**

Paragraphs 5,6, and 7 of Subsection 105.02 of the Standard Specifications are void and superseded by the following:

- 5. a. The Contractor shall provide electronic working drawings in a Portable Document Format (PDF). The PDFs shall be sized to print on an 11x17 inch sheet of paper and have a minimum resolution of 300 dpi. Each sheet of the shop drawings shall have a space provided for an electronic stamp that measures 2.5 inches x 3.5 inches when printed.



- b. Electronic working drawing files shall be named with the following file naming format:  
  
Control Number\_Brief Description\_Date.pdf  
  
For example: 12345\_FloorDrains\_05Feb2015  
12345\_FloorDrainCoverLetter\_05Feb2015
  - c. The project number, control number, and project location as it appears on the plans shall be shown on the front sheet of each Shop Drawing file. Structure numbers shall be included, if applicable.
6. No electronic working drawings shall be submitted to the Engineer unless they have been checked by the Contractor. The electronic submittal shall be accompanied by a Contractor's letter of approval in a PDF format. This letter shall also be named with the format shown in the example above. The letter of approval shall clearly indicate that the Contractor is responsible for any errors on the working drawings.
  7. a. Electronic submittals shall be submitted by email to the following address:  
  
[DOR.ShopDrawings@nebraska.gov](mailto:DOR.ShopDrawings@nebraska.gov)
    - b. Attachments shall be limited to 25 MB of data per email. Larger files shall be separated and sent in multiple emails.
    - c. Electronic working drawings will only be accepted from the Prime Contractor.
  8. Any reference to hard copy shop drawings in the contract shall be considered void.

## **UNION PACIFIC RAILROAD COMPANY**

### **UNION PACIFIC RAILROAD SPECIAL PROVISION FOR HIGHWAY PROJECTS**

For purposes of these Special Provisions, Union Pacific Railroad Company is referred to as "UPRR" and the term "Contractor" shall mean the Contractor or Contractors hired by the State to perform any Project work on any portion of UPRR's property and shall also include the Contractor's subcontractors and the Contractor's and subcontractor's respective employees, officers and agents.

UPRR shall provide an inspector or inspectors for any direct labor work undertaken by UPRR, the State or Contractor on or in connection with the Project as a Project expense.

## **I. RAILROAD SAFETY TRAINING**

- A. UPRR requires that anyone working within 25 feet of any track be trained in Federal Railroad Administration (FRA) Roadway Worker Protection. This training is available from several sources, including other railroads, railroad industry training professionals and computer based training. UPRR requires such training per 49 CFR 214.343 but does not endorse any specific Roadway Worker Protection Training.
- B. UPRR requires that anyone working on UPRR property, although greater than 25 feet from the track, be trained on the minimum UPRR safety requirements. This training is available from several sources, including a video and pamphlet titled "Minimum Safety Requirements for Engineering Department Contractors" and computer based training. This training is in addition to the regulatory training described in Paragraph A above.
- C. The Contractor, or its agents or representatives, will not be allowed on UPRR railroad right-of-way until it has successfully completed the mandatory safety training as outlined above. The Contractor must furnish employees with documentation that they have completed the required regulatory and UPRR safety training. This can be accomplished by issuing cards showing the employee's training, issuing lists of employees who have completed specific training or by having available, at the job site, other forms of documentation.
- D. The Contractor will be responsible for all costs associated with attending each training class.

## **II. FLAGGING PROTECTION**

- A. The Contractor shall notify UPRR's Manager of Track Maintenance, Anthony Trotta, (402) 501-3817, at least fifteen (15) calendar days in advance of the Contractor's commencement of work within railroad right-of-way. The Contractor shall give notice thirty (30) calendar days in advance of proposed performance of any work in which any person or equipment will be within 25 feet of any track, or will be near enough to any track that any equipment extension (such as, but not limited to, a crane boom) can reach to within 25 feet of any track. This notice shall include the Project Number, the Contractor's name, date of flagging, location of flagging services to be provided, and an estimate of the expected duration of flagging. No work of any kind shall be performed, and no person, equipment, machinery, tools, materials or vehicles shall be located, operated, placed or stored within 25 feet of any railroad track at anytime, for any reason, unless and until a UPRR flagger is provided. Upon receipt of such 30 calendar days' notice, the Manager of Track Maintenance will determine and inform the Contractor whether a flagger need be present and whether the Contractor need implement any special protective or safety measures. If flagging or other special protective or safety measures are performed by UPRR, such services will be provided at the Contractor's expense with the understanding that if UPRR provides any flagging or other services, the Contractor shall not be relieved of any of its responsibilities or liabilities set forth herein.

- B. Prospective bidders shall familiarize themselves fully with all flagging special provisions of UPRR.

### III. REIMBURSEMENT TO UPRR FOR FLAGGING COSTS

- A. The Contractor shall promptly pay UPRR all charges connected with such flagging services within thirty (30) calendar days after the Contractor's receipt of the monthly billing or final billing from UPRR. To enable orderly flagger reassignment to other projects the Contractor shall be required to notify the UPRR Manager of Track Maintenance described in Paragraph A above at least five (5) working days prior to the termination of flagging needs or five (5) working days prior to completion of the Contractor's Project work, whichever is sooner. The Contractor may request a final billing at this time. The Contractor shall inform the following UPRR Manager of Industry & Public Projects person in writing, Mike Blackley, (402) 544-2029) when the Project is complete. The State shall not make final payment to the Contractor until UPRR has provided written notification to the State that the Contractor has paid UPRR in full for all flagging or other protective services expenses that UPRR has billed to the Contractor in connection with the Project. The Contractor is responsible for all flagger requests and payments on the Project. The Contractor's work may be suspended upon notice of non-compliance from UPRR until required flaggers or other protective measures are in place. UPRR will notify the Contractor when non-compliance is reported by UPRR train crews or other UPRR employees.
- B. The rate of pay per hour for each worker will be the UPRR prevailing hourly rate in effect for an eight-hour day for the class of worker used during regularly assigned hours and overtime in accordance with Labor Agreements and Schedules in effect at the time the work is performed, a full eight-hour day or greater during which any flagger is furnished shall be charged in full to the State's Prime Contractor. The estimated cost for one flagger is \$1,260 / 12 hr / day per day. A full eight-hour day or greater will not be split between any Contractor. In addition to the cost of such labor, a composite charge for vacation, holiday, health and welfare, supplemental sickness, Railroad Retirement and UC, supplemental pension, Employee, Liability & Property Damage, and administration will be included, computed on actual payroll. The composite charge will be the prevailing composite charge in effect on the day that flagging was performed. One and one-half times the current hourly rate is paid for overtime, Saturdays and Sundays; two and one-half times current hourly rate for holidays. Wage rates are subject to change, at any time, by law or by agreement between UPRR and its employees, and may be retroactive as a result of negotiations or a ruling of an authorized Governmental Agency. Additional charges on labor are also subject to change. If the wage rate or additional charges are changed, the Contractor shall pay on the basis of the new rates and charges. The Contractor shall also be required to pay UPRR for all other expenses incurred by UPRR including, but not limited to, travel time, travel expense, set up and take down activities associated with any Railroad flagging or protective services provided by the Railroad.
- C. Reimbursement to UPRR will be required covering the full eight hour day during which any flagger is furnished, unless they can be assigned to other UPRR work during a portion of such day, in which event reimbursement will not be required

for the portion of the day during which the flagger is engaged in other UPRR work. Reimbursement will also be required for any day not actually worked by said flagger following its assignment to work on the Project for which UPRR is required to pay the flagger and which could not reasonably be avoided by UPRR by assignment of such flagger to other work, even though the Contractor may not be working during such time.

#### **IV. PROTECTION OF UTILITIES**

- A. Before the Contractor begins its operations on UPRR right-of-way it shall confer with the designated representatives of the State and UPRR with regard to any underground or overhead utilities which may be on or in close proximity to the site of the work. The Contractor shall take such measures as the State or UPRR may direct in protecting those utilities properly throughout the period its construction operations are in progress. The party or parties owning or operating overhead or underground utilities shall perform the actual work of moving, repairing, reconditioning or revising those utilities, except as otherwise provided in the contract. Whenever and wherever such operations are undertaken by owners of utilities, the Contractor shall cooperate to the extent that ample protection of its work will be provided so that the entire work that is contemplated in the contract may be expedited to the best interests of all concerned, as judged by the Engineer for the State.
- B. The Contractor shall be responsible for any and all damages to utilities that are permitted to remain in place, or to reconstructed utilities in the vicinity, which may be due either directly or indirectly to its operations, and shall repair promptly any such damaged property to the satisfaction of the State's Engineer and the owner of the property, or shall make payment to such owners for repairs as may become necessary on account of damages that are due to its operations.
- C. Direct payment for this work will not be made but it shall be considered that the protection of the utilities is subsidiary to any or all of the items for which the contract provides that direct payment shall be made.
- D. The Contractor shall telephone UPRR during normal business hours (7:00 a.m. to 9:00 p.m., Central Time, Monday through Friday, except holidays) at 1-800-336-9193 (also a 24-hour, 7-day number for emergency calls) to determine if fiber optic cable is buried anywhere on UPRR's property to be used by the Contractor. If there is fiber optic cable, the Contractor shall telephone the telecommunications company(ies) involved, make arrangements for a cable locator and, if applicable, for relocation or other protection of the fiber optic cable. The Contractor shall not commence any work until all such protection or relocation (if applicable) has been accomplished.

**V. WRITTEN NOTICE TO UPRR**

The Contractor shall give written notice to UPRR's Manager Industry and Public Projects, Mike Blackley, (402) 544-2029); to his or her authorized representative, at least fifteen (15) days in advance of the date on which it expects to begin any work under or adjacent to any of the tracks of UPRR or it expects to begin any construction work on the right-of-way of UPRR. The Contractor shall also give written notice to such UPRR Manager of Industry and Public Projects, no later than fifteen (15) days after completion of all work on UPRR's right-of-way.

**VI. BRIDGE REMOVAL PLANS**

- A. If any existing bridge or portion thereof, needs to be demolished and removed, the Contractor, at its expense, shall submit to UPRR by certified mail three (3) complete sets of the Bridge Removal Plan. The Bridge Removal Plan shall include details, procedures and the sequence of staged removal of the bridge, including all steps necessary to remove the bridge in a safe and controlled manner.
- B. The Contractor shall submit to UPRR: three (3) complete sets of the Contractor's Bridge Removal Plan for review and comments. The Bridge Removal Plan shall be sealed by a Civil or Structural Engineer registered in the State of Nebraska. A minimum of thirty (30) days shall be allowed for UPRR's review after the complete submittal is received and approved by UPRR. The Contractor shall not perform any bridge removal work until it has received written approval from UPRR of the Contractor's final Bridge Removal Plan. The Bridge Removal Plan and all demolition work shall conform to the requirements of the "Guidelines for Preparation of a Bridge Demolition and Removal Plan for Structures over Railroad" (Attachment XX) and "Guidelines for Temporary Shoring" (Attachment XX).

**VII. PROTECTION OF PROPERTY**

- A. The Contractor shall use the utmost care to guard against accidents or cause the least possible interference with the operation of trains of UPRR and the telephone, telegraph or signal lines of UPRR or of any tenant of UPRR's right-of-way. The Contractor shall use the utmost care in guarding against injury to underground and overhead public utilities and services at or near the site of the work.
- B. All work to be done under this contract shall be handled by the Contractor so as to not interfere with the use of tracks, wires, signals and property of UPRR or its tenants, and the underground or overhead services of public and private utilities, and the Contractor shall be responsible for any damages which may be sustained by UPRR, its tenants, employees, passengers or freight in its care, or by the owners of any public or private overhead or underground services caused by such interference which could have been avoided by the proper handling of said work. The Contractor shall discontinue immediately, upon request of the Engineer or UPRR representative, any practices or actions which, in the opinion of the Engineer or UPRR representative, are unsafe or cause damage to underground or overhead services of public or private utilities, or which might

result in delays to trains, engines or cars, or damage to tracks, roadbed, telephone, telegraph or signal wires.

- C. The Contractor shall take all precautions for the purposes of protecting the embankment of all railroad tracks as may be determined necessary by the authorized representative of UPRR. The Contractor shall affix the seal of a registered professional Engineer licensed to practice in the State of Nebraska on all plans and calculations pertaining to details for sheeting or otherwise protecting excavations next to or adjacent to railroad tracks if necessary and noted on the State's plans. The Contractor also shall take all precautions for the protection of underground and overhead services either public or private, as may be determined by the Engineer.
- D. A minimum temporary horizontal construction clearance of 12 feet measured perpendicular from the centerline of the nearest track to all physical obstructions including, but not limited to, formwork, stockpiled materials, parked equipment, bracing or other construction supports shall be provided. Temporary horizontal construction clearance shall provide sufficient space for drainage ditches parallel to the standard roadbed section or provide an alternative system that maintains positive drainage. A minimum temporary vertical construction clearance of 21 feet measured above top of high rail for all tracks shall be provided.
- E. Any changes necessary in the clearance set forth above shall be made only by special arrangements with the UPRR Manager Industry and Public Projects that is named in Section V above.

#### **VIII. UPRR CROSSINGS**

- A. The Contractor shall use only public roadways, or approved temporary crossings that are specifically shown on the plans, to cross railroad tracks. Every attempt should be made to use public roadways. If the Contractor should require a temporary crossing for construction purposes at a location other than an existing public crossing, provisions for such crossing shall be negotiated with UPRR by the Contractor, and all costs for such crossing shall be borne by the Contractor. It is not guaranteed that UPRR will grant a temporary crossing. The requirements of these Special Provisions shall apply, and all costs for such crossing, shall be borne by the Contractor.
- B. Prospective bidders should familiarize themselves with UPRR temporary crossing and insurance requirements before bidding on the work.

#### **IX. INSPECTION**

Subsection 105.09 in the Standard Specifications is amended to provide also that the work shall be subject to the inspection of the properly authorized representatives of UPRR and that such inspection shall in no manner make UPRR a party to this contract and will in no manner interfere with the rights of either party hereunder.

**X. INDEMNITY**

- A. The State agrees to insert the following provision in any contract in which State's Contractor will have access to UPRR's property:

To the extent allowed by law, Contractor hereby releases and shall indemnify, defend and hold harmless UPRR, its affiliated companies, partners, successors, assigns, legal representatives, officers, directors, shareholders, employees and agents for, from and against any and all claims, liabilities, fines, penalties, damages, losses, liens, causes of action, actions, suits, demands, costs and expenses (including, without limitation, court costs and reasonable attorneys' fees) and judgments (collectively, "Claims"), of any nature, kind or description of any person (including, without limitation, the employees of the parties hereto and the employees of UPRR) or entity directly or indirectly arising out of, resulting from, or related to (in whole or in part) (i) the use, occupancy or presence of State, Contractor, or its subcontractors, employees or agents, in, on, or about UPRR's property pursuant to this Agreement; (ii) the performance or failure to perform by Contractor, its subcontractors, employees, or agents, its work or any obligation under this Agreement; or (iii) the sole or contributing acts or omissions of Contractor, its subcontractors, employees, or agents, in, on, or about UPRR's property pursuant to this Agreement. Contractor's duty to defend under the above indemnity provision includes, without limitation, the obligation of Contractor to appear and defend in the name of UPRR, any suits or actions brought against UPRR with respect to any such Claims, and to pay and satisfy any final judgment that may be rendered against UPRR in any such suit or action. THE LIABILITY AND DUTY TO DEFEND ASSUMED BY CONTRACTOR UNDER THE ABOVE INDEMNITY PROVISION WILL NOT BE AFFECTED BY THE FACT, IF IT IS A FACT, THAT THE CLAIM WAS OCCASIONED BY OR CONTRIBUTED TO BY THE NEGLIGENCE OF UPRR, ITS AGENTS, SERVANTS, EMPLOYEES, OR OTHERWISE, EXCEPT (I) TO THE EXTENT THAT SUCH CLAIM WAS PROXIMATELY CAUSED BY THE ACTIVE GROSS NEGLIGENCE OR INTENTIONAL MISCONDUCT OF UPRR OR ITS EMPLOYEES, SERVANTS OR AGENTS, OR (II) FOR CLAIMS ARISING SOLELY OUT OF THE NEGLIGENT ACTIONS OF UPRR OR ITS EMPLOYEES, SERVANTS OR AGENTS.

- B. If Contractor fails to indemnify, defend and hold UPRR harmless as provided in the above indemnity provision, then to the extent allowed by law, the State shall indemnify, defend and hold UPRR harmless under the above indemnity provision as if State were Contractor.

**XI. INSURANCE**

For purposes of this Special Provision, Union Pacific Railroad Company is referred to as "UPRR" and the term "Contractor" shall mean the Contractor or Contractors hired by the State to perform any Project work on any portion of UPRR's property and shall also include all the Contractor's subcontractors and the Contractor's and subcontractor's respective employees, officers and agents.

The Contractor shall carry the following insurance coverage:

- A. Commercial General Liability insurance. Commercial general liability (CGL) with a limit of not less than \$3,000,000 each occurrence and an aggregate limit of not less than \$4,000,000. CGL insurance must be written on ISO occurrence form CG 00 01 12 04 (or a substitute form providing equivalent coverage).

The policy must also contain the following endorsement, (WHICH MUST BE STATED ON THE CERTIFICATE OF INSURANCE):

- “Contractual Liability Railroads” ISO form CG 24 17 10 01 (or a substitute form providing equivalent coverage) showing “Union Pacific Railroad Company Property” as the Designated Job Site.
- “Designated Construction Project(s) General Aggregate Limit” ISO Form CG 25 03 03 97 (or a substitute form providing equivalent coverage) showing the Project location as described in the Agreement on the Form Schedule.

- B. Business Automobile Coverage insurance. Business auto coverage written on ISO form CA 00 01 (or a substitute form providing equivalent liability coverage) with a limit not less than \$3,000,000 for each accident. Such insurance shall cover liability arising out of any auto (including owned, hired, and non-owned autos).

The policy must contain the following endorsements, (WHICH MUST BE STATED ON THE CERTIFICATE OF INSURANCE):

- “Coverage For Certain Operations In Connection With Railroads” ISO form CA 20 70 10 01 (or a substitute form providing equivalent coverage) showing “Union Pacific Property” as the Designated Job Site.
- Motor Carrier Act Endorsement - Hazardous materials clean up (MCS-90) if required by law.

- C. Workers Compensation and Employers Liability insurance including but not limited to:

- Contractor's statutory liability under the workers' compensation laws of the State of Nebraska
- Employers' Liability (Part B) with limits of at least \$500,000 each accident, \$500,000 disease policy limit \$500,000 each employee

If rules and regulations issued by the State of Nebraska require the Contractor to participate in the State's Worker's Compensation fund and if Workers Compensation insurance will not cover the liability of Contractor, Contractor shall comply with such rules and regulations. If Contractor is self-insured, evidence of State approval must be provided along with evidence of excess Workers Compensation coverage. Coverage shall include liability arising out of the U.S. Longshoremen's and Harbor Workers' Act, the Jones Act, and the Outer Continental Shelf Land Act, if applicable.



- D. Umbrella or Excess Policies. In the event Contractor utilizes umbrella or excess policies, these policies shall “follow form” and afford no less coverage than the primary policy.
- E. Railroad Protective Liability insurance. Contractor must maintain “Railroad Protective Liability” insurance written on ISO occurrence form CG 00 35 12 04 (or a substitute form providing equivalent coverage) on behalf of Railroad as named insured, with a limit of not less than \$2,000,000 per occurrence and an aggregate of \$6,000,000. A BINDER OF INSURANCE STATING THE POLICY IS IN PLACE MUST BE SUBMITTED TO THE RAILROAD BEFORE WORK MAY COMMENCE AND UNTIL THE ORIGINAL POLICY IS FORWARDED TO UNION PACIFIC RAILROAD.

**Other Requirements**

- F. Punitive damages exclusion, if any, must be deleted (and the deletion indicated on the certificate of insurance), unless (a) insurance coverage may not lawfully be obtained for any punitive damages that may arise under this Agreement, or (b) all punitive damages are prohibited by all states in which this Agreement will be performed.
- G. Contractor waives all rights against Railroad and its agents, officers, directors and employees for recovery of damages to the extent these damages are covered by the workers compensation and employer’s liability or commercial umbrella or excess liability insurance obtained by Contractor required by this Agreement (WHICH MUST BE STATED ON THE CERTIFICATE OF INSURANCE).
- H. All policy(ies) required above (except worker’s compensation and employers liability) must include Railroad as “Additional Insured” using ISO Additional Insured Endorsements CG 20 26, and CA 20 48 (or substitute forms providing equivalent coverage). The coverage provided to Railroad as additional insured shall, to the extent provided under ISO Additional Insured Endorsement CG 20 26, and CA 20 48 provide coverage for Railroad’s negligence whether sole or partial, active or passive, and shall not be limited by Contractor’s liability under the indemnity provisions of this Agreement.
- I. Any insurance policy shall be written by a reputable insurance company acceptable to UPRR or with a current Best’s Insurance Guide Rating of A- and Class VII or better, and authorized to do business in the State of Nebraska.
- J. The fact that insurance is obtained by Contractor or UPRR on behalf of Contractor shall not be deemed to release or diminish the liability of Contractor, including, without limitation, liability under the indemnity provisions of this Agreement. Damages recoverable by UPRR shall not be limited by the amount of the required insurance coverage.

**XII. ADDITIONAL RIGHT-OF-WAY**

The State right-of-way plans show the permanent and temporary easements acquired or to be acquired by the State for this Project. Any additional land or easements that the Contractor may desire for the construction of the Project, shall be provided by the Contractor at its own expense.

**XIII. RESTORATION OF UPRR PROPERTY**

In the event the Contractor shall in any manner move or disturb other property of UPRR, in connection with the use of the said property, then, and in that event, the Contractor shall, as soon as possible and at its sole expense, restore such property to the same condition as it was in before such property was moved or disturbed.

**XIV. FINAL CLEAN UP**

In addition to Subsection 104.08 in the Standard Specifications, the Contractor, upon the completion of the work contemplated in this contract, shall remove all machinery, equipment, surplus materials, falsework, rubbish, ditches, and temporary building, furnished or erected by him from within the limits of the right-of-way of UPRR and shall leave the said right-of-way in a condition acceptable to UPRR's Manager of Track Maintenance, or his authorized representative.

### PERCENTAGE OF COST OF WORK WITHIN RAILROAD RIGHT-OF-WAY

The following information is furnished to aid in the determination of a proper premium for the Railroad Protective Liability Insurance required elsewhere in these special provisions.

#### RAILROAD PROTECTIVE POLICY DATA SHEET

Railroad: Union Pacific Railroad Company

Railroad Contact: Mike Blackley

Title: Manager Industry & Public Projects

Address: Union Pacific Railroad Company, 1400 Douglas Street, Stop 0910, Omaha, NE 68179

Telephone Number: (402) 544-2029

Project Number: STR-680-9(1192)

Project Location: SB I-680 to WB I-80 Bridge, Omaha

Type of Project: Bridge Repair

No. of trains/day: Total: 13

Freight or Coal: 13 Speed: 30 mph Passenger 0 Speed N/A mph

No. of Tracks: Mainline 1 Branchline 1

Project Over RR: No  Yes  Project Under Railroad: No  Yes

Railroad Shoo-fly Required: No  Yes

Project Parallel to RR: No  Yes  If Yes, Number of Miles N/A

Crossings on State Highway or City Street System: No  Yes

If Yes, Number of Crossings 1 @ DOT #815672J MP 445.70

Pavement or Overlay up to Crossing on County or City Road: No  Yes

If Yes, Number of Crossings N/A

Work to be done by Railroad Flagging

It shall be the contractor's responsibility to contact the railroad for additional information needed to purchase the Railroad Protective Policy.

The percentage of work within railroad right of way that is within 50 feet (15.25 meters) of any railroad track shall be covered by railroad protective insurance. The railroad's ownership of right of way that extends beyond 50 feet (15.25 meters) from the closest track shall be covered under regular Contractor's Public liability and Property Damage Insurance in the amounts specified in this contract.

<u>Group</u>	<u>Approximate Percent of Work Within 50 feet (15.25 meters) of Nearest Track</u>	<u>Approximate Percent of Work on RR/ROW Not Within 50 feet (15.25 meters) of Nearest Track</u>	<u>Description of Work</u>
<u>All</u>	<u>6 %</u>	<u>20 %</u>	<u>---</u>

**LIABILITY INSURANCE  
(A-55-0414)**

Subsection 107.13 in the Standard Specifications is void and superseded by the following:

**107.13 – Liability Insurance**

Prior to execution of the contract, the Contractor shall obtain insurance coverage to fully protect it from loss associated with the work, and have at a minimum the insurance described below:

1. General Liability:  
Limits of at least:
  - \$ 1,000,000 per Occurrence
  - \$ 2,000,000 General Aggregate
  - \$ 2,000,000 Completed Operations Aggregate
  - \$ 1,000,000 Personal and Advertising Injury
  - a. Contractor shall be responsible for the payment of any deductibles.
  - b. Coverage shall be provided by a standard form Commercial General Liability Policy (CG0001 or equivalent) covering bodily injury, property damage including loss of use, and personal injury.
  - c. The General Aggregate shall apply on a Per Project Basis.
  - d. The State of Nebraska, Department of Roads, shall be named as an Additional Insured on a primary and non-contributory basis including completed operations for three (3) years after final acceptance and payment.
  - e. Contractor agrees to waive its rights of recovery against the State of Nebraska, Department of Roads. Waiver of Subrogation in favor of the State of Nebraska, Department of Roads shall be added to the policy.
  - f. Contractual liability coverage shall be on a broad form basis and shall not be amended by any limiting endorsements.

- g. If work is being performed near a railroad track, the 50' railroad right-of-way exclusion must be deleted.
  - h. Products and completed operations coverage in the amount provided above shall be maintained for the duration of the work, and shall be further maintained for a minimum period of three years after final acceptance and payment.
  - i. Coverage shall be included for demolition of any building or structure, collapse, explosion, blasting, excavation and damage to property below surface of ground (XCU coverage).
  - j. Policy shall not contain a total or absolute pollution exclusion. Coverage shall be provided for pollution exposures arising from products and completed operations as per standard CG0001 Pollution Exclusion or equivalent. If the standard pollution exclusion as provided by CG0001 has been amended, coverage must be substituted with a separate Pollution Liability policy of \$1.0 million per occurrence and \$2.0 million aggregate. If coverage is provided by a "claims made" form, coverage will be maintained for three years after project completion. Any applicable deductible is the responsibility of the Contractor.
2. Automobile Liability:  
Limits of at least:  
\$ 1,000,000 CSL per Accident
- a. Coverage shall apply to all Owned, Hired, and Non-Owned Autos.
  - b. If work is being performed near a railroad track, the 50-foot railroad right-of-way exclusion must be deleted.
  - c. Contractor agrees to waive its rights of recovery against the State of Nebraska, Department of Roads. Waiver of Subrogation in favor of the State of Nebraska, Department of Roads, shall be added to the policy.
  - d. Automobile liability coverage shall be obtained from an insurance carrier who is licensed with the Nebraska Department of Insurance.
3. Workers' Compensation:  
Limit: Statutory coverage for the State where the project is located.  
Employer's Liability limits: \$500,000 Each Accident  
\$500,000 Disease – Per Person  
\$500,000 Disease – Policy Limit
- a. Contractor agrees to waive its rights of recovery against the State of Nebraska, Department of Roads. Waiver of Subrogation in favor of the State of Nebraska, Department of Roads shall be added to the policy.
  - b. Workers' compensation coverage shall be obtained from an insurance carrier who is licensed with the Nebraska Department of Insurance.
  - c. Where applicable, the Longshore and Harborworkers Compensation Act endorsement shall be attached to the policy.

4. Umbrella/Excess:  
Limits of at least:  
\$1,000,000 per Occurrence
  - a. Policy shall provide liability coverage in excess of the specified Employers Liability, Commercial General Liability and Automobile Liability.
  - b. The State of Nebraska, Department of Roads, shall be an "Additional Insured."
  - c. Contractor agrees to waive its rights of recovery against the State of Nebraska, Department of Roads. Waiver of subrogation in favor of the State of Nebraska, Department of Roads shall be provided.
5. Pollution Liability:
  - a. When "hazardous wastes" or contaminated or polluted materials must be handled and/or moved, the Contractor shall obtain Pollution Liability Coverage with minimum limits of \$1,000,000 per occurrence and \$2,000,000 aggregate.
  - b. If, during the course of construction, hazardous wastes, contaminated or polluted material are discovered on the project, the Contractor shall immediately cease any operation that may disturb these materials, and shall immediately notify the Engineer of all facts related to the discovery of these materials.
  - c. Unforeseen work related to the discovery of hazardous, contaminated or polluted materials on the project, and the extra cost, if any, of pollution liability coverage will be handled as "extra work."
6. Additional Requirements:
  - a. The Contractor shall provide and carry any additional insurance required by the Special Provisions.
  - b. Except as otherwise provided herein, all insurance shall be kept in full force and effect until after the State releases the Contractor from all obligations under the contract.
  - c.
    - (1) If any of the work is sublet, equivalent insurance shall be provided by or on behalf of the subcontractor or subcontractors (at any tier) to cover all operations.
    - (2) Approved trucking subcontractors (at any tier) who are being utilized only for the purpose of hauling materials shall be exempt from the requirements of Paragraphs 1, 4, and 5.
    - (3)
      - (i) When a Contractor or subcontractor chooses to employ a trucker by carrying the driver on his or her payroll and entering into a lease agreement for the truck, the owner-operator of the truck shall be required to comply with the Automobile Liability provisions of Paragraph 2.
      - (ii) Furthermore, it shall be the duty of the Prime Contractor to ensure that the owner-operator of the truck has such insurance in effect. The Prime Contractor shall maintain evidence that any truckers so

- utilized (at any tier) are insured to the minimum limits specified and be able to furnish documentation of the same on demand.
- (iii) Failure to ensure that insurance coverage exists and failure to maintain evidence thereof shall be considered a breach of the contract.
- d. Any insurance policy shall be written by an insurance company with a Best's Insurance Guide Rating of A – VII or better.
- e. Prior to execution of the contract, Contractor shall provide the State of Nebraska, Department of Roads evidence of such insurance coverage in effect in the form of an Accord (or equivalent) certificate of insurance executed by a licensed representative of the participating insurer(s). Certificates of insurance shall show the Nebraska Department of Roads as the certificate holders.
- f. For so long as insurance coverage is required under this agreement, the Contractor shall have a duty to notify the Department when the Contractor knows, or has reason to believe, that any insurance coverage required under this agreement will lapse, or may be cancelled or terminated. The Contractor must forward any pertinent notice of cancellation or termination to the Department at the address listed below by mail (return receipt requested), hand-delivery, or facsimile transmission within 2 business days of receipt by Contractor of any such notice from an insurance carrier. Notice shall be sent to:
- Nebraska Department of Roads  
Construction Division --- Insurance Section  
1500 Highway 2, P.O. Box 94759  
Lincoln, NE 68509-4759  
Facsimile No. 402-479-4854
- g. Failure of the owner or any other party to review, approve, and/or reject a certificate of insurance in whole or in part does not waive the requirements of this agreement.
- h. The limits of coverage set forth in this document are suggested minimum limits of coverage. The suggested limits of coverage shall not be construed to be a limitation of the liability on the part of the Contractor or any of its subcontractors/tier subcontractors. The carrying of insurance described shall in no way be interpreted as relieving the Contractor, subcontractor, or tier subcontractors of any responsibility or liability under the contract.
- i. If there is a discrepancy of coverage between this document and any other insurance specification for this project, the greater limit or coverage requirement shall prevail.

## **CONSTRUCTION DETAILS**

### **TEMPORARY WATER POLLUTION CONTROL (B-3-1014)**

Section 204 in the Standard Specifications is void.

**CONSTRUCTION STORMWATER MANAGEMENT CONTROL  
(B-3-1014)**

**A. General**

1. This Section defines some best management practices (BMPs) for erosion and sediment control measures and construction practices the Contractor shall use to prevent soil erosion and avoid water pollution.
2.
  - a. The Department and the Contractor are co-permittees of the NPDES Construction Storm Water General Permit.
  - b. The Contractor shall comply with all conditions required by the current NPDES Construction Storm Water General Permit.
3. The Contractor shall exercise every reasonable precaution throughout the life of the contract to prevent silting of the waters of the state, the project site, and adjacent property. Construction of drainage facilities, as well as performance of other contract work which will contribute to the control of siltation, shall be carried out in conjunction with earthwork operations or as soon thereafter as is practicable.
4.
  - a. The Contractor shall take sufficient precautions to prevent pollution of the waters of the state, the project site, and adjacent property from construction debris, petroleum products, chemicals, or other harmful materials.  
  
The Contractor shall conduct and schedule the operations to avoid interference with any protected species.
  - b. The Contractor shall comply with all applicable statutes relating to pollution of the waters of the state and fish and game regulations.
5. All construction debris shall be disposed in a manner that it cannot enter any waterway. Excavation shall be deposited as to protect the waters of the state from siltation.
6. All erosion and sediment control measures shall be properly installed and maintained by the Contractor until all permanent drainage facilities have been constructed, and all slopes are sufficiently vegetated to be an effective erosion deterrent; or until tentative acceptance of the work.
7. All erosion and sedimentation resulting from the Contractor's operations and the weather conditions must be corrected by the Contractor.



**LIMITATION OF OPERATIONS  
(B-3-1014)**

**A. General**

1. The maximum exposed surface area for the Contractor's operations in excavation, borrow, and embankment is 18 acres (72,800 m<sup>2</sup>) plus an equal area of clearing and grubbing/large tree removal. A written request for an increase in the maximum exposed surface area may be approved by the Engineer. This approval will be based on the soil, moisture, seasonal conditions, the Contractor's operation, or other conditions.
2. The Engineer shall have the authority to reduce the maximum exposed surface area when any of the following conditions warrant:
  - a. Soil and moisture conditions are such that erosion is probable.
  - b. Seasonal conditions may force extended delays.
  - c. Proximity to the waters of the state requires more stringent controls.
  - d. Equipment and personnel available on the job is not sufficient to properly maintain erosion and dust control measures.
  - e. Any other environmental condition in the area that may exist which would be affected by erosion from the project.
3. Construction operations in rivers, streams, wetlands, and impoundments shall be restricted to those areas specifically shown in the contract. Rivers, streams, wetlands, and impoundments shall be promptly cleared of all false work, piling, debris, or other obstructions placed therein or caused by the construction operations.
4. Fording and operation of construction equipment within streams and wetlands will not be allowed, unless explicitly allowed in the contract. Streams are defined as any area between the high banks, regardless of the flow conditions.

**CONSTRUCTION METHODS  
(B-3-1014)**

**A. General**

1. The Contractor shall conduct all construction activities and install temporary erosion control measures, as necessary, to control sediment and avoid soil erosion during construction.
2. The Contractor shall incorporate all permanent erosion control features into the project at the earliest practicable time.

3. Construction stormwater management control measures for Contractor obtained work areas located outside the right-of-way, such as borrow site operations, haul roads, plant sites, staging sites, waste sites, equipment storage sites, etc. are the sole responsibility of the Contractor. All construction stormwater management control measures for these areas are at the Contractor's expense. The Contractor is responsible for securing all required permits for use of these sites.
4. The construction stormwater management procedures contained herein shall be coordinated with any permanent erosion control measures specified elsewhere in the contract to the extent practical to assure economical, effective, and continuous erosion and sediment control throughout the construction period.
5. The Contractor shall be responsible to limit erosion and prevent siltation into the waters of the state during the construction period, as well as during the times that work may be suspended.
6.
  - a. All erosion and sediment control items shall be installed by personnel who are knowledgeable in the principles and practice of various BMP installations.
  - b. The installation of all erosion and sediment control items shall be done under the direct supervision of the Contractor's employee who has successfully completed training provided by the Department and has been certified as an Erosion and Sediment Control Inspector (Inspector). The Contractor's Inspector shall be present at each site during installation to direct and inspect all erosion and sediment control BMP installations.
    - i. The NDOR Erosion and Sediment Control Inspector Certification is obtained by completing an Erosion and Sediment Control Inspector Training Course provided by the Nebraska Department of Roads and passing the examination that accompanies the training.
  - c. The Contractor shall notify the Engineer of all employees, who have been certified as Inspectors, who will be on the project to direct and inspect all erosion and sediment control BMP installations.
  - d. No payment will be made for any erosion and sediment control item unless a Contractor's Inspector was present to directly supervise and inspect the work.
  - e. No payment will be made for any erosion and sediment control item that is not properly installed. All erosion and sediment control items shall be installed as per the contract.

**ENVIRONMENTAL COMMITMENT DOCUMENT  
(B-3-1014)**

**A. Environmental Commitment Document**

1. a. An Environmental Commitment Document will be created by the Department to identify all project specific environmental commitments and will be included in the Contract.
- b. The Department will provide information for the following, when applicable:
  - i. Storm Water Pollution Prevention Plan (SWPPP)
  - ii. U.S. Army Corps of Engineers (USACE) Section 404 Permit
  - iii. Nebraska Department of Environmental Quality 401 Water Quality Certification
  - iv. State Title 117 Waters (USACE Non-Jurisdictional)
  - v. Floodplain Permit
  - vi. Historic Clearance
  - vii. Endangered Species Act Clearance
  - viii. Nebraska Nongame and Endangered Species Conservation Act Clearance
  - ix. National Environmental Policy Act Compliance
  - x. NPDES Construction Stormwater Permit (within Right-of-Way limits, only)
  - xi. Conservation Measures
  - xii. Migratory Bird Treaty Act
  - xiii. Bald and Golden Eagle Protection Act Compliance
  - xiv. Other pertinent issues
- c. The Contractor shall provide information for the following, when applicable:
  - i. Temporary Erosion Control Plan
  - ii. Spill Prevention and Control Plan
  - iii. Migratory Bird Treaty Act Compliance Plan
  - iv. Name and telephone number of the Contractor's representative responsible for the Environmental Commitments
  - v. Name and telephone number of the employees that are NDOR-Certified Erosion and Sediment Control Inspectors
  - vi. Critical Path Construction Schedule
  - vii. Other items as defined elsewhere in the contract

**STORM WATER POLLUTION PREVENTION PLAN (SWPPP)  
(B-3-1014)**

**A. General**

1. A SWPPP is required for projects that construction activities will cause a land disturbance of one (1) acre or more. The Department will prepare the SWPPP for the areas within the Right-of-Way, temporary easements and permanent easements.
2. For projects not requiring a SWPPP, the Contractor shall comply with the requirements of Environmental Commitment Document, Paragraph 1.b. of this Special Provision, as applicable.
3. Contractor obtained work areas, located on private property, are not included in the NDOR Project SWPPP.

**B. Temporary Erosion Control Plan**

1. The Contractor shall prepare and submit the Temporary Erosion Control Plan prior to the start of any work. The Contractor shall not begin work until the Temporary Erosion Control Plan has been submitted to the Engineer and appropriate erosion control measures are in place. Payment for any work on the contract will be withheld if erosion control measures are not in place or properly maintained.
2. The Temporary Erosion Control Plan will be reviewed at project progress meetings. All active Contractors shall have their Inspectors present and work in cooperation to determine any necessary changes. Necessary changes will be documented on the Temporary Erosion Control Plan by the Engineer.
3. Payment for preparing the Temporary Erosion Control Plan, inspections and meeting reviews are subsidiary to items that direct payment is made.

**C. Spill Prevention and Control Plan**

1. All project activities shall be addressed in the Spill Prevention and Control Plan. The Contractor shall prepare and submit the plan to the Engineer and install all appropriate spill prevention and control measures prior to the start of any work.
2. The Spill Prevention and Control Plan shall clearly state measures to prevent, contain, document and clean up a spill. It shall state measures for disposal of the contaminated material, disposal documentation and incident review to train personnel to prevent spills from reoccurring.
3. Spill Prevention and Control Plans are applicable to construction sites where hazardous materials are stored, used and/or generated onsite. Hazardous materials include, but not limited to: hazardous wastes, pesticides, paints, cleaners, petroleum products, fertilizers, solvents and porta-potty wastes.
4. Direct payment will not be made for the Spill Prevention and Control Plan.

**D. Migratory Bird Treaty Act Compliance Plan**

1. The Contractor shall not begin work until a Migratory Bird Treaty Act Compliance Plan has been submitted to the Engineer and appropriate nesting migratory bird avoidance measures are in place.
2. a. The Contractor shall clearly state the necessary measures they intend to use to avoid a “Take” of nesting migratory birds in the Migratory Bird Treaty Act Compliance Plan. Measures may include but are not limited to:
  - i. Clearing and grubbing prior to April 1<sup>st</sup> or after September 1<sup>st</sup>
  - ii. Tree removal prior to April 1<sup>st</sup> or after September 1<sup>st</sup>
  - iii. Clearing empty nests on structures prior to April 1<sup>st</sup>
  - iv. Maintaining clear structures until commencement and throughout the duration of work on structures
  - v. Netting structures to prevent nesting
  - vi. Commitment to perform surveys according to protocol
  - vii. Hire a biologist to survey areas to be disturbed prior to commencement of work during the nesting season
  - viii. Submittal of required bird survey reports
  - ix. Training of Contractor Personnel to insure compliance
3. a. The Migratory Bird Treaty Act Compliance Plan is applicable to the entire project site to avoid the “Take” of migratory birds protected under the Migratory Bird Treaty Act.  
b. “Take” is defined as: pursuit, hunt, shoot, wound, kill, trap, capture, collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect.
4. The Migratory Bird Treaty Act Compliance Plan shall adhere to the NDOR’s Avian Protection Plan located at:  
<http://www.transportation.nebraska.gov/environment/guides/avian-protection-plan.pdf>

Direct payment will not be made for the Migratory Bird Treaty Act Compliance Plan.

**E. SWPPP Inspection**

1. The Contractor shall accompany the Engineer on inspections in accordance with the NPDES Construction Storm Water General Permit.
2. The SWPPP will be maintained and updated by the Engineer as work progresses and site conditions change to accurately describe the BMPs that are currently in place.
3. The Contractor’s participation in SWPPP inspections, maintenance and updates shall begin on the first day construction activities cause land disturbance and end

on the date of project completion as evidenced as the completion date in the District Engineer's Letter of Tentative Acceptance.

4. a. The Contractor's Inspector shall be responsible for ensuring that all BMPs are installed in accordance with the contract or the manufacturers' recommendations. The Contractor's Inspector shall be capable of reading and interpreting these documents.
- b. The Contractor's Inspector shall be familiar with product and structural BMPs. The Contractor's Inspector shall inspect, assess, and supervise the maintenance of erosion and sediment control BMPs to ensure compliance with the NPDES Construction Storm Water General Permit while preserving BMP functionality.
5. Payment for project inspection is subsidiary to items that direct payment is made.

### **ENVIRONMENTAL COMMITMENT ENFORCEMENT (B-3-1014)**

#### **A. General**

1. This specification establishes payment and disincentive assessment for the Contractor's performance in complying with Contract Environmental Commitments.
2. Deficiencies are described but not limited to:
  - a. Failure to install pollution prevention control BMPs as work progresses or as described in the SWPPP.
  - b. Failure to maintain existing pollution prevention control BMPs.
  - c. Failure to remove non-functioning pollution prevention control BMPs.
  - d. Failure to comply with USACE Section 404 Permit requirements.
  - e. Failure to comply with NPDES Construction Storm Water General Permit requirements.
  - f. Failure to comply with all applicable statutes relating to pollution of the waters of the state.
  - g. Exceeding the maximum exposed surface area for excavation of 18 Acres without written request for permission and written approval.
  - h. Failure to comply with wildlife species specific conservation conditions.
  - i. Failure to comply with the Contract.
  - j. Failure to comply with the Engineers directives.

**B. SWPPP Deficiency Notification**

1. The Engineer will document and direct the Contractor to correct deficiencies.
2.
  - a. The Contractor shall commence correcting deficiencies, provide adequate equipment and personnel, and diligently pursue correcting deficiencies without cessation until all deficiencies have been corrected.
  - b. The count of Working Days and/or Calendar Days will continue during the time period that corrective work is being performed.
  - c. Delays to the project as a result of the Contractor conducting corrective actions for the Contract Environmental Commitments will not constitute a valid reason for an extension of the contract time allowance.
3. Deficiencies shall be corrected within seven (7) calendar days of notification or within an approved extension. When deficiencies are not corrected within seven (7) calendar days or within an approved extension, the Engineer will make a disincentive assessment to the contract as stated herein.
4.
  - a. If soil, weather, or other conditions prevent the Contractor from completing the corrective actions within seven (7) calendar days, the Contractor shall notify the Engineer in writing. The Contractor's letter shall state the reasons preventing corrective action within the time allowed. The Contractor shall propose a written Corrective Action Plan within 48 hours. Corrective work shall continue while the Corrective Action Plan is developed. The Contractor's Corrective Action Plan must contain a course of action and a time frame for completion. If the reasons and the Corrective Action Plan are acceptable, the Engineer may extend the time in which to complete the corrective work.
  - b. The Contractor will be allowed to proceed with the plan as proposed without incurring a disincentive assessment. If all corrective work is completed within the time allowance shown in the Notification or within an approved extension, a disincentive assessment will not be imposed upon the Contractor.
  - c. Storm events or soil and weather conditions occurring on other projects, which interfere with a Contractor completing corrective actions on the project within seven (7) calendar days, will not be justification for a time extension to complete the corrective work.
5. If all corrective work identified in the Notification has not been completed at the end of the seventh (7<sup>th</sup>) calendar day after the Initial Notice Date or within an approved extension, a Shut-Down Notice will be issued on the eighth (8<sup>th</sup>) calendar day after the Initial Notice Date or on the calendar day following the last day of an approved extension.
6. All operations shall cease as of the date and time cited in the Shut-Down Notice. The Contractor shall work, exclusively, on the deficiencies until all have been

corrected or as directed by the Engineer. Upon issuance of the Shut-Down Notice, a disincentive of \$500.00 per deficiency per calendar day will be assessed thru the day the corrective work is completed, inclusive.

7. The Engineer may require the Contractor to provide a written Procedures Plan that describes the process to prevent reoccurrence of deficiencies. The written Procedures Plan shall be provided within two (2) calendar days of the request. Failure to correct all deficiencies and provide a Procedures Plan may result in payments being withheld until such time that procedures are outlined.
  - a. Payment for preparing a written Procedures Plan is subsidiary to items that direct payment is made.

**C. Storm Event Restoration – Incentive and Disincentive**

1. The Department will pay “Storm Event Restoration - Incentive” when the Contractor completes the restoration work to eliminate the pollution prevention control deficiencies within seven (7) calendar days of Notification or within an approved extension. Multiple deficiencies may be included in one notification. If the restoration work has not been completed within seven (7) calendar days after the Initial Notice or within an approved extension, payment for the item of “Storm Event Restoration - Incentive” will not be made.
2. A storm event is defined as a storm exceeding 0.50 inch of rain in a 24 hour period.
3. The Department will notify the Contractor of pollution prevention control deficiencies.
4.
  - a. Payment for the item of “Storm Event Restoration - Incentive” may not be made when the Contractor is notified to correct pollution prevention devices not installed in accordance with the contract or the manufacturer’s recommended installation instructions.
5. If the restoration work is not completed within seven (7) calendar days or within an approved extension, a disincentive assessment of \$500.00 per deficiency per calendar day will be assessed. The disincentive assessment will begin on the eighth (8<sup>th</sup>) calendar day after the issuance of the Initial Notice Date or on the calendar day following the last day of an approved extension(s) and continue through the day that the restoration work is completed, inclusive.

**D. Method of Measurement**

1.
  - a. “Storm Event Restoration – Incentive” will be measured by the each upon completion of restoration of all deficiencies included in a notification within the allowed time and only one payment per notification is allowed when multiple deficiencies are included on the notification.
  - b. If deficiencies from multiple notifications are restored during the same restoration operation, only one (1) incentive is eligible for payment.



- c. If multiple notifications are the result of successive storm events and deficiencies are transferred to ensuing notifications, incentive payment is only eligible for the latest notification.
- 2. "Storm Event Restoration – Disincentive" will be measured by the calendar day in accordance with Paragraph C.5. above.

**E. Basis of Payment**

- |    |  |   |
|----|--|---|
| 1. | <b>Pay Item</b><br>Storm Event Restoration – Incentive<br>Storm Event Restoration – Disincentive | <b>Pay Unit</b><br>Each<br>Calendar Day |
|----|--|---|
- 2. All equipment, materials, etc. used in the restoration work will be paid for in accordance with Division 800 of the Standard Specifications.
  - 3. Payment is full compensation for all other incidentals required to complete the restoration work included in the notification within the allowed time.

**F. Environmental Commitments – Contractor Compliance**

- 1. To provide payment for all plans, inspections, surveys, reports, travel, qualified inspection persons and any other subsidiary activities for the work of implementing threatened and endangered species commitments, temporary erosion control or any other environmental commitments prescribed in the contract.
- 2. Multiple visits to the project may be required to comply with environmental commitments prescribed in the contract.

**G. Method of Measurement**

- 1. No measurement is required.

**H. Basis of Payment**

- |    |  |                             |
|----|--|-----------------------------|
| 1. | <b>Pay Item</b><br>Environmental Commitments – Contractor Compliance | <b>Pay Unit</b><br>Lump Sum |
|----|--|-----------------------------|
- 2. Partial payments will be made as follows:
    - a. The Department will pay 50 percent of the total amount bid for the item Environmental Commitments – Contractor Compliance within seven (7) calendar days after the Notice to Proceed Date.
    - b. Upon completion of 50 percent of the Original Contract Amount, the Department will pay 30 percent of the amount bid for the item Environmental Commitments – Contractor Compliance.

- c. Upon completion of 75 percent of the Original Contract Amount, the Department will pay the remaining 20 percent of the amount bid for the item Environmental Commitments – Contractor Compliance.
  - d. Failure to comply with any or all of the contract requirements, included for payment under the item of Environmental Commitments – Contractor Compliance, will preclude all payment for the item, including any previous payment.
3. Payment is full compensation for all work prescribed in the contract.

**I. Immediate Action Deficiencies**

1. Deficiencies that pose an imminent threat to the environment are considered an emergency situation. These deficiencies will be identified in the Immediate Action Deficiencies Section of the Environmental Commitment Deficiency Notification Form. The corrective work for Immediate Action Deficiencies shall begin immediately and continue without cessation until completed.
2. The Engineer will issue a shut-down notice. All work on the contract shall cease until the corrective work has been completed. The Engineer may allow the Contractor to continue working in areas unaffected by the Immediate Action Deficiency, provided corrective actions are being actively performed on the deficiency.
3. Immediate Action Deficiencies are not eligible for an incentive payment.
4. The Contractor will be assessed a disincentive assessment of \$1,000.00 per deficiency per calendar day for failure to begin corrective actions or failing to continue to completion as directed by the Engineer or by the regulatory agency with jurisdiction.
5. Examples of Immediate Action Deficiencies include but are not limited to:
  - a. Threatened & Endangered Species habitat protection deficiencies
  - b. USACE Section 404 Permit Noncompliance
  - c. Petroleum Spills/Tank Leakage
  - d. Hazardous Material Spills

**J. Rights Reserved**

1. The Department reserves the right to initiate and perform corrective action on any deficiencies which result from the Contractors' actions, inactions, or for failure to comply with the NPDES Construction Stormwater General Permit, USACE Section 404 Permit, or any other applicable permit.
2. The Contractor shall be liable to the Department for any and all costs incurred by the Department for corrective actions taken by the Department.

3. It is expressly understood that the provisions of this specification shall not relieve the Contractor of their responsibilities nor shall it relieve the Surety of its obligation for and concerning any just claim.
4. The Contractor shall indemnify and save harmless the Department and all of its representatives from any and all actions or claims brought because of the Contractor's actions, inactions, or for failure to comply with the NPDES Construction Storm Water General Permit, USACE Section 404 Permit, or any other applicable permit.

### **SALVAGING AND PLACING TOPSOIL**

Subsection 207.01 in the Standard Specifications is amended to provide that the salvaged topsoil shall be placed 4 inches thick on all disturbed areas.

### **SAWING PAVEMENT**

Paragraph 5. of Subsection 203.04 in the Standard Specifications is void.

### **SUBGRADE PREPARATION (C-1-0307)**

Paragraph 2.a. of Subsection 302.03 in the Standard Specifications is amended to include that trimming on narrow, irregular or roadway grading of 1/2 mile (0.8 km) or less may be accomplished using conventional methods.

### **BRIDGE END PROTECTION**

Bridge ends shall be protected at all times with existing guardrail, new guardrail or concrete protection barriers.

### **TYPE B HIGH INTENSITY WARNING LIGHTS (D-6-0307)**

All references in the plans to Type B High Intensity Warning Lights shall be considered void. The plans will not be revised to reflect this change.

**TEMPORARY TRAFFIC CONTROL DEVICES  
(Type II Barricades, Reflectorized Drums, 42" (1070 mm) Reflective Cones, and  
Vertical Panels)  
(D-6-1112)**

Paragraph 2.d. of Subsection 422.03 in the Standard Specifications is void and superseded by the following:

- d. (1) Reflectorized drums used for traffic warning or channelization shall be constructed of lightweight, flexible, and deformable materials, be a minimum of 36 inches (900 mm) in height, and have a minimum width of 18 inches (450 mm), regardless of orientation. The predominant color of the drum shall be orange.
- (2) Steel drums shall not be used.
- (3) The markings on drums shall be horizontal, shall be circumferential, and shall display four 6-inch (150 mm) wide bands of retroreflective sheeting, alternating fluorescent orange - white – fluorescent orange - white. The fluorescent orange sheeting shall meet the luminance requirements of the following table.

**FHWA Luminance Factor**

Luminance Factor $Y_T$			
Sheeting Type	Min	Max	Fluorescence Luminance Factor Limit, $Y_F$
Fluorescent Orange	25	None	15

- e. When approved by the Engineer or shown in the plans, 42" (1070 mm) reflective cones may be used in lieu of Type II Barricades or Reflectorized Drums. 42" (1070 mm) reflective cones shall include a 30-pound (14 kg) rubber base and display four 6-inch (150 mm) wide bands of retroreflective sheeting, alternating fluorescent orange - white - fluorescent orange - white. 42" (1070 mm) reflective cones shall not be used for lane-closure tapers or shifts.
- f. Rubber base-mounted 36-inch vertical panels shall not be used for channelization when the speed limit exceeds 40 miles per hour.

Paragraph 2.b. of Subsection 422.04 of the Standard Specifications is void and superseded by the following:

- b. (i) Type II Barricades, Reflectorized Drums, and 42" (1070 mm) Reflective Cones shall be counted as "Barricades, Type II" and measured for payment by the number of calendar days each is in place and positioned as shown in the plans or as directed by the Engineer.
- (ii) Vertical Panels shall be measured for payment as permanent "Sign Days" (by the each) by the number of calendar days each vertical panel unit is in place and positioned as shown in the plans or as directed by the Engineer.

Paragraph 2.c. of Subsection 422.04 of the Standard Specifications is amended to include Reflectorized Drums.

Paragraphs 3. and 4. of Subsection 422.05 of the Standard Specifications are void and superseded by the following:

3. a. The pay item "Barricade, Type II" is used to pay for three items ("Barricades, Type II", "42" (1070 mm) Reflectorized Cones", and "Reflectorized Drums").
- b. "Barricades, Type II", which includes "42" (1070 mm) Reflectorized Cones", and "Reflectorized Drums", is paid for as an "established" contract unit price item. The established unit price is identified on the "Schedule of Items" shown in the Proposal.
4. Payment for vertical panels includes all posts, brackets, or hardware necessary to install and maintain the vertical panel units.

### **WORK ZONE TRAFFIC CONTROL SIGNS (D-6-1212)**

The Department has adopted the FHWA 2009 Manual of Uniform Traffic Control (MUTCD) and the 2011 Nebraska Supplement to the MUTCD as the official guidance for work zone traffic control signs. Many work zone traffic control signs have been revised, redesigned, or replaced in the 2009 MUTCD (and 2011 Nebraska Supplement). Accordingly, all work zone signs shall comply with the following:

- 1 - All signs, regardless of age, shall meet the design standards of the 2009 MUTCD (and 2011 Nebraska Supplement).

### **TEMPORARY PAVEMENT MARKING (D-10-0811)**

Paragraph 4.f. of Subsection 422.01 in the Standard Specifications is void.

Paragraph 6.a.(2) of Subsection 422.03 is void and superseded by the following:

- (2) When the markings are no longer needed, the Contractor shall remove them. If removing markings from the final wearing surface, the removal process shall not mar or damage the surface. Removed markings shall no longer be visible on the final wearing surface.

Paragraph 6. of Subsection 422.03 in the Standard Specifications is amended to include the following:

This work shall consist of installing and removing reflectorized temporary pavement lines of the color, width and line configuration shown in the plans or as designated by the Engineer.

Temporary paint markings will be used on this project. The use of Type I tape will not be permitted and Type II tape may be used for short durations only, as directed by the

Engineer. Temporary paint stripes shall be a minimum 4" (100 mm) wide, 10' (3 m) long with a 30-foot (9 m) gap or a minimum 4" (100 mm) wide solid line as shown on the plans.

Temporary pavement marking which is no longer applicable shall be removed as directed by the Engineer.

Paragraph 12.a. of Subsection 422.04 is void and superseded by the following:

- a. "Pavement Marking Removal" and "Temporary Pavement Marking Removal" shall be measured by the linear foot (meter) along the centerline of the traveled roadway for each line removed.

Subsection 422.04 is amended to include the following:

21. The use of paint for Temporary Pavement Marking shall be measured per linear foot (meter) for the item "Temporary Pavement Marking, Type Paint".
22. Temporary pavement marking tape Type II shall be measured per linear foot (meter) for the item "Temporary Pavement Marking, Type II".
23. Initial surface preparation requiring sand or shot blasting shall be measured per linear foot (meter) for the item "Temporary Pavement Marking, Surface Preparation". Surface preparation for repainting, consisting of air blasting and brushing, shall be subsidiary to other items for which payment is made.

Paragraph 1. of Subsection 422.05 is amended to include the following:

<b>Pay Item</b>	<b>Pay Unit</b>
Temporary Pavement Marking Removal	Linear Foot (LF)
Temporary Pavement Marking, Type Paint	Linear Foot (LF)
Temporary Pavement Marking, Type II	Linear Foot (LF)
Temporary Pavement Marking, Surface Preparation	Linear Foot (LF)

Paragraph 9.c. of Subsection 422.05 is void.

Paragraph 13. of Subsection 422.05 is void and superseded by the following:

13. Removal of temporary pavement markings including overlay broken/solid lines will be paid for except:
  - a. When the temporary markings are intended to be covered up by permanent markings.
  - b. When surface preparation removes the temporary markings.

Section 1069 in the Standard Specifications is amended to include the following:

1. Prior to the initial placement of the markings, temporary paint, or Type II tape the pavement upon which the markings are to be placed shall be dry, cleaned and

properly prepared by sand or shot blasting, as a minimum, and to the extent recommended by the manufacturer so that all contaminants, loose debris, and other foreign material are completely removed. Surface preparation for any subsequent application shall consist of air blasting and brushing the roadway surface to remove all loose dirt, mud or other debris and to dry the surface. Each additional application of paint shall be applied over the previously painted stripes.

Prior to placing the temporary pavement markings on the prepared surface, the Contractor shall layout, spot or string line the proposed temporary marking location. The temporary markings shall be aligned in such a way as to provide a smooth and gradual transition to and from the existing markings, and throughout both straight and horizontally curved sections of the project.

2. The material used for temporary paint marking shall be a commercially available acrylic resin Type II traffic paint that dries to no pickup in 4 minutes and shall be applied with a minimum of 6 pounds (0.7 kg) of glass beads per gallon (liter). The paint shall be applied at a minimum width of 4 inches (100 mm) and a wet thickness of approximately 15 mils (380  $\mu$ m) {approximately 16.5 gallons (39 liters) of paint per mile (kilometer) of solid line}. The equipment used to paint the line shall be a machine designed for the purpose of applying long line traffic lane markings of the type, width and thickness required, and shall be self-propelled or truck mounted and be equipped with an adjustable guide-on to assure proper placement of the line. Hand application, walk behind equipment or towing of the equipment will not be allowed.

Temporary paint lines shall be used on new or existing concrete pavement and asphaltic concrete pavement.

Any temporary painted line or segment of line, placed before December 1, which fails to adhere to the roadway surface for a minimum of 60 days under normal vehicular traffic or which appears wavy, nonuniform, thin, poorly applied, misaligned, beadless or nonreflective, shall be replaced as directed by the Engineer. For temporary painted pavement markings placed between December 1 and March 15, the minimum time requirement shall be 15 days with the same conditions applicable. No direct payment will be made for replacement within the 60 day or 15 day warranty periods.

After the minimum 60 day or 15 day warranty periods, the Contractor may be required to repaint the temporary traffic markings, as directed by the Engineer. Direct payment will be made for each additional application. However, should the additional application fail within the 60 day or 15 day warranty periods, the provisions as stated in the previous paragraph shall apply.

The Contractor must begin each additional repainting application within 72 hours after notification by the Engineer. Should the Contractor fail to begin repainting within this 72 hour period, the Engineer may use State forces or hire a private contractor to repaint the temporary traffic markings. The Contractor will be assessed any costs above the contract unit price "Temporary Pavement Marking, Type Paint" incurred by the State as a result of performing the corrective action by others, and the project will be shut down until the painting is completed.

When painting is required with air temperatures between 38° F (3° C) and 50° F (10° C), the paint shall be heated according to the manufacturer's recommendation prior to application on the dry, clean and properly prepared pavement. Any paint application made when the air temperature is below 38° F (3° C) will be paid for by the State, even if the application falls within either the 60 day or 15 day warranty periods previously described.

3. Temporary pavement marking tape Type II shall be a mixture of high quality polymeric materials and pigments, with glass beads throughout the pigmented portion of the film, and a reflective layer of high index of refraction glass beads bonded to the top surface. The film shall be precoated with a pressure-sensitive adhesive. Unless otherwise specified, the temporary pavement marking shall be 4 inches (100 mm) wide and the reflectorizing glass beads shall be incorporated to facilitate removal of the tape easily from asphalt and Portland cement concrete surfaces intact or in large pieces, at temperatures above 40° F (4° C), either manually or with a recommended roll up device. Removal shall be accomplished without the use of heat, solvents, grinding or sandblasting.

## **POLYUREA PAVEMENT MARKING, GROOVED (D-11-0313)**

### **I. Description**

This work shall consist of furnishing and installing retroreflective polyurea pavement markings in accordance with this provision and in conformance to the dimensions and lines shown on the plans or established by the Engineer.

The polyurea marking material shall be applied by spray method onto asphaltic cement concrete and Portland cement concrete surfaces. Following an application of glass beads or black aggregate, and upon curing, the resulting marking shall be an adherent reflectorized stripe of the specified thickness and width that is capable of resisting deformation by traffic.

The Contractor shall field verify the pavement marking quantities required for the project prior to purchasing materials. The Department will not be held responsible for the Contractor's shortage or surplus of material. The Contractor's verification of quantities and purchasing material shall not delay the project or the installation of pavement marking when required.

The polyurea pavement marking shall be applied in grooves cut into the surfacing. The grooves shall be made in a single pass dry cut using stacked diamond cutting heads; the equipment used shall be self-vacuuming and leave the cut groove ready for polyurea pavement marking application. The equipment and method used shall be approved by the polyurea pavement marking manufacturer. The bottom of the groove shall have a fine corduroy finish. If a course, tooth pattern is present, increase the number of blades and decrease the spacers on the cutting head. The polyurea pavement marking shall be applied in the grooves the same day as the cut. Grooves shall be clean and dry prior to polyurea pavement marking application. All conflicting pavement markings remaining after polyurea pavement marking application shall be removed; this removal shall be subsidiary to the pavement marking.



Groove width: pavement marking width + 1 inch to 2 inch maximum  
Groove depth: per manufacturer's recommendations  
Groove length: full length of marking + minimum required grooving transition  
Groove position: 2 inches off of joint line (per plan)

Grooving of the surfacing shall be performed in accordance with the polyurea manufacturer's recommendations. Grooving the surfacing shall not be measured and paid for but shall be considered subsidiary to "\_\_\_\_ Polyurea Pavement Marking, Grooved".

## II. Materials

### A. Polyurea

#### Composition Requirements:

Composition requirements are per manufacturer's specifications. The Polyurea Pavement Markings approved for use are shown on the NDR Approved Products List. Markings which have not been previously approved by the Department will not be permitted on the project until approved by the Traffic Engineer.

#### Properties:

1. Color and Weathering Resistance: The mixed polyurea compound, white, yellow and black, when applied to a 3" x 6" aluminum panels at 15±1 mil in thickness with no glass beads or elements and exposed for 500 hours in a Q.U.V. Environmental Testing Chamber, as described in ASTM-G154, Cycle #1, shall conform to the following minimum requirements. The color of the white polyurea system shall not be darker than Federal Standard No. 595A-17778. The color of the yellow polyurea system shall conform to Federal Standard No. 595A-13538. The color of the black polyurea system shall conform to Federal Standard No. 595A-17038.
2. Track-Free Time (Laboratory): When tested in accordance with ASTM D 711, the polyurea marking material shall reach a track-free condition in 5 minutes or less for a 15 mil thickness. This test shall be performed with AASHTO Type 1 beads coated at a rate of 0.099 pounds per square foot. The track-free time shall not increase substantially with decreasing temperature.
3. Adhesion to Concrete: The polyurea coating, when tested according to ACI Method 503, shall have such a high degree of adhesion to the specified concrete surface that there shall be a 100% concrete failure in the performance of this test. The prepared specimens shall be conditioned at room temperature (75°± 2° F) for a minimum of 24 hours and maximum of 72 hours prior to the performance of the tests indicated.
4. Adhesion to Asphalt: The polyurea coating, when tested according to ACI Method 503, shall have such a high degree of adhesion to the specified

asphalt surface that there shall be a 100% asphalt failure in the performance of this test. The prepared specimens shall be conditioned at room temperature ( $75^{\circ} \pm 2^{\circ}$  F) for a minimum of 24 hours and maximum of 72 hours prior to the performance of the tests indicated.

B. Reflective Media

The reflective media shall be made up of glass beads for drop-on application and shall conform to the following requirements *or be an approved equivalent*.

1. Glass Beads

The required glass beads shall be a 60/40 blend (60% sinkers and 40% floaters) of AASHTO M 247-81 Type I gradation 1.5 index glass beads. The glass beads shall have a minimum of 70% Rounds as measured according to ASTM D1155. Crush Resistance shall be measured according to the procedures of ASTM D1213 and shall be a minimum of 30 pounds retained on US #40 Mesh.

Acid Resistance: A sample of glass beads supplied by the manufacturer shall show resistance to corrosion of their surface after exposure to a 1% solution (by weight) of sulfuric acid. The 1% acid solution shall be made by adding 5.7 cc of concentrated acid into 1000 cc of distilled water.

CAUTION: Always add the concentrated acid into the water, not the reverse. The test shall be performed as follows:

Take a 1" x 2" sample, adhere it to the bottom of a glass tray and place just enough acid solution to completely immerse the sample. Cover the tray with a piece of glass to prevent evaporation and allow the sample to be exposed for 24 hours under these conditions. Then decant the acid solution (do not rinse, touch, or otherwise disturb the bead surfaces) and dry the sample while adhered to the glass tray in a 150° F (66° C) oven for approximately 15 minutes. Microscopic examination (20X) shall show not more than 15% of the beads having a formation of very distinct opaque white (corroded) layer on their entire surface.

C. Non-Reflective Media

Black aggregate shall be broadcast to saturation on all black lines to provide a matte, non-reflective finish. The gradation of the black aggregate is as follows:

U.S. Sieve	Retained (%)
#20	17-37
#30	45-65
#40	14-25
Pan	0-1

**D. Finished Markings**

Because of normal variances in road surfaces, application processes and measurement, the properties of markings made from the materials specified herein will vary from one installation to the next. When the materials are applied according to the specifications in Section III, they shall be capable of forming markings with the following reproducibility of properties:

1. On-the-road Track-Free Time: When installed at 77° F and at a wet film thickness of 15±1 mils, the markings shall reach a no-track condition in less than 3 minutes. Track-free shall be considered as the condition where no visual deposition of the polyurea marking to the pavement surface is observed when viewed from a distance of 50 feet, after a free-rolling traveling vehicle's tires have passed over the line. The track-free time shall not increase substantially with decreasing temperature.
2. Skid Resistance: The average initial skid resistance shall be 45 BPN or greater when tested according to ASTM E303.
3. Reflectance: The initial retroreflectance averaged over many installations shall be at least 500 [(mcd)(ft<sup>-2</sup>)(fc<sup>-1</sup>)] for white and 350 [(mcd)(ft<sup>-2</sup>)(fc<sup>-1</sup>)] for yellow. The standard deviation of initial retroreflectance for many installations shall be no more than 130 [(mcd)(ft<sup>-2</sup>)(fc<sup>-1</sup>)] for both white and yellow.

The initial retroreflectance of a single installation shall be the average value determined according to the measurement and sampling procedures outlined in ASTM D 6359, using a 30-meter retroreflectometer. The 30-meter retroreflectometer shall measure the coefficient of retroreflected luminance,  $R_L$ , at an observation angle of 1.05 degrees and an entrance angle of 88.76 degrees.  $R_L$  shall be expressed in units of millicandelas per square foot per foot-candle [(mcd)(ft<sup>-2</sup>)(fc<sup>-1</sup>)]. The metric equivalent shall be expressed in units of millicandelas per square meter per lux [(mcd)(m<sup>-2</sup>)(lux<sup>-1</sup>)].

Initial performance of pavement markings shall be measured within 14 days after application. The Traffic Engineer shall be notified prior to the placement of pavement markings.

**III. Application**

The Contractor shall furnish equipment and apply the materials according to the following specifications:

**A. Equipment**

Application equipment shall be capable of producing markings that meet the specifications of the manufacturer's listed on the NDR Approved Products List for Polyurea Pavement Marking.

At any time throughout the duration of the project, the Contractor shall provide free access to his application equipment for inspection by the Engineer, his authorized representative or a materials representative.

When black and white polyurea are applied together to create a contrast pattern, they shall be applied from one truck in a single pass operation.

B. Application Conditions:

1. **Moisture:** The markings shall only be applied during conditions of dry weather and when the pavement surface is dry and free of moisture.
2. **Air Temperature:** The markings shall only be applied when road and air temperatures are above 40 degrees F.
3. **Surface Preparation:** Marking operations shall not begin until applicable surface preparation work is completed and approved by the Engineer.
  - 3.1 Prior to applying the markings, the Contractor shall remove any remaining existing markings to expose a minimum of 80% of the pavement surface.
  - 3.2 Prior to applying the markings, the Contractor shall remove all curing compounds on new Portland cement concrete surfaces.
  - 3.3 Prior to applying the markings, the Contractor shall remove all dirt, sand, dust, oil, grease and any other contaminants from the road surface.
  - 3.4 Application over temporary paint is acceptable provided the following conditions are met:
    - 3.4.1 Temporary paint shall be a water-based material
    - 3.4.2 Temporary paint shall be applied at a dry mil thickness of 8 mils or less
    - 3.4.3 If Temporary paint is greater than 8 mils Temporary Line needs to be removed
    - 3.4.4 Temporary paint shall be well worn with minimal glass beads remaining
4. **Dimensions:** The pavement markings shall be placed only on properly prepared surfaces and at the widths and patterns as designated on the contract plans. The markings shall be applied in accordance with the "Manual on Uniform Traffic Control Devices" and in accordance with the Engineer's plans.
5. **Other Restrictions:** The Engineer and/or Contractor shall determine further restrictions and requirements of weather and pavement conditions necessary to meet the all other application specifications and produce markings that perform to the satisfaction of the Engineer.

6. **Binder Thickness:** The polyurea binder (mixed Part A and Part B) coating shall be applied at rates to achieve minimum uniform wet thicknesses as follows:

<b>Surface Type</b>	<b>Recommended Polyurea Pavement Marking Thickness (1 inch=1000 mils)</b>
Existing Smooth Asphalt or Concrete Surface	20±2 mils
New Concrete Surface <sup>1</sup>	20±2 mils
New Asphalt Surface (Standard Asphalt Mix)	20±2 mils
Open Grade Friction Course (OGFC) or Stone Matrix Asphalt (SMA) <sup>2</sup>	25±2 mils
Rough Concrete or Asphalt	22±2 mils
Concrete or Asphalt after Grinding Off Pavement Markings <sup>3</sup>	22±2 mils

- <sup>1</sup> Use thicker binder (20 mils) on new concrete surfaces with heavy tines.  
<sup>2</sup> Very large aggregate sizes for open grade friction course or stone matrix asphalt mixes may require a thickness of 25 mils for proper coverage.  
<sup>3</sup> Pavement marking thickness determined by the type of surface and roughness/texture created from grinding operation.

7. **Reflective Media Application:** The Contractor shall ensure that the reflective media are properly set in the polyurea coating so that their exposed portions are free of polyurea coating material. The specified reflective media shall be dropped per the manufacturer's specified rates to achieve their recommended coating weights:
8. **Volumetric Proportioning:** The Contractor shall ensure proper proportioning as required by manufacturer's specifications and mixing of the polyurea components so that the markings are adequately hardened throughout and are free of soft or uncured material. Typically, such areas will darken over time from dirt and tire residue.
9. **Overspray:** The Contractor shall ensure the polyurea coating does not exhibit excessive overspray.
10. **Adhesion:** The Contractor shall ensure that the polyurea coating is well adhered to the road surface, and that the reflective media are well adhered to the binder.

11. **Marking Performance:** The typical average initial retroreflectance of the markings shall be 500 [(mcd)(ft<sup>-2</sup>)(fc<sup>-1</sup>)] for white and 350 [(mcd)(ft<sup>-2</sup>)(fc<sup>-1</sup>)] for yellow.

The average initial retroreflectance shall be determined according to the measurement and sampling procedures outlined in ASTM D 6359, using a 30 meter retroreflectometer. The 30 meter retroreflectometer shall measure the coefficient of retroreflected luminance,  $R_L$ , at an observation angle of 1.05 degrees and an entrance angle of 88.76 degrees.  $R_L$  shall be expressed in units of millicandelas per square foot per foot-candle [(mcd)(ft<sup>-2</sup>)(fc<sup>-1</sup>)]. The metric equivalent shall be expressed in units of millicandelas per square meter per lux [(mcd)(m<sup>-2</sup>)(lux<sup>-1</sup>)].

Initial performance of pavement markings shall be measured within 14 days after application.

#### IV. **Observation Period**

Following initial completion of all pavement marking, there will be a 180-day observation period before final acceptance. During the observation period, the Contractor, at no expense to the Department of Roads, shall replace any marking that the Engineer determines are not performing satisfactorily due to defective materials and/or workmanship in manufacture and/or application. At the end of the observation period the minimum required retention percentage for marking installed shall be 90%.

Determination of Percentage Retained - The percentage retained shall be calculated as the nominal area of the strip less the area of loss divided by the nominal area and expressed as a percentage of the nominal area. A claim, made by the State against the Contractor, shall be submitted to the Contractor in writing within 30 days after the 180-day observation period. When such a claim is made prior to August 1, the replacement material shall be installed during that same construction season. Replacement material for any claim after August 1, shall be installed prior to June 1, of the following year. Marking replacement shall be performed in accordance with requirement specified herein for the initial application, including but not limited to surface cleaning, sealer application, etc.

Final acceptance of all marking will include an inspection of the appearance of the markings during daylight and darkness. Any markings that fail to have a satisfactory appearance during either period, as determined by the Engineer, shall be reapplied at no expense to the Department of Roads.

Final acceptance of the pavement marking will be: (1) 180 days after the initial completion of all work, or (2) upon completion of all corrective work, whichever occurs last.

#### V. **Contract Units and Basis for Payment**

- A. Linear pavement markings will be measured in linear feet complete-in-place for the width specified.
- B. Arrows and Legends are measured by the each.

Subsection 423.05 of the Standard Specifications is amended to include the item: "\_\_\_\_ Polyurea Pavement Marking, Grooved". Payment shall be full compensation for grooving the pavement surface, furnishing and applying all markings, and for all materials, labor, tools, equipment and incidentals necessary to complete the work.

Payment will be made under:

Pay Item	Pay Unit
____ Polyurea Pavement Marking, Grooved	Linear Feet
____ Polyurea Pavement Marking, Grooved	Each

Payment is full compensation for all work prescribed in this Section.

**TEMPORARY TRAFFIC CONTROL FOR PERMANENT PAVEMENT MARKING  
(D-13-1007)**

Paragraph 4. of Subsection 423.04 in the Standard Specifications is void.

**INERTIAL BARRIER SYSTEM  
(D-14-0509)**

Paragraph 9.b.(5) of Subsection 422.03 in the Standard Specifications is void and superseded by the following:

- (5) All inertial barriers shall have 5 to 15 percent (by volume) rock salt mixed with the filler material.

**CONCRETE PROTECTION BARRIERS  
(D-20-0614)**

Guidance for concrete protection barriers:

1. Type A: 4-loop barriers with a large opening at the bottom.  
Type B: 6-loop barriers with 4 lifting slots and no slots for tie-down rods.  
Type C: 6-loop barriers with 4 lifting slots and 6 slots for tie-down rods.
2. Barriers Type A, B and C may be used on this project and may directly be pinned to each other in the same installation arrangement; however, only Type B or C concrete protection barriers shall be allowed for use on any Interstate roadway or Interstate bridge.
3. Other existing barriers meeting NCHRP 350 or MASH testing guidelines and FHWA approval may only be used with written permission (containing this project name and/or control number) from the District and Roadway Design Division.

4. If new barriers are to be fabricated for use on this project, only Type C barriers shall be fabricated.

Paragraph 5 of Subsection 422.03 in the Standard Specifications is amended to include the following:

- f. (1) Concrete protection barriers that become dislodged or moved out of alignment shall be placed back in alignment as soon as practical. If the dislodged barriers are considered to be a hazard to the traveling public by the Engineer, or the barriers encroach into the traveled lane, the barriers shall be realigned within four (4) hours of the time the Contractor is notified. For each occurrence, failure to realign the barriers within the four (4) hour time period will result in the assessment of a lump sum \$1,000 liquidated damage assessment and the Engineer may proceed to correct the adverse condition(s) in a manner that is deemed appropriate. The Contractor will also be assessed the cost incurred when the action is performed by others. This assessment has not been provided for elsewhere in the contract and shall be considered in addition to other liquidated damage assessments which are a part of the contract.

## **TRAFFIC CONTROL MANAGEMENT**

### **Description and General Requirements**

Paragraph 1. of Subsection 422.01 in the Standard Specifications is void and superseded by the following:

1. a. This work consists of furnishing, installing at the locations shown on the plans, operating, maintaining, and when work is complete, removing the temporary traffic control devices described in this Section. This work shall also consist of providing Traffic Control Management by furnishing one or more qualified individuals who shall be specifically responsible for performing or supervising the installation, inspection, maintenance, and removal of those devices.
- b. When project conditions warrant, the Engineer may suspend the need for Traffic Control Management and will notify the Contractor accordingly. The Contractor shall be given at least three days' notice of the suspension, but the work may be suspended in a lesser time if mutually acceptable to the Department and the Contractor. During periods when no payment is being made for Traffic Control Management under this special provision, this provision will not apply.

Paragraphs 2.i., 2.j.(2)(ii), and 2.k. of Subsection 422.01 of the Standard Specifications are void.

Paragraph 2. of Subsection 422.01 of the Standard Specifications is amended to include the following:

- p.(1) The Contractor shall designate an individual, other than the Project Superintendent, to be the Traffic Control Manager for the project. This person shall be qualified by having attended and having satisfactorily passed the examination which accompanies the training for the courses for Traffic Control Supervisor or Traffic Control Technician offered by the American Traffic Safety



Services Association (ATSSA). The training shall have been completed no more than 4 years prior to working on the project. Formal certification by ATSSA in these disciplines is encouraged, but not mandated. Other training or certifications may be accepted if approved by the Engineer. The Traffic Control Manager shall also possess a current Flagger Certification Card. Documentation of the Traffic Control Manager's training or certifications shall be provided to the Engineer prior to the installation of any traffic control devices on the project.

- (2) The Contractor may also designate one or more Assistant Traffic Control Managers for the project. These individuals shall possess a valid Flagger Certification Card and be qualified by having attended and having satisfactorily passed the examination which accompanies the training for the course for Traffic Control Technician or Traffic Control Supervisor offered by the American Traffic Safety Services Association (ATSSA) --- the training having been completed no more than 4 years prior to working on the project --- or by certification according to the Department's certification program for Assistant Traffic Control Managers --- the training having been completed no more than 2 years prior to working on the project . Documentation of the Assistant Traffic Control Manager's training or certifications shall be provided to the Engineer.
- (3) In order to be qualified according to the Department's Certification Program, the prospective Assistant Traffic Control Manager must:
  - i. View the 47-minute video "Training and Certification of Assistant Traffic Control Managers."
  - ii. Correctly answer 80 percent of the questions on an examination that accompanies the video.
- (4) Upon satisfactory completion of the training and examination procedure, the prospective Assistant Traffic Control Manager shall be issued an Assistant Traffic Control Manager Certification Card by the examining Contractor. The Assistant Traffic Control Manager's name, last four digits of social security number, and test score shall be reported to the Construction Engineer on DR Form 90a, "Certification Report for Assistant Traffic Control Managers."
- (5) The video examination forms, Assistant Traffic Control Manager Cards, and Certification Reports for Assistant Traffic Control Managers shall be furnished by the Department.
- q. The Traffic Control Manager or Assistant Traffic Control Manager shall be available and reasonably accessible (within 30 minutes) to the project during normal working hours on every day that work is being performed on the project and always on-call at other times. During other than normal working hours, these individuals shall respond and be on the project within 60 minutes of notice being given that traffic control items on the project are in need of attention. The Contractor may elect to have an employee or employees perform this function simultaneously on more than one project, but shall not be relieved from the sanctions or disincentives that may be imposed for failure to meet the deadlines specified herein.

- r. The Traffic Control Manager's or Assistant Traffic Control Manager's activities on the project shall be dedicated to the purpose of monitoring and maintaining the traffic control devices. The performance of other crafts or trades will be permitted, but shall be secondary to the performance of duties associated with traffic control.
- s. The Contractor shall provide prior to the installation of any traffic control devices on the project two to four telephone numbers where the Traffic Control Manager or an Assistant Traffic Control Manager may be reached 24 hours a day, seven days a week.
- t. The Traffic Control Manager or Assistant Traffic Control Manager shall have available at all times an approved, current version of the Traffic Control Plan.
- u. If corrective action is not taken by the Contractor within the times specified in Paragraph 2.q., the Engineer may suspend all work on the project until the problem is corrected. The Engineer shall make reasonable allowance for existing weather conditions in the case of materials whose installation is governed by temperature or other atmospheric conditions.

### **Construction Methods**

Subsection 422.03 of the Standard Specifications is amended to include the following:

- 20. The Traffic Control Manager's or Assistant Traffic Control Manager's duties shall include:
  - a. Insuring that all traffic control devices, including flagging operations, are functioning properly, are clean, and are correctly located as shown on the Traffic Control Plan or as directed by the Engineer. This provision in no way restricts the cleaning, repair and maintenance of traffic control devices to the Traffic Control Manager or his or her assistants.
  - b. Inspecting all traffic control devices on every calendar day that traffic control devices are in place, whether in use or covered. Inspections shall take place a minimum of twice daily, at least two inspections shall be eight hours apart, and at least one weekly inspection shall be during the hours of darkness. However, during or following periods of inclement weather or when the situation warrants for other reasons, inspections shall be done more frequently. Additionally, when flagger control is being utilized, at least one inspection each week shall be performed during flagging operations for monitoring purposes. The Traffic Control Manager or Assistant Traffic Control Manager shall perform the inspections.
  - c. Monitoring the cleaning and maintenance of all traffic control devices and the placement of temporary pavement markings.
  - d. Completing a Traffic Control Inspection Form provided by the Engineer at the completion of each inspection. These forms shall be submitted daily to the Engineer, either in person or via facsimile transmission.

- e. Monitoring flagging operations on the project to insure signing and flagging techniques are in compliance with Department and ATSSA requirements (flagger location and proper spacing / signage as per the plans). The Traffic Control Manager or Assistant Traffic Control Manager shall not act as a flagger, except in an emergency or when providing relief for short periods of time.
- f. Coordinating all traffic control operations, including those of subcontractors and suppliers.
- g. Coordinating traffic-related activities with the appropriate law enforcement, fire, and emergency medical agencies.
- h. Attending all project scheduling meetings.

**Method of Measurement**

Subsection 422.04 of the Standard Specifications is amended to include the following:

- 21.(1) Traffic Control Management is measured by the day for the actual number of days management and inspection are required and provided. Payment will only be made for one day of Traffic Control Management during each midnight-to-midnight period regardless of the number of Traffic Control Managers or Assistants required to adequately perform the work.
- (2) No measurement will be made when the Engineer has suspended the need for Traffic Control Management and notified the Contractor accordingly.

**Basis of Payment**

Paragraph 1. of Subsection 422.05 of the Standard Specifications is amended to include the following:

<b>Pay Item</b>	<b>Pay Unit</b>
Traffic Control Management	Day (d)

Paragraph 15. of Subsection 422.05 of the Standard Specifications is renumbered to be Paragraph 16. Subsection 422.05 of the Standard Specifications is amended to include the following:

- 15. With regard to inspection, maintenance and repair of temporary traffic control devices, an assessment in the amount of \$500 per occurrence per day shall be charged to the Contractor when any of the following occur (these assessments shall be in addition to any other liquidated damages which may be assessed):
  - a. The Contractor fails to respond within the timeframe specified in Paragraph 2.q. of the amended Subsection 422.01 of the Standard Specifications. Response time shall begin when:
    - 1) The Engineer notifies the Contractor of deficiencies in person;

- 2) The Engineer makes notification of deficiencies via the 24-hour phone number(s) provided by the Contractor; or
  - 3) The Engineer leaves a message or receives no answer at the number(s) provided;
- b. The Contractor fails to begin corrective actions to repair, replace, remove, relocate, or clean any traffic control devices or pavement markings within two hours of the completion of an inspection that uncovers deficiencies or within two hours of notification of deficiencies by the Engineer (including flagging operations).
  - c. The Contractor fails to begin corrective actions to repair, replace, remove, relocate, or clean any traffic control devices or pavement markings within two hours of documented notification by an official law enforcement agency (including flagging operations).
  - d. The Contractor fails to correct improper flagging procedures.
  - e. The Contractor fails to make or report the inspections prescribed in this specification.
  - f. The Engineer observes and documents any occurrence of the Contractor or his or her subcontractors flagrantly disregarding the necessary maintenance of traffic control devices that are in obvious need of attention.

### **RELOCATE INERTIAL BARRIER SYSTEM**

Paragraph 19.b. of Subsection 422.04 in the Standard Specifications is void and superseded by the following:

- b. "Relocate Inertial Barrier System" is the pay item for moving the inertial barrier system to a new location after initial installation and operation.

Paragraph 1. of Subsection 422.05 is amended to include the following:

1.	<b>Pay Item</b>	<b>Pay Unit</b>
	Relocate Inertial Barrier System	Each (ea)

### **REMOVABLE BLACK TAPE, TYPE 4**

#### **I. Description**

This work shall consist of furnishing and installing removable black tape in accordance with this provision and in reasonably close conformance to the dimensions and lines shown on the plans or established by the Engineer. The removable black tape shall be placed along the left edge of the removable white tape, or as directed by the Engineer.

## II. Materials - General

The patterned tape shall be precoated with a pressure sensitive adhesive and shall be capable of being adhered to existing markings, asphalt cement concrete (ACC) or portland cement concrete (PCC) in accordance with the manufacturer's instructions without the use of heat, solvents or other additional adhesives, and shall be immediately ready for traffic after application. The bidder shall identify equipment necessary for proper application and removal, and make recommendations for application that will assure effective product performance.

The removable black tape shall be suitable for use for one year after the date of receipt when stored in accordance with the manufacturer's recommendations.

The removable black tape approved for use is shown on the NDR Approved Products List.

## III. Classification

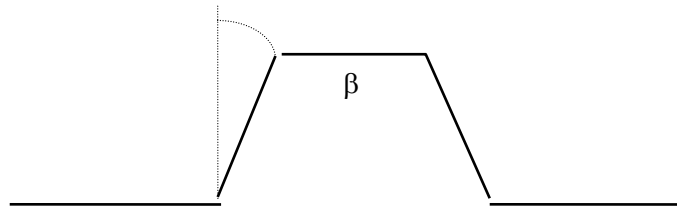
The removable black tape shall be a highly durable, skid resistant, non-reflective, pliant polymer tape. The black tape shall be removable when no longer needed.

## IV. Requirements

**Composition:** The removable black tape shall not contain metallic foil and shall consist of a mixture of high quality polymeric materials, pigments and inorganic fillers distributed throughout its base cross-sectional area, with a matte black non-reflective top layer. The patterned surface shall have a minimum of 20% of the surface area raised and coated with non-skid particles. The channels between the raised areas shall be substantially free of particles. The film shall be precoated with a pressure sensitive adhesive. A non-metallic medium shall be incorporated to facilitate removal.

**Skid Resistance:** The surface of the removable black tape shall provide an initial average skid resistance value of 60 BPN when tested in accordance with ASTM E 303.

**Thickness:** The patterned material, without adhesive, shall have a minimum caliper of 0.075" (1.651mm) at the thickest portion of the patterned cross-section and a minimum caliper of 0.015" (0.381mm) at the thinnest portion of the cross-section.



**Removability:** The removable black tape shall be removable from asphalt concrete and Portland cement concrete intact or in large pieces, either manually or with a roll-up device, at temperatures above 40°F (4°C) without the use of heat, solvents, grinding or blasting.

**V. Installation**

The markings shall be applied in accordance with the manufacturer's installation instructions. Marking configurations shall be in accordance with the "Manual on Uniform Traffic Control Devices." Tape shall not be installed unless the surface and air temperatures are in compliance with the manufacturer's specifications. Pavement markings shall be applied to clean, dry surfaces in accordance with the manufacturer's installation instructions or a method approved by the Engineer.

The Contractor shall have on the project at all times during the application of the removable pavement markings at least one employee with a valid American Traffic Safety Services Association (ATSSA) certification. The ATSSA certification may be for either a "Certified Pavement Marking Technician" or a "Certified Pavement Marking Specialist." The Contractor shall provide the Engineer a copy of the employee's certification prior to the beginning of work.

**VI. Observation**

During the project phase the markings are intended for, the Contractor, at no expense to the Department of Roads, shall replace any markings that the Engineer determines are not performing satisfactorily due to defective materials and/or workmanship in manufacture and/or application. The installation of all markings will include an inspection of the appearance of the markings during daylight and darkness. Any markings that fail to have a satisfactory appearance during either period, as determined by the Engineer, shall be reapplied at no expense to the Department of Roads.

**VII. Removal**

Upon completion of the project or phase, the Contractor shall remove the tape in whole. The removal procedure shall not damage the roadway surface.

**VIII. Contract Units And Basis For Payment**

Subsection 422.01 of the 2007 Standard Specifications is amended to include the item: "Removable Black Tape, Type 4". The price shall be full compensation for furnishing, installing, and removing all markings, and for all materials (including adhesive), labor, tools, equipment and incidentals necessary to complete the work.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
____ Inch Black Removable Tape, Type 4	Linear Foot

**REMOVABLE WET REFLECTIVE TAPE, TYPE 4**

**I. Description**

This work shall consist of furnishing and installing retroreflective preformed patterned pavement markings in accordance with this provision and in reasonably close conformance to the dimensions and lines shown on the plans and/or required by the

Engineer.

## II. Materials - General

The preformed patterned markings shall consist of white or yellow films with clear microcrystalline ceramic beads incorporated to provide immediate and continuing retroreflection during both wet and dry conditions. This film shall be manufactured without the use of lead chromate pigments or other similar, lead-containing chemicals.

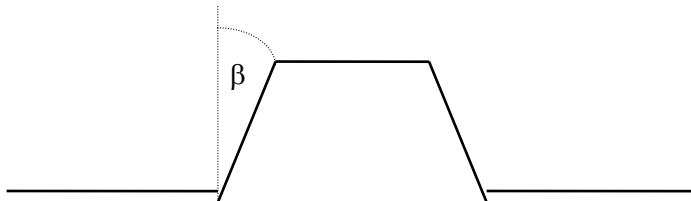
The quality of the pavement marking shall be such that the performance requirements for the marking shall be met. The markings shall be precoated with a pressure sensitive adhesive and shall be capable of being adhered to Asphalt concrete or Portland cement concrete at temperatures as low as 50°F (10°C) in accordance with the manufacturer's recommendations. When stored in a cool dry area indoors, the materials shall be suitable for use for one year after the date of purchase.

## III. Classification

The removable retroreflective pavement marking tape must be designed and constructed in such a manner that it can be readily removed when the markings are no longer applicable. The tape shall be capable of performing for the duration of a normal construction season and shall then be capable of being removed intact or in large pieces. The tape shall be wet and dry reflective throughout its useful life. (A normal construction season is defined as the time after the last snowplowing in the spring and before the first snowplowing in the fall/winter.)

## IV. Composition and Retroreflectivity Requirements

Composition: The retroreflective pliant polymer pavement markings shall consist of a mixture of high-quality polymeric materials, pigments and glass beads distributed throughout its base cross-sectional area, with a reflective layer of microcrystalline ceramic beads bonded to a durable polyurethane topcoat surface. The patterned surface shall have approximately 20%  $\pm$  10% of the surface area raised and presenting a near vertical face ( $\beta$  angle of 0° to 60°) to traffic from any direction. (See diagram below.) The channels between the raised areas shall be substantially free of exposed beads or particles.



Retroreflectance: The white and yellow markings shall have the initial expected retroreflectance values as shown in Table 1 under dry, wet, and rainy conditions. The photometric quantity to be measured shall be coefficient of retroreflected luminance ( $R_L$ ) and shall be expressed as millicandelas per square foot per foot-candle  $[(\text{mcd} \cdot \text{ft}^{-2}) \cdot \text{fc}^{-1}]$ . The metric equivalent shall be expressed as millicandelas per square meter per lux  $[(\text{mcd} \cdot \text{m}^{-2}) \cdot \text{lx}^{-1}]$ .

Retroreflectance values shall be measured under dry conditions in accordance with the testing procedures of ASTM D4061.

Retroreflectance values shall be measured under wet conditions in accordance with ASTM E2176 or ASTM E2177. Wet retroreflectance values measured under a “condition of continuous wetting” (simulated rain) shall be in accordance with ASTM E2176, and to reduce variability between measurements, test method shall be performed in controlled laboratory environment while the marking is positioned with a 3 to 5 degree lateral slope. A wetting agent shall be used to improve wetting of the pavement marking by the water. It is recommended that a 0.1% by volume liquid soap solution be used. Measurements shall be reported as an average for each roll tested, in a minimum of three locations.

Wet retroreflectance values measured under a “condition of wetness” shall be in accordance with ASTM E2177, and the test may be performed with the marking installed on the road. New markings shall be tested using a wetting agent, as previously described. Laboratory measurements shall be performed using a 3 to 5 degree lateral slope. Measurements shall be reported as an average for each roll tested, in a minimum of three locations

**Table 1**  
**Expected Initial  $R_L$  under dry, wet, and rainy conditions**

<b>White</b>	<b>Dry</b>	<b>Wet &amp; Rainy</b>
Entrance Angle	88.76°	88.76°
Observation Angle	1.05°	1.05°
Retroreflected Luminance $R_L [(mcd \cdot m^{-2}) \cdot lx^{-1}]$	500	250

<b>Yellow</b>	<b>Dry</b>	<b>Wet &amp; Rainy</b>
Entrance Angle	88.76°	88.76°
Observation Angle	1.05°	1.05°
Retroreflected Luminance $R_L [(mcd \cdot m^{-2}) \cdot lx^{-1}]$	300	200

Note: The test instrument shall use an Entrance Angle of 88.76° and Observation Angle of 1.05° which represents a simulated driver viewing geometry at a 30 meter distance.

Beads: Index of Refraction: All “dry-performing” microcrystalline ceramic beads bonded to the polyurethane-coated, patterned surface of the material shall have a minimum index of refraction of 1.70 when tested using the liquid oil immersion method. All “wet-performing” microcrystalline ceramic beads bonded to the polyurethane-coated, patterned surface of the material shall have a minimum index of refraction of 2.30 when tested using the liquid oil immersion method. The glass beads mixed into the pliant polymer shall have a minimum index of refraction of 1.5 when tested by the liquid oil immersion method.



## Testing Procedure For Refractive Index of Beads By Liquid Immersion

### Equipment Required:

1. Microscope (minimum 100X magnification)
2. Light source - preferably sodium light or other monochromatic source, but not absolutely essential
3. Refractive index liquids
4. Microscope slide and slide cover
5. Mortar and pestle

### Procedure:

1. Using the mortar and pestle, crush a few representative beads and place a few of these crushed particles on a microscope slide.
2. Place a drop of a refractive index liquid, with an index as close to that of the glass as can be estimated, on the particles.
3. Cover the slide with a microscope slide cover and view the crushed particles by transmitted light normal to the slide surface (illuminated from the bottom).
4. Adjust the microscope mirror to allow a minimum light intensity for viewing. This is particularly important if sodium light is not used.
5. Bring a relatively flat and transparent particle into focus.
6. By slightly raising and lowering the objective (microscope tube), look for one or both of the following:
  - a. Becke Line - This light line will appear to move either into the particle or away from it. In general, if the objective is raised, the line will move toward the material of higher refractive index; if the objective is lowered, the line will move toward the material of lower index.
  - b. Variation in Particle Brightness - When raising the object from a sharp focus, the particle will appear to get brighter or darker than the surrounding field. If it becomes brighter, the glass has a higher refractive index than the liquid. If it becomes darker, the glass has a lower refractive index than the liquid. In both cases, the opposite will be true if the object is lowered.
7. This test can be used to confirm that the beads are above or below a specified index. It can also be used to give an accurate determination of the index ( $\pm 0.001$ ). This is done by using several refractive index liquids until a match or near match of indices occurs. The index of the glass will equal that of the liquid when no Becke line and no variation in bead brightness can be observed.

The size and quality of the beads shall be such that the performance requirements for the retroreflective pliant polymer shall be met.

**Acid Resistance:** The beads shall show resistance to corrosion of their surface after exposure to a 1% solution (by weight) of sulfuric acid. The 1% acid solution shall be made by adding 5.7cc of concentrated acid into 1000cc of distilled water. **CAUTION:** Always add the concentrated acid into the water, not the reverse. The test shall be performed as follows:

Take a 1-inch x 2-inch sample, adhere it to the bottom of a glass tray and place just enough acid solution to completely immerse the sample. Cover the tray with a piece of glass to prevent evaporation and allow the sample to be exposed for 24 hours under these conditions. Then decant the acid solution (do not rinse, touch or otherwise disturb the bead surfaces) and dry the sample while adhered to the glass tray in a 150° F. (66° C.) oven for approximately 15 minutes.

Microscopic examination (20X) shall show no more than 15% of the beads having a formation of a very distinct opaque white (corroded) layer on their entire surface.

**Color:** The preformed markings shall consist of white film with pigments selected and blended to conform to standard highway colors.

**Removability:** The pavement markings shall be removable from Asphalt concrete and Portland cement concrete intact or in large pieces, at temperatures above freezing without the use of heat, solvents, grinding or blasting without permanently scarring the roadway surface.

**Skid Resistance:** The patterned surface of the retroreflective pliant polymer shall provide an initial average skid resistance value upon manufacturing of 45 BPN when tested according to ASTM E303 except values shall be taken in one direction and then at a 45° angle from that direction. These two values shall then be averaged to find the skid resistance of the patterned surface.

**Patchability:** The pavement marking material shall be capable of use for patching worn areas of the same type in accordance with manufacturer's instructions.

**Thickness:** The patterned material without adhesive shall have a minimum caliper of 0.075 inches (1.651mm) at the thickest portion of the patterned cross-section and a minimum caliper of 0.020 inches (.508mm) at the thinnest portion of the cross-section.



## V. Installation

The markings shall be applied in accordance with the manufacturer's installation

instructions. Marking configurations shall be in accordance with the "Manual on Uniform Traffic Control Devices." Tape shall not be installed unless the surface and air temperatures are in compliance with the manufacturer's specifications. Pavement markings shall be applied to clean, dry surfaces in accordance with the manufacturer's installation instructions or a method approved by the Engineer.

The Contractor shall have on the project at all times during the application of the removable pavement markings at least one employee with a valid American Traffic Safety Services Association (ATSSA) certification. The ATSSA certification may be for either a "Certified Pavement Marking Technician" or a "Certified Pavement Marking Specialist." The Contractor shall provide the Engineer a copy of the employee's certification prior to the beginning of work.

**VI. Observation**

During the project phase the markings are intended for, the contractor, at no expense to the Department of Roads, shall replace any markings that the Engineer determines are not performing satisfactorily due to defective materials and/or workmanship in manufacture and/or application. The installation of all markings will include an inspection of the appearance of the markings during daylight and darkness. Any markings that fail to have a satisfactory appearance during either period, as determined by the Engineer, shall be reapplied at no expense to the Department of Roads.

**VII. Removal**

Upon completion of the project or phase, the Contractor shall remove the tape in whole. The removal procedure shall not damage the roadway surface.

**VIII. Contract Units And Basis For Payment**

Subsection 422.01 of the 2007 Standard Specifications is amended to include the item: "Removable Wet Reflective Tape, Type 4". The price shall be full compensation for furnishing, installing, and removing all markings, and for all materials (including adhesive), labor, tools, equipment and incidentals necessary to complete the work.

Payment will be made under:

<b>Pay Item</b>	<b>Pay Unit</b>
___ Removable Wet Reflective Tape, Type 4	Linear Foot

**INSTALL OVERLAY SIGN**

Subsection 417.05 of the 2007 Standard Specifications is amended to include the following:

Temporary overlay signs to be installed shall be obtained at a location determined by the Engineer. A manner of installation shall be chosen such that the mounting of the overlay sign shall not cause the existing sign to become unsuitable. Tape shall not be applied to sign sheeting at any time.

Upon the completion of the work requiring the overlay the sign shall be removed from the existing sign. A manner of removal shall be chosen such that the removal of the overlay sign shall not cause the existing sign to become unsuitable. Upon removal the Overlay sign shall be returned to a location determined by the Engineer.

If damage to the sign occurs during removal, storage or installation, the sign shall be replaced by the Contractor at no cost to the Department.

The pay item for this work shall be "INSTALL OVERLAY SIGN" and the unit price shall be by the Each (ea).

Payment is full compensation for installation and removal of the overlay sign.

### **SURFACING UNDER GUARDRAIL (E-3-1212)**

Amend Section 503 in the Standard Specifications to include Surfacing Under Guardrail.

At the Contractor's option, the surfacing may be constructed using Class "47B-3000" Concrete, Class "AX-3000" Concrete, Class "PR-3000" Concrete (Class 47B-20 Concrete, Class AX-20 Concrete, Class PR-20 Concrete), or any commercially produced hot mix asphaltic concrete, which has been approved by the Engineer. These materials may be used interchangeably during the course of the work except that surfacing at any individual location must be completed with the same material with which the work was begun.

If concrete is used in the surfacing, it shall reach a minimum strength of 3000 psi (20 Mpa) before opening to traffic.

Amend Subsection 302.04 in the Standard Specifications to provide that the work of subgrade preparation for surfacing under guardrail will not be measured for payment, but shall be considered subsidiary to the item "Surfacing Under Guardrail".

Subsection 304.04 in the Standard Specifications is amended to provide that the work of earth shoulder construction associated with surfacing under guardrail will not be measured for payment, but shall be considered subsidiary to the item "Surfacing Under Guardrail."

Subsection 503.05 in the Standard Specifications is amended to provide that P.G. Binder used in the asphaltic concrete will not be measured for payment, but shall be considered subsidiary to the item "Surfacing Under Guardrail".

Subsection 504.04 in the Standard Specifications is amended to provide that the application of a tack coat, including furnishing emulsified asphalt, will not be measured for payment, but shall be considered subsidiary to the item "Surfacing Under Guardrail".

The work and materials required for any drainage curb placed on surfacing under guardrail will not be measured and paid for, but will be considered subsidiary to the item "Surfacing Under Guardrail".

The work and materials required for surfacing under guardrail will be paid for at the contract unit price per square yard (square meter) for the item "Surfacing Under Guardrail". Payment will be

full compensation for the work prescribed in these Special Provisions and the Standard Specifications.

**COLD WEATHER ASPHALTIC CONCRETE PLACEMENT  
(E-8-1214)**

Table 501.02 in the Standard Specifications is void and superseded by the following:

**Table 501.02**

<b>Cold Weather Asphaltic Concrete Placement</b>	
<u>Lift Thickness</u>	<u>Minimum Surface Temperatures*</u>
Less than 2 inches (50 mm)	45°F (7°C)
2 to 3 inches (50 mm to 75 mm)	37°F (3°C)
Greater than 3 inches (75 mm)	35°F (2°C)

\*32°F (0°C) for all lift thicknesses when a Warm Mix Additive is used in accordance with the contract.

**ASPHALTIC CONCRETE  
(E-8-1211)**

Paragraph 2.a.5.(ii) of Subsection 503.03 is void and superseded by the following:

During storage, the PG Binder temperature shall be maintained in accordance with binder supplier recommendations. All plants shall be equipped with a circulating system for PG Binder which is designed to assure proper and continuous circulation during the operating period. Storage tanks shall have sufficient capacity to provide for continuous operation. The tanks shall be situated and constructed to allow the volume of the PG Binder to be safely and accurately determined at any time.

Paragraph 2.a. of Subsection 503.04 is void and superseded by the following:

2. Asphalt Mix Control Strip:
  - a. At the Contractor's option, the control strip may be waived. The decision to omit the control strip must be communicated to the Engineer prior to the start of production. When the control strip is waived:
    - (1) The moving average of four air voids values for the first three asphaltic concrete sublots is not valid and a pay factor of 1.0 shall be applied.
    - (2) The first three asphaltic concrete sublots shall be subject to the following removal criteria and removal shall be at no cost to the Department.

Sublot	Removal Criteria
1-1	$V_{a_{1-1}}$ less than 1.5 or greater than 7.0
1-2	$(V_{a_{1-1}} + V_{a_{1-2}}) \div 2$ less than 1.67 or greater than 6.67
1-3	$(V_{a_{1-1}} + V_{a_{1-2}} + V_{a_{1-3}}) \div 3$ less than 1.83 or greater than 6.33

Where:  $V_{a_{1-1}}$  = the single test air voids for Sublot 1-1  
 $V_{a_{1-2}}$  = the single test air voids for Sublot 1-2  
 $V_{a_{1-3}}$  = the single test air voids for Sublot 1-3

- b. On the first production day, a 600 ton (544 Mg) control strip shall be placed and approved before full production begins. The Contractor shall construct the control strip using the approved asphalt mix design with laydown and compaction procedures that are representative for the project.
- c. The Contractor shall take at least 3 control strip mixture samples and record the test results for the mixture properties. The Contractor will also record compaction density values and rolling pattern information. This data will be for information only and shared with the Engineer.

Table 503.02 is void and superseded by the following:

**Table 503.02**

Control Strip Sampling			
Sample No.	Ton (Mg)	Air Voids for SPH	Air Voids for SPR
1	0 to 200 (0-180)	2.5 to 6.0	1.5 to 5.0
2	201 to 400 (181-363)	2.5 to 6.0	1.5 to 5.0
3	401 to 600 (364-544)	2.5 to 6.0	1.5 to 5.0

Paragraph 2.b.(2) of Subsection 503.04 is void and superseded by the following:

- (2) Marshall or Gyratory air voids of each sample shall be calculated using the maximum specific gravity of that sample.

Paragraph 2.b.(4) of Subsection 503.04 is void and superseded by the following:

The control strip will be accepted at 100% pay if all of the following test results are met. If any of the following test results are not met, the control strip will be subject to removal.

- (i) The Dust to Binder ratio is between 0.70 and 1.70.
- (ii) CAA is no more than 5% lower than the minimum specified shown on Table 1028.02 using blended cold feed material or ignition oven test results. FAA is no more than 0.5% lower than the minimum specified using blended cold feed material or no more than 1.0% lower than the minimum specified using ignition oven test results shown on Table 1028.03.

- (iii) Air voids are between 2.5% to 6.0% for SPH and between 1.5% to 5.0% for SPR.

Paragraph 2.h. of Subsection 503.04 is void.

Paragraph 2.j. of Subsection 503.04 is void and superseded by the following:

- j. When a control strip is constructed, the Contractor will use the three individual air void tests within the control strip and apply those individual values to the individual air void test result of the first 750 ton (680 Mg) subplot of Lot 1 to calculate the initial moving average of four and resulting pay factor for the initial 750 ton (680 Mg) subplot.

Paragraphs 5.a.(1) and 5.a.(3) of Subsection 503.04 are void and superseded by the following:

- a. (1) The actual mixing temperature shall be selected by the Contractor, in accordance with binder supplier recommendations, to provide adequate aggregate coating and mixture compaction at laydown.
- a. (3) Never shall the selection of the mixing temperature be such that drainage of the PG Binder from the aggregate will exceed contract specifications.

Paragraphs 10.a. and 10.b. of Subsection 503.04 are void.

Paragraphs 2.a. and 2.b.(1) of Subsection 503.06 are void.

Paragraph 2.b. (2) of Subsection 503.06 is void and superseded by the following;

- (2) For each subplot of Asphaltic Concrete Type SPR, SPS and SPH, the asphaltic concrete unit price is a product of all applicable pay factors for the item "Asphaltic Concrete, Type \_\_\_\_\_". Included in a subplot, following approval of the control strip(s), may be any roadway Asphaltic Concrete Type SPR, SPS and SPH which is produced, sampled and tested and approved by the Engineer for use as Patching, State Maintenance Patching, and Asphalt for Intersections and Driveways on project shall be eligible for inclusion in subplot(s) tonnage pay factor determination using the roadway Asphaltic Concrete Type \_\_\_\_\_ unit price. When a control strip is not constructed, the pay factor for the running average of four air voids shall be fixed at 1.0 for the first three asphaltic concrete subplots.

Paragraphs 5.a., 5.b., and 5.c. of Subsection 503.06 are void and superseded by the following:

- 5. a. When asphaltic concrete in any lot 3750 tons (3400 Mg) or portion of a lot 3750 tons (3400 Mg) is rejected and removed from the road, payment will not be made for the asphaltic concrete or for the PG Binder contained in the rejected material. The determination of the quantity of PG Binder for which payment will not be made will be based on the percent of PG Binder used in the rejected material.

- b. The order of precedence to determine the PG Binder quantity is:
- (1) Actual lot 3750 tons (3400 Mg) tests.
  - (2) The average of the day's run.
  - (3) The job-mix formula.

Paragraph 12. of Subsection 503.06 void.

**TACK COAT  
(E-8-1214)**

Subsection 504.02 in the Standard Specifications is amended to include the following:

**Table 504.01**

CFS-1, FS-1 Emulsified Asphalt Requirements	
Tests on emulsion:	Specification
Viscosity, Saybolt Furol, T 59, 25°C (77°F), sec.	20 – 100
Sieve Test, % Retained, maximum (note 1)	0.10
Residue by Distillation, %, minimum	57.0
Storage Stability, %, maximum (note 1)	1.0
Tests on distillation residue:	
Penetration, dmm.	40 - 175
Ductility, 25°C (77°F), cm., minimum	40
Solubility in Trichloroethylene, %, minimum	97.5
Note 1: See note "b" of AASHTO M 208 Shall be formulated as either a cationic or anionic, fast-setting emulsion that is suitable for tack coat dilution, and to have an accelerated breaking time in cooler temperature applications.	

Subsection 504.03, Paragraph 3.b. is void and superseded by the following:

- b. Emulsified asphalt shall be diluted in the distributor with potable water at a rate of one part water to one part emulsified asphalt.

Subsection 504.03, Paragraph 3.c. is void and superseded by the following:

- c. The rate of application shall be adequate to bond the new bituminous layer to the existing surface. This shall be from 0.10 to 0.20 Gal/SY (0.45 to 0.90 L/m<sup>2</sup>) when applied to existing or milled surfaces, and from 0.05 to 0.10 Gal/SY (0.23 to 0.45 L/m<sup>2</sup>) when applied to freshly laid asphaltic concrete.



Paragraph 2. of Subsection 504.05 is void and superseded by the following:

2. Any amount of tack coat emulsified asphalt which is outside the specified property ranges of Table 504.02, shall be paid for at the contract unit price multiplied by the pay factor determined in Table 504.02. If the resultant Pay Factor for the material indicates rejection as an option, the Engineer will determine if the non-compliant material will be removed.

**Table 504.02**

Tolerances and Pay Factors		
Specified Property	Tolerance	Pay Factor
AASHTO T 59, Prior to Dilution, Residue after Distillation	≥ 56.0%	1.00
	54.0% - 55.9%	0.85
	52.0% - 53.9%	0.70
	< 52.0%	0.40 or Reject
<p>Pay Factors for Tests for ALL other Properties Specified*</p> <p>1.00 for deviation of ± less than or equal to 10%                      0.75 for a deviation of ± greater than 10% to less than or equal to 25%                      0.40 or Reject for deviation of ± greater than 25%</p> <p>* When the specification requirement is stated as a percentage, the test result deviation from the specification will be divided by the specification value. The resulting deviation percentage is then applied to the listed criteria.</p> <p>Note: When more than one specified property exceeds specification tolerances, the single largest Pay Factor Reduction will be the one applied.</p>		

Paragraph 3. of Subsection 504.05 is void and superseded by the following:

3. When disputes arise in test results, the Department will select an independent laboratory for referee testing on the remainder of the sample. The identity of the independent laboratory will not be revealed until the selected laboratory has completed the referee testing.
  - a. Only the Contractor can initiate dispute resolution, and request referee testing.
  - b. If the independent lab's tests indicate failing results and pay deductions equal to or greater than the Department's, the Contractor will reimburse the Department for the cost of testing. If the independent lab's tests indicate that the material meets specifications or is at a pay deduction less than the Department's, the Department will assume the cost of testing. When the independent lab's tests indicate a pay deduction, the lesser of the Department's and the independent lab's deductions will be applied.

Paragraph 4. of Subsection 504.05 is void and superseded by the following:

4. Water used to dilute emulsified asphalt is subsidiary to "Tack Coat" and is included in the solution that is placed and measured for payment.

Subsection 504.05 is amended to include the following:

5. Payment is full compensation for all work prescribed in this Section.

### **BITUMINOUS PAVEMENT PATCHING (E-8-1212)**

Paragraphs 1, 2 and 3 of Subsection 516.05 in the Standard Specifications are void and superseded by the following:

1. a. Bituminous Pavement Patching of flexible pavement and the repair or replacement of any subgrade material authorized by the Engineer will be measured by one of the methods described in Paragraph 1.b. based upon the depth of the patch.
  - b.(1) For patches 16-inches (40cm) deep or less, determined at the time of patching, the patching will be measured by the ton (megagram) of "Asphaltic Concrete for Patching, Type \_\_\_\_" required to complete the patch and repair any faulty subgrade. No equipment rental will be paid for this work, and all equipment used to complete the work shall be subsidiary to the item, "Asphaltic Concrete for Patching, Type \_\_\_\_."
  - (2) For patches more than 16 inches (40cm) deep, determined at the time of patching, the patching will be measured by the ton (megagram) of "Asphaltic Concrete for Patching, Type \_\_\_\_" required to complete the patch and repair any faulty subgrade. Additionally, the hours of equipment rental required to complete the patching and repair in that portion of the patch deeper than 16-inches will be measured by the hour of equipment rental in accordance with Section 919. Only approved equipment needed to patch and excavate the failure is to be rented, and only the time utilized to perform the work in the region deeper than 16-inches (40 cm) is to be measured. Excluded is any equipment needed to haul asphalt to the site.
2. a. Bituminous Pavement Patching of concrete pavement and the repair or replacement of any subgrade material authorized by the Engineer will be measured by the square yard (square meter) of completed and accepted work regardless of depth. Additionally, the asphaltic concrete used to complete the patch will be measured for payment and included with the roadway tonnage.
  - b. Bituminous Pavement Patching of concrete pavement is divided into 3 types (see Table 516.02). The types are based on the size of the individual patches constructed in a single lane. If a damaged area spans 2 or more lanes, then the continuous patch will be counted as multiple patches -- 1 patch per lane.

**Table 516.02**

<b>Asphalt Patch Sizes in Rigid Pavement</b>	
<b>Type</b>	<b>Size</b>
A	5 SY (5 m <sup>2</sup> ) or less
B	Greater than 5 SY to 15 SY (5 m <sup>2</sup> to 12.5 m <sup>2</sup> )
C	Greater than 15 SY (12.5 m <sup>2</sup> )

3. “Asphaltic Concrete, Type \_\_\_\_\_,” “Asphaltic Concrete for Patching, Type \_\_\_\_\_,” “Asphalt Cement \_\_\_\_\_,” and “Hydrated Lime for Asphalt Mixtures” used in either the patching of flexible pavement or concrete pavement will be measured for payment by the ton (megagram) in accordance with Subsection 503.05.

### **DROP-OFF/COLD-MILLED TAPERED EDGE (E-8-0613)**

Paragraph 7. of Subsection 107.07 is void and superseded by the following.

7. a. The Contractor shall conduct all operations to minimize any drop-offs (abrupt changes in roadway elevation) exposed to traffic.
- b.(1) Unless otherwise specified in the Contract, drop-offs greater than 2 inches tall at the shoulder edge that are adjacent to the traveled way shall be protected by a wedge of compacted stable material capable of carrying traffic (the wedge being 1 vertical to 3 horizontal or flatter). An edgeline warning stripe shall be placed on the traffic side of the drop-off.
- (2) The Engineer shall authorize other methods, such as concrete barriers or Type II barricades, to protect drop-offs when conditions do not allow a wedge of compacted, stable material.
- (3) Unless otherwise ordered by the Engineer, drop-offs up to 2 inches (50 mm) may remain exposed with appropriate warning signs alerting motorists to the condition.
- c. Open trenches which span all or part of the traveled way and/or auxiliary lanes shall be no wider than 18 inches (450 mm) and must have a steel-plate cover placed and anchored over them. The plate shall have sufficient strength so as to only allow a maximum vertical deflection of 1/2 inch (12.5 mm). A wedge of suitable material shall create a smooth transition between the pavement and the steel plate. Warning signs shall be used to alert motorists to the presence of the steel plates.

Paragraph 3.b. of Subsection 510.04 is void and superseded by the following.

3. b. The Contractor shall not leave a milled vertical edge greater than 1-inch tall between lanes overnight. One of the following options shall be performed if the milling will result in a vertical grade separation greater than 1 inch (25 mm) between lanes:
- (1) Milling shall be performed in all adjacent traffic lanes on the same day so that at the end of each day, no drop off of over 1 inch (25 mm) remains.

- (2) The milling shall create a tapered edge between the traffic lanes. The tapered edge shall have a slope from 3 [H]: 1 [V] to 4 [H]: 1 [V], not measured more than one foot in width nor extend into the lane more than one foot. Temporary pavement marking shall be placed at the top and contiguous with the tapered edge.
- c. If the Contractor fails to complete the above options, the Contractor shall provide – at no cost to the Department – additional traffic control necessary to maintain traffic on the milled lane (or lanes) as directed by the Engineer. This additional traffic control may require the use of a pilot car, flaggers, lighted flagger station, etc.
- d. Transitions between milled and unmilled in the direction of travel surfaces will be feathered either by milling or with wedges of bituminous material (maximum slope 1 vertical to 12 horizontal).

### **OPTIONAL NOTCHED WEDGE JOINT (E-8-1013)**

#### **Description**

The Contractor has the option of constructing a notched wedge joint. If the Contractor chooses to construct this joint, it shall be built as shown on the plans and to the following requirements:

Paragraph 5.e. of Subsection 503.04 is void if a notched wedge joint is constructed between the adjacent traffic lanes.

This work shall consist of constructing a notched wedge longitudinal joint between adjacent passes of asphaltic concrete lifts over 1" on pavement that will be open to traffic and contains uneven lanes. The notched wedge joint shall consist of a vertical notch  $\frac{1}{2}$  the thickness of the asphalt lift, and an 8" to 12" uniform taper extending into the adjoining lane (see plan typical).

#### **Equipment**

1. The notched wedge joint device shall be a manufactured strike-off device attached to the asphalt paver screed and able to produce the required shape and configuration after compaction, as detailed in the plan typical.
2. The device shall be self-adjusting, spring-loaded, and able to generate a smooth, uniform surface and slope without disrupting the smoothness of the paving mat.
3. The device shall be capable of applying vertical loads by pressure or ballasting methods.
4. The device may or may not have capability of vibration.

### **Construction Method**

1. The notched wedge joint device shall be heated prior to the beginning of laydown either manually or as part of the notched wedge joint device.
2. The notched wedge joint shall be constructed in one pass of the paver. A constant head of asphaltic concrete shall be supplied in front of the notched wedge to provide pre-compaction of the notched wedge joint.
3. The taper of the notched wedge joint will be a minimum of 8" and a maximum of 12".
4. The notched wedge joint shall be used at any longitudinal joint locations situated between two driving lanes. The Contractor also has the option to utilize the notched wedge joint at other longitudinal joint locations.
5. A tack coat shall be applied to the full face of the in-place notched wedge joint, prior to the placement of full lane tack coat application.

### **Method of Measurement**

The construction of a notched wedge joint will not be measured and paid for but will be subsidiary to the associated asphaltic concrete.

## **ASPHALTIC CONCRETE PLACEMENT**

The 3 inch Asphaltic Concrete Type SLX overlay shall be placed in two 1-1/2 inch lifts.

## **CONCRETE SURFACE MILLING**

Subsection 510.04 of the Standard Specifications is amended to include the following:

The Contractor shall use waterblasting equipment operated with sufficient consistent pressure to effectively clean the pavement surface of all dirt, foreign materials, loose surfacing material, and any residue before placement of the asphaltic concrete overlay. Care shall be taken to prevent any debris or construction materials from entering any inlets on the project that lead directly to:

1. waterways,
2. poorly-vegetated ditches, or
3. well-vegetated ditches having less than 200 feet between the conduit outlet and the point of discharge of the ditch into a waterway.

Inlets shall not be blocked or otherwise restricted in such a way to cause water to collect within an active traffic lane.

The concrete must be completely dry before placement of any asphaltic concrete on these areas.

All material salvaged from this operation shall become the property of the Contractor and shall be removed from the project.

**CONCRETE PAVEMENT CORING  
(F-17-0110)**

Paragraphs 3. a. and 3.b. of Subsection 603.05 of the Standard Specifications are void and superseded by the following:

3. a. (1) A pay factor will be applied to each unit based on the compressive strength of 1 core per unit tested in accordance with AASHTO T 24.
- (2) Concrete cores must have a minimum age of 28 days before testing.
- (3) The paved area shall be divided into units, and each unit will be considered separately.
- (4) Units are 750 linear feet (230 m) of pavement for each separately placed width or width of each class of concrete whether or not placed separately starting at the beginning of the pavement.
- b. (1) When any unit core fails to have the required minimum compressive strength, the Contractor will have the option to obtain, at no cost to the Department, two additional cores from that unit provided that:
  - (i) The cores shall be cut by the contractor. (The cutting to be witnessed by the Engineer)
  - (ii) The cores shall be cut within seven (7) days of being notified of the strength deficiency, and
  - (iii) The cores shall be cut within 6 inches of the original unit core in the longitudinal direction.
- (2) The Engineer will take possession of the cores and have them tested within 24 hours at the Materials and Research laboratory.
- (3) The results of all three cores sampled at the location will be averaged for the final compressive strength calculation and pay factor.
- (4) The Department may agree to cut the additional cores if requested to do so by the Contractor, but will do so only if the Department's coring crew is available on the project and has sufficient time to cut and transport the cores for testing during normal working hours within seven (7) days of the Contractor being notified of the strength deficiency.

Paragraph 4.a.(4) of Section 603.05 in the Standard Specifications is void and replaced by the following:

A separately placed width is the width between field constructed longitudinal joints, between a longitudinal construction joint and the edge, or between two pavement edges. A separately placed width may include more than one pay class of concrete, such as doweled and non-doweled.

**PORTLAND CEMENT CONCRETE PAVEMENTS  
GENERAL REQUIREMENTS  
(F-20-0611)**

Paragraph 7.b. of Subsection 601.02 in the Standard Specifications is void and superseded by the following:

- b. The finishing machine shall travel at a controlled speed such that it produces a uniform, well consolidated pavement that does not contain large voids.

Paragraph 10.d. of Subsection 601.02 is void and superseded by the following:

- d. The Contractor shall always have a tachometer available to monitor vibrator frequency. The vibrator frequency shall be within the manufacturer's specifications not to exceed 9,000 vpm.

Paragraph 12.d.(1) of Subsection 601.02 is void and superseded by the following:

- (1) The mechanical joint saw shall have an adjustable guide to insure a true line is cut. The mechanical joint saw blade shall be water-cooled, or specifically designed for early-entry sawing if air cooled.

Paragraph 12.d.(2) of Subsection 601.02 is void.

Paragraph 12.d.(3) of Subsection 601.02 is void and superseded by the following:

- d. (3) The joint cut shall be made with a diamond-toothed blade.

**CONCRETE PAVEMENT  
(F-21-0611)**

Paragraph 2.a. of Subsection 603.03 in the Standard Specifications is amended to include the following:

- (6) The base material shall be moistened through a uniform, lightly applied spray pattern prior to concrete placement as directed by the Engineer.

Paragraphs 2.d. and e. of Subsection 603.03 are void and superseded by the following:

- d. After being consolidated with internal mechanical vibration, the concrete shall be struck off to a uniform height approximately 0.5 inch (12 mm) above the finished surface and then finished to the final elevation by means of a vibrating mechanical or vibrating hand operated screed.
- e. Finished concrete shall be of uniform density with no segregation, honeycombing, or large voids.

Paragraph 3.f. of Subsection 603.03 is void and superseded by the following:

- f. (1) A wet burlap, carpet, or canvas drag will be drawn over the entire surface in a longitudinal direction for a final finish, dampening of this drag material will be accomplished through a uniform, lightly applied spray pattern.
- (2) The drag shall be suspended from a mandrel, or similar device, to insure a uniform texture.
- (3) The drag shall be lifted from the surface of the concrete pavement when the paving train is not in motion for 30 minutes or more and carefully reset before resuming the dragging operations.
- (4) Drags shall be rinsed or washed as necessary to obtain a uniform surface. Drags that cannot be cleaned shall be replaced.

Paragraphs 4.e., f., g., and h. of Subsection 603.03 are void and superseded by the following:

- e. For areas with pavement widening, dowel baskets shall be placed in all transverse contraction joints which are 6 feet (1.8 mm) or wider.
- f. If normal vibration is found inadequate to thoroughly consolidate the plastic concrete within and around the dowel basket assemblies, adjustments to the material and/or operations shall be made.
- g. Precautions shall be taken to assure that the sawed contraction joint is located directly over the center of the dowel bars.
- h. Transverse cracks which form in the concrete pavement panels between load transfer joints shall be stitched as shown in the plans, described in the Special Provision or repaired as directed by the Engineer. No payment will be made for this work.

Paragraph 6.b.(7)(i) of Subsection 603.03 is void and superseded by the following:

- (7) (i) The concrete shall be textured by dragging a wet burlap, carpet, or canvas belt over the full width of the surface in a longitudinal direction. Dampening of this drag material will be accomplished through a uniform, lightly applied spray pattern.

Paragraph 6.c.(4)(i) of Subsection 603.03 is void and superseded by the following:

- (4) (i) The concrete shall be textured by dragging a wet burlap, carpet, or canvas belt over the full width of the surface in a longitudinal direction. Dampening of this drag material will be accomplished through a uniform, lightly applied spray pattern.

Paragraph 7.a.(3) of Subsection 603.03 is void and superseded by the following:

- (3) (i) The curing compound shall be applied in 2 equal applications immediately following each other or other methods approved by the Engineer.



- (ii) The total rate of applications shall be at a minimum of 1 Gal/100 SF (0.3 L/m<sup>2</sup>) of surface area for tined surfaces or 1 Gal/150 SF (0.2 L/m<sup>2</sup>) of surface area for all other finishes.

Paragraph 8.a.(6) of Subsection 603.03 is voided and superseded by the following:

- (6) Any panels that contain random cracking will be considered unacceptable. The Engineer will decide whether to replace or repair the panel. The Contractor shall replace or repair these panels at the direction of the Engineer at no cost to the Department. A 20% deduction will be assessed on any repaired panel. Any panel that is replaced will not be assessed a 20% deduction.

Paragraph 8.d.(3) of Subsection 603.03 is void.

Paragraphs 8.d.(4), (5) and (6) of Subsection 603.03 are void and superseded by the following:

- (4) Before sealing, the joint wall (not the bottom of joint) surfaces shall be sandblasted or water-blasted to remove all dirt, curing compound residue, laitance, and any other foreign material. After sandblasting, the entire joint shall be cleaned with compressed air having a minimum pressure of 90 psi (620 kPa). The compressed air shall be free of oil, water, and other contaminants. The joints shall be dry at the time of sealing.
- (5) (i) Transverse contraction joints in Portland cement concrete pavements shall be sealed so that the joint is filled to approximately 1/8" to 3/8" (3 to 9 mm) below the top of the joint with an approved hot poured sealant.
  - (ii) All overflow material shall be removed from the surface of the pavement.
  - (iii) If adhesion is not satisfactory, the material shall be rejected.
- (6) The Contractor shall give the Engineer one copy of the hot pour manufacturer's sealing recommendations.

Paragraph 9.b. of Subsection 603.03 in the 2007 edition of the NDOR Standard Specifications for Highway Construction is void and superseded by:

- b. When the pay item "Portland Cement Concrete Smoothness Testing" is not included in the contract, the Contractor shall test the hardened concrete for surface irregularities with a California Profilograph. Areas showing high spots (bumps) in excess of 0.30 inches in a 25 foot span will be plainly marked on the pavement and on the printed pavement profile trace. All identified high spots shall be ground to the required profile. The grinding shall be performed so that the cement-aggregate bond is not broken. The equipment and profilograph test procedure requirements of Section 602 of the Standard Specifications for Highway Construction shall apply to this surface testing.

Paragraph 9.c of Subsection 603.03 is amended to include:

- c. At the Engineer's option, the use of a 10 foot straightedge to locate high spots in excess of 1/8 inch may be allowed in lieu of bump detection using a profilograph testing.

Paragraphs 11.c., d. and e. of Subsection 603.03 are void and superseded by the following:

- c. The Contractor's forces may be allowed on the concrete pavement when the concrete has reached a minimum age of 14 days or when the concrete has reached a compressive strength of 3000 psi (24 MPa) when tested in accordance with ASTM C 39.
- d. With the approval of the Engineer, the Contractor may elect to increase the early strength of the concrete by adding cement and/or reducing the water/cement ratio, and then the pavement may be opened to traffic provided it has attained a compressive strength of 3500 psi (24 MPa). The concrete in the area where the early strength is required shall be paid for at the bid price.
- e. When required by the Special Provisions or when requested by the Contractor, the maturity method, as provided for in ASTM C 1074, may be used in lieu of the requirements of Subsection 603.03, Paragraph 10.c. and d. to determine the strength of concrete pavement for the purpose of early opening to traffic. Requests by the Contractor for use of the maturity method shall be on a project basis and shall be made in writing to the Materials and Research Engineer. The Contractor shall be responsible to coordinate with the Materials & Research Division to develop the maturity curve.

Paragraph 3.a. and b. of Subsection 603.05 is void and superseded by the following:

- 3. a. A pay factor will be applied to each unit based on the compressive strength of 1 core per unit tested in accordance with AASHTO T 24. Concrete cores must have a minimum age of 28 days before testing. The Contractor will have the option to obtain two additional cores for any unit core that fail to have the required minimum compressive strength provided that the cores are:
  - (1) Obtained and tested within seven (7) days of being notified of the strength deficiency, under the supervision of the Engineer.
  - (2) Cut within 6 inches of the original unit core in the longitudinal direction.

The results of all three cores sampled at the location will be averaged for the final compressive strength calculation and pay factor.

- b. The paved area shall be divided into units. Each unit will be considered separately. Units are 750 linear feet (230 m) of pavement for each separately placed width, or width of each class of concrete whether or not placed separately starting at the beginning of the pavement.

Paragraph 4.a.(7) of Subsection 603.05 is void and superseded by the following:

- (7) At the option of the Engineer, cores may not be required from irregular areas with widths less than 8 feet (2.4 m) or from an individual pavement type that involve less than 5,000 square yards (4200 m<sup>2</sup>) of pavement.

Paragraph 4.c.(4) of Subsection 603.05 is void and superseded by the following:

- (4) If the average thickness of the cores is deficient by more than 0.25 inch (6 mm) but not more than 0.50 inch (12.5 mm) an adjusted unit price will be paid in accordance with Table 603.04. Cores deficient by more than 0.50 inch (12.5 mm) will be treated as prescribed in Paragraph 4.d. of this Subsection.

### **PREFORMED EXPANSION JOINT (G-11-1212)**

Section 734 of the Standard Specifications is void and superseded by the following:

#### **Description**

1. This work shall consist of furnishing and installing a Preformed Expansion Joint in a preformed gap at the locations and limits shown on the plans.
2. The Preformed Expansion Joint shall be either a Precompressed Polyurethane Foam Joint or a Preformed Silicone Joint, as indicated in the plans.
  - a. When the item is "Precompressed Polyurethane Foam Joint, Type \_\_\_\_" the joint shall be a Precompressed Polyurethane Foam Joint of the type indicated in the plans.
  - b. When the item is "Preformed Silicone Joint, Type \_\_\_\_", the joint shall be a Preformed Silicone Joint of the type indicated in the plans.
  - c. When the item is "Preformed Expansion Joint, Type \_\_\_\_", the joint may be either a Precompressed Polyurethane Foam Joint or a Preformed Silicone Joint of the type indicated in the plans.

#### **Material Requirements**

1. Precompressed Polyurethane Foam Joints:
  - a. PPF Joint shall be precompressed self-expanding polyurethane foam with factory applied silicone facing on top of the foam.
  - b. PPF joints shall be ordered for the joint material dimension shown in the plans.
  - c. Approved PPF Joint systems are shown on the NDOR Approved Products List under Precompressed Polyurethane Foam Joint, Type A or B.
2. The approved Preformed Silicone Joint systems are shown on the NDOR Approved Products List under Preformed Silicone Joint, Type A or B.
3. Primers, epoxy adhesives, and silicone sealants shall comply with the manufacturer's recommendations.
4. Materials shall be resistant to ozone, ultraviolet rays, petroleum products, solvents, industrial cleaners, corrosive vapors and acids.

5. Joint material shall be delivered to the Contractor's storage area and to the job site in the Manufacturer's original undamaged containers with wrapping intact. Storage of joint material shall be in a dry, enclosed area, off the ground, between 60°F (16°C) and 75° F (24°C) and out of direct sunlight until immediately prior to installation.

**Construction Methods**

1. The installation of the Preformed Expansion Joint and the adhesives shall be completed according to the manufacturer's specifications. Additional field applied silicone is required on both sides of the top of the joint. Any installation that fails to meet the manufacturer's specifications shall be removed and replaced at no cost to the Department.
2. The installation instructions and specifications shall be given to the Engineer 7 days prior to the installation.
3. The Preformed Expansion Joint shall be installed in the presence of the Engineer.
4. The joint opening in the concrete shall be cleaned by sandblasting and shall be dry and free of oil and other deleterious materials before the installation of the Preformed Expansion Joint.
5. The installation of the Preformed Expansion Joint shall be completed between 45°F (7°C) and 90°F (32°C).
6. Any joint material damaged during corrective grinding shall be replaced at no cost to the Department.

**Method of Measurement**

1. The Preformed Expansion Joint shall be measured for payment by the linear foot (meter) of the joint properly installed and accepted by the Engineer.
2. Pay limits for the Preformed Expansion Joints shall be the horizontal distance from end to end along the centerline of the joint assembly at the locations shown in the plans and 1 foot (0.3 m) upward at the gutter line if shown.

**Basis of Payment**

- |  |  |                 |                 |                                      |                              |  |                              |                                     |                              |
|--|--|-----------------|-----------------|--------------------------------------|------------------------------|--|------------------------------|-------------------------------------|------------------------------|
| <ol style="list-style-type: none"> <li>1.</li> </ol> | <table border="0"> <tr> <td style="text-align: center;"><b>Pay Item</b></td> <td style="text-align: center;"><b>Pay Unit</b></td> </tr> <tr> <td>Preformed Expansion Joint, Type ____</td> <td>Linear Foot (LF) [Meter (m)]</td> </tr> <tr> <td>Precompressed Polyurethane Foam Joint, Type ____</td> <td>Linear Foot (LF) [Meter (m)]</td> </tr> <tr> <td>Preformed Silicone Joint, Type ____</td> <td>Linear Foot (LF) [Meter (m)]</td> </tr> </table> | <b>Pay Item</b> | <b>Pay Unit</b> | Preformed Expansion Joint, Type ____ | Linear Foot (LF) [Meter (m)] | Precompressed Polyurethane Foam Joint, Type ____ | Linear Foot (LF) [Meter (m)] | Preformed Silicone Joint, Type ____ | Linear Foot (LF) [Meter (m)] |
| <b>Pay Item</b>                                      | <b>Pay Unit</b>  |                 |                 |                                      |                              |  |                              |                                     |                              |
| Preformed Expansion Joint, Type ____                 | Linear Foot (LF) [Meter (m)]   |                 |                 |                                      |                              |  |                              |                                     |                              |
| Precompressed Polyurethane Foam Joint, Type ____     | Linear Foot (LF) [Meter (m)]   |                 |                 |                                      |                              |  |                              |                                     |                              |
| Preformed Silicone Joint, Type ____                  | Linear Foot (LF) [Meter (m)]   |                 |                 |                                      |                              |  |                              |                                     |                              |
| <ol style="list-style-type: none"> <li>2.</li> </ol> | <p>Payment is full compensation for furnishing and installing the Preformed Expansion Joint and for all labor, equipment, tools and incidentals necessary to complete the work.</p>  |                 |                 |                                      |                              |  |                              |                                     |                              |

## **SILICONE JOINT SEALER (G-12-0109)**

### **Description**

1. This work shall consist of providing and installing silicone joint sealers in a preformed roadway gap at the locations and limits shown in the plans.

### **Material Requirements**

1. The approved products for the Silicone Joint Sealers are shown on the NDOR Approved Products List under Silicone Joint Sealer. Care shall be taken to order the right material and backer rod according to the dimensions of the joints shown on the plans.
2. Storage
  - a. Sealant material shall be delivered to the storage area and to the job site in the manufacturer's original, undamaged containers with wrapping intact.

### **Construction Methods**

1. The installation of the Silicone Joint Sealers shall be completed according to the manufacturer's Specifications. Any installation that fails to meet the manufacturer's specifications shall be removed and replaced at no cost to the NDOR.
2. The Silicone Joint Sealers installation instructions / specifications shall be given to the Engineer 7 days prior to the installation.
3. The installation of the Silicone Joint Sealers shall be done in the presence of the Engineer.
4. The joint opening in the concrete shall be cleaned by sandblasting and shall be dry before the installation of the Silicone Joint Sealers.
5. As the material is self leveling, the Contractor is responsible for containing it in the joint until it has retained its set and may need to apply more material as needed to get the desired depths at all locations.

### **Method of Measurement**

1. The silicone joint sealer shall be measured for payment by the linear foot (meter) of the joint installed and accepted by the Engineer.
2. Pay limits for the silicone joint sealer shall be the horizontal distance from end to end along the centerline of the joint assembly at the locations shown in the plans.

### **Basis of Payment**

1. 

<b>Pay Item</b>	<b>Pay Unit</b>
Silicone Joint Sealer	Linear Foot (LF) [Meter (m)]
2. Payment is full compensation for all labor, materials, tools and incidentals necessary to complete the work.

## **BRIDGE JOINT NOSING**

### **Description**

This work shall include sawing, removals (including existing angle irons), forming, and placing of the bridge joint nosing materials required at the expansion joint locations, as specified in the plans. This provision applies to:

- New construction, such as when a new approach slab is being constructed
- Breaking out concrete bridge deck or approaches and building new expansion joint seat
- Saw cutting existing concrete to allow installation of a new expansion joint
- Repairing broken edges of expansion joint gaps such as with nosing material
- Asphalt overlays on bridge decks and approaches

### **Material Requirements**

Products for repair of expansion joint seats or gap edges or used to enhance the durability of gap edges are known as nosing materials. Such materials are given on the Approved Products List as "Bridge Joint Nosing Materials". Products not shown on the Approved Products List may be used as allowed by Materials and Research Division.

### **Equipment**

Appropriate equipment, in good working order shall be employed to ensure proper mixing and timely application of nosing materials.

### **Construction Methods**

Construction of expansion joint seats shall be done as shown in the plans and compliant with all applicable Special Provisions.

All faces of the joint gap or seat shall be laid out in a straight line (shall not deviate from a straight line by more than  $\frac{1}{4}$  inch at any point). This rule is applicable to whatever method is used to construct the gap, whether it is saw cutting, concrete forming, placing nosing material, etc.

Nosing materials shall be used as prescribed by the manufacturer. In addition, or to augment the manufacturer's instructions as to preparation, all concrete surfaces against which repair or reconstruction material is to be placed, shall be thoroughly cleaned and free of all dust, laitance, moisture or any substances that may interfere with proper adhesion of the material to the concrete. Concrete against which nosing materials are applied shall have been cured for a period as specified by the nosing manufacturer.

### **Method of Measurement**

The quantity of nosing for which payment will be made shall be computed by the Department in cubic feet from dimensions shown in the plans. No field measurement is required unless actual geometry deviates substantially from what is shown in the plans. No deduction shall be made for the amount of material displaced by reinforcement.

**Basis of Payment**

The Bridge Joint Nosing shall be paid by the cubic foot of the nosing installed and accepted by the Engineer. Preparation of the joint, including sawing, removals, sandblasting and forming will not be paid for directly but shall be considered subsidiary to the Bridge Joint Nosing.

<b>Pay Item</b>	<b>Pay Unit</b>
Bridge Joint Nosing	Cubic Feet (CF)

**COLD LIQUID-APPLIED MEMBRANE****000.01 - Description of Work**

1. This work shall consist of providing and installing a seamless spray elastomer waterproofing membrane to suitable concrete or miscellaneous metal surfaces. The tack coat and asphaltic surface course is not part of this item.

**000.02 - Material Requirements**

1. The Cold Liquid-Applied Membrane (CLAM) shall be a spray applied, 100% solids, fast cure, and high-build polymer system consisting of the following components:
  - a. A two component polymer primer shall be applied at 130-200 ft<sup>2</sup>/gallon, or at the rate specified by the manufacturer.
    - (1) The primer materials shall meet the requirements shown in Table 1.
    - (2) The primer shall be provided by the same manufacturer as the base membrane.
  - b. The base membrane shall be applied to the primer at a minimum thickness of 80 mils or at the minimum thickness required to pass the crack bridging test, whichever is thicker.
    - (1) The base membrane materials shall meet the requirements shown in Table 2.
  - c. The Bridge Deck Top Coat shall be applied to the base membrane at 30 - 40 mils and an aggregate layer shall be broadcast into it before it hardens.
    - (1) The Bridge Deck Top Coat shall be a 100% solids, two component, rapid curing elastomer that is compatible with the base membrane.
    - (2) The Bridge Deck Top Coat materials shall meet the requirements shown in Table 3.
    - (3) The aggregate shall be recommended by supplier and subject to approval by the Engineer.

- d. The Wick Drain shall be a composite material and shall meet the requirements specified in Table 4.
2. Base Membrane, Bridge Deck Top Coat and aggregate layer shall be capable of accepting emergency and temporary vehicular traffic at highway speeds greater than 65 mph one hour after application.
- a. A non-skid aggregate surface shall be retained without significant aggregate loss throughout the duration of traffic exposure.
  - b. Membrane system shall not be exposed to traffic for more than 7 days or as allowed by the product manufacturer.
3. Material certifications must be submitted and approved 10 days prior to construction. Material Submittals shall include the following:
- a. Manufacturer shall provide independent laboratory test results from an AASHTO-accredited laboratory certifying each component's conformance to the physical property requirements listed in Tables 1, 2 and 3. All testing shall be current (conducted within the past three (3) years).
  - b. The manufacturer's material safety data sheets (MSDS) for each of the components. All primers and membranes shall be from the same manufacturer.
  - c. Two sample coupons (4"x4") that are representative of the finished membrane surface, texture, and color.

**Table 1.  
Material Properties of Primer**

Properties	Test Method	Value
Minimum Gel Time (minutes)		5
Maximum Tack Free Time at 77 °F (hours)		2.5
Mixing Ratio		Per Manufacturer
Minimum Adhesion to Concrete (psi)	ASTM D 4541	150



**Table 2.**  
**Material Properties of Base Coat**

<b>Properties</b>	<b>Test Method</b>	<b>Value</b>
Solids Content (%)		100
Minimum Shore Hardness Type D	ASTM D2240	50
Minimum Elongation (%)	ASTM D638	250
Minimum Tensile strength (psi)	ASTM D638	2000
Tear Strength, pli, Die C	ASTM D624	390
Maximum Taber Abrasion (mg loss)	ASTM D4060	250
Moisture Vapor Transmission (perms)	ASTM E96 Procedure B	0.90
Maximum Gel Time (seconds)		10
Tack Free (seconds)		30
Open to Traffic (hours)		1
Crack Bridging Test opening (inches)	ASTM C1305 for minimum of	pass

**Table 3.**  
**Material Properties of Top Coat**

<b>Physical Property</b>	<b>Test Method</b>	<b>Value</b>
Solids Content (%)		100
Minimum Gel Time (seconds)		30
Minimum Tack Free Time (minutes)		5
Maximum Open to Traffic (hours)		1
Minimum Shore Hardness Type D	ASTM D2240	40
Minimum Tensile strength (psi)	ASTM D 638	2000
Tear Strength Die C (pli)	ASTM D 638	350
Minimum Elongation at break (%)	ASTM D 638	150
Crack Bridging Test	ASTM C1305 for minimum of 80 mils Base Coat + 40 mils	pass

**Table 4.  
Physical Requirements of Wick Drain**

<b>Fabric Properties</b>	<b>Value</b>	<b>Test Method</b>
Material	Polypropylene	
Minimum Grab Tensile Strength (lb)	130	ASTM D-4632
Minimum Puncture Strength (lb)	41	ASTM D-4833
Minimum Trapezoidal Tear (lb)	60	ASTM D-4533
Minimum Elongation (%)	50	ASTM D-4632
EOS (AOS) (sieve size)	70	ASTM D-4751
Minimum Permittivity (1/sec)	0.8	ASTM D-4491
Minimum Flow Rate (gpm/sqft)	60	ASTM D-4491
Minimum UV Stability (%)	70	ASTM D-4355
<b>Core Properties</b>	<b>Value</b>	<b>Test Method</b>
Material	Polypropylene	
Minimum Tensile Strength (lb)	225	ASTM D-4595
<b>Product Properties</b>	<b>Value</b>	<b>Test Method</b>
Minimum Discharge Capacity (gpm)	1.6	ASTM D-4716
Roll width (in)	3 to 4.5	
Maximum total thickness (in)	0.5	

### **000.03 - - Construction Methods**

1. Construction methods and procedures must be submitted to the Engineer for approval at least 10 days prior to construction. Construction method submittal shall include the following:
  - a. Substrate preparation and repair details.
  - b. The manufacturer's current installation and testing procedure document. This document shall conform in its entirety with all the requirements specified herein.
  - c. Service record showing that the membrane applicator has a satisfactory record of not less than 3 years, prior to the date of submission, for similar applications with names of specific structures and owner contact information.
  - d. Service record showing that the membrane manufacturer has a satisfactory record of not less than 5 years, prior to the date of submission, for similar applications with names of specific structures and owner contact information.
  - e. Scheduling and phasing of the installation.
2. Storage
  - a. All materials shall be shipped and stored in a dry shaded area between 35°F to 90°F and according to the manufacturer's recommendations.

3. Preparation of the Surface to be covered by Waterproof Membrane

- a. Concrete substrate shall be clean and sound. Unsound concrete shall be removed and replaced with approved repair concrete.
  - (1) Newly placed concrete shall be broom finished. No belting, scoring, tining or other texturing shall be used.
  - (2) Portland cement concrete to be covered by Waterproof Membrane shall cure for a minimum of 12 days before applying the waterproof membrane.
- b. The Engineer shall be contacted for guidance if ponding of water is observed on the concrete bridge deck before membrane is placed.
- c. If deck drain pipes are present the tops of the pipes shall be level with the surface of the deck or below the surface of concrete deck by not more than  $\frac{1}{4}$  inch.
- d. Concrete surfaces to be covered by membrane shall be prepared to SSPC-SP13/NACE No. 6.
- e. Metal surfaces to be covered by membrane shall be prepared in accordance with SSPC-SP10 Near White Blast.
- f. Surfaces that are not to be covered with membrane shall be protected to prevent defacement by membrane system. Should defacement occur the Contractor shall clean surfaces on the structure as directed by the Engineer at no cost to the Department.

4. Weather and Moisture Conditions

- a. The membrane system shall not be applied in wet weather or at ambient temperatures below 35°F without approval by the Engineer and the Product manufacturer. The primer or adhesive shall only be applied on clean and dry surfaces when the temperature of the substrate exceeds the dew point by at least 5°F (3° C). Special attention shall be given to assure that there is no moisture present at the interface between the deck and bridge curb.
  - (1) The Contractor shall verify that surfaces to which membrane system will be applied are sufficiently dry by one of the two following methods.
    - (a) No condensation shall be found by taping an 18 inch by 18 inch plastic sheet tightly to the surface of the concrete per ASTM D4263. The plastic sheet test shall be performed only when surface temperatures and ambient conditions are within the established parameters for application of the overlay system. In the event of rain, the concrete shall be allowed to air dry for a minimum of 24 hours before performing the plastic sheet test. This test shall be performed by the Contractor and observed by the Engineer. The Department will allow a 4 hour test duration instead of the 16 hours specified in ASTM D4263.

(b) Substrate moisture content shall be 5.0% or less when tested concrete moisture content with a non-destructive concrete moisture meter. This method shall be accepted only if accurate calibration can be demonstrated to the Engineer.

(2) The Contractor shall supply a digital weather instrument that can measure both ambient temperature and dew point, and an infrared surface temperature measuring instrument

## 5. Membrane System Placement

- a. Installation of Membrane system shall not begin until all materials and equipment to complete the work are on the job site. All equipment shall be maintained in good working order and reserve equipment shall be available as required.
- b. Manufacturer's representative shall be on-site throughout the installation process and shall perform and record relevant quality control readings.
- c. The primer shall be applied on prepared surfaces at the rate specified by the manufacturer.
- d. Primer shall be tack free before placement of the membrane. Primer shall be reapplied if set more than 24 hours.
- e. Spray waterproofing membrane over primed surfaces at a minimum thickness of 80 mils (20 ft<sup>2</sup> per gallon) or the minimum thickness required to pass the ASTM C 1305 Crack Bridging Test. Spray additional base coats as required to achieve the specified thickness.
  - (1) The lips of drain openings and edges of open joints, deck slab, and other openings at deck level shall be completely sealed by extending the full waterproofing course over the lip or edge.
  - (2) Edge of membrane shall extend up the face of curbs to 1/2 inch below the height of the overlay surface.
- f. Spray top coat membrane over base membrane at a thickness of 30-40 mils and immediately broadcast aggregate at 0.33-0.50 lbs. per ft<sup>2</sup> to achieve a minimum coverage rate of 95%.
- g. Wick drains shall be placed on a thin layer of tacky mastic on top of Membrane. Wick Drains shall be placed at the face of low-side curbs extending longitudinally to terminate at deck drains or ends of closed bridge rail or as shown in the plans.
- h. Traffic will be allowed on the two coat spray membrane with aggregate for 2 calendar days or as recommended by manufacturer, whichever is less before beginning paving operations.

4. Asphalt Overlay
  - a. A minimum of 3 inches compacted overlay thickness is required unless otherwise shown in plans.
  - b. The use of a pickup machine and the dumping of asphaltic concrete directly on the membrane are not allowed unless a placement program is submitted for approval by the Engineer.
  - c. Rollers shall be operated in static mode unless permitted by the Engineer.
  - d. A vibratory plate compactor shall be on site and used in areas that cannot be roller-compacted such as near the face of bridge rails.
  
5. Quality Control
  - a. Use magnetic, ultrasonic, or destructive testing to assure proper application, this shall be outlined in the submittal documents on the method, minimum number, and randomness of the locations for testing. Any destructive testing areas shall be repaired by re-spraying or filling with special two component gun grade material provided by the manufacturer.
  - b. After membrane system is inspected and accepted, the tack coat and Hot Mix overlay can be placed as shown in the plans. The hot mix contractor shall take care and make placement operations as in accordance by the membrane manufacturer and any other requirements of the Certified Representative.
  - c. All details for the installation, plan, materials, schedules, certifications, and construction of the membrane and Asphalt overlay shall be submitted, reviewed and approved prior to installation. A pre-paving meeting shall be scheduled by the Contractor with the Project Manager and NDOR Staff, and all subcontractors involved in performing this work, at least 72 hours prior to construction.

**000.04 - Method of Measurement**

1. The unit of payment for the Cold Liquid-Applied Membrane is the Square Foot.
  - a. The area receiving the membrane system will not be measured directly, but will be plan dimension of the surface receiving the treatment.

**000.05 - Basis of Payment**

- |    |  |                  |
|----|--|------------------|
| 1. | <b>Pay Item</b>                            | <b>Pay Unit</b>  |
|    | Cold Liquid Applied Membrane Waterproofing | Square Foot (SF) |
2. Payment is full compensation for all work prescribed in this Section.

**BRIDGE DECK REPAIR AND BRIDGE APPROACH REPAIR**

Bridge deck repair and bridge approach repair are treated similarly in this provision, except where a distinction is made.

**CONCRETE BRIDGE DECK/APPROACH REPAIR  
WITH CLASS 47BD 4000 CONCRETE  
(Station 719+02.70 Lt. and 5517+79.48)**

**Description**

1. The work shall include removing unsound concrete, disposing of the old concrete, preparation of the repair area, and furnishing, placing, finishing, and curing the concrete for repairs to bridge decks and/or approaches.

**Material Requirements**

1. Materials shall conform to the requirements in Table A.

**Table A**

<b>Material Requirements</b>	
<b>Applicable Materials</b>	<b>Section</b>
Portland Cement Concrete	1002
Curing Materials	1010, 1011
Water for Concrete	1005
Adhesive	1018
Joint Sealing Filler	1014

2. The 47BD concrete may use Class F coarse aggregate shown in Table 1033.03A

**Equipment**

1. Surface preparation equipment shall be of the following types:
  - a. Concrete saws capable of sawing to a specified depth.
  - b. Sandblasting equipment able to remove rust and concrete from exposed reinforcing bars. The equipment shall also be able to remove loose and fractured particles from the prepared concrete surface.
  - c. Power-driven hand tools will be allowed with the following restrictions:
    - (1) Jackhammers greater than the nominal 60 lb (27 kg) class shall not be used.
    - (2) Jackhammers or chipping tools shall not be operated at an angle greater than 45 degrees measured from the deck surface.
    - (3) Chipping hammers greater than the 30 lb (13.5 kg) class shall not be used to remove concrete from around reinforcing bars.

2. Vibrating screeds, either mechanical or hand operated shall be used to finish the concrete.

### Construction Methods

1. General Requirements:

- a. No loads other than construction equipment shall be allowed on any portion of the concrete bridge deck or approach which has undergone preparation and removal of the old concrete surface. No construction load will be allowed which exceeds either an 8,000 lb (3625 kg) wheel load or a 16,000 lb (7250 kg) axle load. Any combination of axles closer than 4 feet (1.2 m) center-to-center will be considered to be one axle.
- b. The Contractor shall take all necessary precautions to prevent damage to persons or property beneath the structure.

2. Concrete Removal Requirements:

- a. All unsound concrete shall be removed from the concrete bridge deck or approach. When no overlay is indicated on the plan, the Contractor shall use a diamond blade to cut around the perimeter of the repair area to a depth of one inch. All repairs shall be cut so the edges are either parallel or perpendicular to the traveled way. When an overlay is indicated on the plan, saw-cutting is not necessary and edges shall be left irregular.
- b. The Contractor shall remove, scarify or chip the concrete deck or approach to a minimum depth of two inches in any area requiring repair until all unsound concrete is removed. Where scarifying equipment cannot be used, hand chipping will be required.
  - (1) Care shall be exercised to prevent cutting or otherwise damaging any exposed reinforcing bars. Repairs to damaged reinforcing steel shall be performed by the Contractor as directed by the Engineer at no expense to the Department. Additional concrete removal and replacement necessary to repair damaged reinforcing steel shall be at no expense to the Department.
  - (2) Any damaged epoxy coating of existing reinforcing steel shall be repaired according to Subsection 1021.03.
- c. Defective concrete shall be removed in the following manner:
  - (1) Where machine scarifying is employed to remove concrete, extreme care shall be used to avoid cutting reinforcing bars. Any damage caused by the Contractor shall be repaired by the Contractor as directed by the Engineer at no additional cost to the Department.
  - (2) At points where removal of unsound concrete is adjacent to reinforcing bars or the removal of unsound concrete leaves over 2/3 of the bar diameter exposed, the removal shall be continued so that at least 3/4 inch clearance surrounds the bar allowing new concrete to bond to the entire periphery of the exposed bar.

- (3) Wherever removal of unsound concrete extends to the top of the bottom layer of steel, the remaining thickness shall be removed to the full depth of the bridge deck or approach.
- (4) When concrete removal goes lower than three inches from the bottom of the bridge deck or approach, the remaining concrete, in that location, shall be removed to full depth.
- (5) Any removals shall be carefully done to prevent damage to the bottom of the deck or approach and to leave removal boundaries which will allow complete filling with plastic concrete.

3. Preparation of the Surface:

- a. All debris and rubble resulting from bridge deck or approach removal shall be thoroughly swept up and disposed of. The Contractor shall sandblast all exposed reinforcing bars, all prepared concrete surfaces, and the portion of the bridge curb and all surfaces of steel roadway joints that will be in contact with the concrete. The remaining concrete surface and reinforcing bars shall be cleaned with compressed air, vacuum, brushes or other methods as necessary to produce a surface free of particles, dust, liquids or other contaminants.
- b. In cases where the placement of the concrete is delayed beyond 24 hours after the sandblasting has been completed, the formation of incidental rust on the rebars due to humidity or rain shall not be cause for re-sandblasting.

4. Forming:

- a. Forms shall be provided in areas where the removal goes through the entire depth of the bridge deck. Forms for small areas (1 square yard or less) may be wired to the reinforcing bars for support. Forms for larger areas shall be supported by blocking from the beams.
- b. Forms shall be provided as required to re-establish edges of approaches that have been removed. Voids discovered under approaches shall be filled with flowable fill concrete.

5. Placing Concrete:

- a. The Engineer shall inspect and be satisfied that all removal and preparation has been done in compliance with this provision.
- b. The clean dry vertical and horizontal faces of the repair shall be coated with Grade 2 Epoxy Adhesive from the NDR Approved Products List just before placing the new concrete.
  - (1) The epoxy adhesive shall be applied to the vertical sides of the repair with a brush.
  - (2) The epoxy application rate shall be limited so the epoxy adhesive does not become dry before it is covered with the new concrete.



- c. The Contractor shall furnish and place Class 47BD 4000 psi concrete for the deck or approach repair. The concrete shall be handled and consolidated so there will be no separation of the aggregate and the mortar.
  - d. An internal vibrator shall be used to consolidate the concrete. Excessive vibration shall be avoided.
  - e. A vibrating screed shall be used on repairs 5 feet or wider to finish the concrete to the final elevation.
  - f. The surface shall be floated with a magnesium bull float. The surface shall be hand tined parallel to the existing tining in the deck or approach. If the deck or approach is to be overlaid prior to opening to traffic, no tining is required.
6. Sealing Joints:
- a. All transverse and longitudinal joints surrounding the repair shall be sealed and the work considered subsidiary to the pay item "Bridge Deck Repair" or "Bridge Approach Repair".
  - b. Sealing is not required if the repairs will be overlaid with asphalt or concrete.
7. Curing:
- a. The Contractor shall apply curing compound to all concrete deck or approach repairs.
  - b. The application rate shall be 1 Gal/200 SF
8. Smoothness:
- a. The elevation of deck or approach repairs shall be corrected in a manner that eliminates swales or bumps. Swales and bumps are defined as having 1/8 inch or greater deviation using an approved 10 foot straightedge. Corrective actions shall be completed by diamond grinding or replacement. The condition of the adjacent pavement shall be considered when evaluating the 1/8 inch deviation requirement.

#### **Method of Measurement**

- 1. "Concrete Bridge Deck Repair" shall be measured for payment by the square yard of deck repaired, as determined by field measurements.
- 2. "Bridge Approach Repair" shall be measured for payment by the square yard of approach repaired, as determined by field measurements.

**Basis of Payment**

	<b>Pay Item</b>	<b>Pay Unit</b>
1.	Concrete Bridge Deck Repair	Square Yard (SY)
2.	Bridge Approach Repair	Square Yard (SY)
3.	Payment for above pay items shall be full compensation for the completion of the work and for providing all materiel described in the contract documents.	

**DOWELING INTO CONCRETE STRUCTURES - POST INSTALLED ADHESIVE ANCHORS**

**Materials**

1. This provision is concerned with reinforcing bars adhered to hardened concrete. The adhesive anchor system used for post-installed anchorage of reinforcing steel to concrete shall conform to requirements of the most recently published ACI 355.4, *Acceptance criteria for Qualification of Post-Installed Anchors in Concrete and Commentary*.
2. With regard to epoxy resin adhesives for the anchor system, one of the following requirements shall be met:
  - a. Adhesives for post-installed anchors are acceptable for use if they are given on the Approved Products List and they also comply with minimum requirements as stated in this provision.
  - b. Adhesives for post-installed anchors shall meet ACI 355.4 and also comply with minimum requirements as stated in this provision. Bulk mixed adhesives are not permitted.
3. The adhesive anchors, shall be supplied as an entire system. The system shall include, but not be limited to, the new adhesive cartridge, a clean mixing nozzle, extension tube, a dispensing gun and all manufacturer recommended supplies for properly cleaning the drilled hole.
4. Anchorage design is in accordance with Appendix D of ACI 318-11. For adhesive anchors, the following minimum values for bond stress were assumed for design using the above adhesive anchor assemblies:

$$T = 2050 \text{ psi}$$

5. Epoxy resin adhesives used for doweling reinforcing bars into hardened concrete shall be capable of providing the full tensile resistance of the reinforcement at the embedment depths specified in the plans. The ultimate tensile force for 60 ksi reinforcement is given in the table below for various bar sizes. If the particular product used requires a greater embedment depth to achieve the required pull-out capacity than that shown in the plans, the Engineer shall be informed.

#3	7,425 lb.
#4	13,500 lb.
#5	20,925 lb.
#6	29,700 lb.

### General Installation Guidelines

1. Concrete shall have a minimum compressive strength ( $f'_c$ ) of 2500 psi at the time of adhesive anchor installation.
2. Concrete at time of anchor installation shall have a minimum age of 21 days.
3. Concrete temperature at the time of anchor installation shall be 50°F (10°C) or warmer.
4. Anchor embedment depth and projection (length protruding) from the concrete surface are shown on the drawing or detail for the particular anchor being installed. The Engineer shall be consulted in cases where this information is unclear or absent from the plans.
5. Adhesives shall be stored and installed within the service temperature ranges recommended by the manufacturer.

### Installation Techniques

1. Post-installed adhesive anchors shall be installed in accordance with the Manufacturer's Printed Installation Instructions (MPII) with the exception, as follows. When the instructions of this provision are more stringent than the MPII, adhesive anchors shall be installed in accordance with these provisions, as a minimum requirement.
2. Installation of adhesive anchors, horizontally or upwardly inclined or those used to support sustained tension loads, shall be performed by personnel certified by the ACI/CRSI Adhesive Anchor Installer Certification Program. It is recommended that all adhesive anchors are installed under the supervision of a certified installer.
3. The installer's qualifications, when required, shall be submitted to the Engineer, prior to any work being done on the project.
4. The Contractor shall provide all equipment required to install the adhesive anchor, including but not limited to drills, setting tools, clean-out brushes, blow-out bulbs, oil-free compressed air, shop vacuums, wrenches, etc.
5. Anchors shall be installed in holes drilled with a rotary impact hammer drill or rock drill.

6. Anchor holes shall be thoroughly cleaned prior to adhesive injection, as required by the MPII. At a minimum, this consists of cleaning with compressed air free of oil and moisture using a nozzle extended to the bottom of the hole. This shall be supplemented with brush or other tool cleaning to remove all concrete dust and loose material followed by a second compressed air cleaning. This is commonly known as “blow-brush-blow” (BBB).
7. Drilled and cleaned anchor holes shall be protected from contamination until the adhesive is installed.
8. A drilled hole shall be re-cleaned if, in the opinion of the Engineer, the hole has become contaminated after cleaning.
9. Unless otherwise indicated on the MPII, adhesive shall be dispensed through a tube or cartridge extension, beginning at the maximum depth of the hole that is withdrawn as adhesive is injected until the hole is entirely filled. This shall be followed by insertion and rotation of the anchor to the specified depth. Where necessary, spaces around anchors, at the surface, shall be sealed to prevent loss of the adhesive during curing where holes are drilled in a range from horizontally to upward.
10. Anchors to be installed in the adhesive shall be clean and free of any surface contaminants or imperfections; e.g., oil, loose rust, paint or other coatings.
11. Installed adhesive anchors shall be securely fixed in place to prevent displacement during curing of the adhesive. Unless shown otherwise on the drawings, anchors shall be installed perpendicular to the concrete surface. Anchors displaced before full adhesive cure shall be considered damaged and replaced at the Contractor’s expense.
12. Reinforcing bars shall not be bent after being adhered to the concrete unless permitted by the Engineer.

**Basis of Payment**

1. Pay shall be made subsidiary to other items for which payment is made.

**EXISTING REINFORCEMENT ENCOUNTERED DURING REPAIR**

When existing reinforcing steel is broken or has a section loss greater than 20%, the Contractor shall lap splice the existing bar with a bar of matching size. Lap splices shall be as given in the following table:

Bar #	Non-epoxy Length (in.)	Epoxy (Length (in.))
4	15	18
5	20	24
6	26	31
7	33	39
8	45	54
9	59	71
10	74	89
11	95	139

The bar used to splice, shall lap, by the length given above, with a portion of the existing bar of which 80% or more of the full section is present, on either side of a break or deteriorated or damaged segment.

All existing reinforcing steel exposed during removal of defective concrete shall be incorporated into the new work. Such bars shall be blast cleaned to remove all rust and corrosion. The bars shall be either reformed, as required, to assume their original (intended) shape or bent to allow placement into the new work. Bars that are required to be cut shall be left as long as possible, reformed if necessary and incorporated into the new work. Deviations from these instructions shall be allowed only when clearly indicated in the plans.

For any reinforcing bar that has more than 2/3 of its diameter exposed, the existing concrete shall be removed so that a minimum clearance of 3/4" is provided all around the bar for the placement of new concrete.

All material, labor, tools, equipment and incidentals shall be subsidiary to other work for which payment is made.

## **HELICAL PILE FOR GRADE BEAMS**

### **Description**

The work shall consist of designing, furnishing and installing pre-manufactured helical piles to support new structures.

### **1.0 GENERAL**

The Helical Piles consist of helical bearing plate(s) attached at the tip of a high strength central steel shaft. The central steel shaft is intended to accept applied load and transfer to a bearing soil strata at some depth below the surface.

#### **1.1 Purpose of Specification**

The purpose of this specification is to describe the furnishing of all designs, materials, tools, equipment, labor supervision, and installation techniques necessary to install Helical Piles as detailed on the contract drawings, including pile-top details.

#### **1.2 Scope of Work**

This work consists of furnishing all necessary engineering and design services, supervision, labor, tools, materials, and equipment to perform all work necessary to install the Helical Piles per the specifications described herein, and as shown on the contract drawings. The Contractor shall install Helical Piles that will develop the load capacities as detailed on the drawings. The responsibilities and duties of the respective parties for this project are summarized in Table 1.0.

**Table 1.0** Tasks and Responsibilities to be Allocated

TASK		RESPONSIBLE PARTY
1	Site Investigation, Initial Geotechnical Investigation, Soil Parameters	NDOR
2	Overall scope of work, structure –including design loads , pile locations, pile spacing and orientation	NDOR
3	Design criteria	NDOR
4	Specify type of corrosion protection	NDOR
5	Minimum total pile length, depth to bearing stratum	Contractor
6	Helical Pile components and details	Contractor
7	Details of pile connection to structure	Contractor
8	Preparation of working drawings and installation records	Contractor
9	Construction methods, schedule, sequencing, and coordination of work	Contractor
10	Requirements of field production control, including logging of installation torque vs. installed depth	Contractor
11	Quality Control	Contractor
12	Quality Assurance	NDOR

### 1.3 Qualifications of the Helical Pile Contractor

The HELICAL PILE Contractor shall be experienced in performing design and construction of helical piles and shall furnish all materials, labor, and supervision to perform the work. The Contractor shall be trained and certified by the Helical Pile Manufacturer in the proper methods of design and installation of the HELICAL PILE system. The Contractor shall provide names of on-site personnel materially involved with the work, including those who carry documented certification from the Helical Pile Manufacturer. At a minimum, these personnel shall include foreman, machine operator, and project engineer/manager.

### 1.4 Allowable Tolerances

- 1.4.1 Centerline of piling shall not be more than 3 inches from indicated plan location.
- 1.4.2 Pile plumbness shall be within 2° of plan inclination.
- 1.4.3 Top elevation of pile shall be within +1 inch to -2 inches of the design vertical elevation.

### 1.5 Quality Assurance

- 1.5.1 Helical Piles shall be installed by a contractor certified by the helical pile manufacturer. The Contractor shall have satisfied the certification requirements relative to the technical aspects of the product and installation procedures as required by the manufacturer. Certification documents shall be provided upon request to the NDOR or their representative.
- 1.5.2 The certified Contractor shall employ an adequate number of skilled workers who are experienced in the necessary crafts and who are familiar with the specified requirements and methods needed for proper performance of the work of this specification.

- 1.5.3 All Helical Piles shall be installed in the presence of a designated representative of the NDOR unless said representative informs the Contractor otherwise.
- 1.5.4 Helical Pile components as specified shall be manufactured by a facility whose quality systems comply with ISO (International Organization of Standards) 9001 requirements. Certificates of Registration denoting ISO Standards Number shall be presented upon request to the NDOR or their representative.

**1.6 Design Criteria**

- 1.6.1 Helical Piles shall be designed to meet the specified loads as shown on the contract drawings. The calculations and working drawings required from the Contractor shall be submitted to the NDOR for review and acceptance in accordance to Section 2.1 “Construction Submittals”. See PILE DATA table on the contract drawings for the design pile bearing. This value is provided in tons as determined from the Load Factor Method according to the AASHTO Standard Specification, 17<sup>th</sup> Edition, 2002.
- 1.6.2 The ultimate structural capacity shall be determined as:

1.6.2.1 For compression loads:

$$P_{ultc} = f_{yshaft} * A_{shaft}$$

Where:  $P_{ultc}$  = ultimate structural capacity in compression (kip)

$f_{yshaft}$  = minimum yield strength of central steel shaft (ksi)

$A_{shaft}$  = area of central steel shaft (in.2)

*The ultimate structural capacity may be reduced by the ultimate load capacity per helix plate(s) – depending on what fraction of the total load is transferred to the soil in end bearing.*

- 1.6.3 The contract drawings may indicate specific reinforcing details for the interface at the top of the HELICAL PILE and the structure.
- 1.6.4 The HELICAL PILE capacity (either in skin friction or end-bearing) shall not be relied upon from the following soil layers as defined in the geological profile or geotechnical reports:



The overall length and installed torque of a HELICAL PILE shall be specified such that the required in-soil capacity is developed by end-bearing on the helical plate(s) in an appropriate strata(s).

It is recommended that the theoretical end-bearing capacity of the helical plates be determined using commercially available software. The N-values for the various strata(s) are provided on the contract plans. The NDOR shall determine the allowable response to axial loads.

## **1.7 Ground Conditions**

The Geologic profile, including standard penetration (N-values) shown on the contract drawings shall be considered to be representative of the in-situ subsurface conditions likely to be encountered on the project site. The N-values are provided on the geologic profile for the second and third 6 inch increments of the standard penetration test (SPT). This information shall be used as the basis for helical pile design using generally accepted engineering judgment and methods.

If during HELICAL PILE installation, subsurface conditions of a type and location are encountered of a frequency that were not reported, inferred and/or expected at the time of preparation of the bid, the additional costs required to overcome such conditions shall be considered as extras to be paid for.

## **2.0 SUBMITTALS**

### **2.1 Construction Submittals**

- 2.1.1 The Contractor shall prepare and submit to the NDOR, for review, working drawings and design calculations for the Helical Pile foundation intended for use at least 14 calendar days prior to planned start of construction. All submittals shall be signed and sealed by a Registered Professional Engineer currently licensed in the State of Nebraska.
- 2.1.2 The Contractor shall submit a detailed description of the construction procedures proposed for use to the NDOR for review. This shall include a list of major equipment to be used.
- 2.1.3 The Working Drawings shall include the following:
  - 2.1.3.a HELICAL PILE number, location and pattern by assigned identification number
  - 2.1.3.b HELICAL PILE design load
  - 2.1.3.c Type and size of central steel shaft
  - 2.1.3.d Helix configuration (number and diameter of helical plates)
  - 2.1.3.e Minimum effective installation torque
  - 2.1.3.f Minimum overall length
  - 2.1.3.g Inclination angle (-0- for vertical piles)
  - 2.1.3.h Minimum cased length, if applicable
  - 2.1.3.i Cut-off elevation



- 2.1.4 The Contractor shall submit shop drawings for all HELICAL PILE components, including casing components and pile top attachment to the NDOR for review. This includes HELICAL PILE lead and extension section identification (manufacturer's catalog numbers).
- 2.1.5 The Contractor shall submit certified mill test reports for the central steel shaft, as the material is delivered, to the NDOR for record purposes. The ultimate strength, yield strength, % elongation, and chemistry composition shall be provided.
- 2.1.6 The Contractor shall submit to the NDOR copies of calibration reports for each torque indicator and all load test equipment to be used on the project. The calibration tests shall have been performed within one year of the date submitted. HELICAL PILE installation and testing shall not proceed until the NDOR has received the calibration reports. These calibration reports shall include, but are not limited to, the following information:
  - 2.1.6.a Name of project and Contractor
  - 2.1.6.b Name of testing agency
  - 2.1.6.c Identification (serial number) of device calibrated
  - 2.1.6.d Description of calibrated testing equipment
  - 2.1.6.e Date of calibration
  - 2.1.6.f Calibration data
- 2.1.7 Work shall not begin until all the submittals have been received and reviewed by the NDOR. The Contractor shall allow the NDOR a reasonable time to review, comment, and return the submittal package after a complete set has been received. All costs associated with incomplete or unacceptable submittals shall be the responsibility of the Contractor.

## **2.2 Installation Records (see sample installation log)**

The Contractor shall provide the NDOR copies of HELICAL PILE installation records within 24 hours after each installation is completed. Records shall be prepared in accordance with the specified division of responsibilities as noted in Table 1.0. These installation records shall include, but are not limited to, the following information:

- 2.2.1 Name of project and Contractor
- 2.2.2 Name of Contractor's supervisor during installation
- 2.2.3 Date and time of installation
- 2.2.4 Name and model of installation equipment
- 2.2.5 Type of torque indicator used
- 2.2.6 Location of HELICAL PILE by assigned identification number
- 2.2.7 Actual HELICAL PILE type and configuration – including lead section (number and size of helical plates), number and type of extension sections (manufacturer's SKU numbers)
- 2.2.8 HELICAL PILE installation duration and observations
- 2.2.9 Total length of installed HELICAL PILE
- 2.2.10 Cut-off elevation

- 2.2.11 Inclination angle (-0- for vertical piles)
- 2.2.12 Installation torque at one-foot intervals for the final 10 feet
- 2.2.13 Comments pertaining to interruptions, obstructions, or other relevant information
- 2.2.14 Rated load capacities

### 2.3 Closeout Submittals

The Contractor shall transfer all manufacturer's warranties and guarantees to the Department. All manufacturer's warranty and guarantee documentation and all operation and parts manuals shall also be given to the Department.

## 3. PRODUCTS AND MATERIALS

### 3.1 Central Steel Shaft:

The central steel shaft, consisting of lead sections, helical extensions, and plain extensions, shall comply with the following minimum requirements:

- 3.1.1 Round-Cornered-Square (RCS) solid steel bars:
  - Shall be hot rolled Round-Cornered-Square (RCS) solid steel bars meeting dimensional and workmanship requirements of ASTM A29. The bar shall be either modified medium carbon steel grade (similar to AISI 1044) with improved strength due to fine grain size or high strength low alloy (HSLA), low to medium carbon steel grade with improved strength due to fine grain size.
    - 3.1.1.1 Minimum torsional strength rating = 5,500 ft-lb
    - 3.1.1.2 Minimum yield strength = 70 ksi
    - 3.1.1.3 Round-Cornered Square (RCS) solid steel bars shall only be used in conjunction with a grout column of 4 to 10 inches to provide lateral stability to the central shaft. The grout shall be a neat grout with a compressive capacity of no less than 4000 psi. All appropriate displacement plates and spacings shall be shown in the shop drawings.
- 3.1.2 Structural steel tube or pipe:
  - Shall be seamless or straight-seam welded, per ASTM A53, A252, ASTM A500, or ASTM A618. Minimum wall thickness is 0.300" (schedule 80).
    - 3.1.2.1 Torsional strength rating = 11,000 ft-lb
    - 3.1.2.2 Minimum yield strength = 50 ksi

### 3.2 Helical Bearing Plate:

Shall be hot rolled carbon steel sheet, strip, or plate formed on matching metal dies to true helical shape and uniform pitch. Bearing plate material shall conform to the following ASTM specifications:

- 3.2.1 ASTM A36, ASTM A572, A1018, or A656 with minimum yield strength of 50 ksi. Minimum plate thickness is 3/8".

### **3.3 Bolts:**

The size and type of bolts used to connect the central steel shaft sections together shall conform to the following ASTM specifications:

- 3.3.1 For use with solid square shafts: 3/4" diameter bolts per ASTM A320 Grade L7.
- 3.3.2 For use with solid square shafts: 7/8" diameter bolt per ASTM A193 Grade B7.
- 3.3.3 For use with solid square shafts: 1-1/8" diameter bolt per ASTM A193 Grade B7.
- 3.3.4 For use with solid square shafts: 1-1/4" diameter bolt per ASTM A193 Grade B7.
- 3.3.5 For use with steel tube or pipe shafts: 3/4" diameter bolts per SAE J429 Grade 5.

### **3.4 Couplings:**

Shall be formed as integral part of the plain and helical extension material. The couplings shall be hot upset forged sockets or hot forge expanded sockets.

### **3.5 Plates, Shapes, or Pier Caps:**

Structural steel plates and shapes for HELICAL PILE top attachments shall conform to ASTM A36 or ASTM A572 Grade 50.

## **4.0 EXECUTION**

### **4.1 Installation Equipment**

- 4.1.1 Shall be rotary type, hydraulic power driven torque motor with clockwise and counterclockwise rotation capabilities. The torque motor shall be capable of continuous adjustment to revolutions per minute (RPM's) during installation. Percussion drilling equipment shall not be permitted. The torque motor shall have torque capacity 15% greater than the torsional strength rating of the central steel shaft to be installed.
- 4.1.2 Equipment shall be capable of applying adequate down pressure (crowd) and torque simultaneously to suit project soil conditions and load requirements. The equipment shall be capable of continuous position adjustment to maintain proper HELICAL PILE alignment.

### **4.2 Installation Tooling**

- 4.2.1 Installation tooling should be maintained in good working order and safe to operate at all times. Flange bolts and nuts should be regularly inspected for proper tightening torque. Bolts, connecting pins, and retainers should be periodically inspected for wear and/or damage and replaced with identical items provided by the manufacturer. Heed all warning labels. Worn or damaged tooling should be replaced.

- 4.2.2 A torque indicator shall be used during HELICAL PILE installation. The torque indicator can be an integral part of the installation equipment or externally mounted in-line with the installation tooling.
- 4.2.2.1 Shall be capable of providing continuous measurement of applied torque throughout the installation.
  - 4.2.2.2 Shall be capable of torque measurements in increments of, at most, 500 ft-lb
  - 4.2.2.3 Shall be calibrated prior to pre-production testing or start of work. Torque indicators which are an integral part of the installation equipment, shall be calibrated on-site. Torque indicators which are mounted in-line with the installation tooling, shall be calibrated either on-site or at an appropriately equipped test facility. Indicators that measure torque as a function of hydraulic pressure shall be calibrated at normal operating temperatures.
  - 4.2.2.4 Shall be re-calibrated, if in the opinion of the NDOR and/or Contractor reasonable doubt exists as to the accuracy of the torque measurements.

#### **4.3 Installation Procedures**

- 4.3.1 Central Steel Shaft:
- 4.3.1.1 The HELICAL PILE installation technique shall be such that it is consistent with the geotechnical, logistical, environmental, and load carrying conditions of the project.
  - 4.3.1.2 The lead section shall be positioned at the location as shown on the working drawings. The HELICAL PILE sections shall be engaged and advanced into the soil in a smooth, continuous manner at a rate of rotation of 5 to 20 RPM's. Extension sections shall be provided to obtain the required minimum overall length and installation torque as shown on the working drawings. Connect sections together using coupling bolt and nut torqued to 40 ft-lb.
  - 4.3.1.3 Sufficient down pressure shall be applied to uniformly advance the HELICAL PILE sections approximately 3 inches per revolution. The rate of rotation and magnitude of down pressure shall be adjusted for different soil conditions and depths.

#### **4.4 Termination Criteria**

- 4.4.1 The torque as measured during the installation shall not exceed the torsional strength rating of the central steel shaft.

- 4.4.2 The minimum installation torque and minimum overall length criteria as shown on the working drawings shall be satisfied prior to terminating the installation of the Helical Pile.
- 4.4.3 If the torsional strength rating of the central steel shaft and/or installation equipment has been reached prior to achieving the contractor specified minimum overall length required, the Contractor shall have the following options:
  - 4.4.3.1 Terminate the installation at the depth obtained subject to the review and acceptance of the HELICAL PILE design representative.
  - 4.4.3.2 Remove the existing HELICAL PILE and install a new one with fewer and/or smaller diameter helical plates. The new helix configuration shall be subject to review and acceptance of the NDOR. If re-installing in the same location, the top-most helix of the new HELICAL PILE shall be terminated at least (3) three feet beyond the terminating depth of the original HELICAL PILE. Shaft section shall not be reused after it has been permanently twisted during a previous installation.
- 4.4.4 If the minimum installation torque as shown on the working drawings is not achieved at the minimum overall length, and there is no maximum length constraint, the Contractor shall have the following options:
  - 4.4.4.1 Install the HELICAL PILE deeper using additional extension sections, displacement plates, casing if required, and grout.
  - 4.4.4.2 Remove the existing HELICAL PILE and install a new one with additional and/or larger diameter helical plates. The new helix configuration shall be subject to review and acceptance of the NDOR. If re-installing in the same location, the top-most helix of the new HELICAL PILE shall be terminated at least (3) three feet beyond the terminating depth of the original HELICAL PILE.
  - 4.4.4.3 De-rate the load capacity of the HELICAL PILE and install additional pile(s). The de-rated capacity and additional pile location shall be subject to the review and acceptance of the NDOR.
- 4.4.5 If the HELICAL PILE is refused or deflected by a subsurface obstruction, the installation shall be terminated and the pile removed. The obstruction shall be removed, if feasible, and the HELICAL PILE re-installed. If obstruction can't be removed, the HELICAL PILE shall be installed at an adjacent location, subject to review and acceptance of the NDOR.
- 4.4.6 The average torque for the last three feet of penetration shall be used as the basis of comparison with the minimum installation torque as shown on

the working drawings. The average torque shall be defined as the average of the last three readings recorded at one-foot intervals.

**5.0 METHOD OF MEASUREMENT**

- 5.1 Helical Pile will be measured for payment by the each for pile meeting the design criteria. This will be determined by field measurement and recorded on the helical pile installation log.
- 5.2 Unforeseen obstructions encountered that result in a production interruption will be paid for as "extra work". See Standard Specifications, Section 109.

**6.0 BASIS OF PAYMENT**

<b>6.1</b>	<b>Pay Item</b>	<b>Pay Unit</b>
	Helical Pile	Each

**Helical Pile Installation Log**

Page(s): \_\_\_\_\_ of \_\_\_\_\_

**Project Name:** \_\_\_\_\_

**Contractor:** \_\_\_\_\_

**Name & Model of Installation Equip:** \_\_\_\_\_

**Project No:** \_\_\_\_\_

**Date:** \_\_\_\_\_

**Project Address:**

**Time:** \_\_\_\_\_

\_\_\_\_\_ **Time to Install:** \_\_\_\_\_

\_\_\_\_\_ **Pile Location No:** \_\_\_\_\_

\_\_\_\_\_ **Shaft Type/Size:** \_\_\_\_\_

**Project Type:** \_\_\_\_\_

\_\_\_\_\_

**(New Construction/Remedial Repair)**

\_\_\_\_\_

**Termination/Bracket:** \_\_\_\_\_

**Helix Configuration:** \_\_\_\_\_

**On-Site Supervisor:** \_\_\_\_\_

**Total Length of HELICAL PILE:** \_\_\_\_\_

**Inclination angle of HELICAL PILE:** \_\_\_\_\_

**Torque Indicator Type:** \_\_\_\_\_

**Comments:** \_\_\_\_\_

**Cut-off Elevation:** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_





accordance with the coating manufacturer's recommendations. Surface profile after abrasive blasting shall be in accordance with the coating manufacturer's recommendations. Care shall be taken to protect nearby surfaces.

Removal of lead paint shall be done in accordance with Section 732 of the Standard Specifications for Highway Construction. Existing paint shall be assumed to contain lead unless confirmed otherwise by testing. The Contractor is required to conduct its own monitoring at project start-up, and in accordance with federal regulations adjust worker protection and work practices according to the results. Containment shall be provided by the Contractor to capture all spent abrasive blast material and paint chip debris. The Contractor shall dispose of all wastes in accordance with all federal, state and local regulations.

After abrasive blasting, the Contractor shall test for the presence of soluble salts using a CHLOR\*TEST kit. If salts are detected, the substrate shall be pressure washed with CHLOR\*RID in accordance with manufacturer's recommendations until the salt is removed.

Surfaces to be painted shall exhibit the cleanliness required by the coating manufacturer prior to applying the coating.

Coatings shall be applied in accordance with Section 709 of the Standard Specifications for Highway Construction, and in accordance with the coating manufacturer's recommendations.

The Contractor shall apply each coat to the thicknesses specified. The Contractor shall measure the thickness of each coat using nondestructive magnetic dry film thickness gages. The Contractor shall comply with SSPC-PA2 for the calibration and use of the gages, and the frequency of thickness measurements. Spot readings 120% of the specified maximum and 80% of the specified minimum are acceptable, provided the average thicknesses are within the specified tolerances.

If there are questions regarding the non-destructive measurements of coating thickness, a Tooke Gage (destructive scratch gage) may be used when authorized by the Engineer. The Contractor shall conduct measurements in accordance with ASTM D4138, but limit the use of the gage to a minimum of locations. The Contractor shall mark and repair all damage caused by the destructive testing, whether created by the Engineer or the Contractor.

The Contractor shall apply additional coating of the same type to areas of insufficient thickness.

The Contractor shall use care during application to assure that all repairs blend in with the surrounding surfaces.

The Contractor shall provide the finish coat in a color and gloss as specified on the plans and approved by the Engineer.

The Contractor shall select from one of the following coating systems.

- ***If painting Girder Ends:***

Application shall be by airless spray in accordance with manufacturer's recommendations.

**Carboline Company**

Sales contact: Jesse Hartman  
(319) 754-4823

Prime coat:	Carbozinc 11 HS, Solvent Based Inorganic Zinc	(2.0 - 3.0 mils DFT)
Intermediate coat:	Carboguard 893, Cycloaliphatic Amine Epoxy	(4.0 - 6.0 mils DFT)
Finish coat:	Carbothane 133HB, Aliphatic Acrylic-Polyester Polyurethane	(3.0 - 5.0 mils DFT)

**International**

Sales contact: Eric Shelton  
(785) 817-0150

	<b><u>Devco High Performance Coatings</u></b>	
Prime coat:	Catha-Coat 304L, Inorganic Zinc Silicate	(2-3 mils DFT)
Intermediate coat:	Bar-Rust 231, Surface Tolerant Epoxy	(4-8 mils DFT)
Finish coat:	Devthane 378, Polyurethane	(2-3 mils DFT)

OR

	<b><u>International</u></b>	
Prime coat:	Interzinc 22HS, Inorganic Zinc-Rich Silicate	(2.5 - 3 mils DFT)
Intermediate coat:	Intergard 475HS, Epoxy	(4-8 mils DFT)
Finish coat:	Interthane 870, Polyurethane	(3-5 mils DFT)

**PPG Industries, Inc**

Sales contact: Ron Wolfe  
(712) 355-1954

Prime coat:	METALHIDE 1001 Inorganic Zinc Rich Coating (97-673 Series)	(2.5 - 3.5 mils DFT)
Intermediate coat:	PITT-GUARD Direct-To-Rust Epoxy Mastic Coatings (97-145 Series)	(4.0 - 7.0 mils DFT)
Finish coat:	PITTHANE High Build Semi-Gloss Urethane Enamels (95-8800 Series)	(2.0 - 5.0 mils DFT)

**Sherwin Williams Company**

Sales contact: Joe Wishard  
(402) 699-6994

Prime coat:	Zinc Clad II LV, Inorganic Zinc-Rich Coating	(2.0 - 4.0 mils DFT)
Intermediate coat:	Macropoxy 646 Fast Cure Epoxy	(5.0 - 10.0 mils DFT)
Finish coat:	Acrolon 218 HS, Acrylic Polyurethane	(3.0 - 6.0 mils DFT)

OR

Prime coat:	Corothane I - Mio-Zinc Primer (or Corothane I - Galvapak Zinc Primer)	(3.0 - 4.0 mils DFT)
Intermediate coat:	Corothane I – Mastic	(2.5 - 3.5 mils DFT)
Finish coat:	Corothane I - Aliphatic Finish Coat	(2.0 - 3.0 mils DFT)

- ***If painting Bearings:***

Application shall be by brush and roller methods in accordance with manufacturer's recommendations.

**Carboline Company**

Sales contact: Jesse Hartman  
(319) 754-4823

Prime coat:	Carboguard 893, Cycloaliphatic Amine Epoxy	(4.0 - 6.0 mils DFT)
Intermediate coat:	Carboguard 893, Cycloaliphatic Amine Epoxy	(4.0 - 6.0 mils DFT)
Finish coat:	Carboguard 893, Cycloaliphatic Amine Epoxy	(4.0 - 6.0 mils DFT)

**International**

Sales contact: Eric Shelton  
(785) 817-0150

	<b><u>Devoe High Performance Coatings</u></b>	
Prime coat:	Bar-Rust 235, Surface Tolerant Epoxy	(3-6 mils DFT)
Intermediate coat:	Bar-Rust 235, Surface Tolerant Epoxy	(3-6 mils DFT)
Finish coat:	Bar-Rust 235, Surface Tolerant Epoxy	(3-6 mils DFT)

**Sherwin Williams Company**

Sales contact: Joe Wishard  
(402) 699-6994

Prime coat:	Macropoxy 646 Fast Cure Epoxy	(5.0 - 10.0 mils DFT)
Finish coat:	Macropoxy 646 Fast Cure Epoxy	(5.0 - 10.0 mils DFT)

- ***If painting Existing Piling:***

Application shall be by airless spray in accordance with manufacturer's recommendations.

**Carboline Company**

Sales contact: Jesse Hartman  
(319) 754-4823

Prime coat:	Carbozinc 859, Organic Zinc-Rich Epoxy	(3.0 - 5.0 mils DFT)
Intermediate coat:	Carbomastic 15, Epoxy mastic	(3.0 - 5.0 mils DFT)
Finish coat:	Carboguard 890, Cycloaliphatic Amine Epoxy	(4.0 - 6.0 mils DFT)

**International**

Sales contact: Eric Shelton  
(785) 817-0150

<u>Devoe High Performance Coatings</u>		
Prime coat:	Catha-Coat 302H, Reinforced Inorganic Zinc	(3-5 mils DFT)
Intermediate coat:	Bar-Rust 231, Surface Tolerant Epoxy	(6-8 mils DFT)
Finish coat:	Bar-Rust 231, Surface Tolerant Epoxy	(6-8 mils DFT)

**Sherwin Williams Company**

Sales contact: Joe Wishard  
(402) 699-6994

Prime coat:	Corothane I - GalvaPac Zinc Primer – B65 series	(3.0 - 4.0 mils DFT)
Finish coat:	Polysiloxane XLE-80, Epoxy Siloxane	(5.0 - 7.0 mils DFT)

## **PENETRATING CONCRETE SEALERS**

### **Description**

This work shall consist of furnishing and applying Penetrating Concrete Sealers to Portland Cement Concrete at the locations shown in the plans or ordered by the Engineer in accordance with the requirements of these specifications.

### **Material Requirements**

The Penetrating Concrete Sealer must be from Nebraska's Approved Products List.

### **Application Methods**

#### **Prior to Application**

1. Concrete to be sealed shall have cured for a minimum of 28 days.
2. All surfaces shall be cleaned of sand, surface dust, dirt, oil, grease, chemical films, cure compounds or coatings and other contaminants with a high pressure water washer capable of delivering water at not less than 2,000 psi. If high pressure water does not remove surface contaminants, then sand blasting will be required at the engineer's discretion.
3. Surfaces shall be allowed to air dry for a minimum of 48 hours.
4. A 2ft x 2ft clear plastic sheet shall be taped around all of its edges to a representative region of the cleaned concrete for not less than 20 minutes. If upon removal of the plastic sheet, moisture is observed on its surface, additional drying time shall be required before application of Penetrating Concrete Sealer.
5. The Engineer shall consult NDOR Materials and Research Division to determine if a Rilem Tube Absorption Test should be performed.

6. Test applications of the Penetrating Concrete Sealer may be required at the discretion of the Engineer.

### Application

1. Air, Material and surface temperatures shall be 40° F (4° C) or higher during application. Penetrating Concrete Sealers shall not be applied when temperatures are expected to fall below 30° F (-1 C°) within 12 hours or when rain is expected within 6 hours. Do not apply sealer materials during wet weather conditions or if adverse weather conditions are anticipated within 12 hours of the completion of sealer application.
2. Typical Limits of Application
  - i) As indicated in the plans and in conjunction with instructions herein.
  - ii) For superstructures with **open rails**, Penetrating Concrete Sealer shall be applied to:
    - (1) Outside edge of deck.
    - (2) Underside of deck for a minimum of 8 inches from the outside edge
      - (a) Penetrating Concrete Sealer shall **not** be applied to deck undersides or edges when an epoxy polymer overlay (EPO) is being applied on the same plan.
    - (3) Top, sides and bottom of rail.
    - (4) All surfaces of posts. If an EPO is being done also, only surfaces not covered by the epoxy and aggregate shall be sealed.
    - (5) Deck surfaces, underneath rails, not covered by an overlay of any type.
  - iii) For superstructures with **closed rails**, Penetrating Concrete Sealer shall be applied to all surfaces of the rail.
  - iv) Substructure components shall be sealed to the limits indicated in the plans.
3. Horizontal Application: Penetrating Concrete Sealer shall be applied with low pressure sprayer (10 – 25 psi) or roller so as to thoroughly saturate the concrete surface. Sufficient quantity is indicated when the sealer stands for a few seconds before completely penetrating the concrete surface.
4. Vertical Application: Apply from bottom up with low pressure sprayer (10 – 25 psi) or roller so as to thoroughly saturate the concrete surface and create a uniform wet appearance.
5. Precise Application Rates will vary with concrete mix, porosity, finish and environment, but may be estimated at 200 – 300 sq. ft. per gallon.
6. Drying time shall be a minimum of 2 hours for light traffic or by manufacturer's recommendation and maybe extended at the discretion of the Engineer.

### Method of Measurement

1. "Penetrating Concrete Sealer" is measured by the Square Foot

**Basis of Payment**

1.	<b>Pay Item</b> Penetrating Concrete Sealer	<b>Pay Unit</b> SQ. FT.
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**PREPARATION OF BRIDGE AT STATIONS  
719+02.70 LT, 735+84.12 LT and 5517+79.48**

**Description**

Preparation of the existing bridge structure(s) shall be in accordance with the pertinent provisions of Section 704 of the Standard Specifications.

**Removal Items**

The work shall include all work necessary to prepare the existing bridge for repair, including any of the following that apply:

- a. The removal of existing concrete bridge components to limits necessary for the required construction.
- b. The saw-cutting and breaking back of existing concrete structures.
- c. The removal of the existing steel structures as necessary.
- d. The removal of the existing bearing devices as necessary.
- e. The cleaning and roughening of the existing concrete that comes into contact with the new work.
- f. The cleaning, straightening and extending of the existing reinforcing steel into the new work.
- g. The cleaning and removal of loose rusted areas of piling to be incorporated into the new work.
- h. The removal of expansion devices and/or expansion joint material to perform work shown in the plans shown in the plans.
- i. Cutting down of bearing piles and sheet piles to 2'-0" below the finished grade, if applicable.

**Phasing**

The existing structure may be used to maintain traffic during the phased construction. The work shall be done in phases according to the details shown on the plans.

### **Disposal of Materials**

If there are lead plates under the existing steel rail posts, the lead plates shall be recycled in accordance with Subsection 203.01 Paragraph 3. (Environmental Requirements) of the Standard Specifications for Highway Construction as prescribed for lead plates under existing bearings.

Extreme caution shall be exercised in removing the existing bridge or bridge components so that no material or debris falls upon the roadway (if so located) below the bridge. The Contractor shall take adequate precautions to protect all traffic and roadways. No material or debris resulting from the preparation shall be permitted to fall upon the roadway below the bridge.

All material resulting from the removal of specified bridge components shall become the property of the Contractor and shall be promptly removed from the right-of-way.

### **SURFACE PREPARATION OF CONCRETE BRIDGE DECKS AND APPROACHES**

This provision shall apply to all concrete bridge decks and approaches that are to receive waterproof membrane and asphaltic concrete overlay.

Prior to placement of the waterproofing membrane on surfaces of concrete bridge decks and approaches, those surfaces shall be prepared to a Concrete Surface Profile (CSP) of 4 or smoother, as per the International Concrete Repair Institute (ICRI), by grinding, shot blasting or other approved method. All tining shall be removed.

All surfaces of repairs to concrete bridge decks or approaches or concrete surfaces of new construction shall be finished with a steel screed or float. No burlap drag, belting, scoring, tining or other texturing shall be used. Concrete shall be finished to a Concrete Surface Profile (CSP) of 4 or smoother as per the International Concrete Repair Institute (ICRI). Correction of irregularities shall be done after the concrete is seven days old.

Curing compound applied to any concrete to be covered by waterproofing membrane shall be an approved bituminous liquid curing compound as per Section 1013 of the Specifications.

Payment for work done in fulfillment of this provision shall not be paid directly but shall be paid subsidiary to other items for which payment is made.

### **ACCELERATED BRIDGE DECK REPAIR AND BRIDGE APPROACH REPAIR**

Bridge deck repair and bridge approach repair are treated similarly in this provision, except where a distinction is made. Rapid cure materials shall be used to minimize traffic delays.

**CONCRETE BRIDGE DECK/APPROACH REPAIR  
WITH RAPID CURING CONCRETE  
(Station 735+84.12 Lt.)**

**Description**

1. The work shall include removing unsound concrete, disposing of the old concrete, preparation of the repair area, and furnishing, placing, finishing, and curing the concrete for repairs to bridge decks and/or approaches.

**Material Requirements**

Rapid cure concrete materials shall comply with one of the following:

1. Products shall be used that are from the Pavement and Structural Patching Materials on the Approved Products List (APL) and also are suitable for the purpose of repairing structural concrete in bridge decks.
2. Products that are submitted by the Contractor for approval and are approved by Materials and Research Division for repairing structural concrete in bridge decks.
3. Materials shall have cure times and be placed at such times that allow the construction zone to be opened to traffic ½ hour before sunset. The material shall have attained a compressive strength of, at least, 3000 PSI before being exposed to traffic.
4. The compressive strength of the material shall be a minimum of 4000PSI at 28 days after placement.
5. The material shall be compatible with the asphalt and membrane system, if used.

**Equipment**

1. Surface preparation equipment shall be of the following types:
  - a. Concrete saws capable of sawing to a specified depth.
  - b. Sandblasting equipment able to remove rust and concrete from exposed reinforcing bars. The equipment shall also be able to remove loose and fractured particles from the prepared concrete surface.
  - c. Power-driven hand tools will be allowed with the following restrictions:
    - (1) Jackhammers greater than the nominal 60 lb (27 kg) class shall not be used.
    - (2) Jackhammers or chipping tools shall not be operated at an angle greater than 45 degrees measured from the deck surface.
    - (3) Chipping hammers greater than the 30 lb (13.5 kg) class shall not be used to remove concrete from around reinforcing bars.



2. Vibrating screeds, either mechanical or hand operated shall be used to finish the concrete.

### **Construction Methods**

1. General Requirements:

- a. No loads other than construction equipment shall be allowed on any portion of the concrete bridge deck or approach which has undergone preparation and removal of the old concrete surface. No construction load will be allowed which exceeds either an 8,000 lb (3625 kg) wheel load or a 16,000 lb (7250 kg) axle load. Any combination of axles closer than 4 feet (1.2 m) center-to-center will be considered to be one axle.
- b. The Contractor shall take all necessary precautions to prevent damage to persons or property beneath the structure.

2. Concrete Removal Requirements:

- a. All unsound concrete shall be removed from the concrete bridge deck or approach. When no overlay is indicated on the plan, the Contractor shall use a diamond blade to cut around the perimeter of the repair area to a depth of one inch. All repairs shall be cut so the edges are either parallel or perpendicular to the traveled way. When an overlay is indicated on the plan, saw-cutting is not necessary and edges shall be left irregular.
- b. The Contractor shall remove, scarify or chip the concrete deck or approach to a minimum depth of two inches in any area requiring repair until all unsound concrete is removed. Where scarifying equipment cannot be used, hand chipping will be required.
  - (1) Care shall be exercised to prevent cutting or otherwise damaging any exposed reinforcing bars. Repairs to damaged reinforcing steel shall be performed by the Contractor as directed by the Engineer at no expense to the Department. Additional concrete removal and replacement necessary to repair damaged reinforcing steel shall be at no expense to the Department.
  - (2) Any damaged epoxy coating of existing reinforcing steel shall be repaired according to Subsection 1021.03.
- c. Defective concrete shall be removed in the following manner:
  - (1) Where machine scarifying is employed to remove concrete, extreme care shall be used to avoid cutting reinforcing bars. Any damage caused by the Contractor shall be repaired by the Contractor as directed by the Engineer at no additional cost to the Department.
  - (2) At points where removal of unsound concrete is adjacent to reinforcing bars or the removal of unsound concrete leaves over 2/3 of the bar diameter exposed, the removal shall be continued so that at least 3/4 inch clearance surrounds the bar allowing new concrete to bond to the entire periphery of the exposed bar.

- (3) Wherever removal of unsound concrete extends to the top of the bottom layer of steel, the remaining thickness shall be removed to the full depth of the bridge deck or approach.
- (4) When concrete removal goes lower than three inches from the bottom of the bridge deck or approach, the remaining concrete, in that location, shall be removed to full depth.
- (5) Any removals shall be carefully done to prevent damage to the bottom of the deck or approach and to leave removal boundaries which will allow complete filling with plastic concrete.

3. Preparation of the Surface:

- a. All debris and rubble resulting from bridge deck or approach removal shall be thoroughly swept up and disposed of. The Contractor shall sandblast all exposed reinforcing bars, all prepared concrete surfaces, and the portion of the bridge curb and all surfaces of steel roadway joints that will be in contact with the concrete. The remaining concrete surface and reinforcing bars shall be cleaned with compressed air, vacuum, brushes or other methods as necessary to produce a surface free of particles, dust, liquids or other contaminants.
- b. In cases where the placement of the concrete is delayed beyond 24 hours after the sandblasting has been completed, the formation of incidental rust on the rebars due to humidity or rain shall not be cause for re-sandblasting.

4. Forming:

- a. Forms shall be provided in areas where the removal goes through the entire depth of the bridge deck. Forms for small areas (1 square yard or less) may be wired to the reinforcing bars for support. Forms for larger areas shall be supported by blocking from the beams.
- b. Forms shall be provided as required to re-establish edges of approaches that have been removed. Voids discovered under approaches shall be filled with flowable fill concrete.

5. Placing Concrete:

- a. The Engineer shall inspect and be satisfied that all removal and preparation has been done in compliance with this provision.
- b. Primers or pretreatments for rapid curing concrete products shall be used as instructed by the manufacturer.
- c. The Contractor shall furnish and place rapid curing concrete for the deck or approach repair. The concrete shall be handled and consolidated so there will be no separation of the aggregate and the mortar.
- d. Vibration of rapid curing concrete repair products shall be as prescribed by the manufacturer. A vibrating screed shall be used on repairs 5 feet or wider to finish the concrete to the final elevation.

- f. The surface shall be floated with a magnesium bull float. The surface shall be hand tined parallel to the existing tining in the deck or approach. If the deck or approach is to be overlaid prior to opening to traffic, no tining shall be done.
6. Sealing Joints:
    - a. All transverse and longitudinal joints surrounding the repair shall be sealed and the work considered subsidiary to the pay item "Concrete Bridge Deck Repair" or "Bridge Approach Repair".
    - b. Sealing is not required if the repairs will be overlaid with asphalt or concrete.
  7. Curing shall be as prescribed by the manufacturer except that the curing shall also be compatible with the type of overlay being used.
  8. Smoothness:
    - a. The elevation of deck or approach repairs shall be corrected in a manner that eliminates swales or bumps. Swales and bumps are defined as having 1/8 inch or greater deviation using an approved 10 foot straightedge. Corrective actions shall be completed by diamond grinding or replacement. The condition of the adjacent pavement shall be considered when evaluating the 1/8 inch deviation requirement.
  9. The forgoing methods of construction shall be employed unless the product manufacturer's instructions call for additional or more stringent requirements.

**Method of Measurement**

1. "Concrete Bridge Deck Repair" shall be measured for payment by the square yard of deck repaired, as determined by field measurements.
2. "Bridge Approach Repair" shall be measured for payment by the square yard of approach repaired, as determined by field measurements.

**Basis of Payment**

- |    | <b>Pay Item</b>             | <b>Pay Unit</b>  |
|----|-----------------------------|------------------|
| 1. | Concrete Bridge Deck Repair | Square Yard (SY) |
| 2. | Bridge Approach Repair      | Square Yard (SY) |
3. Payment for above pay items shall be full compensation for the completion of the work and for providing all materiel described in the contract documents.

## **POLYURETHANE CONCRETE PAVEMENT STABILIZATION (Pavement Jacking)**

### **1. SCOPE**

- 1.1 The work consists of designing, furnishing, and installing two-part, high-density polyurethane material according to the project Plans and this specification.
- 1.2 The parties and contract terms referred to in this specification are as follows:
  - 1.2.1 The State may have contractual agreements with, and be represented by, other parties such as engineers, architects, or contractors that preform services under the direction of the State.
  - 1.2.2 The Installing Contractor installs the polyurethane material and possibly performs other tasks associated with the project.
  - 1.2.3 The Plans refer to the contract documents; including but not limited to the drawings and specifications for the project.
- 1.3 The work may include void filling, stabilizing and/or lifting pavement and slab structures, or undersealing pavement and faulted joints where required.
- 1.4 The State will provide suitable access to the construction site for the Installing Contractor's personnel and equipment.
- 1.5 Unless otherwise noted, the Installing Contractor shall provide all labor, tools, equipment, and material necessary to accomplish the work.
- 1.6 Unless specifically noted otherwise in the contract documents, the State will remove and replace structures, utilities, or other surficial improvements in the work area as necessary to facilitate the work.
- 1.7 The State will be responsible for overall construction oversight.
- 1.8 The State will be responsible for soil density testing subsequent to the polyurethane foam injection, unless otherwise noted.
- 1.9 The work does not include any post-installation monitoring unless specifically noted otherwise in the contract documents.

### **2. REFERENCES**

- 2.1 American Society for Testing and Materials (ASTM)
  - 2.1.1 ASTM S1621: Compressive Properties of Rigid Cellular Plastics
  - 2.1.2 ASTM D1622/D1622M: Apparent Density of Rigid Cellular Plastics

2.1.3 ASTM C273: Shear Properties of Sandwich Core Materials

2.1.4 ASTM D2842: Standard Test Method for Water Absorption of Rigid Cellular Plastics

### **3. APPROVED POLYURETHANE FOAM MANUFACTURERS**

- 3.1 Due to the special requirements for design and manufacturing of polyurethane foam, the system shall be obtained from a qualified manufacturer with an approved product.
- 3.2 Unless a product is suitable for the specific purpose described herein and resides on the Approved Products List (APL), a request to allow any manufactured polyurethane foam product must be submitted to the Materials and Research Division for review not less than seven (7) calendar days prior to the bid date. The request must include:
  - 3.2.1 Documentation of at least five years of production experience manufacturing polyurethane products for similar applications,
  - 3.2.2 Documentation that the manufacturer's polyurethane products have been used successfully on at least five similar projects within the last three (3) years, and/or,
  - 3.2.3 Product acceptance by the local building code official(s) having jurisdiction over the project.

### **4. ACCEPTABLE PRODUCTS**

- 4.1 Two-part, closed-cell, polyurethane foam products PolyLEVEL<sup>®</sup> 400 and PolyLEVEL<sup>®</sup> 400H manufactured in accordance with the requirements of Sections 4 and 5 of this specification.

### **5. MATERIALS**

- 5.1 PolyLEVEL<sup>®</sup> 400 Two-part, High-density Polyurethane Foam
  - 5.1.1 Two-part, one to one ratio by volume, closed-cell, high-density polyurethane foam system.
  - 5.1.2 Viscosity: The viscosities of the resin and diisocyanate are 700 to 900 Centipoise (cps) and 150 to 250 cps, respectively, in accordance with ASTM D2196.
  - 5.1.3 Unit Weight: The unit weights of the resin and diisocyanate are 9.4 lb/gal and 10.25 lb/gal, respectively, in accordance with ASTM D1475.
  - 5.1.4 Minimum free-rise density of at least 3.8 lb/cubic foot per ASTM D1622.

- 5.1.5 Minimum molded compressive strength of at least 85 psi per ASTM D1621.
- 5.1.6 Minimum molded shear strength of at least 120 psi per ASTM C273.
- 5.1.7 Maximum water absorption of less than or equal to 0.03 lb/square foot when tested per ASTM D2842.
- 5.1.8 Achieve 90% compressive strength in 15 minutes.
- 5.2 POLYLEVEL<sup>®</sup> 400H Two-part, High-density, Hydrophobic Polyurethane Foam
  - 5.2.1 Used in applications where water is present beneath the slab.
  - 5.2.2 Viscosity: The viscosities of the resin and diisocyanate are 700 to 950 Centipoise (cps) and 150 to 250 cps, respectively, in accordance with ASTM D2196.
  - 5.2.3 Unit Weight: The unit weights of the resin and diisocyanate are 9.7 lb/gal and 10.25 lb/gal, respectively, in accordance with ASTM D1475.
  - 5.2.4 Minimum free-rise density of at least 3.8 lb/cubic foot per ASTM D1622.
  - 5.2.5 Minimum molded compressive strength of at least 85 psi per ASTM D1621.
  - 5.2.6 Minimum molded shear strength of at least 120 psi per ASTM C273.
  - 5.2.7 Maximum water absorption of less than or equal to 0.03 lb/square foot when tested per ASTM D2842.
  - 5.2.8 Achieve 90% compressive strength in 15 minutes.

## **6. QUALIFICATIONS OF INSTALLING CONTRACTOR**

- 6.1 The Installing Contractor shall submit to the State a proposal including the documentation required in this section. Work shall not begin until all the submittals have been received and approved by the State. All costs associated with incomplete or unacceptable submittals shall be the responsibility of the Installing Contractor.
- 6.2 Evidence of the Installing Contractor's competence in the installation of polyurethane materials shall be provided to the Engineer's satisfaction and may include any or all of the following:
  - 6.2.1 Polyurethane manufacturer's certificate of competency in installation of polyurethane materials,
  - 6.2.2 A list of at least three similar projects completed in the previous three years wherein the Installing Contractor installed polyurethane similar to those shown in the project Plans. Such a list shall include names and

phone numbers of those project representatives who can verify the Installing Contractor's participation in those projects, and/or,

- 6.2.3 A letter from the polyurethane manufacturer or manufacturer's representative expressing ability and intent to provide on-site supervision of the polyurethane installation.
- 6.3 A listing of all safety violations lodged against the Installing Contractor within the previous three years and the current status or final resolutions thereof. Descriptions of safety improvements instituted within the previous three years may also be submitted, at the Installing Contractor's discretion.

## **7. PRE-CONSTRUCTION SUBMITTALS**

- 7.1 Within two (2) weeks of receiving the contract award, the Installing Contractor shall submit the following documentation:
  - 7.1.1 Certification that the proposed polyurethane material meets the requirements of Section 5.
  - 7.1.2 Qualifications of the Installing Contractor per Section 6.2.
  - 7.1.3 Minimum and/or maximum quantity of polyurethane material.
  - 7.1.4 Soil testing procedures and failure criteria, if applicable.
  - 7.1.5 Provide proof of insurance coverage as stated in the general specifications and/or contract.

## **8. POLYURETHANE INSTALLATION**

- 8.1 Installing Contractor shall furnish and install polyurethane material per the project Plans. In the event of conflict between the project Plans and the Installing Contractor's proposed installation method, the Installing Contractor shall not begin work until conflict has been resolved with the State.
- 8.2 The State shall request marking of underground utilities by an underground utility location service as required by law, and the Installing Contractor shall avoid contact with all marked underground utilities.
- 8.3 The portion of the construction site occupied by the Installing Contractor, including equipment and material stockpiles, shall be kept reasonably clean and orderly.
- 8.4 The installation of polyurethane may be observed by representatives of the State for quality assurance purposes. The Installing Contractor shall give the State at least 24 hours' notice prior to starting the polyurethane installation.
- 8.5 The polyurethane will be installed with a truck, trailer, or buggy mounted pumping unit capable of injecting high-density polyurethane material under the concrete slab or pavement. The pumping unit will be capable of controlling the

temperature and rate of flow of the material, as well as, measuring the total amount of material injected.

- 8.6 If 5/8 inch diameter holes are required for the placement of the polyurethane material, the hole locations may be approved by the State prior to installation. After installation, the drilled holes will be cleaned out and filled with non-shrink grout or high-strength mortar mix.
- 8.7 Provide laser levels, manometers, dial indicators, or other measuring devices capable of detecting slab movement within 0.1 inches to verify stabilization and/or lift of the slab and/or structure.
- 8.8 The rate, temperature, and amount of material required will be determined by the Installing Contractor and approved by the State.

**9. INSTALLATION RECORD SUBMITTALS**

9.1 The Installing Contractor shall provide the State copies of the polyurethane material usage record within 24 hours after each installation section has been completed. Formal copies shall be submitted within 30 days following the completion of the polyurethane installation. The material usage record shall include, but is not limited to, the following information:

9.1.1 Date and time of installation

9.1.2 Location of installation

9.1.3 Total material used

9.1.4 Comments pertaining to interruptions, obstructions, other relevant information

**10. CLEANUP**

Within one week of completion of the work, the Installing Contractor shall remove any and all material, equipment, tools, debris, of other items belonging to the Installing Contractor or used under the Installing Contractor's direction.

**11. METHOD OF MEASUREMENT**

The high-density polyurethane material shall be measured by the pound. Weight of the injected material will be recorded and documented at each location and at the end of each work shift

**12. BASIS OF PAYMENT**

Payment shall be made for the pay item "Pavement Jacking" by the lump sum (LS). Such payment shall be considered full compensation for all work, materials, equipment and incidentals required to jack and stabilize the structures as indicated by the plans and contract documents.



## EROSION CONTROL

Subsection 807.02 in the Standard Specifications is amended to include the following:

Erosion Control	Minimum Purity	Application Rate in lb of Pure Live Seed/1000 sq. yard
Perennial ryegrass – Linn	85	1.75
Western wheatgrass – Barton, Flintlock	85	1.5
Slender wheatgrass	85	1
Kentucky fescue	85	0.75
Blue grama – NE, KS, CO, MN, SD	30	0.3
Buffalograss – Sharp's Improved, Cody, Bison, Texoka	80	1
Sideoats grama – Butte, El Reno, Trailway	75	1
Sand dropseed ( <i>Sporobolus cryptandrus</i> )	90	0.05
Oats	90	7

**All seed shall be origin Nebraska, adjoining states, or as specified. A Contractor proposing to use a substitute variety, or origin shall submit for the Engineer's consideration a seed tag representing the seed which shows the variety, origin and analysis of the seed.**

Rate of application of commercial inorganic fertilizer shall be:

	Rate of Application per 1000 SY (Minimum)
Available Nitrogen (N <sub>2</sub> )	4 or 9 lb.
Available Phosphoric Acid (P <sub>2</sub> O <sub>5</sub> )	0 lb.

Rate of application of granular sulphur coated urea fertilizer shall be:

Nitrogen (Total Available)	0 lb.
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## EROSION CONTROL

Subsection 807.01 is void and superseded by the following:

This work shall consist of the preparation of slopes and waterways and the furnishing and application of soil retention blankets at the locations shown in the plans.

Subsection 807.02

Paragraphs 2., 2.a., 2.b. and 2.c. are void and superseded by the following:

Wire staples shall be used for anchoring the soil retention blanket. The staples shall be a minimum of 13 gauge U-shaped steel wire with a 1 inch or larger throat with at least 6 inch long legs.

Paragraph 5. is void.

Subsection 807.03

Paragraph 6.c. is void.

Paragraphs 7.a.i. and 7.a.ii. are void.

Paragraph 8. is void.

Paragraph 1. of Subsection 807.05 is amended to include the following:

<b>Pay Item</b>	<b>Pay Unit</b>
Erosion Control, Class _____	Square Yard (SY)

**INTERLOCKING CONCRETE PAVER BLOCKS**

Interlocking Concrete Paver Blocks shall conform to the Standard Specifications for Highway Construction except as amended.

**1. Material Requirements**

Subsection 705.02 of the Standard Specifications is amended to include the following:

Blocks shall be precast in a plant for which the method of manufacture and quality of concrete are subject to the approval of the Department of Roads. The blocks shall meet the following requirements (expressed as an average value of three samples):

Compressive Strength (Min.)	4000 psi
Water Absorption (Percent – Max..)	7.0%
Density (Min.)	130 lbs/ft <sup>3</sup>
Height (Nominal ± 10%)	6 inch

The compressive strength shall be determined from a 2-inch cube cut from a block. A minimum of three blocks per a day's pour shall be submitted to Materials and Research Division for testing. Blocks may be either closed (Maximum 10% open area) or open celled (Minimum 20% open area) as identified in the plans. When no cell style is identified the default shall be open celled.

Interlocking concrete pavers shall be as shown on the NDR Approved Products List.

Geotextile Filter Fabric for Interlocking Concrete Paver Block: Geotextile for use under Interlocking Concrete Paver Block applications shall be either a woven monofilament polypropylene geotextile meeting the AASHTO M 288 Class 2 Geotextile Strength Property Requirements or a nonwoven monofilament geotextile meeting the Class 1 requirements. The geotextile shall also meet the requirements of Table 6 in the AASHTO M 288 specifications unless otherwise noted in the plans.

The geotextile shall be free of defects, rips, holes, or flaws.

Fill Material for Interlocking Concrete Paver Block: Fill material for the open spaces between paver blocks shall consist of select soil from the construction site.

The requirements provided here for reference only and shall not be construed to supersede the AASHTO specification.

AASHTO M 288	Class 1		Class 2	
	Elongation		Elongation	
	<50 %	≥50%	<50%	≥50%
Grab Strength (ASTM D 4632)	315 lbs.	200 lbs.	250 lbs.	160 lbs.
Sewn Seam Strength (ASTM D 4632)	280 lbs.	180 lbs.	225 lbs.	140 lbs.
Tear Strength (ASTM D 4533)	110 lbs.	80 lbs.	90 lbs.	55 lbs.
Puncture Strength (ASTM D 6241)	600 lbs.	430 lbs.	490 lbs.	310 lbs.

AASHTO M 288	Table 6		
	Percent in Situ Soil Passing No. 200 Sieve		
	<15 %	15-50%	>50%
Permittivity (ASTM D 4491)	0.7 sec. <sup>-1</sup>	0.2 sec. <sup>-1</sup>	0.1 sec. <sup>-1</sup>
Apparent Open Size (ASTM D 4751)	No. 40	No. 60	No. 70
Ultraviolet Stability (ASTM D 44355)	50% after 500 h of exposure		

2. **CONSTRUCTION METHODS**

Subsection 705.02 of the Standard Specifications is amended to include the following:

Prior to placing pavers, the previously constructed subgrade shall be cleaned of all foreign substances. The surface of the subgrade shall be inspected for adequate compaction and surface tolerances. Ruts, soft spots, areas having inadequate compaction, and deviations of the surface from the specified tolerances shall be corrected prior to placing pavers.

Areas on which pavers are to be placed shall be trimmed and dressed to conform to plan cross sections within an allowable tolerance of plus or minus 2 inches from the theoretical slope lines and grades. Ruts and ditches shall be filled and leveled. Where such areas are below the allowable minus tolerance limit, they shall be brought to grade by filling with material similar to the adjacent material and well compacted. Immediately prior to placing pavers, the prepared subgrade will be inspected by the Engineer and no material shall be placed thereon until the area has been approved.

Geotextile filter fabric shall be laid flat but not stretched on the soil and shall be secured with Type 1 Erosion Control Anchoring Devices (See Approved Product List – Erosion Control). Fabric shall be laid with the long dimension horizontal. Overlaps of fabric at transverse and longitudinal joints shall be 12 inches minimum. Anchors shall be placed 3 inches in from the edge of the geotextile and through both thicknesses of overlapped geotextile along the midpoint of the overlap at not greater than 6-foot intervals. Additional pins shall be installed where needed to prevent slippage.

Geotextile installation shall proceed at such a rate that geotextile is covered with blocks within 2 days of laying of the fabric.

Placement of the block matrix may be by either hand or as cable tied machine placed mats. Placement of the block matrix shall be done in a manner that avoids damage to the drainage layer, geotextile or subgrade during installation. Final acceptance and approval of the installation will be made by the Engineer.

Joint spacing between adjacent blocks in the matrix shall be maintained so that binding of blocks does not occur and so that block-to-block interlock is achieved. In areas of curvature or grade change, orientation of an individual block to adjacent blocks in the matrix shall be such that block-to-block interlock and intimate contact with the geotextile is maintained.

Placement of the block matrix in channels shall preferentially begin at the upstream end and proceed downstream. Contractor may at his risk and with agreement of the Engineer place the block matrix starting from the downstream end and proceeding upstream, but shall also provide a temporary toe trench and anchoring at the upstream edge of the ACB System to protect against water undermining the system during flow events. Placement of the block matrix on side slopes and steep slopes exceeding 20% (1:5 V:H) shall begin at the toe of the slope and proceed upslope. Block placement shall not bring block-to-block interconnections into tension.

Individual blocks within the block matrix shall not protrude above the plane of the finished matrix more than 0.5 inches. Blocks that protrude more than 0.5 inches shall be removed and replaced until it protrudes no more than 0.5 inches. If necessary, additional blocks shall be removed and replaced to provide a planar surface.

Block matrices placed as cable tied, machine placed mats shall use manufacturer approved lifting equipment and cables. Mats shall be placed side by side or end to end such that they abut each other. Mats seams or openings between mats that are 2 inches or greater shall be filled with flowable fill.

Equipment shall not be allowed on the installed pavers that would break or otherwise damage the pavers.

Backfilling of the paver blocks shall be completed as soon as practicable after the Engineer has approved the block matrix installation. The surrounding sides of the installed paver blocks shall be filled with material similar to the adjacent material. The fill material for the open spaces through and between the pavers and shall be crushed limestone and be placed on the surface of the pavers and raked, brushed or tamped into the open spaces. Enough fill material shall be applied to fill the open spaces and excess fill material shall be removed from the surface.

**3. METHOD OF MEASUREMENT AND BASIS OF PAYMENT**

The item "Interlocking Concrete Paver Block" shall be measured and paid for by the square foot, surfaced measured. The price bid shall be full compensation for excavation, geotextile filter fabric, fillers, pavers, and all miscellaneous materials and labor required to complete the work.

**GUARDRAIL END TREATMENT, TYPE I  
(I-1-1214)**

Section 902 in the Standard Specifications is amended to include "Guardrail End Treatment, Type I".

This work consists of furnishing and installing a guardrail end treatment system according to the details and at the locations shown in the plans.

The Contractor has the option of installing one of the following systems:

- |                |   |
|----------------|---|
| 1.) SKT-SP-MGS | Manufactured by Road Systems, Inc.<br>3616 Old Howard County Airport<br>Big Springs, TX 79720<br>(915) 263-2435 |
| 2.) X-Tension  | Manufactured by Lindsay Manufacturing<br>505 Crown Point Ave.<br>Omaha, NE 68110<br>(402) 210-4593              |

The lengths of manufacturers' end treatments vary; the Contractor must install a total length of 53'-1.5", including the end treatment, to last post with curved end or rectangular "head" beyond the last post. The additional length required will be W-beam guardrail with Midwest Guardrail System 31" design.

The Contractor will be required to furnish two sets of shop plans to the Department of the system to be installed. The guardrail end treatment shall be installed in accordance with the recommendations of the manufacturer.

Payment shall be full compensation for all work required to provide and install the system.

## RECONSTRUCT INLET

This work shall consist of the reconstruction of the existing inlet as shown in the plans.

The work will be measured as a single unit and shall be paid for at the contract unit price per each for the item "Reconstruct Inlet". This price shall be considered full compensation for all excavation, removal of existing materials to the limits shown in the plans, concrete, reinforcing steel, labor equipment, tools, and incidentals necessary to complete the work. Cast iron grate and frame will be measured and paid for as specified in Section 916 in the Standard Specifications.

## END ANCHORAGE ASSEMBLY

Section 902 in the Standard Specifications is amended to include the item "End Anchorage Assembly".

Paragraph 1. of Subsection 902.05 is amended to include the following:

<b>Pay Item</b>	<b>Pay Unit</b>
End Anchorage Assembly	Each (ea)

## TIMBER AND LUMBER (J-5-0711)

Paragraphs 2.a. and 2.b. of Subsection 1075.02 in the Standard Specifications are void and superseded by the following:

2. a. The creosote, pentachlorophenol and copper naphthenate preservative treatment for timber and lumber shall be by the Empty-cell (Rueping) Process; and, where allowed, the ammoniacal copper arsenate (ACA), chromated copper arsenate (CCA), and ammoniacal copper zinc arsenate (ACZA) preservative treatment for timber and lumber shall be by the Full-cell (Bethel) Process. Treatment shall conform to the requirements as specified in T1-Use Category System: User Specification for Treated Wood of the American Wood-Preservers' Association Standards and AASHTO M 133. Preservatives shall meet the requirements of Section 1076.
- b. Preservative Treatment. The preservative treatment and minimum retentions for timber and lumber shall conform to the requirements as specified in U1-Use Category System: User Specification for Treated Wood of the American Wood Preservers' Association Standards as amended herein. Minimum retentions for all timber and lumber shall conform to Use Category UC4C. Minimum retentions for fence posts shall conform to Use Category UC4A. Timber and lumber to be treated with ammoniacal copper arsenate or ammoniacal copper zinc arsenate shall be dried to the fiber saturation point required to put the timber into satisfactory condition to accept the preservative and attain the required preservative retention and penetration. After treatment, with the exception of offset blocks and posts for guardrail terminals systems, the material shall be

redried and have a moisture content of not more than 30 percent at the time of shipment to the job site.

Paragraph 1.b. of Subsection 1075.05 is void and superseded by the following:

- b. Species. Unless otherwise specified, sawn wood guardrail posts shall be either Douglas Fir (Coast Region) or Southern Yellow Pine.

Wood offset blocks shall be either Douglas Fir (Coast Region), Southern Yellow Pine (major or minor species), or Ponderosa Pine.

## **PERFORMANCE GRADED BINDER**

Section 503 in the Standard Specifications is amended to include Performance Graded Binders.

Section 1029 in the Standard Specifications is void and superseded by the following:

### **I. Description**

The Performance Graded Binder to be used on this project shall be PG Binder 64-34 supplied by a Certified Supplier.

### **II. Certified Supplier**

A supplier must be certified by the Nebraska Department of Roads to be allowed to supply Performance Graded Binder in Nebraska. To be considered certified by the NDR, a supplier must participate in one or more of the following PG Binder groups.

1. AASHTO Materials Reference Laboratory (AMRL)
2. Western Cooperative Testing Group (WCTG)
3. Combined States Binder Group (CSBG)

The supplier must also maintain and follow the requirements of the group or groups in which they participate in, to maintain certification by the Nebraska Department of Roads. In addition, active participation is required to maintain certification by the Department. Active participation will include submitting of round robin sample results, along with meeting other requirements of the group or groups.

A certified supplier may be asked to supply to the Department, past round robin results, laboratory inspection reports, reasons for and investigative reports on out lying results, quality control testing, and/or technician training and proficiency testing reports.

The binder supplier agrees to inspection of their plant or terminal without notice anytime during production or supplying of material to the Department. The inspection may also include the supplier's laboratory.

A certified supplier can voluntarily submit samples of binders proposed for use to the Materials and Research Bituminous Laboratory for quality and verification testing.

### **III. Supplier Certification**

A supplier may request certification by contacting the Nebraska Department of Roads, Materials and Research Division, Flexible Pavement Engineer at (402) 479-3839. A temporary certification may be issued for a period of up to one year. Split sample testing will be required prior to receiving a temporary certification. Split sample testing will be done on all grades of binder that the supplier intends to supply during the temporary certification. The supplier will have up to one year to become certified by participating in and following the requirements of one or more of the approved binder groups.

A supplier may become certified through active participation in other binder certification/round robin groups that are approved by the NDR. The NDR may request from the supplier prior to approval, past or current round robin results, quality control testing, laboratory inspection reports, and/or technician training and proficiency testing reports.

### **IV. Loss of Certification**

Certification will be withdrawn from a supplier for a minimum of 6 months when one or more of the following conditions exist.

1. Inability to consistently supply material meeting specifications as outlined herein.
2. Failure to maintain an acceptable quality control program.
3. The failure to meet one or more of the conditions of being a Certified Supplier as outlined above.

Notification of decertification of a supplier will be submitted in writing by the NDR. Material from a decertified source will not be accepted for use on NDR projects and the NDR districts will be notified of this action.

### **V. Supplier Recertification**

If a supplier has lost certification and seeks to be recertified, the following steps are required.

1. Fulfill the requirements outlined above for gaining Certified Supplier status.
2. Submit documentation to the Flexible Pavement Engineer explaining why decertification occurred, and the actions that are going to be taken to correct the problems identified in writing by the NDR.

### **VI. Binder Sampling and Testing:**

1. Lots: Each 3750 tons (3400 Mg) of HMA type produced, or portion thereof, will be a binder lot.
2. A binder lot will include only one PG Binder grade or a blend as allowed in paragraph VI.6.e.



3. A binder lot will only include one supplier of the PG Binder or a blend as allowed in paragraph VI.6.e.
4. Blending of different binder grades and binders from different suppliers will be allowed with restrictions as noted in paragraph VI.6.e. The Engineer must be notified of the intent to blend prior to actual blending.
5. All binders shall be sampled at the rate of at least one sample per lot.
  - a. The sample shall consist of two one-quart (liter) cans and shall be taken by the Contractor's Certified Sampling Technician, with assistance from or under supervision of NDR personnel. The sample shall be taken at the plant from the line between the storage tank and the mixer or from the tank supplying material to the line, at a location at which material sampled is representative of the material in the line to the mixer. One can will be tested for specification compliance, and the other can portion will be saved for check tests and dispute resolution, if needed. The sampling process shall follow procedures of the NDR Materials Sampling Guide.
  - b. Testing. When the tested PG Binder is in compliance, the binder lot will be accepted and both cans of the sample can be discarded. If the tested PG Binder does not comply, then the price of the PG Binder lot represented by the sample shall be adjusted according to Tables 2 and 3. Overall project average testing requirements and price adjustments will also apply, as stated in Table 4.
  - c. In cases where the total HMA type is less than 3750 tons, only one PG Binder lot sample per grade per supplier is required. If the tested PG Binder does not comply, the price of the PG Binder lot shall be adjusted according to Tables 2 and 3.

**6. Material Requirements**

- a. Performance Graded Binder, as specified in the contract items, shall be in accordance with the PG+ specifications as noted, and AASHTO M320 with the exception of Direct Tension.
- b. Substitution of a PG Binder, which exceeds the upper and lower grade designations from the specified, requires advance notification to, and approval by, the Engineer. The substitution of the PG Binder shall also be identified in the sample identification submittals.
- c. Material Certification - A Material Certification shall be submitted prior to construction, stating the type of modifier being used, and the recommended mixing and compaction temperatures for the Hot Mix Asphalt. The Material Certification must state that acid has not been used. The Material Certification must also state that the material has not been air blown or oxidized.
- d. The Contractor shall receive from the supplier, instructions on the proper storage and handling of each grade and shipment of PG Binder.

- e. Blending of PG Binders at the hot mix plant site will be allowed only when transitioning to an asphalt mixture requiring a different grade of binder, and with the following restrictions:
- (1) The resultant blend will meet PG+ (modified binders) and/or AASHTO M320 specifications when tested as  $\pm 3^{\circ}$  C of the specified PG Binder. The sample of the blended material 1) will be considered as a lot sample, 2) will be taken during initial production following the blending of the binders, and 3) shall have deductions applied as per Tables 2, 3, and 4 when not meeting specifications. On the blended sample's identification form will be a note explaining the blending conditions and a statement that the sample is a blend of materials. The next lot sample, following the sample representing the blend, will be tested as the specified binder grade for the asphalt mixture being produced and shall meet AASHTO M320 and PG+ (if modified) specifications.
  - (2) Modified Binders - Only blending of the same type of elastomer modifiers listed in VI.6.f.(1) will be allowed.
- f. When modified binders are specified, the following PG+ specifications (Table 1) and AASHTO M320 (with the exception of Direct Tension) will apply:
- (1) The Performance Graded Binder shall be a binder, which incorporates a blend of base asphalt and elastomer modifiers of styrene-butadiene (SB), styrene-butadiene-styrene (SBS) or styrene-butadiene-rubber (SBR). Acid shall not be used. Air blown and/or oxidized asphalt will not be allowed. The supplier must certify that the binder is not acid modified, and that acid was not used. The binder supplier must also certify that air blowing or oxidization has not been done/used to modify the binder or used to change the properties of the binder.
  - (2) The composite material shall be thoroughly blended at the asphalt refinery or terminal prior to being loaded into the transport vehicle. The polymer modified binder shall be heat and storage stable and shall not separate when handled and stored as per the supplier's storage and handling recommendations.
  - (3) The composite material shall be homogenous, and shall not demonstrate evidence of 1) localized gellation or over-crosslinking of polymers, 2) improper use of gelling modifiers used in addition to polymer modification, or 3) otherwise any other lumpy conglomerations.
  - (4) To insure the binder is of a modification system in which no acid is used, the Materials and Research Bituminous Laboratory will perform a random free-acid verification test. ARR-MAZ AD-here LOF65-00, amine anti strip will be added at the rate of 0.5% to

sample(s) that have been heated to 300 degrees F or until viscous and stirred for a minimum of 5 minutes. The resultant blend will then be tested for PG grading and compared to PG grading prior to the blending. Binders tested for acid modification shall meet AASHTO M320 specifications, and shall not show a drop of  $G^*/\sin(\delta)$  of more than 25% when compared to the result(s) of the sample prior to the verification test. If the verification test reveals material that does not meet AASHTO M320 specifications, or shows a drop of  $G^*/\sin(\delta)$  greater than 25%, the material that is represented by the sample will be rejected. If a random sample demonstrates acid modification, additional samples will be tested.

- (5) Supplier-submitted samples of binder proposed for use, can be tested for acid modification. Binders that demonstrate acid modification will not be accepted for use.
- (6) Lot samples of the binder shall meet or exceed the PG+ specifications as listed, in addition to AASHTO M320 specifications. For PG+, Table 1 specification testing, material will be tested on original unaged binder for phase angle specification, and RTFO aged material for elastic recovery. Project lot samples can also be tested for acid modification as described in VI.6.f.(4).
- (7) When it is determined that material exceeds Table 1, Table 2 will apply. When it is determined that a single sample(s) does not meet AASHTO M320 specifications, Table 3 will apply.
- (8) All project samples will be tested for original binder dynamic shear rheometry compliance.
- (9) Modified binders with a temperature spread of 104 shall be exempt of the AASHTO M320 requirement for the test of Viscosity, AASHTO T316.
- (10) All specified binders with a temperature spread of 92 or greater, shall be modified with an elastomer modifier as specified in paragraph VI.6.f.(1).

**Table 1**  
**Additional Specifications for Modified Binders**

PG+ Specifications	Spec Base			Spec w/Tol. <sup>2</sup>		
	92	98	104	92	98	104
Temperature Spread <sup>1</sup>						
Elastic Recovery; AASHTO T301 tested at 77°F (RTFO Aged AASHTO T301)	Minimum 65%			Minimum 60%		
Phase Angle; degrees (Maximum) (Original Binder)	77.0	75.0	73.0	79.0	77.0	75.0

<sup>1</sup> Temperature Spread is determined by subtracting the low temperature from the high temperature. Example (PG 64-28: 64 – (-28) = 92).

<sup>2</sup> Tolerances were determined from CSBG round robin data and AASHTO or ASTM precision statements. Material exceeding these tolerances is subject to 75% pay or removal.

**Table 2**  
**PG + Single Sample Tolerance and Pay Factor Table**

	<b>Pay Factor of 0.75 or Removal<sup>1</sup></b>		
Temperature Spread	<b>92</b>	<b>98</b>	<b>104</b>
Elastic Recovery Percentage (RTFO Aged AASHTO T301)	< 60%		
Phase Angle (degrees) (Original Binder)	> 79.0	> 77.0	>75.0

- <sup>1</sup> Price Reduction will be applied to contract unit price of asphalt binder. The Engineer will determine if the non-compliant material will be removed. Removal and replacement will be at no additional cost to the Department. If the non-compliant material is accepted, a price factor of 0.75 will be applied. The price factor will be applied to the contract unit price of asphalt binder.

**Table 3**  
**Single Sample Tolerance and Price Factor Table**

	<b>Pay Factor of 0.75 or Removal<sup>1</sup></b>
<u>Tests on Original Binder</u> Dynamic Shear, G*/Sin δ, kPa	< 0.93
<u>Tests on Rolling Thin Film Oven Residue</u> Dynamic Shear, G*/Sin δ, kPa	< 1.98
<u>Tests on Pressure Aging Vessel Residue</u> Dynamic Shear, G*Sin δ, kPa	> 5600
<u>Creep Stiffness</u> S, mPa	> 325
m-Value	< 0.285

- <sup>1</sup> Price Reduction will be applied to contract unit price of asphalt binder. The Engineer will determine if the non-compliant material will be removed. Removal and replacement will be at no additional cost to the Department. If the non-compliant material is accepted, a price factor of 0.75 will be applied. The price factor will be applied to the contract unit price of asphalt binder.

**VII. Overall Project Average - Price Reduction Based on Complete M320 Testing**

- Binders that demonstrate acid modification as per VI.6.f.(4) shall be rejected, and the test results will not be included in Overall Project Averages.
- PG+, Table 1 specifications do not apply to Overall Project Averages.

3. Out of specification material will be determined by the specifications outlined in AASHTO M320, excluding Direct Tension.
4. The Nebraska Department of Roads, Materials and Research Bituminous Laboratory, will do complete specifications testing on at least one sample per HMA type from the project. The Department will randomly select one sample for complete specifications testing out of every five samples received. When any test result shows a sample not meeting specifications, the previous and following lot sample received will also be tested for complete specifications compliance. Adjacent lot sample testing will continue in this manner until tested samples meet all specifications, or there are no more lot samples to be tested.
5. Samples not selected for complete specifications testing are “control” samples. Control samples will be tested for original binder AASHTO M320 Dynamic Shear, as well as PG+ phase angle if modified. When a control sample falls out of AASHTO M320 Dynamic Shear and/or PG+ phase angle specification, it will then be tested for complete M320 and PG+ specifications compliance. And, as mentioned in VII.4, adjacent lot samples will be tested when any results do not meet specification. Adjacent lot testing will continue until tested samples meet all specifications, or there are no more lot samples to be tested. This additional complete testing for M320 and PG+ compliance is in addition to the minimum number of samples that will be tested for complete M320 and PG+ compliance.
6. At the completion of testing, all M320 test results will be averaged. The average will not include M320 results from any binder lots that have already been reduced in pay by Table 3. For averages that do not meet M320 specifications, the largest reduction shown in Table 4 will be applied to all the Performance Graded Binder used on the project, with the exception of any binder lots that were already reduced in pay by Tables 2 and/or 3. In cases where there is only one PG Binder Grade lot sample left when determining the Overall Project Average tests results, then the Pay Factor for the PG Binder lot represented by that sample is determined by Table 4.

**Table 4**  
**Overall Project Average – Pay Factor Table**

	<b>Range of Average</b>	<b>Pay Factor Applied</b>
<u>Tests on Original Binder</u> Dynamic Shear, $G^*/\sin \delta$ , kPa Min. 1.00 kPa	< 1.00 – 0.98	0.98
	< 0.98 – 0.96	0.95
	< 0.96 – 0.94	0.92
	< 0.94	0.85
<u>Tests on Rolling Thin Film Oven Residue</u> Dynamic Shear, $G^*/\sin \delta$ , kPa Min. 2.20 kPa	< 2.20 – 2.156	0.98
	< 2.156 – 2.09	0.95
	< 2.09 – 2.024	0.92
	< 2.024	0.85
<u>Tests Pressure Aging Vessel Residue</u> Dynamic Shear, $G^*/\sin \delta$ , kPa Max. 5000 kPa	>5000 – 5100	0.98
	>5100 – 5250	0.95
	>5250 – 5400	0.92
	>5400	0.85
m-Value Min. 0.300	< 0.300 – 0.298	0.98
	< 0.298 – 0.293	0.95
	< 0.293 – 0.290	0.92
	< 0.290	0.85
<u>Creep Stiffness</u> S, mPa Max. 300 mPa	>300 – 306	0.98
	>306 – 315	0.95
	>315 – 324	0.92
	>324	0.85

#### **VIII. Single Sample Reduction and Overall Project Average Reduction**

A sample representing a lot, incurring pay reduction or removal by Table 2 and/or 3, will incur pay reduction or removal only for the material that the sample represents.

Only the largest overall project average reduction from Table 4 will apply when more than one test average falls out of AASHTO M320 specifications.

Pay Factors or removals, based on single sample test results, and pay factors based on overall project average test results, are separate from each other, and both will be applied.

#### **IX. Investigation of Verification Lot Samples That Do Not Meet Specifications**

When the lot sample shows test results out of specification limits, the process of resolving the sample failure will include the following actions, as appropriate:

1. The Bituminous Lab may conduct retesting of the remaining portion of the sample as determined necessary to confirm or disaffirm the original test result(s).

2. The Bituminous Laboratory will notify the NDR project personnel, who will in turn notify the Contractor. All will arrange to investigate all aspects of the testing, loading, handling and delivery of the material in question. The Contractor and NDR project personnel shall report findings to the Bituminous Laboratory.
3. The Bituminous Laboratory will collect and compile all information provided.
4. The Bituminous Laboratory will issue the standard report of tests for all samples tested, to include any resulting pay factor deductions or removals. A copy of the report of tests will be distributed to the District and Construction Division. The District will then provide a copy to the Contractor. Supplier requests for a copy of this report will be directed to the Contractor.

**X. Dispute Resolution**

After testing and investigations have been completed on the sample, and there is still a dispute, the NDR will select an independent laboratory for referee testing to take place on the remainder of the sample, or any other representative samples obtained. The identity of the independent laboratory will not be revealed until the selected laboratory has completed the referee testing, and the NDR has submitted a final report of the results. If the independent lab's tests indicate failing results and pay deductions equal to or greater than the NDR's, the Contractor will reimburse the NDR for the cost of testing. If the independent lab's tests indicate that the material meets specification or is at a pay deduction less than the NDR's, the NDR will assume the cost of testing. When the independent lab's tests indicate a pay deduction, the lesser of the NDR's and the independent lab's deductions will be applied.

Only the Contractor can initiate dispute resolution, and request referee testing. The request must be made, in writing, to the NDR Construction Division within 60 days of awareness of sample results. For any period of time past 60 days, dispute resolution is forfeited.

**XI. Method of Measurement**

PG Binder shall be measured in accordance with Subsection 503.05 in the Standard Specifications.

**XII. Basis of Payment**

Subsection 503.06 in the Standard Specifications is amended to provide that PG Binder, accepted by the Engineer for use in asphaltic concrete, will be paid for at the contract unit price per ton (Megagram) for the item "Performance Graded Binder \_\_\_\_\_", less any deductions as prescribed in the tolerance and price reduction tables.

**SECTION 1028 - SUPERPAVE ASPHALTIC CONCRETE  
(J-7-1013)**

Section 1028 in the Standard Specifications is void and superseded by the following:

**1028.01 -- Description**

1. a. Superpave Asphaltic Concrete is a Contractor-designed mix.
- b. The Contractor shall be required to define properties using a gyratory compactor that has met the Superpave evaluation test procedures, during mix design and production.
2. Job Mix Formula
  - a. Before production of asphaltic concrete, the Contractor shall submit, in writing, a tentative Job Mix Formula (JMF) on the NDOR Mix Design Submittal Form for verification to the Department.
  - b. The JMF shall be determined from a mix design for each mixture. A volumetric mixture design in accordance with AASHTO R 35 as modified within this specification will be required. However, the mixture for the Superpave specimens and maximum specific gravity mixture shall be aged for two hours at compaction temperature. The mixture shall be prepared using the following:
    - (1) Mixture Conditioning of Hot Mix Asphalt (HMA), AASHTO R 30.
    - (2) Method for Preparing and Determining the Density of Hot Mix Asphalt Specimens by Means of the SHRP Gyratory Compactor, AASHTO T312.
  - c. The JMF shall identify:
    - (1) The virgin mineral aggregates and pit locations
    - (2) Recycled Asphalt Pavement (RAP) and source locations
    - (3) Hydrated lime
    - (4) Mineral filler
    - (5) The percent passing value for each specified sieve for the individual and blended materials
  - d.
    - (1) The Contractor shall submit one uncoated, proportioned 22 lb. (10,000 gram) sample of the blended mineral aggregates for consensus properties and specific gravity testing, for all mix types except SPS. Once verified, the Contractor may begin plant production and QC testing with the QA/QC program.
    - (2) The Contractor has the option of submitting the following; 2 proportioned 22 lb. (10,000 gram) samples of the blended mineral aggregates (which are precoated with hydrated lime, if lime is used) and two one-quart (liter) samples of the proposed PG Binder to be used in the mixture to the Department Materials and Research Central Laboratory at least 15 NDR working days before production of asphaltic concrete. If submitted these



samples will be used to verify the Contractor's Superpave mix design test results and mix properties.

- (3) Submitted with these samples shall be a copy of the Contractor's results for all Superpave mix design tests.
- (4) Mix design shall include at a minimum:
  - (i) The bulk specific gravity (Gsb), which shall be 2.585, for data purposes and as information only, for all mixes.
  - (ii) The target binder content. The binder content will be determined by ignition oven results. A correction factor of 0.3% will be added to the ignition oven results for mixes containing hydrated lime, and an adjustment factor of 0.1% will be added to the ignition oven results for mixes containing WMA.
  - (iii) The supplier and grade of PG Binder.
  - (iv) The maximum specific gravity of the combined mixture (Rice).
  - (v) The bulk specific gravity (Gmb) and air voids at N initial (Nini), N design (Ndes) and N maximum (Nmax) of the gyratory compacted specimens.
  - (vi) Voids in the Mineral Aggregate (VMA) and Voids Filled with Asphalt (VFA) at Ndes.
  - (vii) Fine Aggregate Angularity (FAA) and specific gravity, Coarse Aggregate Angularity (CAA), Flat and Elongated Particles and Sand Equivalent of the aggregate blend.
  - (viii) Location description and/or legal descriptions and producers of materials used in the mix.
  - (ix) Dust to Binder Ratio.
  - (x) JMF compaction temperatures from NDOR Gyratory Temperature Table (See Table 1028.11).
  - (xi) The hydrated lime content.

3. Quality Control Program:

- a. The Contractor shall establish, provide, and maintain an effective Quality Control (QC) Program. The QC Program shall detail the methods and procedures that will be taken to assure that all materials and completed construction conforms to all contract requirements.
- b. Although guidelines are established and certain minimum requirements are specified herein and elsewhere in the contract, the Contractor shall assume full responsibility for placing a pavement course that meets the target field values.
- c. The Contractor shall establish a necessary level of control that will:
  - (1) Adequately provide for the production of acceptable quality materials.

- (2) Provide sufficient information to assure both the Contractor and the Engineer that the specification requirements can be met.
- d.
  - (1) The Contractor shall develop and submit a copy of their QC Program to the Department. A copy of the QC Program shall be kept on file in the QC lab trailer. This Program shall be updated as needed and submitted annually for review.
  - (2) The Contractor shall not begin any construction or production of materials without an approved QC Program.
- e. The QC Program shall address, as a minimum, the following items:
  - (1) QC organization chart.
  - (2) Inspection requirements.
    - (i) Equipment.
    - (ii) Asphalt concrete production.
    - (iii) Asphalt concrete placement.
  - (3) QC testing plan.
  - (4) Documentation of QC activities.
  - (5) Requirements for corrective action when QC or acceptance criteria are not met.
  - (6) Any additional elements deemed necessary.
  - (7) A list, with the name and manufacturers model number, for all test equipment used during laboratory testing.
  - (8) A description of maintenance and calibration procedures, including the frequency that the procedures are performed.
- f. The QC organization chart shall consist of the following personnel:
  - (1) A Program Administrator:
    - (i) The Program Administrator shall be a full-time employee of the Contractor or a Subcontractor (Consultant) hired by the Contractor.
    - (ii) The Program Administrator shall have a minimum of 5 years' experience in highway construction.
    - (iii) The Program Administrator need not be on the job site at all times but shall have full authority to institute any and all actions necessary for the successful implementation of the QC Program.
    - (iv) The Program Administrator's qualifications and training shall be described in the QC Program.
  - (2) Quality Control Technicians:
    - (i) The quality control technicians shall report directly to the Program Administrator and shall perform all sampling and quality control tests as required by the contract.

- (ii) The QC technicians shall be certified every 5 years by the Department Materials and Research Division.
  - (iii) Certification at an equivalent level by a state or nationally recognized organization may be acceptable.
  - (iv) The QC technician's credentials and training records shall be submitted to the Department.
  - (v) The Contractor may have a non-certified technician working under the direct supervision of a certified technician for no more than one construction season.
- g.
  - (1) Inspections shall be performed daily to ensure continuing compliance with contract requirements until completion of the work.
  - (2) QC test results and periodic inspections shall be used to ensure the mix quality and to adjust and control mix proportioning.
- 4. Contractor's Lab Equipment:
  - a. The Contractor shall calibrate and correlate the testing equipment according to the procedures prescribed for the individual tests and conduct tests in conformance with specified testing procedures.
  - b. The Contractor shall have the following equipment (or approved equal) at or near the project location:
    - (1) A gyratory compactor and molds meeting AASHTO criteria.
    - (2) An Asphalt Content Ignition Oven meeting AASHTO criteria.
    - (3) Rice equipment specified in AASHTO T 209, procedure 9.5.1, Weighing in Water. The thermometer being used to measure water temperature will be as specified in T 209.
    - (4) FAA equipment specified in AASHTO T304.
    - (5) To test density of compacted asphaltic concrete, a minimum 6000 gm balance, 0.1 gm resolution, with under body connect and water container large enough to conveniently place specimen in the basket and completely submerge the basket and specimen without touching the sides or bottom is required.
    - (6) QC Laboratory which contain the following:
      - Air conditioner.
      - Dedicated phone.
      - FAX machine or email.
      - Photocopy machine.
      - Sample storage.
      - Work table.
      - Bulletin board.
      - Running water.

Desk and chair.

Separate power supply.

Incidental spoons, trowels, pans, pails.

- (7) Diamond saw for cutting cores.
- (8) Diamond core drill minimum 3 inch (75 mm).
- (9) Oven, 347°F (175°C) minimum, sensitive plus 5°F (plus 2°C).
- (10) USA Standard Series Sieves for coarse and fine aggregate with appropriate shakers (12 inch (300 mm) recommended).
- (11) Personal Computer capable of running the latest version of Department Superpave software, creating an electronic copy of the data, and printing to a Color Printer.

5. QC Testing Plan:

- a. The testing plan shall provide that the samples be collected in accordance with the Department statistically based procedure of random sampling.
- b. The Contractor may add any tests necessary to adequately control production.
- c. All QC test results shall be reported on the latest version of the Department's provided Superpave software by the Contractor with a copy provided to the Engineer within 1 week after the tests are complete. Daily review by the Engineer shall be allowed. At the completion of the asphalt production, the Contractor shall submit to the Department a final copy of the Superpave test results on electronic recording media (CD, e-mail, flash drive, etc.).
- d. Corrective Action Requirements:
  - (1) The Contractor shall establish and utilize QC charts for individual QC tests. The requirements for corrective action shall be linked to the control charts.
  - (2) The Contractor's QC Program shall detail how the results of QC inspections and tests will be used to determine the need for corrective action.
  - (3) (i) A clear set of rules to determine when a process is out of control and the type of correction to be taken to regain process control will be provided.
  - (ii) As a minimum, the plan shall address the corrective actions that will be taken when measurements of the following items or conditions relating to the mixture approach the specification limits:
    - (I) Plant produced mix gradations at laydown (See gradation tolerances).
    - (II) Binder content.
    - (III) Air voids.

- (IV) VMA (mix design only).
- (V) VFA (mix design only).
- (VI) FAA AASHTO T 304.  
CAA ASTM D 5821.
- (VII) Dust to Binder Ratio.
- (VIII) Density.
- (IX) Contaminates.
- (iii) Corrective actions that will be taken when the following conditions occur:
  - (I) Rutting.
  - (II) Segregation.
  - (III) Surface voids.
  - (IV) Tearing.
  - (V) Irregular surface.
  - (VI) Low Density.

**1028.02 -- Material Characteristics**

1. The type of PG Binder will be shown in the contract.
2. Recycled Asphalt Pavement:
  - a. The Contractor may submit to the State a proposal to supplement the virgin aggregates of the asphaltic concrete mix with a Contractor’s specified percentage of Recycled Asphalt Pavement (RAP). The Contractor is responsible for investigating and maintaining the quality and verifying the quantity of the RAP material.
  - b. In recycled asphaltic concrete mixtures, the allowable percent of RAP will be as shown in Table 1028.01.

**Table 1028.01**

Asphaltic Concrete Type	Percent, RAP	
	Minimum	Maximum
SPS	0	55
SPR	0	55
SPH	0	35

3. Aggregates:
  - a. Aggregates for use in superpave asphaltic concrete shall be tested on an individual basis.
  - b. With the exception of Asphaltic Concrete Type SPS the blended mineral aggregate shall not contain more than 80% limestone on the final surface lift of asphaltic concrete.

- c. Asphaltic Concrete Type SPR may contain a total maximum of 10% of the virgin material that is composed of natural, uncrushed aggregate by manmade methods commonly known as but not limited to: 47B gravel, 2A gravel, gravel surfacing, sluice sand, blow sand, waste sand, fill sand, road gravel, roofing gravel, hot mix sand or gravel, coarse sand, fine sand, plaster sand, masonry sand, pit run sand or gravel. For clarification on any proposed gravel, contact the Department Flexible Pavements Engineer.
- d. Chat or coal sand will not be allowed in any mix.
- e. Crushed rock material for use in asphaltic concrete, 1/4 inch (6.35 mm) and smaller, screenings and manufactured sand shall have a Sodium Sulfate loss of not more than 12% by mass at the end of 5 cycles. Sampling size and frequency shall adhere to the current Department Materials Sampling Guide.
- f. Quartzite and granite shall conform to the requirements of Subsection 1033.02, Paragraph 4, a. (8). Sampling size and frequency shall adhere to the current Department Materials Sampling Guide.
- g. Crushed rock (Limestone) and Dolomite shall conform to the requirements of Paragraph 4.a. (4), (5) and (6). of Subsection 1033.02 of the Standard Specifications. Sampling size and frequency shall adhere to the current Department Materials Sampling Guide.
- h. Soundness tests shall not be required for fine sand.
- i. Once the satisfactory quality of aggregates from a source has been established, sufficient additional soundness tests will be performed to insure the continued satisfactory quality of the material, as determined by the Materials Sampling Guide
- j. Aggregate consensus properties may be performed on material prior to the application of hydrated lime.
- k. The coarse aggregate angularity value of the blended aggregate material shall meet or exceed the minimum values for the appropriate asphaltic concrete type as shown in Table 1028.02. If the coarse portion of the blend is all ledge rock the CAA tests may be waived.

**Table 1028.02  
Coarse Aggregate Angularity  
(ASTM D 5821)**

<b>Asphaltic Concrete Type</b>	<b>CAA (minimum)</b>
SPS	--
SPR	83
SPH	95/90*

\* Denotes two faced crushed requirements

- l. The fine aggregate angularity value of the blended aggregate material shall meet or exceed the minimum values for the appropriate asphaltic concrete type as shown in Table 1028.03.
- m. The specific gravity for calculation of the Fine Aggregate Angularity (FAA) shall be determined on a washed combined aggregate sample of the material passing the No. 8 (2.36 mm) sieve and retained on the No. 100 (150  $\mu$ m) sieve. The Contractor will determine the specific gravity to be used in the calculation of FAA mixture design value(s) and, if verified by the Department Aggregate Laboratory, this same value can be used throughout production. The verification value determined by the Department Aggregate Laboratory will be on a combined aggregate sample supplied by the Contractor that is representative of the material proposed or being used during production. The specific gravity to be used throughout production to calculate FAA values will be the Contractor's verified value or the Department determined value (whenever verification is not made) and will be noted on the Mix Design. Changes in aggregate percentages during production may require determination of a revised specific gravity for FAA.

**Table 1028.03  
Fine Aggregate Angularity  
(AASHTO T304 Method A)**

<b>Asphaltic Concrete Type</b>	<b>FAA (minimum)</b>
SPS	--
SPR	43.0
SPH	45.0

- n. The coarse aggregate shall not contain flat and elongated particles exceeding the maximum value for the appropriate asphaltic concrete type category shown in these provisions according to Table 1028.04.

**Table 1028.04  
Flat and Elongated Particles\*  
(ASTM D 4791)**

<b>Asphaltic Concrete Type</b>	<b>Percent, Maximum</b>
SPS	25
SPR	10
SPH	10

\*Criterion based on a 5:1 maximum to minimum ratio.

- o. The sand equivalent of the blended aggregate material from the fine and coarse aggregates shall meet or exceed the minimum values for the appropriate asphaltic concrete type shown in these provisions according to Table 1028.05.

**Table 1028.05  
Sand Equivalent Criteria  
(AASHTO T 176)**

<b>Asphaltic Concrete Type</b>	<b>Sand Equivalent, Minimum</b>
SPS	30
SPR	45
SPH	45

- p. Dust to binder ratio is the ratio of the percentage by weight of aggregate finer than the No. 200 (75  $\mu\text{m}$ ) sieve to the asphalt content expressed as a percent by weight of total mix. The dust to binder ratio shall be within 0.70 and 1.70.
- q. The blended aggregate shall conform to the gradation requirements specified in Table 1028.06 and Table 1028.07 for the appropriate nominal size.

**Table 1028.06  
Gradation Control Points for 0.75 Inch (19 mm) and 0.5 Inch (12.5 mm) Nominal Size**

<b>English Sieve (Metric)</b>	<b>0.75 Inch (19 mm) Control Points (percent passing)</b>		<b>0.5 Inch (12.5 mm) Control Points (percent passing)</b>	
	<b>Minimum</b>	<b>Maximum</b>	<b>Minimum</b>	<b>Maximum</b>
1 inch (25 mm)	100.0			
3/4 inch (19 mm)	90.0	100.0	100.0	
1/2 inch (12.5 mm)		90.0	90.0	100.0
3/8 inch (9.5 mm)				90.0
No. 8 (2.36 mm)	23.0	49.0	28.0	58.0
No. 16 (1.18 mm)				
No. 30 (600 $\mu\text{m}$ )				
No. 50 (300 $\mu\text{m}$ )				
No. 200 (75 $\mu\text{m}$ )	2.0	8.0	2.0	10.0



**Table 1028.07**  
**Gradation Control Points for 0.375 Inch (9.5 mm) Nominal Size and SPR**

English Sieve (Metric)	0.375 Inch (9.5 mm) Control Points (percent passing)		SPR Control Points (percent passing)		SPR (Fine) Control Points (percent passing)	
	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
3/4 inch (19 mm)			98.0	100.0		
1/2 inch (12.5 mm)	100.0					
3/8 inch (9.5 mm)	90.0	100.0	81.0	89.0	81.0	96.0
No. 4 (4.75 mm)		90.0				
No. 8 (2.36 mm)	32.0	67.0	46.0	56.0	46.0	56.0
No. 16 (1.18 mm)						
No. 30 (600 μm)						
No. 50 (300 μm)			12.0	21.0	12.0	21.0
No. 200 (75 μm)	2.0	10.0	4.0	9.0	4.0	9.0

- r. The combined mineral aggregate for Asphaltic Concrete, Type SPS, shall be an aggregate or a combination of aggregates, and mineral filler if needed, that conforms to the gradation requirements specified in Table 1028.08.

**Table 1028.08**  
**Gradation Control Points for Type SPS**

English Sieve (Metric)	Control Points (percent passing)	
	Minimum	Maximum
1 inch (25 mm)	100.0	
3/4 inch (19 mm)	94.0	100.0
1/2 inch (12.5 mm)	81.0	100.0
No. 4 (4.75 mm)	70.0	90.0
No. 8 (2.36 mm)	42.0	70.0
No. 16 (1.18 mm)	29.0	43.0
No. 30 (600 μm)	19.0	34.0
No. 50 (300 μm)	11.0	20.0
No. 200 (75 μm)	2.0	10.0

- s. Mineral filler shall consist of pulverized soil, pulverized crushed rock, broken stone, gravel, sand-gravel, sand or a mixture of these materials that conforms to the requirements in Table 1028.09.

**Table 1028.09**  
**Mineral Filler for Type SPS**

	Min.	Max.
Total Percent Passing the No. 50 (300 μm) Sieve	95	100
Total Percent Passing the No. 200 (75 μm) Sieve	80	100
Plasticity Index (material passing the No. 200 (75 μm) Sieve, except soil)	0	3
Plasticity Index for Soil	0	6

**1028.03 -- Acceptance Requirements**

1. Mix Criteria:
  - a. The target value for the air voids of the SPH Asphaltic Concrete shall be 4% ( $\pm 1\%$ ) at the Ndes number of gyrations. For Type SPS Asphaltic Concrete the air voids at Ndes shall be a minimum of 1.5% with a maximum of 5.0%. For Type SPR Asphaltic Concrete the air voids shall be 3% ( $\pm 1\%$ ) at the Ndes number of gyrations.
  - b. The design criteria for each mixture shall be determined from Tables 1028.10, 1028.11, and 1028.12.

**Table 1028.10**  
**Gyratory Compaction Effort**  
**(Average Design High Air Temperature <39 degrees C)**

Asphaltic Concrete Type	Nini	Ndes	Nmax
SPS	6	40	62
SPR	7	65	100
SPH	8	95	150

**Table 1028.11**  
**Gyratory Compaction Temperatures**

Mix Type	% RAP	Compaction Temp °F
SPS	0-25	270 $\pm$ 5
	26-50	280 $\pm$ 5
SPR	0-35	280 $\pm$ 5
	36-50	290 $\pm$ 5
SPH	0-35	300 $\pm$ 5

**Table 1028.12**  
**Minimum Binder Content**

Mix Type (Metric)	Minimum Binder Content, Percent
SPS	4.8
SPR	5.0
3/8 inch (9.5 mm)	5.5
1/2 inch (12.5 mm)	5.1
3/4 inch (19 mm)	5.0

- c. During production of Lot #1 and randomly selected lots thereafter, the Contractor shall provide to the Department 6 properly prepared gyratory samples for AASHTO T 283 testing for all mixtures except Asphaltic Concrete Type SPS. Superpave mixtures shall contain 1.25% hydrated lime as specified in the Special Provision "Hydrated Lime for Asphaltic

Mixtures". Each Superpave mixture shall be tested for moisture sensitivity in accordance with AASHTO T 283. The 6 inch (150 mm) specimens shall be compacted in accordance with AASHTO T 312 to 7% ( $\pm 0.5\%$ ) air voids at 95 mm in height and evaluated to determine the Tensile Strength Ratio (TSR).

- d. During production of Lot #1, the Contractor shall provide to the Department two 75mm gyratory puck samples at 4.0% voids ( $\pm 0.5\%$ ) for APA testing for all mixtures except Asphaltic Concrete Type SPS.
2. The Contractor shall make Mix adjustments when:
    - a. The mix does not meet the current approved JMF or any other requirements of the contract.
    - b. Surface voids create a surface or texture that does not meet the criteria of Sections 502 and 503 in these Standard Specifications.
    - c. Rutting occurs.
  3. The Contractor shall inform the Engineer when changes in mixture properties or materials used occur for any reason. Changes such as, but not limited to, types or sources of aggregates or changes in grades, sources, properties or modification procedures (if modified) of PG Binders. The Department may require a new job mix formula, mix design and moisture sensitivity test. The new proposed job mix formula shall be in accordance with the requirements as stated above.
  4. Mix adjustments at the plant are authorized within the limits shown in Table 1028.13 as follows:
    - a. The adjustment must produce a mix with the percent air voids and all other properties as stated in these specifications.
    - b. All adjustments must be reported to the Engineer.
    - c. The adjustment values in Table 1028.13 will be the tolerances allowed for adjustments from the Department verified mix design "Combined Gradation" target values which resulted from production or mix design adjustments, but cannot deviate from Superpave gradation criteria. Mix adjustments for individual aggregates, including RAP, greater than 25% of the original verified mix design proportion or greater than 5% change in the original verified mix design percentage, whichever is greater, may require the Contractor to submit a new mix design, as determined by the Engineer. The Contractor is responsible for requesting new mix design targets as they approach these tolerances, failure to do so may result in a suspension of operations until a new mix design is approved.

**Table 1028.13**

<b>Aggregate Adjustments</b>	
<b>Sieve Size</b>	<b>Adjustments</b>
1 inch (25 mm), 3/4 inch (19 mm), 1/2 inch (12.5 mm), 3/8 inch (9.5 mm), No. 4 (4.75 mm)	± 6%
No. 8 (2.36 mm), No. 16 (1.18 mm), No. 30 (600 µm), No. 50 (300 µm)	± 5%
No. 200 (75 µm)	± 2%

5. Sampling and Testing:
- a. The Contractor shall take samples at frequencies identified by the Engineer, according to the Department statistically based procedure. The samples shall be approximately 75 lbs (34 kg) and split according to AASHTO T-248 to create a companion sample. This sample splitting can be either at: 1) the sampling location, with the Department taking custody of their sample at that time or 2) after being transported to the test facility in an insulated container, with the Department taking custody of their sample at that time as determined by the Engineer. The details of sampling, location, splitting etc. shall be determined at the pre-construction conference.
  - b. All samples transported to the test facility and companion samples within the Lot shall be identified by attaching or faxing the lab calculation sheet from the latest version of the superpave software, stored, and retained by the Contractor until the Department has completed the verification testing process. Transporting of all samples will be under the observation of Department.
  - c.
    - (1) The sample shall be taken from the roadway, behind the paver before compaction or from the windrow. For SPS mixes, the Contractor has the option to obtain the samples directly at the plant.
    - (2) At least one QC sample shall be tested for every 750 tons (680 Mg) of plant produced mix.
      - (i) If, at the completion of the project, the final lot consists of less than 3,750 tons (3,400 Mg) of asphaltic concrete, 1 sample for each 750 tons (680 Mg) or fraction thereof, shall be taken and tested.
    - (3) Additional sampling and testing for the Contractor's information and quality control may be performed at the Contractor's discretion. Any additional testing will not be used in pay factor determination.
    - (4) (i) When cold feed samples are being taken, the acquisition shall be timed such that the material in the sample represents, as close as possible, the same material in the sample taken behind the paver. If cold feeds are sampled and tested by Contractor, a split of that sample must be submitted with the hot mix subplot sample. The Contractor will be notified what subplot (a minimum of 1 subplot per lot) sample must be tested for FAA and CAA from the blended

cold feed material according to the Department random sampling schedule. All other FAA and CAA subplot samples may be taken from the randomly selected portion of the blended cold feed material or obtained from the random samples taken behind the paver. Samples shall be taken under the observation of Department and split according to AASHTO T-248, with the Department taking custody of their sample at that time.

- (ii) For projects using RAP material the FAA shall be established as follows: a RAP sample will be processed through an ignition oven and then combined with the proportioned amount of virgin aggregate defined by the mix design and then proceeding with FAA and CAA testing.
- d. The sample shall be compacted immediately while still hot (additional heating may be required to raise the temperature of the sample to compaction temperature).
- e. Each production sample shall be tested as follows:
  - (1) Bulk Specific Gravity (Gmb) shall be determined for each specimen in accordance with AASHTO T 166 Bulk Specific Gravity of Compacted Bituminous Mixtures Using Saturated Surface Dry Specimens. One specimen shall be compacted for each production sample.
  - (2) One Theoretical Maximum Specific Gravity (Gmm) test for each production sample of uncompacted mixture shall be determined in accordance with AASTHO T 209 procedure 9.5.1. Weight in water - Maximum Specific Gravity of Bituminous Paving Mixtures.
  - (3)
    - (i) The Blended Aggregate Bulk Specific Gravity (Gsb) shall be 2.585 for information only for all mixes.
    - (ii) FAA - AASHTO T 304 Method A. The pour time of the test sample into the funnel shall be completed in 5±1 seconds.
    - (iii) CAA - ASTM 5821. For SPR mixes, CAA testing and results are only required on the cold feed verification test for the lot.
  - (4) The laboratory air voids shall be determined in accordance with the following:

**Table 1028.14**

$Gmb(corr)@Nany = Gmb(meas)@Nmax \times (height@Nmax \div height@Nany)$ $\%Gmm(corr)@Nany = 100 \times (Gmb(corr)@Nany \div Gmm(meas))$ $\% Air Voids@Nany = 100 - \%Gmm(corr)@Nany$ $VMA@Ndes = 100 - (Gmb(corr)@Ndes \times Ps \div Gsb)$ $VFA@Ndes = 100 \times ((VMA@Ndes - \% Air Voids@Ndes) \div VMA@Ndes)$ $Measured = (meas)$ $Corrected = (corr)$
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- (5)
  - (i) The percent of PG Binder shall be determined for each QC test. The percent of PG Binder will be computed by ignition oven results. A correction factor of 0.3% will be

added to the ignition oven results for mixes containing hydrated lime.

- (ii) The gradations shall be determined for each QC test using AASHTO T 30.

- (6) Except as noted in this Subsection, all sampling and testing shall be done as prescribed in the Department Materials Sampling Guide and Standard Method of Tests.

f. Testing Documentation:

- (1) All test results and calculations shall be recorded and documented on data sheets using the latest version of Department provided "Superpave" software. A copy containing complete project documentation will be provided to the Department at the completion of asphalt production.

g. Superpave Software:

- (1) QC charts from the software shall be made available for review by the Engineer at any time.
- (2) As a minimum, the following values shall be reported on Department provided software:
  - (i) Laboratory Gyratory density.
  - (ii) Ignition oven or cold feed aggregate gradations for all Superpave sieves will be reported.
  - (iii) PG Binder content shall be plotted to the nearest 0.01% by ignition oven results in accordance with AASHTO T 308.
  - (iv) The theoretical maximum specific gravity (Rice) to the nearest 0.001% will be reported.
  - (v) Laboratory Gyratory air voids at Ndes shall be plotted to nearest 0.1%. Laboratory Gyratory air voids, at Nini, Ndes and Nmax shall be reported to nearest 0.1%.
  - (vi) FAA and CAA of the asphaltic concrete for both cold feed and ignition oven samples will be reported to the nearest 0.1% for FAA and 1% for CAA. A minimum of one subplot FAA and CAA cold feed sample per lot will be tested and recorded on Department provided software.
  - (vii) VMA content shall be plotted to nearest 0.1% and VFA shall be reported to the nearest 0.1%.
  - (viii) Dust to Binder ratio to the nearest 0.01 will be reported.

6. Verification Sampling and Testing:

- a. The Department will select and test at random one of the subplot samples (750 tons, 680 Mg) within a Lot (3750 tons, 3400 Mg) for verification and report results.

- b. The results of Contractor QC testing will be verified by the Department's verification tests. Any samples outside of the tolerances in Table 1028.15 and 1028.16 will result in an Independent Assurance (IA) review of testing and may result in the Department test results being applied.
- (1) On any given Lot, if the results of Air Void verification testing and its companion QC testing are within 1.0% air voids, the Air Void verification for the entire Lot is complete and the Contractor test results will be used to determine the pay factors. If the Air Void verification test results and the companion QC test results are outside the above tolerance, the results from the verification test will be used to determine the pay factor for that subplot. Any or all of the remaining four Department subplot samples may be tested and the Department subplot test results may be applied to the respective sublots and the resulting pay factors will apply.
  - (2) On any given Lot, if the results of the FAA verification testing and its companion QC testing are within 0.5 percent, the FAA verification for the entire Lot is complete and the Contractor test results will be used to determine the pay factor. If the FAA verification test results and the companion QC test results are outside the above tolerance, the results from the verification test will be used to determine the pay factor for that subplot. Any or all of the remaining four Department subplot samples may be tested and the Department subplot test results may be applied to the respective sublots and the resulting pay factors will apply.
- c. When verification tests are within testing tolerance but results show a consistent pattern of deviation from the QC results, the Engineer may cease production and/or request additional verification testing or initiate a complete IA review.

**Table 1028.15**  
**Asphaltic Concrete Testing Tolerances**

<b>Test</b>	<b>Tolerance</b>
Asphalt Content by Ignition Oven	0.5%
Gyratory Density	0.020
Maximum Specific Gravity	0.015
Bulk Dry Specific Gravity (Gsb)	0.020
FAA	0.5%
CAA	10%
Field Core Density	0.020
Air Voids	1.0%

**Table 1028.16  
Blended Aggregate Gradation  
Testing Tolerances**

Sieve Size	Tolerance
3/4 inch (19 mm), 1/2 inch (12.5 mm), 3/8 inch (9.5 mm), No. 4 (12.5 mm), No. 8 (2.36 mm)	5%
No. 16 (1.18 mm), No. 30 (600 $\mu$ m), No. 50 (300 $\mu$ m)	4%
No. 200 (75 $\mu$ m)	2%

- d. Independent Assurance (IA) Review of Testing:
- (1) The Contractor shall allow the Department personnel access to their laboratory to conduct IA review of technician testing procedures and apparatus. Any deficiencies discovered in testing procedures will be reported by the department and corrected by the Contractor.
  - (2) During IA review, the Department personnel and the Contractor will split a sample for the purpose of IA testing. The samples selected will be tested in the Department Branch Laboratory. Any IA test results found to be outside of defined testing tolerances above will be reported. The Contractor shall verify the testing apparatus and make corrections if the apparatus is out of tolerance.
  - (3) See Section 28 of the Materials Sample Guide for more information on IA testing.
- e. If the project personnel and the Contractor cannot reach agreement on the accuracy of the test results, the Department will be asked to resolve the dispute, which will be final. It is the Contractor's responsibility to obtain a large enough sample size for any referee testing (a total sample size of 6000 grams, to be retained by the Department after splitting, is recommended for FAA testing). All dispute resolutions will be in accordance with the Quality Assurance Program requirements in the NDOR Materials Sampling Guide.



7. Production Tolerances, Acceptance, and Pay Factors

**Table 1028.17  
Production Tolerances\***

<b>Test</b>	<b>Allowable Deviation from Specification</b>
<i>Dust to Asphalt Ratio</i>	None
<i>Coarse Aggregate Angularity</i>	- 5% below Min.
<i>Fine Aggregate Angularity for SPR Only</i>	- 0.2% below Min. for cold feed - 0.5% below Min. for ignition oven
<i>Fine Aggregate Angularity for all other mixes</i>	- 0.5% below Min. for cold feed - 1.0% below Min. for ignition oven
Minimum Binder Content	None

\* These tolerances are applied to the mix design specification values, not the submitted mix design targets.

- a. The Contractor shall notify the Engineer whenever a test result approaches the Specification limits.
- b. When any single test result for FAA testing falls outside the allowable production tolerances in Table 1028.17, the material represented by this test will be accepted with a 20% penalty or rejected, as determined by the Engineer. For all other tests, when any single test result, on the same mix property, from two consecutive QC samples fall outside the allowable production tolerances in Table 1028.17, the material represented by these tests will be accepted with a 20% penalty or rejected, as determined by the Engineer.
- c. The Contractor shall assume the responsibility to cease operations when specifications are not being met.
- d. Acceptance and pay factors for Asphaltic Concrete Type SPS will be based on compacted in place average density and joint density.
- e. For each subplot of Asphaltic Concrete Type SPS, SPR and SPH, the asphaltic concrete unit price is a product of all applicable pay factors for the item "Asphaltic Concrete, Type \_\_\_\_\_". Included in a subplot, following approval of the control strips, may be any roadway Asphaltic Concrete Type SPS, SPR or SPH which is produced and approved by the Engineer and including material used for Patching, State Maintenance Patching, and Asphalt for Intersections and Driveways on project shall be eligible for inclusion in subplot(s) tonnage pay factor determination using the roadway Asphaltic Concrete Type \_\_\_\_\_ unit price. When a control strip is not constructed, the pay factor for the running average of four air voids shall be fixed at 1.0 for the first three asphaltic concrete sublots.
  - (1) When there is a production tolerance pay factor penalty as stated in Paragraph 7.b. subsection 1028.03 this penalty percentage will be entered in the Superpave Asphalt Pay Factor Summary under production specifications for each subplot affected. These

individual pay factors will then be multiplied by each other to determine a total pay factor for each subplot [(750 tons) (680 Mg)].

- f. The pay factors for the single test air voids and moving average of four air voids pay factors will be determined in accordance with Table 1028.18.

**Table 1028.18**  
**Acceptance Schedule**  
**Air Voids -  $N_{des}$**

Air voids test results for Asphaltic Concrete Type SPR	Air voids test results for SPH Asphaltic Concrete	Pay Factor	
		Moving average of four	Single test
Less than 0.5%	Less than 1.5%	50% or Reject	50% or Reject
0.5% to 0.9%	1.5% to 1.9%	50% or Reject	50%
1.0% to 1.4%	2.0% to 2.4%	50% or Reject	95%
1.5% to 1.9%	2.5% to 2.9%	90%	95%
2.0% to 2.4%	3.0% to 3.4%	100%	100%
2.5% to 3.5%	3.5% to 4.5%	102%	104%
3.6% to 4.0%	4.6% to 5.0%	100%	100%
4.1% to 4.5%	5.1% to 5.5%	95%	95%
4.6% to 5.0%	5.6% to 6.0%	90%	95%
5.1% to 5.5%	6.1% to 6.5%	50% or Reject	90%
5.6% to 6.0%	6.6% to 7.0%	50% or Reject	50%
6.1% and over	7.1% and over	50% or Reject	50% or Reject

- 8. Asphalt Concrete Density Samples:
  - a. The Contractor shall perform density tests under direct observation of Department personnel. The Contractor shall establish the method of testing in the preconstruction conference and shall test in accordance with the AASHTO T 166, NDR T 587, or as otherwise described in these Special Provisions. The Contractor shall insure that the proper adjustment bias and/or correction factors are used and accessible to Department personnel along with all other inputs when NDR T 587 is selected. All correlation factors and test results shall be generated and reported on the Department Density spreadsheet. When AASHTO T 166 is being used, the Department will observe the Contractor taking, transporting, and testing the cores. The Department will take immediate custody of the cores at the completion of the testing. All disputed values determined using NDR T 587 will be resolved using AASHTO T 166.

- b. The Contractor shall determine the density of samples by comparing the specific gravity of the core sample to the Maximum Specific Gravity (Rice) as follows:

$$\% \text{ Density} = \frac{\text{Specific Gravity of Core}}{\text{Maximum Mix Specific Gravity Rice}} \times 100$$

where:

$$\text{Sp. Gr. of Core} = \frac{\text{Wt. of Core in Air}}{\text{Wt. of SSD Core} - \text{Wt. of Core in Water}}$$

$$\text{Maximum Mix Specific Gravity} = (\text{Rice}) \frac{\text{Wt. of Mix in Air}}{\text{Wt. of Mix in Air} - \text{Wt. of Mix in Water}}$$

**Note:** The individual QC test value of the Maximum Mix Specific Gravity (Rice), determined by AASHTO T 209, will be used to calculate the density of each corresponding core.

- c. The Contractor shall cut cores the first day of work following placement of the mixture. The core samples shall be a minimum of a 3 inch (75mm) diameter.
- d. Normally, 1 sample for determination of density will be taken from each subplot (750 tons) (680 Mg) at locations determined by the Engineer.
- e. The average density of the lot shall be used to compute the pay factor for density. Exceptions to the sampling and testing of core samples for the determination of density are as follows:
- (1) When the nominal layer thickness is 1 inch (25 mm) or less, the sampling and testing of density for this layer will be waived.
  - (2) When the average thickness of the 5 cores for a lot is 1 inch (25 mm) or less, the testing of density samples for this lot will be waived.
  - (3) When the nominal layer thickness and the average of the original 5 cores for a lot are both more than 1 inch (25 mm), but some of the cores are less than 1 inch (25 mm) thick, additional cores shall be cut at randomly selected locations to provide 5 samples of more than 1 inch (25 mm) thickness for the determination of the pay factor for density.
- f. (1) If, at the completion of the project, the final lot consists of less than 3,750 tons (3400 Mg) of asphaltic concrete, a minimum of 3 samples, or 1 sample for each 750 tons (680 Mg) or fraction thereof, whichever is greater, shall be taken and tested for density.
- (2) The test results shall be averaged and the density pay factor based on the values shown in Table 1028.19.
  - (3) Should the average of less than 5 density tests indicate a pay factor less than 1.00, additional density samples to complete the set of five shall be taken at randomly selected locations and the density pay factor based on the average of the 5 tests.

**Table 1028.19**

<b>Acceptance Schedule Density of Compacted Asphaltic Concrete</b>	
<b>Average Density (5 Samples, Percent of Voidless Density)</b>	<b>Pay Factor</b>
Greater than 92.4	1.00
Greater than 91.9 to 92.4	0.95
Greater than 91.4 to 91.9	0.90
Greater than 90.9 to 91.4	0.85
Greater than 90.4 to 90.9	0.80
Greater than 89.9 to 90.4	0.70
89.9 or Less	0.40 or Reject

- g. If requested by the Contractor, check tests for all density tests in the original set, taken no later than the working day following the receipt of all test results for the lot, will be allowed in lots with a density pay factor of less than 1.00. No re-rolling will be allowed in these lots. Locations for checks tests will be provided by the Engineer from the Random Sampling Schedule. The average density obtained by the check tests shall be used to establish the density pay factor for the lot.
- h. The location of density samples are identified by the Random Sampling Schedule. When the random location is noted as zero or the lane width (i.e., zero or 12 ft. on a 12-foot lane), the core shall be cut with the outer edge of the core barrel no greater than 4 inches away (laterally) from the edge of the top of the mat for an unconfined edge or from the edge of the top of the hot mat (joint) for a confined edge. If using a nuclear gauge, the 4 inches would be measured to the edge of the gauge base. The percent density value at these edge-of-lane locations shall be adjusted upward by 2.5%, but to a value of no greater than 92.5%, and the resultant value used in determining the density pay factor. No initial value of 92.5 or greater shall be adjusted.

**WARM MIX ASPHALT  
(J-7-1114)**

The Contractor has the option to use Warm Mix Asphalt (WMA) meeting the following requirements.

1. Warm Mix Asphalt (WMA)

Warm Mix Asphalt mixtures shall follow the requirements of Superpave Asphaltic Concrete and all other applicable sections with the following exceptions:

- a. The Contractor shall request the use of a WMA additive in writing when submitting the Job Mix Formula. The requested additive shall be an approved Level I or II production product or combination thereof. The manufacturer's

recommended additive rates, specifications, and all other pertinent information shall be included in the requests. All requests must be approved by the Flexible Pavements Engineer prior to their use.

b. Level I Production

- (1) Level I WMA additives are as follows: water injection devices.
- (2) Hydrated Lime at 1.25% by weight of virgin aggregate is required for all mixtures.
- (3) The allowable drop in temperature shall be a maximum of 40°F below the producer's recommended production temperature for Hot Mix Asphalt (HMA), or less as required during production to achieve proper laydown and compaction properties. Plant production temperatures shall not drop below 230°F.

c. Level II Production

- (1) Level II WMA additives are as follows: Advera, Evotherm (DAT, ET, 3G), AkzoNobel Rediset LQ-1102C, Cecabase RT 945 w/AD-here LOF 65-00, and Sasobit.
- (2) For amine based WMA additives, 25% of the additive must be considered an amine based anti-stripping agent. Amine based WMA additives with anti-stripping agents shall be terminal blended by the binder supplier or a system approved by the Flexible Pavements Engineer for application at the plant. For all other warm mix technologies hydrated lime shall be added at a minimum rate of 1.25% by weight of virgin aggregate, including the weight of limestone. Hydrated Lime shall not be used on Level II WMA mixtures when the WMA additive is an Amine based additive or when the Amine WMA additives are used in combination with Level I water injection. The minimum rate for amine based WMA additives shall be 0.7%. The dosage rate of anti-strip shall not exceed manufacturer's recommendations.
- (3) The drop in temperature shall be a maximum of 90°F from the producer's recommended production temperature for HMA. Plant production temperatures shall not drop below 215°F.

d. Other WMA additives shall not be used unless otherwise approved by the Flexible Pavements Engineer.

e. WMA additives may be used in combination by approval of the Flexible Pavements Engineer.

f. Asphalt mixes shall be tested for TSR on the first lot of production and then on randomly selected lots thereafter.

g. Field samples shall be heated and compacted using the following table unless otherwise approved by the Flexible Pavements Engineer.

### Gyratory Compaction Temperatures

Mix Type	% Rap	Compaction Temp °F
SPS	0-25	270 + 5
	26-50	280 + 5
SPR	0-35	280 + 5
	36-50	290 + 5
SPH	0-35	300 + 5

- h. NDOR may suspend or eliminate the use of WMA on a project if any of the following conditions occur: rutting, segregation, surface voids, tearing, irregular surface, low density, raveling, stripping, or if pavement does not meet any other design criteria.
2. Warm Mix Asphalt (WMA) additives will be measured and paid for directly by the unit of each for the item "Hydrated Lime/Warm Mix Asphalt" for each ton of hot mix asphalt produced.

## ASPHALT DENSITY GAUGE (J-7-1013)

### Description

An Asphalt Density Gauge may be used for Quality Control when determining the in-place density of asphaltic concrete.

### Material Requirements

The device must be approved by the Flexible Pavements Engineer.

### Testing Method

1. The Contractor shall establish the method of testing in the preconstruction conference. All testing shall be in accordance with AASHTO T-343 and as directed in this provision.
2. The first 3 density locations of the project shall be cored in accordance with AASHTO T166 to calibrate the asphalt density gauge. Prior to coring, the Contractor shall calibrate the device at each core location.
3. Calibration: A correction factor shall be established for the first 3 cores by calculating the difference between the average density measurement of the asphalt density gauge and the roadway core density. This correction factor shall be entered into the device and used for measuring subsequent densities. The correction factor shall be verified with another core for every 15 density readings that are to be recorded.
4. Density Reading Procedure: Place the asphalt density gauge on the asphalt mat over the area to be tested. Record the density reading, and repeat this process for a total of 5 readings, as detailed in Figure 1. An average of the 5 readings will be used as the density reading for each location. For densities taken less than 6 inches from the edge

of the lift, density readings shall be taken as shown in Figure 2. The span between density reading locations in each direction shall be no greater than 12”.

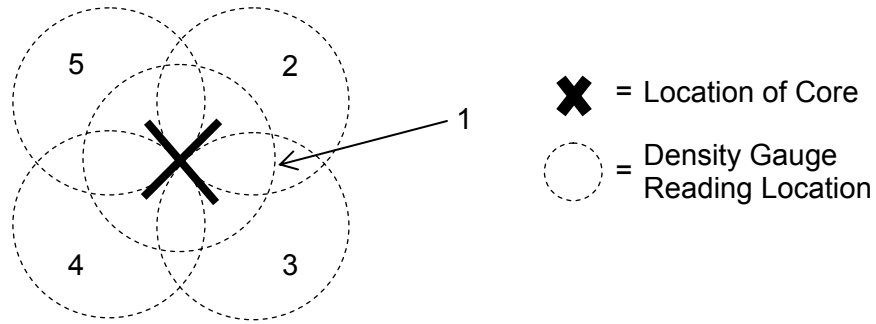


Figure 1: Asphalt density gauge reading pattern

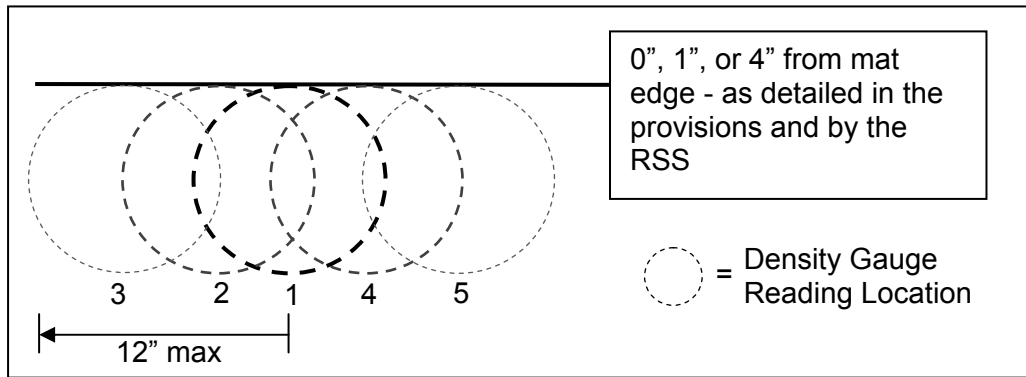


Figure 2: Asphalt density gauge reading pattern less than 6” from mat edge

5. If any density measured by the asphalt density gauge is below 90%, a density core shall be cut at that location and used for density measurement for that subplot. Density readings below 90% shall not be used to calculate a correction factor. All disputed values determined using the asphalt density gauge will be resolved using AASHTO T 166.

### ASPHALTIC CONCRETE LONGITUDINAL JOINT DENSITY TESTING (J-7-1013)

#### Description

One sample for determination of joint density will be taken randomly from each lot. This joint density sample stands independent of the required standard density per subplot used for determining the average of 5 density pay factor.

## Equipment

Testing shall be conducted in accordance with the AASHTO T 166, NDR T 587, or an approved Asphalt Density Gauge. The Contractor shall insure that the proper adjustment bias and/or correction factors are used and accessible to Department personnel, along with all other inputs when NDR T 587 or the Asphalt Density Gauge is selected. All correlation factors and test results shall be generated and reported on the Department Density spreadsheets.

## Testing

1. The Contractor shall establish the method of testing in the preconstruction conference.
2. One sample for determination of joint density will be taken randomly from each lot, as determined by the Engineer. The location of the edge density samples are identified by the Random Sampling Schedule.
3. The joint density core shall be cut 1 inch away (laterally) from the identified edge of the top of the mat.
4. The Contractor shall cut cores the first day of work following placement of the mixture. The core samples shall be a minimum of a 3 inch (75mm) diameter.
5. The Department will observe the Contractor taking, transporting, and testing the cores (as applicable). The Department will take immediate custody of the cores at the completion of the testing. All disputed values determined using NDR T 587 or the Asphalt Density Gauge will be resolved using AASHTO T166.
6. The Contractor shall determine the density of samples by comparing the specific gravity of the core sample to the Maximum Specific Gravity (Rice) as follows:

$$\% \text{ Density} = \frac{\text{Specific Gravity of Core}}{\text{Maximum Mix Specific Gravity Rice}} \times 100$$

where:

$$\text{Sp. Gr. of Core} = \frac{\text{Wt. of Core in Air}}{\text{Wt. of SSD Core} - \text{Wt. of Core in Water}}$$

$$\text{Maximum Mix Specific Gravity} = (\text{Rice}) \frac{\text{Wt. of Mix in Air}}{\text{Wt. of Mix in Air} - \text{Wt. of Mix in Water}}$$

**Note:** The individual QC test value of the Maximum Mix Specific Gravity (Rice), determined by AASHTO T 209, will be used to calculate the density of each corresponding core.

7. Exceptions to the sampling and testing of joint density core samples for the determination of density are as follows:
  - a. When the nominal layer thickness is 1 inch (25 mm) or less, the sampling and testing of density for this layer will be waived.
  - b. When the average thickness for the standard lot is 1 inch (25 mm) or less, the testing of joint density samples for this lot will be waived.



8. If requested by the Contractor, a re-test for the original joint density test, taken no later than the working day following the receipt of the test result, will be allowed. Locations of re-tests will be provided by the Engineer from the Random Sampling Schedule. The density obtained by the re-test shall be used to establish the density pay factor for the lot.

**Method of Measurement**

All work related to the Asphaltic Concrete Longitudinal Joint Density Sample will not be measured and paid for but will be subsidiary to the associated asphaltic concrete.

**Basis of Payment**

1. The pay factor shall be computed according to the following table:

<b>Joint Density Test Lot Pay Factor</b>			
<b>Joint Density</b>	<b>SPS</b>	<b>SPR</b>	<b>SPH</b>
93.0 or greater	102%	102%	102%
92.0 to 92.9	100%	102%	102%
91.0 to 91.9	98%	100%	102%
90.0 to 90.9	98%	98%	100%
89.0 to 89.9	98%	98%	98%
88.9 or Less	98%	98%	98%

2. The pay factor will be incorporated in the production specs calculation in the Superpave Software. Any incentive or disincentive will be added or subtracted to the pay factor after any other applicable production tolerances pay factors have been incorporated. The pay factor will apply to the entire lot.

**HYDRATED LIME FOR ASPHALT MIXTURES  
(J-12-0213)**

**1. General**

Hydrated lime will be added to all aggregates (at the Contractor’s option, limestone may be excluded) used for asphalt mixtures except Asphaltic Concrete used for Temporary Surfacing, and Asphaltic Concrete Type SPS, HRB and SPL. Hydrated lime will be added to pre-moistened aggregates whether it is used directly into the mix or stockpiled for marinating purposes. The application of moisture and hydrated lime to the aggregates along with equipment calibration and procedures to prevent any "dusting" shall be documented and approved in the Contractor's Quality Control (QC) Plan.

**2. Material Requirements**

The lime shall meet the chemical and physical properties defined in AASHTO M 303 for Type I - High calcium-hydrated lime, or meet the requirements of ASTM 1097 for Type S Hydrated Lime.

The hydrated lime being used, whether for mix design or plant mix production, shall be stored in an enclosed container and must be used within 90 days. Stockpiles marinating

shall also be used within 90 days. Lime that is stored over 90 days in a protected storage silo environment may be submitted for chemical analysis to verify that it meets the specification for use in the mix.

Water shall conform to the requirements of Section 1005.

### **3. Construction**

Prior to the addition of hydrated lime the aggregates shall have a minimum moisture content of 3% by weight of aggregate. The surface of the aggregate shall be uniformly dampened by water.

If additional moisture is required it shall be added at the entry end of an enclosed pug mill mixer and prior to the addition of hydrated lime.

Hydrated Lime shall be added at a rate of 1.25 percent by weight of virgin aggregate, including the weight of the limestone.

### **4. Equipment**

The addition of lime shall be plant controlled, and blended with an enclosed twin-shaft pug mill with a production capacity rating that exceeds the aggregate feed rate. It shall be capable of effective mixing in the full range of asphaltic concrete production rates.

The pug mill set up shall be located in the system at a location where the mixed material can be readily inspected on a belt prior to entry into the drum.

The pug mill shall be designed such that the mixture of aggregate and hydrated lime is moved in a near horizontal direction (within 20 degrees of horizontal) by the mixing paddles without the aid of conveyor belts for a distance of at least three feet (900 mm). Mixing devices which permit the mixture of aggregate and hydrated lime to fall through the mixing blades onto a belt or chute are not acceptable.

A positive signal system and a limit switch device shall be installed in the plant at the point of introduction of the hydrated lime. The positive signal system shall be placed between a metering device and the drum plant, and utilized during production whereby an alarm is activated, alerting the plant that the hydrated lime is not being introduced into the mixture.

The hydrated lime storage silo shall have enough capacity for continuous production. The silo shall be replenished by pneumatic delivery from road tankers at a pressure that will not create dusting. Hydrated lime will be dispensed from the silo into the pug mill by a conventional vane feeder or a load cell pod system.

The mechanism for adding moisture to the aggregate will be configured and located to insure that all virgin aggregate is uniformly coated with moisture prior to the lime application.

**5. Sampling and Testing**

Hydrated lime shall be certified by the supplier stating its compliance to the specifications.

A physical inventory of hydrated lime usage will be required during mix production. A daily silo inventory, noting "beginning weight", "weight added during the day's production", and "end of day weight", will be recorded and made available for review by the Engineer. When a weigh pod system is used, an accumulative accounting method shall be used to calculate and review lime addition rates throughout production. When calculations indicate a hydrated lime usage of  $\pm 0.15$  percent from the design percentage the Contractor shall assume the responsibility to cease production and recalibrate the system prior to resuming mix production. Any asphaltic concrete placed having 0.15 percent below the design percentage shall be removed and replaced at no cost.

The percent of moisture shall be determined and documented: 1) from belt samples or 2) from stockpile samples, a minimum of once per day.

**6. Mixture QC and Verification Testing**

During an ignition oven burn off, lime will combine with the sulfur in the binder and produce ash. Therefore, when mix containing hydrated lime is being designed and produced a correction factor to the ignition oven burn off result of +0.30% shall be used. This correction factor shall be added to the ignition oven binder content reading in order for the actual binder content to be determined.

**7. Method of Measurement:**

Hydrated Lime shall be measured for payment by the unit of each for each ton of hot mix asphalt used and incorporated into the project, or for State Maintenance Patching.

Water applied shall not be measured and paid for but shall be considered subsidiary to the item "Hydrated Lime/Warm Mix Asphalt".

**8. Basis of Payment:**

Lime, measured as provided herein and incorporated into the project, shall be paid for at the contract unit price per each for the item "Hydrated Lime/Warm Mix Asphalt". Lime measured as provided herein and used for State Maintenance Patching shall be paid for at the contract unit price per each for the item "Hydrated Lime/Warm Mix Asphalt for State Maintenance Patching". This price shall be full compensation for furnishing, delivering, hauling, storing, all labor, equipment, tools and incidentals necessary to complete the work.

**HYDRATED LIME SLURRY FOR ASPHALT MIXTURES  
(J-12-0213)**

- 1. General** — The Contractor will have the option of using Hydrated Lime Slurry For Asphalt Mixtures or Hydrated Lime For Asphalt Mixtures. Hydrated lime slurry will be added to all aggregates (at the Contractor's option, limestone may be excluded) used for asphalt mixtures except Asphaltic Concrete used for Temporary Surfacing, and Asphaltic Concrete Type SPS and SPL. Hydrated lime slurry will be added to aggregates whether it is used directly into the mix or stockpiled for marinating purposes. The application of

hydrated lime slurry to the aggregates along with equipment calibration and procedures shall be documented and approved in the Contractor's Quality Control (QC) Plan.

2. **Material Requirements** — The lime shall meet the chemical and physical properties defined in AASHTO M 303 for Type I - High calcium-hydrated lime, or meet the requirements of ASTM 1097 for Type S Hydrated Lime.

The dry hydrated lime being used, whether for mix design or plant mix production, shall be stored in an enclosed container and must be used within 90 days. Stockpiles marinating shall also be used within 90 days. Hydrated lime (dry or slurry) that is stored over 90 days in a protected storage silo or slurry tank may be submitted for chemical analysis to verify that it meets the specification for use in the mix.

Water shall conform to the requirements of Section 1005.

3. **Construction** — Hydrated Lime shall be added at a rate of 1.25 percent by weight of virgin aggregate, including the weight of the limestone.
4. **Equipment** — The addition of lime shall be plant controlled, and blended with an enclosed twin-shaft pug mill with a production capacity rating that exceeds the aggregate feed rate. It shall be capable of effective mixing in the full range of asphaltic concrete production rates.

The pug mill set up shall be located in the system at a location where the mixed material can be readily inspected on a belt prior to entry into the drum.

The pug mill shall be designed such that the mixture of aggregate and hydrated lime is moved in a near horizontal direction (within 20 degrees of horizontal) by the mixing paddles without the aid of conveyor belts for a distance of at least three feet (900 mm).

Mixing devices which permit the mixture of aggregate and hydrated lime to fall through the mixing blades onto a belt or chute are not acceptable.

A positive signal system and a limit switch device shall be installed in the plant at the point of introduction of the hydrated lime. The positive signal system shall be placed between a metering device and the drum plant, and utilized during production whereby an alarm is activated; alerting the plant that the hydrated lime is not being introduced into the mixture.

A minimum of two hydrated lime slurry tanks shall be used for blending and supply. Slurry shall be drawn for production from only one tank at a time. The hydrated lime slurry tanks shall have enough capacity for continuous production.

Hydrated lime slurry shall be dispensed from a slurry tank into the pug mill by a pressure regulated spray system having an electronic flow measurement system that has been calibrated to insure the proper application rates will be provided. Certificate of Calibration for the spray bar system should be provided by the Contractor with the calibration being performed by a third party every 12 months (minimum) or at the Engineer's request.

The electronic flow measurement system shall automatically record the flow rate of the lime slurry being feed to the pug mill. The data recorder system shall be capable of

recording the flow rate (in gallons per minute) at intervals of not more than 5 minutes and shall have the capability of calculating the volume of lime slurry used each day, from each slurry tank, and shall be capable of printing a summary of the daily lime slurry usage for each tank. This printout of the daily lime slurry volumes shall be presented to the NDOR representative at the end of each day's production.

- 5. Blending and Supply Hydrated Lime Slurry** — The Contractor shall determine the target hydrated lime slurry concentration (percent solids) that will be used to produce the asphalt mixture. This target concentration value shall be provided to the Engineer prior to production of the asphalt mixture and shall not be less than 30 percent. The target concentration value shall not be modified without the approval of the Engineer. It is the Contractor's responsibility to control the concentration of the hydrated lime slurry.

Only valid weights of dry hydrated lime shall be added to the required quantity of water to provide uniform hydrated lime slurry having a dry solids content within  $\pm 0.5$  percent of the Contractor's target value. Water or dry hydrated lime shall not be added to a tank that is actively supplying hydrated lime slurry to the pug mill. Hydrated lime slurry shall not be drawn from a tank that is not completely blended in accordance with the manufacturer's recommendations.

The hydrated lime slurry in the active supply tank shall be agitated prior to and during production in accordance with the manufacturer's recommendations.

Dry hydrated lime shall be transferred at a pressure that will not create dusting.

- 5.1** If individual hydrated lime slurry tanks are dedicated to only blending or supply, then thoroughly mixed hydrated lime slurry may be added from the blending tank(s) to the supply tank during production, provided the concentrations are within  $\pm 0.5$  percent.
- 5.2** If the hydrated lime slurry tanks are used for both blending and supply, the tanks shall be plumbed such that hydrated lime slurry can be supplied to the pug mill from any of the blending/supply tanks without disruption of the slurry supply.
- 6. Sampling and Testing** — Hydrated lime shall be certified by the supplier stating its compliance to the specifications.

The concentration of the lime slurry shall be controlled within  $\pm 0.5$  percent of the target hydrated lime slurry concentration (percent solids). The concentration of the hydrated lime shall be determined in accordance with section 6.1. It is the Contractor's responsibility to halt production to make adjustments when the concentrations fall out of compliance.

The concentration of the lime slurry shall be determined and recorded by the Contractor immediately following blending each batch of lime slurry for the project. These records shall include date and time of test, sample collection information, and the unit weight, temperature and concentration of slurry. These records shall be made available to the Engineer upon request.

A physical inventory of hydrated lime usage will be required during mix production. This inventory shall be used to verify the lime application rate, and for payment of the

hydrated lime. The concentration of the lime slurry shall be determined and recorded by the Contractor at the beginning and at approximately the mid-point of each day's production. The hydrated lime slurry samples shall be collected from the supply line leading to the pug mill. These records shall include date and time of test, sample collection information, and the unit weight, temperature and concentration of slurry. These records shall be presented to the NDOR representative at the end of each day's production.

When calculations indicate that the application rate of "dry" hydrated lime to the aggregate is  $\pm 0.15$  percent from the design percentage the Contractor shall assume the responsibility to cease production and recalibrate the system prior to resuming mix production. Any asphaltic concrete placed having a "dry" hydrated lime application rate (applied to aggregate) of 0.15 percent below the design percentage shall be removed and replaced at no cost.

**6.1** The Contractor shall determine the solids content (concentration) of the hydrated lime slurry using Table 1, Table 2 and the Slurry Worksheet. The Contractor shall provide and use the standard weight per 83.205-ml Gardner cup meeting the requirements of ASTM D 244.

After a batch of lime slurry has been produced, use the following procedures to verify that the intended percent solids have been achieved.

1. Fill a quart container 3/4 full with lime slurry. Samples can be taken from ports located at either end of the vessel. Do not use glass.
2. Weigh a dry, empty Gardner (WPG) cup and cover to the nearest 0.01 of a gram. Record this weight.
3. Shake the lime slurry sample well. Immediately fill the WPG cup.
4. Tap the WPG cup lightly on an immovable object to allow for the escape of air bubbles.
5. Slowly turn the cap of the WPG cup until it is completely seated. If the cover is pushed on quickly, lime slurry will squirt out through the hole in the center. Be sure to point the top of the WPG away from you (or others) while putting on the cap.
6. Hold the WPG cup by the top and bottom with thumb and forefinger. Be sure to cover the hole in the cap.
7. Rinse the WPG cup under running water to remove any lime from the outside of the cup.
8. Dry the outside of the cup thoroughly.
9. Weigh the dry, filled WPG cup to the nearest 0.01 of a gram. Record this weight.
10. Promptly remove the cover, insert thermometer and record the temperature.
11. Subtract the empty cup weight (from step 2) from the filled cup weight (step 9) and record the difference.

12. Multiply the difference by 0.1. This number is the density (lbs./gallon) of the lime slurry. Record this number.
  13. Look up the temperature correction in Table 2 and record the value.
  14. Multiply the slurry density times the temperature correction value. This is the adjusted slurry density. Record the adjusted slurry density on the slurry worksheet.
  15. Find the nearest density to that recorded above on the "Slurry Solids Chart" on Table 1, Slurry Solids Chart - 24 degrees C. The corresponding number is the percent solids (concentration) of the lime slurry sample. Record on worksheet.
7. **Mixture QC and Verification Testing** — During an ignition oven burn off, lime will combine with the sulfur in the binder and produce ash. Therefore, when mix containing hydrated lime is being designed and produced a correction factor to the ignition oven burn off result of +0.30% shall be used. This correction factor shall be added to the ignition oven binder content reading in order for the actual binder content to be determined.
8. **Method of Measurement** — Hydrated Lime shall be measured for payment by the unit of each for each ton of hot mix asphalt used and incorporated into the project, or for State Maintenance Patching.
- Water applied shall not be measured and paid for but shall be considered subsidiary to the item "Hydrated Lime/Warm Mix Asphalt".
9. **Basis of Payment** — Lime, measured as provided herein and incorporated into the project, shall be paid for at the contract unit price per each for the item "Hydrated Lime/Warm Mix Asphalt". Lime measured as provided herein and used for State Maintenance Patching shall be paid for at the contract unit price per each for the item "Hydrated Lime/Warm Mix Asphalt for State Maintenance Patching". This price shall be full compensation for furnishing, delivering, hauling, storing, all labor, equipment, tools and incidentals necessary to complete the work.

**Table 1, Page 1**  
**Slurry Solids Chart – 24°C**

Density lbs./gal.	Slurry Solids %	Density lbs./gal.	Slurry Solids %	Density lbs./gal.	Slurry Solids %	Density lbs./gal.	Slurry Solids %
9.108	15.1	9.402	20.1	9.715	25.1	10.050	30.1
9.114	15.2	9.406	20.2	9.722	25.2	10.057	30.2
9.120	15.3	9.414	20.3	9.728	25.3	10.064	30.3
9.128	15.4	9.420	20.4	9.735	25.4	10.071	30.4
9.131	15.5	9.426	20.5	9.741	25.5	10.078	30.5
9.137	15.6	9.433	20.6	9.748	25.6	10.085	30.6
9.143	15.7	9.439	20.7	9.755	25.7	10.092	30.7
9.148	15.8	9.445	20.8	9.761	25.8	10.099	30.8
9.154	15.9	9.451	20.9	9.768	25.9	10.106	30.9
9.160	16.0	9.457	21.0	9.774	26.0	10.113	31.0
9.166	16.1	9.463	21.1	9.781	26.1	10.120	31.1
9.171	16.2	9.469	21.2	9.787	26.2	10.127	31.2
9.177	16.3	9.476	21.3	9.794	26.3	10.134	31.3
9.183	16.4	9.482	21.4	9.800	26.4	10.141	31.4
9.189	16.5	9.488	21.5	9.807	26.5	10.148	31.5
9.195	16.6	9.494	21.6	9.814	26.6	10.155	31.6
9.200	16.7	9.500	21.7	9.820	26.7	10.163	31.7
9.206	16.8	9.506	21.8	9.827	26.8	10.170	31.8
9.212	16.9	9.513	21.9	9.833	26.9	10.177	31.9
9.218	17.0	9.519	22.0	9.840	27.0	10.184	32.0
9.224	17.1	9.525	22.1	9.847	27.1	10.191	32.1
9.230	17.2	9.531	22.2	9.853	27.2	10.198	32.2
9.235	17.3	9.538	22.3	9.860	27.3	10.205	32.3
9.241	17.4	9.544	22.4	9.867	27.4	10.212	32.4
9.247	17.5	9.550	22.5	9.873	27.5	10.220	32.5
9.253	17.6	9.556	22.6	9.880	27.6	10.227	32.6
9.259	17.7	9.563	22.7	9.887	27.7	10.234	32.7
9.265	17.8	9.569	22.8	9.894	27.8	10.241	32.8
9.271	17.9	9.575	22.9	9.900	27.9	10.248	32.9
9.277	18.0	9.581	23.0	9.907	28.0	10.255	33.0
9.282	18.1	9.588	23.1	9.914	28.1	10.263	33.1
9.288	18.2	9.594	23.2	9.920	28.2	10.270	33.2
9.294	18.3	9.600	23.3	9.927	28.3	10.277	33.3
9.300	18.4	9.607	23.4	9.934	28.4	10.284	33.4
9.306	18.5	9.613	23.5	9.941	28.5	10.292	33.5
9.312	18.6	9.619	23.6	9.948	28.6	10.299	33.6
9.318	18.7	9.626	23.7	9.954	28.7	10.306	33.7
9.324	18.8	9.632	23.8	9.961	28.8	10.314	33.8
9.330	18.9	9.638	23.9	9.968	28.9	10.321	33.9
9.336	19.0	9.645	24.0	9.975	29.0	10.328	34.0
9.342	19.1	9.651	24.1	9.982	29.1	10.335	34.1
9.348	19.2	9.658	24.2	9.988	29.2	10.343	34.2
9.354	19.3	9.664	24.3	9.995	29.3	10.350	34.3
9.360	19.4	9.670	24.4	10.002	29.4	10.358	34.4
9.366	19.5	9.677	24.5	10.009	29.5	10.365	34.5
9.372	19.6	9.683	24.6	10.016	29.6	10.372	34.6
9.378	19.7	9.690	24.7	10.023	29.7	10.380	34.7
9.384	19.8	9.696	24.8	10.030	29.8	10.387	34.8
9.390	19.9	9.703	24.9	10.037	29.9	10.394	34.9
9.396	20.0	9.709	25.0	10.044	30.0	10.402	35.0



**Table 1, Page 2**  
**Slurry Solids Chart – 24°C**

Density lbs./gal.	Slurry Solids %	Density lbs./gal.	Slurry Solids %	Density lbs./gal.	Slurry Solids %	Density lbs./gal.	Slurry Solids %
10.409	35.1	10.795	40.1	11.210	45.1	11.658	50.1
10.417	35.2	10.803	40.2	11.218	45.2	11.667	50.2
10.424	35.3	10.811	40.3	11.227	45.3	11.677	50.3
10.432	35.4	10.819	40.4	11.236	45.4	11.686	50.4
10.439	35.5	10.827	40.5	11.244	45.5	11.695	50.5
10.447	35.6	10.835	40.6	11.253	45.6	11.705	50.6
10.454	35.7	10.843	40.7	11.262	45.7	11.714	50.7
10.462	35.8	10.851	40.8	11.270	45.8	11.724	50.8
10.469	35.9	10.859	40.9	11.279	45.9	11.733	50.9
10.477	36.0	10.867	41.0	11.288	46.0	11.743	51.0
10.484	36.1	10.875	41.1	11.297	46.1	11.752	51.1
10.492	36.2	10.883	41.2	11.305	46.2	11.762	51.2
10.499	36.3	10.892	41.3	11.314	46.3	11.771	51.3
10.507	36.4	10.900	41.4	11.323	46.4	11.781	51.4
10.514	36.5	10.908	41.5	11.332	46.5	11.790	51.5
10.522	36.6	10.916	41.6	11.341	46.6	11.800	51.6
10.530	36.7	10.924	41.7	11.349	46.7	11.809	51.7
10.537	36.8	10.932	41.8	11.358	46.8	11.819	51.8
10.545	36.9	10.941	41.9	11.367	46.9	11.828	51.9
10.552	37.0	10.949	42.0	11.376	47.0	11.838	52.0
10.560	37.1	10.957	42.1	11.385	47.1	11.848	52.1
10.568	37.2	10.965	42.2	11.394	47.2	11.857	52.2
10.575	37.3	10.974	42.3	11.403	47.3	11.867	52.3
10.583	37.4	10.982	42.4	11.412	47.4	11.877	52.4
10.591	37.5	10.990	42.5	11.421	47.5	11.886	52.5
10.599	37.6	10.998	42.6	11.430	47.6	11.896	52.6
10.606	37.7	11.007	42.7	11.439	47.7	11.906	52.7
10.614	37.8	11.015	42.8	11.447	47.8	11.915	52.8
10.622	37.9	11.023	42.9	11.456	47.9	11.925	52.9
10.629	38.0	11.032	43.0	11.465	48.0	11.935	53.0
10.637	38.1	11.040	43.1	11.475	48.1	11.945	53.1
10.645	38.2	11.048	43.2	11.484	48.2	11.954	53.2
10.653	38.3	11.057	43.3	11.493	48.3	11.964	53.3
10.661	38.4	11.065	43.4	11.502	48.4	11.974	53.4
10.668	38.5	11.074	43.5	11.511	48.5	11.984	53.5
10.676	38.6	11.082	43.6	11.520	48.6	11.994	53.6
10.684	38.7	11.090	43.7	11.529	48.7	12.004	53.7
10.692	38.8	11.099	43.8	11.538	48.8	12.014	53.8
10.700	38.9	11.107	43.9	11.547	48.9	12.023	53.9
10.707	39.0	11.116	44.0	11.556	49.0	12.033	54.0
10.715	39.1	11.124	44.1	11.566	49.1	12.043	54.1
10.723	39.2	11.133	44.2	11.575	49.2	12.053	54.2
10.731	39.3	11.141	44.3	11.584	49.3	12.063	54.3
10.739	39.4	11.150	44.4	11.593	49.4	12.073	54.4
10.747	39.5	11.158	44.5	11.602	49.5	12.083	54.5
10.755	39.6	11.167	44.6	11.612	49.6	12.093	54.6
10.763	39.7	11.175	44.7	11.621	49.7	12.103	54.7
10.771	39.8	11.184	44.8	11.630	49.8	12.113	54.8
10.779	39.9	11.193	44.9	11.639	49.9	12.123	54.9
10.787	40.0	11.201	45.0	11.649	50.0	12.134	55.0

**Table 2**  
**Correction Factor to Adjust Slurry Densities for Temperature**

<b>Temp (C)</b>	<b>Factor</b>	<b>Temp (C)</b>	<b>Factor</b>
20	0.99927	61	1.01176
21	0.99944	62	1.01218
22	0.99962	63	1.01262
23	0.99981	64	1.01305
24	1.00000	65	1.01349
25	1.00002	66	1.01394
26	1.00041	67	1.01439
27	1.00063	68	1.01485
28	1.00085	69	1.01531
29	1.00109	70	1.01578
30	1.00132	71	1.01626
31	1.00157	72	1.01673
32	1.00182	73	1.01722
33	1.00208	74	1.01770
34	1.00234	75	1.01820
35	1.00261	76	1.01870
36	1.00289	77	1.01920
37	1.00318	78	1.01971
38	1.00347	79	1.02022
39	1.00376	80	1.02074
40	1.00407	81	1.02126
41	1.00438	82	1.02179
42	1.00469	83	1.02232
43	1.00501	84	1.02286
44	1.00534	85	1.02341
45	1.00567	86	1.02395
46	1.00601	87	1.02451
47	1.00635	88	1.02506
48	1.00670	89	1.02563
49	1.00706	90	1.02619
50	1.00742	91	1.02677
51	1.00779	92	1.02734
52	1.00816	93	1.02793
53	1.00854	94	1.02851
54	1.00892	95	1.02911
55	1.00931	96	1.02970
56	1.00970	97	1.03031
57	1.01010	98	1.03091
58	1.01051	99	1.03152
59	1.01092	100	1.03214
60	1.01134	101	1.03276



**PORTLAND CEMENT CONCRETE  
(J-15-0914)**

Paragraph 1. of Subsection 1002.02 in the Standard Specifications is amended to include the following:

Concrete mixes will be in accordance of Table 1002.02.

Paragraph 3. of Subsection 1002.02 is void and superseded by the following:

3. Type IP and IT Interground/Blended cement shall be used for all classes of concrete except for pavement repair. Type IP and IT Interground/Blended cement shall meet all requirements of ASTM C 595. Pavement repair shall include Type I/II Portland Cement for Class PR1 Concrete and Type III Portland Cement shall be used in Class PR3 Concrete.

Tables 1002.02 and 1002.03 in Subsection 1002.02 are void and superseded by the following:

**ENGLISH  
TABLE 1002.02**

Class of Concrete (1)	Base Cement Type	Total Cementitious Materials Min. lb/cy	Total Aggregate		Air Content % Min.-Max. (2)	Ledge Rock (%)	Water/Cement Ratio Max. (3)	Required Strength Min. psi
			Min. lb/cy	Max. lb/cy				
47B**	IP/IT*	564	2850	3150	6.5 - 9.0	-	0.45	3500
47B***		564	2850	3150	6.0 - 8.5	-	0.45	3500
47BD		658	2500	3000	6.0 - 8.5	30+3	0.42	4000
47B-HE		752	2500	3000	6.0 - 8.5	30±3	0.40	3500
BX <sub>(4)</sub>		564	2850	3150	6.0 - 8.5	-	0.45	3500
47B-OL		564	2850	3200	6.0-8.5	30±3	0.36	4000
PR1		I/II	752	2500	2950	6.0 - 8.5	30±3	0.36
PR3	III	799	2500	2950	6.0 - 8.5	30±3	0.45	3500
SF <sub>(5)</sub>	I/II	589	2850	3200	6.0 - 8.5	50±3	0.36	4000

- (1) Each class of concrete shall identify the minimum strength requirement, per plans and specifications.  
All classes of concrete shall be air-entrained and a water-reducing admixture shall be used per manufacture's recommendations.
- Class R Combined Aggregate shall use a mid-range water reducer admixture. The dosage shall be at the manufacture's recommendation and the Engineer may approve a low-range water reducer admixture.
- (2) As determined by ASTM C 138 or ASTM C 231.  
*FOR INFORMATION ONLY. The Contractor may develop a Quality Control Program to check the quantity of air content on any given project; such as, checking the air content behind the paver.*
- (3) The Contractor is responsible to adjust the water/cement ratio so that the concrete supplied achieves the required compressive strength without exceeding the maximum water/cement ratio. The minimum water/cement ratio for any slip form concrete pavement is 0.38, unless the Contractor requests approval from the Engineer in writing to change the minimum water/cement ratio to 0.36.
- (4) For temporary surfacing, Type I/II cement is allowed.
- (5) Minimum Portland Cement shall be 564 lbs/cyds and the total Silica Fume added shall be 25 lbs/cyds.

(\* ) Refer to Subsection 1004.02 for material characteristics.

**Lithium Nitrate** may be used in place of Supplemental Cementitious Materials (SCMs), see Section 1007 of the Standard Specifications as modified in these Special Provisions.

(\*\*) For slip form applications.

(\*\*\*) For hand-pours and substructures applications.

<b>Table 1002.03</b>	
<b>Table of Acceptable Concrete Class Substitutions</b>	
Class Specified	Acceptable Class for Substitution
BX	47B, 47BD or 47B-HE
47B	47BD or 47B-HE

Paragraphs 5., 6., 7., 8., 9. and 10. of Subsection 1002.02 are void and superseded by the following:

5. Class PR1 and PR3 Concrete:
  - a. The calcium chloride for use in PR concrete shall be either:
    - (1) A commercially prepared solution with a concentration of approximately 32 percent by weight.
    - (2) A Contractor prepared solution made by dissolving 4.5 pounds of Grade 2 or 6.2 pounds of Grade 1 calcium chloride per gallon of water to provide a solution of approximately 32 percent by weight.
  - b. The 7.4 pounds of water in each gallon of solution shall be considered part of the total water per batch of concrete.
  - c. The calcium chloride solution shall be added, just prior to placement, at a rate of 0.375 gallons/100 pounds of cement (1.4 lb. calcium chloride per 100 lb. cement).
  - d. Class A, Flaked or Pellet Calcium Chloride shall be added at a rate not to exceed 2.0 percent of the weight of the cement for Grade 1, or 1.6 percent of the weight of the cement for Grade 2. Grade 1 Calcium Chloride purity is between 70 and 90 percent and Grade 2 Calcium Chloride is between 91 and 100 percent.
  - e. Where mixing trucks are used:
    - (1) For Class PR3 Concrete, calcium chloride shall be thoroughly mixed into the concrete before placement. The minimum mixing time is 2 minutes.
    - (2) For Class PR1 Concrete, calcium chloride shall be added first and then the concrete mixed at least 2 minutes or as required by manufacturer. Next, the Type F high range water-reducer admixture is added and the concrete is mixed an additional 5 minutes.
6. Class High Early (47B-HE) Concrete
  - a. High Early (47B-HE) concrete shall be cured as prescribed in Subsection 603.03, Paragraph 7. The Contractor shall take necessary curing measures so the required strength is achieved.
  - b. High Early concrete shall achieve a compressive strength of 3,500 psi at 48 hours after placement.

- c. The 48-hour compressive strengths shall be used to determine pay factor deductions for high early concrete in accordance with Table 603.03.
  - d. A non-calcium chloride accelerator shall be used when the ambient temperature at the time of the placement of concrete is 70°F or less.
  - e. When requested by the Contractor, the maturity method, as provided in NDR C 1074, may be used in lieu of the requirements of Subsection 603.03, Paragraphs 11.c. and d. to determine the strength of concrete pavement for the purpose of early opening to traffic and acceptance. Requests by the Contractor for use of the maturity method shall be on a project basis and shall be made in writing to the Engineer.
7. The yield of the concrete proportions shall be determined and adjusted by the Producer.
8. All Classes of Concrete with the exception of PR1 and PR3 shall have a Durability Factor not less than 70 and a mass loss not greater than five percent after 300 freeze/thaw cycles when tested in accordance with ASTM C 666. The freeze/thaw testing shall be conducted according to Procedure A.

Paragraphs 1. & 2. of Subsection 1002.03 are void and superseded by the following:

1. The Contractor shall identify the plant that will supply the concrete 14 days before use and be entirely responsible for its calibration, batching of concrete, aggregate and sampling of cement per NDR Sampling Guide.
- a. The Contractor shall be responsible for the following:
    - 1) Batching concrete.
    - 2) Contractor shall sample aggregate from the conveyor belt or stockpile. Gradations from a split sample shall be tested in accordance to Section 1033 and reported to the Engineer at the frequency required by the Materials Sampling Guide.
      - i. Contractor shall retain possession of the split samples on-site at the Contractor's facility until such a time as determined by the Engineer.
        - a. At the pre-construction meeting:
          - 1) Contractor shall determine the location of testing and report the names of the technician performing the sampling and testing.
          - 2) Engineer will notify the Contractor of the retrieval of the split samples.
        - ii. The Contractor shall split the sample, place the Department's split sample into a cloth bag and immediately seal the split sample with the provided security seal. The cloth sample bag shall be supplied by the Department.
        - iii. The sampling splitting and placement of the security seal of aggregate samples shall be witnessed by certified Department personnel.

- iv. Contractor shall secure the split sample using a consecutively numbered security seal of 75 pounds breaking strength provided by the Department. The Contractor shall use the consecutively numbered security seals to identify and track each Aggregate Class. Samples that are not consecutively numbered will be investigated for custody of the sample and the Engineer may cease production until it is determined what action will be required.
  - a. The Contractor shall report the security seal tracking number with the split sample gradation.
  - b. The following training shall be required for personnel who oversee the batching of the concrete:
    - 1) Concrete Technician Personnel
      - i. Concrete Plant Technician
    - 2) Portland Cement Sampler
      - i. NDR Portland Cement Sampler
- 2. Portland Cement Concrete shall be supplied by certified Ready Mix Plants that are in compliance with the requirements in the *Quality Control Manual*, Section 3, -- Certification of Ready Mixed Concrete Production Facilities published by the National Ready Mixed Concrete Association. Refer to NDR Material Sampling Guide for the policy on stationary and portable plants.

Paragraph 4. of Subsection 1002.03 is void and superseded by the following:

- 4. a. Mix times shall meet the requirements of ASTM C 94. Mixing time tests shall be repeated whenever the concrete appearance indicates that mixing was inadequate.
- b. Batch plants that are transporting the concrete in non-agitating trucks, the mixing time will not be less than 60 seconds, and for agitating trucks, the mixing time will not be less than 45 seconds.
- c. The Certification of stationary and portable ready mix plants will conform to the tests that are required in the NDR Materials Sampling Guide.

Paragraph 6. of Subsection 1002.03 is void and superseded by the following:

- 6. Batch tickets shall be prepared as prescribed in the National Ready Mixed Concrete Association's *Quality Control Manual*. The Contractor shall keep all gradations and batch tickets until final acceptance by the Department. Projects that have less than 200 cubic yards of concrete placed will be allowed to have hand written tickets. For projects greater than 200 cubic yards, hand written tickets will be at the Engineer's discretion. The concrete batch tickets shall show batch weights, aggregate moisture (shall be tested daily and moisture probes are allowed), admixtures used, water, and mix design calculations. A copy of the batch ticket shall be given to the Engineer upon delivery of concrete.



Paragraph 8. of Subsection 1002.03 is void and superseded by the following:

8. Coarse aggregate and aggregate from a dry pit shall be uniformly saturated with water before it is used. The wetting shall begin 24 hours prior to the concrete mixing to allow complete saturation.

Paragraph 13.a. of Subsection 1002.03 is void and superseded by the following:

13. a. The quantity of water shall be determined by the Contractor. The minimum quantity of water should be used which will produce required workability. Any additional water used to rinse the charging hopper and fins after the batching of concrete is allowed. This water must be estimated and recorded on the batch ticket.

Subsection 1002.04 is void and superseded by the following:

1. Class 47B Concrete Mix Design Submittal:
  - a. The Contractor shall submit the Concrete Mix Design Worksheet consisting of design mix proportions, testing of mix design from a minimum of 4 cubic yards and aggregate data for 47B class of concrete being placed on the project.
    - (1) All testing must be performed by a qualified laboratory found on the NDR's Material and Research website, under the *Nebraska Qualified Consultant & LPA Laboratories* and submitted to the Engineer.
    - (2) The Concrete Mix Design shall be submitted to the Engineer 4 weeks prior to any concrete being placed on the project.
    - (3) The Concrete Mix Design shall not be paid for directly by the Department and shall be subsidiary to items which direct payment is made.
    - (4) Concrete shall not be placed on the project before the Concrete Mix Design Worksheet has been reviewed and approved by the Engineer.
  - b. The Contractor shall submit the Concrete Mix Design Worksheet to the Engineer. Email submissions are preferred but will be accepted by fax or postal mail.
    - (1) Contractor's Mix Design Worksheet can be found on the Materials and Research website. The submitted Mix Design Worksheet shall include the following:
      - Contractor Name
      - Project Number
      - Date
      - Location of ready mix or central mix plant
      - Date submitted
      - Signature of Contractor representative

- (2) Material Source Information.
  - Cement Manufacturer
  - Type of Interground/Blended Cement
  - Type of Admixtures
  - Aggregate Pit and Quarry location
- (3) Specific Gravity of each individual aggregate source.
- (4) Sand Equivalent for dry pit sand-gravel aggregate.
- (5) Combined Aggregate percent passing as described on Table 1033.03C.
- (6) Contractor's Target combined aggregate gradation percent passing.
  - (i) The Contractor's required worksheet can be found on the Materials and Research website.

(7) Testing of Mix Design:

The mix design shall show the weights of all ingredients including Interground/Blended cements, aggregates, water, admixtures types and water cement ratio.

- Temperature of concrete at time of sampling, ASTM C 1064.
  - The air content of plastic concrete, ASTM C 231.
  - Weight per cubic foot, Yield, ASTM C 138. The relative Yield shall be a minimum of 97%.
  - Compressive strength shall be performed with a minimum of three averaged specimens at 7-day and 28-day, ASTM C 39. The minimum 28-day compressive strength shall be 3500 psi.
- (8) Traditional 47B Mix Design is defined as an IP(25) cement, 70 percent Class B Aggregate and 30 percent Class E Aggregate may be exempt from the concrete testing described in Paragraph 1.(b)(7). All other requirements shall be included in the Concrete Mix Design Report.

- c. The PCC Engineer will notify the Contractor of the mix design approval for Class 47B Concrete. Approval of the mix design does not alleviate the Contractor of the responsibility of the in-place concrete. The Contractor may adjust admixtures, water cement ratio, vibrator frequency, etc., as needed in accordance to the specifications.
- d. The Contractor shall submit a new concrete mix design worksheet meeting the above requirements when a change occurs in the source,

type, or proportions of cements or aggregates; unless otherwise approved by the Engineer.

2. The quantity of water to be used shall be determined by the Contractor. It shall not be varied without the Engineer's consent.
3. If the concrete mixture is excessively wet causing segregation, excessive bleeding, excessively dry or any other undesirable condition, the concrete shall be rejected. At the option of the Engineer, slump tests may be performed to determine the consistency.
4. Concrete which has developed initial set before it is consolidated and finished shall be rejected.
5.
  - a. If false set is encountered, the batching operation shall be stopped until the problem is resolved.
  - b. Each batch must be mixed or agitated for at least 3 additional minutes after observing the false set and the concrete must be of satisfactory consistency.
6. Compressive strength tests shall be made in accordance with ASTM C 39.
7. Concrete shall be sampled as prescribed in the NDR *Materials Sampling Guide*. Samples shall be taken at the point of placement, never before the discharge from the last conveyance.
8. Aggregate Acceptance, Verification, Sampling and Testing:
  - a. The aggregate will be accepted based on the Contractor's testing results except as noted below.
  - b. The aggregate verification sampling and testing by the Department will be randomly selected and tested according to subplot sizes in Table 1002.05.

Table 1002.05

Aggregate Class	Lot	Sublot
E and F	3000 tons	1000 tons
A,B and C	6000 tons	2000 tons
R	3000 tons	1000 tons

- c. The results of Contractor split sample will be verified by the Department's verification tests. Any samples outside of the tolerances as specified according to the Materials Sampling Guide, Section 28 under the *Acceptable Tolerance Limits for Independent Assurance* will result in an Independent Assurance (IA) review of testing and may result in the Department test results being applied.
  - d. On any given Lot, if the results of the gradation from the verification test are within Department's specification, the Contractor's results will be used for the entire lot. On any given Lot, if the gradations results from the

verification test are outside Department's specification, further investigation will be initiated by the Engineer for that subplot. Any or all of the remaining Department subplot samples may be tested and the Department subplot test results may be applied to the respective subplot and the acceptance will apply.

- e. When verification tests are within testing tolerance but results show a consistent pattern of deviation from the split sample results, the Engineer will exercise one or more of the following:
  - Cease production.
  - Request additional verification testing.
  - Initiate a complete IA review.
  
- f. Independent Assurance (IA) Review of Testing:
  - 1) The Contractor shall allow the Department personnel access to the Contractors' laboratory to conduct IA review of the technician testing procedures and apparatus. Any deficiencies discovered in the Contractor's testing procedures will be reported to the Contractor and corrected by the Contractor.
  
  - 2) During the IA review, the Department personnel and the Contractor shall split a sample for the purpose of IA testing. The samples selected will be tested in the Department's Branch Laboratory. Any IA test results found to be outside of defined testing tolerances as stated in Paragraph 8.c. of Subsection 1002.04 will be reported to the Contractor. The Contractor shall immediately correct any deficiencies found during the IA review.
  
  - 3) If the project personnel and the Contractor cannot reach agreement on the accuracy of the test results, the Department Central Laboratory will be asked to resolve the dispute, which will be final. All dispute resolutions will be in accordance with the Quality Assurance Program requirements in the NDR's Materials Sampling Guide.

## **PORTLAND AND INTERGROUND/BLENDED CEMENT (J-15-0214)**

Section 1004 in the Standard Specifications is void and superseded by the following:

### **1004.01 – Description**

- 1. Portland cement is the binder in concrete, locking the aggregate into a solid structure. It is manufactured from Lime, Silica, and Alumina (with a small amount of plaster of Gypsum).
  
- 2. Equivalent alkali referred to herein is hereby defined as the sum of the Sodium Oxide ( $\text{Na}_2\text{O}$ ) and the Potassium Oxide ( $\text{K}_2\text{O}$ ) calculated as Equivalent Alkali  $\text{Na}_2\text{O}_e = \text{Na}_2\text{O} + 0.658 \text{K}_2\text{O}$ .

3. Interground and Blended cements consist of intimate and uniform intergrinding or blending of Portland cement clinker, Slag cement, Pozzolan and/or Limestone.

#### **1004.02 – Material Characteristics**

1. Type I, Type II, Type I/II and Type III Portland cement shall conform to the requirements in ASTM C 150 with the following additional requirements:
  - a. Portland cement shall not contain more than 0.60 percent equivalent alkali.
  - b. Processing additions may be used in the manufacture of the cement, provided such materials have been shown to meet the requirements of ASTM C 465 and the total amount does not exceed 1 percent of the weight of Portland cement clinker.
2. Interground and Blended Cement shall conform to the requirements in ASTM C 595 with the following additional requirements:
  - a. Interground/Blended cement (Type IP)
    - (1) For Type IP(25) shall be composed of Class F fly ash or Class N pozzolan replacement shall be 25%  $\pm$  2%.
    - (2) For Type IP(20) shall be composed of Class F fly ash or Class N pozzolan replacement shall be 20% + 2%.
  - b. Interground/Blended cement (Type IT)
    - (1) For SCMs, Slag cement and Limestone, the maximum replacement by weight shall be 40%. The manufacturer has a production tolerance of  $\pm$  2% from the proposed replacement.
    - (2) For Slag Cement, the maximum replacement shall be 20% or less when incorporated into the final Interground/Blended cement.
    - (3) For Limestone cement, the replacement range shall be from 5.1% to 10.0% when incorporated into the final Interground/Blended cement.
  - c. No additional SCMs, Slag cement and Limestone will be added at the batch plant.

#### **1004.03 – Procedures**

1. The Contractor shall provide adequate protection for the Portland and Interground/Blended cement against dampness.
  - a. Portland and Interground/Blended cement shall be hauled or stored in railroad cars, dry bulk trailers or in suitable moisture-proof buildings.
  - b. The use of tarpaulins for the protection of the Portland and Interground/Blended cement against moisture will not be allowed.

2. No Portland and Intergrround/Blended cement which has become caked or lumpy shall be used.
3. Portland and Intergrround/Blended cement which has been spilled shall not be used.
4. Accepted Portland and Intergrround/Blended cement which has been held in storage at the concrete mix plant more than 90 days shall be retested.
5. Portland and Intergrround/Blended cement coming directly from the manufacturer shall not be used until the temperature is 150°F or less.
6. Portland cement having false set when tested in accordance with in ASTM C 150 will not be used.

#### **1004.04 – Acceptance Requirements**

1. For Department projects, Portland and Intergrround/Blended cements must be on the NDR Approved Product List (APL).
2. The Contractor shall submit any new Portland and Intergrround/Blended cements to the Engineer to be approved for the APL with the following:
  - a. Material source information:
    - 1) Mill Location
    - 2) Type of Portland and Intergrround/Blended cements
    - 3) Grinding Period
    - 4) Associated Manufacture Product Name
    - 5) Provide source and type of each SCMs and/or Slag Cement used for final product.
      - (i) The Department will allow the use of ASTM C 1697.
        - a. When two or more SCMs and/or Slag Cement are pre-blended, the Contractor shall report chemical composition analysis of the final blend.
        - b. The final blend shall be reported as per ASTM C 1697, Paragraph 4.
    - 6) Portland cement shall conform to ASTM C 150.
    - 7) Intergrround/blended cements shall conform to ASTM C 595.
    - 8) Provide total cementitious materials replacement per ASTM C 595.
    - 9) Report test results per ASTM C 1567 at 28-days.

3. Alkali Silica Reaction Requirements and Testing:
  - a. Interground/Blended cement shall be tested according to the provisions of ASTM C 1567.
    - (1) The mortar bars shall be composed of Type IP or IT Interground/blended cement and sand and gravel from an approved Platte River Valley-Saunders County source.
      - i. When Elkhorn River-Madison County source or an out of state aggregate source and type IP(20) or IT cement is being used on a project, the Elkhorn River or an out of state aggregate source shall be used in lieu of the Platte River Valley-Saunders County source.
      - ii. When Contractor proposes a change of aggregate source, then the new aggregate source shall be tested by ASTM C 1567.
    - (2) The mortar bars for the ASTM C 1567 shall not exceed 0.10% expansion at 28 days.
      - i. To accommodate precision within multi-laboratory testing, expansion up to and including 0.13% will be accepted for use. If the expansion is above 0.13%, the material is noncompliant. If tolerance problems are not corrected within 30 days following notification, the Interground/blended cement in question will be removed from the NDR's APL.
4. Portland and Interground/Blended cements will be placed on NDR's APL based on the conformance with the NDR's Acceptance Policy Portland and Interground/Blended Cements.

#### **1004.05 - Sampling and Testing Requirements**

1. All Portland and Interground/Blended cements shall be sampled and tested at the rate as described in the NDR's Materials Sampling Guide.
  - a. The Department will inform the Contractor when a sample is required.
  - b. A sample shall be taken by a Contractor's Certified Portland Cement Sampler and must be under the supervision of Department certified personnel.
  - c. The sample shall be taken at the plant from a bulk shipment of a rail car, dry bulk trailer, batch plant silo or from the line between the bulk truck and the silo. Upon sampling, the Department will take immediate custody of the sample.
  - d. When Elkhorn River aggregate- Madison County source or an out of state aggregate source and type IP(20) or IT cement is being used on a project, the Elkhorn River or an out of state aggregate source shall be used in lieu of the Platte River Valley aggregate source.
2. Noncompliant material from the mill, terminal or project will be temporarily removed from the Approved Products List pending further investigation.

3. If the noncompliant Portland or Interground/Blended cement is removed from the Approval Products List, all shipments from the supplier will be held until the investigation of the failing samples have been completed by the NDR Materials and Research Division. These procedures shall be in accordance with this provision.

### **WATER FOR CONCRETE (J-15-0214)**

Section 1005 in the Standard Specifications is void and superseded by the following:

#### **1005.01 – Description**

1. Water shall be free from objectionable quantities of oil, acid, alkali, salt, organic matter, or other deleterious materials and shall not be used until the source of supply has been approved.
2. Wash water from the mixer washout may be used only with the Engineer's approval. Use of wash water will be discontinued if undesirable reaction with admixtures or aggregates occurs.

#### **1005.02 – Material Characteristics**

1. Water which contains more than 0.25 percent total solids by weight shall not be used.
2. When required by the Engineer, the quality of mixing water shall be determined by NDR C 114, NDR T 290, NDR D 512, NDR C 1602, ASTM C 31, ASTM C 109, ASTM C 191, and ASTM C 1603.
3. Upon written request by the concrete producer and approval by Materials and Research, the concrete producer may utilize up to 10% wash water for batching all classes of concrete with the following conditions:
  - a. Wash water shall conform to the requirements in NDR's Material Sampling Guide under Policy for Certification of Ready Mix Plants.
  - b. Wash water must be clarified wash water that has been passed through a settling pond system.
  - c. Wash water must be scalped off of a settling basin that has been undisturbed for a minimum of 12 hours.
  - d. Wash water must be metered into each load.
  - e. Wash water quantities shall be shown on the batch ticket.



**CALCIUM CHLORIDE  
(J-15-0214)**

Section 1006 of the Standard Specifications is void and superseded by the following:

**1006.01 – Description**

Calcium Chloride shall be Type S (Solid) or Type L (Liquid). Calcium Chloride can be used for; but not limited to, dust control and acceleration of the set of concrete.

**1006.02 – Material Characteristics**

The requirements for calcium chloride shall be tested in accordance with ASTM D 98.

**1006.03 – Acceptance Requirements**

Acceptance shall be based on requirements contained in the NDR Materials Sampling Guide.

**SECTION 1007 -- CHEMICAL ADMIXTURES  
(J-15-0214)**

Section 1007 in the Standard Specifications is void and superseded by the following:

**1007.01 -- Description**

1. Admixtures are materials added to Portland cement concrete to change characteristics such as workability, strength, permeability, freezing point, and curing.
2. The Department's concrete admixture types are:
  - a. Type A - Water-Reducing Admixture - An admixture that reduces the quantity of mixing water required to produce concrete of a given slump.
  - b. Type B - Retarding Admixture - An admixture that slows the setting of concrete.
  - c. Type C - Accelerating Admixture - An admixture that speeds the setting and early strength development of concrete.
  - d. Type D - Water-Reducing and Retarding Admixture - An admixture that reduces the quantity of mixing water required to produce concrete of a given slump and slows the setting of concrete.
  - e. Type E - Water-Reducing and Accelerating Admixture - An admixture that reduces the quantity of mixing water required to produce concrete of a given slump and speeds the setting and early strength development of concrete.
  - f. Type F - Water-Reducing, High Range Admixture - An admixture that reduces the quantity of mixing water required to produce concrete of a given slump by 12 percent or greater.

- g. Type G - Water-Reducing, High Range and Retarding Admixture - An admixture that reduces the quantity of mixing water required to produce concrete of a given slump by 12 percent or greater and slows the setting of concrete.
- h. Air-Entraining - An admixture that encapsulates air in the concrete.
- i. Lithium Nitrate – An admixture used to control the Akali Silica Reaction (ASR) in concrete.

**1007.02 -- Material Characteristics**

- 1. Type A through G admixtures shall meet the requirements in ASTM C 494.
- 2. Air-entraining admixtures shall meet the requirements in ASTM C 260.
- 3. Use of admixtures other than those cited may be requested by the Contractor.
- 4. Admixtures shall not contain more than 1 percent of chlorides calculated as calcium chloride unless specified otherwise in the Specification.
- 5. Admixtures shall be used at the manufacturer's recommended dosage rates.
- 6. The air-entraining admixture characteristics shall produce concrete with satisfactory workability and total air content as prescribed in Table 1002.02.
- 7. a. When using the Lithium Nitrate admixture, the Contractor shall submit to the Engineer:
  - (i) A five pound sample of Portland cement that will be used on the project.
  - (ii) The Manufacturer's method for determining the recommendation for the required dose rate based on the equivalent alkali content.
  - (iii) Water content of the Lithium Nitrate admixture solution.
- b. The Engineer will report the equivalent alkali content to the Contractor. The Contractor shall use the reported equivalent alkali content to determine the required dose rate based on the manufacturer's recommendation.

**1007.03 -- Procedures**

- 1. The process for adding admixtures to a ready mix truck on the project site involves positioning the load of concrete up to the truck chute, stopping short of discharge.
  - a. The admixture is then poured over the surface of the concrete and mixed for at least 5 minutes.
  - b. No more than 1.3 gallons of water shall be used to rinse the admixture from the fins and top chute. This water must be shown on the proportioning report and shall not exceed the water cement ratio.
  - c. When Lithium Nitrate is used, the portion of the admixture that is water will be shown on the proportioning report and shall not exceed the water cement ratio.
  - d. The Contractor is responsible for the addition of the admixture.

2. a. If the air content is less than the minimum specified, addition of air-entraining admixtures is allowed.
- b. The Contractor shall take measures based on manufacturer's recommendations, that are within compliance of NDR Specifications, to bring the load of concrete into NDR prescribed limits according to Table 1002.02.
- c. If the air content is then outside the limits in Table 1002.02, the load of concrete shall be rejected.

**1007.04 -- Acceptance Requirements**

1. a. Approved chemical admixtures are shown on the NDR Approved Products List.
- b. Admixture approval shall be based upon annual certifications and certified test results submitted to the NDR Materials and Research Division.
2. The admixture must be essentially identical in concentration, composition, and performance to the admixture tested for certification.
3. Admixtures not identified on the NDR Approved Products List may be used under the following conditions:
  - a. A certificate of compliance and certified test results must be submitted to the NDR Materials and Research Division and approval for use must be given by the NDR Materials and Research Division.

**SILICA FUME  
(J-15-0307)**

Paragraph 2 of Subsection 1009.03 in the Standard Specifications is void and superseded by the following:

2. Silica fume shall be protected from temperatures in excess of 90°F (32°C).

**LIQUID MEMBRANE-FORMING COMPOUNDS FOR CURING CONCRETE  
(J-15-0307)**

Subsection 1012.03 in the Standard Specifications is void and superseded by the following:

**1012.03 – Acceptance Requirements**

1. All curing compounds to be approved must be from the current calendar year with no carry-over from the previous years.
2. Approved compounds are on the NDR Approved Products List.
3. Products not on the NDR Approved Products List shall be sampled and tested in accordance with requirements of the NDR Materials Sampling Guide.

## **BITUMINOUS LIQUID COMPOUNDS FOR CURING CONCRETE (J-15-1007)**

Section 1013 in the Standard Specifications is void and superseded by the following:

### **1013.01 – Description**

The compound shall consist essentially of an asphaltic base and shall be of a consistency suitable for spraying at temperatures existing at the time of construction operations. It shall form a continuous, uniform film. It shall be free of precipitated matter caused by conditions of storage or temperature. The compounds shall be relatively nontoxic.

### **1013.02 – Material Characteristics**

- a. When tested in accordance with AASHTO T 155, the loss of water shall not be more than 0.11 lb/ft<sup>2</sup> (0.55 kg/m<sup>2</sup>) of surface area at 3 days, unless otherwise specified by the Engineer.
- b. The Contractor has the option of using bituminous tack coat. The tack coat shall conform to all requirements of Section 504.

### **1013.03 – Acceptance Requirements**

Products shall be sampled and tested in accordance with requirements of the NDR Materials Sampling Guide.

## **JOINT AND CRACK SEALING FILLER (J-15-0813)**

Section 1014 in the Standard Specifications is void and superseded by the following:

### **1014.01 – Description**

Joint sealing filler shall be either a cold applied silicone product or an asphalt product (hot pour) conforming to the requirements of this Section. The type of joint filler to be used shall be as specified in the plans or special provisions. If not specified, any of the joint sealing fillers in this Section may be used.

Crack sealing filler shall be a hot pour sealer conforming to the requirements of this Section.

### **1014.02 -- Material Characteristics**

1. NE-3405 and NE-3405LM (hot pour)
  - a. NE-3405 joint and crack sealer shall conform to the requirements of ASTM D6690, Type II. The material shall conform to the requirements of Table 1 with the following exception:
    - (i) The test of Bond, non-immersed, ASTM D5329, 3 specimens through 3 cycles shall be run at 0°F (-18°C), 100% extension.

- b. NE-3405LM (Low Modulus) joint and crack sealer shall conform to the requirements of ASTM D6690, Type IV. The material shall conform to the requirements of Table 1.
- c. The test of Bond, non-immersed, ASTM-D5329, will be tested on concrete blocks that will be constructed by the NDR Concrete Laboratory. The concrete blocks will be made of a 47B concrete mixture as prescribed in Section 1002 in the NDR Standard Specifications. The design is amended so that no fly ash is used in the mixture. All other specifications for Portland Cement Concrete apply.
- d. Sample conditioning, preparation and heating shall be in accordance with ASTM D 5167 with the following exceptions:
  - (i) The following sentence of Section 8.1.2, "Also, if present, remove container liner by cutting it away", is void and superseded by the following:

"Also, if present, as much of the polyethylene bag as possible, shall be removed by cutting it away. Wholly-meltable type container in contact with the sample section shall be left in place."
  - (ii) The last sentence of Section 8.1.2 "Solid Materials" is void and superseded by the following:

The entire vertical section which has been cut, shall be placed into the pot for melting.
  - (iii) The Section of 8.2.2.1 "Solid Materials" is void.
  - (iv) The Section of 8.2.3 is void and superseded by the following:

After the solid segment is added to the melter, the material shall be allowed to minimally melt to a uniform viscous state suitable for the installation of the stirrer or paddle. The sample shall then be stirred for one full hour. The oil bath temperature shall be regulated to bring the material to the maximum heating temperature within the one hour of stirring.
  - (v) The Section of 8.2.4.1 is void and superseded by the following:

During the one full hour of stirring, check the temperature of the material at maximum 15 minute intervals using a Type K thermocouple with the calibration verified in accordance with Section 6.1.7 to ensure conformance with specified temperature requirements. Stop the mechanical stirrer when measuring temperatures. If material temperatures ever exceed the maximum heating temperature, or ever drop below the minimum application temperature after the maximum heating temperature was reached, discard the sample and re-do the heating. Maintain appropriate records of times and temperatures to verify conformance with specification requirements.

- (vi) The Section of 8.2.4.2 is void.
- e. ASTM D 5329 shall include the following changes:
  - (i) Sections 6.4 and 12.4 “Specimen Preparation” shall have the reference of “177 ml (6 oz.)” replaced with “3 oz.”
  - (ii) Section 6 “Cone Penetration, Non-Immersed” shall be superseded with the following exceptions:
    - 1. Section 6.5 “Procedure” is void and superseded by the following:

Place the specimen in a water bath maintained at 77 +/- 0.2°F (25 +/- 0.1°C) for two hours immediately before testing. Remove the specimen from the bath and dry the surface by shaking gently to remove free water from the surface of the specimen. Using the apparatus described in Section 6.3, make one determination at or near the center of the specimen. Take care to ensure the cone point is placed on a point in the specimen that is representative of the material itself, and is free of dust, water, bubbles, or other foreign material.
    - 2. Section 6.6 “Report” is void and superseded by the following:

Record the value as penetration of the specimen in dmm units.
  - (iii) Section 12 “Resilience” shall be superseded with the following exceptions:
    - 1. Section 12.5 “Procedure”, void the sentence “Make determinations at three points equally spaced from each other and less than 13mm (½ inch) from the container rim” and supersede with the sentence “Make one determination at or near the center of the tin.”
    - 2. Section 12.6 “Report” is void.

2. Silicone Joint Sealer (cold applied)

- a. Silicone joint sealers may be either self-leveling or non-sag and shall meet the requirements in Table 1014.01.

**Table 1014.01**

<b>Silicone Joint Sealer Requirement</b>		
<b>Property</b>	<b>Requirement</b>	<b>Test</b>
As supplied:		
Specific Gravity	1.010-1.515	ASTM D792
Work Time, minimum	10 minutes	
Tack-Free, at 25°C	20-360 minutes	
Cure Time, at 25°C, maximum	14 days	
Full Adhesion, maximum	21 days	
As cured, at 25°C + 1.5		
Elongation, minimum	800%	ASTM D412
Durometer		
Non-Sag, Shore A	10-25	ASTM D2240
Self-Leveling, Shore 00, minimum	40	ASTM D2240
Joint Movement Capacity	+100% to -50%	ASTM C719
Tensile Stress, at 150% Elongation	45 psi	ASTM D412

**1014.03 -- Packaging**

1. NE-3405 and NE-3405LM

- a. The joint and crack sealer can be packaged in either cardboard box of wholly-meltable type containers.
- (i) Cardboard box containers shall be manufactured from double wall kraft board producing a minimum bursting test certification of 350 PSI (241 N/cm<sup>2</sup>) and using water-resistant adhesives. The use of metal staples or fasteners of any kind will be prohibited for closing the lids of the boxes. Tape or other like material is acceptable.
- a. The joint and crack sealer shall be in meltable [300°F (149°C)] polyethylene bag(s).
- (ii) Wholly-meltable type containers, and any of their components, shall be fully meltable and integrational with the joint and crack sealer by the time the manufacturer's minimum application temperature is reached.
- a. The wholly-melted and integrated container must not adversely affect the test specifications of the joint and crack sealer.

2. Silicone Joint Sealer

- a. Each container shall include information regarding manufacturer and product name.

#### 1014.04 -- Acceptance Requirements

1. NE-3405 and NE-3405LM
  - a. Acceptance of the manufactured material is based on pre-approval by either on or off-site sampling. Acceptable hot pour sealant lots are listed on the NDR Approved Products List.
    - (i) NDR on-site field sampling shall be in accordance with the NDR Materials Sampling Guide.
    - (ii) Off-site (Proxy) sampling shall be in accordance with ASTM D 6690.
      1. Proxy sampling shall be overseen by an outside party approved by the NDR, preferably another DOT Agency. Proxy samples shall include a manufacturer's Certificate of Compliance. Proxy samples shall also include a dated signature of origin by the Representative that is not affiliated with the manufacturer, and can either be on the Certificate of Compliance, or separate letter.
      2. For convenience in both sampling and shipping samples, sample containers smaller than a manufacturer's usual production containers are allowed, as long as the sample is 1500 grams min.
      3. Samples shall be sent to the NDR Bituminous Laboratory, or alternatively, sent to an NDR-approved independent laboratory for testing which will be at no cost to the Department. If a NDR-approved independent laboratory will be used for testing purposes, the NDR Bituminous Laboratory must be notified so that NDR concrete blocks for Bond testing can be sent to it.
2. Silicone Joint Sealer
  - a. Acceptance of applied silicone joint sealers shall be in accordance with the NDR *Materials Sampling Guide*.
  - b. Acceptable silicone joint sealer manufacturer products are listed on the NDR Approved Products List.
    - (i) For products that are not listed, approval may be based upon test results from an independent laboratory submitted to the NDR Concrete Materials Section by the manufacturer, and testing by the NDR. Approval must be made prior to product use.



## **EPOXY COMPOUNDS AND ADHESIVES (J-15-0308)**

Section 1018 in the Standard Specifications is void and superseded by the following:

### **1018.01 – Description**

This specification provides requirements for two-component, epoxy-resin bonding systems for use in non-load bearing applications and resin adhesives for application to Portland cement concrete.

### **1018.02 – Material Characteristics**

1. Epoxy-resin bonding systems shall conform to the requirements of ASTM C 881. Approved systems are shown on the NDR Approved Products List.
2. The classification of Epoxy-Resin Bonding Systems is as follows:
  - a. Type I For use in non-load bearing applications for bonding hardened concrete and other material to hardened concrete.
  - Type II For use in non-load bearing applications for bonding freshly mixed concrete to hardened concrete.
  - Type III For use in bonding skid resistant materials to hardened concrete, and as a binder in epoxy mortars or epoxy concretes.
  - b. Grade 1 Low viscosity.
  - Grade 2 Medium viscosity.
  - Grade 3 Non-sagging consistency.
  - c. Class A For use below 40°F (4°C); the lowest allowable temperature to be defined by the manufacturer of the product.
  - Class B For use between 40°F and 60°F (4°C and 15°C).
  - Class C For use above 60°F (15°C); the highest allowable temperature to be defined by the manufacturer of the product.
  - Class D For use between 40°F and 65°F (4°C and 18° C).
  - Class E For use between 60°F and 80°F (15°C and 26°C).
  - Class F For use between 75°F and 90°F (24°C and 32°C).

### **1018.03 – Procedures**

1. The compounds shall be of the type and grade specified in the plans or as directed by the Engineer.

2. The class of the compounds shall be selected for use according to climatic conditions at the time of application.
3. All bonding surfaces shall be clean and free of all oil, dirt, grease, or any other materials which would prevent bonding.
4. Mixing and application shall be in strict accordance with the manufacturer's instructions.

**1018.04 – Acceptance Requirements**

1. Epoxy-resin bonding systems and resin adhesives approved for use are shown on the NDR Approved Products List.
2. Epoxy-resin bonding systems that are not on the NDR Approved Products List may be accepted based on a manufacturer's certificate of compliance.

**DEFORMED METAL CENTER JOINT AND METAL KEYWAY  
(J-15-0307)**

Paragraph 1 a. of Subsection 1027.01 in the Standard Specifications is void and superseded by the following:

a. Metal Center Joint:

Metal center joint sections shall be manufactured from sheets no less than 18 gauge [0.05 inch (1.3 mm)] thick and shall be of the size and trapezoidal shape shown in the plans. The sections shall be punched along the centerline of the narrow face of the trapezoid to admit the tie bars required by the plans and also at intervals of not greater than 2 feet (600 mm) to receive pins that are driven vertically into the subgrade to support the metal center joint.

**AGGREGATES  
(J-15-0914)**

Subsection 1033.01 is amended to include the following paragraphs and Subsection 1033.02, Paragraphs 1 and 3. of the Standard Specifications is void and superseded by the following:

**1033.01 – Description**

This combined aggregate gradation using Class R aggregate is to optimize aggregate blends utilizing more locally available materials.

Achieving a uniform gradation for Class R may require the use of two or more different aggregates. It is the responsibility of the contractor to consider additional material characteristics; such as, but not limited to particle shape, cubicity, angularity, etc., when designing a mix.

**1033.02 -- Material Characteristics****1. Sampling and Testing Procedures:**

All materials shall be sampled and tested in accordance with Table 1033.01. All material source locations and quarries must be approved by the Department for prior to use.

**Table 1033.01**

<b>Sampling and Testing Procedures</b>	
<b>Procedure</b>	<b>Method</b>
Sampling	NDR T 2
Sieve Analysis	NDR T 27
Clay Lumps, Shale, and Soft Particles	NDR T 504
Abrasion	AASHTO T 96
Freeze and Thaw Soundness	NDR T 103
Specific Gravity and Absorption (course aggregate)	AASHTO T 85
Specific Gravity and Absorption (fine aggregate)	AASHTO T 84
Total Evaporable Moisture Content of Aggregates by Drying	AASHTO T 255
Plastic Fines in Graded Aggregates and Soils by Use of the Sand Equivalent Test	AASHTO T 176
Sodium Sulfate Soundness	AASHTO T 104
Calcium Carbonate	NDR C 25
Organic Impurities	AASHTO T 21
Mortar-Making Properties	AASHTO T 71
Reducing Field Samples of Aggregate to Testing Size	AASHTO T 248

**2. Portland Cement Concrete Aggregates:****a. Sand-Gravel Aggregate:**

- (1) Aggregate shall be washed and composed of clean, hard, durable and uncoated particles.
- (2) Aggregates produced from wet pits by pumping must be adequately washed by means approved by the Department.
- (3) Aggregates from dry pits shall be adequately washed by means approved by the Department and have a Sand Equivalent value not less than 90 in accordance with AASTHO T 176.
  - (i) If the Sand Equivalent is less than 90, the Engineer may elect to stop aggregate production until such a time ASTM C 109 has been completed. The aggregate, when subjected to the test for mortar-making properties, shall produce a mortar having a compressive strength at the age of 7 days equal to or greater than that developed by mortar of the same proportions and consistency made of the same cement and aggregate after the aggregate has been washed to a sand equivalent greater than 90. Materials failing to produce equal or greater strength shall be unacceptable.

- (4) Aggregate for concrete shall have a soundness loss of not more than 10% by weight at the end of 5 cycles using Sodium Sulfate Soundness test AASHTO T 104.
- (5) The weight of the aggregate shall not contain more than 0.5% clay lumps.
- (6) Aggregate subjected to the colorimetric test for organic impurities which produces a color darker than the standard shall be further tested for its mortar-making properties in accordance with AASHTO T 71. The Engineer may elect to stop aggregate production until such a time AASHTO T 71 testing has been completed.
  - (i) Aggregate, when subjected to the test for mortar-making properties, shall produce a mortar having a compressive strength at the age of 7 days equal to or greater than that developed by mortar of the same proportions and consistency made of the same cement and aggregate after the aggregate has been treated in a 3% solution of sodium hydroxide. Materials failing to produce equal or greater strength shall be unacceptable, except when determined to be acceptable under the provisions of Subsection 105.03.
- (7) Aggregate shall meet the requirement in Tables 1033.02A, 1033.02B and 1033.03C.

**Table 1033.02A**

		Percentage	Percent Passing									
			1 1/2"	1"	3/4"	1/2"	3/8"	No.4	No.10	No.20	No.30	No.200
AGGREGATE SPECIFICATION RANGE	Class A	Max	--	--	--	--	100	100	90	--	40	3
		Min	--	--	--	--	100	92	64	--	10	0
	Class B	Max	--	100	--	--	--	97	70	--	40	3
		Min	--	100	--	--	--	77	50	--	16	0
	Class C	Max	--	100	--	--	--	88	50	--	20	3
		Min	--	100	--	--	--	44	24	--	4	0

**Table 1033.02B**

Aggregate Classes and Uses	
Aggregate Class	Concrete Description
A	Overlay Concrete SF
B	47BD, 47B-HE, 47B-OL, PR 1 and PR 3
C	BX

**b. Ledge Rock Aggregate:**

- (1) Aggregate shall consist of Limestone, Quartzite, Dolomite, Gravel and Granite composed of clean, hard, durable, and uncoated particles.
- (2) The percent of clay lumps, shale, or soft particles shall not exceed the following amounts:

Clay Lumps .....	0.5%
Shale .....	1.0%
Soft Particles .....	3.5%

- (3) Any combination of clay lumps, shale, and soft particles shall not exceed 3.5%.

- (4) Aggregate for concrete shall be free of coatings that will inhibit bond and free of injurious quantities of loam, alkali, organic matter, thin or laminated pieces, chert, or other deleterious substances as determined by the Engineer.
- (5) Aggregate for concrete shall not have a soundness loss greater than 8.0% by weight at the completion of 16 cycles of alternate freezing and thawing.
- (6) Aggregates for concrete shall have a Los Angeles Abrasion loss percentage of not more than 40.
- (7) All fractions passing the No.4 sieve shall meet quality requirement of soundness loss of not more than 10% by weight at the end of 5 cycles using sodium sulfate solution.
- (8) The ledge rock shall be tested according to ASTM C 1260.
  - (a) The mortar bars for the ASTM C 1260 shall not exceed 0.10% expansion at 28 days.
    - (i) If the proposed ledge rock exceeds 0.10% expansion at 28 days, the ledge rock shall be tested in accordance to ASTM C 1567. If the expansion is greater than 0.10%, the ledge aggregate shall not be used.
      - a. The ASTM C 1567 mortar bars shall be composed of Type IP or IT Interground/blended cement and the proposed Ledge Rock aggregate.
      - b. To accommodate precision within multi-laboratory testing, expansion up to and including 0.13% will be accepted for use. If the expansion is above 0.13%, the material is noncompliant.
- (9) Aggregate shall meet the requirements in Tables 1033.03A, B, and C.

**Table 1033.03A**

	Percent	Percent Passing										
		1 1/2"	1"	3/4"	1/2"	3/8"	No.4	No.10	No.20	No.30	No.200	
AGGREGATE SPECIFICATION RANGE	Class E	Max	100	100	90	--	45	12	--	*4	--	3
	Class E	Min	100	92	66	--	15	0	--	0	--	0
AGGREGATE SPECIFICATION RANGE	Class F	Max	--	--	100	100	90	30	8	--	--	3
	Class F	Min	--	--	100	96	40	4	0	--	--	0

\*If the No. 200 sieve is less than 1.5% passing the No.20 sieve could be increased to maximum of 6% passing.

**Table 1033.03B**

Aggregate Classes and Uses	
Aggregate Class	Concrete Description
E	47BD, 47B-HE, PR 1 and PR 3
F	47B-OL, Overlay Concrete SF

**c. Combined Aggregates:**

- (1) The Contractor shall design and meet the specification requirements. It is the Contractor's responsibility to provide desirable mix properties; such as, but not limited to, workability, resistance to segregation, stable air void system, good finishing properties and good consolidation properties.
- (2) The combined blended aggregate shall meet the requirement in Table 1033.03C and 1033.03D.

**Table 1033.03C**

<b>*Class R - Combined Aggregate Gradation Limits (Percent Passing)</b>								
<b>Sieve Size</b>	<b>1 ½ inch</b>	<b>1 inch</b>	<b>¾ inch</b>	<b>No.4</b>	<b>No.10</b>	<b>No.30</b>	<b>No. 50</b>	<b>No.200</b>
Max	100	100	98.0	70.0	50.0	30.0	12.0	3.0
Min	-	92.0	85.0	45.0	31.0	8.0	2.0	0

\* Refer to Subsection 1002.04, Paragraph 1.b.(8) for the traditional 47B Mix Design

**Table 1033.03D**

<b>Aggregate Classes and Uses</b>	
<b>Aggregate Class</b>	<b>Concrete Description</b>
R	47B

**d. Aggregate Production and Testing:**

- (1) Any change greater than 3% in the original verified constituent percentage of the combined aggregates gradation will be considered non-compliant. Any change of the combined gradation targets must remain within the Combined Aggregate Gradation Limits in Table 1033.03C. The Contractor shall resubmit a new mix design if the material is deemed non-compliant in accordance with Subsection 1002.04, Paragraph 1.
- (2) The blended gradation tolerance ranges from the approved mix design are established in Table 1033.03E.
  - (i) The Contractor shall assume the responsibility to cease operations when the specifications are not met. Production shall not be started again without the approval of the Engineer.

**Table 1033.03E Blended Aggregate Production Tolerances**

<b>Sieve Size</b>	<b>Tolerances</b>
No. 4 or greater	+ 5%
No. 10 to No. 30	+ 4%
No. 50	+ 3%
Minus No. 200	+ 1%

- (3) Ledge rock and aggregate from a dry pit shall be uniformly saturated with water before it is used. The wetting shall begin 24 hours before concrete mixing to allow complete saturation.

**DOWEL BARS  
(J-15-0812)**

Paragraph 1.c. of Subsection 1022.01 in the Standard Specifications is void and superseded by the following:

1. c. Both Type A and Type B coated dowel bars shall be coated with a bond breaker shown on the NDR Approved Products List, dipped in asphalt or paraffin, or greased in accordance with the specified requirements as shown in the Standard Plans.

**EPOXY COATED REINFORCING STEEL  
(J-15-0509)**

Paragraph 5. of Subsection 1021.03 in the Standard Specifications is void and superseded by the following:

5. In order to protect the coated reinforcement from damage, the Contractor shall use padded or nonmetallic slings and padded straps. Bundled bars shall be handled in a manner which will prevent excessive sagging of bars which will damage the coating. If circumstances require storing coated steel reinforcing bars outdoors for more than two months, protective storage measures shall be implemented to protect the material from sunlight, salt spray and weather exposure. Coated steel reinforcing bars, whether individual bars or bundles of bars, or both, shall be covered with opaque polyethylene sheeting or other suitable opaque protective material. For stacked bundles, the protective covering shall be draped around the perimeter of the stack. The covering shall be secured adequately, and allow for air circulation around the bars to minimize condensation under the covering. Coated steel reinforcing bars, whether individual bars or bundles of bars, or both, shall be stored off the ground on protective cribbing. The bundled bars shall not be dropped or dragged. If, in the opinion of the Engineer, the coated bars have been extensively damaged, the material will be rejected. The Contractor may propose, for the approval of the Engineer, alternate precautionary measures.

**INCENTIVE PAYMENT FOR THE USE OF  
RECYCLED ASPHALTIC PAVEMENT (RAP) FOR ASPHALTIC MIXTURES  
(J-22-1213)**

**General**

This specification establishes a standard method for paying an incentive to use Recycled Asphaltic Pavement (RAP) in asphalt mixture types: SPH, SPS, SPR, SLX and LC. The intent of this specification is to provide an incentive for incorporating as much RAP into the asphalt mixtures as allowed by the respective mixture's specification.

**Method of Measurement**

1. The RAP Incentive Payment shall be based on the actual total of asphalt production for the entire project. A RAP Incentive Payment shall be calculated for each eligible asphaltic concrete type.
2. The following formula will be used to calculate the “RAP Incentive Factor”.

$$\text{RAP Incentive Factor} = [(A-B) \div 100] \times C \times D$$

Where:

- A = State’s Established Percent Binder – based on gradation band.
- B = Actual Percentage of Binder – added to asphaltic mixture.
- C = Unit Bid price of Binder
- D = RAP Pay Factor

3. The State’s established percent binder values (‘A’ values) are as follows:

<b>Asphaltic Concrete Types</b>	<b>‘A’ Value</b>
SPH having 0.500-inch grading band	5.2% Binder
SPS, SPL, SPR and SPR (Fine)	5.2% Binder
SLX	5.5% Binder
SPH having 0.375-inch grading band	5.8% Binder
LC	6.2% Binder

*Incentive payments will be made for only the mix types list in this table.*

4. The actual percentage of binder added to the particular asphaltic mixture (‘B’ value) shall be calculated as follows:

$$B = (\text{Actual Pay Tons of Binder} \div \text{Actual Pay Tons of Asphaltic Concrete}) \times 100$$

5. The Unit Bid Price of Binder (‘C’ value) is the established contract price for the performance graded binder type used to produce the mix for which the incentive is being calculated.

6. The RAP Pay Factor (‘D’ value) shall be as follows:

<b>RAP Source</b>	<b>‘D’ Value</b>
Contractor supplied RAP	0.50
State supplied RAP coming from an <b>OFF</b> -project source	0.35
* RAP coming from an <b>ON</b> -project source	0.15

\* RAP coming from an **ON**-project source shall be completely utilized before allowing RAP from any other source to be used in the asphalt production.

7. Contractor supplied RAP and RAP supplied from either off-project or on-project sources shall be stored, handled and used separately. Incentive payments for RAP from these three source types shall be paid separately. The Contractor may propose a RAP



consumption plan that will use multiple RAP sources concurrently and will follow the utilization hierarchy (as detailed above) upon the completion of the project.

8. The Contractor has sole responsibility for determining the quality, quantity, and uniformity of the RAP material. The maintenance of any stockpiles and processing of the RAP material shall also be the sole responsibility of the Contractor.

**Basis of Payment**

- |    |  |                              |
|----|--|------------------------------|
| 1. | <b>Pay Item</b><br>RAP Incentive Payment _____ | <b>Pay Unit</b><br>Each (ea) |
|----|--|------------------------------|
2. The overall RAP Incentive Payments shall be full compensation for all RAP materials and all hauling, handling and processing necessary to complete the work described in this section.
  3. The overall RAP Incentive Payments – for each eligible mix type and/or RAP source – shall be the RAP Incentive Factor multiplied by the total accepted tons of asphaltic concrete in which the RAP was incorporated.
  4. RAP Incentive Payment is paid for as an “established” contract unit price which is shown in the bid proposal “Schedule of Items”.
  5. The actual quantity for RAP Incentive Payment will be calculated based on the Method of Measurement stated above in this provision.

**RECYCLED ASPHALT SHINGLES FOR USE IN ASPHALTIC CONCRETE  
(J-25-0411)**

**Description:**

Recycled Asphalt Shingles (RAS) may be used in Asphaltic Concrete. The maximum allowable (by weight) will be 10% on shoulders and 5% on mainline.

**Materials:**

All RAS shall consist of organic felt shingles or fiberglass shingles, obtained from a shingle manufacturing facility or tear offs. Scrap shingles shall not contain any objectionable materials (less than 1.5% by weight), including but not limited to: road tar, metal, glass, wood, plastic, brick, rubber, fabric, or any other material having similar characteristics. The RAS shall not contain harmful quantities of asbestos in accordance with guidelines provided by the Environmental Protection Agency and shall conform to all state and local regulations.

All RAS material shall be sized so that 100% (by weight) of the material passes through a 1/2-inch sieve, and at least 95 percent shall pass through a 3/8-inch sieve.

Before mix design approval, the following shall be submitted, along with materials and paper work for the mix design.

- I. Certification by the processor of the shingle scrap, as to the shingle scraps content and source. Certification forms are available from DOR.

- II. A 5-lb. sample of the shingle scrap material for review.

**Construction Requirements:**

RAS shall be stockpiled separate, from other salvaged material. Blending of scrap material in a stockpile with other salvage material is prohibited.

Scrap shingles shall be introduced into the hot mix asphalt, at the asphalt mixing plant, at the same point where Recycled Asphalt Pavement (RAP) is introduced.

Asphaltic Concrete containing RAS, regardless of RAP content, shall have a minimum of 55% virgin PG Binder.

**Basis of Payment:**

The RAS material will be eligible for the RAP Incentive at a rate of 50% as specified elsewhere in the specifications.

## RECYCLED ASPHALT SHINGLES (RAS) CERTIFICATION SHEET

Project .....

### Processor of Shingle Scrap:

Name .....

Address .....

.....

Contact .....

Phone .....

We the undersigned, certify that the shingle scrap to be used on this project, was supplied directly from the processor listed below. We also certify that the material supplied consisted of only organic and/or fiberglass shingles and contains no harmful quantity of asbestos or other hazardous material in accordance with Environmental Protection Agency and all state and local regulations.

.....  
*Name of Contractor Shingle Scrap was Supplied to*

.....  
*Address*

.....  
*Authorized Representative of Processor of Shingle Material*

.....  
*Date*

### ASPHALTIC CONCRETE TYPE SLX (J-29-0414)

Asphaltic Concrete, Type SLX shall meet all of the requirements of Asphaltic Concrete, Type SPR, listed in Section 1028 and these Special Provisions, with the following exceptions:

**1. Material Characteristics:**

- a. The type of PG Binder used shall be PG Binder 64-34 with 0.7% of an approved amine-based WMA additive.

- b. Reclaimed Asphalt Pavement (RAP) will be added to the mix at a minimum of 20% and a maximum of 35%. The RAP must be fractionated/processed prior to use, to a sizing such that the combined hot mix meets the required gradation. The mat cannot exhibit any visual defects or cold spots from RAP conglomeration.
- c. The mix shall contain a minimum of 20% Crushed Rock Chips (with a minimum of 45% retained on the #4 sieve and a maximum of 5% passing the #200 sieve).
- d. The Asphaltic Concrete shall have a minimum Fine Aggregate Angularity (FAA) of 43.0 on the combined aggregate blend. There is no requirement for Coarse Aggregate Angularity (CAA).
- e. Asphaltic Concrete Type SLX shall use the gradation band listed below.

**Gradation Control Points for Type SLX**

English Sieve (Metric)	Control Points (percent passing)	
	Minimum	Maximum
1/2 inch (12.5 mm)	98.0	100.0
3/8 inch (9.5 mm)	93.0	100.0
No. 4 (4.75 mm)	70.0	87.0
No. 8 (2.36 mm)	45.0	65.0
No. 16 (1.18 mm)	25.0	41.0
No. 30 (600 μm)	15.0	31.0
No. 50 (300 μm)	10.0	21.0
No. 100 (150 μm)	---	---
*No. 200 (75 μm)	4.0	10.0

\* Dust to binder ratio is the ratio of the percentage by weight of aggregate finer than the No. 200 (75 μm) sieve to the asphalt content expressed as a percent by weight of total mix. The dust to binder ratio shall be between 0.70 and 1.70.

**2. Design Criteria:**

- a. The optimum binder content shall be the binder content that produces 2.0 to 4.0 percent air voids at 50 gyrations, with a minimum content of 5.3%.
- b. The Voids in the Mineral Aggregate (VMA) shall be a minimum of 16% ± 1% (mix design only).

**3. Placing and Finishing:**

- a. Asphaltic Concrete shall be placed only when the ambient temperature is at least 40°F (4°C) and rising.
- b. The asphaltic concrete temperature shall be 285° F (154°C) or above measured in the truck just prior to placement. Exceptions to this requirement are that the PG Binder Supplier recommended maximum temperature requirement shall not be exceeded.
- c. The Contractor will use steel wheel compactors only. Rubber tire rollers will not be allowed.

**4. Asphaltic Concrete Density:**

Regardless of layer thickness, Asphaltic Concrete Type SLX will be monitored for density.

An initial rolling pattern test strip shall be completed to determine the rolling pattern that will target a minimum of 92.5% density. The Contractor shall monitor the density through a combination of rolling pattern and field testing as deemed necessary by the Engineer.

**Method of Measurement:**

For each lot of Asphaltic Concrete Type SLX, the asphaltic concrete shall be paid by the contract unit price for the item "Asphaltic Concrete, Type SLX". The asphaltic concrete unit price is a product of all applicable pay factors excluding density and CAA.

**Basis of Payment:**

Paragraphs 2.a., 2.b.(1), 2.b.(2) and 2.b.(3) of Subsection 503.06 are void and superseded by the following:

Asphaltic Concrete Type SLX shall be paid per ton (Mg) for the item "Asphaltic Concrete Type SLX".

**SECTION 1038 -- PLASTIC PIPE  
(J-30-1014)**

Section 1038 in the Standard Specifications is void and superseded by the following:

**1038.01 – Description**

High density polyethylene (HDPE), polyvinyl chloride (PVC), and other NDR approved plastic pipes are authorized for use as stipulated in the contract documents.

**1038.02 -- Material Characteristics**

1. High density polyethylene (HDPE) pipes and fittings shall conform to the following Specification requirements for the size required:

**Table 1038.01  
Polyethylene Pipe**

English Size (Metric)	Specification	Description
15 to 36 in (375 to 900 mm)	AASHTO M 294	Corrugated Polyethylene Pipe, Type C (Cell Class 335420C)
15 to 60 in (375 to 1500 mm)	AASHTO M 294	Corrugated Polyethylene Pipe, Type S (Cell Class 335420C)
15 to 60 in (375 to 1500 mm)	ASTM F 894	Profile Wall, OP, RSC 160 (Cell Class 335434C)
15 to 60 in (375 to 1500 mm)	ASTM F 2562	Steel Reinforced Thermoplastic Ribbed Pipe (Cell Class 345464C)

2. Polyvinyl Chloride (PVC) [Cell Classification 12454C or 12364C (as determined by ASTM D-1784) if applicable] pipe and fittings shall conform to the following Specification requirements for the size required:

**Table 1038.02  
Polyvinyl Chloride Pipe**

English Size (Metric)	Specification	Description
18 to 48 in (450 to 1200 mm)	ASTM F 679	Gravity Sewer Pipe & Fittings
15 to 48 in (375 to 1200 mm)	ASTM F 794	Profile Gravity Sewer Pipe & Fittings, DWCP, OP, Series 46
15 to 48 in (375 to 1200 mm)	ASTM F 949	Corrugated Sewer Pipe w/smooth Interior with Fittings
15 in (375 mm)	ASTM D 2680	Composite Sewer Pipe
15 in (375 mm)	ASTM D 3034	Type PSM Sewer Pipe & Fittings, SDR 35

3. Plastic pipe for underdrains shall conform to the requirements of AASHTO M 252, ASTM F 405, ASTM F 794 or ASTM F 949 for perforated or non-perforated pipe. Perforations for ASTM F 794 PVC pipe shall be slotted as per ASTM F 949.
4. Metal flared-end sections shall conform to the requirements in Section 1036.
5. A 10 foot (3 m) sample of each size and type of plastic pipe shall be sent to the NDR Materials and Tests Laboratory in Lincoln for testing, before being incorporated into the project.

### 1038.03 -- Acceptance Requirements

Plastic pipe will be accepted based on the requirements of this Section and sampling and testing requirements in accordance with the *NDR Materials Sampling Guide*.

**PROPOSAL GUARANTY  
(A-40-0307)**

As an evidence of good faith in submitting a bid for this work, the bidder shall indicate the type of bid bond applied to this project in accordance with the Proposal Guaranty Bid Bond Section of these Special Provisions.

\* \* \* \* \*

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SCHEDULE OF ITEMS

CONTRACT ID: 2555X

PROJECT(S): STR-680-9(1192)

CALL ORDER NO. : 220

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
SECTION 0001 GROUP 1 GRADING						
0001	0030.10 MOBILIZATION	LUMP	LUMP			.
0002	1041.00 SALVAGING AND PLACING TOPSOIL	SY	967.000	.		.
0003	1101.00 REMOVE PAVEMENT	SY	716.000	.		.
0004	1101.25 SAWING PAVEMENT	LF	292.000	.		.
0005	1102.00 REMOVE ASPHALT SURFACE	SY	453.000	.		.
0006	1109.20 REMOVE CONCRETE BARRIER	LF	35.500	.		.
0007	3017.50 INTERLOCKING CONCRETE PAVER BLOCK	SF	3400.000	.		.
0008	7017.00 REMOVE GUARDRAIL	LF	735.000	.		.
0009	7017.50 REMOVE & SALVAGE GUARDRAIL	LF	30.000	.		.
0010	L019.13 EROSION CONTROL, CLASS 1D	SY	931.000	.		.

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SCHEDULE OF ITEMS

CONTRACT ID: 2555X

PROJECT(S): STR-680-9(1192)

CALL ORDER NO. : 220

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0011	L019.20 EROSION CONTROL, CLASS 2A	36.000 SY	.		.	
	SECTION 0001 TOTAL				.	

SECTION 0002 GROUP 1A MSE WALL

0012	0030.10 MOBILIZATION	LUMP	LUMP		.	
0013	1010.26 EXCAVATION FOR MSE WALL	980.000 CY	.		.	
0014	4095.00 CONCRETE FACE PANELS	980.000 SF	.		.	
0015	4095.01 REMOVE CONCRETE FACE PANELS	470.000 SF	.		.	
0016	4095.20 COPING	83.000 LF	.		.	
0017	4095.21 REMOVE COPING	83.000 LF	.		.	
0018	6005.34 SILICONE JOINT SEALER	74.000 LF	.		.	
0019	8024.75 SELECT GRANULAR BACKFILL FOR MSE WALL	815.000 CY	.		.	
	SECTION 0002 TOTAL				.	

NEBRASKA DEPARTMENT OF ROADS

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SCHEDULE OF ITEMS

CONTRACT ID: 2555X

PROJECT(S): STR-680-9(1192)

CALL ORDER NO. : 220

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
SECTION 0003 GROUP 4 CULVERTS						
0020	0030.40 MOBILIZATION	LUMP	LUMP			.
0021	4004.50 CAST IRON GRATE AND FRAME	750.000 LB		.		.
0022	4012.19 RECONSTRUCT INLET	1.000 EACH		.		.
0023	4050.01 EXCAVATION FOR PIPE, PIPE-ARCH CULVERTS, AND HEADWALLS	94.000 CY		.		.
0024	4105.59 CLASS 47B-3000 CONCRETE FOR INLET AND JUNCTION BOX	1.400 CY		.		.
0025	4155.50 REINFORCING STEEL FOR INLET AND JUNCTION BOX	120.000 LB		.		.
0026	4360.18 18" METAL FLARED-END SECTION	3.000 EACH		.		.
0027	P402.18 18" CULVERT PIPE, TYPE 3,4,5 OR 6	170.000 LF		.		.
	SECTION 0003 TOTAL					.

SECTION 0004 GROUP 6 BRIDGE AT STA 719+02.70  
3 - SPAN STEEL GIRDER ROLLED BEAM BRIDGE - REPAIRS  
ALT GROUP AA1

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PROJECT(S): STR-680-9(1192)

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0028	0030.60 MOBILIZATION	LUMP	LUMP			.
0029	3050.15 CONCRETE FOR PAVEMENT APPROACHES CLASS 47BD-4000	469.300 CY	.		.	
0030	3051.10 EPOXY COATED REINFORCING STEEL FOR PAVEMENT APPROACHES	78725.000 LB	.		.	
0031	6004.48 BRIDGE JOINT NOSING	39.900 CF	.		.	
0032	6005.32 PREFORMED EXPANSION JOINT, TYPE A	163.700 LF	.		.	
0033	6007.12 CONCRETE BRIDGE DECK REPAIR	314.000 SY	.		.	
0034	6010.22 CLASS 47B-3000 CONCRETE FOR BRIDGE	46.000 CY	.		.	
0035	6030.00 PREPARATION OF BRIDGE AT STATION 719+02.70 LT	1.000 EACH	.		.	
0036	6131.23 PENETRATING CONCRETE SEALER	2195.000 SF	.		.	
0037	6131.50 EPOXY COATED REINFORCING STEEL	7170.000 LB	.		.	
0038	6210.14 HP 12 INCH X 53 LB STEEL PILING	1540.000 LF	.		.	

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0039	8091.00 GRANULAR BACKFILL	350.000 CY	.		.	
	SECTION 0004 TOTAL				.	

SECTION 0005 GROUP 6A BRIDGE AT STA 719+02.70  
3 - SPAN STEEL GIRDER ROLLED BEAM BRIDGE - REPAIRS  
ALT GROUP AA2

0040	0030.60 MOBILIZATION	LUMP	LUMP		.	
0041	3050.15 CONCRETE FOR PAVEMENT APPROACHES CLASS 47BD-4000	469.300 CY	.		.	
0042	3051.10 EPOXY COATED REINFORCING STEEL FOR PAVEMENT APPROACHES	78725.000 LB	.		.	
0043	6004.48 BRIDGE JOINT NOSING	39.900 CF	.		.	
0044	6005.32 PREFORMED EXPANSION JOINT, TYPE A	163.700 LF	.		.	
0045	6007.12 CONCRETE BRIDGE DECK REPAIR	314.000 SY	.		.	
0046	6010.22 CLASS 47B-3000 CONCRETE FOR BRIDGE	46.000 CY	.		.	
0047	6030.00 PREPARATION OF BRIDGE AT STATION 719+02.70 LT	1.000 EACH	.		.	

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0048	6131.23 PENETRATING CONCRETE SEALER	2195.000 SF	.		.	
0049	6131.50 EPOXY COATED REINFORCING STEEL	7170.000 LB	.		.	
0050	6208.00 HELICAL PILE	32.000 EACH	.		.	
0051	8091.00 GRANULAR BACKFILL	350.000 CY	.		.	
	SECTION 0005 TOTAL				.	

SECTION 0006 GROUP 6B BRIDGE AT STA 735+84.12  
2 - SPAN STEEL GIRDER WELDED PLATE BRIDGE - REPAIRS

0052	0030.60 MOBILIZATION	LUMP	LUMP		.	
0053	3985.02 PAVEMENT JACKING	LUMP	LUMP		.	
0054	6004.48 BRIDGE JOINT NOSING	37.000 CF	.		.	
0055	6005.32 PREFORMED EXPANSION JOINT, TYPE A	152.000 LF	.		.	
0056	6007.12 CONCRETE BRIDGE DECK REPAIR	226.000 SY	.		.	



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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0057	6030.00 PREPARATION OF BRIDGE AT STATION 735+84.12 LT	1.000 EACH	.		.	
0058	6131.23 PENETRATING CONCRETE SEALER	3435.000 SF	.		.	
0059	6960.11 BRIDGE APPROACH REPAIR	106.000 SY	.		.	
	SECTION 0006 TOTAL				.	

SECTION 0007 GROUP 6C BRIDGE AT STA 5517+79.48  
SINGLE SPAN STEEL GIRDER WELDED PLATE BRIDGE - REPAIRS

0060	0030.60 MOBILIZATION	LUMP	LUMP		.	
0061	3050.15 CONCRETE FOR PAVEMENT APPROACHES CLASS 47BD-4000	268.900 CY	.		.	
0062	3051.10 EPOXY COATED REINFORCING STEEL FOR PAVEMENT APPROACHES	47520.000 LB	.		.	
0063	6004.48 BRIDGE JOINT NOSING	46.400 CF	.		.	
0064	6005.32 PREFORMED EXPANSION JOINT, TYPE A	192.800 LF	.		.	
0065	6007.12 CONCRETE BRIDGE DECK REPAIR	142.000 SY	.		.	

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0066	6010.22 CLASS 47B-3000 CONCRETE FOR BRIDGE	36.400 CY	.		.	
0067	6030.00 PREPARATION OF BRIDGE AT STATION 5517+79.48	1.000 EACH	.		.	
0068	6131.23 PENETRATING CONCRETE SEALER	2537.000 SF	.		.	
0069	6131.50 EPOXY COATED REINFORCING STEEL	5920.000 LB	.		.	
0070	6430.49 PAINTING STRUCTURE (ZONE COAT) AT STATION 5517+79.48	LUMP		LUMP		.
0071	6960.11 BRIDGE APPROACH REPAIR	21.000 SY	.		.	
0072	8091.00 GRANULAR BACKFILL	125.000 CY	.		.	
	SECTION 0007 TOTAL				.	

SECTION 0008 GROUP 7 GUARDRAIL

0073	0030.70 MOBILIZATION	LUMP		LUMP		.
0074	7011.20 W-BEAM GUARDRAIL	731.250 LF	.		.	

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0075	7018.01 RESET GUARDRAIL	30.000 LF	.		.	
0076	7020.00 BRIDGE APPROACH SECTIONS	5.000 EACH	.		.	
0077	7022.00 END ANCHORAGE ASSEMBLY	1.000 EACH	.		.	
0078	7024.25 GUARDRAIL END TREATMENT, TYPE I	2.000 EACH	.		.	
	SECTION 0008 TOTAL				.	

SECTION 0009 GROUP 8C SIGNING

0079	0030.81 MOBILIZATION	LUMP	LUMP		.	
0080	7308.10 REMOVE SIGN	2.000 EACH	.		.	
0081	7311.10 REINFORCING STEEL	900.000 LB	.		.	
0082	7320.01 INSTALL OVERLAY SIGN	10.000 EACH	.		.	
0083	7321.05 INSTALL TYPE A SIGN	32.000 SF	.		.	

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0084	7322.05 INSTALL TYPE B SIGN	334.500 SF	.		.	
0085	7360.24 24" SIGN SUPPORT FOOTING	3.000 EACH	.		.	
0086	7390.10 REMOVE SIGN, POST, AND FOOTING	3.000 EACH	.		.	
	SECTION 0009 TOTAL				.	

SECTION 0010 GROUP 9 BITUMINOUS

0087	0030.90 MOBILIZATION	LUMP	LUMP		.	
0088	3008.05 TIE BARS	80.000 EACH	.		.	
0089	3013.13 CONCRETE CLASS 47BD-4000 BARRIER CURB	35.500 LF	.		.	
0090	3013.14 CONCRETE CLASS 47BD-4000 BARRIER CURB TYPE A	210.000 LF	.		.	
0091	3075.92 14" CONCRETE PAVEMENT, CLASS 47B-3500	561.000 SY	.		.	
0092	6133.08 COLD LIQUID - APPLIED MEMBRANE WATERPROOFING	57340.000 SF	.		.	

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0093	7515.03 5" BLACK POLYUREA PAVEMENT MARKING, GROOVED	1300.000 LF	.		.	
0094	7515.05 5" WHITE POLYUREA PAVEMENT MARKING, GROOVED	7800.000 LF	.		.	
0095	7515.12 12" WHITE POLYUREA PAVEMENT MARKING, GROOVED	850.000 LF	.		.	
0096	7516.05 5" YELLOW POLYUREA PAVEMENT MARKING, GROOVED	4300.000 LF	.		.	
0097	8022.20 HYDRATED LIME/WARM MIX ASPHALT	1570.000 EACH	.		.	
0098	9005.71 ASPHALTIC CONCRETE, TYPE SLX	1570.000 TON	.		.	
0099	9021.13 PERFORMANCE GRADED BINDER (64-34)	65.940 TON	.		.	
0100	9053.00 TACK COAT	1920.000 GAL	.		.	
0101	9111.00 WATER	3.000 MGAL	.		.	
0102	9170.00 EARTH SHOULDER CONSTRUCTION	3000.000 STA	.		.	
0103	9173.20 SUBGRADE PREPARATION	540.000 SY	.		.	

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0104	9186.00 CONCRETE SURFACE MILLING	3466.600 SY	.		.	
0105	9188.50 SURFACING UNDER GUARDRAIL	510.000 SY	.		.	
0106	9300.38 RAP INCENTIVE PAYMENT	2669.000 EACH	1.00000		2669.00	
	SECTION 0010 TOTAL				.	

SECTION 0011 GROUP 10 GENERAL ITEMS

0107	0001.08 BARRICADE, TYPE II	32522.000 BDAY	0.50000		16261.00	
0108	0001.10 BARRICADE, TYPE III	1672.000 BDAY	.		.	
0109	0001.75 TEMPORARY SIGN DAY	120.000 EACH	.		.	
0110	0001.90 SIGN DAY	10528.000 EACH	.		.	
0111	0001.99 CONTRACTOR FURNISHED SIGN DAY	908.000 EACH	.		.	
0112	0002.17 4" BLACK REMOVABLE TAPE, TYPE 4	7800.000 LF	.		.	

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0113	0002.18 4" WHITE REMOVABLE WET REFLECTIVE TAPE, TYPE 4	7800.000 LF	.		.	
0114	0002.19 4" YELLOW REMOVABLE WET REFLECTIVE TAPE, TYPE 4	2300.000 LF	.		.	
0115	0002.28 TEMPORARY PAVEMENT MARKING REMOVAL	17000.000 LF	.		.	
0116	0002.30 PAVEMENT MARKING REMOVAL	6750.000 LF	.		.	
0117	0002.44 TEMPORARY PAVEMENT MARKING, TYPE PAINT	20000.000 LF	.		.	
0118	0002.47 TEMPORARY PAVEMENT MARKING SURFACE PREPARATION	20000.000 LF	.		.	
0119	0002.97 FLASHING ARROW PANEL	424.000 DAY	.		.	
0120	0003.50 CONCRETE PROTECTION BARRIER	1475.000 LF	.		.	
0121	0003.56 RELOCATE CONCRETE PROTECTION BARRIER	2775.000 LF	.		.	
0122	0003.57 RELOCATE INERTIAL BARRIER SYSTEM	5.000 EACH	.		.	
0123	0003.58 INERTIAL BARRIER SYSTEM	3.000 EACH	.		.	

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LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0124	0003.64 REPLACEMENT MODULE	14.000 EACH	.		.	
0125	0005.10 TRAFFIC CONTROL MANAGEMENT	132.000 DAY	.		.	
0126	0010.04 FIELD OFFICE	1.000 EACH	.		.	
0127	0030.00 MOBILIZATION	LUMP		LUMP		.
0128	9110.01 RENTAL OF LOADER, FULLY OPERATED	50.000 HOUR	.		.	
0129	9110.02 RENTAL OF MOTOR GRADER, FULLY OPERATED	50.000 HOUR	.		.	
0130	9110.03 RENTAL OF DUMP TRUCK, FULLY OPERATED	50.000 HOUR	.		.	
0131	9110.07 RENTAL OF SKID LOADER, FULLY OPERATED	50.000 HOUR	.		.	
0132	L860.50 ENVIRONMENTAL COMMITMENTS - CONTRACTOR COMPLIANCE	LUMP		LUMP		.
	SECTION 0011 TOTAL					.
	TOTAL BID					.