

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

NEBRASKA DEPARTMENT OF ROADS
LETTING DATE: February 05, 2015

CALL ORDER: 225 CONTRACT ID: 2560X

CONTROL NO./SEQ. NO.: 22560 /000 PROJECT NO.: STR-6-7(1052)

TENTATIVE START DATE: 07/20/15 CONTRACT TIME: 15 WORKING DAYS

LOCATION: WB US-6 OVER 108TH STREET, OMAHA
IN COUNTY: DOUGLAS

BIDDER

GROUP 6 BRIDGE AT STA 1934+78.51

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-6-7(1052)**

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.

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.

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
(Tentative Start Date)**

The State Track meet is during the end of May 2015. NDOR District 2 personnel will not accept any start date prior to June 1, 2015, or after July 20, 2015.

ENVIRONMENTAL COMMITMENT

Control No.: 22560 Project No.: STR-6-7(1052)

Project Name: (WB) US-6 Over 108th St., 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) 479-3812p

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.

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://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.

Refueling. Refueling will be conducted within the confines of the paved roadway surface or within the boundaries of an approved stockpile/staging site.

Restricted Activities. 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.

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.

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)

Contact Person: Jon Barber, Highway Environmental Program Manager, (402) 479-4412

**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

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.

**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 m²) 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 1st or after September 1st
 - ii. Tree removal prior to April 1st or after September 1st
 - iii. Clearing empty nests on structures prior to April 1st
 - 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 (7th) calendar day after the Initial Notice Date or within an approved extension, a Shut-Down Notice will be issued on the eighth (8th) 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 (8th) 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

- | | | | | | | |
|--|-----------------|-----------------|-------------------------------------|------|--|--------------|
| <ol style="list-style-type: none"> 1. <table border="0" style="margin-left: 20px;"> <tr> <td style="padding-right: 20px;">Pay Item</td> <td style="padding-right: 20px;">Pay Unit</td> </tr> <tr> <td>Storm Event Restoration – Incentive</td> <td>Each</td> </tr> <tr> <td>Storm Event Restoration – Disincentive</td> <td>Calendar Day</td> </tr> </table> 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. | Pay Item | Pay Unit | Storm Event Restoration – Incentive | Each | Storm Event Restoration – Disincentive | Calendar Day |
| Pay Item | Pay Unit | | | | | |
| Storm Event Restoration – Incentive | Each | | | | | |
| Storm Event Restoration – Disincentive | Calendar Day | | | | | |

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

- | | | | | |
|---|-----------------|-----------------|---|----------|
| <ol style="list-style-type: none"> 1. <table border="0" style="margin-left: 20px;"> <tr> <td style="padding-right: 20px;">Pay Item</td> <td style="padding-right: 20px;">Pay Unit</td> </tr> <tr> <td>Environmental Commitments – Contractor Compliance</td> <td>Lump Sum</td> </tr> </table> | Pay Item | Pay Unit | Environmental Commitments – Contractor Compliance | Lump Sum |
| Pay Item | Pay Unit | | | |
| Environmental Commitments – Contractor Compliance | 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.

**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

Sheeting Type	Luminance Factor Y_T		
	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).

WET REFLECTIVE PREFORMED PAVEMENT MARKING TYPE 4- GROOVED (D-12-1208)

I. Description

This work shall consist of furnishing and installing retroreflective preformed patterned pavement markings in Contractor installed grooves 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 film 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.

Preformed words and symbols shall conform to the applicable shapes and sizes as outlined in the "Manual on Uniform Traffic Control Devices for Streets and Highways."

The preformed markings shall be capable of adhering to asphaltic cement concrete and Portland cement concrete by the use of a pre-coated pressure sensitive adhesive. A surface preparation adhesive may be used to precondition the pavement surface. The preformed markings shall conform to pavement contours by the action of traffic. The pavement markings shall be capable of application on new, dense and open-graded asphalt concrete wearing courses during the paving operation in accordance with the manufacturer's instructions. After application, the markings shall be immediately ready for traffic. The bidder shall identify proper surface preparation adhesives (where necessary) to be applied at the time of application, all equipment necessary for proper application, and recommendations for application that will assure effective product performance. The preformed markings shall be suitable for use for one year after the date of receipt when stored in accordance with the manufacturer's recommendations.

III. **Surface Preparation**

The grooves for tape widths equal to or less than 8 inches shall preferably be made in a single, dry-cut pass. However, alternate (multiple pass) methods may be used, provided they produce the desired result --- a groove, the bottom of which has a fine corduroy or textured appearance, is of a uniform depth with no visible ridge(s), and does not significantly and obviously deviate from a plane. (If the tape manufacturer publishes any type of grooving and application guidelines, the Contractor shall provide the Engineer with the most current information available prior to commencing work and make reference to it.)

The equipment and method used shall be approved by the tape manufacturer and shall leave the cut groove ready for tape installation. If a course, tooth pattern is present, the Contractor shall increase the number of blades and decrease the number of spacers on the cutting head. If self-vacuinating equipment is not used, the groove shall be immediately vacuumed.

The pavement marking tape shall be placed in the grooves the same day the grooves are cut. Grooves shall be clean and dry prior to tape application. All conflicting pavement markings remaining after tape installation shall be removed; and this removal shall be subsidiary to the pavement marking.

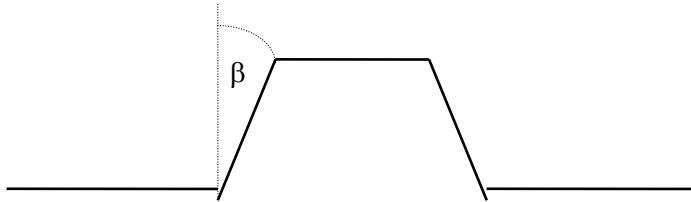
Groove width:	tape width + 1 inch to 2 inch max
Groove depth:	100 mils \pm 10 mils
Groove length:	full length of tape + required grooving transition
Groove position:	2 inches off of joint line (per plan)

IV. **Classification**

The markings shall be highly durable, retroreflective, pliant polymer materials designed for longitudinal and word/symbol markings subjected to high traffic volumes and severe wear conditions such as shear action from crossover or encroachment on typical longitudinal configurations such as edge lines and lane lines. The markings shall be capable of providing retroreflection during both wet and dry conditions.

V. **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 their 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 50% ± 15% of the surface area raised and presenting a near vertical face (β 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 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 [(mcd • ft²) • fc⁻¹]. The metric equivalent shall be expressed as millicandelas per square meter per lux [(mcd • m⁻²) • 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. Wet retroreflectance values measured under a “condition of wetness” shall be in accordance with ASTM E2177.

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

<u>Dry, Wet & Rainy</u>		
Entrance Angle	88.76°	88.76°
Observation Angle	1.05°	1.05°
Retroreflected Luminance R_L [(mcd • m ⁻²) • lx ⁻¹]	500	250

Note: The test instrument shall use an Entrance Angle of 88.76° and Observation Angle of 1.05° which represent 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

*Available from R.P. Cargille Laboratories, Inc., Cedar Grove, NJ.

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 (± 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.

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 0.065 inches (1.651mm) at the thickest portion of the patterned cross-section and a minimum caliper of 0.02 inches (.508mm) at the thinnest portion of the cross-section.



VI. 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.

The Contractor shall have on the project at all times during the application of the permanent 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.

VII. Observation

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 markings 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 markings 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.

VIII. Contract Units and Basis for Payment

Subsection 423.04 of the 2007 Standard Specifications is amended to include the item: “_____ Wet Reflective Preformed Pavement Marking, Type 4, Grooved”. The price shall be full compensation for grooving the pavement surface, furnishing and installing all markings, and for all materials (including adhesive), labor, tools, equipment and incidentals necessary to complete the work.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
_____ Wet Reflective Preformed Pavement Marking, Type 4, Grooved	Linear Foot

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

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

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:

Pay Item	Pay Unit
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.

SECTION 605 -- CONCRETE PAVEMENT REPAIR

Section 605 of the Standard Specifications is void and superseded by the following:

605.01 – Description

1. This work shall consist of repairing Portland Cement concrete pavement at the locations shown in the contract or as designated by the Engineer. The work shall include removing deteriorated concrete, disposing of the old concrete, preparation of the repair area, and furnishing, placing, finishing and curing the concrete.

2. Concrete pavement repairs are grouped into 3 types based on the surface area of the patch (see Table 605.01). If a pavement failure extends across more than one lane, each lane will be counted as a separate repair.

Table 605.01

PCC Pavement Repair Groups	
<u>Type</u>	<u>Size</u> <u>Square Yards or m²</u>
A	Less than 5
B	5 to 15
C	More than 15

3. Full width concrete pavement repairs shall be a minimum of 4 feet (1.2 m) in length.
4. Removal of concrete for partial depth pavement repair shall be to the depth necessary to reach sound concrete. The minimum depth of removal shall be 3 inches (75 mm), or as shown in the contract.
5. Full depth pavement repair shall be constructed on a prepared subgrade or foundation course as prescribed in the contract. The thickness of the new concrete pavement will be as shown in the contract, or 2 inches thicker than the adjacent pavement, if not shown in the contract.
6. Special Prosecution:
- a. When performing concrete pavement repairs on 2-lane roadways, the Contractor shall have all lanes open to traffic before sunset and at times when the Contractor is not working. Where the pavement has been removed and the Contractor is unable to complete the required patching in time for the concrete to obtain the full curing time required prior to opening the section of the road to traffic, the excavation shall be filled with a commercially available cold-mix bituminous mixture, or other suitable temporary patch material with a durable surface. The Contractor will be required to maintain traffic flow across these patches while they are in service. When it is necessary to use temporary patches, they shall be removed, the excavation cleaned out, and the required permanent patch placed, within 48 hours, unless otherwise directed by the Engineer. The temporary patches will be at no cost to the Department.
 - b. When performing concrete pavement repairs on multi-lane highways, the Contractor will be permitted to have one lane closed during repairs. Repairs shall not be left open overnight. Where the pavement has been removed, and the Contractor is unable to complete the required patch before sunset, the Contractor shall fill the excavated area with either: (1) the appropriate patching concrete material for curing overnight, or (2) a suitable material with a durable surface. When it is necessary to use temporary patches, they shall be removed, the excavation cleaned out, and the required permanent patch placed, within 48 hours, unless otherwise directed by the Engineer. The temporary patches will be at no cost to the Department.

605.02 -- Material Requirements

1. a. Repairs shall be made with Class 47B-HE-3500 (47B-HE-25 MPa).
2. All materials shall be furnished by the Contractor and shall conform to the requirements in Table 605.02.

Table 605.02

Material Requirements	
Applicable Materials	Section
Portland Cement Concrete.....	1002
Aggregates.....	1033
Fly Ash.....	1008
Curing Compounds (Without Asphalt Overlay)	1012
Curing Compounds (With Asphalt Overlay)	1013
Joint Sealing Filler.....	1014
Admixtures	1007
Water	1005
Epoxy Compounds & Adhesives.....	1018

605.03 – Equipment

1. A mobile mixer conforming to the requirements of Section 1002 may be used.
2. Adequate hand tools shall be provided, including an internal vibrator.
3. Screeds, either mechanical or hand operated, shall be used to finish the concrete except for small patches and curb repair. The screeds shall be either a vibrating or roller type screed specifically designed for striking off concrete.
4. Internal vibrators shall meet the requirements of Section 601
5. Drills for dowels or tie bars, shall be capable of drilling the appropriate sized hole parallel to the surface of the concrete and the longitudinal centerline within 1/8 inch.

605.04 -- Construction Methods

1. Removals General Requirements
 - a. The Contractor shall remove the concrete pavement and curbs if applicable without damaging the adjacent concrete pavement and curbs.
 - b. The Contractor shall remove and dispose of all old pavement, reinforcing steel, and all other materials.
 - (1) The repair section shall be removed with minimum disturbance of the underlying foundation course. Any loosened foundation course material shall be removed and replaced with concrete.
 - c. If reinforcing fabric is encountered, it shall not be replaced.

- d. The Contractor shall cut around the perimeter of the repair area as shown in the contract.
 - (1) All repairs shall be cut so the edges are parallel or perpendicular to the traveled way.
 - (2) Curb repairs shall be cut a minimum of 2 inches (50 mm) in depth with a diamond saw and breaking back the remaining thickness to form vertical edges on the existing concrete.
 - (3) Saw over-cuts shall be kept to a minimum.
- e. The Contractor shall use hand or pneumatic tools to remove the concrete pavement. If the patch is full depth Type C, then a drop hammer may be used to remove the pavement.
- f. When tie bars in longitudinal joints are damaged during concrete removal, they shall be replaced by the Contractor at no additional cost to the Department with reinforcing bars [No. 5 (16 mm in diameter) bars that are 18 inches (450 mm) in length]. The new tie bars shall be installed into holes drilled in the existing concrete and secured in place with a non-shrink grout or epoxy on the NDR Approved Products List.

2. Preparation

a. General

- (1) The repair sections shall be removed to the lines designated by the Engineer, including reinforcement that interferes with the operations.
- (2) Foundation course replacement consists of removing and disposing of foundation course (i.e., bituminous, cement treated, crushed concrete, granular) or subgrade below the concrete pavement, which excludes the additional 2 inch (50 mm) of removal, as shown in the contract. The wheel-type cutter shall be operated to produce minimum disturbance of the foundation course material, with no encroachment of the cut into the concrete of the adjoining lane.
 - (i) When the Engineer determines that the foundation course or subgrade needs replacing, the Contractor shall remove and dispose of the foundation course or subgrade, prepare the subgrade, and replace these materials with concrete of the same type used for the repair. The additional depth of concrete required shall be placed monolithically with the joint repair or pavement repair concrete.
- (3) The Contractor shall compact the subgrade or foundation course under full depth patches to the maximum density achievable.
- (4) A bond breaker shall be used as shown in the contract.
- (5) The subgrade shall be uniformly wetted before placing the concrete.
- (6) Where the repair area is not bordered by existing concrete pavement, a form shall be used as the pavement edge to provide the same surface elevation and edge alignment as the existing pavement. The form shall be supported or braced in position to prevent movement during the placement and finishing of the concrete. Forms for concrete pavement repair shall conform to the requirements of Subsection 603.03.

b. Preparation full depth with dowels or tie bars

- (1) Removal shall extend across the existing joint a minimum of 2 feet (600 mm) into the adjacent panel in doweled concrete.
- (2) Dowel bars or tie bars shall be anchored into the faces of the existing concrete as designated in the contract.
- (3) The dowel bar holes shall be drilled at the same plane \pm 1/8 inch and at the spacing shown in the contract.
- (4) The tie bar holes can be drilled independently.
- (5) The drilled holes shall be thoroughly cleaned with compressed air to remove all dust, dirt, loose material and moisture.
- (6) After cleaning and prior to dowel or tie bar insertion, an application of grout or Type IV, Grade 3 epoxy shall be made at the back of the hole. The grout or epoxy shall be from the Approved Products List. Twist the dowel or tie bar one full turn during insertion to completely surround it with the grout or epoxy. Retention disks shall be placed on the bars as designated in the contract. The furnishing and installation of dowel and tie bars will not be paid for directly but shall be considered subsidiary to the concrete pavement or joint repair work being performed.
- (7) For the new matching transverse joints on repairs that span existing joints, the dowel baskets shall be placed parallel to the joint, and the dowel bars shall be parallel to centerline.

c. Preparation partial depth

- (1) For partial depth repairs, the Contractor shall cut and chip the pavement edges with a 15 pound (6.8 kg) maximum chipping hammer to form reasonably neat vertical surfaces.
- (2) All surfaces, including the bottom, of the partial depth concrete repairs shall be free from loose concrete, sand, and other debris and shall be maintained in a dry and clean condition.
- (3) All surfaces shall be cleaned and dry before the bonding agent is applied.
 - (i) The bonding agent shall be a Type IV, Grade 2 Epoxy Adhesive on the Approved Products List.
 - (iii) The bonding agent shall be applied to all surfaces, including the bottom. The vertical faces of the transverse joints, longitudinal joints, or cracks exposed in the repair shall not be coated with the bonding agent.

3. Placing and Finishing

a. The Contractor shall furnish and place the concrete. The concrete shall be handled and consolidated so there will be no separation of the aggregate and the mortar.

- (1) The new concrete repairs shall be finished a minimum $\frac{3}{4}$ " higher than the adjacent bridge approach slabs at approximately Sta. 108+62 and Sta. 113+60, at the same elevation of the polyester concrete overlay.

b. An internal vibrator shall be used to consolidate the concrete.

- c. A vibrating screed shall be used on a full depth concrete repair, that is 5 feet or wider, to finish the concrete to the final elevation.
 - d. The concrete shall be floated with a magnesium bull float and then given a drag finish with wet burlap, carpet, or canvas in a direction parallel to the traffic flow. If the surface is not to receive an overlay or smoothness grinding, it shall be tined to match the existing surface.
4. Joints
- a. The Contractor shall create joints in full depth repairs as shown in the contract.
 - b. When pavement and joint repairs will not be overlaid, all sawcuts, transverse joints, and longitudinal joints shall be thoroughly cleaned with compressed air to remove all dust, dirt, loose material and moisture, and sealed with hot pour joint sealant.
 - c. Random cracks which develop in the new concrete repair that will not be overlaid with asphaltic concrete shall be routed and sealed.
 - d. Joints shall not be sealed until after any corrective work or Diamond Grinding and Texturing Concrete Pavement is completed. Formed joint wells that are destroyed shall be re-constructed, and joints of insufficient depth shall be deepened prior to sealing.
5. Curing
- a. The Contractor shall apply curing compound to all concrete pavement repairs. The cure compound shall be applied immediately after each patch is completed.
 - (1) When pavement and joint repairs are overlaid with asphaltic concrete, the curing method shall be with tack coat. An approved asphalt emulsion or bituminous based compound may be used with approval of the Engineer.
 - (2) White pigmented curing compound shall be used when the repair will be the wearing surface. The application rate shall be 1 Gal/150 SF (0.4 L/m²).
 - b. Class PR1-3500 (PR1-25) or PR3-3500 (PR3-25) concrete pavement repairs shall be covered with polyethylene film and then insulation board or insulated blankets immediately after the curing compound has been applied.
 - (1) The insulation board and insulated blankets shall have an R-value (thermal resistance) equal to or greater than 5 ft²-hr-°F/BTU [1.0 m²(°C/W)].
 - (2) Insulation and polyethylene film shall be maintained until concrete reaches opening strength.
 - c. Class PR1-3500 (PR1-25 MPa) or PR3-3500 (PR3-25 MPa) concrete pavement repairs shall not be opened to traffic until the compressive strength reaches 3500 psi (25 MPa). This will be determined by use of Maturity Method or

cylinders, at the discretion of the Engineer. Table 605.03 is a guide to the minimum time the PR-3500 Concrete will reach a compressive strength of 3,500 psi.

Table 605.03

(Class PR1-3500 [25 Mpa] and PR3-3500 [25 Mpa])	
Minimum Ambient Air Temperature [°F (°C)]	(Hours)
Below 41 (5° C)	12
41 – 60 (5°-16°C)	8
Above 60 (16°C)	4

- (1) Concrete shall not be placed when ambient air temperatures are expected to drop below 40 °F (4° C) during the cure period.
 - (2) Class PR3 Concrete shall be used for all concrete repair if the repaired areas must be opened to traffic within 24 hours, except that Class PR1 Concrete may be used provided the minimum required strength can be attained within the allotted time.
 - (3) Strength measurements for the opening and the 24-hour pay strengths of the PR1 and PR3 Concrete may be performed using the Maturity Method or cylinders, at the discretion of the Engineer.
- d. Class 47B-3500 (47B-25 MPa) or Class 47B-HE-3500 (47B-HE-25 MPa) concrete pavement repairs shall not be opened to traffic until the compressive strength reaches 3,500 psi (25 MPa) as determined by the Maturity Method or cylinders, at the discretion of the Engineer. Table 605.04 is a guide to the minimum time the 47B-3500 Concrete will reach a compressive strength of 3,500 psi.
- (1) Concrete shall not be placed when ambient air temperature is expected to drop below 40°F (4°C) during the cure period.

Table 605.04

(Class 47B-3500 25 MPa)	
Minimum Ambient Air Temperature [°F (°C)]	(Hours)
Below 41 (5° C)	120
41 – 60 (5°-16°C)	72
Above 60 (16°C)	48

6. Smoothness

- a. The pavement elevation of repair areas shall be corrected in a manner that eliminates dips or bumps. Dips and bumps are defined as having a 1/8 inch or greater deviation using an approved 10 foot straightedge. If the repair will be the

wearing surface, the correction shall be diamond grinding or replacement. If the repair will be overlaid, the correction shall be milling, diamond grinding or replacement. The condition of the adjacent pavement shall be considered when evaluating the 1/8 inch deviation requirement.

7.
 - a. Disturbed or damaged areas in the existing surfaced shoulder resulting from the repair operation shall be repaired by the Contractor at no additional cost to the Department.
 - b. Damaged areas of the surfaced shoulders shall be removed by sawing.
 - c. The shoulder shall be repaired with the same material as the existing shoulder or as directed by the Engineer.

605.05 -- Method of Measurement

1.
 - a. The quantity of each type of concrete pavement repair and joint repair are measured in cubic yards (meters) of pavement replaced in each separate lane.
 - b. Concrete pavement repairs that adjoin full depth repair areas of varying widths in the same traffic lane which are situated such that the removals of the areas may be accomplished concurrently, shall be considered as a single repair. The total area of the adjoining areas shall be combined to determine the repair type as shown in Table 605.01.
 - c. Joint repairs that the final measurement is in excess of 9 feet in length will be paid for as the appropriate pavement repair item.
 - d. The quantity of curb repair is measured in linear feet.
2. "Foundation Course Replacement" will be measured by the cubic yard of foundation course replaced.

605.06 -- Basis of Payment

1.	Pay Item	Pay Unit
	Concrete Curb Repair	Linear Foot (LF) [Meter (m)]
	Concrete Pavement, ____ Joint Repair	Cubic Yard (CY) [Cubic Meter (m ³)]
	Concrete Pavement Repair, Type A, Full Depth	Cubic Yard (CY) [Cubic Meter (m ³)]
	Concrete Pavement Repair, Type B, Full Depth	Cubic Yard (CY) [Cubic Meter (m ³)]
	Concrete Pavement Repair, Type C, Full Depth	Cubic Yard (CY) [Cubic Meter (m ³)]

Concrete Pavement Repair, Type A, Partial Depth	Cubic Yard (CY) [Cubic Meter (m ³)]
Concrete Pavement Repair, Type B, Partial Depth	Cubic Yard (CY) [Cubic Meter (m ³)]
Concrete Pavement Repair, Type C, Partial Depth	Cubic Yard (CY) [Cubic Meter (m ³)]
Foundation Course Replacement	Cubic Yard (CY) [Cubic Meter (m ³)]

2. When the Engineer directs that partial depth concrete pavement repairs be constructed with a thickness greater than what is shown in the contract, an adjustment will be made to provide compensation for the work. The adjustment will be as follows:

$$\text{Adjusted Unit Price} = \text{Bid Price} \times \frac{\text{(Actual Thickness Placed)}}{\text{(Thickness shown in the contract)}}$$

3. a. The 24-hour compressive strength shall be used to determine pay factor deductions for PR Concrete in accordance with Table 603.03.
- b. The 28-day compressive strength of each day's production will be determined from cylinder strength tests for 47B Concrete.
- (1) Payment shall be reduced by the amount prescribed in Table 603.03.
- (2) For 47B Concrete, if the 28 day strength fails, the Contractor has the option to take 3 core samples at no additional cost to the Department. The average compressive strength of these cores will be used to determine the actual 28-day compressive strength of each day's production.
- (i) Cores must be taken within 45 days from the date the concrete was poured.
- (ii) The Engineer shall select the site where the cores will be taken.
4. "Foundation Course Replacement" will be paid for at the contract unit price per cubic yard for the item "Foundation Course Replacement". This price shall be full compensation for removing and disposing of the old foundation course, preparation of the subgrade, furnishing and placing the replacement concrete, and for all labor, equipment, tools and incidentals necessary to complete the work.
5. The sealing of all random cracks or joints will not be measured and paid for directly but shall be considered subsidiary to the joint or pavement repair work being performed.
6. Payment is full compensation for all work prescribed in this Section.

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 Prefomed 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 Prefomed Expansion Joint.
5. The installation of the Prefomed 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 Prefomed 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 Prefomed 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

- | | | |
|----|--|------------------------------|
| 1. | Pay Item | Pay Unit |
| | Prefomed Expansion Joint, Type ____ | Linear Foot (LF) [Meter (m)] |
| | Precompressed Polyurethane Foam Joint, Type ____ | Linear Foot (LF) [Meter (m)] |
| | Prefomed Silicone Joint, Type ____ | Linear Foot (LF) [Meter (m)] |
2. Payment is full compensation for furnishing and installing the Prefomed Expansion Joint and for all labor, equipment, tools and incidentals necessary to complete the work.

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.

Pay Item	Pay Unit
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.

CONCRETE REPAIR

Description

Repair of deteriorated or damaged concrete manifested as spalling, delamination, cracking, crushing or breakage. This type of repair shall consist of patching defective concrete with suitable materials. Concrete repair shall be performed at locations indicated on the plans.

Material Requirements

Products appearing on the Approved Products List under "Pavement and Structural Patching Materials" may be used without further qualification. Products suitable for vertical and overhead placement are shown on a continuation of this list. Products used shall be prescribed by the manufacturer for the purpose for which they are to be used.

Equipment

Sand blasting equipment for cleaning of reinforcing steel and adequate tools for placement of repair material shall be used as needed. Effective mixing equipment shall be used for mixing concrete repair materials.

Construction Methods

The Contractor shall sandblast and clean all exposed reinforcing bars and all prepared concrete surfaces. All concrete surfaces that new material is placed against shall be clean and free of all dust and laitance so as to ensure proper adhesion of the material to the concrete. The instructions of the repair product manufacturer shall be followed regarding preparation, installation and any precautions that pertain to safety or performance of the product.

Method of Measurement

All work done under the pay item "CONCRETE REPAIR" shall be paid for by the SQUARE FOOT (SF) of area, as determined by field measurement.

Basis of Payment

Payment for work done under the pay item "CONCRETE REPAIR" shall be paid at the contract unit price per SQUARE FOOT (SF). Payment shall be full compensation for all labor, equipment, tools, materials and incidentals necessary to do the work.

CRACK EPOXY INJECTION (APPLICATION OF EPOXY COMPOUNDS)

Description

This provision covers the repair of deep cracks in concrete structures with epoxy based compounds. The concrete shall be thoroughly repaired by full depth injection of epoxy, where required, so as to restore structural integrity of the concrete.

Material Requirements

Epoxy compounds and adhesives are covered in Section 1018 of "The Standard Specifications for Highway Construction". Type I or Type IV products compatible with the epoxy injection process shall be chosen. Product viscosities should be compatible with the size and type of cracks to be repaired. The Approved Products List under "Epoxy Resin Bonding Systems" shows products that may be used without further qualification. The Engineer shall make the final determination as to product suitability for a specific purpose. It is recommended that, in case any uncertainty exists as to the suitability of a product, Bridge Division be contacted prior to ordering that product.

Equipment

Equipment compatible with the epoxy injection process shall be used.

Construction Methods

Techniques should be used to affect a "deep" injection as much as is practical to restore the integrity of the concrete. Methods shall be in accordance with industry standards and application of materials shall be as prescribed by the material manufacturer.

Before epoxy injection, the soundness of the concrete shall be investigated. Unsound concrete that may become unattached during injection shall be removed and exposed reinforcing steel cleaned. Areas where concrete is spalled or has been removed shall be repaired as per special provision "CONCRETE REPAIR". Subsection 1018.03 of "The Standard Specifications for Highway Construction" shall apply.

Basis of Payment

All labor, material, tools, equipment and incidentals shall be paid subsidiary to the pay item "CONCRETE REPAIR".

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.	Pay Item	Pay Unit
	Penetrating Concrete Sealer	SQ. FT.

PREPARATION OF BRIDGE AT STATION 1934+78.51

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.

POLYESTER POLYMER CONCRETE OVERLAY

000.01 - - Description of work

1. This work shall consist of constructing a polyester polymer concrete overlay (Polyester Concrete Overlay or PCO) wearing surface in accordance with these specifications, as shown on the plans or as directed by the Engineer. The PCO shall be composed of the following three components – polyester resin binder, high molecular weight methacrylate (HMWM) resin and aggregate.

000.02 - - Material Requirements

1. **Primer.** The prepared surface shall receive a wax-free low odor, high molecular weight methacrylate prime coat.

- a. The primer shall comply with the requirements shown in Table 1.

Table 1.
Properties of High Molecular Weight Methacrylate (HMWM) Resin

Property	Requirement	Test Method
Viscosity *	0.025 Pa-s, maximum (Brookfield RVT with UL adapter, 50 RPM at 77deg. F)	ASTM D 2196
Specific Gravity *	0.90, minimum (at 77 deg. F)	ASTM D 1475
Volatile Content *	30 percent, maximum	ASTM D 2369
Flash Point *	180 deg. F, minimum	ASTM D 3278
Vapor Pressure *	1.0 mm Hg, maximum (at 77 deg. F)	ASTM D 323
Tack Free Time	400 minutes, maximum (at 77 deg. F)	ASTMC 679
PCC Saturated Surface-Dry Bond Strength	500 psi, minimum (24 hrs at 70 +/- 1 deg. F)	California Test 551

*Tested prior to adding initiator

- b. **Mixing Requirements.** The prime coat initiator shall consist of a metal drier and peroxide. If supplied separately from the resin, at no time shall the metal drier be mixed directly with the peroxide.
- c. **Storage.** The containers shall be stored in a manner that will not allow leakage or spillage from one material to contact the containers or materials of the other.
2. **Aggregates.** Furnish 3/8 inch – 0 inch aggregate that meets the following requirements.
- a. **Crushed Particles.** Aggregate retained on the No. 8 sieve shall have a maximum of 45 percent crushed particles as determined by AASHTO T 335.
- b. **Absorption.** The aggregate absorption shall not exceed one percent as determined by AASHTO T 85.
- c. **Moisture Content.** At the time of mixing with the resin, the moisture content of the aggregate, as determined by AASHTO T 255, shall not exceed one half of the aggregate absorption.
- d. **Temperature.** The aggregate temperature shall be between 45 deg. F and 90 deg. F at the time of mixing.
- e. **Combined Gradation.** Aggregate for the PCO shall comply with the requirements shown in Table 2.

Table 2.
Combined aggregate gradation

Sieve Size	3/8" Max. Percent Passing
3/8"	100
#4	62 – 85
#8	45 – 67
#16	29 – 50
#30	16 – 36
#50	5 – 20
#100	0 – 7
#200	0 – 3

- f. **Fine Aggregate** The fine aggregate shall consist of clean natural sand.
- g. **Finishing Sand** The sand for abrasive finish shall be commercial quality blast sand having at least 95 percent passing the No. 8 sieve and at least 95 percent retained on the No. 20 sieve when tested in accordance with AASHTO T 27. The absorption of the sand shall not exceed 1% when tested in accordance with AASHTO T 84.
3. **Polyester Resin Binder** The resin shall be an unsaturated isophthalic-styrene copolymer conforming to the requirements shown in Table 3.

Table 3.
Polyester Resin Binder

Property	Requirement	Test Method
Viscosity *	0.075 to 0.200 Pa-s (RVT, No. 1 Spindle, 20 RPM at 77 deg. F)	ASTM D 2196
Specific Gravity *	1.05 to 1.10 (at 77 deg. F)	ASTM D 1475
Elongation	35 percent, minimum (Type I at 0.45"/min. Thickness = 1/4" +/- 0.04")	ASTM D 638
	Sampling Condition: 18 hrs/77 deg. F/50% + 5 hrs/158 deg. F	ASTM D 618
Tensile Strength	2,500 psi, minimum (Type I at 0.45"/min. Thickness = 1/4 " +/- 0.04")	ASTM D 638
	Sampling Condition: 18 hrs/77 deg. F/50% + 5 hrs/158 deg. F	ASTM D 618
Styrene Content *	40 to 50 percent (by weight)	ASTM D 2369
Silane Coupler	1.0 percent, minimum (by weight of polyester-styrene resin)	
PCC Saturated Surface-Dry Bond Strength	500 psi, minimum (24 hrs at 70 +/- 1 deg. F)	California Test 551

*Tested prior to adding initiator

- a. **Silane Coupler** The silane coupler shall be an organosilane ester, gammamethacryloxypropyltrimethoxysilane.

- b. **Hardener.** The promoter/hardeners shall be compatible with suitable methyl ethyl ketone peroxide (MEKP) and cumene hydroperoxide (CHP) initiators. MEKP initiators shall be used when the surrounding concrete temperatures are above 60 deg. F. A blend of initiators may be used as approved by the engineer when the surrounding concrete temperature is 50 – 60 deg. F.
 - c. **Delivery of Materials.** All materials shall be delivered in their original containers bearing the manufacturer's label, specifying date of manufacturing, batch number, trade name, and quantity. Each shipment of polyester resin binder and HMWM resin shall be accompanied by a Material Safety Data Sheet (MSDS).
4. **Inspection.** Stored materials shall be inspected prior to their use, and shall meet the requirements of this Specification at the time of use.
5. **Failure.** Any material which is rejected because of failure to meet the required tests or that has been damaged so as to cause rejection shall be immediately replaced at no additional expense to the Commission.
6. **Required Amount.** Sufficient material to perform the entire PCO application shall be in storage at the site prior to any field application, so that there shall be no delay in procuring the material for each day's application.
7. **Training.** The Contractor shall arrange to have the material supplier furnish technical service related to application of material and health and safety training for personnel who are to handle the polyester polymer concrete and the HMWM resin prime coat.
8. **Technical Support.** The polyester resin materials supplier shall have a representative on-site during placement of the polyester polymer concrete.
9. **Mix Design.** The Contractor shall prepare and submit the polyester polymer concrete mix design and mixing procedures to the NDOR Materials and Research Division for approval. The mix design shall include a recommended initiator percentage for the expected application temperature. The Contractor shall not begin ordering materials for application of the polyester polymer concrete until the polyester polymer concrete mix design and mixing procedures are approved.
10. **Required Properties and Tolerances of PCO** The properties and requirements of the PCO material in Table 4.

Table 4.
Polyester Concrete Properties

Property	Requirement	Test Method
Compressive Strength for Traffic	2,000 psi, min. before opening to traffic	ASTM C 805
Surface Tolerance	See section 000.03, 4.n.3 below	n/a
Bond Strength	250 psi, min.	See section 000.03, 4.n.1 below
Set Time	30 to 90 minutes	Visual
Density	See (g) below	ASTM C 138
Modulus of Elasticity at 7 days	1,000 ksi, min. 2,000 ksi, max.	ASTM C 469
Surface Preparation Depth	1/8 inch, min.	ASTM E 965

- a. Modulus of Elasticity - Sample Polyester Concrete within one minute of mixing. Cast two sets of three 4 by 8 inch cylinder specimens from each batch of Polyester Concrete placed on the Project, according to AASHTO T 106. A batch is defined as "per mixer" or "6 cubic yards", whichever is greater. Test one set according to ASTM C 469 to determine modulus of elasticity at 7 days. Retain the second set and submit to the Engineer for verification testing.

000.03 – Construction Methods

1. **Storage of Materials.** The material shall be stored to prevent damage by the elements and to ensure the preservation of their quality and fitness for the work. The storage space shall be kept clean and dry, and shall contain a high-low thermometer. The temperatures of the storage space shall not fall below nor rise above that recommended by the manufacturer. Every precaution shall be taken to avoid contact with flame.
2. **Surface Preparation.** The concrete surface shall be prepared by removing all material which may act as bond breaker between the surface and the polyester polymer concrete.
 - a. **New Bridge Decks.** On new concrete decks, the surface shall be given a very rough texture while still plastic by use of a wire comb or other approved texturing device which will produce a bondable surface acceptable to the engineer.
 - b. **Existing Bridge Decks.** All bridges will require, at minimum, a single-pass steel shot blast of the preparation surface. The surface shall be shot blasted to a relief equal to the International Concrete Repair Institute (ICRI) Concrete Surface Profile 6 to 7. The width of overlap of successive passes of the machine shall be as minimal as possible to limit double exposure. The contractor must make available to the Engineer, a set of ICRI surface profile cards to verify the shot blast profile. Inaccessible areas shall be abrasive blasted. Any asphalt or epoxy patches encountered shall be completely removed to sound, natural concrete and patched as described below. Unsound areas of concrete shall be located by chain drag and hammer and patched prior to placement of the PCO.
 - (1) **Patching.** After the bridge deck area to be overlaid is cleaned and properly prepared unsound areas of concrete shall be located by chain

drag and hammer and patched prior to placement of the PCO. Unsound areas shall be repaired as follows: Saw cut around unsound areas to a minimum depth of 3/4 inch; inside the saw cut area, remove a minimum of 3/4 inch of concrete and continue to remove unsound concrete as needed until a base of sound concrete has been established; air blast to remove dust and loose material; apply HMWM primer; place polyester polymer concrete or other patching material, approved by the Engineer, to restore the original depth of the patched area. Surfaces of concrete patches placed in the deck after scarifying shall be textured to an approximate depth of 1/4 inch before placing the overlay.

- c. **Removing Contaminates.** The textured or scarified deck shall be shot blasted followed by an air blast. Any loose or foreign material detected on the concrete surface prior to placement of the polyester polymer concrete shall be removed by shot or air blasting. The shot blasting shall remove all dirt, oil and other foreign materials, as well as any unsound concrete or laitance from the surface and edges against which new polyester polymer concrete is to be placed. The shot-blast equipment shall be capable of providing a uniform surface texture. The compressor shall be equipped to prevent oil in the air supply. The concrete surface may require retexturing where penetration of foreign material is evident. No contamination of the retextured or scarified concrete surface shall be permitted. With approval from the Engineer, the contractor may use automatic shot blasting units in lieu of shot blasting. The abrasive shall be steel shot or Coal Slag or other by-product material having a Moh's hardness of at least 6. Refer to ICRI Technical Guideline No. 310.2-1997 for recommended diameter of steel shot. Loose shot shall be collected using a magnet, magnetic broom, air blast, vacuum or stiff bristle broom. Wet methods are not allowed.
 - d. **Steel Surfaces.** All steel surfaces that will be in contact with the overlay shall be cleaned in accordance with SSPC-SP10, Near -White Blast Cleaning, except that wet blasting methods shall not be allowed.
 - e. **Cleaned surfaces** shall not be exposed to vehicular or pedestrian traffic other than that required by the overlay operation. All equipment to enter or cross the prepared surface, such as work vehicles, trailers, carts, etc., that contain motor oil, transmission fluid, gear oil, radiator fluid, lubricants, etc. shall be accompanied by a protection membrane such as plastic tarps or rolled plastic placed on the prepared deck surface under equipment to protect the prepared deck surface from contamination.
3. **Application of Prime Coat.** One coat of HMWM prime coat shall be applied to the prepared concrete and steel surfaces immediately before placing the polyester polymer concrete. The prime coat shall be uniformly applied to completely cover the surface to receive the overlay. The area receiving the prime coat shall be dry and had no exposure to any moisture within the past 24 hours. Prior to applying the prime coat, the surface shall be cleaned with compressed air to remove accumulated dust and any other loose material.
- a. **Surface Temperature.** The concrete bridge deck surface shall be between 50 deg. F and 90 deg. F when applying the prime coat.

- b. **Relative Humidity.** Polyester polymer concrete shall not be placed when the relative humidity is above 90 percent.
 - c. **Dryness.** The Contractor shall verify that the surfaces to which PCO primer is to be applied are sufficiently dry by one of the following methods.
 - (1) Moisture content shall be below 6% as measured by a moisture meter capable of measuring the content of concrete surfaces in percent. The moisture meter shall be calibrated annually by the meter manufacturer. A certificate of calibration from the meter manufacturer shall accompany the moisture meter. The Contractor shall also supply a digital weather instrument that can measure both ambient temperature and dew point, and an infrared surface temperature measuring instrument.
 - (2) Condensation shall be found by taping a 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.
 - d. **Curing.** Polyester polymer concrete shall be placed immediately after the prime coat is applied to the bridge deck.
 - e. **Prime Coat Contaminated.** If the primed surface becomes contaminated, the contaminated area shall be cleaned by abrasive blasting and re-primed at no additional expense to the Department.
4. **Placement of Polyester Polymer Concrete.**
- a. **Placement Time.** The polyester polymer concrete shall be placed on the prime coat within two hours of placing the prime coat.
 - b. **Surface Temperature.** The surface temperature of the area to receive polyester polymer concrete shall be the same as specified in Section 3. a. of this special provision.
 - c. **Mixing Equipment.** The concrete shall be volumetrically mixed at the bridge site by a continuous mixer.
 - d. **Batching Information.** The continuous mixer shall be equipped with a metering device that automatically measures and records the aggregate volumes and corresponding resin volumes. The volumes shall be recorded at no greater than five minute intervals along with the time and date of each recording. A printout of the recordings shall be furnished to the Engineer at the end of each shift. Readout gages shall be visible to the Engineer at all times.

- e. **Mixture Consistency.** The concrete discharged from the mixer shall be uniform in composition and consistency. Mixing capability shall be such that initial and final finishing operations can proceed at a steady pace.
- f. **Contamination.** The Contractor shall prevent any cleaning chemicals from reaching the polyester polymer concrete mix during the mixing operation
- g. **Addition of Initiator.** Polyester polymer concrete shall be placed prior to gelling and within 15 minutes following the addition of initiator, whichever occurs first. Polyester polymer concrete that is not placed within this time shall be discarded.
- h. **Amount of Polyester Resin.** The polyester resin binder in the polyester polymer concrete shall be 12 percent +/- 1 percent by weight of the dry aggregate. The Contractor shall determine the exact percentage as approved by the Engineer.
- i. **Amount of Peroxide Initiator.** The amount of peroxide initiator used shall result in a polyester polymer concrete set time between 30 and 120 minutes during placement. The initial set time will be determined by using an initial-setting time Gillmore needle in accordance with ASTM C266. Accelerators or inhibitors may be required as recommended by the polyester resin supplier and as approved by the Engineer.
- j. **Finishing Equipment.** Finishing equipment shall be capable of consolidating the polyester polymer concrete and striking off the polyester polymer concrete to the final grade, thickness, texture and cross-sections as shown in the contract documents.
- k. **Overlay Thickness.** The PCO shall be placed at a variable depth and to a minimum thickness of 3/4 inch. Actual overlay thickness will be at the discretion of the Engineer to provide a smooth riding surface that corrects minor profile grade irregularities. Care shall be taken in placement of screed rail to provide a smooth transition from End of Floor to the Roadway pavement at each end of the bridge.
- l. **Surface Texturing.** The surface shall be fine textured as per Section 706.03.8.b of the Specifications.
- m. **Curing.** Traffic and construction equipment shall not be permitted on the PCO for at least two hours and until the PCO has reached a minimum compressive strength of 3,000 psi as verified by the rebound number determined in accordance with ASTM C805.
- n. **Testing.** Acceptance of PCO will be based on Contractor's modulus of elasticity, bond strength, and surface tolerance test results.
 - (1) Bond testing shall be performed for each placement on each day. Testing will be conducted at three locations 48 hours after placement. Testing will be performed in accordance to ACI 506R. A passing test is the failure of the concrete substrate or bond strength above 250 psi.

- (2) Perform acceptance testing according to the referenced tests, and furnish samples to the Engineer as required. Failing test results may be cause for rejection of the mix with removal and replacement of the affected material at no additional cost to the Agency.
- (3) Surface Tolerance - The finished surface of the PCO, when tested with a 12 foot straightedge, shall not vary by more than 1/4 inch. Furnish the straightedge and operate it under the direction of the Engineer. Correct all non-specification surface tolerance with a diamond grinder.

000.04 – Basis of Payment

- | | | |
|----|---|-------------------------------|
| 1. | Pay Item
Polyester Concrete Overlay | Pay Unit
Cubic Yard |
|----|---|-------------------------------|
2. This contract price shall be full compensation for furnishing and placing the approved Polyester Concrete Overlay.
 - a. Payment is to include all preparation, equipment, materials, tools, labor and any other incidentals necessary to complete installation to the pay limits shown on the plans and required by this Special Provision.
 3. Any installation that fails to meet this specification shall be removed and replaced with a properly installed PCO at the expense of the Contractor.

**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 ₍₄₎		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	3500
PR3	III	799	2500	2950	6.0 - 8.5	30±3	0.45	3500
SF ₍₅₎	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.

Table 1002.03	
Table of Acceptable Concrete Class Substitutions	
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 (Na_2O) and the Potassium Oxide (K_2O) 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 Interground/Blended cement which has become caked or lumpy shall be used.

3. Portland and Interground/Blended cement which has been spilled shall not be used.
4. Accepted Portland and Interground/Blended cement which has been held in storage at the concrete mix plant more than 90 days shall be retested.
5. Portland and Interground/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 Interground/Blended cements must be on the NDR Approved Product List (APL).
2. The Contractor shall submit any new Portland and Interground/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 Interground/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) Interground/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/ft² (0.55 kg/m²) 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

Silicone Joint Sealer Requirement		
Property	Requirement	Test
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/cm²) 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

Sampling and Testing Procedures	
Procedure	Method
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

*Class R - Combined Aggregate Gradation Limits (Percent Passing)								
Sieve Size	1 ½ inch	1 inch	¾ inch	No.4	No.10	No.30	No. 50	No.200
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

Aggregate Classes and Uses	
Aggregate Class	Concrete Description
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

Sieve Size	Tolerances
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.

**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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DATE: 01/06/15

SCHEDULE OF ITEMS

CONTRACT ID: 2560X

PROJECT(S): STR-6-7(1052)

CALL ORDER NO. : 225

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
SECTION 0001 GROUP 6 BRIDGE AT STA 1934+78.51						
0001	0001.08 BARRICADE, TYPE II	1890.000 BDAY	0.50000		945.00	
0002	0001.10 BARRICADE, TYPE III	81.000 BDAY	.		.	
0003	0001.90 SIGN DAY	648.000 EACH	.		.	
0004	0002.97 FLASHING ARROW PANEL	27.000 DAY	.		.	
0005	0005.10 TRAFFIC CONTROL MANAGEMENT	27.000 DAY	.		.	
0006	0030.60 MOBILIZATION	LUMP		LUMP		.
0007	3039.11 CONCRETE PAVEMENT REPAIR, TYPE A, FULL DEPTH	0.890 CY	.		.	
0008	3039.12 CONCRETE PAVEMENT REPAIR, TYPE B, FULL DEPTH	4.440 CY	.		.	
0009	3039.13 CONCRETE PAVEMENT REPAIR, TYPE C, FULL DEPTH	36.670 CY	.		.	
0010	6005.34 SILICONE JOINT SEALER	200.000 LF	.		.	

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SCHEDULE OF ITEMS

CONTRACT ID: 2560X

PROJECT(S): STR-6-7(1052)

CALL ORDER NO. : 225

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0011	6005.36 PRECOMPRESSED POLYURETHANE FOAM JOINT, TYPE A	88.000 LF	.		.	
0012	6010.22 CLASS 47B-3000 CONCRETE FOR BRIDGE	1.900 CY	.		.	
0013	6016.12 POLYESTER CONCRETE OVERLAY	45.000 CY	.		.	
0014	6030.00 PREPARATION OF BRIDGE AT STATION 1934+78.51	1.000 EACH	.		.	
0015	6131.23 PENETRATING CONCRETE SEALER	4529.000 SF	.		.	
0016	6131.50 EPOXY COATED REINFORCING STEEL	137.000 LB	.		.	
0017	6617.25 CONCRETE REPAIR	6.000 SF	.		.	
0018	7517.04 4" WHITE WET REFLECTIVE PREFORMED PAVEMENT MARKING, TYPE 4, GROOVED	625.000 LF	.		.	
0019	7518.04 4" YELLOW WET REFLECTIVE PREFORMED PAVEMENT MARKING, TYPE 4, GROOVED	500.000 LF	.		.	
0020	8028.01 FOUNDATION COURSE REPLACEMENT	1.050 CY	.		.	

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DATE: 01/06/15

SCHEDULE OF ITEMS

CONTRACT ID: 2560X

PROJECT(S): STR-6-7(1052)

CALL ORDER NO. : 225

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0021	9186.00 CONCRETE SURFACE MILLING	215.000 SY	.		.	
0022	L860.50 ENVIRONMENTAL COMMITMENTS - CONTRACTOR COMPLIANCE	LUMP	LUMP		.	
	SECTION 0001 TOTAL				.	
	TOTAL BID				.	