

INFORMATIONAL PROPOSAL

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

NEBRASKA DEPARTMENT OF ROADS
LETTING DATE: September 03, 2015

CALL ORDER: 600
CONTROL NO. SEQ. NO.: 61430 000

CONTRACT ID: 6430X
PROJECT NO.: RD-80-4(1030)

TENTATIVE START DATE: 08/08/2016

CONTRACT TIME: 45 Working Days

LOCATION: I-80, GOTHENBURG WEST (WB)

IN COUNTIES: DAWSON, LINCOLN

BIDDER

GROUP 6 BRIDGE AT STATION 1841+60
GROUP 6A BRIDGE AT STATION 1841+60
GROUP 9 BITUMINOUS
GROUP 10 GENERAL ITEMS

SEE SPECIAL PROVISIONS FOR GROUP TIES

NOTES

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

THE NUMBER OF GROUP _____ 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. RD-80-4(1030)**

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 September 3, 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.

GROUPS 6, 6A, 9 AND 10 ARE TIED TOGETHER AND BIDDING PROPOSAL FORMS FOR THIS WORK WILL BE ISSUED AND A CONTRACT AWARDED TO A CONTRACTOR WHO IS QUALIFIED FOR BITUMINOUS.

STATUS OF UTILITIES

The following information is current as of June 10, 2015.

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 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
(General Requirements)**

The following requirements shall apply to this project.

1. The maximum lane closure length, excluding tapers, will be limited to 7.2± miles in the westbound direction. The lane closure length in the eastbound direction shall be only that required for the bridge work. The Contractor will be allowed one lane closure in each direction.
2. There are no peak hours for this project.
3. The Contractor shall have a work crew at the closure site at all times during a lane closure during daylight hours, unless otherwise directed by the Engineer.
4. Lane closures shall be limited to the length required for the work being performed, up to a maximum length of 7.2± miles in the westbound direction and as described in No.1 for the eastbound direction..

Although the Department will not unreasonably prevent the Contractor from utilizing a lane closure of the maximum length, lane closures shall not be established for lengths greater than necessary. The Contractor is directed to schedule the placement of traffic control devices to accommodate each day's closure to the extent practical. Accordingly, the Department will only pay for those traffic control devices considered reasonably necessary to protect the actual work area.

5. A lane closure shall not be installed during nighttime hours. Nighttime hours shall be defined as being from sunset to ½ hour after sunrise in the eastbound direction and from ½ hour before sunset to sunrise in the westbound direction.

6. The Contractor shall schedule their operations so that all interstate lanes and ramps shall be open to traffic at night and at times when the Contractor is not working, except as described elsewhere in these provisions.
7. If the Contractor is planning on only working on the westbound bridge prior to beginning any roadway work, the length of the lane closure for that westbound bridge work shall be limited to only that length needed for the bridge work.

SPECIAL PROSECUTION AND PROGRESS (Milling/Asphaltic Concrete Placement)

Traffic will not be allowed on any surface that has been milled.

The following work shall be performed during daylight hours of the same day.

- A. Mill 2 inches by Cold Milling Class 3.
- B. Place 2 inches of Asphaltic Concrete Type SPH(0.5).

ENVIRONMENTAL COMMITMENT

Control No.: 61430

Project No.: RD-80-4(1030)

Project Name: Gothenburg West (WB)

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)

Conservation Measure for Environmentally Sensitive Areas

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)

- See **Attachment 1** for a list of potential wetlands and/or other potential regulated waters identified from a desktop review of published resources. The above condition pertains to the areas as listed on Attachment 1. If access to any of these areas is required to complete the project construction, the NDOR Construction Project Manager shall coordinate with the Environmental Permits Unit to determine need for field verification and/or permitting requirements prior to disturbance of the area. (Contractor, District Construction)

Contact Person: Patrick Sward, Highway Environmental Biologist, (402) 479-3901

General Conservation Conditions

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.

Ground Disturbance Activities. No ground disturbing activities are allowed in association with this project, outside of the footprint of the paved area and the necessary soil disturbance to taper an earth shoulder (would occur within 12 inches of the existing surfaced roadway).

Bald and Golden Eagle Protection Act

- Suitable bald eagle nesting and/or roosting habitat exists within 0.5 miles of the Environmental Study Area. If construction will begin between February 1 and April 15, a nest survey must be completed at least 1 but not more than 14 days prior to construction. If construction will begin between April 15 and October 1, a nest survey completed in March is sufficient, as nests will likely already be constructed if nesting will occur that year. However, a nest survey may be completed anytime during this timeframe, as long as it is completed prior to construction. If bald eagles are nesting in

the area, consultation with NGPC and USFWS will be required. **Eagle roosting surveys will be conducted if construction occurs between October 1 and January 31.**

NDOR Construction Project Managers should contact NDOR Environmental at 402-479-3546 or Melissa.marinovich@nebraska.gov at least 30 days prior to construction start to schedule Bald Eagle surveys.

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: Shannon Sjolie, Highway Environmental Biologist, (402) 479-4415

Attachment 1

NDOR Environmental Permits Unit
M.M. = Mile Marker/Reference Post
Rt = Right side
Lt = Left side

Environmentally Sensitive Areas

Potential Wetlands – DO NOT DISTURB (Toe of Slope to edge of R.O.W.)

M.M. 206+72 to 206+84 Lt
M.M. 206+90 to 207+02 Lt
M.M. 207+12 to 207+65 Lt
M.M. 208+79 to 208+91 Lt
M.M. 208+79 to 208+81 Rt
M.M. 209+42 to 209+52 Lt
M.M. 210+03 to 210+05 Rt/Lt
M.M. 210+64 to 211+45 Rt
M.M. 210+81 to 210+91 Lt
M.M. 211+00 to 211+15 Lt
M.M. 211+37 to 211+54 Lt

Bald Eagle Survey Protocol Nebraska Game and Parks Commission

Background

Bald eagles (*Haliaeetus leucocephalus*) utilize the mature, forested areas along the major river systems in Nebraska. Eagles are present throughout the year in Nebraska as they both breed and winter in Nebraska. Nest building activity may begin as early as December. Nests are typically built near rivers, lakes and reservoirs and in Nebraska are most often in large cottonwood trees, although bald eagles use other types of trees nationwide. The nests are constructed with large sticks and lined with leaves and grasses. A breeding pair will often return to the same nest and add new material each year. Nests can become 8 feet across and 12 feet deep. Nesting activities begin with egg laying which occurs as early as February. Fledging takes place when the young are approximately 10 – 11 weeks old, however the young remain near the nest and are dependent on the adults for food for at least another 6 weeks. In Nebraska, the nesting season continues through August.

The bald eagle southward migration begins as early as October and the wintering period extends from December through March. Breeding pairs may stay at their nest site year round if food is available. Eagles are often most numerous from late February through early March, when wintering numbers are supplemented by migrants that wintered further south. All migrants that breed elsewhere typically leave by late March. Wintering eagle numbers fluctuate from year to year, but birds typically concentrate in areas with large open water where food is available and form winter roosts. In Nebraska, there are often few locations that provide adequate resources for eagles during the winter. Protection of these areas is important, as relocation during the winter may impact survival. Roosts may be in deciduous or coniferous trees, but in Nebraska, most are in cottonwood trees. Eagles may establish winter roosts miles from the foraging areas (Keister et al. 1985). Winter roosting may assist with finding resources (Knight and Knight 1983) and pair bond formation. In Nebraska, some communal roost sites can have as many as 100 eagles (Nebraska Game and Parks Commission 1993).

Purpose

Eagle surveys are designed to ensure awareness and resolution to any potential conflicts between bald eagle and potentially disruptive human activities. To document the presence or absence of bald eagles and their activities, two types of surveys are recommended: nest surveys and winter roost surveys. These should be considered when a disturbance will occur within 0.5 miles of areas of suitable habitat for bald eagles.

Nest Surveys

Bald eagle nests are usually conspicuous and distinctive, but it must be stressed that nests can be well concealed and very difficult to see, particularly when trees have foliage. Nest surveys should complete a full inspection of potential trees for bald eagle nests within 0.5 miles of the project in areas considered suitable habitat. Transects should be recorded using GPS. In addition to nests, any bald eagles observed during the survey and their behavior should be noted. Potential nests should be observed from a distant location that does not disturb the eagles to confirm the presence or absence of eagles. Nest surveys are to be conducted by a qualified biologist. Results of surveys and transect locations should be sent to the Nebraska Game and Parks Commission and US Fish and Wildlife Service.

If construction will begin between February 1 and April 15, a nest survey must be completed at least 1 but not more than 14 days prior to construction. If construction will begin between April 15 and October 1, a nest survey completed in March is sufficient, as nests will likely already be constructed if nesting will occur that year. However a nest survey may be completed anytime

during this timeframe, as long as it is completed prior to construction. If bald eagles are nesting in the area, consultation with NGPC and USFWS will be required, so it is in the project proponent's best interest to complete the survey and notify the agencies as early as possible.

(See timing diagram page 3)

Winter Roost Surveys:

For the purposes of avoiding adverse impacts to wintering bald eagles, two types of roosts are defined. *Transitory roosts* are defined as 3 or more eagles, within 100 meters of each other, for at least 2 nights in an area with no previous knowledge of winter communal roosting.

Communal roosts are defined as 6 or more eagles in a small area for extended periods of time or used for multiple years. Communal roosts in Nebraska are monitored, so typically their existence will be known and conservation measures established prior to construction.

If construction will be occurring in an area near suitable habitat (near open water with large trees present) where there is no prior knowledge of a communal roost site and construction will be occurring between October 1 and January 31 winter roost surveys are necessary. Winter roost surveys should begin at least 1 day prior to the first date of construction. Winter roost surveys should be conducted daily at dawn as the eagles are likely to leave the roost to forage within the first hour of daylight (depending on weather conditions). These surveys need only be conducted in the area of active construction, not the entire project area. Surveys may be completed by a trained individual using appropriate binoculars or spotting scope. Survey reports should be submitted weekly to the Nebraska Game and Parks Commission and US Fish and Wildlife Service. Evidence of a roost should be reported immediately.

Please note, eagles seen soaring over a construction site should be watched to observe potential nesting or roosting, but construction does not need to terminate due to soaring behavior.

(See timing diagram page 3)

References

Buehler, D.A. 2000. Bald Eagle (*Haliaeetus leucocephalus*), In The Birds of North America, No. 506 (A. Poole and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA.

Keister, G. P., Jr., R. G. Anthony and H. R. Holbo. A model of energy consumption in bald eagles: An evaluation of night communal roosting. The Wilson Bulletin. 97(2): 148-160

Knight, S. K. and R. L. Night. 1983. Aspects of food finding by wintering bald eagles. The Auk 100: 477-484.

Nebraska Game and Parks Commission. 1993. Nebraska's threatened and endangered species: Bald eagle. Nebraska Game and Parks Commission, Lincoln, Nebraska.

Bald Eagle Survey Recommendations
 Timing Diagram
 Standard Protocol prepared by NE Game and Parks Commission
 January-07

	December	January	February	March	April	May	June	July	August	September	October	November	December
Bald Eagle Activity	Nest building		Hatching and rearing young				Winter activities				nest building		
	Winter Activities		Egg laying and incubation			Fledging Young			Winter activities			winter activities	
Required Surveys	C) Daily surveys for winter roosts		A) survey 2 weeks prior		B) One survey completed in March					C) Daily surveys for winter roosts			

- A) Projects starting between February 1 to April 15 must have a nest survey completed 1-14 days prior to the start of construction
- B) Projects starting between April 15 to October 1 need a nest survey completed as early as March, or before project begins
- C) Projects starting between October 1 and December need daily winter roost surveys completed

NOTE: Surveys are only necessary in areas where the disturbance is near suitable eagle habitat

Timing of eagle activity references:

Draft National Bald Eagle Management Guidelines, US Fish and Wildlife Service, 2006,
 Buehler, D.A. 2000. Bald Eagle (*Haliaeetus leucocephalus*), In The Birds of North America, No. 506 (A. Poole and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA.
 Nebraska Game and Parks Commission. 1993. Nebraska's threatened and endangered species: Bald eagle. Nebraska Game and Parks Commission, Lincoln, Nebraska.

**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

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

F. Environmental Commitments – Contractor Compliance

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

G. Method of Measurement

- 1. No measurement is required.

H. Basis of Payment

- | | | |
|----|--|-----------------------------|
| 1. | Pay Item
Environmental Commitments – Contractor Compliance | Pay Unit
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 THERMOPLASTIC PAVEMENT MARKING

I. Description

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

This specification covers wet reflective thermoplastic materials suitable for use as reflective pavement markings on asphalt pavements. A manufacturer recommended heat source fuses the markings to the asphalt pavements. Glass beads shall be pre-mixed into the material furnished. Both glass beads and wet beads shall be applied to the surface either before or after fusion to the pavement. Upon cooling, the material produces an adherent reflectorized marking of specified thickness and width, capable of resisting deformation by traffic.

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

The thermoplastic pavement marking shall be applied in grooves cut into the surfacing, when called for in the plans. The grooves shall be made in a single pass dry cut; the equipment used shall be self vacuuming and leave the cut groove ready for thermoplastic pavement marking application. The equipment and method used shall be approved by the thermoplastic pavement marking manufacturer. The thermoplastic pavement marking shall be applied in the grooves the same day as the cut. Grooves shall be clean and dry prior to thermoplastic pavement marking application. All conflicting pavement markings which remain after application of the thermoplastic pavement markings shall be removed. The removal of conflicting, pre-existing temporary or permanent pavement marking shall be paid for with the appropriate removal pay item. The removal of conflicting temporary or permanent pavement marking placed as part of this work shall be at no cost to the Department.

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

Grooving of the surfacing shall be performed in accordance with the thermoplastic manufacturer's recommendations. Grooving the surfacing shall not be measured and paid for but shall be considered subsidiary to "Wet Reflective Thermoplastic Pavement Marking, Grooved".

II. Requirements

a. General

- (1) Provide the material in white and/or yellow as specified.
- (2) Provide material with a minimum thickness of 0.1 inch as supplied by the manufacturer.
- (3) Provide material that is resistant to deterioration due to exposure to sunlight, water, oil, gasoline, salt, or adverse weather conditions.
- (4) After application, the material must exhibit no appreciable deformation or discoloration, remain tack free, and not lift from the pavement under normal traffic conditions within a road temperature range of 20° to 150°F.
- (5) Provide material that is capable of conforming to pavement contours, breaks, and faults through the action of traffic at normal pavement temperatures.

b. Color

Provide yellow material that meets the minimum chromaticity coordinates in **TABLE 1**.

X	.470	.510	.485	.530
Y	.455	.485	.425	.456

c. Retroreflectivity

Required initial retroreflectance values are shown in the table below. Typical retroreflectivity is determined as the average of many readings (mcd(ft²)(fc⁻¹)) metric equivalent (mcd(m²)(lux⁻¹)) as described below.

	White	Yellow
Dry (ASTM E1710)	400	325
Wet Recovery (ASTM E2177)	350	275
Wet Continuous (ASTM E2832)	100	75

- (1) Some reasonable variance should be expected (for example, application on very rough road surfaces or differences in glass beads).
- (2) The initial retroreflectance value of a single installation or unit of work shall be the average value determined according to the measurement and sampling procedures outlined in ASTM D7585, using a 30-meter (98.4 feet) retroreflectometer, except as modified below. The 30-meter retroreflectometer shall measure the coefficient of retroreflected luminance, R_L at an observation angle of 1.05 degrees and an entrance angle of 88.76 degrees. R_L shall be expressed in units of millicandelas per square foot per foot-candle [mcd(ft²)(fc⁻¹)]. The metric equivalent shall be expressed in units of millicandelas per square meter per lux [mcd(m²)(lux⁻¹)].

- (3) The initial retroreflectance values of the pavement marking shall be measured no sooner than 48 hours after application, but not later than 30 days after application. The Contractor shall provide an acceptable 30-meter retroreflectometer to use on the project (the retroreflectometer will remain the property of the Contractor). The Contractor will take measurements in the presence of the Engineer. Prior to taking measurements, the Contractor shall calibrate the retroreflectometer according to the manufacturer's requirements.

Measurements will be taken at equally spaced evaluation sections located by the Engineer. One evaluation section is required every 3 miles along a segment. If the last evaluation section is less than 1.5 miles, it shall be combined with the preceding section.

The evaluation sections shall be at least 400 ft. in length and have a minimum of 10 readings taken over the length of the section.

All measurements shall be made in the direction of travel. On centerlines of undivided highways, measurements shall be taken in both directions in each location and averaged for one measurement.

These measurements shall be taken for each color line in the evaluation section.

The Department will do verification testing on the evaluation section. When the average of the readings for an evaluation section fall below the minimum, the entire section represented by those readings will be further evaluated by the Engineer and may be subject to removal and replacement.

- (4) The Department may elect to determine wet retroreflectance values measured under a "condition of continuous wetting" (simulated rain) in accordance with ASTM E2832. To reduce variability between measurements, the test method shall be performed in a controlled laboratory environment while the marking is positioned with a 3 to 5 degree lateral slope. Measurements shall be reported as the average of the minimum of three locations. Samples of the completed finished product shall be applied to flat panels during application and brought back to the lab for testing. When such samples are taken, the Department will furnish the panels.

d. Dimensions

The pavement markings shall be placed only on properly prepared surfaces and at the widths and patterns as designated in the contract. The markings shall be applied in accordance with the "Manual on Uniform Traffic Control Devices" and in accordance with the Engineer's plans.

Any markings that are found to be 0.5 inches less than the width shown in the plans shall be removed and replaced by the Contractor.

e. Thermoplastic Material and Premix Beads.

- (1) Provide thermoplastic material that complies with AASHTO M 249 with exception of the relevant differences due to the material being supplied in a preformed state.
- (2) All pigments must be heavy metal free, including, but not restricted to lead, cadmium, and mercury.

f. Glass Beads for Drop-on Application.

Provide glass beads that are specifically manufactured to be compatible with the thermoplastic system, and comply with AASHTO M 247, Type I.

g. Wet Reflective Media.

Provide wet reflective media approved by the manufacturer. The wet reflective media that qualify for use are shown in the NDR Approved Products List.

III. Test Methods

a. Thermoplastic Material and Premix Beads. AASHTO T 250

b. Glass Beads for Drop-On Application. AASHTO M 247

IV. Observation Period

Following initial completion of all pavement marking, there will be a 180-day observation period before final acceptance. During the observation period, the Contractor, at no expense to the Department of Roads, shall replace any 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 marking installed shall be 90%.

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

Final acceptance of all marking will include an inspection of the appearance of the markings during daylight and darkness. Any markings that fail to have a satisfactory

appearance during either period, as determined by the Engineer, shall be reapplied at no expense to the Department of Roads.

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

V. Certification of Compliance

The Contractor shall furnish a manufacturer’s certification that the material complies with the provisions of this specification.

VI. Contract Units and Basis for Payment

- a. Linear pavement markings will be measured in linear feet complete-in-place for the width specified.

Subsection 423.05 of the 2007 Standard Specifications is amended to include the item: “Wet Reflective Thermoplastic Pavement Marking, _____”. The price shall be full compensation for grooving the pavement surface, furnishing and applying all markings, and for all materials, labor, tools, equipment and incidentals necessary to complete the work.

Payment will be made under:

Pay Item	Pay Unit
_____ Wet Reflective Thermoplastic Pavement Marking, _____	Linear Feet

SURVEILLANCE OF TEMPORARY TRAFFIC CONTROL DEVICES

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

The Contractor shall provide continuous Surveillance of Temporary Traffic Control Devices on a 24-hours-per-day basis during construction activities and when lanes or ramps are closed. Surveillance will not be required when all lanes and ramps are open to traffic and equipment and traffic control devices have been removed and placed a safe distance away from the roadway (i.e., during specified holidays, during peak hours, and on UNL home football game days for projects east of Highway US-281).

The Contractor shall designate personnel, other than the Project Superintendent, to provide the continuous 24-hour surveillance. These personnel shall be responsible for monitoring the work zone, identifying deficiencies, and effecting the immediate repair, correction or replacement of the traffic control devices.

Individuals assigned to perform the surveillance of traffic control devices on the project shall be dedicated to the purpose of monitoring and maintaining the traffic control devices.

The personnel assigned shall also be responsible for completing a Traffic Control Inspection form, provided by the Engineer, at the completion of each 24-hour period. These forms shall be submitted daily to the Engineer, either in person or via facsimile transmission.

These individuals shall possess a valid Flagger Certification Card and also 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 surveillance personnel's training or certifications shall be provided to the Engineer.

In order to be qualified according to the Department's Certification Program for Assistant Traffic Control Managers, the individual must:

- 1 – View the 47-minute video "Training and Certification of Assistant Traffic Control Managers."
- 2 – Correctly answer 80 percent of the questions on an examination that accompanies the video.

Upon satisfactory completion of the training and examination procedure, the trained individual shall be issued an Assistant Traffic Control Manager Certification Card by the examining Contractor. The individual'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."

The video, examination forms, Assistant Traffic Control Manager Cards, and Certification Reports for Assistant Traffic Control Managers shall be furnished by the Department.

"Continuous Surveillance" shall be defined as having one or more persons on the project at all times. It is assumed that these personnel will be assigned in three 8-hour shifts per day, with one 30-minute meal break and two 15-minute breaks per shift. Ultimately, however, shift and break lengths shall be determined by the Contractor.

The Contractor shall provide the Engineer with a means of contacting or locating the 24-hour surveillance personnel on the project and shall also provide the Engineer with the names and telephone numbers of personnel to contact if the 24-hour surveillance personnel cannot be located on the project.

The Department expects deficiencies to be corrected immediately upon detection, but in no case should the time limit for correction exceed sixty minutes. Failure to (1) correct deficiencies or (2) respond to notifications from the Department or law enforcement officials within the sixty-minute time period will result in the assessment of a \$1,000 liquidated damage assessment. This liquidated damage assessment will be assessed per occurrence and per calendar day that the deficiency is not corrected. This assessment will be in addition to other liquidated assessment described elsewhere in the proposal. *[If applicable, Exception: the replacement and repositioning of tubular posts*

shall be performed within the time period stipulated in paragraph 13.c.(3) of Subsection 422.03. Also, the Contractor shall be responsible for immediate removal of tubular posts that become dislodged and of all other objects that encroach or impede traffic.]

Additionally, if necessary, the Engineer may proceed to correct deficiencies in a manner that he or she deems appropriate and assess the Contractor for the costs incurred as a result of the performance of the corrective action by others.

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

This work shall be measured and paid for by the calendar day for the item "Surveillance of Temporary Traffic Control Devices". This price shall be considered full compensation for all labor, materials, equipment, tools and incidentals necessary to complete the work.

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

Payment for "Surveillance of Temporary Traffic Control Devices" will not be made for any day 24-hour surveillance is not provided and will not extend beyond the last working day or calendar day allowed by the contract, except for any approved extension of contract time allowance.

ASPHALTIC CONCRETE PAVEMENT SMOOTHNESS (E-5-1110)

Section 502 in the Standard Specifications is void and superseded by the following:

502.01 – General

1. This specification establishes a standard for asphaltic concrete pavement smoothness, and defines defective pavement smoothness. The intent of the specification is to produce a finished asphaltic concrete pavement driving surface with an International Roughness Index (IRI) no greater than 68 inches per mile for multi-lift roadways and no greater than 74 inches per mile for single-lift roadways. Pavement smoothness will be evaluated as prescribed in this section.
2. When the pay item "Asphalt Pavement Smoothness Testing I/D" is included in the contract, all the requirements of the following sections including the incentive/disincentive provisions shall apply.
3. When the pay item "Asphalt Pavement Smoothness Testing" is included in the contract, the incentive/disincentive provisions of this section do not apply, but the smoothness testing, evaluation, and pavement surface correction shall be performed as prescribed in this provision.
4. When the contract contains no item for smoothness testing, the asphaltic concrete pavement shall be evaluated in accordance with Paragraph 11. of Subsection 503.04.

502.02 – Equipment

1. The Contractor shall furnish a non-contact inertial pavement profiler that meets the requirements of ASTM Standard E 950, verified by the manufacturer. The profiler must be approved by the Nebraska Department of Roads as specified in Section 502.03 of this provision.
2. The non-contact profiler may be a lightweight version or a high speed version.
3. The non-contact profiler shall be equipped with a computerized system that will record, analyze, and print the test data.
4. The non-contact profiler shall produce a printed pavement profile report. The report shall include the following information:
 - a. Project number
 - b. Test date
 - c. Traffic lane
 - d. Test direction
 - e. Test path
 - f. Pass number (1 for initial test; 2, 3, etc. for repeat runs)
 - g. Operator's name
 - h. Project stations
 - i. Data filter values
 - j. IRI values for each test section
 - k. Bump locations for each test section, as determined by California profilograph emulation.
5. The non-contact profiler must also produce and print profilograph emulation results that are consistent with results that would be obtained using a Department-approved California-style profilograph. The profilograph emulation shall be used to determine the locations of correctable bumps and/or dips, as specified in Paragraphs 1.b. and 1.c. of Subsection 502.05 in this provision.
6. Diamond grinding equipment used for surface correction shall be power driven, self-propelled units specifically designed to grind and texture pavements. The cutting head shall be at least 36 inches (0.9 m) wide and consist of many diamond blades with spacers. The Engineer may approve equipment with a narrower width for irregular and confined areas which will not accommodate larger equipment, and for bumps of limited number and area.

502.03 – Certification and Independent Assurance Testing

1. The Department shall calibrate and certify the Contractor's non-contact profiler annually at a test site established by the Department.
 - a. The non-contact profiler shall be inspected for compliance with general equipment requirements, including data analysis system, guidance system, and overall condition.

- b. The non-contact profiler shall be calibrated for distance measurement by moving it over the prescribed path of a premeasured test distance to determine its distance calibration factor.
 - c. The non-contact profiler shall be checked for vertical measurement accuracy by performing the height measurement calibration procedure in AASHTO Designation PP 49-03, Certification of Inertial Profiling Systems, Section 6.
 - d. The non-contact profiler shall be checked for overall performance by driving it over the prescribed path of a pre-measured pavement test section at its normal operating speed.
 - e. Distance measurement indicated by the non-contact profiler shall be within 0.2% tolerance of the actual pre-measured test section distance. To ensure accurate distance measurement during test runs, the air pressure of the distance measurement tire must always be maintained at the same level used for calibration.
 - f. The IRI reported by the non-contact profiler for the test section shall be within 10.0% tolerance of the IRI reported by a Nebraska Department of Roads non-contact profiler for the same test section.
 - g. A dated and signed decal will be placed on the non-contact profiler to certify its acceptability for use on Nebraska Department of Roads pavement construction projects. The certification expires one year from its issue date.
2. The Department shall certify the Contractor's non-contact profiler operator at least every 5 years. The operator may be certified by presenting certification from another State Highway Agency or by completing certification training conducted by the Nebraska Department of Roads.
 3. The Department shall schedule and perform Independent Assurance tests for the Contractor's non-contact profilers and operators at least once per construction season. Independent Assurance testing shall be conducted at a randomly selected time on an active construction project. The criteria for the test will be similar to those used for certification.

502.04 – Profile Test Procedures

1. The Contractor shall perform all pavement smoothness specification tests except the 10-foot (3 m) straight edge testing as shown in Paragraph 15. of this Subsection.
2. The Engineer shall furnish a report form to the Contractor identifying all required test sections.
 - a. The pavement surface shall be divided into lane-width segments that end at a bridge, railroad crossing, or other designated termini.
 - b. The lane-width segments shall be further divided into individual 528 feet long test sections in the direction of project stationing. The last test section in a segment is usually shorter than 528 feet.

- c. If a test section is less than 300 feet long, it shall be combined with the preceding 528 feet long test section for analysis.
3. The Contractor's certified non-contact profiler operator shall perform smoothness specification tests in the Engineer's presence. Smoothness testing shall be performed during normal daylight working hours unless otherwise approved by the Engineer.
4. The asphaltic concrete pavement surface temperature shall be 150 degrees F (65 degrees C) or lower when smoothness tests are performed.
5. The non-contact profiler operator shall perform pavement smoothness measurements in the right-hand or left-hand wheel path of all driving lanes, as directed by the Engineer, including climbing and fly-by lanes. The wheel path is the path followed by the right or left wheels of a truck or car traveling in the center of a traffic lane. It is assumed to be 3 feet from the left or right lane lines. In urban areas, where inlet block-outs or manholes are in the right or left-hand wheel path, the pavement smoothness measurements shall be made in a location determined by the Engineer.
6. The Contractor shall remove all objects and foreign material from the pavement surface before testing, including any extra run-in and run-out lengths required for the non-contact profiler. Unless adequate traffic and personnel control is provided by the Contractor, the non-contact profiler must not be operated in active construction zones congested with construction equipment and/or personnel that could result in collision with the profiler.
7. The non-contact profiler operator shall guide the profiler along the specified wheel path of each traffic lane at a constant speed and directional path throughout the length of pavement being tested. The speed of the non-contact profiler must be within the speed range recommended by the manufacturer. Sudden changes in speed or direction during a test run will disqualify that test, and a new test must be performed. Confined pavement test sections that cannot be properly tested with a non-contact profiler shall be tested with a California-style profilograph approved by the Nebraska Department of Roads.
8. A lateral location indicator shall be used to align the non-contact profiler in the required test path during testing. Pavement edges, longitudinal joints, or longitudinal pavement markings may be used as reference lines.
9. Before testing, the non-contact profiler operator shall perform routine check procedures of the measurement system as recommended by the manufacturer. To ensure consistent distance measurement, the operator shall also check and adjust the distance recording wheel tire pressure several times a day.
10. All station references on the non-contact profiler reports shall be actual project stations. Stations shall be accurately noted on any printed profiles at least every 200 feet. The distance measured by the non-contact profiler shall compare within 0.2 percent of the actual distance tested, as determined using project stationing, for all testing and retesting runs. Test runs that do not compare within 0.2 percent will disqualify that test. New tests must be performed for all disqualified tests, following calibration of the distance measuring system.

11. Immediately after completion of the tests, the non-contact profiler operator and the Engineer shall sign any printed reports and profiles to verify their authenticity. The signed prints then become the property of the Department.
12. The Engineer shall perform or schedule verification tests on at least 10 percent of the lane miles of pavement surface, with a non-contact profiler owned by the Department.
13. If the verification test, Independent Assurance tests, or other observations indicate that the Contractor's procedures and/or results are not acceptable or accurate, the Engineer may do any of the following:
 - a. require the Contractor to calibrate the non-contact profiler and re-run the tests.
 - b. disqualify the Contractor's equipment and/or operator.
 - c. perform the tests for part, or all, of the project with a non-contact profiler owned by the Department, and charge the Contractor \$500.00 per lane mile for all testing done by the Department.
14. The following areas of pavement shall be excluded from the IRI requirements, unless otherwise specified in the Special Provisions.
 - a. Pavement on horizontal curves having a centerline radius of curvature of less than 1,000 feet, and pavement within the super elevation transition of such curves.
 - b. Pavement within 50 feet of a transverse joint that separates the pavement from an approach slab to a bridge deck or existing pavement not constructed under the contract.
 - c. Pavement for truck weigh stations or rest areas, acceleration/deceleration lanes, and interchange ramps and loops.
 - d. Pavement within 50 feet of railroad crossings and associated transitions.
 - e. Pavement with a posted speed limit of 45 miles per hour or less.
 - f. Pavement where the Engineer requires the Contractor to open an area prematurely to cross traffic at intersections and driveways.
 - g. Additional exceptions shown on the summary sheet in the plans.
15. Excluded pavement sections shall be measured for bumps and dips with either a profilograph, non-contact profiler, or a 10-foot straight edge. If the profilograph or non-contact profiler is used, the deviation shall not exceed 0.40 inch in a 25 ft. span. The deviation of the surface shall not exceed 1/8 inch if a 10-foot straightedge is used.
16. The Contractor shall complete all surface profile testing within 7 calendar days or 5 working days (whichever is later) after the completion of the mainline pavement. In addition, the following shall apply:
 - a. The initial (uncorrected) surface of all top-lift asphaltic concrete pavement sections shall be profile tested within 2 working days of being placed.

- b. The surface of all asphaltic concrete pavement sections that receive corrective work shall be profile tested within 2 working days of the completion of this work.
- c. The Contractor shall notify the Engineer of their intent to perform profile testing at least 2 calendar days prior to the testing (or as mutually agreed) to allow the Engineer to be present at the time of the testing.
- d. The Contractor shall allow the Engineer to witness all aspects of the profile testing, including traveling in the profiler conveyance vehicle.
- e. The profile test results shall be provided to the Engineer immediately after completion of the testing.

502.05 – Evaluation

- 1. The Contractor shall determine an IRI and the number of correctable bumps and dips for each test section, record the information on the report form, and provide a copy of the report to the Engineer.
 - a. The IRI shall be calculated by the non-contact profiler software using the quarter-car simulation. IRI shall be reported in units of inches per mile.
 - b. Correctable bumps shall be separately identified by the non-contact profiler software in a summary report using the California profilograph emulation. Bumps will appear as high points on the printed profile, and correspond to high points on the pavement surface. Correctable bumps are vertical deviations on the pavement surface that exceed 0.40 inch in height above a base line span of 25 feet.
 - c. Correctable dips shall be separately identified by the non-contact profiler software in a summary report using the California profilograph emulation. Dips will appear as low points on the printed profile, and correspond to low points on the pavement surface. Correctable dips are vertical deviations on the pavement surface that exceed 0.40 inch in depth below a base line span of 25 feet.

502.06 – Pavement Surface Correction

- 1. The Contractor shall locate and perform all required pavement surface corrective work, with the approval of, and in the presence of, the Engineer.
- 2. Corrective work may be required for any bump, dip, or a combination of bumps and dips or other roughness that, in the opinion of the Engineer, produces an objectionable ride. Corrective work shall be accomplished at no cost to the Department.
 - a. When the initial IRI of a test section is 96 in/mi or less, bump and dip correction is the only corrective work allowed for that section.
 - b. When the IRI of a test section exceeds 96 in/mi, corrective work shall be performed.
 - c. The Contractor shall retest all corrected test sections.

3. All bumps, as defined in Paragraph 15. of Subsection 502.04, and Paragraph 1.b. of Subsection 502.05, and all test sections with an IRI exceeding 96 in/mi shall be corrected by diamond grinding.
 - a. Bumps shall be considered corrected when they are at or below the 0.40 inch maximum height.
 - b. Sections with an IRI exceeding 96 in/mi shall be considered corrected when the IRI for that section has been reduced to a value of 96 in/mi or less.
4. All dips, as defined in Paragraph 15. of Subsection 502.04, and Paragraph 1.c. of Subsection 502.05, shall be corrected until they are at or below the 0.40 inch (10 mm) maximum depth. All dips shall be corrected by diamond grinding on either or both sides of the dip.
5. Pavement surface correction by diamond grinding shall be limited so that newly placed asphaltic materials are not reduced in thickness to less than the required plan thickness minus $\frac{1}{4}$ inch. In the event that (a) bumps, (b) dips, or (c) test sections exceeding 96 in/mi cannot be corrected by diamond grinding to the specified limits without violating these thickness criteria, the Contractor shall have the following options that will be subject to the approval of the Engineer.
 - a. Remove and replace a sufficient length of the surface layer to correct the deficiency, under the following conditions:
 - (1) The Contractor shall furnish replacement material that meets the original specifications for the material removed.
 - (2) Removal and replacement shall be for the full lane width.
 - (3) The thickness of the replacement asphaltic materials shall be a minimum of 3 times the nominal aggregate size of the asphaltic concrete mixture.
 - b. A combination of diamond grinding and removal and replacement methods.
 - c. Elect to leave in place an uncorrected or partially corrected bump, dip, or test section exceeding an IRI of 96 in/mi, for a monetary deduction in accordance with Section 502.09.

502.07 - Traffic Control

The Contractor shall provide all traffic control for smoothness testing and corrective work at no cost to the Department.

502.08 - Method of Measurement

1. "Asphalt Pavement Smoothness Testing I/D" and "Asphalt Pavement Smoothness Testing" shall be measured on a lump sum basis.

2. a. When the pay item "Asphalt Pavement Smoothness Testing I/D" is included in the contract, the unit price of the accepted quantity of asphaltic concrete pavement and performance graded binder in the surface layer of each non-contact profiler test section shall be adjusted according to the schedule in Table 502.01, subject to the limitations in Paragraphs 3. and 4. of this Subsection. Pavement sections excluded from this smoothness specification shall not qualify for incentive pay.
- b. When the pay item "Asphalt Pavement Smoothness Testing" is included in the contract, the incentive/disincentive provisions of this Subsection do not apply.

Table 502.01a.

Payment Adjustment Schedule (Multi-Lift Roadways)	
International Roughness Index (IRI) Inches Per Mile	Percent of Contract Prices
0 to 37	107
Greater than 37 to 43	105
Greater than 43 to 49	103
Greater than 49 to 56	102
Greater than 56 to 68	100
Greater than 68 to 74	98
Greater than 74 to 80	96
Greater than 80 to 86	94
Greater than 86 to 93	92
Greater than 93 to 96	90
Greater than 96	Corrective Work Required

Table 502.01b.

Payment Adjustment Schedule (Single-Lift Roadways)	
International Roughness Index (IRI) Inches Per Mile	Percent of Contract Prices
0 to 37	107
Greater than 37 to 43	105
Greater than 43 to 49	103
Greater than 49 to 56	102
Greater than 56 to 74	100
Greater than 74 to 80	97
Greater than 80 to 86	95
Greater than 86 to 93	93
Greater than 93 to 96	90
Greater than 96	Corrective Work Required

3. When the initial IRI of a test section is 96 in/mi or less, that value shall determine the percent of incentive pay for the section, unless bump and dip correction performed in that section increases the percent of pay.
4. When the initial IRI of a test section is greater than 96 in/mi, corrective work performed in that section may increase the percent of pay up to the 100 percent level indicated in Table 502.01.

502.09 – Basis of Payment

1. When the pay item “Asphalt Pavement Smoothness Testing I/D” is included in the contract, the overall pay factor for the accepted quantity of asphaltic concrete and performance graded binder in the surface layer of all non-contact profiler test sections shall be determined according to the formula in Table 502.02.

Table 502.02a.

Pay Factor Formula (Multi-Lift Roadways)	
$PF = \frac{A(1.07) + B(1.05) + C(1.03) + D(1.02) + E(1.00) + F(0.98) + G(0.96) + H(0.94) + I(0.92) + J(0.90)}{A + B + C + D + E + F + G + H + I + J}$	
Where:	
A	= Length of pavement with an IRI of 0 to 37 in/mi
B	= Length of pavement with an IRI greater than 37 to 43 in/mi
C	= Length of pavement with an IRI greater than 43 to 49 in/mi
D	= Length of pavement with an IRI greater than 49 to 56 in/mi
E	= Length of pavement with an IRI greater than 56 to 68 in/mi
F	= Length of pavement with an IRI greater than 68 to 74 in/mi
G	= Length of pavement with an IRI greater than 74 to 80 in/mi
H	= Length of pavement with an IRI greater than 80 to 86 in/mi
I	= Length of pavement with an IRI greater than 86 to 93 in/mi
J	= Length of pavement with an IRI greater than 93 to 96 in/mi

Table 502.02b.

Pay Factor Formula (Single-Lift Roadways)	
$PF = \frac{A(1.07) + B(1.05) + C(1.03) + D(1.02) + E(1.00) + F(0.97) + G(0.95) + H(0.93) + I(0.90)}{A + B + C + D + E + F + G + H + I}$	
Where:	
A	= Length of pavement with an IRI of 0 to 37 in/mi
B	= Length of pavement with an IRI greater than 37 to 43 in/mi
C	= Length of pavement with an IRI greater than 43 to 49 in/mi
D	= Length of pavement with an IRI greater than 49 to 56 in/mi
E	= Length of pavement with an IRI greater than 56 to 74 in/mi
F	= Length of pavement with an IRI greater than 74 to 80 in/mi
G	= Length of pavement with an IRI greater than 80 to 86 in/mi
H	= Length of pavement with an IRI greater than 86 to 93 in/mi
I	= Length of pavement with an IRI greater than 93 to 96 in/mi

2. a. The Contractor shall be assessed an additional \$500.00 deduction for each of the following uncorrected or partially corrected smoothness irregularities that are left in place.
 - (1) Bumps
 - (2) Dips
 - (3) Sections with an IRI value exceeding 96 in/mi, but less than 105 in/mi.
- b. The Contractor shall be assessed an additional \$1000.00 deduction for each uncorrected or partially corrected section with an IRI value of 105 in/mi or greater.
3. The work of "Asphalt Pavement Smoothness Testing I/D" and "Asphalt Pavement Smoothness Testing" shall be paid at the lump sum contract unit price. This price shall be full compensation for all smoothness testing as set forth in this specification.

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

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

Table 501.02

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

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

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

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

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

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

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

Sublot	Removal Criteria
1-1	Va ₁₋₁ less than 1.5 or greater than 7.0
1-2	(Va ₁₋₁ + Va ₁₋₂) ÷ 2 less than 1.67 or greater than 6.67
1-3	(Va ₁₋₁ + Va ₁₋₂ + Va ₁₋₃) ÷ 3 less than 1.83 or greater than 6.33

Where: Va₁₋₁ = the single test air voids for Sublot 1-1
 Va₁₋₂ = the single test air voids for Sublot 1-2
 Va₁₋₃ = the single test air voids for Sublot 1-3

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

Table 503.02 is void and superseded by the following:

Table 503.02

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

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

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

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

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

- (i) The Dust to Binder ratio is between 0.70 and 1.70.
- (ii) CAA is no more than 5% lower than the minimum specified shown on Table 1028.02 using blended cold feed material or ignition oven test results. FAA is no more than 0.5% lower than the minimum specified using blended cold feed material or no more than 1.0% lower than the minimum specified using ignition oven test results shown on Table 1028.03.
- (iii) Air voids are between 2.5% to 6.0% for SPH and between 1.5% to 5.0% for SPR.

Paragraph 2.h. of Subsection 503.04 is void.

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

- j. When a control strip is constructed, the Contractor will use the three individual air void tests within the control strip and apply those individual values to the

individual air void test result of the first 750 ton (680 Mg) subplot of Lot 1 to calculate the initial moving average of four and resulting pay factor for the initial 750 ton (680 Mg) subplot.

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

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

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

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

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

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

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

5. a. When asphaltic concrete in any lot 3750 tons (3400 Mg) or portion of a lot 3750 tons (3400 Mg) is rejected and removed from the road, payment will not be made for the asphaltic concrete or for the PG Binder contained in the rejected material. The determination of the quantity of PG Binder for which payment will not be made will be based on the percent of PG Binder used in the rejected material.
- b. The order of precedence to determine the PG Binder quantity is:
 - (1) Actual lot 3750 tons (3400 Mg) tests.
 - (2) The average of the day's run.
 - (3) The job-mix formula.

Paragraph 12. of Subsection 503.06 void.

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

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

Table 504.01

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

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

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

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

- c. The rate of application shall be adequate to bond the new bituminous layer to the existing surface. This shall be from 0.10 to 0.20 Gal/SY (0.45 to 0.90 L/m²) when applied to existing or milled surfaces, and from 0.05 to 0.10 Gal/SY (0.23 to 0.45 L/m²) when applied to freshly laid asphaltic concrete.

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

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

Table 504.02

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

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

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

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

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

Subsection 504.05 is amended to include the following:

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

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

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

1. a. Bituminous Pavement Patching of flexible pavement and the repair or replacement of any subgrade material authorized by the Engineer will be measured by one of the methods described in Paragraph 1.b. based upon the depth of the patch.
 - b.(1) For patches 16-inches (40cm) deep or less, determined at the time of patching, the patching will be measured by the ton (megagram) of "Asphaltic Concrete for Patching, Type ____" required to complete the patch and repair any faulty subgrade. No equipment rental will be paid for this work, and all equipment used to complete the work shall be subsidiary to the item, "Asphaltic Concrete for Patching, Type ____."
 - (2) For patches more than 16 inches (40cm) deep, determined at the time of patching, the patching will be measured by the ton (megagram) of "Asphaltic Concrete for Patching, Type ____" required to complete the patch and repair any faulty subgrade. Additionally, the hours of equipment rental required to complete the patching and repair in that portion of the patch deeper than 16-inches will be measured by the hour of equipment rental in accordance with Section 919. Only approved equipment needed to patch and excavate the failure is to be rented, and only the time utilized to perform the work in the region deeper than 16-inches (40 cm) is to be measured. Excluded is any equipment needed to haul asphalt to the site.

2. a. Bituminous Pavement Patching of concrete pavement and the repair or replacement of any subgrade material authorized by the Engineer will be measured by the square yard (square meter) of completed and accepted work regardless of depth. Additionally, the asphaltic concrete used to complete the patch will be measured for payment and included with the roadway tonnage.
 - b. Bituminous Pavement Patching of concrete pavement is divided into 3 types (see Table 516.02). The types are based on the size of the individual patches constructed in a single lane. If a damaged area spans 2 or more lanes, then the continuous patch will be counted as multiple patches -- 1 patch per lane.

Table 516.02

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

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

**DROP-OFF/COLD-MILLED TAPERED EDGE
(E-8-0515)**

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

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

Paragraphs 3.b. and 3.c. of Subsection 510.04 are void and superseded by the following.

3. b. The Contractor shall not leave a milled vertical edge greater than 1-inch tall between lanes overnight. One of the following options shall be performed if the milling will result in a vertical grade separation greater than 1 inch (25 mm) between lanes:
 - (1) Milling shall be performed in all adjacent traffic lanes on the same day so that at the end of each day, no drop off of over 1 inch (25 mm) remains.
 - (2) The milling shall create a tapered edge between the traffic lanes. The tapered edge shall have a slope from 3 [H]: 1 [V] to 4 [H]: 1 [V], not measured more than one foot in width nor extend into the lane more than one foot. Temporary pavement marking shall be placed at the top and contiguous with the tapered edge.
- c. If the Contractor fails to complete the above options, the Contractor shall provide – at no cost to the Department – additional traffic control necessary to maintain traffic on the

milled lane (or lanes) as directed by the Engineer. This additional traffic control may require the use of a pilot car, flaggers, lighted flagger station, etc.

- d. Transitions between milled and unmilled in the direction of travel surfaces will be feathered either by milling or with wedges of bituminous material (maximum slope 1 vertical to 12 horizontal).

OPTIONAL NOTCHED WEDGE JOINT (E-8-1013)

Description

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

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

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

Equipment

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

Construction Method

1. The notched wedge joint device shall be heated prior to the beginning of laydown either manually or as part of the notched wedge joint device.
2. The notched wedge joint shall be constructed in one pass of the paver. A constant head of asphaltic concrete shall be supplied in front of the notched wedge to provide pre-compaction of the notched wedge joint.
3. The taper of the notched wedge joint will be a minimum of 8" and a maximum of 12".

4. The notched wedge joint shall be used at any longitudinal joint locations situated between two driving lanes. The Contractor also has the option to utilize the notched wedge joint at other longitudinal joint locations.
5. A tack coat shall be applied to the full face of the in-place notched wedge joint, prior to the placement of full lane tack coat application.

Method of Measurement

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

RUMBLE STRIPS (E-13-0911)

This work consists of cutting rumble strips in pavements to the dimensions, spacing, and at the locations shown in the plans or directed by the Engineer. The cutting head shall have the cutting tips arranged in a pattern as to provide a smooth cut [approximately 1/16" (2 mm) between peaks and valleys].

Alignment of the edge of the pattern will be randomly checked by the Engineer. Any rumble strips misaligned [\pm 2 inches (\pm 50 mm)] shall be re-cut.

The Contractor shall demonstrate to the Engineer on an initial 500 foot (150 m) test section that the equipment and method will provide the desired milled rumble strip and surface inside each depression without tearing, snagging, or chipping the pavement. If the desired results are not being provided, as determined by the Engineer, the Contractor shall provide new equipment or method, or make necessary adjustments to provide the desired results. If the initial 500 foot (150 m) section results are unsatisfactory it will be repaired or replaced as determined by the Engineer, at no additional cost to the Department.

Excess waste material resulting from the operation shall be removed on a daily basis by use of a power broom or other method approved by the Engineer. Excess waste material shall be removed prior to opening the adjacent lane to traffic.

Any joint that had been previously sealed and then was damaged due to the installation of the rumble strip shall be resealed as directed by the Engineer.

The Contractor shall not place rumble strips on bridge decks and bridge approach slabs.

Method of Measurement

Each shoulder receiving rumble strips shall be measured separately in stations of 100 feet (100 meters). Centerline rumble strips placed left and right of centerline, as shown in the plans, shall be measured separately in stations of 100 feet (100 meters). Stations shall be measured horizontally along the project centerline between the beginning and ending points. Deductions will be made for all areas where rumble strips are not required.

Basis of Payment

Pay Item	Pay Unit
Rumble Strips, Asphalt _____	Station (Sta) Station (StaM)
Rumble Strips, Concrete _____	Station (Sta) Station (StaM)

Payment is full compensation for all work required to install the rumble strips, and resealing joints as required. No additional payment will be made for the test sections that were deemed unsatisfactory.

**COLD MILLING CLASS 3
AND COLD MILLING CLASS 3, TYPE A**

Void Paragraph 9.a. of Subsection 510.04 of the Standard Specifications and replace it with the following:

The remaining salvaged bituminous material produced from the cold milling operation not used in production of asphaltic concrete on the project shall become the property of the Contractor and removed from the project.

Amend Subsection 510.05 of the Standard Specifications to provide for the measurement of Cold Milling Class 3 in equivalent stations, this being the actual number of square feet of milling divided by 2800.

ASPHALTIC CONCRETE PLACEMENT

The 2 inch Asphaltic Concrete Type SPH(0.5) overlay shall be placed in one 2 inch lift.

The 2 inch tapering to 1½ inches Asphaltic Concrete Type SPS overlay shall be placed in one lift.

**TABULATION OF CORES
(FOR INFORMATION ONLY)**

Location	Distance Ft. Rt. or Lt of Lane Dir.CL	Field Depth Inches Hot Mix Asphalt (HMA)	Remarks
R.P. 206.0	6 Rt.	2.75 HMA	
R.P. 208.0	9 Rt.	3.25 HMA	
R.P. 210.0	9 Rt.	3.00 HMA	
R.P. 221.0	6 Rt.	3.00 HMA	
R.P. 207.0	9 Lt.	3.00 HMA	
R.P. 209.0	6 Lt.	2.50 HMA	
R.P. 211.0	9 Lt.	3.25 HMA	

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 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 PR1-3500 (PR1-25 MPa) or Class PR3-3500 (PR3-25 MPa) Concrete.
 - b. Repairs shall be made with Class 47B-3500 (47B-25 MPa) or Class 47B-HE-3500 (47B-HE-25 MPa), if the contract allows for lane closures or detours to accommodate the extended curing period.
- 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.
- 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.

8. Existing Asphaltic Concrete

- a. Core records indicate the thickness and location of the existing asphalt, as shown below:

80 (206.0)	Westbound	AC thickness is 2.75"
80 (207.0)	Westbound	AC thickness is 3.0"
80 (208.0)	Westbound	AC thickness is 3.25"
80 (209.0)	Westbound	AC thickness is 2.50"
80 (210.0)	Westbound	AC thickness is 3.0"
80 (211.0)	Westbound	AC thickness is 3.25"
80 (212.0)	Westbound	AC thickness is 3.0"

9. Asphaltic Concrete for Patching

- a. The asphalt surface shall be milled after performing the pavement repair work, or as shown elsewhere in the contract.
- b. If the Contractor elects to pour concrete to the top of the existing concrete and use asphaltic concrete to finish filling the repair area, it shall be either "Asphaltic

Concrete for Patching, Type ***, as shown in the contract, or temporary asphaltic concrete. Temporary asphalt cannot be left in place.

- c. "Asphaltic Concrete for Patching, Type ***", will be measured and paid for at the contract unit price per ton (mg). Temporary asphaltic concrete will be any asphaltic concrete approved by the Engineer. The material, placement, maintenance, removal and disposal of temporary asphaltic concrete will not be measured and paid for, but shall be considered subsidiary to the item "Concrete Pavement Repair, Type A, B, or C, Full Depth".

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.

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 the Approved Products List.

General Instructions

Instructions, given herein, shall be followed as a minimum requirement. The manufacturer's instructions shall be followed. The Engineer shall be the interpreter of these instructions, should conflict arise.

Preparation

1. Concrete, to be sealed, shall have cured for a minimum of 28 days.
2. All surfaces shall be thoroughly cleaned. Remove sand, surface dust, dirt, oil, grease, chemical films, curing compounds, coatings or 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, 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 2 ft. x 2 ft. clear plastic sheet shall be taped to a test area of the surface, as directed by the Engineer. The sheet shall be taped on all edges, to 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 six 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 shall be as indicated in the plans and in conjunction with instructions herein.
 - i) For superstructures with **open rails, without epoxy polymer overlay (EPO)**, 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
 - (3) Top, sides and bottom of rail
 - (4) All surfaces of posts
 - (5) Deck surfaces, underneath rails, not covered by an overlay of any type

- ii) For superstructures with **open rails, with EPO**, penetrating concrete sealer shall be applied to top, bottom and sides of the rail and to all sides of the posts, except where EPO is applied, as shown in plans.
 - iii) For superstructures with **closed rails**, penetrating concrete sealer shall be applied to all accessible surfaces of the rails, except the portions where EPO is applied, as shown in the plans.
 - iv) Substructure components shall be sealed within 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 two hours for light traffic or by manufacturer's recommendation and may be extended at the discretion of the Engineer.

Method of Measurement

1. The pay item "Penetrating Concrete Sealer" is given in square feet (SF) calculated from dimensions shown in the plans or as-built plans.

Basis of Payment

Payment shall be full compensation for fulfilment of all that is defined in the contract documents and manufacturer's instructions.

1.	Pay Item Penetrating Concrete Sealer	Pay Unit Square Feet (SF)
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MULTI-LAYER EPOXY POLYMER OVERLAY

Description

The work shall consist of preparing the surface of the reinforced concrete bridge deck, and furnishing and placing a multi-layer epoxy polymer overlay (EPO).

Materials

The EPO shall be comprised of a two component epoxy or epoxy/urethane blend (resin and hardener), combined with aggregate as described in the following:

1. Epoxy:

- a. The epoxy or epoxy/urethane blend shall be Type III, for use in bonding skid resistant materials to hardened concrete.
- b. Type III epoxy or epoxy/urethane blend shall comply with AASHTO M 235 (ASTM C 881), and shall meet additional requirements shown in Table 1.0 or Table 1.1, and is the class appropriate for the temperature at the time of application, as designated by the manufacturer.
- c. Provide Grade 1 or 2, 100 percent solids, thermosetting, moisture-insensitive epoxy, per ASTM D2369.
- d. The Engineer will collect a 16 oz. sample of each component for quality acceptance testing.

Table 1.0

ADDITIONAL REQUIREMENTS FOR TYPE III EPOXY POLYMER OVERLAY		
Property	Requirement	Test Method
Viscosity	7-25 poises	ASTM D2393, Brookfield RVT, Spindle 3 at 20 RPM
Gel Time	15-45 min.	ASTM C 881, ¶ 11.2.1 modified, 50 to 100 ml sample
Compressive Strength*, 3 hr.	1000 psi min.	ASTM C 579, w/ plastic inserts
Compressive Strength*, 24 hr.	5000 psi min.	ASTM C 579, w/ plastic inserts
Tensile Strength, 7 days	2000-5000 psi	ASTM D 638 @ 73 deg. F
Elongation, 7 days	40-70%	ASTM D 638 @ 73 deg. F
Elongation, 7 days	20% min.	ASTM D 638 @ 40 deg. F
Pull-Off Strength, after 24 hr. min. Cure Time of Layer 2.	250 psi min.	ASTM C1583 (using 50mm disks)
Epoxide Equivalent	<215	ASTM D1632

*Mixed with aggregate.

Table 1.1

ADDITIONAL REQUIREMENTS FOR TYPE III EPOXY URETHANE BLEND		
Property	Requirement	Test Method
Viscosity	35-70 poises	ASTM D2393, Brookfield RVT, Spindle 3 at 20 RPM
Gel Time	15-45 min.	ASTM C 881, ¶ 11.2.1 modified, 50 to 100 ml sample
Compressive Strength*, 3 hr.	1000 psi min.	ASTM C 579, w/ plastic inserts
Compressive Strength*, 24 hr.	5000 psi min.	ASTM C 579, w/ plastic inserts
Tensile Strength, 7 days	2200-5000 psi	ASTM D 638 @ 73 deg. F
Elongation, 7 days	40-100%	ASTM D 638 @ 73 deg. F
Elongation, 7 days	20% min.	ASTM D 638 @ 40 deg. F
Flexural Creep, total, 7 days	0.0065 in.	California Test Method 419
Flexural Yield Strength	5000 psi min.	ASTM D790
Pull-Off Strength, after 24 hr. min. Cure Time of Layer 2.	250 psi min.	ASTM C1583 (using 50mm disks)
Epoxide Equivalent	<215	ASTM D1632

*Mixed with aggregate.

- e. The Contractor shall submit for approval the following information to the Engineer:
- (1) Name, address and telephone number of the epoxy manufacturer. Include the name of the preferred contact person.
 - (2) Brand name of the material.
 - (3) Type, Grade and Class of the material.
 - (4) Manufacturer's certificate of compliance stating that epoxy components consist of 100% solids.
 - (5) Information regarding recommended usage and application instructions.
 - (6) Material Safety Data Sheets.
 - (7) Test results shall be submitted by a Cement and Concrete Reference (CCRL) or AASHTO Materials Reference (AMRL) accredited Laboratory. The certified lab will show test results of AASHTO M 235 (ASTM C 881) and requirements of Table 1.0 or Table 1.1, except for pull-off strength per ASTM C1583.
 - (8) A Fourier Transform Infrared Spectrophotometry (FTIR) spectrum in transmittance mode must be included for each component.
 - (9) Verification that the testing apparatus used for bond tests has been calibrated within the last year according to ASTM C900-06, Annex A1.

2. Aggregate:

- a. Provide a singly crushed siliceous gravel or chat that is free of dirt, clay and foreign of organic material.
- b. The Engineer shall collect a 60 lb. sample of the aggregate for use in quality assurance testing and acceptance. This sample shall be collected from the material delivered to the jobsite.
- c. The aggregates provided shall meet the requirements of Tables 2.0 & 3.0 below:

Table 2.0

QUALITY REQUIREMENTS FOR AGGREGATE		
Property	Requirement	Test Method
Sodium Sulfate Soundness, Maximum Loss	12%	AASHTO T104
Maximum Wear	30%	AASHTO T96
Acid Insoluble Residue, Minimum	55%	NDOR C25
Fine Aggregate Angularity, Minimum	40%	AASHTO T304, Method C
Moisture Content, Maximum	0.20%	AASHTO T255

Table 3.0

GRADATION REQUIREMENTS FOR AGGREGATES (percent passing)				
Sieve	4	8	16	30
% Passing	100	10-40	0-5	0-1

Equipment

The Contractor may request the use of other equipment or methods. The Contractor shall submit a list to the Engineer of all equipment to be used at least two weeks prior to construction. Equipment must comply with the following requirements.

1. **Surface Preparation Equipment:** Steel Shot-blasting equipment capable of producing a surface relief equal to the International Concrete Repair Institute (ICRI) Concrete Surface Profile (CSP) 5 to 6. The shot-blast equipment shall be capable of providing a uniform surface texture. The equipment shall be inspected before use, and worn blasting wheels and liners are required to be replaced. Steel shot is the consumed material. Coal Slag or other by-product material having a Moh's hardness of at least 6 is permitted. 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.
2. **Mechanical Distribution Equipment:**
 - a. 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.
 - b. An epoxy distribution system shall be capable of accurate and complete metering, mixing and distributing the polymer at the specified rate on 100% of the prepared surface. Use an application machine that features positive displacement volumetric metering pumps controlled by a hydraulic power unit. Use motionless, in-line mixing so as to not overly shear the material or entrap air in the mix.
 - c. An aggregate spreader shall be capable of uniform and accurate application of the dry aggregate over 100% of the prepared surface.
 - d. An air compressor shall be capable of producing a sufficient amount of oil-free and moisture-free compressed air to remove all dust and loose material.

3. Hand Application Equipment:

- a. Calibrated containers for accurate measurement of epoxy components shall be used.
 - b. To minimize the formation of air bubbles produced during mechanical mixing of the epoxy components, the mixer shall only use paddle types "Jiffy" or "Sika" paddle types, or approved equal.
 - c. Adequate additional hand tools may be used to facilitate the placement of the EPO according to this specification and the manufacturer's recommendations.
4. Uniformly spread prepared mixture to the deck surface using 3/16" notched squeegees. Ensure squeegee blades are replaced regularly to maintain specified application rates.
5. Do not use power driven tools heavier than a 15 pound chipping hammer, during surface preparation.

Construction Method

1. Preparation of Surface:

- a. The Contractor shall determine the size of shot, flow of shot, forward speed of shot blast machine and number of passes to achieve a surface preparation that will satisfy the required pull-off strength of the EPO.
- b. Deteriorated and/or delaminated concrete shall be removed and repaired with EPO slurry (epoxy and aggregate combined) or approved patch material. The maximum depth of repair with slurry shall be limited to 3". No Magnesium Phosphate patch materials will be permitted.
- c. In all cases, the EPO shall not be placed on any Portland cement concrete less than 28 days old.
- d. All bridges will require, at minimum, a single-pass shot blast of the preparation surface. The Contractor shall produce a surface relief equal to the International Concrete Repair Institute (ICRI) Concrete Surface Profile 5 to 6. 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.
- e. Use abrasive blasting and/or hand tools to clean small areas (curb lines, rail posts, under open rails, etc.) where shot blasting is unable to be performed, to the satisfaction of the engineer.
- f. Metal deck drains and areas of the curb or railing above the proposed surface from the shot blast shall be protected.
- g. All dirt, paint, oil, asphalt, laitance, carbonation, curing materials and other deleterious material from the surface of the deck and bridge rails (6" above deck or first break in the case of a continuous rail) shall be removed.
- h. The Contractor shall clean all prepared surfaces by air blasting with dry, oil free air or vacuuming. Sweeping with brooms for final cleaning is not acceptable.
- i. Any contamination of the prepared deck surface or surface of subsequent layers shall be removed. Contaminated areas shall be shot blasted or bush hammered to produce an acceptable surface for placement of the EPO.
- j. The Contractor shall prevent rain water from transporting objectionable materials from surrounding paving onto the bridge deck.

- k. Visible moisture on the prepared deck at the time of placing the EPO is unacceptable. The Contractor shall identify moisture in the concrete by taping an 18"x18" plastic sheet to the deck 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 prior to performing the plastic sheet test. This test shall be performed by the Contractor and observed by the Engineer. **The NDOR will allow a 6 hour test duration in lieu of the 16 hours specified in ASTM D4263.**
- l. The first layer shall be placed within 24 hours of preparing the deck surface. Deck surfaces exposed for more than 24 hours must be re-cleaned by shot-blasting prior to application of the EPO. **NO abrasive blasting with sand will be permitted other than that described in ¶ 1.e above.**

2. Proportioning: All epoxy materials shall be proportioned according to the manufacturer's recommendations.

3. Placing the Epoxy Polymer Overlay:

- a. The EPO shall be placed in two separate layers to the surfaces shown in the Contract at application rates shown in Table 4.0:

Table 4.0

EPOXY POLYMER OVERLAY APPLICATION RATES		
Layer	Epoxy Rate	Aggregate Rate*
1	Not Less Than .22 gal./sq. yd.	10 lb./ sq. yd. min.
2	Not Less Than .45 gal./sq. yd.	14 lb./ sq. yd. min.

*Apply enough aggregate to completely cover the epoxy.

- b. Notched squeegees or mechanical application equipment shall be used to place the mixed epoxy on the deck surfaces immediately and uniformly at the prescribed rate.
- c. The Contractor shall continually monitor the gel time of the mixed epoxy. The EPO shall not be placed if conditions are such that gel time is less than 10 minutes.
- d. Deck drains shall be closed so the epoxy and aggregate shall not enter the drains.
- e. A paintbrush or roller shall be used to apply the epoxy on the face of curbs to the top of the curb. On bridges with continuous concrete barrier rails, apply the epoxy to the first break in the geometry of the barrier or 6 inches above the deck or existing overlay whichever is greater. On bridges with open concrete barriers, apply the epoxy to the following surfaces:
 - (1) All 4 faces of the posts a min. of 6 inches above the deck or existing EPO.
 - (2) The outside edge of deck.
 - (3) A minimum of 8 inches on the underside of the deck or slab overhangs.
- f. A single layer of Epoxy and aggregate shall be applied to curbs, barriers or posts during placement of layer 1. No aggregate is required for the outside edge or underside of deck overhangs.
- g. The bridge deck and all mixed epoxy and aggregate components must be a minimum of 60°F at the start of application. See paragraph 4.a.

- h. The dry aggregate shall be applied to cover the epoxy completely within 10 minutes of application.
- i. Any first layer surfaces of epoxy that do not receive enough aggregate before gelling of the epoxy occurs must be removed and replaced.
- j. Excess aggregate from the first layer after sufficiently cured shall be vacuumed or swept. If damage or tearing occurs, halt sweeping or vacuuming operation.
- k. Traffic must not be allowed on the first EPO layer.
- l. The epoxy and aggregate for the second layer shall be placed at the prescribed rate and in the same manner as the first layer and placed within 24 hours after the placement of the first layer.
- m. Second layer surfaces that do not receive enough aggregate before gelling of the epoxy may be re-coated with epoxy and aggregate.
- n. All longitudinal joints will be at the edge of one lane or as indicated by the Engineer. No joints will be allowed on the wheel path.
- o. The EPO shall be produced and placed within the specified limits in a continuous and uniform operation.
- p. All construction joints shall be taped to provide a clean straight edge for adjacent EPO placement. This includes joints between previously placed EPO materials and at centerline.
- q. The exposed edges at the ends of the bridge and at expansion joints shall be finished to minimize bridge deck roughness.
- r. A bond breaker shall be applied to all expansion joints.

4. Curing: Minimum curing times are noted in Table 5.0:

Table 5.0

EPOXY POLYMER OVERLAY CURE TIMES							
	Average Temperature of Deck, Mixed Epoxy, and Aggregate, F deg.						
Layer	55-59	60-64	65-69	70-74	75-79	80-85	85+
	Minimum Cure Time (hours)						
1	5	4	3	2.5	2	1.5	1
2	6.5	6.5	5	4	3	3	3

- a. The average temperatures listed in Table 5.0 are to be taken immediately prior to placement of epoxy on deck surfaces. The second layer shall be cured for 8 hours if the air temperature falls below 55°F during the curing period. The cure times listed for the 55-59°F temperature range are provided for the case where the deck, mixed epoxy, and aggregate satisfy the 60°F min. temperature at the start of placement and subsequently decrease during placement.
- b. The work shall be planned and performed in such a way as to provide for the minimum curing times specified in this provision or as specified by the epoxy manufacturer.

5. Temperature Limitations:

- a. The minimum temperature of deck, mixed epoxy, and aggregate at the start of placement of the EPO shall be 60°F.
- b. If the manufacturer's temperature requirements are more restrictive than provided in this provision they will govern.

- c. The EPO must not be placed when conditions are such that the deck temperature will exceed 100°F.
 - d. The EPO must not be placed if conditions are such that gel time is less than 10 minutes.
 - e. The EPO must not be placed if the air temperature is expected to drop below 55°F within 8 hours of placement.
- 6. Correction of Unbonded or Damaged Areas:** Any areas of the EPO discovered to be un-bonded by sounding or chaining and areas of the EPO damaged by the contractor's operation shall be repaired before payment is made. A squared perimeter of areas to be repaired shall be saw cut to the top of the concrete surface and the EPO shall be removed with small air tools (15 pounds maximum) or shot blasting. The underlying concrete area shall be shot blasted to remove contaminants, and the EPO shall be replaced according to standard placement procedures. There is no additional cost to the Department for unbonded or damaged areas.

Temporary Pavement Markings

1. The Contractor shall use Overlay Markers ("Tabs") or Removable Wet Reflective Tape as needed to maintain traffic during phased construction operations.
2. If Overlay Markers are used, two markers shall be installed 5 feet apart at 40 foot intervals on centerline. Edge line markers shall be installed at 10 foot intervals.
3. Avoid installing Overlay Markers with high strength epoxy to avoid damage to EPO.
4. No grooving for temporary pavement tape will be allowed.
5. In the event that the temporary pavement markings are needed to be in place over winter, "Temporary Pavement Marking, Type Paint" shall be used. The removal of the temporary pavement marking paint shall be completed using a self-vacuuming water blaster. The placement and removal of "Temporary Pavement Marking, Type Paint" shall be at no additional cost to the Department. Removal of painted temporary pavement markings by shot blasting or grinding will not be allowed.

Bond (Pull-Off) Testing

1. The Contractor shall record the results of the pull-off tests.
2. The Contractor shall perform pull-off tests of three specimens on each lot of the completed overlay in accordance with ASTM C1583 (using 50mm pull-off disks) under the observation of the Engineer. **A lot shall be defined as 1200 square feet of EPO per lane of traffic of the bridge and approach (if applicable), with the following stipulations:**
 - a. Shoulders 8 feet and under shall be included in the lot containing the adjacent lane.
 - b. Shoulders exceeding 8 feet shall be considered a separate lot.
 - c. For lots less than 1200 square feet, no less than 3 specimens shall be tested.
3. The location of the three pull-off specimens per lot shall be determined by the Engineer.

4. The loading disk used in the pull-off tests shall be adhered to the finished surface of the EPO following core drilling operation to a depth at least 1/2" into the concrete substrate.
5. The pull-off tests shall not start any sooner than 24 hours after placement of the second layer of the EPO.
6. The pull-off test shall not be performed when the deck temperature exceeds 85° F.

Method of Measurement

1. Epoxy Polymer Overlay will be measured for payment by the square yard of deck surface and bridge approach surface area overlaid as determined by field measurement.
2. Epoxy Polymer Overlay applied to bridge rails or barriers and epoxy applied to the deck edge or deck underside will not be measured directly and will be considered subsidiary to the Multi-Layer Epoxy Polymer Overlay.

Basis of Payment

1.

Pay Item	Pay Unit
Multi-Layer Epoxy Polymer Overlay	Square Yard (SY)
2. For each lot, the EPO unit price is multiplied by bond strength pay factor for the item "Multi-Layer Epoxy Polymer Overlay".
3. The bond strength of the three (3) pull-off specimens will be averaged to determine the pay factor for each lot with the following exception:

If the tensile strength of a specimen is less than 250 psi and failure is in the concrete at a depth of at least 1/4 inch over more than 50% of the test surface, then the tensile strength used for that single specimen will be 250 psi.

4. The pay factors for the average bond strength test are as shown in Table 6.0:

Table 6.0

BOND STRENGTH PAY FACTORS	
Average Bond Strength of Lot *	Percent Pay
Greater than 245 psi	100%
235 psi - 245 psi	90%
225 psi - 234 psi	75%
Less than 225 psi	40% or Reject

*245 psi allows for a 2% margin of error (with 250 psi required)

5. Any lot rejected by the Engineer will be removed and replaced at no additional cost to the Department.
6. Temporary Pavement Markings shall not be measured and paid for directly but shall be considered subsidiary to Multi-Layer Epoxy Polymer Overlay.
7. Payment is full compensation for all work in this Section.

PRESERVATION OF TREES (H-11-0911)

Paragraph 3 of Subsection 107.09 is amended to include the following:

Trees are an asset to the roadside corridor and shall be protected from immediate and long term damage such as trunk scarring, soil compaction, injury or destruction of roots and all forms of damage from vehicles, equipment or materials too close to the trees.

“No materials, vehicles or equipment shall be stored or parked within 25 feet of existing trees 4” caliper or larger, whether standing alone or in groups, throughout the length of the project.”

The Contractor shall protect from disturbance or damage, all trees as described above by installing adequate protection for all trees and tree groupings. Within the interchanges, protection shall be either snow fence, orange barrier fence or caution tape, all supported on metal posts, to prevent parking or storage of materials within these sensitive areas. This protection will not be paid for separately but considered the duty of the Contractor to fulfill the requirements described in Subsection 107.09 of the Standard Specifications and this special provision.

All materials used to establish protection for the trees shall remain the property of the Contractor and shall be removed by the Contractor at the end of the contract or as directed by the Engineer.

PERFORMANCE GRADED BINDER

The Performance Graded Binder to be used on this project shall be PG Binder 52-34 for Asphaltic Concrete, Type SPS and PG Binder 64-34 for Asphaltic Concrete, Type SPH supplied by a Certified Supplier.

SECTION 1029 - PERFORMANCE GRADED BINDER (J-6-0715)

Section 503 in the Standard Specifications is amended to include Performance Graded Binders.

Subsection 1029.01 in the Standard Specifications is void and superseded by the following:

1029.01 -- Description

1. Performance Graded (PG) binder shall conform to the requirements of AASHTO M320 Table 1. PG binder shall also conform to the Department PG+ specifications (Table 1029.01) when classified as a modified binder.
 - a. The test of Direct Tension, AASHTO M320 Table 1, is omitted.

2. The Performance Graded Binder shall be supplied by a supplier that is certified by the Department.
 - a. A supplier may request certification by contacting the Nebraska Department of Roads, Materials and Research Division, Flexible Pavement Engineer.
 - b. A certified supplier must furnish a quality control program to the Department Bituminous Laboratory for review and approval. The program shall follow, at a minimum, the guidelines of AASHTO R26.
 - c. A certified supplier must be a participant in one or more of the following PG Binder Groups:
 - (1) AASHTO Materials Reference Laboratory (AMRL)
 - (2) Western Cooperative Testing Group (WCTG)
 - (3) Combined States Binder Group (CSBG)
 - (4) A PG Binder round robin Group approved by the Department.
 - d. A certified supplier must maintain and follow the requirements of the group or groups in which they participate in, to maintain certification by the Department. In addition, active participation is required to maintain certification by the Department. Active participation will include submitting of round robin sample results, along with meeting other requirements of the group or groups.
 - (1) For suppliers that desire to provide product while approved PG Binder Group membership is pending, a temporary certification may be issued for a period of up to one year. Split sample testing will be required prior to receiving a temporary certification. Split sample testing will be done on all grades of binder that the supplier intends to supply during the temporary certification period. The supplier will have up to one year to become certified by participating in and following the requirements of one or more of the approved PG Binder Groups, and to meet all other conditions for certification.
 - e. A certified supplier may be asked to supply to the Department: past round robin results, laboratory inspection reports, reasons for and investigative reports on outlying results, quality control testing results, technician training and/or proficiency testing reports.
 - f. A certified supplier will agree to inspection of their plant or terminal without notice anytime during production or supplying of material to the Department. The inspection may also include the supplier's laboratory.
 - g. If desired, a certified supplier can voluntarily submit samples of PG binder proposed for use to the Materials and Research Bituminous Laboratory for courtesy testing prior to HMA (Hot Mix Asphalt) production. The test results will be for Information-Only.

- h. Certification will be withdrawn from a supplier when one or more of the following conditions exist:
 - (1) Inability to consistently supply material meeting specifications as outlined herein.
 - (2) Failure to maintain an acceptable quality control program.
 - (3) The failure to meet one or more of the conditions of being a certified supplier as outlined, but not limited to only these conditions.
- i. Notification of decertification of a supplier will be submitted in writing by the Department. The notification will include the reason(s) why decertification occurred. PG Binders from a decertified source will not be accepted for use on Department projects.
- j. If a supplier has lost certification and seeks to be recertified, the following steps are required:
 - (1) Supplier shall fulfill the requirements outlined above for gaining Certified Supplier status. This may include the submittal of material samples to ensure specifications compliance before recertification approval.
 - (2) Supplier shall submit documentation to the Flexible Pavement Engineer explaining the causes of decertification outlined in the notification, and the actions that are being taken to correct the problem(s) identified by the Department.

Subsection 1029.02 in the Standard Specifications is void and superseded by the following:

1029.02 -- Material Characteristics

- 1. Modified Performance Grade binders shall meet the following specifications:
 - a. All specified binders with a grade temperature spread of 92°C or greater, shall be defined as modified.
 - b. The PG Binder shall meet the Multiple Stress Creep Recovery (MSCR) specifications of the following Table:

**Table 1029.01
PG+ Specifications**

AASHTO T350 MSCR Average % Recovery @ 3.2 kPa for modified PG binders ¹	
AASHTO M320 Performance Grade	Test Temperature of 64°C
58 - 34	25 Min.
64 - 34	45 Min.
70 - 34	75 Min.

¹ MSCR test shall be run on a new sample pellet, not the dynamic shear sample pellet.

- c. The binder shall incorporate a blend of base asphalt and the use of the elastomer modifiers styrene-butadiene (SB), styrene-butadiene-styrene (SBS), or styrene-butadiene-rubber (SBR).
- (1) PolyPhosphoric Acid (PPA) may be used as an additional modifier to elastomer modifiers and shall not exceed 0.50% maximum PPA addition (by weight of binder). The total phosphorous content of the PPA-modified PG Binder shall not exceed 1900 ppm. The total phosphorous content shall be determined as per ASTM D1091, ASTM D6443, or ASTM D6481.
 - (i) To determine specifications compliance, the Department requires a sample of the base asphalt binder, a sample of the PPA, and supplier-prepared varying PPA percentage modified binder samples. These samples shall be sent to the NDR Bituminous Laboratory prior to project HMA production.
 - (2) Crumb rubber may be used as an additional modifier to elastomer modifiers. If crumb rubber is used:
 - (i) Paragraph 5.4 (solubility) of AASHTO M320 is then void.
 - (ii) Paragraph 5.5 (micron requirement) of AASHTO M320 is then void.
- d. PG Grade 70-34 Binder shall be exempt of the AASHTO M320 requirement for the test of Viscosity, AASHTO T316.
- e. The composite material shall be thoroughly mixed at the asphalt refinery or terminal prior to (for tank storage) or as (in-line blending) being loaded into the transport vehicle.
- (1) The modified binder shall be heat and storage stable and shall not separate when handled and stored as per the supplier's recommendations.
 - (2) The composite material shall be homogenous, and shall not demonstrate evidence of localized gelation or over-crosslinking of polymers. The composite material shall not otherwise contain any other non-homogenous conglomerations.

2. Unmodified Performance Grade Binders are defined as specified binders with a grade temperature spread of less than 92°C.

Subsection 1029.03 in the Standard Specifications is void and superseded by the following:

1029.03 -- Procedures

1. A Material Certification shall be submitted to the Engineer prior to construction or when switching suppliers, stating the type of any modifier(s) being used. The Material Certification must also state that the material has not been air blown or oxidized.
 - a. If the PG Grade modification process of the PG Binder includes the use of PPA (Polyphosphoric Acid) and/or crumb rubber, then the Material Certification must also state the type of all modifiers used in the formulation. If PPA is used, the Material Certification must state the % PPA in the binder, and also state and confirm the total phosphorous content of the PPA modified binder.
2. The Contractor shall receive from the supplier, instructions on the proper storage and handling of each grade and shipment of PG Binder.
3. Substitution of a PG Binder, which exceeds the upper and/or lower grade designations from what is specified, requires advance notification to, and approval by, the Engineer. The substitution of the PG Binder shall also be identified in the sample identification submittals.
4. PG Binder Lots and their respective samples are defined as follows:
 - a. Each 3750 tons (3400 Mg) of HMA type produced, or final portion thereof, will be a binder lot.
 - b. A binder lot will include only one PG Binder grade, or will include a blend of grades as defined in paragraph 5.
 - c. A binder lot will include only one supplier of the PG Binder.
 - (1) If a Contractor needs to switch binder suppliers during the production of a binder lot, it is the Contractor's responsibility to ensure both the compatibility and the specifications compliance of the mixture of the respective binder products. The supplier designation of the lot will be listed as "mixed suppliers" if the binder lot sample was taken after this occurs.
 - d. The Engineer must be notified and approve of the intent to blend binder grades, or to switch binder suppliers, prior to either occurrence.
 - e. All binders shall be sampled at the rate of at least one sample per binder lot.
 - (1) The sample shall consist of a two-quart (half gallon) can and shall be taken by the Contractor's Certified Sampling Technician, with confirmation by Department personnel. The sample shall be taken at the plant from

the line between the storage tank and the mixer, or from the tank supplying material to the line, at a location from which material sampled is representative of the material in the line to the mixer. The sampling process shall follow procedures of the NDR Materials Sampling Guide.

- (2) When the tested PG Binder is in compliance, the binder lot will be accepted and the sample will be discarded. If the tested PG Binder does not comply, then the pay factor of the PG Binder lot represented by the sample shall be adjusted according to Table 1029.02, and Table 1029.03 (if modified).
 - (3) When a total HMA type on a project is less than 3750 tons, a minimum of one PG Binder lot sample is required. If the PG Binder does not comply with test specifications, then the pay factor of the PG Binder lot shall be adjusted according to Table 1029.02, and Table 1029.03 (if modified).
5. Blending of differing PG Binder grades at the hot mix plant site will be allowed only with prior approval, and with the following restrictions:
- a. The resultant blend of grades will meet PG+ (if modified binder), and/or AASHTO M320 specifications when tested as $\pm 3^{\circ}$ C of the specified PG Binder grade.
 - b. The sample of the blended material will be considered as a lot sample, and it will be taken during initial production following the blending of the binders.
 - c. The lot sample of the blended material shall have a pay factor applied as per Table 1029.02, and Table 1029.03 (if modified), when not meeting specifications.
 - d. The blended sample's identification form shall note the blending conditions and provide a statement that the sample is a blend of grades.
 - e. The next lot sample, following the sample representing the blend, will be tested as the specified binder grade for the asphalt mixture being produced and shall meet AASHTO M320 and PG+ (if modified), specifications.
 - f. For modified PG Binders, only blending of the same type of elastomer modifiers listed in 1029.02 Paragraph 1.c. will be allowed.
6. The Nebraska Department of Roads, Materials and Research Bituminous Laboratory, will do complete specifications testing (AASHTO M320, and PG+ if modified) on at least one lot sample per HMA type from the project. The Department will also randomly select one lot sample per HMA type for complete specifications testing out of every five lot samples received. When any test result shows a lot sample not meeting specifications, the previous and following lot sample received will also be tested for complete specifications compliance. Adjacent lot sample testing will continue in this manner until tested samples meet all specifications, or there are no more lot samples remaining to be tested.
- a. Lot samples not initially selected for complete specifications testing are "control" samples. Control samples will normally only be tested for original binder AASHTO M320 Dynamic Shear. If a control sample tests outside of AASHTO M320 Dynamic Shear specifications, it will then also be tested for complete M320, and PG+ (if modified) specifications compliance. As mentioned above,

the adjacent lot samples will also be tested for complete specifications compliance. The adjacent lot testing will continue until tested samples meet all specifications, or there are no more lot samples remaining to be tested. This additional adjacent lot complete testing for M320, and PG+ (if modified) compliance, is in addition to the random samples that were selected to be tested for complete M320 and PG+ compliance.

7. All lot samples as tested are subject to the Pay Factors listed in Table 1029.02, and also Table 1029.03 if modified, below:

Table 1029.02
Tests of AASHTO M320 Pay Factor Table ¹

Test and Specification	Test Results	Pay Factor
Original Binder Dynamic Shear, G*/Sin □, kPa Min. 1.00	> 0.99	1.00
	0.97 - 0.99	0.95
	0.94 - 0.96	0.90
	0.91 - 0.93	0.85
	< 0.91	0.70 or Reject
Rolling Thin Film Oven Residue Dynamic Shear, G*/Sin □, kPa Min. 2.20	> 2.19	1.00
	2.12 - 2.19	0.95
	2.04 - 2.11	0.90
	1.96 - 2.03	0.85
	< 1.96	0.70 or Reject
Pressure Aging Vessel Residue Dynamic Shear, G*/Sin □, kPa Max. 5000	< 5001	1.00
	5001 - 5200	0.95
	5201 - 5400	0.90
	5401 - 5600	0.85
	> 5600	0.70 or Reject
Pressure Aging Vessel Residue BBR m-Value Min. 0.300	> 0.350	1.05
	0.300 - 0.350	1.00
	0.295 - 0.299	0.95
	0.290 - 0.294	0.90
	0.285 - 0.289	0.85
	< 0.285	0.70 or Reject
	< 200	1.05
Pressure Aging Vessel Residue BBR Creep Stiffness, mPa Max. 300	200 - 300	1.00
	301 - 310	0.95
	311 - 320	0.90
	321 - 330	0.85
	> 330	0.70 or Reject

**Table 1029.03
PG + Pay Factor Table ¹**

AASHTO T350 Multiple Stress Creep Recovery (MSCR) @ 64°C Test and Specifications	Test Results	Pay Factor
AASHTO M320 Performance Grade 58-34 Average % Recovery @ 3.2 kPa Min. 25%	> 24	1.00
	24	0.95
	23	0.90
	22	0.85
	< 22	0.70 or Reject
AASHTO M320 Performance Grade 64-34 Average % Recovery @ 3.2 kPa Min. 45%	> 44	1.00
	44	0.95
	43	0.90
	42	0.85
	< 42	0.70 or Reject
AASHTO M320 Performance Grade 70-34 Average % Recovery @ 3.2 kPa Min. 75%	> 74	1.00
	74	0.95
	73	0.90
	72	0.85
	< 72	0.70 or Reject

- ¹ If a lot sample has more than one test that results in a reduced pay factor (less than 1.00) from either or both of the above Pay Factor Tables, the single largest pay factor reduction will be the one used in determining the lot pay factor. If a lot sample passes all testing (1.00 or greater), and one or more pay factors are 1.05, the pay factor of 1.05 will be the one used in determining the lot pay factor.
8. When all lot samples have been received and tested, a final pay factor of all the PG Binder per HMA type will be calculated and applied as follows:
- The final pay factor is the average of all lot sample pay factors. The final pay factor cannot exceed 1.000.
- Example Calculations:
- 4 Binder Lots HMA: $\frac{0.95 + 1.05 + 1.00 + 0.85}{4} = 0.962$ Final Pay Factor
- 3 Binder Lots HMA: $\frac{0.95 + 1.05 + 1.05}{3} = 1.017 =$ Final Pay Factor of 1.000
- The final pay factor will be applied to the contract unit price of asphalt binder.
 - The Engineer will determine if lots that have a test pay factor of 0.70 or Reject will be removed. If 0.70 or Reject material is left in place, a price factor of 0.70 will be the determined lot pay factor. The final pay factor will be applied to the contract unit price of asphalt binder.

- (1) Removal and replacement will be at no additional cost to the Department.
 - (2) If any lot was removed, a new lot pay factor will be determined by testing of the replacement material.
9. When the testing of a PG binder lot sample shows test results that are outside of specification limits, the initial process of resolving the sample failure will include the following actions, as appropriate:
 - a. The Department Bituminous Laboratory may conduct retesting of the remaining portion of the sample as determined necessary to confirm the original test result(s).
 - b. The Department Bituminous Laboratory will notify the Department project personnel, who will in turn notify the Contractor. All parties will arrange to investigate all aspects of the testing, loading, handling and delivery of the material in question. The Contractor and Department project personnel shall report their findings to the Bituminous Laboratory.
 - c. The Department Bituminous Laboratory will collect and compile all information provided.
 - d. The Department Bituminous Laboratory will issue a standard report of tests for all samples tested, to include any resulting final pay factor deductions or removals. A copy of the report of tests will be distributed to the District and the Construction Division. The District will then provide a copy to the Contractor. PG Binder Supplier requests for a copy of this report will be directed to the Contractor.
10. If the Contractor wishes to dispute any results after testing and investigations have been completed on any failing lot sample(s) that subjected the final pay factor from paragraph 8 to less than 1.000, the Department will select an independent laboratory for referee testing to take place on the remaining portion of the sample(s).
 - a. Only the Contractor can initiate dispute resolution, and request referee testing. The request must be made, in writing, to the Department Construction Division within 30 days of awareness of final pay factor determination. Otherwise dispute resolution is forfeited.
 - b. The identity of the independent laboratory will not be revealed until the selected laboratory has completed the referee testing, and the Department Bituminous Laboratory has submitted a final report of the results.
 - c. If the independent lab's tests indicate failing results and pay deductions equal to or greater than the Department's, the Contractor will reimburse the Department for the cost of testing. If the independent lab's tests indicate that the material meets specification, or is at a pay deduction less than the Department's, the Department will assume the cost of testing. When the independent lab's tests indicate a pay deduction, the lesser of the Department's and the independent lab's deductions will be applied.

Subsection 503.05 in the Standard Specifications is amended to include the following:

503.05 -- Method of Measurement

PG Binder shall be measured in accordance with Subsection 503.05, Paragraph 3, in the Standard Specifications. References to the term asphalt cement are superseded with the term PG Binder.

Subsection 503.06 in the Standard Specifications is amended to include the following:

503.06 -- Basis of Payment

Subsection 503.06 in the Standard Specifications is amended to provide that PG Binder, accepted by the Engineer for use in asphaltic concrete, will be paid for at the contract unit price per ton (Megagram) for the item "Performance Graded Binder _____", less any deductions as prescribed in the pay factor tables.

SUPERPAVE ASPHALTIC CONCRETE

Section 1028 in the Standard Specifications is amended to provide that Asphaltic Concrete, Type SPH shall use the 0.5 inch gradation band.

**SECTION 1028 - SUPERPAVE ASPHALTIC CONCRETE
(J-7-0315)**

Section 1028 in the Standard Specifications is void and superseded by the following:

1028.01 -- Description

1. a. Superpave Asphaltic Concrete is a Contractor-designed mix.
- b. The Contractor shall be required to define properties using a gyratory compactor that has met the Superpave evaluation test procedures, during mix design and production.
2. Job Mix Formula
 - a. Before production of asphaltic concrete, the Contractor shall submit, in writing, a tentative Job Mix Formula (JMF) on the NDOR Mix Design Submittal Form for verification to the Department.
 - b. The JMF shall be determined from a mix design for each mixture. A volumetric mixture design in accordance with AASHTO R 35 as modified within this specification will be required. However, the mixture for the Superpave specimens and maximum specific gravity mixture shall be aged for two hours at compaction temperature. The mixture shall be prepared using the following:
 - (1) Mixture Conditioning of Hot Mix Asphalt (HMA), AASHTO R 30.

- (2) Method for Preparing and Determining the Density of Hot Mix Asphalt Specimens by Means of the SHRP Gyrotory Compactor, AASHTO T312.
- c. The JMF shall identify:
- (1) The virgin mineral aggregates and pit locations
 - (2) Recycled Asphalt Pavement (RAP) and source locations
 - (3) Hydrated lime
 - (4) Mineral filler
 - (5) The percent passing value for each specified sieve for the individual and blended materials
- d.
- (1) The Contractor shall submit one uncoated, proportioned 22 lb. (10,000 gram) sample of the blended mineral aggregates for consensus properties and specific gravity testing, for all mix types except SPS. Once verified, the Contractor may begin plant production and QC testing with the QA/QC program.
 - (2) The Contractor has the option of submitting the following; 2 proportioned 22 lb. (10,000 gram) samples of the blended mineral aggregates (which are precoated with hydrated lime, if lime is used) and two one-quart (liter) samples of the proposed PG Binder to be used in the mixture to the Department Materials and Research Central Laboratory at least 15 NDR working days before production of asphaltic concrete. If submitted these samples will be used to verify the Contractor's Superpave mix design test results and mix properties.
 - (3) Submitted with these samples shall be a copy of the Contractor's results for all Superpave mix design tests.
 - (4) Mix design shall include at a minimum:
 - (i) The bulk specific gravity (Gsb), which shall be 2.585, for data purposes and as information only, for all mixes.
 - (ii) The target binder content. The binder content will be determined by ignition oven results. A correction factor of 0.3% will be added to the ignition oven results for mixes containing hydrated lime, and an adjustment factor of 0.1% will be added to the ignition oven results for mixes containing WMA.
 - (iii) The supplier and grade of PG Binder.
 - (iv) The maximum specific gravity of the combined mixture (Rice).
 - (v) The bulk specific gravity (Gmb) and air voids at N initial (Nini), N design (Ndes) and N maximum (Nmax) of the gyratory compacted specimens.
 - (vi) Voids in the Mineral Aggregate (VMA) and Voids Filled with Asphalt (VFA) at Ndes.

- (vii) Fine Aggregate Angularity (FAA) and specific gravity, Coarse Aggregate Angularity (CAA), Flat and Elongated Particles and Sand Equivalent of the aggregate blend.
 - (viii) Location description and/or legal descriptions and producers of materials used in the mix.
 - (ix) Dust to Binder Ratio.
 - (x) JMF compaction temperatures from NDOR Gyratory Temperature Table (See Table 1028.11).
 - (xi) The hydrated lime content.
3. Quality Control Program:
- a. The Contractor shall establish, provide, and maintain an effective Quality Control (QC) Program. The QC Program shall detail the methods and procedures that will be taken to assure that all materials and completed construction conforms to all contract requirements.
 - b. Although guidelines are established and certain minimum requirements are specified herein and elsewhere in the contract, the Contractor shall assume full responsibility for placing a pavement course that meets the target field values.
 - c. The Contractor shall establish a necessary level of control that will:
 - (1) Adequately provide for the production of acceptable quality materials.
 - (2) Provide sufficient information to assure both the Contractor and the Engineer that the specification requirements can be met.
 - d.
 - (1) The Contractor shall develop and submit a copy of their QC Program to the Department. A copy of the QC Program shall be kept on file in the QC lab trailer. This Program shall be updated as needed and submitted annually for review.
 - (2) The Contractor shall not begin any construction or production of materials without an approved QC Program.
 - e. The QC Program shall address, as a minimum, the following items:
 - (1) QC organization chart.
 - (2) Inspection requirements.
 - (i) Equipment.
 - (ii) Asphalt concrete production.
 - (iii) Asphalt concrete placement.
 - (3) QC testing plan.
 - (4) Documentation of QC activities.
 - (5) Requirements for corrective action when QC or acceptance criteria are not met.
 - (6) Any additional elements deemed necessary.

- (7) A list, with the name and manufacturers model number, for all test equipment used during laboratory testing.
- (8) A description of maintenance and calibration procedures, including the frequency that the procedures are performed.
- f. The QC organization chart shall consist of the following personnel:
 - (1) A Program Administrator:
 - (i) The Program Administrator shall be a full-time employee of the Contractor or a Subcontractor (Consultant) hired by the Contractor.
 - (ii) The Program Administrator shall have a minimum of 5 years' experience in highway construction.
 - (iii) The Program Administrator need not be on the job site at all times but shall have full authority to institute any and all actions necessary for the successful implementation of the QC Program.
 - (iv) The Program Administrator's qualifications and training shall be described in the QC Program.
 - (2) Quality Control Technicians:
 - (i) The quality control technicians shall report directly to the Program Administrator and shall perform all sampling and quality control tests as required by the contract.
 - (ii) The QC technicians shall be certified every 5 years by the Department Materials and Research Division.
 - (iii) Certification at an equivalent level by a state or nationally recognized organization may be acceptable.
 - (iv) The QC technician's credentials and training records shall be submitted to the Department.
 - (v) The Contractor may have a non-certified technician working under the direct supervision of a certified technician for no more than one construction season.
- g.
 - (1) Inspections shall be performed daily to ensure continuing compliance with contract requirements until completion of the work.
 - (2) QC test results and periodic inspections shall be used to ensure the mix quality and to adjust and control mix proportioning.
- 4. Contractor's Lab Equipment:
 - a. The Contractor shall calibrate and correlate the testing equipment according to the procedures prescribed for the individual tests and conduct tests in conformance with specified testing procedures.
 - b. The Contractor shall have the following equipment (or approved equal) at or near the project location:
 - (1) A gyratory compactor and molds meeting AASHTO criteria.

- (2) An Asphalt Content Ignition Oven meeting AASHTO criteria.
 - (3) Rice equipment specified in AASHTO T 209, procedure 9.5.1, Weighing in Water. The thermometer being used to measure water temperature will be as specified in T 209.
 - (4) FAA equipment specified in AASHTO T304.
 - (5) To test density of compacted asphaltic concrete, a minimum 6000 gm balance, 0.1 gm resolution, with under body connect and water container large enough to conveniently place specimen in the basket and completely submerge the basket and specimen without touching the sides or bottom is required.
 - (6) QC Laboratory which contain the following:
 - Air conditioner.
 - Dedicated phone.
 - FAX machine or email.
 - Photocopy machine.
 - Sample storage.
 - Work table.
 - Bulletin board.
 - Running water.
 - Desk and chair.
 - Separate power supply.
 - Incidental spoons, trowels, pans, pails.
 - (7) Diamond saw for cutting cores.
 - (8) Diamond core drill minimum 3 inch (75 mm).
 - (9) Oven, 347°F (175°C) minimum, sensitive plus 5°F (plus 2°C).
 - (10) USA Standard Series Sieves for coarse and fine aggregate with appropriate shakers (12 inch (300 mm) recommended).
 - (11) Personal Computer capable of running the latest version of Department Superpave software, creating an electronic copy of the data, and printing to a Color Printer.
5. QC Testing Plan:
- a. The testing plan shall provide that the samples be collected in accordance with the Department statistically based procedure of random sampling.
 - b. The Contractor may add any tests necessary to adequately control production.
 - c. All QC test results shall be reported on the latest version of the Department's provided Superpave software by the Contractor with a copy provided to the Engineer within 1 week after the tests are complete. Daily

review by the Engineer shall be allowed. At the completion of the asphalt production, the Contractor shall submit to the Department a final copy of the Superpave test results on electronic recording media (CD, e-mail, flash drive, etc.).

d. Corrective Action Requirements:

- (1) The Contractor shall establish and utilize QC charts for individual QC tests. The requirements for corrective action shall be linked to the control charts.
- (2) The Contractor's QC Program shall detail how the results of QC inspections and tests will be used to determine the need for corrective action.
- (3)
 - (i) A clear set of rules to determine when a process is out of control and the type of correction to be taken to regain process control will be provided.
 - (ii) As a minimum, the plan shall address the corrective actions that will be taken when measurements of the following items or conditions relating to the mixture approach the specification limits:
 - (I) Plant produced mix gradations at laydown (See gradation tolerances).
 - (II) Binder content.
 - (III) Air voids.
 - (IV) VMA (mix design only).
 - (V) VFA (mix design only).
 - (VI) FAA AASHTO T 304.
CAA ASTM D 5821.
 - (VII) Dust to Binder Ratio.
 - (VIII) Density.
 - (IX) Contaminates.
 - (iii) Corrective actions that will be taken when the following conditions occur:
 - (I) Rutting.
 - (II) Segregation.
 - (III) Surface voids.
 - (IV) Tearing.
 - (V) Irregular surface.
 - (VI) Low Density.

1028.02 -- Material Characteristics

1. The type of PG Binder will be shown in the contract.

2. Recycled Asphalt Pavement:
- a. The Contractor may submit to the State a proposal to supplement the virgin aggregates of the asphaltic concrete mix with a Contractor's specified percentage of Recycled Asphalt Pavement (RAP). The Contractor is responsible for investigating and maintaining the quality and verifying the quantity of the RAP material.
 - b. In recycled asphaltic concrete mixtures, the allowable percent of RAP will be as shown in Table 1028.01.

Table 1028.01

Asphaltic Concrete Type	Percent, RAP	
	Minimum	Maximum
SPS	0	55
SPR	0	55
SPH	0	35

3. Aggregates:
- a. Aggregates for use in superpave asphaltic concrete shall be tested on an individual basis.
 - b. With the exception of Asphaltic Concrete Type SPS the blended mineral aggregate shall not contain more than 80% limestone on the final surface lift of asphaltic concrete.
 - c. Asphaltic Concrete Type SPR may contain a total maximum of 10% of the virgin material that is composed of natural, uncrushed aggregate by manmade methods commonly known as but not limited to: 47B gravel, 2A gravel, gravel surfacing, sluice sand, blow sand, waste sand, fill sand, road gravel, roofing gravel, hot mix sand or gravel, coarse sand, fine sand, plaster sand, masonry sand, pit run sand or gravel. For clarification on any proposed gravel, contact the Department Flexible Pavements Engineer.
 - d. Chat or coal sand will not be allowed in any mix.
 - e. Crushed rock material for use in asphaltic concrete, 1/4 inch (6.35 mm) and smaller, screenings and manufactured sand shall have a Sodium Sulfate loss of not more than 12% by mass at the end of 5 cycles. Sampling size and frequency shall adhere to the current Department Materials Sampling Guide.
 - f. Quartzite and granite shall conform to the requirements of Subsection 1033.02, Paragraph 4, a. (8). Sampling size and frequency shall adhere to the current Department Materials Sampling Guide.
 - g. Crushed rock (Limestone) and Dolomite shall conform to the requirements of Paragraph 4.a. (4), (5) and (6). of Subsection 1033.02 of the Standard Specifications. Sampling size and frequency shall adhere to the current Department Materials Sampling Guide.
 - h. Soundness tests shall not be required for fine sand.

- i. Once the satisfactory quality of aggregates from a source has been established, sufficient additional soundness tests will be performed to insure the continued satisfactory quality of the material, as determined by the Materials Sampling Guide
- j. Aggregate consensus properties may be performed on material prior to the application of hydrated lime.
- k. The coarse aggregate angularity value of the blended aggregate material shall meet or exceed the minimum values for the appropriate asphaltic concrete type as shown in Table 1028.02. If the coarse portion of the blend is all ledge rock the CAA tests may be waived.

Table 1028.02
Coarse Aggregate Angularity
(ASTM D 5821)

Asphaltic Concrete Type	CAA (minimum)
SPS	--
SPR	83
SPH	95/90*

* Denotes two faced crushed requirements

- l. The fine aggregate angularity value of the blended aggregate material shall meet or exceed the minimum values for the appropriate asphaltic concrete type as shown in Table 1028.03.
- m. The specific gravity for calculation of the Fine Aggregate Angularity (FAA) shall be determined on a washed combined aggregate sample of the material passing the No. 8 (2.36 mm) sieve and retained on the No. 100 (150 µm) sieve. The Contractor will determine the specific gravity to be used in the calculation of FAA mixture design value(s) and, if verified by the Department Aggregate Laboratory, this same value can be used throughout production. The verification value determined by the Department Aggregate Laboratory will be on a combined aggregate sample supplied by the Contractor that is representative of the material proposed or being used during production. The specific gravity to be used throughout production to calculate FAA values will be the Contractor's verified value or the Department determined value (whenever verification is not made) and will be noted on the Mix Design. Changes in aggregate percentages during production may require determination of a revised specific gravity for FAA.

**Table 1028.03
Fine Aggregate Angularity
(AASHTO T304 Method A)**

Asphaltic Concrete Type	FAA (minimum)
SPS	--
SPR	43.0
SPH	45.0

- n. The coarse aggregate shall not contain flat and elongated particles exceeding the maximum value for the appropriate asphaltic concrete type category shown in these provisions according to Table 1028.04.

**Table 1028.04
Flat and Elongated Particles*
(ASTM D 4791)**

Asphaltic Concrete Type	Percent, Maximum
SPS	25
SPR	10
SPH	10

*Criterion based on a 5:1 maximum to minimum ratio.

- o. The sand equivalent of the blended aggregate material from the fine and coarse aggregates shall meet or exceed the minimum values for the appropriate asphaltic concrete type shown in these provisions according to Table 1028.05.

**Table 1028.05
Sand Equivalent Criteria
(AASHTO T 176)**

Asphaltic Concrete Type	Sand Equivalent, Minimum
SPS	30
SPR	45
SPH	45

- p. Dust to binder ratio is the ratio of the percentage by weight of aggregate finer than the No. 200 (75 μ m) sieve to the asphalt content expressed as a percent by weight of total mix. The dust to binder ratio shall be within 0.70 and 1.70.
- q. The blended aggregate shall conform to the gradation requirements specified in Table 1028.06 and Table 1028.07 for the appropriate nominal size.

Table 1028.06
Gradation Control Points for 0.75 Inch (19 mm) and 0.5 Inch (12.5 mm) Nominal Size

English Sieve (Metric)	0.75 Inch (19 mm) Control Points (percent passing)		0.5 Inch (12.5 mm) Control Points (percent passing)	
	Minimum	Maximum	Minimum	Maximum
1 inch (25 mm)	100.0			
3/4 inch (19 mm)	90.0	100.0	100.0	
1/2 inch (12.5 mm)		90.0	90.0	100.0
3/8 inch (9.5 mm)				90.0
No. 8 (2.36 mm)	23.0	49.0	28.0	58.0
No. 16 (1.18 mm)				
No. 30 (600 μ m)				
No. 50 (300 μ m)				
No. 200 (75 μ m)	2.0	8.0	2.0	10.0

Table 1028.07
Gradation Control Points for 0.375 Inch (9.5 mm) Nominal Size and SPR

English Sieve (Metric)	0.375 Inch (9.5 mm) Control Points (percent passing)		SPR Control Points (percent passing)		SPR (Fine) Control Points (percent passing)	
	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
3/4 inch (19 mm)			98.0	100.0		
1/2 inch (12.5 mm)	100.0					
3/8 inch (9.5 mm)	90.0	100.0	81.0	89.0	81.0	96.0
No. 4 (4.75 mm)		90.0				
No. 8 (2.36 mm)	32.0	67.0	46.0	56.0	46.0	56.0
No. 16 (1.18 mm)						
No. 30 (600 μ m)						
No. 50 (300 μ m)			12.0	21.0	12.0	21.0
No. 200 (75 μ m)	2.0	10.0	4.0	9.0	4.0	9.0

- r. The combined mineral aggregate for Asphaltic Concrete, Type SPS, shall be an aggregate or a combination of aggregates, and mineral filler if needed, that conforms to the gradation requirements specified in Table 1028.08.

**Table 1028.08
Gradation Control Points for Type SPS**

English Sieve (Metric)	Control Points (percent passing)	
	Minimum	Maximum
1 inch (25 mm)	100.0	
¾ inch (19 mm)	94.0	100.0
½ inch (12.5 mm)	81.0	100.0
No. 4 (4.75 mm)	70.0	90.0
No. 8 (2.36 mm)	42.0	70.0
No. 16 (1.18 mm)	29.0	43.0
No. 30 (600 µm)	19.0	34.0
No. 50 (300 µm)	11.0	20.0
No. 200 (75 µm)	2.0	10.0

- s. Mineral filler shall consist of pulverized soil, pulverized crushed rock, broken stone, gravel, sand-gravel, sand or a mixture of these materials that conforms to the requirements in Table 1028.09.

**Table 1028.09
Mineral Filler for Type SPS**

	Min.	Max.
Total Percent Passing the No. 50 (300 µm) Sieve	95	100
Total Percent Passing the No. 200 (75 µm) Sieve	80	100
Plasticity Index (material passing the No. 200 (75 µm) Sieve, except soil)	0	3
Plasticity Index for Soil	0	6

1028.03 -- Acceptance Requirements

1. Mix Criteria:
 - a. The target value for the air voids of the SPH Asphaltic Concrete shall be 4% ($\pm 1\%$) at the Ndes number of gyrations. For Type SPS Asphaltic Concrete the air voids at Ndes shall be a minimum of 1.5% with a maximum of 5.0%. For Type SPR Asphaltic Concrete the air voids shall be 3% ($\pm 1\%$) at the Ndes number of gyrations.
 - b. The design criteria for each mixture shall be determined from Tables 1028.10, 1028.11, and 1028.12.

**Table 1028.10
Gyratory Compaction Effort
(Average Design High Air Temperature <39 degrees C)**

Asphaltic Concrete Type	Nini	Ndes	Nmax
SPS	6	40	62
SPR	7	65	100
SPH	8	95	150

**Table 1028.11
Gyratory Compaction Temperatures**

Mix Type	% RAP	Compaction Temp °F
SPS	0-25	270 ± 5
	26-55	280 ± 5
SPR	0-35	280 ± 5
	36-55	290 ± 5
SPH	0-35	300 ± 5

**Table 1028.12
Minimum Binder Content**

Mix Type (Metric)	Minimum Binder Content, Percent
SPS	4.8
SPR	5.0
3/8 inch (9.5 mm)	5.5
1/2 inch (12.5 mm)	5.1
3/4 inch (19 mm)	5.0

- c. During production of Lot #1 and randomly selected lots thereafter, the Contractor shall provide to the Department 6 properly prepared gyratory samples for AASHTO T 283 testing for all mixtures except Asphaltic Concrete Type SPS. Superpave mixtures shall contain 1.25% hydrated lime as specified in the Special Provision "Hydrated Lime for Asphaltic Mixtures". Each Superpave mixture shall be tested for moisture sensitivity in accordance with AASHTO T 283. The 6 inch (150 mm) specimens shall be compacted in accordance with AASHTO T 312 to 7% ($\pm 0.5\%$) air voids at 95 mm in height and evaluated to determine the Tensile Strength Ratio (TSR).
 - d. During production of Lot #1, the Contractor shall provide to the Department two 75mm gyratory puck samples at 4.0% voids ($\pm 0.5\%$) for APA testing for all mixtures except Asphaltic Concrete Type SPS.
2. The Contractor shall make Mix adjustments when:
 - a. The mix does not meet the current approved JMF or any other requirements of the contract.
 - b. Surface voids create a surface or texture that does not meet the criteria of Sections 502 and 503 in these Standard Specifications.
 - c. Rutting occurs.
 3. The Contractor shall inform the Engineer when changes in mixture properties or materials used occur for any reason. Changes such as, but not limited to, types or sources of aggregates or changes in grades, sources, properties or

modification procedures (if modified) of PG Binders. The Department may require a new job mix formula, mix design and moisture sensitivity test. The new proposed job mix formula shall be in accordance with the requirements as stated above.

4. Mix adjustments at the plant are authorized within the limits shown in Table 1028.13 as follows:
- a. The adjustment must produce a mix with the percent air voids and all other properties as stated in these specifications.
 - b. All adjustments must be reported to the Engineer.
 - c. The adjustment values in Table 1028.13 will be the tolerances allowed for adjustments from the Department verified mix design "Combined Gradation" target values which resulted from production or mix design adjustments, but cannot deviate from Superpave gradation criteria. Mix adjustments for individual aggregates, including RAP, greater than 25% of the original verified mix design proportion or greater than 5% change in the original verified mix design percentage, whichever is greater, may require the Contractor to submit a new mix design, as determined by the Engineer. The Contractor is responsible for requesting new mix design targets as they approach these tolerances, failure to do so may result in a suspension of operations until a new mix design is approved.

Table 1028.13

Aggregate Adjustments	
Sieve Size	Adjustments
1 inch (25 mm), 3/4 inch (19 mm), 1/2 inch (12.5 mm), 3/8 inch (9.5 mm), No. 4 (4.75 mm)	± 6%
No. 8 (2.36 mm), No. 16 (1.18 mm), No. 30 (600 µm), No. 50 (300 µm)	± 5%
No. 200 (75 µm)	± 2%

5. Sampling and Testing:
- a. The Contractor shall take samples at frequencies identified by the Engineer, according to the Department statistically based procedure. The samples shall be approximately 75 lbs (34 kg) and split according to AASHTO T-248 to create a companion sample. This sample splitting can be either at: 1) the sampling location, with the Department taking custody of their sample at that time or 2) after being transported to the test facility in an insulated container, with the Department taking custody of their sample at that time as determined by the Engineer. The details of sampling, location, splitting etc. shall be determined at the pre-construction conference.
 - b. All samples transported to the test facility and companion samples within the Lot shall be identified by attaching or faxing the lab calculation sheet from the latest version of the superpave software, stored, and retained by the Contractor until the Department has completed the verification testing

process. Transporting of all samples will be under the observation of Department.

- c.
 - (1) The sample shall be taken from the roadway, behind the paver before compaction or from the windrow. For SPS mixes, the Contractor has the option to obtain the samples directly at the plant.
 - (2) At least one QC sample shall be tested for every 750 tons (680 Mg) of plant produced mix.
 - (i) If, at the completion of the project, the final lot consists of less than 3,750 tons (3,400 Mg) of asphaltic concrete, 1 sample for each 750 tons (680 Mg) or fraction thereof, shall be taken and tested.
 - (3) Additional sampling and testing for the Contractor's information and quality control may be performed at the Contractor's discretion. Any additional testing will not be used in pay factor determination.
 - (4) (i) When cold feed samples are being taken, the acquisition shall be timed such that the material in the sample represents, as close as possible, the same material in the sample taken behind the paver. If cold feeds are sampled and tested by Contractor, a split of that sample must be submitted with the hot mix subplot sample. The Contractor will be notified what subplot (a minimum of 1 subplot per lot) sample must be tested for FAA and CAA from the blended cold feed material according to the Department random sampling schedule. All other FAA and CAA subplot samples may be taken from the randomly selected portion of the blended cold feed material or obtained from the random samples taken behind the paver. Samples shall be taken under the observation of Department and split according to AASHTO T-248, with the Department taking custody of their sample at that time.
 - (ii) For projects using RAP material the FAA shall be established as follows: a RAP sample will be processed through an ignition oven and then combined with the proportioned amount of virgin aggregate defined by the mix design and then proceeding with FAA and CAA testing.
- d. The sample shall be compacted immediately while still hot (additional heating may be required to raise the temperature of the sample to compaction temperature).
- e. Each production sample shall be tested as follows:
 - (1) Bulk Specific Gravity (Gmb) shall be determined for each specimen in accordance with AASHTO T 166 Bulk Specific Gravity of Compacted Bituminous Mixtures Using Saturated Surface Dry Specimens. One specimen shall be compacted for each production sample.
 - (2) One Theoretical Maximum Specific Gravity (Gmm) test for each production sample of uncompacted mixture shall be determined in

accordance with AASTHO T 209 procedure 9.5.1. Weight in water - Maximum Specific Gravity of Bituminous Paving Mixtures.

- (3) (i) The Blended Aggregate Bulk Specific Gravity (Gsb) shall be 2.585 for information only for all mixes.
- (ii) FAA - AASHTO T 304 Method A. The pour time of the test sample into the funnel shall be completed in 5 ± 1 seconds.
- (iii) CAA - ASTM 5821. For SPR mixes, CAA testing and results are only required on the cold feed verification test for the lot.
- (4) The laboratory air voids shall be determined in accordance with the following:

Table 1028.14

$\text{Gmb}(\text{corr})@N_{any} = \text{Gmb}(\text{meas})@N_{max} \times (\text{height}@N_{max} \div \text{height}@N_{any})$ $\% \text{Gmm}(\text{corr})@N_{any} = 100 \times (\text{Gmb}(\text{corr})@N_{any} \div \text{Gmm}(\text{meas}))$ $\% \text{ Air Voids}@N_{any} = 100 - \% \text{Gmm}(\text{corr})@N_{any}$ $\text{VMA}@N_{des} = 100 - (\text{Gmb}(\text{corr})@N_{des} \times P_s \div \text{Gsb})$ $\text{VFA}@N_{des} = 100 \times ((\text{VMA}@N_{des} - \% \text{ Air Voids}@N_{des}) \div \text{VMA}@N_{des})$ $\text{Measured} = (\text{meas})$ $\text{Corrected} = (\text{corr})$

- (5) (i) The percent of PG Binder shall be determined for each QC test. The percent of PG Binder will be computed by ignition oven results. A correction factor of 0.3% will be added to the ignition oven results for mixes containing hydrated lime.
- (ii) The gradations shall be determined for each QC test using AASHTO T 30.
- (6) Except as noted in this Subsection, all sampling and testing shall be done as prescribed in the Department Materials Sampling Guide and Standard Method of Tests.
- f. Testing Documentation:
- (1) All test results and calculations shall be recorded and documented on data sheets using the latest version of Department provided "Superpave" software. A copy containing complete project documentation will be provided to the Department at the completion of asphalt production.
- g. Superpave Software:
- (1) QC charts from the software shall be made available for review by the Engineer at any time.
- (2) As a minimum, the following values shall be reported on Department provided software:
- (i) Laboratory Gyration density.
- (ii) Ignition oven or cold feed aggregate gradations for all Superpave sieves will be reported.

- (iii) PG Binder content shall be plotted to the nearest 0.01% by ignition oven results in accordance with AASHTO T 308.
- (iv) The theoretical maximum specific gravity (Rice) to the nearest 0.001% will be reported.
- (v) Laboratory Gyratory air voids at Ndes shall be plotted to nearest 0.1%. Laboratory Gyratory air voids, at Nini, Ndes and Nmax shall be reported to nearest 0.1%.
- (vi) FAA and CAA of the asphaltic concrete for both cold feed and ignition oven samples will be reported to the nearest 0.1% for FAA and 1% for CAA. A minimum of one subplot FAA and CAA cold feed sample per lot will be tested and recorded on Department provided software.
- (vii) VMA content shall be plotted to nearest 0.1% and VFA shall be reported to the nearest 0.1%.
- (viii) Dust to Binder ratio to the nearest 0.01 will be reported.

6. Verification Sampling and Testing:
- a. The Department will select and test at random one of the subplot samples (750 tons, 680 Mg) within a Lot (3750 tons, 3400 Mg) for verification and report results.
 - b. The results of Contractor QC testing will be verified by the Department's verification tests. Any samples outside of the tolerances in Table 1028.15 and 1028.16 will result in an Independent Assurance (IA) review of testing and may result in the Department test results being applied.
 - (1) On any given Lot, if the results of Air Void verification testing and its companion QC testing are within 1.0% air voids, the Air Void verification for the entire Lot is complete and the Contractor test results will be used to determine the pay factors. If the Air Void verification test results and the companion QC test results are outside the above tolerance, the results from the verification test will be used to determine the pay factor for that subplot. Any or all of the remaining four Department subplot samples may be tested and the Department subplot test results may be applied to the respective sublots and the resulting pay factors will apply.
 - (2) On any given Lot, if the results of the FAA verification testing and its companion QC testing are within 0.5 percent, the FAA verification for the entire Lot is complete and the Contractor test results will be used to determine the pay factor. If the FAA verification test results and the companion QC test results are outside the above tolerance, the results from the verification test will be used to determine the pay factor for that subplot. Any or all of the remaining four Department subplot samples may be tested and the Department subplot test results may be applied to the respective sublots and the resulting pay factors will apply.
 - c. When verification tests are within testing tolerance but results show a consistent pattern of deviation from the QC results, the Engineer may

cease production and/or request additional verification testing or initiate a complete IA review.

**Table 1028.15
Asphaltic Concrete Testing Tolerances**

Test	Tolerance
Asphalt Content by Ignition Oven	0.5%
Gyratory Density	0.020
Maximum Specific Gravity	0.015
Bulk Dry Specific Gravity (Gsb)	0.020
FAA	0.5%
CAA	10%
Field Core Density	0.020
Air Voids	1.0%

**Table 1028.16
Blended Aggregate Gradation
Testing Tolerances**

Sieve Size	Tolerance
3/4 inch (19 mm), 1/2 inch (12.5 mm), 3/8 inch (9.5 mm), No. 4 (12.5 mm), No. 8 (2.36 mm)	5%
No. 16 (1.18 mm), No. 30 (600 μ m), No. 50 (300 μ m)	4%
No. 200 (75 μ m)	2%

- d. Independent Assurance (IA) Review of Testing:
- (1) The Contractor shall allow the Department personnel access to their laboratory to conduct IA review of technician testing procedures and apparatus. Any deficiencies discovered in testing procedures will be reported by the department and corrected by the Contractor.
 - (2) During IA review, the Department personnel and the Contractor will split a sample for the purpose of IA testing. The samples selected will be tested in the Department Branch Laboratory. Any IA test results found to be outside of defined testing tolerances above will be reported. The Contractor shall verify the testing apparatus and make corrections if the apparatus is out of tolerance.
 - (3) See Section 28 of the Materials Sample Guide for more information on IA testing.
- e. If the project personnel and the Contractor cannot reach agreement on the accuracy of the test results, the Department will be asked to resolve the dispute, which will be final. It is the Contractor's responsibility to obtain a large enough sample size for any referee testing (a total sample size of 6000 grams, to be retained by the Department after splitting, is recommended for FAA testing). All dispute resolutions will be in accordance with the Quality Assurance Program requirements in the NDOR Materials Sampling Guide.

7. Production Tolerances, Acceptance, and Pay Factors

**Table 1028.17
Production Tolerances***

Test	Allowable Deviation from Specification
<i>Dust to Asphalt Ratio</i>	None
<i>Coarse Aggregate Angularity</i>	- 5% below Min.
<i>Fine Aggregate Angularity for SPR Only</i>	- 0.2% below Min. for cold feed - 0.5% below Min. for ignition oven
<i>Fine Aggregate Angularity for all other mixes</i>	- 0.5% below Min. for cold feed - 1.0% below Min. for ignition oven
Minimum Binder Content	None

* These tolerances are applied to the mix design specification values, not the submitted mix design targets.

- a. The Contractor shall notify the Engineer whenever a test result approaches the Specification limits.
- b. When any single test result for FAA testing falls outside the allowable production tolerances in Table 1028.17, the material represented by this test will be accepted with a 20% penalty or rejected, as determined by the Engineer. For all other tests, when any single test result, on the same mix property, from two consecutive QC samples fall outside the allowable production tolerances in Table 1028.17, the material represented by these tests will be accepted with a 20% penalty or rejected, as determined by the Engineer.
- c. The Contractor shall assume the responsibility to cease operations when specifications are not being met.
- d. Acceptance and pay factors for Asphaltic Concrete Type SPS will be based on compacted in place average density and joint density.
- e. For each subplot of Asphaltic Concrete Type SPS, SPR and SPH, the asphaltic concrete unit price is a product of all applicable pay factors for the item "Asphaltic Concrete, Type _____". Included in a subplot, following approval of the control strips, may be any roadway Asphaltic Concrete Type SPS, SPR or SPH which is produced and approved by the Engineer and including material used for Patching, State Maintenance Patching, and Asphalt for Intersections and Driveways on project shall be eligible for inclusion in subplot(s) tonnage pay factor determination using the roadway Asphaltic Concrete Type _____ unit price. When a control strip is not constructed, the pay factor for the running average of four air voids shall be fixed at 1.0 for the first three asphaltic concrete sublots.
 - (1) When there is a production tolerance pay factor penalty as stated in Paragraph 7.b. subsection 1028.03 this penalty percentage will be entered in the Superpave Asphalt Pay Factor Summary under production specifications for each subplot affected. These

individual pay factors will then be multiplied by each other to determine a total pay factor for each subplot [(750 tons) (680 Mg)].

- f. The pay factors for the single test air voids and moving average of four air voids pay factors will be determined in accordance with Table 1028.18.

Table 1028.18
Acceptance Schedule
Air Voids - N_{des}

Air voids test results for Asphaltic Concrete Type SPR	Air voids test results for SPH Asphaltic Concrete	Pay Factor	
		Moving average of four	Single test
Less than 0.5%	Less than 1.5%	50% or Reject	50% or Reject
0.5% to 0.9%	1.5% to 1.9%	50% or Reject	50%
1.0% to 1.4%	2.0% to 2.4%	50% or Reject	95%
1.5% to 1.9%	2.5% to 2.9%	90%	95%
2.0% to 2.4%	3.0% to 3.4%	100%	100%
2.5% to 3.5%	3.5% to 4.5%	102%	104%
3.6% to 4.0%	4.6% to 5.0%	100%	100%
4.1% to 4.5%	5.1% to 5.5%	95%	95%
4.6% to 5.0%	5.6% to 6.0%	90%	95%
5.1% to 5.5%	6.1% to 6.5%	50% or Reject	90%
5.6% to 6.0%	6.6% to 7.0%	50% or Reject	50%
6.1% and over	7.1% and over	50% or Reject	50% or Reject

8. Asphalt Concrete Density Samples:
- a. The Contractor shall perform density tests under direct observation of Department personnel. The Contractor shall establish the method of testing in the preconstruction conference and shall test in accordance with the AASHTO T 166, NDR T 587, or as otherwise described in these Special Provisions. The Contractor shall insure that the proper adjustment bias and/or correction factors are used and accessible to Department personnel along with all other inputs when NDR T 587 is selected. All correlation factors and test results shall be generated and reported on the Department Density spreadsheet. When AASHTO T 166 is being used, the Department will observe the Contractor taking, transporting, and testing the cores. The Department will take immediate custody of the cores at the completion of the testing. All disputed values determined using NDR T 587 will be resolved using AASHTO T 166.

- b. The Contractor shall determine the density of samples by comparing the specific gravity of the core sample to the Maximum Specific Gravity (Rice) as follows:

$$\% \text{ Density} = \frac{\text{Specific Gravity of Core}}{\text{Maximum Mix Specific Gravity Rice}} \times 100$$

where:

$$\text{Sp. Gr. of Core} = \frac{\text{Wt. of Core in Air}}{\text{Wt. of SSD Core} - \text{Wt. of Core in Water}}$$

$$\text{Maximum Mix Specific Gravity} = (\text{Rice}) \frac{\text{Wt. of Mix in Air}}{\text{Wt. of Mix in Air} - \text{Wt. of Mix in Water}}$$

Note: The individual QC test value of the Maximum Mix Specific Gravity (Rice), determined by AASHTO T 209, will be used to calculate the density of each corresponding core.

- c. The Contractor shall cut cores the first day of work following placement of the mixture. The core samples shall be a minimum of a 3 inch (75mm) diameter.
- d. Normally, 1 sample for determination of density will be taken from each subplot (750 tons) (680 Mg) at locations determined by the Engineer.
- e. The average density of the lot shall be used to compute the pay factor for density. Exceptions to the sampling and testing of core samples for the determination of density are as follows:
- (1) When the nominal layer thickness is 1 inch (25 mm) or less, the sampling and testing of density for this layer will be waived.
 - (2) When the average thickness of the 5 cores for a lot is 1 inch (25 mm) or less, the testing of density samples for this lot will be waived.
 - (3) When the nominal layer thickness and the average of the original 5 cores for a lot are both more than 1 inch (25 mm), but some of the cores are less than 1 inch (25 mm) thick, additional cores shall be cut at randomly selected locations to provide 5 samples of more than 1 inch (25 mm) thickness for the determination of the pay factor for density.
- f. (1) If, at the completion of the project, the final lot consists of less than 3,750 tons (3400 Mg) of asphaltic concrete, a minimum of 3 samples, or 1 sample for each 750 tons (680 Mg) or fraction thereof, whichever is greater, shall be taken and tested for density.
- (2) The test results shall be averaged and the density pay factor based on the values shown in Table 1028.19.
 - (3) Should the average of less than 5 density tests indicate a pay factor less than 1.00, additional density samples to complete the set of five shall be taken at randomly selected locations and the density pay factor based on the average of the 5 tests.

Table 1028.19

Acceptance Schedule Density of Compacted Asphaltic Concrete	
Average Density (5 Samples, Percent of Voidless Density)	Pay Factor
Greater than 92.4	1.00
Greater than 91.9 to 92.4	0.95
Greater than 91.4 to 91.9	0.90
Greater than 90.9 to 91.4	0.85
Greater than 90.4 to 90.9	0.80
Greater than 89.9 to 90.4	0.70
89.9 or Less	0.40 or Reject

- g. If requested by the Contractor, check tests for all density tests in the original set, taken no later than the working day following the receipt of all test results for the lot, will be allowed in lots with a density pay factor of less than 1.00. No re-rolling will be allowed in these lots. Locations for checks tests will be provided by the Engineer from the Random Sampling Schedule. The average density obtained by the check tests shall be used to establish the density pay factor for the lot.
- h. The location of density samples are identified by the Random Sampling Schedule. When the random location is noted as zero or the lane width (i.e., zero or 12 ft. on a 12-foot lane), the core shall be cut with the outer edge of the core barrel no greater than 4 inches away (laterally) from the edge of the top of the mat for an unconfined edge or from the edge of the top of the hot mat (joint) for a confined edge. If using a nuclear gauge, the 4 inches would be measured to the edge of the gauge base. The percent density value at these edge-of-lane locations shall be adjusted upward by 2.5%, but to a value of no greater than 92.5%, and the resultant value used in determining the density pay factor. No initial value of 92.5 or greater shall be adjusted.

WARM MIX ASPHALT (J-7-0715)

The Contractor has the option to use Warm Mix Asphalt (WMA) meeting the following requirements.

1. Warm Mix Asphalt (WMA)

Warm Mix Asphalt mixtures shall follow the requirements of Superpave Asphaltic Concrete and all other applicable sections with the following exceptions:

- a. The Contractor shall request the use of a WMA additive in writing when submitting the Job Mix Formula. The requested additive shall be an approved Level I or II production product or combination thereof. The manufacturer's

recommended additive rates, specifications, and all other pertinent information shall be included in the requests. All requests must be approved by the Flexible Pavements Engineer prior to their use.

b. Level I Production

- (1) Level I WMA additives are as follows: water injection devices.
- (2) Hydrated Lime at 1.25% by weight of virgin aggregate is required for all mixtures.
- (3) The allowable drop in temperature shall be a maximum of 40°F below the producer's recommended production temperature for Hot Mix Asphalt (HMA), or less as required during production to achieve proper laydown and compaction properties. Plant production temperatures shall not drop below 230°F.

c. Level II Production

- (1) Level II WMA additives are as follows: Advera, Evotherm (M1), AkzoNobel Rediset LQ-1102C, Cecabase RT 945 w/AD-here LOF 65-00, and Sasobit.
- (2) For amine based WMA additives, 25% of the additive must be considered an amine based anti-stripping agent, unless Poly-Phosphoric Acid (PPA) is used. If PPA is used in the binder, the WMA shall be a non-amine based WMA, specifically for use and compatible with binders containing PPA. WMA additives and anti-strips shall be terminal blended by the binder supplier. For all other warm mix technologies hydrated lime shall be added at a minimum rate of 1.25% by weight of virgin aggregate, including the weight of limestone. Hydrated Lime shall not be used on Level II WMA mixtures when the WMA additive is an Amine based additive or when the Amine WMA additives are used in combination with Level I water injection. The minimum rate for amine based WMA additives shall be 0.7%. The dosage rate of anti-strip shall not exceed manufacturer's recommendations.
- (3) The drop in temperature shall be a maximum of 90°F from the producer's recommended production temperature for HMA. Plant production temperatures shall not drop below 215°F.

d. Other WMA additives shall not be used unless otherwise approved by the Flexible Pavements Engineer.

e. WMA additives may be used in combination by approval of the Flexible Pavements Engineer.

f. Asphalt mixes shall be tested for TSR on the first lot of production and then on randomly selected lots thereafter.

- g. Field samples shall be heated and compacted using the following table unless otherwise approved by the Flexible Pavements Engineer.

Gyratory Compaction Temperatures

Mix Type	% Rap	Compaction Temp °F
SPS	0-25	270 + 5
	26-55	280 + 5
SPR	0-35	280 + 5
	36-55	290 + 5
SPH	0-35	300 + 5

- h. NDOR may suspend or eliminate the use of WMA on a project if any of the following conditions occur: rutting, segregation, surface voids, tearing, irregular surface, low density, raveling, stripping, or if pavement does not meet any other design criteria.
2. Warm Mix Asphalt (WMA) additives will be measured and paid for directly by the unit of each for the item "Hydrated Lime/Warm Mix Asphalt" for each ton of hot mix asphalt produced.

**ASPHALT DENSITY GAUGE
(J-7-1013)**

Description

An Asphalt Density Gauge may be used for Quality Control when determining the in-place density of asphaltic concrete.

Material Requirements

The device must be approved by the Flexible Pavements Engineer.

Testing Method

1. The Contractor shall establish the method of testing in the preconstruction conference. All testing shall be in accordance with AASHTO T-343 and as directed in this provision.
2. The first 3 density locations of the project shall be cored in accordance with AASHTO T166 to calibrate the asphalt density gauge. Prior to coring, the Contractor shall calibrate the device at each core location.
3. Calibration: A correction factor shall be established for the first 3 cores by calculating the difference between the average density measurement of the asphalt density gauge and the roadway core density. This correction factor shall be entered into the device and used for measuring subsequent densities. The correction factor shall be verified with another core for every 15 density readings that are to be recorded.
4. Density Reading Procedure: Place the asphalt density gauge on the asphalt mat over the area to be tested. Record the density reading, and repeat this process for a total of 5 readings, as detailed in Figure 1. An average of the 5 readings will be used as the

density reading for each location. For densities taken less than 6 inches from the edge of the lift, density readings shall be taken as shown in Figure 2. The span between density reading locations in each direction shall be no greater than 12”.

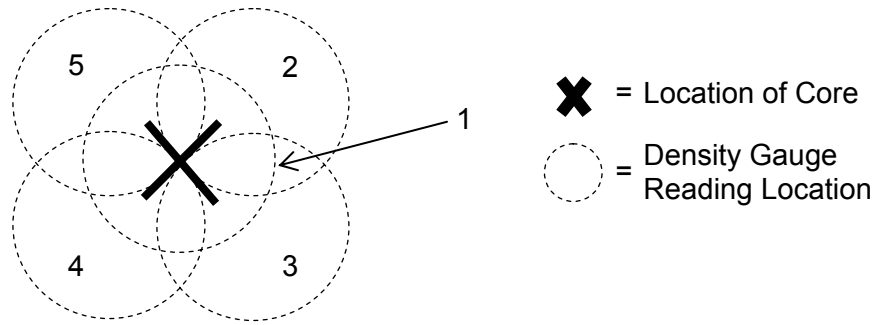


Figure 1: Asphalt density gauge reading pattern

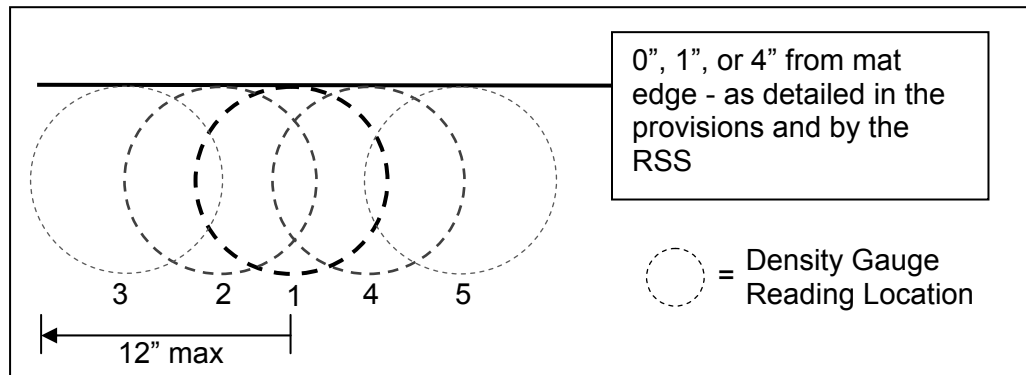


Figure 2: Asphalt density gauge reading pattern less than 6” from mat edge

5. If any density measured by the asphalt density gauge is below 90%, a density core shall be cut at that location and used for density measurement for that subplot. Density readings below 90% shall not be used to calculate a correction factor. All disputed values determined using the asphalt density gauge will be resolved using AASHTO T 166.

ASPHALTIC CONCRETE LONGITUDINAL JOINT DENSITY TESTING (J-7-1013)

Description

One sample for determination of joint density will be taken randomly from each lot. This joint density sample stands independent of the required standard density per subplot used for determining the average of 5 density pay factor.

Equipment

Testing shall be conducted in accordance with the AASHTO T 166, NDR T 587, or an approved Asphalt Density Gauge. The Contractor shall insure that the proper adjustment bias and/or correction factors are used and accessible to Department personnel, along with all other inputs when NDR T 587 or the Asphalt Density Gauge is selected. All correlation factors and test results shall be generated and reported on the Department Density spreadsheets.

Testing

1. The Contractor shall establish the method of testing in the preconstruction conference.
2. One sample for determination of joint density will be taken randomly from each lot, as determined by the Engineer. The location of the edge density samples are identified by the Random Sampling Schedule.
3. The joint density core shall be cut 1 inch away (laterally) from the identified edge of the top of the mat.
4. The Contractor shall cut cores the first day of work following placement of the mixture. The core samples shall be a minimum of a 3 inch (75mm) diameter.
5. The Department will observe the Contractor taking, transporting, and testing the cores (as applicable). The Department will take immediate custody of the cores at the completion of the testing. All disputed values determined using NDR T 587 or the Asphalt Density Gauge will be resolved using AASHTO T166.
6. The Contractor shall determine the density of samples by comparing the specific gravity of the core sample to the Maximum Specific Gravity (Rice) as follows:

$$\% \text{ Density} = \frac{\text{Specific Gravity of Core}}{\text{Maximum Mix Specific Gravity Rice}} \times 100$$

where:

$$\text{Sp. Gr. of Core} = \frac{\text{Wt. of Core in Air}}{\text{Wt. of SSD Core} - \text{Wt. of Core in Water}}$$

$$\text{Maximum Mix Specific Gravity} = (\text{Rice}) \frac{\text{Wt. of Mix in Air}}{\text{Wt. of Mix in Air} - \text{Wt. of Mix in Water}}$$

Note: The individual QC test value of the Maximum Mix Specific Gravity (Rice), determined by AASHTO T 209, will be used to calculate the density of each corresponding core.

7. Exceptions to the sampling and testing of joint density core samples for the determination of density are as follows:
 - a. When the nominal layer thickness is 1 inch (25 mm) or less, the sampling and testing of density for this layer will be waived.
 - b. When the average thickness for the standard lot is 1 inch (25 mm) or less, the testing of joint density samples for this lot will be waived.

8. If requested by the Contractor, a re-test for the original joint density test, taken no later than the working day following the receipt of the test result, will be allowed. Locations of re-tests will be provided by the Engineer from the Random Sampling Schedule. The density obtained by the re-test shall be used to establish the density pay factor for the lot.

Method of Measurement

All work related to the Asphaltic Concrete Longitudinal Joint Density Sample will not be measured and paid for but will be subsidiary to the associated asphaltic concrete.

Basis of Payment

1. The pay factor shall be computed according to the following table:

Joint Density Test Lot Pay Factor			
Joint Density	SPS	SPR	SPH
93.0 or greater	102%	102%	102%
92.0 to 92.9	100%	102%	102%
91.0 to 91.9	98%	100%	102%
90.0 to 90.9	98%	98%	100%
89.0 to 89.9	98%	98%	98%
88.9 or Less	98%	98%	98%

2. The pay factor will be incorporated in the production specs calculation in the Superpave Software. Any incentive or disincentive will be added or subtracted to the pay factor after any other applicable production tolerances pay factors have been incorporated. The pay factor will apply to the entire lot.

HYDRATED LIME FOR ASPHALT MIXTURES (J-12-0213)

1. General

Hydrated lime will be added to all aggregates (at the Contractor's option, limestone may be excluded) used for asphalt mixtures except Asphaltic Concrete used for Temporary Surfacing, and Asphaltic Concrete Type SPS, HRB and SPL. Hydrated lime will be added to pre-moistened aggregates whether it is used directly into the mix or stockpiled for marinating purposes. The application of moisture and hydrated lime to the aggregates along with equipment calibration and procedures to prevent any "dusting" shall be documented and approved in the Contractor's Quality Control (QC) Plan.

2. Material Requirements

The lime shall meet the chemical and physical properties defined in AASHTO M 303 for Type I - High calcium-hydrated lime, or meet the requirements of ASTM 1097 for Type S Hydrated Lime.

The hydrated lime being used, whether for mix design or plant mix production, shall be stored in an enclosed container and must be used within 90 days. Stockpiles marinating

shall also be used within 90 days. Lime that is stored over 90 days in a protected storage silo environment may be submitted for chemical analysis to verify that it meets the specification for use in the mix.

Water shall conform to the requirements of Section 1005.

3. Construction

Prior to the addition of hydrated lime the aggregates shall have a minimum moisture content of 3% by weight of aggregate. The surface of the aggregate shall be uniformly dampened by water.

If additional moisture is required it shall be added at the entry end of an enclosed pug mill mixer and prior to the addition of hydrated lime.

Hydrated Lime shall be added at a rate of 1.25 percent by weight of virgin aggregate, including the weight of the limestone.

4. Equipment

The addition of lime shall be plant controlled, and blended with an enclosed twin-shaft pug mill with a production capacity rating that exceeds the aggregate feed rate. It shall be capable of effective mixing in the full range of asphaltic concrete production rates.

The pug mill set up shall be located in the system at a location where the mixed material can be readily inspected on a belt prior to entry into the drum.

The pug mill shall be designed such that the mixture of aggregate and hydrated lime is moved in a near horizontal direction (within 20 degrees of horizontal) by the mixing paddles without the aid of conveyor belts for a distance of at least three feet (900 mm). Mixing devices which permit the mixture of aggregate and hydrated lime to fall through the mixing blades onto a belt or chute are not acceptable.

A positive signal system and a limit switch device shall be installed in the plant at the point of introduction of the hydrated lime. The positive signal system shall be placed between a metering device and the drum plant, and utilized during production whereby an alarm is activated, alerting the plant that the hydrated lime is not being introduced into the mixture.

The hydrated lime storage silo shall have enough capacity for continuous production. The silo shall be replenished by pneumatic delivery from road tankers at a pressure that will not create dusting. Hydrated lime will be dispensed from the silo into the pug mill by a conventional vane feeder or a load cell pod system.

The mechanism for adding moisture to the aggregate will be configured and located to insure that all virgin aggregate is uniformly coated with moisture prior to the lime application.

5. Sampling and Testing

Hydrated lime shall be certified by the supplier stating its compliance to the specifications.

A physical inventory of hydrated lime usage will be required during mix production. A daily silo inventory, noting "beginning weight", "weight added during the day's production", and "end of day weight", will be recorded and made available for review by the Engineer. When a weigh pod system is used, an accumulative accounting method shall be used to calculate and review lime addition rates throughout production. When calculations indicate a hydrated lime usage of ± 0.15 percent from the design percentage the Contractor shall assume the responsibility to cease production and recalibrate the system prior to resuming mix production. Any asphaltic concrete placed having 0.15 percent below the design percentage shall be removed and replaced at no cost.

The percent of moisture shall be determined and documented: 1) from belt samples or 2) from stockpile samples, a minimum of once per day.

6. Mixture QC and Verification Testing

During an ignition oven burn off, lime will combine with the sulfur in the binder and produce ash. Therefore, when mix containing hydrated lime is being designed and produced a correction factor to the ignition oven burn off result of +0.30% shall be used. This correction factor shall be added to the ignition oven binder content reading in order for the actual binder content to be determined.

7. Method of Measurement:

Hydrated Lime shall be measured for payment by the unit of each for each ton of hot mix asphalt used and incorporated into the project, or for State Maintenance Patching.

Water applied shall not be measured and paid for but shall be considered subsidiary to the item "Hydrated Lime/Warm Mix Asphalt".

8. Basis of Payment:

Lime, measured as provided herein and incorporated into the project, shall be paid for at the contract unit price per each for the item "Hydrated Lime/Warm Mix Asphalt". Lime measured as provided herein and used for State Maintenance Patching shall be paid for at the contract unit price per each for the item "Hydrated Lime/Warm Mix Asphalt for State Maintenance Patching". This price shall be full compensation for furnishing, delivering, hauling, storing, all labor, equipment, tools and incidentals necessary to complete the work.

**HYDRATED LIME SLURRY FOR ASPHALT MIXTURES
(J-12-0213)**

- 1. General** — The Contractor will have the option of using Hydrated Lime Slurry For Asphalt Mixtures or Hydrated Lime For Asphalt Mixtures. Hydrated lime slurry will be added to all aggregates (at the Contractor's option, limestone may be excluded) used for asphalt mixtures except Asphaltic Concrete used for Temporary Surfacing, and Asphaltic Concrete Type SPS and SPL. Hydrated lime slurry will be added to aggregates whether it is used directly into the mix or stockpiled for marinating purposes. The application of

hydrated lime slurry to the aggregates along with equipment calibration and procedures shall be documented and approved in the Contractor's Quality Control (QC) Plan.

2. **Material Requirements** — The lime shall meet the chemical and physical properties defined in AASHTO M 303 for Type I - High calcium-hydrated lime, or meet the requirements of ASTM 1097 for Type S Hydrated Lime.

The dry hydrated lime being used, whether for mix design or plant mix production, shall be stored in an enclosed container and must be used within 90 days. Stockpiles marinating shall also be used within 90 days. Hydrated lime (dry or slurry) that is stored over 90 days in a protected storage silo or slurry tank may be submitted for chemical analysis to verify that it meets the specification for use in the mix.

Water shall conform to the requirements of Section 1005.

3. **Construction** — Hydrated Lime shall be added at a rate of 1.25 percent by weight of virgin aggregate, including the weight of the limestone.
4. **Equipment** — The addition of lime shall be plant controlled, and blended with an enclosed twin-shaft pug mill with a production capacity rating that exceeds the aggregate feed rate. It shall be capable of effective mixing in the full range of asphaltic concrete production rates.

The pug mill set up shall be located in the system at a location where the mixed material can be readily inspected on a belt prior to entry into the drum.

The pug mill shall be designed such that the mixture of aggregate and hydrated lime is moved in a near horizontal direction (within 20 degrees of horizontal) by the mixing paddles without the aid of conveyor belts for a distance of at least three feet (900 mm).

Mixing devices which permit the mixture of aggregate and hydrated lime to fall through the mixing blades onto a belt or chute are not acceptable.

A positive signal system and a limit switch device shall be installed in the plant at the point of introduction of the hydrated lime. The positive signal system shall be placed between a metering device and the drum plant, and utilized during production whereby an alarm is activated; alerting the plant that the hydrated lime is not being introduced into the mixture.

A minimum of two hydrated lime slurry tanks shall be used for blending and supply. Slurry shall be drawn for production from only one tank at a time. The hydrated lime slurry tanks shall have enough capacity for continuous production.

Hydrated lime slurry shall be dispensed from a slurry tank into the pug mill by a pressure regulated spray system having an electronic flow measurement system that has been calibrated to insure the proper application rates will be provided. Certificate of Calibration for the spray bar system should be provided by the Contractor with the calibration being performed by a third party every 12 months (minimum) or at the Engineer's request.

The electronic flow measurement system shall automatically record the flow rate of the lime slurry being feed to the pug mill. The data recorder system shall be capable of

recording the flow rate (in gallons per minute) at intervals of not more than 5 minutes and shall have the capability of calculating the volume of lime slurry used each day, from each slurry tank, and shall be capable of printing a summary of the daily lime slurry usage for each tank. This printout of the daily lime slurry volumes shall be presented to the NDOR representative at the end of each day's production.

- 5. Blending and Supply Hydrated Lime Slurry** — The Contractor shall determine the target hydrated lime slurry concentration (percent solids) that will be used to produce the asphalt mixture. This target concentration value shall be provided to the Engineer prior to production of the asphalt mixture and shall not be less than 30 percent. The target concentration value shall not be modified without the approval of the Engineer. It is the Contractor's responsibility to control the concentration of the hydrated lime slurry.

Only valid weights of dry hydrated lime shall be added to the required quantity of water to provide uniform hydrated lime slurry having a dry solids content within ± 0.5 percent of the Contractor's target value. Water or dry hydrated lime shall not be added to a tank that is actively supplying hydrated lime slurry to the pug mill. Hydrated lime slurry shall not be drawn from a tank that is not completely blended in accordance with the manufacturer's recommendations.

The hydrated lime slurry in the active supply tank shall be agitated prior to and during production in accordance with the manufacturer's recommendations.

Dry hydrated lime shall be transferred at a pressure that will not create dusting.

- 5.1** If individual hydrated lime slurry tanks are dedicated to only blending or supply, then thoroughly mixed hydrated lime slurry may be added from the blending tank(s) to the supply tank during production, provided the concentrations are within ± 0.5 percent.
- 5.2** If the hydrated lime slurry tanks are used for both blending and supply, the tanks shall be plumbed such that hydrated lime slurry can be supplied to the pug mill from any of the blending/supply tanks without disruption of the slurry supply.
- 6. Sampling and Testing** — Hydrated lime shall be certified by the supplier stating its compliance to the specifications.

The concentration of the lime slurry shall be controlled within ± 0.5 percent of the target hydrated lime slurry concentration (percent solids). The concentration of the hydrated lime shall be determined in accordance with section 6.1. It is the Contractor's responsibility to halt production to make adjustments when the concentrations fall out of compliance.

The concentration of the lime slurry shall be determined and recorded by the Contractor immediately following blending each batch of lime slurry for the project. These records shall include date and time of test, sample collection information, and the unit weight, temperature and concentration of slurry. These records shall be made available to the Engineer upon request.

A physical inventory of hydrated lime usage will be required during mix production. This inventory shall be used to verify the lime application rate, and for payment of the

hydrated lime. The concentration of the lime slurry shall be determined and recorded by the Contractor at the beginning and at approximately the mid-point of each day's production. The hydrated lime slurry samples shall be collected from the supply line leading to the pug mill. These records shall include date and time of test, sample collection information, and the unit weight, temperature and concentration of slurry. These records shall be presented to the NDOR representative at the end of each day's production.

When calculations indicate that the application rate of "dry" hydrated lime to the aggregate is ± 0.15 percent from the design percentage the Contractor shall assume the responsibility to cease production and recalibrate the system prior to resuming mix production. Any asphaltic concrete placed having a "dry" hydrated lime application rate (applied to aggregate) of 0.15 percent below the design percentage shall be removed and replaced at no cost.

6.1 The Contractor shall determine the solids content (concentration) of the hydrated lime slurry using Table 1, Table 2 and the Slurry Worksheet. The Contractor shall provide and use the standard weight per 83.205-ml Gardner cup meeting the requirements of ASTM D 244.

After a batch of lime slurry has been produced, use the following procedures to verify that the intended percent solids have been achieved.

1. Fill a quart container 3/4 full with lime slurry. Samples can be taken from ports located at either end of the vessel. Do not use glass.
2. Weigh a dry, empty Gardner (WPG) cup and cover to the nearest 0.01 of a gram. Record this weight.
3. Shake the lime slurry sample well. Immediately fill the WPG cup.
4. Tap the WPG cup lightly on an immovable object to allow for the escape of air bubbles.
5. Slowly turn the cap of the WPG cup until it is completely seated. If the cover is pushed on quickly, lime slurry will squirt out through the hole in the center. Be sure to point the top of the WPG away from you (or others) while putting on the cap.
6. Hold the WPG cup by the top and bottom with thumb and forefinger. Be sure to cover the hole in the cap.
7. Rinse the WPG cup under running water to remove any lime from the outside of the cup.
8. Dry the outside of the cup thoroughly.
9. Weigh the dry, filled WPG cup to the nearest 0.01 of a gram. Record this weight.
10. Promptly remove the cover, insert thermometer and record the temperature.
11. Subtract the empty cup weight (from step 2) from the filled cup weight (step 9) and record the difference.

12. Multiply the difference by 0.1. This number is the density (lbs./gallon) of the lime slurry. Record this number.
 13. Look up the temperature correction in Table 2 and record the value.
 14. Multiply the slurry density times the temperature correction value. This is the adjusted slurry density. Record the adjusted slurry density on the slurry worksheet.
 15. Find the nearest density to that recorded above on the "Slurry Solids Chart" on Table 1, Slurry Solids Chart - 24 degrees C. The corresponding number is the percent solids (concentration) of the lime slurry sample. Record on worksheet.
7. **Mixture QC and Verification Testing** — During an ignition oven burn off, lime will combine with the sulfur in the binder and produce ash. Therefore, when mix containing hydrated lime is being designed and produced a correction factor to the ignition oven burn off result of +0.30% shall be used. This correction factor shall be added to the ignition oven binder content reading in order for the actual binder content to be determined.
8. **Method of Measurement** — Hydrated Lime shall be measured for payment by the unit of each for each ton of hot mix asphalt used and incorporated into the project, or for State Maintenance Patching.
- Water applied shall not be measured and paid for but shall be considered subsidiary to the item "Hydrated Lime/Warm Mix Asphalt".
9. **Basis of Payment** — Lime, measured as provided herein and incorporated into the project, shall be paid for at the contract unit price per each for the item "Hydrated Lime/Warm Mix Asphalt". Lime measured as provided herein and used for State Maintenance Patching shall be paid for at the contract unit price per each for the item "Hydrated Lime/Warm Mix Asphalt for State Maintenance Patching". This price shall be full compensation for furnishing, delivering, hauling, storing, all labor, equipment, tools and incidentals necessary to complete the work.

Table 1, Page 1
Slurry Solids Chart – 24°C

Density lbs./gal.	Slurry Solids %	Density lbs./gal.	Slurry Solids %	Density lbs./gal.	Slurry Solids %	Density lbs./gal.	Slurry Solids %
9.108	15.1	9.402	20.1	9.715	25.1	10.050	30.1
9.114	15.2	9.406	20.2	9.722	25.2	10.057	30.2
9.120	15.3	9.414	20.3	9.728	25.3	10.064	30.3
9.128	15.4	9.420	20.4	9.735	25.4	10.071	30.4
9.131	15.5	9.426	20.5	9.741	25.5	10.078	30.5
9.137	15.6	9.433	20.6	9.748	25.6	10.085	30.6
9.143	15.7	9.439	20.7	9.755	25.7	10.092	30.7
9.148	15.8	9.445	20.8	9.761	25.8	10.099	30.8
9.154	15.9	9.451	20.9	9.768	25.9	10.106	30.9
9.160	16.0	9.457	21.0	9.774	26.0	10.113	31.0
9.166	16.1	9.463	21.1	9.781	26.1	10.120	31.1
9.171	16.2	9.469	21.2	9.787	26.2	10.127	31.2
9.177	16.3	9.476	21.3	9.794	26.3	10.134	31.3
9.183	16.4	9.482	21.4	9.800	26.4	10.141	31.4
9.189	16.5	9.488	21.5	9.807	26.5	10.148	31.5
9.195	16.6	9.494	21.6	9.814	26.6	10.155	31.6
9.200	16.7	9.500	21.7	9.820	26.7	10.163	31.7
9.206	16.8	9.506	21.8	9.827	26.8	10.170	31.8
9.212	16.9	9.513	21.9	9.833	26.9	10.177	31.9
9.218	17.0	9.519	22.0	9.840	27.0	10.184	32.0
9.224	17.1	9.525	22.1	9.847	27.1	10.191	32.1
9.230	17.2	9.531	22.2	9.853	27.2	10.198	32.2
9.235	17.3	9.538	22.3	9.860	27.3	10.205	32.3
9.241	17.4	9.544	22.4	9.867	27.4	10.212	32.4
9.247	17.5	9.550	22.5	9.873	27.5	10.220	32.5
9.253	17.6	9.556	22.6	9.880	27.6	10.227	32.6
9.259	17.7	9.563	22.7	9.887	27.7	10.234	32.7
9.265	17.8	9.569	22.8	9.894	27.8	10.241	32.8
9.271	17.9	9.575	22.9	9.900	27.9	10.248	32.9
9.277	18.0	9.581	23.0	9.907	28.0	10.255	33.0
9.282	18.1	9.588	23.1	9.914	28.1	10.263	33.1
9.288	18.2	9.594	23.2	9.920	28.2	10.270	33.2
9.294	18.3	9.600	23.3	9.927	28.3	10.277	33.3
9.300	18.4	9.607	23.4	9.934	28.4	10.284	33.4
9.306	18.5	9.613	23.5	9.941	28.5	10.292	33.5
9.312	18.6	9.619	23.6	2.948	28.6	10.299	33.6
9.318	18.7	9.626	23.7	9.954	28.7	10.306	33.7
9.324	18.8	9.632	23.8	9.961	28.8	10.314	33.8
9.330	18.9	9.638	23.9	9.968	28.9	10.321	33.9
9.336	19.0	9.645	24.0	9.975	29.0	10.328	34.0
9.342	19.1	9.651	24.1	9.982	29.1	10.335	34.1
9.348	19.2	9.658	24.2	9.988	29.2	10.343	34.2
9.354	19.3	9.664	24.3	9.995	29.3	10.350	34.3
9.360	19.4	9.670	24.4	10.002	29.4	10.358	34.4
9.366	19.5	9.677	24.5	10.009	29.5	10.365	34.5
9.372	19.6	9.683	24.6	10.016	29.6	10.372	34.6
9.378	19.7	9.690	24.7	10.023	29.7	10.380	34.7
9.384	19.8	9.696	24.8	10.030	29.8	10.387	34.8
9.390	19.9	9.703	24.9	10.037	29.9	10.394	34.9
9.396	20.0	9.709	25.0	10.044	30.0	10.402	35.0

Table 1, Page 2
Slurry Solids Chart – 24°C

Density lbs./gal.	Slurry Solids %	Density lbs./gal.	Slurry Solids %	Density lbs./gal.	Slurry Solids %	Density lbs./gal.	Slurry Solids %
10.409	35.1	10.795	40.1	11.210	45.1	11.658	50.1
10.417	35.2	10.803	40.2	11.218	45.2	11.667	50.2
10.424	35.3	10.811	40.3	11.227	45.3	11.677	50.3
10.432	35.4	10.819	40.4	11.236	45.4	11.686	50.4
10.439	35.5	10.827	40.5	11.244	45.5	11.695	50.5
10.447	35.6	10.835	40.6	11.253	45.6	11.705	50.6
10.454	35.7	10.843	40.7	11.262	45.7	11.714	50.7
10.462	35.8	10.851	40.8	11.270	45.8	11.724	50.8
10.469	35.9	10.859	40.9	11.279	45.9	11.733	50.9
10.477	36.0	10.867	41.0	11.288	46.0	11.743	51.0
10.484	36.1	10.875	41.1	11.297	46.1	11.752	51.1
10.492	36.2	10.883	41.2	11.305	46.2	11.762	51.2
10.499	36.3	10.892	41.3	11.314	46.3	11.771	51.3
10.507	36.4	10.900	41.4	11.323	46.4	11.781	51.4
10.514	36.5	10.908	41.5	11.332	46.5	11.790	51.5
10.522	36.6	10.916	41.6	11.341	46.6	11.800	51.6
10.530	36.7	10.924	41.7	11.349	46.7	11.809	51.7
10.537	36.8	10.932	41.8	11.358	46.8	11.819	51.8
10.545	36.9	10.941	41.9	11.367	46.9	11.828	51.9
10.552	37.0	10.949	42.0	11.376	47.0	11.838	52.0
10.560	37.1	10.957	42.1	11.385	47.1	11.848	52.1
10.568	37.2	10.965	42.2	11.394	47.2	11.857	52.2
10.575	37.3	10.974	42.3	11.403	47.3	11.867	52.3
10.583	37.4	10.982	42.4	11.412	47.4	11.877	52.4
10.591	37.5	10.990	42.5	11.421	47.5	11.886	52.5
10.599	37.6	10.998	42.6	11.430	47.6	11.896	52.6
10.606	37.7	11.007	42.7	11.439	47.7	11.906	52.7
10.614	37.8	11.015	42.8	11.447	47.8	11.915	52.8
10.622	37.9	11.023	42.9	11.456	47.9	11.925	52.9
10.629	38.0	11.032	43.0	11.465	48.0	11.935	53.0
10.637	38.1	11.040	43.1	11.475	48.1	11.945	53.1
10.645	38.2	11.048	43.2	11.484	48.2	11.954	53.2
10.653	38.3	11.057	43.3	11.493	48.3	11.964	53.3
10.661	38.4	11.065	43.4	11.502	48.4	11.974	53.4
10.668	38.5	11.074	43.5	11.511	48.5	11.984	53.5
10.676	38.6	11.082	43.6	11.520	48.6	11.994	53.6
10.684	38.7	11.090	43.7	11.529	48.7	12.004	53.7
10.692	38.8	11.099	43.8	11.538	48.8	12.014	53.8
10.700	38.9	11.107	43.9	11.547	48.9	12.023	53.9
10.707	39.0	11.116	44.0	11.556	49.0	12.033	54.0
10.715	39.1	11.124	44.1	11.566	49.1	12.043	54.1
10.723	39.2	11.133	44.2	11.575	49.2	12.053	54.2
10.731	39.3	11.141	44.3	11.584	49.3	12.063	54.3
10.739	39.4	11.150	44.4	11.593	49.4	12.073	54.4
10.747	39.5	11.158	44.5	11.602	49.5	12.083	54.5
10.755	39.6	11.167	44.6	11.612	49.6	12.093	54.6
10.763	39.7	11.175	44.7	11.621	49.7	12.103	54.7
10.771	39.8	11.184	44.8	11.630	49.8	12.113	54.8
10.779	39.9	11.193	44.9	11.639	49.9	12.123	54.9
10.787	40.0	11.201	45.0	11.649	50.0	12.134	55.0

Table 2
Correction Factor to Adjust Slurry Densities for Temperature

Temp (C)	Factor	Temp (C)	Factor
20	0.99927	61	1.01176
21	0.99944	62	1.01218
22	0.99962	63	1.01262
23	0.99981	64	1.01305
24	1.00000	65	1.01349
25	1.00002	66	1.01394
26	1.00041	67	1.01439
27	1.00063	68	1.01485
28	1.00085	69	1.01531
29	1.00109	70	1.01578
30	1.00132	71	1.01626
31	1.00157	72	1.01673
32	1.00182	73	1.01722
33	1.00208	74	1.01770
34	1.00234	75	1.01820
35	1.00261	76	1.01870
36	1.00289	77	1.01920
37	1.00318	78	1.01971
38	1.00347	79	1.02022
39	1.00376	80	1.02074
40	1.00407	81	1.02126
41	1.00438	82	1.02179
42	1.00469	83	1.02232
43	1.00501	84	1.02286
44	1.00534	85	1.02341
45	1.00567	86	1.02395
46	1.00601	87	1.02451
47	1.00635	88	1.02506
48	1.00670	89	1.02563
49	1.00706	90	1.02619
50	1.00742	91	1.02677
51	1.00779	92	1.02734
52	1.00816	93	1.02793
53	1.00854	94	1.02851
54	1.00892	95	1.02911
55	1.00931	96	1.02970
56	1.00970	97	1.03031
57	1.01010	98	1.03091
58	1.01051	99	1.03152
59	1.01092	100	1.03214
60	1.01134	101	1.03276

**PORTLAND CEMENT CONCRETE
(J-15-0615)**

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	5.0 - 7.0	30±3	0.36	4000
PR1		I/II	752	2500	2950	6.0 - 8.5	30±3	0.36
PR3	III	799	2500	2950	6.0 - 8.5	30±3	0.45	3500
SF ₍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-15-0515)

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.
- c. The base material shall conform to Sections 1030, 1031 and 1032.

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 or 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

AGGREGATE SPECIFICATION RANGE	Class	Percentage Max Min	Percent Passing									
			1 1/2"	1"	3/4"	1/2"	3/8"	No.4	No.10	No.20	No.30	No.200
			Class A	--	--	--	--	100	100	90	--	40
Class B	--	100	--	--	--	97	70	--	40	3		
Class C	--	100	--	--	--	88	50	--	20	3		
						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

AGGREGATE SPECIFICATION RANGE	Class	Percent	Percent Passing									
			1 1/2"	1"	3/4"	1/2"	3/8"	No.4	No.10	No.20	No.30	No.200
			Max	100	100	90	--	45	12	--	*4	--
Min		92	66		15	0		0		0		
Max	Class F		--	--	100	90	30	8			3	
Min					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.

**INCENTIVE PAYMENT FOR THE USE OF
RECYCLED ASPHALTIC PAVEMENT (RAP) FOR ASPHALTIC MIXTURES
(J-22-0315)**

General

This specification establishes a standard method for paying an incentive to use Recycled Asphaltic Pavement (RAP) in asphalt mixture types: SPH, SPS, SPR, SRM, SLX and LC. The intent of this specification is to provide an incentive for incorporating as much RAP into the asphalt mixtures as allowed by the respective mixture's specification.

Method of Measurement

1. The RAP Incentive Payment shall be based on the actual total of asphalt production for the entire project. A RAP Incentive Payment shall be calculated for each eligible asphaltic concrete type.
2. The following formula will be used to calculate the "RAP Incentive Factor".

$$\text{RAP Incentive Factor} = [(A-B) \div 100] \times C \times D$$

Where:

- | | | |
|---|---|---|
| A | = | State's Established Percent Binder – based on gradation band. |
| B | = | Actual Percentage of Binder – added to asphaltic mixture. |
| C | = | Unit Bid price of Binder |
| D | = | RAP Pay Factor |

3. The overall RAP Incentive Payments – for each eligible mix type and/or RAP source – shall be the RAP Incentive Factor multiplied by the total accepted tons of asphaltic concrete in which the RAP was incorporated.
4. RAP Incentive Payment is paid for as an “established” contract unit price which is shown in the bid proposal “Schedule of Items”.
5. The actual quantity for RAP Incentive Payment will be calculated based on the Method of Measurement stated above in this provision.

RECYCLED ASPHALT SHINGLES FOR USE IN ASPHALTIC CONCRETE (J-25-0411)

Description:

Recycled Asphalt Shingles (RAS) may be used in Asphaltic Concrete. The maximum allowable (by weight) will be 10% on shoulders and 5% on mainline.

Materials:

All RAS shall consist of organic felt shingles or fiberglass shingles, obtained from a shingle manufacturing facility or tear offs. Scrap shingles shall not contain any objectionable materials (less than 1.5% by weight), including but not limited to: road tar, metal, glass, wood, plastic, brick, rubber, fabric, or any other material having similar characteristics. The RAS shall not contain harmful quantities of asbestos in accordance with guidelines provided by the Environmental Protection Agency and shall conform to all state and local regulations.

All RAS material shall be sized so that 100% (by weight) of the material passes through a 1/2-inch sieve, and at least 95 percent shall pass through a 3/8-inch sieve.

Before mix design approval, the following shall be submitted, along with materials and paper work for the mix design.

- I. Certification by the processor of the shingle scrap, as to the shingle scraps content and source. Certification forms are available from DOR.
- II. A 5-lb. sample of the shingle scrap material for review.

Construction Requirements:

RAS shall be stockpiled separate, from other salvaged material. Blending of scrap material in a stockpile with other salvage material is prohibited.

Scrap shingles shall be introduced into the hot mix asphalt, at the asphalt mixing plant, at the same point where Recycled Asphalt Pavement (RAP) is introduced.

Asphaltic Concrete containing RAS, regardless of RAP content, shall have a minimum of 55% virgin PG Binder.

Basis of Payment:

The RAS material will be eligible for the RAP Incentive at a rate of 50% as specified elsewhere in the specifications.

RECYCLED ASPHALT SHINGLES (RAS) CERTIFICATION SHEET

Project

Processor of Shingle Scrap:

Name

Address

.....

Contact

Phone

We the undersigned, certify that the shingle scrap to be used on this project, was supplied directly from the processor listed below. We also certify that the material supplied consisted of only organic and/or fiberglass shingles and contains no harmful quantity of asbestos or other hazardous material in accordance with Environmental Protection Agency and all state and local regulations.

.....
Name of Contractor Shingle Scrap was Supplied to

.....
Address

.....
Authorized Representative of Processor of Shingle Material
Date

**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.

* * * * *

600INFSEP15

INDEX

AGGREGATES 159

ASPHALT DENSITY GAUGE 123

ASPHALTIC CONCRETE 61

ASPHALTIC CONCRETE LONGITUDINAL JOINT DENSITY TESTING 124

ASPHALTIC CONCRETE PAVEMENT SMOOTHNESS..... 51

ASPHALTIC CONCRETE PLACEMENT 70

BITUMINOUS LIQUID COMPOUNDS FOR CURING CONCRETE 153

BITUMINOUS PAVEMENT PATCHING 66

BORROW, WASTE, STOCKPILE, AND PLANT SITE APPROVAL 22

BUY AMERICA..... 21

CALCIUM CHLORIDE..... 149

COLD MILLING CLASS 3 AND COLD MILLING CLASS 3, TYPE A 70

COLD WEATHER ASPHALTIC CONCRETE PLACEMENT..... 61

CONSTRUCTION DETAILS..... 32

CONSTRUCTION METHODS 33

CONSTRUCTION STORMWATER MANAGEMENT CONTROL 32

CONTRACT TIME ALLOWANCE 19

DEFORMED METAL CENTER JOINT AND METAL KEYWAY..... 159

DOWEL BARS 163

DROP-OFF/COLD-MILLED TAPERED EDGE 67

ELECTRONIC SHOP DRAWINGS 27

ENVIRONMENTAL COMMITMENT 8

ENVIRONMENTAL COMMITMENT DOCUMENT 35

ENVIRONMENTAL COMMITMENT ENFORCEMENT 38

EPOXY COATED REINFORCING STEEL..... 164

EPOXY COMPOUNDS AND ADHESIVES 157

GENERAL CONDITIONS 6

HYDRATED LIME FOR ASPHALT MIXTURES 126

HYDRATED LIME SLURRY FOR ASPHALT MIXTURES..... 128

**INCENTIVE PAYMENT FOR THE USE OF RECYCLED ASPHALTIC PAVEMENT (RAP)
FOR ASPHALTIC MIXTURES** 164

JOINT AND CRACK SEALING FILLER 153

LEGAL RELATIONS AND RESPONSIBILITY TO THE PUBLIC..... 17

LIABILITY INSURANCE 28

LIMITATION OF OPERATIONS..... 33

LIQUID MEMBRANE-FORMING COMPOUNDS FOR CURING CONCRETE..... 152

MULTI-LAYER EPOXY POLYMER OVERLAY 83

OPTIONAL NOTCHED WEDGE JOINT 68

PARTIAL PAYMENT 20

PENETRATING CONCRETE SEALERS	81
PERFORMANCE GRADED BINDER	92
PORTLAND AND INTERGROUND/BLENDED CEMENT	145
PORTLAND CEMENT CONCRETE.....	137
PREFORMED EXPANSION JOINT	80
PRESERVATION OF TREES.....	92
PROPOSAL GUARANTY	168
PROPOSAL GUARANTY BID BOND.....	16
RECYCLED ASPHALT SHINGLES FOR USE IN ASPHALTIC CONCRETE.....	166
RECYCLED ASPHALT SHINGLES (RAS) CERTIFICATION SHEET.....	167
REQUIRED SUBCONTRACTOR/SUPPLIER QUOTATIONS LIST	16
RUMBLE STRIPS.....	69
SECTION 1007 -- CHEMICAL ADMIXTURES.....	150
SECTION 1028 - SUPERPAVE ASPHALTIC CONCRETE	101
SECTION 1029 - PERFORMANCE GRADED BINDER	92
SECTION 605 -- CONCRETE PAVEMENT REPAIR.....	71
SILICA FUME.....	152
SPECIAL PROSECUTION AND PROGRESS	
(Federal Immigration Verification System)	18
(General Requirements).....	7
(Migratory Birds)	14
(Milling/Asphaltic Concrete Placement).....	8
(Subletting or Assigning of Contract)	23
STATUS OF RIGHT OF WAY	7
STATUS OF UTILITIES.....	6
STORM WATER DISCHARGES	15
STORM WATER POLLUTION PREVENTION PLAN (SWPPP).....	36
SUPERPAVE ASPHALTIC CONCRETE	101
SURVEILLANCE OF TEMPORARY TRAFFIC CONTROL DEVICES	49
TABULATION OF CORES	
(FOR INFORMATION ONLY)	70
TACK COAT.....	64
TEMPORARY TRAFFIC CONTROL DEVICES	
(Type II Barricades, Reflectorized Drums, 42" (1070 mm) Reflective Cones, and Vertical Panels).....	43
TEMPORARY WATER POLLUTION CONTROL	32
TYPE B HIGH INTENSITY WARNING LIGHTS.....	43
VALUE ENGINEERING PROPOSALS (VEP)	17
WARM MIX ASPHALT	121
WATER FOR CONCRETE	149
WET REFLECTIVE THERMOPLASTIC PAVEMENT MARKING.....	45
WORK ZONE TRAFFIC CONTROL SIGNS	44
WORKER VISIBILITY	17

CONTRACT ID: 6430X

PROJECT(S): RD-80-4(1030)

CALL ORDER NO.: 600

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS

SECTION 1 GROUP 6 BRIDGE AT STATION 1841+60 LT
WB - 4-SPAN PRESTRESSED CONCRETE I - BEAM - REPAIRS

0001	0030.60	MOBILIZATION	LUMP		LUMP		.
0002	6005.36	PRECOMPRESSED POLYURETHANE FOAM JOINT, TYPE A	LF	124.000	.		.
0003	6016.20	MULTI-LAYER EPOXY POLYMER OVERLAY	SY	1889.000	.		.
0004	6131.23	PENETRATING CONCRETE SEALER	SF	3436.000	.		.
SECTION 1 TOTAL							.

SECTION 2 GROUP 6A BRIDGE AT STATION 1841+60 RT
EB - 4-SPAN PRESTRESSED CONCRETE I - BEAM - REPAIRS

0005	0030.60	MOBILIZATION	LUMP		LUMP		.
0006	6005.36	PRECOMPRESSED POLYURETHANE FOAM JOINT, TYPE A	LF	124.000	.		.
0007	6016.20	MULTI-LAYER EPOXY POLYMER OVERLAY	SY	1889.000	.		.
0008	6131.23	PENETRATING CONCRETE SEALER	SF	3436.000	.		.
SECTION 2 TOTAL							.

SECTION 3 GROUP 9 BITUMINOUS

0009	0002.55	OVERLAY BROKEN LINES	STA	764.000	.		.
0010	0002.60	OVERLAY SOLID LINES	STA	1616.000	.		.
0011	0030.90	MOBILIZATION	LUMP		LUMP		.

CONTRACT ID: 6430X

PROJECT(S): RD-80-4(1030)

CALL ORDER NO.: 600

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0012	3039.11 CONCRETE PAVEMENT REPAIR, TYPE A, FULL DEPTH	26.840 CY	.		.	
0013	3039.12 CONCRETE PAVEMENT REPAIR, TYPE B, FULL DEPTH	40.070 CY	.		.	
0014	7515.33 5" WHITE WET REFLECTIVE THERMOPLASTIC PAVEMENT MARKING	1000.000 LF	.		.	
0015	7515.35 5" WHITE WET REFLECTIVE THERMOPLASTIC PAVEMENT MARKING, GROOVED	46800.000 LF	.		.	
0016	7516.33 5" YELLOW WET REFLECTIVE THERMOPLASTIC PAVEMENT MARKING	800.000 LF	.		.	
0017	7516.36 5" YELLOW WET REFLECTIVE THERMOPLASTIC PAVEMENT MARKING, GROOVED	37500.000 LF	.		.	
0018	8022.20 HYDRATED LIME/WARM MIX ASPHALT	14300.000 EACH	.		.	
0019	8028.01 FOUNDATION COURSE REPLACEMENT	1.280 CY	.		.	
0020	9005.23 ASPHALTIC CONCRETE, TYPE SPS	3800.000 TON	.		.	
0021	9005.90 ASPHALTIC CONCRETE, TYPE SPH (0.5)	14300.000 TON	.		.	
0022	9010.51 ASPHALTIC CONCRETE FOR PATCHING, TYPE SPS	200.000 TON	.		.	
0023	9021.12 PERFORMANCE GRADED BINDER (52-34)	128.000 TON	.		.	
0024	9021.13 PERFORMANCE GRADED BINDER (64-34)	543.400 TON	.		.	
0025	9053.00 TACK COAT	25370.000 GAL	.		.	
0026	9179.23 COLD MILLING, CLASS 3	416.783 STA	.		.	
0027	9179.43 COLD MILLING, CLASS 3 TYPE A	355.325 STA	.		.	

CONTRACT ID: 6430X

PROJECT(S): RD-80-4(1030)

CALL ORDER NO.: 600

LINE NO	ITEM DESCRIPTION		APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
				DOLLARS	CTS	DOLLARS	CTS
0028	9185.76	RUMBLE STRIPS, ASPHALT	727.450 STA	.		.	
0029	9300.38	RAP INCENTIVE PAYMENT	31110.000 EACH	1.00000		31,110.00	
0030	9300.52	ASPHALT PAVEMENT SMOOTHNESS TESTING I/D	LUMP	LUMP		.	
SECTION 3 TOTAL						.	

SECTION 4 GROUP 10 GENERAL ITEMS

0031	0001.00	SURVEILLANCE OF TEMPORARY TRAFFIC CONTROL DEVICES	83.000 CDAY	.		.	
0032	0001.08	BARRICADE, TYPE II	20050.000 BDAY	0.50000		10,025.00	
0033	0001.10	BARRICADE, TYPE III	288.000 BDAY	.		.	
0034	0001.75	TEMPORARY SIGN DAY	240.000 EACH	.		.	
0035	0001.90	SIGN DAY	1992.000 EACH	.		.	
0036	0002.97	FLASHING ARROW PANEL	90.000 DAY	.		.	
0037	0030.00	MOBILIZATION	LUMP	LUMP		.	
0038	9110.01	RENTAL OF LOADER, FULLY OPERATED	50.000 HOUR	.		.	
0039	9110.02	RENTAL OF MOTOR GRADER, FULLY OPERATED	50.000 HOUR	.		.	
0040	9110.03	RENTAL OF DUMP TRUCK, FULLY OPERATED	50.000 HOUR	.		.	
0041	9110.07	RENTAL OF SKID LOADER, FULLY OPERATED	50.000 HOUR	.		.	

CONTRACT ID: 6430X

PROJECT(S): RD-80-4(1030)

CALL ORDER NO.: 600

LINE NO	ITEM DESCRIPTION		APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
				DOLLARS	CTS	DOLLARS	CTS
0042	L860.50	ENVIRONMENTAL COMMITMENTS - CONTRACTOR COMPLIANCE	LUMP	LUMP		.	
	SECTION 4 TOTAL					.	
	TOTAL BID					.	