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

NEBRASKA DEPARTMENT OF ROADS
LETTING DATE : October 09, 2003

CALL ORDER: N12 CONTRACT ID: 5111

CONTROL NO./SEQ. NO.: 51111 /000 PROJECT NO.: S-71-4(1012)

TENTATIVE START DATE: 07/06/04 CONTRACT TIME: 65 WORKING DAYS

LOCATION: N-71, BOX BUTTE / SIOUX COUNTY LINE WEST.

IN COUNTY: SIOUX BOX BUTTE

BIDDER

GROUP 9 BITUMINOUS

NOTES

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

THE NUMBER OF _____ CONTRACTS WHICH WILL BE ACCEPTED IN THIS LETTING IS LIMITED TO ____.

NOTICE TO ALL BIDDERS

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

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

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

LETTING QUESTIONS

Prior to the letting, any questions pertaining to the Special Provisions or the plans for this project should be directed to Construction Division personnel at (402) 479-4568 or (402) 479-4529.

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.

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.

SPECIAL PROVISIONS
FOR
STATE
PROJECT NO. S-71-4(1012)

GENERAL CONDITIONS

Sealed 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 October 9, 2003, until 1:30 P.M.

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.

The 1997 English 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 Supplemental Specifications to the 1997 English Edition of the Standard Specifications for Highway Construction dated July 12, 2001, including all amendments and additions thereto effective at the date of the contract, are made part of these Special Provisions, through reference.

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

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

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

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

STATUS OF UTILITIES

The following information is current as of June 12, 2003.

Utility facilities, aerial and/or underground may exist within this project. The contractor should request a utility status update at the project preconstruction conference, and/or prior to starting work.

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

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

The following utilities have facilities within the project area, and have been provided project plans.

Panhandle Rural Electric Membership Association
Nebraska Public Power District
Hemingford Co-op Telephone Co.

All utility rehabilitation will be accomplished prior to or concurrent with construction.

STATUS OF RIGHT-OF-WAY
(S1-16-0801)

According to the best information available, all necessary right-of-way has been acquired.

REQUIRED SUBCONTRACTOR/SUPPLIER QUOTATIONS LIST
(S1-43-0603)

At bid submittal, 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.

CONTROL OF WORK
(S1-43-0901)

Subsection 105.08 in the 1997 Standard Specifications is void and replaced by the following:

105.08 - Authority and Duty of the Inspector

Department inspectors are authorized to inspect all work performed and all materials furnished. Such inspection may extend to the preparation, fabrication, or manufacture of the materials. The inspector has the authority to reject work or materials until any issues can be decided, including the right to suspend work. The inspector is not authorized to alter or waive the provisions of the contract or act as a supervisor for the Contractor.

105.13 – Tentative Acceptance of Portions of the Project

Paragraph 3.a. of Subsection 105.13 is amended by deleting the word “normal”.

LEGAL RELATIONS AND RESPONSIBILITY TO THE PUBLIC
(S1-43-1001)

107.14 – Opening of Sections of the Project to Traffic

Subsection 107.14 Paragraphs 2.b.(1) and (2) are void and replaced by the following:

2.b. (1) Whenever the Department permits the public use of a highway undergoing construction, repair, or maintenance in lieu of a detour route, the Contractor shall not be held responsible for damages to those portions of the project upon which the Department permitted public use, when such damages are the result of no proximate act or failure to act on the part of the Contractor.

(2) If the traveling public should cause damage to the roadway, the Contractor shall assist the State in identifying the responsible party and the Contractor shall as a minimum if present at the time of the damage record pertinent information regarding the accident. (Who caused the damage; when the damage occurred; and how the damage occurred.)

107.15 – Contractor's Responsibility for Work

Subsection 107.15 is amended by adding Paragraph 1.b.(3) as follows:

(3) The Contractor shall not be held responsible for damage caused by the traveling public on those portions of the project where the Department has permitted public use of the road in lieu of using a detour route and the damage as not the result of any proximate act or failure to act on the part of the Contractor.

MEASUREMENT AND PAYMENT
(S1-43-0901)

109.08 – Acceptance, Final Payment, and Termination of Contractor's Responsibility

Subsection 109.08 Paragraph c. amended by deleting the word "normal".

Subsection 109.08 Paragraph d. is void and replaced by the following:

d. If the traveling public should cause damage to the roadway the Contractor shall assist the State in identifying the responsible party and the Contractor shall as a minimum if present at the time of the damage record pertinent information regarding the accident. (Who caused the damage; when the damage occurred; and how the damage occurred.)

SPECIAL PROSECUTION AND PROGRESS
(Overlay Operation)

The Contractor will be required to begin the overlay portion of the project no later than 14 calendar days after beginning the hydrated lime slurry stabilization work.

Should the overlay operation begin later than 14 calendar days after beginning the lime stabilization operation, any pavement structure deterioration that, in the opinion of the Engineer, occurs after this 14 calendar day period, will be repaired by the Contractor at no additional cost.

Exceptions to this requirement will be considered only when the delaying circumstances are, in the opinion of the Engineer, beyond the control of the Contractor.

CONSTRUCTION DETAILS

FUEL COST ADJUSTMENT PAYMENT
(S2-1-0801)

Section 205 in the Standard Specifications and Supplemental Specifications is amended to include the following:

Payment will be made to the contractor for monthly fluctuations in the cost of diesel fuel used in performing the items of work, "Excavation", "Excavation, Borrow", "Excavation, Established Quantity", and/or “Earthwork Measured in Embankment” when the fuel cost fluctuates by more than 10% from the base price defined below. Payments may be positive, negative, or nonexistent depending on the circumstances. Payments or deductions will only be calculated on that portion of the fuel cost fluctuation that exceeds the 10% specified above.

Payments or deductions for the fuel cost adjustment will be included in the contractor’s progress estimates; and the payment or deduction authorized for each estimate will be based upon the algebraic difference between the quantities for “Excavation”, “Excavation, Borrow”, “Excavation, Established Quantity”, and/or “Earthwork Measured in Embankment” on the current estimate and the quantities shown on the previous estimate.

The fuel cost adjustment for the current estimate will be computed according to the following formula:

FCA=QFD where

FCA = Fuel cost adjustment, in dollars;

Q = The algebraic difference between the quantities (in cubic yards or cubic meters) for "Excavation", "Excavation, Borrow", "Excavation, Established Quantity", and/or “Earthwork Measured in Embankment” on the current estimate and the quantities shown on the previous estimate;

F = English
The fuel use factor for diesel fuel, in gallons per cubic yard. For the items of work “Excavation”, “Excavation, Borrow”, and “Excavation, Established Quantity”, “F” shall be equal to .15. For the item of work “Earthwork Measured in Embankment”, “F” shall be equal to .20.

Metric
The fuel use factor for diesel fuel, in liters per cubic meter. For the items of work “Excavation”, “Excavation, Borrow”, and “Excavation, Established Quantity”, “F” shall be equal to .74. For the item of work “Earthwork Measured in Embankment”, “F” shall be equal to 1.00.

D = Allowable price differential.

The allowable price differential, “D”, for the current estimate will be computed according to the following formula:

When the current price, P, is greater than the base price, P(b).

D = P – 1.10P(b), but not less than zero.

When the current price, P, is less than the base price, P(b).

D = P – .90P(b), but not greater than zero.

In either case, P(b) shall be the base diesel price, in dollars per gallon (liter), defined as the average of the minimum and maximum prices for No. 2 Diesel Fuel (Oklahoma) published in the first issue of “*Platt’s Oilgram Price Report*” for the month in which bids for the work were received.

In either case, P, shall be the current diesel price, in dollars per gallon (liter), defined as the average of the minimum and maximum prices for No. 2 Diesel Fuel (Oklahoma) published in the first issue of “*Platt’s Oilgram Price Report*” for the month in which the progress estimate is generated.

WATER
(S2-1-0603)

Paragraph 4.a. of Subsection 205.04 in the Standard Specifications is amended to include the following:

Payment shall be made at the established contract unit price.

TRENCHED WIDENING

Description

Trenched widening will consist of the removal of existing shoulder material and a portion of the existing bituminous surfacing for the placement of material produced in the Hydrated Lime Slurry Stabilization work. Included will be the excavation required outside the remaining surfacing, for the placement of any foundation course and surfacing shown in the plans. Also Included will be the compaction of the subgrade outside the remaining surfacing.

Construction Methods

1. Removal

    a. The Contractor shall remove any vegetation in the area to be widened.

    b. The Contractor shall remove existing shoulder material and a portion of the existing bituminous surfacing to expose a vertical face, as shown in the plans, using methods approved by the Engineer. A milling type machine shall be used to produce the trench. Removal by scarifying or blading will not be allowed. The excavated material shall be placed in a windrow outside of the trench to be used as shouldering material.

2. Preparation of Subgrade

    a. Compact the underlying subgrade with two complete coverage's with a device capable of attaining compaction, as determined by the Engineer. Any unsuitable subgrade material shall be removed and replaced with acceptable material and recompacted to meet the above-mentioned requirements.

3. Placement of Hot Lime Material

    a. Material produced in the Hydrated Lime Slurry Stabilization process shall be placed in the widening area when performing the Hydrated Lime Slurry Stabilization work.

    b. All trenched areas shall be filled with material produced in the Hydrated Lime Slurry Stabilization process by the end of that days work. Public traffic will not be permitted to travel next to these trenched areas until the trench has been filled.

Method of Measurement

Trenched Widening shall be measured for payment by measuring each side separately in stations of 100 feet, measured horizontally along the project centerline, of completed and accepted work.

Basis of Payment

The work of Trenched Widening, measured as provided herein, will be paid for at the contract unit price per Station for the item "Trenched Widening". This price shall be full compensation for all labor, equipment, tools, and incidentals necessary to complete the work.

Removal and replacement of unsuitable subgrade materials shall be measured and paid for as extra work.

SUBGRADE PREPARATION
(S3-1-0801)

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

TEMPORARY TRAFFIC CONTROL DEVICES
(S4-9-1201)

Paragraphs 2.a. of Subsection 422.05 in the Standard Specifications is void and superseded by the following:

2.a. If signs are not returned or are returned damaged, and the damage is beyond reasonable “wear and tear” and the damage was caused by the Contractor, then the Contractor shall be charged the value of the missing or damaged items. These charges shall be deducted from monies due the Contractor upon final payment.

TYPE B HIGH INTENSITY WARNING LIGHTS
(S4-9-1002)

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.

LOCAL MATERIAL SOURCES
(S5-1-0801)

Information regarding possible sources of local materials is available at the Materials and Research Division of the Department of Roads, Lincoln, Nebraska.

SURFACING UNDER GUARDRAIL
(S5-4-0801)

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

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

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

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

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

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

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

The work and materials required for surfacing under guardrail will be paid for at the contract unit price per square yard (square meter) for the item "Surfacing Under Guardrail". Payment will be full compensation for the work prescribed in these Special Provisions and the Standard Specifications.

ASPHALTIC CONCRETE
(S5-5-0801)

Paragraph 5. of Subsection 503.02 in the Standard Specifications is void.

ASPHALTIC CONCRETE
(S5-7-0902)

Paragraph 11.a. in Subsection 503.04 of the 2001 Supplemental Specifications is void.

Paragraph 4 in Subsection 503.05 of the 1997 Standard Specifications is void.

The pay item “Asphalt Pavement Smoothness Testing” in Subsection 503.06 of the 1997 Standard Specifications is void.

ASPHALTIC CONCRETE PAVEMENT SMOOTHNESS
(S5-7-0902)

Section 502 in the 1997 Standard Specifications for Highway Construction and the 2001 Supplemental 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 a Profile Index no greater than 12 inches per mile. 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 shall be performed as prescribed. The asphaltic concrete pavement shall be evaluated in accordance with Paragraph 11. b. of Subsection 503.04 in the 2001 Supplemental Specifications.

4. When the contract contains no item for smoothness testing, the asphaltic concrete pavement shall be evaluated in accordance with Paragraph 11. b. of Subsection 503.04 in the 2001 Supplemental Specifications.

502.02 – Equipment

1. The Contractor shall furnish a 25-ft California profilograph approved by the Nebraska Department of Roads.

2. The profilograph shall have multiple, non-uniformly spaced, articulated support wheels arranged such that no two wheels pass the same location on the pavement surface at the same time (ASTM Designation: E 1274, Paragraph 5.1.2)

3. The profilograph shall be equipped with a computerized system that will record, analyze, and print the test data.

4. The profilograph shall produce a printed pavement profile trace (profilogram) with a vertical scale of 1:1, and a horizontal scale of 1:300 (1" paper = 25' pavement). The profilogram 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. Blanking (Null) band width
   k. Profile counts for each test section
   l. Profile Index for each test section
   m. Bump locations for each test section

502.03 – Certification and Independent Assurance Testing

1. The Department shall calibrate and certify the Contractor's profilograph annually at a test site established by the Department.

   a. The profilograph shall be inspected for compliance with general equipment requirements, including wheel configuration, effective length, data analysis system, guidance system, and overall condition.

   b. The profilograph shall be calibrated for distance measurement by moving it over the prescribed path of a premeasured test distance at walking speed, and determining its distance calibration factor.

   c. The profilograph shall be checked for vertical measurement accuracy by placing a 1-inch and 2-inch calibration block, measured to the nearest 0.01 inch, under the sensing wheel while the profilograph is stationary. The vertical measurement indicated by the profilograph shall be within 4.0% tolerance of the actual premeasured block height.

   d. The profilograph shall be checked for overall performance by moving it over the prescribed path of a pre-measured pavement test section at walking speed.

   e. Distance measurement indicated by the profilograph shall be within 0.2% tolerance of the actual premeasured 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 Profile Index reported by the profilograph for the test section shall be within 10.0% tolerance of the Profile Index reported by a Nebraska Department of Roads profilograph for the same test section.

   g. A dated and signed decal will be placed on the profilograph to certify its acceptability for use on Nebraska Department of Roads pavement construction projects.

2. The Department shall certify the Contractor's profilograph 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 profilographs 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 – Profilograph Test Procedures

1. The Contractor shall perform all pavement smoothness specification tests except the 10-foot straight edge testing as shown in Paragraph 16. below:

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 (0.10 mile) 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 profilograph 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. If the Contractor notifies the Engineer of a proposed test and the Engineer elects not to be present, then the Contractor may proceed unaccompanied.

4. The Contractor shall report test results to the Engineer within 2 NDR workdays after initial asphaltic concrete placement or surface corrective work. The Contractor shall report additional test results to the Engineer as soon as possible, but not later than 7 calendar days after completion of the mainline pavement.

5. The asphaltic concrete pavement surface temperature shall be 150 degrees F. or lower when smoothness tests are performed.

6. The profilograph 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. 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. All wheels of the profilograph shall be on the new pavement for which the Contractor is responsible.

7. The Contractor shall remove all objects and foreign material from the pavement surface before testing.

8. The profilograph operator shall guide the profilograph along the specified wheel path of each traffic lane at walking speed. Propulsion may be by personnel pushing manually, or by a suitable propulsion unit that does not exceed a speed of 4 miles per hour. Excessive speed can produce erratic test results.

9. A lateral location indicator shall be used to keep the profilograph in the required test path during testing. Pavement edges, longitudinal joints, or longitudinal pavement markings may be used as reference lines. An additional person may be required to hold the back end of the profilograph on the required path on horizontal curves.

10. Before testing, the profilograph operator shall lower the profilograph's recording wheel to the pavement surface and move the profilograph forward to the beginning location of a test section to stabilize the measurement system. To ensure consistent distance measurement, the profilograph operator shall also check and adjust the recording wheel tire pressure several times a day.

11. All station references on the profilograms and report forms shall be actual project stations. Stations shall be accurately noted on the profilogram at least every 200 feet.

12. The profilograph operator and the Engineer shall sign the profilograms immediately after completion of the tests. If the Engineer was not present at the time of the tests, then the absence shall be noted on the profilograms.

13. The Engineer shall perform or schedule verification tests on at least 10 percent of the pavement surface, using a profilograph owned by the Department.

14. 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 profilograph 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 profilograph owned by the Department, and charge the Contractor $500.00 per lane mile for all testing done by the Department.

15. The following areas of pavement shall be excluded from the Profile Index, 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 superelevation 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.

16. Excluded pavement sections shall be measured for bumps with either a profilograph or a 10-foot straight edge. If the profilograph is used, the deviation shall not exceed 0.40 inch. The deviation of the surface shall not exceed 1/8 inch, if a 10-foot straightedge is used.

502.05 – Evaluation

1. The Contractor shall determine a Profile Index and number of correctable bumps and dips for each test section, record the information on the report form, and provide a copy of the report, along with the corresponding profilograms, to the Engineer.

   a. The Profile Index shall be calculated by adding the absolute value of the vertical deviations (inches) outside of a 0.1 inch blanking band and dividing the sum by the length of the test section (miles). The resulting Profile Index is in units of inches per mile.

   b. Correctable bumps shall be separately identified on the profilograms. They appear as high points on the profilogram 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 on the profilograms. They appear as low points on the profilogram 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 Profile Index of a test section is 21 in/mi or less, bump and dip correction is the only corrective work allowed for that section.

   b. When the Profile Index of a test section exceeds 21 in/mi, corrective work shall be performed.

   c. The Contractor shall retest all corrected test sections with the profilograph.

3. All bumps, as defined in Subsection 502.05, Paragraph 1.b., and all test sections with a Profile Index exceeding 21 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 a Profile Index exceeding 21 in/mi shall be considered corrected when the Profile Index for that section has been reduced to a value of 21 in/mi or less.

4. All dips, as defined in Subsection 502.05, Paragraph 1.c., shall be corrected until they are at or below the 0.40 inch maximum depth. The Contractor shall have the following options:

   a. diamond grind on either or both sides of the dip,

   b. with the approval of the Engineer, 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.

   c. a combination of the grinding and removal and replacement methods, or

   d. with the approval of the Engineer, elect to leave an uncorrected or partially corrected dip in place for a monetary deduction.

5. 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 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.

502.07 - 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 profilograph 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 502.01

Payment Adjustment Schedule	
Profile Index Inches Per Lane Mile	**Percent of Contract Prices**
0 to 2	107
Greater than 2 to 4	105
Greater than 4 to 6	103
Greater than 6 to 8	102
Greater than 8 to 12	100
Greater than 12 to 14	98
Greater than 14 to 16	96
Greater than 16 to 18	94
Greater than 18 to 20	92
Greater than 20 to 21	90
Greater than 21	Corrective Work Required

3. When the initial Profile Index of a test section is 21 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 Profile Index of a test section is greater than 21 in/mi, corrective work performed in that section may increase the percent of pay up to the 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 profilograph test sections shall be determined according to the formula in Table 502.02.

Table 502.02

Pay Factor Formula		
$PF = \frac{A(1.07) + B+(1.05) + C(1.03) + D(1.02) + E(1.00) + F(0.98) + G(0.96) + H(0.94) + I(0.92) + J(0.90)}{A + B + C + D + E + F + G + H + I + J}$		
Where:		
A	=	Length of pavement with a Profile Index of 0 to 2 inches per mile.
B	=	Length of pavement with a Profile Index greater than 2 to 4 inches per mile.
C	=	Length of pavement with a Profile Index greater than 4 to 6 inches per mile.
D	=	Length of pavement with a Profile Index greater than 6 to 8 inches per mile.
E	=	Length of pavement with a Profile Index greater than 8 to 12 inches per mile.
F	=	Length of pavement with a Profile Index greater than 12 to 14 inches per mile.
G	=	Length of pavement with a Profile Index greater than 14 to 16 inches per mile.
H	=	Length of pavement with a Profile Index greater than 16 to 18 inches per mile.
I	=	Length of pavement with a Profile Index greater than 18 to 20 inches per mile.
J	=	Length of pavement with a Profile Index greater than 20 to 21 inches per mile.

2. The Contractor shall be assessed $500 each for all uncorrected or partially corrected dips left in place.

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.

SEEDING

Subsection 803.02 in the 1997 English Edition of the Standard Specifications is amended to include the following:

Type "B"	Minimum Purity (%)	Broadcast or Hydraulic Seeder Application Rate in lb. of Pure Live Seed/Acre	Approved Mech. Drill Application Rate in lb. of Pure Live Seed/Acre
Perennial Ryegrass – Linn.	85		8
K-31 Fescue	85		15
Thickspike Wheatgrass – Critana	85		5
Western Wheatgrass – Flintlock	85		5
Buffalograss – Sharps, Texoka	80		5
Blue Grama – NE, KS, CO, SD	35		2
Oats	90		12

All seed shall be origin Nebraska, adjoining states, or as specified. A contractor proposing to use a substitute variety, or origin shall submit for the engineer's consideration a seed tag representing the seed which shows the variety, origin and analysis of the seed.

Rates of application of commercial inorganic fertilizer shall be:

	Rate of Application Per Acre (Minimum)
Available Nitrogen (N2) ----------	32 or 36 lb.
Available Phosphoric Acid (P_2O_5) ----------	92 or 96 lb.

Rate of application of granular sulphur coated urea fertilizer shall be:

Nitrogen (total available) ----------	60 lb.

The contractor may, at his option, apply granular urea formaldehyde in lieu of the sulphur coated urea fertilizer at the following rate:

Nitrogen (total available) ----------	60 lb.

GRADING FOR TERMINAL ANCHORAGE SECTION

All earthwork required to accommodate the grading for the guardrail end treatments as well as water required for compaction shall be performed according to all applicable portions of Section 206 in the Standard Specifications.

This work will not be measured and paid for directly but shall be considered subsidiary to the item “Reset Guardrail”.

FLY ASH
(S10-5-0801)

Subsection 1008.01 in the Standard Specifications is void and superseded by the following:

Fly ash shall be Class C or F meeting the requirements of ASTM C 618.

STRUCTURAL STEEL
(S10-5-0801)

Section 1045 of the Standard Specifications is amended to include the following:

1045.03 -- Steel Plate Substitution

The Contractor may use either English or Metric steel plates in accordance with Table 1045.01.

Table 1045.01

English-Metric Steel Plate Substitution Table

Metric (millimeters)	English (inches)	Metric (millimeters)	English (inches)
9	3/8	32	1 1/4
10	3/8	35	1 3/8
11	7/16	38	1 1/2
12	½	40	1 5/8
14	9/16	45	1 3/4
16	11/16	50	2
18	¾	55	2 1/4
20	13/16	60	2 3/8
22	7/8	70	2 3/4
25	1	80	3 1/4
28	1 1/8	90	3 1/2
30	1 ¼		

REPAIR OF DAMAGED METALLIC COATINGS
(S10-5-0801)

Paragraph 2. of Subsection 1061.01 in the Standard Specifications is void and superseded by the following:

2. The material used for repair shall provide a minimum coating thickness of at least 50 µm with one application.

CORRUGATED METAL PIPE
(S10-5-0801)

Table 1035.01 in Section 1035 of the Supplemental Specifications is amended by deleting the title “Steel and Aluminum Culvert Thickness”.

METAL FLARED-END SECTIONS
(S10-5-0801)

Table 1036.01 in Section 1036 of the Supplemental Specifications is amended by deleting the title “Steel and Aluminum Flared-End Thickness”.

REINFORCED CONCRETE PIPE, MANHOLE RISERS, AND FLARED-END SECTIONS
(S10-5-0801)

Paragraph 3.a. of Subsection 1037.02 in the Supplemental Specifications is void and superseded by the following:

3.a. Round reinforced concrete pipe shall conform to the requirements of AASHTO M 170-95 with the exception of the minimum circumferential reinforcing (in2/ft. (mm 2/m) of pipe wall) for 15, 21, and 24 inch (380, 460, 600 mm) Class III pipe, as shown below:

Paragraph 3.b. of Subsection 1037.02 is void and superseded by the following:

b. AASHTO M 170-95 Specifications are modified as follows:

Paragraph 4. of Subsection 1037.02 is void and superseded by the following:

4. Reinforced concrete arch pipe shall conform to the requirements of AASHTO M 206-95.

Paragraph 5. of Subsection 1037.02 is void and superseded by the following:

5. Reinforced concrete elliptical pipe shall conform to the requirements of AASHTO M 207-95.

Paragraph 7. of Subsection 1037.02 is void and superseded by the following:

7. Concrete flared-end sections shall be of the design shown in the plans and in conformance with the applicable requirements of AASHTO M 170-95, Class II pipe, AASHTO M 206-95, Class A-II pipe, or AASHTO M 207-95, Class HE-II pipe for the diameter of pipe which it is to be installed.

HIGH TENSILE BOLTS, NUTS, AND WASHERS (S10-5-1001)

Subsection 1058.02 in the Supplemental Specifications is void.

Paragraph 4.b.(5) in the Standard Specifications is void and superseded by the following:

(5) The bolt, nut, and washer assembly shall be assembled in a Skidmore-Wilhelm calibrator or an acceptable equivalent device. For bolts that are too short to be assembled in the calibrator, see Subsection 1058.03, Paragraph 4.b.(9).

ELASTOMERIC BEARINGS AND LAMINATED BEARING PADS (S10-5-0903)

Paragraph 2. of Subsection 1068.02 in the Standard Specifications is void and superseded by the following:

2. Samples and Certification shall be furnished in accordance with NDR's *Materials Sampling Guide*.

Paragraph 3. of Subsection 1068.02 is void.

STEEL BARS FOR CONCRETE REINFORCEMENT (S10-5-1201)

Section 1020 in the Standard Specifications is void and superseded by the following:

1020.01 - Description

Steel tie bars for longitudinal joint reinforcement in concrete pavements shall be epoxy coated and deformed Grade 40 or 60 billet steel as shown in the plans, specifications or Special Provisions.

1020.02 - Material Characteristics

1. Billet-steel bars shall conform to the requirements of ASTM A 615/A 615M.
2. Epoxy coatings shall conform to the requirements in Section 1021 of the Standard Specifications and Supplemental Specifications.

1020.03 - Acceptance Requirements

Acceptance shall be based on sampling, testing, and certification requirements in accordance with the NDR *Materials Sampling Guide*.

EPOXY COATED REINFORCING STEEL
(S10-5-0403)

Table 1021.01 in Section 1021 of the Standard Specifications is void and superseded by the following:

Table 1021.01			
Bend Test Requirements			
English		**Metric**	
Bar No.	**Mandrel Diameter (inches)**	**Bar**	**Mandrel Diameter (millimeters)**
3	3	10	75
4	4	13	100
5	5	16	125
6	6	19	150
7	7	22	175
8	8	25	200
9	9	29	230
10	10	32	250
11	11	36	280
14	17	43	430
18	23	57	580

PERFORMANCE GRADED BINDER

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

I. Description:

The performance graded binder to be used on this project shall be PG Binder 64-22, supplied by a Certified Supplier.

Certified Supplier

A supplier must be certified by the Nebraska Department of Roads to be allowed to supply Performance Graded Binder in Nebraska. 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
3. Combined States Binder Group

The supplier must maintain and follow the requirements of the group or groups in which they participate in to maintain certification by the Nebraska Department of Roads. In addition, active participation is required to maintain certification by the Department. Active participation

will include submitting of round robin samples results, along with meeting other requirements of the group or groups. Failure to do so will result in loss of certification by the Department.

A certified supplier may be asked to supply to the Department, past round robin results, laboratory inspection reports, reasons for and investigative reports on out lying results, quality control testing, and/or technician training and proficiency testing reports.

Supplier Certification

A supplier may request certification by contacting the Nebraska Department of Roads, Materials and Research Division, Flexible Pavement Engineer at (402) 479-4675. A temporary certification may be issued for a period of up to one year. Split sample testing will be required prior to receiving a temporary certification. Split sample testing will be done on all grades of binder that the supplier intends to supply during the temporary certification. The supplier will have up to one year to become certified by participating in and following the requirements of one or more of the approved binder groups.

A supplier may become certified through active participation in other binder certification/round robin groups that are approved by the Department. The Department may request from the supplier prior to approval, past or current round robin results, quality control testing, laboratory inspection reports, and/or technician training and proficiency testing reports.

II. Binder Sampling and Testing:

1. Lots. Each 3750 tons (3400 Mg) of HMA produced will be a binder lot.

2. A binder lot will include only one PG Binder grade or a blend as allowed in paragraph 6.e.

3. A Binder lot will only include one supplier of the PG Binder or a blend as allowed in paragraph 6.e.

4. Blending of different binder grades and binders from different suppliers will be allowed with restrictions as noted in paragraph 6.e. The Engineer must be notified of the intent to blend prior to actual blending.

5. All binders shall be sampled at the rate of one sample per lot with a minimum of three samples per project.

   a. The sample shall consist of two one-quart (liter) cans and shall be taken by the Contractor's Certified Sampling Technician, with assistance from or under supervision of NDR personnel. The sample shall be taken at the plant from the line between the storage tank and the mixer or from the tank supplying material to the line, at a location at which material sampled is representative of the material in the line to the mixer. One can will be tested for compliance with MP1 specifications and the other can portion will be saved for dispute resolution, if needed. The sampling process shall follow procedures of the NDR Materials Sampling Guide and NDR T 40.

   b. Testing. When the tested PG Binder is in compliance, the binder lot will be accepted and both cans of the sample can be discarded. If the tested PG Binder does not comply, then the price of the PG Binder lot

represented by the sample shall be adjusted according to Table 1. Overall project average testing requirements and price adjustments will also apply, as stated in Table 2.

6. Material Requirements:

a. Performance graded binder, as specified in the contract items shall be in accordance with AASHTO Designation MP1 and meet all minimum and maximum requirements.

b. Substitution of a PG Binder, which exceeds the upper and lower grade designations from the specified, requires advance notification of the Engineer, and be documented by a no cost change order. The bill of lading or delivery ticket shall state the binder grade and specific gravity.

c. Material Certification - A Material Certification shall be submitted prior to construction stating, the type of modifier being used, and the recommended mixing and compaction temperatures for the Hot Mix Asphalt.

d. The Contractor shall receive from the supplier, instructions on the proper storage and handling of each grade and shipment of PG Binder.

e. Blending of PG Binders at the hot mix plant site will be allowed only when transitioning to an asphalt mixture requiring a different grade of binder and with the following restrictions:

(1) The resultant blend will meet MP-1 specifications when tested as ±3° of the specified PG binder. The sample of the blended material will 1) be considered as a lot sample, 2) will be taken during initial production following the blending of the binders, and 3) deductions when not meeting MP-1, will apply. On the blended sample's identification form will be a note explaining the blending conditions and a statement that the sample is a blend of materials. The next lot sample, following the sample representing the blend, will be tested as the specified binder grade for the asphalt mixture being produced and shall meet MP-1 specifications.

(2) Modified Binders - When a type of modification is used and stated in the Material Certification as required in paragraph 6.c., it will not be allowed to be blended with a binder containing a different type of modification. Blending of the same type of modifiers will be allowed.

TABLE 1

SINGLE SAMPLE TOLERANCE AND PRICE REDUCTION TABLE		
	Price Reduction[1] Pay Factor of 0.75	**Determined by Engineer[2] Pay Factor of 0.50 or Removal**
Tests on Original Binder Dynamic Shear, G*/Sin δ, kPa	0.86-0.92	< 0.86
Tests on Rolling Thin Film Oven Residue Dynamic Shear, G*/Sin δ, kPa	1.76-1.97	< 1.76
Tests Pressure Aging Vessel Residue Dynamic Shear, G*Sin δ, kPa	5601-6200	> 6200
Creep Stiffness S, Mpa	325-348	> 348
m-value	0.270-0.284	< 0.270

NOTE: If more than one test fails to meet requirements, the largest individual price reduction (pay factor of 0.75 or 0.50) will be used to calculate price reduction for the asphalt binder.

[1]Price Reduction will be based on contract unit price of asphalt binder.

[2]The Engineer will determine if the non-compliant material will be removed. If the non-compliant material is accepted, a price reduction of 50% will be applied. The price reduction shall be based on the contract unit price of asphalt binder.

The pay factor will be applied to the quantity of material that the sample represents.

Overall Project Average - Price Reduction Based on Complete MP-1 Testing

Out of specification material will be determined by the specifications outlined in AASHTO MP-1, excluding Direct Tension.

The Nebraska Department of Roads, Materials and Research, Bituminous Laboratory will do complete testing, per MP-1 specifications, on a minimum of three samples or 20% of the total samples from the project, whichever is the greatest. The Department will randomly select one sample for complete MP-1 testing out of every five samples received. When any test result shows sample not meeting MP-1 specifications, the previous and following sample received will be tested for complete MP-1 compliance. Testing will continue in this manner until tested samples meet all of MP-1 specifications.

Original Dynamic Shear Rheometer testing will be completed on all samples. When a sample being tested for only Original Dynamic Shear Rheometer compliance falls out of MP-1 specification, it will then be tested for complete MP-1 specification compliance. Adjacent samples will be tested when results, other than the Original Dynamic Shear Rheometer result, do not meet specification. This additional complete testing for MP-1 compliance is in addition to the minimum number of samples that will be tested for complete MP-1 compliance.

At the completion of testing, all complete MP-1 test results will be averaged. For averages that do not meet MP-1 specifications, the largest reduction shown in Table 2 will be applied to all the Performance Graded Binder used on the project.

Table 2

OVERALL PROJECT AVERAGE - PRICE REDUCTION TABLE		
	Range of Average	**Pay Factor Applied**
Tests on Original Binder Dynamic Shear, G*/Sin δ, kPa Min. 1.00 kPa	< 1.00 - 0.98 < 0.98 - 0.96 < 0.96 - 0.94 < 0.94	0.98 0.95 0.92 0.85
Tests on Rolling Thin Film Oven Residue Dynamic Shear, G*/Sin δ, kPa Min. 2.20 kPa	< 2.20 - 2.156 < 2.156 - 2.09 < 2.-09 - 2.024 < 2.024	0.98 0.95 0.92 0.85
Tests Pressure Aging Vessel Residue Dynamic Shear, G*Sin δ, kPa Max. 5000 kPa	< 5000 - 5100 < 5100 - 5250 < 5250 - 5400 < 5400	0.98 0.95 0.92 0.85
m-Value Min. 0.300	< 0.300 - 0.298 < 0.298 - 0.293 < 0.293 - 0.290 < 0.290	0.98 0.95 0.92 0.85
Creep Stiffness S, MPa Max. 300 MPa	< 300 - 306 < 306 - 315 < 315 - 324 < 324	0.98 0.95 0.92 0.85

Single Sample Reduction and Overall Project Average Reduction

A sample representing a lot, not meeting MP-1 Specification, will have a reduction for the material that the sample represents. Only the largest reduction from Table 1, will apply when more than one result of a single sample does not meet MP-1 specifications. Only the largest overall project average reduction from Table 2, will apply when more than one test average falls out of MP-1 specifications. Pay Factors based on both Table 1 and Table 2 test results are separate from each other and both will be applied.

Investigation of Verification Lot Samples That Do Not Meet Specifications

When the lot sample shows test results out of specification limits, the process of resolving the sample failure will include the following actions as appropriate:

1. The Bituminous Lab may conduct retesting of the remaining portion of the original can sample as determined necessary to confirm or disaffirm the original test result(s).

2. The Flexible Pavement Engineer will notify the Contractor who will arrange to investigate all aspects of the testing, loading, handling and delivery of the material in question. The Contractor shall report findings to the Central Laboratory, Flexible Pavement Engineer.

3. The Department will collect and compile all information and prepare a report. A copy of the report will be distributed to the District and the Contractor.

4. The Bituminous Laboratory will issue the standard report of tests for all samples tested, to include any resulting pay factor deductions. A copy of the report of tests will be distributed to the District, Construction Division, and Contractor.

Dispute Resolution

After testing and investigations have been completed on the one can of the sample and there is still a dispute, the Department will select an independent laboratory for referee testing to take place on the second can of the sample. If the independent lab's tests indicate failing results and pay deductions equal to or great 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.

Basis of Measurement

PG Binder shall be measured in accordance with Subsection 503.05 in the Standard Specifications and Supplemental Specifications.

Basis of Payment:

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

SUPERPAVE ASPHALTIC CONCRETE

Section 1028 of the Standard Specifications and Supplemental Specifications is void.

Asphaltic Concrete Type SP4 Special shall use the (0.375) gradation band.

Paragraph 2.b.(1) of Subsection 503.04 is void and superseded by the following:

The contractor shall take at least four (4) control strip mixture samples and record the test results for the mixture properties identified in Paragraph 4.h.(3) of Subsection 1028.03. The contractor will also record compaction density values and rolling pattern information. This data will be for information only and shared with the Engineer.

SECTION 1028 -- SUPERPAVE ASPHALTIC CONCRETE

1028.01 -- Description

1. a. Superpave Asphaltic Concrete is a Contractor-designed mix.

   b. The Contractor will be required to define properties using a gyratory compactor that has met the Superpave evaluation test procedures, during mix design and production.

2. a. Before production of asphaltic concrete, the Contractor shall submit, in writing, a tentative job mix formula on the NDOR Mix Design Submittal Form for verification to the NDR Flexible Pavement Engineer at the Lincoln, Nebraska Central Laboratory.

   b. The job mix formula shall identify the virgin mineral aggregates, RAP, if used, and mineral filler, if needed, with the value of the percent passing each specified sieve for the individual and blended materials.

   c. (1) The Contractor shall submit six – 95 mm and two – 75 mm gyratory pucks compacted to 7% ± 0.5% air voids for testing and 3 proportioned 22 lb. (10,000-gram) samples of the blended mineral aggregates and two one-quart (liter) sample of the proposed PG Binder to be used in the mixture to the NDR Materials and Research Central Laboratory at least 15 NDR working days before production of asphaltic concrete. These samples will be used to verify the Contractor's Superpave mix design test results and mix properties.

   (2) Submitted with these samples shall be a copy of the Contractor's results for all Superpave mix design tests.

   (3) This mix design shall include at a minimum:

   (i) The bulk specific gravity of the blended aggregate. Whenever RAP is used it shall be processed through an ignition oven and then combined proportionally with the virgin aggregate. The bulk specific gravity shall be determined for the blend from an unwashed sample of the - #4 and a washed sample of + #4 material in accordance with AASHTO T 84 and AASHTO T 85 respectively.

   (ii) The target binder content.

   (iii) The supplier and grade of PG Binder.

   (iv) The maximum specific gravity of the combined mixture (Rice).

   (v) The bulk specific gravity and air voids at N initial (Nini), N design (Ndes) and N maximum (Nmax) of the compacted gyratory specimens.

   (vi) Voids in the Mineral Aggregate (VMA) and Voids Filled with Asphalt (VFA) at Ndes.

(vii) Fine Aggregate Angularity (FAA), Coarse Aggregate Angularity (CAA), Flat and Elongated Particles and Clay Content 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) PG Binder recommended mixing and compaction temperatures.

(xi) Type of PG Binder modification, if modified

d. Before the mix design is approved, the Materials and Research Laboratory shall test all properties. This approval is on the submitted laboratory materials, and allows the contractor to begin plant production test strip and verification testing with the QA/QC Program.

3. PG Binder in Recycled Asphalt Pavement:

a. The Contractor may approach the State with a proposal to supplement the virgin aggregates of the asphaltic concrete mix with a Contractor's specified percentage of recycled asphalt pavement (RAP). The State may accept or reject the proposal based on whether the mix design meets the specified criteria of the asphaltic concrete proposed. The RAP may come from the project or an existing stockpile. The Contractor is responsible for investigating the quality and quantity of the RAP material.

b. In recycled asphaltic concrete mixtures, the allowable maximum percent of Reclaimed Asphalt Pavement (RAP) will be as shown in Table 1028.01. If the Contractor elects to exceed these values, the Contractor will be required to lower the minimum pavement design temperature of the PG Binder, one grade, according to AASHTO MP1.

Table 1028.01

Asphaltic Concrete Type	Percent, Maximum RAP
SPS	50
SP1	35
SP2	25
SP3	25
SP4	15
SP4 Special	25
SP5	15

4. 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.

      (3) Allow the Contractor as much latitude as possible in developing control standards.

   d.(1) The Contractor shall develop and keep on file with the Materials and Research Flexible Pavements Engineer a copy of their QC Program.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) Submittals schedule.

      (3) Inspection requirements.

         (i) Equipment.

         (ii) Asphalt concrete production.

         (iii) Asphalt concrete placement.

      (4) QC testing plan.

      (5) Documentation of QC activities.

      (6) Requirements for corrective action when QC and/or acceptance criteria are not met.

      (7) Any additional elements deemed necessary.

(8) A list, with the name and manufacturers model number, for all test equipment used during laboratory testing.

(9) 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) One or more 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 by the NDR 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 NDR training records shall be submitted to the NDR Materials and Research Division.

(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.

h. QC Testing Plan:

(1) The testing plan shall include the NDR statistically based procedure of random sampling for acquiring test samples.

(2) The Contractor may add any tests necessary to adequately control production.

(3) All QC test results shall be reported on NDR software by the Contractor with a copy provided to the Engineer within 1 week after the tests are complete. Daily review by the Engineer will be allowed if requested.

i. 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 approach the specification limits:

(I) Plant produced mix gradations at laydown.

(II) Binder content.

(III) Air voids.

(IV) VMA

(V) VFA (mix design only)

(VI) FAA AASHTO T 304
CAA ASTM D 5821

(VII) Dust to Binder Ratio

(iii) Corrective actions that will be taken when the following conditions occur:

(I) Rutting

(II) Segregation

(III) Surface voids

(IV) Tearing

(V) Irregular surface due to mix tenderness

1028.02 -- Material Characteristics

1. The type of PG Binder shall be shown in the plans or special provisions.

2. 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 60 percent limestone on the final surface lift of asphaltic concrete.

   c. Crushed rock material for use in asphaltic concrete, 1/4 inch (6.35 mm) down, screenings and manufactured sand shall have a Sodium Sulfate loss of not more than 12 percent by mass at the end of 5 cycles. One 20-lb. (10-kg) sample shall be taken by NDR personnel at the project for every 5,000 tons (4500 Mg) of aggregate used, with a minimum of one per project for quality testing.

   d. Quartzite, granite, and chat shall conform to the requirements of Subsection 1033.02, Paragraph 4, a. (8). One 60-lb. (30 kg) sample shall be taken by NDR personnel at the project every 3,000 tons (2700 Mg) of aggregate used, with a minimum of one per project for quality testing.

   e. 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 NDR Materials Sampling Guide. (Some aggregate can be adversely affected by ignition ovens resulting in erroneous reading for asphalt content and gradation unless corrected for.)

   f. Amend Paragraph 4.a. (7) of Subsection 1033.02 to provide that soundness tests shall not be required for fine sand.

   g. Amend Subsection 1033.02 to provide that 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.

   h. 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

Table 1028.02
Coarse Aggregate Angularity
(ASTM D 5821)

Asphaltic Concrete Type	CAA (minimum)
SPS	35
SP1	55
SP2	65
SP3	75
SP4	85/80*
SP4 Special	85/80*
SP5	95/90*

* Denotes two faced crushed requirements

i. 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.

Note: The specific gravity for calculation of the Fine Aggregate Angularity (FAA) shall be determined on a 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 NDOR Aggregate Laboratory, this same value can be used throughout production. The verification value determined by the NDOR 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 NDOR 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	--
SP1	40.0
SP2	43.0
SP3	43.0
SP4	45.0
SP4 Special	45.0
SP5	45.0

j. 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
SP1	10
SP2	10
SP3	10
SP4	10
SP4 Special	10
SP5	10

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

k. 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
Clay Content Criteria
(AASHTO T 176)

Asphaltic Concrete Type	Sand Equivalent, Minimum
SPS	30
SP1	40
SP2	40
SP3	45
SP4	45
SP4 Special	45
SP5	45

l. The blended aggregate shall conform to the gradation requirements specified below for the appropriate nominal size.

(1) It is recommended that the selected blended aggregate gradation does not pass through the restricted zones as specified in the following control points for nominal size. The plot of the blended aggregate gradation of Superpave mix designs with FAA values of less than 43.0 will not enter the limits of the restricted zone. The plot of the blended aggregate gradation of Superpave mix designs with FAA values of 43.0 to less than 45.0 passing through the restricted zone must intersect both the upper and lower limits of the restricted zone between 1) any two consecutive sieves used to define the restricted zone limits, or 2) two vertical lines plotted between the #8 and #50 sieve a distance apart no greater than 1/3 the horizontal distance between the #8 (2.36-mm) and #50 (300-μm) sieves. Superpave mix designs with FAA values of 45.0 or greater will not be restricted from passing through the restricted zone.

Table 1028.06

Gradation Control Points for 0.375 Inch (9.5 mm) Nominal Size

	Control Points (percent passing)		**Restricted Zone Boundary (percent passing)**	
English Sieve (Metric)	**Minimum**	**Maximum**	**Minimum**	**Maximum**
1/2 inch (12.5 mm)	100.0			
3/8 inch (9.5 mm)	90.0	100.0		
No. 4 (4.75 mm)		90.0		
No. 8 (2.36 mm)	32.0	67.0	47.2	47.2
No. 16 (1.18 mm)			31.6	37.6
No. 30 (600 μm)			23.5	27.5
No. 50 (300 μm)			18.7	18.7
*No. 200 (75 μm)	2.0	10.0		

* see note following Table 1028.08

Table 1028.07

Gradation Control Points for 0.5 Inch (12.5 mm) Nominal Size

	Control Points (percent passing)		**Restricted Zone Boundary (percent passing)**	
English Sieve (Metric)	**Minimum**	**Maximum**	**Minimum**	**Maximum**
3/4 inch (19 mm)	100.0			
1/2 inch (12.5 mm)	90.00	100.00		
3/8 inch (9.5 mm)		90.00		
No. 8 (2.36 mm)	28.0	58.0	39.1	39.1
No. 16 (1.18 mm)			25.6	31.6
No. 30 (600 μm)			19.1	23.1
No. 50 (300 μm)			15.5	15.5
* No. 200 (75 μm)	2.0	10.0		

* see note following Table 1028.08

Table 1028.08
Gradation Control Points for 0.75 Inch (19 mm) Nominal Size

	Control Points (percent passing)		Restricted Zone Boundary (percent passing)	
English Sieve (Metric)	**Minimum**	**Maximum**	**Minimum**	**Maximum**
1 inch (25 mm)	100.0			
3/4 inch (19 mm)	90.0	100.0		
1/2 inch (12.5 mm)		90.0		
No. 8 (2.36 mm)	23.0	49.0	34.6	34.6
No. 16 (1.18 mm)			22.3	28.3`
No. 30 (600 μm)			16.7	20.7
No. 50 (300 μm)			13.7	13.7
* No. 200 (75 μm)	2.0	8.0		

* Dust to binder ratio is the ratio of the percentage by weight of aggregate finer than the No. 200 (75 μm) sieve to the asphalt content expressed as a percent by weight of total mix. The dust to binder ratio shall be between 0.60 and 1.60.

m. The combined mineral aggregate for Asphaltic Concrete, Type SPS, shall be an aggregate or a combination of aggregates, and mineral filler if needed.

Table 1028.09
Gradation Control Points for Type SPS

	Control Points (percent passing)	
English Sieve (Metric)	**Minimum**	**Maximum**
1 inch (25 mm)	100.0	
¾ inch (19 mm)	94	100.0
½ inch (12.5 mm)	81	94
No. 8 (2.36 mm)	42	70
No. 16 (1.18 mm)	29	43
No. 30 (600 μm)	19	34
No. 50 (300 μm)	11	20
* No. 200 (75 μm)	2	8

* see note following Table 1028.08

n. 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 following requirements.

Table 1028.10
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

3. 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) An AASHTO approved gyratory compactor and molds.

      (2) An AASHTO approved Asphalt Content Ignition Oven.

      (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

      (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 (suggested size 8 ft. x 45 ft.) (2.4 m x 13.7 m) which contain the following:

          Air conditioner.
          Dedicated phone (where available).
          FAX machine.
          Xerox type copy 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 (6 inch (150 mm) and 4 inch (100 mm) diameter core.

      (9) Oven, 347°F (175°C) minimum, sensitive $\pm$5°F. ($\pm$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 NDR software and Color Printer.

1028.03 -- Acceptance Requirements

1. Volumetric Mix Design

   a. The job mix formula shall be determined from a mix design for each mixture. A volumetric mixture design in accordance with AASHTO PP 28 as modified within this special provision will be required. However, the mixture for the Superpave specimens and maximum specific gravity mixture shall be short-term aged for two hours.

      (1) Practice for Short and Long-Term Aging of Hot Mix Asphalt (HMA), AASHTO R30

      (2) Method for Preparing and Determining the Density of Hot Mix Asphalt Specimens by Means of the SHRP Gyratory Compactor, AASHTO T312

   b. The optimum binder content shall be the binder content that produces 4.0 percent air voids at Ndes. The design shall have at least four binder content points, with a minimum of two points above and one point below the optimum. Submitted with the design will be plots showing the values of Air Voids, VMA, VFA and Density at the four binder contents. The amount of uncompacted mixture shall be determined in accordance with AASHTO T209. For Type SPS Asphaltic concrete the optimum binder content shall be that which produces air voids at Ndes of 1.5 percent to a maximum of 5.0 percent.

   c. The Contractor shall inform the Engineer when changes in mixture properties occur for any reason, such as, but not limited to, the result of changes in the types or sources of aggregates are made or when changes in grades, sources, properties or modification procedures (if modified) of PG Binders are made. These changes 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 and submitted 5 working days prior to use for verification.

   d. Each Superpave mixture shall be tested for moisture sensitivity in accordance with AASHTO T 283. The loose mixture shall be short-term aged for two hours in accordance with AASHTO R30. The 6-inch (152-mm) specimens shall be compacted in accordance with AASHTO T 312 to seven percent air voids at 95-mm in height and evaluated to determine if the minimum Tensile Strength Ratio (TSR) of 80 percent has been met. If the mixture has not met the minimum TSR value, an anti-stripping additive shall be added at a dosage rate, such that the mix will meet the minimum TSR of 80 percent. All data shall be submitted with the mix design verification request. For mixtures containing an anti-stripping additive; during production of Lot #1, the Contractor shall provide to the NDR Central laboratory properly prepared gyratory samples for AASHTO T 283 testing. A TSR test result of less than 80 percent will require mixture modification(s) and a sample from subsequent lots will be tested until a TSR value of at least 80 percent is achieved. Moisture sensitivity testing is not required for Asphaltic Concrete Type SPS.

(1) When tests indicate the need for an anti-stripping additive the Contractor shall be compensated for the cost of liquid anti-strip additive needed, as determined during mixture design verification, at the invoice price of the additive. Liquid anti-strip additives will be added to the PG Binder by the PG Binder Supplier.

e. Design Criteria:

(1) The target value for the air voids of the asphaltic concrete design shall be 4 percent at the Ndes number of gyrations. For Type SPS Asphaltic concrete the air voids at Ndes shall be a minimum of 1.5 percent with a maximum of 5.0 percent.

Table 1028.11
Gyratory Compaction Effort
(Average Design High Air Temperature ≤39 degrees C)

Asphaltic Concrete Type	Nini	Ndes	Nmax
SPS	6	40	62
SP1	7	68	104
SP2	7	76	117
SP3	7	86	134
SP4	8	96	152
SP4 Special	7	76	117
SP5	8	109	174

(2) The design criteria for each mixture shall be determined from Tables 1028.12, 1028.13, and 1028.14.

Table 1028.12

Mix Criteria	SPS, SP1	SP2	SP3, SP4, SP4 Special, SP5
Voids In Mineral Aggregate	See Table 1028.13		
Voids Filled with Asphalt	See Table 1028.14		
%Gmm at Nini	91.5*	90.5	89.0
%Gmm at Nmax	98.0*	98.0	98.0

* No specification requirement for SPS, only %Gmm at Ndes = 95 to 98.5

Table 1028.13
Voids in Mineral Aggregate
Criteria at Ndes

Nominal Maximum Aggregate Size (Metric)	Minimum VMA, Percent*
3/8 inch (9.5 mm)	15.0
1/2 inch (12.5 mm)	14.0
3/4 inch (19 mm)	13.0

* No specification requirement for SPS

Table 1028.14
Voids Filled with Asphalt
Criteria at Ndes
(for mix design only)

Asphaltic Concrete Type	Design VFA, Percent
SPS	N/A
SP1	70 – 80
SP2	65 – 78
SP3	65 – 78
SP4	65 – 75
SP4 Special	65 - 75
SP5	65 – 75

2. The Contractor shall make Mix adjustments when:

   a. Air voids, VMA, FAA, CAA or Binder content do not meet the currently approved criteria.

   b. Surface voids create a surface and/or texture that does not meet the criteria of Sections 502 and 503 in the 1997 English and Metric Edition of the Standard Specifications.

   c. Pavement does not meet any other design criteria.

   d. Rutting occurs.

3. Mix adjustments at the plant are authorized within the limits shown in Table 1028.15 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 1028.15 will be the tolerances allowed for adjustments from the NDR verified mix design “Combined Gradation” target values which resulted from production or mix design adjustments, but cannot deviate from Superpave gradation criteria, or violate restricted zone criteria specified in paragraph 2. l. (1) of Subsection 1028.02. 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 1028.15

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)	± 6%
No. 8 (2.36 mm), No. 16 (1.18 mm), No. 30 (600 μm), No.50 (300 μm)	± 4%
No. 200 (75 μm)	± 2%

4. Sampling and Testing:

   a. The Contractor shall take samples at frequencies identified by the Engineer, according to the NDR statistically based procedure. The samples shall be approximately 75 pounds (34 kg) and split according to NDR T-248 either at: 1) the sampling location, with the NDR taking custody of their sample at that time or 2) after being transported to the test facility in an insulated container, 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 the lab calculation sheet from the superpave 2002 software, stored, and retained by the Contractor until the NDR has completed the verification testing process.

   c. (1) The sample shall be taken from the roadway, behind the paver before compaction or from the windrow.

   (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 may be performed at the Contractor's discretion. Any additional testing will not be used in pay factor determination.

   (4) At least 1 sample shall be taken between the first 110 tons (100 Mg) and 300 tons (270 Mg) at the following times: 1) at the project start-up, 2) when a test result, identified in Paragraph 4,h,(3) of Subsection 1028.03, is out of specification, and 3) when a substantial aggregate proportion or other major mix change has been made. This sample, when other than at start-up, will be in lieu of the next scheduled random sample location.

(5) The Contractor will be notified what sublot sample must be tested for FAA and CAA according to the NDR random sampling schedule. The FAA and CAA may be sampled from the blended cold feed material but in addition the Contractor will be required to test FAA and CAA from a roadway sample using an ignition oven sample for correlation. If the coarse portion of the blend is all ledge rock the CAA tests can be waived. If the samples tested with the ignition oven meet the CAA and FAA minimum requirement, then the cold feed sample does not have to be tested. When both ignition oven and cold feed samples are being tested the acquisition of the samples shall be timed such that each sample represents, as close as possible, the same aggregate being fed into the plant.

(6) 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) (i) 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 determined from a combined aggregate blend, including any RAP following ignition burn-off, on the + #4 and - #4 material. This test and recalculation will be required if the mix design changes according to the tolerances in Paragraph 3.c. of subsection 1028.03 and/or table 1028.15.

(ii) AASHTO T 84 - Specific Gravity and Absorption of Fine Aggregate.

(iii) AASHTO T 85 - Specific Gravity and Absorption of Coarse Aggregate.

(4) The laboratory air voids shall be determined in accordance with the following:

Table 1028.16

Gmb(corr)@Nany = Gmb(meas)@Nmax x (height@Nmax ÷ height@Nany)
%Gmm(corr)@Nany = 100 x (Gmb(corr)@Nany ÷ Gmm(meas))
% Air Voids@Nany = 100 - %Gmm(corr)@Nany
VMA@Ndes = 100 – (Gmb(corr)@Ndes x Ps ÷ Gsb)
VFA@Ndes = 100 x ((VMA@Ndes - % Air Voids@Ndes) ÷ VMA@Ndes)
Measured = (meas)
Corrected = (corr)

5. (i) The percent of PG Binder shall be determined foreach QC test. The percent of PG Binder will be computed by ignition oven results.

(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 *NDR 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 2002 version of NDOR provided "Superpave" software. A copy containing complete project documentation will be provided to the Materials and Research Division at the completion of the project.

g. QC Charts:

(1) QC charts shall be posted at the asphalt production site and kept current with both individual test results and moving average values for review by the Engineer.

(2) Control charts shall include a target value and specification limits.

(3) As a minimum, the following values shall be plotted or reported on NDR provided software:

(i) Laboratory Gyratory density

(ii) Ignition oven or cold feed aggregate gradations for all Superpave sieves will be reported.

(iii) PG Binder content shall be plotted to the nearest 0.1 percent by ignition oven results in accordance with AASHTO T 308.

(iv) The theoretical maximum specific gravity (Rice) to the nearest 0.001 percent will be reported.

(v) Laboratory Gyratory air voids at Ndes shall be plotted to nearest 0.1 percent. Laboratory Gyratory air voids, at Nini, Ndes and Nmax shall be reported to nearest 0.1 percent.

(vi) FAA and CAA of the asphaltic concrete for both cold feed and ignition oven samples will be reported to the nearest 0.1 percent.

(vii) VMA content shall be plotted to nearest 0.1 percent and VFA shall be reported to the nearest 0.1 percent.

(viii) Dust to Binder ratio to the nearest 0.01 will be reported.

h. Independent Assurance (IA) Review of Testing:

(1) The Contractor will allow NDR personnel access to their laboratory to conduct IA review of technician testing procedures and apparatus. Any deficiencies discovered in testing procedures will be noted and corrected.

(2) During IA review, NDR personnel and the Contractor will split a sample for the purpose of IA testing. The sample(s) selected will be tested in the NDR Branch Laboratory. Any IA test results found to be outside of defined testing tolerances will be noted. The Contractor must then verify the testing apparatus and make corrections if the apparatus is out of tolerance.

(3) Testing Tolerances

(i) Asphaltic Concrete and Asphaltic Concrete Aggregates.

Table 1028.17

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	10.0%
Field Core Density	0.020

(4) Aggregate Gradation (Blended Aggregate)

Table 1028.18

Size Fraction Between Consecutive Sieves, %	Tolerance
0.0 to 3.0	2%
3.1 to 10.0	3%
10.1 to 20.0	5%
20.1 to 30.0	6%
30.1 to 40.0	7%
40.1 to 50.0	9%

5. a. In response to tests results, the Contractor shall notify the Engineer whenever the process approaches the Specification limits.

b. When any single test result(s), on the same mix property, from two consecutive QC samples fall outside the allowable production tolerances in Table 1028.19, the material represented by these tests will be accepted with a 20% penalty or rejected, as determined by the Engineer.

Table 1028.19
Production Tolerances*

Test	Allowable Single Test Deviation from Specification
Voids in the Mineral Aggregate	- 0.75% to + 1.25% from Min.
Dust to Asphalt Ratio	None
Coarse Aggregate Angularity	- 5% below Min.
Fine Aggregate Angularity	- 0.50% below Min.

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

c. The Contractor shall assume the responsibility to cease operations when specifications other than those stated in Table 1028.19 are not being met and production shall not be started again without approval of the Engineer.

6. Verification Sampling and Testing:

a. The NDR will select and test at random one of the sublot samples (750 tons, 680 Mg) within a Lot (3750 tons, 3400 Mg) for verification and report results in a timely manner.

b. The results of Contractor QC testing will be verified by NDR verification tests. On any given Lot, if the results of Air Void verification testing and its companion QC testing are within 1.4 percent 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 sublot. Any or all of the remaining four NDR sublot samples may be tested and the NDR sublot test results may be applied to the respective sublots and the resulting pay factors will apply.

c. When verification test results show a consistent pattern of deviation from the QC results, the Engineer may cease production and request additional verification testing or initiate a complete IA review.

d. If the project personnel and the Contractor cannot reach agreement on the accuracy of the test results, the Materials and Research Laboratory will be asked to resolve the dispute, which will be final.

7. Acceptance and Pay Factors

a. Acceptance and pay factors for Asphaltic Concrete Type SPS will be based on compacted in place average density.

b. Acceptance and pay factors for Asphaltic Concrete Type SP1, SP2, SP3, SP4, SP4 Special and SP5 will be based on single test air voids, running average air voids, compacted in place average density, and production tolerances pay factor as stated in Paragraph 5.b. subsection 1028.03

(1) When there is a production tolerance pay factor penalty as stated in Paragraph 5.b. subsection 1028.03 this penalty percentage will be subtracted from the percent pay for single test air voids for each sublot affected. These three individual pay factors will then be multiplied by each other to determine a total pay factor for each sublot [(750 tons) (680 Mg)].

8. Asphaltic Concrete Air Voids

a. Normally, 1 sample for testing will be taken from each sublot [(750 tons) (680 Mg)] at locations determined by the Engineer.

b. 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 1028.20.

c. If the average air voids pay factor is (50% or reject) the NDR will have the first option of accepting or rejecting the asphaltic concrete represented in this sublot. If the NDR accepts this sublot the Contractor will have the second option of replacing this asphaltic concrete for no pay on the removal and for whatever pay factor that applies to the replacement.

d. In the case of removal, the foremost limits of the removal will be defined as the tonnage (mass) at which the production and placement was halted and a design change was made. The rear limits will be at the tonnage (mass) where linear interpolation with the previous test return to an accepted range and out of rejection limits or at the limit(s) of the defective material as determined by additional core samples taken and tested by the Contractor which show result(s) in an acceptable range and out of rejection limits to the satisfaction of the Engineer.

Table 1028.20

Acceptance Schedule Air Voids - N_{des}		
Air voids test results	**Moving average of four**	**Single test**
Less than 1.5%	Reject	Reject
1.5% to less than 2.0%	Reject	50%
2.0% to less than 2.5%	50% or Reject	95%
2.5% to less than 3.0%	90%	95%
3.0% to less than 3.5%	100%	100%
3.5% to 4.5%	102%	104%
Over 4.5% to 5.0%	100%	100%
Over 5.0% to 5.5%	95%	95%
Over 5.5% to 6.0%	90%	95%
Over 6.0% to 6.5%	50% or Reject	90%
Over 6.5% to 7.0%	Reject	50%
Over 7.0%	Reject	Reject

9. Asphalt Concrete Density Samples:

   a. Density tests will be performed by the Contractor under direct observation of NDR personnel. The Contractor will establish the method of testing in the preconstruction conference and shall be tested in accordance with the AASHTO T 166 or NDR T 587. The Contractor will insure that the proper adjustment bias and/or correction factors are used and accessible to NDR 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 NDOR Density spreadsheet. All disputed values determined using NDR T 587 shall be resolved using AASHTO T 166.

b. Density of samples shall be determined 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:

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

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

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

c. Either 4 inch (100 mm) or 6 inch (150 mm) diameter core samples shall be cut by the Contractor the first day of work following placement of the mixture.

d. Normally, 1 sample for determination of density will be taken from each sublot (750 tons) (680 Mg) at locations determined by the Engineer.

e. The theoretical maximum density for each lot (3,750 tons) (3,400 Mg) shall be calculated using AASHTO T 209.

f. 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.

g. For the first lot (3,750 tons) (3,400 Mg) of asphaltic concrete produced on a project and for asphaltic concrete used for temporary surfacing, the pay factor for density shall be computed in accordance with Table 1028.21. After the completion of the first lot, the pay factor for density shall be computed in accordance with Table 1028.22.

h. (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 1028.22.

(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 1028.21

Acceptance Schedule Density of Compacted Asphaltic Concrete (First Lot)	
Average Density (5 Samples, Percent of Voidless Density)	**Pay Factor**
Greater than 90.0	1.00
Greater than 89.5 to 90.0	0.95
Greater than 89.0 to 89.5	0.70
89.0 or Less	0.40 or Reject

Table 1028.22

Acceptance Schedule Density of Compacted Asphaltic Concrete (Subsequent Lots)	
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

i. If requested by the Contractor, check tests for all density tests in the original set, taken no later than the working day following placement 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 determined by a new random sampling schedule provided by the Engineer. The average density obtained by the check tests shall be used to establish the density pay factor for the lot.

10. PG Binder Sampling

a. At least one sample (2-1 quart cans) (2-1 liter cans) of PG Binder will be sampled by the Contractor's QC Technician for every Lot (3750 tons) (3400 Mg) of asphalt concrete mixture produced.

b. Samples will be taken in accordance with NDR Standard Method T40.

c. The QC Technician will include on the Sample Identification form all information required by the contract.

HYDRATED LIME SLURRY STABILIZATION
(Contractor QAQC)
(S10-13-0703)

Description

1. This work shall consist of constructing a Hydrated Lime Slurry base course. Produce the stabilized base course by milling the bituminous pavement, mixing the reclaimed bituminous pavement material with hydrated lime slurry and emulsified asphalt. Spread and compact the mixture in accordance with these specifications, as shown on the plans or directed by the Engineer.

Materials

2.a. The hydrated lime slurry shall be manufactured at the jobsite by slaking pebble quicklime. Pebble quicklime shall conform to the requirements listed in these Special Provisions. Each load of quicklime shall be accompanied by a certification stating the purity of that load.

2.b. The Emulsified Asphalt to be used shall be CSS-1H or CSS-1.

2.c. Water used for the hydrated lime slurry shall conform to the requirements of Section 1005 of the Standard Specifications.

Pebble Quicklime

2.d. This Specification covers pebble quicklime that is suitable for treatment of soil and soil-aggregate mixtures for purposes of stabilization. Pebble quicklime is a calcined material, the major part of which is calcium oxide or calcium oxide in natural association with a lesser amount of magnesium oxide capable of slaking with water. This specification applies to limes made from calcium type limestone.

Requirements

2.e. Provide materials that comply with the requirements of AASHTO M 216 (ASTM C 977).

2.f. Receipt and approval of certification stating purity and type.

Mix Design

3.a. A mixture design is required before the start of the project. The Contractor shall complete the mix design or have a mix design performed by a testing laboratory familiar with this type of recycling. The Contractor shall submit the mixture design to the Engineer for approval.

3.b. The proposed mix design shall have the properties as listed below and as indicated by the criteria given in Table 1.

TABLE 1

50 blow Marshall Design

Property	Criteria
Cured Marshall Stability*, ASTM D 1559, Part 5, 40°C, min., lb.	1250
Retained Marshall Stability* after soaking based on cured stability, min., %	70
*Cured stability determined on 60°C curing to constant weight (<72 hours). Retained stability determined after 23-hour water soak at 25°C followed by 40°C soak for one hour.	

3.c. Pebble quicklime shall be added by mass to the required quantity of water to provide uniform hydrated lime slurry having dry solids content of not less than 30 percent.

3.d. The milled bituminous material shall pass a 1.25-inch (31.5 mm) sieve.

3.e. The quantity of hydrated lime shall be determined by the mix design but shall have a minimum of 1.0 percent hydrated lime, based on the mass of dry RAP, added to the RAP.

3.f. The quantity of asphalt emulsion and mixing water shall be determined by the mixture design.

Sampling and Processing

3.g. Obtain cores from the areas to be recycled. If cores show significant differences in various areas, such as different type or thickness of layers between cores, then separate mix designs shall be performed for each of these pavement segments. It is recommended to take at a minimum, one core for each lane mile and where visual differences in the pavement are noticed. Cores shall be cut in the laboratory to the depth specified for the cold-in-place recycling project. Cores shall be crushed in the laboratory. This material shall be crushed to simulate field processed conditions. Perform a mix design(s) using the recycled asphalt pavement millings.

3.h. A target gradation using the following sieve sizes shall be submitted with the mix design and shall conform to the tolerances shown during field production.

Sieve Size	Tolerance During Production
1¼ inch (31.5 mm)	0
1 inch (25 mm)	±10
¾ inch (19 mm)	±10
No. 4 (4.75 mm)	±10
No. 30 (600 µm)	±10
No. 200 (75 µm)	±10

Equipment

4. Cold Recycling shall consist of a unit or a combination of units, which will satisfactorily perform the following requirements:

4.A. Configuration

1. Slake pebble quicklime and transport the hydrated lime slurry to the milling operation.

2. Mill the bituminous pavement, add the hydrated lime slurry to the RAP, and pick up the RAP.

3. Process the RAP to meet the specified gradation.

4. Add the emulsified asphalt to the RAP and mix the RAP uniformly with the hydrated lime slurry and emulsified asphalt.

5. Deposit the mixture in a paver.

4.B. Performance

1. The slaking equipment shall be specifically manufactured for this purpose. Tank trucks or trailers used to transport hydrated lime slurry shall have mechanical agitators.

2.(I) The milling unit shall be capable of milling the asphalt pavement to a depth shown in the plans and 12 feet (3.66 meters) wide in one pass, unless otherwise specified. It shall have automatic controls capable of maintaining uniform grade and cross-slope.

2.(II) The milling chamber shall have a spray bar to incorporate hydrated lime slurry into the RAP. The metering device for the spray bar shall be calibrated to, and controlled by, the continuous weighing system for the RAP.

3. The RAP processing unit shall be a crusher with a scalper screen, or other approved devices capable of reducing the RAP to the specified gradation.

4. The mixing unit shall have a continuous weighing system for the RAP, coupled with meters to maintain the proper proportion of RAP material, hydrated lime slurry and emulsified asphalt. The mixing unit shall be capable of producing a homogenous mixture of processed RAP material, hydrated lime slurry and emulsified asphalt and depositing the recycled mixture into a paver, without segregation.

5. The liquid metering systems shall deliver the additive to within 0.2 percentage points of the desired application rate, and shall shut off automatically if the delivery of RAP material is stopped.

6. Positive means shall be provided for calibration of the weighing and metering devices.

Construction Requirements:

5. Cold mill the existing bituminous surfacing in such a manner that does not disturb the underlying material in the existing roadway. The Contractor shall conduct his operations to prevent segregation of hydrated lime slurry stabilization material. Areas of segregated lime stabilized material shall be removed and replaced with non segregated material or the type of Asphaltic Concrete used on the project at no additional charge.

Spreading and finishing

5.a. The RAP, lime and emulsion mixture shall be delivered to the paver immediately after mixing the lime with the RAP. The recycled material shall be spread and finished true to crown and grade, in one or more lifts with a bituminous paver meeting the requirements of Section 503 or other equipment approved by the Engineer.

Compaction and Density Requirements

5.b. Compaction and density requirements for this project shall be a minimum of 97 percent of the target density obtained on a test strip compacted under the following conditions: The Mix temperature of the test strip shall be 50 degrees F (10° C) or higher. At least two test strips shall be completed to determine the target density and optimum sequence of rollers. These test strips will remain in place as part of the completed work. The depth of the lift shall be representative of the project.

5.c. Target density shall be the highest density achieved on the test strip using the rolling procedure approved by the Engineer. The rolling procedure, used on the test strip, shall have a minimum of six roller coverage's. The Engineer will use a nuclear gauge to establish a density growth curve for each procedure. Rolling shall be discontinued when four consecutive coverage's of the rollers fail to increase the density 1 pound per cubic foot (16 kg per cubic meter).

5.d. The Contractor shall have, as a minimum, the following self-propelled rollers for use on the project: a double drum vibratory steel roller and a pneumatic tire roller. The vibratory roller shall meet the requirements of Subsection 503 of the Standard Specifications and also have a minimum operating weight of 18,000 pounds (8165 kg) and a drum width of not less than 66 inches (1.68 meters). The vibratory roller may be

used in the static mode. The pneumatic tired roller shall weigh at least 30 tons (27 Mg) and have a minimum tire pressure of 90 pounds per square inch (psi) (620 kPa). The air pressure in each of the pneumatic tires will be within 5 (psi) (34 kPa) of each other. The Contractor shall supply a suitable tire pressure gauge. The rollers shall have watering systems to keep drums and tires wetted as required to prevent mixture pickup.

5.e. When there is a significant change in mix proportions, weather conditions or other controlling factors the Engineer may require construction of another test strip(s) to check target density.

5.f. Stabilization will not be performed when the ambient air temperature is less than 50 degrees F (10 degrees C). Also, the weather must not be foggy or rainy. The above requirement may be waived, but only in writing by the Engineer.

Preparation of Roadway

6. Remove vegetation from cracks, joints and other areas such as along edges of the roadway to prevent the contamination of the reclaimed asphalt pavement during the milling operation. If foreign matter or debris exists (dirt, leaves, etc.), the roadway shall be cleaned by power brooming.

Patching

7. The Contractor will repair all areas in the recycled roadway, which develop cracking and/or settlement after the cold recycling process. These areas shall be repaired by deep patching and completed prior to placement of the asphaltic concrete surfacing. The existing asphalt surfacing material, base and subgrade soil as required, shall be removed and replaced with the type of asphaltic concrete being produced on the project at that time and properly compacted to produce a stable repair.

Sampling and Testing

8. The Contractor shall randomly sample the recycled mixture for each 2500-foot (760 meter) lane section to verify that the mix design and density requirements are being met. If a sample fails to meet any of the mix design or density requirements the Contractor shall make any necessary adjustments and retest to verify that the mixture is meeting the requirements. All test results shall be reported to the State project personnel and a copy of the test reports submitted to the Engineer.

Method of Measurement

9.a. Patching shall be measured for payment in accordance with Subsection 516.05 of the Standard Specifications.

9.b. Hydrated Lime Slurry Stabilization shall be measured for payment by the station of completed and accepted work measured along the project centerline.

9.c. The Hydrated Lime will be measured by the Ton (Mg) of hydrated lime used in the slurry. Using the relationship of Pure Quicklime (CaO) x 1.32 = Hydrated Lime Ca(OH2), the basis of pay for jobsite slaked hydrated lime shall be the "calculated method" using the certified lime purity for each load as follows:

Quicklime Delivered x % purity x 1.32 = A
Quicklime Delivered x % inert material x 1.0 = B
A+B = Total Hydrated Lime Produced (Pay Quantity)

9.d. Emulsified Asphalt for Hydrated Lime Slurry Stabilization shall be measured for payment by the gallon (liter). The refinery certified volume shall be used as a basis of measurement if the entire shipment is used.

Basis of Payment

10.a. "Hydrated Lime Slurry Stabilization" shall be paid for at the Contract unit price per station. This price shall include the milling, processing, addition and mixing of the lime slurry and emulsified asphalt, shaping, compaction, finishing, vegetation removal, roadway sweeping, tests strips and for all equipment, labor, tools, and incidentals necessary to complete the work.

10.b. The accepted quantity of "Hydrated Lime" will be paid at the Contract unit price per ton (Mg).

10.c. The accepted quantity of "Emulsified Asphalt for Hydrated Lime Slurry Stabilization" will be paid at the Contract unit price per gallon (liter). If the actual type of Emulsified Asphalt used is different than that shown in these provisions, the unit price will be adjusted, up or down, by the difference in the invoice price of the material.

10.d. Patching, measured as provided herein, shall be paid for in accordance with Subsection 516.06 of the Standard Specifications.

10.e. Water used in the hydrated lime slurry will not be measured for payment but shall be considered subsidiary to the item "Hydrated Lime".

CHECKING PERCENT SOLIDS OF LIME SLURRY

When requested by the Engineer, the Contractor shall determine the solids content 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.

Table 2, “Correction Factors to Adjust Density of Temperature”, for accurate measurement of solids if slurry is not at 24 degrees C.

I. 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.

II. Weigh a dry, empty Gardner (WPG) cup and cover to the nearest 0.01 of a gram. Record this weight.

III. Shake the lime slurry sample well. Immediately fill the WPG cup.

IV. Tap the WPG cup lightly on an immovable object to allow for the escape of air bubbles.

V. 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.

VI. Hold the WPG cup by the top and bottom with thumb and forefinger. Be sure to cover the hole in the cap.

VII. Rinse the WPG cup under running water to remove any lime from the outside of the cup.

VIII. Dry the outside of the cup thoroughly.

IX. Weigh the dry, filled WPG cup to the nearest 0.01 of a gram. Record this weight.

X. Promptly remove the cover and insert thermometer. Record temperature.

XI. Subtract the empty cup weight (step 2) from the filled cup weight (step 9). Record the difference.

XII. Multiply the difference by 0.1. This number is the density (lbs./gallon) of the lime slurry. Record this number.

XIII. Look up the temperature correction in Table 2. Record.

XIV. Multiply the slurry density times the temperature correction. This is the adjusted slurry density. Record on the slurry worksheet.

XV. 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 of the lime slurry sample. Record on worksheet.

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

SUPERPAVE ASPHALTIC CONCRETE

The Asphaltic Concrete SP4 Special shall conform to all SP4 requirements listed in the Standard Specifications, Supplemental Specifications, Special Provisions and the requirements listed below.

Table 1028.11 of the Supplemental Specifications is void and superseded by the following:

Table 1028.11
Gyratory Compaction Effort
(Average Design High Air Temperature ≤39 degrees C)

Asphaltic Concrete Type	Nini	Ndes	Nmax
SPS	6	40	62
SP0	6	50	74
SP1	7	68	104
SP2	7	76	117
SP3	7	76	117
SP4	7	76	117
SP5	8	109	174

PROPOSAL GUARANTY
(S1-38-0801)

As an evidence of good faith in submitting a proposal for this work or for any portion thereof as provided in the proposal form, the bidder must file with his proposal a bid bond, which must be executed on the Department of Roads' Bid Bond form, in the amount of 5 percent of the amount bid for any group of items or collection of groups for which the bid is submitted. Any alterations, conditions or limitations added to the Department of Roads' Bid Bond form will be unacceptable and cause the bid not to be opened and read.

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N12INFOCT03