

STATE OF DELAWARE  
DEPARTMENT OF TRANSPORTATION



**BID PROPOSAL**

**CONTRACT T202103301**

**CTF, OPEN END, SOUTH, FY21-FY22**

Advertisement Date: September 4, 2020

**INCLUDED IN THIS DOCUMENT:**

**BID PROPOSAL:**

*GENERAL DESCRIPTION*  
*PROSPECTIVE BIDDERS NOTES*  
*GENERAL NOTICES*  
*SPECIAL PROVISIONS*  
*QUANTITY SHEET SUMMARY*

**ADDITIONAL BID PROPOSAL ITEMS:**

**ATTACHED OR POSTED DOCUMENTS:**

*PROJECT PLANS*  
*QUESTIONS & ANSWERS (if posted)*  
*GUARDRAIL END-TREATMENT INFO*

**PAPER BIDDERS CONTACT DELDOT  
FOR BID SUBMITTAL DOCUMENTS:**

*DRUG TESTING AFFIDAVIT;*  
*CERTIFICATION FORM;*  
*BID BOND FORM;*  
*CD FOR BID PRICE ENTRY & PRINTING*

This Bid Proposal and related documents can be viewed on [bids.delaware.gov](https://bids.delaware.gov) and, for subscribers [bidx.com/de/](https://bidx.com/de/)

**Internet Bids** for Bidders with Bid Express® accounts can be submitted at [BIDX.com/de](https://bidx.com/de/); **OR**;

**Paper Bids With CD** will be received at the DelDOT Administration Building, Dover, DE;

**ALL BIDS DUE PRIOR TO 2:00 P.M. Local Time, October 6, 2020**

## GENERAL DESCRIPTION

- A. BIDS DUE:** **OCTOBER 6, 2020 PRIOR TO 2:00 P.M. Local Time** – unless changed via Addendum.  
**LOCATION:** Bidder's Room, DelDOT Administration Building, 800 South Bay Road, Dover, DE 19901.  
**OR:** Bidders with Bid Express<sup>®</sup> accounts can submit bids at [BIDX.com/de](https://BIDX.com/de).
- B. PRE-BID MEETING:** No
- C. LOCATION:** SUSSEX County  
These improvements are more specifically shown on the Location Map(s) of the attached Plans.
- D. DESCRIPTION:** The improvements consist of furnishing all labor and materials for the purpose of making general improvements to roads, streets, and other locations throughout Sussex County as requested and funded by legislators. This contract will address legislator and community needs in a timely manner; as funding is made available. The methods for addressing these needs will vary and could include, but not be limited to: patching, milling, overlays, crack sealing, pipe replacements, drainage projects, replacing pavement markings, adjusting & repairing drainage inlets, manholes, water valves, and other utilities, and any other work required to complete each work order.
- E. COMPLETION TIME:** All work on this contract must be complete within 730 Calendar Days.  
The Contract Time includes an allowance for 0 Weather Days.  
The Department's intent is to issue a Notice to Proceed for work to start on or about November 16, 2020.
- F. SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, DELAWARE DEPARTMENT OF TRANSPORTATION, AUGUST 2016** apply to this Bid Proposal and Project. The Contractor shall make himself aware of any revisions and corrections (Supplemental Specifications, if any) and apply them to the applicable item(s) of this contract. The Standard and Supplemental Specifications can be viewed [here](#). Units of Measure can be found at 101.04.
- G. ATTACHMENTS:** Included as part of this Bid Proposal are; *Project Plans; Questions & Answers* (if posted); *Addenda* (if issued), *Referenced Documents, Documents Posted with this Bid Proposal*; and *Bid documents mailed to contractors*.
- H. ADDENDA:** All Addenda are posted on the internet at [bids.delaware.gov](https://bids.delaware.gov), and [bidx.com/de/](https://bidx.com/de/) and are included as part of the Bid Proposal. The Bidder is responsible to check the Website as needed to ensure that the Bidder is aware of Addenda that are included in the Bid Proposal. If Addenda are issued, the final Addendum will be posted no later than the end of the day two business days prior to the bid date. Each Addendum number and issue date must be entered on the submitted Certification Form. This original Bid Proposal will not be updated, you must refer to each Addendum.
- I. QUESTIONS:** E-MAIL TO; [dot-ask@delaware.gov](mailto:dot-ask@delaware.gov)  
Questions regarding this project are to be e-mailed to the above address no less than **six business days** prior to the bid opening date in order to receive a posted response. Please include the Contract number in the subject line. Questions and responses are posted at [bids.delaware.gov](https://bids.delaware.gov), and [bidx.com/de/](https://bidx.com/de/). The date of the final posted Questions and Answers document must be entered on the submitted Certification Form.

*Prospective Bidders Notes begin on the following page...*

**J. PROSPECTIVE BIDDERS NOTES:**

**1. BIDDERS MUST BE REGISTERED** with DelDOT in order to submit a bid. E-Mail [dot-ask@delaware.gov](mailto:dot-ask@delaware.gov) or call (302) 760-2031 to request registration information.

**2. BIDS MUST BE SUBMITTED VIA:**

(a) **Internet** - Bidders with Bid Express<sup>®</sup> accounts can submit bids at [www.bidx.com/de/](http://www.bidx.com/de/).

**OR:**

(b) **Paper Bid** with supplied CD and printout of Bid Item prices and all required documents and forms.

For paper bids, contact DelDOT at [dot-ask@delaware.gov](mailto:dot-ask@delaware.gov) or (302) 760-2031 to request a CD for bidding, required forms, and instructions. Bidders enter their Bid Item prices into the supplied CD then print the form and submit the printed prices form along with the CD and other required documents prior to the Bid due date/time.

*(CD's cannot be used to submit bids to bidx.com)*

***Do not submit both Internet and Paper Bids. If so, the Internet bid will be rejected.***

**3. SURETY BOND** - Each proposal must be accompanied by a deposit of either surety bond or security for a sum equal to at least 10% of the amount bid.

**4. DRUG TESTING** - Regulation 4104; The state Office of Management and Budget has developed regulations that require Contractors and Subcontractors to implement a program of mandatory drug testing for Employees who work on Large Public Works Contracts funded all or in part with public funds pursuant to 29 Del.C. §6908(a)(6). **Refer to the full requirements at the following link:**

<http://regulations.delaware.gov/register/december2017/final/21%20DE%20Reg%20503%2012-01-17.htm>

Note a few of the requirements;

- \* **At bid submission** - Each bidder must submit with the bid a single signed affidavit certifying that the bidder and its subcontractors has in place or will implement during the entire term of the contract a Mandatory Drug Testing Program that complies with the regulation (*a blank affidavit form is attached*);
- \* **At least two business days prior to contract execution** - The awarded Contractor shall provide to DelDOT copies of the Employee Drug Testing Program for the Contractor, each participating DBE firm, and all other listed Subcontractors;
- \* **Subcontractors** - Contractors that employ Subcontractors on the job site may do so only after submitting a copy of the Subcontractor's Employee Drug Testing Program along with the standard required subcontractor information. A Subcontractor shall not commence work until **DelDOT** has approved the program in writing.

**5. PERFORMANCE-BASED RATING SYSTEM** - 29 Del.C. §6962 (c)(12)(a) requires DelDOT to include a performance-based rating system for contractors. The Performance Rating for each Contractor shall be used as a prequalification to bid at the time of bid. Refer to 'General Notices' for details.

**6. NO RETAINAGE** will be withheld on this contract unless through the Performance-Based Rating System.

**7. EXTERNAL COMPLAINT PROCEDURE** can be viewed on DelDOT's Website, [https://deldot.gov/Business/cr/index.shtml?dc=civil\\_rights\\_eeo](https://deldot.gov/Business/cr/index.shtml?dc=civil_rights_eeo) or request a copy by calling (302) 760-2555.

**8. DELAWARE BUSINESS LICENSE;** a copy of your firm's Business License must be submitted with your bid.

**9. SECTION 106.06 BUY AMERICA** Contract Requirement in the Delaware Standard Specifications for Road and Bridge Construction, August, 2016 does not apply to this contract.

**10. FLATWORK CONCRETE TECHNICIAN CERTIFICATION TRAINING:**

Section 501.03, 503.03, 505.03, 610.03, 701.03 and 702.03 of the 2016 Standard Specifications require contractors to provide an American Concrete Institute (ACI) or National Ready-Mix Concrete Association (NRMCA) certified concrete flatwork technician to supervise all finishing of flatwork concrete.

**11. PREVAILING WAGES DO NOT APPLY TO THIS PROJECT**, refer to *29 Del. C. § 6960 (m)*. Standard Specification Section 811.05 A..2. through A.6. (Basis of Payment for Flaggers) does not apply to this project.

*- end -*

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## GENERAL NOTICES

### SPECIFICATIONS :

The Delaware specifications entitled "*Standard Specifications for Road and Bridge Construction August, 2016*", hereinafter referred to as the *Standard Specifications*; the *Supplemental Specifications* to the Standard Specifications effective as of the advertisement date of this Bid Proposal and hereby included by reference; the *Special Provisions*; *Notes on the Plans*; this *Bid Proposal* including referenced documents; any *Addenda* thereto; and any posted *Questions and Answers*; shall govern the work to be performed under this contract. The Contractor shall make itself aware of these specifications, revisions and corrections, and apply them to the applicable item(s) of this contract.

### CLARIFICATIONS :

Under any Section or Item included in the Contract, the Contractor shall be aware that when requirements, responsibilities, and furnishing of materials are outlined in the details and notes on the Plans and in the paragraphs preceding the "Basis of Payment" paragraph in the Standard Specifications or Special Provisions, no interpretation shall be made that such stipulations are excluded because reiteration is not made in the "Basis of Payment" paragraph.

### ATTESTING TO NON-COLLUSION :

The Department requires as a condition precedent to acceptance of bids a sworn statement executed by, or on behalf of, the person, firm, association, or corporation to whom such contract is to be awarded, certifying that such person, firm, association, or corporation has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with such contract. The form for this sworn statement is included in the proposal and must be properly executed in order to have the bid considered.

### QUANTITIES :

The quantities shown are for comparison of bids only. The Department may increase or decrease any quantity or quantities without penalty or change in the bid price.

### PERFORMANCE-BASED RATING SYSTEM

29 Del.C. §6962 (c)(12)(a) requires a Department of Transportation project, excluding a Community Transportation Fund or municipal street aid contract, to include a performance-based rating system. At the time of bid, the Performance Rating for each Contractor shall be used as a prequalification to bid.

Bidders with Performance Rating scores equal to or greater than 85% shall be permitted to bid. Bidders with scores of less than 85% who comply with the retainage requirements of 29 Del.C. §6962 shall be permitted to bid provided the *Agreement to Accept Retainage* (located on the Certification Page) is executed and submitted with the bid. Lack of an executed *Agreement to Accept Retainage* will result in the rejection of the bid by the Department. Successful bidders awarded Department contracts who have no performance history within the last five (5) years will be assigned a provisional Performance Rating of 85% at the date of advertisement.

Notification of Performance Rating. The Department shall post publicly the Performance Rating for all Contractors on the Department's [website](#). DelDOT will complete performance-based evaluations on the construction company contracted by the Department to build the project (the "Contractor"). Provisions to appeal Performance Ratings are described in the regulations. The regulations are set forth in Section 2408 of Title 2, Delaware Administrative Code, found [here](#).

### PREFERENCE FOR DELAWARE LABOR:

Delaware Code, Title 29, Chapter 69, Section 6962, Paragraph (d), Subsection (4)b: "In the construction of all public works for the State or any political subdivision thereof, or by firms contracting with the State or any political subdivision thereof, preference in employment of laborers, workmen or mechanics shall be given to bona fide legal citizens of the State who have established citizenship by residence of at least 90 days in the State. Each public works contract for the construction

of public works for the State or any political subdivision thereof shall contain a stipulation that any person, company or corporation who violates this section shall pay a penalty to the Secretary of Finance equal to the amount of compensation paid to any person in violation of this section."

EQUALITY OF EMPLOYMENT OPPORTUNITY ON PUBLIC WORKS :

Delaware Code, Title 29, Chapter 69, Section 6962, Paragraph (d), Subsection (7) states;

- a. As a condition of the awarding of any contract for public works financed in whole or in part by State appropriation, such contracts shall include the following provisions:

During the performance of this contract, the contractor agrees as follows:

1. The contractor will not discriminate against any employee or applicant for employment because of race, creed, color, sex, sexual orientation, gender identity or national origin. The contractor will take positive steps to ensure that applicants are employed and that employees are treated during employment without regard to their race, creed, color, sex, sexual orientation, gender identity or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places available to employees and applicants for employment notices to be provided by the contracting agency setting forth this nondiscrimination clause.
2. The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to race, creed, color, sex, sexual orientation, gender identity or national origin.
3. The contractor will ensure employees receive equal pay for equal work, without regard to sex. Employee pay differential is acceptable if pursuant to a seniority system, a merit system, a system which measures earnings by quantity or quality of production, or if the differential is based on any other factor other than sex.

TAX CLEARANCE :

As payments to each vendor or contractor aggregate \$2,000, the Division of Accounting will report such vendor or contractor to the Division of Revenue, who will then check the vendor or contractor's compliance with tax requirements and take such further action as may be necessary to ensure compliance.

LICENSE :

A person desiring to engage in business in this State as a contractor shall obtain a license upon making application to the Division of Revenue.

CONTRACTOR / SUBCONTRACTOR LICENSE: 29 DEL. C. §6967:

- (b) No agency shall accept a proposal for a public works contract unless such contractor has provided a proper and current copy of its occupational and/or business license, as required by Title 30, to such agency.
- (c) Any contractor that enters a public works contract must provide to the agency to which it is contracting, within 30 days of entering such public works contract, copies of all occupational and business licenses of subcontractors and/or independent contractors that will perform work for such public works contract. However, if a subcontractor or independent contractor is hired or contracted more than 20 days after the contractor entered the public works contract the occupational or business license of such subcontractor or independent contractor shall be provided to the agency within 10 days of being contracted or hired.

DIFFERING SITE CONDITIONS:

SUSPENSIONS OF WORK and SIGNIFICANT CHANGES IN THE CHARACTER OF WORK:

Differing site conditions: During the progress of the work, if subsurface or latent physical conditions are encountered at the site differing materially from those indicated in the contract or if unknown physical conditions of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in the work provided for in the contract are encountered at the site, the party discovering such conditions shall promptly notify the other party in writing of the specific differing conditions before they are disturbed and before the affected work is performed.

Upon written notification, the engineer will investigate the conditions, and if he/she determines that the conditions materially differ and cause an increase or decrease in the cost or time required for the performance of any work under the contract, an adjustment, excluding loss of anticipated profits, will be made and the contract modified in writing accordingly. The engineer will notify the contractor of his/her determination whether or not an adjustment of the contract is warranted.

No contract adjustment which results in a benefit to the contractor will be allowed unless the contractor has provided the required written notice. No contract adjustment will be allowed under their clause for any effects caused on unchanged work.

Suspensions of work ordered by the engineer: If the performance of all or any portion of the work is suspended or delayed by the engineer in writing for an unreasonable period of time (not originally anticipated, customary or inherent to the construction industry) and the contractor believes that additional compensation and/or contract time is due as a result of such suspension or delay, the contractor shall submit to the engineer in writing a request for adjustment within 7 calendar days of receipt of the notice to resume work. The request shall set forth the reasons and support for such adjustment.

Upon receipt, the engineer will evaluate the contractor's request. If the engineer agrees that the cost and/or time required for the performance of the contract has increased as a result of such suspension and the suspension was caused by conditions beyond the control of and not the fault of the contractor, its suppliers, or subcontractors at any approved tier, and not caused by weather, the engineer will make an adjustment (excluding profit) and modify the contract in writing accordingly. The engineer will notify the contractor of his/her determination whether or not an adjustment of the contract is warranted.

No contract adjustment will be allowed unless the contractor has submitted the request for adjustment within the time prescribed. No contract adjustment will be allowed under this clause to the extent that performance would have been suspended or delayed by any other cause, or for which an adjustment is provided for or excluded under any other term or condition of this contract.

Significant changes in the character of work: The engineer reserves the right to make, in writing, at any time during the work, such changes in quantities and such alterations in the work as are necessary to satisfactorily complete the project. Such changes in quantities and alterations shall not invalidate the contract nor release the surety, and the contractor agrees to perform the work as altered.

If the alterations or changes in quantities significantly change the character of the work under the contract, whether or not changed by any such different quantities or alterations, an adjustment, excluding loss of anticipated profits, will be made to the contract. The basis for the adjustment shall be agreed upon prior to the performance of the work. If a basis cannot be agreed upon, then an adjustment will be made either for or against the contractor in such amount as the engineer may determine to be fair and equitable.

The term "significant change" shall be construed to apply only to the following circumstances:

- (A) When the character of the work as altered differs materially in kind or nature from that involved or included in the original proposed construction, or
- (B) When a major item of work, as defined elsewhere in the contract, is increased in excess of 125 percent or decreased below 75 percent of the original contract quantity. Any allowance for an increase in quantity shall apply only to that portion in excess of 125 percent of original contract item quantity, or in case of a decrease below 75 percent, to the actual amount of work performed.

RIGHT TO AUDIT

The Department shall have the right to audit the books and records of the contractor or any subcontractor under this contract or subcontract to the extent that the books and records relate to the performance of the contract or subcontract. The books and records shall be maintained by the contractor for a period of 3 years from the date of final payment under the prime contract and by the subcontractor for a period of 3 years from the date of final payment under the subcontract (29 Del.C. §6930)

### SPECIAL PROVISIONS

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S.P. Code	SPECIAL PROVISION DESCRIPTION
202500-15	GRADING AND RESHAPING ROADWAY
203500-15	DITCHING
401500-15	FOG SEAL
401501-15	BITUMINOUS ASPHALT TACK COAT
401502-15	ASPHALT CEMENT COST ADJUSTMENT
401504-15	FRICTION MASTIC FOG SEAL
401506-15	SPEED HUMP
401532-15	PAVING SURCHARGE, ZONE 13
401533-15	PAVING SURCHARGE, ZONE 14
401696-15	ENTRANCE, DRIVEWAY, AND INTERSECTING STREET PAVING SURCHARGE
401699-15	QUALITY CONTROL/QUALITY ASSURANCE OF BITUMINOUS CONCRETE
763556-15	ROAD LOCATION MOBILIZATION, ZONE 13
763557-15	ROAD LOCATION MOBILIZATION, ZONE 14

**202500 - GRADING AND RESHAPING ROADWAY**

**Description:**

This work consists of grading and reshaping roadway which includes widening, grading, scarifying, reshaping and compacting the existing roadway to the proposed typical section as described on the Plans; and includes in case of removing the material on crests cut to a maximum depth of 12" (300 mm) below the original ground throughout the full width of the typical section, if required or directed by the Engineer.

The Contractor shall take particular care to waste and dispose of, away from the site all the material on each side, adjacent to, and contiguous with the roadway that is unsuitable; such as grass, root mat, weeds, brush, shrubs, leaves, and/or any other types of vegetation, organic matter, and objectionable debris. Existing material of these types shall not be used for the improvement. Soils, to be used for the roads to receive bituminous surface treatment/ hot-mix, and for the roads to be stabilized, shall conform to the particular type of borrow shown on the Plans for each specific type of construction.

When grading to the typical section, materials encountered that are not suitable to form embankment shall be removed from the ditches, backslopes, etc., and disposed of away from the site.

The subgrade shall be prepared in accordance with subsections 202.02 and 202.06 of the Standard Specifications.

**Method of Measurement:**

The quantity of grading and reshaping roadway will be measured in miles (kilometers) along the centerline of the completed roadway.

**Basis of Payment:**

The quantity of grading and reshaping roadway will be paid for at the Contract price per mile (kilometer). Price and payment will constitute full compensation for performing all the work described in these Special Provisions, as noted on the Plans, and/or as directed by the Engineer, and includes, disposal and removal, away from the site of the unsuitable materials, for widening, grading, reshaping and compacting the shoulders for all labor, tools, equipment, and incidentals necessary to complete the item.

7/31/2020

**203500 - DITCHING**

**Description:**

This work consists of excavating lateral and longitudinal ditches

**Construction Methods:**

Excavate ditches as shown on the Plans. Spread all material excavated from the ditches on each side of the ditch. Grade and contour the surface to blend with the surrounding ground. Prepare the land and condition along both sides of the ditch to the width necessary to receive the material. The Contractor will clear and dispose of any brush alongside the ditches in accordance with section 201. Stabilize the disturbed areas in accordance with section 908.

**Method of Measurement:**

The quantity of ditching will be measured in linear feet along the centerline of the ditch, constructed and accepted.

**Basis of Payment:**

The Department will pay the quantity of ditching at the contract unit price per linear foot. Price and payment will constitute full compensation for clearing, disposing of debris, excavating, and grading for all labor, materials, equipment, tools, and incidentals required to complete the work.

11/4/2019

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**401500 – FOG SEAL**

**Description:**

This work consists of preparing the surface, furnishing and applying an emulsified asphalt and water mixture as a surface seal.

**Materials:**

Materials for fog seal shall be a 1:1 mixture CSS-1h, which conforms to Section 1016 of the Standard Specifications, and water, which conforms to Section 1021 of the Standard Specifications. A Certificate of Analysis shall be submitted for each lot of CSS-1h for approval. The percentage of residual asphalt of the CSS-1h shall be no less than 57 percent. The emulsion should be diluted no more than 24 hours before its intended use. This is to avoid settlement of the diluted emulsion. The emulsion may be circulated using a centrifugal or other suitable pump to ensure uniformity.

**Equipment:**

Distributors. The distributors used shall be capable of uniformly applying the bituminous material in liquid form. Devices to control the pressure, volume, and temperature shall be provided. Each distributor shall have an approved calibration chart, be equipped with an approved sampling device, and conform to the following:

- a. *Pressure.* The pressure shall be supplied by a positive displacement pump or air compressor. The pressure shall be uniform throughout the entire width of spray. If pressure is supplied by an air compressor, automatic controls must be provided to maintain sufficient and even pressure throughout the application of an entire load.
- b. *Temperature.* The distributor shall be equipped with a heating system that applies heat uniformly across the width of the tank. Provisions shall be made for circulating or agitating the material whenever necessary while heating. The distributor shall be equipped with a thermometer marked in degrees Fahrenheit of sufficient range to determine the actual temperature of the material.
- c. *Tachometer.* All distributors shall be provided with an approved tachometer recording feet (meters) per minute with a tabulation of feet per load with adjustments. Each load tabulation shall start at zero. There shall also be a totaling tabulation of this instrument.

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- d. *Volume.* A tachometer shall give correct readings of the speed, and the volumetric efficiency of the distributor shall ensure the correct volume at various speeds. Tests shall be required to prove the volumetric efficiency of the distributor at various speeds as directed by the Engineer.
- e. *Circulating System.* All pump distributors shall be equipped with a circulating system designed to maintain a homogenous liquid while circulating in the distributor tank. This circulating system shall also be arranged to circulate the material in the tank truck before application.

Air distributors shall be equipped with a device for agitating the bituminous material in the tank trucks when necessary.

- f. *Tests.* Necessary tests shall be made to determine the accuracy of all pressure gauges, tachometers, and pump efficiencies. The tests shall be made by the Contractor when and as required by the Engineer.
- g. *Spray Bars.* Each distributor shall be equipped with spray bars capable of applying material uniformly throughout the entire length of the spray bars when they are extended. Spray bar extensions shall be provided for applying up to a 12' width in one operation. Spray bars shall be equipped with a cleaning device and a shut-off valve to prevent dribbling, dripping, or streaking.
- h. *Tank Capacity Gauge.* A float or other approved type tank capacity gauge shall be furnished to indicate the volume in the tank in not less than 25 gal units. The gauge shall have adjustments for correction.

Tanks shall have a minimum capacity of 750 gal.

The rate of application of the distributor shall be calibrated by an approved method determined by the Engineer.

If the Engineer deems that the equipment applying the material is inadequate or fails to comply with all regulations, the Engineer will order the equipment to be removed from the job and require that another unit be placed on the work.

**Application of Fog Seal Material:**

The fog seal shall be applied in one application at the rates specified using the pressure distributor for the full width of the sealing operation, unless otherwise directed. Apply at the temperature that is recommended by the manufacture.

The nozzles of the spray bar shall be kept clean at all times. If one or more nozzles becomes blocked during the application of bituminous materials, the distributor shall be stopped immediately, and the nozzles shall be cleaned. The streaked areas shall be made uniform using a hand hose or other approved methods.

If the Contractor is unable to keep the application uniform, the operation shall be discontinued until a more experienced operator or a better distributor, or both, can be provided; or, the Contractor shall take such other precautions as may be necessary to keep the application within specified limits.

When applying bituminous materials adjacent to structures or curbs, the Contractor shall furnish and use effective means of protecting the structures or curbs from discoloration.

**Construction Methods:**

The surface upon which the fog seal is to be placed shall be cleaned thoroughly to the satisfaction of the Engineer. The fog seal shall be applied at a rate of 0.05 to 0.17 gal/yd<sup>2</sup> at ambient temperature. The application rate appropriate for the surface being sealed shall be determined by the Engineer. This rate will be determined by test strip. Apply the fog seal when the air and surface temperature is 60°F and above. Measure the air and surface temperature in the shade away from artificial heat. The application shall not begin if rain or high winds are eminent. The Engineer will determine when weather conditions are suitable for application. The fog seal should be a thin, uniform coating sufficient to seal the underlying pavement. The fog seal shall be applied using pressurized distributing equipment with a spray bar or other approved distribution system. During the application of the fog seal, care shall be taken to prevent splattering of adjacent pavement, curb and gutter and structures. Surface preparation shall be completed by removing all vegetation prior to sweeping with a power broom followed by a final sweeping with a approved vacuum truck. The preparation shall be done just prior to the application of the fog seal and be approved by the Engineer.

**Method of Measurement:**

The quantity of Emulsified Asphalt fog seal will be measured as the actual number of gallons of fog seal applied. The quantity will be determined by any or all of the following methods and should be verified for accuracy

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by computations based on field measurements taken on and along the completed finished surfaces. Multiple layers will not be measured separately.

1. **Truck Measurement:** If bituminous materials are delivered to the Project in tank trucks, distributor tanks, or drums, the Contractor shall not remove any bituminous material from the transporting vehicle or container until necessary measurements have been made, nor shall the transporting vehicle or container be released until final outage has been measured. If weighing is not convenient, the Contractor shall furnish the Engineer with a certified chart showing the dimensions and volume of each container together with a gauge or calibrated measuring rod which will permit the volume of the material to be determined by vertical measurement.
  
2. **Metering:** The volume may be determined by metering, in which case the metering device used and the method of using it shall be subject to the approval of the Engineer.
  
3. **Time of Deliveries:** The arrival and departure of vehicles delivering bituminous materials to the Project site shall be so scheduled that the Engineer is afforded proper time for the measurements of delivered volume and final outage. The Engineer will make the necessary measurements only during the Contractor's normal daily working hours.

**Basis of Payment:**

The quantity of the fog seal will be paid for at the Contract unit price per gallon of diluted CSS-1h. Price and payment will constitute full compensation for preparing the surface, mobilizing and furnishing all equipment, materials, and labor; placing the material; and for all labor, equipment, tools and incidentals necessary to complete the work.

10/11/2018

**401501 - BITUMINOUS ASPHALT TACK COAT**

**Description:**

This work consists of furnishing and applying an un-cut PG 64-22 graded asphalt tack coat.

**Materials:**

Materials for tack coat shall conform to Section 1012 of the Standard Specifications. A Certificate of Analysis shall be submitted for each lot of material for approval.

**Equipment:**

Distributors. The distributors used shall be capable of uniformly applying the bituminous material in liquid form. Devices to control the pressure, volume, and temperature shall be provided. Each distributor shall have an approved calibration chart, be equipped with an approved sampling device, and conform to the following:

- a. *Pressure.* The pressure shall be supplied by a positive displacement pump or air compressor. The pressure shall be uniform throughout the entire width of spray. If pressure is supplied by an air compressor, automatic controls must be provided to maintain sufficient and even pressure throughout the application of an entire load.
- b. *Temperature.* The distributor shall be equipped with a heating system that applies heat uniformly across the width of the tank. Provisions shall be made for circulating or agitating the material whenever necessary while heating. The distributor shall be equipped with a thermometer marked in degrees Fahrenheit of sufficient range to determine the actual temperature of the material.
- c. *Tachometer.* All distributors shall be provided with an approved tachometer recording feet per minute with a tabulation of feet per load with adjustments. Each load tabulation shall start at zero. There shall also be a totaling tabulation of this instrument.
- d. *Volume.* A tachometer shall give correct readings of the speed, and the volumetric efficiency of the distributor shall ensure the correct volume at various speeds. Tests shall be required to prove the volumetric efficiency of the distributor at various speeds as directed by the Engineer.

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- e. *Circulating System.* All pump distributors shall be equipped with a circulating system designed to maintain a homogenous liquid while circulating in the distributor tank. This circulating system shall also be arranged to circulate the material in the tank truck before application.

Air distributors shall be equipped with a device for agitating the bituminous material in the tank trucks when necessary.

- f. *Tests.* Necessary tests shall be made to determine the accuracy of all pressure gauges, tachometers, and pump efficiencies. The tests shall be made by the Contractor when and as required by the Engineer.
- g. *Spray Bars.* Each distributor shall be equipped with spray bars capable of applying material uniformly throughout the entire length of the spray bars when they are extended. Spray bar extensions shall be provided for applying up to a 12' width in one operation. Spray bars shall be equipped with a cleaning device and a shut-off valve to prevent dribbling, dripping, or streaking.
- h. *Tank Capacity Gauge.* A float or other approved type tank capacity gauge shall be furnished to indicate the volume in the tank in not less than 25 gal units. The gauge shall have adjustments for correction.

Tanks shall have a minimum capacity of 750 ga.

The rate of application of the distributor shall be calibrated by an approved method determined by the Engineer.

If the Engineer deems that the equipment applying the material is inadequate or fails to comply with all regulations, the Engineer will order the equipment to be removed from the job and require that another unit be placed on the work.

**Heating and Application of Bituminous Material:**

Bituminous materials used for each treatment shall be heated in a manner that ensures even heating of the entire mass and maintained within the specified temperature and pressure range during application. Any material which has been damaged shall be rejected, and any section treated with damaged material shall be removed and replaced.

The bituminous material shall be applied in one application at the rates specified using the pressure distributor for the full width of the paving operation, unless otherwise directed.

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The nozzles of the spray bar shall be kept clean at all times. If one or more nozzles becomes blocked during the application of bituminous materials, the distributor shall be stopped immediately, and the nozzles shall be cleaned. The streaked areas shall be made uniform using a hand hose or other approved methods.

If the Contractor is unable to keep the application uniform, the operation shall be discontinued until a more experienced operator or a better distributor, or both, can be provided; or, the Contractor shall take such other precautions as may be necessary to keep the application within specified limits.

When applying bituminous materials adjacent to structures or curbs, the Contractor shall furnish and use effective means of protecting the structures or curbs from discoloration.

### **Construction Methods:**

The surface upon which the tack coat is to be placed shall be cleaned thoroughly to the satisfaction of the Engineer. Tack coat shall be applied at a rate of 0.08 to 0.17 gal/yd<sup>2</sup>, at a temperature of 310 to 340 °F. The application rate appropriate for the surface being overlaid shall be determined by the Engineer. This rate will be determined during the application of the warm-mix test strip. The tack coat should be a thin, uniform coating sufficient to bond the overlay to the underlying pavement. Tack coat shall be applied using pressurized distributing equipment with a spray bar or other approved distribution system. Tack coat shall be applied in advance of the hot-mix operation, but no further than 500 feet in front of the paver. All contact surfaces of curbing, gutters, manholes, and other facilities shall be coated with a uniform coat of hot asphalt cement (tack) just before the mixture is placed. During the application of tack coat, care shall be taken to prevent splattering of adjacent pavement, curb and gutter and structures. Prior to paving, the Contractor should verify that the tack coat has adequate adhesive properties. The Engineer may suspend paving operations until adequate adhesion is achieved.

### **Method of Measurement:**

The quantity of Bituminous Asphalt Tack Coat will be measured as the actual number of gallons of tack coat applied. The quantity will be determined by any or all of the following methods and should be verified for accuracy by computations based on field measurements taken on and along the completed finished surfaces. Multiple layers will not be measured separately.

1. **Truck Measurement:** If bituminous materials are delivered to the Project in tank trucks, distributor tanks, or drums, the Contractor shall not remove any bituminous material from the transporting vehicle or container until necessary measurements have been made, nor shall the transporting vehicle or container be released until final outage has been measured. If weighing is not convenient, the Contractor shall furnish the Engineer with a certified chart showing the dimensions and volume of each container together with a gauge or calibrated measuring rod which will permit the volume of the material to be determined by vertical measurement.

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2. **Metering:** The volume may be determined by metering, in which case the metering device used and the method of using it shall be subject to the approval of the Engineer.
  
3. **Time of Deliveries:** The arrival and departure of vehicles delivering bituminous materials to the Project site shall be so scheduled that the Engineer is afforded proper time for the measurements of delivered volume and final outage. The Engineer will make the necessary measurements only during the Contractor's normal daily working hours.

**Basis of Payment:**

The quantity of Bituminous Asphalt Tack Coat will be paid for at the Contract unit price per gallon. Price and payment will constitute full compensation for mobilizing and furnishing all equipment, materials, and labor; placing the material; and for all labor, equipment, tools and incidentals necessary to complete the work.

**NOTE:**

The Asphalt Cement Cost Adjustment for this item will use the conversion factor of 8.42 lb/gal. to convert to a weight for payment under item 401502 - Asphalt Cement Cost Adjustment.

6/28/2018

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**401502 - ASPHALT CEMENT COST ADJUSTMENT**

For Sections 304, 401, 402, 403, 404, and 405, payments to the Contractor shall be adjusted to reflect increases or decreases in the Delaware Posted Asphalt Cement Price when compared to the Project Asphalt Cement Base Price, as defined in these Special Provisions.

The Delaware Posted Asphalt Cement Price will be issued monthly by the Department and will be the industry posted price for Asphalt Cement, F.O.B. Philadelphia, Pennsylvania.

The Project Asphalt Cement Base Price will be the anticipated Delaware Posted Asphalt Cement Price expected to be in effect at the time of receipt of bids.

All deviations of the Delaware Posted Asphalt Cement Price from the Project Asphalt Cement Base Price are eligible for cost adjustment. No minimum increases or decreases or corresponding percentages are required to qualify for cost adjustment.

Actual quantity of asphalt cement qualifying for any Asphalt Cement Cost Adjustment will be computed using the weight of eligible asphalt that is shown on the QA/QC pay sheets as a percentage for the delivered material.

If the mix was not inspected and no QA/QC pay sheet was generated, then the asphalt percentage will be obtained from the job mix formula for that mix ID.

The asphalt percentage eligible for cost adjustment shall only be the virgin asphalt cement added to the mix.

There shall be no separate payment per ton cost of asphalt cement. That cost shall be included in the various unit prices bid per ton for those bid items that contain asphalt cement (mentioned above).

The Asphalt cement cost adjustment will be calculated on grade PG 64-22 asphalt regardless of the actual grade of asphalt used. The Project Asphalt Cement Base Price for the project will be \$\_\_\_\_\_per ton (\$\_\_\_\_\_ per metric ton).

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If the Contractor exceeds the authorized allotted completion time, the price of asphalt cement on the last authorized allotted work day, shall be the prices used for cost adjustment during the time liquidated damages are assessed. However, if the industry posted price for asphalt cement goes down, the asphalt-cement cost shall be adjusted downward accordingly.

**NOTE**

Application of Asphalt Cement Cost Adjustment requirements as indicated above shall apply only to those contracts involving items related to bituminous base and pavements, and with bitumen, having a total of 1,000 tons or more of hot-mix bid quantity in case of Sections 401, 402 and 403; and 15,000 gallons or more in case of Sections 304, 404 and 405.

08/07/14

**401504 – FRICTION MASTIC FOG SEAL**

**Description:**

This work consists of applying a surface preservation treatment of mastic asphalt and aggregate material.

**Materials:**

Furnish materials in accordance with the following:

**Asphalt.** Furnish an emulsified asphalt in accordance with Table 1. Provide water in accordance with manufacturers recommendations.

**Table 1. Emulsified Asphalt**

<b>Property</b>	<b>Test Procedure</b>	<b>Min</b>	<b>Max</b>
Viscosity	T 59	20	100
Particle Charge Test	T 59	Positive	
Sieve, %	T 59	0	0.1
Residue by Distillation, percent	T 59	60	-
Penetration at 77°F, 100 g, 5 sec.	T 49	40	150

Use a quantity of emulsified asphalt in the mixture, expressed as a percentage of total weight, the percentage shown on the plans, or as directed.

**Aggregate.** Furnish aggregate meeting the grade shown in Table 2.

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**Table 2. Aggregates**

<b>Physical Properties<sup>1</sup></b>			
<b>Property</b>	<b>Test Procedure</b>	<b>Min.</b>	<b>Max.</b>
Water Absorption, %	T 84	-	4
Micro-Deval, %	D 7428 <sup>2</sup>	-	20
<b>Gradation<sup>3</sup></b>			
<b>Sieve</b>	<b>Standard</b>	<b>Master Grading Band Limits Percent Passing</b>	<b>Target Tolerance</b>
No. 8	C 136	100	
No. 16	C 136	85-100	
No. 30	C 136	75-100	± 5
No. 60	C 136	10-40	± 5
No. 100	C 136	0-10	± 5
No. 200	C 117	0-5	± 1

1. Perform physical property tests on aggregates that are received before blending into sealer.
2. Micro-Deval on aggregate larger than No. 60 sieve U.S.

**Additives.** Add clay, polymer, water, and other additives as required. Use a minimum of 4% polymer by weight. Furnish water free of industrial wastes and other objectionable matter.

**Other Additives.** Use approved additives as recommended by the Friction Mastic Fog Seal manufacture when necessary to adjust mix time in the field.

**Mix Design:**

Furnish a laboratory mix design meeting the requirements shown in Table 3:

**Table 3. Laboratory Mix Design**

<b>Test</b>	<b>Test Procedure</b>	<b>Min</b>	<b>Max</b>
Wet-Track Abrasion Loss, 3 day soak, g/m <sup>2</sup>	D 3910 <sup>1</sup>	--	80
Asphalt Content by Ignition Method, %	T 308	30	--
Dynamic Friction Test Number, 20 kph	E 1911 <sup>2</sup>	0.90	--

1. Use the modified method to account for realistic application depth and fine emulsion mixture.
2. Establish base friction value using prepared laboratory compacted slab of approved mix as surface to be tested. The Dynamic Friction Test (DFT) number ratio should indicate that after application of the mastic seal, the surface retains required minimum percentage DFT number of the original pavement surface.

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Furnish a production or field sample meeting the requirements shown in Table 4:

**Table 4. Production or Field Sample**

<b>Test</b>	<b>Test Procedure</b>	<b>Min</b>	<b>Max</b>
Solids Content by Evaporation, %	T 59 <sup>1</sup>	48	--
Asphalt Content by Ignition Method, %	T 308 <sup>3</sup>	30	--
Rotational Viscosity, 20 rpm, RV spindle, 25°C, cP	D 2196 <sup>2</sup>	800	4000
Temperature for storage and application, °F	--	60	130

1. Dry specimens to a state where measurements taken 20 minutes apart do not change.
2. Test samples within 7 days.
3. Reduce sample size to achieve asphalt quantity. It is very important that this test be performed on a completely dry sample.

**Equipment:**

**Mixing Plant.** Provide a stationary pugmill, weigh-bath, or continuous mixing plant as approved. Equip plants with digital proportioning and metering devices that produce a uniform mixture of asphalt, aggregate, and additives in the specified proportions.

**Distributors.** The distributors used shall be capable of uniformly applying the asphaltic material in liquid form. Devices to control the pressure, volume, and temperature shall be provided. Each distributor shall have an approved calibration chart, be equipped with an approved sampling device, and conform to the following:

- a. *Pressure.* The pressure shall be supplied by a positive displacement pump or air compressor. The pressure shall be uniform throughout the entire width of spray. If pressure is supplied by an air compressor, automatic controls must be provided to maintain sufficient and even pressure throughout the application of an entire load.
- b. *Temperature.* The distributor shall be equipped with a heating system that applies heat uniformly across the width of the tank. Provisions shall be made for circulating or agitating the material whenever necessary while heating. The distributor shall be equipped with a thermometer marked in degrees Fahrenheit of sufficient range to determine the actual temperature of the material.
- c. *Tachometer.* All distributors shall be provided with an approved tachometer recording feet per minute with a tabulation of feet per load with adjustments. Each load tabulation shall start at zero. There shall also be a totaling tabulation of this instrument.
- d. *Volume.* A tachometer shall give correct readings of the speed, and the volumetric efficiency of the distributor shall ensure the correct volume at various speeds. Tests shall be required to prove the volumetric efficiency of the distributor at various speeds as directed by the Engineer.

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- e. *Circulating System.* All pump distributors shall be equipped with a circulating system designed to maintain a homogenous liquid while circulating in the distributor tank. This circulating system shall also be arranged to circulate the material in the tank truck before application.

Air distributors shall be equipped with a device for agitating the bituminous material in the tank trucks when necessary.

- f. *Tests.* Necessary tests shall be made to determine the accuracy of all pressure gauges, tachometers, and pump efficiencies. The tests shall be made by the Contractor when and as required by the Engineer.
- g. *Spray Bars.* Each distributor shall be equipped with spray bars capable of applying material uniformly throughout the entire length of the spray bars when they are extended. Spray bar extensions shall be provided for applying up to a 12' width in one operation. Spray bars shall be equipped with a cleaning device and a shut-off valve to prevent dribbling, dripping, or streaking.
- h. *Tank Capacity Gauge.* A float or other approved type tank capacity gauge shall be furnished to indicate the volume in the tank in not less than 25 gal units. The gauge shall have adjustments for correction.

Tanks shall have a minimum capacity of 750 gal.

The rate of application of the distributor shall be calibrated by an approved method determined and agreed upon by the Engineer and Contractor.

If the Engineer deems that the equipment applying or mixing the material is inadequate or fails to comply with all regulations, the Engineer will order the equipment to be removed from the job and require that another unit be placed on the work.

**Asphalt Storage and Handling Equipment.** When using storage tanks, furnish a thermometer in each tank to continuously indicate the asphalt temperature. Keep equipment clean and free of leaks. Keep asphalt material free of contamination. Furnish storage tanks capable of keeping the Friction Mastic Fog Seal in uniform suspension and adequately mixing the asphalt, aggregate and additives.

**Application of Fog Seal Material:**

The fog seal shall be applied in one application at the rates specified using the pressure distributor for the full width of the sealing operation, unless otherwise directed. Apply at the temperature that is recommended by the manufacture.

The nozzles of the spray bar shall be kept clean at all times. If one or more nozzles becomes blocked during the application of bituminous materials, the distributor shall be stopped immediately, and the nozzles shall be cleaned. Corrective actions shall be taken as approved by the engineer. If the contractor repeatedly fails to apply a uniform application of the material, the engineer reserves the right to stop work for the day until the contractor can show they corrected the issue and can achieve a uniform application.

**Construction Methods:**

**Weather Limitations.**

1. Measure the air temperature in the shade away from artificial heat.
2. Do not place mixture when, in the Engineer's opinion, general weather conditions are unsuitable. Meet the requirements for air and surface temperature shown below.
3. Apply mixture when air temperature is above 50°F and rising. Do not apply mixture when air temperature is 60°F and falling. In all cases, do not apply mixture when surface temperature is below 60°F.
4. The contractor shall provide the Engineer with an Action Plan in the event of an unexpected rainstorm that saturates undried material. The plan must include a way to contain the run-off of the material and clean up material from road and off-road edges to allow the road and/or lane to be opened to traffic before contractor leaves the jobsite.

**Surface Preparation.** Remove existing raised pavement markers. Repair any damage incurred by removal as directed. Remove dirt, dust, or other harmful material before applying. Remove any vegetation and/or debris that cannot be broom-cleaned or blown free.

**Application.**

Distribute material at the following rates or as directed:

- First Application: 1.0 to 1.5 lbs per SY
- Second Application: 1.0 to 1.5 lbs per SY
- Total application after the second application: 2.5 lbs per SY minimum

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When applying bituminous materials adjacent to structures or curbs, the Contractor shall furnish and use effective means of protecting the structures or curbs from discoloration.

**Edges.** Adjust the shot width so operations do not encroach on traffic or interfere with the traffic control plan, as directed. Use paper or other approved material at the beginning and end of each shot to construct a straight transverse joint. Unless otherwise approved, match longitudinal joints with the lane lines. The Engineer may require a string line, if necessary, to keep the edge straight. Use sufficient pressure to flare the nozzles fully.

**Defects.** Immediately take corrective action if curing delays opening to traffic or surface irregularities, including but limited to streaks, uncoated, and blotchy areas. The Engineer may allow placement to continue for no more than one day of production while taking appropriate action. Suspend application until the problem is corrected to satisfaction of the Engineer.

**Opening to Traffic.** Open the treated surface to traffic when mutually agreed upon by Engineer and Contractor. Furnish and uniformly distribute clean, fine sand on the surface to blot the excess when an excessive quantity of mixture is applied. Maintain ingress and egress as directed by applying sand to freshly treated areas.

### **Method of Measurement:**

The Department will measure the Friction Mastic Fog Seal in square yards of the composite Friction Mastic Fog Seal mixture, which includes asphalt emulsion, aggregate, and additives.

### **Basis of Payment:**

The Department will pay for Friction Mastic Fog Seal per square yard. Payment constitutes full compensation for:

1. Asphalt emulsion, aggregate, and additives
2. preparing the surface;
3. providing and hauling;
4. placing all materials;
5. disposal of surplus materials;
6. any incidentals to apply materials; and
7. opening to traffic.

The Department will make no compensation for corrective actions taken to remediate defective work.

5/15/2020

**401506 - SPEED HUMP**

**Description:**

This work consists of furnishing all materials, constructing bituminous concrete speed hump and installing delineators at the location(s) shown on the Plans and/or directed by the Engineer.

**Materials:**

The materials required for the construction of speed hump shall be bituminous concrete Type C and shall conform to the requirements of Section 401, and for permanent striping, requirements of Section 817 of the Standard Specifications shall govern.

The delineator blank shall be 6" x 12" aluminum plate, alloy 6061 T651 or 5052 H32, 1/8" (min) in thickness with 1 1/2" radius corners, punched with two (2) 1/2" holes 2" from top and bottom, treated with a chromate conversion coating meeting ASTM B449. Reflector shall be covered on one side only with Type III High Intensity grade silver retroreflective sheeting or other approved material with greater reflectivity.

The breakaway delineator post shall be composed of square steel tubes conforming to the notes and details shown on the Plans.

Pavement striping shall be alkyd-thermoplastic or an approved permanent pavement marking tape.

**Construction Method:**

The speed hump shall be constructed in accordance with the applicable requirements of Section 401. While the plans depict the construction of Speed Humps in two passes, the Department has obtained satisfactory results in constructing the speed hump through template ramps, which allow the placement of bituminous concrete in one pass. However, regardless of the method used, it shall be the responsibility of the Contractor to produce satisfactory results in constructing the speed hump in accordance with the details shown on the Plan.

One of the important requirements of this Contract is that the Contractor shall rotomill only those roadway pavement as required by the Plans within one residential community, or nearby communities without over extending the milling operation in one working day and shall return the following day to construct the speed humps at those locations milled on the previous day.

Two (2) reflectors per post are to be mounted back to back 4' from the ground with two (2) M10x1.5 grade 2 plated steel hex head bolts with two way steel lock nuts. Nylon washers are also to be used between the bolt or

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nut and the reflector face. Within 48 hours of installation the speed hump shall be striped as specified in the Plan notes and details. If the Contractor elects to use temporary striping prior to the permanent pavement striping such temporary striping will be considered incidental to this item.

**Method of Measurement:**

The quantity of speed hump will be measured as the actual number of linear feet of speed hump constructed and accepted, measured between the two curb lines of the road.

**Basis of Payment:**

The quantity of speed hump will be paid for at the Contract unit price per linear foot. Price and payment will constitute full compensation for furnishing and placing all materials, saw cutting, pavement milling, furnishing and installing delineators as shown on the plans or as directed by the Engineer, permanent striping (Thermoplastic or tape as required by the plan), for all labor, equipment, tools and incidentals necessary to complete the work.

5/9/17

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**401520 - PAVING SURCHARGE, ZONE 1**

**401521 - PAVING SURCHARGE, ZONE 2**

**401522 - PAVING SURCHARGE, ZONE 3**

**401523 - PAVING SURCHARGE, ZONE 4**

**401524 - PAVING SURCHARGE, ZONE 5**

**401525 - PAVING SURCHARGE, ZONE 6**

**401526 - PAVING SURCHARGE, ZONE 7**

**401527 - PAVING SURCHARGE, ZONE 8**

**401528 - PAVING SURCHARGE, ZONE 9**

**401529 - PAVING SURCHARGE, ZONE 10**

**401530 - PAVING SURCHARGE, ZONE 11**

**401531 - PAVING SURCHARGE, ZONE 12**

**401532 - PAVING SURCHARGE, ZONE 13**

**401533 - PAVING SURCHARGE, ZONE 14**

**401534 - PAVING SURCHARGE, ZONE 15**

**401535 - PAVING SURCHARGE, ZONE 16**

**401536 - PAVING SURCHARGE, ZONE 17**

**401537 - PAVING SURCHARGE, ZONE 18**

**401538 - PAVING SURCHARGE, ZONE 19**

**Description:**

The item(s) "Paving Surcharge" consist of compensating the Contractor for cost differential in supplying bituminous concrete material to the specific zone as shown on the Plans.

All the requirements of Section 401 shall be applicable to these items except as modified herein and in the Superpave Special Provisions.

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**Method of Measurement:**

The Contractor will be paid an additional amount per ton as a surcharge over the Contract unit price bid for each type of bituminous concrete items covered by applicable Sections of 401, 402, 403 and Special Provisions to be used in that particular Zone for day and nighttime paving or patching.

**Basis of Payment:**

The payment for the item will be made at the Contract unit price per ton (metric ton) bid for the item "Paving Surcharge" for the applicable Zone in the Contract, which price will be full compensation.

5/10/2017

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**401580 - RIDE QUALITY OF BITUMINOUS PAVEMENT**

**Description:**

This specification outlines requirements for an acceptable ride surface in addition to requirements established in DeDOT Standard Specifications. The Contractor is responsible for providing smoothness characteristics that meet these requirements. The Contractor is responsible for providing equipment, maintenance of traffic (MOT) as required by the Delaware MUTCD, and performing testing in accordance to this specification. All costs for testing and MOT are incidental to this item. Both the International Roughness Index (IRI) and deviations located within a 10' straightedge are used to characterize smoothness in this Special Provision.

**Definitions:**

*Class 1 Project* - a project that consists of full depth construction. Full depth construction is considered to be when contract documents or modifications provide opportunity for preparation of the subgrade prior to paving.

*Class 2 Project* - a project that consists of a minimum of two smoothness opportunities.

*Class 3 Project* - a project that consists of one smoothness opportunity.

*Deviation* - a hump or depression that exceeds defined tolerances.

*Smoothness Opportunity* - a smoothness opportunity is considered to be any of the following; roadway milling, placement of a leveling course, in-place recycling, or placement of a lift of bituminous concrete. The final wearing surface is considered one smoothness opportunity.

**Equipment:**

The Contractor must have a 10' straightedge available during all paving operations.

The Contractor must also have a high speed or lightweight inertial profiling system that meets requirements of AASHTO M328 capable of collecting data in both wheelpaths simultaneously.

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Prior to the start of corrective actions, the Contractor must provide to the Engineer:

1. Manufacturer, Make, and Model of the test system
2. Equipment Owner,
3. Relevant Certifications,
4. Manufacturer Calibration Procedures, and
5. Relevant Operator Training information.

**Testing:**

The Contractor is responsible for testing the pavement surface using an approved inertial profiler in accordance to manufacturer and AASHTO R57 from the start of paving limits to the end of pavement limits. Testing must be performed 3 times in each lane paved in the direction of traffic flow. Testing must be performed within seven (7) days of completion of project paving operations in each location.

The Contractor is responsible for providing information relative to locations that are to be excluded from calculation of the International Roughness Index. These areas must still meet 10' straightedge requirements.

Areas that are to be tested but will be removed prior to IRI analysis are:

1. 50 feet prior to the first bridge deck expansion joint and 50 feet after the last expansion joint if a bridge deck is excluded from smoothness operations.
2. 50' longitudinally from the center of an existing obstruction within the test area such as a manhole, water main, or catch basin that impedes paving operations.
3. 50' longitudinally from transverse joints that separate it from existing pavement not included on this contract.

Areas that are not to be profiled but are still subject to 10' straightedge requirements are:

1. Shoulder areas
2. Parking lots
3. Ramps, Streets, or Acceleration / Deceleration lanes less than 1000' in length.

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**Submission Requirements:**

Test results must be submitted to the Engineer within five working days of completion of testing. Results not received within the allotted time frame will be assessed a charge of \$1,000.00 per day at the discretion of the Engineer.

The Contractor is required to submit summary table IRI reports from their test equipment for 1 run for each lane and direction of paving. This report must also include:

1. Profiling Company Name
2. Date of Test
3. Contract Number
4. Location Description
5. Testing Personnel

The Contractor is required to submit ERD files for each of the 3 tests run in each lane and direction of paving to the Engineer for analysis. The Contractor must provide to the Engineer written documentation indicating the start and end of bridges and the center of obstructions relative to the stationing used on the testing that are not subject to IRI analysis.

**Acceptance and Payment:**

Acceptance of the final pavement will be based on Engineer calculated IRI values using ProVAL software upon removal of allowable areas of exemption and the number of deviations found in the pavement surface. The IRI measurements will be calculated in 0.1 mile (528 foot) sections for payment purposes. The average value of the three test runs will be used and the average value will be rounded to the nearest tenth. Payments for each section will be based on estimated tonnage calculated from plan thickness and widths using the average maximum specific gravity ("Rice") for all surface mix used at that location.

Deviations equal to or in excess of 0.25" in 10' are to be corrected at the Contractor's expense or will have a discount charge of \$200.00 per deviation.

$$\text{Estimated Tonnage} = [L * W * T] * \text{Rice} * 62.4 \text{ (lb/ft}^3\text{)} * (0.0005 \text{ tons} / 12 \text{ in.})$$

Where: L = Length Segment (ft.)

W = Lane Width (ft.)

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T = Plan Thickness (in.)

$$IRI \text{ Incentive / Disincentive} = \text{Estimated Tonnage} * UP * (PA-100)/100$$

Where: UP = Contract Unit Price (Dollars)

PA = Pay Adjustment (Table A)

The total pay adjustment for paving work performed on each location is:

$$(\sum IRI \text{ adj for each section}) - \text{Total Deviations} * 200$$

It is possible to receive incentive for IRI measurements and a discount charge for excessive deviations on the same project. If a 528' section has an IRI value resulting in a deduction of at least 84% of the section pay, the deviation discount charge for that section is disregarded and the IRI discount charge is the only action taken for that section.

<b>Table A: Payment Adjustments for IRI</b>	
<b>Class 1</b>	
IRI per 0.1 mile Segment (in./mi.)	Pay Adjustment
≤ 50	103%
> 50 and < 145	100+ 0.2(65- IRI)
≥ 145	84%
<b>Class 2</b>	
IRI per 0.1 mile Segment (in./mi.)	Pay Adjustment
≤ 60	106%
> 60 and < 170	100+ 0.2(90- IRI)
≥ 170	84%

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Correction to the paving surface, such as diamond grinding with approved equipment, patching, or other measures may be taken at the Contractor's expense and at the Engineers discretion to correct pavement surfaces assessed a discount charge. The Engineer may require corrective actions including remove & replace if the deviation discount charge exceeds 50% of the cost of materials or the IRI pay adjustment is 84%. Deviations must be corrected if it is determined that they are at a height or depth that may create a safety concern.

4/10/2019

**401696 – ENTRANCE, DRIVEWAY AND INTERSECTING STREET PAVING SURCHARGE**

**Description:**

To compensate for work associated with paving the tie-ins at entrances, driveways and intersecting streets when such work cannot be completed as part of the mainline (roadway, auxiliary lanes, shoulder) paving operation. The surcharge limits will extend from the outermost roadway element to the point of tie-in as directed by the Engineer with the following exceptions.

No Surcharge will be paid:

1. When the tie-in does not exceed three feet from the outermost roadway element.
2. For paving any portion of a tie-in which exceeds 100 feet from the outermost roadway element. The entire tie-in section will be performed under normal paving operations.
3. When the intersecting street is to be paved under the same Contract.
4. For paving of auxiliary lanes and crossovers in the median of divided highways.

**Method of Measurement:**

The quantity of entrance, driveway and intersecting street paving surcharge will be measured as the actual number of tons of bituminous concrete placed and accepted in entrances, driveways and intersecting streets as described in this item.

**Basis of Payment:**

The quantity of entrance, driveway and intersecting street paving surcharge will be paid for at the Contract unit price per ton. Price and payment will constitute full compensation for the additional labor and equipment costs involved with the reduced production associated with such work.

10/12/17

**401699 - QUALITY CONTROL/QUALITY ASSURANCE OF BITUMINOUS CONCRETE**

**.01 Description**

This item shall govern the Quality Assurance Testing for supplying bituminous asphalt plant materials and constructing bituminous asphalt pavements and the calculation for incentives and disincentives for materials and construction. The Engineer will evaluate all materials and construction for acceptance. The procedures for acceptance are described in this Section. Include the costs for all materials, labor, equipment, tools, and incidentals necessary to meet the requirements of this specification in the bid price per ton for the bituminous asphalt. Payment to the Contractor for the bituminous asphalt item(s) will be based on the Contract price per ton and the pay adjustments described in this specification.

**.02 Bituminous Concrete Production – Quality Acceptance**

**(a) Material Production - Tests and Evaluations.**

All acceptance tests shall be performed by qualified technicians at qualified laboratories following AASHTO or DelDOT procedures, and shall be evaluated using Quality Level Analysis. The Engineer will conduct acceptance tests. The Engineer will directly base acceptance on the acceptance test results, the asphalt cement quality, the Contractor's QC Plan work, and the comparisons of the acceptance test results to the QC test results. The Engineer may elect to utilize test results of the Contractor in some situations toward judging acceptance.

Supply and capture samples, as directed by the Engineer under the purview of the Engineer from delivery trucks before the trucks leave the production plant. Hand samples to the Engineer to be marked accordingly. The sample shall represent the material produced by the Contractor, and shall be of sufficient size to allow the Engineer to complete all required acceptance tests. The Engineer will direct the Contractor when to capture these samples, on a statistically random, unbiased basis, established before production begins each day based upon the anticipated production tonnage. The captured sample shall be from the Engineer specified delivery truck. The Contractor may visually inspect the specified delivery load during sampling and elect to reject the load. If the contractor elects to reject the specified delivery truck, each subsequent load will be inspected until a visually acceptable load is produced for acceptance testing. All visually rejected loads shall not be sent to a Department project.

The first sample of the production day will be randomly generated by the Engineer between loads 0 and 12 (0-250 tons). Subsequent samples will be randomly generated by the Engineer on 500-ton sub-lots for the production day. Samples not retrieved in accordance with the Contractor's QC plan will be deemed unacceptable and may be a basis for rejection of material produced. Parallel tests or dispute resolution tests will only be

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performed on material captured at the same time and location as the acceptance test sample. Parallel test samples or Dispute Resolution samples will be created by splitting a large sample or obtaining multiple samples that equally represent the material. The Engineer will perform all splitting and handling of material after it is obtained by the Contractor.

The Contractor may retain dispute resolution samples or perform parallel tests with the Engineer on any acceptance sample.

The Engineer will evaluate and accept the material on a lot basis. All the material within a lot shall have the same JMF (mixture ID). The lot size shall be targeted for 2000 tons or a maximum period of three days, whichever is reached first. If the 2000<sup>th</sup> ton target lot size is achieved during a production day, the lot size shall extend to the end of that production day. The Contractor may interrupt the production of one JMF in order to produce different material; this type of interruption will not alter the determination of the size or limits of material represented by a lot. The Engineer will evaluate each lot on a subplot basis. The size for each subplot shall be 100 to 500 tons and testing for the sub lots will be completed on a daily basis. For each subplot, the Engineer will evaluate one sample.

The target size of sub-lots within each lot, except for the first sample of the production day, is equal-sized 500 ton sub lots and will be based upon anticipated production, however, more or fewer sublots, with differing sizes, may result due to the production schedule and conditions. If the actual production is less than anticipated, and it's determined a sample will not be obtained (based upon the anticipated tonnage), a new sample location will be determined on a statistically random, unbiased basis based upon the new actual production. If the actual production is going to be 50 tons or greater over the anticipated sub lot production, a new sample location will be determined on a statistically random, unbiased basis based upon the new actual production. The Engineer will combine the evaluation and test results for all of the applicable sublots in order to evaluate each individual lot.

If the Engineer is present, and the quantity exceeds 25 tons, a statistically random sample will be used for analysis. When the anticipated production is less than 100 tons and greater than 25 tons, and the Engineer is not present, the contractor shall randomly select a sample using the Engineer's random location program. The captured sample shall be placed in a suitable box, marked to the attention of the Engineer, and submitted to the Engineer for testing. A box sample shall also be obtained by the contractor at the same time and will be used as the Dispute Resolution sample if requested by the Engineer. The Contractor shall also obtain one liquid asphalt sample (1 pint) per grade of asphalt used per day and properly label it with all pertinent information.

The Engineer will conduct the following tests in order to characterize the material for the pavement compaction quality and to judge acceptance and the pay adjustment for the material:

- AASHTO T312 - Preparing and Determining the Density of Hot Mix Asphalt (HMA) Specimens by Means of the Superpave Gyratory Compactor
- AASHTO T166, Method C (Rapid Method) - Bulk Specific Gravity of Compacted Hot Mix Asphalt (HMA) Using Saturated Surface Dry Specimens

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- AASHTO T308 - Determining the Asphalt Binder Content of Hot Mix Asphalt (HMA) by the Ignition Method
- AASHTO T30 - Mechanical Analysis of Extracted Aggregate
- AASHTO T209 - Theoretical Maximum Specific Gravity and Density of Hot Mix Asphalt (HMA)
- ASTM D7227 - Standard Practice for Rapid Drying of Compacted Asphalt Specimens using Vacuum Drying Apparatus

#### **(b) Pavement Construction - Tests and Evaluations.**

The Engineer will directly base acceptance on the compaction acceptance test results, and on the inspection of the construction, the Contractor's QC Plan work, ride smoothness as referenced in the contract documents, lift thickness as referenced in the contract documents, joint quality as referenced in the contract documents, surface texture as referenced in the contract documents, and possibly the comparisons of the acceptance test results to the independent test results. For the compaction acceptance testing, the Engineer will sample the work on a statistically random basis, and will test and evaluate the work based on daily production.

Notify the Engineer of any locations within that road segment that may not be suitable to achieve minimum (93%) compaction due to existing conditions prior to paving the road segment. Schedule and hold a meeting in the field with the Engineer in order to discuss all areas that may potentially be applicable to Table 5a before paving starts. Areas that will be considered for Table 5a will be investigated in accordance to the method described in Appendix B. If this meeting is not held prior to paving, no areas will be considered for Table 5a. Areas of allowable exemptions that will not be cored include the following: partial-depth patch areas, driveway entrances, paving locations of less than 100 tons, areas around manholes and driveway entrances, and areas of paving that are under 400 feet in continuous total length and/or 5 feet in width.

The exempt areas around manholes will be a maximum of 4 feet transversely on either side from the center of the manhole, and 20 feet longitudinally on either side from the center of the manhole. The exempt areas around driveway entrances shall be the entire width of the driveway, and 3 feet from the edge of the longitudinal joint next to the driveway. Areas of exemption that will be cored for informational purposes only include: areas where the mat thickness is less than three times the nominal maximum aggregate size as directed by the Engineer, violations of Section 401.08 in the Standard Specifications as directed by the Engineer, and areas shown to contain questionable subgrade properties as proven by substantial yielding under a fully legally loaded truck. Failure to obtain core samples in these areas will result in zero payment for compaction regardless of the exempt status.

The Engineer will evaluate and accept the compaction work on a daily basis. Payment for the compaction will be calculated by using the material production lots as referenced in **.02 Acceptance Plan (a) Material Production - B Tests and Evaluation** and analyzing the compaction results over the individual days covered in the material production lot. The compaction results will be combined with the material results to obtain a payment for this item.

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The minimum size of a compaction lot shall be 100 tons. If the compaction lot is between 101 and 1000 tons, the Engineer shall randomly determine four compaction acceptance test locations. If the compaction lot is between 1001 and 1500 tons, the Engineer shall randomly determine six compaction acceptance test locations. If the compaction lot is between 1501 and 2000 tons, the Engineer shall randomly determine eight compaction acceptance test locations. If the compaction lot is greater than 2000 tons, the Engineer shall randomly determine two compaction acceptance test locations per 500 tons.

If a randomly selected area falls within an Engineer approved exemption area, the Engineer will select one more randomly generated location to be tested per the requirements of this Specification. If that cannot be accomplished, or if an entire location has been declared exempt, the compaction testing shall be performed as per these Specifications but a note will be added to the results that the location was an Engineer approved exempt location.

Testing locations will be a minimum of 1.0 feet from the newly placed longitudinal joint and 50 feet from a new transverse joint.

Cut one six (6) inch diameter core through the full lift depth at the exact location marked by the Engineer. Cores submitted that are not from the location designated by the Engineer will not be tested and will be paid at zero pay.

Notify the Engineer prior to starting paving operations with approximate tonnage to be placed. The Contractor is then responsible for notifying the appropriate Engineer test personnel within 12 hours of material placement. The Engineer will mark core locations within 24 hours of notification. After determination of locations, the Contractor shall complete testing within two operational days of the locations being marked. If the cores are not cut within two operational days, the area in question will be paid at zero pay for compaction testing.

Provide any traffic control required for the structural number investigation, sampling, and testing work at no additional cost to the Department.

Commence coring of the pavement after the pavement has cooled to a temperature of 140°F or less. Cut each core with care in order to prevent damaging the core. Damaged cores will not be tested. Label each core with contract number, date of construction, and number XX of XX upon removal from the roadway. Place cores in a 6-inch diameter plastic concrete cylinder mold or approved substitute for protection. Separate cores in the same cylinder mold with paper. Attach a completed QC test record for the represented area with the corresponding cores. The Engineer will also complete a test record for areas tested for the QA report and provide to Materials & Research. Deliver the cores to the Engineer for testing, processing, and report distribution at the end of each production day.

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Repair core holes per Appendix A, Repairing Core Holes in Bituminous Asphalt Pavements. Core holes shall be filled immediately. Failure to repair core holes at the time of coring will result in zero pay for compaction testing for the area in question.

The Engineer will conduct the following tests on the applicable portion of the cores in order to evaluate their quality:

- AASHTO T166, Method C (Rapid Method) B Bulk Specific Gravity of Compacted Hot Mix Asphalt (HMA) Using Saturated Surface Dry Specimens
- AASHTO T209 - Theoretical Maximum Specific Gravity and Density of Hot Mix Asphalt
- ASTM D7227 - Standard Practice for Rapid Drying of Compacted Asphalt Specimens using Vacuum Drying Apparatus

The Engineer will use the average of the last five test values of the same JMF (mixture ID) material at the production plant in order to calculate the average theoretical maximum specific gravity of the cores. The average will be based on the production days test results and as many test results needed from previous days production to have an average of five samples. If there are less than five values available, the Engineer will use the JMF design value in addition to the available values to calculate the average theoretical maximum specific gravity.

### **.03 Payment and Pay Adjustment Factors.**

The Engineer will determine pay adjustments for the bituminous asphalt item(s) in accordance with this specification. The Engineer will determine a pay adjustment factor for the material produced and a pay adjustment factor for the pavement construction. Pay adjustments for material and construction will be calculated independently. When the pay adjustment calculation for either material or construction falls to zero payment per tables 4, 5, or 5a, the maximum pay adjustment for the other factor will not exceed 100.

Pay Adjustment factors will only be calculated on in place material. Removed material will not be used in payment adjustment calculations.

Material Production Pay Adjustments will be calculated based upon 70% of the contract unit price and calculated according to section .03(a) of this specification. Pavement construction Pay Adjustments will be calculated based upon 30% of the contract unit price and calculated according to section .03(b) of this specification.

#### **(a) Material Production - Pay Adjustment.**

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Calculate the material pay adjustment by evaluating the production material based on the following parameters:

<b>Table 2 - Material Parameter Weight Factors</b>		
<b>Material Parameter</b>	<b>Single Test Tolerance (+/-)</b>	<b>Weight Factor</b>
Asphalt Content	0.4	0.30
#8 Sieve (>=19.0 mm)	7.0	0.30
#8 Sieve (<=12.5 mm)	5.0	0.30
#200 Sieve (0.075mm Sieve)	2.0	0.30
Air Voids (4.0% Target)	2.0	0.10

Using the JMF target value, the single test tolerance (from Table 2), and the test values, the Engineer will use the following steps to determine the material pay adjustment factor for each lot of material:

1. For each parameter, calculate the mean value and the standard deviation of the test values for the lot to the nearest 0.1 unit.
2. For each parameter, calculate the Upper Quality Index (QU):  
$$QU = ((JMF \text{ target}) + (\text{single test tolerance}) - (\text{mean value})) / (\text{standard deviation}).$$
3. For each parameter, calculate the Lower Quality Index (QL):  
$$QL = ((\text{mean value}) - (JMF \text{ target}) + (\text{single test tolerance})) / (\text{standard deviation}).$$
4. For each parameter, locate the values for the Upper Payment Limit (PU) and the Lower Payment Limit (PL) from Table 3 - Quality Level Analysis by the Standard Deviation Method. (Use the column for “n” representing the number of sublots in the lot. Use the closest value on the table when the exact value is not listed).
5. Calculate the PWL for each parameter from the values located in the previous step:  
$$PWL = PU + PL - 100.$$
6. Calculate each parameter’s contribution to the payment adjustment by multiplying its PWL by the weight factor shown in Table 2 for that parameter.

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7. Add the calculated adjustments of all the parameters together to determine the Composite PWL for the lot.
8. From Table 4, locate the value of the Pay Adjustment Factor corresponding to the calculated PWL. When all properties of a single test are within the single test tolerance of Table 2, Pay Adjustment factors shall be determined by Column B. When any property of a single test is outside of the Single Test Tolerance parameters defined in Table 2, the Material Pay Adjustment factor shall be determined by Column C
9. For each lot, determine the final material price adjustment:

Final Material Pay Adjustment =

(Lot Quantity) x (Item Bid Price) x (Pay Adjustment Factor) x 70%. This final pay calculation will be paid to the cent.

In lieu of being assessed a pay adjustment penalty, the Contractor may choose to remove and replace the material at no additional cost to the Department. When the PWL of any material parameter in Table 2 is below 60, the Engineer may require the removal and replacement of the material at no additional cost to the Department. Test results on removed material shall not be used in calculation of future PWL calculations for Mixture ID.

The test results from the Engineer on production that is less than 100 tons will be combined with the two most recently completed Engineer tests with the same Mixture ID to calculate payment for the lot encompassing the single test. If that cannot be accomplished, the approved JMF will be used to calculate payment for the lot encompassing the single test. Payment for previously closed lots will not be affected by the analysis.

When a sample is outside of the allowable single test tolerance for any Materials criteria in Table 2, that sample will be isolated. For payment purposes, the test result of the out of acceptable tolerance sample will be combined with the two previous acceptable samples of the same JMF and analyzed per this specification. The material that is considered out of the acceptable tolerance will only include the material within the represented sub-lot (i.e., a maximum of 500 tons). If the previous acceptable test result is from the previous production day, only the material produced on the second production day will be considered out of tolerance. All future sub lots will not include the isolated test. The pay factors for the out of tolerance sample lot will be calculated using column C of table 4.

If, during production, a QA sample test result does not meet the acceptable tolerances and the Contractors QC sample duplicates the QA sample test result, the Contractor can make an appropriate change to the mixture (within the JMF boundaries), and request to have that sample further isolated. After the Contractor has made appropriate changes, the Contractor will visually inspect each produced load. The first visually acceptable load will be sampled and tested. If that sample test result shows compliance with the specifications, the material that is considered out of the acceptable tolerance will include the material from the previous acceptable test result to the third load after the initially sampled and tested sample. If the sample does not meet the specification requirements,

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the Engineer will no longer accept material. Production may resume when changes have been made and an acceptable sample and test result is obtained.

<b>Table 3 B Quality Level Analysis by the Standard Deviation Method</b>							
<b>PU or PL</b>	<b>QU and QL for An@ Samples</b>						
	<b>n = 3</b>	<b>n = 4</b>	<b>n = 5</b>	<b>n = 6</b>	<b>n = 7</b>	<b>n = 8</b>	<b>n = 9</b>
100	1.16	1.50	1.79	2.03	2.23	2.39	2.53
99	-	1.47	1.67	1.80	1.89	1.95	2.00
98	1.15	1.44	1.60	1.70	1.76	1.81	1.84
97	-	1.41	1.54	1.62	1.67	1.70	1.72
96	1.14	1.38	1.49	1.55	1.59	1.61	1.63
95	-	1.35	1.44	1.49	1.52	1.54	1.55
94	1.13	1.32	1.39	1.43	1.46	1.47	1.48
93	-	1.29	1.35	1.38	1.40	1.41	1.42
92	1.12	1.26	1.31	1.33	1.35	1.36	1.36
91	1.11	1.23	1.27	1.29	1.30	1.30	1.31
90	1.10	1.20	1.23	1.24	1.25	1.25	1.26
89	1.09	1.17	1.19	1.20	1.20	1.21	1.21
88	1.07	1.14	1.15	1.16	1.16	1.16	1.17
87	1.06	1.11	1.12	1.12	1.12	1.12	1.12

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86	1.04	1.08	1.08	1.08	1.08	1.08	1.08
85	1.03	1.05	1.05	1.04	1.04	1.04	1.04
84	1.01	1.02	1.01	1.01	1.00	1.00	1.00
83	1.00	0.99	0.98	0.97	0.97	0.96	0.96
82	0.97	0.96	0.95	0.94	0.93	0.93	0.93
81	0.96	0.93	0.91	0.90	0.90	0.89	0.89
80	0.93	0.90	0.88	0.87	0.86	0.86	0.86
79	0.91	0.87	0.85	0.84	0.83	0.82	0.82
78	0.89	0.84	0.82	0.80	0.80	0.79	0.79
77	0.87	0.81	0.78	0.77	0.76	0.76	0.76
76	0.84	0.78	0.75	0.74	0.73	0.73	0.72
75	0.82	0.75	0.72	0.71	0.70	0.70	0.69
74	0.79	0.72	0.69	0.68	0.67	0.66	0.66
73	0.75	0.69	0.66	0.65	0.64	0.63	0.63
72	0.74	0.66	0.63	0.62	0.61	0.60	0.60
71	0.71	0.63	0.60	0.59	0.58	0.57	0.57
70	0.68	0.60	0.57	0.56	0.55	0.55	0.54
69	0.65	0.57	0.54	0.53	0.52	0.52	0.51

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68	0.62	0.54	0.51	0.50	0.49	0.49	0.48
67	0.59	0.51	0.47	0.47	0.46	0.46	0.46
66	0.56	0.48	0.45	0.44	0.44	0.43	0.43
65	0.52	0.45	0.43	0.41	0.41	0.40	0.40
64	0.49	0.42	0.40	0.39	0.38	0.38	0.37
63	0.46	0.39	0.37	0.36	0.35	0.35	0.35
62	0.43	0.36	0.34	0.33	0.32	0.32	0.32

**Table 3 B Quality Level Analysis by the Standard Deviation Method**

QU and QL for An@ Samples							
PU or PL	n = 3	n = 4	n = 5	n = 6	n = 7	n = 8	n = 9
61	0.39	0.33	0.31	0.30	0.30	0.29	0.29
60	0.36	0.30	0.28	0.27	0.27	0.27	0.26
59	0.32	0.27	0.25	0.25	0.24	0.24	0.24

Table 4 - PWL Pay Adjustment Factors		
PWL	Pay Adjustment Factor (%) Column B	Pay Adjustment Factor (%) Column C
100	+5	0
99	+4	-1
98	+3	-2
97	+2	-3
96	+1	-4
95	0	-5
94	-1	-6
93	-2	-7
92	-3	-8
91	-4	-9
PWL<91	PWL - 100	PWL - 100

**(b) Pavement Construction - Pay Adjustments.**

The Engineer will determine the pavement construction pay adjustment by evaluating the construction of the pavement, based on the following parameter:

- Degree of compaction of the in-place material

Using the test values for the cores, the Engineer will use the following steps to determine the pavement construction pay adjustment for each lot of work.

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1. Calculate the core bulk specific gravity values from the subplot tests values, to the nearest 0.001 unit. Obtain the Theoretical maximum Specific Gravity values from the corresponding laboratory subplot tests.
2. Calculate the Degree of Compaction:  
 Degree of Compaction =  

$$\left( \frac{\text{Core Bulk Specific Gravity}}{\text{Theoretical Maximum Specific Gravity}} \right) \times 100\%$$
 recorded to the nearest 0.1%.
3. The average compaction for the sublots shall be averaged together for the compaction level of the lot. The lots compaction test level shall be averaged and recorded to the nearest whole percent.
4. Locate the value of the Payment Adjustment Factor corresponding to the calculated degree of compaction from Table 5 or Table 5a.
5. Determine the pavement construction price adjustment by using the following formula:  

$$\text{Construction Pay adjustment} = (\text{Lot Quantity}) \times (\text{Bid Price}) \times (\text{Pay Adjustment Factor}) \times 30\%.$$

<b>Table 5: Compaction Price Adjustment Highway Locations</b>		
Degree of Compaction (%)	Range	Pay Adjustment Factor (%)
>= 97.0	>= 96.75	-100*
96.5	96.26 – 96.74	-5
96.0	95.75 – 96.25	-3
95.5	95.26 – 95.74	-2
95.0	94.75 – 95.25	0
94.5	94.26 – 94.74	0
94.0	93.75 – 94.25	1
93.5	93.26 – 93.74	3
93.0	92.75 – 93.25	5
92.5	92.26 – 92.74	3
92.0	91.75 – 92.25	0
91.5	91.26 – 91.74	0
91.0	90.75 – 91.25	-5
90.5	90.26 – 90.74	-15
90.0	89.75 – 90.25	-20
89.5	89.26 – 89.74	-25
89.0	88.75 – 89.25	-30

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88.5	88.26 – 88.74	-50
=<88.0	=<88.25	-100*

\* or remove and replace it at Engineer's discretion

**Table 5A: Compaction Price Adjustment Other<sup>1</sup> Locations**

Degree of Compaction	Range	Pay Adjustment Factor (%)
>= 97.0	>= 96.75	-100*
96.5	96.26 – 96.74	-5
96.0	95.75 – 96.25	-3
95.5	95.26 – 95.74	-2
95.0	94.75 – 95.25	0
94.5	94.26 – 94.74	0
94.0	93.75 – 94.25	0
93.5	93.26 – 93.74	1
93.0	92.75 – 93.25	3
92.5	92.26 – 92.74	1
92.0	91.75 – 92.25	0
91.5	91.26 – 91.74	0
91.0	90.75 – 91.25	0
90.5	90.26 – 90.74	0
90.0	89.75 – 90.25	0
89.5	89.26 – 89.74	0
89.0	88.75 – 89.25	-1
88.5	88.26 – 88.74	-3
88.0	87.75 – 88.25	-5
87.5	87.26 – 87.74	-10
87.0	86.75 – 87.25	-15
86.5	86.26 – 86.74	-20
86.0	85.75 – 86.25	-25
85.5	85.26 – 85.74	-30
85.0	84.75 – 85.25	-40
84.5	84.26 – 84.74	-50
=< 84.0	=<84.25	-100*

\* or remove and replace at Engineer's discretion

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<sup>1</sup> This chart is to be used for areas where the structural value of the area to be paved is less than 1.75 as determined by the Engineer. See Appendix B - Method for Obtaining Cores for Determination of Roadway Structure. This chart is applicable to rehabilitation work only; full depth construction will not be considered for Table 5a.

### .04 Dispute Resolution.

Disputes or questions about any test result shall be brought to the attention of the Contractor and the Engineer within two operational days of reported test results. The following dispute resolution procedures will be used.

The Engineer and the Contractor will review the sample quality, the test method, the laboratory equipment, and the laboratory technician. If these factors are not the cause of the dispute, a third party dispute resolution will be used.

Third party resolution testing can be performed at either another Contractor's laboratory, the Engineer's laboratory, or an independent accredited laboratory. Unless otherwise mutually agreed upon by DAPA and the Engineer, the Engineer's qualified laboratory in Dover and qualified personnel shall conduct the necessary testing for third party Dispute Resolution after the Engineer has provided reasonable notice to allow the Contractor to witness this testing.

When disputes over production testing occur, the samples used for Dispute Resolution testing will be those samples the properly captured, labeled, and stored, as described in the second paragraph of the section of these specifications titled **.02 Acceptance Plan, (a) Material Production - Tests and Evaluations**. If no samples are available, the original testing results will be used for payment calculations.

Dispute Resolution samples for air void content will be heated by a microwave oven.

If there is a discrepancy between the Engineer's acceptance test result and the Contractor's test result, the Contractor may ask for the Dispute Resolution sample to be tested. The Contractor may request up to two dispute resolution samples be tested per calendar year without charge. Any additional Dispute Resolution samples run at the Contractors request where the results substantiate the acceptance test result will be assessed a fee of \$125. Any additional Dispute Resolution samples that substantiate the Contractors test result will not be assessed the fee.

When disputes over compaction core test results occur, the Engineer's acceptance core will be used for the dispute resolution sample. The Contractor will be advised on when the testing will occur as referenced above to witness the testing. The results of the dispute resolution testing shall replace all of the applicable disputed test results for payment purposes.

**Appendix A - Repairing Core Holes in Bituminous Asphalt Pavement**

**Description.**

This appendix describes the procedure required to repair core holes in a bituminous concrete pavement.

**Materials and Equipment.**

The following material shall be available to complete this work:

- Patch Material - DelDOT approved High Performance Cold Patch material shall be used.

The following equipment shall be available to complete this work:

- Sponge or other absorbent material - Used to extract water from the hole.
- Compaction Hammer - mechanical (electrical, pneumatic, or gasoline driven) tamping device with a flat, circular tamping face smaller than 6 inches in diameter.

**Construction Method.**

After core removal from the hole, remove all excess water from within the hole, and prevent water from re-entering the hole.

Place the patch material in lifts no greater than 3 inches and compact with mechanical tamping device. If the hole is deeper than 3 inches, use two lifts of approximately equal depths so that optimum compaction is achieved. Make sure that the patch surface matches the grade of the existing roadway. Make every effort to achieve the greatest possible compaction

**Performance Requirements.**

The Engineer will judge the patch on the following basis:

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- The patch shall be well compacted
- The patch surface shall match the grade of the surrounding roadway surface.

**Basis of Payment.**

No measurement or payment will be made for the patching work. The Contractor must gain the Engineer's acceptance of the patching work before the Engineer will accept the material represented by the core.

**Appendix B - Method for Obtaining Cores for Determination of Roadway Structure**

The Contractor is responsible for obtaining cores in areas that they propose are eligible for compaction price adjustments according to Table 5a in this specification. Table 5a is not applicable for new full-depth pavement box construction. Cores submitted for this process shall be obtained according to the following process.

1. Contact Materials & Research (M&R) personnel to determine if information about the area is already available. If M&R has already obtained cores in the location that is being investigated, the contractor may opt to use the laboratory information for the investigation and not core the area on their own.
2. If M&R does not have information concerning the section of the roadway, the contractor needs to contact M&R to arrange for verification of coring operations. Arrangements shall be made to allow for an individual from M&R to be on the site when the cores are obtained. Cores will be turned over to M&R for evaluation.
3. The Contractor is responsible for providing all traffic control and repairing core holes in accordance to 401699 Appendix A - Repairing Core Holes in Bituminous Asphalt Pavements.
4. Cores are to be taken throughout the entire project for the area in question. Cores will be spaced, from the start of the project in increments determined based on field and project specifics. Cores will be evenly distributed throughout the project location. The cores will be taken in the center of the lane in question.

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5. Additional cores may be taken at other locations, if surface conditions indicate that there may be a substantial difference in the underlying section. The location of these cores should be documented and submitted to M&R.
  
6. Cores shall be full depth and include underlying materials. If there is a stone base included in the pavement section, at a minimum 1 core must have information concerning the thickness of the base. This is determined by augering to the subgrade surface.
  
7. The calculations used to determine the structural capacity of the roadway is as follows. If the contractor finds, upon starting the coring process, that the areas are of greater thickness than applicable to Table 5a, they may terminate the coring process on their own and retract the request.

**Structural Number Calculations**

Each pavement box material is assigned a structural coefficient based upon AASHTO design guides. The structural coefficient is used to determine the total strength of the pavement section.

Materials used in older pavement sections are assigned lower structural coefficients to compensate for aging of the materials. The coefficients used to determine the structural number of an existing pavement are:

<b>Existing Material</b>	<b>Structural Coefficient</b>
HMA	0.32
Asphalt Treated Base	0.26
Soil Cement	0.16
Surface Treatment (Tar & Chip)	0.10
GABC	0.14
Concrete	0 - 0.7*



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For the Type C lift the calculation would be:

Newly Placed B	$2.25 * 0.4$	=	0.90
Existing HMA	$2 * 0.32$	=	0.64
GABC	$7 * 0.14$	=	0.98
			<b><u>2.52</u></b>

11/3/14

**Contract No. T202103301**

**763544 - ROAD LOCATION MOBILIZATION, ZONE 1**

**763545 - ROAD LOCATION MOBILIZATION, ZONE 2**

**763546 - ROAD LOCATION MOBILIZATION, ZONE 3**

**763547 - ROAD LOCATION MOBILIZATION, ZONE 4**

**763548 - ROAD LOCATION MOBILIZATION, ZONE 5**

**763549 - ROAD LOCATION MOBILIZATION, ZONE 6**

**763550 - ROAD LOCATION MOBILIZATION, ZONE 7**

**763551 - ROAD LOCATION MOBILIZATION, ZONE 8**

**763552 - ROAD LOCATION MOBILIZATION, ZONE 9**

**763553 - ROAD LOCATION MOBILIZATION, ZONE 10**

**763554 - ROAD LOCATION MOBILIZATION, ZONE 11**

**763555 - ROAD LOCATION MOBILIZATION, ZONE 12**

**763556 - ROAD LOCATION MOBILIZATION, ZONE 13**

**763557 - ROAD LOCATION MOBILIZATION, ZONE 14**

**763558 - ROAD LOCATION MOBILIZATION, ZONE 15**

**763559 - ROAD LOCATION MOBILIZATION, ZONE 16**

**763560 - ROAD LOCATION MOBILIZATION, ZONE 17**

**763561 - ROAD LOCATION MOBILIZATION, ZONE 18**

**763562 - ROAD LOCATION MOBILIZATION, ZONE 19**

**Description:**

This Pay Item consists of compensating the Contractor for each re-mobilization of all equipment and accessories between work locations.

This Pay Item for Road Location Mobilization is only payable for work related to patching and associated material removal operations. Mobilization for all other work shall be incidental to their respective pay items.

**Method of Measurement:**

"One mobilization fee shall be paid for each move into a mobilization zone, which shall cover all locations within that mobilization zone, and all work orders issued within that zone. A separate mobilization fee **will not** be paid for each individual location. No mobilization fee will be paid if a new work order is issued while work on a previous work order is ongoing in that zone. A separate mobilization fee will only be paid if the Contractor is directed by the Department to move from the mobilization zone in which he is presently working, or inclement weather causes a substantial delay in work. A substantial delay due to inclement weather shall be defined as fourteen or more calendar days. Payment of any mobilization fees shall be agreed upon between the Contractor and the Department, in writing, prior to commencement of work.

**Basis of Payment:**

The number of Road Location Mobilizations shall be paid at the Contract unit price per each. Price and payment shall constitute full compensation for all material, labor, equipment, tools and incidentals required to complete the work.

5/10/17



Delaware Department of Transportation  
Quantity Sheet Summary

Proposal ID: T202103301

Project Description: CTF, OPEN END, SOUTH, FY21-FY22

NOT TO BE USED FOR BIDDING

Item Number	Description	Unit	Quantity
202000	EXCAVATION AND EMBANKMENT	CY	250
202500	GRADING AND RESHAPING ROADWAY	MILE	5
203500	DITCHING	LF	1000
207000	STRUCTURAL EXCAVATION	CY	250
209005	FURNISHING BORROW, TYPE C FOR PIPE AND UTILITY TRENCH BACKFILL	CY	250
211001	REMOVAL OF PORTLAND CEMENT CONCRETE PAVEMENT, CURB AND SIDEWALK	SY	500
301002	GRADED AGGREGATE BASE COURSE, TYPE B, PATCHING	CY	200
301003	GRADED AGGREGATE BASE COURSE, TYPE B	TON	800
302005	DELAWARE NO. 57 STONE	TON	250
401005	SUPERPAVE TYPE C, PG 64-22 (CARBONATE STONE)	TON	14000
401029	SUPERPAVE TYPE C, PG 64-22, PATCHING	TON	1250
401030	SUPERPAVE TYPE B, PG 64-22, PATCHING	TON	1250
401053	SUPERPAVE TYPE C, PG 64-22, THIN LIFT	TON	2500
401500	FOG SEAL	GAL	7000
401501	BITUMINOUS ASPHALT TACK COAT	GAL	1000
401504	FRICTION MASTIC FOG SEAL	SY	35000



Delaware Department of Transportation  
Quantity Sheet Summary

Proposal ID: T202103301

Project Description: CTF, OPEN END, SOUTH, FY21-FY22

NOT TO BE USED FOR BIDDING

Item Number	Description	Unit	Quantity
401506	SPEED HUMP	LF	240
401532	PAVING SURCHARGE, ZONE 13	TON	9500
401533	PAVING SURCHARGE, ZONE 14	TON	9500
401696	ENTRANCE, DRIVEWAY, AND INTERSECTING STREET PAVING SURCHARGE	TON	200
402000	BITUMINOUS CONCRETE PATCHING	SYIN	30000
504001	CRACK AND JOINT SEALING LESS THAN 3/4 INCH WIDE	LF	50000
601031	REINFORCED CONCRETE PIPE, 12" CLASS IV	LF	300
601033	REINFORCED CONCRETE PIPE, 18", CLASS IV	LF	300
601219	CORRUGATED POLYETHYLENE PIPE, TYPE S, 12"	LF	300
601221	CORRUGATED POLYETHYLENE PIPE, TYPE S, 18"	LF	300
602002	DRAINAGE INLET, 34" X 18"	EACH	15
602003	DRAINAGE INLET, 34" X 24"	EACH	15
602030	MANHOLE, 48" X 30"	EACH	10
602130	ADJUSTING AND REPAIRING EXISTING DRAINAGE INLET	EACH	40
602132	ADJUSTING AND REPAIRING EXISTING MANHOLE	EACH	60
701013	PORTLAND CEMENT CONCRETE CURB, TYPE 1-8	LF	400
701014	PORTLAND CEMENT CONCRETE CURB, TYPE 2	LF	400



Delaware Department of Transportation  
Quantity Sheet Summary

Proposal ID: T202103301

Project Descripton: CTF, OPEN END, SOUTH, FY21-FY22

NOT TO BE USED FOR BIDDING

Item Number	Description	Unit	Quantity
701022	INTEGRAL PORTLAND CEMENT CONCRETE CURB AND GUTTER, TYPE 3-6	LF	400
705001	PORTLAND CEMENT CONCRETE SIDEWALK, 4"	SF	2000
705002	PORTLAND CEMENT CONCRETE SIDEWALK, 6"	SF	2000
705007	SIDEWALK SURFACE DETECTABLE WARNING SYSTEM	SF	400
705008	PEDESTRIAN CONNECTION, TYPE 1	SF	800
705009	PEDESTRIAN CONNECTION, TYPE 2, 3, AND/OR 4	SF	800
707001	RIPRAP, R-4	SY	50
708003	GEOTEXTILES, RIPRAP	SY	50
710002	ADJUST WATER VALVE BOXES	EACH	60
760010	PAVEMENT MILLING, BITUMINOUS CONCRETE PAVEMENT	SYIN	20000
760011	PAVEMENT MILLING, BITUMINOUS CONCRETE PAVEMENT, TAPER CUT	SYIN	2000
760012	PAVEMENT MILLING, BITUMINOUS CONCRETE PAVEMENT, VARIABLE DEPTH	SYIN	20000
762000	SAW CUTTING, BITUMINOUS CONCRETE	LF	5000
762001	SAW CUTTING, CONCRETE, FULL DEPTH	LF	1000
762004	BUTT JOINTS	SY	10000
763000	INITIAL EXPENSE/DE-MOBILIZATION	LS	1
763556	ROAD LOCATION MOBILIZATION, ZONE 13	EACH	10



Delaware Department of Transportation  
Quantity Sheet Summary

Proposal ID: T202103301

Project Descripton: CTF, OPEN END, SOUTH, FY21-FY22

NOT TO BE USED FOR BIDDING

Item Number	Description	Unit	Quantity
763557	ROAD LOCATION MOBILIZATION, ZONE 14	EACH	10
803001	FURNISH AND MAINTAIN PORTABLE CHANGEABLE MESSAGE SIGN	EADY	120
805001	PLASTIC DRUMS	EADY	3000
808002	FURNISH AND MAINTAIN TRUCK MOUNTED ATTENUATOR, TYPE II	EADY	50
810001	TEMPORARY WARNING SIGNS AND PLAQUES	EADY	50000
811003	FLAGGER, SUSSEX COUNTY, STATE	HOUR	2500
811015	FLAGGER, SUSSEX COUNTY, STATE, OVERTIME	HOUR	250
817002	PERMANENT PAVEMENT STRIPING, SYMBOL/LEGEND, ALKYD-THERMOPLASTIC	SF	2000
817013	PERMANENT PAVEMENT STRIPING, EPOXY RESIN PAINT, WHITE/YELLOW, 5"	LF	2000
817031	REMOVAL OF PAVEMENT STRIPING	SF	500
819018	INSTALLATION OR REMOVAL OF TRAFFIC SIGN(S) ON SINGLE SIGN POST	EACH	10
908001	TOPSOIL	TON	2000
908014	PERMANENT GRASS SEEDING, DRY GROUND	SY	5000
908016	PERMANENT GRASS SEEDING, SUBDIVISION	SY	10000
908020	EROSION CONTROL BLANKET MULCH	SY	1000