DOUGLAS COUNTY, GEORGIA

CONTRACT

FOR

Patching and Milling of Various Douglas County Roads Consisting of 10.98 Miles

PROJECT NUMBER: T014D1234 (SPLOST/LMIG)

SOLICITATION NUMBER: 20-008

LET DATE: 05/12/2020

DOUGLAS COUNTY BOARD OF COMMISSIONERS
8700 HOSPITAL DRIVE
DOUGLASVILLE, GEORGIA 30134

"DO NOT DISASSEMBLE THIS BOOKLET OR REMOVE ANY PAGES! THIS COMPLETE BOOKLET MUST BE SUBMITTED AS A BID PACKAGE. SEE SPECIAL PROVISION 102.03. THE BID WILL BE CONSIDERED INCOMPLETE AND AUTOMATICALLY DISQUALIFIED OR REJECTED"

****

ENTER ALL REQUIRED INFORMATION
EITHER BY HAND OR BY STAMP

DOUGLAS COUNTY
BOARD OF COMMISSIONERS
Romona Jackson-Jones, Chairman
Henry Mitchell, III, Member
Kelly Robinson, Member
Tarenia Carthan, Member
Ann Jones Guider, Member

DOUGLAS COUNTY
DEPARTMENT OF TRANSPORTATION
Miguel Valentin, Director
Department of Transportation
8700 Hospital Drive
Douglasville, Georgia 30134
Telephone: (770) 920-4932

SECTION I

BID PROPOSAL

TABLE OF CONTENTS

APPENDICES

DOUGLAS COUNTY BOARD OF COMMISSIONERS
Purchasing Department
Invitation to Bid
SOLICITATION NO. 20-008

NOTICE TO CONTRACTORS

Sealed Bids will be received by The Douglas County Board of Commissioners in the Douglas County Purchasing Department, 3rd Floor, Douglas County Courthouse, 8700 Hospital Drive, Douglasville, Georgia 30134, **until 2:00 p.m., ET Tuesday, May 12, 2020.**

The work to be bid consists of furnishing all materials, labor, and equipment for:

Patching and Milling of Various Douglas County Roads
Consisting of 10.98 Miles

A MANDATORY pre-bid meeting will be conducted at 2:00 p.m. ET, Tuesday, April 28, 2020, via conference call. Therefore, all bidders interested in attending the pre-bid meeting will need to email their contact information to dcpurchasing@co.douglas.ga.us prior to the MANDATORY pre-bid meeting.

Bids may be mailed, or hand delivered. **Bids shall be opened and read publicly at 2:00 p.m., ET Tuesday, May 12, 2020.** Bids shall be submitted in a sealed envelope, so marked as "**Solicitation No. 20-008 Patching and Milling of Various Douglas County Roads, 05/12/2020, as well as the Bidder's name**, addressed to the Douglas County Board of Commissioners, **ATTENTION:** Purchasing Director's Office, 8700 Hospital Drive, Douglasville, Georgia, 30134**.**

All questions regarding this bid shall be in writing either by mail, fax (770-920-7219), or email (dcpurchasing@co.douglas.ga.us). No questions shall be received after **5:00 p.m. ET, Friday, May 1, 2020**. Responses will be provided by **5:00 p.m. ET, Tuesday, May 5, 2020.** No other County staff or officials associated with this project should be contacted regarding this bid. **DOING SO, MAY RESULT IN BIDDER'S DISQUALIFICATION.**

Douglas County further reserves the right to extend the value of this Contract by up to 20% of the original value of the Contract (Bid Amount), to accomplish unforeseen Work, within the scope of the original Contract. Extended work will be contracted in accordance with provisions of Section IV of this contract (Section 104.03.A – AUTHORITY TO MAKE CHANGES).

All bids shall be accompanied by a Bid Bond in favor of the Board of Commissioners of Douglas County in the amount of at least five percent (5%) of the Bid for the complete work. The Bid Bond shall be forfeited to the Board of Commissioners of Douglas County, Georgia as liquidated damages if the Bidder fails to execute the Contract and provide Performance Bond, Payment Bond, and Liability Insurance Certificate within fifteen (15) calendar days after being notified that he/she has been awarded the contract.

Payment will be made in accordance with the Douglas County's Financial Policy **(original invoice from contractor is required before payment will be made).**

All bidders must be Pre-Qualified with Georgia Department of Transportation (GDOT) and all subcontractors must be registered with GDOT. Qualifications of the Bidder will be reviewed before the Award of the Contract. The County may award the contract to other than low Bidder. The Douglas County Board of Commissioners reserves the right to reject any and all Bids and to waive informalities.

There is a minimum 15% DBE participation goal required on this contract. This goal is not to be considered as a fixed quota, set aside or preference. The DBE goal can be met by prime contracting, sub-contracting, joint-venture or mentor/ protégé relationship as may be allowed by Georgia Department of Transportation requirements.

Notice to Proceed (NTP) on this Project will be issued following receipt of the correct and fully executed Contract Documents and upon an approved Purchase Order in the full contract amount.

The Bid Form and Specifications are available for review at the Douglas County Purchasing Office (770.920.7247), 3rd Floor, Douglas County Courthouse, 8700 Hospital Drive, Douglasville, Georgia 30134 between the hours of 8:00 a.m. to 5:00 p.m. ET Monday through Friday.

Bid documents may be purchased at Superior Reprographics, Inc., 591 Thornton Road, Lithia Springs, Georgia, 30122 (770-944-7293) or email: print@superiorreprographics.com **for $43.70 per set**. Such payments are non-refundable. Please reference **Douglas County Solicitation: 20-008.** Purchasing arrangements for Bid documents are strictly the responsibility of the bidder.

Superior Reprographics, Inc. is the **only** approved source for these plans and bid documents. Bidders must allow **24 hours** printing time for each order. Bidders are cautioned not to obtain bid documents from any other source, than the one mentioned above, to ensure that the bid documents are complete and include the latest amendments/changes and addenda. **IT IS THE BIDDER'S RESPONSIBILITY TO ENSURE THAT THEIR BID DOCUMENTS ARE COMPLETE AND CORRECT PRIOR TO BID SUBMITTAL.**

Completion Date for this Contract shall be:

ONE HUNDRED TWENTY (120) CALENDAR DAYS FROM NTP

No Bid will be received or accepted after the above specified time and date of the Bid Opening. Bids submitted after the designated time and date will be deemed invalid and returned unopened to the Bidder.

DOUGLAS COUNTY

PROPOSAL INDEX

Project No. T014D1234 (SPLOST/LMIG) LET DATE: 05/12/2020

This contract is broken into four (4) sections as follows:

SECTION I	THE BIDDING DOCUMENTS NEEDED TO BID THIS PROJECT
SECTION II	THE CONTRACT DOCUMENTS NEEDED TO EXECUTE THE CONTRACT AS THE SELECTED LOW BIDDER.
SECTION III	GENERAL CONDITIONS OF THE CONTRACT
SECTION IV	SPECIAL CONDITIONS OF THE CONTRACT

GENERAL REQUIREMENTS

1. The work on this Project shall be governed by the 2013 Edition of the Georgia Department of Transportation Standard Specifications Construction of Transportation Systems, Special Provisions, and Current Edition of the GDOT State of Georgia Supplemental Specifications Construction of Transportation Systems.

   The materials used in The Work shall meet all quality requirements of the Contract. Materials will not be considered as finally accepted until all tests, including any to be taken from the finished work, have been completed and evaluated.

   Upon request by the Engineer, the Contractor shall furnish formal written invoices from the materials suppliers. The invoices shall show the quantities and the dates shipped.

2. **DEFINITIONS AND TERMS:** Delete the following paragraphs from Section 101 of the 2013 Edition of the Georgia Department of Transportation State of Georgia Standard Specifications Construction of Transportation System and replace with the following:

DELETE:	**REPLACE WITH:**
101.10 Board	**THE DOUGLAS COUNTY BOARD OF COMMISSIONERS**
101.13 Chief Engineer	**THE DIRECTOR OF THE DOUGLAS COUNTY DEPARTMENT OF TRANSPORTATION** or appointee acting as his duly authorized representative
101.14 Commissioner	**THE CHAIRMAN OF THE DOUGLAS COUNTY BOARD OF COMMISSIONERS**
101.22 Department	**THE DOUGLAS COUNTY DEPARTMENT OF TRANSPORTATION**
101.24 Engineer	Same as **101.13** - Chief Engineer (above)
101.62 State Highway Engineer	Same as **101.13** - Chief Engineer (above)
101.63 State	**THE DOUGLAS COUNTY BOARD OF COMMISSIONERS**
101.81 Treasurer	**THE DIRECTOR OF PURCHASING**

3. **CONTRACT COMPLETION DATE:** This Contract shall be completed on or before **ONE HUNDRED TWENTY (120) CALENDAR DAYS FROM NOTICE TO PROCEED DATE.**

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

CERTIFICATIONS

(English Projects)

Failure to complete appropriate certification requirements identified below or submission of a false certification shall render the Bid non-responsive.

EXAMINATION OF PLANS AND SPECIFICATIONS

I certify that I have carefully examined the Plans for this project and the Georgia Department of Transportation State of Georgia Standard Specifications Construction of Transportation System, 2013 Edition, and current edition of the GDOT State of Georgia Supplemental Specifications Modifying the 2013 Standard Specifications Construction of Transportation Systems and the Special Provisions included in and made a part of this Proposal, and have also personally examined the site of the work. On the basis of the said specifications and plans, I propose to furnish all necessary machinery, tools, apparatus and other means of construction, and do all the work and furnish all the materials, in the manner specified.

I understand the quantities mentioned are "approximate only" and are subject to either increase or decrease and hereby propose to perform any increased or decreased quantities of work or extra work on the basis provided for in the Specifications.

I also hereby agree that Douglas County would suffer damages in a sum equal to at least the amount of the enclosed Proposal Guaranty, in the event my Proposal should be accepted and a Contract tendered me there under and I should refuse to execute same and furnish Bonds and Liability Insurance as herein required, in consideration of which, I hereby agree that, in the event of such failure on my part to execute said Contract and furnish said Bonds and Liability Insurance within fifteen (15) days after the date of the letter transmitting the Contract to me, the amount of said Proposal Guaranty shall be and is hereby forfeited to Douglas County as liquidated damages as the result of such failure on my part.

I further propose to execute the Contract Agreement described in the Specifications as soon as the work is awarded to me, and to begin and complete the work within the time limit provided or suffer liquidated damages in accordance with applicable specifications and regulations. I also propose to furnish a Performance & Payment Bonds and Liability Insurance, approved by the Douglas County Board of Commissioners, as required by the laws of the State of Georgia. These Bonds shall not only serve to guarantee the completion of the work on my part, but also to guarantee the excellence of both workmanship and materials until the work is finally accepted, as well as to fully comply with all the laws of the State of Georgia.

CONFLICT OF INTEREST

By signing and submitting this Contract, I hereby certify that employees of the company or employees of any company supplying material or subcontracting to do work on this Contract will not engage in business ventures with employees of Douglas County nor shall they provide gifts, gratuities, favors, entertainment, loans or other items of value to employees of this Department.

Also, by signing and submitting this Contract, I hereby certify that I will notify Douglas County through its Engineer of any business ventures entered into between employees of this company or employees of any company supplying material or subcontracting to do work on this Contract with a family member of Douglas County employees.

DRUG-FREE WORKPLACE CERTIFICATION

The undersigned certifies that the provisions of Code Sections 50-24-1 through 50-24-6 of the Official Code of Georgia Annotated, relating to the "Drug-free Workplace Act", have been complied with in full. The undersigned further certifies that:

1. A drug-free workplace will be provided for the Contractor's employees during the performance of the Contract; and

2. Each Contractor who hires a subcontractor to work in a drug-free workplace shall secure from that Subcontractor the following written certification:

   "As part of the subcontracting agreement with _____,
   (Contractor's Name)
   _____certifies to the Contractor that a drug-free
   (Subcontractor's Name)
   workplace will be provided to and for the Subcontractor's employees during the performance of this Contract pursuant to Paragraph (7) of Subsection (b) of Code Section 59-24-3."

   Also, the undersigned further certifies that he will not engage in the unlawful manufacture, sale, distribution, dispensation, possession, or use of a controlled substance or marijuana during the performance of the Contract.

NON-COLLUSION, CERTIFICATION

I hereby certify that I have not, nor has any member of the firm(s) or corporation(s), either directly or indirectly, entered into any agreement, participated in any collusion, nor otherwise taken any action in restraint of free competitive bidding in connection with this submitted bid.

It is understood and agreed that this Proposal is one of several competitive bids made to Douglas County, and in consideration of mutual agreements of the bidders, similar hereto, and in consideration of the sum of One Dollar cash in hand paid, receipt whereof is hereby acknowledged, the undersigned agrees that this Proposal shall be an option, which is hereby given by the undersigned to Douglas County to accept or reject this Proposal at any time within that prescribed in Section 103.02 (Award and Execution of Contract) (of the Special Provisions, SECTION IV, of this contract), unless the successful bidder agrees in writing to a longer period of time for the Award, and in consideration of the premises, it is expressly covenanted and agreed that this Proposal is not subject to withdrawal by the Proposer or Bidder, during the term of said option.

I hereby acknowledge receipt of the following checked Amendments of the Proposal, Plans, Specifications, and/or other documents pertaining to the Contract.

AMENDMENT NOS.: 1__2__3__4__5__.

I UNDERSTAND THAT FAILURE TO CONFIRM THE RECEIPT OF AMENDMENTS IS CAUSE FOR REJECTION OF BIDS.

Witness my hand and seal this, the _____day of_____, 2020.

Contractor:

The bidder(s) whose signature(s) appears on this document, having personally appeared before me, and being duly sworn, deposes and says that the above statements are true and correct.

_____
(Print Company Name)

By:_____ **(SEAL)**
Corporate President/Vice President
or Individual Owner **or** Partner
(Strike through all except the one which applies).

****

Sworn to and subscribed before me this ___day of _____,2020.

Joint Bidder:

_____ **(SEAL)**
(Notary Public)

_____
(Print Company Name)

My commission expires the _____day of _____2020.

By_____ **(SEAL)**
Corporate President/Vice President
or Individual Owner **or** Partner.
(Strike through all except the one, which applies)

…….
FEDERAL ID NO./IRS NO.
_____

****

Joint Bidder:

_____
Company Name (Print)

By:_____ **(SEAL)**
Corporate President/Vice President
or Individual Owner **or** Partner
(Strike through all except the one which applies).

BID BOND

KNOW ALL MEN BY THESE PRESENTS, THAT WE_____

_____ (hereinafter called the Principal) and_____ (hereinafter called the Surety), a Corporation chartered and existing under the laws of the State of _____ _____with its principal offices in the City of _____ _____and authorized to do business in the State of Georgia, are held and firmly bound unto Douglas County, Georgia, in the full and just sum of : _____ _____D0LLARS, and _____CENTS ($_____) good and lawful money of the United States of America, to be paid upon demand to Douglas County, Georgia, to which payment will and truly to be made, we bind ourselves, our heirs, executors, administrators and assigns jointly and severally and firmly by these presents:

WHEREAS, the Principal is about to submit, or has submitted to Douglas County, Georgia, a Proposal for furnishing materials, labor and equipment for:

Patching and Milling of Various Douglas County Roads Consisting of 10.98 Miles

WHEREAS, the Principal desires to file this Bond in accordance with law in lieu of a certified Bidder's check otherwise required to accompany this proposal.

NOW, THEREFORE, the conditions of this obligation are such that if the Proposal be accepted, the Principal shall within fifteen (15) days after receipt of notification of the acceptance, execute a Contract in accordance with the Proposal and upon the terms, conditions, and prices set forth in the form and manner required by Douglas County, Georgia, and **execute a sufficient and satisfactory Certificate of Liability Insurance, Performance Bond and Payment Bond payable to Douglas County, Georgia. The Performance Bond shall be 100% of the total Contract Price, and the Payment Bond shall be 110% of the total Contract Price,** in form and with security satisfactory to said Douglas County, Georgia, and otherwise to be and remain in full force and virtue in law; and the Surety shall, upon failure of the Principal to comply with any or all of the foregoing requirements within the time specified above, immediately pay to Douglas County, Georgia, upon demand, the amount hereof in good and lawful money of the United States of America, not as a penalty, but as liquidated damages.

IN TESTIMONY THEREOF, the Principal and Surety have caused these presents to be duly signed and sealed this _____day of _____,2020.

_____(**SEAL**)	_____(**SEAL)**
Principal	Surety
By:_____	By: _____
Address: _____	Address:_____
_____	_____
Telephone No: _____	Telephone No:_____

INSURANCE REQUIREMENTS

Prior to execution of the Contract, and at all times that the Contract is in force, the Contractor shall obtain, maintain and furnish the County Certificates of Insurance from licensed companies doing business in the State of Georgia and an A.M. Best Rating A-6 or higher and acceptable to the County covering:

1. Statutory Workers' Compensation Insurance
   (a) Employers Liability
   Bodily Injury by Accident - $500,000 Each Accident
   Bodily Injury by Disease - $500,000 Policy Limit
   Bodily Injury by Disease - $500,000 Each Employee

2. Comprehensive General Liability Insurance
3.
   (a) $1,000,000 Limit of Liability per Occurrence for Bodily Injury and Property Damage
   (b) Owner's and Contractor's Protective
   (c) Blanket Contractual Liability
   (d) Blanket "X", "C" and "U"
   (e) Products/Completed Operations Insurance
   (f) Broad Form Property Damage
   (g) Personal Injury Coverage

4. Automobile Liability
5.
   (a) $1,000,000 Limit of Liability per Occurrence for Bodily Injury and Property Damage
   (b) Comprehensive Form covering all Owned, Non-owned and Hired Vehicles

6. Umbrella Liability Insurance

   (a) 4,000,000 Limit of Liability
   (b) Coverage at least as Broad as Primary Coverage as outlined under Items 1, 2, 3 above

5. Douglas County Board of Commissioners (DCBC), its subcontractors and affiliated companies, its officers, directors and employees shall be named on the Certificates of Insurance as Additional Insureds and endorsed onto the policies for Comprehensive General Liability, Automobile Liability and Umbrella Liability Insurance maintained pursuant to this Contract in connection with liability of Douglas County, arising out of Contractor's operations. Copies of the endorsements shall be furnished the County prior to execution of the Contract. Such insurance is Primary Insurance and shall contain a Severability of Interest clause as respects to each Insured. Such policies shall be non-cancelable except on thirty (30) days written notice to the County. Any separate insurance maintained in force by the Additional Insureds named above shall not contribute to the insurance extended by Contractor's Insurer(s) under this Additional Insured Provision.

Certificate Holder Should Read: **Douglas County Board of Commissioners**

Patching and Milling of Various Douglas County Roads Consisting of 10.98 Miles
PROJECT NUMBER: T014D1234

Agent: _____**Telephone No.**_____

Address: _____

CORPORATE CERTIFICATE

I, _____, certify that I am the Secretary of the Corporation named as Contractor in the forgoing Proposal; that _____, who signed Proposal on behalf of the Contractor, was then (title)_____of said Corporation; that said Proposal was duly signed for and in behalf of said Corporation by authority of its Board of Directors, and is within the scope of its corporate powers, that said Corporation is organized under the laws of the State of _____, this _____ day of _____, 2020.

(SEAL)

_____
(Signature)

_____
(Company)

_____
(Address)

_____

_____
(Telephone No)

LIST OF SUBCONTRACTORS

I do _____, do not _____, Propose to subcontract some of the work on this project.

I propose to subcontract work to the following subcontractors:

NAME AND ADDRESS	**TYPE OF WORK**

Contractor Printed Name: _____ Signed: _____

GENERAL NOTES

1. All references in this document, which includes all papers, writings, documents, drawings, or photographs used or to be used, in connection with this document, to the State Highway Department of Georgia, State Highway Department, Georgia State Highway Department, Highway Department, or Department when the context thereof means the State Highway Department of Georgia, and shall be deemed to mean, the Department of Transportation.

2. The data, together with all other information shown on these plans, or in any way indicated thereby, whether by drawings or notes, or in any other manner, are based upon field investigations and are believed to be indicative of actual conditions. However, the same are shown as information only, are not guaranteed and do not bind the Department of Transportation in any way. The attention of the bidder is specifically directed to Sections 102.04, 102.05, 102.06 and 104.03 of the Specifications – current edition.

3. **CONTRACTOR/SUBCONTRACTOR AFFIDAVITS:** On this project, the successful Contractor and each of his Subcontractors shall be required to fill in and sign a copy of the appropriate respective affidavit. The signed affidavits are to be submitted as a part of the Contract and are required before an NTP will be issued.

4. **NOTICE TO PROCEED (NTP**): On this project, the NTP will be issued upon correct and fully executed Contract Documents between the Successful Bidder and the County and upon approval of a Purchase Order in the contract amount.

5. The Contractor shall have on The Work at all times, as his agent, a competent Superintendent capable of reading and thoroughly understanding the Plans and Specifications, and thoroughly experienced in the type of work being performed who shall receive instructions from the Engineer or his authorized representatives. The Superintendent shall have full authority to execute orders or directions of the Engineer without delay, and to promptly supply such materials, equipment, tools, labor, and incidentals as may be required. Such superintendence shall be furnished, irrespective of the amount of work sublet.

   The Superintendent shall notify the Engineer prior to starting any Pay Item Work. The Prime Contractor shall coordinate and be responsible to the Engineer for all activities of subcontractors.

6. The **Contractor shall** fax a copy of all hot mix asphalt test results to Douglas County Department of Transportation to arrive not later than 10:00 A.M., E.T. on the day following production. Fax number is 678-626-0157, ATTN: Project Manager.

7. **SURETIES:** Douglas County only accepts payment and performance bonds from sureties listed on the US Treasury list of approved sureties.

8. **ASPHALT CEMENT PRICE ADJUSTMENT:** For this contract, no price adjustment shall be considered.

9. The **Contractor shall** furnish advance-warning signs and shall have portable signs at all roads and streets that intersect these roads while work is in progress. The signs shall be in accordance with Section 150 of the Special Provisions of the GDOT Standard. **This work will not be paid for separately, but shall be included in the Bid Price for Item 150, Traffic Control.**

GENERAL NOTES continued . .

10. The **Contractor shall not** simultaneously perform work on opposite sides of the roadway when the work is within twelve feet (12') of the travel-way, unless such areas are separated by at least one-half mile of distance in Rural Areas or at least 500 feet in Urban Areas. The Contractor shall have a Flagman at intersecting roads where the Tack is being placed. **A Flagman shall not motion for a motorist to run in Tack or other areas which may result in damage to vehicles or danger to drivers.** When 1-way traffic is approved the Contractor shall provide the necessary Flagmen to direct such traffic. When traffic is permitted through the work area under stage construction, the Contractor shall furnish Pilot Vehicles at the Engineer's request. **This work will not be paid for separately, but shall be included in the Bid Price for Item 150, Traffic Control.**

11. In preparation of the roadway prior to resurfacing, the Contractor shall blade the existing shoulders no lower in elevation than the existing pavement or shoulder. If bladed below the existing elevation, corrective work shall be done by the Contractor. **This will not be paid for separately, but shall be included in the Overall Bid Price.**

12. The Contractor's attention is directed to Section 149 of the Specifications – current edition – Construction Layout. The Contractor shall provide the necessary construction layout. **Cost for this work shall be included in the overall bid price.**

13. **REMOVAL of MISCELLANEOUS ROADWAY ITEMS:** The removal and disposal of Miscellaneous Roadway items, including, but not limited to, curbs, drainage structures, pavement, edge preparation grass, weeds, soils, and debris, unacceptable materials, and abandoned obstructions shall become the property and responsibility of the Contractor. Any Miscellaneous Roadway Items to be disposed of shall be done so off the project and in a manner so as not to be unsightly. **This work and any Item to be removed that Is not identified as a pay item shall not be paid for separately, but shall be included in the Overall Bid Price.**

14. **PATCHING and REPAIR of MINOR DEFECTS:** Potholes and broken areas shall be patched and compacted as directed by the Engineer. Areas to be patched shall be milled to the width & depth directed, loose material shall be removed, the area shall be cleaned and primed or tack coated. Disposal of removed patch material is the responsibility of the Contractor and shall not be disposed of on the Right-of-Way or leave an unsightly appearance on the project. Patching materials do not require a Job Mix Formula, but shall meet the gradation range shown on Section 828 and the asphalt content to be used, must be approved by the Engineer. If the leveling and patching mix type is not designated, determine the Mix Type by the thickness or spread rate according to Table 3, Page 226. in the Georgia Department of Transportation Standard Specifications, current Edition, **do not use 4.75 mm. This will be paid for in the Overall Bid Price for Patching.**

15. **BRIDGE DECK MILLING:** If bridge deck milling is required, extreme care should be taken by the Contractor to avoid milling into the bridge deck and bridge deck seals. The Contractor at no cost to the Department of Transportation shall repair any damages to the bridge deck or bridge deck seals. All bridge deck repairs shall be made to the satisfaction of the Engineer. Any damages to the above-mentioned bridge deck or seals shall be repaired within three (3) days after the damages occur and prior to the resurfacing of the damaged areas in accordance to Subsection 107.13 of the Specifications – current edition.

16. **MILLING/PATCHING:** The Contractor shall provide positive drainage in the milling operation such that water does not pond on the roadway. Milled areas (to include areas milled for patching) shall be covered or patched on the same day milled and prior to opening lanes to traffic. Failure by the Contractor to cover milled or patched areas on the same day shall result in liquidated damages to be assessed in accordance with Section 108.08 of the Specifications – current edition. Edge milling shall be required to be covered in accordance with Special Provision Section150-02 (Temporary Traffic Control (TTC) zones) Section B (work zone restrictions) #5 (Milled Surface Restrictions). However, no area should be left with a difference in elevation of more than 2 inches.

GENERAL NOTES continued . .

17. **DRAINAGE STRUCTURES:** The Contractor is responsible for maintaining all drainage structures within the limits of the project throughout the duration of the project. Any debris that goes in drainage structures as a result of construction operation (milling, shoulder grading, etc.) shall be cleaned out by the Contractor at no additional cost to the Department.

18. The Contractor shall be responsible for applying soil sterilant in accordance with Section 725 of the Specifications – current edition at the joint face prior to application of the tack coat.

19. On this project, the **Maximum Total Gross Vehicle Weight shall not exceed 56,000 pounds**.

20. Leveling Course to be placed as either spot leveling or full-width leveling or both, at the discretion of the Engineer. For Leveling Courses, use a Motor Grader equipped with a spreader box and smooth tires to spread the material or use a mechanical spreader meeting the requirements in Sub-Section 400.3.02.C., *Equipment at Project Site.*

21. **INSTALLATION of PAVEMENT MARKINGS, Not Required**, Required centerline(s), edge line(s), and lane line(s), are listed as "Required Striping" in Appendix A, Section I of this contract. Striping shall be accomplished in two phases on this project:

    Phase 1 **Temporary Striping is not required in this project.** in accordance with Section 150.04 of the Georgia DOT Specifications. The temporary centerline shall be striped within three (3) days after the Final Surface has been laid as outlined in Special Provision 150, *Traffic Control*, of The Georgia Department of Transportation Standard Specifications, Construction of Transportation System, 2013 Edition. **The cost for this work is to be included in the overall cost of the project.**

    Phase 2 **Permanent Pavement Markings Not Required on this project** (those for which a pay item is included in the contract, Item 653) shall be delayed for a period of **15** days minimum after placement of the final surface course on each roadway, but shall be complete no later than 45 days following placement of the final surface.

    All Stop Bars listed in "Required Striping" in Appendix A, shall be replaced with 24" thermoplastic and shall be placed along with the temporary striping. Except as directed by the Engineer, within subdivisions, only those stop bars at access roads onto major roadways shall be replaced with 24" (inch) thermoplastic stop bars. **Only those permanent quantities noted in the Detailed Estimate/Bid Form in Appendix B, Section I of this contract will be paid for as extra work.**

    Except as items are included in the Detailed Estimate/Bid Form, The Contractor shall replace all other existing pavement markings (School Zones, Symbols, Words, painted Stop Bars (in subdivisions), in accordance with Section 150 of the Georgia Department of Transportation Standard Specifications, Construction of Transportation System, 2013 Edition. **This work will not be measured for separate payment, but shall be included in the Lump Sum Bid Price for Item 150 – Traffic Control.**

22. **REPLACEMENT OF SIGNAL LOOPS:** The contractor shall, upon cutting into a signal loop, contact the County at **678-626-0158** for notification and contractor is responsible for coordination and replacement of damaged loops per engineer's direction at contractor's expense.

23. **VISUAL AND STRAIGHTEDGE INSPECTION:** All paving shall be subject to visual and straightedge inspection during construction operations and thereafter prior to Final Acceptance. A ten foot (10') straightedge shall be maintained in the vicinity of the paving operation at all times for the purpose of measuring surface irregularities on all courses. The straightedge and labor for its use; shall be provided by the Contractor. The surface of all courses shall be inspected with the straightedge as necessary to detect irregularities. All irregularities in excess of 3/16 inch in ten feet (10') for subsurface courses shall be corrected. Irregularities such as rippling, tearing, or pulling, which in the judgment of

GENERAL NOTES continued . .

the Engineer indicate a continuing problem in equipment, mixture or operating technique will not be permitted to recur. The paving operation shall be stopped until appropriate steps are taken by the Contractor to correct the problem.

24. **LIQUIDATED DAMAGES:** Liquidated damages on this project shall be assessed in accordance with Department of Transportation, State of Georgia Supplemental Specification Section 108-Prosecution and Progress Sub-Section 108-08 Dated January 25, 2009. In addition to contract liquidated damages, there will also be additional liquidated damages accessed for delay in replacement and lane closures. See Special Provision Section 108.08 (C) Intermediate Complete Schedule.

25. **INSPECTION AND ACCEPTANCE:** Upon due written notice from the contractor of presumptive completion of the entire project, the Engineer will make an inspection. If all construction provided for and contemplated by the Contract is found completed to his satisfaction, that inspection shall constitute the Final Inspection and the Engineer will make the final Acceptance and notify the Contractor, in writing, of this Acceptance as of the date of the Final Inspection. If, however, the inspection discloses any work, in whole or in part, as being unsatisfactory, the Engineer will give the Contractor the necessary instructions for correction of the same and the contractor shall immediately comply with and execute such instructions. **Corrections (Punch List Items) are considered a part of the original bid and will not be considered for additional compensation**.

26. **INTEFERENCE WITH TRAFFIC:** No lane closures or interference with traffic will be allowed from 6:00AM – 9:00 AM or 4:00 PM – 8:00 PM Monday thru Friday unless approved by the Engineer. Any request for variance to these restricted hours must be made in advance and approved by the Engineer. Night time or weekend paving will not be allowed. The Department further reserves the right to restrict construction operations at any time, when, in the opinion of the Engineer, the continuance of the work would seriously hinder traffic flow, be needlessly disruptive or unnecessarily inconvenience the traveling or general public.

27. **Shoulder building/grassing is not included in this contract**. Low/Soft Shoulder signs will be provided, installed, and maintained **by the contractor during construction** in accordance with Special Provision 150.03 L. After project completion these signs will remain in place and become property of the County.

28. Milling is primarily intended as edge milling. However, there may be isolated areas where other milling may be required as directed by the Engineer. All milling will be as directed by the Engineer. All milling is variable depth.

29. Patching for this project will consist of variable depths and widths as directed by the Engineer. Average Depth of patching should be a minimum of 2 inches

30. Utility adjustments, i.e. manholes, water valves, gas valves, etc. are not included in this contract. However, utility coordination is required between the Contractor and the Utility owner.

31. Payment for all work satisfactorily completed will be made on a monthly basis for work performed the previous month. The Contractor shall submit a certified, line item, pay request detailing the quantities for which payment is being requested. Each request for payment must be accompanied by a certified statement that all materials and workmanship incorporated into the work, for which the pay request represents, is in accordance with all required Douglas County and or GDOT Specifications.

32. **All millings will be hauled to Douglas County Department of Transportation waste area**.

APPENDIX A

LIST OF ROADS

Patching and Milling of Various Douglas County Roads Consisting of 10.98 Miles

Solicitation No. 20-008

PROJECT NUMBER: T014D1234

LIST OF ROADS

	ROAD NAME	BEGINNING	ENDING	LENGTH IN MILES
1	Lumpkin Court	Ivy Brooke Dr	CDS	0.163
2	Plantation Drive	Richmond Dr	Charleston Pl	0.213
3	Lake Greystone Rd	Old Douglasville Rd	Dead End	0.798
4	Sweet Ridge court	Turner Dr	Dead End	0.171
5	Brannon Dr	Skyview Dr	Dead End	0.208
6	Charleston Lace	Plantation Dr	CDS	0.354
7	Pirkle Rd	Huey Rd	Dead End	0.184
8	Lamar Dr	North Burnt Hickory Rd	Cody Ln	0.255
9	Melanie lane	Wilkes Plantation Dr	Tara Woods Dr	0.216
10	Oliver Street	Line Street	Lake Street	0.151
11	Spine Point Way	CDS	CDS	0.329
12	Skyler Court	Plantation Way	CDS	0.073
13	Laura Ln	Sinyand Rd	Mt Vernon Rd	0.698
14	Rhett Butler Dr	Tara Woods Dr	Dead End	0.217
15	Ridge Hill Pkwy	Milam Rd	Glen Ridge Cir	0.342
16	Bryten Dr	Holly Springs dr	Bronte Lane	0.310
17	Town Manor Dr	Mill Water Crossing	Dead End	0.243
18	Arolla Lane	Morinda Dr	CDS	0.075
19	Anna Ruby Lane	Chattanooga Way	CDS	0.244
20	Autumn Glo Court	Forest View Trail	CDS	0.316
21	Rocky Creek Dr	Kings Highway	South pebble Dr	0.414
22	Cora Street	Valhalla Dr	S. Skyline Dr	0.083
23	East Shore Circle	Shore Circle	Shore Dr	0.225
24	Eton Court	S. Skyline Dr	CDS	0.038
25	Burnt Orange Dr	Pine Forest Dr	Hemp Street	0.155
26	Ale Lane	Andy Mountain Rd	Dead End	0.120
27	Dundee Court	Post Rd	CDS	0.068
28	Ms Betty's Place	Nolanwood Lane	CDS	0.125
29	Stewart Mill Rd	Central Church Rd	Yancey Rd	1.042
30	Reid Rd	Yeager Rd	Central Church Rd	0.609
31	McDuff Dr	Yeager Rd	Macedin Dr	0.223
32	Oak Court	Yeager Rd	CDS	0.099
33	Amalfi Way	Reid Rd	Dead End	0.415
34	John West Rd	Bright Star Rd	Hwy 78	1.707
			Total Miles	10.984

APPENDIX B

DETAILED ESTIMATE/ BID FORM

Patching and Milling of Various Douglas County Roads Consisting of 10.98 Miles

Solicitation No. 20-008

PROJECT NUMBER: T014D1234

2020 PATCHING AND MILLING OF VARIOUS COUNTY ROADS (10.98 MILES)
DOUGLAS COUNTY PROJECT # T014D1234

Item No.	Item Description	Units	Quantity	Unit Price	Bid Amount
150-1000	Traffic Control -DCR-01-17	LS	1		
402-1802	RECYCLED ASPH. CONC. PATCHING, INCL BITUM MATL & "H" LIME	TN	9,500		
432-5010	MILL ASPH CONC PVMT, VARIABLE DEPTH	SY	56,000		
				TOTAL BID:	

CONTRACTOR NAME:

CONTRACTOR SIGNATURE:

This revised unit price bid schedule can be inserted as an amended page in the bid documents. **DO NOT DISASSEMBLE THE BID DOCUMENTS.**

SECTION II

AGREEMENT FOR CONSTRUCTION

CONTRACT DOCUMENTS

TABLE OF CONTENTS

CONTRACT
OATH OF SUCCESSFUL BIDDER

Personally appeared before the undersigned officer duly authorized by law to administer oaths and who, after being first duly sworn, depose and say that they are all the officers, agents, persons, or employees who have acted for or represented
(Company Name)_____
(Address)_____(Telephone No.) _____, in bidding or procuring a Contract with DOUGLAS County, Georgia on the following project(s):

Patching and Milling of Various Douglas County Roads Consisting of 10.98 Miles
PROJECT NUMBER: T014D1234

And that said (has/have) not by (himself/themselves) or through any persons, officers, agents or employees prevented or attempted to prevent by any means whatsoever competition in such bidding; or by any means whatsoever prevented or endeavored to prevent anyone from making a bid therefore, or induced or attempted to induce another to withdraw a bid for said work.

By: _____
(Signature of Bidder)

_____
(Name Printed)

_____

_____
(Title)

Sworn to and subscribed before me this _____ day
of _____, 2020.

NOTARY PUBLIC
(SEAL)

DOUGLAS COUNTY, GEORGIA

CONTRACT PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS, THAT WE

_____ (hereinafter called the Principal) and (hereinafter called the Surety) are held and firmly bound unto Douglas County, Georgia, (hereinafter known as the Owner), for the use of said obligee and all persons doing work or furnishing skill, tools, machinery, supplies, or material under or for the purpose of the Contract hereinafter referred to, in the full and just sum of_____

_____dollars and _____cents ($_____) lawful money of the United States of America, to be paid to said Owner, its successors, and assigns to which payment will and truly be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, the above bound Principal has entered into a Contract or Contracts with the said Owner, bearing the date of _____, 2020
, for furnishing material, labor and equipment for:

Patching and Milling of Various Douglas County Roads Consisting of 10.98 Miles
PROJECT NUMBER: T014D1234

WHEREAS, it was one of the conditions of the Award by said Owner pursuant to which said Contract was entered into, that these presents shall be executed.

NOW THEREFORE, the conditions of this obligation are such that if the above bound Principal shall in all respects fully comply with the terms and conditions of said Contract, and his obligation thereunder, including the Specifications and Proposal, therein referred to and made a part thereof, and such alterations as may be made in said Specifications as therein provided for, and including one-year guarantee period from date of Final Acceptance, and shall indemnify and save harmless the Owner against and from all costs, expenses, damages, injury or loss, to which the said Owner may be subjected by reason of any wrongdoing, misconduct, want of care of skill, negligence or default, including patent infringement, on part of said Principal, his agents or employees, in the execution or performance of said Contract, and shall promptly pay all just claims for damages or injury to property and for all Work done, or skills, tools and machinery, supplies, labor, and materials furnished and debts incurred by said Principal in or about the construction or improvement contracted for this obligation to be void; otherwise, in full force and effect.

And the said Surety to this Bond, for value received, hereby stipulates and agrees that no change, extensions of time, alterations, or additions to the terms of the Contract or to the Work to be performed thereunder or the Specifications accompanying same shall in any wise affect its obligation on this Bond, and it does hereby waive notice of any such change, extension of time, alterations, or additions to the terms of the Contract or to the Work or to the Specifications.

CONTRACT PERFORMANCE BOND

This Bond shall be for the use of all persons doing work or furnishing skill, tools, machinery, or materials under or for the purpose of this Contract, in accordance with the provisions of the Official Code of the State of Georgia, as amended, and is intended to be and shall be construed to be a Bond in compliance with the requirements thereof.

The life of this Bond extends through the Life of the Contract, including the sixty-day maintenance period, and until one year after the Final Acceptance of the Work by the Owner.

IN TESTIMONY THEREOF, the Principal and Surety have caused these presents to be duly signed and sealed in quadruplicate, this _____ day of _____, 2020

CONTRACTOR

(Company Name)

Attest:_____ **By:**_____**(SEAL)**

Title:_____ **Title:**_____

SURETY

(Company Name)

Attest:_____ **By:**_____**(SEAL)**

Title: _____ **Title:**_____

_____
(Local Agent's Signature)

_____
(Name Printed or Typed)

_____
(Company Name)

_____
(Address)

_____
(Telephone No.)

Executed in Quadruplicate

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS, THAT WE

_____ as Principal, and as Surety, are held and firmly bound unto DOUGLAS County, in the full sum of **(110% of the Total Contract Price)**_____ _____dollars and _____cents ($_____), for the use and protection of said DOUGLAS County, Georgia and all subcontractors and all persons supplying labor, materials, and machinery, and equipment for the performance of the Work provided for in the Contract hereinafter referred to, for the payment of which well and truly to be made we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally by these presents.

WHEREAS, the above bound Principal has entered into a Contract or Contracts with DOUGLAS County, Georgia, dated the _____ day of _____, 2019, for furnishing material, labor and equipment for:

Patching and Milling of Various Douglas County Roads Consisting of 10.98 Miles
PROJECT NUMBER: T014D1234

WHEREAS, it was one of the conditions of the Award by DOUGLAS County pursuant to which said Contract was entered into, that these presents shall be executed.

NOW, THEREFORE, the conditions of this obligation are such that if the above bound Principal shall promptly pay all subcontractors and all other persons supplying labor, materials, machinery, and equipment furnished for the performance of the Work provided for by said Contract, and such alterations or additions as may be made therein or in the Plans and Specifications, then this Bond to be void; otherwise, in full force and effect, and

The Surety to this Bond, for value received, agrees that no change, extensions of time, alterations or additions to the terms of the Contract or the Work to be performed thereunder of the Specifications accompanying the same shall in any wise affect its obligation on this Bond, and alterations or additions to the terms of the Contract or the Work or to the Specifications. It is agreed that this Bond is executed pursuant to and in accordance with the provisions of the Official Code of the State of Georgia, as amended, and is intended to be and shall be construed to be a Bond in compliance with the requirements thereof.

PAYMENT BOND

IN WITNESS WHEREOF, the Principal and Surety have caused these presents to be duly signed and sealed in quadruplicate, this _____ day of _____, 2020

CONTRACTOR

(Company Name)

Attest:_____ **By:**_____**(SEAL)**

Title:_____ **Title:**_____

SURETY

(Company Name)

Attest:_____ **By:**_____**(SEAL)**

Title: _____ **Title:**_____

_____
(Local Agent's Signature)

_____
(Name Printed or Typed)

_____
(Company Name)

_____
(Address)

_____
(Telephone No.)

Executed in Quadruplicate

AGREEMENT

THIS AGREEMENT made and entered into this _____ day of _____, 2020 by and between DOUGLAS County, Georgia, (Party of the First Part, hereinafter called the County) and _____, (Party of the Second Part, hereinafter called the Contractor).

WITNESSETH: That the said Contractor has agreed, and by these presents does agree with the said County, for and in consideration of _____ _____dollars and_____cents ($_____) and other good and valuable consideration, and under the penalty expressed in Bonds hereto attached, to furnish all equipment, tools, materials, skill, and labor of every description necessary to carry out and complete in good, firm, and substantial and workmanlike manner, the Work specified, in strict conformity with the Drawings and the Specifications hereinafter set forth, which Drawings and Specifications together with the base bid Proposal made by the Contractor, General Conditions, Special Provisions, Detailed Specifications, and this Agreement, shall all form essential parts of this Contract. The Work covered by this Contract includes all Work indicated on Plans and Specifications and listed in the Proposal entitled:

Patching and Milling of Various Douglas County Roads Consisting of 10.98 Miles
PROJECT NUMBER: T014D1234

The Contractor shall commence the Work with adequate forces and equipment within ten (10) days from receipt of Notice to Proceed from the County and shall complete the Work on or before **120 (ONE HUNDRED TWENTY) CALENDAR DAYS FROM NOTICE TO PROCEED DATE.**

Liquidated Damages for this project shall be Three hundred ninety one _____dollars and Zero cents ($____391.00___), per calendar day past this date, in accordance with Section 108.08, 2013 Edition of the Georgia Department of Transportation Standard Specifications Construction of Transportation Systems, Special Provisions, and all current Supplemental Specifications.

As full compensation for the faithful performance of this Contract, the County shall pay the Contractor in accordance with the General Conditions and the prices stipulated in the Bid hereto attached.

It is further mutually agreed between the parties hereto that if, at any time after the execution of this Agreement and the Surety Bonds hereto attached for its faithful performance, the County shall deem the Surety or Sureties upon such Bonds to be unsatisfactory, of, if, for any reason, such Bonds cease to be adequate to cover the performance of the Work, the Contractor shall, at his expense, within five (5) days after receipt of Notice from the County so to do, furnish an additional Bond or Bonds in such form and amount, and with such Surety or Sureties as shall be satisfactory to the County. In such event no further payment to the Contractor shall be deemed to be due under this Agreement until such new or additional security for the faithful performance of the Work shall be furnished in manner and form satisfactory to the County.

AGREEMENT

The Contractor hereby assumes the entire responsibility and liability for any and all injury to, or death of any and all persons, including the Contractor's agents, servants, and employees, and in addition thereto, for any and all damages to property caused by or resulting from or arising out of any act or omission in connection with this Contract or the prosecution of work hereunder, whether caused by the Contractor or the Contractor's agents, servants, or employees, or by any of the Contractor's subcontractors or suppliers, or by the County, and the Contractor shall indemnify and hold harmless the County against any and all loss and/or expense which they or either of them may suffer or pay as a result of claims or suits due to, because of, or arising out of any and all such injuries, deaths and/or damage, irrespective of the County (except that the County shall be indemnified for their own sole negligence). The Contractor, if requested, shall assume and defend at the Contractor's own expense, any suit, action or other legal proceedings arising there from, and the Contractor hereby agrees to satisfy, pay, and cause to be discharged or record any judgment which may be rendered against the County arising there from.

In the event of any such loss, expense, damage, or injury, or if any claim or demand for damages as heretofore set forth is made against the County, the County may withhold from any payment due or thereafter to become due to the Contractor under the terms of this Contract, an amount sufficient in its judgment to protect and indemnify the County from any and all claims, expense, loss, damages, or injury; and the County in its discretion, may require the Contractor to furnish a Surety Bond satisfactory to the County providing for such protection and indemnity, which Bond shall be furnished by the Contractor within five (5) days after written demand has been made therefore. The expense of said Bond shall be borne by the Contractor.

The Contractor, at all times that this Contract is in force, agrees to provide, as a minimum, insurance coverage in accordance with the attached Insurance Requirements. The County shall be named on the Certificate of Insurance as Additional Insured's and endorsed on the Policies for Comprehensive General Liability, Automobile Liability and Umbrella Liability Insurance maintained pursuant to this Contract in connection with liability of the County arising out of Contractor's operations. Copies of the endorsements shall be furnished to the County prior to the execution of the Contract. Such insurance is primary insurance and shall contain a Severability of Interest Clause as respects each insured. Such policies shall be non-cancellable except on thirty (30) days written notice to the County. Any separate insurance maintained in force by the Additional Insured's named above shall not contribute to the insurance extended by Contractor's insurer(s) under this Additional Insured provision.

AGREEMENT

The Contract executed in quadruplicate, constitutes the full agreement between the parties, and the Contractor shall not sublet, assign, transfer, pledge, convey, sell or otherwise dispose of the whole or any part of this Contract or his right, title, or interest therein to any person, firm or corporation without the previous consent of the County in writing.

IN WITNESS WHEREOF, The Parties hereto, acting through their duly authorized agents, have signed and sealed this Agreement.

EXECUTED this _____ day of _____, 2020.

DOUGLAS COUNTY, GEORGIA

Attest:_____ By:_____**(SEAL)**
County Clerk — Chairman
DOUGLAS COUNTY — DOUGLAS COUNTY BOARD OF COMMISSIONERS

CONTRACTOR

Attest:_____ By:_____**(SEAL)**

Title:_____ Title: _____

Approved as to Form:

By:_____
Attorney
DOUGLAS COUNTY, GEORGIA

INSURANCE REQUIREMENTS

Prior to execution of the Contract, and at all times that the Contract is in force, the Contractor shall obtain, maintain and furnish the County Certificates of Insurance from licensed companies doing business in the State of Georgia and an A.M. Best Rating A-6 or higher and acceptable to the County covering:

1. Statutory Workers' Compensation Insurance
   (a) Employers Liability
   Bodily Injury by Accident - $500,000 Each Accident
   Bodily Injury by Disease - $500,000 Policy Limit
   Bodily Injury by Disease - $500,000 Each Employee

2. Comprehensive General Liability Insurance
   (a) $1,000,000 Limit of Liability per Occurrence for Bodily Injury and Property Damage
   (b) Owner's and Contractor's Protective
   (c) Blanket Contractual Liability
   (d) Blanket "X", "C" and "U"
   (e) Products/Completed Operations Insurance
   (f) Broad Form Property Damage
   (g) Personal Injury Coverage

3. Automobile Liability
   (a) $1,000,000 Limit of Liability per Occurrence for Bodily Injury and Property Damage
   (b) Comprehensive Form covering All Owned, Non-owned and Hired Vehicles

4. Umbrella Liability Insurance
   (a) $4,000,000 Limit of Liability
   (b) Coverage at least as Broad as Primary Coverage as outlined under Items 1, 2 and 3 above

7. Douglas County Board of Commissioners (DCBC), its subcontractors and affiliated companies, its officers, directors and employees shall be named on the Certificates of Insurance as Additional Insureds and endorsed onto the policies for Comprehensive General Liability, Automobile Liability and Umbrella Liability Insurance maintained pursuant to this Contract in connection with liability of Douglas County, arising out of Contractor's operations. Copies of the endorsements shall be furnished the County prior to execution of the Contract. Such insurance is Primary Insurance and shall contain a Severability of Interest clause as respects to each Insured. Such policies shall be non-cancelable except on thirty (30) days written notice to the County. Any separate insurance maintained in force by the Additional Insureds named above shall not contribute to the insurance extended by Contractor's Insurer(s) under this Additional Insured Provision.

<u>Certificate Holder Should Read</u>: Douglas County Board of Commissioners

Patching and Milling of Various Douglas County Roads Consisting of 10.98 Miles
PROJECT NUMBER: T014D1234

Agent:_____ Telephone No. _____

Address: _____

CONTRACTOR AFFIDAVIT AND AGREEMENT

(Contractor, Please Fill This Out For This Contract)

By executing this affidavit, the undersigned contractor verifies its compliance with O.C.G.A. 13-10-91, stating affirmatively that the individual, firm, or corporation which is contracting with Douglas County, Georgia has registered with and is participating in a federal work authorization program* (i.e., any of the electronic verification of work authorization programs operated by the United States Department of Homeland Security or any equivalent federal work authorization program operated by the United States Department of Homeland Security to verify information of newly hired employees, pursuant to the Immigration Reform and Control Act of 1986 (IRCA), P.L. 99-603), in accordance with the applicability provisions and deadlines established in O.C.G.A. § 13-10-91.

The undersigned further agrees that, should it employ or contract with any subcontractor(s) in connection with the physical performance of services pursuant to this contract with Douglas County, Georgia, contractor shall secure from such subcontractor(s) similar verification of compliance with O.C.G.A. § 13-10-91 on the Subcontractor Affidavit provided in Rule 300-10-01-.08 or a substantially similar form. Contractor further agrees to maintain records of such compliance and provide a copy of each such verification to Douglas County, Georgia at the time the subcontractor(s) is retained to perform such service.

_____
EEV/Basic Pilot Program* User Identification Number

_____
(Contractor Name)

_____ _____
BY: Authorized Officer or Agent Date

_____
Title of Authorized Officer or Agent of Contractor

_____
Printed Name of Authorized Officer or Agent

SUBSCRIBED AND SWORN
BEFORE ME ON THIS THE

_____ DAY OF _____, 2020

_____
Notary Public
My Commission Expires:

_____

*As of July 1, 2007, the applicable federal work authorization program is the “EEV/Basic Pilot Program” operated by the U.S. Citizenship and Immigration Services Bureau of the U.S. Department of Homeland Security, in conjunction with the Social Security Administration (SSA)

STATE OF GEORGIA
COUNTY OF DOUGLAS

SUBCONTRACTOR AFFIDAVIT

(Contractor, Please Have Your Subcontractor Fill This Out for This Contract)

By executing this affidavit, the undersigned subcontractor verifies its compliance with O.C.G.A. § 13-10-91, stating affirmatively that the individual, firm or corporation which is engaged in the physical performance of services under a contract with (name of contractor) on behalf of Douglas County, Georgia has registered with and is participating in a federal work authorization program* (i.e., any of the electronic verification of work authorization programs operated by the United States Department of Homeland Security or any equivalent federal work authorization program operated by the United States of Homeland Security to verify information of newly hired employees, pursuant to the Immigration Reform and Control Act of 1986 (IRCA), P.L. 99-603), in accordance with the applicability provisions and deadlines established in O.C.G.A. § 13-10-91.

_____
EEV/Basic Pilot Program* User Identification Number

_____
(Subcontractor Name)

_____ _____
BY: Authorized Officer or Agent Date

_____
Title of Authorized Officer or Agent of Subcontractor

_____
Printed Name of Authorized Officer or Agent

SUBSCRIBED AND SWORN
BEFORE ME ON THIS THE

_____ DAY OF _____, 2020

_____
Notary Public
My Commission Expires:

_____

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STATE OF GEORGIA
COUNTY OF DOUGLAS

SUBCONTRACTOR AFFIDAVIT

(Contractor, Please Have Your Subcontractor Fill This Out for This Contract)

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_____
EEV/Basic Pilot Program* User Identification Number

_____
(Subcontractor Name)

_____ _____
BY: Authorized Officer or Agent Date

_____
Title of Authorized Officer or Agent of Subcontractor

_____
Printed Name of Authorized Officer or Agent

SUBSCRIBED AND SWORN
BEFORE ME ON THIS THE

_____ DAY OF _____, 2020

_____
Notary Public
My Commission Expires:

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STATE OF GEORGIA
COUNTY OF DOUGLAS

SUBCONTRACTOR AFFIDAVIT

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_____
EEV/Basic Pilot Program* User Identification Number

_____
(Subcontractor Name)

_____ _____
BY: Authorized Officer or Agent Date

_____
Title of Authorized Officer or Agent of Subcontractor

_____
Printed Name of Authorized Officer or Agent

SUBSCRIBED AND SWORN
BEFORE ME ON THIS THE

_____ DAY OF _____, 2020

_____
Notary Public
My Commission Expires:

_____

*As of July 1, 2007 O.C.G.A. § 13-10-91, the applicable federal work authorization program is the “EEV/Basic Pilot Program” operated by the U.S. Citizenship and Immigration Services Bureau of the U.S. Department of Homeland Security, in conjunction with the Social Security Administration (SSA).

STATE OF GEORGIA
COUNTY OF DOUGLAS

SUBCONTRACTOR AFFIDAVIT

(Contractor, Please Have Your Subcontractor Fill This Out For This Contract)

By executing this affidavit, the undersigned subcontractor verifies its compliance with O.C.G.A. § 13-10-91, stating affirmatively that the individual, firm or corporation which is engaged in the physical performance of services under a contract with (name of contractor) on behalf of Douglas County, Georgia has registered with and is participating in a federal work authorization program* (i.e., any of the electronic verification of work authorization programs operated by the United States Department of Homeland Security or any equivalent federal work authorization program operated by the United States of Homeland Security to verify information of newly hired employees, pursuant to the Immigration Reform and Control Act of 1986 (IRCA), P.L. 99-603), in accordance with the applicability provisions and deadlines established in O.C.G.A. § 13-10-91.

_____
EEV/Basic Pilot Program* User Identification Number

_____
(Subcontractor Name)

_____ _____
BY: Authorized Officer or Agent Date

_____
Title of Authorized Officer or Agent of Subcontractor

_____
Printed Name of Authorized Officer or Agent

SUBSCRIBED AND SWORN
BEFORE ME ON THIS THE

_____ DAY OF _____, 2020

_____
Notary Public
My Commission Expires:

_____

*As of July 1, 2007 O.C.G.A. § 13-10-91, the applicable federal work authorization program is the “EEV/Basic Pilot Program” operated by the U.S. Citizenship and Immigration Services Bureau of the U.S. Department of Homeland Security, in conjunction with the Social Security Administration (SSA).

STATE OF GEORGIA
COUNTY OF DOUGLAS

SUBCONTRACTOR AFFIDAVIT

(Contractor, Please Have Your Subcontractor Fill This Out For This Contract)

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_____
EEV/Basic Pilot Program* User Identification Number

_____
(Subcontractor Name)

_____ _____
BY: Authorized Officer or Agent Date

_____
Title of Authorized Officer or Agent of Subcontractor

_____
Printed Name of Authorized Officer or Agent

SUBSCRIBED AND SWORN
BEFORE ME ON THIS THE

_____ DAY OF _____, 2020

_____
Notary Public
My Commission Expires:

_____

*As of July 1, 2007 O.C.G.A. § 13-10-91, the applicable federal work authorization program is the “EEV/Basic Pilot Program” operated by the U.S. Citizenship and Immigration Services Bureau of the U.S. Department of Homeland Security, in conjunction with the Social Security Administration (SSA).

Disadvantaged Business Enterprise (DBE)

The Disadvantaged Business Enterprise Program (DBE) ensures that contracts are made available to small business owned and controlled by socially economically disadvantaged individuals. The Douglas County Board of Commissioners has adopted the regulation governing DBEs subject to the requirements of Title 49, Code of Federal Regulations, Part 26. The national goal for participation of Disadvantaged Business Enterprises (DBE) is 10%. Douglas County's overall goal for DBE participation is fifteen (15) percent for all awards valued at $250,001.00 or greater on the following: all construction projects, capital projects, DOT projects, property maintenance contracts, and all other bids where the Director of Purchasing deems same applicable. For awards valued $50,000.00 up to $250,000.00, vendors are required to use "Best Efforts" to meet the fifteen (15) percent DBE goal.

The contractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of this contract. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as Douglas County deems appropriate. Each subcontract the contractor signs with a subcontractor must include the assurance in this paragraph (see 49 CFR 26.13(b)).

Bidders are required to document sufficient DBE participation to meet these goals or, alternatively, document adequate good faith efforts to do so, as provided for in 49 CFR 26.53. Award of this contract is conditioned on submission of the following information to be submitted concurrent with and accompanying sealed bid the following:

1. The names and addresses of DBE firms that will participate in this contract;
2. A description of the work each DBE will perform;
3. The dollar amount of the participation of each DBE firm participating;
4. Written documentation of the bidder commitment to use a DBE subcontractor whose participation it submits to meet the contract goal;
5. Written confirmation from the DBE that it is participating in the contract as provided in the prime contractor's commitment; and
6. If the contract goal is not met, evidence of good faith efforts to do so.

Bidders must present the information required above as a matter of responsiveness with initial proposals (see 49 CFR 26.53(3)).

The contractor is required to pay its subcontractors performing work related to this contract for satisfactory performance of that work no later than 30 days after the contractor's receipt of payment for that work from the Douglas County.

In addition, the Contractor is required to return any retainage payments to those subcontractors within 30 days after the subcontractor's work related to this contract is satisfactorily completed.

The contractor must promptly notify Douglas County whenever a DBE subcontractor performing work related to this contract is terminated or fails to complete its work, and must make good faith efforts to engage another DBE subcontractor to perform at least the same amount of work. The contractor may not terminate any DBE subcontractor and perform that work through its own forces or those of an affiliate without prior written consent of Douglas County.

Disadvantaged Business Enterprise (DBE)

Subcontractor Proposal Form

This Form to be completed by DBE Firms Committed to work on the Project

This form is intended to capture the DBE subcontractor's description of work to be performed and the price of the work submitted to the prime contractor. Prime contractor should have its DBE subcontractors complete this form and include all completed forms with the DBE submission packet when due as per the solicitation.

DBE Subcontractor Name		Project Name	
Bid/ Proposal No.	Point of Contact	DBE Certification Number:	
		Current DBE Certification Expiration Date:	
Address			
Telephone No.		Email Address	
Prime Contractor Name			

Work Category (i.e., plumbing, electrical, etc.)	**Description of Work Submitted to the Prime Contractor Involving Construction, Services, Equipment, or Supplies**	**Will any of this work go to lower tier subs?**	**Price of Work Submitted to the Prime Contractor**

I certify that the forgoing statements are true and correct.

Subcontractor Signature	**Print Name**
Title	**Date**

This Form is to be completed by the Prime Bidder

DBE PARTICIPATION PLAN

Bidder:		Project:	
Contact:		Date:	
Phone:		DBE Goal %	
Email:		DBE Goal $$	

DBEs COMMITTED TO PROJECT WORK

(DBEs committed to project work must complete and submit the DBE Proposal Form)

DBE FIRM NAME	Work to be Performed	Commitment Amount
	Total DBE Commitment Amount (Dollars)	
	Total DBE Commitment Amount (Percentage of Contract amount)	

BIDDER'S SIGNATURE:

This section must be signed by a Principal or an individual with the authority to bind the bidder. By signing this form, as an authorized representative of the Bidder, you declare under penalty of perjury any other applicable state or federal laws that the statements made in this document are true and complete to the best of your knowledge. It is your responsibility to ensure that the selected DBEs are certified for the work to be performed and that the DBE actually perform the work.

Name: _____

Title: _____

Signature: _____

Date: _____

DBE GOOD FAITH EFFORT DOCUMENTATION

In accordance with 49 CFR 26.53, a contract must be awarded to bidders/offerors that meet the goal or make adequate good faith efforts (GFE) to meet the goal. A determination of GFE must be documented. If you fail to meet the DBE Participation Goal stated in the Bid Solicitation, you must complete this form. Further, documentation of GFE must include copies of each DBE **AND** non-DBE subcontractor quotes submitted to the bidder when a non-DBE subcontractor was selected over a DBE for work on the contract. This information is subject to verification.

WORK TYPE	**DESCRIPTION OF WORK, SERVICE OR MATERIAL**		**DBE FIRM NAME**	
Contact Name	Contact Date	List Contact Method (phone no, email, etc.)	Contact Results	Bid Amount
Comments:				

WORK TYPE	**DESCRIPTION OF WORK, SERVICE OR MATERIAL**		**DBE FIRM NAME**	
Contact Name	Contact Date	List Contact Method (phone no, email, etc.)	Contact Results	Bid Amount
Comments:				

WORK TYPE	**DESCRIPTION OF WORK, SERVICE OR MATERIAL**		**DBE FIRM NAME**	
Contact Name	Contact Date	List Contact Method (phone no, email, etc.)	Contact Results	Bid Amount
Comments:				

Business References

Submit reference information for similar projects. This list shall include customers' names, addresses, and a current contact with phone number.

References
Please provide three (3) customer references

1. Contact Name: _____

   Company Name: _____

   Address: _____

   Phone:_____Email Address:_____

2. Contact Name: _____

   Company Name: _____

   Address: _____

   Phone:_____Email Address:_____

3. Contact Name: _____

   Company Name: _____

   Address: _____

   Phone:_____Email Address:_____

SECTION III

GENERAL CONDITIONS

A. DESCRIPTION OF PROJECT
(Summary of Information by Road)

B. MAP SHEETS

SECTION III

GENERAL CONDITIONS

Unless otherwise directed, all work performed under this contract shall be in accordance with the Georgia Department of Transportation Standard Specifications, Construction of Roads and Bridges, 2013 Edition, Current Edition of the GDOT State of Georgia Supplemental Specifications Modifying the 2013 Standard Specifications Construction of Transportation Systems, Georgia Department of Transportation Standard Details and Drawings, Current Supplemental Specifications and Special Provisions modifying them (referred to in SECTION IV of this Document).

APPENDIX A

DESCRIPTION OF PROJECT

**(SUMMARY OF INFORMATION BY ROAD
WILL BE PROVIDED PRIOR TO THE MANDATORY PRE-BID MEETING
ON TUESDAY, APRIL 21, 2020 AT 2:00 p.m., ET)**

**PATCHING AND MILLING
OF VARIOUS COUNTY ROADS CONSISTING OF 10.98 MILES**

PROJECT NUMBER: T014D1234

APPENDIX B

MAP (LOCATION) SHEETS

(WILL BE PROVIDED PRIOR TO THE MANDATORY PRE-BID MEETING ON TUESDAY, APRIL 21, 2020 AT 2:00 p.m., ET)

PATCHING AND MILLING
OF VARIOUS COUNTY ROADS CONSISTING OF 10.98 MILES

SECTION IV

SPECIAL AND SUPPLEMENTAL PROVISIONS

TABLE OF CONTENTS

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

First Use 200 1 Specifications: November 0 I, 2002
Revised: November 19, 2006

SPECIAL PROVISION

PROMPT PAYMENT:

Prime Contractors, who sublet a portion of their work, shall pay their subcontractors for satisfactory performance of their contracts no later than **10-calendar days** from receipt of each payment made to them.

Any delay or postponement of payment among the parties may take place only for good cause with prior written approval from the Department.

If the contractor is found to be in noncompliance with these provisions, it shall constitute a breach of contract and further payments for any work performed may be withheld until corrective action is taken. If corrective action is not taken, it may result in termination of the contract.

All subcontract agreements shall contain this requirement.

DEPARTMENT OF TRANSPORTATION

STATE OF GEORGIA

SPECIAL PROVISION

SEQUENCE OF OPERATION

(Should conflict arise between instructions in this "Sequence of Operations and the Department of Transportation, State of Georgia Special Provision Section 150, Section 150 will have precedence)

I. GENERAL

A. The purpose of this Special Provision is to provide a Sequence of Operation for the construction of this project. This Special Provision also provides special procedures that will permit vehicular and pedestrian traffic to pass through and around the project area safely with a minimum of inconvenience.

B. This Special Provision sets forth specific procedures and does not relieve the Contractor of any responsibilities required by the Specification Section 150, other Specifications, Plans, or the MUTCD.

C. Planned off-site detours are not provided for this project.

D. Where traffic is permitted through the work area under stage construction, the Contractor may choose to construct, at no additional expense to the Department temporary on-site bypasses or detours in order to expedite the work. Plans for such temporary bypasses or detours shall be submitted to the engineer for approval 30 calendar days prior to proposed construction. Such bypasses or detours shall be removed promptly, when in the opinion of the engineer, they are no longer necessary for the satisfactory progress of the work.

E. The Contractor's trucks and other vehicles shall travel in the direction of normal roadway traffic unless separated from the through traffic by positive construction barriers approved by the engineer. On interstates or other divided highways, the contractors' vehicles shall not cross the medians and shall enter and exit at the existing interchanges.

F. When construction operations necessitate an existing traffic signal to be out of service, the contractor shall coordinate with the appropriate owner(s) of the signal and furnish off-duty police officers to regulate and maintain traffic control at the site.

G. There shall be no reduction in the total number of available traffic lanes except as specifically allowed by the contract and as approved by the engineer.

H. The Contractor shall schedule and arrange the work to ensure the least inconvenience and the utmost in safety to the traveling public and to the Contractors' and the Department's forces.

I. All outfall ditches, special ditches, critical storm drain structures, erosion control structures, retention basins, etc., shall be constructed, where possible, prior to the beginning of grading operations so that the best possible drainage and erosion control

will be in effect during the grading operations, thereby keeping the roadway areas as dry as possible.

J. In the prosecution of the work, if it becomes necessary to remove any existing signs, markers, guardrail, etc., not covered by a specific pay item, they shall be removed, stored, and reinstalled, when directed by the Engineer, to line and grade, and in the same condition as when removed.

K. The Sequence of Operations provided for in this contract, in conjunction with any staging details, which may be shown in the plans, is a suggested Sequence for performing the work. It is intended as a general staging plan for the orderly execution of the work while minimizing the impact on the mainline, cross-streets, and side streets. The Contractor shall develop detailed staging and traffic control plans for performing specific portions of the work, including but not limited to, traffic shifts, detours, bridge widening, paces, lane closures, or other activities that disrupt traffic flow. These plans shall be submitted for approval at least two weeks prior to the schedule date of the activity.

L. As an alternative to the Sequence of Operations described herein, the Contractor may submit a Sequence of Operation for approval. A twenty-calendar day lead time for the Department's review shall be given this submission so that a decision on its acceptability can be made and presented at the Pre-construction Conference. Insufficient lead-time or no submission by the Contractor shall be construed as acceptance of the procedures outlined herein and the willingness to execute same.

The Department will not pay, or in any way reimburse the Contractor for claims arising from the Contractor's inability to perform the work in accordance with the Sequence of Operations provided in this Special Provision or the plans or from an approved contractor alternate.

II. ORDER OF WORK

A. NON-DIVIDED HIGHWAYS

1. The Contractor shall not simultaneously perform work on opposite sides of the roadway when the work is within 12 linear feet of the traveled way, unless such areas are separated by at least one mile of distance in rural areas or at least 500 linear feet of distance in urban areas.

2. Pilot vehicles will be required during resurfacing lane construction, minor widening projects, unless the Engineer determines they are not necessary.

3. On two-lane projects where full width sections of the existing sub-grade, base or surfacing is to be removed, and new base, sub-grade, or surfacing is to be constructed, the Contractor shall maintain one-lane traffic through the construction areas by removing and replacing the undesirable material for half the width of the existing roadway at a time. Replacement shall

be made such that paving is completed to the level of the existing pavement in the adjacent lane by the end of the workday.

B. EXCAVATION

1. All areas within the limits of the project, which are determined by the Engineer to be damaged, due either directly or indirectly to the process of construction, shall be

   cleaned up, redressed, and grassed. All surplus materials shall be removed and disposed of as required.

2. When trenching is required for minor roadway or shoulder widening, all operations at one site shall be completed to the level of the existing pavement in the same workday.

III. ENFORCEMENT

In the event that compliance with the objectives stated herein, or contained in the Contractor's approved alternate Sequence of Operation is not achieved the Engineer may close down all operations being performed except Traffic Control and Erosion Control. The Engineer may also withhold any payments due until all the requirements herein have been met.

IV. MEASUREMENT AND PAYMENT

There will be no special measurement or payment for the work described herein, and all cost, direct or indirect, of complying with the requirements of this Special Provision shall be included in the overall bid submitted, as shown in Section 150, Traffic Control.

Date: June 14, 2001
First Use Date 2001 Specifications:
November 1, 2002

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

SPECIAL PROVISION

CONSTRUCTION DETAILS FOR RESURFACING AND WIDENING PROJECTS

A. General

Perform patching, according to Plan details and the applicable portions of Section 400.

The provisions of Sections 104 and 105 apply when patching operations necessitate traffic control in construction areas.

B. Spot Patching and Replacement of Existing Base

1. Complete all removal and patching operations at any one site within the same day.
2. Hand spreading and compaction using mechanical tampers will be required in areas inaccessible to conventional equipment.
3. Patching is paid for according to the Plans and Proposal. Payment includes all removal and replacement work necessary to complete the Item.

C. Shoulders (Not required for this project)

No shoulder construction will be required on Projects that have no widening or new shoulder paving, except where additional shoulder work is shown on the Plans.

For Projects involving pavement widening or paved shoulder construction, the cost of trenching and shoulder construction or reconstruction of the existing shoulders is included in the overall bid submitted.

Ensure trenching and shoulder construction conforms to the following requirements:

1. Trenching consists of the removal, satisfactory disposal and replacement of existing shoulder materials. Ensure trench dimensions are according with Plan details.

   Blade materials excavated from the trench for widening to a smooth and uniform section on shoulders and slopes. Dispose of any excess and large, undesirable material as directed by the Engineer. Compact sub-grade under widening sections to 95% of the theoretical density as determined by GDT 7, GDT 67, or GDT 24.
2. Where trenching is necessary for widening or paved shoulder construction, complete all operations at any one site to the level of the existing pavement in the same working day.
3. Perform widening operations on only one side of the existing traveled roadway at a time within any one-half-mile (800 m) stretch.

D. Other Work

The Department reserves the right to perform, with its own forces, any maintenance or construction work as may be necessary on or near The Work covered by the Contract.

E. Enforcement

If the requirements of this Specification are not achieved, the Engineer will cease all Work being performed and may withhold any monies due or which may become due until the above requirements have been met.

First Use Date:-January I, 2007
Revised: March 26, 2008
March 5, 2009
September 30, 2009

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

SPECIAL PROVISION

Utility Conflicts

Utility companies having known facilities that conflict with the construction of this project will be directed by the Department to adjust or relocate their facilities and will be notified of the contract award.

Conform to all the requirements of the Specifications as they relate to cooperation with utility owners and the protection of utility installations that exist on the project. Refer to the **requirements** of Section 107, Legal Regulations and Responsibility to the Public, with particular attention to Subsection 107.21.

Coordinate The Work with any work to be performed by others in any right of way clearance and arrange a schedule of operations that will allow for completion of the Project within the specified contract time. Where stage construction is required, notify the utility owner when each stage of work is completed and the site is available for utility work to proceed.

Information concerning utility facilities known to exist within the project limits, including the list of owners, is available for reference.

Under Georgia Code Section 32-6-171, utilities are required to remove or relocate their facilities. The Department is required to give the utility at least 60 days written notice directing the removal, relocation, or adjustment and the utility owner is required to begin work within the time specified in the utility's work plan or revised work plan.

Upon request, copies of all agreements with utility companies having facilities on this project will be made available for examination by the Contractor at the Department's District Office. Utility Adjustment Schedules, when submitted to the Department by the utilities, will be made available to the Contractor after the Notice to Contractors has been posted by the Office of Construction Bidding Administration. The Utility Adjustment Schedules are available on the Office of Construction Bidding Administration's web site. Utility Adjustment Schedules may be included with the Utility Special Provision in the Contract Proposal on select projects. The Contractor is responsible for considering in its bid all existing and proposed utility locations and the removals, relocations and adjustments specified in the Utility's Work Plan.

For this Project, Utility Owners that are required to remove, relocate, or adjust their facility to accommodate the construction of this Project may be liable to the Contractor

for damages or delay costs resulting from the Utility Owner's failure to clear conflicts within the time specified in the approved Utility Work Plan. If the Utility Owner is unable to submit and obtain Department approval of a revised Work Plan or fails to complete the removal, relocation, or adjustment of its facilities in accordance with the approved Work Plan, the Utility Owner may be liable to the Department. or the Contractor, for damages Or delay costs.

In accordance with Subsection 105.06 of the Specifications, the Department is not liable for payment of any claims due to utility delays, inconvenience or damage sustained by 'the Contractor due to interference of any utilities or appurtenances, or the operation or moving them. .

Whenever the Contractor considers that it is or will be entitled to damages or delay costs from the Utility Owner in accordance with O.C.G.A. 32-6-171, the Contractor shall provide written notice to the Utility Owner and the Department within ten (10) days from the time of the dispute or potential dispute is identified. The Contractor shall follow the Procedures for Utility Damages or Delay Costs outlined **in** the latest edition of The Utility Accommodation Policy and Standards Manual. Failure to follow the above will result in waiver of the Contractor's claim against the Utility Owner for damages or delay costs.

In accordance with Subsection 107.21 ,G delays by utilities will continue to be considered by the Department in charging Contract Time. For purposes of applying provisions of this paragraph, railroads and the Metropolitan Atlanta Rapid Transit Authority (MARTA) are considered utilities.

SPECIAL PROVISIONS
Modification of Standard Specifications

SECTION 101 - DEFINITIONS AND TERMS:

Delete Section 101 of the 2013 Edition of the State of Georgia Standard Specifications, Construction of Transportation System and add the following:

101.10 Board	THE DOUGLAS COUNTY BOARD OF COMMISSIONERS
101.13 Chief Engineer	DOUGLAS COUNTY DIRECTOR, DEPARTMENT OF TRANSPORTATION ACTING DIRECTLY THROUGH THE DOUGLAS COUNTY BOARD OF COMMISSIONERS
101.14 Commissioner	THE CHAIRMAN OF THE DOUGLAS COUNTY COMMISSIONERS
101.22 Department	THE DOUGLAS COUNTY BOARD OF COMMISSIONERS
101.24 Engineer	Same as 101.13 - Chief Engineer (above)
101.62 State Highway Engineer	Same as 101.13 - Chief Engineer (above)
101.63 State: The State of Georgia	THE DOUGLAS COUNTY BOARD OF COMMISSIONERS
101.81 Treasurer	DOUGLAS COUNTY DIRECTOR OF PURCHASING

SECTION 102 - BIDDING REQUIREMENTS AND CONDITIONS:

Section 102.01 PREQUALIFICATION OF BIDDERS: Delete in its entirety and substitute the following:

"Bids will be considered only from experienced and well equipped Contractors engaged in work of this type and magnitude. Contractors must be presently pre-qualified to do this type of work with the Georgia Department of Transportation and have received a Certificate of Qualification in accordance with the Rules and Regulations approved and adopted by the State Transportation Board." Sub-contractors must be registered with the Georgia Department of Transportation.

Bidders may be required to submit evidence setting forth qualifications, which entitle him to considerations as a responsible Contractor. A list of work of similar character successfully completed within the last two years may be required giving the location, size and listing equipment available for use on this work. Before accepting any bid, the County may require evidence of the Contractor's financial ability to successfully perform the work to be accomplished under the contract."

Section 102.05 EXAMINATION OF PLANS, SPECIFICATIONS, SPECIAL PROVISIONS AND SITE OF THE WORK: Add the following paragraph:

SECTION 102 - BIDDING REQUIREMENTS AND CONDITIONS

"The County will not be responsible for Bidders' errors or misjudgment, nor for any information on local conditions or general laws and regulations." **It is the bidders responsibility to insure that their set of bid documents are complete and correct prior to bid submittal.**

Section 102.06 PREPARATION OF PROPOSAL: Delete Sub-Section 102.06 and Substitute the following:

The Bidder shall submit his Proposal on the form furnished in the bid document package. The blank spaces on the Proposal shall be filled in correctly for each Pay Item (except Alternate Items) and the Bidder shall write in ink the Unit Price or a Lump Sum Price as called for in the Proposal for each Pay Item listed therein. In addition, the Bidder shall also show the products of the respective Unit Prices and quantities and the total amount of the Bid by adding the amounts of all Bid Items. In the event of a discrepancy in any of the figures, the Unit Price will govern and the Bid will be recalculated.

In the case of Alternate Items, Unit Prices shall be entered for only one alternate.

The Non-Collusion Certificate on the County's standard form included in the Proposal shall be executed.

Proposal Forms for bidding this project are required to be purchased from Superior Reprographics, Inc., 591 Thornton Road**,** Lithia Springs, Georgia, 30122. Phone: 770-944-7293, FAX 770-944-8975, or email print@superiorreprographics.com**.**

If the Proposal is made by an individual, its name and post office address shall be shown; if by a partnership, the name and post office address of one member of the partnership shall be shown; if by a corporation, the Proposal shall show the name, title and business address of the officer signing the Proposal. The Bidder's Proposal shall be signed in ink by the individual, by one or more members of a partnership, or by one or more of the officers of a corporation whichever is applicable. In the event of a joint venture, the Proposal shall be signed in ink by each individual involved, by each partnership through one or more of its members, or by each corporation through one or more officers of the corporation, whichever is applicable. Proposals not properly signed may be disqualified and rejected.

Section 102.07 REJECTION OF PROPOSALS: Delete Sub-Section 102.07 paragraph "G" and add the following subparagraphs:

"I. The County reserves the right to reject, for any reason, any and all bids, to waive technicalities, and to make an award as deemed in its best interest. It is understood that all bids are made subject to this Agreement, that the County reserves the right to award the bid to the lowest responsive and responsible Bidder, and in arriving at this decision, full consideration will be given to the reputation of the Bidder, his financial responsibility, and work of this type successfully completed.

"J. The County also reserves the right to reject any and all bids from any person, firm, or corporation who is in arrears in any debt or obligation to Douglas County, Georgia."

Section 102.09 DELIVERY OF PROPOSALS: Delete Subsection 102.09 and Substitute the following:

SECTION 102 - BIDDING REQUIREMENTS AND CONDITIONS

Each Proposal, together with the Proposal Guaranty, shall be submitted in a sealed envelope so marked as to identify its contents without being opened. Proposal forms are not transferable. Proposals will be received until the time and date set in the Notice To Contractors and shall be in the hands of the officials indicated by that time. Proposals received after the advertised cutoff time established for submission of Proposals will be returned unopened to the Bidder.

Section 102.15 ADDENDA AND INTERPRETATION: Add the following as 102.15:

"No interpretation of the meaning of the Contract Documents will be made orally to any Bidder. Any request for such interpretation should be in writing addressed to the Douglas County Purchasing Office (770-920-7247), 3rd Floor Douglas County Courthouse, 8700 Hospital Drive, Douglasville, Georgia 30134. Each such interpretation shall be given in writing, separately numbered and dated, and furnished to each interested Bidder. Any request not received in time to accomplish such interpretation and distribution will not be accepted."

SECTION 103 - AWARD AND EXECUTION OF CONTRACT

Section 103.02 AWARD OF CONTRACT: Delete in its entirety and substitute the following:

"The contract, if awarded, shall be awarded to the lowest responsive, reliable, and responsible bidder. Douglas County reserves the right to exercise exclusive discretion as to the responsibility of any bidder.

The contract shall be executed on the forms attached, will be subject to all requirements of the Contract Document, and shall form a binding Contract between the contracting parties."

The Contract will be awarded by the County, if at all, within 50 calendar days after the opening of the Proposals, unless the successful Bidder agrees in writing to a longer period for the award.

Single as well as multiple Proposals for a project will be publicly opened and read. If only one Proposal is received on a project and the amount of that Proposal is equal to or less than the Department's cost estimate for the project, as certified by the Chief Engineer, that cost estimate will be read. If only one Proposal is received and the amount of that Proposal exceeds the Department's cost estimate for the project, the Department may, at its option, exercise one of the following:

1. Award the Contract as bid.
2. Negotiate a price which is fair and reasonable and award the Contract as negotiated.
3. Reject the Proposal and re-advertise, perform the work itself, or abandon the project.

4. In all cases, the negotiated price shall not be greater than the price bid. Prior to negotiations, the Department will inform the bidder of the Department's estimate for the project. Award to the successful bidder will be made public through the publication of the Award announcement. If the successful bidder fails to execute the Contract and file acceptable Bonds within the period set forth in Subsection 103.07 thereby causing

cancellation of the Award and forfeiture of the Proposal Guaranty, the Department may award the Contract to the next lowest reliable bidder, re-advertise, abandon the project, or perform the work itself.

Section 103.04 RETURN OF PROPOSAL GUARANTY: Delete in its entirety and substitute the following:

All Bid Guaranties may be retained until the Contract and Contract Bond have been signed and approved. Early release of Bid Guaranties will be considered if a request is made in writing.

Section 103.06 EXECUTION AND APPROVAL OF CONTRACT: Delete in its entirety and substitute the following:

The Contract shall be signed by the successful Bidder and returned within 15 calendar days after the date of the letter transmitting the Contract to the Bidder. No Contract shall be considered as effective until it has been fully executed by all of the parties.

Section 103.07 FAILURE TO EXECUTE CONTRACT: Delete in its entirety and substitute the following:

"Failure to execute the Contract, Contract Performance and Payment Bond, or furnish satisfactory proof of carriage of the insurance required within ten days after the date of Notice of Award of the Contract may be just cause for the annulment of the award and for the forfeiture of the proposal guaranty to Douglas County, not as a penalty, but as liquidation damages sustained. At the discretion of the County, the award may then be made to the next lowest responsible Bidder, or the Work may be re-advertised or constructed by County forces. The Contract and Contract bonds shall be executed in quadruplicate."

SECTION 104 - SCOPE OF WORK

Section 104.03.A - AUTHORITY TO MAKE CHANGES: Delete the second paragraph and substitute the following:

Whenever an alteration in character of work involves a substantial change in the nature of the design or in the type of construction or materially increases or decreases the cost of performance, a Supplemental Agreement acceptable to both parties shall be executed before work is started on such alteration, except that in the absence of a Supplemental Agreement acceptable to both parties, the Engineer may direct that the work be done either by Force Account or at existing Contract prices subject to the provisions of Sub-Section 105.13. Any Force Account Agreement must be in writing, specifying the terms of payment, signed by the State Highway Engineer and agreed to in writing by the Contractor.

All work shall be performed as directed and in accordance with the Specifications.

Section 107 – Legal Regulations and Responsibility to the Public

Delete Section 107 and Substitute the following:

107.01 Laws to Be Observed

The Contractor shall keep fully informed of all Federal and State laws, all local laws, ordinances, codes, and regulations and all orders and decrees of bodies or tribunals having any jurisdiction or authority, which in any manner affect those engaged or employed on The Work, or which in any way affect the conduct of The Work. The Contractor shall at all times observe and comply with all such laws, ordinances, codes, regulations, orders, decrees, and permits; and shall protect and indemnify the Department and its representatives against any claim or liability arising from or based on the violation of any such law, ordinance, code, regulation, order, decrees, and permits, whether by himself, his employees, subcontractors, or agents.

107.02 Permits and Licenses

The Contractor shall procure all permits and licenses, pay all charges, taxes, and fees, and give all notices necessary and incidental to the due and lawful prosecution of The Work.

107.03 Patented Devices

If the Contractor employs any design, device, material, or process covered by letters of patent or copyright, he shall provide for such use by suitable legal agreement with the patentee or owner. The Contractor and the Surety shall indemnify and save harmless the Department from any and all claims for infringement by reason of the use of any such patented design, device, material, or process, or any trademark or copyright, and shall indemnify the Department for any costs, expenses, and damages which it may be obliged to pay by reason of any infringement, at any time during the prosecution or after the completion of The Work.

107.04 Restoration of Surfaces Opened By Permit

The right to construct or reconstruct any utility service in the highway or street and to grant permits for the same at any time, is expressly reserved by the Department for the proper authorities of the municipality or county in which The Work is done and the Contractor shall not be entitled to any damages either for the digging up of the street or highway, or for any delay occasioned thereby. Any individual, firm, or corporation wishing to make an opening in the street or highway must secure a permit from the Department. The Contractor shall allow parties bearing such permits, and only those parties, to make openings in the street or highway. When ordered by the Engineer, the Contractor shall make in an acceptable manner all
necessary repairs due to such openings and such necessary work will be paid for as Extra Work, or as provided in the Specifications, and will be subject to the same conditions as original work performed.

107.05 Federal-Aid Provisions

When the United States Government pays all or any part of the cost of a project, the Federal laws and the rules and regulations made pursuant to such laws must be observed by the Contractor, and The Work shall be subject to the inspection of the appropriate Federal agency. Such inspection shall in no sense make the Federal Government a party to this Contract and will in no way interfere with the rights of either party hereunder.

107.06 Sanitary Provisions

The Contractor shall provide and maintain in a neat, sanitary condition such accommodations for the use of his employees as may be necessary to comply with the requirements of the State Department of Health and other authorities having jurisdiction, and shall permit no public nuisance.

107.07 Public Convenience and Safety

The Contractor shall at all times so conduct The Work as to assure the least possible obstruction of traffic. The safety and convenience of the general public and the residents along the highway and the protection of persons and property shall be provided for by the Contractor as specified under Subsection 104.05, Subsection 107.09, Section 150, the Project Plans, and Special Provisions. Traffic whose origin and destination is within the limits of the Project shall be provided ingress and egress at all times unless otherwise specified in the Plans or Special Provisions. The ingress and egress includes entrance and exit via driveways at the various properties, and access to the intersecting roads and streets.

The Contractor shall maintain sufficient personnel and equipment on the project at all times, particularly during inclement weather, to ensure that ingress and egress are provided when and where needed. Two-way traffic shall be maintained at all times unless otherwise specified or approved. The Contractor shall not stop traffic without permission granted by the Engineer. All equipment used on The Work shall come equipped with factory-installed mufflers, or

manufacturer's recommended equivalent, in good condition. These mufflers shall be maintained in good condition throughout the construction period.

107.08 Railroad-Highway Provisions

All work to be performed by the Contractor on a railroad company's right-of-way or property shall be done in a manner satisfactory to the chief engineer of the railroad company, or his authorized representative, and shall be performed at such times and in such manner as not to unnecessarily interfere with the movement of trains or traffic upon the track of the railroad company. The Contractor shall use all reasonable care and precaution in order to avoid accidents, damage, or unnecessary delay or interference with the railroad company's trains or other property, or property of tenants of railroad company. The Contractor shall notify the railroad company and obtain its approval before commencing work on the railroad company's right-of-way or property. The Contractor shall determine what measures are required by the railroad company to protect its operations and right-of-way or property during construction. Such protection may include the use of a flagger or flaggers provided by the railroad company. The Contractor shall be responsible for ensuring that the required protection is provided and shall pay the railroad company directly for any and all such services which may be required to accomplish the construction unless otherwise specified. Any temporary grade crossings or other means needed during construction by the Contractor for transporting materials of any nature and/or equipment across the railroad tracks will be the responsibility of the Contractor to handle directly with the railroad company and bear all costs incidental to such crossings including flagging services provided by the railroad company. A "Special Provisions for the Protection of Railroad Interests" may be included in the proposal to stipulate insurance and other requirements of the railroad company.

107.09 Barricades and Danger, Warning, and Detour Signs

The Contractor shall furnish, install, and maintain all necessary and required barricades, signs, and other traffic control devices in accordance with these Specifications, Project Plans, Special Provisions, and the MUTCD, and take all necessary precautions for the protection of the work and safety of the public. Unless otherwise specified, all traffic control devices furnished by the Contractor shall remain the property of the Contractor.

107.10 Forest Protection

In carrying out work within or adjacent to State or National Forests, or any other forests, parks, or other public or private lands, the Contractor shall obtain necessary permits and comply with all of the regulations of the appropriate authorities having jurisdiction over such forest, park, or lands. The Contractor shall keep the areas in an orderly condition, dispose of all refuse, obtain permits for the construction and maintenance of all construction camps, stores, warehouses, residences, latrines, cesspools, septic tanks, and other structures in accordance with the requirements of the appropriate authority.

The Contractor shall take all reasonable precautions to prevent and suppress forest fires and shall require his employees and subcontractors, both independently and at the request of forest officials, to do all reasonably within their power to prevent and suppress and to assist in preventing and suppressing forest fires; to notify a forest official at the earliest possible moment of the location and extent of any fire seen by them; and to extinguish or aid in extinguishing nearby fires.

107.11 Construction Over or Adjacent to Navigable Waters

A. Navigation to Be Protected

Since navigable waterways are under the jurisdiction of the United States Coast Guard and/or the United States Army Corps of Engineers, all work done in, over, on or adjacent to such waters shall comply with their requirements. Free navigation shall not be impeded, and navigable depths shall be maintained. The Contractor shall comply with permits issued by the United States Coast Guard and/or the United States Army Corps of Engineers, and the Contractor shall obtain and comply with other permits in accordance with the requirements of Subsection 107.02. Special Provisions for environmental protection may be included in the proposal to stipulate environmental commitments and other requirements.

B. Obstructions to be Removed

When the construction has progressed enough to permit removal, all falsework, piling and other obstructions shall be removed to the satisfaction of the Federal agency having jurisdiction. In all cases such clearing must be done thoroughly before The Work will be accepted by the Department.

107.12 Use of Explosives

When the use of explosives is necessary for the prosecution of The Work, the Contractor shall exercise the utmost care not to endanger life or property, and shall obey all State, Federal and other Governmental regulations applying to transportation, storage, use, and control of such explosives.

The Contractor shall be completely responsible for any and all damage resulting from the transportation, storage, use, and control of explosives in the prosecution of The Work by the Contractor, the contractor's agents, or employees; and shall hold the Department harmless from all claims of damages resulting in any manner therefrom. The Contractor shall notify each public utility owner having structures or other installations, above or below ground, near the site of The Work of his intention to use explosives.
Such notice shall be given sufficiently in advance to enable the utility owners to take such steps as they may deem necessary to protect their property from injury. Such notice shall not relieve the Contractor of responsibility for all damages resulting from his blasting operations.

All explosives shall be stored securely in compliance with all laws and ordinances, and all such storage places shall be clearly marked DANGEROUS EXPLOSIVES. Explosives and detonators shall be stored in separate storage facilities in separate areas. Where no laws or ordinances apply, locked storage shall be provided satisfactory to the Engineer, never closer than 1,000 Ft (300 m) from any travel-road, building, or camping area. In all cases where the transport, storage, or use of explosives is undertaken, such activities shall be controlled and directed by fully qualified representatives of the Contractor. Whenever electric detonators are used, all radio transmitters shall be turned off within a radius of 500 Ft (150 m). No blasting supplies shall be transported in vehicles with two-way radio unless the transmitter is turned off, or extra shielding precautions are taken. Appropriate signs shall be placed so as to give ample warning to anyone driving a vehicle equipped with two-way radio. Electrical detonators will not be used within 500 Ft (150 m) of a railroad. Submit a blasting plan to the Engineer a minimum of five working days prior to use of explosives that provides details of the proposed blasting plan, including, but not limited to, the type and amount of explosives, the shot sequence, the description of and distance to the closest inhabitable structure, and other information as requested by the Engineer. Submission of blasting plan does not relieve the contractor of the responsibility for the adequate and safe performance of the blasting.

107.13 Protection and Restoration of Property and Landscape

A. General Provisions

The Contractor shall be responsible for the preservation of all public and private property, crops, fish ponds, trees, monuments, highway signs and markers, fences, grassed and sodded areas, etc. along and adjacent to the highway, and shall use every precaution necessary to prevent damage or injury thereto, unless the removal, alteration, or destruction of such property is provided for under the Contract. The Contractor shall use suitable precaution to prevent damage to all underground structures, whether shown on the Plans or not, and shall protect carefully from disturbance or damage, all land monuments and property marks until the Engineer has witnessed or otherwise referenced their location and shall not move them until directed. The Contractor shall not willfully or maliciously injure or destroy trees or shrubs, and he shall not remove or cut them without proper authority. The Contractor shall be responsible for all sheet piling, shoring, underpinning, etc., as may be required for the protection of abutting property, nearby buildings, streets, and the like. The Contractor shall be responsible for all damage or injury to property of any character, during the prosecution of The Work, resulting from any act, omission, neglect, or misconduct in his manner or method of executing The Work, or at any time due to defective work or materials, and said responsibility will not be released until the Project shall have been completed and accepted. When the Contractor's excavating operations encounter remains of prehistoric people's dwelling sites or artifacts of historical or archeological significance, the operations shall be temporarily discontinued. The Engineer will contact archeological authorities and the Office of Environmental Services to determine the disposition thereof. When directed by the Engineer, the Contractor shall excavate the site in such a manner as to preserve the artifacts encountered and shall remove them for delivery to the custody of the proper authorities. Such excavation will be considered and paid for as Extra Work. When the Contractor's normal operations are delayed by such stoppage or extra work, an appropriate time extension will be granted.
The Contractor shall plan, coordinate, and prosecute the work so that disruption to personal property and business is held to a practical minimum. No resident or business shall be denied vehicular access to their property for any length of time other than as determined by the Engineer is absolutely necessary. Where two or more existing driveways are present for a business, only one existing driveway shall be closed at any time. All construction areas abutting lawns and yards of residential or commercial property shall be restored promptly. Backfilling of each drainage structure or section

of curb and gutter, sidewalk, or driveway shall be accomplished as soon as adequate strength is obtained. Finishing, dressing, and grassing shall be accomplished immediately thereafter as a continuous operation within each area being constructed with emphasis placed on completing each individual yard or business frontage. Care shall be taken to provide positive drainage to avoid ponding or concentration of runoff. Handwork, including raking and smoothing, shall be required to ensure that roots, sticks, rocks, and other debris are removed in order to provide a neat and pleasing appearance. Grassing, when in season, shall immediately follow in order to establish permanent cover at the earliest date. If grassing is not in season, proper erosion control shall be installed and maintained. The work described above shall be in addition to that required by Subsection 104.07, “Final Cleaning Up” and Subsection 105.16, “Final Inspection and Acceptance”.

B. Erosion and Siltation Control
The Contractor shall take all necessary measures throughout the life of the Project to control erosion and silting of rivers, streams, and impoundments (lakes, reservoirs, etc.). Construction of drainage facilities as well as performance of other Contract work which will contribute to the control of erosion and siltation shall be carried out in conjunction with clearing and grubbing, and earthwork operations as stipulated in Section 161.

C. Pollution
The Contractor shall exercise every reasonable precaution throughout the life of the Contract to prevent pollution of rivers, streams or impoundments. Pollutants such as chemicals, fuels, lubricants, bitumens, raw sewage and other harmful waste shall not be discharged into or alongside rivers, streams, and impoundments, or into natural or manmade channels leading thereto. The Contractor shall also comply with the applicable regulations of other State and Federal departments and to all governmental statues relating to the prevention and abatement of pollution.

D. Insect Control Regulations
The Plant Pest Control Division of the U.S. Department of Agriculture and the Georgia State Department of Agriculture restrict the movement of certain items from areas infested with Japanese Beetles or Imported Fire Ants so as to prevent the spread of these pests to non-infested areas. Where insect infested areas are shown on the Plans, Contractors will control their operations in such a manner as to comply fully with the requirements of Section 155.

E. Reclamation of Material Pits and Waste Disposal Areas
Whenever or wherever the Contractor obtains material from a source or wastes material on an area other than within the Right-of-Way, regardless of the fashion, manner or circumstances for which the source or area is obtained, it shall be reclaimed in accordance with the requirements of Section 160.

F. Mailboxes
The property owner shall have the responsibility for removing and relocating the mailbox to an area outside construction limits. The Engineer will mark a point for the relocation of the box. The stake should be set so that the location of the box will be convenient to both the mail carrier and the patron, yet not interfering with the proposed work. It may be necessary for the Engineer to confer with the Post Office serving the area. The Contractor shall notify each affected owner, in writing, that their mailbox is in conflict with the proposed construction, that they have ten days to relocate the box and that, after the expiration of the 10 days’ notice, if the owner has not relocated the box, it shall be removed by the Contractor and laid upon the owner’s property, clear of the Right-of-Way. Any cost to the Contractor for removing the mailboxes as stated above shall be included in the price bid for other items.

G. Failure to Comply
Failure of the Contractor to comply with any of the above provisions or to install erosion prevention items included in the Contract at the time specified, will be evidence of omission and neglect, and the Contractor will be liable for damages as outlined in Subsection 107.13.H below. Furthermore, the Engineer shall withhold payment on all Contract Items until such time as the Contractor complies in full with all of the aforesaid provisions.

H. Payment for Damages
When or where any direct or indirect damage or injury is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the Work, or in consequence of the non-execution thereof by the Contractor, the Contractor shall restore, at his own expense, such property to a condition similar or equal to that existing before such damage or injury was done, by repairing, rebuilding or otherwise restoring as may be directed, or shall make good such damage or injury in an acceptable manner.

I. Compensation
All costs pertaining to any requirement contained herein shall be included in the overall Bid submitted unless such requirement is designated as a separate Pay Item in the Proposal.

107.14 Load Restrictions

It is hereby agreed between the Department and the Contractor that in the performance of The Work under the Contract, the following load restrictions and stipulations shall be in full force and effect during the life of the Contract:

A. Parties Affected
The load restrictions and stipulations contained herein shall be applicable to the equipment of the Contractor; each agent or subcontractor employed by the Contractor; and each person or persons, firm, partnership, corporation or any combination thereof, hauling materials, supplies or equipment to or on the Project, by or for the Contractor.

B. Within Project Limits
No hauling equipment which is loaded beyond those limits provided by State Law shall be permitted on any portion of the new or existing pavement structure except that such loads will be permitted on non-stabilized bases and subbases prior to placing roadway paving subject to the provisions of Subsection 107.17. Axle loads and gross weight limits will be evaluated in accordance with current Georgia Law.

All damage caused by any equipment to any permanent installation or portion of The Work shall be promptly repaired by the Contractor at his expense.
When it becomes necessary to cross existing pavement with excessive loads, the Contractor shall provide and remove, at his own expense, proper cushioning by means of earth blanket or otherwise as directed.

C. Outside Project Limits
All equipment users included in Subsection 107.14.A, above, operating equipment on roads outside the Project limits shall be governed by the following regulations:

1. No vehicle shall carry any load in excess of that specified by Georgia Law.

2. On County System roads the maximum total gross weight shall not exceed 56,000 lbs. (25,400 kg) unless a vehicle is making a pickup or delivery on such roads.

3. For a specific individual trip the above weight limitations may be exceeded provided a special permit is obtained from the Department for each such movement. A special permit will not relieve the Contractor of liability for damage that may result from such a movement. Refer to O.C.G.A §32-6-26 Weight of Vehicle and Load, SB54 (2011) for compliance with weight limitations and exceptions.

4. Authorized personnel of the Department of Public Safety shall be permitted to weigh each truck hauling material to the Project whenever the Department so desires. The owner of each truck shall instruct his operators to cooperate with and assist the truck weighers in every way possible.

5. A Certified Public Weigher operating under the provisions of Standard Operating Procedure 15 shall not dispatch any vehicle loaded with material to be incorporated into the Project when the gross vehicle weight exceeds the limit established by law.
6. Ready Mix Concrete trucks shall comply with load restrictions as specified in Laboratory Standard Operating Procedure 10, “Quality Assurance for Ready-Mixed Concrete Plants in Georgia.”

D. Responsibilities
It will be the responsibility of the Contractor to advise his personnel, and all equipment users included in Subsection 107.14.A, as to the load restrictions and stipulations contained herein.

E. Excess Loads and Violations
If multiple violations assignable to a given Certified Public Weigher are occurring, that Certified Public Weigher may be suspended from weighing materials dispatched to Department of Transportation projects.

107.15 Responsibility for Damage Claims

The Contractor shall indemnify and save harmless the Department, its officers and employees, from all suits, actions, or claims of any character brought because of any injuries or damage received or sustained by any person, persons, or property on account of the operations of the said Contractor; or on account of or in consequence of any neglect in safe-

guarding The Work; or through use of unacceptable materials in constructing The Work; or because of any act of omission, neglect or misconduct of said Contractor; or because of any claims or amounts recovered from any infringements of patent, trademark, or copyright; or from any claims or amounts arising or recovered under the Workmen's Compensation Act, or any other law, ordinance, order, or decree; and so much of the money due the said Contractor under and by virtue of his Contract as may be considered necessary by the Department for such purpose may be withheld for the use of the State; or, in case no money is due, his surety may be held until such suit or suits, action or actions, claim or claims for injuries or damages as aforesaid shall have been settled and suitable evidence to that effect furnished to the Department; except that money due the Contractor will not be withheld when the Contractor produces satisfactory evidence that he is adequately protected by public liability and property damage insurance.

107.16 Opening Sections of Project to Traffic

Whenever any bridge or section of roadway is in acceptable condition for travel, the Engineer may direct that it be opened to traffic, whether or not the opening was originally provided for, and such opening shall not be held to be in any way an acceptance of the bridge or roadway, or any part thereof, or as a waiver of any of the provisions of the Contract. Necessary repairs or renewals made on any section of the roadway or bridge thus opened to traffic under instructions from the Engineer, due to defective material or work, or to any cause other than ordinary wear and tear, pending completion and acceptance of the roadway, bridge, or other work, shall be done by the Contractor, without additional compensation. Also, the Contractor shall not receive additional compensation for completing the Work except as specified in Subsection 104.03. If the Contractor is dilatory in completing shoulders, drainage structures, or other features of work, the Engineer may so notify him in writing and establish therein a reasonable period of time in which the Work should be completed. If the Contractor is dilatory, or fails to make a reasonable effort toward completion in this period of time, the Engineer may then order all or a portion of the Project opened to traffic. On such sections which are so ordered to be opened, the Contractor shall conduct the remainder of his construction operations so as to cause the least obstruction to traffic and shall not receive any added compensation due to the added cost of the Work by reason of opening such section to traffic.

On any section opened to traffic under any of the above conditions, whether stated in the Special Provisions or opened by necessity of Contractor's operations, or unforeseen necessity, any damage to the highway not attributable to traffic which might occur on such section (except slides) shall be repaired by the Contractor at his expense. The removal of slides shall be done by the Contractor on a basis agreed to prior to the removal of such slides.

107.17 Contractor's Responsibility for the Work

From the first day the Contractor begins work, or from the date Contract Time commences, whichever occurs first, until written final acceptance of the project by the Engineer, the Contractor shall have the charge and care thereof and shall take every precaution against injury or damage to any part thereof by the action of the elements or from any other cause, whether arising from the execution or from the non-execution of The Work. The Contractor shall rebuild, repair, restore, and make good all injuries or damages to any portion of The Work occasioned by any of the above causes before final acceptance and shall bear the expense thereof except that the Department may, in its discretion, reimburse the Contractor for the repair of damage to The Work due to unforeseeable causes beyond the control of and without the fault or negligence of the Contractor, including but not restricted to acts of God, of the public enemy or of governmental authorities. The Contractor's responsibility for damages and injuries is defined in Subsection 104.05.A. In case of suspension of work from any cause whatsoever, the Contractor shall be responsible for the Project and shall take such precautions as may be necessary to prevent damage to the Project, provide for normal drainage and shall erect any necessary temporary structures, signs, or other facilities at his expense.

107.18 Acquisition of Right-of-Way

Rights of Way for the project will be obtained by the Department, in coordination with local governments and others. However, the Contractor's access to the portions of the right-of-way may be restricted. Where such restrictions are known in advance to the Department they will be listed in the bid proposal. Delays to the progress of the Work may be encountered because of restricted access to portions of the right-of-way. When such delays occur, whether caused by restrictions listed in the bid proposal or restrictions that develop after the Contract is signed, the parties agree in executing the Contract that such delays do not constitute breach of the Contract. Delays in availability of right-of-way beyond those listed in the bid proposal, or that develop after the Contract has been signed, that impact the controlling Item or Items of the Work will not be charged against the Contract Time. Additional compensation for such delays shall not be paid, except as provided in Subsection 105.13, "Claims for Adjustments and Disputes," or Subsection 109.09, "Termination Clause." In the event the Department is unable to acquire right-of-way needed for the project, resulting in

delay to or termination of the project, such situation will also be controlled by this Section, and will not constitute a breach of the Contract by the Department.

107.19 Personal Liability of Public Officials

In carrying out any of the provisions of the Contract or in exercising any power or authority granted to the Board, Commissioner, Chief Engineer, their agents and employees, by the Contract, there shall be no liability, either personally or as officials or representatives of the Department, it being understood that in all such matters they act solely as agents and representatives of the Department.

107.20 No Waiver of Legal Rights

Upon completion of The Work, the Department will expeditiously make final inspection and notify the Contractor of acceptance. Such final acceptance, however, shall not preclude or estop the Department from correcting any measurement, estimate, or certificate made before or after completion of The Work, nor shall the Department be precluded or estopped from recovering from the Contractor or his Surety, or both, such over-payment as it may sustain, or by failure on the part of the Contractor to fulfill his obligations under the Contract. A waiver on the part of the Department of any breach of any part of the Contract shall not be held to be a waiver of any other or subsequent breach. The Contractor, without prejudice to the terms of the Contract, shall be liable to the Department for latent defects, fraud, or such gross mistakes as may amount to fraud, or as regards the Department's rights under any warranty or guaranty.

107.21 General Description

The Contractor shall designate, prior to beginning any work, a Worksite Utility Coordination Supervisor (WUCS) who shall be responsible for initiating and conducting utility coordination meetings and accurately recording and reporting the progress of utility relocations and adjustment work. Also, the WUCS shall prepare an Emergency Response Plan for the purpose of planning, training, and communicating among the agencies responding to the emergency. The WUCS shall be the primary point of contact between all of the Utility companies, the Contractor and the Department.

The WUCS shall recommend the rate of reoccurrence for utility coordination meetings and the Engineer will have the final decision on the regularity for utility coordination meetings. In no case will utility coordination meetings occur less than monthly until controlling items of utility relocations and adjustment milestones are completed. The WUCS shall contact each of the utility companies for the purpose of obtaining information including, but not limited to, a Utility Adjustment Schedule for the controlling items of utility relocations and adjustments. The WUCS shall notify the appropriate utility company and/or utility subcontractors and the Department of the status of controlling items of relocations and adjustment milestones as they are completed. The WUCS shall furnish the Engineer, for approval, a Progress Schedule Chart, immediately following the receipt of the Notice to Proceed unless otherwise specified, which includes the utility companies controlling items of work and other information in accordance with Section 108.03 or elsewhere in the Contract documents.

A. Qualifications

The WUCS shall be an employee of the Prime Contractor, shall have at least one year experience directly related to highway and utility construction in a supervisory capacity and have a complete understanding of the Georgia Utilities Protection Center operations, and shall be knowledgeable of the High-voltage Safety Act and shall be trained on the Georgia Utility Facility Protection Act (GUFPA). The Department does not provide any training on GUFPA but will maintain a list of the Georgia Public Service Commission certified training programs developed by other agencies. Currently the following companies offer approved GUFPA training programs:

Associated Damage Consultants
Phone: 706.234.8218 or 706.853.1362
Georgia Utility Contractors Association
Phone: 404.362.9995

Georgia Utilities Protection Center
Phone: 678.291.0631 or 404.375.6209
H B Training & Consulting
Phone: 706.619.1669 or 877.442.4282 (Toll Free)

Section 107 – Legal Regulations and Responsibility to the Public

The Prime Contractor is responsible for obtaining the GUFPA training for their employees.
Questions concerning the Georgia Public Service Commission GUFPA training program should be directed to:
Georgia Public Service Commission
244 Washington St. SW
Atlanta, GA 30334-5701
404.463.9784

B. Ticket Status
During the utility coordination meetings the WUCS shall collect and maintain the Ticket Status information to determine the status of all locate requests within the project limits.

This information will be used to assure those planning to use mechanized equipment to excavate or work within the project limits are prepared to begin work when they have reported or estimated beginning work. At points where the Contractor's or utility company's operations are adjacent to or conflict with overhead or underground utility facilities, or are adjacent to other property, damage to which might result in considerable expense, loss, or inconvenience, work shall not commence until all arrangements necessary for the protection thereof have been made.

C. Notice
The names of known utility companies and the location of known utility facilities will be shown on the Plans, or listed in the Subsurface Utility Engineering Investigation if performed or in the Special Provisions; and the WUCS shall give 24-hour notice to such utility companies before commencing work adjacent to said utility facilities which may result in damage thereto. The WUCS shall further notify utility companies of any changes in the Contractor's work schedules affecting required action by the utility company to protect or adjust their facilities. Notice to the utility companies by the Department of the Award of Contract, under Subsection 105.06, shall not be deemed to satisfy the notice required by this paragraph. Furthermore, this 24-hour notice shall not satisfy or fulfill the requirements of the Contractor as stated in Chapter 9 of Title 25 of the Official Code of Georgia Annotated, known as the "Georgia Utility Facility Protection Act".

D. Agenda
The WUCS shall cooperate with the companies of any underground or overhead utility facilities in their removal and relocations or adjustment work in order that these operations may progress in a reasonable manner, that duplication of their removal and relocations or adjustment work may be reduced to a minimum, and services rendered by those parties will not be unnecessarily interrupted. To promote this effort the WUCS shall prepare an agenda for the utility coordination meetings and circulate same in advance of the meeting to encourage input and participation from all of the utility companies. The agenda will be prepared by an examination of the project site and may include photographs of potential/actual utility conflicts.

E. Emergency Response Plan
The WUCS shall prepare an Emergency Utility Response Plan (EURP) within 30 days following the receipt of the Notice to Proceed. The EURP shall indicate the project location (which includes street address and or major intersections / major highway route, if possible with a land mark) that would be reported in case of an emergency, WUCS, Emergency Utility Coordinator (EUC), utility company name, utility company emergency contact information to include but not limited to emergency phone number, response time for emergency, working condition of devices needed to facilitate prompt shut off, and primary point of contact name and phone number for the project. Emergency Utility Coordinator (EUC) shall be an employee of the Prime Contractor and shall notify the appropriate utility company and/or utility subcontractors in case of an emergency. EURP must include the contact details of the EUC, if WUCS is not the primary emergency utility coordinator for this project. The plan will also include a means of reporting emergencies and the Utility Emergency Response Information for each company. The WUCS/EUC shall post the EURP in an area readily accessible to the Department and project personnel. Also, WUCS shall distribute the copies of EURP by e-mail and hard copy to GA DOT Area Engineer, GA DOT Construction Project Engineer, Contractor's project manager, superintendent, and all approved sub-contractors whose work can be in conflict with utilities facilities, personnel of the each facility/owner/ operator who has facilities within the project limits and keep a copy in close proximity to active construction. In the event of interruption to gas, water or other utility services as a result of accidental breakage or as a result of being exposed or unsupported, the WUCS/EUC shall promptly notify the appropriate emergency officials, the Georgia Utilities Protection Center and the appropriate utility facility company or operator, if known. Until such time as the damage has been repaired, no person shall engage in excavating or blasting activities that may cause further damage to the utility facility. In order to keep up with the latest / most updated EURP contact information (name and phone numbers); WUCS shall include an item in the agenda of Utility Coordination meeting about the updates / changes in the EURP plan. The Emergency Utility Response Plan and Emergency Utility Response Information template can be found at the State of Georgia, Office of Utilities Webpage.

Section 107 – Legal Regulations and Responsibility to the Public

F. Submission
Provisions for reporting all utility coordination meetings, the progress of utility relocation and adjustment work milestones and ticket status information will be reported on a form developed by the WUCS and will be distributed by the WUCS to all of the utility companies as milestones are met and shall be included as part of the project records. These reports shall be delivered to the Engineer for review, on a monthly basis. The WUCS shall immediately report to the Engineer any delay between the utility relocation and adjustment work, the existing Utility Adjustment Schedule, or the proposed Utility Adjustment Schedule so that these differences can be reconciled.

G. Delays
Delays and interruptions to the controlling Item or Items of The Work caused by the adjustment or repair of water, gas, or other utility appurtenances and property may be considered for an extension of Contract Time as provided in Subsection 108.07.E unless such delays are due to the negligence of the Contractor.

H. Facilities Supported on Bridges
If the utility facilities are to be supported on bridges, the following provisions shall apply:
1. The Plans will show the location of the facility and the auxiliary items necessary to support the facility.
2. The Contractor constructing the bridge shall install anchor bolts, thimbles, inserts, or other auxiliary items attached to the bridge as a part of the support for the utility facility. The Utility Company shall furnish these auxiliary items, unless the Contract indicates these items are to be furnished by the Contractor as a part of the bridge construction.
3. The Utility or its subcontractor constructing the utility facility shall install hanger rods, pipe rollers, and other attachments necessary for the support of the utility facility as indicated on the Plans. The Utility Company shall furnish these attachments at no cost to the Department or the prime contractor unless otherwise specified. This work shall also include:
a. Caulking the openings around the utility where it passes through endwalls to prevent the passage of undesirable materials.
b. Painting the exposed portions of utility supports unless such supports are corrosion resistant. Painting shall be done in accordance with the applicable portions of Section 535, unless otherwise specified.
4. The sequence of bridge construction work may be set forth in the Plans and/or the Special Provisions and will show at what stage of the Work a utility company will be allowed to make the utility installation. Further, all or any portion of The Work under Subsection 107.21.H.3 may be included in the bridge Contract by the Plans and/or the Special Provisions.
5. Any damage to the bridge structure caused by the utility installation shall be repaired to the satisfaction of the Engineer at the expense of the Utility or its subcontractor installing the utility facility.

I. Clearances
The Plans provide for at least minimum clearance of utilities as required by the National Electrical Safety Code, U.S. Department of Commerce, and National Bureau of Standards. Any additional clearance the Contractor may desire or require in performing The Work shall be arranged by the Contractor with the utility company.
The Department will pay no extra compensation for such additional clearances.

J. Utility Relocation Progress Schedule
The purpose of the Utility Adjustment Schedule is to provide the Contractor with the pertinent information, including any utility staging required, dependent activities, or joint-use coordination that is required for the creation of a feasible progress schedule. A suitable Utility Adjustment Schedule form is available from the Department for the WUCS to circulate to utility companies for any proposed project construction staging or should a utility company not duly file a Utility Adjustment Schedule to the Department during the preconstruction phase of the project. The WUCS shall submit a Utility Relocation Progress Schedule showing together the Progress Schedule Chart referenced in Section 108.03 and the proposed Utility Adjustment Schedules from all utility companies to the Engineer for review and approval. Copies of existing Utility Adjustment Schedules with utility companies having facilities on this project will be made available at the Georgia Department of Transportation, Office of Construction Bidding Administration, located at One Georgia Center, 600 West Peachtree Street, NW, Atlanta, GA 30308, for examination by the Contractor. The Utility Adjustment Schedules are available on-line at: www.dot.ga.gov/partner smart/contractors/bidding letting/bidx/default.aspx

K. Compensation
There will be no separate measurement or payment for this Work. The cost associated with this Work shall be included in the overall Bid submitted.

107.22 Hazardous and/or Toxic Waste

When the Contractor's operations encounter or expose any abnormal condition which may indicate the presence of a hazardous and/or toxic waste, such operations shall be discontinued in the vicinity of the abnormal condition and the Engineer shall be notified immediately. The presence of barrels, discolored earth, metal, wood, or visible fumes, abnormal odors, excessively hot earth, smoke, or anything else which appears abnormal may be indicators of hazardous and/or toxic wastes and shall be treated with extraordinary caution as they are evidence of abnormal conditions.

The Contractor's operations shall not resume until so directed by the Engineer. Disposition of the hazardous and/or toxic waste will be made in accordance with the requirements and regulations of the Department of Human Resources and the Department of Natural Resources. Where the Contractor performs work necessary to dispose of hazardous and/or toxic waste, payment will be made at the unit prices for pay items included in the contract which are applicable to such work or, where the contract does not include such pay items, payment will be as provided in Subsection 109.05, "Extra Work."

107.23 Environmental Considerations

A. Construction Erosion control measures shall be installed, to the greatest practical extent, prior to clearing and grubbing.

Particular care shall be exercised along stream buffers, wetlands, open waters and other sensitive areas to ensure that these areas are not adversely affected. Construction equipment shall not cross streams, rivers, or other waterways except at temporary stream crossing structures shown on the plans or as allowed by permit. Construction activities within wetland areas are prohibited except for those within the construction limits as shown on the Plans and as specified in Subsection 107.23.E. All sediment control devices (except sediment basins) installed on a project shall, as a minimum, be cleaned of sediment when one half the capacity, by height, depth or volume, has been reached. Sediment basins shall be cleaned of sediment when one-third the capacity by volume has been reached.

B. Bridge Construction Over Waterways

Construction waste or debris, from bridge construction or demolition, shall be prevented from being allowed to fall or be placed into wetlands, streams, rivers or lakes. Excavation, dewatering, and cleaning of cofferdams shall be performed in such a manner as to prevent siltation. Pumping from cofferdams to a settling basin or a containment unit will be required if deemed necessary by the Engineer. Operations required within rivers or streams, i.e. jetting or spudding, shall be performed within silt containment areas, cofferdams, silt fence, sediment barriers or other devices to minimize migration of silt off the project.

C. Environmental Clearance of Local Material or Disposal Sites

Specific written environmental approval from the Engineer will be required for any local material or disposal sites not included in the Plans.

No work shall be started at any potential local material or waste site not shown on the plans prior to receiving said environmental approval from the Engineer. Local material sites are defined as borrow pits, common borrow, base, embankment, sand clay base, topsoil base, soil cement base, granular embankment, asphalt sand, maintenance pits, or stockpiled borrow sources. Disposals sites, as defined in Standard Specification 201.3.05.E.3, may be defined as excess material, common fill, or inert waste. The Contractor may obtain environmental approval on a site with one of two methods: 1) GDOT provided environmental surveys or 2) environmental surveys obtained by the Contractor at no cost to the Department. The Contractor must choose one method for review and approvals, which will apply to all sites required for a
given project, and submit an Environmental Review Notification indicating their chosen method.

1. If the Contractor chooses to obtain their own environmental surveys, they shall be conducted by a consultant(s) prequalified to work with the Department in the following area classes: 1.06(b) – History; 1.06(e) – Ecology; and 1.06(f) – Archaeology. Background research and field methods shall be conducted in accordance with the Office of Environmental Services Environmental Procedures Manual, with documentation in an Environmental Survey Results Memorandum (template available from the Office of Environmental Services).

2. If the Contractor requests that GDOT conduct required environmental surveys, an Environmental Survey Request shall be submitted for each site (template available from the Office of Environmental Services). Upon receipt of an Environmental Survey Request, the Office of Environmental Services shall provide environmental approval or denial

within thirty (30) business days. Upon receipt of an Environmental Survey Results Memorandum, the Office of Environmental Services shall provide environmental approval or denial within ten (10) business days. The Department will not accept requests for review of sites before a Notice to Proceed is issued. Incomplete Survey Requests, surveys that are not conducted by a GDOT prequalified consultant, or surveys that do not meet the required level of field effort or documentation, will be denied by GDOT OES and may require resubmittal. The Engineer will inform the Contractor in writing as to the approval or denial of environmental clearance. Approvals may be provided upon condition that an Environmentally Sensitive Area (ESA) be designated within or adjacent to the site prior to use. All ESA stipulations shall be adhered to in accordance with Standard Specification 107.23.F. If a site is denied, the Contractor may, at no expense to the Department, seek to obtain permits or pursue other remedies that might otherwise render the site(s) acceptable, if available. Any and all changes to proposed sites or their associated haul roads that are not included within the original Environmental Survey Request or Environmental Survey Results Memorandum, including expansion, utilization for purposes other than those indicated in the original submittal, etc. must be submitted for further environmental review and approval prior to use. Sites included in the Plans have environmental clearance and shall be used only for the purpose(s) specified in the Plans or other contract documents. Should the Contractor wish to expand or utilize said sites for any purpose other than that provided for in the Plans or other contract documents, specific written environmental clearance as noted above shall be obtained.

D. Control of Pollutants

Pollutants or potentially hazardous materials, such as fuels, lubricants, lead paint, chemicals or batteries, shall be transported, stored, and used in a manner to prevent leakage or spillage into the environment. The Contractor shall also be responsible for proper and legal disposal of all such materials. Equipment, especially concrete or asphalt trucks, shall not be washed or cleaned-out on the Project except in areas where unused product contaminants can be prevented from entering waterways.

E. Temporary Work in Wetlands Outside of the Construction Limits within the Right-of-Way and Easement Areas

Temporary work in wetlands (that are not delineated with orange barrier fence) will be subject to the following requirements:

1. Temporary work in wetlands shall be accomplished by using temporary structures, timber, concrete, soil with geotextile fabric, or other suitable matting. The area shall not be grubbed.
2. Soil matting shall be protected from erosion in accordance with the Specifications.
3. Whenever temporary work is required in Saltwater Marsh Wetlands, all temporary structures and/or matting shall be removed in their entirety prior to Final Acceptance of the Project. Matted and compressed soils shall be backfilled to their original ground elevation with material meeting the requirements of Section 212 – Granular Embankment.
4. Whenever temporary work is required in Freshwater Wetlands, all temporary structures and/or matting (exclusive of soil matting to be retained in the final roadway section) shall be removed in their entirety prior to Final Acceptance of the Project.

Once the temporary materials have been removed, the area shall be covered by Excelsior or Straw blankets according to Section 713 of the Specifications. The grassing and ground preparation referenced in Subsection 713.3.03, "Preparation", will not be applicable to this Work.

5. The Engineer shall be notified so that a field inspection may be conducted to certify that the temporary materials were properly removed and that the area was properly restored. The Contractor shall be responsible for any corrective action required to complete this Work.
6. There will be no separate measurement or payment for this Work. The cost associated with this work shall be included in the overall Bid submitted.

F. Environmentally Sensitive Areas

Some archaeological sites, historic sites, wetlands, streams, stream and pond buffers, open waters and protected animal and plant species habitat within the existing/required Right-of-Way and easement areas may be designated as ENVIRONMENTALLY SENSITIVE AREAs (ESAs). These areas are shown on the applicable Plan sheets and labeled "ESA" (e.g. ESA – Historical Boundary, ESA – Wetland Boundary). The Department may require that some ESAs or portions thereof be delineated with orange barrier fence. The Contractor shall install, maintain, and replace as necessary orange barrier fence at ESAs as delineated in the Plan sheets.

The Contractor shall not enter, disturb, or perform any construction related activities, other than those shown on the approved plan sheets within areas designated as ESAs including ESAs or portions thereof not delineated with orange barrier fence.

This includes but is not limited to the following construction activities: clearing and grubbing; borrowing; wasting; grading; filling; staging/stockpiling; vehicular use and parking; sediment basin placement; trailer placement; and equipment cleaning and storage. Also, all archaeological sites, historic sites, wetlands, streams, stream and pond

buffers, open waters, and protected animal and plant species habitat that extend beyond the limits of existing/required Right-of- Way and easement areas shall be considered ESAs and the Contractor shall not perform any construction related activities (such as those listed above) within these areas or make agreements with property owners to occupy these areas for construction related activities (such as those listed above). The Contractor shall make all construction employees aware of the location(s) of each ESA and the requirement to not enter or otherwise disturb these areas. If the Contractor is found to have entered an ESA, either within or outside the project area, for any purpose not specifically shown on the approved plan sheets, the Department may, at its discretion, issue a stop work order for all activities on the project except erosion control and traffic control until such time as all equipment and other items are removed and the ESA is restored to its original condition. However, should damage to an ESA occur as a result of the Contractor's action in violation of this section, and notwithstanding any subsequent correction by the Contractor, the Contractor shall be liable for any cost arising from such action, including but not limited to, the cost of repair, remediation of any fines, or mitigation fees assessed against the Department by another government entity.

G. Protection of Migratory Birds and Bats

The following conditions are intended as a minimum to protect migratory birds and bats during construction Activities:

1. Project personnel shall be advised about the potential presence and appearance of federally protected migratory birds, including the barn swallow (*Hirundo rustica*), cliff swallow (*Petrochelidon pyrrhonota*), and eastern phoebe (*Sayornis phoebe*), and that there are civil and criminal penalties for harassing, harming, pursuing, hunting, shooting, wounding, killing, capturing, or collecting these species in violation of the Migratory Bird Treaty Act of 1918. The law protects adults, fledglings, nestlings, eggs, and active nests. All bats are protected under Georgia state law (Official Code of Georgia § 27-1-28), with some species protected under the federal Endangered Species Act of 1973. Pictures and habitat information shall
be posted in a conspicuous location in the Project field office until such time that construction has been completed and time charges have stopped.

2. The demolition of existing bridge and culvert, the extension of existing culvert, and bridge maintenance activities on the underside of the bridge deck shall take place outside of the breeding and nesting season of phoebes, swallows and other migratory birds, which begins April 1 and extends through August 31, unless exclusionary barriers are put in place to prevent birds from nesting. For bridges, exclusionary barriers may be made of plastic, canvas or other materials proposed by the Contractor and approved by the State Environmental Administrator prior to installation. For box culverts, exclusionary barriers may be overlapping strips of flexible plastic (also called "PVC Strip Doors" or "Strip Curtains") or an alternate material proposed by the Contractor and approved by the State Environmental Administrator prior to installation. Exclusionary barriers must be installed on the bridge(s) and/or box culvert(s) prior to March 1 or after August 31, but in no time in between this period. Exclusionary barriers are not a guaranteed method of preventing migratory birds from nesting beneath bridges and work schedules shall take into account the possibility that barriers will not be successful. If exclusionary barriers are to be used, these steps shall be followed:

a. The Project ecologist shall be notified by phone (404) 631-1100 of the decision to install exclusionary barriers and the date of the proposed installation prior to the installation of any exclusionary devices.
b. The structure(s) shall be checked for nests prior to the placement of exclusionary barriers. If nests are present, they shall be inspected to ensure that eggs or birds are not present. If the nests are found to be occupied, construction activities associated with the bridge shall be postponed until after August 31 when the breeding season is complete.
c. For any box culvert(s) being replaced, exclusionary barriers shall be installed on both the inlet and outlet openings. For any box culvert(s) being extended, exclusionary barriers shall be placed on the opening(s) (inlet and/or outlet) where work is taking place. For bridge(s) being removed, barriers shall be installed along the full length of the bridge(s). In all cases, barriers shall be installed prior to March 1 and left in place until August 31 or until the culvert removal, culvert extension, or bridge demolition is complete. If the exclusionary barriers fail to prevent nesting (i.e., birds are able to bypass barriers and build nests), construction activities associated with the bridge shall be postponed until after August 31.
d. During construction activities, exclusionary barriers shall be inspected daily for holes or other defects that impair its ability to exclude migratory birds from nesting beneath the bridge. Any holes or defects shall be repaired immediately.
e. Entanglement and/or entrapment of barn swallows, cliff swallows, and eastern phoebes in exclusionary netting constitutes harm to migratory birds. Any entanglement and/or entrapment of migratory birds shall be reported immediately to the Project Engineer, who in turn will notify the State Environmental Administrator, Georgia Department of Transportation, Office of Environmental Services at (404) 631-1101.

3. Migratory birds may nest in other structures or natural features that will be impacted by construction activities. If active nests containing eggs are encountered within the footprint of construction activities, the finding shall be reported

immediately to the Project Engineer, who in turn shall notify the State Environmental Administrator, Georgia Department of Transportation, Office of Environmental Services at (404) 631-1101. All activity within 50 feet of active nests shall cease pending consultation by the Department with the U. S. Fish and Wildlife Service and the lead Federal Agency.

4. When working on bridges and culverts, sightings of bat species shall be reported immediately to the Project Engineer who in turn will notify the State Environmental Administrator, Georgia Department of Transportation, Office of Environmental Services at (404) 631-1101. All construction activity on the structure shall cease pending consultation by the Department with the U. S. Fish and Wildlife Service and/or the Georgia Department of Natural Resources and/or the lead Federal Agency. The Department will inform the Contractor of any changes to the project.

5. In the event any incident occurs that causes harm or injury to migratory birds during construction activities, the incident shall be reported immediately to the Project Engineer who in turn shall notify the State Environmental Administrator, Georgia Department of Transportation, Office of Environmental Services at (404) 631-1101. All activity shall cease pending consultation by the Department with the U. S. Fish and Wildlife Service and the lead Federal Agency.

6. Within 30 days of the completion of construction and the stopping of time charges, a report shall be provided to the State Environmental Administrator, Georgia Department of Transportation, Office of Environmental Services, 600 West Peachtree Street NW, Atlanta, Georgia 30308. GDOT in turn will provide copies of the report to the U.S. Fish and Wildlife Service, the Georgia Department of Natural Resources Wildlife Resources Division, and the lead Federal Agency.

The following information will be included in the report:

a. Contractor name and address.
b. Name and title of report preparer.
c. GDOT Project Identification (PI) number.
d. County(s) in which project is located.
e. Project description.
f. Construction start and end dates.
g. Date GDOT was notified of intent to install barrier(s) per # 107.23G.2.a.
h. Number and type(s) of structures on which exclusion barriers were installed.
i. Type(s) of exclusion material used on each structure.
j. Start and end date(s) of installation of exclusionary barrier on each structure.
k. Start and end date(s) of removal of exclusionary barrier from each structure.
l. Photographs of each structure before and after exclusionary barrier installation.
m. Statement regarding whether the exclusionary barrier was effective in deterring bird use of the structure during construction.
n. Description of any incidents causing harm or injury to migratory birds during construction. This should include incidents that were reported as required under 107.23G.5.
o. Description of any sightings of bat species when working on bridges and culverts. This should include incidents that were reported as required under 107.23G.4.

7. All costs pertaining to any requirement contained herein shall be included in the overall bid submitted unless such requirement is designated as a separate Pay Item in the Proposal.

107.24 Closing of Roadways without On-Site Detours

When existing roadways are to be closed to through traffic and on-site detours are not provided, the Contractor shall submit a written notice to the Engineer for approval 14 days prior to the closure of the existing roadways. After receiving approval from the Engineer for the closure, the Contractor shall install signs at each closure site, in accordance with the MUTCD, to inform the traveling public of the proposed closure, including the date of closure. The sign shall be placed 5 days prior to the closure, at the direction of the Engineer. Prior to the closure, the Area Engineer will inform local government officials and agencies, local news media, and the DOT Public Information Office of the proposed closure of the roadways.

107.25 Disruption to Residential and Commercial Property

The Contractor shall plan, coordinate, and prosecute the work such that disruption to personal property and business is held to a practical minimum. All construction areas abutting lawns and yards of residential or commercial property shall be restored promptly. Backfilling of each drainage structure or section of curb and gutter, sidewalk, or driveway shall be accomplished as soon as adequate strength is obtained. Finishing, dressing and grassing shall be accomplished

immediately thereafter as a continuous operation within each area being constructed with emphasis placed on completing each individual yard or business frontage. Care shall be taken to provide positive drainage to avoid ponding or concentration of runoff.
Handwork, including raking and smoothing, shall be required to ensure that roots, sticks, rocks, and other debris is removed in order to provide a neat and pleasing appearance.
Grassing, when in season, shall immediately follow in order to establish permanent cover at the earliest date. If grassing is not in season, proper erosion control shall be installed and maintained.
The work described herein shall be in addition to that required by Subsection 104.07 “Final Cleaning Up” and Subsection 105.16 “Final Inspection and Acceptance.”

Section 107.18 ACQUISITION OF RIGHT OF WAY: Add the following paragraph:

“The Contractor shall inspect all easements and right-of-way to insure that the County has obtained all land and right-of-way necessary for completion of the Work to be performed pursuant to the Contract Documents. The Contractor shall comply with all stipulations contained in easements acquired by the County.”

Section 107.21 CONTRACTORS RESPONSIBLILITY FOR UTILITY PROPERTY AND SERVICE: Add the following sentence to Paragraph A:

“The Contractor is responsible for the location of above and below ground utilities and structures which may be affected by the Work.

SECTION 108 – PROSECUTION AND PROGRESS

Section 108.06 TEMPORARY SUSPENSION OF WORK: (Federal Aid Projects)
Delete Subsection 108.06 and substitute the following:

The Engineer has the authority to suspend the Work wholly or in part, for as long as he may deem necessary, because of unsuitable weather, or other conditions considered unfavorable for continuing the Work, or for as long as he may deem necessary by reason of failure of the Contractor to carry out orders given, or to comply with any provisions of the Contract.

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 compensations 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 for 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 supplies, 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.

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

SPECIAL PROVISION

Section 108- Prosecution and Progress

Delete the fifth paragraph from Subsection 108.01 and substitute the following:

No Subcontracts, or transfer of Contract, shall in any case release the Prime Contractor of his/her liability under the contracts & bonds. No Subcontractor shall commence work in advance of the written approval of the Subcontract by the Department. Except for certain items exempted by the State Transportation Board, each Subcontractor shall be prequalified or registered with the Department. Each Subcontract for a Registered Subcontractor shall not exceed $ 1,000,000.00 and Subcontracts for Prequalified Contractors shall not exceed their current capacity. Prequalified or Registered Subcontractors shall be qualified or registered with the Department in accordance with Chapter 672-5 of the Rules and Regulations Governing the Prequalification of Prospective Bidders adopted by the State Transportation Board.

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

SPECIAL PROVISION

Section 108 – Prosecution and Progress

Retain Subsection 108.03 except as modified below:

For this project, the Progress Schedule required by Subsection 108.03 need not be submitted.

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

SPECIAL PROVISION

Section 108 – Prosecution and Progress
(Contactor Performs 70% of Work)

Delete paragraphs one through four of Subsection 108.01 and substitute the following:

The Contractor shall not sublet, sell, transfer, assign. Or otherwise dispose of the contract or Contracts, or any portion thereof, or his/her right, title, or interest therein, without written consent of the Engineer. For Subcontracts, consent of the Engineer will not be considered until after award of the Contract.

In Case: such consent is given, the Contractor will be permitted to sublet a portion thereof, but shall perform, with his/her own organization, work, amounting to not less than seventy percent (70%) of the total Contract cost, including materials, equipment, and labor.

As a further exception, any items designated as "Special Items" may be performed by Subcontract and the cost of any such Specialty Items so performed by the Contractor with his/her own organization.

Purchase of materials by the Prime Contractor for use by the Subcontractor will not be allowed when computing the 70% requirement.

108.01 Subletting of Contract

The Contractor shall not sublet, sell, transfer, assign, or otherwise dispose of the Contract or Contracts, or any portion thereof, or of his/her right, title, or interest therein, without written consent of the Engineer. For Subcontracts, consent of the Engineer will not be considered until after award of the Contract. In case such consent is given, the Contractor will be permitted to sublet a portion thereof, but shall perform, with his/her own organization, work amounting to not less than thirty percent (30%) of the total Contract cost, including materials, equipment, and labor.

As further exception, any items designated as Specialty Items may be performed by Subcontract and the cost of any such Specialty Items so performed by Subcontract may be deducted from the total cost before computing the amount of work required to be performed by the Contractor with his/her own organization. Purchase of materials by the Prime Contractor for use by a Subcontractor will not be allowed when computing the 30% requirement.

No Subcontracts, or transfer of Contract, shall in any case release the Prime Contractor of his/her liability under the Contract and Bonds. No Subcontractor shall commence work in advance of the written approval of the Subcontract by the Department.

Except for certain items exempted by the State Transportation Board, each Subcontractor shall be prequalified or registered with the Department. Each Subcontract for a Registered Subcontractor shall not exceed $1,000,000.00 and Subcontracts for Prequalified Contractors shall not exceed their current capacity. Prequalified or Registered Subcontractors shall be qualified or registered with the Department in accordance with Chapter 672-5 of the Rules and Regulations Governing the Prequalification of Prospective Bidders adopted by the State Transportation Board.

In the event any portion of a Subcontract is further sublet, all of the provisions governing subletting, including registration and written approval by the Engineer, shall apply.

This Sub-Section shall not apply to Contracts between the Department and counties, municipalities, or other State agencies.

All subcontract agreements between the Prime Contractor and subcontractor shall be in writing and shall contain all of the Federal-Aid requirements and pertinent provisions of the Prime Contract. The Prime Contractor shall, upon request by the Engineer, furnish copies of any subcontract agreement to the Department within ten (10) days of such request. This provision applies to all subcontracts, including second or multi-tier subcontracts.

According to the provisions stated above, the following items are designated Specialty Items for general transportation system construction and building construction whenever they appear in the Contract:

General Transportation System Contracts

- Grassing items
- Fencing items
- Highway lighting items
- Sign items
- Guardrail items (except bridge handrail)
- Utility items
- Comfort and convenience items in rest areas
- Landscaping items
- Pressure grouting, slab removal and replacement
- Permanent traffic markings
- Signal systems
- Railroad track work above sub-ballast
- Drilled caisson foundations
- Construction layout
- Asphaltic concrete leveling and asphalt concrete patching (when used on surface treatment and slurry seal resurfacing contracts)

Building Contracts

- Structural Steel
- Plumbing
- Heating, ventilation, and air conditioning (HVAC)
- Electrical
- Telephone service
- Masonry
- Glass work
- Drywall
- Ceiling installation

- Roofing
- Carpentry
- Floor covering
- Raised flooring
- Landscaping
- Security system
- Fire protection
- Gutters
- Painting
- Insulation
- Doors
- Elevators
- Construction layout

The Contractor's cost for Construction Layout shall be fully documented prior to deduction from the original Contract amount)

108.02 Notice to Proceed

The delivery to the Contractor of a notice, stating that construction is authorized, constitutes Notice to Proceed. The Contractor shall do no work under the Contract until receipt of the Notice to Proceed, and the Department will not be obligated to pay for work done prior to receipt of the Notice to Proceed.

Within 10 calendar days after the Notice to Proceed has been issued, the Contractor shall begin The Work. Contract Time charges for Available Day and Calendar Day projects will begin on the date the Contractor starts to work, or 10 days after the Notice to Proceed, whichever occurs first. For Completion Date projects Contract Time charges shall begin on the day after the Notice to Proceed.

Where the Contractor's access to part of the right-of-way is restricted, either the Special Provisions in the Contract or the Conditional Notice to Proceed will indicate such restrictions. The Department may, at its option, issue a Conditional Notice to Proceed if, in the opinion of the Engineer, a sufficient portion of the right-of-way is available to the Contractor to allow construction to proceed.

108.03 Prosecution and Progress

The Contractor shall provide sufficient materials, equipment, and labor to guarantee the completion of the Project in accordance with the Plans and Specifications within the time set forth in the Proposal. Unless otherwise required by the Engineer, each operation shall begin as soon after the Contract is awarded as conditions will permit. Each class of work will be expected to continue from the date it is begun until it is completed.

The Contractor shall furnish the Engineer, for approval, a Progress Schedule immediately following the receipt of the Notice to Proceed. Unless otherwise specified, the schedule shall be prepared on forms furnished by the Department or an acceptable critical path schedule will be used as the basis for establishing the controlling items of work and as a check on the progress of The Work. This Schedule will not be required on resurfacing projects.

Approval of the Progress Schedule shall not be construed to imply approval of any particular method or sequence of construction or to relieve the Contractor of providing sufficient materials, equipment, and labor to guarantee the completion of the Project in accordance with the Plans, Specifications, and Special Provisions within the time set forth in the Proposal.

Contract Time as shown in the Proposal is the allowable time. The Contractor's proposed Progress Schedule may indicate a completion date in advance of the Contract Specified Completion Date; however, the Department will not be liable in any way for the Contractor's failure to complete the project prior to the Contract Specified Completion Date.

At least 48 hours before commencing The Work, the Contractor shall notify the Engineer of his intention to begin so that proper inspection may be provided. Should the prosecution of The Work be discontinued for any reason, the Contractor shall notify the Engineer at least 24 hours in advance of resuming operations.

If the Contractor's operations are materially affected by changes in the Plans or in the amount of work, or if he has failed to comply with the approved schedule, the Contractor shall submit a revised Progress Schedule, if requested by the Engineer, which schedule shall show how he proposes to prosecute the balance of The Work. The Contractor shall submit the revised Progress Schedule within 10 days after the date of the request. The Contractor shall incorporate into every Progress Schedule submitted, any contract requirements regarding the order of performance of portions of The Work.

No payments will be made to the Contractor while he is delinquent in the submission of a Progress Schedule or a revised Progress Schedule.

108.04 Limitation of Operations

The Contractor shall conduct The Work at all times in such a manner and in such sequence as will assure the least interference with traffic and shall provide for smooth and safe traffic flow. It shall be the decision of the Engineer as to what will assure the least interference with traffic and smooth, safe traffic flow. Also, the Engineer may require the Contractor to finish a section on which work is in progress before work is started on any additional sections if the opening of such section is essential to public convenience.

108.05 Character of Workers, Methods and Equipment

The Contractor shall at all times employ sufficient labor and equipment for prosecuting the several classes of work to full completion in the manner and time required by these Specifications.

All workers shall have sufficient skill and experience to perform properly the work assigned to them. Workers engaged in special or skilled work shall have sufficient experience in such work and in the operation of the equipment required to perform all work properly and satisfactorily.

Any person employed by the Contractor or by any Subcontractor who the Engineer determines does not perform work in a proper and skilled manner or is intemperate or disorderly shall, at the written request of the Engineer, be removed forthwith by the Contractor or Subcontractor employing such person, and shall not be employed again in any portion of The Work without the approval of the Engineer.

Should the Contractor fail to remove such person or persons as required above, or fail to furnish suitable and sufficient personnel for the proper prosecution of The Work, the Engineer may suspend The Work by written notice until such orders are complied with.

All equipment that is proposed to be used on The Work shall be of sufficient size and in such mechanical condition as to meet the requirements of The Work and to produce a satisfactory quality of work. Equipment used on any portion of the Project shall be such that no injury to the roadway, adjacent property, or other highways will result from its use.

When the methods and equipment to be used by the Contractor in accomplishing the construction are not prescribed in the Contract, the Contractor is free to use any methods or equipment that he demonstrates to the satisfaction of the Engineer will accomplish The Work in conformity with the requirements of the Contract.

When the Contract specifies that the construction be performed by the use of certain methods and equipment, such methods and equipment shall be used unless others are authorized by the Engineer. If the Contractor desires to use a method or type of equipment other than those specified in the Contract, he may request authority from the Engineer to do so. The request shall be in writing and shall include a full description of the methods and equipment proposed to be used and an explanation of the reasons for desiring to make the change. If approval is given, it will be on the condition that the Contractor will be fully responsible for producing construction work in conformity with Contract requirements. If, after trial use of the substituted methods or equipment, the Engineer determines that the work produced does not meet Contract requirements, the Contractor shall discontinue the use of the substitute method or equipment and shall complete the remaining construction with the specified methods and equipment. The Contractor shall remove the deficient work and replace it with work of specified quality, or take such other corrective action as the Engineer may direct. No change will be made in basis of payment for the construction items involved nor in Contract Time as a result of authorizing a change in methods or equipment under these provisions.

108.06 Temporary Suspension of Work

The Engineer has the authority to suspend The Work wholly or in part, for as long as he may deem necessary, because of unsuitable weather, or other conditions considered unfavorable for continuing The Work, or for as long as he may deem necessary by reason of failure of the Contractor to carry out orders given, or to comply with any provisions of the Contract.

No additional compensation will be paid the Contractor because of suspension. If it becomes necessary to stop The Work for an indefinite period, the Contractor shall store all materials in such a way that they will not impede the traveling public unnecessarily or become damaged in any way, and he shall take every precaution to prevent damage or deterioration of The Work done; provide suitable drainage of the roadway, and erect temporary structures where necessary. The Work shall be resumed when conditions are favorable or when corrective measures satisfactory to the Engineer have been applied; when, and as ordered by the Engineer in writing. The Contractor shall not stop The Work without authority.

If The Work is stopped by any temporary or permanent injunction, court restraining order, process or judgment of any kind, directed to either of the parties hereto, then such period or delay will not be charged against the Contract Time nor shall the Department be liable to the Contractor on account of such delay or termination of work.

108.07 Determination of Contract Time

The definition of Contract Time and when Contract Time officially begins is stated in Subsection 101.19. After the Contract has been signed by all parties, Contract Time becomes the specified period of time, agreed upon by the Contractor, the Surety, and the Department, during which all Items and quantities of work set forth in the Proposal and included in the original Contract will be completed.

A. Available Day Contracts

An available day is defined in Subsection 101.04. The Engineer will furnish the Contractor a written monthly statement showing the total number of available days charged through the preceding month. The Contractor will be allowed one week in which to file a written protest setting forth in what respect said statement is incorrect, otherwise the statement shall be deemed to have been accepted by the Contractor as correct.

B. Calendar Day Contracts

When the Contract Time is on a calendar day basis it shall consist of the number of calendar days stated in the Contract counting from the date Contract Time starts as defined in Subsection 108.02, including all Sundays, holidays, and non-work days.

C. Completion Day Contracts

When the Contract completion time is a fixed date, it shall be the date on which all work on the Project shall be completed.

D. Settlement Periods

Settlement Periods shall be computed in calendar days unless otherwise stated in the contract documents.

E. Extension of Contract Time

If satisfactory fulfillment of the Contract requires performance of work in greater quantities than those set forth in the Proposal, the Contract Time allowed for performance shall be extended on a basis commensurate with the amount and difficulty of the added work as determined by the Engineer, whose decision shall be final and conclusive.

If the estimated time for the consolidation of embankments at bridge ends is extended, the Contract Time will be extended as provided in Subsection 208.3.05.B.3.

If the normal progress of The Work is delayed for reasons beyond his control, the Contractor shall, within 15 days after the start of such delay, file a written request to the Engineer for an extension of time setting forth therein the reasons and providing complete documentation for the delay which he believes will justify the granting of his request. The Contractor's plea that insufficient time was specified is not a valid reason for extension of time. If the Engineer finds that The Work was delayed because of conditions beyond the control and without the fault of the Contractor, he may extend the time for completion in such amount as the conditions justify.

Any authorized extension of the Contract Time will be in full force and effect the same as though it was the original Contract Time.

F. Suspension of Time Charges

If the Engineer suspends The Work by reason of failure of the Contractor to carry out written orders given, or to comply with any provision of the Contract, Time Charges will continue through the period of such suspension.

If the Contractor is declared in default, Time Charges will continue.

Except on Completion Date Contracts, Time Charges will not be made against the Contract when the only remaining controlling items of work are shut down by the Engineer because of seasonal limitations or temperature controls.

G. When Time Charges Cease

Time charges will cease when all work on Contract Items have been completed to the satisfaction of the Engineer. The only exception to this requirement is that a satisfactory growth of vegetative cover and application(s) of nitrogen will not be required when Time Charges are stopped, provided all filling of washes and repairs to planted areas have been accomplished. Maintenance of planted areas in order to produce a satisfactory growth after Time Charges have stopped will be performed without assessment of liquidated damages provided this work is diligently prosecuted. If, during this waiting period, maintenance of any part of the Project is inadequate, the Engineer may resume Time Charges 10 days after written notification to the Contractor and will continue Time Charges until the unsatisfactory conditions are corrected.

108.08 Failure or Delay in Completing Work on Time

Time is an essential element of the Contract, and any delay in the prosecution of The Work may inconvenience the public, obstruct traffic, or interfere with business. In addition to the aforementioned inconveniences, any delay in completion of The Work will always increase the cost of engineering. For this reason, it is important that The Work be pressed vigorously to completion. Should the Contractor or, in case of default, the Surety fail to complete The Work within the time stipulated in the Contract or within such extra time that may be allowed, charges shall be assessed against any money due or that may become due the Contractor in accordance with the following schedule:

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA
SPECIAL PROVISION

Section 108 – Prosecution and Progress

Add the following to Subsection 108.08:

C. Intermediate Completion Schedule

An overall Completion Date is established for this Project. However, it is necessary to complete certain portions of The Work at an earlier time.

For this Project, the following items of work and corresponding intermediate completion times are required:

Earth Shoulder Rehabilitation
Failure to complete earth shoulder filling work within thirty (30) Calendar days after completion of paving operations of the roadway will result in the assessment of Liquidated Damages at a rate of **$500.00** per Calendar day.

Cover Milled Area
Failure to cover each milled area, within three (3) calendar days per milled area, will result in the assessment of Liquidated Damages at a rate of **$1,000.00** per Calendar day.

Complete Paving Operations
Failure to complete all paving operations, excluding patching, (e.g., shoulder clipping, asphalt shoulder widening, milling, leveling, resurfacing, etc.) within thirty (30) Calendar days, from the start date of any of the paving operations, will result in the assessment
of Liquidated Damages at a rate of **$500.00** per Calendar day.

Permanent Striping Placement
Failure to ensure placement of permanent striping after completion of the final surface course will not begin until fifteen (15) Calendar days and must be completed within forty-five (45) Calendar days. Failure to comply will result in the assessment of Liquidated Damages at a rate of **$1,000.00** per Calendar day.

Traffic Loop Replacement
Failure to replace Traffic Loops and have operational within the designated time as specified in Section 150.11 will result in liquidated damages at a rate of **$2,000.00** per Calendar day or any part thereof.

Lane Closures
Failure to reopen lanes at the times specified in Section 150.11 will result in liquidated Damages at a rate of **$1,000.00** per Hour or any part thereof.

PLEASE NOTE: THESE RATES ARE IN ADDIONTION TO LIQUIDITAED DAMAGES THAT MAY BE ASSESSED IN ACCORDANCE WITH SUB-SECTION 108.08 FOR FAILURE TO COMPLETE THE OVERALL PROJECT.

Schedule of Deductions for Each Day of Overrun in Contract Time			
Original Contract Amount		Daily Charges	
From More Than	To and Including	Available Day	Calendar Day or Completion Date
$0	$500,000	$118	$84
$500,000	$1,000,000	$211	$151
$1,000,000	$2,000,000	$346	$247
$2,000,000	$5,000,000	$547	$391
$5,000,000	$10,000,000	$998	$713
$10,000,000	$20,000,000	$1,667	$1,191
$20,000,000	$40,000,000	$2,617	$1,869
$40,000,000	----------	$7,125	$5,089

When the Contract Time is on either the calendar day or completion date basis, the schedule for calendar days shall be used. When the Contract Time is based on an available day basis, the schedule for available days shall be used.

For each Calendar Day or Available Day, as specified, that any work shall remain uncompleted after the contract time specified for the completion of The Work required by the Contract, the sum specified in the Contract will be deducted from any money due the Contractor, not as a penalty, but as liquidated damages; provided however, that due account shall be taken of any adjustment of the contract time for completion of the work granted under the provisions of Subsection 108.07.E. The Department may waive such portions of the liquidated damages as may accrue after the work is in condition for safe and convenient use by the traveling public.

A. Liquidated Damages

The amount of such charges is hereby agreed upon as fixed liquidated damages due the Department after the expiration of the time for completion specified in the Contract. The Contractor and his Surety shall be liable for liquidated damages in excess of the amount due the Contractor on the final payment.
These fixed liquidated damages are not established as a penalty but are calculated and agreed upon in advance by the Department and the Contractor due the uncertainty and impossibility of making a determination as to the actual and consequential damages which are incurred by the Department, the State, and the general public as a result of the failure on the part of the Contractor to complete The Work on time.

3. **Deduction From Partial Payments:** Liquidated damages, as they accrue, will be deducted from periodic partial payments.

4. **Deduction From Final Payment:** The full amount of liquidated damages will be deducted from final payment to the Contractor and/or his Surety.

5. **No Liquidated Damages Charged for Delay by the Department:** In case of default of the Contract and the subsequent completion of The Work by the Department as hereinafter provided, the Contractor and his Surety shall be liable for the liquidated damages under the Contract, but no liquidated damages shall be chargeable for any delay in the final completion of The Work by the Department due to any unreasonable action, negligence, omission, or delay of the Department. In any suit for the collection of or involving the assessment of liquidated damages, the reasonableness of the amount shall be presumed. The liquidated damages referred to herein are intended to be and are cumulative and shall be in addition to every other remedy now or hereafter enforceable at law, in equity, by statute, or under the Contract.

B. No Waiver of Department's Rights

Permitting the Contractor to continue and finish The Work or any part of it after the expiration of the time allowed for completion or after any extension of time, shall not operate as a waiver of the rights of the Department under the Contract.

108.09 Default of Contract

If the Contractor fails to begin The Work within the time specified, or fails to perform The Work with sufficient workers, equipment, or materials to ensure its prompt completion, or performs The Work unsuitably, or neglects or refuses to remove materials or perform anew such work as shall be rejected as defective and unsuitable, or discontinues the prosecution of The Work, or from any other cause whatsoever does not carry on The Work in an acceptable manner, or becomes insolvent or is adjudicated a bankrupt, or commits any act of bankruptcy or insolvency, or allows any final judgement to stand against him unsatisfied for a period of 10 days, or makes an assignment for the benefit of creditors, or fails to comply with the contract requirements regarding wage payments or EEO requirements, or fails to sign the standard release form as stipulated in Subsection 109.08 "Final Payment," the Engineer may give notice in writing by registered or certified mail to the Contractor and the Surety, stating the nature of the deficiencies and directing that The Work including its progress be remedied and made satisfactory.

If, within 10 days after such notice, the Contractor or his Surety does not proceed in satisfactory way to remedy the faults specified in said notice, the Engineer will notify the Contractor and his Surety by registered or certified mail that the Contractor is in default and, by the same message, direct the Surety to take over The Work including all of the obligations pertaining to the Contract. If the Surety takes over the work in a satisfactory way within 10 days after such notice of default, the Department will thenceforth pay to the Surety the amounts due and to become due under the Contract, less all deductions provided herein including liquidated damages. The Department shall not be liable for any sums not due under the Contract and shall not be made a party to any dispute between the Contractor and the Surety.

If the Contractor is declared in default and The Work and other Contract obligations are taken over by the Surety as required by its Bond, and when all parts of The Work have been completed and found to be satisfactory by the Engineer, as provided for in Subsection 105.16 "Final Inspection and Acceptance," the said Surety is hereby constituted the attorney in fact of the Contractor for the purpose of executing such final releases as may be required by the Department or to do any other act or thing, including the execution of any documents, necessary to the completion of the Contract and a final settlement of same, including but not limited to those documents required by the provisions regarding final payment and release as set forth in Subsection 109.08.

For all purposes, as herein set out and defined, including the execution of documents necessary to the final completion and settlement of the Contract, the Surety, under such circumstances, is hereby authorized and directed by the Contractor to perform such acts and execute such documents as fully and completely as though the same were performed or executed by such contractor, and to be lawfully binding upon such Contractor as though such acts had been performed or such documents executed by him in person.

If the Surety does not take over The Work in a satisfactory way within 10 days after the notice of default, or does not proceed to finish The Work according to the Contract, the Department shall have full power and authority, without impairing the obligation of the Contract or the Contract Bond, to take over the completion of The Work; to appropriate or use any or all material and equipment on the ground that may be suitable, to enter into agreements with others for the completion of the Contract according to the terms and provisions thereof; or to use such other methods as may be required for the completion of the Contract. In so assuming the obligations of the Contractor, the Department does so as the agent of the Contractor.

Assumption of these duties and obligations by the Department will not act as a release of the Contractor or his Surety from any of the provisions of this Contract. The Contractor and his Surety shall be liable for all costs incurred by the Department in completing The Work and also for all liquidated damages in conformity with the terms of the Contract. If the sum of such liquidated damages and the expense so incurred by the Department is less than the sum which would have been payable under this Contract if it had been completed by the Contractor or his Surety, the Contractor, or his Surety, shall be entitled to receive the difference; and if the sum of such expense and such liquidated damages exceeds the sum that would have been payable under the Contract, the Contractor and his Surety shall be liable and shall pay to the Department the amount of such excess. Notice to the Contractor shall be deemed to have been served when delivered to the person in charge of any office used by the Contractor, his representative at or near The Work or by registered or certified mail addressed to the Contractor at the last known place of business.

Time Charges shall continue through a period of a default in compliance with the provisions of Subsection 108.07.F.

108.10 Termination of Contractor's Responsibility

Except as specified in the Contract Bond and in Subsection 107.20, the Contractor's responsibility for The Work shall terminate upon final acceptance of The Work by the Department.

Section 109—Measurement and Payment

109.01 Measurement and Quantities

The method of measurement and computations to be used in determination of quantities of material furnished and of work performed under the Contract will be those methods generally recognized as conforming to good engineering practice. Unless otherwise specified, longitudinal measurements for area computations will be made along the surface, and no deductions will be made for individual fixtures having an area of 9 ft^2 (1 m^2) or less. Unless otherwise specified, transverse measurements for area computations will be the neat dimensions shown on the Plans or ordered in writing by the Engineer.

Where payment is to be made by the square yard (square meter) for a specified thickness, the length will be measured on the surface along the centerline and the pay width shall be that width specified on the plans for the Final surface of the completed section. Intermediate courses shall be placed at a width sufficient to support successive courses with no detriment to the stability of the successive courses. The width of material required beyond the pay width will not be eligible for payment and shall be considered incidental to the work.

Structures will be measured according to neat lines shown on the Plans or as altered to fit field conditions.
All items which are measured by the linear foot (linear meter), such as pipe culverts, guard rail, underdrains, etc., will be measured parallel to the base or foundation upon which such structures are placed, unless otherwise shown on the Plans.
In computing volumes of excavation, the average end area method or other acceptable methods will be used.
The term “gage,” when used in connection with the measurement of steel plates, will mean the U.S. Standard Gage.
When the term “gage” refers to the measurement of electrical wire it will mean the wire gage specified in the National Electrical Code.

The term “ton” will mean the short ton consisting of 2,000 pounds avoirdupois. The term “megagram” will mean one metric ton, equivalent to 1,000 kg. Any commodity paid for by weight shall be weighed on scales that have been approved as specified below and which are furnished at the expense of the Contractor or Supplier. Weighing and measuring systems including remote controls shall be subject to type-approval by the Department of Transportation. The manufacture, installation, performance, and operation of such devices located in Georgia shall conform to, and be governed by, the Official Code of Georgia, Annotated, Section 10-2-5 of the Georgia Weights and Measures Act, the Georgia Weights and Measures Regulations, as amended and adopted, the current edition of the National Bureau of Standards Handbook 44, and these Specifications. Weighing and measuring systems located outside Georgia which are utilized for weighing materials to be used in Department work shall be manufactured, installed, approved, and operated in accordance with applicable laws and regulations for the state in which the scales are located.

All weighing, measuring, and metering devices used to measure quantities for payment shall be suitable for the purpose intended and will be considered to be “commercial devices.” Commodity scales located in Georgia shall be certified before use for accuracy, condition, etc., by the Weights and Measures Division of the Georgia Department of Agriculture, or its authorized representative. Scales located outside Georgia shall be certified in accordance with applicable laws and regulations for the state in which the scales are located. This certification shall have been made within a period of not more than one year prior to date of use for weighing commodity.

All equipment and all mechanisms and devices attached thereto or used in connection therewith shall be constructed, assembled, and installed for use so that they do not facilitate the perpetration of fraud. Any scale component or mechanism, which if manipulated would alter true scale values (including manual zero setting mechanisms) shall not be accessible to the scale operator. Such components and mechanisms that would otherwise be accessible to the scale operator shall be enclosed. Provisions shall be made for security seals where appropriate on equipment and accessories. A security seal shall be affixed to any adjustment mechanism designed to be sealed. Scale or accessory devices shall not be used if security seals have been broken or removed.

Any certified scale or scale component which has been repaired, dismantled, or moved to another location shall again be tested and certified before it is eligible for weighing.

Whenever materials that are paid for based on weight are from a source within the State, the scales shall be operated by and the weights attested to by signature and seal of a duly authorized Certified Public Weigher in accordance with Standard Operating Procedure 15 and the Official Code of Georgia, Annotated, Section 10-2-5 of the Georgia Weights and Measures Act as amended and adopted.

When such materials originate from another state that has a certified or licensed weigher program, the scales shall be operated by a weigher who is certified by that state in accordance with applicable laws, and weight ticket recordation shall be in accordance with Standard Operating Procedure 15.

When materials are paid for based on weight and originate from another state which has no program for certifying or licensing weighers, the materials shall be weighed on scales located in the State of Georgia by a Certified Public Weigher in accordance with Standard Operating Procedure 15 and the Official Code of Georgia, Annotated, Section 10-2-5 of the Georgia Weights and Measures Act as amended and adopted.

No scale shall be used to measure weights greater than the scale manufacturer's rated capacity. A digital recorder shall be installed as part of any commodity scale. The recorder shall produce a printed digital record on a ticket with the gross, tare, and net weights of the delivery trucks, along with the date and time printed for each ticket. Provisions shall be made so that the scales or recorders may not be manually manipulated during the printing process. The system shall be so interlocked as to allow printing only when the scale has come to rest. Either the gross or net weight shall be a direct scale reading. Printing and recording systems that are capable of accepting keyboard entries shall clearly and automatically differentiate a direct scale weight value from any other weight values printed on the load ticket.

All scales used to determine pay quantities shall be provided to attain a zero balance indication with no load on the load receiving element by the use of semi-automatic zero (push-button zero) or automatic zero maintenance.

Vehicle scales shall have a platform of sufficient size to accommodate the entire length of any vehicle weighed and shall have sufficient capacity to weigh the largest load. Adequate drainage shall be provided to prevent saturation of the ground under the scale foundation.

The Engineer, at his discretion, may require the platform scales to be checked for accuracy. For this purpose the Contractor shall load a truck with material of his choosing, weigh the loaded truck on his scales, and then weigh it on another set of certified vehicle scales. When the difference exceeds 0.4 percent of load, the scales shall be corrected and certified by a registered scale serviceman registered in the appropriate class as outlined in the Georgia Weights and Measures Regulations or in accordance with applicable requirements of the state in which the scales are located. A test report shall be submitted to the appropriate representative of the Department of Agriculture.

Materials to be measured by volume in the hauling vehicle shall be hauled in approved vehicles and measured therein at the point of delivery. Vehicles for this purpose may be of any size or type acceptable to the Engineer, provided that the body is of such shape that the actual contents may be readily and accurately determined. All vehicles shall be loaded to their water level capacity as determined by the Engineer, provided that the body is of such shape that the actual contents may be readily and accurately determined.

Cement and lime will be measured by the ton (megagram). Whenever cement or lime is delivered to the Project in tank trucks, a certified weight shall be made at the shipping point by an authorized Certified Public Weigher who is not an employee of the Department. Whenever cement and lime are from a source within the State, the scales shall be operated by the weights attested to by signature and seal of a duly authorized Certified Public Weigher in accordance with Standard Operating Procedure 15 and the Official Code of Georgia, Annotated, Section 10-2-5 of the Georgia Weights and Measures Act as amended and adopted. When such materials originate from another state that has a certified or licensed weigher program, the scales shall be operated by a weigher who is certified by that state in accordance with applicable laws, and the weight ticket recordation shall be in accordance with Standard Operating Procedure 15. When cement and lime originate from another state that has no program for certifying or licensing weighers, the materials shall be weighed on scales located in the State of Georgia by a Certified Public Weigher in accordance with Standard Operating Procedure 15 and the Official Code of Georgia, Annotated, Section 10-2-5 of the Georgia Weights and Measures Act as amended and adopted.
The shipping invoice shall contain the certified weights and the signature and seal of the Certified Public Weigher. A security seal shall also be affixed to the discharge pipe cap on the tank truck before leaving the shipping point. The number on the security seal shall also be recorded on the shipping invoice. The shipping invoice for quicklime shall also contain a certified lime purity percentage. Unsealed tank trucks will require reweighing by a Certified Public Weigher.

Timber will be measured by the thousand feet board measure (MFBM) (cubic meter) actually incorporated in the structure. Measurements will be based on nominal widths and thickness and the actual length in place. No additional measurement will be made for splices except as noted for overlaps as shown on the Plans.

The term “Lump Sum” when used as an item of payment will mean complete payment for The Work described in the Contract.

When a complete structure or structural unit (in effect, “Lump Sum” work) is specified as the unit of the measurement, the unit will be construed to include all necessary fittings and accessories.

Rental of equipment will be measured as defined in Subsection 109.05.B.4.

When standard manufactured items are specified as fence, wire, plates, rolled shapes, pipe conduits, etc., and these items are identified by gage, unit weight, section dimensions, etc., such identification will be considered to be nominal weights or dimensions. Unless more stringently controlled by tolerance in cited Specifications, manufacturing tolerances established by the industries involved will be accepted.

109.02 Measurement of Bituminous Materials

A. By Weighing the Material

The Department prefers this method whenever it is practicable. This method will be considered acceptable under the following conditions:

1. **Weighed On Project:** If the weights of the bituminous materials delivered by tank trucks are to be determined on the Project, weights shall be determined on scales that have been previously checked by the Department with standard weights for accuracy. The scale platform shall be large enough to accommodate the entire vehicle at one time. Under no conditions will truck scales be used to measure weights greater than their rated capacity. All weights not determined in the presence of an authorized representative of the Department shall be made by a Certified Public Weigher who is not an employee of the Department of Transportation and who is in good standing with the Georgia Department of Agriculture. The weight tickets shall carry both the signature and seal of the Certified Public Weigher.

2. **Weighed At Shipping Point:** A certified weight made at the shipping point by an authorized Certified Public Weigher who is not an employee of the Department of Transportation and who is registered with the Georgia Department of Agriculture, will be acceptable provided all openings in the tank have been sealed by the producer and when, upon inspection on the Project, there is no evidence of any leakage. The shipping ticket in this case must carry the signature and seal of the Certified Public Weigher. If the tank is not completely emptied the amount of material remaining in the tank truck will be measured by either weight or volume and the amount so determined, as verified by the Engineer, will be deducted from the certified weight.

3. **By Extraction Analysis:** The weight of bituminous material used will be determined by extraction tests made by the field laboratory. The average asphalt content for each Lot will be used to compute the weight of the Asphalt Cement to be paid for in accordance with the following formula:

English:

P = % AC x T
Where:
P = Pay Tons of Asphalt Cement
% AC = Lot average of % Asphalt Cement by weight of total mix as determined by extraction
T = Actual accepted tons of mixture as weighed

Metric:
P = % AC x T
Where:
P = Pay mega-grams of Asphalt Cement
% AC = Lot average of % Asphalt Cement by weight of total mix as determined by extraction
T = Actual accepted mega-grams of mixture as weighed

4. **By Digital Recording Device:** The amount of bituminous material as shown on the printed tickets will be the Pay Quantity.

B. By Volume

The volume will be measured and corrected for the difference between actual temperature and 60 °F (15 °C). Containers shall be level when measured, and one of the following methods shall be used, whichever is best suited to the circumstances:

1. **Tank Car Measurement:** If the material is shipped to the Project in railroad tank cars, the Contractor shall furnish the Engineer a certified chart showing the dimensions and volume for each inch (25 mm) of depth for each tank.
   The Engineer will make outage and temperature measurements before unloading is begun and after it is finished. The measurements will be taken when the bituminous material is at a uniform temperature and free from air bubbles.

   The Contractor shall not remove any bituminous material from any tank until necessary measurements have been made nor shall he release the car until final outage has been measured. The total number of gallons (liters) allowed for any tank car shall not be more than the U.S. Interstate Commerce Commission rating for that car, converted to gallons at 60 °F (15 °C).

2. **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.

3. **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.

4. **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.

C. Production for Multiple Projects

When a Contractor is producing Asphaltic Concrete from one plant, which is being placed on two or more jobs, public or private, the amount of bituminous material used may be determined by extraction tests in accordance with Subsection 109.02.A.3 or digital recording device in accordance with Subsection 109.02.A.4.

D. Tack Coat

When the same storage facility is utilized for Bituminous Materials to be used in Hot Mix Asphaltic Concrete, Bituminous Tack Coat, and/or Surface Treatment, the quantity used for Tack Coat shall be converted to tons (megagrams) and deducted from the quantities for the Bituminous Material used in the Hot Mix Asphaltic Concrete and Surface Treatment.

E. Corrections

When the volume and temperature have been determined as defined above, the volume will be corrected by the use of the following formula:

$$\frac{V_{English} = V1}{K\,(t-60) + 1} \qquad \frac{V_{metric} = V1}{K\,(t-15) + 1}$$

Where:
V = Volume of bituminous material at 60 °F (15 °C)
V1= Volume of hot bituminous material
t = Temperature of hot bituminous material in degrees Fahrenheit (Celsius)
K= Coefficient of Expansion of bituminous material (correction factor)

The correction factors K for various materials are given below:

- 0.00035 (0.00063) per °F (°C) for petroleum oils having a specific gravity of 60 °F/60 °F (15 °C/15 °C) above 0.966
- 0.00040 (0.00072) per °F (°C) for petroleum oils having a specific gravity of 60 °F/60 °F (15 °C/15 °C) between 0.850-0.966

- 0.00030 (0.00054) per °F (°C) for Tar
- 0.00025 (0.00045) per °F (°C) for Emulsified Asphalt
- 0.00040 (0.00072) per °F (°C) for Creosote Oil

109.03 Scope of Payment

The Contractor shall receive and accept the compensation provided for in the Contract as full payment for furnishing all materials, labor, tools, equipment, superintendence and incidentals, and for performing all work contemplated and embraced under the Contract in a complete and acceptable manner, for any infringement of patent, trademark or copyright, for all loss or damage arising from the nature of The Work, or from the action of the elements, for all expenses incurred by or in consequence of the suspension or discontinuance of The Work, or from any unforeseen difficulties which may be encountered during the prosecution of The Work and for all risks of every description connected with the prosecution of The Work until its Final Acceptance by the Engineer, except as provided in Subsection 107.16.

The payment of any partial estimate prior to Final Acceptance of the Project as provided in Subsection 105.16 shall in no way affect the obligation of the Contractor to repair or renew any defective parts of the construction or to be responsible for all damages due to such defects.

109.04 Payment and Compensation for Altered Quantities

When alteration in Plans or quantities of work not requiring Supplemental Agreements as herein before provided for are ordered and performed, the Contractor shall accept payment in full at the Contract Unit Bid Prices for the actual quantities of work done, and no allowance will be made for increased expense, loss of expected reimbursement, or loss of anticipated profits suffered or claimed by the Contractor, resulting either directly from such alterations, or indirectly from unbalanced allocation among the Contract Items of overhead expense on the part of the Bidder and subsequent loss of expected reimbursement therefore, or from any other cause.

Compensation for alterations in Plans or quantities of work requiring Supplemental Agreements shall be as stipulated in such agreement, except that when the Contractor proceeds with The Work without change of price being agreed upon, he shall be paid for such increased or decreased quantities at the Contract Unit Prices Bid in the Proposal for the Items of The Work.

109.05 Extra Work

Extra work, as defined in Subsection 101.27, when ordered in accordance with Subsection 104.04, will be authorized in writing by the Engineer. The authorization will be in the form of a Supplemental Agreement or a Force Account.

A. Supplemental Agreement

In the case of a Supplemental Agreement, the work to be done will be stipulated and agreed upon by both parties prior to any extra work being performed.
Payment based on Supplemental Agreements shall constitute full payment and settlement of all additional costs and expenses including delay and impact damages caused by, arising from or associated with The Work performed.

B. Force Account

When no agreement is reached for Extra Work to be done at Lump Sum or Unit Prices, such work may be authorized by the Department to be done on a Force Account basis. A Force Account estimate that identifies all anticipated costs shall be prepared by the Contractor on forms provided by the Engineer. Work shall not begin until the Force Account is approved. Payment for Force Account work will be in accordance with the following:

1. **Labor:** For all labor, equipment operators and supervisors, excluding superintendents, in direct charge of the specific operations, the Contractor shall receive the rate of wage agreed upon in writing before beginning work for each and every hour that said labor, equipment operators and supervisors are actually engaged in such work.
   The Contractor shall receive the actual costs paid to, or in behalf of, workers by reason of subsistence and travel allowances, health and welfare benefits, pension fund benefits, or other benefits, when such amounts are required by collective bargaining agreement or other employment contract generally applicable to the classes of labor employed on The Work.
   An amount equal to 15% of the sum of the above items will also be paid the Contractor.

2. **Bond, Insurance, and Tax:** For property damage, liability, and worker's compensation insurance premiums, unemployment insurance contributions, and Social Security taxes on the Force Account work, the Contractor shall receive the actual cost, to which cost no percentage will be added. The Contractor shall furnish satisfactory evidence of the rate or rates paid for such bond, insurance, and tax.

3. Materials: For materials accepted by the Engineer and used, the Contractor shall receive the actual cost of such material incorporated into The Work, including Contractor paid transportation charges (exclusive of machinery rentals as hereinafter set forth), to which cost 10% will be added.

4. Equipment: For any machinery or special equipment (other than small tools) including fuel and lubricant, plus transportation costs, the use of which has been authorized by the Engineer, the Contractor shall receive the rental rates indicated below for the actual time that such equipment is in operation on The Work or the time, as indicated below, the equipment is directed to stand by.

Equipment rates shall be based on the latest edition of the *Rental Rate Blue Book for Construction Equipment* or *Rental Rate Blue Book for Older Construction Equipment*, whichever applies, as published by EquipmentWatch using all instructions and adjustments contained therein and as modified below.

- Allowable Equipment Rates shall be established as defined below:
- Allowable Hourly Equipment Rate = Monthly Rate/176 x Adjustment Factors.
- Allowable Hourly Operating Cost = Hourly Operating Cost.
- Allowable Rate Per Hour = Allowable Hourly Equipment Rate + Allowable Hourly Operating Cost.
- Standby Rate = Allowable Hourly Equipment Rate x 35%

NOTE: The monthly rate is the basic machine plus any attachments

Standby rates shall apply when equipment is not in operation and is directed by the Engineer to standby for later use. In general, Standby rates shall apply when equipment is not in use, but will be needed again to complete The Work and the cost of moving the equipment will exceed the accumulated standby cost. Payment for standby time will not be made on any day the equipment operates for 8 or more hours. For equipment accumulating less than 8 hours operating time on any normal workday, standby payment will be limited to only that number of hours which, when added to the operating time for that day equals 8 hours. Standby payment will not be made on days that are not normally considered workdays.

The Department will not approve any rates in excess of the rates as outlined above unless such excess rates are supported by an acceptable breakdown of cost.

Payable time periods will not include:

- Time elapsed while equipment is broken down
- Time spent in repairing equipment, or
- Time elapsed after the Engineer has advised the Contractor the equipment is no longer needed

If a piece of equipment is needed which is not included in the above *Blue Book* rental rates, reasonable rates shall be agreed upon in writing before the equipment is used. All equipment charges by persons or firms other than the Contractor shall be supported by invoices.

- Transportation charges for each piece of equipment to and from the site of The Work will be paid provided:
- The equipment is obtained from the nearest approved source
- The return charges do not exceed the delivery charges
- Haul rates do not exceed the established rates of licensed haulers, and
- Such charges are restricted to those units of equipment not already available and not on or near the Project

No additional compensation will be made for equipment repair.

5. Miscellaneous: No additional allowance will be made for general superintendence, the use of small tools, or other costs for which no specific allowance is herein provided.

6. Compensation: The Contractor's representative and the Engineer shall compare records and agree on the cost of work done as ordered on a Force Account basis at the end of each day on forms provided by the Department.

7. Subcontract Force Account Work: For work performed by an approved Subcontractor or Second-tier Subcontractor, all provisions of this Section (109.05) that apply to the Prime Contractor in respect to labor, materials

and equipment shall govern. The prime Contractor shall coordinate the work of his Subcontractor. The prime Contractor will be allowed an amount to cover administrative cost equal to 5% of the Subcontractor's amount earned but not to exceed $5,000.00 per Subcontractor. Markup for Second-tier Subcontract work will not be allowed. Should it become necessary for the Contractor or Subcontractor to hire a firm to perform a specialized type of work or service which the prime Contractor or Subcontractor is not qualified to perform, payment will be made at reasonable invoice cost. To each invoice cost a markup to cover administrative cost equal to 5% of the total invoice but not to exceed $5,000.00 will be allowed the Contractor or Subcontractor but not both.

8. **Statements:** No payment will be made for work performed on a Force Account basis until the Contractor has furnished the Engineer with duplicate itemized statements of the cost of such Force Account work detailed as follows:

    a. Name, classification, date, daily hours, total hours, rate, and extension for each laborer, equipment operator, and supervisor, excluding superintendents.
    b. Designation, dates, daily hours, total hours, rental rate, and extension for each unit of machinery and equipment.
    c. Quantities of materials, prices, and extensions.
    d. Transportation of materials.
    e. Cost of property damage, liability, and worker's compensation insurance premiums, unemployment insurance contributions, and Social Security tax.

Statements shall be accompanied and supported by invoices for all materials used and transportation charges. However, if materials used on the Force Account work are not purchased specifically for such work but are taken from the Contractor's stock, then, in lieu of the invoices, the Contractor shall furnish an affidavit certifying that such materials were taken from his stock, that the quantity claimed was actually used, and that the price and transportation claimed represent the actual cost to the Contractor.

Payment based on Force Account records shall constitute full payment and settlement of all additional costs and expenses including delay and impact damages caused by, arising from or associated with The Work performed.

109.06 Eliminated Items

Should any Items contained in the Proposal be found unnecessary for the proper completion of The Work, the Engineer may, upon written order to the Contractor, eliminate such Items from the Contract, and such action shall in no way invalidate the Contract. When a Contractor is notified of the elimination of Items, he will be reimbursed for actual work done and all costs incurred, including mobilization of materials prior to said notifications.

109.07 Partial Payments

A. General

At the end of each calendar month, the total value of Items complete in place will be estimated by the Engineer and certified for payment. Such estimate is approximate only and may not necessarily be based on detailed measurements. Value will be computed on the basis of Contract Item Unit Prices or on percentage of completion of Lump Sum Items. When so requested by the Contractor and approved by the Engineer, Gross Earnings of $500,000.00 or more for work completed within the first 15 days of any month will be certified for payment on a semi-monthly basis subject to the conditions and provisions of Subsection 109.07.A, Subsection 109.07.B.6, Subsection 109.07.C, Subsection 109.07.D, Subsection 109.07.E, and Subsection 109.07.F.

B. Materials Allowance

Payments will be made on delivered costs, or percentage of bid price if otherwise noted, with copies of paid invoices provided to the Department for the materials listed below which are to be incorporated into the Project provided the materials:

- Conform to all Specification requirements.
- Are stored on the Project Right-of-Way or, upon written request by the Contractor and written approval of the Engineer, they may be stored off the Right-of-Way, but local to the Project, provided such storage is necessary due to lack of storage area on the Right-of-Way, need for security, or need for protection from weather.

As a further exception to on-Project storage, upon written request by the Contractor, the Engineer may approve off-the-Project storage items uniquely fabricated or precast for a specific Project, such as structural steel and precast concrete, which will be properly marked with the Project number and stored at the fabrication or precast facility.

The Engineer may approve out-of-state storage for structural steel and prestressed concrete beams uniquely fabricated for a specific Project stored at the fabrication facility.

1. Paid invoices should accompany the materials allowance request, but in no case be submitted to the Project Engineer later than 30 calendar days following the date of the progress payment report on which the materials allowance was paid.
   In case such paid invoices are not furnished within the established time, the materials allowance payment will be removed from the next progress statement and no further materials allowance will be made for that item on that Project.

2. Materials allowances will be paid for those items which are not readily available, and which can be easily identified and secured for a specific project and for which lengthy stockpiling periods would not be detrimental. Some exclusions are as follows:

   a. No payments will be made on living or perishable plant materials until planted.
   b. No payments will be made on Portland Cement, Liquid Asphalt, or Grassing Materials.
   c. No payment will be made for aggregate stockpiled in a quarry. Payment for stockpiled aggregate will be made only if the aggregate is stockpiled on or in the immediate vicinity of the project and is held for the exclusive use on that project. The aggregate must be properly secured. If the aggregate stockpiled is to be paid for perton (megagram) it must be reweighed on approved scales at the time it is incorporated into the Project.
   d. No payments will be made on minor material items, hardware, etc.

3. No materials allowance will be made for materials when it is anticipated that those materials will be incorporated into The Work within 30 calendar days.

4. No materials allowance will be made for a material when the requested allowance for such material is less than $25,000.

5. Where a storage area is used for more than one project, material for each project shall be segregated from material for other projects, identified, and secured. Adequate access for auditing shall be provided. All units shall be stored in a manner so that they are clearly visible for counting and/or inspection of the individual units.
6. The Commissioner may, at his discretion, grant waiver to the requirements of this Section when, in his opinion, such waiver would be in the public interest.

Subsequently, in the event the material is not on-hand and in the quantities for which the materials allowance was granted, the materials allowance payment will be removed from the next progress statement and no further materials allowance will be made for those items on that Project. If sufficient earnings are not available on the next progress statement, the Contractor agrees to allow the Department to recover the monies from any other Contract he may have with the Department, or to otherwise reimburse the Department.

Payments for materials on hand shall not exceed the invoice price or 75 percent of the bid prices for the pay items into which the materials are to be incorporated, whichever is less.

C. Minimum Payment

No partial payment will be made unless the amount of payment is at least $1000.00.

D. Liquidated Damages

Accrued liquidated damages will be deducted in accordance with Subsection 108.08.

E. Other Deductions

In addition to the deductions provided for above, the Department has the right to withhold any payments due the Contractor for items unpaid by the Contractor for which the Department is directly responsible, including, but not limited to, royalties (see Section 106).

F. Amount of Payment

The balance remaining after all deductions provided for herein have been made will be paid to the Contractor. Partial estimates are approximate and are subject to correction on subsequent progress statements. If sufficient earnings are not available on the subsequent progress statement, the Contractor agrees to allow the Department to recover the monies from any other Contract he may have with the Department, or to otherwise reimburse the Department. The Engineer is

responsible for computing the amounts of all deductions herein specified, for determining the progress of the Work and for the items and amounts due to the Contractor during the progress of the Work and for the final statement when all Work has been completed.

G. Interest

Under no circumstances will any interest accrue or be payable on any sums withheld or deducted by the Department as authorized by Subsection 109.07.A, Subsection 109.07.B.6, Subsection 109.07.C, Subsection 109.07.D, Subsection 109.07.E, and Subsection 109.07.F.

H. Insert the Following in Each Subcontract

The Contractor shall insert the following in each Subcontract entered into for work under this Contract:

"The Contractor shall not withhold any retainage on Subcontractors. The Contractor shall pay the Subcontractor 100% percent of the gross value of the Completed Work by the Subcontractor as indicated by the current estimate certified by the Engineer for payment."

Neither the inclusion of this Specification in the Contract between the Department and the Prime Contractor nor the inclusion of the provisions of this Specification in any Contract between the Prime Contractor and any of his Subcontractors nor any other Specification or Provision in the Contract between the Department and the Prime Contractor shall create, or be deemed to create, any relationship, contractual or otherwise, between the Department and any Subcontractor.

109.08 Final Payment

When Final Inspection and Final Acceptance have been made by the Engineer as provided in Subsection 105.16, the Engineer will prepare the Final Statement of the quantities of the various classes of work performed. All prior partial estimates and payments shall be subject to correction in the Final Statement. The District Engineer will transmit a copy of the Statement to the Contractor by Registered or Certified Mail. The Contractor will be afforded 20 days in which to review the Final Statement in the District Office before it is certified for payment by the Engineer. Any adjustments will be resolved by the District Engineer or in case of a dispute referred to the Chief Engineer whose decision shall be final and conclusive. After approval of the Final Statement by the Contractor, or after the expiration of the 20 days, or after a final ruling on disputed items by the Chief Engineer, the Final Statement shall be certified to the Treasurer by the Chief Engineer stating the Project has been accepted and that the quantities and amounts of money shown thereon are correct, due and payable.

The Treasurer, upon receipt of the Engineer's certification, shall in turn furnish the Contractor with the Department's Standard Release Form to be executed in duplicate. The aforesaid Release Form, showing the total amount of money due the Contractor, shall be sent to the Contractor by Registered or Certified Mail, to be delivered to such Contractor upon the signing of a return receipt card, to be returned to the Department in accordance with the provision of Federal law in respect to such matters and such return receipt card shall be conclusive evidence of a tender of said sum of money to the Contractor. Upon receipt of the properly executed Standard Release Form, the Treasurer shall make final payment jointly to the Contractor and his Surety. The aforesaid certification, executed release form, and final payment shall be evidence that the Commissioner, the Engineer, and the Department have fulfilled the terms of the Contract, and that the Contractor has fulfilled the terms of the Contract except as set forth in his Contract Bond.

The Standard Release Form is to be executed by the Contractor within 120 days after delivery thereof, as evidenced by the Registered or Certified Mail Return Receipt. Should the Contractor fail to execute the Standard Release Form because he disputes the Final Payment as offered, or because he believes he has a claim for damages or additional compensation under the Contract, the Contractor shall, within 120 days after delivery to the Contractor of the Standard Release Form, as evidenced by the Registered or Certified Mail Return Receipt, enter suit in the proper court for adjudication of his claim. Should the Contractor fail to enter suit within the aforesaid 120 days, then by agreement hereby stipulated, he is forever barred and stopped from any recovery or claim whatsoever under the terms of this Contract.

Should the Contractor fail to execute the Standard Release Form or file suit within 120 days after delivery thereof, then the Surety on the Contractor's Bond is hereby constituted the attorney-in-fact of the Contractor for the purpose of executing such final releases as may be required by the Department, including but not limited to the Standard Release Form, and for the purpose of receiving the Final Payment under this Contract.

The Department reserves the right as defined in Subsection 107.20, should an error be discovered in any estimates, to claim and recover from the Contractor or his Surety, or both, such sums as may be sufficient to correct any error of overpayment.

Such overpayment may be recovered from payments due on current active Projects or from any future State work done by the Contractor. The foregoing provisions of this Section shall be applicable both to the Contractor and the Surety on his Bond; and, in this respect, the Surety shall be bound by the provisions of Subsection 108.09 of these Specifications in the same way and manner as the Contractor.

A. Interest

In the event the Contractor fails to execute the *Standard Release Form* as prepared by the Treasurer because he disputes the amount of the final payment as stated therein, the amount due the Contractor shall be deemed by the Contractor and the Department to be an unliquidated sum and no interest shall accrue or be payable on the sum finally determined to be due to the Contractor for any period prior to final determination of such sum, whether such determination be by agreement of the Contractor and the Department or by final judgement of the proper court in the event of litigation between the Department and the Contractor.

The Contractor specifically waives and renounces any and all rights it may have under Section 13-6-13 of the Official Code of Georgia and agrees that in the event suit is brought by the Contractor against the Department for any sum claimed by the Contractor under the Contract, for delay damages resulting from a breach of contract, for any breach of contract or for any extra or additional work, no interest shall be awarded on any sum found to be due from the Department to the Contractor in the final judgement entered in such suit. All final judgements shall draw interest at the legal rate, as specified by law. Also, the Contractor agrees that notwithstanding any provision or provisions of Chapter 11 of Title 13 of the Official Code of Georgia that the provisions of this contract control as to when and how the Contractor shall be paid for The Work. Further, the Contractor waives and renounces any and all rights it may have under Chapter 11 of Title 13 of the Official Code of Georgia.

B. Termination of Department's Liability

Final payment will be in the amount determined by the statement as due and unpaid. The acceptance of the final payment or execution of the Standard Release Form or failure of the Contractor to act within 120 days as provided herein after tender of payment, or final payment to the Contractor's Surety in accordance with the provisions stipulated herein, shall operate as and be a release to the Department, the Commissioner, and the Engineer from all claims of liability under this contract and for any act or neglect of the Department, the Commissioner, or the Engineer.

109.09 Termination Clause

A. General

The Department may, by written notice, terminate the Contract or a portion thereof for the Department's convenience when the Department determines that the termination is in the State's best interest, or when the Contractor is prevented from proceeding with the Contract as a direct result of one of the following conditions:

1. An Executive Order of the President of the United States with respect to the prosecution of war or in the interest of national defense.
2. The Engineer and Contractor each make a determination, that, due to a shortage of critical materials required to complete the Work which is caused by allocation of these materials to work of a higher priority by the Federal Government or any agency thereof, it will be impossible to obtain these materials within a practical time limit and that it would be in the public interest to discontinue construction.
3. An injunction is imposed by a court of competent jurisdiction which stops the Contractor from proceeding with the Work and causes a delay of such duration that it is in the public interest to terminate the Contract and the Contractor was not at fault in creating the condition which led to the court's injunction.
   The decision of the Engineer as to what is in the public interest and as to the Contractor's fault, for the purpose of Termination, shall be final.
4. Orders from duly constituted authority relating to energy conservation.

B. Implementation

When, under any of the conditions set out in Subsection A of this Section, the Contract, or any portion thereof, is terminated before completion of all Items of Work in the Contract, the Contractor shall be eligible to receive some or all of the following items of payment:

1. For the actual number of units of Items of Work completed, payment will be made at the Contract Unit Price.
2. Reimbursement for organization of the Work and moving equipment to and from the job will be considered where

the volume of work completed is too small to compensate the Contractor for these expenses under the Contract Unit Prices. However, the Engineer's decision as whether or not to reimburse for organization of the Work and moving equipment to and from the job, and in what amount, shall be final.

3. Acceptable materials, obtained by the Contractor for the Work, that have been inspected, tested, and accepted by the Engineer, and that are not incorporated in the Work will, at the request of the Contractor, be purchased from the Contractor at actual cost as shown by receipted bills and actual cost records at such points of delivery as may be designated by the Engineer. This will include any materials that have been delivered to the project site or that have been specifically fabricated for the project and are not readily usable on other projects.

It will not include materials that may have been ordered, but not delivered to the project site and that are readily usable on other projects (e.g., guard rail, stone, lumber, etc.).

4. For Items of Work partially completed, payment adjustments including payments to afford the Contractor a reasonable profit on work performed, may be made as determined by the Engineer based upon a consideration of costs actually incurred by the Contractor in attempting to perform the Contract.

5. No payment will be made, and the Department will have no liability, for lost profits on Work not performed. In particular, the Department will not be liable to the Contractor for all profits the Contractor expected to realize had the project been completed, nor for any loss of business opportunities, nor for any other consequential damages.

6. In order that the Department may make a determination of what sums are payable hereunder, the Contractor agrees that, upon termination of the Contract, it will make all of its books and records available for inspection and auditing by the Department.
   To be eligible for payment, costs must have been actually incurred, and must have been recorded and accounted for according to generally accepted accounting principles, and must be items properly payable under Department policies. Where actual equipment costs cannot be established by the auditors, payment for unreimbursed equipment costs will be made in the same manner as is provided in Subsection 109.05 for Force Account Work. Idle time for equipment shall be reimbursed at standby rates. In no case will the Contractor be reimbursed for idle equipment after the Engineer has advised the Contractor the equipment is no longer needed on the job. Refusal of the Contractor to allow the Department to inspect and audit all of the Contractor's books and records shall conclusively establish that the Department has no liability to the Contractor for any payment under this provision, and shall constitute a waiver by the Contractor of any claim for damages allegedly caused by breach or termination of the Contract. The amount payable under this provision, if any, is to be determined by the Engineer, whose determination will be final and binding.

7. The sums payable under this Subsection shall be the Contractor's sole and exclusive remedy for termination of the Contract.

C. Termination of a Contract

Termination of a Contract or a portion thereof shall not relieve the Contractor of his responsibilities for any completed portion of the Work, nor shall it relieve his Surety of its obligation for and concerning any just claims arising out of the Work performed.

109.10 Interest

In the event any lawsuit is filed against the Department alleging the Contractor is due additional money because of claims or for any breach of contract, the Contractor hereby waives and renounces any right it may have under O.C.G.A. Section 13-6-13 to prejudgment interest. Also, the Contractor agrees that notwithstanding any provision or provisions of Chapter 11 of Title 13 of the Official Code of Georgia that the provisions of this contract control as to when and how the Contractor shall be paid for The Work. Further, the Contractor waives and renounces any and all rights it may have under Chapter 11 of Title 13 of the Official Code of Georgia.

Section 148—Pilot Vehicles

148.1 General Description

Specifications for this work will be included elsewhere in the Contract.

Section 149—Construction Layout

149.1 General Description

Perform construction layout to guide and control performance of items of the work according to this Specification.

This work includes:

- Placing, replacing (if necessary), and maintaining construction layout points.
- Preparing construction layout drawings, sketches, and computations.
- Recording data in field books such as alignment, slope stake, blue top, drainage layout, bridge, and other books used for layout for this Project.

149.1.01 Definitions Section 149-Construction Layout

General Provisions 101 through 150

149.1.02 Related References

A. Standard Specifications

General Provisions 101 through 150

B. Referenced Documents

General Provisions 101 through 150

149.1.03 Submittals

Submit the following documentation to the Department:

A. Project Construction Records
These records detail information that the Department uses to determine the template line for the as-built cross sections, which defines the computation line for unclassified excavation. These records include:

- Survey records
- Bound field notebooks
- Computer printouts that record the Project's construction

Prepare the records as directed by the Engineer.

B. Survey Documents
Furnish the Engineer with a copy of survey documents that relate to construction layout. Provide these documents when the Engineer requests or as they are completed. The Engineer may check the documents for accuracy and may require revisions where necessary. The documents become Department property and will be included in the permanent Project records.

C. Drainage Structure Sketches
Profile both inlet and outlet ends of proposed drainage structures for at least 100 ft (30 m) in the existing ditch line or stream bed. Adjust flowline elevations, if necessary, to enhance the hydraulics and to reduce silting, scouring, or backwater.

Calculate the length of each structure and provide sketches of the structure to the Engineer for review and approval at least 24 hours before beginning the work.

D. Bridge Layout Sketch
Furnish a layout sketch before staking on bridges. After staking, submit a revised sketch for the Engineer's review and approval before beginning construction. Include in the layout sketch relevant stations, angles, dimensions, and redundant checks including exterior beam dimensions in each span. Also include all horizontal and vertical clearances with calculations that verify the clearances shown.

Submit for the Engineer's review and approval survey data and calculations with the layout sketch and information required for bent construction.

Verify the Plan elevations for all bridge bearing seats on the substructure.

E. Wall Layout Sketches
Submit sketches and other data verifying either that the wall will fit the final field conditions, or indicate where revisions are necessary. Submit these sketches well before the wall construction begins so the Engineer can make any necessary structural design changes.

149.2 Materials

General Provisions 101 through 150

149.2.01 Delivery, Storage, and Handling

General Provisions 101 through 150

149.3 Construction Requirements

General Provisions 101 through 150

149.3.01 Personnel

Furnish personnel capable of establishing line and grade points necessary to complete the work. Establish these points within the generally accepted surveying tolerances, and ensure that they are acceptable for the work being performed.

149.3.02 Equipment

Furnish surveying equipment, stakes, and all materials necessary to perform the work, subject to the Engineer's approval.

149.3.03 Preparation

A. General Pre-Construction
Before beginning construction:

1. Ensure that plan dimensions, alignment, and elevations are compatible with existing field conditions. Make adjustments where necessary.
2. Ensure alignment tie-ins by coordinating construction layout with that of other Contractors whose work abuts any portion of the work. All adjustments are subject to the Engineer's approval.

B. Widening and Reconstruction
Before beginning construction where existing pavement is to be retained either for widening or for reconstruction:

1. Take three-point levels of the pavement throughout the length to be retained.
   Normally, the three-point levels will be required at 50 ft (15 m) intervals. However, the Engineer may adjust these intervals according to existing field conditions. Three-point levels are not required on asphalt shoulder widening projects and earth shoulder reconstruction projects.

2. From the three-point levels, prepare a graphic grade plot that "best fits" the existing pavement to minimize the leveling requirements (if any) of the existing roadway. Cross slopes may be varied within the ranges shown on the Plans or adjusted by the Engineer to produce the "best fit."

3. On passing lane or widening Projects where existing pavement is not to be overlaid:

    a. Profile and plot the outside edge of the existing pavement to obtain a smooth profile grade.
    b. Transfer this grade to the new edge of paving using the proper cross slope.
4. Furnish data to the Engineer for approval before beginning widening and reconstruction.
5. On widening, reconstruction, or passing lane projects, obtain the Engineer's approval of the "best fit" profile. Ensure that grade stakes are set to control the construction of any required widening based upon the "best fit" profile and cross slope. Construct proposed widening flush with the existing edge of paving. Provide positive drainage in all cases.

C. Existing Bridge Widening or Modification

To widen or modify existing bridges, do the following before ordering materials or beginning construction:

1. Verify existing elevations and dimensions as well as confirm or determine required new cap elevations.
2. Profile the removal line and cross section the existing deck.
3. Use this profile information to determine a "best fit" finished grade for the widened portion.
4. Compute the new cap elevations based on this "best fit" information.
5. Furnish survey data, layout sketch, and calculations to the Engineer for approval.

D. Retaining Wall Construction Layout

Set stakes, take necessary cross sections, and perform necessary calculations at each wall before beginning wall construction to ensure that the geometric design of the retaining wall conforms to actual conditions.

149.3.04 Fabrication

General Provisions 101 through 150

149.3.05 Construction

A. Verify Plan Elevations

Verify plan elevations for all bridge bearing seats on the substructure.

B. Verify Bent Layout

After bent construction has begun, verify bent layout at each major phase of the construction to ensure that the bent is properly positioned in relation to adjacent bents.

C. Establish the Centerline

Establish the centerline as follows:

1. Establish or reestablish the centerline from the monuments and/or reference points the Department will provide.

2. On widening or reconstruction Projects, establish the horizontal and vertical alignment of the existing roadway and bridges.

3. Modify the Plan horizontal and vertical alignment to conform to the existing alignment as necessary.

The Department will furnish at least one bench mark that the Contractor shall preserve, and if necessary, relocate as follows:

    a. Verify the accuracy of the bench mark(s) and report discrepancies to the Engineer.
    b. Establish additional benchmarks needed for construction.
    c. Maintain the bench marks for necessary Department checks.

E. Flag In-Place Survey Control Monuments

Flag and protect in-place survey control monuments and reference points, including Right-of-Way/property line intersections, as follows:

1. Pay for and replace destroyed or disturbed stakes or monuments.

2. When included as Pay Items, stake Right-of-Way markers.

F. Line, Grades, and Stakes

Set other line and grade stakes needed to construct the job, including stakes needed to relocate utilities. Stake the Right – of-Way and maintain throughout the life of the project. Restake flattened slopes, minor grade or alignment changes, and other incidentals.

G. Stake Centerline Control Alignments

Stake centerline control alignments shown on the Plans or adjusted as described above when the Department needs accurate measurement of quantities for payment. Stake these control alignments as follows:

1. Stake the alignments to an accuracy of 1:5000.

2. Stake the alignments just before the Department takes aerial photography or field cross sections for both original and final cross sections.

3. Provide the Department with elevations of positions staked for the Department's quantity measurements. Ensure that these elevations are of third order accuracy, or better. Determine them using the differential leveling method.

4. Take intermediate cross sections required because of stage construction, detours, or other reasons.

H. Provide Graphic Sketches

Prepare and use graphic sketches of super elevation runout on curves on multi-lane roadways and of tie-ins of ramps to mainline on freeways and expressways to help provide positive drainage, adequate super elevation, and a pleasing appearance. Prepare and use similar sketches for street or roadway intersections.

I. Maintain the Stakes

After construction has begun in any segment of the Project, maintain the stakes that identify construction station numbers and locations as follows:

1. Ensure that stakes are placed at intervals not to exceed 200 ft (60 m) and use even, 100 ft (30 m) stations. On asphalt shoulder widening and earth shoulder reconstruction projects use mile post numbers when stations are not used. Mark and flag stakes so that they are visible to DOT Project personnel in that segment of the Project until construction is complete. Projects utilizing GPS controlled fine grading equipment, place stakes at intervals not to exceed 300 ft (91 m) on English projects and 100 m (310 ft) on metric projects. Use even, 100 ft (30 m) or 100 m (310 ft), stations.

2. During grading activities in fills or cuts over 20 ft (6 m), extend slope stakes up or down the slopes in intervals of 10 ft (3 m) or less to achieve an accurate cross section.

3. Denote the offset distance to the construction centerline on the station number stakes, when the station number is maintained in a location other than on the construction centerline. On asphalt shoulder widening and earth shoulder reconstruction projects use the offset to the edge of pavement on the stakes.

J. Traffic Markings

When traffic markings are to be placed by either the Contractor or others, furnish the layout and clean and pre-line the surface to allow the placement of permanent pavement markings on the Project.

When traffic markings are not included in the Project plans, the Department will provide striping plans and/or standard drawings for the Contractor's use.

K. Provide Bridge Construction Layout

Provide alignment control, grade control, and calculations to set these controls for bridge construction.

For new bridges, the Department will furnish the necessary input data forms for the Department's "Bridge Geometry" computer program upon the Contractor's request. The Department will process the data to help the Contractor obtain finished deck elevations.

Data processing is available only as an alternate service to determine elevations. If this service is elected for use, prepare the input data and the Department will furnish the output data. The following limitations apply:

- The Department will not assume liability for the accuracy of either input or output data.
- The Department will limit this service to two programs per bridge.
- This service is not available for existing bridges that are to be widened. Finished deck elevations for bridges that are to be widened will not be furnished.

149.3.06 Quality Acceptance

The Engineer's acceptance of all or any part of the Contractor's layout shall not relieve the Contractor of responsibility to secure proper dimensions for the completed work. Correct at the Contractor's expense work incorrectly located due to layout error.

149.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150

149.4 Measurement

This item is not measured for payment.

149.4.01 Limits

General Provisions 101 through 150

149.5 Payment

This work is not paid for separately. The costs for performing layout work as described in this Specification are included in the bid for the items of work to which the layout is incidental.

Any unnecessary work, overruns, costs, etc., resulting from inaccurate data submitted by the Contractor will be deducted from Contractor payments.

149.5.01 Adjustments

General Provisions 101 through 150.

Section 150—Traffic Control

150.1 General Description

Specifications for this work will be included elsewhere in the Contract.

Section 151—Mobilization

151.1 General Description

Mobilization, when listed as a pay item in the Proposal, includes preparatory work and operations, including but not limited to, moving personnel, equipment, supplies, and incidentals to the Project site. Mobilization also includes all other work and operations that shall be performed or costs incurred before beginning work on the various Items on the Project site.

151.1.01 Definitions

General Provisions 101 through 150.

151.1.02 Related References

A. Standard Specifications

General Provisions 101 through 150.

B. Referenced Documents

General Provisions 101 through 150.

151.1.03 Submittals

General Provisions 101 through 150.

151.2 Materials

General Provisions 101 through 150.

151.2.01 Delivery, Storage, and Handling

General Provisions 101 through 150.

151.3 Construction Requirements

General Provisions 101 through 150.

151.3.01 Personnel

General Provisions 101 through 150.

151.3.02 Equipment

General Provisions 101 through 150.

151.3.03 Preparation

General Provisions 101 through 150.

151.3.04 Fabrication

General Provisions 101 through 150.

151.3.05 Construction

General Provisions 101 through 150.

151.3.06 Quality Acceptance

General Provisions 101 through 150.

151.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

151.4 Measurement

This item of work is not measured separately for payment.

151.4.01 Limits

The total sum of payments shall not exceed the original Contract amount bid for this item.

151.5 Payment

The Department will make partial payments as follows:

1. The first regular payment is 50 percent of the amount bid for mobilization, or 3 percent of the original Contract amount, whichever is less.

2. When 5 percent of the original contract amount is earned, the next progress payment is 100 percent of the amount bid for mobilization, or 3 percent of the total original contract amount, whichever is less, minus any previous payments.

3. Any amount bid for mobilization in excess of 3 percent of the original Contract amount is paid when work on the Project is complete.

4. The total sum of the payments shall not exceed the original Contract amount bid for this item.
Payment includes all costs for mobilization, demobilization, and remobilization as required to complete the work.

Payments will be made under:

Item No. 151	Mobilization	Per lump sum

151.5.01 Adjustments

General Provisions 101 through 150.

Section 152—Field Laboratory Building

152.1 General Description

This work includes furnishing and maintaining field laboratory buildings, if required by the Contract. The building is reserved for the Engineer's exclusive use as long as the Engineer deems necessary.

152.1.01 Definitions

General Provisions 101 through 150.

152.1.02 Related References

A. Standard Specifications

Section 400—Hot Mix Asphaltic Concrete Construction
Section 402—Hot Mix Recycled Asphaltic Concrete

B. Referenced Documents

AASHTO TP4
AASHTO T166
AASHTO T209
AASHTO T309
GDT 125, "Method of Test for Determining Asphalt Content by Ignition"
NFPA–10A

152.1.03 Submittals

General Provisions 101 through 150.

152.2 Materials

General Provisions 101 through 150.

152.2.01 Delivery, Storage, and Handling

General Provisions 101 through 150.

152.3 Construction Requirements

General Provisions 101 through 150.

152.3.01 Personnel

General Provisions 101 through 150.

152.3.02 Equipment

General Provisions 101 through 150.

152.3.03 Preparation

General Provisions 101 through 150.

152.3.04 Fabrication

General Provisions 101 through 150.

152.3.05 Construction

A. Field Laboratory Physical Requirements
Provide a laboratory using a structure approved by the Engineer, such as a:

- Building
- Trailer
- Fixed building erected on the site
- Vacated house at an approved location

Each field laboratory shall house the required testing equipment and meet the minimum requirements for dimensions, space, and facilities.
Each building or trailer shall be at least 7 ft (2.1 m) wide and 7 ft (2.1 m) high inside and contain not less than 120 ft² (11 m²) of floor space. Each unit shall be floored, roofed, and weather tight and contain the following:

- At least one hinged or sliding window on each side with each window having at least 6.5 ft² (0.6 m²) of openings
- An entrance door that can be securely locked
- Built-in work table with at least two drawers (one lockable)
- Lighting and ventilation
- Heating with necessary fuel
- Potable running water
- Electric current
- Sheds and platforms required for special testing equipment
- Sanitary Facilities—Include in each field laboratory sanitary facilities that meet the requirements of the local or
- State Health Departments.
- Fire Extinguisher—Equip each building with at least one approved fire extinguisher that meets the following requirements:

  1) Multipurpose dry chemical type extinguisher
  2) Underwriters Laboratory rating of 4A-40BC

Mount the extinguisher(s) in a convenient and conspicuous place that is easily accessible from any part of the building. Maintain the extinguisher(s) in working condition according to the requirements of NFPA–10A.

B. Plant Laboratory Physical Requirements
Provide laboratory buildings at asphalt, concrete, or base plants. Place the buildings so that the plant is in full view from one of the windows.

C. Number of Laboratories Required
The number of laboratories shown in the Proposal is based on estimated job requirements. Actual conditions may require more or fewer. Provide the quantity as required by the Engineer at the Unit Price Bid for the facility.

D. Asphaltic Concrete Plant Laboratory Requirements

1. **Laboratory Building.** Provide a laboratory building that meets the minimum requirements for a Field Laboratory as described in Subsection 152.3.05.A.

2. **Ventilation System.** Equip the laboratory so that when the windows and doors are closed and the ventilation system is functioning as required, the temperature can be maintained between 65 °F and 80 °F (18 °C and 27 °C).

3. **Enclosures.** Provide enclosures in laboratories for procedures where extracting solvent vapors are emitted. After the asphalt is extracted, dry samples under an enclosure or inside an oven that is vented outside the lab. Provide enclosures as follows:

Equip each enclosure with the following:

- A hood, glass, or other doors capable of enclosing the extracting solvent vapors from the ambient air in the lab
- An exhaust fan located in the rear or top of the hood for each work compartment

- Replacement air provided through an open window or other opening to achieve the specified exchange of Air
- Ventilation system capable of exchanging air at the rate of 100 $ft^3/ft^2/min$ (30 $m^3/m^2/min$) over the entire open door area of each enclosure

Locate the laboratory ventilation, heating, and cooling systems so that the exhausted extracting solvent vapors do not re-enter the laboratory through either the heating or cooling systems.
Ensure that the extracting solvent is supplied to the laboratory through a closed-system opening only under the enclosures.

Mount the storage containers for the extracting solvent outside the laboratory and run a feed line from the container to a cut-off valve located in the enclosures. Ensure that all parts of the enclosures, hoods, and other related equipment are functional during testing.

4. **Platform.** Provide a safe platform to the proper height for the Inspector to use to obtain asphalt mix or base samples and to inspect mixes in the truck beds.

5. **Testing Equipment.** Furnish and maintain in good condition at the field laboratory the following testing equipment. All testing equipment is subject to the Engineer's approval.

a. One each—Oven (mechanical convection, range to 400 °F (204 °C). Comparable to Blue M Model OV-560A-2.

NOTE: Vent the oven exhaust outside the laboratory.

b. One each—Sieve Shaker (Ro-Tap design or approved equal). Designed for Standard 8 in (203 mm) diameter sieve.

c. One each—

- Computer, IBM or IBM Compatible
- 540 Megabyte Hard Disk Drive (Minimum)
- 3 ½ inch (90 mm) High Density Floppy Disk Drive
- CD-ROM Drive (4X Minimum)
- Mouse
- Modem 9600 Baud (Minimum)
- 1 Parallel and 2 Serial Ports
- 16 Megabyte Random Access Memory Expandable to at Least 32 Megabytes
- VGA Monitor
- 486 Microprocessor Operating at 33 Megahertz (Minimum)

d. One each—Printer (Desk Jet HP Letter Quality Printer)

e. One each—Electronic balance with weighing capacity of at least 26.45 lb. (12,000 grams) with digital display, and sensitivity to meet requirements of AASHTO T166 and AASHTO T209. The weighing device shall have a suspension apparatus which meets requirements of AASHTO T166.

f. * One each—Superpave Gyratory Compactor (SGC) Equipment-A Superpave Gyratory Compactor and appurtenances, including a calibration kit, which meets equipment requirements and testing protocol of a nationally recognized Superpave Center and AASHTO TP 4. The SGC shall be equipped with:

- A printer to provide a real-time printout of the date and time of compaction, number of gyrations, and specimen height for each gyration during the compaction cycle.
- At least two mold assemblies
- A specimen extruder

g. *One each—Vacuum pump flasks or bowls, fittings and other accessories as required by AASHTO T209. (A corelok device with related accessories may be substituted if approved by the Department).

h. *One each—Asphalt Ignition Oven which meets requirements of GDT 125 and AASHTO T309.
*Required only for interstate Projects involving mainline traveled way that include pay items under Section 400 or Section 402.

E. Portland Cement Concrete Plant Laboratory Requirements
For Portland cement concrete plants, provide a plant laboratory building and testing and curing equipment meeting the following minimum requirements.

1. Laboratory Building. Provide a laboratory building that contains:

- Combined office/workspace measuring 300 ft² (28 m²)
- Heating and air conditioning equipment capable of maintaining an interior temperature of 70 °F (21 °C)
- Separate office space with enough space for a desk and at least two chairs
- A work table at least 2.5 ft (750 mm) wide, 5 ft (1500 mm) long, and 3 ft (900 mm) high to prepare concrete
- cylinders for testing
- An outside work area of at least 10 ft by 10 ft (3 m by 3 m) consisting of a concrete slab constructed level and true, with a light broom finish

2. **Testing and Curing Equipment.** Provide the following testing and curing equipment:

- Concrete cylinder capping equipment including molds, melting pot with ventilation and accessories, and a sufficient supply of capping compound, all meeting applicable ASTM Specifications.
- Concrete cylinder compression testing machine with a minimum capacity of 250,000 lbs (1112 kN) that meets applicable ASTM Specifications.
- Concrete cylinder curing tanks capable of maintaining 200 cylinders at 73 °F ± 3 °F (23 °C ± 1.7 °C) for a 28-day curing period.
- Concrete cylinder warm water curing tank capable of maintaining 18 cylinders at 95 °F ± 5 °F (35 °C ± 2.8 °C) for a 24-hour curing period.

Maintain the equipment in good condition and to the Engineer's approval.

152.3.06 Quality Acceptance

The dimensions specified above are minimum requirements. Minor dimensional and detail deviations are not cause for rejection if the Engineer approves of the deviation.

152.3.07 Contractor Warranty and Maintenance

Maintain each building, appurtenance, and sanitary facility as required by this Specification. Furnish electricity, water, and heating as required by this Specification.
Ownership of the building(s) remains with the Contractor. Maintaining and furnishing the buildings(s) after the date of Final Acceptance of the Project is not required.

152.4 Measurement

The actual number of field laboratories furnished according to this Specification is measured separately for each laboratory. There will be no measurement or payment for laboratories furnished at base, asphaltic concrete, or Portland cement concrete central mix plants.

152.4.01 Limits

General Provisions 101 through 150.

152.5 Payment

Each field laboratory measured for payment as described in Subsection 152.4, is paid at the Contract Unit Price bid for each laboratory.

Payment is full compensation for the cost of all foundations, buildings, sheds, platforms, utilities, maintenance, sanitary facilities, removal, razing, heat, electricity, water, and site preparation and cleanup according to this Specification.
Payment for each field laboratory is made in two installments:
Sixty-five percent of the contract price is paid when the Laboratory is ready for occupancy.
Thirty-five percent of the contract price is paid when the Department finishes using the laboratory.

Payment will be made under:

Item No. 152	Field laboratory	Per each

152.5.01 Adjustments

General Provisions 101 through 150.

Section 153—Field Engineer's Office

153.1 General Description

This work includes providing, furnishing, and maintaining field office buildings, when the Contract requires, before beginning construction and according to this Specification. The Contractor shall possess the building while the Department uses it. See Subsection 153.3.07, "Contractor Warranty and Maintenance."
The Engineering personnel will use the building exclusively for as long as they consider necessary, but no longer than the date of Final Acceptance of the Project.

153.1.01 Definitions

General Provisions 101 through 150.

153.1.02 Related References

A. Standard Specifications

Section 636—Highways Signs
Section 643—Fence
Section 910—Sign Fabrication
Section 911—Sign Posts
Section 912—Sign Blanks and Panels
Section 913—Reflectorizing Materials

B. Referenced Documents

NFPA-10A

153.1.03 Submittals

Before installing Project Office signs, submit a signage plan for this work to the Engineer for approval.

153.2 Materials

Ensure that all materials are of commercial grade. Sampling and testing is not required.

Section 161—Control of Soil Erosion and Sedimentation

161.1 General Description

Specifications for this work will be included elsewhere in the Contract.

Section 162—Erosion Control Check Dams

162.1 General Description

This work includes furnishing, constructing, and maintaining erosion control check dams.

162.1.01 Definitions

General Provisions 101 through 150.

162.1.02 Related References

A. Standard Specifications

Section 810—Roadway Materials

B. Referenced Documents

General Provisions 101 through 150.

162.1.03 Submittals

General Provisions 101 through 150.

162.2 Materials

A. Erosion Control Materials

Use these materials as needed to control erosion on check dams:

1. Where required, use any commercial type of woven wire minimum 14 ½ gauge.

2. Obtain other materials such as logs, brush, stakes, etc., from the Right-of-Way where available.

3. Place Number 57 stone, where required, at the location and depth indicated on the Plans.

4. Ensure that material in the earth dams meets the requirements of Subsection 810.2.01.A.1, “Classes” for Class II soils.

162.2.01 Delivery, Storage, and Handling

General Provisions 101 through 150.

162.3 Construction Requirements

162.3.01 Personnel

General Provisions 101 through 150.

162.3.02 Equipment

General Provisions 101 through 150.

162.3.03 Preparation

General Provisions 101 through 150.

62.3.04 Fabrication

General Provisions 101 through 150.

162.3.05 Construction

A. Check Dam Construction

Construct check dams as follows:

1. Construct check dams before roadway clearing, grubbing, or grading is done in the affected drainage area. Construct according to the Plans.

2. Remove the trees, logs, brush, etc., within the Right-of-Way and the affected area that may be used to construct the check dams. Do not disturb other natural ground cover.

NOTE: Use only rubber-tired equipment to work in the affected drainage area until after the check dam is in place and completed.

3. Obtain the embankment material for the earth dams from outside the area draining into the protected pond or stream.

4. Immediately after completing the earthwork on the earth dams, place a layer of Number 57 stone on the downstream side of the dam. Immediately grass the remaining portions (top and upstream slopes) of the earth dams.

5. Immediately after grading, grass or stabilize with straw mulch roadway cut and fill slopes that drain toward the check dam drainage area.

6. Leave check dams in place after construction is complete unless otherwise directed by the Engineer.

162.3.06 Quality Acceptance

General Provisions 101 through 150.

162.3.07 Contractor Warranty and Maintenance

Repair the check dams as needed during the life of the Contract.

The estimated number of check dams required is shown on the Plans. Additional check dams may be necessary and shall be constructed when directed by the Engineer.

162.4 Measurement

The number of erosion control check dams measured for the payment is the actual number completed and accepted.

162.4.01 Limits

General Provisions 101 through 150.

162.5 Payment

Erosion control check dams, as measured in Subsection 162.4, "Measurement," are paid for at the Contract Unit Price. Payment is full compensation for:

- Earth dam construction and compaction
- Required grassing, mulching, and Number 57 stone
- Log dams and dissipaters
- Removal if ordered by the Engineer

Payment for this Item is made as follows:

- 75 percent of the Contract Price is paid when each erosion control check dam is complete in place.
- 25 percent is paid when the Engineer instructs the Contractor that the check dam is no longer required but will remain in place or be removed, whichever applies.

NOTE: Temporary devices will be left in place at the Engineer's discretion without a change in cost

Payment will be made under:

Item No. 162	Erosion control check dam---type___	Per each

162.5.01 Adjustments

General Provisions 101 through 150.

Section 163—Miscellaneous Erosion Control Items

163.1 General Description

- This work includes constructing and removing:
- Silt control gates
- Temporary erosion control slope drains shown on the Plans or as directed
- Sediment basins
- Baled straw sediment barrier and check dams
- Rock filter dams
- Stone filter berms
- Stone filter rings
- Other temporary erosion control structures shown on the Plans or directed by the Engineer

This work also includes applying mulch (straw or hay, erosion control compost), and temporary grass.

163.1.01 Related References

A. Standard Specifications

Section 109—Measurement and Payment
Section 161—Control of Soil Erosion and Sedimentation
Section 171—Temporary Silt Fence
Section 500—Concrete Structures
Section 603—Rip Rap
Section 700—Grassing
Section 715—Bituminous Treated Roving
Section 720 – Triangular Silt Barrier
Section 800—Coarse Aggregate
Section 801—Fabrics
Section 822—Emulsified Asphalt
Section 860—Lumber and Timber
Section 863—Preservative Treatment of Timber Products
Section 890—Seed and Sod
Section 893—Miscellaneous Planting Materials

B. Referenced Documents

AASHTO M252
AASHTO M294

163.1.02 Submittals

Provide written documentation to the Engineer as to the average weight of the bales of mulch.

163.2 Materials

Provide materials shown on the Plans, such as pipe, spillways, wood baffles, and other accessories including an anti-seep collar, when necessary. The materials shall remain the Contractor's property after removal, unless otherwise shown on the Plans.

Materials may be new or used; however, the Engineer shall approve previously used materials before use.

Materials shall meet the requirements of the following Specifications:

Material	Section
Mulch	893.2.02
Temporary Silt Fence	171
Concrete Aprons and Footiongs shall be Class A	500
Rip Rap	603
Temporary Grass	700
Bituminous Treated Roving	715
Triangular Silt Barrier	720
Lumber and Timber	860.2.01
Preservative Treatment of Timber Products	863.1
Corrugated Polyethylene Temporary Slope Drain Pipe	AASHTO M252 or M294

163.2.01 Delivery, Storage, and Handling

General Provisions 101 through 150.

163.3 Construction Requirements

163.3.01 Personnel

General Provisions 101 through 150.

163.3.02 Equipment

General Provisions 101 through 150.

163.3.03 Preparation

General Provisions 101 through 150.

163.3.04 Fabrication

General Provisions 101 through 150.

163.3.05 Construction

A. Silt Control Gates
If silt control gates are required or are directed by the Engineer, follow these guidelines to construct them:

1. Clear and grade only that portion of the roadway within the affected drainage area where the drainage structure will be constructed.

2. Construct or install the drainage structure and backfill as required for stability.

3. Install the silt control gate at the inlet of the structure. Use the type indicated on the Plans.

4. Vary the height of the gate as required or as shown on the Plans.

5. Finish grading the roadway in the affected drainage area. Grass and mulch slopes and ditches that will not be paved. Construct the ditch paving required in the affected area.

6. Keep the gate in place until the work in the affected drainage area is complete and the erodible area is stabilized.

7. Remove the Type 1 silt gate assembly by sawing off the wood posts flush with the concrete apron. Leave the concrete apron between the gate and the structure inlet in place. The gate shall remain the property of the Contractor.

B. Temporary Slope Drains
If temporary slope drains are required, conduct the roadway grading operation according to Section 161 and follow these guidelines:

1. Place temporary pipe slope drains with inlets and velocity dissipaters (straw bales, silt fence, or aprons) according to the Plans.

2. Securely anchor the inlet into the slope to provide a watertight connection to the earth berm. Ensure that all connections in the pipe are leak proof.

3. Place temporary slope drains at a spacing of 350 ft. (105 m) maximum on a 0% to 2% grade and at a spacing of 200 ft (60m) maximum on steeper grades, or more frequently as directed by the Engineer. Keep the slope drains in place until the permanent grass has grown enough to control erosion.

4. Remove the slope drains and grass the disturbed area with permanent grass. However, the temporary slope drains may remain in place to help establish permanent grass if approved by the Engineer.

C. Sediment Basins
Construct sediment basins according to the Plans at the required location, or as modified by the Engineer.

1. Construct the unit complete as shown, including:
   - Grading
   - Drainage
   - Rip rap
   - Spillways
   - Anti-seep collar
   - Temporary mulching and grassing on internal and external slopes
   - Accessories to complete the basin

2. When the sediment basin is no longer needed, remove and dispose of the remaining sediment.

3. Remove the sediment basin. Grade to drain and restore the area to blend with the adjacent landscape.

4. Mulch and permanently grass the disturbed areas according to Section 700.

D. Sediment Barrier (baled straw)
Construct sediment barrier (baled straw) according to the Plan details. Use rectangular, standard size baled straw in mechanically produced bales.

The following items may be substituted for sediment barrier (baled straw)

1. Type B Silt Fence.

2. Triangular Silt Barrier.

3. Synthetic Fiber: Use synthetic fiber bales of circular cross section at least 18 in (450 mm) in diameter. Use synthetic bales of 3 ft or 6 ft (0.9 m or 1.8 m) in length that are capable of being linked together to form a continuous roll of the desired total length. Use bales that are enclosed in a geotextile fabric and that contain a pre-made stake hole for anchoring.

4. Coir: Use coir fiber bales of circular cross section at least 16” (400mm) in diameter. Use coir bales of 10 ft., 15 ft., or 20 ft. (3 m, 4.5 m, or 6 m) in length. Use coir baled with coir twine netting with 2 in X 2 in (50 mm X 50 mm) openings. Use coir bales with a dry density of at least 7 lb./ft^3 (112 kg/m^3). Anchor in place with 2 in X 4 in (50 mm X 100 mm) wooden wedges with a 6 in (150 mm) nail at the top. Place wedges no more than 36 in (900 mm) apart.

5. Excelsior: Use curled aspen excelsior fiber with barbed edges in circular bales of at least 18 in (450 mm) in diameter and nominally 10 ft. (3 m) in length. Use excelsior baled with polyester netting with 1 in X 1 in (25 mm by 25 mm) triangular openings. Use excelsior bales with a dry density of at least 1.4 lb./ft^3 (22 kg/m^3). Anchor in place with 1 in (25 mm) diameter wooden stakes driven through the netting at intervals of no more than 2 ft. (600 mm).

6. Compost Filter Sock: Use general use compost (see Subsection 893.2.02.A.5.b) in circular bales at least 18 in diameter. Use compost baled with photo-degradable plastic mesh 3 mils thick with a maximum 0.25 in X 0.25 in (6 mm X 6 mm) openings. Anchor in place with 1 in (25 mm) diameter wooden stakes driven through the netting at intervals of no more than 2 ft. (600 mm). The sock shall be dispersed on site when no longer required, as determined by the Engineer. Do not use Compost Filter Socks in areas where the use of fertilizer is restricted.

7. Compost Filter Berm: Use erosion control compost (see Subsection 893.2.02) to construct an un-compacted 1.5 ft. to 2 ft. (450 mm to 600 mm) high trapezoidal berm which is approximately 2 ft. to 3 ft. (600 mm to 1 m) wide at the top and minimum 4 f.t (1.2 m) wide at the base. Do not use Compost Filter Berms in areas where the use of fertilizer is restricted.

The construction of the compost filter berm includes the following:

a. Keeping the berm in a functional condition.
b. Installing additional berm material when necessary.
c. Removing the berm when no longer required, as determined by the Engineer. At the Engineer's discretion, berm material may be left to decompose naturally, or distributed over the adjacent area.

E. Other Temporary Structures
When special conditions occur during the design stage, the Plans may show other temporary structures for erosion control with required materials and construction methods.

F. Temporary Grass
Use a quick growing species of temporary grass such as rye grass, millet, or a cereal grass suitable to the area and season.

Use temporary grass in the following situations:

- When required by the Specifications or directed by the Engineer to control erosion where permanent grassing cannot be planted.
- To protect an area for longer than mulch is expected to last (60 calendar days).

Plant temporary grass as follows:

1. Use seeds that conform to Subsection 890.2.01, "Seed." Perform seeding according to Section 700; except use the minimum ground preparation necessary to provide a seed bed if further grading is required.

2. Prepare areas that require no further grading according to Subsection 700.3.05.A, "Ground Preparation." Omit the lime unless the area will be planted with permanent grass without further grading. In this case, apply the lime according to Section 700.

3. Apply mixed grade fertilizer at 400 lbs/acre (450 kg/ha). Omit the nitrogen. Mulch (with straw or hay) temporary grass according to Section 700. (Erosion control compost Mulch will not be allowed with grassing.)

4. Before planting permanent grass, thoroughly plow and prepare areas where temporary grass has been planted according to Subsection 700.3.05.A, "Ground Preparation".

5. Apply Polyacrylamide (PAM) to all areas that receive temporary grassing.

6. Apply Pam (powder) before grassing or PAM (emulsion) to the hydro-seeding operation.

7. Apply PAM according to manufacturer specifications.

8. Use only anionic PAM.

For projects that consist of shoulder reconstruction and/or shoulder widening, refer to Section 161.3.05H for Wood Fiber Blanket requirements.

G. Mulch
When stage construction or other conditions prevent completing a roadway section continuously, apply mulch (straw or hay or erosion control compost) to control erosion. Mulch may be used without temporary grassing for 60 calendar days or less. Areas stabilized with only mulch (straw/hay) shall be planted with temporary grass after 60 calendar days.

Apply mulch as follows:
1. Mulch (Hay or Straw) - Without Grass Seed

a. Uniformly spread the mulch over the designated areas from 2 in to 4 in (50 mm to 100 mm) thick.
b. After spreading the mulch, walk in the mulch by using a tracked vehicle (preferred method), empty sheep foot roller, light disking, or other means that preserves the finished cross section of the prepared areas. The Engineer will approve of the method.
c. Place temporary mulch on slopes as steep as 2:1 by using a tracked vehicle to imbed the mulch into the slope.
d. When grassing operations begin, leave the mulch in place and plow the mulch into the soil during seed bed preparation. The mulch will become beneficial plant food for the newly planted grass.

2. Erosion control compost - Without Grass Seed

a. Uniformly spread the mulch (erosion control compost) over the designated areas 2 in (50 mm) thick.
b. When rolling is necessary, or directed by the Engineer, use a light corrugated drum roller.
c. When grassing operations begin, leave the mulch in place and plow the mulch into the soil during seed bed preparation. The mulch will become beneficial plant food for the newly planted grass.
d. Plant temporary grass on area stabilized with mulch (erosion control compost) after 60 calendar days.
e. Do not use Erosion Control Compost in areas where the use of fertilizer is restricted.

H. Miscellaneous Erosion Control Not Shown on the Plans
When conditions develop during construction that were unforeseen in the design stage, the Engineer may direct the Contractor to construct temporary devices such as but not limited to:

- Bulkheads
- Sump holes
- Half round pipe for use as ditch liners
- U-V resistant plastic sheets to cover critical cut slopes

The Engineer and the Contractor will determine the placement to ensure erosion control in the affected area.

I. Diversion Channels
When constructing a culvert or other drainage structure in a live stream that requires diverting a stream, construct a diversion channel.

J. Temporary Check Dams
Temporary check dams are constructed of the following materials;

- Stone plain rip rap according to Section 603 or of sand bags as in Section 603 without Portland cement. (Place plastic filter fabric on ditch section before placing rip rap.)
- Fabric (Type C silt fence)
- Hay Bales

Temporary check dams shall be constructed according to plan details and shall remain in place until the permanent ditch protection is in place or being installed and the removal is approved by the Engineer.

K. Construction Exits
Locate construction exits at any point where vehicles will be leaving the project onto a public roadway. Install construction exits at the locations shown in the plans and in accordance with plan details.

L. Retrofit
Add the retrofit device to the permanent outlet structure as shown on the Plan details.
When all land disturbing activities that would contribute sediment-laden runoff to the basin are complete, clean the basin of sediment and stabilize the basin area with vegetation.
When the basin is stabilized, remove the retrofit device from the permanent outlet structure of the detention pond.

M. Inlet Sediment Trap
Inlet sediment traps consist of a temporary device placed around a storm drain inlet to trap sediment. An excavated area adjacent to the sediment trap will provide additional sediment storage.
Inlet sediment traps may be constructed of Type C silt fence, plastic frame and filter, hay bales, baffle box, or other filtering materials approved by the Engineer.
Construct inlet sediment traps according to the appropriate specification for the material selected for the trap.
Place inlet sediment traps as shown on the Plans or as directed by the Engineer.

N. Rock Filter Dams
Construct rock filter dams of the material selected as shown in the approved erosion and sediment control plan.
Construct and place this item in accordance with the approved erosion control construction detail(s) and Standard Specification Section 603.
Rock filter dams shall remain in place until the permanent ditch protection is in place or is being installed and their removal is approved by the Engineer.

O. Stone Filter Berms
Construct stone filter berms of the material selected as shown in the approved erosion and sediment control plan.

Construct and place this item in accordance with the approved erosion control construction detail(s) and Standard Specification Section 603.
Stone filter berms shall remain in place until the permanent slope protection is in place or is being installed and their removal is approved by the Engineer.

P. Stone Filter Rings
Construct stone filter rings of the material selected as shown in the approved erosion and sediment control plan.
Construct and place this item in accordance with the approved erosion control construction detail(s) and Standard Specification Section 603.
A stone filter ring shall remain in place until final stabilization of the area which drains toward it is achieved and its removal is approved by the Engineer.

163.3.06 Quality Acceptance

General Provisions 101 through 150.

163.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

163.4 Measurement

A. Silt Control Gates
Silt control gates are measured for payment by the entire structure constructed at each location complete in place and accepted. Silt control gates constructed at the inlet of multiple lines of drainage structures are measured for payment as a single unit.

B. Temporary Slope Drains
Temporary slope drains are measured for payment by the linear foot (meter) of pipe placed. When required, the inlet spillway and outlet apron and/or other dissipation devices are incidental and not measured separately.

Sediment basins are measured for payment by the entire structure complete, including construction, maintenance, and removal. Measurement also includes:

- Earthwork
- Drainage
- Spillways
- Baffles
- Rip rap
- Final cleaning to remove the basin

Permanent and temporary grassing for sediment basins is measured separately for payment.

D. Diversion Channels
Diversion channels are not measured for payment. Costs for the entire structure complete, including materials, construction (including earthwork), and removal is included in the price bid for the drainage structure or for other Contract items.

E. Temporary Grass
Temporary grass is measured for payment by the acre (hectare). Lime, when required, is measured by the ton (megagram). Mulch and fertilizer are measured separately for payment.

F. Mulch
Mulch (straw or hay, or erosion control compost) is measured for payment by the ton (megagram).

G. Baled Straw Sediment Barrier, Baled Straw Check Dam and Fabric Check Dams
Baled straw sediment barrier, baled straw check dams, and fabric check dams are measured by the linear foot (meter). When the Contractor substitutes a product allowed in Subsection 163.3.05.D for baled straw sediment barrier or when the Engineer directs this substitution, the product will be measured by the linear foot (meter).

H. Rip Rap Check Dams
Rip Rap Check Dams are measured per each which will include all work necessary to construct the check dam including plastic filter fabric placed beneath the rip rap or sand bags.

I. Construction Exits
Construction exits are measured per each which will include all work necessary to construct the exit including the required geotextile fabric placed beneath the aggregate.

J. Retrofit
Retrofit will be measured for payment per each. The construction of the detention pond and permanent outlet structure will be measured separately under the appropriate items.

K. Inlet Sediment Trap
Inlet sediment traps, regardless of the material selected, are measured per each which includes all work necessary to construct the trap including any incidentals and providing the excavated area for sediment storage.

L. Rock Filter Dams
Rock filter dams are measured for payment per each required. This includes the entire structure at each location and all the work necessary for construction.

M. Stone Filter Berms
Stone filter berms are measured for payment per each required. This includes the entire structure at each location and all the work necessary for construction.

N. Stone Filter Rings
Stone filter rings are measured for payment per each required. This includes the entire structure at each location and all the work necessary for construction.

163.4.01 Limits

General Provisions 101 through 150.

163.5 Payment

A. Silt Control Gates

The specified silt control gates are paid for at the Contract Unit Price per each. Payment is full compensation for:

- Furnishing the material and labor
- Constructing the concrete apron as shown on the Plans
- Excavating and backfilling to place the apron
- Removing the gate

B. Temporary Slope Drains

Temporary slope drains are paid for by the linear foot (meter). Payment is full compensation for materials, construction, removal (if required), inlet spillways, velocity dissipaters, and outlet aprons.

When temporary drain inlets and pipe slope drains are removed, they remain the Contractor's property and may be reused or removed from the Project as the Contractor desires. Reused pipe or inlets are paid for the same as new pipe or inlets.

C. Sediment Basin

Sediment basins, measured according to Subsection 163.4,C "Measurement," are paid for by the unit, per each, for the type specified on the Plans. Price and payment are full compensation for work and supervision to construct, and remove the sediment basin, including final clean-up.

D. Diversion Channel

Diversion channels are not paid for separately; they are included in the price bid for the drainage structure or for other Contract Items.

E. Temporary Grass

Temporary grass is paid for by the acre (hectare). Payment is full compensation for all equipment, labor, ground preparation, materials, wood fiber mulch, polyacrylamide, and other incidentals. Lime (when required) is paid for by the ton (mega-gram). Mulch and fertilizer are paid for separately.

F. Mulch

Mulch is paid for by the ton. Payment is full compensation for all materials, labor, maintenance, equipment and other incidentals.

The weight for payment of straw or hay mulch will be the product of the number of bales used and the average weight per bale as determined on certified scales provided by the contractor or state certified scales. Provide written documentation to the Engineer stating the average weight of the bales.

The weight of erosion control compost mulch will be determined by weighing each loaded vehicle on the required motor truck scale as the material is hauled to the roadway, or by using recorded weights if a digital recording device is used. The contractor may propose other methods of providing the weight of the mulch to Engineer for approval.

G. Baled Straw Sediment barrier, Baled Straw Check Dams and Fabric Check Dams (Type C Silt Fence)

Baled straw sediment barrier, baled straw check dams and fabric check dams (type C silt fence), complete in place and accepted are paid for at the Contract Unit Price bid per linear foot (meter). Payment is full compensation for constructing, and removing (when directed) the baled straw sediment barrier or either check dam.

When the Contractor substitutes any product allowed in Subsection 163.3.05.D for baled straw sediment barrier or when the Engineer directs this substitution, payment is made at the bid price per linear foot (meter) for baled straw sediment barrier.

H. Rip Rap Check Dams

Rip Rap Check Dams are paid for per each. Payment is full compensation for all materials, construction, and removal. Reused stone plain rip rap or sandbags are paid for on the same basis as new items. Filter fabric required under rip rap check dams is included in the price bid for each check dam.

I. Construction Exits

Construction exits are paid for per each. Payment is full compensation for all materials including the required geotextile, construction, and removal.

J. Retrofit
This item is paid for at the Contract Unit Price per each. Payment is full compensation for all work, supervision, materials (including the stone filter), labor and equipment necessary to construct and remove the retrofit device from an existing or proposed detention pond outlet structure.

K. Inlet Sediment Trap
Inlet sediment traps are paid for per each. Payment is full compensation for all materials, construction, and removal

L. Rock Filter Dams
Rock filter dams are paid for per each. Payment is full compensation for all materials, construction, and removal for each. Clean reused stone Type 3 riprap and #57 stone are paid for on the same basis as new items. Plastic woven filter fabric is required under rock filter dams and is included in the price bid for each.

M. Stone Filter Berms
Stone filter berms are paid for per each. Payment is full compensation for all materials, construction, and removal for each. Clean reused stone Type 3 riprap and #57 stone are paid for on the same basis as new items. Plastic woven filter fabric is required under rock filter berms and is included in the price bid for each.

N. Stone Filter Rings
Stone filter rings are paid for per each. Payment is full compensation for all materials, construction, and removal for each. Clean reused stone Type 3 riprap and #57 stone are paid for on the same basis as new items. Plastic woven filter fabric is required under stone filter rings and is included in the price bid for each.
The Items in this Section (except temporary grass and mulch) are made as partial payments as follows:

- When the item is installed and put into operation the Contractor will be paid 75 percent of the Contract price.
- When the Engineer instructs the Contractor that the Item is no longer required and is to remain in place or is removed, whichever applies, the remaining 25 percent will be paid.

Temporary devices may be left in place at the Engineer's discretion at no change in cost. Payment for temporary grass will be made based on the number of acres (hectares) grassed. Mulch will be based on the number of tons (megagrams) used.
Payment is made under:

Item No. 163	Construct and remove silt control gate, type__	Per each
Item No. 163	Construct and remove temporary pipe slope drains	Per linear foot (meter)
Item No. 163	Construct and remove temporary sediment barrier or baled straw check dam	Per linear foot (meter)
Item No. 163	Construct and remove sediment basin type__, Sta. No.___	Per each
Item No. 163	Construct and remove Fabric Check Dam - type C silt fence	Per linear foot (meter)
Item No. 163	Construct and remove Rip Rap Check Dams ,Stone Plain Rip Rap/Sand Bags	Per Each
Item No. 163	Construction exit	Per each
Item No. 163	Construct and remove retrofit, Sta. No.____	Per each
Item No. 163	Construct and remove rock filter dam	Per each
Item No. 163	Construct and remove stone filter berm	Per linear foot (meter)
Item No. 163	Construct and remove stone filter ring	Per each
Item No. 163	Construct and remove inlet sediment trap	Per each
Item No. 163	Temporary grass	Per acre (hectare)
Item No. 163	Mulch	Per ton (megagram_

163.5.01 Adjustments

General Provisions 101 through 150.

Section 165—Maintenance of Temporary Erosion and Sedimentation

Control Devices165.1 General Description

This work consists of providing maintenance on temporary erosion and sediment control devices, including but not limited to the following:

- Silt fence
- Sediment basins
- Silt control gates
- Check dams
- Silt retention barriers
- Rock filter dams
- Stone filter berms
- Stone filter rings

It also consists of removing sediment that has accumulated at the temporary erosion and sediment control devices.

165.1.01 Definitions

General Provisions 101 through 150.

165.1.02 Related References

A. Standard Specifications

General Provisions 101 through 150.

Section 165—Maintenance of Temporary Erosion and Sedimentation Control Devices

B. Referenced Documents

General Provisions 101 through 150.

165.1.03 Submittals

General Provisions 101 through 150

165.2 Materials

General Provisions 101 through 150.

165.2.01 Delivery, Storage, and Handling

General Provisions 101 through 150.

165.3 Construction Requirements

165.3.01 Personnel

General Provisions 101 through 150.

165.3.02 Equipment

General Provisions 101 through 150.

165.3.03 Preparation

General Provisions 101 through 150.

165.3.04 Fabrication

165.3.05 Construction

A. General

As a minimum, clean the sediment from all temporary erosion control devices (except sediment basins) installed on the project when one half the capacity, by height, depth or volume has been reached. Clean the sediment from all temporary sediment basins installed on a project when one third the capacity of the storage volume has been filled.

Handle sediment excavated from any erosion or sediment control device in one of the following ways:

- Remove sediment from the immediate area and immediately stabilize it to prevent the material from refilling any erosion or sediment control device.
- Place and mix it in the roadway embankment, or waste it in an area approved by the Engineer.
- Repair or replace at no cost to the Department, any erosion or sediment control devices that are not functioning properly or are damaged due to negligence or abuse.

B. Temporary Silt Fence

Maintenance of Temporary Silt Fence consists of furnishing all labor, tools, materials, equipment and necessary incidentals to remove and dispose of accumulated sediment down to the original ground line (0 % filled). Also included is the removal of sediment accumulations ("filtercake") on the fabric by tapping the fabric on the downstream side.

C. Silt Control Gates

Maintenance of Temporary Silt Control Gates consists of all labor, tools, materials, equipment and necessary incidentals to remove and dispose of accumulated sediment down to the original ground line (0% filled). When applicable, this item will include the removal of sediment accumulations on the fabric by tapping the fabric on the downstream side.

D. Check Dams (all types)

Maintenance of Temporary Erosion Control Check Dams shall consist of all labor, tools, materials, equipment and necessary incidentals to remove and dispose of accumulated sediment down to the original ground line (0% filled). This item also includes the removal of any material deposited in sump holes. When applicable, this item will include the removal of sediment accumulations on the fabric by tapping the fabric on the downstream side, or from the baled straw by similar means.

E. Silt Retention Barrier

Maintenance of Temporary Silt Retention Barrier consists of all labor, tools, materials, equipment and necessary incidentals to remove and dispose of accumulated sediment down to the original ground line (0% filled).

F. Temporary Sediment Basins

Maintenance of Temporary Sediment Basins consists of all labor, tools, materials, equipment and necessary incidentals to remove and dispose of accumulated sediment down to the original bottom of the basin. This also includes removing accumulated sediment from the rock filter and restoring the rock filter to its original specified condition and any work necessary to restore all other components to the pre-maintenance conditions.

G. Sediment Barrier (baled straw)

Maintenance of sediment barrier (baled straw) consists of furnishing all labor, tools, materials, equipment and necessary incidentals to remove and dispose of accumulated sediment down to the original ground line (0 % filled). Also included is the removal of sediment accumulations on the bales by tapping.

H. Triangular Silt Barrier

Maintenance of Triangular Silt Barrier consists of all labor, tools, materials, equipment and necessary incidentals to remove and dispose of accumulated sediment down to the original ground line (0% filled).

I. Retrofit:

Maintenance of the retrofit device consists of all labor, tools, materials, equipment and necessary incidentals to remove and properly dispose of accumulated sediment in the permanent detention pond being utilized as a temporary sediment basin. This item also includes any maintenance that is required to ensure the retrofit device is maintained per Plan details and any maintenance of the stone filter to maintain its filtering ability, including cleaning and replacement.

J. Construction Exit:
Maintenance of the construction exit consists of all labor, tools, materials, equipment and incidentals, including additional stone and geotextile fabric as required to prevent the tracking or flow of soil onto public roadways. This includes, scarifying existing stone, cleaning existing stone, or placement of additional stone.
Cleaning of the construction exit by scraping and/or brooming only will not be measured for payment.

K. Inlet Sediment Trap
Maintenance of inlet sediment traps consists of all labor, tools, materials, equipment and necessary incidentals to remove and properly dispose of accumulated sediment in the trap and/or the excavated area adjacent to the trap. It also includes any maintenance that is required to remove sediment accumulations ("filtercake") from the material selected to construct the inlet sediment trap.

L. Rock Filter Dams
Maintenance of rock filter dams consists of all labor, tools, materials, equipment, and necessary incidentals to remove and dispose of accumulated sediment down to the original ground line (0% filled). This item also includes the removal of any material deposited in sump holes.

M. Stone Filter Berms
Maintenance of stone filter berms consists of all labor, tools, materials, equipment, and necessary incidentals to remove and dispose of accumulated sediment down to the original ground line (0% filled). This item also includes the removal of any material deposited in sump holes.

N. Stone Filter Rings
Maintenance of stone filter rings consists of all labor, tools, materials, equipment, and necessary incidentals to remove and dispose of accumulated sediment down to the original ground line (0% filled). This item also includes the removal of any material deposited in sump holes.

165.3.06 Quality Acceptance

General Provisions 101 through 150.

165.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

165.4 Measurement

A. Temporary Silt Fence:
Maintenance of temporary silt fence, Type A, B, or C, is the actual linear feet (meter) of silt fence, measured in place, where sediment is removed.

B. Silt Control Gates:
Maintenance of temporary silt control gates, type I, II, III or IV, as specified on the Plans, is measured as a single unit.

C. Check Dams (All Types):
Maintenance of temporary erosion control check dams as specified on the Plans is the actual linear feet (meter) of baled straw, type c silt fence or rip rap, measured in place, where sediment is removed.

D. Silt Retention Barrier:
Maintenance of temporary silt retention barrier as specified on the Plans, is measured by the linear foot (meter) where sediment is removed.

E. Temporary Sediment Basins:
Maintenance of temporary sediment basins as specified on the Plans, is measured as a single unit.

F. Sediment Barrier (baled straw)
Maintenance of sediment barrier (baled straw), is the actual linear feet (meter) of baled straw measured in place, where sediment is removed.

G. Triangular Silt Barrier:
Maintenance of triangular silt barrier as specified on the plans, is measured by the linear foot (meter) where sediment is removed.

H. Retrofit:
Maintenance of retrofit device at the location specified on the Plans is measured per each.

I. Construction Exit:
Maintenance of construction exit at the location specified on the Plans, or as directed by the Engineer is measured per each.

J. Inlet Sediment Trap
Maintenance of inlet sediment trap at the location specified on the Plans, or as added by the Engineer is measured per each.

K. Rock Filter Dams
Maintenance of rock filter dams as specified on the plans is measured as a single unit.

L. Stone Filter Berms
Maintenance of stone filter berms as specified on the plans is measured as a single unit.

M. Stone Filter Rings
Maintenance of stone filter rings as specified on the plans is measured as a single unit.

165.4.01 Limits

General Provisions 101 through 150.

165.5 Payment

A. Temporary Silt Fence:
Maintenance of temporary silt fence, Type A, B, or C, is paid for at the contract unit price bid per linear foot (meter).

B. Silt Control Gates:
Maintenance of temporary silt control gates, Type I, II, III, or IV as specified on the Plans is paid for at the contract unit price bid per each.

C. Check Dams (All Types):
Maintenance of Check Dams as specified on the Plans is paid for at the contract unit price bid per linear foot (meter).

D. Silt Retention Barrier:
Maintenance of temporary silt retention barrier as specified on the Plans is paid for at the contract unit price bid per linear foot (meter).

E. Temporary Sediment Basins:
Maintenance of temporary sediment basins as specified on the Plans is paid for at the contract unit price bid per each.

F. Sediment Barrier (baled straw):
Maintenance of sediment barrier (baled straw) as specified on the Plans is paid for at the contract unit price bid per linear foot (meter).

G. Triangular Silt Barrier:
Maintenance of triangular silt barrier as specified on the Plans is paid for at the contract unit price bid per linear foot (meter).

H. Retrofit:
Maintenance of the retrofit device at the location specified on the Plans is paid for at the contract unit price bid per each.

I. Construction Exit:
Maintenance of the construction exit at the location specified on the Plans or as added by the Engineer is paid for at the contract unit price per each.

J. Inlet Sediment Trap
Maintenance of the inlet sediment trap at the location specified on the Plans or at the location specified by the Engineer is paid for at the contract unit price per each.

K. Rock Filter Dams
Maintenance of rock filter dams as specified on the plans is paid for at the contract unit price bid per each.

L. Stone Filter Berms
Maintenance of stone filter berms as specified on the plans is paid for at the contract unit price bid per each.

M. Stone Filter Rings
Maintenance of stone filter rings as specified on the plans is paid for at the contract unit price bid per each.

Payment will be made under:

Item No. 165	Maintenance of temporary silt fence Type____	per linear foot (meter)
Item No. 165	Maintenance of silt control gate Type ____	per each
Item No. 165	Maintenance of check dams (all types)	per linear foot (meter)
Item No. 165 Maintenance of silt retention barrier		
Item No. 165 Maintenance of temporary sediment basin, Sta. No. ____		per each
Item No. 165 Maintenance of sediment barrier (baled straw)		per linear foot (meter)
Item No. 165 Maintenance of triangular silt barrier		per linear foot (meter)
Item No. 165 Maintenance of retrofit, Sta. No.____		per each
Item No. 165 Maintenance of construction exit		per each
Item No. 165 Maintenance of inlet sediment trap		per each
Item No. 165 Maintenance of rock filter dam		per each
Item No. 165 Maintenance of stone filter berm		per linear foot (meter)
Item No. 165 Maintenance of rock filter dam		per each

165.5.01 Adjustments

General Provisions 101 through 150.

Section 326-Portland Cement Concrete Subbase

326.5 Payment

Portland cement concrete subbase will be paid for at the Contract Unit Price per square yard (meter) for each specified thickness shown on the plans. This payment will be full compensation for:

- Providing Portland cement and all other materials
- Applying first and second applications of curing compound
- Providing all equipment and labor
- Mixing
- Hauling
- Providing other incidentals necessary to complete the Item
- Replacing subbase when required

Payment will be made under:

Item No. 326	Portland cement concrete subbase _____ in (mm) thick	Per square yard (meter)

326.5.01 Adjustments

General Provisions 101 through 150.

Section 327—Mining, Crushing, and Stockpiling Aggregates

327.1 General Description

Specifications for this work will be included elsewhere in the Contract.

Section 328—Foamed Asphalt Stabilized Base Course

328.1 General Description

Specifications for this work will be included elsewhere in the Contract.

Section 329—Reclaiming, Crushing And Stockpiling Of Concrete And Asphalt Pavements

329.1 General Description

Specifications for this work will be included elsewhere in the Contract.

Section 400—Hot Mix Asphaltic Concrete Construction

400.1 General Description

This work includes constructing one or more courses of bituminous plant mixture on the prepared foundation or existing roadway surface. The mixture shall conform with lines, grades, thicknesses, and typical cross sections shown on the Plans or established by the Engineer.

This section includes the requirements for all bituminous plant mixtures regardless of the gradation of the aggregates, type and amount of bituminous material, or pavement use.
Acceptance of work is on a lot-to-lot basis according to the requirements of this Section and Section 106.

400.1.01 Definitions

Segregated Mixture: Mixture lacking homogeneity in HMA constituents of such a magnitude that there is a reasonable expectation of accelerated pavement distress or performance problems. May be quantified by measurable changes in temperature, gradation, asphalt content, air voids, or surface texture.

New Construction: A roadway section more than 0.5 mile (800 m) long that is not longitudinally adjacent to the existing roadway. If one or more lanes are added longitudinally adjacent to the existing lane, the lane(s) shall be tested under the criteria for a resurfacing project. If work is performed on the existing roadway including leveling, grade changes, widening and/or resurfacing then that lane shall be tested under the criteria for a resurfacing project.

Trench Widening: Widening no more than 4 ft. (1.2 m) in width.

Comparison sample: Opposite quarters of material sampled by the Contractor.

Independent Sample (Quality Assurance Sample): A sample taken by the Department to verify an acceptance decision without regard to any other sample that may also have been taken to represent the material in question.

Referee sample: A sample of the material retained during the quartering process which is used for evaluation if a comparison of Contractor and Departmental split sample test results is outside allowable tolerances.

400.1.02 Related References

A. Standard Specifications

Section 106—Control of Materials
Section 109—Measurement and Payment
Section 152—Field Laboratory Building
Section 413—Bituminous Tack Coat
Section 424—Bituminous Surface Treatment
Section 802—Coarse Aggregate for Asphaltic Concrete
Section 828—Hot Mix Asphaltic Concrete Mixtures

B. Referenced Documents

AASHTO T 315
AASHTO T 209
AASHTO T 202
AASHTO T 49

Department of Transportation Standard Operating Procedure (SOP) 15

Department of Transportation Standard Operating Procedure (SOP) 27

Department of Transportation Standard Operating Procedure (SOP) 40

GDT 38
GDT 73
GDT 78
GDT 83
GDT 119
GDT 125
GDT 126
GDT 134
GSP 15
GSP 21
QPL 1
QPL 2
QPL 7
QPL 26
QPL 30
QPL 39
QPL 41
QPL 45
QPL 65
QPL 67
QPL 70
QPL 77

400.1.03 Submittals

A. Invoices

Furnish formal written invoices from a supplier for all materials used in production of HMA when requested by the Department. Show the following on the Bill of Lading:

- Date shipped
- Quantity in tons (megagrams)
- Included with or without additives (for asphalt cement)

Purchase asphaltic cement directly from a supplier listed on **Qualified Products List 7** and provide copies of Bill of Lading at the Department's request.

B. Paving Plan

Before starting asphaltic concrete construction, submit a written paving plan to the Engineer for approval. Include the following on the paving plan:

- Proposed starting date
- Location of plant(s)
- Rate of production
- Average haul distance(s)
- Number of haul trucks
- Paver speed feet (meter)/minute for each placement operation
- Mat width for each placement operation
- Number and type of rollers for each placement operation
- Sketch of the typical section showing the paving sequence for each placement operation
- Electronic controls used for each placement operation
- Temporary pavement marking plan

If staged construction is designated in the Plans or contract, provide a paving plan for each construction stage.
If segregation is detected, submit a written plan of measures and actions to prevent segregation. Work will not continue until the plan is submitted to and approved by the Department.

C. Job Mix Formula

Submit to the Engineer a written job mix formula proposed for each mixture type to be used based on an approved mix design. Furnish the following information for each mix:

- Specific project for which the mixture will be used
- Source and description of the materials to be used
- Mixture I.D. Number
- Proportions of the raw materials to be combined in the paving mixture
- Single percentage of the combined mineral aggregates passing each specified sieve
- Single percentage of asphalt by weight of the total mix to be incorporated in the completed mixture
- Single temperature at which to discharge the mixture from the plant
- Theoretical specific gravity of the mixture at the designated asphalt content
- Name of the person or agency responsible for quality control of the mixture during production

Do the following to have the formulas approved in accordance with SOP 40 "Approval of Contractor Job Mix Formulas" and to ensure their quality:

1. Submit proposed job mix formulas for review at least two weeks before beginning the mixing operations.

2. Do not start hot mix asphaltic concrete work until the Engineer has approved a job mix formula for the mixture to be used. No mixture will be accepted until the Engineer has given approval.

3. Provide mix designs for all SMA, Superpave and 4.75 mm mixes to be used. The Department will provide mix design results for other mixes to be used.

4. After a job mix formula has been approved, assume responsibility for the quality control of the mixtures supplied to the Department according to Subsection 106.01, "Source of Supply and Quantity of Materials."

D. Quality Control Program

Submit a Quality Control Plan to the Office of Materials for approval. The Quality Control Program will be included as part of the certification in the annual plant inspection report.

400.2 Materials

Ensure materials comply with the specifications listed in Table 1

Heat Stable Anit-Stripping Additive	831.2.04
Hydrated Lime	882.2.03
Silicone Fluid (When approved by the Office of Materials)	831.2.05
Bituminous Tack Coat: PG 58-22, PG 64-22, PG 67-22	820.2
Hot Mix Asphaltic Concrete Mixtures	828
Fiber Stabilizing Additives	819

When approved by the Office of Materials and required in the Contract, provide Uintaite material, hereafter referred to by the common trade name Gilsonite, as a reinforcing agent for bituminous mixtures. Supply a manufacturer's certification that the Gilsonite is a granular solid which meets the following requirements:

Softening Point (AASHTO: T-53)	300-350 F (150-175 C)
Specific Gravity, 77 F (25 ^{o}C) (AASHTO: T-228)	1.04 ± 0.02
Flash Point, COC (AASHTO: T-48)	550 F (290 C) Min.
Ash Content (AASHTO: T-111)	1.0% Max.
Penetration, 77 F (25 ^{o}C), 100 gm., 5 sec. (AASHTO: T-49)	0

400.2.01 Delivery, Storage, and Handling

Storage of material is allowed in a properly sealed and insulated system for up to 24 hours except that Stone Matrix Asphalt (SMA), Open-Graded Friction Course (OGFC), or Porous European Mix (PEM) mixtures shall not be stored more than 12 hours. Mixtures other than SMA, OGFC, or PEM may be stored up to 72 hours in a sealed and insulated system, equipped with an auxiliary inert gas system, with the Engineer's approval. Segregation, lumpiness, drain-down, or stiffness of stored mixture is cause for rejection of the mixture. The Engineer will not approve using a storage or surge bin if the mixture segregates, loses excessive heat, or oxidizes during storage.

The Engineer may obtain mixture samples or recover asphalt cement according to GDT 119. AASHTO T315, AASHTO T 202 and AASHTO T 49 will be used to perform viscosity and penetration tests to determine how much asphalt hardening has occurred.

A. Vehicles for Transporting and Delivering Mixtures

Ensure trucks used for hauling bituminous mixtures have tight, clean, smooth beds.
Follow these guidelines when preparing vehicles to transport bituminous mixtures:

1. Use an approved releasing agent from QPL 39 in the transporting vehicle beds, if necessary, to prevent the mixture from sticking to the bed. Ensure that the releasing agent is not detrimental to the mixture. When applying the agent, drain the excess agent from the bed before loading. Remove from the project any transporting vehicles determined to contain unapproved releasing agents.

2. Protect the mixture with a waterproof cover large enough to extend over the sides and ends of the bed. Securely fasten the waterproof cover before the vehicle begins moving.

3. Insulate the front end and sides of each bed with an insulating material with the following specifications:

- Consists of builders insulating board or equivalent
- Has a minimum "R" value of 4.0
- Can withstand approximately 400 °F (200 C) temperatures

Install the insulating material so it is protected from loss and contamination. A "Heat Dump Body" may be used in lieu of insulation of the bed. "Heat Dump Body" refers to any approved transport vehicle that is capable of diverting engine exhaust and transmitting heat evenly throughout the dump body to keep asphalt at required temperature. Mark the "Heat Dump Body" clearly with "OPEN" and "CLOSE" position at the exhaust diverter. Install a padlock and lock it in the "OPEN" position when the "Heat Dump Body" is used to transport bituminous mixtures.

4. Mark each transporting vehicle with a clearly visible identification number.

5. Create a hole in each side of the bed so that the temperature of the loaded mixture can be checked. The placement of these holes shall be located to assure that the thermometer is being placed in the hot mix asphaltic concrete. Ensure the mixture is delivered to the roadway at a temperature within ± 20 °F (± 11 °C) of the temperature on the job mix formula.

If the Engineer determines that a truck may be hazardous to the Project or adversely affect the quality of the work, remove the truck from the project.

B. Containers for Transporting, Conveying, and Storing Bituminous Material
To transport, convey, and store bituminous material, use containers free of foreign material and equipped with sample valves. Bituminous material will not be accepted from conveying vehicles if material has leaked or spilled from the containers.

400.3 Construction Requirements

400.3. 01 Personnel

General Provisions 101 through 150.

400.3.02 Equipment

Hot mix asphaltic concrete plants producing mix for Department use are governed by Quality Assurance for Asphaltic Concrete Plants in Georgia, Laboratory Standard Operating Procedure No. 27.
The Engineer will approve the equipment used to transport and construct hot mix asphaltic concrete. Ensure the equipment is in satisfactory mechanical condition and can function properly during production and placement operations. Place the following equipment at the plant or project site:

A. Field Laboratory
Provide a field laboratory according to Section 152.

B. Plant Equipment
1. Scales

Provide scales as follows:

a. Furnish (at the Contractor's expense) scales to weigh bituminous plant mixtures, regardless of the measurement method for payment.

b. Ensure the weight measuring devices that provide documentation comply with Subsection 109.01, "Measurement and Quantities."

c. Provide weight devices recording the mixture net weights delivered to the truck when not using platform scales. A net weight system will include, but is not limited to:

- Hopper or batcher-type weight systems delivering asphaltic mixture directly to the truck
- Fully automatic batching equipment with a digital recording device

d. Use a net weight printing system only with automatic batching and mixing systems approved by the Engineer.

e. Ensure the net weight scale mechanism or device manufacturer, installation, performance, and operation meets the requirements in Subsection 109.01, "Measurement and Quantities"

f. Provide information on the Project tickets according to Department of Transportation SOP-15.

2. Time-Locking Devices

Furnish batch type asphalt plants with automatic time-locking devices controlling the mixing time automatically. Construct these devices to ensure the operator cannot shorten or eliminate any portion of the mixing cycle.

3. Surge- and Storage-Systems

Provide surge and storage bins as follows:

a. Ensure bins for mixture storage are insulated and have a working seal, top and bottom, to prevent outside air infiltration and to maintain an inert atmosphere during storage. Bins not intended as storage bins may be used as surge bins to hold hot mixtures for part of the working day. However, empty these surge bins completely at the end of the working day.

b. Ensure surge and storage bins can retain a predetermined minimum level of mixture in the bin when the trucks are loaded.

c. Ensure surge and storage systems do not contribute to mix segregation, lumpiness, drain-down, or stiffness.

d. Ensure the scale mechanism or device manufacture, installation, performance, and operation meets the requirements in subsection 109.01"Measurement and Quantities".

4. Controls for Dust Collector Fines
Control dust collection as follows:

a. When collecting airborne aggregate particles and returning them to the mixture, have the return system meter all or part of the collected dust uniformly into the aggregate mixture and waste the excess. The collected dust percentage returned to the mixture is subject to the Engineer's approval.

b. When the collected dust is returned directly to the hot aggregate flow, interlock the dust feeder with the hot aggregate flow and meter the flow to maintain a flow that is constant, proportioned, and uniform.

5. Mineral Filler Supply System
When mineral filler is required as a mixture ingredient:

a. Use a separate bin and feed system to store and proportion the required quantity into the mixture with uniform distribution.

b. Control the feeder system with a proportioning device meeting these specifications:

- Is accura te to within ± 10 percent of the filler required
- Has a convenient and accurate means of calibration
- Interlocks with the aggregate feed or weigh system to maintain the correct proportions for all rates of production and batch sizes

c. Provide flow indicators or sensing devices for the mineral filler system and interlock them with the plant controls to interrupt the mixture production if mineral filler introduction fails to meet the required target value after no longer than 60 seconds.

d. Add mineral filler to the mixture as follows, according to the plant type:

- Batch Type Asphalt Plant. Add mineral filler to the mixture in the weigh hopper.
- Continuous Plant Using Pugmill Mixers. Feed the mineral filler into the hot aggregate before it is introduced into the mixer to ensure dry mixing is accomplished before the bituminous material is added.
- Continuous Plants Using the Drier-Drum Mixers. Add the mineral filler to ensure dry mixing is accomplished before the bituminous material is added and ensure the filler does not become entrained into the air stream of the drier.

6. Hydrated Lime Treatment System
When hydrated lime is required as a mixture ingredient:

a. Use a separate bin and feed system to store and proportion the required quantity into the mixture.

b. Ensure the aggregate is uniformly coated with hydrated lime aggregate before adding the bituminous material to the mixture. Ensure the addition of hydrated lime will not become entrained in the exhaust system of the drier or plant.

c. Control the feeder system with a proportioning device meeting these specifications:

- Is accurate to within ± 10 percent of the amount required
- Has a convenient and accurate means of calibration
- Interlocks with the aggregate feed or weigh system to maintain the correct proportions for all rates of production and batch sizes and to ensure that mixture produced is properly treated with lime

d. Provide flow indicators or sensing devices for the hydrated lime system and interlock them with the plant controls to interrupt mixture production if hydrated lime introduction fails to meet the required target value after no longer than 60 seconds.

7. Net Weight Weighing Mechanisms

Certify the accuracy of the net weight weighing mechanisms by an approved registered scale serviceperson at least once every 6 months. Check the accuracy of net weight weighing mechanisms at the beginning of Project production and thereafter as directed by the Engineer.

Check mechanism accuracy as follows:

a. Weigh a load on a set of certified commercial truck scales. Ensure that the difference between the printed total net weight and that obtained from the commercial scales is no greater than 4 lbs/1,000 lbs (4 kg/Mg) of load.

Check the accuracy of the bitumen scales as follows:

- Use standard test weights.
- If the checks indicate printed weights are out of tolerance, have a registered scale serviceperson check the batch scales and certify the accuracy of the printer.
- While the printer system is out of tolerance and before its adjustment, continue production only if using a set of certified truck scales to determine the truck weights.

b. Ensure plants using batch scales maintain ten 50 lb (25 kg) standard test weights at the plant site to check batching scale accuracy.

c. Ensure plant scales that are used only to proportion mixture ingredients, and not to determine pay quantities, are within two percent throughout the range.

8. Fiber Supply System

When stabilizing fiber is required as a mixture ingredient:

a. Use a separate feed system to store and proportion by weight the required quantity into the mixture with uniform distribution.

b. Control the feeder system with a proportioning device that meets these Specifications:
   - Is accurate to within ± 10 percent of the amount required. Automatically adjusts the feed rate to maintain the material within this tolerance at all times
   - Has a convenient and accurate means of calibration
   - Provide in-process monitoring, consisting of either a digital display of output or a printout of feed rate, in pounds (kg) per minute, to verify feed rate
   - Interlocks with the aggregate feed or weigh system to maintain the correct proportions for all rates of production and batch sizes

c. Provide flow indicators or sensing devices for the fiber system and interlock them with the plant controls to interrupt the mixture production if fiber introduction fails or if the output rate is not within the tolerances given above.

d. Introduce the fiber as follows:

   - When a batch type plant is used, add the fiber to the aggregate in the weigh hopper. Increase the batch dry mixing time by 8 to 12 seconds from the time the aggregate is completely emptied into the mixer to ensure the fibers are uniformly distributed prior to the injection of asphalt cement into the mixer.

   - When a continuous or drier-drum type plant is used, add the fiber to the aggregate and uniformly disperse prior to the injection of asphalt cement. Ensure the fibers will not become entrained in the exhaust system of the drier or plant.

9. Crumb Rubber Modifier Supply System

When specified, crumb rubber modifier may be substituted at the Contractor's discretion to produce a PG 76-22 asphaltic cement at the production facility in accordance with Section 820:

a. Use a separate feed system to store and proportion by weight of the total asphaltic cement, the required percentage of crumb rubber into the mixture.

b. Control the feeder system with a proportioning device meeting these Specifications:

- Is accurate to within ± 6 percent of the amount required. Automatically adjusts the feed rate to maintain the material within this tolerance at all times.
- Has a convenient and accurate means of calibration.
- Provide in-process monitoring, consisting of either a digital display of output or a printout of feed rate, in pounds per minute, to verify feed rate. The supply system shall report the feed in 1 lb (454 gr.) increments using load cells that will enable the user to monitor the depletion of the modifier. Monitoring the system volumetrically will not be allowed.
- Interlocks with the aggregate weigh system and asphaltic cement pump to maintain the correct proportions for all rates of production and batch sizes.

c. Provide flow indicators or sensing devices for the system and interlock them with the plant controls to interrupt the mixture production if the crumb rubber introduction output rate is not within the ± 6 percent tolerance given above. This interlock will immediately notify the operator if the targeted rate exceeds introduction tolerances. All plant production will cease if the introduction rate is not brought back within tolerance after 30 seconds. When the interlock system interrupts production and the plant has to be restarted, upon restarting operations; the modifier system shall run until a uniform feed can be observed on the output display. All mix produced prior to obtaining a uniform feed shall be rejected.

d. Introduce the crumb rubber modifier as follows:

- When a batch type plant is used, add the rubber to the aggregate in the weigh hopper. Increase the batch dry mixing time by 15 to 20 seconds from the time the aggregate is completely emptied into the mixer to ensure the modifiers are uniformly distributed prior to the injection of asphalt cement into the mixer. Increase the batch wet mix time by 15 to 20 seconds to ensure the crumb rubber modifier is uniformly blended with the asphaltic cement.

- When a continuous or drier-drum type plant is used, add the rubber to the aggregate and uniformly disperse prior to the injection of asphalt cement. The point of introduction in the drum mixer will be approved by the Engineer prior to production. Ensure the crumb rubber modifier will not become entrained in the exhaust system of the drier or plant and will not be exposed to the drier flame at any point after induction.

e. No separate measurement and payment will be made if Contractor elects to utilize crumb rubber.

C. Equipment at Project Site

1. Cleaning Equipment
Provide sufficient hand tools and power equipment to clean the roadway surface before placing the bituminous tack coat. Use power equipment that complies with Subsection 424.3.02.F, "Power Broom and Power Blower."

2. Pressure Distributor

To apply the bituminous tack coat, use a pressure distributor complying with Subsection 424.3.02.B, "Pressure Distributor."

3. Bituminous Pavers

To place hot mix asphaltic concrete, use bituminous pavers that can spread and finish courses that are:

- As wide and deep as indicated on the Plans
- True to line, grade, and cross section
- Smooth
- Uniform in density and texture

a. Continuous Line and Grade Reference Control. Furnish, place, and maintain the supports, wires, devices, and materials required to provide continuous line and grade reference control to the automatic paver control system.

b. Automatic Screed Control System. Equip the bituminous pavers with an automatic screed control system actuated from sensor-directed mechanisms or devices that will maintain the paver screed at a pre-determined transverse slope and elevation to obtain the required surface.

c. Transverse Slope Controller. Use a transverse slope controller capable of maintaining the screed at the desired slope within ± 0.1 percent. Do not use continuous paving set-ups resulting in unbalanced screed widths or offcenter breaks in the main screed cross section unless approved by the Engineer.

d. Screed Control. Equip the paver to permit the following four modes of screed control. The method used shall be approved by the Engineer.

- Automatic grade sensing and slope control
- Automatic dual grade sensing
- Combination automatic and manual control
- Total manual control

Ensure the controls are referenced with a taut string or wire set to grade, or with a ski-type device or mobile reference at least 30 ft (9 m) long when using a conventional ski. Approved non-contacting laser or sonar-type skis listed on QPL 91 "Georgia's List of Approved Non-contacting Laser and Sonar-type Electronic Grade and Slope Controls" may be used in lieu of conventional 30 ft (9m) skis. Under limited conditions, a short ski or shoe may be substituted for a long ski on the second paver operating in tandem, or when the reference plane is a newly placed adjacent lane.

Automatic screed control is required on all Projects; however, when the Engineer determines that Project conditions prohibit the use of such controls, the Engineer may waive the grade control, or slope control requirements, or both.

e. Paver Screed Extension. When the laydown width requires a paver screed extension, use bolt-on screed extensions to extend the screeds, or use an approved mechanical screed extension device. When the screed is extended, add auger extensions to assure a length of no more than 18 inches (0.5 m) from the auger to the end gate of the paver. Auger extensions may be omitted when paving variable widths. Ensure the paver is equipped with tunnel extensions when the screed and augers are extended.

NOTE: Do not use extendible strike-off devices instead of approved screed extensions. Only use a strike-off device in areas that would normally be luted in by hand labor.

4. Compaction Equipment
Ensure that the compaction equipment is in good mechanical condition and can compact the mixture to the required density. The compaction equipment number, type, size, operation, and condition is subject to the Engineer's approval

5. Materials Transfer Vehicle (MTV)

a. Use a Materials Transfer Vehicle (MTV) when placing asphaltic concrete mixtures on Projects on the state route system with the following conditions. If a project fails to meet any one of the following conditions, the MTV's use is not required.

1) When to use:

- The ADT is equal to or greater than 6000,
- The project length is equal to or greater than 3000 linear feet (915 linear meters),
- The total tonnage (megagrams) of all asphaltic concrete mixtures is greater than 2000 tons (1815 Mg).

2) Where to use:

- Mainline of the traveled way
- Collector/distributor (C/D) lanes on Interstates and limited access roadways
- Leveling courses at the Engineer's discretion

3) Do not use the MTV for the following conditions:

- A resurfacing project that only 9.5 mm mix is required.
- A project with lane width that is equal or less than 11 feet (3.4 m).
- A passing lane only project.
- When noted on the plans.

b. Ensure the MTV and conventional paving equipment meet the following requirements:

1) MTV

- Has a truck unloading system which receives mixture from the hauling equipment and independently deliver mixtures from the hauling equipment to the paving equipment.
- Has mixture remixing capability approved by the Office of Materials and is listed on QPL 88 "Georgia's List of Approved Materials Transfer Vehicles".
- Provides to the paver a homogeneous, non-segregated mixture of uniform temperature with no more than 20 °F (11 ^{o}C) difference between the highest and lowest temperatures when measured transversely across the width of the mat in a straight line at a distance of one foot to twenty-five feet (0.3 m to 7.6 m) from the screed while the paver is operating. Ensure that the MTV is capable of providing the paver a consistent material flow that is sufficient to prevent the paver from stopping between truck exchanges.

2) Conventional Paving Equipment

- Has a paver hopper insert with a minimum capacity of 14 tons (13 Mg) installed in the hopper of conventional paving equipment when an MTV is used.

c. If the MTV malfunctions during spreading operations, discontinue placement of hot mix asphaltic concrete after there is sufficient hot mix placed to maintain traffic in a safe manner. However, placement of hot mix asphaltic concrete in a lift not exceeding 2 in. (50 mm) may continue until any additional hot mix in transit at the time of the malfunction has been placed. Cease spreading operations thereafter until the MTV is operational.

d. Ensure the MTV is empty when crossing a bridge and is moved across without any other Contractor vehicles or equipment on the bridge. Move the MTV across a bridge in a travel lane and not on the shoulder. Ensure the speed of the MTV is no greater than 5 mph (8 kph) without any acceleration or deceleration while crossing a bridge.

400.3.03 Preparation

A. Prepare Existing Surface

Prepare the existing surface as follows:

1. Clean the Existing Surface. Before applying hot mix asphaltic concrete pavement, clean the existing surface to the Engineer's satisfaction.

2. Patch and Repair Minor Defects

Before placing leveling course:

a. Correct potholes and broken areas requiring patching in the existing surface and base as directed by the Engineer.

b. Cut out, trim to vertical sides, and remove loose material from the areas to be patched.

c. Prime or tack coat the area after being cleaned. Compact patches to the Engineer's satisfaction. Material for patches does not require a job mix formula, but shall meet the gradation range shown in Section 828. The Engineer must approve the asphalt content to be used.

3. Apply Bituminous Tack Coat

Apply the tack coat according to Section 413. The Engineer will determine the application rate, which must be within the limitations Table 2.

Table 2—Application Rates for Bituminous Tack, gal/yd² (L/m²)

	Minimum	Maximum
Under OGFC and PEM Mixes	0.06 (0.270)	0.80 (0.360)
All Other Mixes	0.04 (0.180)	0.06 (0.270)
*On thin leveling courses and freshly placed asphaltic concrete mixes, reduce the application rate to 0.02 to 0.04 gal/yd² (0.09 to 0.18 L/m²).		

B. Place Patching and Leveling Course

1. When the existing surface is irregular, bring the surface area to the proper cross section and grade with a leveling course of hot mix asphaltic concrete materials.

2. Place leveling at the locations and in the amounts directed by the Engineer.

3. Use leveling course mixtures meeting the requirements of the job mix formulas defined in:

- Subsection 400.3.05.A, "Observe Composition of Mixtures"
- Section 828
- Leveling acceptance schedules in Subsection 400.3.06.A, "Acceptance Plans for Gradation and Asphalt Cement Content"

4. If the leveling and patching mix type is undesignated, determine the mix type by the thickness or spread rate according to Table 3, but do not use 4.75 mm mix on interstate projects.

Table 3—Leveling and Patching Mix Types

Thickness	Rate of Spread	Type of Mix
Up to 0.75 in (19 mm)	Up to 85 lbs/yd² (45 kg/m²)	4.75 mm Mix or 9.5 mm Superpave Type 1
0.75 to 1.5 in. (19 to 38 mm)	85 to 165 lbs/yd² (45 to 90 kg/m²)	9.5 mm Superpave Type 2
1.5 to 2 in. (38 to 50 mm)	165 to 220 lbs/yd² (90 to 120 kg/m²)	12.5 mm Superpave*
2 to 2.5 in. (50 to 64 mm)	220 to 275 lbs/yd² (120 to 150 kg/m²)	19 mm Superpave*
Over 2.5 in. (64 mm)	Over 275 lbs/yd²(150 kg/m²)	25 mm Superpave

* These mixtures may be used for isolated patches no more than 6 in. (150 mm) deep and no more than 4 ft. (1.2 m) in diameter or length.

400.3.04 Fabrication

General Provisions 101 through 150.

400.3.05 Construction

Provide the Engineer at least one day's notice prior to beginning construction, or prior to resuming production if operations have been temporarily suspended.

A. Observe Composition of Mixtures

1. Calibration of plant equipment

If the material changes, or if a component affecting the ingredient proportions has been repaired, replaced, or adjusted, check and recalibrate the proportions.

Calibrate as follows:

a. Before producing mixture for the Project, calibrate by scale weight the electronic sensors or settings for proportioning mixture ingredients.

b. Calibrate ingredient proportioning for all rates of production.

2. Mixture control

Compose hot mix asphaltic concrete from a uniform mixture of aggregates, bituminous material, and if required, hydrated lime, mineral filler, or other approved additive.

Ensure the constituents proportional to produce mixtures meeting the requirements in Section 828. The general composition limits prescribed are extreme ranges within which the job mix formula must be established. Base mixtures on a design analysis that meets the requirements of Section 828.

Ensure the field performance of the in-place mixtures meet the requirements of Subsection 828.2B for Permeability, Moisture Susceptibility, Rutting Susceptibility and Fatigue. In-place mix may be evaluated for compliance with Subsection 828.2.B at the discretion of the State Bituminous Construction Engineer under the following conditions:

- Deviates greater than 10 percent on gradation for mixture control sieves from the approved Job Mix Formula based on Acceptance or Independent Samples.
- Deviates greater than 0.7 percent in asphalt cement content from the approved Job Mix Formula based on Acceptance or Independent Samples.
- The calculated mean pavement air voids result in an adjusted pay factor less than 0.80 or any single sub lot result in mean pavement air voids exceeding 10.5 percent.
- Mix produced not using an approved mix design and/or job mix formula.

Remove and replace any material determined to not meet the requirements established in Section 828.2.B at the Contractor's expense.

If control test results show the characteristic tested does not conform to the job mix formula control tolerances given in Section 828, take immediate action to ensure that the quality control methods are effective.

Control the materials to ensure extreme variations do not occur. Maintain the gradation within the composition limits in Section 828.

B. Prepare Bituminous Material

Uniformly heat the bituminous material to the temperature specified in the job mix formula with a tolerance of ± 20 °F (± 11 °C).

C. Prepare the Aggregate

Prepare the aggregate as follows:

1. Heat the aggregate for the mixture, and ensure a mix temperature within the limits of the job mix formula.

2. Do not contaminate the aggregate with fuel during heating.

3. Reduce the absorbed moisture in the aggregate until the asphalt does not separate from the aggregate in the prepared mixture. If this problem occurs, the Engineer will establish a maximum limit for moisture content in the aggregates. When this limit is established, maintain the moisture content below this limit.

D. Prepare the Mixture

Proportion the mixture ingredients as necessary to meet the required job mix formula. Mix until a homogenous mixture is produced.

1. Add Mineral Filler

When mineral filler is used, introduce it in the proper proportions and as specified in Subsection 400.3.02.B.5, "Mineral Filler Supply System."

2. Add Hydrated Lime

When hydrated lime is included in the mixture, add it at a rate specified in Section 828 and the job mix formula. Use methods and equipment for adding hydrated lime according to Subsection 400.3.02.B.6, "Hydrated Lime Treatment System."

Add hydrated lime to the aggregate by using Method A or B as follows:

Method A—Dry Form—Add hydrated lime in its dry form to the mixture as follows, according to the type of plant:

a. Batch Type Asphalt Plant: Add hydrated lime to the mixture in the weigh hopper or as approved and directed by the Engineer.

b. Continuous Plant Using Pugmill Mixer: Feed hydrated lime into the hot aggregate before it is introduced into the mixer to ensure dry mixing is complete before the bituminous material is added.

c. Continuous Plant Using Drier-Drum Mixer: Add hydrated lime so to ensure the lime will not become entrained into the air stream of the drier and to ensure thorough dry mixing will be complete before the bituminous material is added.

Method B—Lime/Water Slurry—Add the required quantity of hydrated lime (based on dry weight) in lime/water slurry form to the aggregate. This solution consists of lime and water in concentrations as directed by the Engineer. Equip the plant to blend and maintain the hydrated lime in suspension and to mix the hydrated lime with the aggregates uniformly in the proportions specified.

3. Add Stabilizing Fiber

When stabilizing fiber is included in the mixture, add stabilizing fiber at a rate specified in Section 819 and the Job Mix Formula. Introduce it as specified in Subsection 400.3.02.B.8, "Fiber Supply System."

4. Add Gilsonite Modifier

When approved by the Office of Materials and required by the Contract, add the Gilsonite modifier to the mixture at a rate to ensure eight percent by weight of the asphalt cement is replaced by Gilsonite. Use either PG 64-22 or PG 67-22 asphalt cement as specified in Subsection 820.2.01. Provide suitable means to calibrate and check the rate of Gilsonite being added. Introduce Gilsonite modifier by either of the following methods.

a. For batch type plants, incorporate Gilsonite into the pugmill at the beginning of the dry mixing cycle. Increase the dry mix cycle by a minimum of 10 seconds after the Gilsonite is added and prior to introduction of the asphalt cement. For this method, supply Gilsonite in plastic bags to protect the material during shipment and handling and store the modifier in a waterproof environment. The bags shall be capable of being completely melted and uniformly blended into the combined mixture.
Gilsonite may also be added through a mineral filler supply system as described in Subsection 400.3.02.B.5, "Mineral Filler Supply System." The system shall be capable of injecting the modifier into the weigh hopper near the center of the aggregate batching cycle so the material can be accurately weighed.

b. For drum drier plants, add Gilsonite through the recycle ring or through an acceptable means which will introduce the Gilsonite prior to the asphalt cement injection point. The modifier shall be proportionately fed into the drum mixer at the required rate by a proportioning device which shall be accurate within 10 percent of the amount required. The entry point shall be away from flames and ensure the Gilsonite will not be caught up in the air stream and exhaust system.

5. Materials from Different Sources

Do not use mixtures prepared from aggregates from different sources intermittently. This will cause the color of the finished pavement to vary.

E. Observe Weather Limitations

Do not mix and place asphaltic concrete if the existing surface is wet or frozen. Do not lay asphaltic concrete OGFC mix or PEM at air temperatures below 60 ºF (16 ºC). When using a MTV, OGFC mix or PEM may be placed at 55 ºF (13 ºC) when approved by the Engineer. For other courses, follow the temperature guidelines in the following table:

Table 4—Lift Thickness Table

Lift Thickness	Minimum Temperature
1 in (25 mm) or less	55 °F (13 °C)
1.1 to 2 in. (26 mm to 50 mm)	45 °F (8 °C)
2.1 to 3 in. (51 mm to 75 mm)	40 °F (4 °C)
3.1 to 4 in. (76 mm to 100 mm)	35 °F (2 °C)
4.1 to 8 in. (101 mm to 200 mm)	32 °F (0 °C) and rising. Base Material must not be frozen.

F. Perform Spreading and Finishing

Spread and finish the course as follows:

1. Determine the course's maximum compacted layer thickness by the type mix being used according to Table 5.

Table 5—Maximum Layer Thickness

Mix Type	Minimum Layer Thickness	Maximum Layer Thickness	Maximum Total Thickness
25 mm Superpave	2 1/2 in. (64 mm)	4 in. (100 mm)*	---
19 mm Superpave	1 3/4 in. (44 mm)	3 in. (75 mm)*	---
12.5 mm Superpave	1 3/8 in. (35 mm)	2 1/2 in. (64 mm)**	8 in. (200 mm)
9.5 mm Superpave Type 2	1 1/8 in. (28 mm)	1 1/2 in. (38 mm)	4 in. (100 mm)
9.5 mm Superpave Type 1	7/8 in. (22 mm)	1 1/4 in. (32mm)	4 in. (100 mm)
4.75 mm Mix	3/4 in. (19 mm)	1 1/8 in. (28 mm)	2 in. (50 mm)
9.5 mm OGFC	55 lbs/yd² (30 kg/m²)	65 lbs/yd² (36 kg/m²)	---
12.5 mm OGFC	85 lbs/yd² (47 kg/m²)	95 lbs/yd² (53 kg/m²)	---
12.5 mm PEM	110 lbs/yd² (80 kg/m²)	165 lbs/yd² (90 kg/m²)	---
9.5 mm SMA	1 1/8 in. (28 mm)	1 1/2 in. (38 mm)	4 in. (100 mm)
12.5 mm SMA	1 3/8 in. (35 mm)	3 in. (75 mm)	6 in. (150 mm)
19 mm SMA	1 3/4 in. (44 mm)	3 in. (75 mm)	---
* Allow up to 6 in. (150 mm) per lift on trench widening. **Place 9.5 mm Superpave and 12.5 mm Superpave up to 4 in. (100mm) thick for driveway and side road trasition.			

2. Unload the mixture into the paver hopper or into a device designed to receive the mixture from delivery vehicles.

3. Except for leveling courses, spread the mixture to the loose depth for the compacted thickness or the spread rate. Use a mechanical spreader true to the line, grade, and cross section specified.

4. For leveling courses, use a motor grader equipped with a spreader box and smooth tires to spread the material or use a mechanical spreader meeting the requirements in Subsection 400.3.02.C, "Equipment at Project Site."

5. Obtain the Engineer's approval for the sequence of paving operations, including paving the adjoining lanes. Minimize tracking tack onto surrounding surfaces.

6. Ensure the outside edges of the pavement being laid are aligned and parallel to the roadway center line.

7. For New Construction or Resurfacing Contracts containing multiple lifts or courses, arrange the width of the individual lifts so the longitudinal joints of each successive lift are offset from the previous lift at least 1 ft (300 mm). This requirement does not apply to the lift immediately over thin lift leveling courses.
Ensure the longitudinal joint(s) in the surface course and the mix immediately underneath asphaltic concrete OGFC or PEM are at the lane line(s).

NOTE: Perform night work with artificial light provided by the Contractor and approved by the Engineer.

8. Where mechanical equipment cannot be used, spread and rake the mixture by hand. Obtain the Engineer's approval of the operation sequence, including compactive methods, in these areas.

9. Keep small hand raking tools clean and free from asphalt build up. Do not use fuel oil or other harmful solvents to clean tools during the work.

10. Do not use mixture with any of these characteristics:

- Segregated
- Nonconforming temperature
- Deficient or excessive asphalt cement content
- Otherwise unsuitable to place on the roadway in the work

11. Remove and replace mixture placed on the roadway that the Engineer determines has unacceptable blemish levels from segregation, raveling, streaking, pulling and tearing, or other deficient characteristics. Replace with acceptable mixture at the Contractor's expense. Do not continually place mixtures with deficiencies.

    Do not place subsequent course lifts over another lift or course placed on the same day while the temperature of the previously placed mix is 140 °F (60 °C) or greater.

12. Obtain the Engineer's approval of the material compaction equipment. Perform the rolling as follows:

    a. Begin the rolling as close behind the spreader as possible without causing excessive distortion of the asphaltic concrete surface.

    b. Continue rolling until roller marks are no longer visible.

    c. Use pneumatic-tired rollers with breakdown rollers on all courses except asphaltic concrete OGFC, PEM and SMA or other mixes designated by the Engineer.

13. If applicable, taper or "feather" asphaltic concrete from full depth to a depth no greater than 0.5 in (13 mm) along curbs, gutters, raised pavement edges, and areas where drainage characteristics of the road must be retained. The Engineer will determine the location and extent of tapering.

G. Maintain Continuity of Operations

Coordinate plant production, transportation, and paving operations to maintain a continuous operation. If the spreading operations are interrupted, construct a transverse joint if the mixture immediately behind the paver screed cools to less than 250 ºF (120 ºC).

H. Construct the Joints

1. Construct Transverse Joints

a. Construct transverse joints to facilitate full depth exposure of the course before resuming placement of the affected course.

b. Properly clean and tack the vertical face of the transverse joint before placing additional material.

NOTE: Never burn or heat the joint by applying fuel oil or other volatile materials.

c. Straightedge transverse joints immediately after forming the joint.

d. Immediately correct any irregularity that exceeds 3/16 in. in 10 ft (5 mm in 3 m).

2. Construct Longitudinal Joints

Clean and tack the vertical face of the longitudinal joint before placing adjoining material. Construct longitudinal joints so that the joint is smooth, well sealed, and bonded.

3. Construction Joint Detail for OGFC and PEM Mixtures

In addition to meeting joint requirements described above, construct joints and transition areas for 12.5 mm OGFC and 12.5 mm PEM mixtures as follows:

a. For projects which do not have milling included as a pay item:

1) Place OGFC mixture meeting gradation requirements of 9.5 mm OGFC as specified in Section 828 on entrance and exit ramp gore areas and end of project construction joints.

- Taper mixture from 3/8 in (10 mm) at end of project to full plan depth within maximum distance of spread for one load of mixture
- Taper mixture placed on gore areas from thickness of the edge of the mainline to 3/8 in (10 mm) at the point of the ramp transverse joint.

2.) Construct the ramp transverse joint at the point specified in the plans or as directed by the Engineer.

3.) Mixture placed in the transition and gore areas will be paid for at the contract unit price for 12.5 mm OGFC or 12.5 mm PEM as applicable.

b. For projects which have milling included as a pay item:

1) Taper milling for a distance of no less than 50 ft (15 m) to a depth of 2 1/4 in (59 mm) at the point of the transverse joint

2) Taper thickness, if needed, of the dense-graded surface mix within the 50 ft (15 m) distance to 1 1/2 in (40 mm) at the point of the transverse joint

3) Taper thickness of the 12.5 mm OGFC or 12.5 mm PEM to 3/4 in (19 mm) to ensure the material ties in at grade level with the existing surface at the point of the transverse joint

I. Protect the Pavement
Protect sections of the newly finished pavement from traffic until the traffic will not mar the surface or alter the surface texture. If directed by the Engineer, use artificial methods to cool the newly finished pavement to open the pavement to traffic more quickly.

J. Modify the Job Mix Formula
If the Engineer determines that undesirable mixture or mat characteristics are being obtained, the job mix formula may require immediate adjustment.

400.3.06 Quality Acceptance

A. Acceptance Plans for Gradation and Asphalt Cement Content

The Contractor will randomly sample and test mixtures for acceptance on a lot basis. The Department will monitor the Contractor testing program and perform comparison and quality assurance testing. The Contractor's Quality Control Technicians shall participate in the Department's Independent Assurance Systems Basis Program.

1. Determine Lot Amount

A lot consists of the tons (megagrams) of asphaltic concrete produced and placed each production day. If this production is less than 500 tons (500 Mg), or its square yard (meter) equivalent, production may be incorporated into the next working day. The Engineer may terminate a lot when a pay adjustment is imminent if a plant or materials adjustment resulting in a probable correction has been made. Terminate all open lots at the end of the month, except for materials produced and placed during the adjustment period. The lot will be terminated as described in Subsection 400.5.01,"Adjustments".

If the final day's production does not constitute a lot, the production may be included in the lot for the previous day's run; or, the Engineer may treat the production as a separate lot with a corresponding lower number of tests.

2. Determine Lot Acceptance

Determine lot acceptance as found in Subsection 400.5.01, "Adjustments."

The Department will perform the following task:

Determine the pay factor by using the mean of the deviations from the job mix formula of the tests in each lot and apply it to Table 9—Mixture Acceptance Schedule for Surface Mixes or Table 10—Mixture Acceptance Schedule

for Subsurface Mixes, whichever is appropriate. This mean will be determined by averaging the actual numeric value of the individual deviations from the job mix formula, disregarding whether the deviations are positive or negative amounts. Do not calculate lot acceptance using test results for materials not used in the Work. Determine the pay factor for each lot by multiplying the contract unit price by the appropriate pay factor from the Mixture Acceptance Schedule - Table 9 or Table 10. When two or more pay factors for a specific lot are less than 1.0, determine the adjusted payment by multiplying the contract unit price by the lowest pay factor.

If the mean of the deviations from the job mix formula of the lot acceptance tests for a control sieve or for asphalt cement content exceeds the tolerances established in the appropriate Mixture Acceptance Schedule, and if the Engineer determines that the material need not be removed and replaced, the lot may be accepted at an adjusted unit price as determined by the Engineer. If the Engineer determines that the material is not acceptable to leave in place, the materials shall be removed and replaced at the Contractor's expense.

3. Provide Quality Control Program

Provide a Quality Control Program as established in SOP 27 which includes:

- Assignment of quality control responsibilities to specifically named individuals who have been certified by the Office of Materials
- Provisions for prompt implementation of control and corrective measures
- Provisions for communication with Project Manager, Bituminous Technical Services Engineer, and Testing Management Operations Supervisor at all times
- Provisions for reporting all test results daily through the Office of Materials computerized Field Data Collection System; other checks, calibrations and records will be reported on a form developed by the Contractor and will be included as part of the project records
- Notification in writing of any change in quality control personnel

a. Certification Requirements:

- Use laboratory and testing equipment certified by the Department. (Laboratories which participate in and maintain AASHTO accreditation for testing asphaltic concrete mixtures will be acceptable in lieu of Departmental certification.)
- Provide certified quality control personnel to perform the sampling and testing. A Quality Control Technician (QCT) may be certified at three levels:

1) Temporary Certification – must be a technician trainee who shall be given direct oversight by a certified Level 1 or Level 2 QCT while performing acceptance testing duties during the first 5 days of training. The trainee must complete qualification requirements within 30 Georgia Department of Transportation funded production days after being granted temporary certification. A trainee who does not become qualified within 30 Georgia Department of Transportation funded production days will not be re-eligible for temporary certification. A certified Level 1 or Level 2 QCT shall be at the plant at all times during production and shipment of mixture to monitor work of the temporarily certified technician.

2) Level 1 – must demonstrate they are competent in performing the process control and acceptance tests and procedures related to hot mix asphalt production and successfully pass a written exam.

3) Level 2 – must meet Level 1 requirements and must be capable of and responsible for making process control adjustments, and successfully pass a written exam.

- Technician certification is valid for 3 years from the date on the technician’s certificate unless revoked or suspended. Eligible technicians may become certified through special training and testing approved by the Office of Materials. Technicians who lose their certification due to falsification of test data will not be eligible for recertification in the future unless approved by the State Materials Engineer.

b. Quality Control Management

1) Designate at least one Level 2 QCT as manager of the quality control operation. The Quality Control

Manager shall meet the following requirements:

- Be accountable for actions of other QCT personnel
- Ensure all applicable sampling requirements and frequencies, test procedures, and Standard Operating Procedures are adhered to
- Ensure all reports, charts, and other documentation is completed as required

2) Provide QCT personnel at the plant as follows:

- If daily production for all mix types is to be greater than 250 tons (megagrams), have a QCT person at the plant at all times during production and shipment of mixture until all required acceptance tests have been completed
- If daily production for all mix types will not be greater than 250 tons (megagrams) a QCT may be responsible for conducting tests at up to two plants, subject to random number sample selection
- Have available at the plant or within immediate contact by phone or radio a Level 2 QCT responsible for making prompt process control adjustments as necessary to correct the mix

3) Sampling, Testing, and Inspection Requirements.
Provide all sample containers, extractants, forms, diaries, and other supplies subject to approval of the Engineer.

Perform daily sampling, testing, and inspection of mixture production that meets the following requirements:

(a) Randomly sample mixtures according to GSP 15, and GDT 73 (Method C) and test on a lot basis. In the event less than the specified number of samples are taken, obtain representative 6 in (150 mm) cores from the roadway at a location where the load not sampled was placed. Take enough cores to ensure minimum sample size requirements are met for each sample needed.

(b) Maintain a printed copy of the computer generated random sampling data as a part of the project records.
(c) Perform sampling, testing, and inspection duties of GSP 21.

(d) Perform extraction or ignition test (GDT 83 or GDT 125) and extraction analysis (GDT 38). If the ignition oven is used, a printout of sample data including weights shall become a part of the project records. For asphalt cement content only, digital printouts of liquid asphalt cement weights may be substituted in lieu of an extraction test for plants with digital recorders. Calculate the asphalt content from the ticket representing the mixture tested for gradation.

(e) Save extracted aggregate, opposite quarters, and remaining material (for possible referee testing) of each sample as follows:

- Store in properly labeled, suitable containers
- Secure in a protected environment
- Store for three working days. If not obtained by the Department, within three days they may be discarded in accordance with GSP 21.

(f) Add the following information on load tickets from which a sample or temperature check is taken:
- Mixture temperature
- Signature of the QCT person performing the testing

(g) Calibrate the lime system when hydrated lime is included in the mixture:

- Perform a minimum of twice weekly during production
- Post results at the plant for review
- Provide records of materials invoices upon request (including asphalt cement, aggregate, hydrated lime, etc.)

(h) Take action if acceptance test results are outside Mixture Control Tolerances of Section 828.

- One sample out of tolerance

(1) Contact Level 2 - QCT to determine if a plant adjustment is needed

(2) Immediately run a process control sample. Make immediate plant adjustments if this sample is also out of tolerance

NOTE: Determine mixture temperature at least once per hour of production for OGFC and PEM mixes.

(3) Test additional process control samples as needed to ensure corrective action taken appropriately controls the mixture

- Two consecutive acceptance samples of the same mix type out of tolerance regardless of Lot or mix design level, or three consecutive acceptance samples out of tolerance regardless of mix type

(1) Stop plant production immediately

(2) Reject any mixture in storage:

- Deviating more than 10 percent in gradation from the job mix formula based on the acceptance sample
- Deviating more than 0.7 percent in asphalt content from the job mix formula based on the acceptance sample

(3) Make a plant correction to any mix type out of tolerance prior to resuming production

- Do not send any mixture to the project before test results of a process control sample meets Mixture Control Tolerances
- Reject any mixture produced at initial restarting that does not meet Mixture Control Tolerances

4) Comparison Testing and Quality Assurance Program

Periodic comparison testing by the Department will be required of each QCT to monitor consistency of equipment and test procedures. The Department will take independent samples to monitor the Contractor's quality control program.

a) Comparison Sampling and Testing

Retain samples for comparison testing and referee testing if needed as described in Subsection 400.3.06.A.3.b.3. Discard these samples only if the Contractor's acceptance test results meet a 1.00 pay factor and the Department does not procure the samples within three working days.
The Department will test comparison samples on a random basis. Results will be compared to the respective contractor acceptance tests and the maximum difference shall be as follows:

Table 6—Allowable Percent Difference Between Department and Contractor Acceptance Tests

SIEVE SIZE	SURFACE	SUB-SURFACE
1/2 in. (12.5 mm)		4.0%
3/8 in. (9.5 mm)	3.5%	4.0%
No. 4 (4.75 mm)	3.5%	3.5 %
No. 8 (2.36 mm)	2.5%	3.0%
No. 200 (75 µm)	2.0%	2.0%
A.C.	0.4%	0.5 %

NOTE: Pavement courses to be overlaid with OGFC or PEM mixes are considered surface mixes.

(1) If test comparisons are within these tolerances:

- Continue production
- Use the Contractor's tests for acceptance of the lot

(2) If test comparisons are not within these tolerances:

- Another Departmental technician will test the corresponding referee sample
- Results of the referee sample will be compared to the respective contractor and Departmental tests using the tolerance for comparison samples given above.

  a. If referee test results are within the above tolerances when compared to the Contractor acceptance test, use the Contractor's test for acceptance of the effected lot.

  b. If referee test results are not within the above tolerances when compared to the Contractor acceptance test, the Department will review the Contractor's quality control methods and determine if a thorough investigation is needed.

b) Independent Verification Sampling and Testing

(1) Randomly take a minimum of two independent samples from the lesser of five days or five lots of production regardless of mix type or number of projects.

(2) Compare test deviation from job mix formula to Mixture Control Tolerances in Section 828. If results are outside these tolerances, another sample from the respective mix may be taken.

NOTE: For leveling courses less than 110 lb/yd² (60 kg/m²) having quality assurance test results outside the Mixture Control Tolerances of Section 828, use the Department's test results only and applicable pay factors will apply.

If test results of the additional sample are not within Mixture Control Tolerances, the Department will take the following action:

- Take random samples from throughout the subject lot(s) as established in Subsection 400.3.06.A.3.b.3 and use these test results for acceptance and in calculations for the monthly plant rating. Applicable pay factors will apply and the contractor QCT test results will not be included in pay factor calculations nor in the monthly plant rating.
- Determine if the Contractor's quality control program is satisfactory and require prompt corrective action by the Contractor if specification requirements are not being met.
- Determine if the QCT has not followed Departmental procedures or has provided erroneous information.
- Take samples of any in-place mixture represented by unacceptable QCT tests and use the additional sample results for acceptance and in calculations for the monthly plant rating and

apply applicable pay factors. The Contractor QCT tests will not be included in the pay factor calculations nor in the monthly plant rating.

B. Compaction

Determine the mixture compaction using either GDT 39 , GDT 59 or AASHTO T 331. The method of GDT 39 for "Uncoated Specimens, Dense Graded Mixtures Only" shall not apply when the water absorption of a sample exceeds 2.0 percent, as measured according to AASHTO T 166. In this case, either AASHTO T 331 or the paraffin method of GDT 39 shall apply. The compaction is accepted in lots defined in Subsection 400.3.06. A "Acceptance Plans for Gradation and Asphalt Cement Content" and is within the same lot boundaries as the mixture acceptance.
1. Calculate Pavement Mean Air Voids

The Department will calculate the pavement air voids placed within each lot as follows:

a. One test per sub-lot.

- Lots ≥ 500 ton (500 Mg) of mix shall be divided into 5 sub-lots of equal distance
- Lots < 500 tons (500 Mg) of mix shall be divided into a sub-lot or equal sub-lots consisting up to 100 tons (100 Mg) mix each. There may be less than 5 sub-lots.

b. Average the results of all tests run on randomly selected sites in that lot.

c. Select the random sites using GDT 73.

Density tests are not required for asphaltic concrete placed at 90 lbs/yd$_2$ (50 kg/m$_2$) or less, 4.75 mm mix, and asphaltic concrete OGFC, PEM and mixes placed as variable depth or width leveling. Compact these courses to the Engineer's satisfaction. Density tests will not be performed on turn-outs and driveways.

The targeted maximum Pavement Mean Air Void content for all Superpave and Stone Matrix Asphalt mixtures is 5.0 percent. Ensure that the maximum Pavement Mean Air Voids for all Superpave and Stone Matrix Asphalt mixtures does not exceed 7.0 percent. The maximum Pavement Mean Air Voids for 2 foot shoulder widening is 9.0 percent. The adjustment period for density shall be four lots or four production days, whichever is less, in order for the contractor to ensure maximum compactive effort has been achieved which will yield no more than the specified maximum allowed Mean Air Voids. If the contractor needs to adjust the mixture to improve density results, a change in the job mix formula may be requested for approval during the adjustment period so long as the following values are not exceeded:

- Coarse pay sieve ± 4%
- No. 8 (2.36 mm) sieve ± 2%
- No. 200 (75 m) sieve ± 1%
- Asphalt Content ± 0.2%
- All value changes must still be within specification limits

If the Office of Materials is satisfied that the contractor has exerted the maximum compactive effort and is not able to maintain Pavement Mean Air Voids at no more than 7.0%, the Engineer may establish a maximum target for Pavement Mean Air Voids.

Mixture placed during the adjustment period for density shall meet the requirements for a 0.90 pay factor in Table 12 of Subsection 400.5.01.C, "Calculate Mean Pavement Air Voids." Mixture not meeting these density requirements shall be paid for using the applicable pay factor.

If the mean air voids of the pavement placed within a lot exceeds 100% of the maximum target air voids, if established and the Engineer determines that the material need not be removed and replaced, the lot may be accepted at an adjusted unit price as determined by the Engineer.

2. Obtain Uniform Compaction

For a lot to receive a pay factor of 1.00 for compaction acceptance, the air void range cannot exceed 4 percent for new construction or 5 percent for resurfacing projects. The range is the difference between the highest and lowest acceptance test results within the affected lot. If the air void range exceeds these tolerances, apply a Pay Factor of 95%.

The 5% reduced pay factor for the compaction range does not apply in these instances:

- The mixture is placed during the adjustment period as defined in Subsection 400.5.01.A, "Materials Produced and Placed During the Adjustment Period."
- All air void results within a given lot are less than 7.0%.
- A lot containing two sublot or less.
- On two foot trench widening.

C. Surface Tolerance

In this Specification, pavement courses to be overlaid with an Open-Graded Friction Course or PEM are considered surface courses. All Open-Graded Friction Courses or PEM are to be evaluated after the roadway has been opened to traffic for a minimum of 5 days and a maximum of 15 days. Asphalt paving is subject to straightedge and visual inspection and irregularity correction as shown below:

1. Visual and Straightedge Inspection

Paving is subject to visual and straightedge inspection during and after construction operations until Final Acceptance. Locate surface irregularities as follows:

a. Keep a 10 ft (3 m) straightedge near the paving operation to measure surface irregularities on courses. Provide the straightedge and the labor for its use.

b. Inspect the base, intermediate, and surface course surfaces with the straightedge to detect irregularities.

c. Correct irregularities that exceed 3/16 in. in 10 ft (5 mm in 3 m) for base and intermediate courses, and 1/8 in. in 10 ft (3 mm in 3 m) for surface courses.

Mixture or operating techniques will be stopped if irregularities such as rippling, tearing, or pulling occur and the Engineer suspects a continuing equipment problem. Stop the paving operation and correct the problem. Correct surface course evaluations on individual Laser Road Profiler test sections, normally 1mile (1 km) long.

2. Target Surface Smoothness

The Department will use the Laser Road Profiler method to conduct acceptance testing for surface course tolerance according to GDT 126. This testing will be performed only on:

- Surface courses on Projects with mainline traveled way measuring a minimum distance of 1 mile (1600 m)
- Ramps more than 0.5 mile (800 m) long

Combine partial sections measuring less than 0.5 mile (800 m) with the previous full mile for acceptance.

Achieve the smoothest possible ride during construction. Do not exceed the target Laser Road Profiler smoothness index as shown below:

Table 7— Pavement Smoothness Target Requirements

Construction Description	Smothness Index
All Asphaltic Concrete OGFC and PEM placed on interstate resrufacing and new construction. Asphaltic Concrete OGFC and PEM placed on state route new construction	750
Asphaltic Concrete SMA and other resurfacing on interstates. Asphaltic Concrete OGFC and PEM placed on state route resurfacing. All new construction on state routes with exception of OGFC and PEM as stated above.	825
All other resurfacing on state rutes (excluding LARP, PR, airports, etc.)	900
All Urban new construction and resurfacing on state routes within curb and gutter sections located in posted 35 miles per hour (MPH) or less speed zones.	1175

If the target values are not achieved, immediately adjust the operations to meet the target values. Placement operations may be suspended until a remedial plan to comply with target smoothness requirements is submitted and approved by the Engineer if adjustments do not satisfy target smoothness values.

Table 8— Pavement Smoothness Corrective Work Requirement

Construction Description	Smothness Index
All Asphaltic Concrete OGFC and PEM placed on interstate resrufacing and new construction. Asphaltic Concrete OGFC and PEM placed on state route new construction	825
Asphaltic Concrete SMA and other resurfacing on interstates. Asphaltic Concrete OGFC and PEM placed on state route resurfacing. All new construction on state routes with exception of OGFC and PEM as stated above.	900
All other resurfacing on state rutes (excluding LARP, PR, airports, etc.)	1025
All Urban new construction and resurfacing on state routes within curb and gutter sections located in posted 35 miles per hour (MPH) or less speed zones.	1250

If surface tolerance deficiencies need correction, obtain the Engineer's approval of the methods and type mix used.

3. Bridge Approach Ride Quality
The following are subject to a ride quality test by the Department for 100 ft. (30 m) of roadway approaching each end of a bridge using the Lightweight Profiler:

- A state road with 4 lanes or more
- A 2-lane state road with a current traffic count of 2,000 vpd or more
- Locations designated on the Plans

All other bridge approaches not meeting the above criteria shall meet the 1/8 in. in 10 ft (3 mm in 3 m) straightedge requirement. When the distance between the ends of two bridges is less than 200 ft (60 m), the bridge approaches will meet the straightedge requirements.

Test ride quality as follows:

a. The Department will determine a profile index value according to test method GDT 134.

b. The Department will average the profile index value from the right and left wheelpath for each 100 ft (30 m) section for each lane

- Resurfacing Projects – Keep the profile index value under 35 in/mile (555 mm/km), correct individual bumps or depression exceeding 0.2 in. (5 mm) from the blanking band on the profilograph trace.
- All Other Projects – Keep the profile index value under 30 in/mile (475 mm/km), correct individual bumps or depressions exceeding 0.2 in. (5 mm) from blanking band on the profilograph trace.

c. Meet the profile index value for the 100 ft (30 m) section of roadway up to the joint with the approach slab.

d. Schedule the ride quality testing 5 days before needed by contacting the Office of Materials. Clean and clear obstructions from the test area.

e. Correct the sections that do not meet the ride quality criteria of this Specification. After correction, these sections are subject to retesting with the Lightweight Profiler. The Engineer shall direct the type of correction method, which may include:

- Milling
- Grinding
- Removing and replacing the roadway

No additional compensation will be made.

The Department will perform ride quality testing up to two times on the bridge approaches at no cost to the Contractor. Additional profilograph testing will cost the Contractor $500 per test.

4. Surface Smoothness Acceptance

When recommended by the Office of Materials, a pay reduction may be accepted in lieu of correction for roadways and bridge approaches that fail to achieve specified smoothness indexes.

D. Reevaluation of Lots

When lots are reevaluated as shown in Subsection 106.03, “Samples, Tests, Cited Specifications,” sampling and testing is according to GDT 73. Request for reevaluation shall be made within 5 working days of notification of the lot results.

The following procedures apply:

1. Mixture Acceptance

The Department will take the same number of new tests on cores taken at the locations where the loads sampled were placed and will use only those cores results for acceptance. If the location of the sampled loads cannot be isolated and documented to the approval of the Engineer, the lot will not be re-evaluated and the original test results will be used for acceptance. The Department will use the absolute average deviations from the job mix formula for these tests to determine acceptance based on the appropriate column in the Asphalt Cement Content and Aggregate Gradation of Asphalt Concrete Mixture Acceptance Schedule—Table 9 or 10.

2. Compaction Acceptance

The Department will reevaluate the lot through additional testing by cutting the same number of cores originally obtained and averaging these results with the results from the original density tests. The Department will use the average to determine acceptance according to the Compaction Acceptance Schedule in Subsection 400.5.01.C, “Calculate Pavement Mean Air Voids”.

Table 9—Mixture Acceptance Schedule—Surface Mixes

Mixture Characteristics	Pay Factor	Mean of the Deviations from the Job Mix Formula							
		1 Test	2 Test	3 Test	4 Test	5 Test	6 Test	7 Test	8 Test
Asphalt Cement Content (Extraction, Ignition)	1.00	0.00 - 0.70	0.00 - 0.54	0.00 - 0.46	0.00 - 0.41	0.00 - 0.38	0.00 - 0.35	0.00 - 0.32	0.00 - 0.30
	0.95	0.71 - 0.80	0. 55 - 0.61	0.47 - 0.52	0.42 - 0.46	0.39 - 0.43	0.36 - 0.39	0.33 - 0.36	0.31 - 034
	0.90	0.81 - 0.90	0.62 - 0.68	0.53 - 0.58	0.47 - 0.51	0.44 - 0.47	0.40 - 0.45	0.37 - 0.40	0.35 - 0.37
	0.80	0.91 - 1.00	0.69 - 0.75	0.59 - 0.64	0.52 - 0.56	0.48 - 0.52	0.44 - 0.47	0.41 - 0.44	0.38 - 0.41
	0.70	1.01 - 1.19	0.76 - 0.82	0.65 - 0.69	0.57 - 0.61	0.53 - 0.56	0.48 - 0.51	0.45 - 0.47	0.42 - 0.44
	0.50	1.20 - 1.40	0.83 - 0.85	0.70 - 0.72	0.62 - 0.64	0.57 - 0.59	0.52 - 0.55	0.46 - 0.51	0.45 - 0.48
3/8 in. (9.5 mm) Sieve (12.5 mm OGFC, 12.5 mm PEM, 12.5 mm Superpave)	1.00	0.00 - 9.0	0.00 - 6.6	0.00 - 5.6	0.00 - 5.0	0.00 - 4.6	0.00 - 4.2	0.00 - 3.9	0.00 - 3.6
	0.98	9.1 - 10.0	6.7 - 7.5	5.7 - 6.3	5.1 - 5.6	4.7 - 5.2	4.3 - 4.7	4.0 - 4.4	3.7 - 4.1
	0.95	10.1 - 11.9	7.6 - 8.4	6.4 - 7.0	5.7 - 6.3	5.3 - 5.8	4.8 - 5.3	4.5 - 5.0	4.2 - 4.6
	0.90	12.0 - 13.0	8.5 - 9.3	7.1 - 7.7	6.4 - 6.9	5.9 - 6.3	5.4 - 5.8	5.1 - 5.4	4.7 - 5.0
	0.85	13.1 - 14.0	9.4 - 10.2	7.8 - 8.6	7.0 - 7.6	6.4 - 6.9	5.9 - 6.3	5.5 - 5.9	5.1 - 5.5
	0.80	14.1 - 14.5	10.3 - 10.5	8.7 - 8.9	7.7 - 8.0	7.0 - 7.5	6.4 - 6.8	6.0 - 6.4	5.6 - 6.0
3/8 in. (9.5 mm) Sieve (12.5 mm SMA)	1.00	0.00 - 6.8	0.00 - 5.0	0.00 - 4.2	0.00 - 3.8	0.00 - 3.4	0.00 - 3.2	0.00 - 2.9	0.00 - 2.7
	0.98	6.9 - 7.5	5.1 - 5.6	4.3 - 4.7	3.9 - 4.2	3.5 - 3.9	3.3 - 3.5	3.0 - 3.3	2.8 - 3.1
	0.95	7.6 - 8.9	5.7 - 6.3	4.8 - 5.2	4.3 - 4.7	4.0 - 4.4	3.6 - 4.0	3.4 - 3.8	3.2 - 3.4
	0.90	9.0 - 9.8	6.4 - 7.0	5.3 - 5.8	4.8 - 5.2	4.5 - 4.8	4.1 - 4.4	3.9 - 4.1	3.5 - 3.8
	0.85	9.9 - 10.5	7.1 - 7.6	5.9 - 6.4	5.3 - 5.7	4.9 - 5.2	4.5 - 4.7	4.2 - 4.4	3.9 - 4.1
	0.80	10.6 - 10.9	7.7 - 7.9	6.5 - 6.7	5.8 - 6.0	5.3 - 5.6	4.8 - 5.1	4.5 - 4.8	4.2- 4.5
No. 4 (4.75 mm) Sieve (9.5 mm OGFC, 9.5 mm Superpave)	1.00	0.00 - 9.0	0.00 - 6.7	0.00 - 5.7	0.00 - 5.2	0.00 - 4.8	0.00 - 4.4	0.00 - 4.1	0.00 - 3.8
	0.98	9.1 - 10.0	6.8 - 7.6	5.8 - 6.3	5.3 - 5.8	4.9 - 5.4	4.5 - 4.9	4.2 - 4.6	3.9 - 4.3
	0.95	10.1 - 11.9	7.7- 8.5	6.4 - 6.9	5.9 - 6.4	5.5 - 5.9	5.0 - 5.4	4.7 - 5.0	4.4 - 4.7
	0.90	12.0 - 13.0	8.6 - 9.4	7.0 - 7.5	6.5 - 7.0	6.0 - 6.5	5.5 - 5.9	5.1 - 5.5	4.8 - 5.1
	0.85	13.1 - 14.0	9.5 - 10.2	7.6 - 8.0	7.1 - 7.6	6.6 - 7.0	6.0 - 6.4	5.6 - 5.9	5.2 - 5.5

Mixture Characteristics	Pay Factor	Mean of the Diviations from the Job Mix Formula							
		1 Test	2 Test	3 Test	4 Test	5 Test	6 Test	7 Test	8 Test
	0.80	14.1 - 14.5	10.3 - 10.5	8.1 - 8.3	7.7 - 8.0	7.1 - 7.5	6.5 - 6.9	6.0 - 6.4	5.6 - 5.9
No. 4 (4.75 mm) Sieve (9.5 mm Superpave)	1.00	0.00 - 6.8	0.00 - 5.0	0.00 - 4.3	0.00 - 3.9	0.00 - 3.6	0.00 - 3.3	0.00 - 3.1	0.00 - 2.8
	0.98	6.9 - 7.5	5.1 - 5.7	4.4 - 4.7	4.0 - 4.4	3.7 - 4.0	3.4 - 3.7	3.2 - 3.4	2.9 - 3.2
	0.95	7.6 - 8.9	5.8 - 6.4	4.8 - 5.2	4.5 - 4.8	4.1 - 4.4	3.8 - 4.0	3.5 - 3.8	3.3 - 3.5
	0.90	9.0 - 9.8	6.5 - 7.0	5.3 - 5.6	4.9 - 5.2	4.5 - 4.9	4.1 - 4.4	3.9 - 4.1	3.6 - 3.8
	0.85	9.9 - 10.5	7.1 - 7.7	5.7 - 6.0	5.3 - 5.7	5.0 - 5.2	4.3 - 4.8	4.2 - 4.4	3.9 - 4.1
	0.80	10.6 - 10.9	7.8 - 7.9	6.1 - 6.2	5.8 - 6.0	5.3 - 5.6	4.9 - 5.2	4.5 - 4.8	4.2 - 4.4
No. 8 (2.36 mm) Sieve (All mixes except SMA)	1.00	0.00 - 7.0	0.00 - 5.6	0.00 - 4.8	0.00 - 4.3	0.00 - 4.0	0.00 - 3.6	0.00 - 3.4	0.00 - 3.2
	0.98	7.1 - 8.0	5.7 - 6.3	4.9 - 5.4	4.4 - 4.6	4.1 - 4.5	3.7 - 4.1	3.5 - 3.8	3.3 - 3.6
	0.95	8.1 - 9.0	6.4 - 7.0	5.5 - 6.0	4.9 - 5.3	4.6 - 4.9	4.2 - 4.5	3.9 - 4.2	3.7 - 3.9
	0.90	9.1 - 10.9	7.1 - 7.7	6.1 - 6.6	5.4 - 5.8	5.0 - 5.4	4.6 -4.9	4.3 - 4.6	4.0 - 4.3
	0.85	11.0 - 12.0	7.8 - 8.5	6.7 - 7.2	5.9 - 6.4	5.5 - 5.8	5.0 - 5.3	4.7 - 5.0	4.4 - 4.6
	0.75	12.1 - 12.5	8.6 - 8.8	7.3 - 7.5	6.5 - 6.8	5.9 - 6.3	5.4 - 5.7	5.1 - 5.3	4.7 - 4.9
No. 8 (2.36 mm) Sieve (19 mm SMA)	1.00	0.00 - 5.3	0.00 - 4.2	0.00 - 3.6	0.00 - 3.2	0.00 - 3.0	0.00 - 2.7	0.00 - 2.6	0.00 - 2.4
	0.98	5.4 - 6.0	4.3 - 4.7	3.7 - 4.0	3.3 - 3.6	3.1 - 3.4	2.8 - 3.1	2.7 - 2.9	2.5 - 2.7
	0.95	6.1 - 6.8	4.8 - 5.3	4.1 - 4.5	3.7 - 4.0	3.5 - 3.7	3.2 - 3.4	3.0 - 3.2	2.8 - 2.9
	0.90	6.9 - 8.2	5.4 - 5.8	5.6 - 5.0	4.1 - 4.5	3.8 - 4.0	3.5 - 3.7	3.3 - 3.5	3.0 - 3.2
	0.85	8.3 - 9.0	5.9 - 6.4	5.1 - 5.4	4.6 - 4.8	4.1 - 4.4	3.8 - 4.0	3.6 - 3.8	3.3 - 3.4
	0.75	9.1 - 9.4	6.5 - 6.6	5.5 - 5.0	4.9 - 5.1	4.5 - 4.7	4.1 - 4.3	3.9 - 4.0	3.5 - 3.7
No. 8 (2.36 mm) Sieve for OGFC and PEM mixes: When the mean of the deviations from the Job Mix Formula for a particular lot exceeds the tolerance for a 1.00 pay factor in the appropriate column, the lot will be paid for at 0.50 of the Contract Price.									

Table 10—Mixture Acceptance Schedule—Subsurface Mixes

Characteristics	Pay Factor	Mean of the Deviations from the Job Mix Formula							
		1 Test	2 Test	3 Test	4 Test	5 Test	6 Test	7 Test	8 Test
Asphalt Cement Content (Extraction, Ignition)	1.00	0.00 - 0.80	0.00 - 0.61	0.00 - 0.52	0.00 - 0.46	0.00 - 0.43	0.00 - 0.39	0.00 - 0.36	0.00 - 0.34
	0.95	0.81 - 0.90	0. 62 - 0.68	0.53 - 0.58	0.47 - 0.51	0.44 - 0.47	0.40 - 0.43	0.37 - 0.40	0.35 - 037
	0.90	0.91 - 1.00	0.69 - 0.75	0.59 - 0.64	0.52 - 0.56	0.48 - 0.52	0.44 - 0.47	0.41 - 0.44	0.38 - 0.41
	0.80	1.01 - 1.19	0.76 - 0.82	0.65 - 0.69	0.57 - 0.61	0.53 - 0.56	0.48 - 0.51	0.45 - 0.47	0.42 - 0.44
	0.70	1.20 - 1.40	0.83 - 0.85	0.70 - 0.72	0.62 - 0.64	0.57 - 0.59	0.52 - 0.55	0.46 - 0.51	0.45 - 0.48
	0.50	1.41 - 1.60	0.86 - 0.88	0.73 - 0.75	0.65 - 0.67	0.60 - 0.63	0.56 - 0.60	0.52 - 0.56	0.49 - 0.52
1/2 in. (12.5 mm) Sieve (25 mm Superpave)	1.00	0.00 - 12.9	0.00 - 8.1	0.00 - 6.9	0.00 - 6.1	0.00 - 5.5	0.00 - 5.0	0.00 - 4.7	0.00 - 4.4
	0.98	13.0 - 14.0	8.2 - 9.1	7.0 - 7.7	6.2 - 6.8	5.6 - 6.1	5.1 - 5.6	4.8 - 5.2	4.5 - 4.9
	0.95	14.1 - 15.0	9.2 - 10.1	7.8 - 8.5	6.9 - 7.5	6.2 - 6.7	5.7 - 6.1	5.3 - 5.7	5.0 - 5.4
	0.90	15.1 - 16.0	10.2 - 11.1	8.6 - 9.3	7.6 - 8.2	6.8 - 7.4	6.2 - 6.7	5.8 - 6.3	5.5 - 5.9
	0.85	16.1 - 17.0	11.2 - 11.5	9.4 - 9.6	8.3 - 8.6	7.5 - 7.8	6.8 - 7.0	6.4 - 6.5	6.0 - 6.1
	0.80	17.1 - 18.0	11.6 - 11.9	9.7 - 9.9	8.7 - 9.0	7.9 - 8.1	7.1 - 7.3	6.6 - 6.8	6.2 - 6.4
1/2 in. (12.5 mm) Sieve (19 mm SMA)	1.00	0.00 - 9.7	0.00 - 6.0	0.00 - 5.2	0.00 - 4.6	0.00 - 4.1	0.00 - 3.8	0.00 - 3.5	0.00 - 3.3
	0.98	9.8 - 10.5	6.2 - 6.8	5.3 - 5.8	4.7 - 5.1	4.2 - 4.6	3.9 - 4.2	3.6 - 3.9	3.4 - 3.7
	0.95	10.6 - 11.2	6.9 - 7.8	5.9 - 6.4	5.2 - 5.6	4.7 - 5.0	4.3 - 4.6	4.0 - 4.3	3.8 - 4.0
	0.90	11.3 - 12.0	7.9 - 8.3	6.5 - 7.0	5.7 - 6.1	5.1 - 5.6	4.7 - 5.0	4.4 - 4.7	4.1 - 4.4
	0.85	12.1 - 12.8	8.4 - 8.6	7.1 - 7.2	6.2 - 6.5	5.7 - 5.9	5.1 - 5.3	4.8 - 4.9	4.5 - 5.6
	0.80	12.9 - 13.5	8.7 - 8.9	7.3 - 7.4	6.6 - 6.8	6.0 - 6.1	5.4 - 5.5	5.0 - 5.1	4.7 - 4.8
3/8 in. (9.5mm) Sieve (19 mm Superpave, 12.5 mm Superpave)	1.00	0.00 - 10.0	0.00 - 7.5	0.00 - 6.3	0.00 - 5.6	0.00 - 5.2	0.00 - 4.7	0.00 - 4.4	0.00 - 4.1
	0.98	10.1 - 11.9	7.6 - 8.4	6.4 - 7.0	5.7 - 6.3	5.3 - 5.8	4.8 - 5.3	4.5 - 5.0	4.2 - 4.6
	0.95	12.0 - 13.0	8.5 - 9.3	7.1 - 7.7	6.4 - 6.9	5.9 - 6.3	5.4 - 5.8	5.1 - 5.4	4.7 - 5.0
	0.90	13.1 - 14.0	9.4 - 10.2	7.8 - 8.6	7.0 - 7.6	6.4 - 6.9	5.9 - 6.3	5.5 - 5.9	5.1 - 5.5
	0.85	14.1 - 14.5	10.3 - 10.5	8.7 - 8.9	7.7 - 8.0	7.0 - 7.5	6.4 - 6.8	6.0 - 6.4	5.6 - 6.0

Mixture Characteristics	Pay Factor	Mean of the Diviations from the Job Mix Formula							
		1 Test	2 Test	3 Test	4 Test	5 Test	6 Test	7 Test	8 Test
	0.80	14.6 - 15.0	10.6 - 10.8	9.0 - 9.2	8.1 - 8.4	7.6 - 7.8	6.9 - 7.3	6.5 - 6.8	6.1 - 6.5
No. 4 (4.75 mm) Sieve (9.5 mm Superpave)	1.00	0.00 - 10.0	0.00 - 7.6	0.00 - 6.3	0.00 - 5.8	0.00 - 5.4	0.00 - 4.9	0.00 - 4.6	0.00 - 4.3
	0.98	10.0 - 11.9	7.7 - 8.5	6.4 - 6.9	5.9 - 6.4	5.5 - 5.9	5.0 - 5.4	4.7 - 5.0	4.4 - 4.7
	0.95	12.0 - 13.0	8.6 - 9.4	7.0 - 7.5	6.5 - 7.0	6.0 - 6.5	5.5 - 5.9	5.1 - 5.5	4.8 - 5.1
	0.90	13.1 - 14.0	9.5 - 10.2	7.6 - 8.0	7.1 - 7.6	6.6 - 7.0	6.0 - 6.4	5.6 - 5.9	5.2 - 5.5
	0.85	14.1 - 14.5	10.3 - 10.5	8.1 - 8.3	7.7 - 8.0	7.1 - 7.5	6.5 - 6.9	6.0 - 6.4	5.6 - 5.9
	0.80	14.6 - 15.0	10.6 - 15.0	8.4 - 8.6	8.1 - 8.4	7.6 - 8.0	7.0 - 7.4	6.5 - 6.8	6.0 - 6.3
No. 8 (2.36 mm) Sieve (All mixes except SMA)	1.00	0.00 - 8.0	0.00 - 6.3	0.00 - 5.4	0.00 - 4.8	0.00 - 4.5	0.00 - 4.1	0.00 - 3.8	0.00 - 3.6
	0.98	8.1 - 9.0	6.4 - 7.0	5.5 - 6.0	4.9 - 5.3	4.6 - 4.9	4.2 - 4.5	3.9 - 4.2	3.7 - 3.9
	0.95	9.1 - 10.0	7.1 - 7.7	6.1 - 6.6	5.4 - 5.8	5.0 - 5.4	4.6 - 4.9	4.3 - 4.6	4.0 - 4.3
	0.90	10.1 - 11.9	7.8 - 8.5	6.7 - 7.2	5.9 - 6.4	5.5 - 5.8	5.0 -5.3	4.7 - 5.0	4.4 - 4.6
	0.85	12.0 - 13.0	8.6 - 8.8	7.3 - 7.5	6.5 - 6.8	5.9 - 6.3	5.4 - 5.7	5.1 - 5.3	4.7 - 4.9
	0.75	13.1 - 14.0	8.9 - 9.1	7.6 - 7.8	6.9 - 7.2	6.4 - 6.6	5.8 - 6.4	5.4 - 5.7	5.0 - 5.3
No. 8 (2.36 mm) Sieve (19 mm SMA)	1.00	0.00 - 6.0	0.00 - 4.7	0.00 - 4.1	0.00 - 3.6	0.00 - 3.4	0.00 - 3.1	0.00 - 2.9	0.00 - 2.4
	0.98	6.1 - 6.8	4.8 - 5.2	4.2 - 4.5	3.7 - 4.0	3.5 - 3.7	3.2 - 3.4	3.0 - 3.2	2.8 - 2.9
	0.95	6.9 - 7.5	5.3 - 5.8	4.6 - 5.0	4.1 - 4.4	3.8 - 4.0	3.5 - 3.7	3.3 - 3.5	3.0 - 3.2
	0.90	7.6 - 8.9	5.9 - 6.4	5.1 - 5.4	4.5 - 4.8	4.1 - 4.4	3.8 - 4.0	3.6 - 3.8	3.3 - 3.5
	0.85	9.0 - 9.8	6.5 - 6.6	5.5 - 5.6	4.9 - 5.1	4.5 - 4.7	4.1 - 4.3	3.9 - 4.0	3.6 - 37
	0.75	9.9 - 10.5	6.7 - 6.8	5.7 - 5.9	5.2 - 5.4	4.8 - 5.0	4.4 - 4.6	4.1 - 4.3	3.8 - 4.0

E. Segregated Mixture

Prevent mixture placement yielding a segregated mat by following production, storage, loading, placing, and handling procedures. Ensure needed plant modifications and provide necessary auxiliary equipment. (See Subsection 400.1.01, "Definitions.")

If the mixture is segregated in the finished mat, the Department will take actions based on the degree of segregation. The actions are described below.

1. Unquestionably Unacceptable Segregation

When the Engineer determines the segregation in the finished mat is unquestionably unacceptable, follow these measures:

a. Suspend Work and require the Contractor to take positive corrective action. The Department will evaluate the segregated areas to determine the extent of the corrective work to the in-place mat as follows:

- Perform extraction and gradation analysis by taking 6 in (150 mm) cores from typical, visually unacceptable segregated areas.
- Determine the corrective work according to Subsection 400.3.06.E.3.

b. Require the Contractor to submit a written plan of measures and actions to prevent further segregation. Work will not continue until the plan is submitted to and approved by the Department.

c. When work resumes, place a test section not to exceed 500 tons (500 Mg) of the affected mixture for the Department to evaluate. If a few loads show that corrective actions were not adequate, follow the measures above beginning with step 1.a. above. If the problem is solved, Work may continue.

2. Unacceptable Segregation Suspected

When the Engineer observes segregation in the finished mat and the work may be unacceptable, follow these measures:

a. Allow work to continue at Contractor's risk.

b. Require Contractor to immediately and continually adjust operation until the visually apparent segregated areas are eliminated from the finished mat. The Department will immediately investigate to determine the severity of the apparent segregation as follows:

- Take 6 in (150 mm) cores from typical areas of suspect segregation.
- Test the cores for compliance with the mixture control tolerances in Section 828.

When these tolerances are exceeded, suspend work for corrective action as outlined in Subsection 400.3.06.E.3.

3. Corrective Work

a. Remove and replace (at the Contractor's expense) any segregated area where the gradation on the control sieves is found to vary 10 percent or more from the approved job mix formula, the asphalt cement varies 1.0% or more from the approved job mix formula, or if in-place air voids exceed 13.5% based on GDT 39. The control sieves for each mix type are shown in Subsection 400.5.01.B "Determine Lot Acceptance."

b. Subsurface mixes. For subsurface mixes, limit removal and replacement to the full lane width and no less than 10 ft. (3 m) long and as approved by the Engineer.

c. Surface Mixes. For surface mixes, ensure that removal and replacement is not less than the full width of the affected lane and no less than the length of the affected areas as determined by the Engineer.
Surface tolerance requirements apply to the corrected areas for both subsurface and surface mixes.

400.3.07 Contractor Warranty and Maintenance

A. Contractor's Record

Maintain a dated, written record of the most recent plant calibration. Keep this record available for the Engineer's inspection at all times. Maintain records in the form of:

- Graphs
- Tables
- Charts
- Mechanically prepared data

400.4 Measurement

Thickness and spread rate tolerances for the various mixtures are specified in Subsection 400.4.A.2.b, Table 11, Thickness and Spread Rate Tolerance at Any Given Location. These tolerances are applied as outlined below:

A. Hot Mix Asphaltic Concrete Paid for by Weight

1. Plans Designate a Spread Rate

a. Thickness Determinations. Thickness determinations are not required when the Plans designate a spread rate per square yard (meter).
If the spread rate exceeds the upper limits outlined in the Subsection 400.4.A.2.b, Table 11, "Thickness and Spread Rate Tolerance at Any Given Location", the mix in excess will not be paid for.
If the rate of spread is less than the lower limit, correct the deficient course by overlaying the entire lot.
The mixture used for correcting deficient areas is paid for at the Contract Unit Price of the course being corrected and is subject to the Mixture Acceptance Schedule—Table 9 or 10.

b. Recalculate the Total Spread Rate. After the deficient hot mix course has been corrected, the total spread rate for that lot is recalculated, and mix in excess of the upper tolerance limit as outlined in the Subsection 400.4.A.2.b, Table 11, "Thickness and Spread Rate Tolerance at Any Given Location" is not paid for.
The quantity of material placed on irregular areas such as driveways, turnouts, intersections, feather edge section, etc., is deducted from the final spread determination for each lot.

2. Plans Designate Thickness

If the average thickness exceeds the tolerances specified in the Subsection 400.4.A.2.b, Table 11, "Thickness and Spread Rate Tolerance at Any Given Location", the Engineer shall take cores to determine the area of excess thickness. Excess quantity will not be paid for.
If the average thickness is deficient by more than the tolerances specified in the Thickness and Spread Rate Tolerance at Any Given Location table below, the Engineer shall take additional cores to determine the area of deficient thickness. Correct areas with thickness deficiencies as follows:

a. Overlay the deficient area with the same mixture type being corrected or with an approved surface mixture. The overlay shall extend for a minimum of 300 ft (90 m) for the full width of the course.

b. Ensure that the corrected surface course complies with Subsection 400.3.06.C.1, "Visual and Straightedge Inspection." The mixture required to correct a deficient area is paid for at the Contract Unit Price of the course being corrected.

The mixture is subject to the Mixture Acceptance Schedule—Table 9 or 10 . The quantity of the additional mixture shall not exceed the required calculated quantity used to increase the average thickness of the overlaid section to the maximum tolerance allowed under the following table.

Table 11—Thickness and Spread Rate Tolerance at Any Given Location

Course	Thickness Specified	Spread Rate Specified
Apshaltic concrete base course	±0.5 in (± 13 mm)	+40 lbs, -50 lbs (+20 kg, -30 kg)
Intermediate and/or wearing course	±0.25 in (± 6 mm)	+20 lbs, -25 lbs (+10 kg, -15 kg)
Overall of any combination of 1 and 2	±0.5 in (± 13 mm)	+40 lbs, -50 lbs (+20 kg, -30 kg)

Note 1: For asphaltic concrete 9.5 mm OGFC and 12.5 mm OGFC, control the spread rate per lot within 5 lbs/yd$_2$ (3 kg/m$_2$) of the designated spread rate. For asphaltic concrete 12.5 mm PEM, control the spread rate per lot within 10 lbs/yd$_2$ (6 kg/m$_2$) of the designated spread rate.

Note 2: Thickness and spread rate tolerances are provided to allow normal variations within a given lot. Do not continuously operate at a thickness of spread rate not specified.

When the Plans specify a thickness, the Engineer may take as many cores as necessary to determine the average thickness of the intermediate or surface course. The Engineer shall take a minimum of one core per 1,000 ft (300 m) per two lanes of roadway. Thickness will be determined by average measurements of each core according to GDT 42.
If the average exceeds the tolerances specified in the Subsection 400.4.A.2.b, Table 11, "Thickness and Spread Rate Tolerance at Any Given Location", additional cores will be taken to determine the area of excess thickness and excess tonnage will not be paid for.

B. Hot Mix Asphaltic Concrete Paid for by Square Yard (Meter)

1. The thickness of the base course or the intermediate or surface course will be determined by the Department by cutting cores and the thickness will be determined by averaging the measurements of each core.

2. If any measurement is deficient in thickness more than the tolerances given in the table above, additional cores will be taken by the Department to determine the area of thickness deficiency. Correct thickness deficiency areas as follows:

    a. Overlay the deficient area with the same type mixtures being corrected or with surface mixture. Extend the overlay at least 300 ft (90 m) for the full width of the course.

    b. Ensure the corrected surface course complies with Subsection 400.3.06.C.1, Visual and Straightedge Inspection"

    c. The mixture is subject to the Mixture Acceptance Schedule—Table 9 or 10.

3. No extra payment is made for mixtures used for correction.

4. No extra payment is made for thickness in excess of that specified.

NOTE: Thickness tolerances are provided to allow normal variations within a given lot. Do not continuously operate at a thickness not specified.

C. Asphaltic Concrete
Hot mix asphaltic concrete, complete in place and accepted, is measured in tons (megagrams) or square yards (meters) as indicated in the Proposal. If payment is by the ton (megagram), the actual weight is determined by weighing each loaded vehicle on the required motor truck scale as the material is hauled to the roadway, or by using recorded weights if a digital recording device is used.

The weight measured includes all materials. No deductions are made for the weight of the individual ingredients. The actual weight is the pay weight except when the aggregates used have a combined bulk specific gravity greater than 2.75. In this case the pay weight is determined according to the following formula:

$$T1 = T \times \left\{ \% AC + \left(\frac{\% \text{ Aggregate } \times 2.75}{\text{Combined bulk Specific Gravity}} \right) + \% Y \right\} \Bigg/ 100$$

where:

T1	Pay weight, tonnage (Mg)
T=	Actual weight
% AC	Percent asphalt cement by weight of total mixture
% aggregate	Percent aggregate by weight of total mixture
Combined Bulk Sp. Gr. =	Calculated combined bulk specific gravity of various mineral aggregates used in the mixture
% Y=	Percent hydrated lime by weight of mineral aggregate

D. Bituminous Material
Bituminous material is not measured for separate payment.

E. Hydrated Lime
When hydrated lime is used as an anti-stripping additive, it is not measured for separate payment.

F. Field Laboratory
The field laboratory required in this Specification is not measured for separate payment.

G. Asphaltic Concrete Leveling
Payment of hot mix asphaltic concrete leveling, regardless of the type mix, is full compensation for furnishing materials, bituminous materials, and hydrated lime (when required) for patching and repair of minor defects, surface preparation, cleaning, hauling, mixing, spreading, and rolling.

Mixture for leveling courses is subject to the acceptance schedule as stated in Subsection 400.3.06.A and Subsection 400.3.06.B.

H. Asphaltic Concrete Patching

Hot mix asphaltic concrete patching, regardless of the type mix, is paid for at the Contract Unit Price per ton (Megagram), complete in place and accepted. Payment is full compensation for:

- Furnishing materials such as bituminous material and hydrated lime (when required)
- Preparing surface to be patched
- Cutting areas to be patched, trimmed, and cleaned
- Hauling, mixing, placing, and compacting the materials

400.4.01 Limits

When the asphaltic concrete is paid for by the square yard (meter) and multiple lifts are used, the number and thickness of the lifts are subject to the Engineer's approval and are used to prorate the pay factor for the affected roadway section.

400.5 Payment

When materials or construction are not within the tolerances in this Specification, the Contract Price will be adjusted according to Subsection 106.03, "Samples, Tests, Cited Specifications" and Subsection 400.3.06, "Quality Acceptance." Hot mix asphaltic concrete of the various types are paid for at the Contract Unit Price per ton (megagram) or per square yard (meter). Payment is full compensation for furnishing and placing materials including asphalt cement, hydrated lime when required, approved additives, and for cleaning and repairing, preparing surfaces, hauling, mixing, spreading, rolling, and performing other operations to complete the Contract Item.
Payment will be made under:

Item No. 400	Asphaltic concrete type Superpave, group-blend, including polymer-modified bituminous materials and hydrated lime.	Per ton (megagram)
Item No. 400	Asphaltic concrete type Superpave, group-blend, including bituminous materials and hydrated lime.	Per ton (megagram)
Item No. 400	Asphaltic concrete type Superpave, group-blend, including bituminous materials, Gilsonite modifier, and hydrated lime.	Per ton (megagram)
Item No. 400	_____inches asphaltic concrete, type Superpave, group-blend including bituminous materials, Gilsonite modifier and hydrated lime.	Per square yard (meter)
Item No. 400	Asphaltic concrete type Stone Matrix Asphalt, group-blend, including polymer-midified bituminous materials, and hydrated lime.	Per ton (megagram)
Item No. 400	Asphaltic concrete type OGFC, group 2 only, including bituminous materials, and hydrated lime.	Per ton (megagram)
Item No. 400	Asphaltic concrete type OGFC, group 2 only, including polymer-modified bituminous materials, and hydrated lime.	Per ton (megagram)
Item No. 400	Asphaltic concrete type Porous European Mix, group 2 only, including polymer-modified bituminous materials, and hydrated lime.	Per ton (megagram)

400.5.01 Adjustments

A. Materials Produced and Placed During the Adjustment Period

An adjustment period is allowed at the start of mixing operations for each type of mix placed on the Contract. Asphaltic Concrete OGFC or PEM shall be granted an adjustment period for the first 500 tons (500 Mg) produced for the Contract. A new adjustment period shall not be granted for a change of producer, mix design or asphalt plant location. The adjustment period is provided to adjust or correct the mix and to establish the construction procedures and sequence of operations.

The adjustment period consists of the tons (mega-grams) of the affected mix produced and placed on the first day of operation. If this quantity is less than 500 tons (500 Mg), the Engineer may combine the tons (mega-grams) produced and placed on the first day of operation with the tons (mega-grams) produced and placed on the next production day of the affected mix for the adjustment period.

The material produced and placed during the mixture adjustment period is one lot. If the mix is adjusted during this period, a new lot may be necessary, but a new adjustment period will not be permitted.

This material shall be paid for at 100 percent of the Contract Unit Price provided it meets the minimum requirements for a 1.00 pay factor for asphalt cement content and a 0.90 pay factor for gradation in the Mixture Acceptance Schedule—Table 9 or 10.

If the material placed during the adjustment period fails to meet the above requirements, it will be paid for using the applicable acceptance schedule. However, when mixture used for leveling at a spread rate of 90 lbs./yd² (50 kg/m²) or less is also used for the surface mix at a spread rate greater than 90 lbs./yd² (50 kg/m²), an additional adjustment period will be allowed for compaction only. This material will be paid for at a 1.00 pay factor provided it:

- Meets the minimum requirements for a 1.00 pay factor in the Mixture Acceptance Schedule—Table 9 or 10 for both asphalt content and gradation.

- Meets the minimum requirements for a 0.90 pay factor in Table 12 of Subsection 400.5.01C, "Calculate Mean Pavement Air Voids.

Mixture which does not meet these requirements shall be paid for using the applicable acceptance schedule.

B. Determine Lot Acceptance

Pay factor adjustments are based on control sieves and asphalt cement content. The control sieves used in the mixture acceptance schedule for the various types of mix are indicated below:

Control Sieves Used in the Mixture Acceptance Schedule	
Asphaltic concrete 25 mm Superpave	1/2 in., No. 8 (12.5 mm, 2.36 mm) sieves and asphalt cement
Asphaltic concrete 19 mm SMA	
Asphaltic concrete 19 mm Superpave	
Asphaltic concrete 12.5 MM Superpave	
Asphaltic concrete 12.5 MM SMA	
Asphaltic concrete 12.5 MM PEM	
Asphaltic concrete 12.5 MM OGFC	
Asphaltic concrete 9.5 mm Superpave	
Asphaltic concrete 9.5 mm SMA	
Asphaltic concrete 9.5 mm OGFC	
Asphaltic concrete 4.75 mm Mix	

For projects which do not have milling quantities established as a Pay Item, the Department will pay for 12.5 mm OGFC and PEM placed on ramps and end of project transitions under the appropriate mixture pay item, but the mix shall be subject to the same gradation and control sieve requirements as asphaltic concrete 9.5 mm OGFC. Add polymer-modified bituminous material, hydrated lime, and stabilizing fiber to this mix.

The Department will perform the following tasks:

1. Using the Mixture Acceptance Schedule—Table 9 or 10, determine the mean of the deviations from the job mix formula per test results per lot.

2. Determine this mean by averaging the actual numeric value of the individual deviations from the job mix formula; disregard whether the deviations are positive or negative amounts.

3. Use the Asphalt Cement Content and Aggregate Gradation of Asphalt Concrete Mixture Acceptance Schedule—Table 9 to determine acceptance of surface mixes and the Mixture Acceptance Schedule—Table 10 to determine acceptance of subsurface mixes.

On Contracts involving 1,000 tons (1000 Mg) or less of asphaltic concrete, the mixture is accepted for 100 percent payment of the asphaltic concrete Unit Price provided it meets the following:

1. Minimum requirements for a 1.00 pay factor for asphalt cement content and a 0.90 pay factor for gradation in the applicable Mixture Acceptance Schedule—Table 9 or 10.

2. Minimum requirements for a 0.90 pay factor in Table 12 of Subsection 400.5.01C, "Calculate Pavement Mean Air Voids.

If the material placed on Contracts involving 1,000 tons (1000 Mg) or less of asphaltic concrete does not meet the above requirements, the material will be paid for using the applicable acceptance schedule.

C. Calculate Pavement Mean Air Voids

The Department will determine the percent of maximum air voids for each lot by dividing the pavement mean air voids by the maximum pavement mean air voids acceptable.

The Department will determine the payment for each lot by multiplying the Contract Unit Price by the adjusted pay factor shown in the following Air Voids Acceptance schedule:

Table 12 - Air Voids Acceptance Schedule

Pay Factor	Percent of Maximum Air Voids (Lot Average of Tests)	Percent of Maximum Air Voids (Lot Average all Tests)(for Reevaluations)
1.00	≤100	≤100
0.97	100.1 -- 105	100.1 -- 104
0.95	105.1 -- 112	104.1 -- 109
0.90	112.1 -- 124	109.1 -- 118
0.80	124.1 -- 149	118.1 -- 136
0.70	149.1 -- 172	136.1 -- 153
0.50	172.1 -- 191	153.1 -- 166

When recommended by the Office of Materials, Lots receiving less than 0.5 pay factor shall be removed and replaced at the Contractor's expense.

When the range tolerance is exceeded, the Department will apply a pay factor of 0.95 as described in Subsection 400.3.06.B.2.

D. Asphaltic Concrete for Temporary Detours

Hot mix asphaltic concrete placed on temporary detours not to remain in place as part of the permanent pavement does not require hydrated lime. Hot mix used for this purpose is paid for at an adjusted Contract Price. The payment for this item shall cover all cost of construction, maintenance and removal of all temporary mix. Hot mix asphaltic concrete placed as temporary mix shall meet requirements established in Subsection 400.3.05.F.

Where the Contract Price of the asphaltic concrete for permanent pavement is let by the ton (megagram), the Contract Price for the asphaltic concrete placed on temporary detours is adjusted by subtracting $0.75/ton ($0.85/mg) of mix used.

Where the Contract price of the mix in the permanent pavement is based on the square yard (meter), obtain the adjusted price for the same mix used on the temporary detour by subtracting $0.04/yd² ($0.05/ m²) per 1-in (25-mm) plan depth.

Further price adjustments required in Subsection 400.3.06, "Quality Acceptance," which are based on the appropriate adjusted Contract Price for mix used in the temporary detour work shall apply should temporary mix be left in place. Hot mix asphalt produced as temporary mix containing no hydrated lime shall be removed and replaced with permanent mix containing hydrated lime.

E. Determine Lot Payment

Determine the lot payment as follows:

1. When one of the pay factors for a specific acceptance lot is less than 1.0, determine the payment for the lot by multiplying the Contract Unit Price by the adjusted pay factor.

2. When two or more pay factors for a specific acceptance lot are less than 1.0, determine the adjusted payment by multiplying the Contract Unit Price by the lowest pay factor.

If the mean of the deviations from the job mix formula of the tests for a sieve or asphalt cement content exceeds the tolerances established in the Mixture Acceptance Schedule—Table 9 or 10 and if the Engineer determines that the material need not be removed and replaced, the lot may be accepted at an adjusted unit price as determined by the Engineer. If the pavement mean air voids exceed the tolerances established in the Air Voids Acceptance Schedule – Table 12, remove and replace the materials at the Contractor's expense.
If the Engineer determines the material is not acceptable to leave in place, remove and replace the materials at the Contractor's expense.

Section 401—Cold Mix for Patching

401.1 General Description

This Specification contains requirements for a mixture of mineral aggregates and cutback asphalt suitable for short periods of stockpiling.

401.1.01 Definitions

General Provisions 101 through 150.

401.1.02 Related References

A. Standard Specifications

Section 800—Coarse Aggregate
Section 802—Aggregates for Asphaltic Concrete
Section 820—Asphalt Cement
Section 821—Cutback Asphalt
Section 824—Cationic Asphalt Emulsion

B. Referenced Documents

ASTM D 396
ASTM D 975

401.1.03 Submittals

General Provisions 101 through 150.

401.2 Materials

Ensure that materials meet the following specifications:

Material	Section	
Cationic Asphalt Emulsion, CMS-2	824.2.01	
Cutback Asphalt, Grade MC-250	821.2.01	
Asphalt Cement, PF 64-22	820.2.01	
Liquifier, No. 2 Fuel Oil	ASTM D 396	
Liquifier, No. 2 Deisel Fuel Oil	ASTMD 975	
Fine Aggregate for Asphaltic Concrete	802.2.01	
Course Aggregate for Asphaltic Concrete	802.2.02	

For a list of sources, see QPL 70.

A. Substitutions
Instead of using MC-250 as a bituminous material, a mixture of PG 64-22 and either No. 2 heating fuel oil or No. 2 diesel fuel oil may be used in a blend of 67 percent PG 64-22 and 33 percent fuel oil. Blend these materials before mixing or add them separately when mixing.

B. Composition of Mixtures
Ensure that bituminous cold mixtures are uniform mixtures of aggregate, asphaltic material and, if required, mineral filler.

Ensure that the constituents are proportioned to produce mixtures that meet the requirements given in the Composition Table. Group I aggregate, Group II aggregate, or a blend of both may be used.

Aggregate meeting gradation the requirement for size 89 aggregate in Section 800 may be used instead of composite blends, at the Engineer's discretion.

Composition Table for Cold Mixes for Biuminous Plant Mixtures for Patching			
Cold Mix Type	**12.5 mm Superpave**	**9.5 mm Superpave (Level B)**	**9.5 mm Superpave (Level A)**
Gradation Requirements, Percent Passing, by Weight			
3/4 in (19 mm) sieve	100		
1/2 in (12.5 mm) sieve	90 to 100	100	100
3/8 in (9.5 mm) sieve	70 to 89	90 to 100	90 to 100
No. 4 (4.75 mm) sieve		55 to 75	65 to 85
No. 8 (2.36 mm) sieve	34 to 39	42 to 47	53 to 58
No. 50 (300 µm) sieve	8 to 27	8 to 27	10 to 35
No. 200 (75 µm) sieve	3.5 to 6.5	4.3 to 7.0	4.5 to 7.0
Percent Residual AC, by Weight of Total Mixture	4.3 to 6.5	4.3 to 7.0	4.5 to 7.0

C. Mixing Temperature

The recommended temperatures for aggregate and bituminous materials to ensure proper mixing are as follows:

CMS-2	140 - 160 °F (60 - 70 °C)
PG 64-22	300 - 350 °F (150 - 175 °C)
MC-250	100 - 225 °F (40 - 105 °C)
Aggregates	200 - 225 °F (95 - 105 °C)

401.2.01 Delivery, Storage, and Handling

A. Stockpiling the Mixture

1. Place the finished mixture in small stockpiles to allow the mixture to cure properly.
2. After curing, stockpile the mixture in one large stockpile if possible.
3. Ensure that the stockpiling area is clean and well drained.

401.3 Construction Requirements

General Provisions 101 through 150.

401.3.01 Personnel

General Provisions 101 through 150.

401.3.02 Equipment

General Provisions 101 through 150.

401.3.03 Preparation

General Provisions 101 through 150.

401.3.04 Fabrication

General Provisions 101 through 150.

401.3.05 Construction

General Provisions 101 through 150.

401.3.06 Quality Acceptance

General Provisions 101 through 150.

401.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

401.4 Measurement

Cold mix will be measured by weight in tons (megagrams) according at Subsection 109.01, "Measurement and Quantities," and no deductions will be made for the asphalt cement or liquifier.

401.4.01 Limits

General Provisions 101 through 150.

401.5 Payment

Cold mix will be paid for at the Contract Unit Price per ton (mega-gram). Payment is full compensation for materials costs, production costs, and shall be FOB the stockpile at the plant.

Payment will be made under:

Item No. 401	Cold mix	Per ton (megagram)

401.5.01 Adjustments

General Provisions 101 through 150.

Section 402—Hot Mix Recycled Asphaltic Concrete

402.1 General Description

This work includes producing and placing hot mix recycled asphaltic concrete that incorporates reclaimed asphalt pavement (RAP), reclaimed asphalt shingles (RAS), virgin aggregate, hydrated lime, and neat asphalt cement.

402.1.01 Definitions

General Provisions 101 through 150.

402.1.02 Related References

A. Standard Specifications

Section 400—Hot Mix Asphaltic Concrete Construction
Section 800—Coarse Aggregate
Section 828—Hot Mix Asphaltic Concrete Mixtures

B. Referenced Documents

SOP 41 "Guidelines for RAP Stockpile Approval"

402.1.03 Submittals

A. Certified Weight Tickets
Notify the Engineer before removing RAP from a stockpile that belongs to the Department. Submit to the Engineer the certified weight tickets of materials removed from the stockpile.
B. Affidavit
Submit to the laboratory an affidavit stating the sources of stockpiled materials to be used on a State project. Include the following information in the letter:

- State project number
- Location from which the material was removed
- Approximate removal dates
- Mix types removed and the estimated quantity of each type in the stockpiles
- Other available information about the stockpiled material such as percentage of local sand in the RAP

Obtain specific approval from the laboratory to use RAP or RAS stockpiles.
Adhere to Guidelines for RAP Stockpile Approval.

402.2 Materials

A. RAP Material Composition

Use RAP materials from any of the following:

- Existing roadway
- Contractor's RAP stockpile that has been approved by the Department
- Department stockpile

NOTE: The location of Department RAP material stockpiles will be given on the Plans.

Do not use RAP materials that contain alluvial gravel or local sand in any mixture placed on interstate projects except for mixtures used in shoulder construction. When used in shoulder construction, limit RAP containing local sand or alluvial gravel so that the sand or gravel contributes no more than 20% of the total aggregate portion of the mix.

1. RAP Percentage
   For non-interstate projects, limit the percentage of RAP allowed in recycled mixes so that the overall amount of alluvial gravel does not exceed 5 percent of the total mix. The percentage of alluvial gravel, local sand, and Group I material in the RAP will be determined through petrographic analysis or available records.

2. RAP furnished to the Contractor but not used in the work remains the Contractor's property.
   RAP used in the recycled mixtures for mainline or ramps (if applicable) may make up from 0 to 40 percent of the mixture depending on the amount of RAP available, the production facilities, and whether the mixture meets the requirements in Section 828.
   The maximum ratio of RAP material to the recycled mixtures other than SMA is 40 percent for continuous mix type plants and 25 percent for batch type plants. The maximum ratio of RAP material to the recycled mixture is 15 percent for Stone Matrix Asphalt (SMA) mixes.

3. Process RAP Material
   Process RAP material to be used in the recycled mixture so that 100 percent will pass the 2 in (50 mm) sieve. Additional crushing and sizing may be required if the RAP aggregate exceeds the maximum sieve size for the mix type as shown in Section 828. Obtain representative materials from the RAP stockpile for the mix design.

B. RAS Material
RAS materials are produced as a by-product of manufacturing roofing shingles and/or discarded shingle scrap from the reroofing of buildings.

1. Limit the amount of RAS material used in the recycled mixture to no greater than 5 percent of the total mixture weight.

2. Shred the RAS material before incorporating it into the mix to ensure that 100 percent of the shredded pieces are less than 1/2 in (12.5 mm) in any dimension.

3. Remove all foreign materials such as paper, roofing nails, wood, or metal flashing.

4. Provide test results for Bulk Sample Analysis, known as Polarized Light Microscopy, if post-consumer shingles are used to certify the RAS material is free of asbestos. Test stockpiles at the rate of one test per 1000 tons (megagrams) prior to processing.

Other than as specifically stated in this Subsection, ensure that RAS material is used according to the same requirements as described for RAP material.

C. Asphaltic Concrete Removed from an Existing Roadway
Asphaltic concrete removed from an existing roadway becomes the Contractor's property unless specified otherwise on the Plans. RAP material retained by the Department is designated on the Plans, and the RAP shall be stockpiled at the location specified on the Plans.

D. Local Sand and Group I Material in RAP
Use of local sand in recycled mixes is restricted as stipulated in Section 828 for the Project. However, RAP which contains local sand may be used in surface and intermediate layers of non-interstate projects so long as the RAP percentage used does not contribute more than 5% local sand to the total aggregate portion of the mix. The amount of local sand in the RAP material shall be considered when determining the percentage of local sand in the total mix.
Where Pay Items specify that Group II only aggregate is to be used, RAP which consists primarily of Group II aggregate, but contains some Group I aggregate, shall be limited such that the Group I aggregate makes up no more than 5% of the total aggregate portion of the mix. When a Blend I mix is specified, any Group I materials in the RAP will be considered when determining the Group I portion allowed in the total mix as specified in Subsection 828.2.A.2.

E. Asphalt Cement
Using laboratory evaluations, the Department will determine the asphalt cement grade to be used in the recycled mixture. The asphalt cement shall meet the requirements of Section 820.
When the asphalt cement is blended with asphalt cement recovered from the RAP material and after tests on residue from thin film oven tests, the asphalt cement shall have a viscosity of 6,000 to 16,000 poises (600 to 1600 Pa) or as approved by the Engineer. Recover asphalt cement from the recycled mixture to verify that the specified viscosity is being met.

If the Engineer determines during construction that the selected asphalt cement grade is not performing satisfactorily, the Department may change the asphalt cement grade in the mixture, with no change in the Contract Unit Price.

F. Recycled Mixture
The recycled mixture shall be a homogenous mixture of RAP or RAS material, virgin aggregate, hydrated lime, and neat asphalt cement. Ensure that the mixture conforms to an approved mixture design outlined in Section 828.

402.2.01 Delivery, Storage, and Handling

Separate the stockpiles by Project sources and by Group I and Group II aggregate types. Erect a sign on each stockpile to identify the source(s).
If RAP material from different project sources becomes intermixed in a stockpile, only use those materials when approved by the laboratory.
The Department may reject by visual inspection stockpiles that are not clean and free of foreign materials.

402.3 Construction Requirements

402.3.01 Personnel

General Provisions 101 through 150.

402.3.02 Equipment

A. Hot Mix Plant
Use a hot mix plant for the recycling process with necessary modifications approved by the Engineer to process recycled material. Design, equip, and operate the plant so that the proportioning, heating, and mixing yields a uniform final mixture within the job mix formula tolerances.

B. Cold Feed Bin
Proportion the RAP or RAS material using a separate cold feed bin. Ensure that the material meets the size requirements in Subsection 402.2, "Materials." The ratio of the RAP or RAS to virgin aggregate shall be controlled gravimetrically.

C. Electronic Belt Weighing Devices
Use electronic belt weighing devices to monitor the flow of RAP or RAS and the flow of virgin aggregate. For batch-type

plants, the RAP or RAS portion of the mix may be weighed in a weigh hopper before incorporating it into the pugmill. The RAP shall be screened through a 2-inch maximum sized screen prior to crossing the cold feed weigh. Ensure the amount of RAP material incorporated into the asphalt plant does not change after this final measurement is processed by the asphalt plant computer.

D. Feeders and Conveyors
Equip plants with an interlocking system of feeders and conveyors that synchronize the RAP or RAS material flow with the virgin aggregate flow. Ensure that the electronic controls track the flow rates indicated by the belt weighing devices and develop the signal to automatically maintain the desired ratio at varying production rates. Design the RAP or RAS feeder bins, conveyor system, and auxiliary bins (if used) to prevent RAP material from segregating and sticking.

402.3.03 Preparation

General Provisions 101 through 150.

402.3.04 Fabrication

General Provisions 101 through 150.

402.3.05 Construction

Follow the requirements in Section 400 for hot mix recycled asphaltic concrete production and placement, materials, equipment, and acceptance plans except as noted or modified in this Specification.

402.3.06 Quality Acceptance

The Department may require additional quality control tests to determine the RAP stockpile consistency and the RAP aggregate quality. In this case, conduct at least three extraction/gradation tests from each individual source. Ensure that aggregate meets the quality standards in Section 800.

402.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

402.4 Measurement

Recycled asphaltic concrete mixture, complete in place and accepted, is measured in tons (megagrams). The weight is determined by recorded weights if an approved recording device is used. Or, the weight is determined by weighing each loaded vehicle on an approved motor truck scale as the material is hauled to the roadway.

402.4.01 Limits

General Provisions 101 through 150.

402.5 Payment

The work performed and the materials furnished as described in this Specification will be paid for at the Contract Unit Price per ton (megagram). Payment is full compensation for providing materials, hauling and necessary crushing, processing, placing, rolling and finishing the recycled mixture, and providing labor, tools, equipment, and incidentals necessary to complete the work, including hauling and stockpiling RAP or RAS material.

Payment will be made under:

Item No. 402	Recycled asphaltic concrete __mm Supepave, group-blend, including bituminous materials	Per ton (megagram)
Item No. 402	Recycled asphaltic concrete __mm Supepave, group-blend, including bituminous materials and hydrated lime	Per ton (megagram)
Item No. 402	Recycled asphaltic concrete __mm Supepave, group-blend, including polymer-modified bituminous materials and hydrated lime	Per ton (megagram)
Item No. 402	Recycled asphaltic concrete __mm Supepave, Type __, group-blend, including bituminous materials and hydrated lime	Per ton (megagram)
Item No. 402	Recycled asphaltic concrete __mm mix, group-blend, including bituminous materials and hydrated lime	Per ton (megagram)
Item No. 402	_____in (mm) recycled asphaltic concrete type Superpave, group-blend, including bituminous materials	Per square yard (meter)
Item No. 402	_____in (mm) recycled asphaltic concrete type Superpave, group-blend, including bituminous materials and hydrated lime	Per square yard (meter)
Item No. 402	_____in (mm) recycled asphaltic concrete type Superpave, group-blend, including polymer-modified bituminous materials and hydrated lime	Per square yard (meter)
Item No. 402	_____ in (mm) recycled asphaltic concrete _____ mm mix, group-blend, including bituminous materials and hydrated lime	Per square yard (meter)
Item No. 402	Recycled asphaltic concrete patching including bituminous materials	Per ton (megagram)
Item No. 402	Recycled asphaltic concrete patching including bituminous materials andy hydrated lime	Per ton (megagram)

A. Materials Produced and Placed During the Adjustment Period
An adjustment period is allowed at the start of mixing operations for each type of mix placed on the Contract. A new adjustment period shall not be granted for a change of producer, mix design or asphalt plant location. The adjustment period is provided to adjust or correct the mix and to establish the construction procedures and sequence of operations.

The adjustment period consists of the tons (megagrams) of the affected mix produced and placed on the first day of operation. If this quantity is less than 500 tons (500 Mg), the Engineer may combine the tons (megagrams) produced and placed on the first day of operation with the tons (megagrams) produced and placed on the next production day of the affected mix for the adjustment period.

The material produced and placed during the mixture adjustment period is one lot. If the mix is adjusted during this period, a new lot may be necessary, but a new adjustment period will not be permitted.
This material shall be paid for at 100 percent of the Contract Unit Price provided it meets the minimum requirements for a 1.00 pay factor for asphalt cement content and a 0.90 pay factor for gradation in the Mixture Acceptance Schedule—Table 9 or 10 .

If the material placed during the adjustment period fails to meet the above requirements, it will be paid for using the applicable acceptance schedule. However, when mixture used for leveling at a spread rate of 90 lbs/yd² (50 kg/m²) or less is also used for the surface mix at a spread rate greater than 90 lbs/yd² (50 kg/m²), an additional adjustment period will be allowed for compaction only. This material will be paid for at a 1.00 pay factor provided it:

- Meets the minimum requirements for a 1.00 pay factor in the Mixture Acceptance Schedule—Table 9 or 10 for both asphalt content and gradation.

- Meets the minimum requirements for a 0.90 pay factor in Table 12 of Subsection 400.5.01C, "Calculate Mean Pavement Air Voids.

Mixture which does not meet these requirements shall be paid for using the applicable acceptance schedule.

B. Determine Lot Acceptance

Pay factor adjustments are based on control sieves and asphalt cement content. The control sieves used in the mixture acceptance schedule for the various types of mix are indicated below:

Control Sieves Used in the Mixture Acceptance Schedule	
Asphaltic concrete 25 mm Superpave	1/2 in., No. 8 (12.5 mm, 2.36 mm) sieves and asphalt cement
Asphaltic concrete 19 mm SMA	1/2 in., No. 8 (12.5 mm, 2.36 mm) sieves and asphalt cement
Asphaltic concrete 19 mm Superpave	3/8 in., No. 8 (9.5 mm, 2.36 mm) sieves and asphalt cement
Asphlatic concrete 12.5 mm Superpave	3/8 in., No. 8 (9.5 mm, 2.36 mm) sieves and asphalt cement
Asphaltic concrete 12.5 mm SMA	3/8 in., No. 8 (9.5 mm, 2.36 mm) sieves and asphalt cement
Asphaltic concrete 9.5 mm Supepave	No. 4, No. 8 (4.75 mm, 2.36 mm) sieves and asphalt cement
Asphaltic concrete 9.5 mm SMA	No. 4, No. 8 (4.75 mm, 2.36 mm) sieves and asphalt cement
Asphaltic concrete 4.75 mm Mix	No. 8 (2.36 mm) sieves and asphalt cement

The Department will perform the following tasks:

1. Using the Mixture Acceptance Schedule—Table 9 or 10, of Subsection 400.3.06 to determine the mean of the deviations from the job mix formula per test results per lot.

2. Determine this mean by averaging the actual numeric value of the individual deviations from the job mix formula; disregard whether the deviations are positive or negative amounts.

3. Use the Asphalt Cement Content and Aggregate Gradation of Asphalt Concrete Mixture Acceptance Schedule—Table 9 or 10 of Subsection 400.3.06 to determine acceptance of surface mixes and the Mixture Acceptance Schedule—Table 10 of Subsection 400.3.06 to determine acceptance of subsurface mixes.

On Contracts involving 1,000 tons (1000 Mg) or less of asphaltic concrete, the mixture is accepted for 100 percent payment of the asphaltic concrete Unit Price provided it meets the following:

1. Minimum requirements for a 1.00 pay factor for asphalt cement content and a 0.90 pay factor for gradation in the applicable Mixture Acceptance Schedule—Table 9 or 10 of Subsection 400.3.06.

2. Minimum requirements for a 0.90 pay factor in Table 12 of Subsection 402.5.01.C, "Calculate Pavement Mean Air Voids.

If the material placed on Contracts involving 1,000 tons (1000 Mg) or less of asphaltic concrete does not meet the above requirements, the material will be paid for using the applicable acceptance schedule.

C. Calculate Pavement Mean Air Voids

The Department will determine the percent of maximum air voids for each lot by dividing the pavement mean air voids by the maximum pavement mean air voids acceptable.

The Department will determine the payment for each lot by multiplying the Contract Unit Price by the adjusted pay factor shown in the following Air Voids Acceptance schedule:

Table 12 - Air Voids Acceptance Schedule

Pay Factor	Percent of Maximum Air Voids (Lot Average of Tests)	Percent of Maximum Air Voids (Lot Average all Tests) (for Reevaluations)
1.00	≤100	≤100
0.97	100.1 -- 105	100.1 -- 104
0.95	105.1 -- 112	104.1 -- 109
0.90	112.1 -- 124	109.1 -- 118
0.80	124.1 -- 149	118.1 -- 136
0.70	149.1 -- 172	136.1 -- 153
0.50	172.1 -- 191	153.1 -- 166

When the range tolerance is exceeded, the Department will apply a pay factor of 0.95 as described in Subsection 400.3.06.B.2.

D. Asphaltic Concrete for Temporary Detours

Hot mix asphaltic concrete placed on temporary detours that will not remain in place as part of the permanent pavement does not require hydrated lime. Hot mix used for this purpose is paid for at an adjusted Contract Price. The payment for this item shall cover all cost of construction, maintenance and removal of all temporary mix. Hot mix asphaltic concrete placed as temporary mix shall meet requirements established in Subsection 400.3.05.F.

Where the Contract Price of the asphaltic concrete for permanent pavement is let by the ton (megagram), the Contract Price for the asphaltic concrete placed on temporary detours is adjusted by subtracting $0.75/ton ($0.85/mg) of mix used.

Where the Contract price of the mix in the permanent pavement is based on the square yard (meter), obtain the adjusted price for the same mix used on the temporary detour by subtracting $0.04/yd² ($0.05/ m²) per 1-in (25-mm) plan depth.

Further price adjustments required in Subsection 400.3.06, “Quality Acceptance,” which are based on the appropriate adjusted Contract Price for mix used in the temporary detour work shall apply should temporary mix be left in place. Hot mix asphalt produced as temporary mix containing no hydrated lime shall be removed and replaced with permanent mix containing hydrated lime.

E. Determine Lot Payment

Determine the lot payment as follows:
1. When one of the pay factors for a specific acceptance lot is less than 1.0, determine the payment for the lot by multiplying the Contract Unit Price by the adjusted pay factor.

2. When two or more pay factors for a specific acceptance lot are less than 1.0, determine the adjusted payment by multiplying the Contract Unit Price by the lowest pay factor.

If the mean of the deviations from the job mix formula of the tests for a sieve or asphalt cement content exceeds the tolerances established in the Mixture Acceptance Schedule—Table 9 or 10 and if the Engineer determines that the material need not be removed and replaced, the lot may be accepted at an adjusted unit price as determined by the Engineer. If the pavement mean air voids exceed the tolerances established in the Air Voids Acceptance Schedule – Table 12, remove and replace the materials at the Contractor’s expense.
If the Engineer determines that the material is not acceptable to leave in place, remove and replace the materials at the Contractor’s expense.

Section 403—Hot In-Place Recycled Asphaltic Concrete

403.1 Description

This Section covers the hot in-place recycling of the existing surface in a continuous multi-step process which includes:

- Softening the existing surface with heat
- Hot milling to obtain the depth shown in the plan typical section or stated in the contract general notes
- Applying a tack coat
- Applying a rejuvenating agent
- Adding plant produced asphaltic concrete and virgin aggregate, if needed, prior to remixing
- Thoroughly remixing, leveling, and relaying the recycled mixture

403.1.01 Definitions

General Provisions 101 through 150.

403.1.02 Related References

A. Standard Specifications

Section 106
Section 109
Section 400
Section 800
Section 824

B. Referenced Documents

AASHTO T-49
AASHTO T-209
AASHTO TP 4
AASHTO TP 5
ASTM D92
ASTM D2170
ASTM D2872
ASTM D4124
GDT 38
GDT 42
Error! Reference source not found.GDT 83
GDT 115
GDT 119
GDT 125
313
GDT 126
GSP 15

403.1.03 Submittals

Submit the proposed mix design for approval. As a minimum, the design shall include the following:

- The proportional blend of in-place materials and rejuvenating agent
- The proportional percentage of virgin aggregate and plant-produced hot mix asphalt, if required
- The sources of all materials to be used in the mixture
- The theoretical maximum specific gravity of the final mixture determined by AASHTO T-209
- The air void volume of the mixture after compacting for 50 gyrations with a gyratory compactor according to AASHTO TP 5

Use an approved, qualified laboratory to perform the mixture design analysis. Ensure the final design mixture has an air void volume within 3-5%.

Submit to the Office of Materials (OM) representative samples of each ingredient to be used in the final in-place mixture for design verification and additional testing as needed. The Department will perform testing for moisture and rutting susceptibility. Adjust mixture proportions as needed to ensure the final mixture meets the following requirements:

- Average rut depth not to exceed 0.3 in (7 mm) when tested using GDT 115.
- Minimum tensile splitting ratio of 80% and minimum individual stress results of 60 psi (415 kPa) when tested using GDT 66.

EXCEPTION: A tensile splitting ratio of no less than 70% is acceptable so long as all individual test values exceed 100 psi (690 kPa).

Allow the Department two weeks to verify the mix design after receiving the proposed mix design and material. Do not begin recycling operations until the Department has approved the design and accepted the mixture.

403.2 Materials

The materials to be used and their specifications are listed below:

A. Aggregate
Add virgin aggregate, if required, which is from an approved source and which meets requirements of Section 800. Use the stone size and spread rate specified in the plans Additional virgin aggregate from approved sources may be added based on the mixture design analysis at no additional cost to the Department.

B. Plant-Produced Hot Mix Asphaltic Concrete
Add the type and amount of plant-produced asphaltic concrete, if required, as specified in the plans. Additional asphaltic concrete may be added based on the mixture design analysis at no additional cost to the Department. Ensure the hot mix asphaltic concrete is produced according to Section 400 and Section 402.

C. Asphalt Cement Rejuvenating Agent
Obtain approval by the Office of Materials for the source, amount, and type of rejuvenating agent to be used. The Department reserves the right to change,without a change in the contract unit price, the agent and amount being used in the mixture if it is determined by the Engineer that the rejuvenating agent is not performing satisfactorily.

D. Bituminous Tack Coat
Use a cationic asphalt emulsion CRS-2h, CSS-1h, or CQS-1h for the bituminous tack coat that meets Section 824. Apply the tack coat with a system equipped with positive stop/start capabilities that will prevent tack puddles and which will uniformly distribute the tack across the full width of the surface being recycled. Apply tack after the existing surface has been heated, milled, and removed from the roadway and prior to replacing the material onto the roadway.

E. Asphalt Modifier
Provide asphalt modifier as specified in the Plans. It shall be added at a dosage rate that will yield at least 3% solid polymer by weight of the asphalt cement of the in-place material. Asphalt modifiers shall be approved by the Office of Materials prior to use in the work. The Department reserves the right to change the type modifier and amount to be used, without a change in the contract unit price, if the Engineer determines that the asphalt modifier is not performing satisfactorily.

403.2.01 Delivery, Storage, and Handling

A. Aggregate Storage
Store or stockpile mineral aggregates in a manner that will prevent segregation, mixing of the various sizes, and contamination with foreign materials.

B. Storage of Bituminous Material
Always keep clean all equipment used to store and handle bituminous material and operate it in such a manner to prevent contamination with foreign matter.

403.3 Construction Requirements

403.3.01 Personnel

General Provisions 101 through 150.

403.3.02 Equipment

The Engineer shall approve all equipment, tools, and machines used to perform this work. Do not attempt work with malfunctioning equipment. The Engineer may stop the work if equipment and tools are not sufficient to place the materials satisfactorily.

A. Heating and Milling Units
Ensure the heating unit meets the following requirements:

- Capable of heating the asphaltic concrete pavement to a temperature high enough to remove excess moisture and allow hot milling of the material to the designated plan depth without breaking aggregate particles
- Controls the heating process to prevent charring the existing surface, avoid producing undesirable pollutants, and prevent differential softening of the pavement
- Confine the heat application under a shielded, or enclosed, hood

Make all efforts to protect adjacent landscape from heat damage. Rebuild, repair, restore, and make good all injuries or

damages to adjacent landscape, at the Contractor's expense. Equip the unit which contains milling heads with longitudinal grade controls as described in Subsection 403.3.02.C which will consistently control the depth of the milling operation. Milling heads shall remove the heated existing pavement to the depth specified in the Plans for the full transverse width even if additional virgin aggregate or asphaltic concrete mixture is added at no cost to the Department. Use a portable milling unit to remove heated material from around utility structures to the full plan depth just prior to placement of the recycled material. Do not attempt to remove heated material from utility structures with hand tools only and do not damage the structures. Repair any damage to structures at no cost to the Department.

B. Blending Unit
Provide a blending unit which meets the following requirements:

- Capable of blending the removed material and rejuvenating agent (as well as virgin aggregate, asphalt modifier, and plant-produced hot mix asphaltic concrete, if required) into a homogeneous mixture
- Synchronizes application of all materials based on the volume of material being recycled to provide a proportional application at the predetermined application rate

Add the rejuvenator after milling has taken place and before or during the blending process with a positive start/stop mechanism that is automatically controlled by the volume of recycled material to be rejuvenated. Do not add rejuvenator based on linear distance travelled.
Add asphalt modifier, if required, at locations specified in the Plans or directed by the Engineer. Add modifiers during the blending process through a distribution system that will uniformly control the rate of application based on the volume of material being recycled and which contains a measuring system to verify the dosage rate.

C. Screed
Ensure the screed meets the following requirements:

- Capable of collecting and distributing the recycled mixture over variable widths for the entire width being processed
- Capable of controlling transverse cross-slope as directed by the Engineer
- Provides a uniform cross-section without streaks or blemishes
- Controls longitudinal grade electronically in conjunction with a mobile reference or by a non-contacting laser or sonar type ski with at least four referencing stations mounted at a minimum length of 24 feet (7.2 m)

D. Auxiliary Equipment
Provide suitable surface cleaning equipment, hand tools, rollers, and other support equipment necessary to perform the work. Ensure all other equipment meets requirements of Section 400.

403.3.03 Preparation

General Provisions 101 through 150.

403.3.04 Fabrication

General Provisions 101 through 150.

403.3.05 Construction

A. Surface Preparation
Thoroughly clean the surface to be recycled of all dirt, vegetation, and other objectionable materials immediately prior to the affected area being recycled. Remove all metal raised pavement markers and thermoplastic paint markings prior to recycling.

B. Heat, Remove, and Blend Materials
Evenly heat the pavement at full lane width plus a minimum 3 in (75 mm) overlap onto adjacent pavement materials. Control the heating to ensure uniform penetration without differential softening of the surface, and so that the heated material has a temperature in the range of 240 20 F (115 11 C) measured immediately behind the heating unit. If virgin aggregate is added, distribute the aggregate across the entire width being recycled prior to the last heat application. Hot mill and rework the pavement to the width and depth shown in the plan typical section. Control the width of each pass to provide proper placement of longitudinal joints. Control the depth of loosened pavement to within 1/4 in (6 mm) of the depth specified. Ensure the milled material is heated sufficiently so that it is free of lumps. Milled particles shall not be greater than 1-1/2 in (40 mm) in size. Accomplish the recycling by using milling heads capable of gathering the loose material and conveying it to a mixing chamber. The mixing chamber should blend the material uniformly and create a windrow with the final mix. Do not use scrappers, scarifiers, or any mechanical means of removing the softened pavement other than milling heads.
Ensure the final blended mix in the windrow is uniform. All aggregate shall be consistently coated. There shall be no evidence of broken or fractured aggregate in the windrowed material. Inconsistency and or non-uniformity of the windrowed material prior to placement will result in the immediate cessation of recycling until a plan of corrective action is approved by the Engineer. After modifications to the equipment or adjustment to the additives proportions have been made and approved, the Contractor should be allowed to resume work in a 500 ft (152 m) test section to be evaluated by the Engineer prior to continuing recycling
Blend the removed material with a rejuvenating agent (and virgin aggregate, asphalt modifier, or plant-produced hot mix asphaltic concrete, if needed) to produce a homogeneous mixture. Control the rate of application of the rejuvenator to ensure compliance with the mix design and Dynamic Shear Rheometer (DSR) values specified in Subsection 403.3.06.A. Apply other materials as specified in the contract or as determined by the mix design analysis.

C. Tack Coat
Apply tack coat uniformly over the milled area prior to placement of the blended materials. Control the application rate within 0.04 – 0.06 gal/yd$_2$ (0.18 – 0.27 L/m$_2$). At any time during the recycling process it is observed that an adequate bond is not being achieved, three six-inch (150mm) cores may be obtained for testing. These cores will be evaluated for adequate bond strength using NCAT's bond shear device inconjunction with the Marshall Apaparatus. A minimum shear strength of 100 psi shall be required.

D. Application
Control placement of the mixture to produce a surface true to line, grade, and cross-slope with a uniform surface texture free of segregation, lumps, or other unacceptable streaks or blemishes as determined by the Engineer. Ensure the mixture meets the acceptance requirements for mixture quality, compaction, smoothness, and thickness as specified in Subsection 403.3.06.
E. Overlay
Overlay the recycled mixture, if required by the contract, by producing and placing a mixture that meets requirements of Section 400 and Section 402. Smoothness requirements for the hot in-place recycled mixture do not apply if the mixture is overlaid.

403.3.06 Quality Acceptance

A. Mixture
Base acceptance of the materials used in the work on Section 106 and Section 400 except that pay factors for gradation and asphalt content will not apply. Take a minimum of one sample of mixture for each day of operation to determine quality acceptance of the mixture.
Take samples directly behind the paver according to GSP 15 at the location determined by the Engineer. Perform extraction and gradation testing according to GDT 83 and GDT 38 or other suitable method approved by the Office of Materials. Determine the laboratory density, stability and flow of the mixture using the 50 blow Marshal procedure in AASHTO T-245.
Recover the extracted asphalt cement using GDT 119 and test for dynamic shear according to AASHTO TP 5, Method for Determining the Rheological Properties of Asphalt Binder Using Dynamic Shear Rheometer (DSR). Adjust the amount of rejuvenator as necessary to maintain DSR results within a range of 800-2000 poises (80-200 Pa-s) when tested at 140 F (60 C). Do not continue the work until corrective adjustments are made if two consecutive samples exceed the range for DSR values.
Submit test results electronically to the Engineer and Office of Materials within 24 hours after samples are taken.

B. Compaction
Compact the recycled mixture immediately after placement so that the maximum Pavement Mean Air Voids is 7.0 percent or less based on the theoretical specific gravity measured daily using the T-209 method performed on mixture sampled directly behind the paver. Determine the mixture compaction using either GDT 39 or GDT 59. The compaction is accepted in lots defined in Subsection 400.3.06.A “Acceptance Plans for Gradation and Asphalt Cement Content” and is within the same lot boundaries as the mixture acceptance. Meet the compaction requirements of Subsection 400.3.06.B. and Subsection 400.5.01.C. The Department will perform all compaction testing.

C. Smoothness
The Department will perform acceptance testing for surface course smoothness tolerance using the Laser Road Profiler according to GDT 126. Smoothness testing will be performed on the mainline traveled way and on ramps more than one half mile (kilometer) in length.
Clean the roadway of any debris and obstructions and provide traffic control to conduct the testing when requested by the engineer.
Ensure the pavement does not exceed a target smoothness index of 900. Do not continue the work until corrective adjustments have been made if the target value is exceeded. Perform corrective work at no expense to the Department by repeating the hot in-place recycling process, according to this Section, if the smoothness index exceeds 1025.
Maintain a 10 ft. (3 m) straightedge in the vicinity of the paving operation at all times to use in measuring minor surface irregularities and provide the labor for its use. Correct all irregularities in excess of 1/8 in (3 mm) in 10 ft. (3 m). Stop the operation until corrective measures are taken when irregularities such as rippling, tearing, or pulling indicate a continuing problem in equipment, mixture, or operating techniques.

D. Mill Depth
Mill heated material to the thickness specified in the plan typical section or contract general notes. Take cores at locations determined by the Engineer at a minimum frequency of one core per 1000 ft (300 m) per two lanes of roadway or five cores per day, whichever is less, to verify mill depth.
The Department will determine the average mill depth based on roadway core measurements according to GDT 42. Mill depth will be determined based on total rejuvenated thickness less any thickness contributed by added virgin materials. To receive full payment for mill depth, ensure the average milled depth is no less than 1/4 in (6 mm) of that specified in the plan typical section or contract general notes. Apply a pay reduction of 25% to the total square yards (meters) applied that day if the average depth is less than that specified, by more than 1/4 in (6 mm) but no more than 1/2 in (13 mm) of that specified.
Take additional cores to determine the area of deficient depth if the average depth is less than that specified, by more than 1/2 in (13 mm).

E. Corrections
Correct any areas deficient in depth by more than 1/2 in (13 mm) by repeating the hot in-place recycling process at no expense to the Department. Stop the work until corrective measures are made if the average mill depth for two consecutive days is less than 1/4 in (6 mm) of that specified. No individual location shall be recycled more than 2 times.

If after the second recycling process, the deficiency is still apparent, mill and in-lay this location with plant produced asphaltic concrete. The plant produced asphaltic concrete shall be equivalent to the recycled design properties.

F. Test Section and Acceptance
The contractor shall be granted a 1 lane mile (1600 m) test section at the beginning of construction to be evaluated by the Office of Materials for acceptance prior to continuing recycling. If any specified requirement is not obtained, work shall be immediately stopped. If at any time during construction, it is determined that the Contractor's equipment and recycling techniques cannot consistently meet requirements, the recycling operation shall be stopped until the Office of Materials reviews and approves all modifications in equipment and recycling techniques.

The Contractor shall place a 500 ft. (152m) test section to be evaluated and accepted by the Office of Materials prior to resuming recycling.

G. Rutting susceptibility test.
Cores taken each day for depth verification shall be tested according to GDT 115. Maximum deformation shall be 5.0 mm (0.2 in).

403.4 Measurement

Hot in-place recycled asphaltic concrete mixture is measured by the square yard (meter) of the surface area completed and to the depth specified. In computing square yards (meters), the lengths and widths used shall be as specified in Section 109, Measurement and Payment.
Rejuvenating agent, virgin aggregate, and plant-produced asphaltic concrete shall be added as individual components of the recycled mixture as required in the mix design analysis. Include this cost in the unit bid price per square yard (meter).
Bituminous materials for tack coat applied and accepted will be measured as outlined in Section 109.

403.4.01 Limits

General Provisions 101 through 150.

403.5 Payment

Hot in-place recycled asphaltic concrete is paid for at the contract unit price per square yard (meter). Payment is full compensation for furnishing all materials, all equipment, Work, and labor. Payment also includes removal of raised pavement markers and thermoplastic striping, if applicable, heating and hot-milling, adding rejuvenator, performing the mix design, performing project sampling and testing, and other incidentals necessary to complete the work. Aggregate and hot mix asphaltic concrete which may be added to meet requirements of the mix design analysis shall be included in the contract unit price.

Bituminous tack coat is paid for per gallon (liter) under separate payment. Hot mix asphaltic concrete specified for overlaying, if any, will be paid for under separate payment. Aggregate specified in the contract, if any, (excluding that required based on the mix design analysis) will be paid for under separate payment.

Payment will be made under:

Item No. 403	Hot in-place recycled asphaltic concrete	Per square yard (meter)
Item No. 403	Hot in-place recycled asphaltic concrete including polymer-modifier	Per square yard (meter)

403.5.01 Adjustments

General Provisions 101 through 150.

Section 404—Paver-Laid Surface Treatment

404.1 General Description

Specifications for this work will be included elsewhere in the Contract.

Section 405—Hot Asphalt-Vulcanized Rubber Seal Treatment

405.1 General Description

This work includes placing a hot asphalt–vulcanized rubber seal treatment on an existing pavement surface according to the Specifications.

405.1.01 Definitions

General Provisions 101 through 150.

405.1.02 Related References

A. Standard Specifications

Section 413—Bituminous Tack Coat
Section 424—Bituminous Surface Treatment
Section 800—Coarse Aggregate
Section 820—Asphalt Cement

B. Referenced Documents

General Provisions 101 through 150.

405.1.03 Submittals

General Provisions 101 through 150.

405.2 Materials

A. Asphalt Cement
Before adding rubber and diluent, ensure that the asphalt cement conforms to Section 820.2.01, PG 58-22.

B. Ground Vulcanized Tire Rubber

Ensure that the ground vulcanized tire rubber meets the following requirements:

Sieve Size	Maximum Percent Passing by Weight
No. 8 (2.36 mm)	100
No. 10 (2.0 mm)	98
No. 40 (435 µm)	10

Ensure that the granulated rubber has the following characteristics:

- A specific gravity of 1.17 ± 0.03
- No more than a trace of fabric
- Free of wire or other contaminating materials
  An exception is that up to four percent of calcium carbonate may be included to prevent the particles from sticking together.
- Fully vulcanized

C. Diluent
For diluent, use kerosene with a boiling point above 350 ºF (175 ºC).

D. Cover Aggregate

Ensure that cover aggregate conforms to Section 800, Class "A," Group II.
Ensure that gradation of the cover aggregate meets Section 800 for No. 7 stone.
Preheat the cover aggregate to 290 ºF to 350 ºF (140 ºC to 175 ºC) and precoat with a maximum of 0.75 percent of performance grade PG 58-22 described in Section 820. See Subsection 405.3.05.A, "Mixing."

405.2.01 Delivery, Storage, and Handling

General Provisions 101 through 150.

405.3 Construction Requirements

405.3.01 Personnel

General Provisions 101 through 150.

405.3.02 Equipment

Ensure that equipment conforms to Section 424 and the following:

A. Canvas Cover
If directed by the Engineer, cover exposed material with canvas to help prevent the temperature of exposed material from dropping. See Subsection 405.3.05.A, "Mixing."

B. Aggregate Spreader
Use an adjustable, self-propelled aggregate spreader to accurately spread the amounts given in the Plans per square yard (meter).

C. Rubber Tire Rollers
Use at least three rubber tire rollers loaded to 5,000 lbs (2275 kg) per tire. Inflate tires to 100 psi (700 kPa).

405.3.03 Preparation

A. Spread the Asphalt-Rubber Composition
Before applying the hot asphalt-rubber composition, clean and patch the existing pavement surface and treat with a bituminous tack coat as specified in Section 413.

B. Test the Distributor Trucks
Before spreading the asphalt-rubber composition, test distributor trucks for transverse spread within the previous 6 months. Prove to the Engineer that each transverse spread was as uniform as possible and variance was never greater than 15 percent.

NOTE: A transverse spread for other asphalt products will not be accepted. The rate of transverse spread will be determined according to the requirements of the Georgia tentative test method.

405.3.04 Fabrication

General Provisions 101 through 150.

405.3.05 Construction

A. Mixing
Mix asphalt and rubber as follows:

1. Before adding the rubber, ensure that the temperature of the asphalt is no higher than 325 °F (160 °C) for PG 58-22.

2. Rapidly combine the rubber with the asphalt. Mix the rubber until the material approaches a semi-fluid consistency.

Ensure that the weight proportions of the two materials are as follows:

Asphalt	75 ± 2%
Rubber	25 ± 2%

3. Mix the hot asphalt and rubber for at least 5 minutes.

NOTE 1: Design the rubber and asphalt combination method to ensure that the Engineer can determine the percentages by weight of each component to be mixed.
Ensure that the mixing equipment can produce a homogenous mixture of rubber and asphalt to prevent separation.

NOTE 2: Preheating, precoating, and covering aggregate with canvas may be waived if proper facilities are not available and if application conditions are favorable. Precoating is often used for dust control.

4. After the asphalt and rubber have reacted fully, add a diluent to:

- Temporarily reduce the viscosity of the mixture
- Improve the spraying action from the distributor
- Provide a better coating of cover aggregate

The diluent amount is 5.5 percent to 7.5 percent, by volume, of the hot asphalt-rubber composition. When adding the diluent, ensure that the temperature of the hot asphalt-rubber composition does not exceed 350 °F (175 °C).

B. Spreading
Spread the asphalt-rubber mixture as follows:

1. When the proper consistency is reached, immediately begin application. Never hold the mixture at temperatures over 325 °F (160 °C) for more than 1.5 hours after reaching application consistency.

2. Use the following application rates:
   a. In areas where temperatures remain above 20 °F (–7 °C) during the winter season, apply the hot asphalt-rubber mixture at 0.55 gallons/yd², ± 0.03 gallons/yd² (2.5 liters/m², ± 0.15 liters/m²).

   b. In areas where temperatures drop below 20 °F (-7 °C); apply the mixture at 0.60 gal/yd², ± 0.03 gal/yd² (2.7liters/m², ±0.15 liters/m²) unless otherwise specified by the Engineer.
   Application rates are based on 7.5 lbs/gal (0.90 kg/L), hot, and conversions to the standard 60 °F (15 °C) are not necessary.

NOTE: Place the hot asphalt-rubber mixture only when the ambient temperature is 60 °F (15 °C) or above and rising.

3. Apply the cover aggregate at 25 to 40 lbs/yd² (14 to 22 kg/m²), which is 25 to 27 lbs (14 to 15 kg) for No. 7 stone and 35 to 39 lbs(19 to 21 kg) for No. 8 stone, or as directed by the Engineer.

4. Perform at least four complete coverages with the pneumatic rollers. Roll the cover aggregate immediately after application to ensure maximum aggregate embedment.

Do not permit traffic on the completed surface until approved by the Engineer.

5. If heavy or high-speed traffic may displace the cover aggregate, apply 5 to 10 lbs/yd² (2.5 to 5.0 kg/m²) of sand after rolling and before opening the lane to traffic as directed.

6. Sweep the joint edges clean of overlapping cover aggregate before applying the adjacent asphalt–rubber material.

7. Avoid skips and overlaps at joints and protect the surfaces of adjacent structures from being spattered or marred. These defects will be corrected at the Contractor's expense.

8. Make transverse joints as follows:
   a. Place building paper over the ends of the previous applications.
   b. Start the adjoining application on the building paper.
   c. Remove and dispose of the paper to the Engineer's satisfaction.

9. In urban areas, remove excess chips within 24 hours after placing. Do not use gutter brooms or steel-tined brooms, and do not disturb the loose chips from parkways, sidewalks, and intersecting streets.
Continue this operation until excess or loose rock is removed from the roadway surface and abutting Rights-of-Way.

10. If needed, apply a flush coat to areas without substantial traffic at the Engineer's direction. Apply light sanding after flushing to prevent pickup, if required.

405.3.06 Quality Acceptance

General Provisions 101 through 150.

405.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

405.4 Measurement

The quantity to be measured is the number of square yards (meters) of seal treatment completed and accepted. The length is measured along the surface. The width is specified on the Plans, plus or minus any authorized changes. Irregular areas are measured by the surface square yards (meters) within the lines shown on the Plans or authorized changes.

405.4.01 Limits

General Provisions 101 through 150.

405.5 Payment

The accepted quantity of seal treatment is paid for at the Contract Unit Price per square yard (meter). Payment is full compensation for providing materials, hauling, mixing, spreading, rolling, and performing any other work to complete the Item.

Payment will be made under:

Item No. 405 Hot asphalt vulcanized rubber seal treatment Per square yard (meter)

405.5.01 Adjustments

General Provisions 101 through 150.

Section 406—Coal Tar Emulsion Seal Coat

406.1 General Description
Specifications for this work will be included elsewhere in the Contract.

Section 407—Asphalt-Rubber Joint and Crack Seal

407.1 General Description
This work includes filling (Type M) or sealing (Type S) joints and cracks in existing pavements with rubber asphalt mixtures. A polymer-modified asphalt rubber (PMAR) blend may be used in lieu of both Type M and Type S.

407.1.01 Definitions

Type M: Used to fill joints and cracks in Portland cement concrete or asphaltic concrete pavements when required by the Plans before placing an overlay.

Type S: Used to seal joints and cracks in Portland cement concrete and asphaltic concrete pavements and shoulders when not placing an overlay.

407.1.02 Related References

A. Standard Specifications

Section 820—Asphalt Cement

B. Referenced Documents

AASHTO PP5
ASTM D 4
ASTM D36
ASTM D3407
ASTM D 3583

407.1.03 Submittals
Certify that each lot of premixed material meets the requirements of this Specification and shall submit the test results of each lot for each Project. Ensure that each sealant lot is delivered in containers with the manufacturer's name or trademark and lot number plainly marked.

Furnish samples of the individual components of premixed material as follows:

- At least 20 lbs (10 kg) of rubber representative of each lot
- At least 5 gal (15 L) of asphalt containing additives as proportioned
- Proportional quantities of mixing aids or additives not included above

407.2 Materials
Ensure that the sealant material is a premixed, asphalt-rubber sealant mixture. Ensure that the mixture is a blend of asphalt cement, aromatic extender oil(s), and recycled or reclaimed tire crumb rubber (18 ± 1 percent and 22 ± 1 percent by weight for Type S and Type M, respectively based on weight) in a closely controlled manufacturing process. The dosage rates of tire crumb rubber may be reduced if a polymer modifier is added to the mixture. Produce a mixture with the following properties:

A. Workability
The mixture pours readily and penetrates a 1/4 in (6 mm) pavement joint or crack to a depth of at least 1 in (25 mm) when the application temperature of the fully reacted mixture is 350 ºF (204 ºC) and the air temperature is 35 ºF (2 ºC) or higher.

The mixture, when placed in conventional field installation equipment, readily melts to a pumping consistency after being heated to 400 °F (204 °C) for 2 hours maximum. The mixture remains in a pumping consistency when the temperature of the field installation equipment is reduced to the normal operating temperature range of 300 ºF to 350 ºF (150 ºC to 175 ºC).

B. Curing
The mixture contains no water or volatile solvents and cures immediately when cooled to a sufficient viscosity to prevent tracking caused by traffic.

C. Softening Point and Flexibility
When a fully reacted mixture sample of asphalt-rubber has been heated at 350 ºF (175 ºC) for one hour, or when a PMAR blend has been heated at 380 ºF (195 ºC) for one hour, it shall passthe following laboratory tests:

1. Softening Point
The minimum softening point by ring and ball described in ASTM D 36 is as follows:

PMAR	185°F (85 °C)
Type S	135°F (60 °C)
Type M	150°F (65 °C)

2. Flexibility
Bend a 1/8 in (3 mm) thick x 1 in (25 mm) wide x 6 in (150 mm) long mixture specimen after conditioning to 10 ºF (-12 ºC) at a minimum bending rate of 9 degrees per second(10 seconds maximum for a 90º bend) over a 1 in (25 mm) diameter mandrel without cracking.

D. Separation
Test the PMAR blend for phase separation by pouring a representative sample of the mixture into aluminum tubes 1 in (25 mm) in diameter and 5-1/2 in (137 mm) long as described in AASHTO PP5. Cure the samples at 325 ºF (165 ºC) for 48 hours. Take samples from the top and bottom of the tube and determine softening point as described in ASTM D 36. Average the test results from the top and bottom samples. If there is 4% or more difference between the average test result and either of the top or bottom test results, reject the mixture due to separation.

E. Adhesion
When cooled, the mixture bonds strongly to both asphalt and concrete pavement surfaces. The mixture contains no materials that chemically react with these surfaces to reduce the short-term and long-term adhesion bonds.

F. Acceptable Recycled or Reclaimed Tire Crumb Rubber
Before the rubber is added, ensure the asphalt cement used in the mixture conforms to the requirements of Section 820.2.01, PG 58-22 or PG 64-22.

Ensure that the recycled, reclaimed tire crumb rubber used in the mixture meets the following requirements:

- Was obtained from used pneumatic tires (such as automobile, truck, bus, etc.)—not solid tires and non-tire rubber sources.
- Was produced from an ambient grinding process (crushes, tears, grinds, or wears the used rubber tires at or above ordinary room temperature that produces rubber particles with a ragged, sponge-like surface). Cryogenically ground rubber or tire buffings are prohibited.
- Contains recycled, vulcanized crumb rubber and/or reclaimed (devulcanized) rubber
- Contains at least 25 percent natural rubber by weight of the total rubber portion of the mixture
- Contains no more than a trace of fabric
- Is free of wire and other contaminating materials, except up to four percent calcium carbonate or talc to prevent rubber particles from sticking
- Contains no rubber particles greater than 1/4 in (6 mm) long

Meets the following gradation requirements:

Sieve Size	Percent Passing
No. 10 (2.0mm)	100%
No. 16 (1.18 mm)	95 to 100%
No. 30 (600 µm)	40 to 80%
No. 80 (180 µm)	0 to 5%

G. Poly-modified Asphalt Rubber

If a PMAR blend is used, ensure it meets the following additional requirements:

PROPERTY	SPECIFICATION LIMITS
Cone Penetration, 77 °F (25 °C)	30-60 dmm
Resilience, 77 °F (25 °C), % Recovery	30% minimum
Ductility,, 77 °F (25 °C), 50 mm/minute	300 mm minimum
Asphalt Compatibliy (ASTM D 3407)	Pass
Bitumen Content (ASTM D 4)	60% minimum
Tesile Adneasion (ASTM D 3583)	500% minimum
Rotational Viscosity (Brookfield), No. 5 spindle, 20 RPM, 400 °F (205 °C)	3,000 - 15,000 cp

Package the premixed sealant material in units weighing no more than 30 lbs (15 kg) with a maximum of two 30 lbs (15 kg) units per shipping container. Ensure that the plastic film used to package the units melts at normal application temperatures when placed in the installation equipment.

407.3 Construction Requirements

407.3.01 Personnel

General Provisions 101 through 150.

407.3.02 Equipment

A. Field Installation Equipment

Use field installation equipment that produces or maintains specified temperatures, even if filled to capacity.
Ensure that the equipment produces or maintains a homogenous mixture of asphalt and rubber at a uniform temperature without hot or cool spots or rubber and asphalt segregation in the mixture.

B. Crack Filling Equipment

Ensure that the equipment for filling the joints and cracks directs the sealant into the crack. Seal large cracks from the bottom up. Provide squeegees as necessary.

C. Air Compressor(s)

Ensure that the air compressors are satisfactory to the Engineer.

407.3.03 Preparation

A. Joint and Crack Preparation

Use compressed air to thoroughly clean the joints and cracks to be sealed.
Clean the pavement surface and check the joints and cracks to ensure that they are free of vegetation, dirt, dust, moisture, and other foreign material.

407.3.04 Fabrication

General Provisions 101 through 150.

407.3.05 Construction

A. Restrictions
Do not seal joints and cracks if:

- The joint or crack surface to be treated is not thoroughly dry.
- Rain is imminent.
- The air temperature is below 35 ºF (2 ºC).

B. Procedure
Follow this procedure to seal joints and cracks:

1. Place the prepackaged sealant mixture in the field installation equipment.

2. Heat the sealant mixture for the proper time and temperature to provide a full reaction between the asphalt and rubber.

3. Apply the mixture at the specified application temperature according to the manufacturer's recommendations or the laboratory's approval.

4. Carefully fill the joint or cracks, slightly overfull. Strike off the excess with a V-shaped squeegee to feather the sealant out to a width of approximately 2 in (50 mm).

Section 407—Asphalt-Rubber Joint and Crack Seal

407.3.06 Quality Acceptance
If the packaged units are bonded or stuck together or to the shipping container, or if packaging staples or fasteners cause sealant contamination, the material may be rejected as determined by the Engineer.
The manufacturer must meet the requirements of this Specification and furnish evidence of successful field installation and performance under similar environmental and project conditions.

407.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

407.4 Measurement
Joints and cracks will be measured by the linear foot (meter) by surface measure.

407.4.01 Limits

General Provisions 101 through 150.

407.5 Payment
Joints and cracks sealed according to the Plans and this Specification will be paid for at the Contract Unit Price bid.
Payment is full compensation for furnishing all materials and performing the work.

Payment will be made under:

Item No. 407	Polymer-modified asphalt-rubber joint and crack seal	Per linear foot (meter)
Item No. 407	Asphalt-rubber joint and crack seal, type "S"	Per linear foot (meter)
Item No. 407	Asphalt-rubber joint and crack seal, type "M"	Per linear foot (meter)

407.5.01 Adjustments
General Provisions 101 through 150.

Section 408—Joint and Crack Cleaning and Seal

408.1 General Description

Specifications for this work will be included elsewhere in the Contract.

Section 409—Latex Modified Asphalt Concrete

409.1 General Description

Specifications for this work will be included elsewhere in the Contract.

Section 410—Warm Mix Recycled Asphaltic Concrete

410.1 General Description

Specifications for this work will be included elsewhere in the Contract.

Section 411—Asphaltic Concrete Pavement, Partial Removal

411.1 General Description

This work includes removing portions of existing asphaltic concrete pavement, removing base and subgrade as shown on the Plans or as directed by the Engineer, and sawing joints in the existing asphaltic concrete pavement.

411.1.01 Definitions

General Provisions 101 through 150.

411.1.02 Related References

A. Standard Specifications

Section 205—Roadway Excavation
Section 444—Sawed Joints in Existing Portland Cement Concrete Pavements

B. Related Documents

General Provisions 101 through 150.

411.1.03 Submittals

General Provisions 101 through 150.

411.2 Materials

General Provisions 101 through 150.

411.2.01 Delivery, Storage, and Handling

General Provisions 101 through 150.

411.3 Construction Requirements

411.3.01 Personnel

General Provisions 101 through 150.

411.3.02 Equipment

General Provisions 101 through 150.

411.3.03 Preparation

General Provisions 101 through 150.

411.3.04 Fabrication

General Provisions 101 through 150.

411.3.05 Construction

A. Saw Joints
Saw joints as follows:

1. Saw joints true to the lines shown on the Plans or as directed by the Engineer.

2. Saw joints the full depth of the existing asphaltic concrete unless otherwise shown on the Plans or directed by the Engineer.

3. Leave a neat, vertical face for the full depth of the retained portion.
   The Engineer may approve sawing less than full depth if the Contractor demonstrates that the requirements can be met.

B. Remove Pavement
After sawing the joints, begin removing the isolated pavement.

Use removal methods that will not damage the pavement edges that will remain in place or impede the proposed construction.
Pavement, base, or subgrade removed becomes the Contractor's property unless otherwise specified in the Contract.

C. Protect Remaining Edges
After removing the pavement, protect the pavement edges that will remain in place.

1. Do not allow traffic or equipment to cross the remaining edges.

2. Repair or restore the damaged edges to the Engineer's satisfaction at no additional cost to the Department.

411.3.06 Quality Acceptance

General Provisions 101 through 150.

411.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

411.4 Measurement
This work will not be measured separately for payment.

411.4.01 Limits

General Provisions 101 through 150.

411.5 Payment

No separate payment will be made for the work described in this section.
When Item 205 is included in the Proposal as a Pay Item, payment for this work is included in payment for unclassified excavation by the cubic yard (meter) as described in Subsection 205.4, "Measurement." Otherwise, payment is included in the overall price bid for other Contract Items.
Payment is full compensation for providing labor and equipment, sawing, removing and disposing, and providing other incidentals to accomplish the work described in this Specification.
Sawing Portland cement concrete overlaid with asphaltic concrete will be measured and paid for according to Section 444.

411.5.01 Adjustments

General Provisions 101 through 150.

Section 412—Bituminous Prime

412.1 General Description

This work includes preparing and treating an existing surface with bituminous material and blotter material, if required. Treat the surface according to these Specifications and conform to the lines shown on the Plans or established by the Engineer.

412.1.01 Definitions

General Provisions 101 through 150.

412.1.02 Related References

A. Standard Specifications
Section 424—Bituminous Surface Treatment
Section 821—Cutback Asphalt

B. Referenced Documents
General Provisions 101 through 150.

412.1.03 Submittals

General Provisions 101 through 150.

412.2 Materials

Unless otherwise specified, select the types of bituminous materials. The Engineer will determine the grade of materials to be used. The Specifications for the bituminous materials include:

Material	Section
Cutback Asphalt, RC-30, RC-70, RC-250, or MC-250, MC-30, or MC-70	821.2.01
Blotter Material (Sand)	412.3.05.G.3

412.2.01 Delivery, Storage, and Handling

General Provisions 101 through 150.

412.3 Construction Requirements

412.3.01 Personnel

General Provisions 101 through 150.

412.3.02 Equipment

Provide equipment that is in good repair, including at least the following units that meet the requirements of Subsection 424.3.02, "Equipment."

- Pressure distributor
- Power broom and blower
- Aggregate spreader (if required)
- Pneumatic-tired roller
-

412.3.03 Preparation

See Subsection 412.3.05.B, "Condition of Surface."

412.3.04 Fabrication

General Provisions 101 through 150.

412.3.05 Construction

Prime the following bases and other areas:

- Cement or lime stabilized bases or sub-bases, regardless of pavement thickness
- Soil or aggregate bases or sub-bases on which bituminous surface treatment will be placed
- Soil or aggregate bases or sub-bases on which less than 5 in (125 mm) total thickness of hot mix asphaltic concrete will be placed

Prime is not required on driveway construction and paved shoulders.

A. Weather Limitations

Do not apply bituminous prime under any of these conditions:

- Surface is wet.
- Air temperature is below 40 ºF (4 ºC) in the shade.
- Rain is imminent.
- Weather conditions may prevent proper prime coat construction.

B. Condition of Surface

Ensure that the surface to which the prime is to be applied has been finished to the line, grade, and cross section specified.

Ensure that the surface is uniformly compacted and bonded. Correct surface irregularities according to the Specifications for the construction being primed.

C. Cleaning

Remove from the road loose material, dust, caked clay, and other material that may prevent bonding of the prime with the surface. Use power sweepers or blowers the full width of the prime and 2 ft (600 mm) more on each side. Where necessary, sweep by hand.

D. Moisture

Ensure that the surface is only slightly damp. If the surface is too wet, allow it to dry. If it is too dry, the Engineer may require that it be sprinkled lightly just before priming.

E. Temperature and Surface Texture

The surface texture and condition of the surface determine the bituminous material grades to be used.

The following table shows the bituminous material grades and application temperatures as they are applied to various surface textures.

Base Texture	Tight	Average	Open
Materials and grade	MC-30	RC-70 or MC 70	RC-250 or MC-250
Aplication temperature °F (°C)	80-120 (27-49)	105-180 (41-82)	145-220 (63-104)

The Engineer will determine the temperature for applying bituminous prime within the limits shown above.

Heat and apply bituminous materials as specified in Subsection 424.3.05.D, "Heating Bituminous Material" and Subsection 424.3.05.E, "Applying Bituminous Material."

F. Amount and Extent of Prime
The Engineer will determine the exact amount of bituminous material to be used within minimum and maximum rates of 0.15 to 0.30 gal/yd² (0.7 to 1.4 liters/m²). Apply the specified amount as follows:

1. Apply the determined amount uniformly and accurately. Ensure that the amount applied to any 0.5-mile (800 m) section is within 5 percent of the amount specified.

2. Apply the prime the full width of the proposed wearing surface that will be superimposed plus 6 in (150 mm) more on each side.

G. Protection, Curing, and Maintenance
Do the following after priming the surface:

1. Close to Traffic
   Do not allow traffic on the primed surface. Leave the surface undisturbed until the prime thoroughly cures and does not pick up under traffic.

2. Roll
   If the surface becomes soft after it is primed, roll the surface longitudinally with a pneumatic-tired roller at no more than 6 mph (10 kph) until the surface is firmly set.

3. Blot
   If necessary to prevent the prime from being picked up, spread clean, dry, sharp sand over the surface by hand or mechanically. Apply sand only to places that are tacky and use the least amount needed to prevent pick up. No extra payment for this work or material will be made.

4. Open to Traffic
   After rolling and sanding (if required), open the primed surface to ordinary traffic subject to the conditions in Subsection 412.3.05.G.1, "Close to Traffic."
5. Curing and Maintenance
   The primed surface is properly cured when it has penetrated the base sufficiently to not be picked up or displaced by traffic. Temperature and weather conditions may increase curing time. Insure the primed surface has cured to the satisfaction of the Engineer prior to its being covered by other construction.
   Maintain the prime coat and the primed surface course until it is covered by other construction. Repair potholes, scabs, and soft spots prior to covering with other construction. Remove excess bituminous material.

412.3.06 Quality Acceptance
General Provisions 101 through 150.

412.3.07 Contractor Warranty and Maintenance
General Provisions 101 through 150.

412.4 Measurement
Bituminous material for prime is not measured for separate payment.

412.4.01 Limits
General Provisions 101 through 150.

412.5 Payment
Bituminous material for prime is not paid for separately. The cost to clean the surface, furnish, haul and apply materials including water and sand, roll, and perform repairs and maintenance is included in the Unit Price bid for each individual Base Item.

412.5.01 Adjustments
General Provisions 101 through 150.

Section 413—Bituminous Tack Coat

413.1 General Description

This work includes furnishing and applying a bituminous tack coat on a prepared road surface including cleaning the road surface.

413.1.01 Definitions

General Provisions 101 through 150.

413.1.02 Related References

A. Standard Specifications

Section 109—Measurement and Payment
Section 400—Hot Mix Asphaltic Concrete Construction
Section 424—Bituminous Surface Treatment
Section 427—Emulsified Asphalt Slurry Seal
Section 820—Asphalt Cement
Section 822 – Emulsified Asphalt
Section 824—Cationic Asphalt Emulsion

B. Referenced Documents

General Provisions 101 through 150.

413.1.03 Submittals

General Provisions 101 through 150.

413.2 Materials

Ensure materials meet the following Specifications:

Material	Section
Asphalt cement, performance grade PG 58-22, PG 64-22, or PG 67-22	820.2.01
Anionic emulsion asphalt NTSS-1HM	822.2.01
Cationic emulsified asphalt CRS-2h or CRS-3	824.2.01

Asphalt cement of performance grade PG 58-22, PG 64-22 or PG 67-22 is used for bituminous tack coat in work performed in Section 400. Use anionic emulsified asphalt as an option with the approval of the Engineer. Use cationic emulsified asphalt as a special application material only if directed by the Engineer.

The Department may change the grade or type of bituminous materials without a change in the Contract Unit Price if the Engineer determines the grade or type selected is not performing satisfactorily.

413.2.01 Delivery, Storage, and Handling

General Provisions 101 through 150.

Emulsified Asphalt

Maintain all equipment used for the delivery, storage, and handling of anionic emulsified asphalt or cationic emulsified asphalt to prevent contamination of the emulsion. Transfer anionic emulsified asphalt or cationic emulsified asphalt directly to the pressure distributor from the transport tanker.

Provide and maintain temperature measuring devices to continuously monitor the temperature of anionic emulsified asphalt or cationic emulsified asphalt in storage and in the pressure distributor. Do not allow anionic emulsified asphalt or cationic emulsified asphalt to freeze.

Note 1: Do not store anionic emulsified asphalt or cationic emulsified asphalt for a period longer than 30 days from the time of initial loading.

Note 2: Do not use anionic emulsified asphalt or cationic emulsified asphalt on GDOT funded Off System Projects after 30 days of initial loading.

413.3 Construction Requirements

413.3.01 Personnel

General Provisions 101 through 150.

413.3.02 Equipment

Provide equipment in good repair, including the following units that meet the requirements of Subsection 424.3.02, "Equipment".

- Power broom and blower
- Pressure distributor

Provide a dedicated pressure distributor for anionic emulsified asphalt NTSS-1HM to avoid contamination with incompatible materials.

413.3.03 Preparation

General Provisions 101 through 150.

413.3.04 Fabrication

General Provisions 101 through 150.

413.3.05 Construction

A. Seasonal and Weather Limitation

Do not apply tack coat if the existing surface is wet or frozen. Do not place emulsified asphalt if the air temperature in the shade is less than 40 °F (4 °C).

B. Application

Coat the entire areas to be paved with the tack coat unless directed otherwise by the Engineer. Apply tack coat with distributor spray bars instead of hand hoses, except in small areas inaccessible to spray bars.

Application Rates for Anionic Emulsified Asphalt or Cationic Emulsified Asphalt, gal/yd$_2$ (L/m$_2$)

Type Mix	Minimum	Maximum
All Mixes except OGFC and PEM	**0.06 (0.270)**	0.10 (0.450)
On thin leveling courses and freshly placed asphaltic concrete mixes, reduce the application rate to 0.04 to 0.06 gal/yd2 (0.180 to 0.270 L/m2).		
Allow anionic emulsified asphalt or ctionic emulsified asphalt to break for a minimum of 30 minutes after initial application. Proceed with paving only after the anionice emulsified asphalt NTSS-1HM has cured to the satifaction of the Engineer.		
Do not use anionic emulsified asphalt or actionic emulsified asphalt under OGFC or PEM.		

C. Temperature of Material
Apply bituminous materials within the temperature ranges specified below.

Bituminous Materials	Temperature of Application °F (°C)
Asphalt cement	350 - 400 (175 - 205)
Anionic Emulsified Asphalt NTSS-1HM	140 -180 (60 - 80)

D. Cleaning
Immediately before applying the tack coat, clean the entire area free of loose dirt, clay, and other foreign materials.

E. Application Rate
The Engineer will determine the application rate of the bituminous tack coat.

F. Limitations and Areas Coated
Apply only enough tack coat to the prepared road surface that can be covered with the new pavement course the same working day the tack coat is applied.

G. Maintenance and Protection
After applying the tack coat material, allow it to break until it is tacky enough to receive the surface course. Do not allow traffic on the tack.

413.3.06 Quality Acceptance

General Provisions 101 through 150.

413.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

413.4 Measurement

Bituminous materials for tack coat applied and accepted are measured as outlined in Subsection 109.02, “Measurement of Bituminous Materials.”
Diluting emulsified tack coat is not ordinarily allowed except when used underneath slurry seal and approved by the Engineer.

The composition of diluted emulsified tack coat defined in Subsection 427.3.05, “Construction” is measured by the gallon (liter) of diluted mix.

413.4.01 Limits

General Provisions 101 through 150.

413.5 Payment
The accepted volume of bituminous material will be paid for at the Contract Unit Price per gallon (liter) for bituminous tack coat of the type and grade approved by the Engineer, complete in place. Payment is full compensation for preparing, cleaning, furnishing, hauling, applying material, and providing incidentals to complete the work.

Payment will be made under:

Item No. 413	Bituminous tack coat	Per gallon (liter)
Item No. 413	Diluted emulsified asphalt coat	Per gallon (liter)

413.5.01 Adjustments

General Provisions 101 through 150

Section 414—Hot Asphalt—Rubber Seal Treatment for Stress Relieving Interlayer

414.1 General Description
Specifications for this work will be included elsewhere in the Contract.

Section 415—Asphalt Concrete Open Graded Interlayer

415.1 General Description
Specifications for this work will be included elsewhere in the Contract.

Section 416—Intelligent Compaction for Asphalt Concrete

416.1 General Description
Specifications for this work will be included elsewhere in the Contract.

Section 417—Paver Mounted Temperature Equipment

417.1 General Description
Specifications for this work will be included elsewhere in the Contract.

Section 653—Thermoplastic Traffic Stripe

653.1 General Description
This work includes furnishing and applying standard and wet weather thermoplastic reflectorized pavement marking compound. Ensure markings conform to Plan details and locations, these Specifications, and the Manual on Uniform Traffic Control Devices.
Thermoplastic traffic stripe consists of solid or broken (skip) lines, words, and symbols according to Plan color, type, and location.

653.1.01 Definitions
Thermoplastic Marking Compound: A heated compound extruded or mechanically sprayed on the pavement that cools to pavement temperature. When combined with glass spheres and/or reflective composite optics it produces a reflectorized pavement marking.
Short Lines: Crosswalks, stop bars, arrows, symbols, and crosshatching. Extrude short lines rather than spraying them on.

653.1.02 Related References

A. Specifications
Section 656—Removal of Pavement Markings

B. Referenced Documents
QPL 46
QPL 71
SOP 37
SOP 38
SOP 39
Federal Test Standard Number 595B
Federal Test Standard Number 695B
AASHTO M 247

AASHTO M 249
ASTM D 92
ASTM D 476
ASTM D 2240
ASTM D 4960
ASTM E 1710
ASTM E 2177
40 CFR 261.24
EPA Method 3050
EPA Method 3052
EPA Method 6010
EPA Method 7000A

Ensure the producers of the thermoplastic compound and the producers of both the intermix and drop-on glass spheres furnish to the Department copies of certified test reports showing results of all tests specified in this Section. Also ensure that producers certify that the materials meet the other requirements of this Section by submitting copies of certification at the time of sampling.

653.2 Materials

A. General Characteristics of Thermoplastic
Use thermoplastic material produced from an approved source listed on QPL 46. Use thermoplastic material that meets the requirements of AASHTO M 249 with the following exceptions:

1. Material Composition
   Ensure the resin of the thermoplastic material is an alkyd binder. Ensure the alkyd binder consists of a mixture of synthetic resins and a high boiling point plasticizer. Ensure at least one synthetic resin is a solid at room temperature. Ensure at least 50% of the binder composition is 100% maleic-modified glycerol ester resin. Ensure at least 18% by weight of the entire material formulation consists of binder. Do not use alkyd binder that contains petroleum based hydrocarbon resins. Ensure the finished thermoplastic material is not adversely affected by contact with pavement materials or by petroleum droppings from traffic. Use thermoplastic material that has been evaluated (2 year field evaluation) by the National Transportation Product Evaluation Panel (NTPEP) test facility or other approved test facility.

2. Suitability for Markings
   Use thermoplastic material that is especially compounded for traffic markings and has the following characteristics:
   - Prevents markings from smearing or spreading under normal traffic conditions at temperatures below 120 ^{o}F (49 ^{o}C)
   - Gives a uniform cross section, with pigment evenly dispersed throughout the material
   - Has a uniform material density and character throughout its thickness
   - Allows the stripe to maintain its original dimensions and placement
   - Ensures that the exposed surface is free from tack and is not slippery when wet
   - Does not lift from the pavement in freezing weather
   - Has cold ductility properties that permit normal movement with the road surface without chipping or cracking

3. Color
Confirm the color of thermoplastic as follows:
   a. White – Use titanium dioxide that meets the requirements of ASTM D 476, Type II, Rutile, as the pigment for white thermoplastic material. Do not use anatase titanium dioxide pigment. Ensure thermoplastic material is free from dirt or tint. Ensure white thermoplastic material heated for 240 ± 5 minutes at 425 ± 3 ºF (218 ± 3 ºC) and cooled to 77 ± 3 ºF (25 ± 2 ºC) matches Federal Test Standard Number 695B-Color 17925. Ensure the material, when compared to the magnesium oxide standard using a standard color spectrophotometer according to ASTMD 4960, meets the following:

Scale	Definition	Magnesium Oxide Standard	Sample
Rd	Reflectance	100	75 min.
a	Redness-Greenness	0	-5 to +5
b	Yellowness-Blueness	0	-10 to +10

b. Yellow – Use only non-hazardous pigments as defined by the Resource Conservation and Recovery Act (RCRA) Subarticle C rules, table 1 of 40 CFR 261.24 "Toxicity Characteristic". Do not use yellow thermoplastic containing more than 3.0 ppm lead by weight when tested in accordance with the most recent EPA Methods 3050 and 6010 or 7000. Ensure yellow thermoplastic material heated for 240 ± 5 minutes at 425 ± 3 ºF (218 ± 2 ºC) and cooled to 77 ± 3 ºF (25 ± 2 ºC) matches Federal Test Standard Number 595B-Color 13538. Ensure the material, when compared to PR#1 Chart using a standard color spectrophotometer according to ASTM D 4960, plots within the following chromaticity coordinates:

c. Initial Reflectance (CIE Y): 45 minimum

	1	2	3	4
X	0.455	0.510	0.472	0.530
Y	0.444	0.485	0.400	0.456

d. Ensure the in-service daytime chromaticity for yellow material plots within the following coordinates after a period of 30 days:

	1	2	3	4
X	0.435	0.510	0.449	0.530
Y	0.429	0.485	0.377	0.456

4. Indentation Resistance
Measure the hardness by a Shore Durometer, Type A2, as described in ASTM D 2240. Maintain the temperature of the Durometer, 4.4 lb. (2 kg) load and the specimen for 2 hours at 115 °F (45 ₀C). Apply the Durometer and 4.4 lb. (2 kg) load to the specimen. The reading must fall between 50 to 75 units, after 15 seconds.

5. Reheating
Ensure that the compound does not break down, deteriorate, scorch, or discolor if held at application temperature of 425 °F (218 °C) for 6 hours and if reheated up to 4 times to the application temperature. Ensure that the color of white and yellow thermoplastic comply with Subsection 653.2.A.3.a and Subsection 653.2.A.3.b after prolonged heating or reheating.

6. Intermixed Glass Spheres and Reflective Composite Optics
Ensure glass spheres meet the requirements of AASHTO M 247.
Do not use glass spheres and /or reflective composite optics containing greater than 200 ppm total arsenic, 200 ppm total antimony, or 200 ppm total lead when tested according to US EPA Methods 3052 and 6010C, or other approved methods.

7. Flashpoint
Ensure the thermoplastic flashpoint is not less than 500 ºF (260 ºC) as determined by ASTM D 92.

B. Drop-On Glass Spheres and Reflective Composite Optics

Ensure glass spheres meet the requirements of AASHTO M 247. Use spheres produced from an approved source listed on QPL 71. Glass spheres conforming to an alternative gradation may be used provided all other requirements of AASHTO M 247 and this specification are met. Do not use glass spheres and /or reflective composite optics containing greater than 200 ppm total arsenic, 200 ppm total antimony, or 200 ppm total lead when tested according to US EPA Methods 3052 and 6010C, or other approved methods.

C. Sealing Primer

Place the particular type of binder-sealer at the application rate as recommended in writing by the thermoplastic material manufacturer.

653.2.01 Delivery, Storage, and Handling

Use material delivered in 50 lb (22.7 kg) unit cardboard containers or bags strong enough for normal handling during shipment and on-the-job transportation without loss of material.

Ensure that each unit container is clearly marked to indicate the following:

- Color of the material
- Process batch number or similar manufacturer's identification
- Manufacturer's name
- Address of the plant
- Date of manufacture

653.3 Construction Requirements

653.3.01 Personnel

General Provisions 101 through 150.

653.3.02 Equipment

Depending on the marking required, use hand equipment or truck-mounted application units on roadway installations.

A. Application Machine

Ensure that each application machine is equipped with the following features:

- Parts continuously mix and agitate the material.
- Truck-mounted units for lane, edge, and center lines operate at a uniform, predetermined rate of speed, both uphill and downhill, in order to produce a uniform application of striping material and capable of following straight lines and making normal curves in a true arc.
- Conveying parts between the main material reservoir and the shaping die or gun prevent accumulation and clogging.
- Parts that contact the material are easily accessible and exposable for cleaning and maintenance.
- Mixing and conveying parts, including the shaping die or gun, maintain the material at the plastic temperature with heat transfer oil or electrical element controlled heat. Do not use an external source of direct heat.
- Parts provide continuously uniform stripe dimensions.
- Applicator cleanly and squarely cuts off stripe ends and applies skip lines. Do not use pans, aprons, or similar appliances that the die overruns.
- Parts produce varying widths of traffic markings.
- Applicator is mobile and maneuverable enough to follow straight lines and make normal curves in a true arc.

B. Automatic Bead Dispenser

Apply glass spheres and/or reflective composite optics to the surface of the completed stripe using a dispenser attached to the striping machine to automatically dispense the beads/optics instantaneously upon the installed line. Synchronize the glass sphere/optics dispenser cutoff with the automatic cutoff of the thermoplastic material.

C. Special Kettles

Use special kettles for melting and heating the thermoplastic material. Use kettles equipped with automatic thermostatic control devices that provides positive temperature control and prevents overheating. Ensure that the applicator and kettles are equipped and arranged according to the requirements of the National Fire Underwriters.

D. Hand Equipment

Use hand equipment for projects with small quantities of lane lines, edge lines, and center lines, or for conditions requiring the equipment. Use hand equipment approved by the Engineer.

Ensure hand equipment can hold 150 lbs (68 kg) of molten material and is maneuverable to install crosswalks, arrows, legends, lane, edge, and center lines.

E. Auxiliary Vehicles

Supply the necessary auxiliary vehicles for the operation.

653.3.03 Preparation

For asphaltic concrete pavement, do not begin placement of thermoplastic striping until 15 calendar days after completion of the final surface course.

653.3.04 Fabrication

General Provisions 101 through 150.

653.3.05 Construction

A. General Application

Notify the Engineer prior to the placement of the thermoplastic materials. Furnish the Engineer with the manufacturer's name and batch numbers of the thermoplastic materials and glass spheres to be used. Ensure that the approved batch numbers appear on the thermoplastic materials and glass spheres packages.

Thoroughly clean pavement areas to be striped. Use hand brooms, rotary brooms, air blasts, scrapers, or other approved methods that leave the pavement surface clean and undamaged. Take care to remove all vegetation and road film from the striping area. Ensure all new Portland cement concrete pavement surfaces are mechanically wire brushed or abrasive cleaned to remove all laitance and curing compound before being striped.

Lay stripe with continuous uniform dimensions.

Apply the type of stripe at each location according to the Plans, using one of the following methods:

- Spray techniques
- Extrusion methods wherein one side of the shaping die is the pavement and the other three sides are contained by or are part of the suitable equipment to heat and control the flow of material.
- Extrusion methods using a pressurized ribbon gun to control the application of material.

1. Temperature
   Apply thermoplastic traffic stripe only when the pavement temperature in the shade is above 40 °F (4 °C).
   To ensure optimum adhesion, install the thermoplastic material in a melted state at the manufacturer's recommended temperature but not at less than 375 °F (190 °C).

2. Moisture
   Do not apply when the surface is moist. When directed by the Engineer, perform a moisture test on the Portland cement concrete pavement surface. Perform the test as follows:

   a. Place approximately 1 yd^2 (1m^2) of roofing felt on the pavement surface.

   b. Pour approximately 1/2 gallon (2 L) of molten thermoplastic onto the roofing felt.

   c. After 2 minutes, lift the roofing felt and inspect to see if moisture is present on the pavement surface or underside of the roofing felt.

   d. If moisture is present, do not proceed with the striping operation until the surface has dried sufficiently to be moisture free.

3. Sealing Primer
   To ensure optimum adhesion, apply a binder-sealer material before installing the thermoplastic in each of the

following cases:

- Where directed by the Engineer for sprayed thermoplastic
- Old asphaltic concrete pavements with exposed aggregates
- Portland cement concrete pavements

Ensure that the binder-sealer material forms a continuous film that mechanically adheres to the pavement and dries rapidly. Use a binder-sealer currently in use and recommended by the thermoplastic material manufacturer according to QPL 46.

Apply the binder-sealer immediately in advance of, but concurrent with, the application of the thermoplastic material. Apply in a continuous film over the pavement surface.

4. Bonding to Old Stripe
   If the old stripe is to be renewed by overlaying with new material, ensure the new material bonds to the old line without splitting or cracking.

5. Offset from Construction Joints
   Off-set longitudinal lines at least 2 in (50 mm) from construction joints of Portland cement concrete pavements.

6. Crosswalks, Stop Bars, and Symbols
   Make crosswalks, stop bars, and symbols at least 3/32 in (2.4 mm) thick at the edges and no more than 3/16 in (4.8 mm) thick at the center.

7. Thickness
   Maintain the following minimum average dry thicknesses above the surface on all types of pavement

   - 0.090 in (2.3 mm)* for lane lines
   - 0.060 in (1.5 mm)* for edge lines
   - 0.120 in (3.0 mm)* for gore area lines

(See below for '*' reference.)

Compute the minimums by the amount of material used each day, as follows:

(For 5 in wide stripe)	
* Average Thickness (in)=	{(lbs used) ÷ (total linear feet)} x 0.236
(For 125 mm wide stripe)	
* Average Thickness (in)=	{(kg used) ÷ (total linear meters)} x 4.0
(For 10 in wide stripe	
* Average Thickness (in)=	{(lbs used) ÷ (total linear feet)} x 0.118
(For 250 mm wide stripe)	
* Average Thickness (in)=	{(kg used) ÷ (total linear meters)} x 2.0

8. Glass Spheres and Reflective Composite Optics

   a. Apply glass spheres and/or reflective composite optics to installed stripe surface above the minimum rate recommended by the thermoplastic material manufacturer to produce the required retroreflectivity value in accordance with Subsection 653.3.06.

   b. Apply the glass sphere and/or reflective composite optics top-coating with a pressure-type gun specifically designed for applying glass spheres and/or reflective composite optics that will embed at least one-half of the sphere's and optic's diameter into the thermoplastic immediately after the material has been applied to the pavement.

B. Removing Existing Stripe

Remove existing stripe according to Section 656.

Remove 100 percent of existing traffic stripe from:

- Portland cement concrete pavement where the new stripe will be placed at the same location as the existing marking
- Pavement where the new stripe will be placed at a different location from the existing markings

C. Tolerance and Appearance
No traffic stripe shall be less than the specified width and shall not exceed the specified width by more than 1/2 in (13mm). The length of the 10 ft (3 m) segment for skip stripe and the 30 ft (9 m) gap between segments may vary plus or minus 1 ft (300 mm). The alignment of the stripe shall not deviate from the intended alignment by more than 1 in (25 mm) on straight lines. On curves up to and including 1 degree (radius of 1745 m or greater), the alignment of the stripe shall not deviate from the intended alignment by more than 1 in (25 mm). On curves exceeding 1 degree (radius less than 1745 m), the alignment of the stripe shall not deviate from the intended alignment by more than 2 in (50 mm).
Stop work when deviation exceeds the above dimensions, and remove the nonconforming stripe.

D. Traffic Marking Protection
Do not allow traffic onto or permit vehicles to cross newly applied pavement markings until they are sufficiently dry. Remove and replace any portion of the pavement markings damaged by passing traffic or from any other cause, at no additional cost to the Department.

653.3.06 Quality Acceptance

A. General
For a minimum of 30 days from the time of placement, ensure the thermoplastic pavement marking material shows no signs of failure due to blistering, excessive cracking, chipping, bleeding, staining, discoloration, oil content of the pavement materials, smearing or spreading under heat, deterioration due to contact with grease deposits, oil, diesel fuel, or gasoline drippings, spilling, poor adhesion to the pavement material, vehicular damage, and normal wear. In the event that failures mentioned above occur, ensure corrective work is completed at no additional cost to the Department.
Obtain pavement marking retroreflectivity values with a 30 meter geometry retroreflectometer.

B. Initial Retroreflectivity

1. Longitudinal Lines
   Within 30 days of installation, ensure the in-place markings meet the following minimum reflectance values:

   a. Standard

	White	Yellow
Dry (ASTM E 1710)	400 mcd/lux/m²	300 mcd/lux/m²

   b. Wet Weather

	White	Yellow
Dry (ASTM E 1710)	400 mcd/lux/m²	300 mcd/lux/m²
Wet recovery (ASTM E 2177)	150 mcd/lux/m²	125 mcd/lux/m²

   For each center line, edge line, and skip line, measure retroreflectivity 9 times for each mile; 3 times within the first 500 ft (152 m), 3 times in the middle, and 3 times within the last 500 ft (152 m). For projects less than one mile in length, measure retroreflectivity 9 times as above.

Record all retroreflectivity measurements on the form OMR CVP 66 in SOP 39.

2. Messages, Symbols, and Transverse Lines
At the time of installation, ensure the in-place markings when tested according to ASTM E 1710 meet the following minimum reflectance value of 275 mcd/lux/m^2.

Perform at a minimum, one retroreflectivity measurement at one message, one symbol and one transverse line per intersection. Take one measurement per mile for locations other than intersections (i.e. school messages, railroad messages, bike symbols etc.)

C. Six Month Retroreflectivity (Longitudinal Lines)
Maintain the following minimum reflectance values for 180 days after installation:

1. Standard

	White	Yellow
Dry (ASTM E 1710)	400 med/ulx/m²	300 med/ulx/m²

2. Wet Weather

	White	Yellow
Dry (ASTM E 1710)	400 med/ulx/m²	300 med/ulx/m²
Wet recovery (ASTM E 2177)	150 med/ulx/m²	125 med/ulx/m²

Retest the in-place markings according to Subsection 653.3.06.B.1 180 days after installation to ensure these minimum retroreflectance values are maintained.

NOTE: The Contractor is responsible for retroreflectivity testing. Furnish initial test results to the Engineer within 30 days of application. Furnish 6 month test results to the Engineer within 180 days of application or prior to final acceptance, whichever comes first.

D. Thickness

1. New Striping
Check the thicknesses on all skip lines, edge lines and center lines with an approved traffic marking thickness gage consisting of 3 dials as follows:
For each center line, edge line, and skip line, measure thickness above the pavement 3 times for each mile; once within the first 500 ft (152 m), once in the middle, and once within the last 500 ft (152 m). For projects less than one mile in length, measure the thickness above the pavement 3 times.
Record all thickness measurements on the form OMR CVP 66 in SOP 39.

2. Recapping Refurbishment Thermoplastic
Place durable tape, film, or metal plate of known and uniform thickness on an area to be striped. After the striper has passed over, remove the sample and measure the thickness with calipers or a micrometer.
For each center line, edge line, and skip line, measure thickness above the pavement 3 times for each mile; once within the first 500 ft (152 m), once in the middle, and once within the last 500 ft (152 m). For projects less than one mile in length, measure the thickness above the pavement 3 times.
Submit results to the Engineer.

E. Corrective Work
For each mile section, if the thermoplastic traffic stripe fails to meet Plan details or Specifications or deviates from stated dimensions, correct it at no additional cost to the Department. If removal of pavement markings is necessary, perform it according to Section 656 and place it according to this Specification. No additional payment will be made for removal and replacement of unsatisfactory striping. Ensure corrective work is completed at no additional cost to the Department.

Perform testing according to this Specification. Any retest due to failures will be performed at no additional cost to the Department. Furnish all test reports to the Department.

Retroreflectivity and Thickness Longitudinal Line Deficiency: A deficiency will ensue when two or more Location Average results as recorded on form OMR CVP 66 within a One-Mile Section do not meet the performance criteria herein. The entire line within this one mile section will be determined to be deficient. If the evaluated section is less than 1.0 mile, a single Location Average result not meeting the performance criteria herein will result in the entire line to be determined to be deficient.

Retroreflectivity Transverse Markings and Symbol Deficiency: A single Location Average result on the marking or symbol not meeting the performance criteria herein will result in the marking or symbol to be determined to be deficient.

653.3.07 Verification

See SOP 39

653.4 Measurement

When stripe will be paid for by the square yard (meter), the actual number of square yards (meters) painted will be measured. The space between the stripes will be included in the overall measurement.
Linear measurements may be made by electronic measuring devices attached to a vehicle.

Thermoplastic traffic stripe, complete in place and accepted, is measured as follows:

A. Solid Traffic Stripe
Stripe is measured by the linear foot (meter), linear mile (kilometer), or square yard (meter). Breaks or omissions in solid lines or stripes at street or road intersections are not measured for payment.

B. Skip Traffic Stripe
Skip stripe is measured by the gross linear mile (kilometer) as specified. The unpainted space between the painted stripes is included in the overall measurement if the Plan ratio of one to three (10 ft [3 m] segment and 30 ft [9 m] gap or other patterns as designated on the Plans) remains uninterrupted. Measurement begins and ends on a stripe.

C. Words and Symbols
Each word or symbol complete according to Plan dimensions is measured by the Unit.

653.4.01 Limits

General Provisions 101 through 150.

653.5 Payment

Payment is full compensation for the Work under this section, including:

- Cleaning and preparing surfaces
- Furnishing all materials
- Applying, curing, and protecting stripe
- Protecting traffic, including providing necessary warning signs
- Furnishing tools, machines, and other equipment necessary to complete the Item

Measurement and payment for removing pavement markings will be according to Section 656 when shown in the Proposal as a payment Item. Otherwise, removal will not be paid for separately, but will be included in the payment for other Work under this section.

Payment will be made under:

Item No. 653	Thermoplastic solid traffic stripe, __ in (mm), (color)	Per Linear foot (meter)
Item No. 653	Thermoplastic solid traffic stripe, __ in (mm), (color)	Per linear mile (kilometer)
Item No. 653	Thermoplastic skip traffic stripe, __ in (mm), (color)	Per gross linear foot (meter)
Item No. 653	Thermoplastic skip traffic stripe, __ in (mm), (color)	Per gross linear mile (kilometer)
Item No. 653	Thermosplastic pavement markings, words, and symbols (color), type _____	Per each
Item No. 653	Thermoplastic traffic stripe	Per square yard (meter)
Item No. 653	Wet Weather Termoplastic solid traffic stripe, __ in (mm), (color)	Per Linear foot (meter)
Item No. 653	Wet Weather Termoplastic solid traffic stripe, __ in (mm), (color)	Per linear mile (kilometer)
Item No. 653	Wet Weather Termoplastic skip traffic stripe, __ in (mm), (color)	Per gross linear foot (meter)
Item No. 653	Wet Weather Termoplastic skip traffic stripe, __ in (mm), (color)	Per gross linear mile (kilometer)

653.5.01 Adjustments

General Provisions 101 through 150.

Section 654—Raised Pavement Markers

654.1 General Description

This work includes furnishing and placing raised pavement markers according to the Plans or as directed by the Engineer. Use markers that conform to Plan shapes, dimensions, and tolerances.

654.1.01 Definitions

General Provisions 101 through 150.

654.1.02 Related References

A. Standard Specifications

Section 868—Bituminous Adhesive for Raised Pavement Markers
Section 886—Epoxy Resin Adhesives
Section 919—Raised Pavement Marker Materials

B. Referenced Documents

QPL 74

654.1.03 Submittals

General Provisions 101 through 150.

654.2 Materials

Ensure that materials meet the requirements of the following Specifications:

Material	Section
Bituminous Adhesive	868
Epoxy Resin Adhesives	886
Pavement Markers	919

654.2.01 Delivery, Storage, and Handling

General Provisions 101 through 150.

654.3 Construction Requirements

654.3.01 Personnel
General Provisions 101 through 150.

654.3.02 Equipment
Before beginning construction, clean marker replacement equipment and ensure that it is mechanically sound.

A. Containers and Stirring Devices
Clean containers and stirring devices (paddles, propellers for drills, etc.) before hand-mixing epoxy.

B. Automatic Mixing Device
1. Cleaning
Clean the mixing head to the automatic epoxy mixing equipment after stopping work for any extended period of time. The length of down-time allowed depends on the pot life of the adhesive system being used.
2. Mixing Ratio
Use an automatic mixing device that delivers separate components to the mixing head in a one-to-one ratio by volume.
3. Sample Valves
Equip the lines feeding the mixing head with suitable valves to allow samples to be taken for checking the ratio of each component.

C. Bituminous Adhesive Equipment
Clean and maintain equipment for melting, stirring, and dispensing bituminous adhesive according to the bituminous adhesive manufacturer's requirements.

654.3.03 Preparation

General Provisions 101 through 150.

654.3.04 Fabrication

General Provisions 101 through 150.

654.3.05 Construction

A. Adhesive Types
Cement markers to pavement surfaces with a Type I-R Epoxy or Type I-S Epoxy (see Section 886), or with a bituminous adhesive (see Section 868). Space markers according to the Plans.

1. **Type I-R Epoxy.** Use Type I-R Epoxy when the pavement temperature is above 50 °F (10 °C), or when traffic conditions require a rapid setting system.

2. **Type I-S Epoxy.** Use Type I-S Epoxy when the pavement temperature is above 60 °F (15 °C) and traffic conditions permit a slower setting system.

3. **Bituminous Adhesive.** Use bituminous adhesive when the pavement temperature is above 40 °F (4 °C) or when traffic conditions require a rapid setting material.

B. Handling and Applying Adhesives
Obtain an epoxy adhesive furnished as two separate components. Combine and use the components as follows:

1. Immediately before use, thoroughly stir the individual components with separate paddles. Reject material permanently increasing in viscosity or showing settling of pigments, filler, or thixotropic additives that cannot be readily redispersed.

2. After stirring or agitating the two separate components, mix them in a one-to-one ratio and blend thoroughly until obtaining a uniform color without streaks.

3. At time of mixing, ensure that the temperature of both components is 60 ° to 80 °F (15 ° to 27 °C). If necessary, heat components using indirect heat to avoid locally overheating and decomposing the material. Do not heat adhesive above 120 °F (49 °C).

4. Place markers between the start of mixing the epoxy system and the termination of the pot life. The Engineer will designate the allowable pot life based on environmental factors. Never use a partially set mixed system that does not readily extrude around the perimeter of the marker when pressed to the roadway.

5. When using an approved fast-setting epoxy system, mix the separate components with a two-component type automatic mixing and extrusion apparatus, and place markers immediately.

6. Use bituminous adhesive furnished in approximately 30 lb (14 kg) cubes.

a. Heat the cubes in an oil-jacketed melting pot.
b. Maintain the bituminous adhesive at the manufacturer-recommended temperature during placement of the markers.
c. Discard bituminous adhesive heated above 450 °F (232 °C).

C. Placement of Markers

1. Surface Cleaning

Clean pavement of dirt, curing compound, grease, oil, paint, moisture, loose or unsound layers, or other material that would impair the bond between the adhesive and the roadway.

a. Use either sand-blasting or grinding equipment to clean. Remove the dust before placing the marker.
b. Provide cleaning equipment air lines with suitable traps to prevent oil or moisture from being redeposited on the road surface.

2. Placement Limits

Place markers as follows:

a. Do not place markers over joints in rigid pavement.
b. Do not place markers when pavement temperature is below 40 °F (4 °C).
c. When possible, wait 60 to 90 days before placing markers using epoxy adhesive on newly constructed asphaltic concrete pavements.

3. Marker Placement Using Epoxy Adhesives

Place markers using epoxy adhesives as follows:

a. Place enough adhesive on the cleaned pavement or the bottom of the marker to completely cover the contact area of the marker.
b. Press the marker firmly to the pavement.
c. Allow a slight bead of epoxy adhesive to extrude from under the marker edges.
d. Remove adhesive on the face of the marker or adhesive that obscures the marker. Do not use thinners or solvents to clean epoxy adhesives from the markers.

4. Marker Placement Using Bituminous Adhesives

Place markers using bituminous adhesives as follows:

a. Place enough bituminous adhesive on the cleaned pavement or the bottom of the marker to completely cover the contact area of the marker.
b. Press the marker firmly to the pavement.
c. Allow a slight bead of adhesive to extrude from under the marker edges.
d. Remove adhesive on the face of the marker or adhesive that obscures the marker.
e. Place the marker before the bituminous adhesive cools and does not extrude around the perimeter of the marker when pressed to the roadway.

654.3.06 Quality Acceptance

Refer to QPL 74 for raised pavement markers that have met these requirements.

654.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

654.4 Measurement

The number of each type of installed and accepted pavement marker is counted separately for payment.

654.4.01 Limits

General Provisions 101 through 150.

654.5 Payment

Raised pavement markers will be paid for at the Unit Price for each Unit of each type. Payment is full compensation for furnishing and installing each marker.
When designated, payment will also include recessing the marker.

Payment will be made under:

Item No. 654	Raised pavement markers type _____	Per each
Item No. 654	Raised pavement markers type _____ (recessed)	Per each

654.5.01 Adjustments

General Provisions 101 through 150.

Section 655—Pavement Arrow with Raised Reflectors

655.1 General Description

This work includes installing pavement arrows with raised reflectors. Mark arrows with traffic paint, thermoplastic, or preformed plastic pavement markings according to the Proposal and Plan details.

655.1.01 Definitions

General Provisions 101 through 150.

655.1.02 Related References

A. Standard Specifications
Section 652—Painting Traffic Stripe
Section 653—Thermoplastic Traffic Stripe
Section 654—Raised Pavement Markers
Section 657—Preformed Plastic Pavement Markings
Section 868—Bituminous Adhesive For Raised Pavement Markers
Section 870—Paint
Section 886—Epoxy Resin Adhesives
Section 913—Reflectorizing Materials
Section 919—Raised Pavement Marker Materials

C. Referenced Documents
D.
General Provisions 101 through 150.

655.1.03 Submittals

General Provisions 101 through 150.

Section 819—Fiber Stabilizing Additives

819.1 General Description

This Section covers the general requirements for fiber stabilizing additives incorporated into asphaltic concrete mixtures. These fibers are used to stabilize the asphalt film surrounding aggregate particles to reduce drain-down of the asphalt cement, use cellulose or mineral fiber stabilizer listed on QPL 77, Fiber Stabilizing Additives.

819.1.01 Related References

A. Standard Specifications
General Provisions 101 through 150.

B. Referenced Documents
AASHTO T 245
ASTM D 128
ASTM C 612
GDT 127
GDT 130
QPL 77

819.2 Materials

Use an approved mineral or cellulose fiber stabilizing additive currently listed in QPL 77. Approved additives shall meet the requirements below. Dosage rates below are typical ranges. Use the dosage rate prescribed in the Job Mix Formula, as approved by the Office of Materials.

A. Requirements for all fiber types

1. Use a fiber stabilizer of the type and properties appropriate to the plant's metering and delivery system.

2. When tested in a standard mixture according to GDT 127, the fiber stabilizing additive shall limit drain-down to not more the 0.2% of the weight of the mixture. For the purpose of evaluating these additives, the following test conditions apply.

   The mixture tested shall consist of a standard No. 7 stone and 6.4% asphalt cement.

   Mixing and compaction temperatures for the test shall be as prescribed in AASHTO T 245, Section 3.3.1. Wet mixing time shall be 60 ± 2 seconds.

   Un-separated fibers, determined by visual inspection of the mixture after the drain-down test, shall not exceed 5% of total fiber content.

B. Cellulose Fibers
Add cellulose fibers at a dosage rate between 0.2% and 0.4% by weight of the total mix, according to the approved Job Mix Formula. Fiber properties shall be as follows:

- Ash Content by ASTM D 128: 23% maximum non-volatile content
- pH: 7.0 to 12.0
- Moisture Content: 5.0% maximum

C. Cellulose Pellets
Use cellulose fiber stabilizing additive in pellet form that meets the requirements of Subsection 819.2.A and Subsection 819.2.B. Use pellets that disperse sufficiently at mixing temperature to blend uniformly into the asphalt mixture. Use pellets that do not exceed 0.24 in (6.0 mm) average pellet diameter. Pellets may contain binder ingredients such as asphalt cement, wax, or polymer. Do not use pellets if the binder ingredient exceeds 20.0% of the total weight of the pellets. Use binder that produces no measurable effect on the properties of the asphalt cement. Do not use fiber pellets which soften or clump together when stored at temperatures up to 122 ^{0}F (50 ^{0}C).
Add approved palletized fiber stabilizing additive at a dosage rate between 0.2% and 0.4% by weight of the total mix, according to the approved Job Mix Formula established by the Office of Materials.

NOTE: If the binder material constitutes more than 3% of the pellet weight, the dosage rate shall be based upon the net fiber content.

D. Mineral Fibers
Use mineral fibers made from virgin basalt, diabase, slag or other silicate rock. Add the fiber at a dosage rate prescribed in the approved Job Mix Formula, between 0.3% and 0.6% by weight of the total mix. Use approved mineral fiber from QPL 77, not exceeding 25 % shot content in accordance with ASTM C 612, as tested according to GDT 130:

E. Materials Warranty

General Provisions 101 through 150.

Section 820—Asphalt Cement

820.1 General Description
This section includes the requirements for asphalt cements prepared from crude petroleum.

820.1.01 Related References

A. Standard Specifications

General Provisions 101 through 150.

B. Referenced Documents

Standard Operating Procedure (SOP 4)

AASHTO R 28
AASHTO T 48
AASHTO T 179
AASHTO T 240
AASHTO T 313
AASHTO T 314
AASHTO T 315
AASHTO T 316
AASHTO TP70 / ASTM D7405

820.2 Materials

820.2.01 Asphalt Cement

A. Requirements

1. Type

Use a material homogenous and water-free and will not foam when heated to 347 °F (175 °C).
Ensure blend used to produce a specified performance grade meets the following requirements:

- Is uniform and homogeneous without separation
- Uses PG 64-22 or PG 67-22 described below for the base asphalt
- Consists of production materials not being “air-blown”.
- Contains < 0.5% acid (including Polyphosphoric Acid (PPA) modification, when approved by the Office of Materials.

2. Grade

Use the various grades of asphalt cement meeting the requirements shown in the test requirements for Petroleum Asphalt Cements.

Add Styrene-Butadiene-Styrene (SBS) or Styrene-Butadiene (SB) to neat asphalt to produce a binder meeting requirements for PG 76-22 when roadway ADT is equal to or greater than 100,000 for Stone Matrix Asphalt and Porous European Mix (PEM) or Open Graded Friction Course (OGFC) Mixtures.

Styrene Butadiene Rubber (SBS) or Crumb rubber modified PG 76-22 is an acceptable alternative to SBS or SB modified asphalt cement at contractor's discretion, when roadway ADT is less than 100,000, provided the SBR or crumb rubber modified asphalt cement meets the tests' requirements of PG 76-22. For SBR modified PG 64-22 or PG 67-22 to meet PG 76-22, use only SBR currently approved on QPL-65 "Georgia's List of Approved Latex Suppliers".
For crumb rubber modified PG 64-22 or PG 67-22 to meet PG 76-22, use 30 mesh size ambient or cryogenic ground tire rubber at minimum 10% of weight of total asphalt cement content.
Ensure Trans-Polyoctenamer is added at 4.5% of the weight of the crumb rubber to achieve better particle distribution.

Varying percentage blends of crumb rubber and approved additives may be used, at the discretion of the Office of Materials, provided the end product meets all specified requirements of PG76-22 including Phase Angle. Ensure the end product is homogenous and shows no separation or coagulation. Percentage of ambient or cryogenic ground tire rubber is neat asphalt source dependent to meet specification requirements for PG 76-22.

The maximum Phase Angle requirement is not applicable to the crumb rubber modified PG 76-22 incorporating ≥ 10% crumb rubber with approved additive equivalent to 4.5% of crumb rubber (see notes f, g, i and j).

Test Requirements for Petroleum Asphalt Cements

Test and Method	Test Temperature				Original Binder	Residue Of Binder After:	
	PG 58-22 (Note e)	PG 64-22	PG 67-22	PG 76-22 (Note d)		Rolling Thin Film Oven, AASHTO: T 240	Pressure Aging AASHTO: R 28
Flash Point, Min., AASHTO T 48					446 °F (230 °C)		
Viscosity, Max., AASHTO T 316, (Note a)	275 °F (135 °C)				3Pa-S (3000CP)		
Mass Loss (%), Max., AASHTO T 240, (note b)						0.5	
δ, AASHTO T 315, 10 Rad/Sec	136 °F (58 °C)	147 °F (64 °C)	153 °F (67 °C)	169 °F (76 °C)	≥1.0 kPa	≥2.2 kPa	
Dynamic Shear, G*/sin δ, AASHTO T 315, 10 Rad/Sec	72 °F (22 °C)	77 °F (25 °C)	80 °F (26.5 °C)	88 °F (31 °C)			≥ 5000 kPa
Creep Stiffness, 60 sec., AASHTO T 313, (Note c)	10 °F (-12 °C)						S ≥ 300 000 kPa m ≥ 0.300
Direct Tension, 1.0 mm/min., AASHTO T314, Failure Strain	10 °F (-12 °C)						Report
Multiple Stress Creep & Recovery (MSCR) test, ASTM D7405, AASHTO TP70 (proposed), J_{nr} 3.2 kPa, (Notes f, g, I and j)				64 °C			
Polymer Separation Test ASTM D7173 AASHTO T53 Softening Point (°F) (°C) (h)				(≤ 18 °F) (≤ 10 °C) Difference between top and bottom specimen			

Notes:

a. The Department may waive this requirement if the supplier warrants the asphalt binder can be adequately pumped and mixed at temperatures meeting all applicable safety standards.

b. Heat loss by AASHTO: T 179 may be accepted in lieu of mass loss by AASHTO: T 240.

c. If the creep stiffness is below 300,000 kPa, the direct tension test is not required. If the creep stiffness is 300,000 kPa, report the Direct Tension Failure Strain value. Satisfy the m-value requirement in either case.

d. Ensure the maximum Phase Angle measured by DSR is ≤ 75 degrees.

e. The maximum Mass Loss shall be ≤ 1%, when used in conjunction with Bituminous Surface Treatment (Section 424).

f. MSCR requirement is applicable to the SBR, Crumb Rubber & TOR (or other OMR approved additive) combination modified PG 76-22 asphalt cement. Additionally, ensure the materials meet all PG 76-22 requirements except for phase angle as detailed in sub-section 820.2.01.A.2.

g. Ensure MSCR requirement for Average Percent Recovery at 3.2 kPa is > 35% for laboratory or terminally blended PG 64-22 or PG 67-22 modified using SBR or GTR to meet PG 76-22 requirements.

h. Polymer Separation Test is performed by the Department for SBR and crumb rubber modified PG 76-22.

i. PG 64-22 or PG 67-22 modified to meet PG 76-22 using crumb rubber, via dry method, will be evaluated using complete analysis for compliance with PG 76-22 requirements prior to mixture production using laboratory blended materials. PG 64-22 or PG 67-22 modified to meet PG 76-22 using crumb rubber via dry method, will be evaluated for compliance with original DSR testing requirements for PG 76-22 during mixture production using abson recovery in accordance with GDT 119 in compliance with AC sampling frequencies established in GSP 21 sub-section A.9.

j. PG 64-22 or PG 67-22 modified to meet PG 76-22 using crumb rubber, via the dry method, will be evaluated for MSCR (Jnr @ 3.2 kPa) requirements, in accordance with GDT 119, on AC samples obtained for project assurance at frequencies established in GSP 21 sub-section A.9.
Thoroughly blend the composite materials at the supply facility prior to being loaded into the transport vehicle if modification is required in accordance with 820.2.01. Ensure all blending procedures, formulation, and operations are approved by the Office of Materials.

3. Certification:
Provide certified test results from an approved, certified laboratory of blends for proposed PG asphalt for each specification characteristic of the asphalt cement proposed for shipment. Provide the certified results to the State Materials Engineer as required in Standard Operating Procedure (SOP 4).
The State Materials Engineer may interrupt production until test results are known in the event there is reason to suspect a sample will be outside specification limits. Mixture placed incorporating modified binders determined to not meet specification requirements may be subject to removal at the recommendation of the State Materials Engineer.

B. Materials Warranty
General Provisions 101 through 150.

Section 821—Cutback Asphalt

821.1 General Description
This section includes the requirements for asphalt cements that have been fluxed with petroleum distillates.

821.1.01 Related References

A. Standard Specifications
General Provisions 101 through 150.

B. Referenced Documents

AASHTO T 44
AASHTO T 48
AASHTO T 49
AASHTO T 51
AASHTO T 55
AASHTO T 78
AASHTO T 79
AASHTO T 201

821.2 Materials

821.2.01 Cutback Asphalt

A. Requirements

1. Type: Use an asphalt cement that is uniformly consistent and shows no separation or curbing.
2. Grade: Use various grades of cutback asphalts that meet the requirements shown in Table 1 and Table 2.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

Test as follows:

Test	Method
Water	AASHTO T 55
Flash point	AASHTO T 79 & T 48
Viscosity	AASHTO T 201
Distillation	AASHTO T 78
Ductility	AASHTO T 51
Solubility	AASHTO T 44
Penetration	AASHTO T 49

D. Materials Warranty

General Provisions 101 through 150.

Table 1—Properties of Medium Curing Cutback Asphalts

Requirements	Viscosity Grade									
	MC-30		MC-70		MC-250		MC-800		MC-3000	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Water Percent		0.2		0.2		0.2		0.2		0.2
Flast Point, Cleveland Open Cup, °F (°C)	100 (38)		100 (38)		150 (65)		150 (65)		150 (65)	
Kinematic viscosity at 140°F, centistokes (60 °										
Distillation test: Distillate, percentage by volume of total distillate to 680° F (360°C)										
to 457°F (225 °C)		25		20		10				
to 500°F (260 °C)	40	70	20	60	15	55		35		15
to 600 °F (315 °C)	75	93	65	90	60	87	45	80	15	75
Residue from distillation to 680 °F (360 °C) Volume percentages of sample by difference	50		55		67		75		80	
Tests pm residue from distillation:										
Penetration, 100g, 5 sec., at 77 °F (25 °C), (dmm)	80	250	80	250	80	250	80	250	80	
Ductility at 77°F (25°C), at 5cm per min., (cm	100		100		100		100		100	250
Solubility in trichloroethylene, percent by weight	99.5		99.5		99.5		99.5		99.5	

Table 2—Properties of Rapid Curing Cutback Asphalts

Requirements	Viscosity Grade									
	RC-30		RC-70		RC-250		RC-800		RC-3000	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Water percent		0.2		0.2		0.2		0.2		0.2
Flash point, Tagliabue Open Cup, °F (°C)					80 (25)		80 (25)		80 (25)	
Kinematic viscosity at 140°F (60 °C, mPa·s)	30	60	70	140	250	500	800	1600	3000	6000
Distillation test: Distillate, percentage by volume of total distillate to 680°F (360°C)										
to 374°F (190°C)	15		10							
to 437°F (225°C)	55		50		35		15			
to 500°F (260°C)	75		70		60		45		25	
to 600°F (315°C)	90		85		80		75		70	
Residue from distillation to 680°F (360°C): Volume percentages of sample by difference	50		55		65		75		80	
Penetration, 100g, 5 sec., at 77°F (25°C), (dmm)	60	120	60	120	60	120	60	120	60	120
Ductility at 77°F (25°C), at 5 cm per min., (cm)	100		100		100		100		100	250
Solubility in trichloroethylene, percent by weight	99.5		99.5		99.5		99.5		99.5	

Section 822 — Emulsified Asphalt

822.1 General Description

This section includes the requirements for homogenous emulsions of asphalt, water, and emulsifying agents.

822.1.01 Related References

A. Standard Specifications

Section 820–Asphalt Cement

B. Referenced Documents

AASHTO T 50
AASHTO T 59

822.2 Materials

822.2.01 Emulsified Asphalt

A. Requirements

1. Type

Use materials not containing lumps and not showing separation during handling or storage of up to 30 days.

2. Grade

Use the various grades of emulsified asphalts meeting or exceeding the requirements in Table 1.

Table 1—Requirements for Emulsified Asphalt

Type	Rapid Setting	Slow Setting			Prime
Grade	RS-2h Min. Max.	SS-1h Min. Max.	SS-1 Min. Max.	NTSS-1HM Min. Max.	EAP-1 Min. Max.
Tests on Emulsion: Viscosity Saybolt Furol at 77°F (25°C), (Sec.)		20 100	20 100	20 100	15 100
Viscosity Saybolt Furol at 122°F (50°C), (Sec.)	75 400				
(a) Settement 5 Days, (Percent)	5	5	5	5	5
(b) Storegae Stability Test 2 Day, (Percent)	1	1	1	1	1
(c) Demulsiblity, 35 ml, 0.02N. CaCl2, (Percent)	60				
(d) Cement Mixing Test, (Percent)		2.0	2.0		
Sieve Test, (Percent)	0.10	0.10	0.10	0.30	0.10
Oil Distillation by Volume (Percent)				1	5 12
Residue by Distiallation (Percent AC)	63	57	57	50	50
Test on Residue from Distallation Test: Penetration 77°F (25°C) 100 gm/5 Sec. (dmm)	80 140	40 110	100 200	20	
Ductility at 77°F (25°C) 5cm/min. (cm)	40	40	40		
Solubility in Trichloroethylene, (Percent)	97.5	97.5	97.5	97.5	97.5
Float at 140°F (60 °C), (Sec.)					20
Softening Point, °C				65	
Original DSR @ 86°C G*/Sinδ, 10 rad/s, kPa				1.0	

(a) The test requirement for settlement may be waived when the emulsified asphalt is used in less than five (5) days; or the Engineer may require that the settlement test be run from the time the sample is received until it is used, if the elapsed time is less than five (5) days, if there is an issue of quality.

(b) The 24-hour (1 day) storage stability test may be used but does not predict that the 5 day settlement test will pass.

(c) Ensure the demulsibility test is made within 30 days from date of shipment.

(d) Ensure the cement mixing test will be applicable only if material is used in Asphalt Slurry Seal.

(e) Anionic emulsified asphalt is not compatible with cationic emulsions (CRS, CMS, CSS, CQS etc.). Ensure all equipment is thouroughly cleaned if cationic emulsion was previously present.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance
Test as follows:

Test	Method
Testing emulsified asphalts	AASHTO T 59
Float test	AASHTO T 50

D. Materials Warranty

General Provisions 101 through 150.

Section 823—Cutback Asphalt Emulsion

823.1 General Description

This section includes the requirements for cutback asphalt emulsions.

823.1.01 Related References

A. Standard Specifications

Section 820–Asphalt Cement

B. Referenced Documents

AASHTO:
T 44
T 49
T 51
T 55
T 72
1141
T 111
GDT 11

823.2 Materials

823.2.01 Cutback Emulsion

A. Requirements
Use the various grades of cutback asphalt emulsions that meet the requirements shown in Table 1.

Table 1—Properties of Cutback Asphalt Emulsions

	Grade			
Requirements	**CBAE-2**		**CBAE-3**	
	Min.	**Max.**	**Min.**	**Max.**
Viscosity, Furol at 140° F (60° C), in seconds	100	350	400	700
Distillation:				
Residue (asphalt cement) percent by weight	67		72	
Water content percent by weight	4	12	4	12
Naphtha content (by difference) percent by weight	12	25	10	20
Tests on residue from distillation:				
Penetration at 77° F (25 °C), 100 g, 5 seconds	60	150	60	150
Ductility at 77° F (25 °C), 5 cm per min., (cm)	100		100	
Solubility in trichloroethylene, percent by weight	99		99	
Ash, percent by weight		1.0		1.0

B. Fabrication

1. Prepare the cutback asphalt emulsions by compounding a suitable volatile naphtha, emulsifying agent, and water with asphalt cement.
2. Mechanically invert 100 percent of the cutback emulsions before shipping.

C. Acceptance

Test as follows:

Test	Method
Visosity	AASHTO T 12
Distillation	GDT 11
Water	AASHTO T 55
Penetration	AASHTO T 49
Ductility	AASHTO T 51
Solubility	AASHTO T 44
Ash	AASHTO T 11

D. Materials Warranty

General Provisions 101 through 150.

Section 824—Cationic Asphalt Emulsion

824.1 General Description

This section includes the requirements for cationic asphalt emulsions.

824.1.01 Related References

A. Standard Specifications

General Provisions 101 through 150.

B. Referenced Documents

AASHTO T 49
AASHTO T 51
AASHTO T 53
AASHTO T 59
AASHTO T 72
AASHTO T 301
AASHTO T 302
ASTM D 5546 - 01
QPL 65
GDT 44
GDT 91
GDT 135

824.2 Materials

824.2.01 Cationic Asphalt Emulsion

A. Requirements

1. Use a homogenous emulsion. After thorough mixing, the emulsion cannot show signs of separation within 30 days.

2. Use cationic emulsion grades that meet the requirements in Table 1 (metric).

C. Acceptance

B. Fabrication

General Provisions 101 through 150.

Test as follows:

Test	Method
Testing emulsified asphalts (with the following exception):	AASHTO T 59
Frictional value	GDT 44

D. Materials Warranty

General Provisions 101 through 150.

Table 1—Requirements for Cationic Emulsified Asphalt (Notes)

1. The Engineer may waive the settlement test requirement if the emulsified asphalt is used in less than 5 days. However, the Department may still require that the settlement test be run from the time the sample is received until it is used.

2. The 24-hour storage stability test may be used. However, this test does not predict whether the 5-day settlement test will pass.

3. Perform the demulsibility test within 30 days from date of shipment.

4. The cement mixing test applies only if material is used in Asphalt Slurry Seal.

5. Slurry Seal containing CQS-1h must set sufficiently within 2 hours to allow traffic to resume.

6. In the Laboratory, Slurry Seal containing CQS-1h shall not set while being mixed according to GDT 91 for a minimum of 90 seconds.

7. Use ECR-1 in cold mix recycling of reclaimed pavements.

Table 1—Requirements for Cationic Emulsified Asphalt

Test	CRS-2h		CRS-3		CMS-2		CSS-1h		CQS-1h (Note 5&6)		ECR-1 (Note 7)	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Test on Emulsions												
Vis. Sybolt Furol at 77 °F (25 °C), sec.							20	100	20	150	50	500
Vis. Saybolt Furol at 122 °F (50 °C), sec.	100	400	100	500	50	450						
Storage stability test, (Note 2) 24 hours, percent		1		1		1		1		1		1
Settlement (Note 1) 5 days, percent		5		5		5		5		5		5
Demulsibility (Note 3) 35 ml, 0.8% dioctyl sodium sulfosuccinate, percent	40		40									
Coating Ablity and Water Resistance:												
Coating, dry aggregate					Good							
Coating, after spraying					Fair							
Coating, wet aggregate					Fair						Good	
Coating, after spraying					Fair							
Particle charge test	Positive		Positive		Positive		Positive		Positive			
Sieve test, percent		0.10		0.10		0.10		0.10		0.10		0.10
Cement mixing test, percent (Note 4)								2.0				
Oil distillate by volume of emulsion, percent		3		3	4	12					0	6
Residue, percent	65		65		65		65		65		60	
Test on Residue from Distillation Test: Pentration, 77°F, (25°C), 100 g, 5 sec., (dmm)	80	140	60	110	100	250	40	110	60	110	125	225
Ductility, 77°F (25°C), 5 cm/min., (cm)	40		40		40		40		40		40	
Solubiltiy in trichoroethylene, percent	97.5		97.5		97.5		97.5		97.5		97.5	

824.2.02 Latex-Modified Cationic Asphalt Emulsion

A. Requirements

1. Latex Rubber Additive (LRA)
   Ensure the LRA is a natural latex or an un-vulcanized styrene-butadine rubber in an emulsified latex form.
   Ensure that the LRA comes from an approved source listed in the Department's current QPL 65 for use in cationic asphalt emulsion.

2. Latex-Modified Cationic Asphalt Emulsion

a. Use PG58-22 as the base asphalt.

b. Add the LRA in the necessary proportions to result in a minimum of 3% polymer by weight of the asphalt residue.

c. Co-mill the LRA and asphalt cement while manufacturing the emulsified asphalt to produce a homogeneous mixture.

d. Ensure the latex-modified cationic asphalt emulsion, when undisturbed for 24 hours, shows no separation of emulsion and LRA and no color striations, but has a uniform color throughout.

e. Use a latex-modified cationic asphalt emulsion that meets the requirements in Table 2.

Table 2 – Requirements for Latex-Modified Cationic Asphalt Emulsion

Type	Rapid Setting	
Tests	**CRS-2L**	
Tests on Emulsion	**Min.**	**Max.**
Viscosity, Saybolt Furol @ 122 °F (50 °C), sec		400
Storage stability, 24 hours, percent		1
Settlement, 5 days, percent		5
Demulsibility, 35 ml, 0.8% dioctyl sodium sulfosuccinate, percent	40	
Particle charge test	Positive	
Sieve test, percent		0.10
Residue by distillation, percent	65	
Test on Emulsion Residue	**Min.**	**Max.**
Penetration @ 77 °F (25 °C), 100g, 5 sec., (dmm)	70	150
Ductility, @ 77 °F (25 °C), 5 cm/min., (cm)	100	
Elastic recovery @ 50°F (10°C), percent[2]	55	
Ring & ball softening point, °F	125	
Solubility in toluene by centrifuge, percent	97.5	
Polymer solids content, percent	3.0	

1. AASHTO T-59 modified to include a maximum temperature of 400°F ±10°F (204°C) to be held for a period of 15 minutes.
2. GDT-135, Residue by evaporation.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance
Test as follows:

Test	Method
Penetration of bituminous materials	AASHTO T 49
Ductility	AASHTO T 51
Softening point of bitumen	AASHTO T 53
Testing emulsified asphalts	AASHTO T 59
Viscosity	AASHTO T 72
Elastic recovery	AASHTO T 301
Polymer content of polymer-modified emulsions	AASHTO T 302
Solubility of asphalt binders in toluene by centerifuge	ASTM D 5546-01
Residue by evaporation of latex-modified asphalt emulsions	GDT-135

D. Materials Warranty

General Provisions 101 through 150.

Section 825—Asphalt Plank

825.1 General Description
This section includes the requirements for pre-molded asphalt plank.

825.1.01 Related References

A. Standard Specifications

General Provisions 101 through 150.

B. Referenced Documents

AASHTO M 46

825.2 Materials

825.2.01 Premolded Asphalt Plank

A. Requirements
Use premolded asphalt plank that meets the AASHTO M 46 requirements.

B. Fabrication
General Provisions 101 through 150.

C. Acceptance
General Provisions 101 through 150.

D. Materials Warranty
General Provisions 101 through 150.

Section 826—Damp proofing or Waterproofing Material

826.1 General Description

This section includes the requirements for material used as a mopping coat in damp proofing or as mopping cement for a waterproof membrane system.

826.1.01 Related References

A. Standard Specifications

General Provisions 101 through 150.

B. Referenced Documents

AASHTO M 118
AASHTO M 121

826.2 Materials

826.2.01 Bituminous Material for Damp proofing or Waterproofing

A. Requirements
Use a bituminous material that contains a primer coat and a sealer or mopping coat.

1. Primer
   Use a primer coat that meets the requirements of AASHTO M 121.

2. Sealer or Mopping Coat
   Use a coal-tar pitch that meets the requirements of AASHTO M 118.

3. Coal-Tar Pitch Types
   Unless otherwise specified, use pitch Type I or Type II, as defined below, only when required by the Contract.

   Use Type I on vertical surfaces and Type II on flat surfaces.

   a. Type I Pitch
   A mopping coat for built-up roofs surfaced with slag or gravel. If the roof has nails, use the coat on inclines not exceeding 3 in/f.t (75 mm/300 mm). If the roof does not have nails, use the coat on inclines not exceeding 1 in/ft. (25 mm/300 mm).
   A mopping coat for damp proofing or a plying cement for building a membrane system of waterproofing above ground level. Do not use this material if it will be exposed to temperatures over 125 °F (52 °C).

NOTE: This type of coal-tar pitch is suitable on railroad bridges, tanks, retaining walls, culverts, dams, conduit, etc.

   b. Type II Pitch
   A mopping coat for damp proofing or a plying cement in building a membrane system of waterproofing below ground level. Use this material for roofs exposed to moderate temperatures during installation and service.

B. Fabrication
General Provisions 101 through 150.

C. Acceptance

See the requirements in AASHTO M 118 and M 121.

D. Materials Warranty

General Provisions 101 through 150.

Section 828—Hot Mix Asphaltic Concrete Mixtures

828.1 General Description

This specification includes the requirements for hot mix asphaltic concrete mixtures, including:

- Open-graded surface mixtures (OGFC and PEM)
- Stone Matrix Asphalt mixtures (SMA)
- Superpave mixtures
- Fine-graded (4.75 mm) mixtures

828.1.01 Definitions

The Nominal Maximum Sieve Size is one standard sieve size larger than the first sieve to retain more than ten percent of the aggregate, per AASHTO R35. Mixture types in this section are identified according to Nominal Maximum Sieve Size.

828.1.02 Related References

A. Standard Specifications

Section 400-Hot Mix Asphaltic Concrete Construction

Section 800–Coarse Aggregate

Section 802–Aggregates for Asphaltic Concrete

Section 819–Fiber Stabilizing Additives

Section 820–Asphalt Cement

Section 831–Admixtures

Section 882–Lime

Section 883–Mineral Filler

B. Referenced Documents

AASHTO R30
AASHTO R35
AASHTO T-321
AASHTO T 112
AASHTO T 209
AASHTO T 305
AASHTO T 312
AASHTO T-245
AASHTO T-340
SOP-36
SOP-2
GDT 1

GDT 56
GDT 63
GDT 66
GDT 114
GDT 115
GDT 123
QPL 1
QPL 2
QPL 7
QPL 26
QPL 41
QPL 77
QPL 81

828.2 Materials

A. Requirements

Use approved hot mix asphalt concrete mixtures that meet the following requirements:

1. Produce each asphalt mixture according to a Department approved Job Mix Formula and Asphalt Mix Design, see Subsection 400.1 for submittal and approval of Job Mix Formulas.

2. Ensure individual acceptance test results meet the Mixture Control Tolerances specified in the appropriate table below, Subsections 828.2.01 through 828.2.04.

3. Ensure the Engineer approves all materials used to prepare and place the mixtures before incorporating them into the Work. Use only the ingredients listed in the approved Asphalt Mix Design and Job Mix Formula. For virgin aggregates use sources meeting the requirements of Section 802 and are listed in QPL 1 or QPL 2; for mixes in which local sand is permitted, use the approved sand source identified in the mix design. For mixtures containing Reclaimed Asphalt Pavement (RAP), use only RAP from the approved stockpile identified in the mix design. Use asphalt cement meeting the requirements of Section 820, from a source listed in QPL 7.

4. Obtain approved SMA mix designs, Superpave mix designs and 4.75 mm mix designs from a mix design laboratory certified by the Department. Obtain approved mix designs for types PEM and OGFC mixtures from the Department's Office of Materials and Research, which produces and furnishes these mix designs.

5. Ensure all SMA mix designs are designed in accordance with GDT-123 (“Determining the Design Proportions of Stone Matrix Asphalt Mixtures”). SMA mix designs shall be verified and approved by the Department prior to use. Ensure that Superpave and 4.75 mm mix designs are designed in accordance with SOP-2 ("Control of Superpave Bituminous Mixture Designs") and are approved by the Department as provided therein. Ensure these mixes are designed by a laboratory and technician certified in accordance with SOP-36, ("Certification of Laboratories and Personnel for Design of SMA and Superpave Asphalt Mixtures").

6. Use only mixtures composed of the aggregate groups and blends indicated in the Proposal and Plans by their pay item designations, defined as follows:

Pay item Designation	Allowable Aggregate Groups
Group I or II	Group I, Group II, or Blend I
Group II only	Group II only
Blend I	Either 100% Group II material or a blend of Group I and Group II. Do not use Group I material for more than 60%, by weight, of the total aggregate nor more than 50%, by weight, of the coarse aggregate fraction.

7. For patching or leveling use Group I, Group II, or Blend I. Mix types for patching and leveling are specified in Subsection 400.3.03.B.

8. Include lime (hydrated lime) from an approved source and meeting the requirements of Section 882 in all paving courses except as otherwise provided in the Contract. For a list of approved sources of lime, see QPL 41.

a. Add lime to each mixture at the rate prescribed in the approved mix design.

b. Ensure mix designs using only virgin aggregate include lime at a minimum rate of 1.00 % of the total dry aggregate weight. Ensure mix designs using RAP include lime at a minimum rate equal to 1.00 % of the virgin aggregate fraction plus 0.50 % of the aggregate in the RAP fraction.

c. Add more lime or add lime plus an approved Heat-Stable Anti-Stripping Additive that meets the requirements of Section 831, if necessary to meet requirements for mixture properties, and pursuant to an approved mix design. However, the Department will not make additional payment for these materials. For a list of sources of Heat-Stable Anti-Stripping Additives, see QPL 26.

d. Where specifically allowed in the contract on LARP, airport, and parking lot projects, an approved Heat-Stable Anti-Stripping Additive that meets the requirements of Section 831 may be substituted for hydrated lime. Ensure the mix gradation is adjusted to replace the lime with an equivalent volume of fines passing the 0.075 mm sieve.

Add Heat-Stable Anti-stripping Additive at a minimum rate of 0.5 percent of the asphalt cement portion.

9. Use performance grade PG 64-22 or PG 67-22 asphalt cement in all mix designs and mixtures except as follows:

a. The State Bituminous Construction Engineer will determine the performance grade to be used, based on Table 2 – Binders Selection Guideline for Reclaimed Asphalt Pavement (RAP) Mixtures, AASHTO M323 and laboratory testing results as required in Section 828.2.B for mixtures containing ≥ 25% equivalent binder replacement for RAP/RAS mixtures.

b. Use only grade PG 76-22, excluding shoulder construction in the following mixes: all SMA, 12.5 mm PEM, 9.5 mm and 12.5 mm OGFC, 12.5 mm Superpave, on projects with ADT greater than 25,000; and in all mixtures for which polymer-modified asphalt is specified in the pay item.

10. Use of local sand is restricted as follows:

a. Do not place mixtures containing local sand on the traveled way of the mainline or ramps of the Interstate System. Mixtures with local sand may be used for shoulder construction on these facilities.

b. Ensure local sand will not constitute more than 20 % of the total aggregate weight of any mix design or production mix.

c. Subject to the above limits, 19 mm, 12.5 mm, and 9.5 mm Superpave mix designs and 4.75 mm mix designs containing local sand may be used on projects with a current ADT not exceeding 2,000.

d. 25 mm Superpave mix designs containing not more than 20 % local sand may be used on all facilities except the main line and ramps of the Interstate System.

e. Obtain local sand for use in asphalt mixtures from a source approved by the Department.

f. Approval of local sand sources: The Department will sample, test, and approve sources of local sand. Local sand shall not contain more than 7.0 % clay by weight and shall be free of foreign substances, roots, twigs, and other organic matter. Ensure sand is free of clay lumps, as determined by AASHTO T 112, and shall have a sand equivalent value exceeding 25%, as determined by GDT 63.

B. Fabrication

1. Design procedures: For all Superpave and 4.75 mm mixes, ensure conformance with the Superpave System for Volumetric Design (AASHTO T 312 and AASHTO R30), as adapted in SOP-2. Ensure Superpave mixes are designed at a design gyration number (Ndes) of 65 gyrations and initial gyration number (Nini) of 6 gyrations. For 4.75 mm mixes, (Ndes) shall be 50 gyrations, and (Nini) shall be 6 gyrations. Open-graded mix designs will be designed in accordance with GDT 114 by the Department. In all cases, the procedure for measuring Maximum Specific Gravity (Gmm) shall be AASHTO T 209. In addition to gradation and volumetric analysis, mix designs shall include the following performance tests, as applicable.

2. Performance Test:

a. Permeability test: Superpave and Stone Matrix mix designs shall include testing according to GDT -1 Measurement of Water Permeability of Compacted Asphalt Paving Mixtures. Specimen air voids for this test shall be 6.0 ±1.0 %. The average permeability of three specimens may not exceed 3.60 ft per day (125×10^{-5} cm per sec).

b. Moisture susceptibility test: Mix designs of all types except open-graded surface mixes shall include testing for moisture susceptibility according to GDT 66. Specimen air voids for this test shall be 7.0 ±1.0% for all mixes excluding Stone Matrix mixes. Specimen air voids for this test shall be 6.0 ± 1.0% for Stone Matrix mixes. The minimum tensile splitting ratio is 0.80, except that a tensile splitting ratio of no less than 0.70 may be acceptable if all individual strength values exceed 100 psi (690 kPa). Average splitting strength of the three conditioned and three controlled samples shall be not less than 60 psi (415 kPa) for either group. Retention of coating as determined by GDT 56 shall be not less than 95%.

c. Rutting susceptibility test: Mix designs of all types except Open-graded Surface Mixes (OGFC and PEM), and mixtures designed exclusively for trench widening shall include testing according to GDT 115 or AASHTO T-340. Design limits for this test are as follows: Specimen air voids for this test shall be 5.0 ± 1.0% for all mix types. Testing temperature shall be 64°C (147°F) for all mix types except 19 mm and 25 mm Superpave mixes, which shall be tested at 49°C (120°F). Maximum deformation shall be 5.0 mm for all mixes except 4.75 mm mix, 9.5 mm Type I and 9.5 mm Type II Superpave mixes. Maximum deformation for the 9.5 mm Type II Superpave mix shall be 6.0 mm at 64°C (147°F) and 8.0 mm at 64°C (147°F) for the 4.75 mm and 9.5 mm Type I Superpave mix.

d. Fatigue testing: The Department may verify dense-graded mix designs by fatigue testing according to AASHTO T 321 or other procedure approved by the Department.

e. Hamburg Wheel-Tracking Test: The Department may verify Warm Mix Asphalt dense-graded mix designs or mix designs incorporating Polyphosphoric Acid (PPA) modified binders by Hamburg Wheel-tracking testing according to AASHTO T 324.

C. Acceptance

See Subsection 106.03 and Section 400. Ensure individual test results meet the Mixture Control Tolerances listed in Subsections 828.2, 828.2.01 ,828.2.02, 828.2.03, or 828.2.04, whichever applies with the following exception. Field verification results for rutting susceptibility tests performed on laboratory fabricated and/or roadway cores obtained from asphalt plant produced mixtures shall meet specified requirements with a tolerance of +2.0 mm.

D. Materials Warranty

See General Provisions 101 through 150.

828.2.01 Open-Graded Surface Mixtures

A. Requirements

Produce the mixture according to an approved mix design and Job Mix Formula. Ensure Open-Graded Surface Mixtures meet the following mixture control tolerances and mix design criteria:

Sieve Size	Mixture Control Tolerance, %	Design Gradation Limits, Percent Passing		
		9.5 mm OGFC	12.5 mm OGFC	12.5 mm PEM
3/4 in (19.0 mm) sieve	±0.0		100*	100*
1/2 in (12.5 mm) sieve	±6.1	100*	85-100	80-100
3/8 in (9.5 mm) sieve	±5.6	85-100	55-75	35-60
No. 4 (4.75 mm) sieve	±5.7	20-40	15-25	10-25
No. 8 (2.36 mm) sieve	±4.6	15-30	16-24	5-10
No. 200 (75 µm) sieve	±2.0	8-13	8-12	1-4
Range for % AC	±0.4	6.0-7.25	5.75-7.25	5.5-7.0
Class of stone (Section 800)		"A" only	"A" only	"A" only
Drain-down (AASHTO T305), %		<0.3	<0.3	<0.3

* Mixture control tolerance is not applicable to this sieve for this mix.

1. In 12.5 mm and 9.5 mm OGFC and 12.5 mm PEM mixes, use only PG 76-22 asphalt cement (specified in Section 820).

2. All OGFC and PEM mixes shall include a stabilizing fiber of the type (cellulose or mineral) specified in the mix design and meeting the requirements of Section 819. The dosage rate shall be as specified in the mix design and shall be sufficient to prevent drain-down exceeding the above tolerance.

B. Fabrication

See Section 400.

828.2.02 Stone Matrix Asphalt Mixtures

A. Requirements

Produce the mixture according to an approved mix design and Job Mix Formula. Ensure that Stone Matrix Asphalt mixtures meet the following mixture control tolerances and mix design criteria:

Sieve Size	Mixture Control Tolerance	Design Gradation Limits, Percent Passing		
		9.5 mm SMA	12.5 mm SMA	19 mm SMA
1-in (25.0 mm) sieve	±0.0			100*
3/4 in (19.0 mm) sieve	±7.0	100*	100*	90-100
1/2 in (12.5 mm) sieve	±6.1	98-100**	85-100	44-70
3/8 in (9.5 mm) sieve	±5.6	70-100	50-75	25-60
No. 4 (4.75 mm) sieve	±5.7	28-50	20-28	20-28
No. 8 (2.36 mm) sieve	±4.6	15-30	16-24	15-22
No. 50 (300 µm) sieve	±3.8	10-17	10-20	10-20
No. 200 (75 µm) sieve	±2.0	8-13	8-12	8-12
Range for Total AC	±0.4	6.0-7.5	5.8-7.5	5.5-7.5

(Note 1)	(Note 2)			
Design optimum air voids (%)		3.5 ±0.5	3.5 ±0.5	3.5 ±0.5
% aggregate voids filled with AC (VFA)		70-90	70-90	70-90
Tensile splitting ration after freeze-thaw-cycle GDT-66		80%	80%	80%
Drain-down (AASHTO T305), %		<0.3	<0.3	<0.3

*Mixture control tolerance is not applicable to this sieve for this mix.

**Mixture control tolerance shall be 2.0% for this sieve for 9.5 mm SMA mixes placed at spread rates greater than 135 lb/yd2. For 9.5 mm SMA mixes placed at spread rates of 135 lb/yd2 or less, 100 % passing is required on this sieve.

Note 1: Range for % AC is Original Optimum AC (OOAC) at 35 gyrations (Gyratory compactor) or 50 blows (Marshall compactor) prior to Corrected Optimum AC (COAC) calculation detailed in GDT 123 (Appendix A)

Note 2: Quality Acceptance Test Results for AC content that deviate > ± 0.3% from the approved Job Mix Formula (JMF) consistently over three lots may subject the mix to a revised AC content on project JMF at the discretion of the Office of Materials and Research based on statiscal trend.

1. Ensure SMA mixtures are compacted at 35 gyrations with the Superpave Gyratory compactor or 50 blows with the Marshall compactor.

2 Ensure SMA mixtures contain mineral filler and fiber stabilizing additives and meet the following requirements:

a. Asphalt cement grade PG-76-22 (specified in Section 820) is required in all SMA mixtures.
b. Aggregates for SMA meet the requirements of Subsection 802.2.02.A.3.
c. Use the approved mineral filler specified in the mix design and meeting the requirements of Section 883

Approved sources of mineral filler are listed in QPL 81.

Use the approved Fiber Stabilizing Additive of the type (cellulose or mineral) specified in the mix design and meeting the requirements of Section 819. Approved sources of Fiber Stabilizing Additive are listed in QPL 77. The dosage rate will be as specified in the mix design and sufficient to prevent drain-down exceeding the above tolerance.

B. Fabrication

See Section 400.

828.2.03 Superpave Asphalt Concrete Mixtures

A. Requirements for Superpave Mixtures (except Parking Lot Mixtures)
Produce the mixture according to an approved mix design and Job Mix Formula. Ensure Superpave Asphalt Concrete mixtures meet the following mixture control tolerances and mix design limits:

1. Gradation limits for Superpave mixtures are as follows:

Sieve Size	Mixture Control Tolerance	Design Gradation Limits, Percent Passing				
		9.5 mm Superpave	9.5 mm Superpave	12.5 mm Superpave	19 mm Superpave	25 mm Superpave
1 1/2 in (37.5 mm) Sieve						100*
1- in (25.0 mm)	±8.0			100*	100*	90-100
3/4 in (19.0 mm) sieve	±8.0**	100*	100*	98-100****	90-100	55-89**
1/2 in (12.5 mm) sieve	±6.0***	98-100****	98-100****	90-100	60-89***	50-70
3/8 in (9.5 mm) sieve	±5.6	90-100	90-100	70-89	55-75	
No. 4 (4.75 mm) sieve	±5.6	65-85	55-75			
No. 8 (2.36 mm) sieve	±4.6	48-55	42-47	38-46	32-36	30-36
No. 200 (75 µm) sieve	±2.0	5.0-7.0	5.0-7.0	4.5-7.0	4.0-6.0	3.5-6.0
Range for % AC (Note 3)	±0.4 (Note 2)	5.50-7.25	5.25-7.00	5.00-6.25	4.25-5.50	4.00-5.25

* Mixture control tolerance is not applicable to this sieve for this mix.
** Mixture control tolerance shall be 10.0% for this sieve for 25 mm Superpave.
***Mixture control tolerance shall be 8.0% for this sieve for 19 mm Superpave.
****Mixture control tolerance shall be 2.0% for this sieve for 12.5 mm and 9.5 mm mixes.

Note 1: Use PG 76-22 in 12.5 mm Superpave, excluding shoulder construction, on all projects with ADT greater than 25,000 as detailed in the Contract Pay Item.

Note 2: Quality Acceptance Test Results for AC content that deviating > ± 0.3 % from the approved Job Mix Formula (JMF) consistently over three Lots may subject the mix to a revised AC content on the project JMF at the discretion of the Office of Materials and Research based on statistical trend.

Note 3: Range for % AC is Original Optimum AC (OOAC) at 65 gyrations prior to the Corrected Optimum AC (COAC) calculation detailed in SOP 2 (Appendix D).

2. Volumetric limits are as follows:

Design Parameter	Mix Type	Limits
% of Max. Specific Gravity (Gmm) at design gyrations, (Ndes)	All	96%
% Gmm at the initial number of tyrations, Ni	All	91.5% maximum
% voids filled with asphalt (VFA) at Ndes	9.5 mm Type I	Min. 72; Max. 80
	9.5 mm Type II and 12.5 mm	Min. 72; Max. 76
	19 mm	Min. 71; Max. 76
	25 mm	Min. 69; Max 76
Fines to effective asphalt binder ration (F/Pbe)	9.5 mm Type I	0.6 to 1.4
	All other types	0.8 to 1.6
Minimum Film Thickness (microns)*	All	>7.00
Minimum % Voids in Mineral Aggregate (VMA) Note: VMA shall be calculated using the effective specific gravity of the aggregate (Gse). See SOP-2SP.	25 mm	13.0
	19 mm	14.0
	12.5 mm	15.0
	9.5 Type I	16.0

*Superpave Mixtures approved prior to January 31, 2012, may be adjusted to meet Minimum Film Thickness requirement by mixture adjustments made by the State Bituminous Construction Engineer.

B. Requirements for Superpave Parking Lot Mixes (NOT FOR STANDARD HIGHWAY/STREET PAVING)

1. Surface Layers for parking facilities:

Sieve Size	Mixture Control Tolerance	Design Gradation Limits, Percent Passing		
		4.75 mm Mix	9.5 mm Superpave Type I	9.5 mm Superpave Type II
1-in (25.0 mm) sieve	±8.0			
3/4 in (19.0 mm) sieve	±8.0		100*	100*
1/2 in (12.5 mm) sieve	±6.0	100*	98-100****	98-100****
3/8 in (9.5 mm) sieve	±5.6	90-100	90-100	90-100
No. 4 (4.75 mm) sieve	±5.6	75-95	65-85	55-75
No. 8 (2.36 mm) sieve	±4.6	60-65	48-55	42-47
No. 50 (300 µm) sieve	±3.8	20-50		
No. 200 (75 µm) sieve	±2.0	4-12	5.0-7.0	5.0-7.0
Range for Total AC	0.4	6.00-7.50	5.50-7.25	5.25-7.0

* Mixture control tolerance is not applicable to this sieve for this mix.

****Mixture control tolerance shall be 2.0% for this sieve for 12.5 mm and 9.5 mm mixes.

2. Subsurface Layers for parking facilities:

Sieve Size	Mixture Control Tolerance	Design Gradtion Limits, Percent Passing		
		12.5 mm Superpave	19 mm Superpave	25 mm Superpave
				100*
1-in (25.0 mm) sieve	±8.0	100*	100*	90-100
3/4in (19.0 mm) sieve	±8.0**	98-100****	90-100	55-89**
1/2 in (12.5 mm) sieve	±6.0***	90-100	60-89***	50-70
3/8 in (9.5 mm) sieve	±5.6	70-89	55-75	
No. 8 (2.36 mm) sieve	±4.6	38-46	32-36	30-36
No. 200 (75 µm) sieve	±2.0	4.5-7.0	4.0-6.0	3.5-6.0
Range for Total AC	±0.4	5.00-6.25	4.25-5.50	4.00-5.25

*Mixture control tolerance is not applicable to this sieve for this mix.
**Mixture control tolerance shall be ±10.0% for this sieve for 25 mm Superpave mixes.
***Mixture control tolerance shall be ±8.0% for this sieve for 19 mm Superpave mixes.
****Mixture control tolerance shall be ±2.0% for this sieve for 12.5 mm and 9.5 mm Superpave mixes.

3. Volumetric limits for parking facilities are as follows:

Design Parameter	Mix Type	Limits
% of Max. Specific Gravity (Gmm) at design gyrations, Ndes)	All	96%
% Gmm at the intial number of gyrations, Ni	All	91.5% maximum
% voids filled with aphalt (VFA) at Ndes	9.5 mm Type I	Min. 72; Max. 80
	9.5 Type II and 12.5 mm	Min. 72; Max 78
	19 and 25 mm	Min. 71; Max 76
Fines to effective asphalt binder ration (F/Pbe)	9.5 mm Type I	0.6 to 1.4
	All other types	0.8 to 1.6
Minimum Film Thickness (microns)*	4.75 mm	>6.00
	All other types	>7.00
Minimum % Voids in Mineral Aggregate (VMA)	25 mm	13.0
	19 mm	14.0
Note: VMA shall be calculated using the effective specific gravity of	12.5 mm	15.0
the aggregate (Gse). See SOP-2	9.5 mm Type I, II	16.0

*Mixtures approved prior January 31, 2012, may be adjusted to meet Minimum Film Thickness requirement by mixture adjustments made by the State Bituminous Construction Engineer.

C. Fabrication
See Section 400.

828.2.04 Fine-Graded Mixtures

A. Requirements
Produce the mixture according to an approved mix design and Job Mix Formula. Ensure fine-graded mixtures meet the following mixture control tolerances and design limits:

ASPHALTIC CONCRETE - 4.75 mm Mix		
Sieve Size	**Mixture Control Tolerance**	**Design Gradation Limits, % passing**
1/2 in (12.5 mm sieve*)	±0.0	100*
3/8 in (9.5 mm) sieve	±5.6	90-100
No. 4 (4.75 mm) sieve	±5.7	75-95
No. 8 (2.36 mm) sieve	±4.6	60-65
No. 50 (300 µm) sieve	±3.8	20-50
No. 200 (75 µm) sieve	±2.0	4-12
Range for % AC	±0.4	6.00-7.50
Design optimum air voids (%)		4.0-7.0
% Aggregate voids filled with AC		60-80
Minimum Film Thickness (microns)**		> 6.00

* Mixture control tolerance is not applicable to this sieve for this mix.
** 4.75 mm Mixtures approved prior January 31, 2012, may be adjusted to meet Minimum Film Thickness requirement by mixture adjustments made by the State Bituminous Construction Engineer.

B. Fabrication
See Section 400.

C. Acceptance
See Subsection 106.3 and Section 400. Ensure individual test results meet the Mixture Control Tolerances listed in Subsections 828.2, 828.2.01, 828.2.02, 828.2.03, 828.2.04, whichever applies.

D. Materials Warranty
See General Provisions 101 through 150.

Section 830—Portland Cement

830.1 General Description
This section includes the requirements for Portland cement, including Portland blast-furnace slag cement and Portland-Pozzolan cement.

830.1.01 Related References

A. Standard Specifications
Section 831–Admixtures

B. Referenced Documents

AASHTO M 85
AASHTO M 240
QPL 3

830.2 Materials

830.2.01 Portland Cement

A. Requirements

Use only Portland cements that are listed in QPL 3.

1. Type
Use Portland cement that meets the requirements in AASHTO M 85. Portland cement types include:

Use	High Early Strength Concrete	Ramainign Portland Cement Concrete
*Portland cement	Types I or II	Types I or II

*Portland cement – a hydraulic cement produced by pulverizing clinker consisting essentially of hydraulic crystalline calcium silicates, and usually containing one or more of the following: water, calcium sulfate, up to 5% limestone, and processing additions.

2. Ensure that the Portland cement concrete meets the low alkali and the false set requirements of AASHTO M 85.

3. Do not use cement that is damaged, partially set, lumpy, or caked.

4. Mixing and Storing

Do not mix or store different brands or types of cement in the same bin. Do not mix or store the same brand of cement from different mills in the same bin.

B. Fabrication
General Provisions 101 through 150.

C. Acceptance

See the requirements in AASHTO M 85.

D. Materials Warranty
General Provisions 101 through 150.

830.2.02 Portland Blast-Furnace Slag Cement

A. Requirements

Use Portland blast-furnace slag cement in cement stabilization that meets the requirements of AASHTO M 240, Type IS.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

See requirements of AASHTO M 240, Type IS.

D. Materials Warranty

General Provisions 101 through 150.

830.2.03 Portland-Pozzolan Cement

A. Requirements

Use Portland-Pozzolan cement that meets the requirements of AASHTO M 240, Type IP, with the following modifications:

1. Limit the fly ash content to a maximum of 25 percent by weight.

2. Limit the Pozzolan to fly ash that meets the requirements of Subsection 831.2.03.

3. If grinding fly ash with Portland cement clinker to produce Portland-Pozzolan cement, do the following:

    a. Exclude the fineness and the loss-on-ignition requirements of Subsection 831.2.03.

    b. Ensure that the final blend of Portland-Pozzolan cement meets AASHTO M 240, Type IP requirements.

4. Wherever the Standard Specifications allow or specify Portland cement that meets the requirements of Subsection 830.2.01, you may substitute Portland-Pozzolan cement that meets the requirements of this Subsection.

5. If the substitute cement results in a higher cement factor than required for Type I cement, the cost of the additional cement will be borne by the Contractor.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

See the requirements of AASHTO M 240, Type IP.

D. Materials Warranty

General Provisions 101 through 150.

Section 831—Admixtures

831.1 General Description

This section includes the requirements for the following Portland cement concrete and bituminous concrete admixtures:

- Air-entraining admixtures
- Chemical admixtures
- Fly ash, raw or calcined natural pozzolan, slag, and microsilica
- Heat-stable, anti-stripping additive
- Silicone fluid

831.1.01 Related References

A. Standard Specifications

Section 500—Concrete Structures
Section 828—Hot Mix Asphaltic Concrete Mixtures
Section 830—Portland Cement

B. Referenced Documents

AASHTO M 154
AASHTO M 194
AASHTO M 295
AASHTO M 302
AASHTO M 307

Federal Specification VV-D-1078B

GDT 56
GDT 66
QPL 13
QPL 14
QPL 26
QPL 30
QPL 40

831.2 Materials

Use only admixtures that are listed on the specific Georgia Department of Transportation Qualified Products List (QPL). For a list of Heat Stable Anti-Stripping Additives sources, see QPL 26.

831.2.01 Air-Entraining Admixtures

A. Requirements

1. Use air-entraining admixtures listed in QPL 13.

2. Use air-entraining admixture materials meeting AASHTO M 154, Performance and Uniformity requirements.

3. Test compression and flexure strengths at 7 and 28 days.

4. Use air-entraining admixtures evaluated by the National Transportation Product Evaluation Program (NTPEP) test facility or other approved test facility.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

See requirements of AASHTO M 154.

D. Material Warranty

General Provisions 101 through 150.

831.2.02 Chemical Admixtures for Concrete

A. Requirements

1. Use chemical admixtures listed in QPL 14.

2. Use chemical admixture materials meeting AASHTO M 194 Physical requirements and Uniformity and Equivalence requirements for Types A, B, C, D, E, F, or G, unless otherwise specified.

    a. Waive the length change requirements.
    b. Ensure that the admixtures contain no more than 0.8 percent chloride, calculated as calcium chloride.
    c. Ensure that the air content does not exceed 4 percent when prepared in a standard batch without an added air–entraining agent.

3. Use chemical admixtures evaluated by the National Transportation Product Evaluation Program (NTPEP) test facility or other approved test facility.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance
See the requirements of AASHTO M 194 for chemical admixtures.

D. Material Warranty
General Provisions 101 through 150.

831.2.03 Fly Ash, Raw or Calcined Natural Pozzolan, Slag, and Microsilica

A. Requirements
1. Fly Ash
   Fly ash is finely divided residue from the combustion of ground or powdered coal that is transported from the boiler by flue gases.
   Use fly ash that meets the requirements of AASHTO M 295, Class F or C and that are listed in QPL 30.

2. Raw or Calcined Natural Pozzolan
   This is a siliceous or siliceous and aluminous material.
   Use Pozzolan that meets the requirements of AASHTO M 295, Class N and that are listed in QPL 30.

3. Granulated Iron Blast-Furnace Slag
   This is a glassy granular material formed when molten blast-furnace slag is rapidly chilled and then finely ground.
   Use slag that meets the requirements of AASHTO M 302, Grade 100 or 120 and that are listed in QPL 30.

4. Microsilica (Silica Fume)
   This is an amorphous material with high silica content and purity, made as a by-product of high purity quartz that is reduced with other ingredients in an electric-arc furnace.
   Use microsilica that meets the requirements of AASHTO M 307.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

The Engineer will select the laboratory tests for acceptance and project control.

D. Material Warranty

General Provisions 101 through 150.

831.2.04 Heat-Stable Anti-Stripping Additive

A. Requirements
1. Use heat-stable, anti-stripping additives listed in QPL 26.

2. Submit samples of the proposed heat-stable, anti-stripping additive, asphalt cement, and aggregates to the laboratory for approval before use.

3. Ensure that materials meet the requirements of Section 828 for retained coating and tensile strength ratio when tested with GDT 56 and GDT 66, respectively.

4. Do not use an additive that contains harmful ingredients or adversely alters the specified characteristics of the bituminous material when added in the recommended proportions.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

Test as follows:

Test	Method
Retained coating	GDT 56
Tensile strenght ratio	GDT 66

D. Material Warranty

General Provisions 101 through 150.

831.2.05 Silicone Fluid

A. Requirements

Use silicone fluid that meets Federal Specification VV-D-1078B, Viscosity Grade 1,000. For a list of sources, see QPL 40.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

See Federal Specification VV-D-1078B.

D. Material Warranty

General Provisions 101 through 150.

Section 832—Curing Agents

832.1 General Description

This section includes the requirements for the following curing agents:

- Burlap or cotton fabric
- Sheet materials
- Membrane curing compound

832.1.01 Related References

A. Standard Specifications

General Provisions 101 through 150.

B. Referenced Documents

AASHTO M 148
AASHTO M 171
QPL 16

832.2 Materials

832.2.01 Burlap or Cotton Fabric

A. Requirements

1. Use burlap or cotton fabric meeting these requirements:

- Burlap that is 10 to 18 oz./yd² (340 to 610 g/m²) or two layers of 6 or 7 oz/yd² (200 or 235 g/m²)
- Cotton fabric that is white, loosely woven, and not less than 7 oz/yd² (235 g/m²)
- Strips of burlap or cotton fabric that are between 3 and 6 ft (0.9 and 1.8 m) wide and 3 ft (1 m) longer than the width of the slab to be covered.

2. Use burlap and cotton fabrics that do not contain starch or other material that could stain the concrete. If the fabric is new, soak and dry it before use.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

General Provisions 101 through 150.

D. Materials Warranty

General Provisions 101 through 150.

832.2.02 Sheet Materials

A. Requirements

1. Use sheet material for curing concrete that meets AASHTO M 171 requirements.

2. Use waterproof paper that is white.

3. Use polyethylene film that is white opaque.

4. For curing bridge decks, use sheet material that is either a white burlap polyethylene sheet or a white co-polymer material coated over a layer of absorbent, non-woven, synthetic fabric.

Use sheet material that meets Specification reflection and moisture retention requirements.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

See the requirements under AASHTO M 171.

D. Materials Warranty

General Provisions 101 through 150.

832.2.03 Membrane Curing Compound

A. Requirements

1. Use membrane curing compounds listed in QPL 16

2. Use liquid membrane-forming compounds meeting AASHTO M 148 requirements.

3. Use membrane curing compounds evaluated by the National Transportation Product Evaluation Program (NTPEP) test facility or other approved test facility.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

See the requirements under AASHTO M 148.

D. Materials Warranty

General Provisions 101 through 150.

Section 833—Joint Fillers and Sealers

833.1 General Description

This section includes the requirements for joint fillers and sealers, as follows:

Joint Sealers	Joint Fillers
Hot-poured	• Preformed
• Preformed elastic	• Preformed foam
• Silicone sealant and bond breaker	• Water -blown urethane
For bridge decks:	• Elastomeric polmer type joint compound
• Neoprene	
• Ethylene propylene diene monomer	
For inductive tops:	
• Polyurethane sealant	

833.1.01 Related References

A. Standard Specifications

Section 106–Control of Materials

Section 461–Sealing Roadway and Bridge Joints and Cracks

B. Referenced Documents

AASHTO		ASTM		
M 153	C 679	D 471	D 822	D 1622
M 213	C 793	D 573	D 1056	D 1623
M 220	C 1016	D 746	D 1171	D 1752
T 42	D 412	D 792	D 1149	D 2240

GDT 15
GDT 47
GDT 62
GDT 70
GDT 106
QPL 20
QPL 66
QPL 75

833.2 Materials

833.2.01 Preformed Joint Filler

A. Requirements

General Provisions 101 through 150.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

Use preformed joint filler that meets either AASHTO M 153 or AASHTO M 213 requirements. For a list of sources, see QPL 20.

Ensure that cellulose fiber types meet the requirements of AASHTO M 213 (except for the asphalt content) and contain minimums of 0.2 percent zinc borate as a preservative and 1.5 percent waterproofing wax.

D. Materials Warranty

General Provisions 101 through 150.

833.2.02 Hot-Poured Joint Sealers

A. Requirements

1. Type
   Use a hot-poured joint sealer that is a mixture of materials compatible with asphalt, with or without rubber. The sealer shall have the following characteristics:

   - Forms a resilient and adhesive compound
   - Effectively seals joints and cracks in pavements against moisture during repeated cycles of expansion and Contraction
   - Does not flow from the joint and cannot be picked up by vehicle tires at an ambient temperature of 125 °F (50 °C)

2. Compound Characteristics
   Use a compound that has a uniform pouring consistency capable of completely filling joints without forming large air holes or discontinuities.

   a. Do not pour if the compound temperature is above 450 °F (230 °C).

   b. Follow the pouring temperature and safe heating temperature set by the compound manufacturer for each lot or batch.

   c. Be sure the temperatures are shown on the label. The safe heating temperature is defined as the highest temperature to which the sealing compound can be heated and still meet all the requirements.

3. Physical Characteristics

Use a hot-poured joint sealer that has the following properties:

Property	Required Measurement
Penetration	Less than 0.35 in (9 mm)
Flow	Less than 0.12 in (3 mm)
Resilience	Minimum recovery of 60%
Bond to concrete 0 °F, ± 2 °F (-18 °C, ± 1 °C)	The compound does not separate or have gaps within or between the compound and the blocks.
Compatibility (with asphaltic concrete)	Adhesion does not fail. Oily exudeate does not form at the interface between the sealing compound and the asphaltic concrete. The sealant does not soften or have deleterious effects on the asphaltic concrete.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

The Department will test as follows:

Test	Method
Hot-poured joint sealers	GDT 62

D. Materials Warranty

General Provisions 101 through 150.

833.2.03 Elastomeric Polymer Type Joint Compound

A. Requirements

1. Type
Furnish elastomeric polymer-type joint sealing compound in two components—a base compound and a curing agent.

a. Base compound: A gasoline-resistant elastometric polymer modified with plasticizers, activators, and inert fillers.

b. Curing agent: A blend of accelerators and extenders.

2. Compound Characteristics
Use a sealing compound that can be mixed to a homogenous consistency at the site and applied by an approved mechanical device or poured and troweled manually.

a. If a compound is to be machine-mixed and applied, it shall have a minimum work life of 5 minutes at 80 ºF, ± 5 ºF (27 ºC, ± 3 ºC).

b. If a compound is to be manually mixed and applied, it shall have a minimum work life of 30 minutes at 80 ºF, ± 5 ºF (27 ºC, ±3 ºC).

c. Use a mixture that completely fills the joints without forming air holes or discontinuities, when mixed according to the manufacturer’s instructions.

d. Use a compound that is self-leveling when placed in the joint, but that does not show appreciable flow or movement along a superelevated joint.

e. Use material that does not soften or show any apparent defect after being immersed in water for 7 days.

f. Use a material that forms a tack-free, rubber-like compound that seals pavement or bridge joints within 24 hours of application.

3. Physical Properties

Use material that has the following physical properties:

Property	Required Measurement
Cone penetration	Between 0.1 in (2.5 mm) and 0.39 in (10 mm)
Flow	No appreciable flow
Resilience (air- and oven-cured samples)	Minimum recovery of 75%
Bond	No cracks, separation, or other opening over 1/4 in. (6 mm) deep in the sealer or between the sealer and block
Solubility	Not to exceed 2 percent; no apparent defects that affect the material as a sealant

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

The Department will test as follows:

Test	Method
Elastomeric joint compound	GDT 15

D. Materials Warranty

General Provisions 101 through 150.

833.2.04 Preformed Elastic Joint Sealer

A. Requirements

This section also covers adhesives and lubricants for the sealers.

1. Type

Use a preformed elastic joint sealer that is a vulcanized elastomeric compound using polymerized chloroprene as the only basic elastomer. The joint sealers include both open and closed cell sealers.

2. Certification

a. Submit certified test results of each lot of the joint sealer materials furnished to each Project, either from your tests or from the manufacturer of the preformed joint sealer.
b. The Department will conduct the joint sealer recovery test on random samples from each shipment received or each manufacturer's lot.
c. Submit certified test results of each lot of the lubricant furnished to each Project, either from your tests or from the manufacturer of the joint sealer lubricant/adhesive or adhesive.

3. Preformed Open Cell Joint Sealer

a. Bridge and Roadway Seals: Use sealer that meets the following physical requirements:
b. Bridge Seals: Use a sealer that meets the following compression/deflection requirements:

Normal Size, in (mm)	Movement Capability*, in (mm)	Min. Force 4 lb. per linerar inch (18 N per 25 mm) @ Width, in (mm)	Min. Force --30 lb. linear inch (133 N per 25 mm) Max. Force --100 lb. per linear inche (445 N per 25 mm) @ Width in (mm)
2 (50)	13/16 (20)	1-7/8 (47)	1-1/16 (27)
2-1/2 (63)	1-1/8 (28)	2-3/8 (60)	1-1/4 (32)
3 (75)	1-3/8 (34)	2-7/8 (73)	1-1/2 (38)
3-1/2 (88)	1-5/8 (40)	3-3/8 (86)	1-3/8 (34)
4 (100)	1-3/4 (43)	3-7/8 (98)	2-1/8 (54)

*Movement capability is the movement allowed within the widths of the specified maximum and minimum forces. The design maximum and minimum joint width is based on these widths. The installation width depends on the temperature at the time of installation.

Physical Property	Requirement
Tensile strength	Min. 2,000 psi (14 Mpa)
Elongation at break	Min. 250%
Hardness, Type A durometer	55±5
Oven aging, 79 hours @ 212 °F (100 °C) Tensile strength, change Elongation, change Hardness, change	 Max. -30% Max. -40% +10 points
Oil swell, ASTM oil No 3: Volumen change, 79 hrs. @ 212 °F (100 °)	 Max. 80%
Ozone resistance, 20% strain: 300 ppm in air, 70 hrs @ 100°F (38 °C) (wipe with solvent to remove surface contaminates)	 No cracks
Joint sealer recovery under 50% deflection: Recovery after 70 hrs. @ 212 °F (100 °C) Recovery after 72 hours @ 14 °F (-10 °C) Recovery after 22 hrs. @ -20 °F (-29 °C)	 Min. 85% Min. 85%

c. Roadway Seals: Use a compression/deflection sealer that accommodates the movement specified on the Plans with a minimum force of 4 lbs. per linear inch (18 N per linear 25 mm), not exceeding 20 lbs. per linear inch (89 N per linear 25 mm), exerted on the joint faces.

4. Preformed Closed Cell Joint Sealer for Roadways

a. Use a pre-closed cell polychloroprene joint sealer that meets the following physical requirements:

Physical Property	Requirements
Dimensions	Meet Plan requirements for movement and depth
Surfaces	Smooth and clean
Compression/deflection	Allow movement specified on the Plans with a minmum force for 4 lbs. per linear inch (18N per linear 25 mm) exerted on the joint faces and mzximum deflection equal to 50% of the orginal width.
Joint sealer recovery under 50% deflection	85% recovery (compressed to half orginal thickness for 22 hours @ 158 °F (70 °C), then compression removed for 48 hours at room temperature)
Water absorption	Maximum 5% weight increase
Ozone resistance	No cracking after exposure of sample at 20% strain to 100 ppm ozone for 70 hours at 100 °F (38°C)

5. Joint Sealer Lubricants/Adhesives

a. Lubricant/Adhesive for Preformed Roadway Seals: Use a lubricant/adhesive with the joint sealer that is a one component polychloroprene compound, containing only soluble phenolic resins blended with antioxidants and acid acceptors in an aromatic, hydrocarbon solvent mixture.

The lubricant shall have the following physical properties:

Physical Property	Requirement
Average net weight per gallon (liter)	Min. 7.84 lbs (940 grams)
Solid content	22-26% by weight
Film strenght Tensile strenght Elongation before breaking	 Min. 2,300 psi (16 Mpa) Min. 750%

b. Adhesive for Preformed Bridge or Roadway Seals: Use an adhesive that is a one-part moisture curing polyurethane and hydrocarbon solvent mixture with the following physical properties:

Pyhsical Property	Requirement
Average net weight per gallon (liter)	Min. 8 lbs (960 grams)
Solids content	Min. 72% by weight
Film strength (ASTM D 412)	Min. 1,200 psi (8 Mpa)
Elongation before beraking	Min. 350%
Viscosity	Perform suitably with the installation equipment Remain fluid from 5 to 120 ºF (-15 to 49 ºC)

6. Product Delivery

Deliver each lot of the lubricant/adhesive in containers plainly marked with the manufacturer's name or trademark, lot number, and date of manufacture.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

Test as follows:

1. Preformed Open Cell Joint Sealer

Test	Method
Tensile strength and elongation	ASTM D 412
Hardness	ASTM D 2240
Oven-aging	ASTM D 573
Oil swell	ASTM D 471
Ozone Resistance	ASTM D 1149
Joint sealer recovery	GDT 47
Compression/Deflection	GDT 70

2. Preformed Closed Cell Joint Seals for Roadway

Test	Method
Compression/Deflection	GDT 70
Joint sealer recovery (Run the hot recovery at 158 ºF (70 ºC) instead of 212 ºF (100 ºC). Allow seals to recover for 48 hours at room temperature before measuring.)	GDT 47
Water Absorption	ASTM D 1056
Ozone Resistance	ASTM D 471

3. Joint Sealer Lubricants/Adhesives

Test	Method
Film Strength	ASTM D 412

D. Materials Warranty

For joint sealer lubricants/adhesives:

1. Store the lubricant/adhesive at 50 º to 80 ºF (10 º to 27 ºC).

2. Retest any lubricant/adhesive not used within 270 days of its manufacture.

833.2.05 Water-Blown Urethane Joint Filler

A. Requirements

1. Type
Furnish water-blown urethane joint filler in two components.

a. Mix according to the manufacturer's recommendations and use in pressure relief joints and regular expansion joints.

b. Mix the material at the site and foam it in the joint. Use closed-cell material.

2. Physical Requirements

a. Use the material that meets the following requirements after mixing:

Times at 80 ºF, ± 5 ºF (27 ºC, ± 3 ºC)	Minmum	Maximum
Cream time (interval after mixing the two components and before the material begins to expand)	1 minute	5 minutes
Expansion time (interval between when the material starts and stops expanding).		10 minutes
Tack free time (Determine whether the material is tack free by touching lightly. Begin the time requirement for tack free time when the expansion time ends.)		10 minutes

b. Use material that meets the following requirements after curing:

Physical Property	Requirement
Weight per cubic foot (meter)	4lbs, ± 0.4 lbs (64 kg, ± 6 kg)
Compression to 50% thickness	40 to 130 psi (275 to 895 kPa)
Recovery (compressed to 50% thickness, released, then tested 10 minutes later)	Min. 65%
Extrusion when compressed 50%	Max. O.125 in (3mm)
Moisture absorption	Max. 0.10 lb/ft.² (490 g/m²) of exposed area

B. Fabrication

General Provisions 101 through 150.

C. Acceptance
Test as follows:

Test	Method
Weight per curbic foot (meter)	AASHTO T 42 [omit drying at 220 ºF (104 ºC)]
Compression to 50% thickness	AASHTO T 42
Recovery after compression	AASHTO M 213
Extrusion	AASHTO T 42
Moisture absorption	AASHTO T 42 (calculate absorption based on exposed area)

D. Materials Warranty

General Provisions 101 through 150.

833.2.06 Silicone Sealants and Bond Breakers

Prepare and install silicone and bond breakers according to Section 461.

A. Requirements
1. Silicone

Furnish silicone sealant in a one-part or two part silicone formulation. Use sealant that is compatible with the surface to which it is applied. Do not use acid-cure sealants on Portland cement concrete.

a. Use silicone that meets the physical requirements in Table 1. For a list of silicone joint sealant sources, please see QPL 66. Identify silicones as the following types:

1) Type A—A one part, low modulus, non-sag silicone. Used to seal horizontal and vertical joints in Portland cement concrete pavements and bridges. Tooling is required.

2) Type B—A one part, very low modulus, self-leveling silicone. Used to seal horizontal joints in Portland cement concrete pavements and bridges. Tooling is not normally required.

3) Type C—A one part, ultra-low modulus, self-leveling silicone. Used to seal horizontal joints in Portland cement concrete pavements and bridges and joints between Portland cement concrete pavement and asphaltic concrete shoulders. Tooling is not normally required.

4) Type D—A two part, ultra-low modulus, self-leveling, rapid cure silicone. Used to seal horizontal joints in Portland cement concrete pavements and bridges and joints between Portland cement concrete pavement and asphaltic concrete shoulders. Tooling is not required.

b. Use silicone sealant evaluated by the National Transportation Product Evaluation Program (NTPEP).

c. Use sealant that is compatible with the surface to which it is applied. Do not use acid-cure sealants on Portland cement concrete.

d. Use silicone that meets the following physical requirements:

Table 1—Physical Requirements for Silicone Sealants

Type Silicone	A	B	C	D
Tensile Stress at 150% Strain, Max. psi (kPa) (Note 1)	45 (310)	40 (275)	15 (105)	25 (175)
Durometer Hardness, Shore [0 ºF and 77 ºF 3 ºF (-18 ºC and 25 ºC 2 ºC)] (Note 1)				
Bond to Concrete Mortar, Min. psi (kPaP) (Note 1) (Note 3)				
Tack Free Time (Skin-over) (Max. Minutes) (Note 2)				
Extrusion Rate (Min. Grams/Minute) (Note 4)				
Non-volatile (Min. %)				
Specific Gravity				
Shelf Life (from date of shipment)				
Movement Capability & Adhesion (Note 1)				
Ozone and U.V. Resistance (Note 1)				
Note 1: The cure time for these sepcimens shalll be 21 days for Type A and 28 days for Type B, C, and D. Specimens shall be cured at 77 ºF ± 3 ºF (25 ºC ± 2 ºC) and 50±5% relative humidity.				
Note 2: At conditions of 77 ºF ± 3 ºF (25 ºC ± 2 ºC) and 50±5%				
Note 3: Type C and D silicone shall also meet its bond strength requirement to asphalt concrete.				

2. Bond Breakers

Bond breakers shall be chemically inert and resistant to oils, gasoline, solvents, and primer, if one is required.

Install silicone sealants over a bond breaker to prevent the sealant from bonding to the bottom of the joint.

a. Use bond breakers that are chemically inert and resistant to oils, gasoline, solvents, and primer, if one is required.

b. Do not use bond breaker that will stain or adhere to the sealant.

c. Use either a backer rod or tape bond breaker.

1) Backer Rods

Type L	Closed-cell, expanded polyethylene foam
Type M	Closed-cell, polyolefin foam with a closed-cell skin over an open-cell core

- Use backer rods that meet the following physical requirements:

Physical Property	Requirement
Density	2 lb/ft³ (30 kg/m³) min.
Tensile strength	25 psi (170 kPa) min.
Water absorption	0.02 g/cm³ max.

2) Bond Breaking Tapes

- Type N bond breaking tapes are made from extruded polyethylene with a pressure-sensitive adhesive on one side.
- Bond breaking tapes may be used with all four types of silicone, but is suitable for bridge joints only.
- Bond breaking tapes shall have a minimum thickness of .005 in (0.13 mm.).

3. Joint Sealant Certification

Submit, at no cost to the Department, a minimum of 30 gal (100 L) of material and certified test results on each lot of joint sealant furnished to a Project.

Concrete Mortar and Shore Durometer Hardness at 0 ºF (-18 ºC).

B. Fabrication
Prepare and install silicone and bond breakers according to Section 461,.

C. Acceptance

1. Silicone
Test the silicone as follows:

Test	Method
Tensile stress	ASTM D 412 (die C)
Durometer hardness	ASTM D 2240
Bond to concrete mortar	GDT 106
Tack free time (skin-over)	GDT 106*
Extrusion rate	GDT 106
Non-volatile	GDT 106
Specific gravity	ASTM D 792 (Method A)
Movement capability and adhesion	GDT 106
Ozone and UV resistance	ASTM C 793
*in cases of dispute, use ASTM C 679 as a referee test	

2. Bond Breakers
Test the bond breaker backer rods as follows:

Test	Method
Density	ASTM D 1622
Tensile strength	ASTM D 1623
Water absorption	ATMS C 1016

3. Department Responsibility
The Department will:

a. Evaluate the sealant in the field before accepting any silicone sealants that meet the requirements of this Specification.

b. Install the material submitted by the Contractor in roadway and/or bridge joints. The material shall be in place for two winters without failure before being accepted.

c. Reject any sealant or bond breaker that is evaluated and approved, yet fails in actual use.

D. Materials Warranty

General Provisions 101 through 150.

833.2.07 Neoprene for Bridge Deck Joint Seals

A. Requirements

1. Type
Use a neoprene material for bridge deck joint seals that is a vulcanized elastomeric compound with polymerized chloroprene as the only basic elastomer.

a. Ensure the neoprene meets the physical requirements in Table 2.

Table 2—Physical Requirements for Neoprene

Test	Requirements	Test Method
Tensile strength Before aging After oven aging for 70 hrs. @ 212 ºF (100 ºC) ASTM D 573	1500 psi (10 MPa) min. 30% max. loss	ASTM D 412 ASTM D 573
Elongation at breaks Before aging After oven aging for 70 hrs. @ 212 ºF (100 ºC)	250% min. 40% max.	ASTM D 412 ASTM D 573
Hardness Type A Durometer Before aging After oven aging for	63 ± 10 0 to +15 points change 0 to +15 points change	ASTM D 2240 ASTM D 2240 ASTM D 2240
Ozone Resistance: After 70 hrs. @ 104 ºF (40 ºC), under 20% strain in 300 ppm in air (Wipe specimens with toluene before test to remove surface contaminants)	No cracks	ASTM D 1149
Weight change in oil After 22 hrs. in oil No. 2 (ASTM D 471)	45% max.	AASHTO M 220

2. Certification
Submit certified test results on the joint seal system according to Subsection 106.05, “Materials Certification.”

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

Test according to the methods indicated in Table 2.

D. Materials Warranty

General Provisions 101 through 150.

833.2.08 Ethylene Propylene Diene Monomer for Bridge Deck Joint Seals

A. Submittals
1. Type

Use an ethylene propylene diene monomer (EPDM) material for bridge deck joint seals that is 100 percent EPDM compound.

Ensure the compound shall meet the following physical requirements:

Physical Property	Requirement
Hardness, Type A Durometer	80 ± 5
Tensile strength	Min. 2,000 psi (14 MPa)
Elongation at break	Min. 200%
Low temperature	Not brittle at –67 ºF (-55 ºC)
Weather resistance	No cracks
Ozone resistance (70 hours, 100 ºF (38 ºC), under 20% strain, 100 ppm in air)	No cracks

2. Certification
Submit certified test results of the joint seal system according to Subsection 106.05, “Materials Certification.”

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

Test the EPDM as follows:

Hardness, Type A Durometer	ASTM D 2240
Tensile strength	ASTM D 412
Elongation at break	ASTM D 412
Low temperature	ASTM D 746
Weather resistance	ASTM D 1171
Ozone resistance (70 hours, 100 ºF (38 ºC) under 20% strain, 100 ppm in air)	ASTM D 1149

D. Materials Warranty

General Provisions 101 through 150.

833.2.09 Polyurethane Sealant for Inductive Loops

A. Requirements

1. Type
Use polyurethane sealant that is a one component, moisture-curing, flexible sealant formulated to encapsulate inductive detector loop wires and leads embedded in asphaltic or Portland cement concrete. For a list of sources, see QPL 75.

2. Submit, at no cost to the Department, at least 12, 29 oz. (857 mL) cartridges of the material.

3. Physical Characteristics

- Use a sealant that will:
- Remain flexible to –20 ºF (-30 ºC) (necessary to protect the wire from the stress of pavement movement).
- Fully encapsulate the wire but resist flowing out on inclined or crowned roads.
- Be compatible with asphaltic concrete.
- Not soften the asphaltic concrete to a degree that would cause widening of the joint, when installed in a simulated joint in the laboratory.

4. Use a cured polyurethane sealant that meets the following physical requirements:

Physical Property	Requirement
Hardness, Type A Durometer	35-85
Tensile Strenght	Min. 150 psi (1035 kPa)
Elongation at break	Min. 200%
Flexibility 20 ºF (30 ºC)	No cracks
Weather Resistance	Slight chalking

5. Furnish certified test results of the loop sealant according to Subsection 106.05, “Materials Certification.”

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

1. Test the polyurethane sealant for inductive loops as follows:

Test	Method
Hardness, Type A Durometer	ASTM D 2240
Tensile strength	ASTM D 412 (die C pulled at 20 in (500 mm)/min)
Elongation at break	ASTM D 412 (die C pulled at 20 in (500 mm)/min)
Flexibility –20 ºF (-30 ºC)	25 mil (0.64 mm) free film bend (180°) over a 1/2 in (13 mm) mandrel
Weathering resistance	ASTM D 822; Weatherometer 350 hrs., cured 7 days, 77 ºF (25 ºC), 50%

2. Department Responsibility

The Department will:

a. Evaluate the polyurethane sealant for inductive loops in the field before approving it for use. The material also must meet the requirements of this Specification.

b. Install the material in asphaltic inductive loops. The material shall be in place for one winter without failure before being accepted.

c. Reject any sealant that is evaluated and approved, yet fails in actual use.

D. Materials Warranty

General Provisions 101 through 150.

833.2.10 Preformed Foam Joint Filler

A. Requirements

1. Type
Use a preformed foam joint filler consisting of polyethylene, polyurethane, neoprene, natural rubber, or isomeric polymer closed-cell foam and ultraviolet, stable resistant to oils, chemicals, ozone, and weathering. Ensure the joint filler conforms to the following physical requirements:

Cell Stucture (Conpression--Deflection to 50% of original thickness	Closed Cell 10 - 20 psi (70 -140 Kpa)
Recovery (After 50% compression of original thickness)	95% min.
Water Absorption	1% volume max.
Extrusion at 50% compression of original thickness	0.25 in (6mm) max.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

Test according to ASTM D 1752.

D. Materials Warranty

General Provisions 101 through 150.

Section 883—Mineral Filler

883.1 General Description

This section covers mineral filler used as an ingredient in bituminous paving mixtures. Use mineral filler listed in the approved Asphalt Mix Design and Job Mix Formula and in Qualified Products List (QPL) 81. Use an approved mineral filler that meets the requirements below and consist of finely divided rock dust, slag dust, hydrated lime, hydraulic cement, or fly ash. Other fine, inert, non-toxic materials produced as by-products of industrial processes and meeting the requirements below may be approved as mineral filler based on satisfactory performance in the asphalt mix design procedure. Ensure mineral filler is sufficiently dry, flows freely, and is free from lumps.

883.1.01 Related References

A. Standard Specifications

General Provisions 101 through 150.

B. Referenced Documents

QPL81
AASHTO R 28
AASHTO T 240
AASHTO T 313
AASHTO T 315
GDT-22
GDT 123

883.2 Materials

883.2.01 Mineral Filler

A. Requirements

Use mineral filler meeting the following gradation limits:

Sieve Size	Percent Passing
No. 30 (600 m)	100
No. 50 (300 m)	95-100

Ensure that the mineral filler is free from impurities.

Subject mineral filler for use in Stone Matrix Asphalt (SMA) to mortar property testing according to AASHTO T-240, AASHTO R-28, AASHTO T-313, and AASHTO T-315. Mineral filler may be rejected and removed from QPL-81 for unsatisfactory performance as an ingredient in an asphalt mixture, as determined in these procedures or in the SMA Mix design procedure, GDT-123.

Ensure the total fine mortar meets the following requirements:

Test	Specification
Unaged DSR, G*/sino(kPa)	5 minimum
RTFO Aged DSR, G*/sino(kPa)	11 minimum

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

Test gradation according to GDT-22.

D. Materials Warranty

General Provisions 101 through 150.

Section 884—Chlorides

884.1 General Description

This section includes the requirements for calcium chloride.

884.1.01 Related References

A. Standard Specifications

General Provisions 101 through 150.

B. Referenced Documents

AASHTO M 144

884.2 Materials

884.2.01 Calcium Chloride

A. Requirements

Use calcium chloride that meets the requirements of AASHTO M 144, Type I or Type II.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

General Provisions 101 through 150.

D. Materials Warranty

General Provisions 101 through 150.