

ROCKDALE COUNTY, GEORGIA

INVITATION TO BID #18-15

2018 LMIG RESURFACING

**3.75 Miles of FDR, Asphaltic Concrete Patching, Variable Depth Milling,
Open Graded Interlayer, Leveling & Resurfacing on Numerous Roads**

SPECIAL PROVISIONS

For

Rockdale County Department of Transportation (RDOT)

CONTRACT # C-2018 - _____

1. Modifications of Standard Specifications

Section 400—Hot Mix Asphaltic Concrete Construction

Delete Section 400 and substitute the following:

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 more than one lane is added, and if any of the lanes are longitudinally adjacent to the existing lane, the lanes 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 quarter of material sampled by the **Contractor**.

Quality assurance sample: Independent sample taken by the Department.

Referee sample: A sample of the material remaining after quartering which is used for evaluation if a comparison of **Contractor** and Departmental 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 209

AASHTO T 202

AASHTO T 49

Laboratory Standard Operating Procedure (SOP) 27, “Quality Assurance for Hot Mix Asphaltic Concrete Plants in Georgia”

Department of Transportation Standard Operating Procedure (SOP) 15

GDT 38

GDT 73
GDT 78
GDT 83
GDT 93
GDT 119
GDT 125
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

When the Department requests, furnish formal written invoices from a supplier for all materials used in production of HMA. 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 from a supplier who will provide copies of Bill of Lading upon 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

After the Contract has been awarded, 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 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 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 and Research for approval. The Quality Control Program will be included as part of the certification in the annual plant inspection report.

400.2 Materials

Ensure that materials comply with the specifications listed in Table 1.

Table 1—Materials Specifications

Material	Subsection
Asphalt Cement, Grade Specified	<u>820.2</u>
Coarse Aggregates for Asphaltic Concrete	<u>802.2.02</u>
Fine Aggregates for Asphaltic Concrete	<u>802.2.01</u>
Mineral Filler	<u>883.1</u>
Heat Stable Anti-Stripping Additive	<u>831.2.04</u>
Hydrated Lime	<u>882.2.03</u>

Silicone Fluid	<u>831.2.05</u>
Bituminous Tack Coat: PG 58-22, PG 64-22, PG 67-22	<u>820.2</u>
Hot Mix Asphaltic Concrete Mixtures	<u>828</u>

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 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 T 202 and 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 that 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 that 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 that produce mix for Department use are governed by Quality Assurance for Hot Mix 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 that 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 that the weight measuring devices that provide documentation comply with Subsection 109.01, "Measurement and Quantities."
- c. When not using platform scales, provide weight devices that record the mixture net weights delivered to the truck. A net weight system will include, but is not limited to:
 - Hopper or batcher-type weight systems that deliver 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 that 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 that control the mixing time automatically. Construct these devices so that 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 that 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 that surge and storage bins can retain a predetermined minimum level of mixture in the bin when the trucks are loaded.
- c. Ensure that surge and storage systems do not contribute to mix segregation, lumpiness, drain-down, or stiffness.

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. 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 that the aggregate is uniformly coated with hydrated lime aggregate before adding the bituminous material to the mixture. Add the hydrated lime so that it will not become entrained in the exhaust system of the drier or plant.
 - c. Control the feeder system with a proportioning device that meets 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.

6. 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 that 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.
- d. Have plants that use batch scales maintain ten 50 lb (25 kg) standard test weights at the plant site to check batching scale accuracy.

Ensure that plant scales that are used only to proportion mixture ingredients, not to determine pay quantities, are within two percent throughout the range.

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 that complies 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 that result in unbalanced screed widths or off-center 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 that 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. A non-contacting laser or sonar-type ski with at least four referencing mobile stations may be used with a reference at least 24 ft. (7.3 m) long. 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 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.
- f. 30 - 45 Degree Wedge. The **Contractor** shall equip their paver to ensure a 30 degree minimum up to a 45 degree maximum wedge along the outside edge of the roadway (measured from the horizontal plane) is in place after final compaction on the final surface course. Use an approved mechanical device that will:
 - Apply compactive effort to the asphalt mixture to eliminate objectionable voids as the mixture passes through the wedge device
 - Produce a wedge with a uniform texture, shape, and density while automatically adjusting to varying heights encountered along the roadway shoulder.

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 tuted 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

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 that require 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.
 - e. Prime or tack coat the area after it has been 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)	0.08 (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/yd ² (0.09 to 0.18 L/m ²).		

B. Place Patching and Leveling Course

1. When the existing surface is irregular, bring it 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 that meet the requirements of the job mix formulas defined in:
 - Subsection 400.3.05.A, "Observe Composition of Mixtures"
 - Section 828
4. If the leveling and patching mix type is undesignated, determine the mix type by the thickness or spread rate according to Table 3.

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/yd ² (45 kg/m ²)	4.75 mm Mix or 9.5 mm Superpave Type I
0.75 to 1.5 in (19 to 38 mm)	85 to 165 lbs/yd ² (45 to 90 kg/m ²)	9.5 mm Superpave Type II
1.5 to 2 in (38 to 50 mm)	165 to 220 lbs/yd ² (90 to 120 kg/m ²)	12.5 mm Superpave *
2 to 2.5 in (50 to 64 mm)	220 to 275 lbs/yd ² (120 to 150 kg/m ²)	19 mm Superpave *
Over 2.5 in (64 mm)	Over 275 lbs/yd ² (150 kg/m ²)	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.

Note: Variable depth milling will be done prior to deep patching in all cases where both items are required in the same section. Tack coat shall be used for all patching edges and milled surfaces (not on dirt if exposed in patch).

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.

Make the constituents proportional to produce mixtures that meet 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 that the field performance of the in-place mixtures meet the requirements of Subsection 828.2.B for Permeability, Moisture Susceptibility, Rutting, Susceptibility and Fatigue. The in-place mixtures will be subject to testing for compliance with requirements of Section 828.2.B under the following conditions:

- Deviates greater than 10 percent on gradation on the mixture control sieves from the approved job mix formula based on acceptance or assurance samples.
- Deviates greater than 0.7 percent in asphalt content from the job mix formula based on acceptance or assurance samples.
- The calculated mean pavement air voids result in an adjusted pay factor greater than 0.80 or any single sub-lot results in mean pavement air voids exceeding 10.5%.
- Mix produced using an unapproved mix design or job mix formula.

Remove and replace (at the **Contractor's** expense) any areas determined to not meet the requirements of Section 828.2.B.

If control test results show that 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 that 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 (± 10 °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 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 so that dry mixing is complete before the bituminous material is added.
- c. Continuous Plant Using Drier-Drum Mixer: Add hydrated lime so that the lime will not become entrained into the air stream of the drier and so that 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 it with the aggregates uniformly in the proportions specified.

2. Add Gilsonite Modifier

When required, add the Gilsonite modifier to the mixture at a rate such that 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.

3. 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. 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:

- 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 II	1 1/8 in.(28 mm)	1 1/2 in (38 mm)	4 in (100 mm)
9.5 mm Superpave Type I	7/8 in (22 mm)	1 1/4 in (32 mm)	4 in (100 mm)
4.75 mm Mix	3/4 in (19 mm)	1 1/8 in (28 mm)	2 in (50 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 (100 mm) thick for driveway and side road transition.			

- 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 that the outside edges of the pavement being laid are aligned and parallel to the roadway center line.
 7. For New Construction or Resurfacing Contracts that contain multiple lifts or courses, arrange the width of the individual lifts so that 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 that 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, streaking, pulling and tearing, or other 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 courses 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 °F (120 °C).

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.

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.

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

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 and Research
- 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 and Research 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 production days after being granted temporary certification. A trainee who does not become qualified within 30 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 and Research. 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 and Research 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 that all applicable sampling requirements and frequencies, test procedures, and Standard Operating Procedures are adhered to
 - Ensure that 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 is 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.

- (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
 - 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.)
- (g) 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
 - (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 already in storage that:
 - Deviates more than 10 percent in gradation from the job mix formula based on the acceptance sample
 - Deviates 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

<u>SIEVE SIZE</u>	<u>SURFACE</u>	<u>SUB-SURFACE</u>
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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%

(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) Quality Assurance Sampling and Testing

- (1) Randomly take a minimum of two quality assurance 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) that have 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 lot as 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 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. The **Contractor** QCT tests will not be included in the monthly plant rating.

B. Compaction

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.

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 \geq 500 tons of mix should be divided into 5 sub-lots of equal distance.
 - Lots $<$ 500 tons of mix should be comprised of a sub-lot or sub-lots consisting of up to 100 tons of 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/yd² (50 kg/m²) 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 \pm 4%
- No. 8 (2.36 mm) sieve \pm 2%
- No. 200 (75 μ m) sieve \pm 1%
- Asphalt Content \pm 0.2%
- All value changes must still be within specification limits

If the Office of Materials and Research 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.

If the Pavement Mean Air Voids within a Lot exceeds 7.8 (or 100% of the maximum target air voids, if established is not maintained); the Engineer may stop the paving operation until appropriate steps are taken by the Contractor to correct the deficiency. Upon approval of the Engineer, the paving operation may be restarted but will be limited to a 1000 ft. (300 m) test section to verify that the corrective action taken will result in a satisfactory density. Continued operation may not be permitted if the Pavement Mean Air Voids fail to meet the specified density requirements.

2. Obtain Uniform Compaction

For a lot to be accepted for compaction, 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.

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. Other 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 1 mile (1 km) long.

D. Reevaluation of Lots

Reevaluation of lots and acceptance will be based on Department evaluations. The Department will be reimbursed by the Contractor for all costs of these evaluations. Request for reevaluation shall be made within 5 working days of notification of the lot results.

E. Segregated Mixture

Prevent mixture placement that yields a segregated mat by following production, storage, loading, placing, and handling procedures. Also, make 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 that 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 suspects that it 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.

- a. 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
Asphaltic 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 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 that 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:

$$T1 = T \times \left\{ \frac{\% AC + \left(\frac{\% \text{ Aggregate} \times 2.75}{\text{combined bulk Specific Gravity}} \right) + \% Y}{100} \right\}$$

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 tack coat, bituminous material and hydrated lime (when required)
- Preparing surface to be patched
- Cutting/milling 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

Hot mix asphaltic concrete of the various types is 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 <u>type</u> Superpave, <u>group-blend</u> , Including polymer-modified bituminous materials and hydrated lime	Per ton (megagram)
Item No. 400	Asphaltic concrete <u>type</u> , Superpave, <u>group-blend</u> , including bituminous materials and hydrated lime	Per ton (megagram)
Item No. 400	Asphaltic concrete <u>type</u> Superpave, <u>group-blend</u> , Including bituminous materials, Gilsonite modifier, and hydrated lime	Per ton (megagram)

Item No. 400	_____ inches asphaltic concrete, <u>type</u> Superpave, <u>group-blend</u> including bituminous materials, Gilsonite modifier and hydrated lime	Per square yard (meter)
Item No. 400	Asphaltic concrete <u>type</u> Stone Matrix Asphalt, <u>group-blend</u> , including polymer-modified bituminous materials and hydrated lime	Per ton (megagram)
Item No. 400	Asphaltic concrete <u>type</u> OGFC, <u>group 2</u> only, including bituminous materials and hydrated lime	Per ton (megagram)
Item No. 400	Asphaltic concrete <u>type</u> OGFC, <u>group 2</u> only, including polymer-modified bituminous materials and hydrated lime	Per ton (megagram)
Item No. 400	Asphaltic concrete <u>type</u> Porous European Mix, <u>group 2</u> only, including polymer-modified bituminous materials and hydrated lime	Per ton (megagram)

400.5.01 Adjustments

A. Determine Lot Acceptance

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 Superpave	3/8 in., No. 8 (9.5 mm, 2.36 mm) sieves and asphalt cement
Asphaltic concrete 12.5 mm Superpave	3/8 in., No. 8 (9.5 mm, 2.36 mm) sieves and asphalt cement
Asphaltic concrete 9.5 mm Superpave	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) sieve and asphalt cement

The Department will perform the following tasks:

1. 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.

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.

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.

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," are based on the appropriate adjusted Contract Price for mix used in the temporary detour work.

E. Determine Lot Payment

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 402 – HOT MIX RECYCLED ASPHALTIC CONCRETE

Delete Subsection 402.5 and substitute the following:

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 <u>type</u> superpave, group-blend, including bituminous materials	Per ton (mega gram)
Item No. 402	Recycled asphaltic concrete <u>type</u> superpave, group-blend, including bituminous materials and hydrated lime	Per ton (mega gram)
Item No. 402	Recycled asphaltic concrete <u>type</u> superpave, group-blend, including polymer-modified bituminous materials and hydrated lime	Per ton (mega gram)
Item No. 402	_____ in (mm) recycled asphaltic concrete <u>type</u> superpave, group-blend, including bituminous materials	Per square yard (meter)
Item No. 402	_____ in (mm) recycled asphaltic concrete <u>type</u> superpave, group-blend, including bituminous materials and hydrated lime	Per square yard (meter)
Item No. 402	_____ in (mm) recycled asphaltic concrete <u>type</u> superpave, group-blend, including polymer-modified bituminous materials and hydrated lime	Per square yard (meter)
Item No. 402	Recycled asphaltic concrete patching including bituminous materials	Per ton (mega gram)
Item No. 402	Recycled asphaltic concrete patching including bituminous materials and hydrated lime	Per ton (mega gram)
Item No. 402	Recycled asphaltic concrete leveling including bituminous materials	Per ton (mega gram)
Item No. 402	Recycled asphaltic concrete leveling including bituminous materials and hydrated lime	Per ton (mega gram)

400.5.01 Adjustments

A. Determine Lot Acceptance

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 Superpave	3/8 in., No. 8 (9.5 mm, 2.36 mm) sieves and asphalt cement
Asphaltic concrete 12.5 mm Superpave	3/8 in., No. 8 (9.5 mm, 2.36 mm) sieves and asphalt cement
Asphaltic concrete 9.5 mm Superpave	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) sieve and asphalt cement

The Department will perform the following tasks:

1. Determine the mean of the deviations from the job mix formula per test results per lot.
3. 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.

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.

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.

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," are based on the appropriate adjusted Contract Price for mix used in the temporary detour work.

E. Determine Lot Payment

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 611 – RELAYING, RECONSTRUCTING, OR ADJUSTING TO GRADE OF MISCELLANEOUS ROADWAY STRUCTURES

Retain Standard Specification 611.3.05 as written and add the following paragraphs:

F. Manhole Rings and Cover Rebuilding Standard Special Provision 611.3.05.F

1. **Contractor** shall be responsible for the removal and resetting of the existing manhole ring and covers. The existing ring and covers shall be utilized, if not broken or cracked. If the ring and/or cover cannot be utilized, Rockdale Water Resources (RWR) will supply a new ring and cover to be set by the **Contractor**. These can be scheduled to be picked up by calling 770-278-7500. The RWR Central Maintenance/Warehouse facility is located at 2420 Tatum Road.
 - a. The cast iron frame for the manhole cover shall be set at the required finished elevation and properly anchored to the masonry brick.
 - b. The top surface of the frame and cover shall conform to the crown and grade of the existing adjacent pavement.
 - c. Brick and Mortar: Brick shall be whole and hard burned, conforming to ASTM C 32 Grade MS. Mortar shall be made of One (1) part Portland cement and Two (2) parts clean sharp sand. Cement shall be Type One (1) and shall conform to ASTM C 150. Sand shall meet ASTM C 53.
 - d. Bricks shall be installed by using common brick Portland cement-type joints and stucco/skim coated on the inside of the bricks to provide a smooth continuous surface.
 - e. Rebuilding manhole described herein is considered “Reconstruct Manhole.”
 - f. Rebuilding manhole is from the bottom of the reconstructed subbase to the top of the ring and cover.
2. **Contractor** shall be responsible for removing any brick, debris and/or materials that may fall into any manhole that is worked on and/or in the area of the project.
3. Roadways only requiring resurfacing and not reconstructing may need a riser on the existing manhole frame. The **Contractor** is responsible for supplying and installation of riser ring(s) and the brand used must be approved by the RDOT Director or RDOT Engineering Staff. Where riser rings are used no additional payment will be made under Adjust Sanitary Sewer Manhole to Grade or Reconstruct Sanitary Sewer Manhole -

G. Water Valve Box and Cover

1. **Contractor** shall be responsible for the removal and resetting of the existing water valve box and covers. The existing water valve box and covers shall be utilized, if not broken or cracked. If the water valve box and/or cover cannot be utilized, it must be replaced with a new box and cover to be set by the **Contractor**. Water valve box and covers shall be equal to the following: Cast Iron Water Valves Boxes, two piece, accommodates 4” through 12” water valves, 5-1/4” shafts, screw or slip type Tyler Pipe 6850 or 6855 Series or equivalent. All water valve lids shall be marked with “**WATER**”.
 - a. The cast iron water valve box and cover shall be set at the required finished elevation and properly anchored to the masonry brick.
 - b. The top surface of the water valve box and cover shall conform to the crown and grade of the

existing adjacent pavement.

2. **Contractor** shall be responsible for removing debris and/or materials that may fall into any valve box that is worked on and/or in the area of the project.
- 3 Roadways only requiring resurfacing and not reconstructing may need a riser on the existing water valve box. The **Contractor** is responsible for supplying and installation of risers. Water valve box riser rings shall be to the following Tyler Pipe cast iron risers for 5-1/4" shaft water valve boxes 6850, 6855, 6860 or 6865 series boxes or equivalent. Where riser rings are used no additional payment will be made under Adjust Water Valve Box to Grade or Reconstruct Water Valve Box.
 - a. The cast iron water valve box and cover shall be set at the required finished elevation and properly anchored to the masonry brick.
 - b. The top surface of the water valve box and cover shall conform to the crown and grade of the existing adjacent pavement.
4. The **Contractor** will be responsible for referencing the location of each valve box so that water valve box can be adjusted to the finished grade after the paving operations are complete.

SECTION 802 – AGGREGATES FOR ASPHALTIC CONCRETE

Delete Subsection 802.2.01.A.5. In its entirety.

SECTION 819 – FIBER STABILIZING ADDITIVES

Delete Section 819 in its entirety.

SECTION 828 – HOT MIX ASPHALTIC CONCRETE MIXTURES

Delete Subsection 828 and substitute the following:

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 PP28. Mixture types in this section are identified according to Nominal Sieve Size.

828.1.02 Related References

A. Standard Specifications

Section 400 – Hot Mix Asphaltic Concrete Construction

Section 800 – Course 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

PP 2

PP28

TP 8-94

T 112

T 209

T 305

T 312

T-245

PS-129

SOP-36

SOP-2 SP

GDT 56

GDT 66

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 asphaltic concrete mixtures that meet the following requirements:

1. Produce each asphalt mixture according to a Job Mix Formula and Asphalt Mix Design approved by the Department. For submittal and approval of Job Mix Formulas, see Subsection 400.1.
2. Ensure that 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 that 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 which meet 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 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, OGFC and SMA mixtures from the Department's Office of Materials and Research, which produces and furnishes these mix designs.
5. Ensure that Superpave and 4.75 mm mix designs are designed in accordance with SOP-2SP ("Control of Superpave Bituminous Mixture Designs") and are approved by the Department as provided herein. Ensure that these mixes are designed by a laboratory and technician certified in accordance with SOP-36, ("Certification of Laboratories and Personnel for Design of 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 Subsection 882.2.03 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. Mix designs using only virgin aggregate shall include lime at a minimum rate of 1.00 % of the total dry aggregate weight. Mix designs using RAP shall 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. If necessary to meet requirements for mixture properties, and pursuant to an approved mix design, add more lime or add lime plus an approved Heat-Stable Anti-Stripping Additive that meets the requirements of Subsection 831.2.04. 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 Subsection 831.2.04 may be substituted for hydrated lime. In this case the mix gradation shall be adjusted as necessary 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 67-22 asphalt cement in all mix designs and mixtures except as follows:
 - a. For mixtures containing 25% or greater RAP, the Engineer will determine the performance grade to be used.
 - b. On PR, LARP, airport, and parking lot projects, PG 64-22 may be substituted for PG 67-22, with approval of the Office of Materials and Research, on roads having current ADT less than 2,000.
 - c. Use only grade PG 76-22 in the following mixes: SMA, 12.5 mm PEM, 12.5 mm and 9.5 mm OGFC, 12.5 mm Superpave, excluding shoulder construction, 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. Local sand shall 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. It shall be 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. Design Requirements and limits – all mix types

1. Design procedures: For all Superpave and 4.75 mm mixes, designers shall adhere to the Superpave System for Volumetric Design (AASHTO T 312 and AASHTO PP 2), as adapted in SOP-2SP. The Department will design open-graded mixes and Stone Matrix Asphalt (SMA) mixes according to GDT 114 and GDT 123, respectively. In all cases, the procedure for measuring Maximum Specific Gravity (G_{mm}) shall be AASHTO T 209. In addition to gradation and volumetric analysis, mix designs shall include the following performance tests, as applicable.
 - **9.5 mm Superpave**

9.5mm Superpave mixes should specify “Type I” or “Type II” mix design in the plans or contract documents. If “Mix Design Level A” is specified, ensure the Asphaltic Concrete meets the requirements of a “Type I” mix. If a “Mix Design Level B, C, or D” is specified, ensure the Asphaltic Concrete meets the requirements of a “Type II” mix.
 - **Other Superpave mixes**

No “Type” is required for other Superpave Asphaltic Concrete mixes (12.5 mm, 19 mm, or 25 mm). Any “Mix Design Levels A, B, C, or D” specified in the plans or contract documents do not affect the current asphalt mix designs.
2. Permeability test: Superpave and Stone Matrix mix designs shall include testing according to ASTM PS-129. 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 -scm per sec).
3. 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 %. 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%.
4. 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. Design

limits for this test are as follows: Specimen air voids for this test shall be $5.0 \pm 1.0\%$ for all mix types. Testing temperature shall be 64°C (147°F) for all mix types except 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.

5. Fatigue testing: The Department may verify Superpave designs by fatigue testing according to AASHTO TP 8-94 or other procedure approved by the Department.

828.2.01 Open-Graded Surface Mixtures

A. Requirements

Use approved mixtures that meet the following mixture control tolerances and design criteria:

Sieve Size	Mixture Control Tolerance, %	Design Gradation Limits, % Passing		
		9.5 mm OGFC	12.5 mm OGFC	12.5 mm PEM
3/4 in (19 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	5-10	5-10	5-10
No. 200 (75 μm) sieve	+/- 2.0	2-4	2-4	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 (ASSHTO 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.

828.2.02 Stone Matrix Asphalt Mixtures

A. Requirements

Use approved mixtures that meet the following mixture control tolerances and design criteria:

Sieve Size	Mixture Control Tolerance, %	Design Gradation Limits, % Passing		
		9.5 mm SMA	12.5 mm SMA	19mm mm SMA
1-in (25 mm) sieve	+/- 0.0			100
3/4 in (19 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 % AC	+/-0.4	6.0-7.5	5.8-7.5	5.5-7.5
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 ratio after freeze-thaw cycle GDT-66	80%	80%	80%
Drain-down (ASSHTO T305) %	<0.3	<0.3	<0.3

* Mixture control tolerance is not applicable to this sieve for this mix.

** Mixture control tolerance shall be $\pm 2.0\%$ for this sieve for 9.5 mm SMA mixes placed at spread rates greater than 135 lbs. /yd². For 9.5 mm SMA mixes placed at spread rates of 135 lbs. /yd² or less, 100 % passing is required on this sieve.

1. SMA mixtures shall be compacted at 50 gyrations with the Superpave Gyratory compactor or 50 blows with the Marshall compactor.
2. All SMA mixtures shall contain mineral filler and fiber stabilizing additives and shall 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 shall meet the requirements of Subsection 802.2.02.A.3.
 - c. Use mineral filler that meets requirements of Section 883 and is approved by the Department. Approved sources of mineral filler are listed in QPL 81.
 - d. Do not use local sand in lieu of mineral filler.
 - e. Use an 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 shall be sufficient to prevent drain-down exceeding the above tolerance.

828.2.03 Superpave Asphalt Concrete Mixtures

A. Requirements

Ensure that Superpave mixtures meet the following mixture control tolerances and design limits:

1. All mixes are to be designed at a design gyration number (N_{des}) of 65 gyrations and an initial gyration number (N_{ini}) of 6 gyrations.
2. Gradation limits for Superpave mixtures are as follows:

Sieve Size	Mixture Control Tolerance, %	Design Gradation Limits, % Passing				
		9.5 mm Superpave Type I	9.5 mm Superpave Type II	12.5 mm Superpave Note 1	19 mm Superpave	25 mm Superpave
1-1/2 in (37.5 mm) sieve						100
1-in (25 mm) sieve	+/- 8.0			100*	100*	90-100
3/4 in (19 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

* Mixture control tolerance is not applicable to this sieve for this mix.

** Mixture control tolerance shall be $\pm 10.0\%$ for this sieve for 25 mm Superpave.

***Mixture control tolerance shall be $\pm 8.0\%$ for this sieve for 19 mm Superpave.

****Mixture control tolerance shall be $\pm 2.0\%$ 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

3. The Mixture Control Tolerance for asphalt cement shall be $\pm 0.4\%$ for all mix types.

4. Volumetric limits are as follows:

Design Parameter	Mix Type	Limits
% of Max. Specific Gravity (G_{mm}) at design gyrations, N_{des}	All	96%
% G_{mm} at the initial number of gyrations, N_i	All	91.5% maximum
% voids filled with asphalt (VFA) at N_{des}	9.5 mm Type I	Min 72; Max 80
	All other types	Min 72; Max 76
Fines to effective asphalt binder ratio (F/P_{be})	9.5 mm Type I	0.6 to 1.4
	All other types	0.8 to 1.6
Minimum % Voids in Mineral Aggregate (VMA) Note: VMA shall be calculated using the effective specific gravity of the aggregate (G_{se}). See SOP-2SP.	25 mm	13.0
	19 mm	14.0
	12.5 mm	15.0
	9.5 mm Type I	16.0
	9.5 mm Type II	16.0

*VMA shall be calculated using the effective specific gravity of the aggregate (G_{se}). See SOP-2SP.

828.2.04 Fine Graded Mixtures

A. Requirements

Design gyrations (N_{des}) for fine-graded mixes shall be 50 gyrations. Ensure that 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 (VFA)		60-80

* Mixture control tolerance is not applicable to this sieve for this mix.

B. Fabrication

See Section 400.

C. Acceptance

See Subsection 106.03 and Section 400. Ensure that individual test results meet the Mixture Control Tolerances listed in Subsections 828.2.01, 828.2.02, 828.2.03, or 828.04, whichever applies.

D. Materials Warranty

See General Provisions 101 through 150.

SECTION 883 – MINERAL FILLER

Delete Section 883 in its entirety.

2. SCOPE OF WORK

I. ROADWAYS:

- A. The loop and pulse detectors specified in the Bid Schedule will be replaced as necessary. While the plan is not to mill thru the existing loops and replace all, but should a loop need to be replaced due to construction operations, it will be as directed by Engineer or Inspector.
- B. The overarching goal of this resurfacing contract is to provide smooth, safe, well-draining roadways for the County. As such special emphasis will be placed on bringing the insitu grade back to a 2% cross slope with center crown wherever possible. The successful bidder of this LMIG 2018 contract will be required to have a 4 foot digital smart level on the project at all times to ensure that variable depth milling, leveling and final riding surface are performed in a consistent manner to achieve this overarching goal for the County and its ratepayers. All variable depth milling shall occur in advance of the deep patching operation in all areas where both treatments are required. Deep patching shall occur in advance of leveling operations in all areas where both treatments are required.
- C. Georgia Department of Transportation standard specifications/details and special provisions shown in this ITB #18-15 including the Appendices are to be used as applicable, or as directed by Engineer.
- D. A complete listing of the road segments to be repaved or reconstructed under this **Contract** is available to the bidder in the Appendices Section. The list, in spreadsheet format denotes the name of the roadway; the subdivision, if any, it is in; and the approximate termini, length, and width of the segment to be rehabilitated. Total quantities of each pay item have been included for information only on the individual bid tabulations in the Appendices and require that the **Contractor** verify the quantities.
- E. The **Contractor** is responsible for visiting the actual proposed construction sites where the roadways are marked up in advance of this ITB to denote areas of variable depth milling, leveling, patching etc.
- F. The **Contractor** is responsible for building at minimum 2 foot wide shoulders and clipping high shoulders up to 4 foot wide or more to allow positive drainage off of the new roadway. Please see SP 40 for details on shoulder building and berm clipping. Complete earth shoulder filling work within thirty (30) days, after completion of the final roadway.
- G. All shoulder building and clipping operations must be completed prior to thermoplastic striping operations.
- H. FDR operations must utilize the entire insitu pavement structure, no pre-milling will be allowed in advance of FDR operations. The surplus mixture shall be loaded and trucked at the Contractor's expense to the Rockdale County DOT yard where it will be stockpiled with County equipment and forces.
- I. FDR to be completed per the enclosed SP 316 in the Appendices. The Contractor will submit their proposed job mix formulas for each of the three projects for approval if the County chooses Alternate Bid B and for two projects for Bid A.
- J. Depth of FDR shall be 10" and will be tested for conformance.
- K. Contractor will sweep and paint the bridge deck on Oglesby Bridge Road SW during striping operations.
- L. Temporary striping is required in accordance with section 150.04 of the GDOT specifications. Placement of permanent pavement markings shall not begin until final surface course has been completed for fifteen (15) calendar days and will be completed within forty-five (45) calendar days after the final surface course has been completed.
- M. Notify utility companies a minimum 60 days in advance of any proposed work in order for utility companies to begin clearing conflicts with scheduled work.

- N. The Contractor shall be responsible for all erosion control measures to ensure all compliance with all state and federal laws and guidelines, the cost to be considered incidental and be included in the overall bid price. No additional payments shall be made to the contractor for erosion control.
- O. The contractor shall be responsible for removing, relocating and maintaining the property owner's mailbox to an area outside the construction limits during the life of the contract where necessary. The location should be convenient to both the mail carrier and the patron. Yet not interfere with the proposed work. It may be necessary for the Contractor to confer with the post office serving the area. All costs incurred for the compliance with these requirements shall be included in the unit bid price for remove and replace mailboxes.
- P. All primary entrances into properties will be maintained as accessible at all times.

II. SPECIAL CONSTRUCTION METHODS:

It is the intent of this contract to pay for the removal of unsuitable material below the subbase to the depth necessary and as directed by the Engineer. The undercut areas will be replaced with GAB, pay item 310-1101.

It is the intent of this contract to pay for existing GAB, soil cement, or soil, which is identified as undercut to include the removal, hauling and disposal of the material and be paid for as unclassified material.

Any and all RAP millings and/or surplus dirt/RAP mixture shall be trucked to the rear of 2570 Old Covington Hwy SW, Conyers, GA 30012 at the **Contractor's** expense. The County will provide the operator(s) and equipment to stockpile this material at our end.

3. SEQUENCE OF OPERATIONS

I. GENERAL:

- A. The purpose of this Special Provision is to provide a Sequence of Operations for construction of this project. This Special Provision also provides specific procedures that will permit vehicular and pedestrian traffic to pass area safely and with minimum inconvenience.
- B. This Special Provision sets forth specific procedures and does not relieve the **Contractor** of any responsibilities required by Specification Section 150, other Specifications, Plans, or the MUTCD.
- C. Planned off-site detours are not required 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 **County**, 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 a minimum of at least fourteen (14) calendar days prior to proposed construction. Such bypasses or detours shall be removed promptly when in the opinion of the Engineer 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.
- F. When construction operations necessitate an existing traffic signal to be out of service, the **Contractor** shall 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. The Contractor shall not perform work or move equipment or materials on the traveled way that visibly interferes with traffic flow on the roadways listed below between the hours of 6:00 to 8:30 AM and 4:00 to 6:00 PM, Monday through Friday unless authorized by the Engineer prior to Work being performed. Equipment or materials moved on or across the traveled way at other times shall be done in a manner as not to unduly interfere with traffic.

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- H. The Contractor shall schedule and arrange the Work to ensure the least inconvenience and the utmost in safety for the traveling public and to the Contractor's and the Department's forces. The Engineer shall have discretion to further limit the hours of construction activities within or near school zones or residences in order to provide the safest possible facilities for the traveling public. The Contractor shall not Work in residential areas from dusk to dawn.
- I. The Contractor shall submit to the Engineer at the preconstruction meeting a list identifying the priority order in which the project will be completed. A schedule shall be submitted to the Engineer every week thereafter showing which roads will be completed for that week. Every effort to complete the roads/streets in the order of the list should be made. The Engineer shall be notified immediately if the order of the roads/streets changes. The Engineer will be notified 24 hours in advance when the Contractor moves to a new road/street to Work. The schedule as a minimum show the time line for milling, pulverizing, mixing, paving, grading of shoulders and striping operations as these items may relate to the respective roadway. **Please refer to Section 108.11 for more information regarding scheduling and cancelations.**
- 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. Separate payment will not be made for this Work. All costs associated with the removal and resetting of incidental items shall be included in the overall price bid.
- K. The Contractor shall develop a detailed staging and traffic control plan, if deemed necessary, for performing Work in specific areas of the Work, including but not limited to all traffic shifts, detours, pacing, lane closures or other activities that disrupt traffic flow. When required by the Engineer, the Contractor shall submit his staging and traffic control plan to the Department at least seven (7) business days prior to commencing Work in a specific area so that a decision on its acceptability can be made. The Department shall review and issue its decision within three (3) business days of receipt and, if approved, shall give the Contractor a written Notice to Proceed (NTP) for that portion of the Work. The Contractor shall not commence Work prior to issuance of the NTP.
- L. Contractor shall construct a 30 or 45 degree safety wedge, as required by GDOT, at the edge of all new asphalt overlays. This is to insure that vehicular traffic will have a traversable edge that will allow for a smooth transition if the vehicle should leave the road unexpectedly and over-correct. See Section 400 for more details.

II. ORDER OF WORK:

A. Non-Interstate Divided Highways

1. The Contractor shall not simultaneously perform Work on both the inside shoulder and outside shoulder on either direction of traffic flow when the Work is within 12 feet of the traveled way, unless such areas are separated by at least 3000 feet of distance in rural areas or at least 500 feet of distance in urban areas.

B. Non-Divided Highways

1. The **Contractor** shall not simultaneously perform Work on opposite sides of the roadway when the Work is within 12 feet of the traveled way, unless such areas are separated by at least 3000 feet of distance in rural areas or at least 500 feet of distance in urban areas.
2. Pilot vehicles will be required during FDR operations, placement of bituminous surface treatment or asphaltic concrete on two-lane roadways unless otherwise specified.
3. On two-lane projects where full-width sections of the existing subgrade, base or surfacing are to be removed, and new base subgrade 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.

C. 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. Materials to be wasted shall be disposed of in accordance with Subsection 201.3.05.E of the current Specifications. Note: all clean fill, RAP millings and surplus RAP/Gravel from this project shall be loaded and trucked back to RDOT yard at 2570 Old Covington Hwy. SW, Conyers, GA, 30012. The County will provide equipment and manpower to stockpile this material. 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. SPECIAL CONDITIONS

The special conditions contained herein are Project Specific. When there is a conflict between the General Conditions of the Contract Documents and these Special Conditions, the Special Conditions will govern the Work.

- A. The roads and streets impacted by this construction may require restriction to one-lane traffic and/or temporary closure. The Department prior to start of construction for such restriction **MUST** approve all restrictions to normal traffic flow patterns.
- B. The **Contractor** shall provide off-road parking areas within the construction area and away from the intersecting streets or roads. The unauthorized parking of employees' vehicles and/or equipment will not be permitted along the shoulders or adjacent to the active traffic on any road or street in Rockdale **County**. It will be the **Contractor's** responsibility to prevent the violation of this provision. Failure to comply with the terms of this provision will result in the suspension of the Work.

The **Contractor** shall provide staging areas for equipment, materials and personnel which do not hinder public access or traffic movements. Debris and trash will be cleaned up in these areas to the acceptance of the inspector prior to vacating the area. Any soil contaminated by fuel or oil spills will be excavated and disposed of in accordance with EPA and State requirements for hazardous materials. The **Contractor** shall make every effort to prevent fuel and oil spills.

- C. The **Contractor** shall notify the **County** three business days prior to beginning Work and 24 hours in advance when moving resurfacing/repaving operations from one location to another.
- D. When construction begins on this project, the **Contractor** will be required to continuously pursue the Work without interruption to the completion of each stage of Work. The time duration between reconstruction of the base and paving operation shall be kept a minimum to maintain a safe surface for motorists and shall be at the direction of the Engineer. Shoulder rehabilitation, including seeding of grass, shall be completed within two (2) weeks of main line paving. Cessation of Work without authorization will be considered as justification to deny the **Contractor's** request for an extension of time. Payment of asphalt will be

authorized when all Work is complete on a section of roadway.

- E. Wherever the proposed Work calls for excavation of portions of the existing graded aggregate base (GAB), soil cement, and or soil, the material that is retained shall be compacted to meet the requirements set forth in the Construction and Preparation subsections of the applicable section of the Standard Specifications relating to the particular material, and/or structure, to be implemented immediately upon the retained material
- F. The Contract completion date shall be **20 Weeks from Notice to Proceed, or as approved by Rockdale County Department of Transportation.**
- G. The Work performed under Pay Item 205-0081: EXCAVATION, UNSTABLE MATL & BACKFILL shall cover only the excavation, removal and replacement of unsuitable material encountered during patching and/or base repair. The quantity given in the Bid and Contract Schedules of Items is an approximate estimate of quantities required by the engineer based on observed field conditions; thus, the actual quantity placed may deviate significantly from the given quantity.
- H. The work performed under Pay Item 210-0020: GRADING – ADJUST SHOULDER TO GRADE shall cover the work required to add and grade any additional material required to bring the shoulder up to the finished grade at the edge of the pavement and includes the material. By definition, this work will apply only to those rural-section roadways where the proposed grade at the edge of the pavement is higher than that of the existing roadway or as directed by the Inspector or the Engineer. **This item also includes CUTTING BERMS DOWN to proper elevation to allow surface water on road to drain to ditches.** Contractor is responsible for utility locates.

Further, all insitu pavements in this ITB and subsequent contract must have their edges and shoulders scraped down prior to milling and patching operations to eliminate any standing water on the roadway. This is mandatory and the cost for performing this work shall be included in Pay Item 210-0020 as well. Note that the excess material generated from shoulder clipping and scraping shall be trucked to 2570 Old Covington Hwy. SW, Conyers, GA 30152 (Rockdale County DOT Yard) where it will stockpiled by County employees & equipment. Shoulders shall be built to a minimum of 2 feet in width and clipping operations shall extend far enough that water can sheet flow into existing ditches.

The Contractor will not be required to redefine ditches where there is little or no ditching at present. However, the Contractor will cut the high shoulders down to allow water to move off of the roadway and up to 4 feet out on the shoulder. There may be limited occasions where the motor grader will have to extend their moldboard out past four feet in order to provide positive drainage. Care must also be taken to minimize damage to new pavement edges with heavy equipment. Contractor will be required to cut and patch and restripe any damaged areas of pavement caused by shouldering operations.

As no roadway grade is expected to be raised in excess of approximately 3 inches, the intent of this Work is not to rehabilitate the shoulders; rather the intent is simply to fill and feather the shoulder at the edge of pavement to tie as quickly to the existing as possible. The feathering could extend horizontally up to 48 inches, but not past the existing shoulder break point. Measurement for payment will be measured by the lane mile and any areas where both sides of the roadway are not clipped or in receipt of new shouldering will not be paid under this item. Any areas contiguous with the pavement where there is a drop-off will require shoulder grading. This will be as directed by the Inspector.

This Work shall also include the establishment of permanent grassing on the newly placed material. Payment for in-kind seeding/grassing, mulching, etc. is considered subsidiary to the grading. In conjunction with the grading operations, any erosion control devices or measures that need to be installed to protect adjacent properties is the responsibility of the **Contractor** and is considered subsidiary to the cost of the grading.

- I. Where directed by the Engineer, transitions for driveways will be constructed to improve the driveway slope and break-over. The cost of this Work will be measured and paid for based on the top course of

asphaltic concrete pavement per ton. Where complete removal and replacement of driveways in-kind is required it will be paid for under that line item in the contract.

- J. Along rural areas where mail boxes have been setback from the edge of pavement and the mail truck is required to pull off the pavement to deposit mail, these areas shall be covered with the respective surface and base course depths of new pavement in order to prevent the edge of pavement to ravel off by the mail truck. This additional pavement shall be included in the pay items for asphaltic concrete.
- K. The **Contractor** shall notify the Engineer 48 hours in advance if the **Contractor** intends to Work on the Saturday or Sunday so that the Engineer can provide adequate inspection staff to oversee the **Work**. **Failure to provide notice as required may result in denial of weekend work.**
- L. The **Contractor** shall notify the Engineer 72 hours in advance regarding the roadway project on which resurfacing and/or reconstruction will occur so that the Engineer in writing can notify occupants.
- M. Nominal quantities for the several items have been included in order to provide anticipated Work to be performed and these quantities are found on the itemized quantity Schedule under "As Directed By the Engineer" and are listed below:

Reconstruct SSMH (san/storm)	Adjust WV Boxes	Adjust SSMH
Patching Asphalt	Leveling Asphalt	Several Items under Thermoplastic Pavement Markings
Excavation	Loop & Pulse Detectors	Graded Aggregate Base
Curb Milling	Shoulder Grading	OGI Asphalt
9.5 mm Superpave Asphalt	R & R Driveways In-Kind	12.5 mm Superpave Asphalt
Raised Pavement Markers	Bituminous Tack	Roll Curb R & R

IV. EQUIPMENT NOISE AND OPERATION:

All equipment used on the **Work** shall come equipped with factory installed mufflers or manufacturers recommended equivalent in good condition. These mufflers shall be maintained in good condition throughout the life of the Contract. The equipment should be in good Working order without fuel leaks, damages, worn parts or broken parts which might create a hazard to the environment or personnel. Any equipment noted by the RDOT Director or RDOT Engineering Staff, or their Inspectors to the **Contractor** shall be fixed or removed immediately and any spills should be dealt with in accordance to EPA standards

V. UTILITY CONFLICTS

Utility companies having known facilities that conflict with the construction of this project will be directed by the **County** to adjust or relocate their facilities and will be notified of the Contract award. It is the **Contractor's** duty to notify the **County** of known conflicts.

It will be the **Contractor's** responsibility to conform with 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. The **Contractor's** attention is directed to the requirement of Section 107, LEGAL REGULATIONS AND RESPONSIBILITY TO THE PUBLIC, with particular attention to Article 107.21. F

It shall be the responsibility of the **Contractor** to coordinate his Work with any Work to be performed by others in a Right-of-Way clearance and arrange a schedule of operations that will allow for completion of the Project without undue delay. Where stage construction is required it shall be the **Contractor's** responsibility to notify the utility owner when each stage of **Work** is completed and the site is available for utility Work to proceed.

It shall be the responsibility of the **Contractor** to determine the estimated time for relocation and adjustment of facilities of all utility companies and to consider in his bid all such relocations and adjustments.

In accordance with Article 105.6 of the specifications, the **County** shall not be liable for payment of any costs due to utility delays, inconvenience or damage sustained by the **Contractor** due to interference of any utilities or appurtenances, or the operation of moving them. Delays by utilities will continue to be considered by the **County** in charging Contract time in accordance with Article 107.21.G.

The **Contractor** will not be paid for any delays or extra expense caused by utility facilities, obstructions, or any other items not being removed or relocated to clear construction in advance of his Work.

Georgia law requires that a telephone call or adequate notice must be given to the Utilities Protection Center (UPC) at 770-623-4344 a minimum of three (3) days before **Work** is to begin. The notice will remain in effect for 10 Working days from the date the Utilities Protection Center is notified. **Any milling, pulverizing, or excavation Work on the roadways requires that UPC be notified prior to Work being performed.** If emergencies occur it is the responsibility of the **Contractor** the respective utility company immediately and then the inspector.

VI. ADDENDA

The contents of Addendums will be incorporated into the respective sections of the final CONTRACT AGREEMENT, GENERAL CONDITIONS, and/or SPECIAL PROVISIONS. The **Contractor's** submitted Bid Proposal at the time of bid opening will also be incorporated into the Special Provisions as Appendix C, which will be part of the Contract. **The Contractor shall include as part of his/her Bid Proposal the completed forms on page BD.4 and BD.7 of the Bid Documents verifying that he/she has included all addendums as part of the Bid Proposal.**

**APPENDIX A
INDIVIDUALIZED QUANTITY SHEETS**

Road Name:	Oglesby Bridge Road SW Resurfacing Sections (3 see painted areas on project site)	
Length::	3666.00	LF
Width:	22.00	LF
Sub total SF:	80652.00	SF
Extra Area SF:		SF
Total SY Area	8962.00	SY
Total TN 12.5 mm 165#/SY	740.00	TN
Total TN OGI 95#/SY	426.00	TN
Tack for 12.5 mm	537.72	GA
Tack for OGI	268.86	GA
Total Tack for this Road	807.00	GA
Deep Patching SF 4" 440#/SY	144.00	SF
	240.00	SF
	3465.00	SF
	300	SF
	990	SF
	192	SF
	160	SF
	117	SF
	3300	SF
	990	SF
	660	SF
	105	SF
	198	SF
	135	SF
	345	SF
	660	SF
	300	SF
	759	SF
	84	SF
	330	SF
	300	SF
	294	SF
	250	SF
	1452	SF
	1320	SF
	345	SF
	360	SF
	1872	SF
	360	SF
	54	SF
	132	SF
	60	SF
	363	SF
	300.00	SF
	231.00	SF
	360.00	SF
	495.00	SF
	156.00	SF
	252.00	SF
	630.00	SF
	756.00	SF
	198.00	SF

	180.00	SF
	132.00	SF
	252.00	SF
Deep Patching SF	24578.00	SF
Deep Patching SY	2731.00	SY
Deep Patching TN 4" 440#/SY	601.00	TN
Milling SF 1 1/2"		
Milling SY 1 1/2"		SY
Milling VDM SF	297.00	SF
	550.00	SF
	396.00	SF
	3465.00	SF
	990.00	SF
	264.00	SF
	2640.00	SF
	3300.00	SF
	891.00	SF
	429.00	SF
	3300.00	SF
	990.00	SF
	396.00	SF
	660.00	SF
	132.00	SF
	110.00	SF
	198.00	SF
	297.00	SF
	1188.00	SF
	759.00	SF
	660.00	SF
	495.00	SF
	660.00	SF
	825.00	SF
	759.00	SF
	132.00	SF
	330.00	SF
	330.00	SF
	99.00	SF
	660.00	SF
	550.00	SF
	462.00	SF
	363.00	SF
	550.00	SF
	1452.00	SF
	396.00	SF
	759.00	SF
	360.00	SF
	330.00	SF
	792.00	SF
	429.00	SF
	3432.00	SF
	990.00	SF

		495.00	SF
		660.00	SF
		99.00	SF
		99.00	SF
		132.00	SF
		528.00	SF
		132.00	SF
		363.00	SF
		1155.00	SF
		660.00	SF
		528.00	SF
		220.00	SF
		264.00	SF
		990.00	SF
		1188.00	SF
		495.00	SF
		429.00	SF
		110.00	SF
		1485.00	SF
		1485.00	SF
		1980.00	SF
		132.00	SF
		396.00	SF
		3201.00	SF
		2310.00	SF
		3000.00	SF
Total SF		59603.00	SF
Total SY VDM		6623.00	SY
Stop Bars LF		0.00	LF
RPM Hydrants		0.00	EA
RPM Yellow			EA
RPM White			EA
TOTAL RPMS		0.00	
Leveling		6.05	TN
		18.15	TN
		60.50	TN
		30.25	TN
Total TNS Leveling		115.00	TN

Road Name:	Oglesby Bridge Road SW FDR Sections (see 2 painted areas on project site)	
Length::	6872	LF
Width:	22	LF
Sub total SF:	151184	SF
Extra Area SF:	3000	SF
Total SY Area 22' Wide Pvmnt	17132	SY
Total TN 12.5 mm 165#/SY	1414	TN
Total TN OGI 95#/SY	814	TN
Tack for 12.5 mm	1028	GA
Tack for OGI	514	GA
Total Tack for this Road	1542	GA
Total SY FDR at 23' Wide	17562	SY
Deep Patching SF 4" 440#/SY		SF
TOTAL SF Patching	0.00	SF
TOTAL SY PATCHING	0.00	SY
Total TN 4" 440# Patching	0.00	TN
Milling SF 1 1/2"		
Milling SY 1 1/2"		SY
Milling VDM SF		
Deerwood Decel	3000.00	SF
		SF
Total VDM SF	3000.00	SF
Milling VDM SY	334.00	SY
Stop Bars LF	15.00	LF
RPM Hydrants	3.00	EA
RPM Yellow		EA
RPM White		EA
TOTAL RPMS		
Leveling		TN
Total TNS Leveling	0.00	TN

Road Name:	Crowell Road FDR	
Length::	3480.00	LF
Width:	22.00	LF
Sub total SF:	76560.00	SF
Extra Area SF:	7081.00	SF
Total SY Area Pavement 22'	9294.00	SY
Total SY Area FDR 23'	8894.00	SY
Total TN 9.5 mm 138#/SY	642.00	TN
Total TN OGI 95#/SY	442.00	TN
Tack for 9.5 mm	557.64	GA
Tack for OGI	278.82	GA
Total Tack for this Road	837.00	GA
Deep Patching SF 4" 330#/SY	0.00	SF
Deep Patching SF	0.00	SF
Deep Patching SY	0.00	SY
Deep Patching TN 4" 440#/SY	0.00	TN
Milling SF 1 1/2"		
Milling SY 1 1/2"		SY
Milling VDM SF	9632.00	SF
	3794.00	SF
	4004.00	SF
Total VDM SF	17430.00	SF
Total VDM SY	1937.00	SY
Stop Bars LF	0.00	LF
RPM Hydrants	0.00	EA
RPM Yellow		EA
RPM White		EA
TOTAL RPMS	0.00	
Leveling	0.00	TN
Total TNS Leveling	0.00	TN

Road Name:	Bell Road Resurfacing vs. FDR	
Length::	5500.00	LF
Width:	21.00	LF
Sub total SF:	115500.00	SF
Extra Area SF:	9319.00	SF
Total SY Area	13869.00	SY
Total SY FDR	13445.00	SY
Total SY VDM with FDR	1035.44	SY
Total SY Both	14480.44	SY
Total TN 12.5 mm 165#/SY	1145.00	TN
Total TN OGI 95#/SY	659.00	TN
Tack for 12.5 mm	832.14	GA
Tack for OGI	416.07	GA
Total Tack for this Road	1249.00	GA
Total Portland Cement 55#/SY	370.00	TN
Deep Patching SF 4" 440#/SY	100.00	SF
	84.00	SF
	140.00	SF
	180.00	SF
	20.00	SF
	252.00	SF
	660.00	SF
	100.00	SF
	60.00	SF
	231.00	SF
	420.00	SF
	396.00	SF
	240.00	SF
	84.00	SF
	2250.00	SF
	1551.00	SF
	840.00	SF
	546.00	SF
	273.00	SF
	693.00	SF
	225.00	SF
	504.00	SF
	2508.00	SF
	324.00	SF
	1320.00	SF
	168.00	SF
	150.00	SF
	96.00	SF
	231.00	SF

	150.00 SF
	550.00 SF
	594.00 SF
	651.00 SF
	396.00 SF
	576.00 SF
	330.00 SF
	80.00 SF
	165.00 SF
	420.00 SF
	198.00 SF
	990.00 SF
	216.00 SF
	2640.00 SF
	396.00 SF
	1680.00 SF
	552.00 SF
	1368.00 SF
	759.00 SF
	1100.00 SF
	990.00 SF
	144.00 SF
	648.00 SF
	72.00 SF
	660.00 SF
	2250.00 SF
	660.00 SF
	384.00 SF
	960.00 SF
	330.00 SF
	120.00 SF
	1680.00 SF
	825.00 SF
	168.00 SF
	96.00 SF
	90.00 SF
	800.00 SF
	1254.00 SF
	600.00 SF
	2178.00 SF
	891.00 SF
	1452.00 SF
	252.00 SF
	693.00 SF
	231.00 SF
	600.00 SF
	1650.00 SF

	336.00 SF
	825.00 SF
	350.00 SF
	180.00 SF
	441.00 SF
	225.00 SF
	45.00 SF
	117.00 SF
	1100.00 SF
	270.00 SF
Deep Patching SF	53024.00 SF
Deep Patching SY	5892.00 SY
Deep Patching TN 4" 440#/SY	1297.00 TN
Milling SF 1 1/2"	
Milling SY 1 1/2"	SY
Milling VDM SF	385.00 SF
	660.00 SF
	660.00 SF
	990.00 SF
	396.00 SF
	363.00 SF
	363.00 SF
	462.00 SF
	330.00 SF
	396.00 SF
	660.00 SF
	165.00 SF
	231.00 SF
	550.00 SF
	2475.00 SF
	440.00 SF
	1551.00 SF
	220.00 SF
	1320.00 SF
	693.00 SF
	165.00 SF
	825.00 SF
	660.00 SF
	1386.00 SF
	2508.00 SF
	891.00 SF
	2310.00 SF
	1320.00 SF
	759.00 SF

	264.00 SF
	1100.00 SF
	1001.00 SF
	231.00 SF
	341.00 SF
	165.00 SF
	198.00 SF
	330.00 SF
	550.00 SF
	2970.00 SF
	900.00 SF
	225.00 SF
	231.00 SF
	1023.00 SF
	396.00 SF
	363.00 SF
	792.00 SF
	330.00 SF
	110.00 SF
	165.00 SF
	660.00 SF
	429.00 SF
	198.00 SF
	660.00 SF
	990.00 SF
	660.00 SF
	297.00 SF
	1100.00 SF
	396.00 SF
	2310.00 SF
	726.00 SF
	550.00 SF
	990.00 SF
	1881.00 SF
	759.00 SF
	1100.00 SF
	1980.00 SF
	990.00 SF
	198.00 SF
	1400.00 SF
	792.00 SF
	660.00 SF
	1725.00 SF
	600.00 SF
	450.00 SF
	294.00 SF
	840.00 SF

		2250.00 SF
		660.00 SF
		2268.00 SF
		2145.00 SF
		1100.00 SF
		1452.00 SF
		1254.00 SF
		429.00 SF
		396.00 SF
		1650.00 SF
		1650.00 SF
		2178.00 SF
		1500.00 SF
		165.00 SF
		220.00 SF
		1452.00 SF
		462.00 SF
		693.00 SF
		759.00 SF
		231.00 SF
		99.00 SF
		3750.00 SF
		225.00 SF
		2000.00 SF
		225.00 SF
		990.00 SF
		440.00 SF
		693.00 SF
		495.00 SF
		1188.00 SF
		429.00 SF
		1100.00 SF
		550.00 SF
		1200.00 SF
Milling VDM SF		95752.00 SF
Milling VDM SY		10640.00 SY
Stop Bars LF		14.00 LF
RPM Hydrants		0.00 EA
RPM Yellow		220 EA
RPM White		10 EA
TOTAL RPMS		230.00

Leveling	27.50 TN
	14.67 TN
	5.24 TN
	7.48 TN
	5.24 TN
	1.10 TN
	53.78 TN
	10.01 TN
	6.72 TN
	3.03 TN
	5.45 TN
	2.82 TN
	3.36 TN
	2.02 TN
	3.23 TN
	1.61 TN
	8.07 TN
	2.02 TN
	6.72 TN
Total TNS Leveling	171.00 TN

LMIG 2018

APPENDIX B

**SPECIAL PROVISIONS STANDARD DRAWINGS &
DETAILS**

DEPARTMENT OF TRANSPORTATION

STATE OF GEORGIA

SPECIAL PROVISION

Section 415—Asphaltic Concrete Open Graded Crack Relief Interlayer

Delete Section 415 and substitute the following:

415.1 General Description

This work includes constructing a bituminous plant produced Asphaltic Concrete Open Graded Crack Relief Interlayer (OGI) over the existing roadway surface. The mixture shall serve as asphaltic concrete leveling over irregular surfaces and provide mitigation for reflective cracking prior to the placement of the final surface pavement. The mixture shall conform to the lines, grades, thicknesses, typical sections and cross sections shown on the Plans or established by the Engineer.

This section includes the requirements for Asphaltic Concrete Open Graded Crack Relief Interlayer mixtures regardless of the gradation of the aggregates, type and amount of bituminous material, or pavement use. Follow the requirements in Section 400, Section 402 and Section 828 for production and placement, materials, equipment, and acceptance plans except as noted or modified in this Specification.

Acceptance of work is on a lot-to-lot basis according to the requirements of this Section, Section 400, Section 402 and Section 106.

415.1.01 Definitions

Asphaltic Concrete Open Graded Crack Relief Interlayer: an open graded mixture placed at a lift thickness that yields stone on stone contact that provides in-place air void content of 18 to 23 percent to mitigate existing cracking within asphaltic concrete pavements.

415.1.02 Related References

A. Standard Specifications

Section 106—Control of Materials

Section 109—Measurement and Payment

Section 152—Field Laboratory Building

Section 400 – Hot Mix Asphaltic Concrete Construction

Section 402 – Hot Mix Recycled Asphaltic Concrete

Section 413—Bituminous Tack Coat

Section 800 – Coarse Aggregate

Section 802—Coarse Aggregate for Asphaltic Concrete

Section 820 – Asphalt Cement

Section 828—Hot Mix Asphaltic Concrete Mixtures

Section 831 – Admixtures

Section 882 – Lime

Section 883 – Mineral Filler

B. Referenced Documents

AASHTO T 209

AASHTO T 202

Section 415—Asphaltic Concrete Open Graded Crack Relief Interlayer

AASHTO T 49

AASHTO T 315

Department of Transportation Standard Operating Procedure (SOP) 27

Department of Transportation Standard Operating Procedure (SOP) 15

Department of Transportation Standard Operation Procedure (SOP) 40

GDT 38

GDT 73

GDT 83

GDT 119

GDT 125

GDT 126

GSP 15

GSP 21

QPL 1

QPL 2

QPL 7

QPL 26

QPL 39

QPL 41

QPL 45

415.1.03 Submittals

A. Invoices

Furnish formal written invoices from a supplier for all materials used in production of HMA when requested by 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
-

Section 415—Asphaltic Concrete Open Graded Crack Relief Interlayer

- 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 Asphaltic Concrete Open Graded Crack Relief Interlayer mixtures 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 and Testing for approval. The Quality Control Program will be included as part of the certification in the annual plant inspection report.

415.2 Materials

The requirements established in Section 400 are to be followed for Asphaltic Concrete Open Crack Relief Interlayer production and placement, materials, equipment, and acceptance plans except as noted or modified in this Specification.

Ensure that materials comply with the specifications listed in Table 1.

Section 415—Asphaltic Concrete Open Graded Crack Relief Interlayer

Table 1—Materials Specifications

Material	Subsection
Asphalt Cement, Grade Specified	820.2
Coarse Aggregates for Asphaltic Concrete	802.2.02
Fine Aggregates for Asphaltic Concrete	802.2.01
Mineral Filler	883.1
Heat Stable Anti-Stripping Additive	831.2.04
Hydrated Lime	882.2.03
Silicone Fluid (When approved by the Office of Materials and Testing)	831.2.05
Bituminous Tack Coat: PG 58-22, PG 64-22, PG 67-22	820.2
Hot Mix Asphaltic Concrete Mixtures	828

415.2.01 Mix Design Requirements

The Open Graded Crack Relief Interlayer Mixture shall be formulated to contain approximately 18 to 23 percent in-place air voids after compaction. Use approved mixtures that meet the following mixture control tolerances and design criteria:

Table 2 – Asphaltic Concrete Open Graded Crack Relief Interlayer Mixture

Sieve Size	Mixture Control Tolerance, %	Design Gradation Limits, % Passing
		Open Graded Crack Relief Interlayer
3/4 in (19 mm) sieve	±0.0	100
1/2 in (12.5 mm) sieve	±6.1	80 - 100
3/8 in (9.5 mm) sieve	±5.6	40 - 65
No. 4 (4.75 mm) sieve	±5.7	10 - 25
No. 8 (2.36 mm) sieve	±4.6	2 - 8
No. 200 (75 µm) sieve	±2.0	1 - 4
Range for % AC	±0.4	4.50 – 5.25
Class of stone (Section 800)		"A" only
Drain-down (AASHTO T305), %		<0.3
Design optimum air voids (%)		22% ±1
Control Sieves used in Acceptance Schedule		3/8 in., No. 8 (9.5 mm, 2.36 mm) and Asphalt Cement

Notes:

1. Use only PG 64-22 or PG 67-22 asphalt cement (specified in Section 820).
2. Use no less than 1.0% hydrated lime regardless of aggregates group or source(s) used.
3. Ensure no more than 10 percent Recycled Asphalt Pavement (RAP) is used in Asphaltic Concrete Open Graded Interlayer mixtures.
4. Quality Acceptance Test Results for AC content 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 State Materials Engineer based on statistical trend.
5. Range for % AC is Original Optimum AC (OOAC) at 50 blow Marshall or 50 gyrations prior to the Corrected Optimum

Section 415—Asphaltic Concrete Open Graded Crack Relief Interlayer

AC (COAC) calculation detailed in SOP 2 (Appendix D).

415.3 Construction Requirements

The requirements established in Section 400 are to be followed for asphaltic concrete mixture production and placement, materials, equipment, and acceptance plans except as noted or modified in this Specification.

415.3.01 Personnel

General Provisions 101 through 150.

415.3.02 Construction

Asphaltic concrete plants that produce mix for Department use are governed by Quality Assurance for Hot Mix Asphaltic Concrete Plants in Georgia, Laboratory Standard Operating Procedure No. 27.

Follow requirements established in Section 400 for production and placement, materials, equipment, acceptance plans and adjustments except as noted or modified in this Specification.

- A. Apply the bituminous tack coat according to Section 413. The Engineer will determine the application rate, which must be within the limits of 0.07 gal/yd² to 0.10 gal/yd² (0.32 L/m² to 0.45 L/m²) (**residual asphalt cement**).
- B. The mix shall be produced and placed at a temperature of 250°F with a tolerance of ± 20°F.
- C. Place the mix to a compacted lift thickness of 1-inch (25 mm). For construction purposes, the target thickness will be converted to spread rate based on the bulk specific gravity of the asphaltic concrete mixture being used as shown in the following equation:
$$\text{Spread rate (lbs/yd}^2\text{)} = t * G_{mb} * 46.8 \quad (\text{Spread rate (kg/ m}^2\text{)} = t * G_{mb})$$

Where: t = Compacted lift thickness (inches, mm)
G_{mb} = bulk specific gravity of the mix from the approved mix design

The spread rate shall be controlled within 10 lbs/yd² (6 kg/m²).

- D. Do not place mix at air temperatures below 50 °F (10 °C).
- E. The mix shall be compacted in a manner to achieve 18 to 23 percent in-place air voids. Steel wheel rollers operating in static mode *only* will be used to seat the lift of Asphaltic Concrete Open Graded mixture. Pneumatic tire rollers shall not be allowed on the Asphaltic Concrete Open Graded Crack Relief Interlayer mat.

415.4. Measurement

Asphaltic Concrete Open Graded Crack Relief Interlayer mixture, complete, in place and accepted, is measured in tons (megagrams). If the spread rate exceeds the upper limits outlined in Subsection 415.3.02.C, the mix in excess will not be paid for. If the rate of the spread is less than the lower limit, the deficient course is subject to correction 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 mixture control requirements established in Table 1 – Asphaltic Concrete Open Graded Crack Relief Interlayer Mixture Design and Control. After the deficient course has been corrected, the total spread rate for that lot is recalculated, and the mix in excess of the upper limits outlined in Subsection 415.3.02.C will not be paid for.

415.5 Payment

Asphaltic Concrete Open Graded Crack Relief-Interlayer mix is paid for at the Contract Unit Price per ton (megagram). Payment is full compensation for furnishing and placing materials including asphalt cement, hydrated lime, 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. 415	Asphaltic Concrete Open Graded Crack Relief Interlayer, group-blend, Including bituminous materials and hydrated lime	Per ton (megagram)
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Section 415—Asphaltic Concrete Open Graded Crack Relief Interlayer

415.5.01 Adjustments

A. Materials Produced and Placed During the Adjustment Period

Follow requirements established in Section 400 for production and placement, materials, equipment, acceptance plans and adjustments except as noted or modified in this Specification.

Asphaltic Concrete Open Graded Crack Relief Interlayer shall be granted an adjustment period for the first Lot or day, whichever is less, 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. Test the mixture in accordance with Section 400.3.06. Maintain the asphalt cement content and gradation within the limits provided in Table 1 – Asphaltic Concrete Open Graded Interlayer Mixture Design and Control. The Engineer will not use these test results in the acceptance for payment decision but production and placement operations shall cease for failure to meet mixture control tolerances established in Table 1 – Asphaltic Concrete Open Graded Interlayer Mixture Design and Control.

415.5.02 Determine Lot Acceptance

The Engineer will accept the mixture based on visual inspection. The mixture shall be inspected for texture, segregation, bleeding, fat spots, raveling, delamination, tearing, targeted in-place air void content and slippage areas. Remove and replace any areas determined to be unacceptable to the Engineer.

Office of Materials and Testing

RDOT LMIG 2018

August 25, 2014
Revised: October 6, 2014
December 4, 2015

DEPARTMENT OF TRANSPORTATION STATE OF GEORGIA

SPECIAL PROVISION

Section 802—Aggregates for Asphaltic Concrete

Delete Subsection 802.2.02 and substitute the following:

802.2.02 Coarse Aggregate for Asphaltic Concrete

A. Requirements

1. Types

Ensure coarse aggregate meets the following requirements:

- Class A or B crushed stone, gravel, slag, or synthetic aggregate as in Subsection 800.2.
- Have uniform quality throughout without any deleterious substances.
- Meet the required performance characteristics when combined into a mixture.

NOTE: Do not use alluvial gravel as virgin aggregate.

2. Groups

Coarse aggregate shall be one of either group below as specified in the composition Table in Subsection 828.2.A.2:

- Group I—Limestone, dolomite, marble, or combination thereof
- Group II—Gravel, slag, granite and gneissic rocks, quartzite, or combination thereof

3. Aggregate for Stone Matrix Asphalt

Use coarse aggregate that meets requirements of this Section and Section 800 except as follows:

- Use Class A aggregate only with percent wear of each individual size not to exceed 45 percent based on the B grading of AASHTO T 96
- Use aggregate that meets section 828.2.02 (Stone Matrix Asphalt Mixtures).
- Do not blend aggregates meeting abrasion requirements with aggregates not meeting requirements.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

Test as follows:

Test	Method
Coarse Aggregate	<u>Subsection 800.2.01.C</u>

D. Materials Warranty

General Provisions 101 through 150.

Office of Materials and Testing

November 17, 2006
Revised: May 30, 2012
Revised: November 16, 2012
July 10, 2013
Revised: June 22, 2016

RDOT LMIG 2018
DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA
SUPPLEMENTAL SPECIFICATION

Section 812—Backfill Materials

Delete Section 812 and substitute the following:

812.1 General Description

This section includes the requirements for four types of material used as backfill: foundation backfill, Types I and II, imperfect trench backfill, Type III, and mechanically stabilized wall backfill.

812.1.01 Related References

A. Standard Specifications

Section 810—Roadway Materials

B. Referenced Documents

AASHTO T 11
AASHTO T 27
AASHTO T 96
AASHTO T 104
GDT 4
GDT 6
GDT 7
GDT 24a
GDT 24b
GDT 67
GDT 75
GDT 98
SOP 1

812.2 Materials

812.2.01 Foundation Backfill, Type I

A. Requirements

1. Use natural or artificial mixtures of materials consisting of hard, durable particles of sand or stone, mixed with silt, clay and/or humus material for Type I backfill.
2. Have the final blend of material meet the requirements of Class I or II soils in Subsection 810.2.01.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

Test as follows:

Test	Method
Soil gradation	GDT 4
Volume change	GDT 6
Maximum density	GDT 7 or GDT 67

D. Materials Warranty

General Provisions 101 through 150.

812.2.02 Foundation Backfill, Type II

A. Requirements

1. Type

Use material meeting the requirements of Section 800, Class A or B aggregate, and SOP 1. Crushed concrete may be used provided it meets the requirements of Section 800 that are applicable to Group 2 Aggregates.

Do not use backfill aggregate containing soil or decomposed rock.

2. Gradation

Use material meeting the following gradation requirements:

Sieve Size	% Passing by Weight
1-1/2 in (37.5 mm)	100
1 in (25 mm)	80-100
No. 8 (2.36 mm)	0-5

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

Test as follows:

Test	Method
Sieve analysis	AASHTO T 27

D. Materials Warranty

General Provisions 101 through 150.

812.2.03 Imperfect Trench Backfill, Type III

A. Requirements

1. Type

Use material made from either of the following for Type III backfill:

- A natural soil with a density of less than 95 lb/ft³ (1520 kg/m³) when tested with GDT 7
- An artificial mixture of soil and organic material, such as hay, leaves, or straw

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

The laboratory will:

1. Test the soil density with GDT 7.
2. Review the mixture and the percentages of each material, and approve a mixture suitable for the Project.

D. Materials Warranty

General Provisions 101 through 150.

812.2.04 Mechanically Stabilized Embankment Backfill

A. Requirements

Use material comprised of crushed stone, natural sand, or a blend of crushed stone and natural sand free of soils, organic or any other deleterious substances meeting the following additional requirements:

1. Crushed Stone

Use a material manufactured from Class A or B stone that is free of soil overburden, has a soundness loss of not more than 15 percent, and conforms to the requirements of SOP 1.

2. Natural Sand

May be used in conjunction with an approved, non-corrodible, extensible reinforcement. Use non-plastic material consisting of strong, hard, durable particles having a durability index of at least 70. Use Natural Sand from an approved source on Qualified Products List – 1 or from a source approved by the Office of Materials and Testing. Requirements for approval will be provided by the Geotechnical Bureau.

3. Gradation

Sieve Size	% Passing by Weight
4 in (100 mm)	100
2 in (50 mm)	80 -100
No. 10 (2 mm)	20 - 90*
No 200 (75 μm)	0 - 15
* Natural Sand may be 20 - 100	

4. Chemical

Ensure the material meets the following chemical requirements:

Test Method	Requirement
pH	*5.0 – 9.5
Resistivity	>3000 ohms/cm
Chlorides	<100 ppm
Sulfates	<200 ppm
Note: These chemical requirements are not applicable to MSE walls stabilized with an approved, non-corrodible, extensible reinforcement.	

*Sources of select backfill material having a pH between 4.5 and 5.0 may be used provided the interior face of the MSE wall panels have 3 inches of concrete cover over the reinforcement and the concrete used in the panels contains the following ingredients and proportions:

Material	% by Weight	
	Minimum	Maximum
Cement	30	--
Type F Fly Ash	10	20
Slag	50	60
Type F Fly Ash and Slag	--	70

5. Maximum Dry Density

Use backfill material with a maximum dry density equal to or greater than the design unit weight shown on the plans.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

Test the material as follows:

Test Method	Requirement
Percent Wear	AASHTO T96 ("A" Grading)
Sieve Analysis	AASHTO T 27
Material Passing No. 200 (75 µm) Sieve	AASHTO T 11
Durability Index	GDT 75
Maximum Dry Density	GDT 7 or GDT 24a, GDT 24b
Soundness (Magnesium Sulfate)	AASHTO T 104
pH	GDT 98
Resistivity	GDT 98
Chlorides	GDT 98
Sulfates	GDT 98

RDOT LMIG 2018
DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

SUPPLEMENTAL SPECIFICATION

Section 828—Hot Mix Asphaltic Concrete Mixtures

Delete Section 828 and substitute the following:

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 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](#)

[GDT 127](#)

[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, 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"). Ensure SMA mix designs are verified and approved by the Department prior to use. Ensure 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 meeting 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 meeting 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 Materials 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 $\geq 25\%$ 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. Ensure local sand contains no more than 7.0 % clay by weight and is free of foreign substances, roots, twigs, and other organic matter. Ensure sand is free of clay lumps, as determined by AASHTO T 112, and has 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 (N_{des}) of 65 gyrations and initial gyration number (N_{ini}) of 6 gyrations. Ensure 4.75 mm mixes, (N_{des}) are designed at 50 gyrations, and (N_{ini}) at 6 gyrations. Open-graded mix designs will be designed by the Department in accordance with GDT 114. In all cases, the procedure for measuring Maximum Specific Gravity (G_{mm}) is AASHTO T 209. In addition to gradation and volumetric analysis, ensure mix designs include the following performance tests, as applicable.
2. Performance Test:
 - a. Permeability test: Ensure Superpave and Stone Matrix mix designs include testing according to GDT -1 Measurement of Water Permeability of Compacted Asphalt Paving Mixtures. Ensure specimen air voids for this test are $6.0 \pm 1.0\%$. The average permeability of three specimens may not exceed 3.60 ft per day (125×10^{-5} cm per sec).

- b. Moisture susceptibility test: Ensure mix designs of all types except open-graded surface mixes include testing for moisture susceptibility according to GDT 66. Ensure specimen air voids for this test are $7.0 \pm 1.0\%$ for all mixes excluding Stone Matrix mixes. Ensure specimen air voids for this test are $6.0 \pm 1.0\%$ for Stone Matrix mixes. The minimum tensile splitting ratio is 0.80, except a tensile splitting ratio of no less than 0.70 may be acceptable if all individual strength values exceed 100 psi (690 kPa). Ensure average splitting strength of the three conditioned and three controlled samples are not less than 60 psi (415 kPa) for either group. Ensure retention of coating as determined by GDT 56 is not less than 95%.
- c. Rutting susceptibility test: Ensure mix designs of all types except Open-graded Surface Mixes (OGFC and PEM), and mixtures designed exclusively for trench widening include testing according to GDT 115 or AASHTO T 340. Design limits for this test are as follows: Ensure specimen air voids for this test are $5.0 \pm 1.0\%$ for all mix types excluding SMA mixtures incorporating ≥ 15 percent RAP. Ensure specimen air voids for this test are $6.0 \pm 1.0\%$ for all mix types excluding SMA mixtures incorporating < 15 percent RAP. Ensure specimen air voids for this test are $6.0 \pm 1\%$ for all SMA mixtures. Ensure testing temperature is 64°C (147°F) for all mix types except 19 mm and 25 mm Superpave mixes, which are to be tested at 49°C (120°F). Ensure maximum deformation is 5.0 mm for all mixes except 4.75 mm mix, 9.5 mm Types I and II Superpave mixes. Ensure maximum deformation for the 9.5 mm Type II Superpave mix is 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. Ensure field verification results for rutting susceptibility tests performed on laboratory fabricated and/or roadway cores obtained from asphalt plant produced mixtures 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, % Passing		
		9.5 mm OGFC	12.5 mm OGFC	12.5 mm PEM
3/4 in (19 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	5-10	5-10	5-10
No. 200 (75 μm) sieve	± 2.0	2-4	2-4	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 (GDT 127), %		<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. Ensure all OGFC and PEM mixes include a stabilizing fiber of the type (cellulose or mineral) specified in the mix design and meeting the requirements of [Section 819](#). Ensure the dosage rate is as specified in the mix design and 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 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 mm) sieve	±0.0			100*
3/4 in (19 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 % AC (Note 1)	±0.4 (Note 2)	6.0-7.5	5.8-7.5	5.5-7.5
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 ratio after freeze-thaw cycle GDT-66		80%	80%	80%
Drain-down (GDT 127), %		<0.3	<0.3	<0.3

*Mixture control tolerance is not applicable to this sieve for this mix.

**Mixture control tolerance is ± 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 State Materials Engineer based on statistical 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 Type I	9.5 mm Superpave Type II	12.5 mm Superpave (Note 1)	19 mm Superpave	25 mm Superpave
1½ in (37.5 mm)						100*
1- in (25.0 mm)	± 8.0			100*	100*	90-100
¾ in (19.0 mm)	±8.0**	100*	100*	98-100****	90-100	55-89**
½ in (12.5 mm)	±6.0***	98-100****	98-100****	90-100	60-89***	50-70
⅜ in (9.5 mm)	±5.6	90-100	90-100	70-89	55-75	
No. 4 (4.75 mm) s	±5.6	65-85	55-75			
No. 8 (2.36 mm)	±4.6	48-55	42-47	38-46	32-36	30-36
No. 200 (75 µm)	±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.

** Ensure mixture control tolerance is within ± 10.0% for this sieve for 25 mm Superpave.

***Ensure mixture control tolerance is within ± 8.0% for this sieve for 19 mm Superpave.

***Ensure mixture control tolerance is within ± 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 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 State Materials Engineer 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 gyrations, Ni	All	91.5% maximum
% voids filled with asphalt (VFA) at Ndes	9.5 mm Type I	Min. 72; Max. 80
	9.5 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 ratio (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
	9.5 Type II	16.0

*Superpave Mixtures approved prior to January 31, 2012, may be adjusted to meet Minimum Film Thickness requirements by the State Materials 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 (Note 1)	+ 0.4 (Note 2)	6.00 - 7.50	5.50 - 7.25	5.25 - 7.00

* Mixture control tolerance is not applicable to this sieve for this mix.

****Ensure mixture control tolerance is within ± 2.0% for this sieve for 12.5 mm and 9.5 mm mixes.

Note 1: 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).

Note 2: Quality Acceptance Test Results for AC content that deviate $> \pm 0.3\%$ 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 State Materials Engineer based on statistical trend.

2. Subsurface Layers for parking facilities:

Sieve Size	Mixture Control Tolerance	Design Gradation 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
3/4 in (19.0 mm) sieve	$\pm 8.0^{**}$	98-100****	90-100	55-89**
1/2 in (12.5 mm) sieve	$\pm 6.0^{***}$	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 (Note 1)	+ 0.4 (Note 2)	5.00 - 6.25	4.25 - 5.50	4.00 - 5.25

*Mixture control tolerance is not applicable to this sieve for this mix.

**Ensure mixture control tolerance is within $\pm 10.0\%$ for this sieve for 25 mm Superpave mixes.

*** Ensure mixture control tolerance is within $\pm 8.0\%$ for this sieve for 19 mm Superpave mixes.

****Ensure mixture control tolerance is within $\pm 2.0\%$ for this sieve for 12.5 mm and 9.5 mm Superpave mixes.

Note 1: 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).

Note 2: Quality Acceptance Test Results for AC content that deviate $> \pm 0.3\%$ 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 State Materials Engineer based on statistical trend.

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 initial number of gyrations, Ni	All	91.5 % maximum
% voids filled with asphalt (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 the aggregate (Gse). See SOP-2	12.5 mm	15.0
	9.5 mm Types I, II	16.0

* Mixtures approved prior to January 31, 2012, may be adjusted to meet Minimum Film Thickness requirements by the State Materials 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 that 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 (Note 2)	±0.4 (Note 3)	6.00 – 7.50
Design optimum air voids (%)		4.0 – 7.0
% Aggregate voids filled with AC		60 - 80
Minimum Film Thickness (microns) (Note 1)		> 6.00

* Mixture control tolerance is not applicable to this sieve for this mix.

Note 1: 4.75 mm Mixtures approved prior to January 31, 2012, may be adjusted to meet Minimum Film Thickness requirements by the State Materials Engineer.

Note 2: 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).

Note 3: 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 State Materials Engineer based on statistical trend.

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.

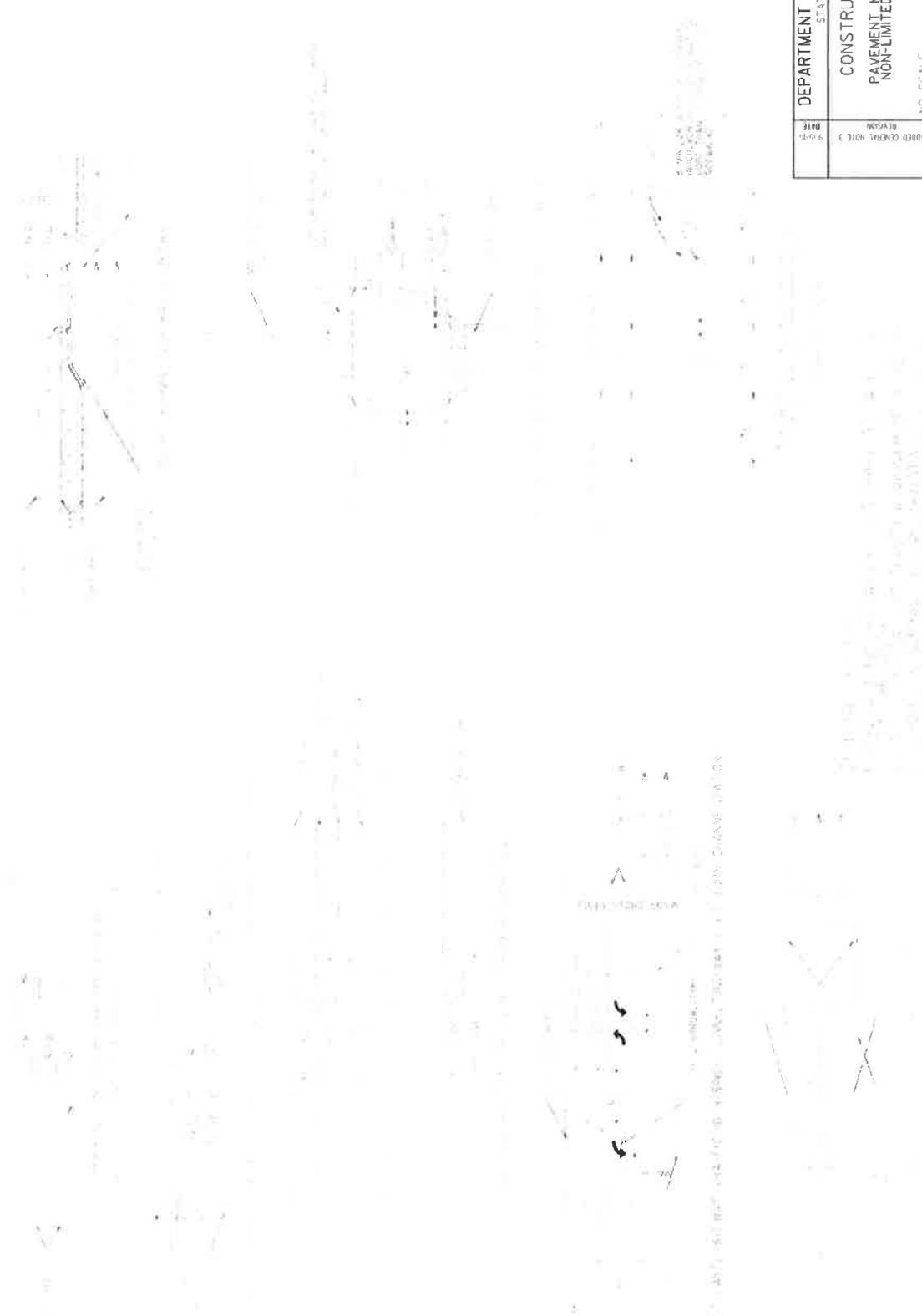
D. Materials Warranty

See General Provisions 101 through 150.

Office of Materials and Testing

RDOT LMIG 2018

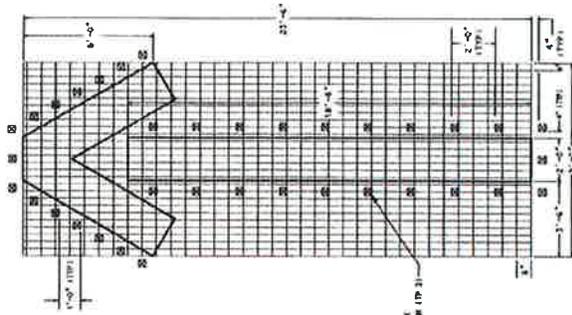
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DEPARTMENT OF TRANSPORTATION STATE OF GEORGIA	
CONSTRUCTION DETAILS	
PAVEMENT MARKING PLACEMENT NON-LIMITED ACCESS ROADWAY	
NO. SCALE	JANUARY, 2000
DATE	NUMBER
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9-5-16	
DR	CHECKED
BY	TRACED

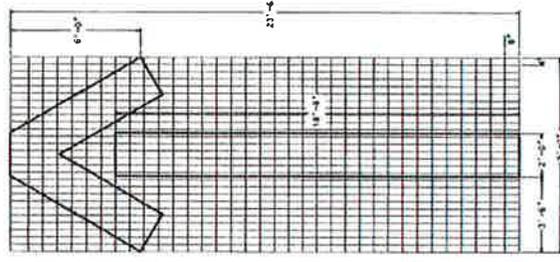
RDOT LMIG 2018

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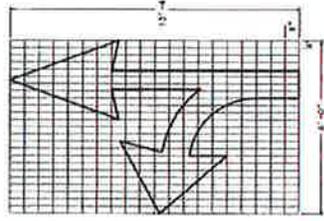


PAVEMENT MARKING, ARROW, WRONG WAY
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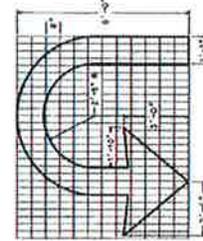
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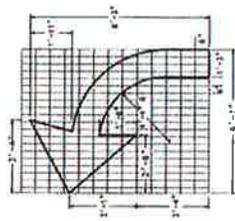
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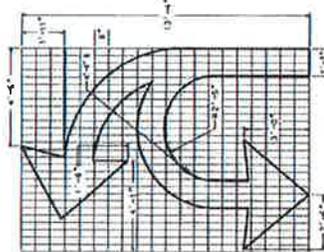
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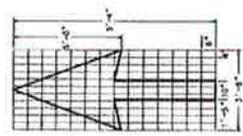
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(26.0 SQ. FT.)



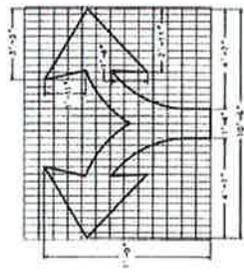
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PAVEMENT MARKING, ARROW, TYPE 6
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(42.0 SQ. FT.)



PAVEMENT MARKING, ARROW, TYPE 1
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(12.0 SQ. FT.)



PAVEMENT MARKING, ARROW, TYPE 5
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(25.5 SQ. FT.)

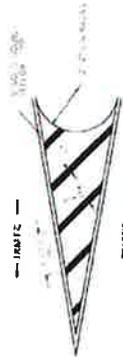
DATE	REVISIONS	GEORGIA DEPARTMENT OF TRANSPORTATION
		OFFICE OF TRAFFIC SAFETY & DESIGN

DETAILS OF
PAVEMENT MARKINGS-ARROWS
NO SCALE
JANUARY 2000

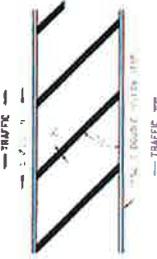
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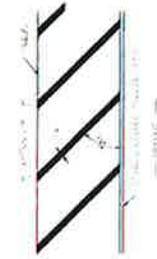
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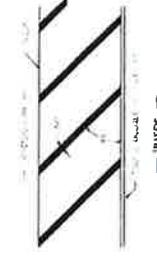
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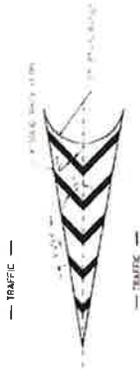
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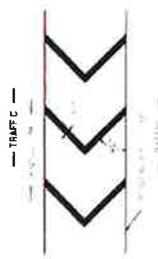
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DETAIL "A" (WHITE)



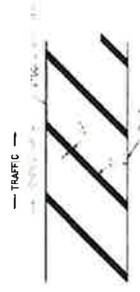
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DETAIL "C" (WHITE)



DETAIL "D" (WHITE)



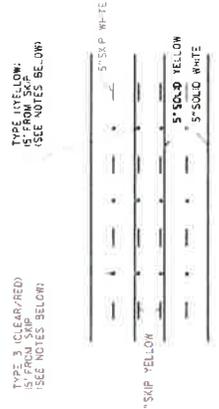
- GENERAL NOTES:**
1. FOR YELLOW STRIPING: THE SQUARE YARDS SHOWN ON PLAN, SUMMARY AND ESTIMATE SHEETS INCLUDES THE AREA WITHIN THE BORDERS AND THE 5" SOLID DOUBLE YELLOW BORDER.
 2. FOR WHITE STRIPING: THE SQUARE YARDS SHOWN ON PLAN, SUMMARY AND ESTIMATE SHEETS INCLUDES THE AREA WITHIN THE BORDERS AS WELL AS THE 8" SOLID WHITE BORDER.

	GEORGIA DEPARTMENT OF TRANSPORTATION	NO SCALE	DATE: 8/25/14 REVISIONS: 1 REVISION: 17/18/25 REVISION: 11/18/18	STATE OF GEORGIA DEPARTMENT OF TRANSPORTATION OFFICE OF ROAD & STRUCTURES SIGNING AND MARKING PLANS JANUARY 2008 T-14
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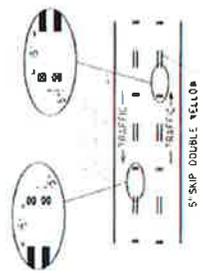
RDOT LMIG 2018

DATE	PROJECT NUMBER	DATE	SCALE
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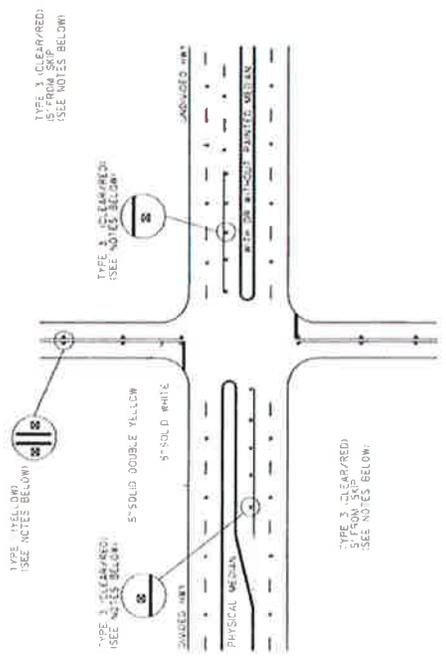
TWO WAY LEFT TURN LANE



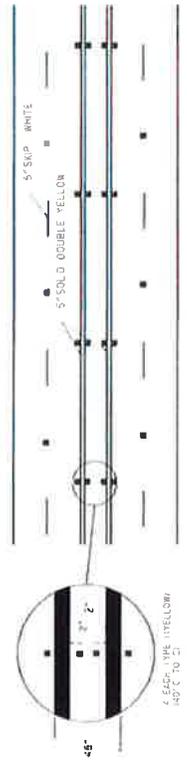
REVERSIBLE LANE



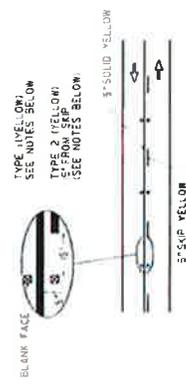
DIVIDED / UNDIVIDED HIGHWAY



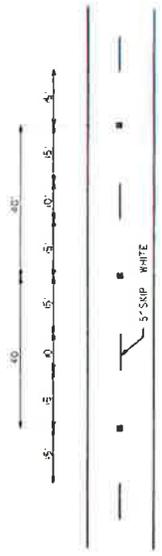
4'-0" STRIPED FLUSH MEDIAN



NO PASSING ZONE



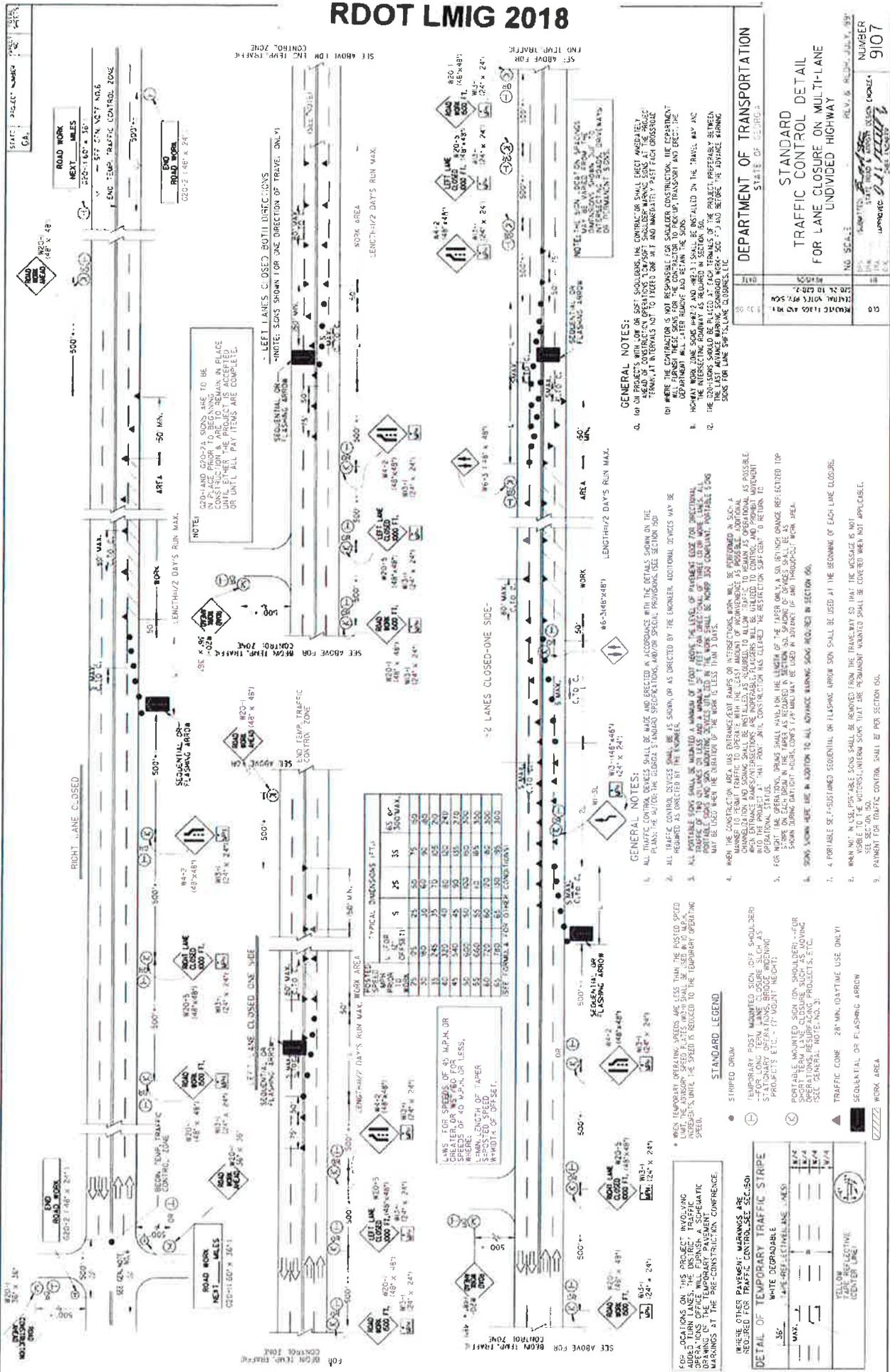
TYPICAL RPM/STRIPE SPACING



- GENERAL NOTES:
1. RAISED PAVEMENT MARKERS SHALL BE SPACED EVERY 40 FT.
 2. ON 5' SOLID WHITE TURN BAY LINES, SPACING SHALL BE 20 FT.
 3. RAISED PAVEMENT MARKERS SHALL BE OFFSET 5 INCHES FROM SOLID LANE LINES.
 4. CLEAR FACE OF TYPE 1 RAISED PAVEMENT MARKERS SHALL BE ORIENTED TOWARD ONCOMING TRAFFIC.

DEPARTMENT OF TRANSPORTATION	
STATE OF GEORGIA	
CONSTRUCTION DETAILS	
RAISED PAVEMENT MARKER LOCATION NON-LIMITED ACCESS ROADWAY	
NO. SCALE	REV. AND. REDRAWN, JUNE 2015
DESIGNED BY	NUMBER
DRAWN BY	T-15A
CHECKED BY	

RDOT LMIG 2018



STATE PROJECT NUMBER		CA
DATE		02/22/18
PROJECT NAME		RDOT LMIG 2018
DRAWING NUMBER		9107
REVISED BY		REV. 6 - 02/22/18
DESIGNED BY		DESIGNED BY
CHECKED BY		CHECKED BY
APPROVED BY		APPROVED BY

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

STANDARD
TRAFFIC CONTROL DETAIL
FOR LANE CLOSURE ON MULTI-LANE
UNDIVIDED HIGHWAY

- GENERAL NOTES:**
- FOR ALL PROJECTS WITH ONE OR MORE LANES CLOSED, THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING UTILITIES AND STRUCTURES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING UTILITIES AND STRUCTURES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING UTILITIES AND STRUCTURES.
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STANDARD LEGEND

- STRIPPED DRUM
- TEMPORARY POST MOUNTED SIGN (OFF SHOULDER)
- FOR LONG TERM LANE CLOSURE, BRIDGE, WIDENING PROJECTS, ETC. - (7' MOUNT HEIGHT)
- PORTABLE MOUNTED SIGN (ON SHOULDER) - FOR SHORT TERM LANE CLOSURE, SUCH AS MOVING SIGN, ETC. - (7' MOUNT HEIGHT)
- TRAFFIC CONE - 28" DIA. (DAYTIME USE ONLY)
- SEQUENTIAL OR FLASHING ARROW
- WORK AREA

DETAIL OF TEMPORARY TRAFFIC STRIPE

WHERE OTHER PAVEMENT MARKINGS ARE REQUIRED FOR TRAFFIC CONTROL, SEE SECTION 500

TYPE	W1-1	W1-2	W1-3	W1-4	W1-5	W1-6	W1-7	W1-8	W1-9	W1-10	W1-11	W1-12	W1-13	W1-14	W1-15	W1-16	W1-17	W1-18	W1-19	W1-20	W1-21	W1-22	W1-23	W1-24	W1-25	W1-26	W1-27	W1-28	W1-29	W1-30	W1-31	W1-32	W1-33	W1-34	W1-35	W1-36	W1-37	W1-38	W1-39	W1-40	W1-41	W1-42	W1-43	W1-44	W1-45	W1-46	W1-47	W1-48	W1-49	W1-50	W1-51	W1-52	W1-53	W1-54	W1-55	W1-56	W1-57	W1-58	W1-59	W1-60	W1-61	W1-62	W1-63	W1-64	W1-65	W1-66	W1-67	W1-68	W1-69	W1-70	W1-71	W1-72	W1-73	W1-74	W1-75	W1-76	W1-77	W1-78	W1-79	W1-80	W1-81	W1-82	W1-83	W1-84	W1-85	W1-86	W1-87	W1-88	W1-89	W1-90	W1-91	W1-92	W1-93	W1-94	W1-95	W1-96	W1-97	W1-98	W1-99	W1-100
DESCRIPTION	W1-1	W1-2	W1-3	W1-4	W1-5	W1-6	W1-7	W1-8	W1-9	W1-10	W1-11	W1-12	W1-13	W1-14	W1-15	W1-16	W1-17	W1-18	W1-19	W1-20	W1-21	W1-22	W1-23	W1-24	W1-25	W1-26	W1-27	W1-28	W1-29	W1-30	W1-31	W1-32	W1-33	W1-34	W1-35	W1-36	W1-37	W1-38	W1-39	W1-40	W1-41	W1-42	W1-43	W1-44	W1-45	W1-46	W1-47	W1-48	W1-49	W1-50	W1-51	W1-52	W1-53	W1-54	W1-55	W1-56	W1-57	W1-58	W1-59	W1-60	W1-61	W1-62	W1-63	W1-64	W1-65	W1-66	W1-67	W1-68	W1-69	W1-70	W1-71	W1-72	W1-73	W1-74	W1-75	W1-76	W1-77	W1-78	W1-79	W1-80	W1-81	W1-82	W1-83	W1-84	W1-85	W1-86	W1-87	W1-88	W1-89	W1-90	W1-91	W1-92	W1-93	W1-94	W1-95	W1-96	W1-97	W1-98	W1-99	W1-100

RDOT LMIG 2018

First Use Date 2013 Specifications: November 1, 2013

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

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.

Remove and dispose of all materials excavated from the trench widening operation. Excess material is to be disposed of at an approved soil disposal site. Compact subgrade 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.

**Department of Transportation
State of Georgia
Special Provision
County: FULTON
PI No.: M005405**

Section 316 – Cement Stabilized Reclaimed Base Construction (CSRB)

316.1 General Description

This work includes constructing a cement stabilized base course by pulverizing the existing flexible pavement and a predetermined depth of the underlying base course with Portland cement. Construct according to these Specifications and to the lines, grades, thickness, and typical cross-sections shown on the Plans or established by the Engineer.

316.1.01 Related References

General Provisions 101 through 150

A. Standard Specifications

[Section 109—Measurement and Payment](#)

[Section 301—Soil Cement Construction](#)

[Section 412—Bituminous Prime](#)

[Section 814—Soil Base Materials](#)

[Section 821—Cutback Asphalt](#)

[Section 824-Cationic Asphalt Emulsion](#)

[Section 830—Portland Cement](#)

[Section 880—Water](#)

B. Referenced Documents

GDT 19 – Determining Maximum Density of Soil-Cement mixtures

GDT 20 – Determining Field Density of soils with <45% retained on the No. 10 sieve and < 10% retained on the 1 inch sieve

GDT 21 - Determining Field Density of soils containing >45% retained on the No.10 sieve or >10% retained on the 1 inch sieve

GDT 59 - Testing Density of roadway materials with Nuclear Gauge

GDT 65 – Laboratory Design of Soil-Cement and Cement Stabilized Graded Aggregate

GDT 67 – Family of Curves Method for determining Maximum Density of soils

GDT 86 – Determining the compressive strength of Cement Stabilized Base cores taken from the roadway

Section 316 – Cement Stabilized Reclaimed Base Construction (CSRB)

316.1.02 Submittals

Prior to construction, submit a Construction Work Plan to the Engineer consisting of the proposed equipment, materials, and operation procedures. If the Engineer determines that the Work Plan is not satisfactory, revise the procedures and augment or replace equipment, as necessary, to complete the Work.

316.1.03 Mix Design

The Contractor shall submit a mix design to **RDOT Consultant** for approval at least three weeks prior to construction. The Mix Design process shall be completed in accordance with [GDOT Test Method/GDT 65](#) by an accredited materials laboratory. The sampling, testing, proportioning, and documentation shall be completed by an accredited materials laboratory. The Contractor will be responsible for ensuring that appropriate traffic control measures are in place during the sampling operations. In-place samples of the road structure shall be taken at a minimum frequency of 1000 feet per two lanes; alternating the sample locations to achieve a sample every 500 lane-feet. Additional samples may be needed to represent material changes and/or problem areas. Each sample shall contain at least 30lbs of proportionally blended materials to be reclaimed. The Portland cement used in the design process must be from an approved source listed on [GDOT's Qualified Products List/QPL3](#) and representative of the same material to be used in construction.

The mix design submittal to the **RDOT Consultant** shall include the following:

1. Approximately 100lbs of proportionally blended material from all in-place samples taken from the roadway.
2. A one gallon sample (plastic container) of the stabilizer used in the mix design.
3. All Test Data (charts, graphs, spreadsheets, etc.) along with design parameters. Test data should include the target gradation of the blended material, optimum moisture content of mixing, and application rate of the stabilizer to meet the design requirements.

Note: Since the Mix Design is based on source specific materials, any changes to materials or sources will render the design invalid.

316.2 Materials

Ensure that materials meet the requirements of the following GDOT Standard Specifications:

Material	Section
Blotter material (sand)	412.3.05.G.3
Soil Base Material	814.2.02
Cutback asphalt, RC-30, RC-70, RC-250 or MC-30, MC-70, MC-250, CSS-1h, AE-P, CRS-2	821.2.01
Portland Cement (Type I or Type II)	830.2.01
Water	880.2.01

Section 316 – Cement Stabilized Reclaimed Base Construction (CSRB)

316.3 Construction Requirements

316.3.01 Personnel

Ensure that only experienced and capable personnel operate equipment.

316.3.02 Equipment

Equipment used in CSRB construction must meet the following requirements and be approved by the Engineer prior to the beginning of construction. All equipment shall be in satisfactory condition and capable of its intended purpose. The Engineer may at any time reject any equipment that is deemed unsafe, erratic, or produces an inadequate performance.

Note: Equipment type, size, operation and condition are subject to the Engineer's approval and must be adjusted and/or replaced upon their request.

A. Reclaimer

CSRB will require a reclaimer unit that meets the following requirements:

1. Designed expressly for reclamation capable of pulverizing and mixing through asphaltic pavement, granular/soil base, Subbases, and subgrade down to depths of at least 12 inches.
2. Having a cutting drum with a minimum width of 8ft.
3. Capable of continuously mixing materials to a homogenous blend and at a consistent depth.
4. Powered by an engine of at least 500 horsepower with steerable front and rear wheels.
5. Controlled by an electronic metering system capable of injecting mix water directly into the mixing chamber and has automatic sensors to monitor water application and mixing depth.

B. Spreader

For CSRB construction, use a cyclone-type mechanical spreader or its equivalent that will spread Portland cement in a relatively dust-free process. Spreader must have an electronic or mechanical metering system which monitors the application rate.

Note: The use of pneumatic tubes to transfer cement or lime directly onto the roadway will not be allowed.

C. Additional Equipment (Water Truck, Compaction and Grading equipment, and Prime Distributer)

Additional equipment necessary to complete the work must be in satisfactory condition and proper for its intended purpose. Compactive equipment includes a sheep's foot roller, vibratory steel wheel roller and a pneumatic rubber tire roller. Use the correct size/type rollers or combination thereof that is capable of achieving the required density. A pressure distributor that complies with GDOT Standard Specifications/Subsection 424.3.02.B will be required to apply the bituminous prime coat.

Note: Equipment type, size, operation and condition are subject to the Engineer's approval and must be adjusted and/or replaced upon their request.

316.3.03 Preparation

Prior to commencing reclaiming operations, blade grass and excess soil a minimum of 12 inches from the edge of pavement. Locate mark and preserve existing centerline, manholes, and utilities (gas, water, and electric lines). Relocate mailboxes and other appurtenances within such proximity to the roadway as to risk damage or

Section 316 – Cement Stabilized Reclaimed Base Construction (CSRB)

interfere with the work. Remove sections of driveway aprons in the right-of-way where necessary to permit the reclaimer to operate without damaging the machinery or driveway pavement. If necessary, saw-cut a neat parallel line to the proposed edge of pavement and remove the concrete along the road. After all work is complete, replace appurtenances to their original location as nearly as possible.

316.3.04 Construction

A. Weather Limitations

1. Mix only when the weather permits the course to be finished without interruption and within the time specified.
2. Mix materials only when the moisture of the materials to be used in the mixture meets the specified limits.
3. Begin mixing only when the air temperature is above 40°F in the shade and rising.

B. Moisture Adjustment

Adjust the moisture content of the roadway materials to within 100 to 120 percent of the optimum moisture immediately before spreading the cement. The optimum moisture content is determined by the Job Mix Design and can be adjusted by the Engineer.

C. Cement Application

1. Apply cement on days when wind will not interfere with spreading.
2. Apply cement at the rate specified on the Job Mix Design (as established by GDT-65) and mix to the depth shown on the Plans. The Engineer may alter the spread rate during the progress of construction if necessary. Maintain the application rate within ± 10 percent of that specified by the Engineer.
3. Provide both equipment and personnel to measure the application rate of cement placed. Each tanker of cement shall be checked by using a square yard cloth/certified scales and by determining the overall coverage area of each tanker. Multiple checks may be necessary to ensure that the spread rate is maintained within the ± 10 percent limit.
4. If the cement content falls below the 10 percent limit in the mixing area, add additional cement to bring the affected area within the tolerance specified, make necessary adjustments to the spreader, and perform additional checks to ensure the problem is corrected. If the cement content is more than the 10 percent limit in the mixing area, the excess quantity will be deducted from the Contractor's pay for cement.
5. Regulate operations to limit the application of cement to sections small enough so that all of the mixing, compacting, and finishing operations can be completed within the required time limits.
6. Pass only spreading and mixing equipment over the spread cement and operate this equipment so that it does not displace cement.
7. Replace damaged cement at no cost to the Department when damage is caused by:
 - a. Hydration due to rain, before or during mixing operations.
 - b. Spreading procedures are contrary to the requirements stated above.
 - c. Displacement by the Contractor's equipment or other traffic.

Section 316 – Cement Stabilized Reclaimed Base Construction (CSRB)

D. Mixing

1. Begin mixing as soon as possible after the cement is spread, and continue until a homogeneous and uniform mixture is produced. The Engineer at any time may require adjustments or replacement of equipment if a homogeneous and uniform mixture conforming to these Specifications is not achieved.
2. Continue pulverizing until the base mixture is uniform in color and conforms to the following gradation requirements:
 - a. 100 percent passing the 3 inch sieve
 - b. 55 percent of the roadway material, excluding gravel, passes the No. 4 sieve.
3. Add water as needed to maintain or bring the moisture content to within the moisture requirements immediately after the preliminary mixing of the cement and roadway material.
4. Mix the additional water homogeneously into the full depth of the mixture.

E. Compaction and Finishing

1. Test Section
 - a. A test section shall be constructed with the first tanker of cement delivered to the project. The length of the test section will be determined by area in which the entire tanker of cement will cover.
 - b. The Engineer will evaluate compaction, moisture, homogeneity of mixture, thickness of stabilization, and finished base surface. And if the Engineer deems necessary, revise the compaction procedure or replace equipment.
 2. Time Limits
 - a. Complete compaction within 2 hours after the cement has been applied.
 - b. Do not perform vibratory compaction on materials more than 90 minutes old, measured from the time cement was added to the mixture.
 - c. Complete all operations within 4 hours from adding cement to finishing the surface.
 3. Moisture Control
 - a. During compaction, ensure that the moisture is uniformly distributed throughout the mixture at a level of between 100 and 120 percent of the optimum moisture content.
 4. Compaction Requirements
 - a. Use a sheep's foot roller, steel wheel roller or pneumatic-tired roller for initial compactive effort unless an alternate method is approved by the Engineer.
 - b. Compact the cement-stabilized base course to at least 98 percent of the maximum dry density established on the Job Mix Design.
 - c. Uniformly compact the mixture and then shape to the grade, line, and cross-section shown on the Plans.
 - d. Remove all loosened material accumulated during the shaping process. Do not use additional layers of cement-treated materials in order to conform to cross-sectional or grade requirements.
-

Section 316 – Cement Stabilized Reclaimed Base Construction (CSRB)

- e. Use a pneumatic-tired roller to roll the finished surface until it is smooth, closely knit, and free from cracks or deformations, and conforming to the proper line, grade, and cross-section.
- f. In places inaccessible to the roller, obtain the required compaction with mechanical tampers approved by the Engineer. Apply the same compaction requirements as stated above in [Subsection 316.3.04.E.4](#).
- g. Perform grading operations immediately after the placement and compaction operations. Roll the stabilized base course again with a pneumatic-tired roller.

F. Construction Joints

1. Form a straight transverse joint at the end of each day's construction or whenever the work is interrupted.
2. Create the straight transverse joint by cutting back into the completed work to form a true vertical face free of loose or shattered material.
3. Form the joint at least 2ft from the point where the spreader strike-off plate comes to rest at the end of the day's work, or at the point of interruption.
4. Form a longitudinal joint as described above if cement-stabilized mixture is placed over a large area where it is impractical to complete the full width during one day's work. Use the procedure for forming a straight transverse joint. Remove all waste material from the compacted base.

G. Priming the Base

1. The surface of the completed base course must be moist cured until the bituminous prime is applied.
2. Apply prime only to an entirely moist surface. If weather delays prime application, apply prime as soon as the surface moisture is adequate
3. Apply bituminous prime according to [GDOT Standard Specifications/Section 412](#) as soon as possible and in no case later than 24 hours after completion of the finishing operations.
4. Protect finished portions of the cement-stabilized base course that are used by equipment in the construction of an adjoining section to prevent marring or damaging of the completed work. Protect the stabilized area from freezing during the curing period.

H. Opening to Traffic

1. Correct any failures caused by traffic at no additional cost to the Department. Make repairs specified in [GDOT Standard Specifications/Subsection 300.3.06.B](#), whenever defects appear. This preservation action does not relieve the Contractor of his responsibility to maintain the work until final acceptance as specified in [GDOT Standard Specifications/Section 105](#).

316.3.05 Quality Acceptance

A. Compaction Tests

1. Determine the maximum dry density from representative samples of compacted material, according to [GDOT Test Method/GDT 19](#) or [GDT 67](#).
2. Determine the in-place density of finished courses according to [GDOT Test Method/GDT 20](#), [GDT 21](#) or [GDT 59](#), as soon as possible after compaction, but before the cement sets.

Section 316 – Cement Stabilized Reclaimed Base Construction (CSRB)

B. Gradation Tests

1. Ensure that the gradation of the completely mixed cement-stabilized base course meets the requirements as stated above in Subsection 316.3.04.D.2.

C. Finished Surface Tests

1. Check the finished surface of the cement-stabilized base course transversely using one of the following tools:
 - a. A template, cut true to the required cross-section and set with a spirit level on non-superelevated sections
 - b. A system of ordinates measured from a stringline
 - c. A surveyor' level
2. Ensure the ordinates measured from the bottom of the template, stringline, or straightedge, to the surface do not exceed $\frac{1}{2}$ inch at any point.

D. Thickness Tolerances

1. Determine the thickness of the cement-stabilized base course, by making as many checks as necessary to determine the average thickness, but not less than one check per 1000 feet per 2 lanes. Checks shall be taken after the completion of the base course and prior to priming.
2. If any measurement is deficient in thickness by more than $\frac{1}{2}$ inch, make additional measurements to isolate the affected area. Correct any area deficient by more than $\frac{1}{2}$ inch to the design thickness by using one of the following methods:
 - a. Apply GDOT approved asphaltic concrete 9.5mm Superpave.
 - b. Reconstruct to the required thickness.

No payment will be made for any Asphaltic Concrete 9.5mm Superpave used to correct deficiencies nor will pavement be made for removing and reconstructing the deficient work.

3. If any measurement exceeds thickness by more than $\frac{1}{2}$ inch, make additional measurements to isolate the affected area. If the basis of payment is per cubic yard and the average thickness for any mile increment exceeds the allowable $\frac{1}{2}$ inch tolerance. The excess quantity in that increment will be deducted from the Contractor's payments. The excess quantity is calculated by multiplying the average thickness that exceeds the allowable $\frac{1}{2}$ inch tolerance by the surface area of the base, as applicable.

316.4 Measurement

A. Cement-Stabilized Base Course

Measure the surface length along the centerline when payment is specified by the square yard. The width is specified on the Plans. Measure irregular areas, such as turnouts and intersections, by the square yard.

B. Portland Cement

Measure Portland cement by the ton.

Section 316 – Cement Stabilized Reclaimed Base Construction (CSRB)

C. Bituminous Prime

Bituminous prime is not measured for separate payment. Include the cost of furnishing and applying bituminous prime according to the provisions of GDOT Standard Specifications/Section 412 in the Unit Price Bid for each individual base item.

316.5 Payment

A. Cement-Stabilized Base Course

Cement-stabilized base, in-place and accepted, will be paid for at the Contract Unit Price per square yard. Payment will be full compensation for roadbed preparation, mixing on the road, shaping, pulverizing, watering, compaction, defect repair, bituminous prime and maintenance.

B. Portland Cement

Portland cement will be paid for at the Contract Unit Price per ton. Payment is full compensation for furnishing, hauling, and applying the material. Only Type I or II Portland cement incorporated into the finished course will be paid for and no payment will be made for cement used to correct defects due to the Contractor's negligence, faulty equipment, or error.

Payment will be made under:

Item No. 301-6000	Cement Treated Base Course	Per square yard
Item No. 301-5000	Portland Cement	Per ton

Office of Materials and Testing

LMIG 2018

APPENDIX C

AWARDED CONTRACTOR'S BID PROPOSAL

APPENDIX D
ROADWAY LIST

2018 LMIG Roadway Rehabilitation List

Rockdale County DOT
Brian Allen, Director
Blair Barnhardt, Deputy Director

ROAD NAME	BEGINNING	ENDING	LENGTH (miles)
Oglesby Bridge Road SW	South River Bridge	SR 212 ROW	2.02
Crowell Road SE	Troupe Smith Road SE	Oglesby Bridge Road SE	0.68
Bell Road SE	Hull Road SE	SR 20 ROW	1.05
Total Estimated Miles			3.75