

**Stephens Road and Old US 90 Lane  
Chip Seal or Paving Project  
Bid# 1920-ENG 1  
ADDENDUM 1**

Whenever there is a conflict between this addendum and the initial proposal or plans, the addendum shall take precedence.

Attached are questions that have been received, along with the answers:

1. is there Chip Seal specifications for the Stephens Road and Old US Lane Chip Seal or Paving Project?

Answer: [The Specifications are attached.](#)

Attachments: Specifications for Chip Seal  
Typical Detail Drawing

## Chip Seal Specifications

The asphalt emulsion used for the chip course shall be a CRS-2p type meeting the following requirements:

<b>Specification Designation</b>	<b>Test Method</b>	<b>Requirements</b>
Viscosity @ 122 degrees F	AASHTO T-59	75 – 300 Sec.
Sieve	AASHTO T-59	0.3% Maximum
Settlement, 5 days	AASHTO T-59	5% Maximum
Demulsibility	AASHTO T-59	40% Minimum
Storage Stability (test 1 day)	AASHTO T-59	1% Maximum
Particle Charge	AASHTO T-59	Positive
Ash Content	ASTM D3723	0.2% Maximum

### **Test of Residue by Drying:**

Percent Residue	CAL-331	65% Minimum
Penetration @ 77 degrees F 100 G, 5 Sec	AASHTO T-49	40 – 90
Ductility @ 77 degrees F 5 cm/min.	AASHTO T-51	40 cm Minimum
Torsional Recovery	CAL-332	18% Minimum

### **Chip Seal Preparation**

No less than 24 hours before beginning chip operations, the contractor shall notify all residents, businesses and agencies by an approved written notice detailing streets and limits of work to be done and the hours of work. The contractor shall also 24 hour post all streets that are to be worked upon with temporary “No Parking – Tow Away” signs at 100 foot intervals. These signs shall also state the day of the week and hours of no parking.

Adequate means shall be provided to protect the chip course from damage from traffic until such time that the mixture has cured sufficiently so that the aggregate will not adhere to and be picked up by the tires of the vehicles.

### **Applying Polymerized Latex Asphaltic Emulsion**

Asphaltic Emulsion shall be prevented from spraying upon adjacent pavements, that portion of the

traveled way being used by traffic structures, railing and barriers, markers, trees and shrubbery that are not to be removed, adjacent property and improvements, and other highway improvements or facilities not mentioned herein.

Distributor trucks shall be of the pressure type with insulated tanks. The use of gravity distributors will not be permitted. Spray bars shall have a minimum length of 9 feet and shall be of the full circulating type. The spray bar shall be adjustable to permit positioning at various heights above the surface to be treated. The valves shall be operated by levers so that one or all valves may be quickly opened or closed in one operation.

Spreading by means of cab controlled valves will be permitted. The valves which control the flow from nozzles shall act positively so as to provide a uniform unbroken spread of bituminous material on the surface. The distributor shall be equipped with devices and charts to provide for accurate and rapid determination and control of the amount of bituminous material being applied and with a bitumeter of the auxiliary wheel type registering speed in feet per minute, and trip and total distance in feet. The spreading equipment shall be designed so that uniform application of bituminous material, in controlled amounts, may be made ranging from 0.02 to one gallon per square yard of surface and with a range of pressure from 25 to 75 pounds per square inch. If a spray bar extension is used to cover a greater width, it shall be of the full circulating type. The distributor shall be equipped with a hose and nozzle to be used for spraying areas which are inaccessible to the distributor. The distributor shall also be equipped with pressure gages and an accurate thermometer for determination of temperatures of the bituminous material. Distributor and booster tanks shall be so maintained at all times as to prevent dripping of bituminous material from any part of the equipment.

In order to secure uniform distribution at the junction of 2 applications, the distribution shall be promptly stopped when the uniform flow decreases, indicating the tank is about empty.

The Owner reserves the right to order the use of any equipment discontinued which, in the opinion of the Engineer, fails to produce a satisfactory distribution of asphalt in accordance with the specifications.

Asphaltic emulsion shall not be applied when weather conditions are unsuitable. Asphaltic emulsion shall not be applied until sufficient aggregates are on hand to immediately cover the asphaltic emulsion, or when the atmospheric temperature is below 65 degrees F, or when the pavement temperature is below 80 degrees F.

The Contractor shall provide a satisfactory method of accurately measuring the volume of liquid asphalt in his storage tanks and in each spreading unit at any time. The initial application rate will be 0.27 gallons per square yard. The rate of application can be changed within a range of 0.20 to 0.35 gallons per square yard as directed by the Engineer.

The Engineer will notify the Contractor, no later than 4:00 p.m., if it is anticipated that the next working day will not be suitable for the application of seal coat. When the Engineer has declared a day to be unsuitable by reason of expected low temperature or unsuitable weather conditions, the Contractor shall not apply material.

Applying asphaltic emulsion shall be discontinued sufficiently early in the day to permit the termination of traffic control prior to darkness. Asphaltic emulsion shall be applied to only one designated traffic lane at a time and the entire width of the lane shall be covered in one operation.

Asphaltic emulsion shall not be applied a greater distance than can be immediately covered by aggregate, unless otherwise permitted by the Engineer.

The determination of the pass shall be made on building paper or similar material spread over the surface. Paper shall also be placed over the treated surface for a sufficient length at the beginning of a spread to avoid spraying existing pavement or previously placed aggregate and so that the nozzles are spreading properly when the uncovered surface is reached. The building paper shall then be removed and disposed of in a manner satisfactory to the Engineer.

The distribution of asphaltic emulsion shall not vary more than 15 percent transversely from the average as determined by tests, nor more than 10 percent longitudinally from the specified rate of application as determined by CA TM 339.

The temperature of the latex asphaltic emulsion at the time of application shall range between 110 and 160 degrees F. Asphaltic emulsion shall be reheated, if necessary but at no time after loading into a tank car or truck for transporting to the site of the work shall the temperature of the emulsion be raised above 160 degrees F, unless permitted by the Engineer. During all reheating operations the asphaltic emulsion shall be agitated to prevent localized overheating.

Asphaltic emulsion shall be heated by a retort or by steam coils in such a manner that steam will not be introduced directly into the liquid asphalt during heating. The Contractor shall furnish and keep available at all times, an accurate thermometer suitable for determining the temperature of the liquid asphalt being applied.

If required by the Engineer, a 300 foot test section shall be applied with each pressure distributor which is to be used for application of the asphaltic emulsion. The test section may be located on a street to be sealed or as directed by the Engineer. Adjustments of nozzles to achieve proper overlap and determination of application rates shall be established as part of the calibration.

### **Contractor Qualifications**

Bidders shall have a minimum of 3 years of experience in the construction of Surface Treatments (Chip Seal). Bidders shall provide a list of five successfully completed Surface Treatment (Chip Seal) projects within the area (300 mile radius) along with contact information for the Owners of those projects, and the completion date for each project.

### **Spreading Aggregate**

Immediately following the application of the asphaltic emulsion, it shall be covered with aggregate spread at the rate of 20 to 30 pounds per square yard (+/- 10 percent).

Aggregates shall be spread by means of a self-propelled chip spreader, equipped with a mechanical device which will spread the aggregates at a uniform rate over the full width of a traffic lane in one application. The joint between adjacent applications of aggregate shall coincide with the line between designated traffic lanes.

Operating the chip spreader at speeds which cause the chips to roll over after striking the bituminous covered surface will not be permitted.

The transverse cut off of aggregate shall be complete and any excess aggregate shall be removed from the surface prior to resuming operations.

Stockpiling of aggregate prior to placing will be permitted, however any contamination resulting during storage or from reloading operations will be cause for rejection.

Aggregate shall be redampened in the vehicles prior to delivery to the spreader when directed by the Engineer. Asphaltic emulsion shall be covered with aggregate before setting or "breaking" of the asphaltic emulsion occurs.

If required by the Engineer, a 300 foot test section shall be covered with each self propelled spreader in order to check spread rate and to determine that the spreader is in good operating condition.

### **Finishing**

After the aggregate has been spread upon the asphaltic emulsion, any piles, ridges, or uneven distribution shall be carefully removed to insure against permanent ridges, bumps or depressions in the completed surface. Additional aggregate shall be spread in whatever quantities may be required to prevent picking up by the rollers or traffic, after which the surface shall be rolled.

Rollers shall be pneumatic-tired type. A minimum of 2 pneumatic-tired rollers shall be provided. Pneumatic-tired rollers shall be the oscillating type having a width of not less than 4 feet with pneumatic tires of equal size diameter and having treads satisfactory to the Engineer. Wobble-wheel rollers will not be permitted. The tires shall be spaced so that the gaps between adjacent tires will be covered by the following tires.

The tires shall be inflated to 90 pounds per square inch, or such lower pressure as designated by the Engineer, and maintained so that the air pressure will not vary more than 5 pounds per square inch from the designated pressure. Pneumatic-tired rollers shall be constructed so that the total weight of the roller can be varied to produce an operating weight per tire of not less than 2,000 pounds. The total operating weight of the roller shall be varied as directed by the Engineer.

Initial rolling shall consist of one complete coverage and shall begin immediately behind the spreader. Asphaltic emulsion and aggregate shall not be spread more than 2,500 feet ahead of completion of initial rolling operations. Secondary rolling shall begin immediately after completion of the initial rolling. The amount of secondary rolling shall be sufficient to adequately seat the aggregate and in no case shall be less than 2 complete passes.

The Contractor shall provide the necessary equipment and flaggers required by the Engineer to control traffic. The surface shall be maintained for a period of 4 days after aggregate is applied to the asphaltic emulsion. Maintenance of the surface shall include the distribution of aggregate over the surface to absorb any free bituminous material, to cover any area deficient in cover coat material and to prevent formation of corrugations. Clean sand may be used in lieu of aggregate to cover any excess of asphaltic emulsion which comes to the surface. The use of roadside material for this purpose will not be permitted.

When directed by the Engineer, excess aggregate shall be salvaged and stockpiled at locations designated by him.

Excess aggregate which in the opinion of the Engineer are not salvageable and which interfere with drainage shall be removed and disposed of by the Contractor at his expense.

Completion of sweeping shall be evidenced by the absence of loose chips in gutters or driveways. Special attention shall be required in sweeping driveways clear of loose chips. The Contractor shall provide a sufficient number of sweepers to sweep all streets within 24 – 48 hours after spreading aggregates for chip course.

ADDENDUM 1  
Bid # 1920-ENG 1  
November 12, 2019

Stephens Road and Old US Lane  
Chip Seal and/or Paving Project

Fog seal will be included in the price of the Chip seal. The contractor shall apply a fog seal to the finished chip seal within 14 days of project completion.

## DOUBLE SURFACE TREATMENT FOR UNIMPROVED ROADS (CHIP SEAL)

### TECHNICAL SPECIFICATIONS

#### 1.0 SCOPE OF WORK

- 1.1 **Description:** The primary work shall consist of furnishing and applying a double application of bituminous surface treatment and the maintenance of traffic in accordance with these specifications and in substantial conformance with the limits established by the owner.
- 1.2 The contractor will supply all material including but not limited to aggregate and emulsion. The contractor will also be responsible for providing all labor, equipment, fuel, traffic control, the placement of signs, residence notification, sweeping, construction and application procedures required for surface treatments.
- 1.3 Bidder must be a provider currently doing business with the general public in the State of Florida, Georgia, or Alabama and having performed on projects equal in size and scope to this bid and be properly licensed as a Certified General Contractor with the State of Florida licensed to do business in the State of Florida.
- 1.4 Bidder must submit the Certification Regarding Debarment (Section 00360). If bidder or any of the principals of the bidding contractor have been debarred or the subject of any debarment proceedings in the last five (3) years or are unable to certify to any of the statements, bidder must submit a complete explanation for consideration by the Board.

#### 2.0 MATERIALS

- 2.1 **Liquid bituminous material for surface treatment:** The contractor shall provide CRS-2h liquid bituminous material conforming to FDOT Standard Specification for Road and Bridge 2007, Section 916-4.1 except as modified herein. The bituminous material shall be polymer modified. The contractor shall provide certification that it has a minimum of five (5) years experience installing and working with chip seal and bituminous liquids. The contractor shall certify the liquid bituminous material meets the aforementioned FDOT specifications and shall provide certification from the manufacturer.
- 2.2 **Aggregates:** The contractor shall provide crushed granite conforming to FDOT standard specifications for Road and Bridge, 2007, section 901, table 1 for #89, #7 or #67 gradation for coarse aggregates except as modified herein. The aggregate shall be washed granite obtained from a source approved by the owner. Sampling and testing of aggregate shall be the responsibility of the contractor. Copies of test results from the aggregate supplier shall be furnished to the owner prior to the start of the surface treatment.

### 3.0 APPLICATION GUIDELINES

3.1 Weather and Seasonal limitations: The surface treatment shall not be applied to a wet surface or when rain is occurring or the threat of rain is present immediately before placement. The surface treatment shall not be applied when the temperature is less than 50 degrees Fahrenheit in the shade. When applying emulsions, the temperature of the surface shall be a minimum of 70°F (21°C), and no more than 140°F (54°C).

### 4.0 EQUIPMENT

- 4.1 Distributor: The liquid bituminous material shall be applied with a truck mounted, pressure distributor that has been calibrated within the previous twelve (12) months, for transverse and longitudinal application rate. The distributor shall be equipped, maintained and operated so that the bituminous material can be applied at controlled temperatures and rates from .035 to 1.5 gallons per square yard. The distributor shall be capable of applying bituminous material of variable widths up to sixteen (16) feet. The distributor shall uniformly apply the bituminous material to the specified rate with a maximum allowed variation of 0.015 gallons per square yard. Distributor equipment shall include tachometer, accurate volume measuring device, a calibrated tank and a thermometer for measuring the temperature of the tank's contents. Distributors shall be equipped with a heating device, asphalt pump and full circulating spray bars adjustable laterally and vertically. Distributors and transport trailers shall be equipped with a sampling valve. Distributor trucks shall be of the pressure type with insulated tanks. The use of gravity distributors will not be permitted, unless approved in writing by Engineer. The valves shall be operated by levers so that one or all valves may be quickly opened or closed in one operation. The valves which control the flow from nozzles shall act positively so as to provide a uniform unbroken spread of bituminous material on the surface. The distributor shall be equipped with devices and charts to provide for accurate and rapid determination and control of the amount of bituminous material being applied and with a bitumeter of the auxiliary wheel type registering speed in feet per minute, and trip and total distance in feet. The spreading equipment shall be designed so that uniform application of bituminous material, in controlled amounts.
- 4.2 Aggregate Spreader: The aggregate spreader shall be a self-propelled unit capable of uniformly spreading the aggregate at the required rate on a minimum width of six (6") inches wider than the width of the lane to be treated. The spreader shall be calibrated within the previous twelve (12) months for transverse and longitudinal application. The spreader shall be equipped with a computer-controlled aggregate/chip spreader in order to ensure the appropriate aggregate coverage at varying speeds, unless approved otherwise by Engineer.
- 4.3 Pneumatic Tire Rollers: The contractor shall use eight (8) to twelve (12) ton self-propelled pneumatic tire rollers with oscillating wheels and low pressure, smooth tires. Maintain the inflation of the tires such that in no two tires the air pressure varies more than 5 psi. The rollers will be equipped with an operating water system and coco pads. A sufficient number of rollers and a sufficient number of passes shall be used to ensure cover aggregate is properly rolled.



- 4.4 Self-Propelled Rotary Power Broom: The self-propelled rotary broom shall be designed, equipped, maintained and operated so the pavement surface can be swept clean. The broom shall have an adjustment to control the downward pressure.

## 5.0 METHOD OF CONSTRUCTION

- 5.1 Preparation of Surface: The chip seal material shall be placed on a firm unyielding prepared road base. Road base shall graded, shaped and compacted to a firm base without depressions, holes, bumps or waves with a minimum LBR of 100.
- 5.2 Application of bituminous material: Liquid bituminous material shall be applied by means of a pressure type distributor in a uniform, continuous spread over the section to be treated. The distributor shall be moving forward at the proper speed when the liquid is discharged onto the pavement. If any areas are deficient the operation shall be stopped and corrected immediately. The liquid shall not be applied more than two hundred (200') feet in advance of the aggregate spreader when the ambient air temperature is above 75 degrees or one hundred (100') feet if the air temperature is below 75 degrees.
- 5.2.1 The first application of the liquid bituminous material shall be applied at a rate of .38 -.5 gallons per square yard depending on the firmness of the road bed, surface texture and the size of the aggregate in use. The second application of the liquid bituminous material shall be applied at a rate of .38 - .4 gallons per square yard depending upon the size of the first layer of aggregate that the liquid is sprayed upon and the size of the aggregate being placed over the first application of surface treatment.
- 5.3 Application of cover Aggregate: Immediately following the spray application of the liquid bituminous material, cover aggregate shall be spread over the liquid material at a rate of 18 – 30 lbs square yard. The second application of cover aggregate shall be at a rate of 18 – 25 lbs. per square yards.
- 5.4 Rolling: Immediately following the first application of the cover material. Roll the entire surface with a pneumatic roller, followed immediately with the steel drum roller. Cover the entire surface one time with the steel drum roller. Then, roll the cover material again with the pneumatic roller. Continue rolling as long as necessary to ensure thorough keying of the cover aggregate into the liquid bituminous material. Eliminate the steel drum when rolling the second application of cover aggregate. Apply the second application of liquid and cover material the same day as the first application, as far as it is practicable and consistent with the setting of the liquid bituminous material.
- 5.5 Sweeping: After rolling of the first application of cover aggregate, lightly broom the loose aggregate in a manner not to dislodge the aggregate embedded in the liquid. Sweep loose material from road bed. Following second application again broom loose aggregate from the road bed prior to the application of the fog seal.
- 5.6 Fog Seal: When surface treatment has set, a fog seal is to be applied at a rate of .1 to .15 gallons per square yard to the entire surface treatment no later than two (2) days from

completion. The liquid for fog seal shall be a cationic mixing type emulsion diluted forty (40%) percent with water. Fog seal shall then be lightly sanded at a rate of plus or minus two (2) pounds per square yard by means of a mechanical spreader.

5.7 Maintenance of Traffic: Maintenance of traffic shall be the contractors responsibility and shall be in accordance with FDOT index 600 design standards, the contractor will determine when traffic may be permitted on newly installed surface treatment.

6.0 METHOD OF MEASUREMENT

Surface treatment shall be measured by the number of square yards of liquid bituminous and cover aggregate compacted in place making no deduction for minor untreated areas such as catch basins and manholes.

7.0 BASIS OF PAYEMENT

The unit price bid per square yard shall include surface treatment materials, all labor costs, and necessary equipment to perform the work, maintenance of traffic and sweeping. The fog seal price shall include application of the fog seal and sanding.

**SECTION 230 LIMEROCK STABILIZED BASE**

**230-1 Description.**

Construct a base course composed of roadbed soil stabilized with limerock.

**230-2 Materials.**

Meet the limerock material requirements as specified in Section 911.

**230-3 Equipment.**

230-3.1 For Mixing: For mixing in the roadway, provide a heavy-duty rotary tiller or other equipment approved by the Engineer as equally effective for this work.

230-3.2 For Compaction: Select the equipment for compacting the stabilized material, except that for the final finish use a steel-wheeled roller.

**230-4 Preparation of Roadbed.**

Complete the area to be stabilized to the lines shown in the plans and to a grade parallel to the finished elevation of the stabilized base, before adding the stabilizing material. Ensure that the elevation of the roadbed is such that the base will conform to the typical cross-section upon completing the work. Dispose of any surplus excavated materials resulting from this work, as specified in 120-5.

**230-5 Incorporation of Stabilizing Material and Mixing-In.**

230-5.1 Spreading and Mixing: Place the limerock on the areas to be stabilized, and spread it uniformly to the loose depth shown in the plans or ordered by the Engineer. Then, thoroughly mix the limerock with the soil. Perform mixing as soon as practicable but not later than one week after placing the limerock on the road. Do not spread more limerock in advance of the mixing operations than can be mixed-in with the soil within one week.

230-5.2 Further Mixing Operations: Repeat the mixing operations as often as may be necessary to distribute the limerock uniformly throughout the soil, as determined by the Engineer. Further manipulate the material to uniformly distribute the limerock throughout the width and depth of the base course.

230-5.3 Plant Mixing: The Contractor may mix the soil, limerock, and water using the central plant-mix method in lieu of mixing in place, provided he obtains a uniform mixture with the proper amount of water.

230-5.4 Shaping Surface: After mixing, shape the surface so it conforms to the grade and typical cross-section shown in the plans after compacting.

230-5.5 Depth of Mixing Stabilizing Material: Ensure that the depth of mixing of the stabilizing material is in accordance with the following table: Specified Base Thickness (inches)	Required Mixing Depth (inches)	
	Minimum	Maximum
6	5 1/2	7 1/2
8	7 1/4	9 3/4
10	9	12

In the event that the measured depth of mixing is less than the minimum specified above, remix the base course, as directed by the Engineer, until the stabilizing material is distributed to the required depth throughout the base course.

Where the measured depth of mixing exceeds the maximum limits specified in the table, add 1 inch, loose measure, of stabilizing material for each 1 inch of mixing depth in excess of the allowable depth (but in no case less than 1 inch of material, for any excess depth), and mix the added material in the top 6 inches of the

base as specified in 230-5.1 and 230-5.2, at no expense to the Department. The Department will not include the volume of stabilizing material, which is added to compensate for excess mixing depth, in the pay quantity, and will not allow any additional compensation for the extra mixing required.

230-6 Compacting and Finishing Base.  
Meet the requirements of 200-6.

230-7 Testing Surface.  
Test the surface in accordance with the requirements of 200-7.

230-8 Priming and Maintaining.  
Meet the requirements of 200-8.

230-9 Method of Measurement.  
230-9.1 General: The quantities to be paid for will be the plan quantity, in square yards, completed and accepted.  
230-9.2 Quantity of Limerock: The quantity to be paid for will be as specified in 210-8.2.

230-10 Basis of Payment.  
Prices and payments will be full compensation for all work specified in this Section, including furnishing, hauling, placing, spreading, mixing, compacting, prime coat application as specified in 300-7 and finishing all limerock stabilizing material; any necessary excavating below the finished grade of the base to provide for placing the stabilizing material; and disposing of all surplus excavation resulting from this work. Where extra limerock material is placed at locations of culverts, etc., as detailed in the plans, the volume of such material, determined as provided above, will be included in the quantity of Limerock Material to be paid for, but no adjustment will be made in the area of base to be paid for.  
Payment will be made under:

- Item No. 230- 1- Limerock Stabilized Base - per square yard.
- Item No. 230- 2- Limerock Material - per cubic yard or per ton.

## **SPECIFICATIONS Triple Surface Treatment**

### **GENERAL REQUIREMENTS**

The County Engineer (or representative) will oversee the work of the Contractor to determine if the work meets the required specifications. The County Engineer or representative will judge the acceptability of the Work and have the authority to disapprove or reject any Work judged to be defective.

#### **Scope of Work**

The primary work covered by this specification shall consist of a prime coat and triple application of bituminous surface treatment and the maintenance of traffic in accordance with these specifications and in substantial conformance with the limits established by the owner.

The contractor will supply all material including but not limited to aggregate and emulsion. The contractor will also be responsible for providing all labor, equipment, fuel, traffic control, the placement of signs, residence notification, sweeping, construction and application procedures required for surface treatments, and cleaning up.

**Work covered by county and FDOT specifications elsewhere include** proving maintenance of traffic, fine grading and compacting the road subgrade, boxing out for limerock, furnishing and applying a 6" limerock base layer, grading the shoulders for sod, installing sod, and clean up.

#### **Warranty**

Contractor will warranty said products for a period of three (3) years from the date the material was laid. Any time during the three (3) years the County may request the contractor to make repairs due to poor quality of materials and or workmanship. Upon request by Owner, Contractor will repair defective work as requested within 21 days. Repaired work will be warranted for an additional year, but not less than the original three year time period.

#### **Opening to Traffic**

Each layer shall be capable of producing an emulsified asphalt paving mixture that will cure at a rate which will permit traffic on the pavement within one hour after application without damaging the pavement surface. Any damage done by traffic shall be repaired by the contractor at his/her expense.

#### **Certificate of Analysis**

Each load of emulsified asphalt shall be accompanied with a Certificate of Analysis/ Compliance to assure that it is the same as that used in the mix design.

#### **Aggregate**

The mineral aggregate used shall be of the type and grade specified for the particular use. The aggregate shall be manufactured crushed granite conforming to FDOT standard specifications for Road and Bridge, 2007, section 901, table 1 for #6 (or 67), #7 (or 78), and #89 gradation for coarse aggregates except as modified herein. The aggregate shall be washed granite obtained from a source approved by the owner. Sampling and testing of aggregate shall be the responsibility of the contractor. Copies of test results from the aggregate supplier shall be furnished to the owner prior to the start of the surface treatment.

### Mix Design

The Contractor shall submit to the County Engineer for approval a complete mix design prepared and certified by a laboratory. Compatibility of the aggregate, polymer-modified emulsion, mineral filler, and other additives shall be verified by the mix design. The mix design shall be made with the same aggregate gradation that the contractor will provide on the project.

The mix design should report the quantitative effects of moisture content on the unit weight of the aggregate (bulking effect). The report must clearly show the proportions of aggregate, mineral filler (minimum and maximum), water (minimum and maximum), additive usage, and polymer-modified asphalt emulsion based on the dry weight of the aggregate.

All the component materials used in the mix design shall be representative of the materials proposed by the contractor to be used on the project. The percentages of each individual material required shall be shown in the laboratory report. Adjustments may be required during construction, based on field conditions. The Project Manager will give final approval for all such adjustments.

Emulsion shall be cationic Polymer Modified (PM) CRS 2H liquid bituminous material conforming to FDOT Standard Specification for Road and Bridge 2007, Section 916-4.1 except as modified herein. The emulsion and stone suppliers shall be submitted to and approved by the Engineer. The emulsion manufacturer shall have a minimum of three (3) years experience manufacturing emulsion in the state of Florida or similar conditions (Georgia, Alabama, etc.). The contractor shall certify that the liquid bituminous material meets the aforementioned FDOT specifications.

### Target Application Rates for Emulsion

First layer application rate	0.3 gal/SY.
Second layer application rate	0.28 gal/SY.
Third layer application rate	0.25 gal/SY.

### Target Application Rate for Granite Stone

The first layer of #6 stone application rate	37 lbs/SY
The second layer of # 7 stone application rate	23 lbs/SY.
The third layer of # 89 stone application rate	17 lbs/SY

### Prime Coat

Prime coat will be required and shall consist of one part emulsified asphalt/three parts water and should be applied with a standard distributor. The emulsified asphalt should be compatible with all elements of the chip seal and shall be submitted to and preapproved by Engineer. The distributor shall be capable of applying the dilution evenly at a rate of 0.05 to 0.10 gal/sq yd.

### Contractor Qualifications

Bidders shall have a minimum of 3 years experience in the construction of Surface Treatments (Chip Seal). Bidders shall provide a list of five successfully completed Surface Treatment (Chip Seal) projects within the State of Florida, Georgia, or Alabama, along with contact information for the Owners of those projects, and the completion date for each project.

## **CHIP SEAL APPLICATION**

### **Chip Seal Preparation**

Adequate means shall be provided to protect the chip course from damage from traffic until such time that the mixture has cured sufficiently so that the aggregate will not adhere to and be picked up by the tires of the vehicles.

### **Surface Preparation**

Immediately prior to applying the emulsion, the surface shall be cleared of all loose material, silt spots, vegetation, and other objectionable material. The Engineer or inspector shall approve the surface preparation prior to surfacing. No dry aggregate either spilled from the lay-down machine or existing on the road, will be permitted. Contractor shall have a mechanical broom on site and shall re-clean any areas as directed by inspector.

The material shall be placed on a firm unyielding prepared road bed. Contractor shall grade, shape and compact the road bed to a firm base leaving no depressions, holes, bumps or waves.

### **Applying Polymerized Asphaltic Emulsion**

The asphalt emulsion used for the chip courses shall be a cationic Polymer Modified CRS-2H type meeting the requirements specified in FDOT Standard Specification 916-4.

Asphaltic Emulsion shall be prevented from spraying upon adjacent pavements, that portion of the traveled way being used by traffic, structures, railing, barriers, markers, trees and shrubbery that are not to be removed, adjacent property and improvements, and other highway improvements or facilities not mentioned herein.

Distributor trucks shall be of the pressure type with insulated tanks. The use of gravity distributors will not be permitted. Spray bars shall have a minimum length of 9 feet and shall be of the full circulating type. The spray bar shall be adjustable to permit positioning at various heights above the surface to be treated. The valves shall be operated by levers so that one or all valves may be quickly opened or closed in one operation.

Spreading by means of cab controlled valves will be permitted. The valves which control the flow from nozzles shall act positively so as to provide a uniform unbroken spread of bituminous material on the surface. The distributor shall be equipped with devices and charts to provide for accurate and rapid determination and control of the amount of bituminous material being applied and with a bitumeter of the auxiliary wheel type registering speed in feet per minute, and trip and total distance in feet. The spreading equipment shall be designed so that uniform application of bituminous material, in controlled amounts, may be made ranging from 0.02 to one gallon per square yard of surface and with a range of pressure from 25 to 75 pounds per square inch. If a spray bar extension is used to cover a greater width, it shall be of the full circulating type. The distributor shall be equipped with a hose and nozzle to be used for spraying areas which are inaccessible to the distributor. The distributor shall also be equipped with pressure gages and an accurate thermometer for determination of temperatures of the bituminous material. Distributor and booster tanks shall be so maintained at all times as to prevent dripping of bituminous material from any part of the equipment. Distributor equipment shall include tachometer, accurate volume measuring device, a calibrated tank and a thermometer for measuring the temperature of the tank's contents. Distributors shall be equipped with a heating device, asphalt pump and full

circulating spray bars adjustable laterally and vertically. Distributors and transport trailers shall be equipped with a sampling valve.

In order to secure uniform distribution at the junction of 2 applications, the distribution shall be promptly stopped when the uniform flow decreases, indicating the tank is about empty.

The Owner reserves the right to order the use of any equipment discontinued which, in the opinion of the Engineer, fails to produce a satisfactory distribution of asphalt in accordance with the specifications.

Asphaltic emulsion shall not be applied when weather conditions are unsuitable. Asphaltic emulsion shall not be applied until sufficient aggregates are on hand to immediately cover the asphaltic emulsion, or when the atmospheric temperature is below 65 degrees F, when the pavement temperature is below 80 degrees Fahrenheit, or when the temperature is less than 50 degrees Fahrenheit in the shade. The surface treatment shall not be applied to a wet surface or when rain is occurring or the threat of rain is present immediately before placement.

The Contractor shall provide a satisfactory method of accurately measuring the volume of liquid asphalt in the storage tanks and in each spreading unit at any time.

The Engineer will notify the Contractor, no later than 2:00 p.m., if Engineer anticipates that the next working day will not be suitable for the application of seal coat. When the Engineer has declared a day to be unsuitable by reason of expected low temperature or unsuitable weather conditions, the Contractor shall not apply material. The Contractor will notify the Engineer no later than 2:00 if Contractor anticipates that the next day will not be suitable for work.

Applying asphaltic emulsion shall be discontinued sufficiently early in the day to permit the termination of traffic control prior to darkness. Asphaltic emulsion shall be applied to only one designated traffic lane at a time and the entire width of the lane shall be covered in one operation.

Asphaltic emulsion shall not be applied a greater distance than can be immediately covered by aggregate, unless otherwise permitted by the Engineer.

The determination of the pass shall be made on building paper or similar material spread over the surface. Paper shall also be placed over the treated surface for a sufficient length at the beginning of a spread to avoid spraying existing pavement or previously placed aggregate and so that the nozzles are spreading properly when the uncovered surface is reached. The building paper shall then be removed and disposed of in a manner satisfactory to the Engineer.

The distribution of asphaltic emulsion shall not vary more than 15 percent transversely from the average as determined by tests, nor more than 10 percent longitudinally from the specified rate of application.

The temperature of the latex asphaltic emulsion at the time of application shall range between 110 and 160 degrees F. Asphaltic emulsion shall be reheated, if necessary but at no time after loading into a tank car or truck for transporting to the site of the work shall the temperature of the emulsion be raised above 160 degrees F, unless permitted by the Engineer. During all reheating operations the asphaltic emulsion shall be agitated to prevent localized overheating.

Asphaltic emulsion shall be heated by a retort or by steam coils in such a manner that steam will not be introduced directly into the liquid asphalt during heating. The Contractor shall furnish and keep available at all times, an accurate thermometer suitable for determining the temperature of the liquid asphalt being applied.



If required by the Engineer, a 300 foot test section shall be applied with each pressure distributor which is to be used for application of the asphaltic emulsion. The test section may be located on a street to be sealed or as directed by the Engineer. Adjustments of nozzles to achieve proper overlap and determination of application rates shall be established as part of the calibration.

Liquid bituminous material shall be applied by means of a pressure type distributor in a uniform, continuous spread over the section to be treated. The distributor shall be moving forward at the proper speed when the liquid is discharged onto the pavement. If any areas are deficient the operation shall be stopped and corrected immediately. The liquid shall not be applied more than two hundred (200') feet in advance of the aggregate spreader when the ambient air temperature is above 75 degrees or one hundred (100') feet if the air temperature is below 75 degrees.

### Spreading Aggregate

Immediately following the application of the asphaltic emulsion, cover aggregate spread at the specified rate per square yard for each of the layers.

Aggregates shall be spread by means of a self-propelled chip spreader, equipped with a mechanical device which will spread the aggregates at a uniform rate over the full width of a traffic lane in one application. The joint between adjacent applications of aggregate shall coincide with the line between designated traffic lanes. Care shall be taken to ensure that all joints are covered completely and evenly with emulsion and rock without bumps or voids in the finish surface.

Operating the chip spreader at speeds which cause the chips to roll over after striking the bituminous covered surface will not be permitted.

The transverse cut off of aggregate shall be complete and any excess aggregate shall be removed from the surface prior to resuming operations.

Stockpiling of aggregate prior to placing will be permitted, however any contamination resulting during storage or from reloading operations will be cause for rejection.

Aggregate shall be redampened in the vehicles prior to delivery to the spreader when directed by the Engineer. Asphaltic emulsion shall be covered with aggregate before setting or "breaking" of the asphaltic emulsion occurs.

If required by the Engineer, a 300 foot test section shall be covered with each self propelled spreader in order to check spread rate and to determine that the spreader is in good operating condition.

### Finishing

After the aggregate has been spread upon the asphaltic emulsion, any piles, ridges, or uneven distribution shall be carefully removed to insure against permanent ridges, bumps or depressions in the completed surface. Additional aggregate shall be spread in whatever quantities may be required to prevent picking up by the rollers or traffic, after which the surface shall be rolled.

Rollers shall be 8 to 12 ton pneumatic-tired type. A minimum of 2 pneumatic-tired rollers shall be provided and shall be the oscillating type having a width of not less than 4 feet with pneumatic tires of equal size diameter and having smooth treads satisfactory to the Engineer. Wobble-wheel rollers will not be permitted. The tires shall be spaced so that the gaps between adjacent tires will be covered by the following tires. A sufficient number of rollers and a sufficient number of passes shall be used to ensure cover aggregate is properly rolled.

The tires shall be inflated to 90 pounds per square inch, or such lower pressure as designated by the Engineer, and maintained so that the air pressure will not vary more than 5 pounds per square inch from the designated pressure. Pneumatic-tired rollers shall be constructed so that the total weight of the roller can be varied to produce an operating weight per tire of not less than 2,000 pounds. The total operating weight of the roller shall be varied as directed by the Engineer.

Initial rolling shall consist of one complete coverage and shall begin immediately behind the spreader. Asphaltic emulsion and aggregate shall not be spread more than 2,500 feet ahead of completion of initial rolling operations. Secondary rolling shall begin immediately after completion of the initial rolling. The amount of secondary rolling shall be sufficient to adequately seat the aggregate and in no case shall be less than 2 complete passes.

Immediately following the first application of the cover material, roll the entire surface with a pneumatic roller, followed immediately with the steel drum roller. Cover the entire surface one time with the steel drum roller. Then, roll the cover material again with the pneumatic roller. Continue rolling as long as necessary to ensure thorough keying of the cover aggregate into the liquid bituminous material. Eliminate the steel drum when rolling the second application of cover aggregate. Apply the second application of liquid and cover material the same day as the first application, as far as it is practicable and consistent with the setting of the liquid bituminous material.

The Contractor shall provide the necessary equipment and flaggers required by the Engineer to control traffic. The surface shall be maintained for a period of 4 days after aggregate is applied to the asphaltic emulsion. Maintenance of the surface shall include the distribution of aggregate over the surface to absorb any free bituminous material, to cover any area deficient in cover coat material and to prevent formation of corrugations. Clean sand may be used in lieu of aggregate to cover any excess of asphaltic emulsion which comes to the surface. The use of roadside material for this purpose will not be permitted.

When directed by the Engineer, excess aggregate shall be removed or shall be salvaged and stockpiled at locations designated by Engineer.

Excess aggregate which in the opinion of the Engineer are not salvageable and which interfere with drainage shall be removed and disposed of by the Contractor at his expense.

Self-Propelled Rotary Power Brooms shall be used and shall be designed, equipped, maintained and operated so the pavement surface can be swept clean. The broom shall have an adjustment to control the downward pressure.

After rolling each application of cover aggregate as specified, lightly broom the loose aggregate (in a manner not to dislodge the aggregate embedded in the liquid) to remove the loose material from the road bed prior to applying the next layer.

Completion of sweeping shall be evidenced by the absence of loose chips in gutters or driveways. Special attention shall be required in sweeping driveways clear of loose chips. The Contractor shall provide a sufficient number of sweepers to sweep all streets within 24 – 48 hours after spreading aggregates for chip course.

### Fog Seal

When surface treatment has set, a fog seal is to be applied at a rate of 0.1 to 0.15 gallons per square yard to the entire surface treatment no later than two (2) days from completion. The liquid for fog seal shall

be a cationic mixing type emulsion diluted forty (40%) percent with water. Fog seal shall then be lightly sanded at a rate of plus or minus two (2) pounds per square yard by means of a mechanical spreader.

#### Maintenance of Traffic

Maintenance of traffic shall be the contractor's responsibility and shall be in accordance with FDOT index 600 design standards, the contractor will determine when traffic may be permitted on newly installed surface treatment.

#### Measurement

Surface treatment shall be measured by the number of square yards of liquid bituminous and cover aggregate compacted in place making no deduction for minor untreated areas such as catch basins and manholes.

#### Basis of Payment

The unit price bid per square yard shall include surface treatment materials, all labor costs, and necessary equipment to perform the work, maintenance of traffic and sweeping.

The fog seal unit price shall include application of the fog seal and sanding.

End of Section

