

**SPECIFICATIONS FOR FULL DEPTH RECLAMATION**  
**WITH INJECTED ASPHALT STABILIZATION**

**1.0 DEFINITIONS**

The term Director [Superintendent, etc.] shall mean the Director of Public Works of the awarding authority.

The term Designee shall mean an employee of the awarding authority, designated by the Director.

The term Contractor shall mean a professional company contracted by the awarding authority to perform work under this agreement.

**2.0 DESCRIPTION**

This work shall consist of pulverizing the pavement structure & portion of the existing roadway base material into a homogenous mass, adding a bituminous stabilizer, and placing and compacting this material to the lines, grades, and dimensions shown on the plans or established by the Designee.

**3.0 MATERIALS**

**3.1 Pulverized Material:**

Pulverized material shall consist of the entire existing bituminous pavement and a predetermined portion of the underlying materials, pulverized and blended into a homogenous mass with uniformly processed base material.

**3.2 Asphalt Stabilizer:**

The bituminous stabilizer shall be emulsified asphalt, grade CSS-1, CSS-1h, SS-1 or SS-1h, meeting the requirements of AASHTO M208 and M140.

**3.3 Material Sampling, Testing and Job Mix Formula (JMF):**

A minimum of 21 days prior to start of construction the Contractor shall send a representative sample of the existing pavement and pre-determined amount of underlying materials to the asphalt emulsion supplier for JMF recommendations. Traffic data shall also be supplied to the Contractor & emulsion supplier for consideration of other additives, such as cement or lime, for high traffic locations and underlying material will be tested to determine plasticity. The composite blended materials will be tested for the emulsion type, grading, coating and recommended percent of emulsion to be added. If the existing pavement depth will not generate the material needed to address cross slope deficiencies without excessive depth of cut into non-bituminous materials, recommendations may include the introduction of RAP in these areas or granular materials of known quality be placed ahead of the initial FDR pass. The emulsion supplier shall forward JMF recommendations to the contractor and Municipality prior to work commencing. The Designee shall approve the final JMF to be utilized.

3.4 Composition of Mixture:

The mixture shall be composed as directed in the job mix formula (JMF) and shall be based upon recommendations by the emulsion supplier or as directed by the Designee. Emulsion, water, Portland Cement, and aggregate shall be added in percentage by weight and verified by tank/truck checks in accordance with the minimum quality control frequencies practical. As the work progresses, it may be necessary for the Designee to make necessary adjustments to the mix design. Changes to compensation will be in accordance with "Basis of Payment" & "Method of Measurement" provisions contained herein.

3.5 New Aggregate or Additional Recycled Material:

If additional material is required & agreed to by the Designee, the material will be supplied by the Municipality or acquired from the Contractor in an extra work order, describing material to be supplied, estimated quantity and total cost. The work order shall be agreed to by both parties prior to work taking place. RAP shall be conditionally accepted at the source by the Designee. It shall be free of winter sand, granular fill, construction debris, and other materials not generally considered bituminous pavement. If RAP is not available for use, new aggregate for mainline travelway shall only contain particles of rock that will pass the 2 inch square mesh sieve & meet the following gradation requirements or as approved by the Designee:

Sieve Size	% Passing
1/2" (12.5 mm)	55 – 85
#4 (4.75 mm)	0 – 40
#200 (0.075 mm)	0 – 5

**4.0 EQUIPMENT**

The equipment used by the Contractor shall include, but not be limited to, one or more of the following:

4.1 Reclaimer:

The reclaimer shall be a self-propelled machine, specially manufactured for Full Depth Reclamation (FDR) type work and capable of reducing the required existing materials and a predetermined portion of the underlying materials, pulverized and blended into a homogenous mass to provide a uniformly processed base material. The machine shall be equipped with standard automatic depth controls and must maintain a consistent cutting depth and width with a minimum power of 540 hp. The machine also shall be equipped with a gauge to show depth of material being processed.

4.2 Liquid Injection and Mixing:

A liquid injection & mixing unit shall be used to introduce the bituminous stabilizer into the pulverized material. The mixing unit shall contain a liquid distribution and mixing system which has been specifically manufactured for FDR with emulsion injection type work, capable of mixing the pulverized material with an evenly metered distribution of emulsified asphalt into a homogeneous mixture, to the depth and width required.

The reclaimer shall be capable of treating a minimum width of 96 inches in a single pass and shall have a full width spray bar consisting of a positive displacement pump interlocked to the machine speed so that the amount of emulsion being added is automatically adjusted with changes in machine speed. The additive system shall be capable of incorporating up to 5.0 Gal/SY, with an allowable variation from any specified rates not to exceed 0.05 Gal/SY. Individual valves on the spray bar shall be capable of being turned off as necessary to minimize emulsion overlap on subsequent passes. Under no circumstances shall the bituminous material be spray applied on the road surface in front of the reclaimer, and incorporated into the FDR material with subsequent passes.

4.3 Placement and Grading Equipment:

A motor grader shall be used for shaping the surface of the FDR base, in accordance with lines, grades and typical cross sections shown on the plans or established by the Director or his/her Designee.

4.4 Rollers:

The recycled material shall be rolled with at least one vibratory roller utilizing high amplitude/low frequency settings. Each roller shall have a compacted width of not less than 5 feet. Each roller shall have a gross weight of not less than 12 tons.

**5.0 CONSTRUCTION PROCEDURES**

5.1 Streets to be Treated:

The Contractor and the Director shall mutually determine the streets which shall receive full depth reclamation with injected emulsion treatment. Measurements of streets to be treated shall be made by the Contractor and the Director or his/her Designee, and the Contractor shall prepare a cost estimate for each street prior to beginning work.

5.2 Surface Preparation:

Surface preparation, which may include cleaning and grubbing; removal of visible cobbles; drainage; adjusting of street irons-valve covers, manhole covers, drop inlet gratings, catch basins; signs, mail boxes and guard rail resetting; etc., will be the responsibility of the awarding authority and will be completed before the contractor moves onto the job.

5.3 Weather Limitations:

FDR with Injected Asphalt Stabilization work shall not be performed between Sept 15th and May 15th, or when the atmospheric temperature is below 50°F, or when weather conditions are such/forecasted that proper pulverizing, spreading, mixing bituminous stabilizer and curing are unfavorable to proper construction procedure or compaction of the pulverized material cannot be accomplished.

5.4 Pulverizing and Asphalt Stabilization:

The entire depth of existing pavement on the travel way shall be pulverized together with a predetermined depth of underlying gravel into a homogeneous mass. All pulverizing shall be done with equipment that will provide a homogeneous mass of pulverized material, processed

in-place. The existing road shall be reclaimed to the depth on the plans or as directed by the Designee, and during this initial pass water and new aggregate may be added if necessary; pre-shaping can also be accomplished at this time. After completion of the first pass, the road shall be shaped and compacted for final stabilization. A second pass of a reclaimer shall be completed with the required amount of injected asphalt emulsion added as per the JMF.

This project will require asphalt stabilizer to be incorporated into the top **4 Inches** of the FDR material, at the rate of **1.0 Gallons** per square yard or as specified in the mix design (see "Method of Measurement" & "Basis of Payment").

5.5 Grading and Compaction:

The completed surface of the FDR with Injected Asphalt Stabilization shall be shaped and maintained in accordance with the lines, grades & typical cross-sections shown on the plans or established by the Director or his/her Designee. Density of the FDR with asphalt stabilizer will be completed using a vibratory steel drum soil compactor as specified herein.

5.6 Curing:

No new pavement shall be placed on the asphalt stabilized base until a minimum curing period of 5 days has elapsed. Additional curing may be needed if weather conditions warrant.

5.7 Traffic Control:

Traffic control including police details, warning lights, Barricades, and warning signs, is the sole responsibility of the awarding authority. Unless otherwise specified, the roadway shall be kept open to traffic at all times, with traffic discontinued on the lane being reclaimed. Controlled traffic may be permitted as soon as the base has been rolled.

**6.0 PERFORMANCE**

The awarding authority will not award this contract unless the Contractor furnished satisfactory evidence of his/her ability and experience to perform this work, and that he/she has sufficient capital and equipment to enable him/her to prosecute the work successfully and to complete it within the time named in the contract. The Contractor shall not sublet any portion of this contract, and will own all equipment used to complete such contract. As part of the bid, the Contractor must submit a list of six similar and successfully completed jobs, whose relevance to the proposed job shall be deemed by the awarding authority. The name, address, and telephone number of a contact person involved with each of these projects must be included so they can be investigated prior to the award of the contract. It will be the responsibility of each bidder to visit the job site with the Director. The awarding authority can reject any bid of a contractor who has not visited the work site.

**7.0 METHOD OF MEASUREMENT AND BASIS OF PAYMENT**

Full Depth Recycled Pavement with Injected Asphalt Stabilization will be measured by the square yard (SY). Additional materials added to restore grade and/or cross-slope as directed by the Designee, will be measured in vehicles at the point of delivery or by some other method previously agreed to by the Contractor and the Designee.

The accepted quantity of Full Depth Recycled Pavement with Injected Asphalt Stabilization, will be paid for at the contract unit price per square yard (SY), complete in-place and will be full compensation for furnishing all equipment, material and labor for pulverizing, blending, stabilizing, grading, compacting, and for all incidentals necessary to complete the work at the required depth and rate of emulsion specified in Section 5.4. This item will be the Basis of Award.

If the JMF requires emulsion be incorporated, above the bid quantity listed in Section 5.4, the contractor will be compensated for the additional Emulsified Asphalt, (Delivered) at the contract unit price per Gallon. If the JMF requires emulsion be incorporated, below the quantity previously listed in Section 5.4, the Town/Municipality shall be credited for material not incorporated in the project at the contract unit price per gallon, delivered. No additional compensation shall be requested by the contractor for changes in the JMF, unless additional materials are incorporated in the previously described work as requested by the Designee. This contract shall include an Asphalt Price Adjustment.

## PRICE ADJUSTEMENT

A fluctuating price will be required for this bid to allow for price adjustments based on the period price of asphalt cement in the awarding authority's state. The price adjustment will be based on the variance in price for the asphalt cement component only from the Base Price to the Period Price. Base price for this bid will be \$\_\_\_\_\_ per ton of asphalt cement.

**"Base Price"** = the price of PG binder liquid per ton that exists on the bid opening date, listed above.

**"Period Price"** = the price of PG binder liquid per ton on the date the stabilization work is performed.

### **Full Depth Reclamation with Injected Asphalt Stabilization:**

Current Price minus Base Price divide by 238 (Gal. in ton emulsion) x .60 (asphalt in Gal. emulsion) = Adjustment per Gallon of Emulsion used. Gallons used will be based on the job mix formula (JMF).

**BID FORM**

**BASE BID: FULL DEPTH RECLAMATION WITH INJECTED ASPHALT STABILIZATION** applied to town prepared roadways in accordance with the attached specifications.

Price per Square Yard \$ \_\_\_\_\_

**ADDITIONAL: EMULSIFIED ASPHALT (DELIVERED)** as per job mix formula.

Price per Gallon \$ \_\_\_\_\_

Bidder: \_\_\_\_\_ Phone: \_\_\_\_\_

Address: \_\_\_\_\_ Fax: \_\_\_\_\_

\_\_\_\_\_

Signature: \_\_\_\_\_

Printed Name & Title: \_\_\_\_\_

Date: \_\_\_\_\_

**REFERENCE LIST FOR FULL DEPTH RECLAMATION  
WITH INJECTED ASPHALT STABILIZATION**

Please list six similar projects that have been completed.

Owner:

Address:

City, State, Zip:

Contact:

Phone:

Contract Amount:

Owner:

Address:

City, State, Zip:

Contact:

Phone:

Contract Amount:

Owner:

Address:

City, State, Zip:

Contact:

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Contract Amount:

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Owner:

Address:

City, State, Zip:

Contact:

Phone:

Contract Amount: