Town of Montville

INVITATION FOR PROPOSALS
PAVEMENT PRESERVATION BID
BID # 2020-7

The Town of Montville is soliciting bids for Cold In-Place Recycling, Ultra-Thin Bonded Wearing Course, Chip Seal, Microsurfacing, and Crackseal.

All proposals are due no later than 5/5/2020 at 11:00 AM and must be received at the Finance Office prior to the due date and time. A proposal must be delivered by regular or overnight mail to the Town of Montville, Finance Office, 310 Norwich/New London Turnpike, Uncasville, Connecticut 06382, with the proposal contained in a sealed envelope marked **"Pavement Preservation Bid"**. The proposal must be signed by a Company official. Proposals will be opened and read aloud in the Finance Office, and interested persons may attend the opening remotely under procedures that will be posted on the Town of Montville's website.

In addition to other reservations and conditions contained in the proposal documents, the Town of Montville reserves the right to waive any technical defects in the proposals received; to waive any formalities or irregularities; to reject any and all proposals for any reason, including that it or they do not conform to the terms and conditions described herein, as determined by the Town in its sole discretion; to accept or reject any part of any proposal received; to present and negotiate terms of a contract together or separately with any party submitting a proposal; to determine qualifications exclusively and finally; to request additional qualifications; and to select any proposal or part thereof based on any combination of factors, including the amount proposal, the time of completion, and the Town's best interests. The Town further reserves the right to retain all proposals submitted and to use any ideas in a proposal regardless of whether or not that proposal is selected.

It is the intent of the Town to award this contract to the lowest responsible bidder who is capable of performing work for all listed bid items. All bid items must be filled out to constitute a qualifying bid.

INSTRUCTIONS TO BIDDERS

Bids shall be submitted on the enclosed forms. Incomplete forms may be cause for disqualification of the Bid. Bids must be signed by an authorized representative/officer/agent of the Bidder.

The Town of Montville shall be the sole judge as to whether any Bid complies with these specifications, and such a decision shall be final and conclusive. Bidders shall state any exceptions taken to the Bid specifications.

Bidders must bid on all five (5) processes.

The Town of Montville is exempt from the Connecticut sales tax, Federal excise taxes, and the provision of the Federal-Robinson-Patman Act.

CONTRACT PERIOD

The contract period shall be for one year, beginning on June 1, 2020 and ending on June 30, 2021.

The Town reserves itself the option to extend the use, terms, conditions and prices of this bid annually, up to a maximum of two (2) years after the first year in which the contract is awarded. Such extension must be mutually agreed upon between the town and the Contractor.

It is the intent of this Request for Bids that all political subdivisions and districts located in the State of Connecticut be entitled to make purchases of materials, equipment, or supplies from the resulting bid award. Each participating entity shall be billed by and make payment directly to the successful bidder. In the event of a failure or breach in performance of any such bid by a participating entity or the successful bidder, The Town of Montville, specifically and expressly disclaims any and all liability for such defective performance or breach, or failure of either party to perform in accordance with its obligations, covenants.

SPECIFICATIONS

ULTRA-THIN BONDED WEARING COURSE

POLYMER MODIFIED ASPHALT EMULSION BONDING MATERIAL
The liquid bituminous material shall be a cationic asphalt emulsion, polymer modified, containing at least 65% total residue. The cationic asphalt emulsion shall be obtained from a storage facility that has been approved by the Director, Materials Bureau, Connecticut State Department of Transportation, within the current calendar year, prior to the start of work.

HOT AGGREGATE/ASPHALT MIXTURE FOR WEARING COURSE
The wearing course shall be a plant mixed hot asphalt concrete and shall be a mixture of single size coarse aggregate, fine aggregate, mineral filler and asphalt cement. The single aggregate shall be nominal 1/4 inch for type A mix or nominal 3/8 inch for type B mix, meeting the gradation in Data Table II. This hot asphalt concrete shall be obtained from a facility that has been approved by the Director, Materials Bureau, Connecticut State Department of Transportation, with in the current calendar year, prior to the start of work. The asphalt content of the mix shall be 4.8 - 5.30% by weight of the total mix and must be computed based on the actual job mix.

SURFACE PREPARATION
The following items will be performed by the Town, unless otherwise directed. It is inherent of the Contractor to assure them that all of the following items have been completed, prior to the start of the project, and so as to assure the successful outcome of the project.
A. Manhole covers, water valves, catch basins, and other such drainage structures shall be clearly referenced for location and adjustment after the surfacing operation.
B. Thermoplastic traffic markings shall be removed. All vegetation at the edge of pavement shall be removed.
C. Pavement cracks and joints, greater that 1/4 inch wide, shall be cleaned and filled with an approved material prior to the surfacing operation.
D. Before applying the PPST serious surface irregularities shall be corrected. Wheel ruts greater that 1 inch in depth should be filled prior to the surfacing operation.
E. The pavement surface area to be treated shall be cleaned by a rotary power broom.

APPLICATION
Ultra-Thin Bonded Wearing Course shall be placed on a dry or damp, but not on a wet, pavement surface. The pavement temperature shall be not less than 50°F and rising. The tack/seal coat shall be applied by the asphalt emulsion spray system mounted on the overlay machine. The sprayer shall accurately and continuously monitor the rate of spray with a uniform application across the entire width to be overlaid. The rate of spray shall be 0.2 (+ 0.05) gallons per square yard. The asphalt emulsion shall be applied at a temperature of 140° F - 180°F. No wheel or other part of the paving machine shall come into contact with the tack/seal coat before the wearing course mixture is applied. The hot asphalt concrete wearing course shall be delivered to the lay down machine at a temperature of 315° F + 15° F. The application rate of the hot asphalt aggregate mixture shall be 60 pounds per square yard, +/- 5 pounds per square yard, for

nominal 1/4 inch mix, and 65 pounds per square yard, +/- 5 pounds per square yard for nominal 3/8 inch mix. The hot asphalt aggregate mixture shall be spread over the polymer modified asphalt emulsion tack/seal within seconds of the spray application of the tack/seal coat. Where shape correction is necessary or the old surface is porous the application rate may need to be increased. The material shall be smoothed over the full width using an ironing type screed to ensure an even mat.
Compaction of the wearing course shall be carried out using a minimum of a steel wheeled double drum roller of minimum deadweight of 10 tons before the material temperature has fallen below 180° F at mid-layer.

BASIS OF PAYMENT
The accepted quantities of Ultra-Thin Bonded Wearing Course will be paid for per square yard per project. A project is defined as any work requiring a single mobilization. If road has not been prepped with shim or a leveling course, added cost for shimming with the mixture may be applied. Price includes: furnishing materials, equipment, labor and bond coat, insurance, as required, and all incidentals necessary to complete this work. Pay items will be broken down as follows: 10,000 to 14,999 square yards, 15,000 to 19,999 square yards, and 20,000 or more square yards.

MATERIALS AND SPECIFICATIONS
Ultra Thin Bonded Wearing Course

DATA TABLE I

POLYMER MODIFIED CATIONIC EMULSION TACK/SEAL COAT

The tack/seal coat materials shall be emulsion modified with an approved polymer, using either a natural or synthetic latex. It shall be smooth and homogeneous and shall conform to the following requirements and be available on site at a temperature of not less than 140*F.

TEST	METHOD	MIN	MAX
Surfactant	Cationic	-	-
Base Asphalt PG 58-28	ASTM D3381	-	-
Polymer Content % mass of Distillation Residue	Spectrophotometer (Texas Method)	3.0	-
Total residue by evaporation	ASTM D244	65	-
Viscosity @ 25 (77°F),SSF	"	20	100
Storage stability, 1 day, % Sedimentation	"	-	1.0
Sieve Test, %	"	-	0.10
Demulsibility,% by wt Residue	"	40	-
Setting Time (minutes)	Observation	3	7

DATA TABLE II

SINGLE SIZE COARSE AGGREGATE COMPONENT GRADATION

ASTM		TOTAL % PASSING BY WT	
US		TYPE A	TYPE B
3/4		-	-
1/2		-	100
3/8		100	85-100
1/4		85-100	30-55
4		40-60	24-45
8		21-37	21-37
16		16-26	16-26

DATA TABLE III

COARSE AGGREGATE PROPERTIES

TESTS	METHOD	Light Medium Traffic <200 heavy veh/day	Heavy Traffic >200 heavy veh/day
Los Angeles Abrasion Value%	ASTM C131	<25	<20
Polish Value, %	ASTM D3319	>50	>50
Water Absorption, %	ASTM C127	<2	<2
Flakiness Index, %	NFP18-561	<20	<15
Crushing Ratio, %	Observation	100	100
Overall Cleanliness (% pas #30)	ASTM C142	<2	<2
Asphalt Affinity*,%	ASTM D3625	>95	>95

*anti-stripping agents may be required to provide acceptable values

DATA TABLE IV

FINE AGGREGATE COMPONENT GRADATION

ASTM		% PASSING BY WEIGHT
US		**Type A or B**
#4		100
#8		90-100
#16		60-80
#30		45-60
#50		30-40
#100		20-30
#200		15-25
Crushing ratio, % minimum (observation)		100
Sand Equivalency, % minimum (ASTM D2419)		60

*Mineral Filler, if required, may be Hydrated Lime, Fly Ash or Baghouse
Fines 100% passing #100, 80% passing #200

DATA TABLE V

ASPHALT CEMENT

PROPERTY	METHOD	PG 64-22
Viscosity, 60°C (140°F) Poise (Regional)	ASTM D 3381	2,000 + 400
Penetration, 25°C (77°F), 100g, 5 sec, min	ASTM D5	60
Softening Point° C (F)	ASTMD 36	45-51(113-124)

*Asphalt cement may be modified by the addition of a thermoplastic polymer

DATA TABEL VI

COMBINED AGGREGATE GRADATIONS - DESIGN TARGET ENVELOPES

AASHTO STANDARD SIEVE SIZES		TOTAL % PASSING BY WT	
US		**TYPE A**	**TYPE B**
3/4		-	-
1/2		-	100
3/8		100	85-100
1/4		85-100	30-55
4		40-60	24-45
8		21-37	21-37
#16		16-26	16-26
#30		12-20	12-20
#50		8-16	8-16
#100		5-10	5-10
#200		5-7	5-7

COLD IN PLACE RECYCLING

Description of Goods and Services

1. Scope

Work under this contract shall consist of milling the existing bituminous pavement, pulverizing these millings, adding emulsified asphalt, possibly adding new aggregate, Portland cement, mixing, repaving and compacting the mixture in one continuous operation to the lines, grades, and dimensions shown on the plans. Contractor shall supply all equipment, including fuel for such equipment, equipment maintenance, equipment repairs, equipment operators and labor.

2. Materials

2.1 The asphalt emulsion type shall be called for in the proposal
(Either HFMS-2 or CSS- 1H) see enclosed specifications for asphalt emulsion.

2.2 The cold recycled asphalt pavement shall consist of approximately three (3) to four (4) inches of the existing bituminous pavement and meet the following gradation requirement.

SIEVE SIZE	% **PASSING**
$1^{1}/_{2}$"	100
1"	90-100

2.3 The existing bituminous material shall be milled in a manner that does not disturb the underlying material in the existing roadway. The depth of milling shall be adjusted as necessary to avoid mixing soil from under the pavement into the recycling process. Wherever feasible, it is desirable to maintain at least two inches (2.0") of existing pavement after the milling process to support the cold-in-place train and limit the incorporation of the base materials.

2.4 Mix Design and Submission Requirements
Mix designs shall be performed on materials obtained from cores within depth of the range of anticipated milling. The mix design shall be performed at varying rates of emulsion addition to determine the optimal emulsion application rate for the given material.

Cores or laboratory testing Contractor performs to establish the recycled asphalt mix design shall be included in the cold-in-place recycled pavement pay item and not paid for separately.

2.5 Aggregate (New coarse and fine)
New Aggregate may be added to the cold-in-place recycling process to improve the characteristics of the finished product but shall not exceed 20% of the total mass of the finished product being placed. Any new coarse or fine aggregate added to the recycling process must meet the requirements of FORM 816 Section M.04 Bituminous Concrete for coarse aggregate, the nominal maximum aggregate size shall not exceed one-half inch (½"). A mix design shall be submitted with the new aggregate incorporated into the design.

2.6 Portland Cement
The use of Portland cement as an additive is acceptable to enhance the characteristics of the finished product. The addition of Portland cement shall not exceed 1.5% of the finished product by weight. If Portland cement is to be used as an additive, it shall be included in the mix design process.

2.7 Fogseal
Due to traffic conditions and surface preparation for the next wearing course, a Fog Seal with cover sand may be required.

3. Construction Requirements

3.1 The existing bituminous material shall be cold recycled in a manner that does not disturb the underlying material in the existing roadway. However, in some circumstances a certain amount of the base material may have to be incorporated. In other instances, it may be necessary for the contractor, with the consent of the highway superintendent, to decrease the depths of cut because of large rocks, ledge or unsuitable materials.

3.2 Recycling operations shall not be performed when the atmospheric temperatures are below 50 degrees Fahrenheit or when the weather is foggy or rainy, or when weather conditions are such that proper mixing, spreading and compacting of the recycled material cannot be accomplished in the judgments of the highway superintendent and the project supervisor.

3.3 When commencing recycling operations, the asphalt emulsion shall be added to the pulverized bituminous material at the initial design rate determined and varied by the project engineer-supervisor as required by existing pavement conditions. This amount will be conveyed to the Town Highway Superintendent before commencement. An allowable tolerance of plus or minus 0.2 percent of initial design rate or project engineer-supervisor direct rate of application shall be maintained at all times. The contractor may add water to the pulverized material to facilitate uniform mixing with the asphalt Emulsion. Said water shall not cause an adverse effect on the addition or the recycled material. In some instances, aggregate will have to be incorporated into the recycled mix to improve the gradation of the in-place mixes. These aggregates shall be crushed stone or gravel conforming to the requirements of ConnDOT M.04.01 1. Coarse Aggregates of the January 2016 Form 817 Specifications for Roads, Bridges, and Incidental Construction, as currently amended. Bank run gravel will not be allowed.

3.4 The contractor shall demonstrate his or her ability to obtain a minimum Density of 95 % of a laboratory specimen prepared in accordance with AASHTO T-245 (50 blows). The Highway Superintendent and or project Engineer- supervisor may require a re-demonstration of rolling capabilities when a change in the recycled material is observed, whenever a change in rolling equipment is made or if densities are not being obtained with the rolling pattern being used.

3.5 After the recycled material has been spread and compacted, an additional hour of curing may be allowed prior to area being opened to traffic. Before placing bituminous surfacing, the recycled material shall be allowed to cure such that the free of moisture content is reduced to 1.5% or less or for a minimum of 7 days.

3.6 Manholes and Other Structures: Contractor will not be responsible for lowering or cutting asphalt or removing asphalt for manholes, the town may lower and plate manholes or saw cut up to but not more than 5' before and after and at least half

way across the road and remove asphalt with backhoe prior to COLD IN PLACE RECYCLING. The Municipality shall be responsible for covering all storm drains and catch basins on the project and have the location of each clearly marked prior to commencement of recycling. Any downtime of the Recycler and affiliated equipment caused by damage due to striking underground utilities that have been left un-marked, shall be compensated at an hourly rate for all hours lost. HMA may be placed in front of milling machine for use.

3.7 The responsibility of ensuring that the cold-in-place recycled mix is not damaged by traffic will be determined by who is in control of Maintenance and Protection of Traffic (municipality or contractor).

3.8 Traffic, including construction traffic, shall be kept off freshly placed Cold-in-place recycled mix for a minimum of one hour or whatever time is required to prevent damage to the surface.

3.9 The decisions of what traffic control will be needed will be made by the highway superintendent and the contractor prior to starting the project. The maximum speed of traffic on the fresh recycled mix shall be 30 km/h (20 mph). This speed must be posted and enforced.

4. Equipment

4.1 The contractor shall furnish a self-propelled down cutting milling machine capable of pulverizing the existing bituminous materials to the specified depth in one pass. Said machine shall have a minimum rotor cutting width of 10.5 feet with the capability of widening to 13.5 feet, standard automatic depth controls and must maintain a constant cutting depth.

4.2 A positive displacement pump, capable of accurately metering the required Quantity of emulsion down to a rate of 4 gal/minute, shall be used.

4.3 Placing of recycled bituminous base course shall be accomplished with a self-propelled bituminous paver having sufficient hopper capacity of (15 ton minimum) to temporarily store surges of materials due to variations in the pavement and milling depths. Ensure that a continuous flow of material is deposited into the paver hopper. Material should not overfill the hopper and spill over the sidewalls, nor should the hopper be under filled such that the drag slats in the bottom of the hopper are exposed. The bituminous recycled material shall be spread in one continuous pass, without segregation.

When a pick-up machine is used to feed the windrow into the paver hopper, the pick-up machine shall be capable of picking up the entire windrow to the underlying materials

In instances where a large surplus of RAP is produced, the equipment shall have provisions for off loading this processed material prior to its being mixed with emulsion. Where deficiencies of material exist due to pavement conditions such as rutting or thin pavement, the off loaded RAP may be added back into the process.

Rolling Procedure

4.4 The number, weight, and type of rollers shall be sufficient to obtain the required compaction of a minimum of 95% while the mixture is a workable condition except that the pneumatic roller(s) shall be 20 ton minimum weight.

Initial rolling is to be done with a rubber tired roller(s) and continued until no displacement is observed or until the pneumatic rollers have “walked out". Final rolling to eliminate pneumatic tire marks and achieve density shall be done by steel wheel roller(s), either in static or vibratory mode, as required to achieve required density.

Rollers shall not be started or stopped on encompassed recycled material. Rolling shall be established so that starting and stopping will be on previously compacted recycled material or on the existing bituminous roadway or shoulder. Any type of rolling that results in cracking, excessive movement, or other types of pavement distress shall be discontinued until such time the problem can be resolved. The highway superintendent and project engineer- supervisor have sole discretion of discontinuation and commencement of rolling operations.

Compaction should begin when the mix begins to break (30 minutes-2 hours).

- Ensure that the rollers are the correct distance behind the paver in accordance with the requirements of the emulsion manufacturer.
- Ensure that rollers are not operating at more than 6.4 km/h (4 mi/h).
- Ensure that there is no damage from potential overrolling.
- Communicate daily with the roller operators to review the developed rolling pattern.
- Ensure that stops, starts, and turns are gradual.
- Ensure that finish rolling is completed within the time specified in the contract documents.
- Ensure that water (or an approved wetting agent if permitted by the contract documents) is lightly sprayed onto the roller drums and tires to prevent pickup. Under no circumstances should diesel or other solvents be used to prevent pickup.

5. Fog Seal Specification

5.1 This work shall consist of furnishing all materials, equipment, labor and preparation necessary for the application of a light coating of asphalt emulsion to the recycled material

5.2 Asphalt emulsion CSS-1H Fogseal will be used

5.3 Provide equipment conforming to the requirements of this section.

- Use equipment for asphalt emulsion distribution ensure that it has a computerized rate control that automatically adjusts the emulsion pump to the unit ground.
- Furnish accurate thermometers for determining any of the applicable temperature requirements of this specification.

5.4 Do not place fog seal if any of the following conditions exist:

- Impending weather conditions do not allow for proper curing or if temperatures are forecasted below 50°F (10°C) within 24 hours from the

time of work
- Existing pavement temperature is 140°F (60°C) or above
- Pavement surface is wet or rain is forecasted within 24 hours of placement

5.5 The Contractor shall follow the construction methods as described:
- Apply the asphalt emulsion at the target rate(s) established during the test strip.
- Maintain the asphalt emulsion temperature from 150 to 185°F (65 to 85°C) during construction, including the start of each day.
- If the target application rates are not the optimum application rates to achieve proper coating of the recycled material or the break time is too long or short, immediately notify the Engineer.
- Do not allow the asphalt emulsion to streak on the road surface. If the Engineer determines that streaking is occurring, cease operations until the Engineer is satisfied that streaking has been eliminated.

5.6 Asphalt Emulsion Application Rates

- Gallons per Square Yard
- 50% Diluted Emulsion 0.03 – 0.11 0.06 – 0.15

5.7 During the application of the fog seal, inspect the fog seal for deficiencies resulting from poor workmanship, flushing, tracking from equipment, surface patterns, and sweeping. Inspect workmanship for untreated areas, minimum overlap on longitudinal joints, and minimum overlap on construction joints.

5.8 Cover Sand will be applied at a rate between two (2) to three (3) pounds per square yard.

6. Contractors Requirements

6.1 The contractor is required to present to the Town a history of 5 years of experience in cold-in place pavement recycling. This history must be included with bid submission.

6.2 The contractor shall own or show the ability to own, rent or subcontract the equipment with properly trained personnel and experience which he or she intends to complete the contract, if so awarded.

6.3 The contractor shall show the ability to properly supply the project with ample access to liquid asphalt as required by the cold in place process.

6.4 The contractor is required to provide a project engineer-supervisor on the job and the name of project engineer-supervisor will be supplied prior to project.

7. Method of Measurement

7.1 Quality controlled cold-in-place recycling shall be measured by the square yard. The depth of cut of the milling operation shall be designated by the engineer/ supervisor and highway superintendent.

7.2 Any additional aggregate or additive placed by the contractor will be measured by the ton.
and the terms and conditions of this bid.

Chip Seal

1. Materials:

1.1 Asphalt Base Emulsion- Catatonic Rapid Set Emulsion (CRS-2P). The specification for CRS-2P shall be in accordance with the material properties and test methods as specified by ASTM, AASHTO, CT DOT Form 817 and successors, and CT State Bid.

1.2 Aggregate- The aggregate shall be washed, hard, durable clean rock, free from coatings or deleterious material. All of the aggregate shall meet the requirement of CT DOT form 817 M.04.01 (3/8" or 1/4" stone, size to be determined by the town) by washed sieve analysis as described in AASHTO T 11, coarse aggregate for bituminous concrete materials. The Contractor shall notify the Town as to aggregate sources. The Contractor is responsible for loading and transporting materials to the site.

1.3 Material Testing-The Town shall approve the source of supply of each of the materials specified before delivery is started. The Contractor shall supply the Town with certifications that all materials to be supplied meet specification. Only materials conforming to the requirements of these specifications and approved by the Town shall be used.

No material shall be used until testing conforms to the specifications stated herein. Materials, which after approval, have in any way become unsuitable for use, will not be accepted by the Town.

The Contractor is responsible for the quality of materials from the source to the job site. No stockpiling of aggregate will be allowed at any location except the source without prior Town approval. Individual load tickets shall be provided to the Town Inspector during aggregate application. Material to be hauled in clean truck bodies.

2. Construction Requirements:

2.1 Equipment - The Contactor shall supply all equipment necessary to do the work specified. Should any equipment become unsatisfactory for whatever cause, the Contractor shall remove and replace the equipment without delay or additional cost.

2.2 Bituninous Carrier - All bituminous carriers must be clean, free from dirt, foreign material and material from previous loadings. Such carriers may not contain materials which tend to clog
pipelines and pumps of distributors. The Contractor is responsible for any loss of material due to defective or improperly closed valves. Bituminous carriers delivering material shall be equipped with a satisfactory thermometer and heating apparatus to ensure that the material is in the proper
condition for application. Each carrier or tanker shall have a working valve in the

bulkhead for sampling purposes.

2.3 Bituminous Distributor - The Contractor's bituminous distributors must be equipped with approved tachometers. These tachometers should be checked and calibrated at the start of each oiling season, for use in determining accurate applications for all grades of emulsion, for varying widths of spray bars through coordination of vehicle speed and pump output. The distributors must be equipped with full circulating bars and have sufficient spare sections of spray bars to apply emulsion in multiples of 2 feet for any reasonable total width of application. Distributors must be equipped with a hand hose in an operating condition for use in covering areas inaccessible for standard spray bars. The distributor must be equipped with two (2) squeegees for removing excess emulsion at starts and stops. The Contractor's distributor must be equipped with an approved calibrated measuring stick and/or gauge to determine at any time the gallons of emulsion remaining in the tank of the distributor. All operators shall be fully trained in the operation of the distributor.

2.4 Aggregate Spreader and Roller - The Contractor operated aggregate spreader must be a self-propelled chip spreader type or approved equal. The aggregate shall be spread evenly by a computerized mechanical chip spreader. The spreader shall be capable of spreading in one (1) foot wide increments, and up to twenty-two (22) feet wide in a single pass.
The Contractor operated rubber tired roller must be a self-propelled pneumatic tire roller equipped with wide tread compaction tires capable of exerting an average contact pressure of anywhere from 60 to 90 pounds per square inch uniformly over the surface.

2.5 Sweeping - The Town shall sweep road(s) to be chip sealed prior to the arrival of the Contractor. The Contractor is required to re-sweep roads immediately prior to placing the base emulsion. The Contractor shall also sweep loose aggregate on the morning of the day following application of the chip seal, weather permitting. Sweeping must be conducted when the road surface is cool. Extreme care must be taken such that cover aggregate that has set is not disturbed. The sweeper must be mobile with a front or side unloading hopper, right and left gutter brooms, and be capable of unloading into a standard six wheel dump truck.

2.6 Delivery Requirements - Delivery of the liquid emulsion will be requested by the Town at least one (1) day prior to the day the emulsion is required on the job site. The Contractor shall have the liquid emulsion delivered to the destination specified, within the required temperature range and ready to apply at the time requested by the Town.
Emulsion temperature at the point of origin and at the time of delivery must be between 150 and 170 degrees F. Emulsions shall be heated to the lowest temperature necessary to obtain a satisfactory application. No emulsion will be heated above 170 degrees F.
At no time may the emulsion be heated above specification limits as I isted herein. The Contractors equipment must be equipped with satisfactory thermometer and heating apparatus. In addition to this equipment, bituminous distributors are to be equipped with pumps capable of circulating materials whereby specification temperatures may be maintained without burning of material adjacent to the heating flues.
2.7 Material Application Rates - The specific emulsion and aggregate application

rates shall be determined using factors such as surface temperature, traffic volume, existing road conditions and the time of the year. The Contractor may alter application rates upon approval of the Town.
Emulsion -0.30 -0.45 Gallons/ Square Yard
Cover Coat Aggregate 3/8" - 21 - 28 pounds / Square Yard

3. Execution of Work:

3.1 Catch Basins, Manholes and Valve Boxes - Catch Basins, manholes and valve boxes shall be covered with an approved material during the chip seal operation. The covering shall be removed immediately after the chip seal operation is complete.

3.2 Weather Limitations - The chip seal shall not be applied when the pavement is moist, or when the weather is, or may be detrimental. Detrimental weather is defined as rain showers, cool temperatures, moist pavement, threat of rain showers or other environmental factors which could affect the performance of the chip seal operation. No chip seal shall be applied if either the pavement or air temperature is below 55 degrees F and falling, but may be applied when both the pavement and air temperature area above 50 degrees F and rising.

3.3 Surface Preparation - The Contractor shall be responsible for all measures required to provide a thoroughly clean and dry pavement surface including vegetation removal (if necessary) and additional sweeping prior to the chip seal application.

3.4 Application of Bituminous Emulsion - The application of emulsion shall be performed by means of a pressure distributor in a manner to achieve a uniform and continuous spread over the existing asphalt surface. The temperature of the emulsion shall be a minimum of 150 degrees F.
The quantity of emulsion per square yard shall be as specified above and agreed upon by the Town. The distributor shall be moving forward at the proper application speed at the time the spray bar is opened. If at any time a nozzle becomes clogged or not spraying a proper pattern, the operation shall be immediately halted until repairs are made. Repairs shall be made immediately after deficiencies are found and prior to the placement of aggregate. The width of the emulsion application shall be no greater than the width of the aggregate spreader except where additional passes are required, then the emulsion shall be four (4) inches beyond the aggregate spread. At no time shall the emulsion be allowed to break, chill, set up, harden or otherwise impair the aggregate retention before the aggregate has been properly applied and rolled.

3.5 Application of Cover Coat Aggregate - The aggregate cover coat shall be applied immediately following the emulsion application by the approved aggregate spreader. The quantity of cover coat material per square yard shall be as specified herein and agreed upon by the Town. The Contractor, prior to the start of work, shall calibrate the aggregate spreader to achieve the design application rate of cover coat aggregate. Spreading shall be accomplished in such a manner that the tires of the trucks and aggregate spreader never contact the newly applied bituminous emulsion. The width of the aggregate spreader shall be equal to the width of the emulsion spread, except where additional passes are required. All areas which are deficient in aggregate, shall be covered immediately with additional material.

3.6 Rolling- Initial rolling shall begin immediately after the application of the cover coat aggregate. Roller(s) shall work to complete a minimum of three (3) passes with sufficient overlap. Should the rolling operation be delayed, the emulsion and aggregate spreading shall be halted until the operation regains the proper sequencing and timing. The maximum speed of the rolling operation shall be 10 miles per hour.

3.7 Sweeping - Within 24 hours after application (weather permitting), excess aggregate shall be swept from the chip sealed roadway and adjacent areas. Disposal of excess aggregate is the responsibility of the Contractor. No used or dirty stone shall be re-applied in subsequent locations in the Town.

3.8 Contractor Furnished Traffic Control - The Contractor shall supply and be responsible for all labor including two (2) Uniformed Flaggers (as defined herein), equipment, signs,cones, and other materials necessary. Traffic control will be performed in accordance with "Work Zone Safety Guidelines for Maintenance Operations" . Payment for Contractor Furnished Traffic Control shall be included in the square yard unit price for the Chip Seal product.

3.9 Uniformed Flaggers - defined as: Persons who have successfully completed flagger training by the American Traffic Safety Services Association (ATSSA), National Safety Council or other Town approved programs. A copy of the Uniformed Flaggers training certificate must be provided to the Town Inspector before the Uniformed Flagger performs any work on any job site. Uniformed flaggers shall wear garments (including high visibility headgear) so as to readily distinguishable as Uniformed Flaggers in accordance with Standard 6E-3 of the Manual on Uniform Traffic Control Devices (MUTCD) and these specifications. A Uniformed Flagger shall be equipped with a Stop/Slow paddle that is at least 18 inches in width with letters 6 inches high which conforms to standard 6E-4 of the MUTCD.

3.10 Variation of SPECIFICATIONS
Only the Town in its sole discretion, may amend, waive, or change any part of this specification. Any variation will be acknowledged in writing by the Town and the Contractor.

BASIS OF PAYMENT: The quantity to be measured for payment will be the number of square yards of Chip Seal actually completed. The accepted quantity of chip seal will be paid for at the contract unit price per square yard, which shall be full compensation for furnishing, transporting, handling and placing the material specified and furnishing of all labor, tools, equipment and incidentals for the satisfactory completion of this item. Pay items will be broken down as follows: 10,000-24,999 square yards, 25,000 to 50,000 square yards, 50,001+ square yards.

MICROSURFACING

Micro-surfacing shall meet or exceed all criteria for said products as published by The International Slurry Surfacing Association (ISSA) and shall be subject to testing according to all pertinent AASHTO and ASTM procedures.

DESCRIPTION: Micro-surfacing is a tough and durable thin overlay material which can restore the original service properties to worn but structurally sound pavements. Its prope1ties are based on a blend of select crushed aggregate and a sophisticated chemical formulation of asphalt cement, cationic emulsifiers, additives, and polymers. This specification covers all materials, equipment, construction and application procedures for rut filling and/or surfacing of existing paved surfaces. The micro-surfacing shall be a mixture of cationic, polymer-modified asphalt emulsion, mineral aggregate, mineral and field control additives, and water, properly propo1tioned, mixed and spread on the paved surface in accordance with this specification and as directed by the Town.

Where required by the Engineer, additional microsurfacing mixture additives shall be utilized for the purpose of improving performance and durability. These mixture additives shall include fibers (polyester or fiberglass). All additives shall be homogenously blended with the other micro-surfacing components.

MATERIALS: The emulsified asphalt shall be a quick-set, polymer-modified cationic type CSS-1 H emulsion, and shall conform to the requirements specified in AASHTO M208 and ASTM 2397. It shall pass all applicable storage and settlement tests. The polymer shall be milled into the emulsion.

Distillation of residue will be at a temperature of 350 degrees F for 20 minutes. Softening Point (ASTM D36 or AASHTO T53) of the residue shall be not less than 140 degrees F.

For fiber-reinforced mixtures, emulsion testing by distillation method (ASTM D5 or AASHTO T49) shall yield Penetration values of between 40 and 120 dmm at 77 degrees F, and a Softening Point (ASTM D36 or AASHTO T53) not less than 135 degrees F.

The mineral aggregate used shall be of the type and grade specified for micro-surfacing. The aggregate shall be manufactured crushed stone such as granite, slag, limestone, chat, or other high quality aggregate or combination thereof.

The aggregate including natural fines when tested by AASHTO methods T11 or T27 or ASTM C117 or C136, should meet the referenced gradation requirements.

Deleterious Substances. To limit the permissible amount of clay-like fines in an aggregate, a sand equivalency value of 65 or higher is required when tested by ASTM 2419.

Soundness: The aggregate shall have a weighted loss of not more than 15% when the sodium sulfate test is used, or 20% when the magnesium sulfate test is used.

Hardness: The aggregate wear, from resistance to abrasion, shall be a maximum of 35% when using AASHTO T96 or ASTM C131 test methods.

The water shall be potable and shall be free of harmful soluble salts.

Special quick-setting emulsifier agents shall be milled into the asphalt emulsion. The emulsified asphalt shall be so formulated that when the paving mixture is applied at a thickness of one inch with the relative humidity at not more than 50% and an ambient air temperature of at least 75 degrees F, the material will cure sufficiently so that rolling traffic can be allowed in one hour with no damage to the surface, as verified by the Engineer.

A mineral additive shall be introduced to the aggregate and may be any recognized brand of non-air entrained Portland cement or hydrated lime that is free of lumps, or other approved mineral additive. It may be accepted upon visual inspection. The amount of mineral additive needed shall be determined by the laboratory mix design and will be considered as part of the material gradation requirement. A liquid field control additive may be introduced and blended with water to provide effective control of the required quick-set properties. This additive shall be made available by the chemical supplier or emulsion manufacturer, and certified to be compatible with the mixture.

ENGINEERING: Before work commences, the contractor shall submit a signed and certified mix design covering the specific material(s) to be used on the project. This design shall be performed by a qualified laboratory at the contractor's expense. Once the materials are approved, no substitution will be permitted unless first tested and approved by the laboratory preparing the mix design.

The laboratory shall develop the job mix design and present certified test results for the contractor's approval. Compatibility of the aggregate and emulsion shall be verified by the mix design. The job mix formula shall meet standard ISSA A143 microsurfacing mix design requirements. All component material used in the mix design shall be representative of the material proposed by the contractor for use on the project.

The Town shall approve the design mix and all microsurfacing materials and methods prior to use.

EQUIPMENT: All equipment, tools, and machines used in the performance of this work shall be maintained in satisfactory working condition at all times to ensure a high quality product.

The material shall be mixed by a self-propelled microsurfacing mixing machine which shall be a continuous flow, continuous run mixing unit able to accurately deliver and proportion the aggregate, emulsified asphalt, mineral and field control additives, and water to a revolving multi-blade twin shafted mixer, and discharge the mixed product on a continuous flow basis. The machine shall have sufficient storage capacity for aggregate, emulsified asphalt, mineral and field control additives, and water to maintain an adequate supply to the proportioning controls.

Individual volume or weight controls for proportioning each material to be added to the mix, i.e., aggregate, emulsified asphalt, mineral and field control additives, and water shall be provided and properly marked. These propo11ioning devices are usually revolution counters or similar devices, and are used in material calibration and determining the materials output at any time.

The emulsion pump shall be a heated, positive displacement type pump.

The surfacing mixture shall be spread uniformly by means of a mechanical type spreader box attached to the mixer, equipped with paddles to agitate and spread the

materials throughout the box. The spreader box width shall be capable of adjustment while paving in order to accommodate the changing width of some roadways without excessive overlaps. A front seal shall be provided to insure no loss of the mixture at the road contact point. The rear seal and secondary strike-off shall act as the final strike-off, and both shall be adjustable. The mixture shall be spread to fill cracks and minor surface irregularities, and leave a uniform skid resistant application of material on the surface. The spreader box and rear strike-off shall be so designed and operated that a uniform consistency is achieved to produce a free flow of material to the rear strike-off. The longitudinal joint where two passes join shall be neat in appearance, uniform and lapped. All excess material shall be removed from the jobsite prior to opening the road. The spreader box shall have suitable means provided to side-shift the box to compensate for variations in pavement width and longitudinal alignment. A rut box shall be available to pre-fill wheel ruts when necessary prior to overlay to eliminate puddles or runoff interruption. The rut box shall be no less than 4' wide and no more than 6' wide.

WEATHER: The material shall be spread only when the road surface and atmospheric temperatures are at least 45 degrees F and rising, the weather is not rainy, and there is no forecast of temperatures below 32 degrees F within 48 hours from the time of placement of the mixture.

SURFACE PREPARATION: The area to be resurfaced shall be thoroughly cleaned of vegetation, loose aggregate and soil, particularly soil that is bound to the surface. Manholes, valve boxes and other service entrances will be protected from the surfacing material with polyethylene sheeting. All services will be uncovered upon completion of work.

HAND WORK: Areas which cannot be reached with the mixing machine shall be surfaced using hand squeegees to provide complete and uniform coverage. The area to be hand-worked shall be lightly dampened prior to mix placement. Care shall be exercised to leave no unsightly appearance from handwork. The same type finish as applied by the spreader box shall be required. Handwork shall be completed immediately after the microsurfacing mixture is discharged from the spreader box.

BASIS OF PAYMENT: The quantity to be measured for payment will be the number of square yards of microsurfacing actually completed. Additional charges for rut filling may be charged per ton of material used. The accepted quantity of microsurfacing will be paid for at the contract unit price per square yard of the type specified in the proposal, which shall be full compensation for furnishing, transporting, handling and placing the material specified and furnishing of all labor, tools, equipment and incidentals for the satisfactory completion of this item. Pay items will be broken down as follows: 10,000 to 14,999 square yards, 15,000 to 19,999 square yards, 20,000+ square yards.

Crackseal

DESCRIPTION: The work covered by this section of the specification consists of furnishing all plant, labor, equipment and materials necessary to perform all operations in connection with the cleaning and sealing of construction and random cracks in bituminous concrete pavements, and vegetation removal and sterilization of cracks where necessary.

MATERIAL: Crack sealer shall be an asphalt-fiber compound designed especially for improving strength and performance of the parent asphalt sealant.

1) Asphalt Sealant shall be a grade PG 64-22 with Fiber. Fiber reinforcing materials shall be short-length polyester fibers having the following properties:
Length---------- 7 mm.
Diameter---------- 0.0008 inch plus or minus 0.0001 inch
Specific Gravity--------- 1.32 to 1.40
Melt Temperature------- 480 degrees F. minimum
Ignition Temperature--- 1000 degrees F. minimum
Tensile Strength--------- 75,000 PSI plus or minus 5,000 PSI
Break Elongation-------- 33% plus or minus 9%----They are fully drawn

2) Asphalt-Fiber compound shall be mixed at a rate of 6-8% fiber weight to weight of asphalt cement. This compound having the same chemical base provides compatibility and exhibits excellent bond strengths. The fiber functions to re-distribute high stress and strain concentrations that are imposed on the sealant by thermal sources, traffic loading, etc.

EQUIPMENT: Equipment used in the performance of the work required by this section of the specification shall be subject to the engineer and maintained in a satisfactory working condition at all times.
1) Air Compressor: Air compressors shall be portable and capable of furnishing not less than 100 cubic feet of air per minute at not less than 90 lbs. per square inch pressure at the nozzle. The compressor shall be equipped with traps that will maintain the compressed air free of oil and water.
2) Manually operated, gas powered air-broom or self-propelled sweeper designed especially for use in cleaning highway and airfield pavements shall be used to remove debris, dirt, and dust from the cracks.
3) Hand tools shall consist of brooms, shovels, metal bars with chisel shaped ends, and any other tools which may be satisfactorily used to accomplish this work.
4) Melting Kettle: The unit used to melt the joint sealing compound shall be double boiler, indirect fired type. The space between the inner and outer shells shall be filled with a suitable heat transfer oil or substitute having a flash point of not less than 600 degrees F. The kettle shall be equipped with a satisfactory means of agitating the joint sealer at all times. This may be accomplished by continuous stirring with mechanically operated paddles and/or by a continuous circulating gear pump attached to the heating unit. The kettle must be equipped with thermostatic control calibrated between 200 degrees F. and 550 degrees F.

PREPERATION OF CRACKS:
1) Debris Removal: All cracks shall be blown clean by high pressure air. All old material and other debris removed from the cracks shall be removed from pavement surface immediately by means of power sweepers or hand brooms or air broom.
2) Vegetation: When cracks show evidence of vegetation, it shall be removed and sterilized by use of Propane Torch unit generating 2000 degrees F. and 3000 foot/second velocity to eliminate all vegetation, dirt, moisture and seeds.
3)General: No crack sealing material shall be applied in wet cracks or where frost, snow or ice is present nor when ambient temperature is below 25 degrees F.

PREPARATION AND PLACEMENT OF SEALER:
1) Joint sealing material shall be heated and applied at a temperature specified by the manufacturer and approved by the engineer. Minimum application temperature shall be 320 degrees F.
2) Sealer shall be delivered to the pavement surface through a pressure hose line and applicator shoe. The shoe width and over-banding area shall not exceed three inches (3") in diameter. When traffic requires immediate use of the

roadway, a boiler slag aggregate shall be broadcast over the cracks to prevent the sealant from being picked up.

WORKMANSHIP: All workmanship shall be of the highest quality, and excess of spilled sealer shall be removed from the pavement by approved methods and discarded. Any workmanship determined to be below the high standards of the particular craft involved will not be accepted and will be corrected and/or replaced as required by the engineer in charge.

PERFORMANCE:

1) It is the intentions of the Public Agency not to award a contract for this work under this or any other proposal if the bidder cannot furnish satisfactory evidence that he has the ability and experience to perform this class of work and that he has sufficient capital and equipment to enable him to prosecute the work successfully and to complete it within the time named in the contract; and the Public Agency reserves the right to reject this or any other proposal or to award the contract as is deemed to be in the best interest of said Public Agency

MEASUREMENT AND PAYMENT:

1) Measurement for this bid unit shall be by the gallon and shall be the actual number of gallons of sealer applied to the pavement per day. Payment shall be at the unit price bid in the proposal and shall be complete payment for the entire item including furnishing, preparation and placing of materials, labor and equipment to be used on this project.

ASPHALT PRICE ADJUSMENTS

Contractor's bid prices below shall be based upon the current State DOT asphalt cement index posted exactly twenty-eight days (28 days) prior to the due date for receipt of bids ("Bid Index"). Contractor's invoices shall include price adjustments for the asphaltic materials based on the actual gallons incorporated into the work, and will be adjusted based on the month the work is completed

TRAFFIC CONTROL – ALL PROCESSES

If Municipality is in charge of traffic control:

Municipality shall be responsible for traffic control patterns throughout the term of Contract. Municipality shall be responsible for providing traffic control personnel, as well as supplying, erecting, maintaining, moving and removing all signs, sign supports, barricades, traffic cones, traffic delineators, and any other materials necessary to establish the traffic patterns.

If Contractor is in charge of traffic control:

Contractor shall be responsible for traffic control patterns throughout the term of Contract. Contractor shall be responsible for providing traffic control personnel, as well as supplying, erecting, maintaining, moving and removing all signs, sign supports, barricades, traffic cones, traffic delineators, and any other materials necessary to establish the traffic patterns. Contractor controlled traffic includes 3 flaggers. Should additional flaggers be needed, there will be an "additional flagger" pay item by the day.

PRICE PAGES

Ultra-Thin Bonded Wearing Course

Project Size	Type A	Type B
10,000 – 14,999 SY	/per SY	/per SY
15,000 – 19,999 SY	/per SY	/per SY
20,000+ SY	/per SY	/per SY

Traffic Control, Contractor Supplies	$_____/sq. yd.
Added Tonnage for Shim	$_____/ton
Additional Flagger	$_____/day

Cold In-Place Recycling

3" Depth Cold In Place Recycling

Total Square Yards	Price per Square Yard
10,000 -24,999	
25,000 -49,999	
50,000 +	

4" Depth Cold In Place Recycling

Total Square Yards	Price per Square Yard
10,000 -24,999	
25,000 -49,999	
50,000 +	

Portland Cement: $_____/ton

Aggregate: $_____/ton

Fog Seal: $_____/sq. yd.

Fog Seal, Municipality Supplies Sand/Sand Truck: $_____/sq. yd.

Fog Seal, Contractor Supplies Sand/Sand Truck: $_____/sq. yd.

Traffic Control, Contractor Supplies: $_____/sq. yd.

Additional Flagger $_____/day

Chip Seal

Project Size	Unit Price
10,000 – 24,999 SY	/per SY
25,000 – 50,000 SY	/per SY
50,001+ SY	/per SY

Traffic Control, Contractor Supplies $_____/sq. yd.

Additional Flagger $_____/day

Microsurfacing

Single Application

Project Size	Unit Price
10,000 – 14,999 SY	/per SY
15,000 – 19,999 SY	/per SY
20,000+ SY	/per SY

Double Application

5,000 – 14,999 SY	/per SY
15,000 – 19,999 SY	/per SY
20,000+ SY	/per SY

Traffic Control, Contractor Supplies $_____/sq. yd.

Rut Filling $_____/ton

Additional Flagger $_____/day

Crackseal

Project Size	Unit Price
101-300 gals/day	/gals
301-500 gals/day	/gals
501+ gals/day	/gals

Traffic Control, Contractor Supplies $_____/sq. yd.

Additional Flagger $_____/day

BIDDER	SIGNATURE
COMPANY NAME	DATE
TITLE	PHONE
ADDRESS	FAX