

# SPECIAL PROVISION

NOTE: This special provision is generally written in the imperative mood. The subject, "the Contractor" is implied. Also implied in this language are "shall", "shall be", or similar words and phrases. The word "will" generally pertains to decisions or actions of Sedgwick County Public Works.

## ASPHALT SURFACE RECYCLING AND PAVING

### 1. DESCRIPTION

This work shall consist of rehabilitating the surface layer of existing asphalt pavement. Rehabilitation shall be performed with equipment designed to simultaneously perform the multi-step process that removes and recycles the surface layer; adds a rejuvenating agent; adds virgin asphalt pavement material; and places all the materials to form a new surface layer, all in one continuous operation. The work includes compaction of the rehabilitated surface. The rehabilitated layer shall conform to the lines, grades, and typical cross sections established by the Engineer.

#### BID ITEMS

Asphalt Surface Recycling

Asphalt Rejuvenating Agent

#### UNITS

Square Yard

Gallons

### 2. MATERIALS

#### a. Hot Mix Asphalt

The virgin asphalt shall meet Sedgwick County specifications for Bituminous Construction, Type BM-1. See special provision **Bituminous Construction**.

#### b. Asphalt Rejuvenating Agent (ARA)

Provide material that has a record of satisfactory performance based on the capability of the material to increase the ductility and lower the viscosity of the asphalt binder in the pavement surface. Provide an asphalt rejuvenating agent composed of a polymer-modified asphalt emulsion. Modify the asphalt base stock with a minimum of 3.0% styrene-butadiene solution polymer. Blend the polymer modified base stock with process oils or other additives before emulsification to achieve the desired finished product properties. The material must comply with the following physical and chemical requirements in TABLE 1:

TABLE 1: ASPHALT REJUVINATING AGENT	
Property	Requirement
Viscosity, Saybolt-Furol at 25°C, sec	15-100
Residue, % min. <sup>1</sup>	60
Sieve test, % max.	0.10
Oil distillate, % max.	2
Storage Stability, 24 hrs.. % max.	1
<b>Tests on Residue from Distillation:</b>	

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Asphaltenes, % max.	25
Penetration @ 4°C, 100g, 5 sec.	50-150
Elastic Recovery, AASHTO T 301, 4°C, 20 cm elongation, % min. Run on Distillation Residue	60

<sup>1</sup>Use modified AASHTO T 59 procedure – distillation temperature of 350° F with a 20 minute hold.

Test in accordance with the applicable provisions of AASHTO T 59, ASTM D 4402 and KT-MR20, “Chemical Analysis of Asphalt Rejuvenating Agents”.

### 3. EQUIPMENT AND OPERATION

The Contractor shall supply a single machine capable of performing all required functions. The only exception would be a separate pre-heater, provided it is used immediately ahead of the main machine. The Contractor shall specify, at the preconstruction conference, the type of equipment intended for use. The equipment shall be on the project in operating condition in sufficient time before the beginning operations to allow evaluation by the Engineer. 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 Engineer reserves the right to reject equipment deemed not suitable for the intended purpose. The Contractor shall be responsible for protecting the area adjacent to the work from heat damage.

- c. **Repaver Equipment.** The equipment for this work shall be a self-contained, self-propelled, automated unit capable of heating, scarifying (or rotary milling), mixing, redistributing and leveling the existing asphalt pavement to the specified depth, all in a single pass. It shall have means of automatically applying an asphalt rejuvenating agent at a uniform rate as shown on the plans or as directed by the Engineer. It shall be capable of applying a virgin hot mix asphalt layer over the hot, partially compacted recycled mixture. The laydown portion of the machine shall have spreading augers, a screed and automatic controls meeting the requirements of **SECTION 155** of the KDOT Standard Specifications for State Road and Bridge Construction (2015). The machine that heats, scarifies, rejuvenates, and levels must also lay the recycled asphalt material, as well as the virgin hot mix asphalt. The recycled asphalt material must be laid within 30 seconds after scarification begins to ensure a hot monolithic bond with the scarified pavement surface.
- d. **Heating Unit.** This unit shall have a hooded oxygen free chamber to prevent damage to adjacent property, including trees and shrubs. It shall heat the pavement surface uniformly to a temperature high enough to allow scarification to the required one inch nominal depth without breaking aggregate particles or charring the pavement surface, but produce reclaimed asphalt mix at an average minimum temperature of 250°F. Temperature of pavement shall not rise above 475°F. The heating chamber shall be capable of fully heating the pavement to a width of at least two inches (2”) beyond the width to be scarified and recycled.

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- e. **Scarifying or Milling Units.** The scarifiers, or rotary millers, shall use pressure loaded scarifiers having teeth spaced less than one inch apart that cut a leveled pattern through the surface conforming to the desired profile of the street in one pass. Average depth of cut shall be one inch (1"). Scarifiers shall be equipped with separate, automatic height adjustments, which allow clearance over manholes, water valves, and other such appurtenances in the street surface. The scarified material shall have a temperature between 225° F and 265° F as measured immediately behind the scarifier, unless otherwise directed by the Engineer.
- f. **Asphalt Rejuvenating Agent Applicator.** This system shall automatically add rejuvenating agent to the scarified material at a uniform rate as shown on the plans or as directed by the Engineer. The application rate shall be synchronized with the working speed of the machine to maintain a tolerance within 5% of the specified rate.
- g. **Conveying System.** The conveying system shall consist of a receiving hopper and conveying system to collect and transport virgin hot mix asphalt material to the finishing unit.
- h. **Recycling Unit.** The recycling unit shall mix, distribute and level the recycled material over the width being processed to produce a uniform cross-section. The recycled material shall be compacted by a recycling screed that lays the recycled mix as a leveling course in alignment with the desired profile of the finished pavement.
- i. **Finishing Unit.** The finishing unit shall have spreading augers and automatic screed controls equivalent to asphalt paving machines meeting the requirements of **SECTION 155** of the KDOT Standard Specifications for State Road and Bridge Construction (2015) to produce a smooth surface conforming to the approximate lines and grades of the pre-existing pavement surface. The unit shall be capable of producing a uniform slope, grade and texture.
- j. **Compaction Rollers.** Compaction shall be by the use of 8 to 12-ton vibrating, self-propelled smooth-faced steel rollers meeting the requirement of **SECTION 151** of the KDOT Standard Specifications for State Road and Bridge Construction (2015) unless otherwise specified by the Engineer.

### 4. CONSTRUCTION REQUIREMENTS

- a. **Surface Preparation.** Prior to commencing heater scarifying operations, the pavement shall be cleaned of any loose material that could interfere with the work. Any soil or aggregate adhering to the pavement shall be loosened and removed. Power brooming shall be supplemented by hand brooming, if necessary, to render the surface free from deleterious material. Any required patching work designated on the plans or in the proposal shall be completed prior to the beginning of the scarifying process.
- b. **Landscape Protection.** It shall be the responsibility of the Contractor to protect the adjacent landscape from heat damage. This protection may consist of individual

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shielding and/or water spray or other methods approved by the Engineer. All areas damaged by excessive heat shall be repaired or replaced at the Contractor's expense.

- c. **Cold Milling.** When transition or edge milling is required, the Contractor shall not extend milling construction to the next project location more than two (2) working days ahead of the recycling operations, unless otherwise approved by the Engineer. The contractor shall also take reasonable precautions to avoid extended separation between milling construction and recycling operations within a single continuous project corridor. Milling construction shall meet the requirements of **SUBSECTION 612.3** of the KDOT Standard Specifications for State Road and Bridge Construction (2015) and follow the lines and grades provided in the plan details.
- d. **Heating and Scarifying Operations.** Uniformly heat the existing pavement to the specified depth. The heating shall be done in a manner that will assure uniform softening and will not char the asphalt. The asphalt pavement shall be fully heated to a width of at least two inches (2") beyond the width to be scarified and recycled. On the next pass paralleling the first, the recycling shall overlap the previously recycled mat by a minimum of two inches (2") to create a hot bond at the longitudinal joint.

Immediately following heating, the pavement surface shall be scarified (or milled) to the specified depth. The removed material shall have a temperature between 115°F and 265°F, unless otherwise directed by the Engineer. The material shall be leveled, mixed, and treated with a rejuvenating agent. The application rate shall be as shown on the plans or as directed by the Engineer.

- e. **Spreading and Compacting Operations.** Virgin hot mix asphalt shall be spread over the recycled material by the following method:

The reclaimed material shall be gathered by a leveling device and spread to a uniform depth over the width being processed. After it is placed, and while it still has a residual temperature of at least 190°F, a layer of virgin hot mix asphalt material conforming to the job mix formula shall be placed over it. The application rate of new material shall be sufficient to provide a nominal one inch (1") overlay thickness. The asphalt shall be laid by a heated, adjustable, vibratory screed capable of laying the asphalt to the appropriate grade, slope and crown.

The minimum compacted density of the combined asphalt material shall be 95 percent (95%) of the Marshall lab test density. Use a minimum of two self-propelled smooth-faced steel rollers complying with **SECTION 151** of the KDOT Standard Specifications for State Road and Bridge Construction (2015). A sufficient number of rollers shall be furnished to keep up with operations. Compaction of the asphalt surface course shall be complete before the temperature of the asphalt drops below 175°F for hot mix asphalt or 165°F for warm mix asphalt.

- f. **Utility Adjustment.** Storm, sanitary sewer, and utility manholes, water valves and gas valves shall be adjusted to meet the new surface elevation. All such adjustments shall

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meet the requirements of, and be measured and paid, per Section 816 of the KDOT Standard Specifications for State Road and Bridge Construction (2015).

- g. **Weather Limitations.** Construct surface recycling when the surface is dry, and the weather is not foggy or rainy. Only construct surface recycling when either the minimum ambient air temperature or the road surface temperature shown in TABLE 2 is met.

TABLE 2: MINIMUM HIR TEMPERATURE REQUIREMENTS		
Existing Surface Type	Ambient Air Temperature (°F)	Road Surface Temperature (°F)
On HMA Surface	50	55
On Asphalt Seal Surface	55	60

- h. **Process Control.** The Engineer shall take random tests of the scarification depth and the surface thickness at least once per day. Exact depths of scarification and thickness of overlay shall be calculated from this information and machine controls adjusted according to the results.

### 5. MEASUREMENT AND PAYMENT

The Engineer will measure surface recycling by the square yard. This includes all irregular variations in width.

The Engineer will measure asphalt rejuvenating agent by the gallon.

Payment for "Asphalt Surface Recycling" and "Asphalt Rejuvenating Agent" at the contract unit prices is full compensation for the specified work.