ITEM #0406289A – REMOVAL OF RUMBLE STRIPS

Description:
Work under this item shall consist of removing rumble strips through milling and repaving with hot mix asphalt (HMA) where shown on the plans or where directed by the Engineer, and in conformance with these specifications. The surface lift of the existing pavement shall be removed by milling out the existing rumble strip to a depth of 1.5 to 2.5 inches. The milled surface shall be swept by hand or machine and then be blown clean with compressed air or a hot air lance. Tack coat is to be applied to the milled surface and any vertical or semi-vertical walls formed by the milling. The milled out area shall then be filled and compacted with HMA S0.375.

Definitions:
Surface lift of pavement: The thickness of the last lift of pavement placed prior to performing crack sealing. A lift is defined as single bituminous-concrete mixture placed at a defined thickness in a single paver pass (or by handwork.)

Materials:
Materials for this work shall consist of the following:

Hot-mix Asphalt (specifically HMA S0.375) conforming to the requirements of Sections 4.06 and M.04 of the Standard Specifications.

Tack coat conforming to the material requirements for tack coat in Sections 4.06 and M.04 of the Standard Specifications.

Equipment:
Equipment for this work shall include, but is not limited to, the following:

Milling machine – A milling machine designed and built for milling HMA pavements. It shall be self-propelled with sufficient power, traction, and stability to maintain depth.

The rotary drum of the machine shall utilize carbide tip tools spaced not more than 5/8 inches apart. Use of a fine-milling drum with a tighter tooth spacing of 0.3 inches is desirable, but optional. The forward speed of the milling machine shall be limited to no more than 45 feet/minute. The tools on the revolving cutting drum must be continually maintained and shall be replaced as warranted to provide a uniform pavement texture. It must include dust control equipment during the removal process.

It shall be capable of removing the existing pavement to a width of 2 to 10 inches wider than the rumble strip.

A wider milling width may be used in cases where two rumble strips are located near and parallel to each other, as may occur in a median area; see Construction Methods.

Sweeper – A hand broom is acceptable for smaller areas when approved by the Engineer. If a mechanized sweeper is used, it shall be equipped with a water tank and be capable of removing the millings and loose debris from the surface. Other sweeping or vacuum type equipment may be provided in lieu of the sweeper where acceptable by the Engineer.

Air compressor – The unit shall consist of an air compressor capable of producing 100 psi, oil free, compressed air for blowing the milled pavement surface clean.

Hot air lance – The unit shall be designed for cleaning and drying the pavement surface. It shall consist of an air compressor capable of delivering 100 psi, oil free heated air. The compressed air emitted from the tip of the lance shall be flame free and be capable of achieving a temperature of at least 1500°F.

Paving and compaction equipment – All equipment used to place and compact the hot mix asphalt required for this work shall meet the requirements of Section 4.06 of the Standard Specifications, except no grade and slope control shall be required. Also, due to the nature of this work, it is expected that much of the placement of hot mix asphalt will require hand work. Either vibratory plate compactors or rollers may be used for compaction.

Construction Methods:

The Contractor shall pre-mark the location of the beginning and ending points of the sections, prior to the removal of the rumble strips. The Engineer shall review and approve the limits of removal.

The width of milling shall be as specified on the Plans or other specifications. If no other width specification exists, the width of milling shall be 2 to 10 inches wider than the existing rumble strip. Rumble strips are typically about 16 inches wide. If there are two rumble strips located near and parallel to one another, as may occur in median areas, and if they both can be removed by a single pass of a wider milling machine without adversely affecting drainage, safety, or quality of results, then a wider milling machine may be used. In this case the length measured for pay will be the sum of the lengths of the two individual rumble strips. Milling widths wider than specified above may be used with the written permission of the Engineer.

The depth of removal shall be as shown on the Plans, or as detailed in specifications, or as directed by the Engineer, generally from 1.5 to 2.5 inches. The intent is to remove the surface lift. If there are no Plans or other specifications, mill 1.5 to 2.5 inches as needed to match the thickness of the surface lift. The Engineer may alter the milling depth based on conditions discovered as work is in progress. It is expected that the milling depth will not exceed 2.5 inches. If the surface lift is 3 inches thick and it is in good condition, as determined by the Engineer, mill only 1.5 inches deep, unless directed otherwise by the Plans, project specifications, or Engineer.

As specified in the requirements for milling, the milled surface shall be swept clean (by hand if necessary.) Once all millings are removed by sweeping, the milled areas shall be allowed to dry if necessary. Any moisture in or on the milled areas must be allowed to evaporate or be removed with the assistance of a hot air lance as specified above. Once the milled area is deemed dry by the

Engineer it shall be blown with compressed or hot lance air, as specified above, so that no debris or dust is present on or within the milled area.

Once deemed clean by the Engineer, the milled area, including the sides/walls of the milled area, shall receive an application of tack coat as specified above and in Section 4.06 of the Standard Specifications.

After the tack coat has had sufficient time to cure or break, HMA S0.375 (Superpave Level 2) shall be placed and compacted to the requirements above and in Section 4.06 of the Standard Specification. It shall be compacted to match the elevation of the surrounding pavement surface.

At all times the Contractor is required to meet the density and compaction and all other requirements specified in Sections 4.06 and M.04 of the Standard Specifications and any supplementals that have been issued by the bid date of the project.

The Contractor shall resurface the milled area prior to opening the roadway to traffic. The milled area shall be swept, cleaned with compressed air, tacked and repaved in the same day.

Precaution should be taken to avoid damage to the existing roadway materials that are to remain in place. If damage occurs, it must be repaired by the Contractor at no additional cost to the State. The methods employed in performing the work and all equipment, tools, machinery and plant used in handling material and executing any part of the work shall be subject to the approval of the Engineer before the work is started; and whenever found unsatisfactory, it shall be changed and improved as required by the Engineer.

The Contractor shall pick up any waste material resulting from the operation in a manner acceptable to the Engineer. This waste material shall be disposed of in accordance with Subarticle 2.02.03-10(a).

Method of Measurement:
This work will be measured for payment by the actual number of linear feet of rumble strips removed. This distance shall be measured longitudinally along the edge of pavement with deductions for bridge decks, acceleration and deceleration lanes, drainage structures, loop detector sawcut locations, and other sections where the rumble strips were not previously installed. If two rumble strips are near one another and are removed by a single milling machine pass, the length measured for pay will be the sum of the lengths of the two rumble strips.

Basis of Payment:
This work will be paid for at the Contract unit price per linear foot for "Removal of Rumble Strips." The price shall include the removal of the existing rumble strips, furnishing all materials, placement, and compaction of the HMA, equipment, tools, labor, and work incidental thereto and also disposal of any waste material resulting from the operation.

Pay item	**Pay Unit**
Removal of Rumble Strips	L.F.