Guidelines for Reworked/Repaved Asphalt Concrete
August 22, 2012

The construction of reworked asphalt in accordance with Developmental Specification 324 consists of rehabilitating the top one to two inches of existing asphalt pavement using, at the contractor's option, either milling and plant produced hot-mix asphalt or the hot-in-place recycling (HIPR) process. For depths of distress greater than two inches, the existing pavement surface may be milled prior to the construction of the reworked asphalt pavement layer. The reworked asphalt layer may then be overlaid by a friction course, if necessary.

The construction of repaved asphalt in accordance with Developmental Specification 325 consists of rehabilitating the top one to two inches of existing asphalt pavement using the HIPR process and placing a hot-mix asphalt friction course on top of the recycled layer simultaneously. The paving can be accomplished with either a single machine, or a two machine process.

Candidate Projects

Reworked or repaved asphalt should only be used on projects with less than 5 million ESALs over their design life (approximately 1700 or less current two-way trucks per day). Alternatively, these processes may be used on interim projects, without regard to traffic level, where the integrity of the existing pavement needs to be maintained until a scheduled reconstruction or widening project can be let. These processes may also be used on historically poor-performing pavements where the expected pavement life is ten years or less. Use on any other projects will require Chief Engineer approval.

Pavement Evaluation

These processes should be used only on pavements that exhibit minor surface distresses such as cracking or raveling. They should not be used on pavements showing signs of structural failure or on pavements with significant rutting problems. Deep structural cracking which extends below the limits of the reworked or repaved asphalt will not be fixed by the process and will reflect quickly through the new surface.

Evaluation of the existing pavement should be performed by staff from the District Materials Office to determine that no structural, moisture, or soil problems exist within the pavement structure. The District Bituminous Engineer should also determine whether the existing pavement layer is suitable for hot-in-place recycling, and if so, make a recommendation as to the depth of the recycled layer. As part of the pavement coring procedure, the District Materials Office should delineate any changes in pavement composition throughout the project limits. Additional pavement cores may be required to accurately delineate any changes in the pavement structure.

All projects suggested for the reworked or repaved asphalt method will require Central Office review and approval. Requests to use these methods should be submitted to the

State Pavement Design Engineer. Review and approval to use these alternative methods will not occur until a pavement design has been provided by the District. Projects shall be designed with conventional, hot-mix asphalt methods until approval to use an alternate method is given by Central Office.

Pavement Design

The typical depth of the recycled asphalt layer will range from one to two inches. A minimum thickness of ½ inch of existing pavement should remain undisturbed below the recycled asphalt layer. The depth of reworking/repaving shall be shown in the plans. The pavement coring report shall be made available to the contractor as part of the Contract Documents.

As indicated earlier in the **Pavement Evaluation** section, these processes are only designed to address minor surface distresses. They do not address structural problems with the pavement. Therefore, a project selected to use either the reworked or repaved asphalt process will be considered a functional overlay as outlined in section 6.8.4 of the Flexible Pavement Design Manual (FDOT document #625-010-002). No structural calculations are necessary.

If a roadway does not have an open-graded friction course and has an existing friction number of 37 or greater, as provided by the District Safety Office, it will be eligible to have the uppermost pavement layer reworked with no friction course layer required to be placed on top. Roadways not requiring a hot-mix asphalt layer to be placed on top of the recycled layer are only eligible for the reworking process.

If a layer of hot-mix asphalt is needed above the recycled asphalt layer, the appropriate friction course should be determined according to chapter 4 of the Flexible Pavement Design Manual and paid for with a separate pay item. Projects that require a friction course to be placed above the recycled asphalt layer are eligible for both the reworked and repaved asphalt processes. As an exception, the repaving process cannot be used if the friction course will be open graded. In addition, the repaving process cannot be used to pave the recycled layer and the friction course layer at different widths. For example, if the pavement design calls for a 2-inch rehab depth in the travel lanes and a 1-inch rehab depth on the paved shoulder, this would require the repaving equipment to pave the recycled layer at a width of 12 feet and pave the friction course layer at a width of 17 feet. The repaving equipment has two separate paving screeds that cannot extend independently of each other, and therefore, it cannot work in this scenario. If additional milling is needed to maintain grade, this should be noted in the plans and the cost included in the Reworked Asphalt or Repaved Asphalt pay item, as appropriate.

Cross slope can be corrected in conjunction with the reworked and repaved asphalt processes. Although it is possible to recycle a layer of asphalt with a variable thickness, this practice is discouraged because of the difficulty in achieving density. The maximum slope correction that can be achieved by the HIPR process is 1.0%. Anything greater than a 1.0% correction will require milling or overbuild. The preferred methods for

correcting cross slope with HIPR are to: 1) Mill in the desired cross slope and recycle a layer of constant thickness, or 2) Mill to depth, recycle a layer of constant thickness, and place Superpave overbuild wedges on top of the reworked layer. Both of these described processes would require a final friction course layer to be placed. Option 1 is eligible for both the reworked and repaved asphalt processes because the friction course is placed directly above the recycled asphalt layer. Option 2 is only eligible for the reworked asphalt method because the overbuild wedges are constructed between the recycled layer and the friction course layer.

The reworked and repaved asphalt processes can be used on Pavement Only Projects (POP). Any Pavement Only Project using recycled asphalt is still subject to POP requirements. All other resurfacing projects using reworked or repaved asphalt will be subject to the requirements of Chapter 25, Volume 1 of the Plans Preparation Manual.

Plans and Spec Package Preparation

As noted in the **Pavement Design** section of this document, roadways requiring a layer of dense-graded, hot-mix asphalt to be placed above the recycled layer, and with the same width as the recycled layer, will be eligible for both the reworked and repaved asphalt processes. Roadways not requiring a final hot-mix layer above the recycled layer, roadways that require an open graded friction course immediately above the recycled layer, and roadways where the width of the recycled layer differs from the width of the overlying hot-mix layer will only be eligible for the reworked asphalt process. Additionally, roadways requiring cross-slope correction by overbuild will also only be eligible for reworked asphalt.

For projects where both the rework and repave methods are applicable, the project shall be let with alternate bids. Alternate AA1 will be Reworked Asphalt, and Alternate AA2 will be Repaved Asphalt. The description on the Typical Section sheet shall call out any milling, if necessary, and its average depth. The description shall also include the phrase, "Construct (_") Reworked [Repaved] Asphalt Concrete in Accordance with Specification Section 324 [325]." The friction course and its thickness will be described in its normal format. For projects using only reworked asphalt, alternate bids will not be applicable, but the above phrase shall be included in the resurfacing description.

Per specification, all milling associated with areas of reworked or repaved asphalt shall be included in the cost of the reworked or repaved asphalt pay item. Areas that will not be subject to any reworking or repaving, but will still require milling, need to have the appropriate milling pay item included. A pay item note shall be included on all reworked asphalt projects that states, "Includes the cost of all milling within the area of the reworked asphalt." For projects with a repaved asphalt alternate, a second pay item note shall be included for the repaved asphalt pay item stipulating the same condition for repaved asphalt. The pay item number for reworked asphalt is 905-324-1. The pay item number for repaved asphalt is 911-325-1.

Central Office's Pavement Management Section shall be included on 90% and 100% plans reviews for any projects using reworked or repaved asphalt. An electronic or hard copy of the plans shall be sent to the State Pavement Design Engineer for review and comment.

The use of the HIPR process requires the use of either Developmental Specification 324 or both Developmental Specifications 324 and 325. Use of Developmental Specification Section 324 (Reworked Asphalt Concrete Pavement) requires the use of Developmental Specification 338B (Value Added Reworked Asphalt Pavement). The reworked asphalt process requires a 3-year bonded warranty. Use of Developmental Specification Section 325 (Repaved Asphalt Concrete Pavement) requires the use of Developmental Specification 338C (Value Added Repaved Asphalt Pavement). The repaved asphalt process requires a 5-year bonded warranty. In both cases, the price of the bond shall be equal to the cost of replacing the recycled layer and any overlying hot-mix asphalt layers with new Superpave asphalt. The use of developmental specifications requires approval by the State Specifications Office. The Engineer shall work with the District Specification Office to obtain approval.

RECOMMENDED REFERENCE MATERIALS

Developmental Specification Section 324: REWORKED ASPHALT CONCRETE PAVEMENT

Developmental Specification Section 325: REPAVED ASPHALT CONCRETE PAVEMENT

Developmental Specification Section 338B: VALUE ADDED REWORKED ASPHALT PAVEMENT

Developemental Specification Section 338C: VALUE ADDED REPAVED ASPHALT PAVEMENT

BASIC ASPHALT RECYCLING MANUAL by Asphalt Recycling and Reclaiming Association (ARRA)