South Carolina Department of Transportation

Engineering Directive

Directive Number: **ED-15** **Effective: June 6, 2018**

Subject: **Pavement Type Selection Process**

References: **None**

Primary Department: **Construction**

Requests for pavement design will be initiated by the design manager and sent to the Pavement Design Unit at the Office of Materials and Research. The Pavement Design Unit will use soil information provided by the Geotechnical Materials Unit at the Office of Materials and Research and estimates of future traffic provided by Traffic Engineering to derive the structural requirements for the pavement structure.

Once the pavement parameters are known, the Pavement Design Unit will analyze the project's pavement type requirements according to the process described in Flowchart of Pavement Type Selection Process provided in appendix A of this directive. For existing pavements, the existing pavement type and its required rehabilitation will generally dictate the pavement type for widening or other improvements. In these cases, the State Pavement Design Engineer will select the pavement type without further approval, subject to the normal review process for all pavement design recommendations.

For pavements being constructed on a new location or reconstructed, the pavement with the lowest initial cost will generally be the default selection without further approval when the required structural number is below 4.0. However, the State Pavement Design Engineer may choose to consider alternative pavement structures for any project if economic circumstances cause significant changes in the price of either pavement type or if consideration of alternative pavement structures is considered to potentially be in the best interest of the South Carolina Department of Transportation (SCDOT), even if the required structural number is below 4.0. The document Pavement Type Selection Factors provided in appendix B of this directive should be referenced when considering alternative pavement structures. If the State Pavement Design Engineer determines that an alternative pavement structure is desirable, review by the Pavement Advisory Committee and approval by both the Director of Preconstruction and the Director of Construction are required.

For ramps, parking areas, minor paving projects of less than 20,000 square yards, and projects officially designated "demonstration projects" by the Deputy Secretary for Engineering for the purposes of pavement research, the State Pavement Design Engineer may select any pavement type after consultation with the design manager and the Director of Construction and without regard to the required structural number. The State Pavement Design Engineer may also make pavement type recommendations directly to the Director of Construction and the Director of Preconstruction for their review or may choose to consult the Pavement Advisory Committee. For other new location or reconstructed pavement projects not meeting the requirements given above and with a required structural number above 5.0 and for rehabilitation projects where the State Pavement Design Engineer has indicated that alternative pavement types may be advantageous, the Pavement Advisory Committee will be convened to make type selection recommendations.

The Pavement Advisory Committee will consist of the Materials and Research Engineer, and permanent representatives from Maintenance, Construction, Traffic Engineering, and FHWA. The design manager for the project and the district construction engineer where the project will be located will also be members. The State Pavement Design Engineer will provide preliminary design and cost information via e-mail to the committee for their review. The Materials and Research Engineer will then convene a meeting of the committee to discuss the information and make pavement recommendations. If the committee reaches a consensus, the recommendations will be forwarded to the Director of Construction and the Director of Preconstruction for their review. The Directors may concur, request additional review by the Pavement Advisory Committee, or override the Pavement Advisory Committee recommendations. The recommendations will then be forwarded to the design manager for inclusion in the plans.

If the Pavement Advisory Committee is unable to reach a consensus, the Director of Construction and the Director of Preconstruction will be consulted for a final decision. If in any instance the Director of Construction and the Director of Preconstruction are unable to agree on the pavement type selection, the Deputy Secretary for Engineering will make the final decision.

The method for selection of pavement type above is intended for use on traditional bid-build contracts. This method may be altered if it is determined that allowing alternate pavement types for design-build projects is advantageous for SCDOT. The document Pavement Type Selection Factors provided in appendix B of this directive should be referenced when considering alternative pavement structures. The decision for allowing alternate pavement types on a design-build contract shall be proposed by the Pavement Advisory Committee and forwarded to the Director of Construction and either the Director of Mega Projects or Director of Preconstruction for their review. The Directors may concur, request additional review by the Pavement Advisory Committee, or override the Pavement Advisory Committee recommendations. The recommendations will then be forwarded to the design manager for inclusion in the request for proposals.

Submitted by: Claude R. Ipock, P.E.
Director of Construction

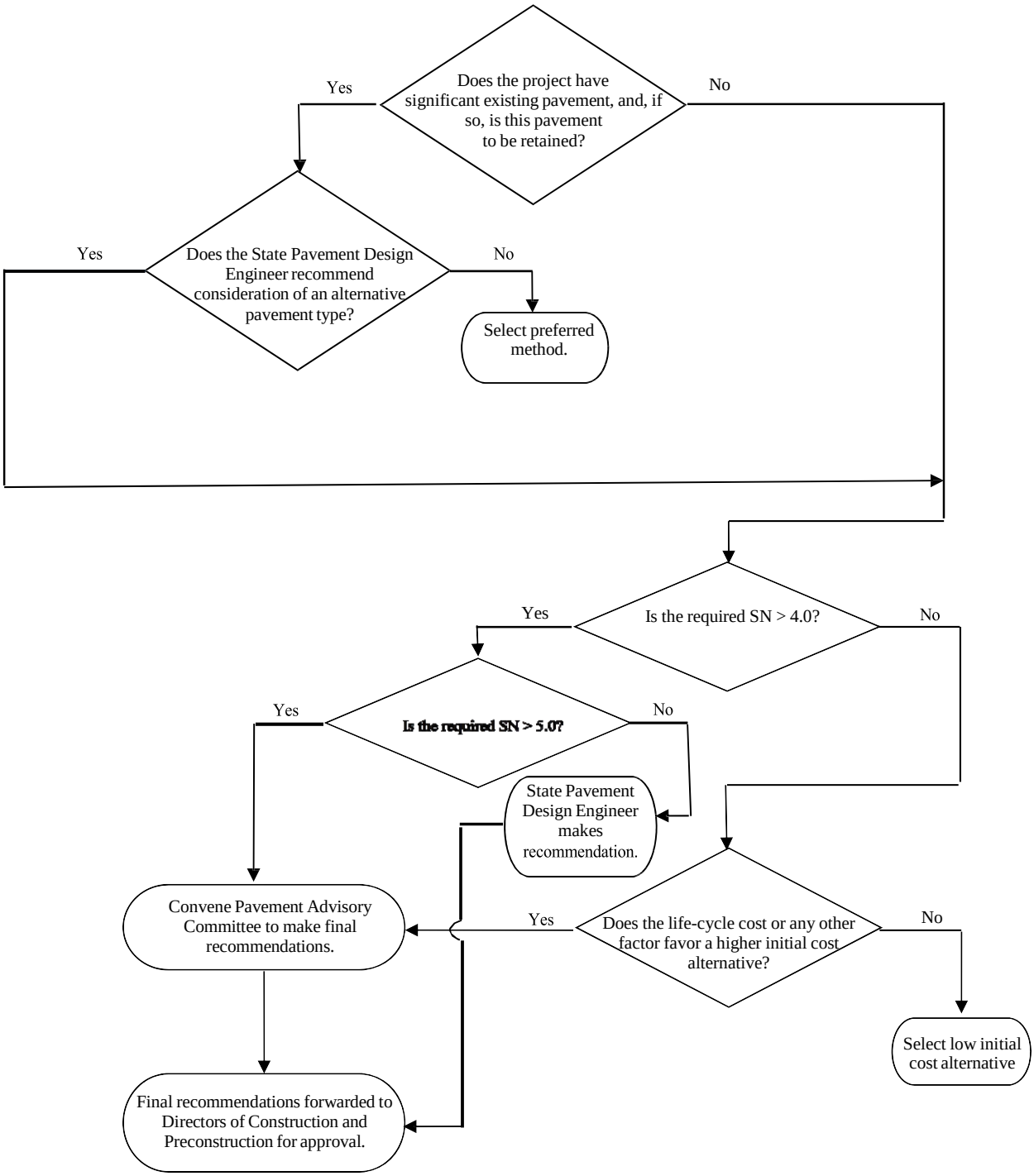
Recommended by: Randall Young, P.E.
Chief Engineer for Project Delivery

Approved by: Leland Colvin, P.E.
Deputy Secretary for Engineering

History: Issued December 8, 2003
First Revision on July 27, 2005
Second Revision on June 1, 2007
Third Revision on July 16, 2009
Fourth Revision on July 15, 2014
Fifth Revision on June 6, 2018

APPENDIX A
FOR ENGINEERING DIRECTIVE 15

Flowchart of Pavement Type Selection Process



APPENDIX B
FOR ENGINEERING DIRECTIVE 15

Pavement Type Selection Factors

The selection of pavement type is not an exact, objective process, but one in which the pavement designer must make judgments on many varying factors. The pavement type selection may be dictated by an overriding consideration for one or more of these factors. The predominant factors in the selection process are given below.

The selection process may be facilitated by comparison of alternate structural designs for one or more pavement types using theoretical or empirically derived methods. However, such methods are not so precise as to absolutely guarantee a certain level of performance from any one alternate or comparable service for all alternates.

Comparative cost estimates can be applied to alternate pavement designs to aid in the decision-making process. The cost for the service of the pavement would include not only the initial cost but also subsequent costs to maintain the service level desired. It should be noted that these procedures are also imprecise due to the lack of information on costs attributable to future events such as maintenance, salvage value, and the value of reduced service to the road user.

Even if structural design and cost comparison procedures were perfected, by their nature they would not encompass all factors that should be considered in pavement type selection. Such a selection should properly be one of professional engineering judgment based on the consideration and evaluation of all factors applicable to a given highway section.

Beyond economic analysis, a variety of factors affect the pavement type selection process. These factors are:

1. Construction Considerations: Staged construction of the pavement structure may dictate the type of pavement selected. Other considerations such as speed of construction, accommodating traffic during construction, safety of traffic during construction, ease of replacement, anticipated future widening, seasons of the year when construction must be accomplished, and others might have a strong influence on paving type selections in specific cases.

2. Initial Cost: While it is desirable to compare pavement costs on the basis of the entire life-cycle, it must be recognized that available resources are finite. In cases where a pressing need for construction exists, deferring needs until adequate resources are available to build a more expensive structure may not be an option. In these cases, first cost becomes an overriding concern in the selection process.

3. Adjacent Existing Pavement: Provided there is no major change in conditions, the choice of a pavement type may be influenced by adjacent existing sections that have given adequate service. The resultant continuity of pavement type serves to simplify maintenance and rehabilitation activities.

4. Stimulation of Competition: It is desirable that monopoly situations be avoided and that improvement in products and methods be encouraged. These goals are aided by healthy competition among industries involved in the production of paving materials.

5. Ease of Maintenance: Certain pavement alternatives may provide a superior life-cycle cost, but may also entail frequent or complex maintenance activities. While SCDOT strives to provide excellent maintenance for its facilities, there is no assurance that additional

resources may be available for options that require unusual levels of maintenance. Consequently, pavement designs should be considered realistically when their future performance is based on critical maintenance activities.

6. Local Preference and Recognition of Local Industry: While these considerations may seem to be outside the realm of pavement design, highway administrators cannot always ignore them. This is especially true when many other factors involved are indecisive with respect to the selection process.

7. Other: Unique or unusual factors not listed here may also influence or drive the selection process. It is important to retain the ability to select pavement type based on professional engineering judgment in special situations.