PAVEMENT TYPE SELECTION MANUAL

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FLORIDA DEPARTMENT OF TRANSPORTATION

PAVEMENT MANAGEMENT SECTION

OFFICE OF ROADWAY DESIGN

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UPDATES TO THIS MANUAL WILL BE ANNOUNCED ON THE PAVEMENT MANAGEMENT WEB SITE:

ADDRESS: http://www.dot.state.fl.us/pavementmanagement/

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1

1 INTRODUCTION

1.1 PURPOSE

The objective of this manual is to provide a Pavement Design Engineer with sufficient information so that the necessary input data can be developed and proper engineering principles applied to develop a Pavement Type Selection Report. This manual addresses methods to properly develop an analysis and the computations necessary for the selection process.

1.2 AUTHORITY

Section 20.23(3) and 334.048(3), Florida Statues.

1.3 SCOPE

The principal users of this manual are the District Pavement Design Engineers and District Design Engineers.

1.4 GENERAL

Chapter 334 of the Florida Statues, known as the Florida Transportation Code, establishes the responsibilities of the state, counties, and municipalities for the planning and development of the transportation systems serving the people of the State of Florida, with the objective of assuring development of an integrated, balanced statewide system.

The Code's purpose is to protect the safety and general welfare of the people of the State and to preserve and improve all transportation facilities in Florida. Under Section 334.048(3), the Code sets forth the powers and duties of the Department of Transportation including to adopt rules, procedures and standards for the conduct of its business operations.

Pavement type selection is primarily a matter of sound application of acceptable engineering criteria and standards. While the standards contained in this manual provide a basis for uniform practice for typical pavement type selection situations, precise rules that would apply to all possible situations must rely on good engineering practice and analyses.

1.5 PAVEMENT TYPE SELECTION MANUAL ORGANIZATION AND REFERENCES

1.5.1 Background

The manual is published as a revision to the March 2008 manual.

1.5.2 References

The pavement type selection guidelines incorporated in this document are based on the 1993 American Association of State Highway and Transportation Officials (AASHTO) Guide for Design of Pavement Structures Appendix B and the Federal Highway Administration's Real Cost User Manual.

1.5.3 Appendices

Included with this manual is one appendix:

Appendix	Contents
A	Pavement Type Selection Quality Control Plan

1.6 DISTRIBUTION

This document is available through the Maps and Publications Section.

Manuals may be downloaded from:

Florida Department of Transportation
Map and Publication Sales

http://www.dot.state.fl.us/mapsandpublications

1.7 PROCEDURE FOR REVISIONS AND UPDATES

Comments and suggestions for changes to the manual are solicited and can be submitted by writing to the address below:

> Florida Department of Transportation
> Pavement Management Section
> 605 Suwannee Street, M.S. 32
> Tallahassee, FL 32399-0450

Each idea or suggestion received will be reviewed by appropriate Pavement Design staff in a timely manner. Items warranting immediate change will be made with the approval of the State Pavement Design Engineer in the form of a Pavement Design Bulletin.

Proposed revisions are distributed in draft form to the District Pavement Design Engineers and District Design Engineers. The District Pavement Design Engineer coordinates the review of the proposed revisions with other affected district offices. The goal is to obtain a majority opinion before revisions are made.

All revisions and updates will be coordinated with the Organization and Procedures Office prior to implementation to ensure conformance with and incorporation into the Department's standard operating system.

The final revisions and addenda will be distributed to District Pavement Design Engineers and copies provided to Maps and Publications. The date of the latest revision will be posted on the Pavement Management Section and the Maps and Publications Internet Web Pages.

> http://www.dot.state.fl.us/mapsandpublications

1.8 TRAINING AND FORMS

None required.

CHAPTER 2

2 GENERAL INFORMATION

2.1 POLICY

The Department has adopted the AASHTO Pavement Type Selection Guidelines published as Appendix B of the 1993 AASHTO Guide for The Design of Pavement Structures.

2.2 CANDIDATE PROJECTS

This procedure is to be used to develop an analysis for the pavement type selection of new construction projects and reconstruction projects greater than one half mile in length where work includes a modification to the base materials.

2.3 PAVEMENT TYPE SELECTION REPORT EXCEPTIONS

Where a lane is to be tied to an existing roadway and the same pavement type is to be used, a memo to the file documenting the decision will be satisfactory and will serve as the analysis report. Any projects less than a half mile will not require pavement type selection documentation.

By Executive Committee decision on June 18th, 2003, new weigh stations, rest areas and welcome stations are to use concrete paving for both access to and internal traffic flow and parking within the facility, so pavement type selection reports are not required.

2.4 REPORTS

All reports will be developed using pavement designs based on AASHTO or other established design methods.

The individual project pavement type selection decisions will be made by the District Design Engineer or as otherwise assigned by the District Secretary. The decision can be based on the project- specific report.

2.5 REVIEWS

Copies of all PTS reports shall be sent to the Central Office Pavement Management Section for a Quality Assurance review. See Section A.6 for information on Quality Assurance Reviews.

The Pavement Type Selection decision will again be reviewed by Design at the time the pavement is to be designed to determine if any overriding factors have changed sufficiently to warrant reconsideration. A letter to the Project Design File documenting this review is adequate.

CHAPTER

3

3 AASHTO PAVEMENT TYPE SELECTION GUIDELINES

THIS CHAPTER HAS BEEN PRINTED WITH THE PERMISSION OF THE AMERICAN ASSOCIATION OF THE STATE HIGHWAY TRANSPORTATION OFFICIALS (AASHTO)

APPENDIX B

PAVEMENT TYPE SELECTION GUIDELINES

3.1 GENERAL

The highway engineer or administrator does not have at his disposal an absolute or undisputable method for determining the type of pavement which should be selected for a given set of conditions. However, the selection of pavement type should be an integral part of any pavement management program.

The selection of pavement type is not an exact science, but one in which the highway engineer or administrator must make a judgment on many varying factors such as traffic, soils, weather, materials, construction, maintenance, and environment. The pavement type selection may be dictated by an overriding consideration for one or more of these factors.

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 guarantee a certain level of performance from any one alternate or comparable service for all alternates.

Also, 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 cost to maintain the service level desired. It should be recognized that such procedures are not precise since reliable data for maintenance, subsequent stages for construction, or corrective work and salvage value are not always available, and it is usually necessary to project costs to some future point in time. Also, economic analyses are generally altruistic in that they do not consider the present or future financial capabilities of the contracting agency.

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

The factors which may have some influence in the decision making process are discussed below. They are generally applicable to both new and reconstructed pavements.

One group includes those factors which may have major influence and may dictate the pavement type in some instances. Some of the major factors are also incorporated in the basic design procedures and influence the structural requirements of the pavement design or subgrade and embankment treatments. In such cases they are assigned an economic value for comparative purposes.

The second group includes those factors which have a lesser influence and are usually taken into account when there are no overriding considerations or one type is not clearly superior from an economic standpoint. A flow chart of pavement selection procedure incorporating the major and secondary factors is shown in Figure 3.1.

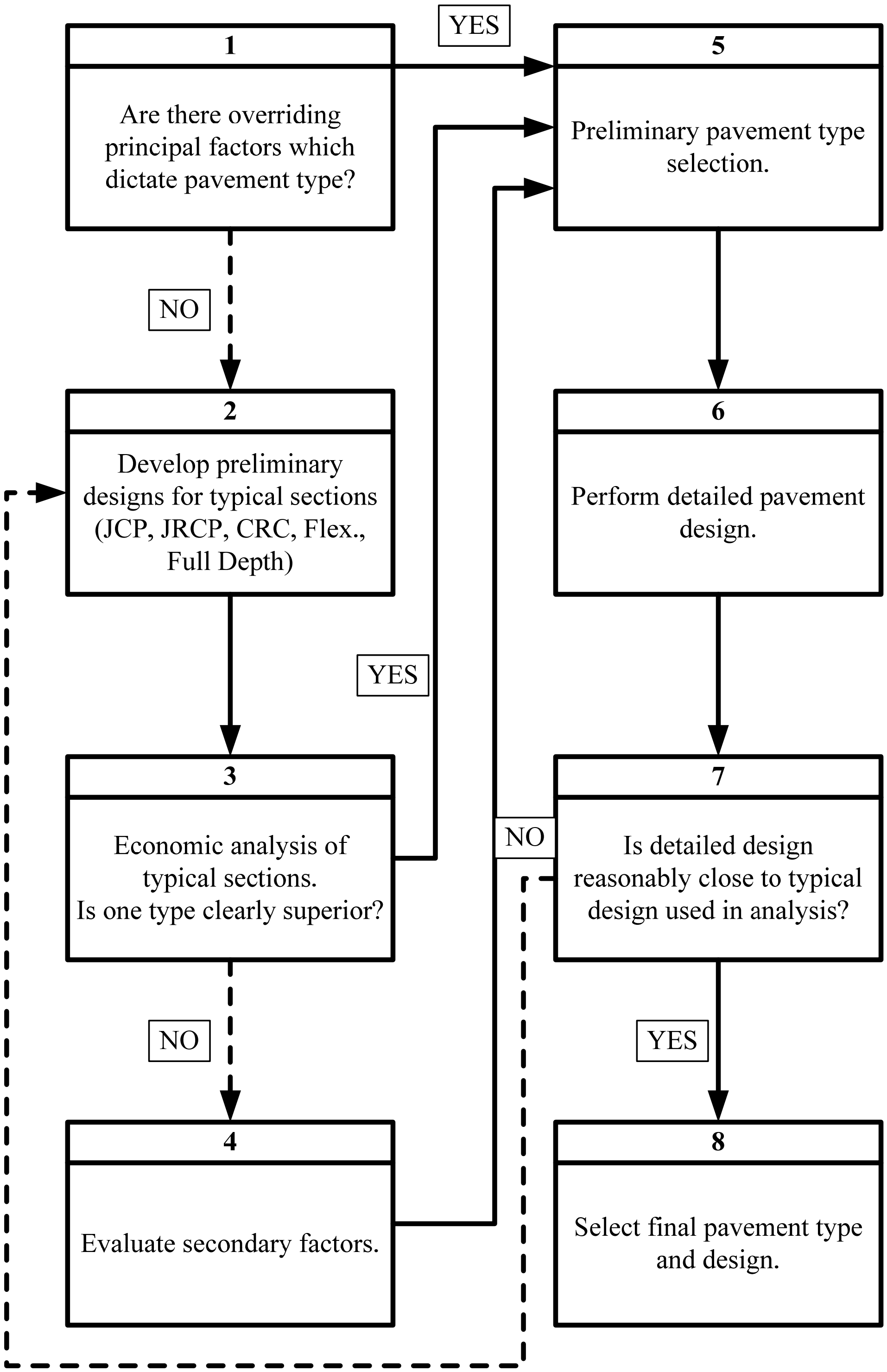
3.2 PRINCIPAL FACTORS

3.3 Traffic

While the total volume of traffic affects the geometric requirements of the highway, the percentage of commercial traffic and frequency of heavy load applications generally have the major effect on the structural design of the pavement.

Traffic forecasts for design purposes have generally projected normal growth in the immediate corridor with an appropriate allowance for changes in land use and potential commercial and industrial development. However, experience over the past several decades has shown that the construction of new major highway facilities diverts large amounts of heavy traffic from other routes in a broad traffic corridor.

Figure 3.1 Pavement Type Selection Process



This, coupled with a decline the quantity of railroad services, has resulted in a considerable underestimation of traffic growth, particularly commercial traffic. Also, the future availability and cost of motor fuels could result in increased legal loads to which pavement structures could be subjected during their design period.

For these reasons, pavement designs for major facilities should incorporate an appropriate margin of safety in the traffic factor. Agencies may choose to establish minimum structural requirements for all alternate pavement types to ensure adequate performance and service life for major facilities. Alternate strategies, or combinations of initial design, rehabilitation and maintenance, can be developed to provide equivalent service over a given period of time although the initial designs are not equivalent.

For heavily traveled facilities in congested locations, the need to minimize the disruptions and hazards to traffic may dictate the selection of those strategies having long initial service life with little maintenance or rehabilitation regardless of relative economics.

3.4 Soil Characteristics

The load-carrying capability of a native soil, which forms the subgrade for the pavement structure, is of paramount importance in pavement performance. Even in given limited areas the inherent qualities of such native soils are far from uniform, and they are further subjected to variations by the influence of weather.

The characteristics of native soils not only directly affect the pavement structure design but may, in certain cases, dictate the type of pavement economically justified for a given location. As an example, problem soils that change volume with time frequently require stage construction to provide an acceptable riding surface.

3.5 Weather

Weather affects subgrade as well as the pavement wearing course. The amount of rainfall, snow and ice, and frost penetration will seasonally influence the bearing capacity of subgrade materials.

Moisture, freezing and thawing, and winter clearing operations will affect pavement wearing surfaces as to performance and maintenance costs. The surfaces, in turn, will have some effect on the ease of winter clearing operations due to differences in thermal absorption or to the ability of the pavement to resist damage from snow and ice control equipment or materials.

In drawing upon the performances record of pavements elsewhere, it is most important to take into consideration the conditions pertaining to the particular climatic belt.

3.6 Construction Considerations

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

3.7 Recycling

The opportunity to recycle material from an existing pavement structure or other sources may dictate the use of one pavement type. Future recycling opportunities may also be considered.

3.8 Cost Comparison

Where there are no overriding factors and several alternate pavement types would serve satisfactorily, cost comparison can be used to assist in determining pavement type.

Unavoidably, there will be instances where financial circumstances are such as to make first costs the dominant factor in selection, even though higher maintenance or repair costs may be involved at a later date. Where circumstances permit, a more realistic measure is cost on the basis of service life or service rendered by a pavement structure. Such costs should include the initial construction cost, the cost of subsequent stages or corrective work, anticipated life, maintenance costs, and salvage value.

Costs to road users during periods of reconstruction or maintenance operations are also appropriate for consideration. Although pavement structures are based on an initial design period, few are abandoned at the end of that period and continue to serve as part of future pavement structure. For this reason, the analysis period should be of sufficient duration to include a representative reconstruction of all pavement types.

3.9 SECONDARY FACTORS

3.10 Performance of Similar Pavements in the Area

To a large degree, the experience and judgment of the highway engineer is based on the performance of pavements in the immediate area of his jurisdiction. Past performance is a valuable guide, provided there is good correlation between conditions and service requirements between the reference pavements and the designs under study.

Caution must be urged against reliance on short term performance records, and on those long term records of pavements which may have been subjected to much lighter loadings for a large portion of their present life. The need for periodic reanalysis of performance is apparent.

3.11 Adjacent Existing Pavements

Provided there is no radical change in conditions, the choice of paving type on highway may be influenced by adjacent existing sections which have given adequate service. The resultant continuity of pavement type will also simplify maintenance operations.

3.12 Conservation of Materials and Energy

Pavement selection may be influenced by the pavement type which contains less of a scarce critical material or the type whose material production, transportation, and placement requires less energy consumption.

3.13 Availability of Local Materials or Contractor Capabilities

The availability and adaptability of local material may influence the selection of pavement type. Also, the availability of commercially produced mixes and the equipment capabilities of area contractors may influence the selection of pavement type, particularly on small projects.

3.14 Traffic Safety

The particular characteristics of wearing course surface, the need for delineation through pavement and shoulder contrast, reflectivity under highway lighting, and the maintenance of a nonskid surface as affected by the available materials may each influence the paving type selection in specific locations.

3.15 Incorporation of Experimental Features

In some instances, the performance of material or design concepts must be determined by field testing under actual construction, environmental, or traffic conditions. Where the material or concept is adaptable to only one paving type, the incorporation of such experimental features may dictate pavement type selection.

3.16 Stimulation of Competition

It is desirable that monopoly situations be avoided, and that improvement in products and methods be encouraged through continued and healthy competition among industries involved in the production of paving materials.

Where alternative pavement designs have comparable initial cost, including the attendant costs of earthwork, drainage facilities, and other appurtenances, and provide comparable service life of life-cycle cost, the highway agency may elect to take alternate bids to stimulate competition and obtain lower prices. If this procedure is used, it is essential that good engineering practices and product improvement are not abandoned for the purpose of making cost more competitive.

Where several materials will adequately serve as a component within the pavement structure, such as a subbase or base course, contractors should be permitted the option of using any of the approved materials.

3.17 Municipal Preference, Participating Local Government Preference, and Recognition of Local Industry

While these considerations seem outside the realm of the highway engineer they cannot always be ignored by the highway administrator, especially if all other factors involved are indecisive as to the pavement type.

3.18 CONCLUSION

In the foregoing, there have been listed and discussed those factors and considerations which influence, to various degrees, the determination of paving types. This has brought to the fore the need, in certain areas, for the development of basic information that is not available at present. It has also served to point out, in general, that conditions are so variable and influences sufficiently different from locality to necessitate a study of individual projects in most instances.

CHAPTER 4

4 PAVEMENT SELECTION PROCESS & INDUSTRY INVOLVEMENT

4.1 PURPOSE

This chapter describes the economic analysis component of the pavement type selection process to be used for projects on the State Highway System greater than one half mile in length for the following: new construction; addition of new through lanes when reconstruction of the existing base is required; and reconstruction that has the primary purpose of removal and replacement of a substantial amount of the existing pavement and base. It is important to emphasize that economic analysis is just one component of the pavement type selection process. As stated in the AASHTO pavement type selection guidelines, "for heavily traveled facilities in congested locations, the need to minimize the disruptions and hazards to traffic may dictate the selection of those strategies having long initial service life with little maintenance or rehabilitation regardless of the relative economics." Though not required, the economic analysis may also be used in the decision making process for a strategy improving the pavement structure through a concrete or asphalt overlay.

The purpose of the process is to provide a fair and impartial evaluation of competing pavement types over the analysis period by using the analysis and cost parameters described in this chapter.

To help to achieve an accurate economic analysis, industry input will be included at three critical stages in project development. These critical stages occur before the project is entered into the work program as well as at the end of Phases I and II of the Department's project development process. The parameters and input values for the economic analysis may evolve as conditions change and technology advances.

4.2 ECONOMIC ANALYSIS

The present value of each alternative pavement type will be calculated in accordance with generally accepted life cycle cost analysis methodologies. The economic analysis of user costs will be performed using the FHWA RealCost software.

When the life cycle cost analysis described in this chapter indicates that project costs for the competing pavement types are within 10% of each other , the costs will be considered equivalent and alternate bids will be sought unless other engineering factors, such as the need to minimize disruption to traffic in congested locations, dictate the particular pavement type. The basis for this decision will be documented in the analysis. Project costs will be considered to be within 10% of each other if they are within the value determined by calculating 10% of the average present worth costs of the pavement alternatives.

Reference: FHWA RealCost Manual

4.3 BASE DATA

The following base data shall be used unless the District thoroughly documents an alternative scenario, such as longer or shorter rehabilitation periods.

4.3.1 Time Periods

- The Analysis Period will be 40 years, unless a longer period is justified, based on engineering principles, by the District and accepted by the State Pavement Design Engineer.

- A discount rate of 3.5% will be used.

- The Initial Pavement Design will be for a minimum of 20 year design life using comparable design inputs and conditions for any pavement type, unless a longer design life is justified for a particular pavement type by the District and accepted by the State Pavement Design Engineer.

4.3.2 Rehabilitation Strategies

For cost analysis, the future rehabilitation strategies shown in Table 4.1 are a baseline that addresses on a statewide basis the historical performance of pavement types in Florida and growth in truck loadings. Baseline rehabilitation strategies will be adjusted by the State Pavement Design Engineer and approved by the Chief Engineer when justified by improvements in design methods, specifications, and materials technology, pavement performance, etc. The District can and should modify the baseline strategies used in the economic analysis on a project-specific basis, if justified, by taking into consideration pavement performance of existing pavements having similar designs and traffic conditions and which are located in similar geotechnical and geographical regions. Documentation supporting the modifications will be included in the report.

These scenarios are not intended to indicate the exact future rehabilitation designs, but rather to reflect reasonable strategies and quantities for estimating life cycle cost. The following acronyms apply to Table 4.1.

CPR: Concrete Pavement Rehabilitation
ARMI: Asphalt Rubber Membrane Interlayer
Str. AC: Structural Asphaltic Concrete
DGFC: Dense Graded Friction Course
OGFC: Open Graded Friction Course
FC: Friction Course (appropriate for facility)
Resf: Resurface

Table 4.1 Future Rehabilitation Strategies

Concrete Pavements		
Rehab Period	Urban Arterial	Rural Arterial and Limited Access
20 Year	CPR (3% Slab replacement)	CPR (3% Slab replacement *)
30 Year	CPR (5% Slab replacement)	CPR (5% Slab replacement *) Crack, Seat and Overlay ARMI 4 inch Str. AC and FC

Asphalt Pavement			
Rehab Period	Urban Arterial	Rural Arterial	Limited Access
14 Year	Mill 2 inch Resf. 1 inch Str. AC and DGFC	Mill 2 inch Resf. 3 inch Str. AC and FC	Mill 3 inch Resf. 4 inch Str. AC and OGFC
28 Year	Mill 2 inch Resf. 1 inch Str. AC and DGFC	Mill 2 inch Resf. 3 inch Str. AC and FC	Mill 3 inch Resf. 4 inch Str. AC and OGFC

* Estimate is based on the percentage of slab area in the truck lane

4.3.3 Rehabilitation Strategy Considerations

The following considerations apply when using any rehabilitation strategy:

- The cost of shoulder construction and rehabilitation will be considered in the economic analysis.
- Salvage value will be used to represent any significant remaining service life after the last rehabilitation. Salvage value is to be determined by multiplying the ratio of the numbers of years beyond the end of the analysis period until the end of the service life of the rehabilitation to the full service life of the last rehabilitation by the present day cost of the last rehabilitation. For example, if the last rehabilitation is estimated to

cost $1M, has an expected service life of 14 years, and occurs at year 35 of a 40 year analysis period, the salvage value would be $642,857 [$1M x (14-(40-35))/14)]

- User costs (motorist delay time, vehicle operating costs, accident costs, etc.) will be considered separately if there is reason to believe that there will be significant differences in these costs between pavement types.

- Indirect costs (engineering, CEI, MOT, etc) will be considered separately if there is reason to believe that there will be significant differences in these costs between pavement types. When utilized, only detailed and project-specific Indirect cost estimates will be considered for either pavement type.

- Costs will be summarized by project mile.

The Pavement Type Selection (PTS) cost analysis will involve the District Estimates Engineer. When there are insufficient cost data in the district, the State Estimates Engineer will be consulted.

Engineering consideration must be given to improvements in design procedures and specifications from historical pavement (e.g. improvements in rut resistance for flexible pavements and good drainage, and/or reduced joint spacing for rigid pavements).

4.3.4 Project Development Time Frame and Solicitation of Industry Input

The District Pavement Design Engineer or the Engineer of Record will develop an initial PTS report for approval by the District Design Engineer before incorporating the project into the work program. During project development two checks of the initial PTS report will be made during Phase I and Phase II, respectively, to verify the assumptions used in the initial report and to provide a more comprehensive design and analysis based on information current at the time of the checks. A revised PTS report annotating the changes made to the previous PTS report will be issued at the completion of each check. At the completion of each iteration of the PTS report, including the initial report and the Phase I/II revised reports, the PTS report will be sent to industry representatives for comments.

Upon completion, the initial and revised PTS reports with the supporting documentation will be sent to the State Pavement Design Engineer for review. After considering District comments, the State Pavement Design Engineer will distribute the reports to industry representatives for comment. Electronic copies will be sent to the Executive Director of the Asphalt Contractors Association of Florida and the President of the Concrete Paving Alliance of Florida. The industry comments are to be sent to the State Pavement Design Engineer within three weeks of receipt of the package.

The District Secretary and Chief Engineer will resolve any disagreements generated by the comments received from the industries and the information provided by the Department.

4.3.5 Revisions to Chapter 4

Occasionally this Chapter will require modification. When the Department begins the process of revision, the proposed modifications will be sent to the Districts and the Industries for review and comment. Once the Industries provide input, the Department will decide on the modifications, and the effective date of the revised Chapter will be coordinated with the implementation of the modifications to occur at approximately the same time.

4.4 AUTHORITY

Section 334.044(2), F.S.
Section 334.044(10)(a), F.S.
Section 336.045, F.S.
Rule 14-15.018, F.A.C.

APPENDIX

A

PAVEMENT TYPE SELECTION QUALITY CONTROL PLAN

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A.1 QUALITY CONTROL PLAN

All Pavement Type Selection Reports will be reviewed independently for accuracy and correctness. The following quality control plan is provided as a guideline.

A.2 DEFINITIONS

The following definitions are used throughout this section.

<u>Quality:</u> Conformance to policies, procedures, standards, guidelines and above all, good engineering practice.

<u>Quality Assurance:</u> Consists of all planned and systematic actions necessary to provide adequate confidence that a design, structure, system, or component will perform satisfactorily and conform with project requirements.

Quality assurance involves establishing project related policies, procedures, standards, training, guidelines, and systems necessary to produce quality.

<u>Quality Control:</u> This is the checking and review of designs and plans for compliance with policies, procedures, standards, guidelines and good engineering practice.

A.3 RESPONSIBILITY

The district offices are responsible for Quality Control. Quality Assurance is the role of the Central Office.

A.4 PAVEMENT TYPE SELECTION REPORTS

Pavement Type Selection Reports will be developed in accordance with the Pavement Type Selection Manual (Document No. 625-010-005). Supporting data will be included in the report file.

A.4.1 Minimum Requirements

The Pavement Type Selection Report as a minimum will include the following items:

- Typical section types and geographical cost locations if different than the district boundary.
- Unit price and quantities per centerline mile used in estimates.
- Summary
- Information Sources

A.4.2 Distribution

In addition to retaining the original documentation in the District Design Office, copies of the approved project level Pavement Type Selection with supporting documentation will be submitted to the State Pavement Design Engineer at least six months prior to its adoption into the Work Program. This information may be submitted to industry representatives for comment.

The annual Pavement Type Selection Report with supporting documentation will be transmitted to the State Pavement Design Engineer each year.

Central Office approval of the annual Pavement Type Selection Report is not required. Pavement Type Selection Reports will be monitored and reviewed, in detail, for quality assurance and for purposes of identifying and improving design policies, procedures, standards and guidelines.

For Federal Aid Projects not covered by Certification Acceptance, two copies of the current approved Pavement Type Selection Report and one copy of the supporting documentation, will be forwarded directly to the appropriate Federal Highway Administration (FHWA) District Engineer for FHWA concurrence.

The District will deal directly with the FHWA to resolve any questions. Central Office Pavement Management will be available for assistance if requested by the District or FHWA. The FHWA will return directly to the District one copy of the summary sheet with signature denoting concurrence. This copy will be filed in the District Project Design file.

A.4.3 Revisions

Changes made subsequent to formal distribution will require that a revision letter to the report be prepared, a copy of which shall be signed and sealed, distributed, and filed for permanent record in the report file.

Minor changes may be noted in type or ink on the original Pavement Type Selection Report with the responsible Professional Engineer's initials and the date of change. A copy of the revised original should then be signed, dated, sealed and filed for permanent record.

Major changes may require that a complete new Pavement Type Selection Report be prepared and processed, in which case it shall note that it supersedes a previous report.

A.4.4 Documentation

The rationale for selection should be clearly documented in the Pavement Type Selection Report.

The reports do not need to be lengthy or overly verbose. Rather, they should focus on reasonable cost estimates and a concise presentation of the analysis.

On projects where there is a deviation from policy (e.g. Research projects), the reasons should be clearly documented in the Pavement Design Package.

A.5 DISTRICT QUALITY CONTROL

The quality control process will include three activities:

- The checking and review of annual Pavement Type Selection Reports for compliance with policies, procedures, standards, guidelines and good engineering practice.
- The checking and review of individual project determinations of annual report applicability.
- Documentation of the Quality Control Process.

The Quality Control Process will be carried out by an independent qualified Professional Engineer. As a minimum, the documentation will consist of a copy of the Quality Control Checklist filed with the Annual Pavement Type Selection Report, or a Pavement Type Selection Applicability Quality Control File maintained by project number order consisting of:

- A copy of a memo referencing the annual report that it is applicable to this project or a copy of the signed and sealed project specific Pavement Type Selection Report.
- A copy of the Quality Control Checklist signed by the Quality Control Engineer.

A sample checklist is attached.

A.6 QUALITY ASSURANCE REVIEWS

The State Pavement Design Engineer will be responsible for conducting and/or coordinating all pavement related Quality Assurance activities within each District. A Quality Assurance review of District Pavement Type Selection activities will be conducted annually.

PAVEMENT TYPE SELECTION

QUALITY CONTROL CHECKLIST

	Satisfactory Yes / No
Project Description……………………………………………….	_____
Financial Project ID / Annual Report………………………….	_____
State Road No…………………………………………………….	_____
County………………………………………..........................	_____
Project Length…………………………………………………….	_____
Transportation System…………………………………………	_____
Flexible Pavement Design	
ESAL…………………………………………………………......	_____
Level of Reliability…………………………………………….	_____
Initial Design Period…………………………………………...	_____
Structural Number ……………………………………………..	_____
Friction Course………………………………………………….	_____
Structural Thickness……………………………………………	_____
Base Thickness………………………………………………….	_____
Number of Through Lanes……………………………………..	_____
Lane Width……………………………………………………...	_____
Shoulder Width………………………………………………...	_____
Rigid Pavement Design	
ESAL…………………………………………………………...	_____
Level of Reliability…………………………………………….	_____
Initial Design Period…………………………………………...	_____
Thickness……………………………………………………….	_____
Base Thickness………………………………………………….	_____

Base Type……………………………………………………… ______

Number of Through Lanes……………………………………...... ______

Lane Width…………………………………………………….. ______

Shoulder Width……………………………………………….... ______

Design Method (1993 or 1998 Supplement)…………………... ______

PROJECT MILE ESTIMATES

Initial

Mainline Quantities……………………………………………. ______

Shoulder Quantities……………………………………………. ______

Unit Prices Reasonable……………………………………..... ______

Rehabilitation

Mainline Quantities……………………………………………. ______

Shoulder Quantities……………………………………………. ______

Unit Prices Reasonable……………………………………..... ______

APPENDIX B

ECONOMIC ANALYSIS COMPUTATION SHEET

COST PER PROJECT MILE

Analysis Period = 40 Years

Discount rate = 3.5%

	COST			P/F		PRESENT WORTH
PCC						
	Initial	_____	*	(1.00000)	=	_____
	20 Year	_____	*	(0.50257)	=	_____
	30 Year	_____	*	(0.35628)	=	_____
		Total Present Worth			=	_____
AC	Initial	_____	*	(1.00000)	=	_____
	14 Year	_____	*	(0.61778)	=	_____
	28 Year	_____	*	(0.38165)	=	_____
		Total Present Worth			=	_____

Costs should be calculated in present day dollars

PAVEMENT TYPE SELECTION

ECONOMIC ANALYSIS COMPUTATION SHEET

COST PER PROJECT MILE

Analysis Period = 40 Years

Discount rate = 3.5%

	COST			P/F		PRESENT WORTH
PCC						
	Initial	_____	*	(1.00000)	=	_____
	_____ Year	_____	*	(_____)	=	_____
	_____ Year	_____	*	(_____)	=	_____
		Total Present Worth			=	_____
AC	Initial	_____	*	(1.00000)	=	_____
	_____ Year	_____	*	(_____)	=	_____
	_____ Year	_____	*	(_____)	=	_____
		Total Present Worth			=	_____

Costs should be calculated in present day dollars