

FLORIDA DEPARTMENT OF TRANSPORTATION



ASSET MANAGEMENT PLAN

PRESERVING THE STATE'S INFRASTRUCTURE



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Transportation Asset Management Plan

Florida Department of Transportation
October 2015

For more information, go to <http://www.dot.state.fl.us/planning/tamp>

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From The Secretary

Florida has a well-established history of maintaining our highways and bridges. We consistently rank at or near the top in state rankings for infrastructure condition. In 2014, 93% of the pavements on the State Highway System (SHS) were in good or excellent condition. More than 99% of our bridges on the SHS have no posted weight restrictions.

We have made a commitment to future generations and to our current residents and the nearly 100 million visitors that arrive in our state each year. This commitment is that the state's transportation system will be safe, efficient, and reliable. Our emphasis on preservation and maintenance is a major part of that commitment.

Florida consistently makes sound investment decisions to protect our transportation system. Our statutory guidance to maintain pavement and bridge condition, coupled with good use of analytical tools and formal policies allow the state to support investment decisions and continue meeting targets for performance and infrastructure condition.

Our Transportation Asset Management Plan establishes the formal approaches to meeting evolving federal guidance with respect to National Highway System pavements and bridges. The Plan demonstrates the clear linkages between maintenance and planning efforts and documents our financial planning, risk management, inspection, and budgeting processes in a clear manner. This plan will also assist our agency in making the right decisions about where and when to invest funds in infrastructure improvements to sustain the system we have invested in over the years. Maintaining a state of good repair over the life cycle of the assets at a minimum practicable cost is good business practice, helping our state attract new investment and economic growth.

This Transportation Asset Management Plan also identifies potential risks that our agency faces related to pavement and bridge condition and how to prevent or mitigate these risks. Doing so will help to allow us to meet our performance targets for years to come.

Working together, we can ensure the department meets its mission of providing a safe transportation system that ensures the mobility of people and goods, enhances economic prosperity and preserves the quality of our environment and communities.

A handwritten signature in black ink, appearing to read "Jim Foxold".

Jim Foxold, Secretary
Florida Department of Transportation

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1.0 About This Plan

The Florida Transportation Asset Management Plan (TAMP) explains the processes and policies affecting pavement and bridge condition and performance in the state. Transportation Asset Management is a strategic and systematic process of operating, maintaining, and improving physical assets effectively throughout their life cycle. It leverages various business, economic, and engineering practices to help guide resource allocation and project selection. The overarching objective is to inform decision-making based upon quality information.

The TAMP acts as a focal point for information about the department's assets, associated management strategies, long-term expenditure forecasts, and business management processes. It is an important tool for demonstrating sustainable asset stewardship, effective use of resources, and justifications for funding.

The TAMP is also a management process for bringing together a variety of business processes, disciplines, and stakeholders (internal and external), to achieve a common understanding and commitment to maintain or improve performance.

It is organized in the following sections:

2.0 Inventory and Condition

3.0 Performance-Based Planning and Programming

4.0 Asset Management Tools

5.0 Financial Plan

6.0 Implementation

The TAMP and supporting documents will be posted at <http://www.dot.state.fl.us/planning/tamp/>. This will include any additional documents required by federal regulations currently being developed.

1.1 PURPOSE

The purpose of the TAMP is to document Florida Department of Transportation's (FDOT's) approach to asset management and how it links to the states performance-based planning and programming processes.

FDOT has a long history of being leaders in the field of transportation asset management. The department primarily manages assets on the State Highway System (SHS). Although this system consists of 12,099 (10 percent) of the 121,829

public road centerline miles in the state, it carries 54 percent of Florida's total traffic.¹ The department inspects and maintains 6,783 bridges and performs inspections on other bridges owned by other state and local government jurisdictions.

The department views it as one of its primary responsibilities to keep the SHS in acceptable physical condition. The system currently is in very good condition; a direct result of the department inspecting and maintaining these assets.

The department has a well-established philosophy, supported by statutes, to preserve its assets before adding capacity to the transportation system. This approach sets the framework for all capacity enhancements and service additions to the transportation network. As such, the philosophy serves as a solid foundation to meet and build upon federally required asset management focused practices.

This TAMP documents how the department will continue to preserve the condition and performance of pavements and bridges for the National Highway System in Florida.

1.2 ASSET MANAGEMENT PLAN OBJECTIVES

The TAMP highlights current FDOT practices and the outcomes of the existing department business processes.

The goals, objectives, and strategies for asset management are clearly defined and consistent among the department's suite of plans and reports. Across all planning levels, starting with the Florida Transportation Plan (FTP), the department remains committed to maintaining the existing system prior to building capacity enhancements. Those commitments are tracked through a range of accountable performance measures that document transportation system performance over time.

Overarching Asset Management Objectives:

- Achieve and maintain a state of good repair for transportation assets;
- Reduce the vulnerability and increase the resilience of critical infrastructure to the impacts of extreme weather and events; and,
- Minimize damage to infrastructure from transportation vehicles.

Bridge-Related Asset Management Objectives:

- Bridge Condition: Ensure that 90 percent of all bridge structures on the State Highway System have a condition rating of either "excellent" or "good;" and

¹ Florida's Transportation System by the Numbers, 2014.
<http://www.dot.state.fl.us/intermodal/system/>

- Restricted Bridges: No more than one percent of all bridge structures on the State Highway System with posted weight restrictions.

Pavement-Related Asset Management Objectives:

- Pavement Condition: Ensure that 80 percent of all lane-miles on the State Highway System have a Pavement Condition Rating of either “excellent” or “good.”

Safety Related Objective:

- Identify and improve riding surfaces that may need to be more skid-resistant or otherwise improved in areas where crash reports indicate problems with pavement conditions.

Maintenance-Related Asset Management Objective:

- Achieve a maintenance rating of at least 80 on the State Highway System (Section 334.046 Florida Statutes.) The maintenance rating is a composite of measures of standard of roadway, traffic services, roadside, drainage and vegetation/aesthetic features.

These objectives are the foundation for performance measures related to asset management and their attainment enables the department to achieve a state of good repair even while experiencing continuing rapid population growth and other roadway impacting challenges and opportunities.

1.3 PAVEMENT CONDITION PERFORMANCE MEASURES

FDOT uses a pavement condition index called Pavement Condition Rating (PCR) to evaluate pavements. The PCR includes a ride measure among its combination of values (others are crack and rutting). The ride measure component is the International Roughness Index (IRI). IRI is the measure proposed by FHWA for MAP 21 reporting. IRI represents measured longitudinal road profiles. It is calculated using a quarter-car vehicle mathematic model, whose response is presented in an index with units of slope (inches per mile). In basic terms, the measure responds to variations in pavement “bumps” across a particular distance. PCR relates to what the public cares much about -- road smoothness. It is defined separately for rigid and flexible pavements:

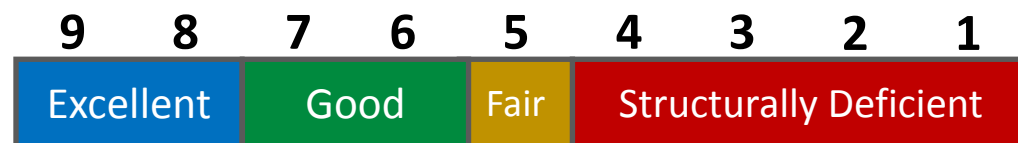
- Rigid Pavement: The rigid pavement condition includes ride rating (measured in IRI) and several distresses, including surface deterioration, spalling, patching, transverse cracking, longitudinal cracking, corner cracking, shattered slab, faulting, pumping, and joint condition. Deductions are taken against the PCR depending on the severity of each distress.
- Flexible Pavement: The flexible pavement condition includes ride rating (measured in IRI) and several distresses: crack rating (includes different size

cracks, raveling, and patching) and rut rating. Deductions are taken against the PCR depending on the severity of each distress.

1.4 BRIDGE CONDITION PERFORMANCE MEASURES

Florida uses the National Bridge Inventory (NBI) rating as its primary performance measure. NBI includes information on approximately 600,000 of the Nation's bridges located on public roads. It presents a state-by-state summary analysis of the number, location, and general condition of highway bridges within each state. The ratings are based upon inspector judgments on each of the bridge's primary elements: deck, superstructure, and substructure.

Figure 1 NBI Rating Scale



The department's primary bridge target is to have 90 percent of its bridges achieve a NBI rating of six or higher. An NBI rating of six or seven means that a bridge is in good condition.

2.0 Inventory and Condition

In order to manage assets effectively, two fundamental questions need to be addressed. First, what facilities does the department own and manage? Second, what condition are those assets in? The practice of developing an inventory and condition assessment sets the stage for all other phases of asset management. In this initial TAMP, the department documents its approach to pavement and bridge assets on the expanded National Highway System (NHS), 2,427 lane miles of which is owned by local governments. These are the minimum requirements of MAP-21. In future updates of the TAMP, the department may expand its perspective to include safety, transit, intelligent transportation systems (ITS), and culverts, among other assets. Table 1 summarizes the inventory and condition of pavement and bridge assets using the proposed MAP-21 performance measures for each². Note that the values are for 2013 which were the latest available for this analysis. Also note that the performance measures listed do not match those currently used by FDOT. However, reporting these measures for MAP-21 would not be an issue for the department.

Table 1 Summary Inventory for State Owned Pavement and Bridges

	Inventory Unit	2013 Inventory	Performance Measure	2013 Performance
Pavement	Lane-miles (state owned)	43,402	Percent on NHS with a high condition rating based on International Roughness Index (IRI) score	81%
Bridge	Number of bridges (state owned)	6,783	Percent deck area on bridges classified as Structurally Deficient (SD)	2.4%

2.1 NHS PAVEMENT

Inventory

The department is responsible for constructing and maintaining a 12,099 centerline mile highway system that consists of 43,402 total lane-miles of pavement.

² Final regulations had not yet been issued by the Federal Highway Administration when the Florida TAMP was adopted.

The department has a focused planning approach that includes a Strategic Intermodal System (SIS), a priority network of highways, railways, transit lines, airports, seaports, and spaceports that form the critical arteries for interstate and interregional commerce. The highway portion of the SIS is a subset of NHS transportation facilities. SIS facilities are classified as “hubs” (nodes of activity such as train stations and airports), “corridors” (such as highways), and “intermodal connectors” (facilities that connect a SIS hub with a SIS corridor).

Table 2 shows state and local ownership of both centerline and lane miles by SIS, NHS and SHS. Centerline miles represent the length of the road, while lane-miles represent the length and lane count for a road.

Table 2 Pavement Inventory - Centerline and Lane Miles by Ownership

	SIS Centerline Miles	SIS Lane Miles	NHS Centerline Miles	NHS Lane Miles	SHS Total Centerline Miles	SHS Total Lane Miles
State owned (includes interstates)	4,294	18,678	8,203	33,708	12,118	43,665
Locally owned	59	221	567	2,427		
Total	4,353	18,899	8,770	36,135		

As of June 30, 2015

Condition

Pavement Condition Survey

The department performs an annual Pavement Condition Survey (PCS) to collect data on all state owned roads. Different metrics exist for flexible (asphalt) and rigid (concrete) pavements; 97.6% of FDOT’s pavement is flexible. The department measures ride quality and cracking for both pavement types, rutting for flexible pavements, and several types of distresses unique to rigid pavements.

The Pavement Condition Unit in the State Materials Office conducts these annual surveys of the entire state highway system in support of the department's Pavement Management Program. The data collected (in terms of crack, ride, and rutting measurements) is used to assess the condition and performance of the state’s roadway as well as to predict future rehabilitation needs.

Pavement Measure: Ride Quality

The two ride quality metrics used by the department are the International Roughness Index (IRI) and Ride Rating (RR). Both measures are computed from a surface profile captured by van-based equipment at freeway speeds. IRI is the rating system required by FHWA in annual highway inventory summaries. It is generated using a standard algorithm (ASTM E1926) and varies from zero, indicating pavement in perfect condition, to infinity. Higher scores indicate worse ride quality.

RR is a second metric used by the department to report ride quality on a scale from 0 to 10, primarily for internal agency use. Starting in 2015, RR will be based on IRI.

Pavement Measure: Defect Metrics

Due to the physical differences between them, defect metrics differ between flexible and rigid pavements. For flexible pavements, the department evaluates cracking and rutting. Flexible pavement defect is measured in the percentage of roadway area affected by each of five types of defect: three degrees of cracking defined by severity (1, 2, or 3); raveling (4); and patching (5).

The total affected surface area is the sum of those percentages. In addition, the “predominate type of cracking” is used to establish a score based on its severity and extent for the areas inside and outside of wheel paths. These scores are added together and subtracted from ten to calculate the Crack Rating (CR). Higher values for CR indicate better condition.

For rigid pavement, the department defines 10 defect metrics as follows:

- surface deterioration
- spalling
- patching
- transverse cracking
- longitudinal cracking
- corner cracking
- shattered slab
- faulting
- pumping
- joint quality

These metrics reflect both the natural deterioration of the concrete surface and structural displacement unique to concrete slab, such as faulting (vertical displacement) and joint quality. The metrics are weighted according to both standard and segment-specific priorities, and the result is deducted from 100 to calculate the Defect Rating.

Pavement Measure: Rutting

The current condition survey field van also measures rutting for flexible pavement in 1/8-inch increments of depth, with each increment deducting one point from a perfect total of 10. The overall rutting score for the road segment is equal to the average of the scores for each wheel path.

Florida Analysis System for Targets (FAST)

Prior to 2009, the department used a formulaic approach to pavement resurfacing project selection. This approach dictated that 5.3% of the statewide lane-miles be resurfaced based on deficiencies. The Florida Analysis System for Targets (FAST) was created to provide a stronger analytic approach to the resurfacing program to meet the 80% non-deficient statewide standard. Based on a set of historical performance information in each district, FAST relies upon regression equations to forecast performance. Crack ratings and other predictive indicators are used to estimate the optimal allocations.

FAST allows for a more detailed forecast analysis, allowing pavement management staff to run a variety of funding scenarios and to help optimize project selection for decision-makers. FAST provides the ability to calculate future resurfacing allocations based on forecasted conditions, impact analysis for these scenarios, a prioritized list of candidate projects, and has improved section level condition forecasts across the SHS.

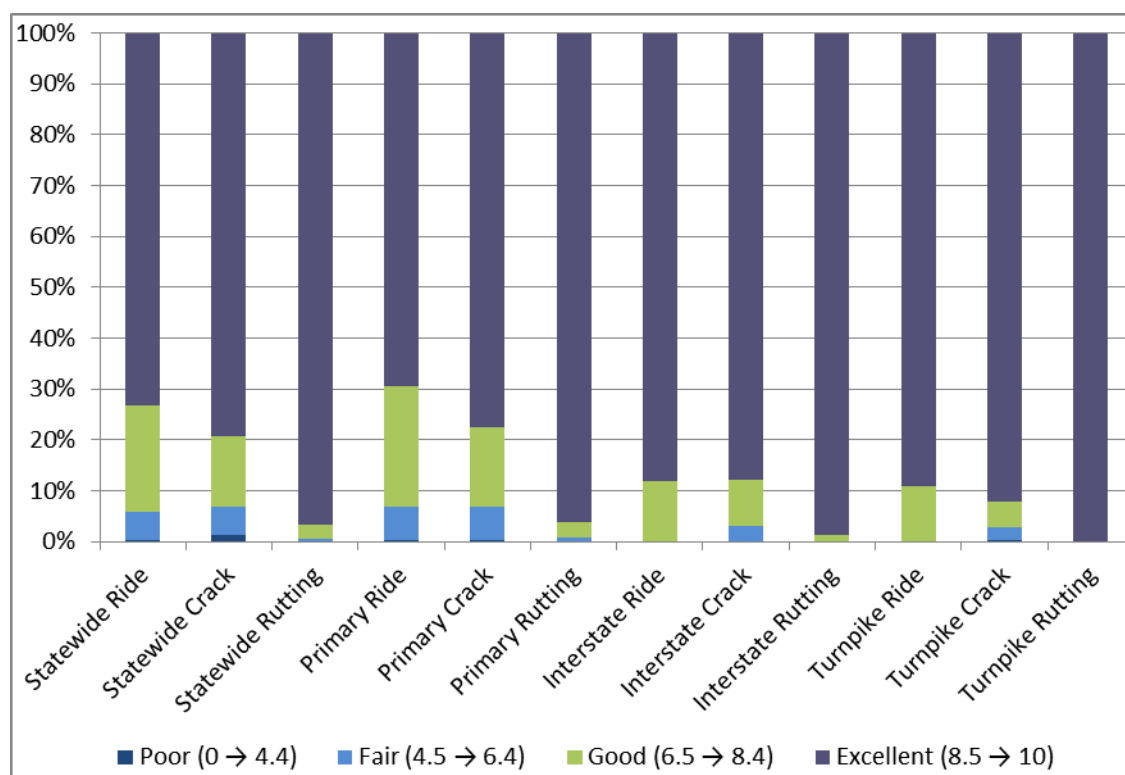
FAST is extremely accurate on a system-wide level, however some section level projections remain difficult to estimate.

Pavement Condition Summary

Figure 2 shows the 2013 condition distribution for FDOT flexible pavement. The chart shows RR_{10} , CR, and rutting - the metrics FDOT uses to inform decisions regarding pavement preservation projects. It also distinguishes among statewide, primary³, Interstate, and Turnpike pavements. All metrics are evaluated from zero to 10, with 10 representing perfect pavement conditions. A pavement is in poor condition if it scores less than six in any category. Pavements generally are in good condition; ride rating typically is in fair condition; and the Turnpike and Interstates typically are in better condition than the average statewide roadway.

³ The “Primary” highway system consists of the National Highway System (NHS) and roads bearing a functional classification of Urban Collector/Major Rural Collector or higher. It is also referred to as the “Federal Aid Highway” system.

Figure 2 Results of 2013 Florida Flexible Pavement Condition Survey



2.2 NATIONAL HIGHWAY SYSTEM BRIDGES

Inventory

Bridges meeting FHWA qualifications are defined within FDOT as Major Structures. Major Structures are those vehicular bridges with a clear opening of greater than 20 feet along the direction of the roadway between abutments, spring lines of arches, extreme ends of openings for multiple boxes, or extreme ends of openings for multiple pipes. Most Major Structures are bridges. However, there are also large culverts (greater than 20 feet) that are classified as major structures.

Approximately 12,000 bridges in Florida are recorded in the National Bridge Inventory (NBI), as shown in Table 3. Of these, 6,783 are state maintained and approximately 5,700 are part of the National Highway System (NHS).

Table 3 Inventory Summary for Bridges Managed by FDOT

	Number of Bridges	Deck Area (ft ²)	SD Area (ft ²)	Percent of Area SD
SIS	4,509	93,116,588	615,445	0.7%
State Owned NHS	4,220	96,125,304	1,831,101	1.9%
Locally Owned NHS	1,488	26,484,291	482,284	1.8%

State Owned Total	5,441	122,600,774	2,890,234	2.4%
NHS	5,708	122,609,594	2,313,385	1.9%
Florida NBI	12,070	172,941,567	4,194,739	2.4%

Note: Based on April 2013 NBI tape data submitted to the FHWA (figures do not include the locally owned bridges on post-May 2013 NHS).

Bridge Inspection Program / Bridge Work Plan

In 2013, the department maintained 6,773 bridges, completing 5,777 inspections on state, turnpike, and locally owned bridges. In 2014, the department maintained 6,846 bridges, completing 7,127 inspections on state, turnpike, and locally owned bridges. Each bridge's current condition is compared with the condition from its prior inspection. Every bridge is inspected at least once every two years to assess its condition and to identify structures that require further maintenance, rehabilitation, or replacement. Special inspections are conducted after major weather events, such as floods and hurricanes.

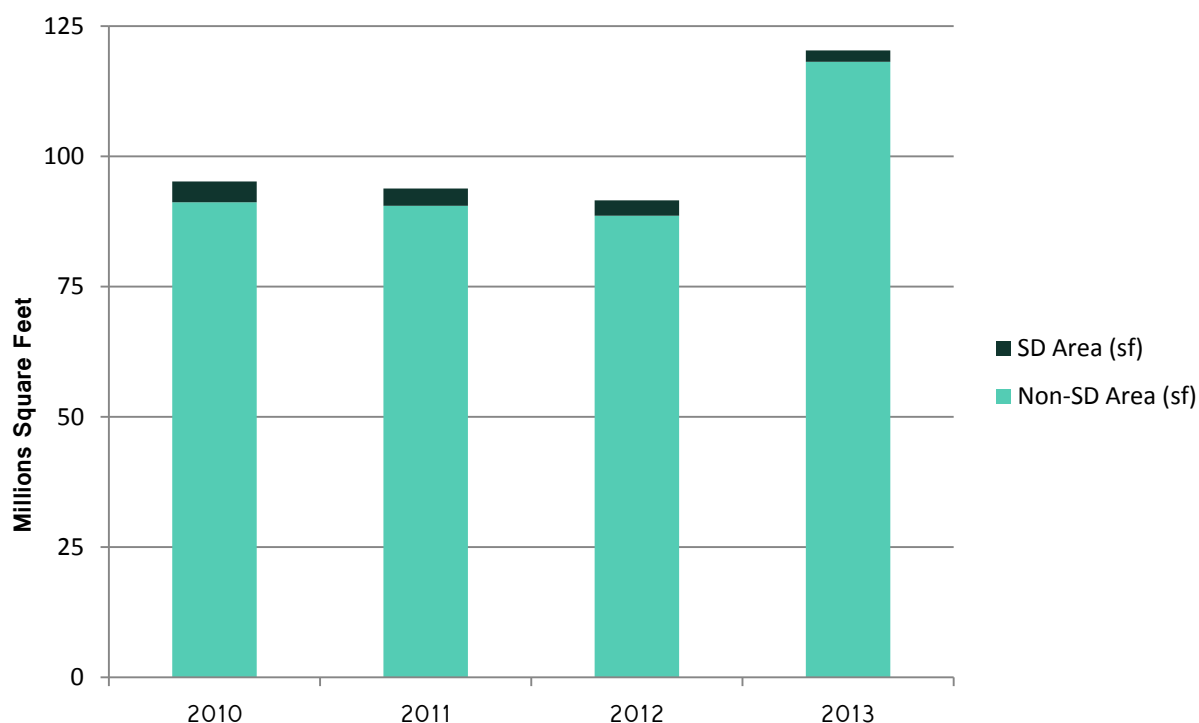
Since FDOT's bridge inspection program began in 1970, there has been a steady improvement in bridge conditions on the State Highway System due to an aggressive maintenance and construction program.

Condition

Figure 3 and Figure 4 show the condition of the state's NHS bridges over the past several years. Figure 3 shows the amount of deck area rated SD against the overall total in the years 2010-2014, while Figure 4 shows how the percentage of deck area on NHS bridges rated SD has declined over time. While interpreting these figures, it should be noted that the NHS in Florida was expanded through the MAP-21 legislation and that these new designations are reflected in the 2013 NBI dataset.

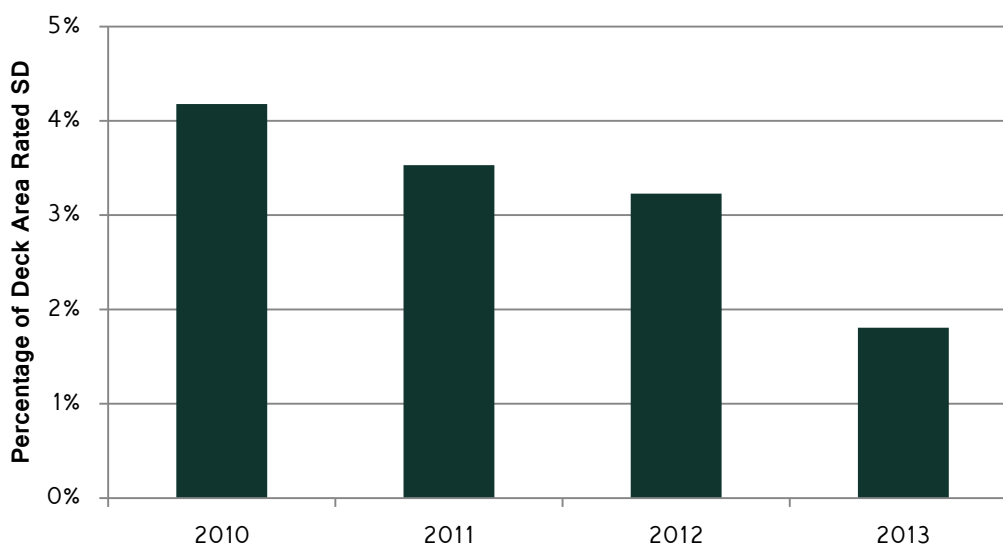
Prior to MAP-21 in 2012, the department (like most state DOTs) did not utilize deck area as a basis for bridge condition. Reported deck area is developed during inspections. In Figure 3, the total structurally deficient deck area declines over the years 2010-2013 because new bridges built during that period significantly increased the newly built share of NHS deck area. The expansion of the federally defined NHS added several new bridges to the NHS and accounts for the expansion in deck area shown in Figure 3.

Figure 3 Amount of NHS Deck Area in Florida Rated Structurally Deficient, 2010-2013



Note: Data for 2013 differs from other years, in that the NHS was expanded and that bridges in their first ten years of life could receive an SD rating.

Figure 4 Percentage of NHS Deck Area in Florida Rated Structurally Deficient, 2010-2013



Note: Data for 2013 differs from other years, in that the NHS was expanded and that bridges in their first ten years of life could receive an SD rating.

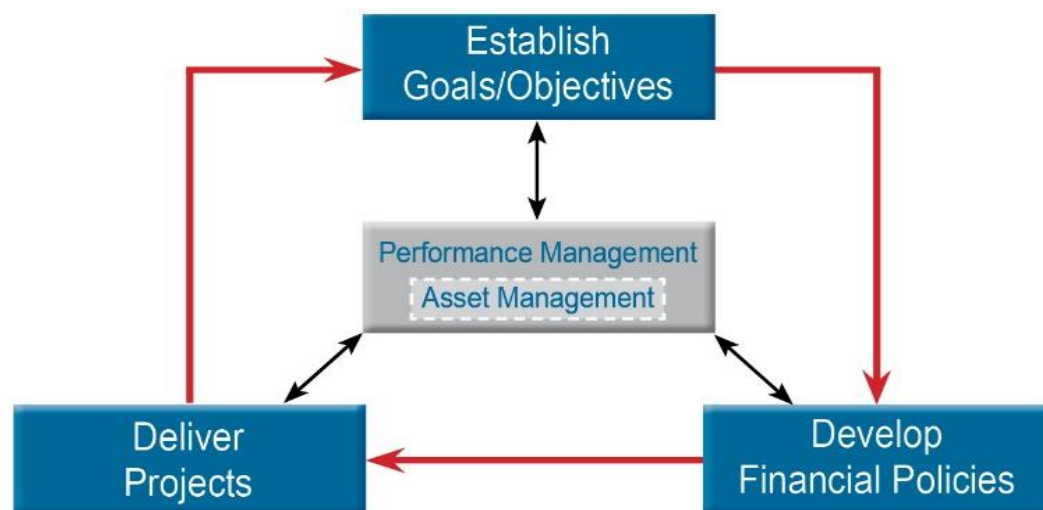
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3.0 Performance-Based Planning and Programming

3.1 PERFORMANCE-BASED PLANNING AND PROGRAMMING PROCESS

The department's Performance Policy and Performance Framework guides and informs transportation decision making (see FDOTPerforms.org). As stated in the Policy, "Performance management also encompasses asset management and performance measurement reflecting the department's priorities for accountability and stewardship of resources". The Performance-Based Planning and Programming Process is shown in Figure 5 and in detail in Figure 6 on page 3-3.

Figure 5 Performance Based Planning and Programming Process



The TAMP influences several critical documents that provide overall financial guidance for the department and in turn influence the projected investment strategy for the TAMP. The Florida Transportation Plan (FTP) provides long-term vision for the state. The FTP sets policy guidance for future department initiatives. The Program and Resource Plan (PRP) shows a 10-year projected annual investment levels for all departmental programs, including the capital and maintenance programs. The PRP provides program-funding levels that form the basis for the department's Finance Plan, Five-Year Work Program, and

Legislative Budget Request. The 10 year project annual investment levels presented in the PRP will serve as the 10 year guide for purposes of the TAMP.

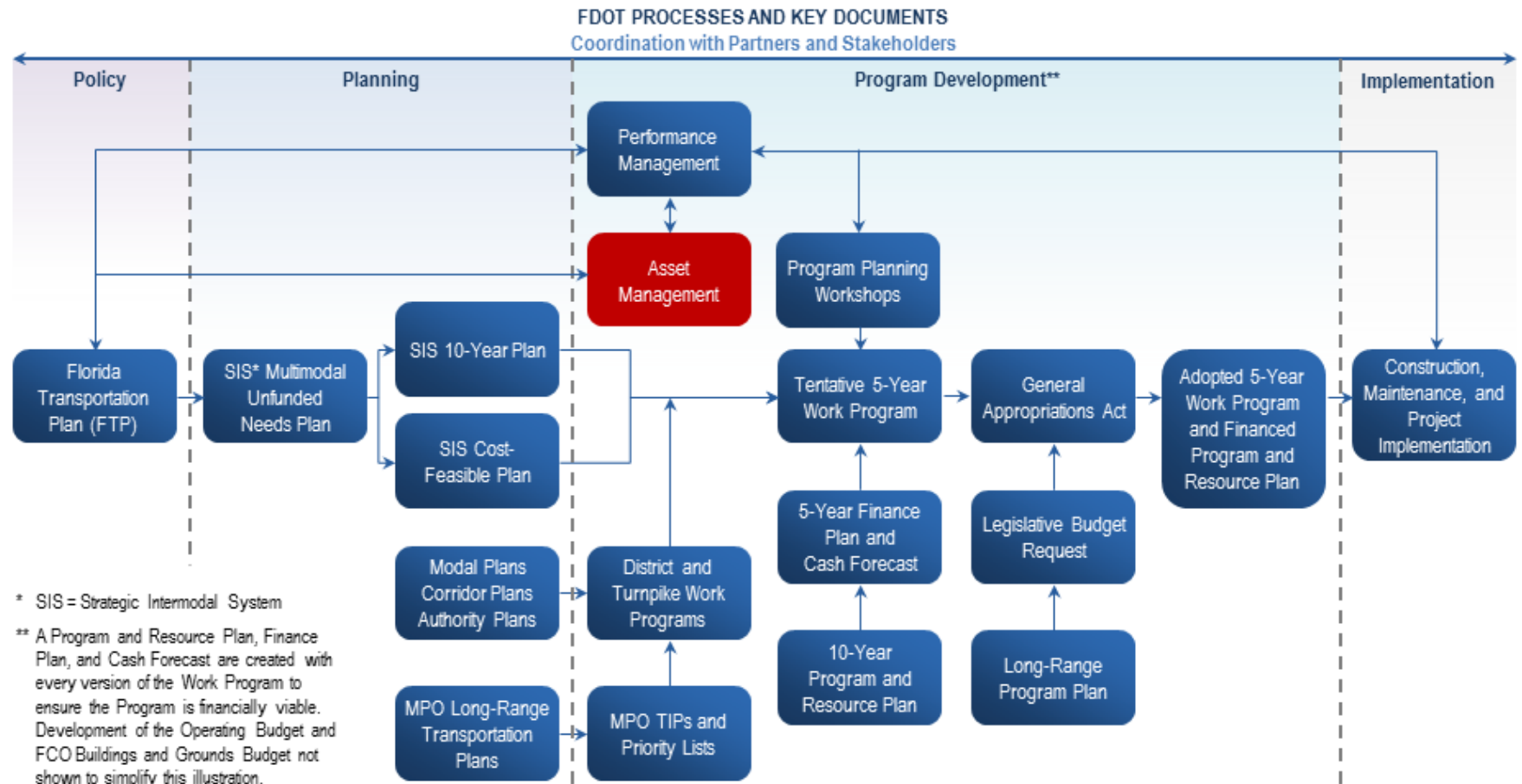
The most important document for project development is the Five-Year Work Program, that identifies which projects and services will be provided, when and where such projects and services will be provided, and how these projects and services will be funded using projected available revenue.

The five-year Finance Plan provides the legislature and department managers with expected revenue forecasts and assurance that the department's planned program is financed (balanced with anticipated revenues). A separate 36-month Cash Forecast provides a model for ensuring that acceptable cash flow is available for project activity and operations over the time period.

An Annual Performance Report (www.fdotperforms.org) documents progress in relation to the department's mission execution and other priorities, plans and programs. FDOT uses performance measures to perform the following:

- Assess how well Florida's multimodal transportation system is functioning;
- Provide information to support and inform decision making;
- Assess how effectively and efficiently transportation programs, projects and services are being delivered;
- Determine customer satisfaction levels; and
- Demonstrate transparency and accountability to Florida's citizens and the department's many other stakeholders.

Figure 6 Department Processes and Key Documents



3.2 PROGRAM OBJECTIVES

Section 1.2 above includes a list of the department's objectives for its asset management plan. These objectives include specific targets for condition and performance ratings.

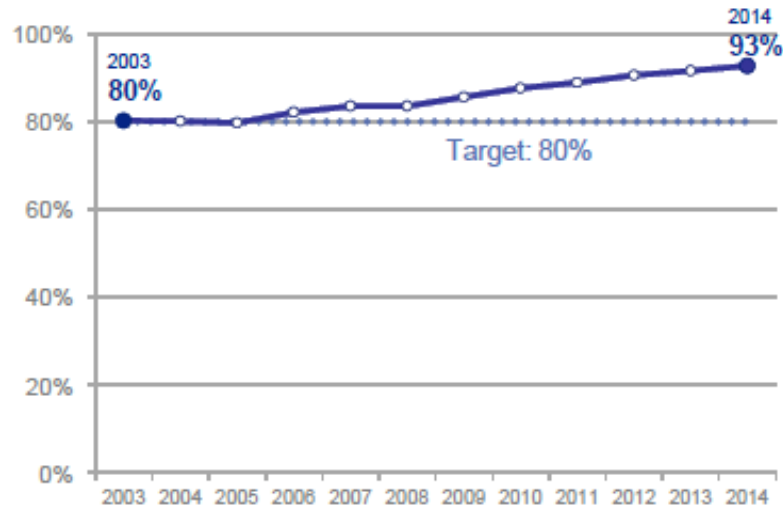
In January 2015, the Federal Highway Administration released a Notice of Proposed Rulemaking (NPRM) for pavement and bridge condition measures. The Notice calls for the TAMP to demonstrate how the department will meet the expected minimum levels for condition of pavements on the National Highway System as required by MAP-21. When the pavement and bridge rulemaking process is complete, MAP-21 regulations will require the department to set targets for pavement condition. Sections 334.046 and 339.135, Florida Statutes, already require pavement on state owned facilities to meet certain standards. For pavement, 80 percent of all lane-miles on the State Highway System must be in good or excellent condition. This requirement must be met before any capacity expansion projects can be considered. Similarly, bridge related targets indicate 90% in excellent or good categories. Each year, the department allocates sufficient funds to meet both objectives.

The bridge and pavement NPRM as presented will require some modifications to the data collection and reporting practices within the department. Florida will meet Federal performance requirements for pavements and bridges due to its well-established policy on funding and ability to meet condition targets as outlined above. Florida intends to meet all requirements in both of the Asset Management related rules (Pavement Condition and Bridge Condition (23 CFR Part 490) as well as Asset Management Plan (23 CFR Part 515). The TAMP may be revised to address these needs in the future when the rules become final.

3.3 PERFORMANCE

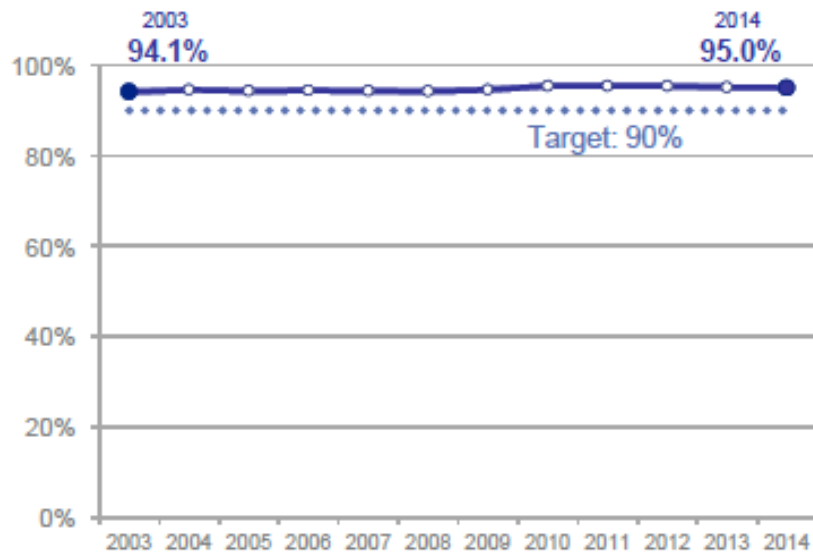
Pavement on the SHS is generally in excellent condition. Ninety-three percent of pavements meet department standards as of 2014. In the past 10 years, overall pavement performance has improved dramatically. A combination of factors, including improved design approaches and preventive maintenance efforts, are responsible for this increase.

Figure 7 Percent Pavement on the State Highway System Meeting Department Standards



For bridge condition, the state's bridges also perform above national averages. More than 90% of the state's bridges meet the department's standards, with 95% meeting that target in 2014.

Figure 8 Percent Bridges on the State Highway System Meeting Department Standards



This established history demonstrates that the state's bridges are in a state of good repair and do not exhibit signs of structural deterioration or are they posted with weight restrictions. Less than 1% of the state's total bridges are posted with weight restrictions.

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4.0 Asset Management Tools

4.1 POLICY, PLANNING, AND PROGRAMMING PROCESSES

Florida has been at the forefront of transportation asset management and asset maintenance best practices. In many national surveys, Florida is consistently rated as having the nation's best pavements and bridges. This focus, and a legislative mandate to maintain consistently high ratings for pavements and bridges, sets a standard for all of Florida's TAM practices. Florida's existing practices for asset management are rooted in meeting these performance standards.

Florida's asset management focus is mission driven and it is clear that the asset management ethic is incorporated into the mission statement, goals, and operating policies of the department.

Pavement Practices

The department consistently follows several steps to ensure it continues to meet its targets with respect to pavement condition. These steps include:

- Resurfacing 3 percent of the arterials on the SHS annually;
- Resurfacing 175 lane miles on the interstate system annually;
- Coordinating with the department's Motor Carrier Size and Weight Office and the Florida Highway Patrol's Office of Commercial Vehicle Enforcement to reduce the illegal operation of commercial motor vehicles exceeding weight limits;
- Facilitating training and technical assistance to assist local governments; and
- Maintaining current data systems for pavement condition surveys and ratings.

Bridge Practices and Strategies

FDOT takes a proactive approach to bridge maintenance emphasizing preventative maintenance and repairs being performed prior to bridges deteriorating to a level that would require much higher repair costs. This helps to ensure that FDOT-maintained bridges meet or exceed their life expectancy, resulting in a lower frequency of replacements due to bridge condition. Bridges are inspected at least once every two years, with more frequent inspections on structures following extreme weather events.

Specifically, the department has also adopted the following strategies aimed to continue meeting this high standard:

- Include all FDOT-maintained bridge projects that need repair in the Bridge Work Plan within 12 months of deficiency identification as candidate projects for potential Work Program adoption.
- Replace or repair all structurally deficient FDOT-maintained bridges and those bridges posted for weight restriction within six (6) years of the deficiency identification.
- Replace all other FDOT-maintained bridges designated for replacement within nine (9) years of the deficiency identification.
- As with pavements, coordinate with the department's Motor Carrier Size and Weight Office and Florida Highway Patrol's Office of Commercial Vehicle Enforcement to reduce the illegal operation of commercial motor vehicles exceeding weight limits on Florida's public roads and bridges.
- Continue to monitor bridges scheduled to be replaced and make interim repairs, as necessary, to safeguard the traveling public.

4.2 LIFE CYCLE COST ANALYSES

Florida currently uses life cycle cost considerations in its project selection processes for pavements and bridges.

Both management systems for pavements and bridges in the state use elements of life cycle costs in the project prioritization process.

The department uses AASHTOWare™ Bridge Management software (BrM), formerly Pontis, to inform bridge management decision making. Florida has been inspecting bridges since 1998 with the Commonly Recognized Elements (CoRe) for bridge inspections. BrM includes a life cycle cost analysis evaluation tool and its associated project planning tool allows agency planners to evaluate various project options using rapid analysis with clear presentation of the life cycle costs associated with each alternative.

FAST incorporates economic costs in its modeling. The FAST pavement tool includes deterioration curves and three basic preservation actions: light, medium, and heavy. The model selects appropriate action for a segment using incremental benefit cost analysis (IBC). The agency allocates resurfacing funds at a level to ensure that 80% of the system remains non-deficient per Statute. The tool uses NCHRP defined user costs as part of its selection criteria.

4.3 RISK MANAGEMENT ANALYSIS

The Florida Transportation Plan requires the department to incorporate and to consider the risk of service interruption (e.g., extreme events, asset failures, bridge scour, etc.) into its priority-setting process. In an asset management approach context, identification, analysis, evaluation, and mitigation are combined into a formalized process.

To develop this TAMP, a risk register was developed that captured a set of risks at the agency, program, and asset levels. This risk register was evaluated in terms of the likelihood of a service interruption and the resulting consequence as based on the scale shown in Figure 9.

Figure 9 Risk Rating Scale

		Consequence (Level/Descriptor)				
Likelihood		1	2	3	4	5
Level	Descriptor	Negligible	Minor	Major	Critical	Catastrophic
1	Low	1	2	3	4	5
2	Medium Low	2	4	6	8	10
3	Medium	3	6	9	12	15
4	Medium High	4	8	12	16	20
5	High*	5	10	15	20	25

This prioritization tool was used in an FDOT workshop in August 2014. Each individual risk categorization area is prioritized. Note that these are potential risks that may or may not occur.

The following risks were identified as the highest priority items to be addressed in the TAMP. Agency Level

1. State and federal funding are significantly reduced across the board for transportation.
2. Funds are not sufficient for capital and maintenance projects due to inflation in construction costs.
3. Funds are not sufficient for capital and maintenance projects due to failure to accurately predict funding.

Program Level

1. Unpredicted variation in construction costs.
2. Unfunded federal mandates.
3. Staff turnover and loss of experience/expertise.
4. Poor management.

5. New infrastructure initiatives.

Asset Level

1. Hurricane damage.
2. Damage or destruction due to flooding.
3. Bridges are damaged or destroyed due to scour.
4. Culverts and other drainage facilities fail (blockages or overtopping) unexpectedly.
5. Sinkholes emerge under or near roadway sections compromising foundation.
6. Assets are damaged or destroyed due to vehicle impacts and/or hazardous materials spill.

Complete mitigation and/or treatment approaches will be presented in a separate document posted on the asset management web page.

5.0 Financial Plan

5.1 INVESTMENT STRATEGIES

The Federal Highway Administration has defined investment strategy as follows:

An investment strategy means a set of strategies that result from evaluating various levels of funding to achieve a desired level of condition to achieve and sustain a state of good repair and system performance at a minimum practicable cost while managing risks.

The Florida legislature has adopted several prevailing principles for the department to meet to achieve and sustain a state of good repair and maintain system performance targets. Among the most germane for this discussion are the requirements to:

- ensure that 80 percent of the pavement surfaces on the SHS meet department standards;
- ensure that 90 percent of department-maintained bridges meet department standards; and
- ensure that the department achieves 100 percent of the acceptable maintenance standard on the SHS (Section 334.046, Florida Statutes).

The department meets the pavement condition standard by balancing resurfacing needs with SHS pavement deterioration rates. Pavement condition standards are based on the percentage of lane-miles with a Pavement Condition Rating of either excellent or good using cracking, ride, or rut measurements. The bridge standard is the percentage of bridge structures on the State Highway System that have a condition of excellent or good. The Maintenance Rating Program uses visual and mechanical evaluation of routine highway maintenance conditions in a uniform manner to rate maintenance levels.

Through these statutory provisions, Florida has established a well-recognized approach to preserve existing assets and protect the public's investment in its highways and bridges. The strong mandated targets, coupled with a departmental commitment to adopting innovative approaches for meeting these condition targets, allow Florida to ensure a strong approach to maintenance and preservation activities.

5.2 FINANCIAL PLAN

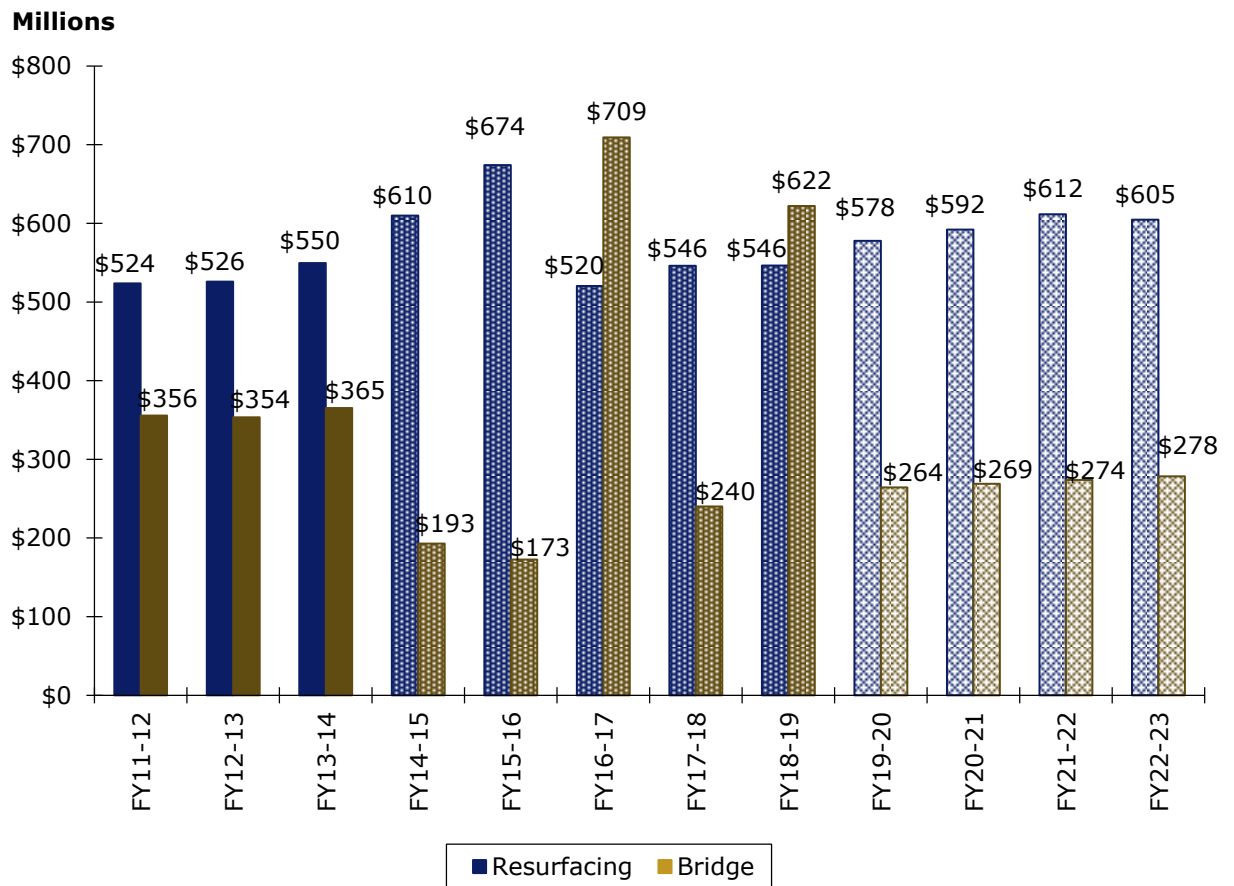
The department annually updates and extends its planned 10-year approach to meet its asset management objectives and other program responsibilities.

The current Work Program and planned 10-year Program Resource Plan provide enough funding to maintain the state of good repair for Florida's pavement and bridge network.

Based on the July 9, 2014 PRP, this section summarizes the amount of funds expected to be available for managing assets over a 10-year period and provides a high-level view of how the funds will be allocated.

Trends in allocations for pavement resurfacing and bridge maintenance are shown in Figure 10 for the years 2011-2023. Over the period shown, the department will allocate approximately \$6.9 billion for resurfacing and approximately \$4.1 billion for bridge maintenance.

Figure 10 Historic and Projected Allocations for Pavement Resurfacing and Bridge Maintenance and Replacements in Fiscal Years 2011-12 through 2022-23



Source: Program and Resource Plan Summary, Fiscal Years 1982-83 to 2012-13, 2013-14 Program and Resource Plan Summary, Florida DOT, July 9, 2014.

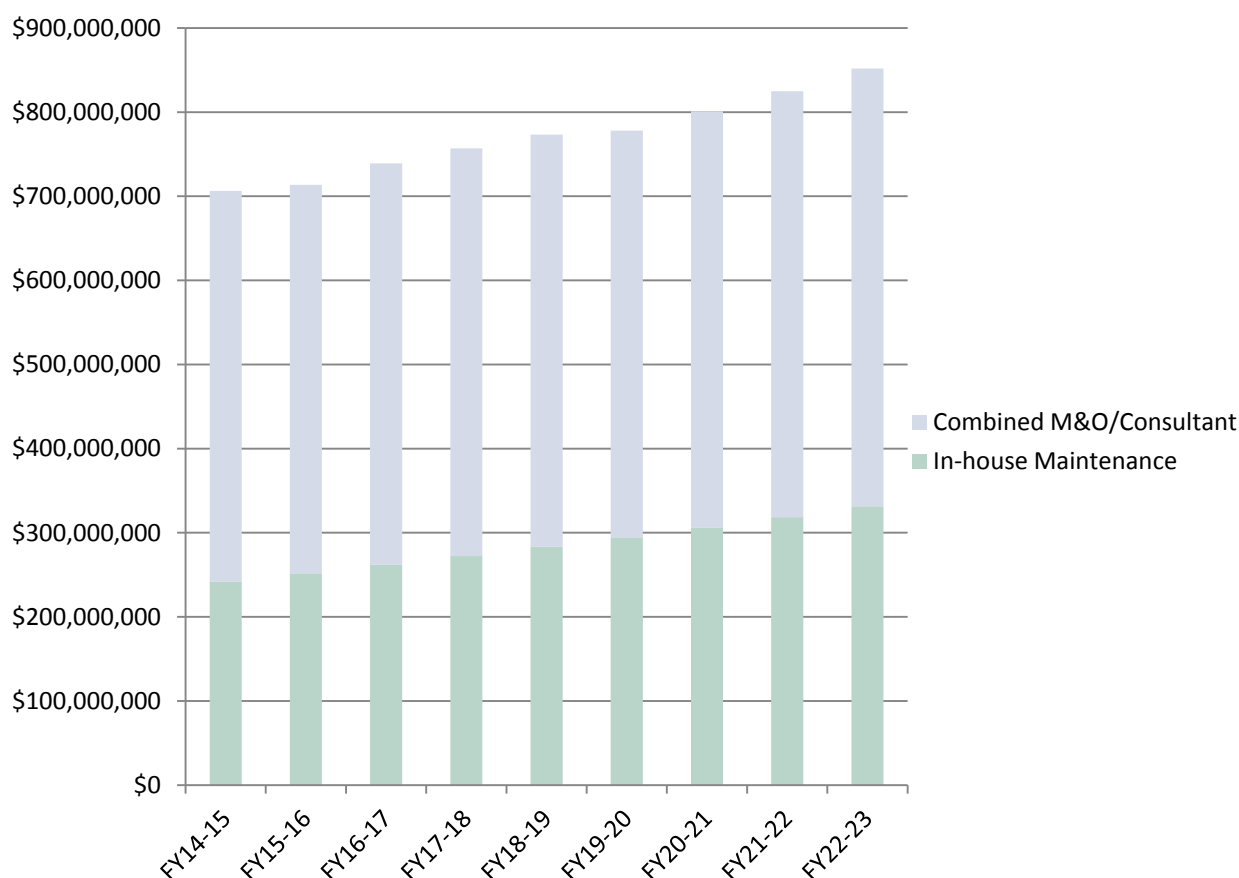
Note: FY 14-15 through FY 18-19 comprises the Five-Year Work Program.

The 2014 Five-Year Work Program reduces the number of lane-miles resurfaced, the number of bridges repaired, and the number of bridges replaced when compared to the previous Work Program. However, the department will still meet its targets and preservation related objectives while maintaining stability. This will enable additional resources to be directed to other department operations and capacity improvement projects without degradation of existing performance. Substantial increases from 2012-2013 are in order for the first three years of the resurfacing program.

The 2013-2014 plan year is funded at \$10 billion, including nearly \$7.2 billion for product.

With respect to Maintenance and Operations, the department has projected small increases throughout the current PRP period. Figure 11 shows the projected allocations for maintenance and operations over the coming decade.

Figure 11 Projected Allocation for Maintenance and Operations in Fiscal Years 2014-15 through 2021-22



Source: 2013/14 Program and Resource Plan Summary, Florida DOT, July 9, 2014.

Note: FY 14-15 through FY 18-19 comprises the Five-Year Work Program

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6.0 Implementation

This section describes the implementation actions necessary to institutionalize the practices described within this plan.

The development of the Florida TAMP is championed by representatives from both the Office of Maintenance and the Office of Policy Planning; these champions chair a Core Working Group tasked with developing the TAMP. The Core Working Group includes the Office of Work Program and Budget, the Pavement Management Office, the Public Transit Office, the Safety Office, the Transportation Statistics Office, the Pavement Condition Survey, the Bridge Office, and the Office of Information Systems. The Core Working Group participates in the development of and reviews the supporting material for the TAMP. It will dissolve and key members will reconvene to become the TAM Steering Committee, a group that will be responsible for ongoing implementation of TAM within the department.

The steps for implementation include:

1. Establish Steering Committee
2. Monitor Federal Transportation Asset Management Rulemaking Process
3. Update Investment Strategies
4. Update TAMP elements based on Final Rulemaking (if necessary)
5. Submit document for Federal Highway Administration Review
6. Respond to comments from FHWA Review and Certification Process
7. Update Risk Register and Mitigation Strategies

Each of these steps are described in the following sections.

1. Establish Steering Committee

The initial step for implementation of the strategic plan is to establish the TAM Steering Committee. The proposed membership is presented in Table 4.

Table 4 TAM Steering Committee

Role	Title, Organization
TAM Co-Champion	Director, Office of Maintenance
TAM Co-Champion	Administrator, Statewide Planning and Policy Analysis, Office of Policy Planning
Intelligent Transportation Systems (ITS)	State Traffic Operations Engineer, Traffic Engineering and Operations Office
Finance and Programming	Director, Office of Work Program and Budget
Pavement	Pavement Management Engineer, Pavement Management
Bridge	State Structures Maintenance Engineer, Bridge Office
Transit	Transit Planning Administrator, Freight, Logistics, and Passenger Operations
Safety	Transportation Safety Engineer, Safety Office
MPO	Executive Director, Metropolitan Planning Organization Advisory Council

The mission of the TAM Steering Committee will be to:

- Update and modify the TAMP as necessary,
- Bring leaders from across the department together to direct asset management policies and effort, and
- Confirm definitions, descriptions, roles and responsibilities presented in the TAMP in accordance with federal rulemaking processes and executive direction.

The proposed Steering Committee would be appointed by the Secretary and meet twice annually to review progress.

2. Monitor Federal Transportation Asset Management Rulemaking Process

Two specific rulemaking processes are underway that directly impact the TAMP. The Asset Management Plan Notice of Proposed Rulemaking closed formally in May 2015. The final rule is anticipated in October 2015. The second is the Assessing Pavement Condition for the National Highway Performance Program and Bridge Condition for the National Highway Performance Program rulemaking. This final rulemaking is also scheduled for October 2015.

The department will continue monitoring these rulemaking processes and modify the plan elements as needed to meet the final rulemaking. [The initial TAMP has used the Notice of Proposed Rulemaking and proposed TAMP template promulgated by the FHWA].

3. Update Investment Strategies

The department will update the investment strategy presented in the TAMP based on the most recent PRP. Based on the expected budget allocations

approved through the Florida legislature, slight variations in future investments may occur.

4. Submit for FHWA Certification and Respond to Comments

The TAMP will be reviewed by FHWA for compliance with the final rulemaking. In accord with the expected process, the Secretary will submit the department's TAMP to FHWA.

5. Update Risk Register and Mitigation Strategies

The TAMP is envisioned to be updated on a four year cycle. In addition, the Risk Register should be revised and re-prioritized on a similar schedule. To maximize the benefits of risk mitigation approaches, the Steering Committee will regularly monitor the proposed activities and approaches.