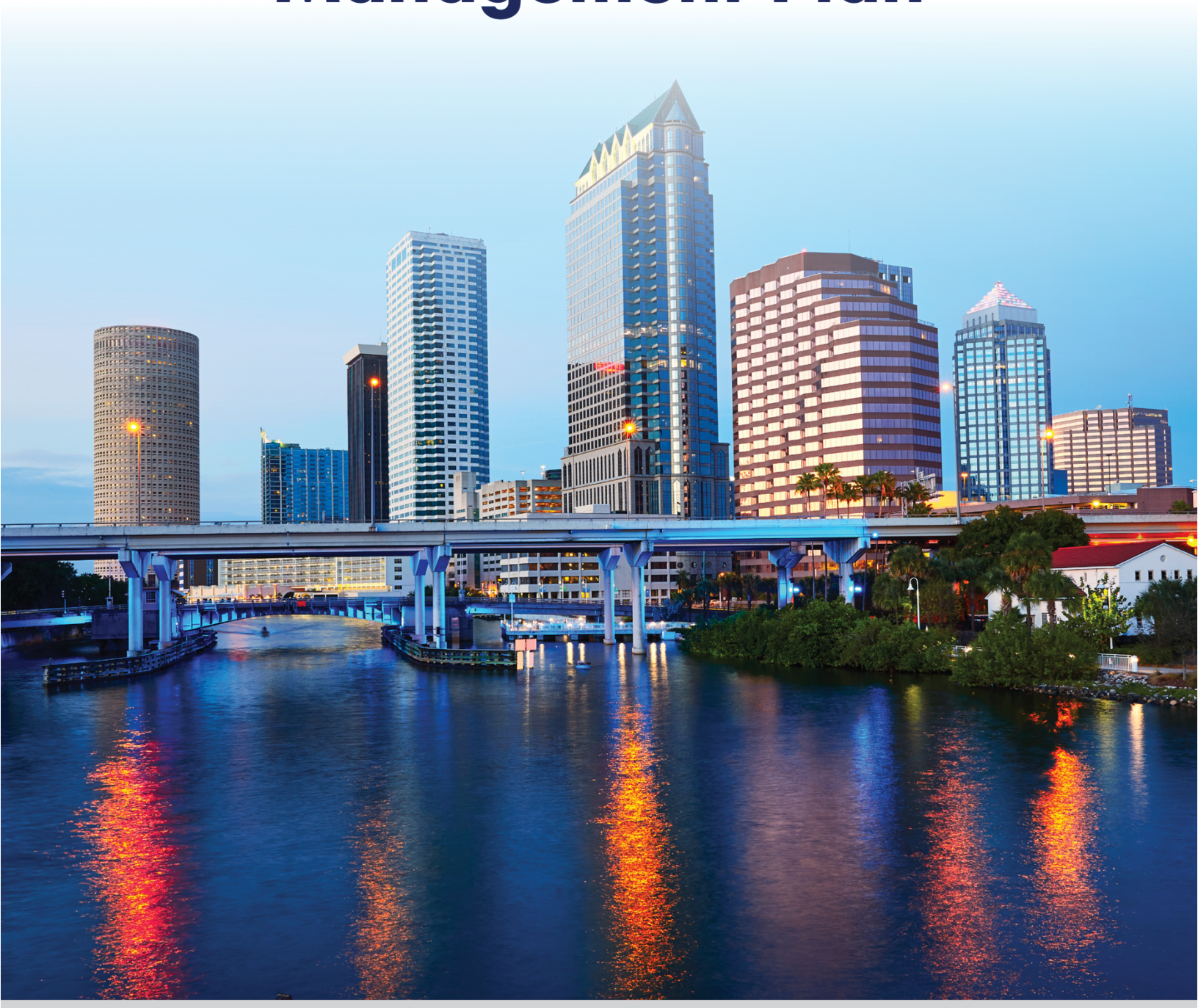
FDOT

FLORIDA DEPARTMENT OF TRANSPORTATION

Transportation Asset Management Plan



DECEMBER 30, 2022

Cover Image:
The Selmon Viaduct Eastbound and Westbound, Tampa, FL

FDOT

Florida Department of Transportation

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JARED W. PERDUE, P.E.
SECRETARY

December 30, 2022

The Honorable Pete Buttigieg
Secretary
U.S. Department of Transportation
1200 New Jersey Ave, SE
Washington, DC 20590

Dear Secretary Buttigieg,

This Transportation Asset Management Plan (TAMP) outlines the department's processes used to improve or preserve the condition and performance of the National Highway System (NHS) pavement and bridge assets. The plan demonstrates the linkages between maintenance and planning and programming efforts, includes financial planning and investment strategies to support progress toward achievement of the State targets for asset condition and performance, and identifies potential risks that our agency faces related to pavement and bridge condition and how we mitigate those risks. The plan also discusses life-cycle planning for our pavement and bridge assets.

Florida has a well-established history of maintaining and preserving our highways and bridges in a state of good repair. Florida consistently ranks at or near the top in state rankings for infrastructure condition. In 2021, eighty-one point three percent of the pavements on the State Highway System (SHS), which contains the majority of the NHS, and ninety-four percent of bridge structures were in Good or Excellent condition.

I approve this plan and the Department remains committed to providing a transportation system that meets customer expectations for safe and reliable travel and to support the state's quality of life and economic competitiveness. Our emphasis on preservation and maintenance is a major part of that commitment. The statutory guidance to maintain pavement and bridge condition, along with the use of analytical tools and formal policies, allows the state to support investment decisions and continue to meet targets for performance and infrastructure condition.

Sincerely,

Jared W. Perdue, P.E.
Secretary

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Executive Summary

Asset management is a strategic and systematic process used by agencies to preserve the physical assets of the transportation system in a state of good repair (SOGR) over their lifecycle at minimum practicable cost. The Florida Transportation Asset Management Plan (TAMP) is a risk-based plan that describes the policies and processes used in Florida to manage the condition and performance of the pavement and bridge assets.

What is the purpose of the TAMP?

The purpose of the TAMP is to document the Florida Department of Transportation's (Department's) approach to asset management with a focus on the National Highway System (NHS), show how asset management links to the state's performance-based planning and programming processes and demonstrate how the Department's asset management plan and processes meet the regulatory requirements of federal law.

What are the Department's Asset Management Objectives?

The TAMP is an essential component to keep the state's transportation system safe and in good repair. The principal objectives of how the Department manages its assets are to:

- Ensure the safety and security of transportation customers.
- Minimize damage to infrastructure from vehicles.
- Achieve and maintain a state of good repair for transportation assets.
- Reduce the vulnerability and increase the resilience of critical infrastructure to impacts from sea level rise, extreme weather, and events.

What is the State of Good Repair (SOGR) Objectives?

For purposes of the TAMP, the Department defines the state of good repair (SOGR) to be the Department's performance measures and targets for pavements and bridges on the State Highway System (SHS).

- 80 percent of pavement on the SHS by lane mile is in a SOGR.
- 90 percent of bridges on the SHS by number of bridges is in a SOGR.

What are the federal requirements?

Federal regulations (23 U.S.C. 119 and 23 CFR Part 515) requires the Department to develop a TAMP to improve or preserve the condition of the NHS pavement and bridge assets, regardless of ownership, and the performance of the NHS. The TAMP must also include investment strategies leading to a program of projects that would make progress toward achievement of Department established targets for asset condition and performance of the NHS, and support progress toward achievement of identified national goals. In addition, the Infrastructure Investment and Jobs Act (IIJA), Section 11105, requires states to have TAMP development processes and TAMP evaluations that include consideration of extreme weather and resilience as part of the life cycle planning and risk management analyses.

What are the federal Performance Measures and established Statewide Targets?

The condition of the NHS pavement and bridge assets (baseline and projected future conditions) are reported to the Federal Highway Administration (FHWA) based on the following measures established through federal rulemaking. To measure progress towards achievement of the SOGR objectives, the Department established statewide targets for each measure, to the extent practicable, in coordination with other NHS owners.

Asset	Performance Measures	2023 Target	2025 Target
Pavements	Percentage of Interstate pavements in Good condition	60.0%	60.0%
	Percentage of Interstate pavements in Poor condition	5.0%	5.0%
	Percentage of non-Interstate NHS pavements in Good condition	40.0%	40.0%
	Percentage of non-Interstate NHS pavements in Poor condition	5.0%	5.0%
Bridges	Percentage of NHS bridges classified as in Good condition by deck area	50.0%	50.0%
	Percentage of NHS bridges classified as in Poor condition by deck area	10.0%	10.0%

What is the Performance Gap?

Currently, there is no gap between the existing conditions of the pavement and bridge assets and the SOGR objectives. The Department is mandated by statute to first preserve the existing assets and protect the public's investment in its highways and bridges. Therefore, funding is allocated "off the top" to ensure the SOGR objectives are met.

What are the TAMP Risks?

The Department continuously engages in efforts of identification and response to risks to accomplish the goals and objectives of the TAMP. The most critical risks are uncertainty of revenue and impacts to assets from sea level rise and extreme weather.

If funding shortages were to develop the Department follows its established process of funding preservation activities before capacity projects.

Impacts to assets from sea level rise and extreme weather are handled by utilizing any available cash balances until reimbursements are received. The Department also periodically reviews and if necessary, updates its design standards to enhance the resilience of the transportation infrastructure.

What is Lifecycle Management of the Assets?

Lifecycle management takes into consideration the whole life of the asset from initial construction through the end of its service life. The Department's pavement and bridge management systems help determine the best strategies to utilize to preserve the condition of the assets to standards at the lowest practicable cost.

What is the asset management Financial Plan and Investment Strategy?

The Department's Program and Resource Plan (PRP) establishes the programming framework by which the Work Program is developed. The PRP is a summary document that contains a complete 10-year projected budget by fiscal year to accomplish program goals and objectives.

In addition, included in statute are requirements which must be considered as the Department plans and develops an integrated, balanced statewide transportation system.

Consistency Determination Checklist

Required Elements	Indicators the TAMP Meets Element Requirements in 23 U.S.C. 119(e) and 23 CFR Part 515	Requirement Met (Yes/No)	Location: Chapter/Page Number
TAMP approved by head of State DOT (23 CFR 515.9(k)	Does the TAMP bear the signature of the head of the State DOT?	Yes	After cover page
State DOT has developed its TAMP using certified processes (23 CFR 515.13(b))	Do the process descriptions align with the FHWA-certified processes for the State DOT? [If the process descriptions do not align with the FHWA-certified processes, the State DOT must request recertification of the new processes as amendments unless the changes are minor technical corrections or revisions with no foreseeable material impact on the accuracy and validity of the processes, analyses, or investment strategies. State DOTs must request recertification of TAMP development processes at least 30 days prior to the deadline for the next FHWA TAMP consistency determination as provided in 23 CFR 515.13(c).]	Yes	Chapter 4: Lifecycle Planning Pg. 30 Chapter 5: Managing Risk and Creating Resilience Pg. 48 Data from other NHS Owners Pg. 99 Chapter 6: Revenues and Financial Plan Pg. 65 Chapter 7: Performance Assessment and Investment Strategies Pg. 90
	Do the TAMP analyses appear to have been prepared using the certified processes?	Yes	See above.
TAMP includes the required content as described in 23 CFR 515.9(a)-(g) (23 CFR 515.13(b))	Does the TAMP include a summary listing of NHS pavement and bridge assets, regardless of ownership?	Yes	Chapter 3 Pg. 13, 23
	Does the TAMP include a discussion of State DOT asset management objectives that meets requirements?	Yes	Chapter 2 Pg. 6
	Does the TAMP include a discussion of State DOT measures and targets for asset condition, including those established pursuant to 23 U.S.C. 150, for NHS pavements and bridges, that meets requirements?	Yes	Chapter 3 Pg. 14-28

	Does the TAMP include a summary description of the condition of NHS pavements and bridges, regardless of ownership, that meets requirements?	Yes	Chapter 3 Pg. 18, 27
	Does the TAMP identify and discuss performance gaps?	Yes	Chapter 7 Pg. 90-99
Required Elements	**Indicators the TAMP Meets Element Requirements in 23 U.S.C. 119(e) and 23 CFR Part 515**	**Requirement Met (Yes/No)**	**Location: Chapter/Page Number**
TAMP includes the required content as described in 23 CFR 515.9(a)-(g) (23 CFR 515.13(b)) **(continued)**	Does the TAMP include a discussion of the lifecycle planning that meets requirements, including results?	Yes	Chapter 4 Pg. 30-47 Chapter 7 Pg. 90-99
	Does the TAMP include a discussion of the risk management analysis that meets requirements?	Yes	Chapter 5 Pg. 48-61
	Does the TAMP include the results of the evaluations of NHS pavements and bridges pursuant to 23 CFR part 667?	Yes	Chapter 5 Pg. 62-64
	Does the TAMP include a discussion of a 10-year Financial Plan to fund improvements to NHS pavements and bridges?	Yes	Chapter 6 Pg. 79-86
	Does the TAMP identify and discuss investment strategies the State intends to use for their NHS pavements and bridges?	Yes	Chapter 6 Pg. 79-88 Chapter 7 Pg. 94-99
	Does the TAMP include a discussion as to how the investment strategies make or support progress toward achieving and sustaining a desired state of good repair over the life cycle of the assets?	Yes	Chapter 7 Pg. 90-99
	Does the TAMP include a discussion as to how the investment strategies make or support progress toward improving or preserving the condition of the assets and the performance of the NHS related to physical assets?	Yes	Chapter 7 Pg. 90-99
	Does the TAMP include a discussion as to how the investment strategies make or support progress toward achieving the State's targets for asset condition and performance of the NHS in accordance with 23 USC 150(d)?	Yes	Chapter 7 Pg. 90-99
	Does the TAMP include a discussion as to how the investment strategies make or support progress toward achieving the national goals identified in 23 USC 150(b)?	Yes	Chapter 6 Pg. 88-89

	Does the TAMP include a discussion as to how the TAMP's lifecycle planning, performance gap analysis, and risk analysis support the State DOT's TAMP investment strategies?	Yes	Chapter 4 Pg. 30 Chapter 6 Pg. 86 Chapter 7 Pg. 90
Infrastructure Investment and Jobs Act (IIJA) Flexibility Memo Requirements	Clearly explain the processes used to develop the extreme weather and resilience portions of the risk management and lifecycle planning sections of the TAMP.	Yes	Chapter 4 Pg. 30 Chapter 5 Pg. 48
	Include discussions of extreme weather and resilience in the risk management and lifecycle planning sections of the TAMP.	Yes	Chapter 4 Pg. 46 Chapter 5 Pg. 48
	Discuss how their investment strategies are influenced by the results of their risk management and lifecycle planning analyses, as provided in 23 CFR 515.7(e).	Yes	Chapter 4 Pg. 46 Chapter 5 Pg. 49 Chapter 6 Pg. 86 Chapter 7 Pg. 90-99 Chapter 8 Pg. 101-102

CHAPTER 1
Introduction

The Florida Department of Transportation (Department) has a long history of leadership in the field of transportation asset management. Many national surveys consistently rate Florida as having the nation's best pavements and bridges. This focus to be the best, and a legislative mandate to maintain consistently high ratings for pavements and bridges, sets a standard for all the Department's transportation asset management practices.

1.1 Purpose

The Florida Transportation Asset Management Plan (TAMP) is a risk-based plan that describes the Department's iterative, system-wide approach, processes and policies used to manage the condition and performance of the pavement and bridge assets on the State Highway System (SHS).

The purpose of the plan is to document the Department's approach to asset management, with a focus on the National Highway System (NHS) and demonstrate how the Department's asset management plan and processes meet the requirements of federal law.

1.2 Agency Overview

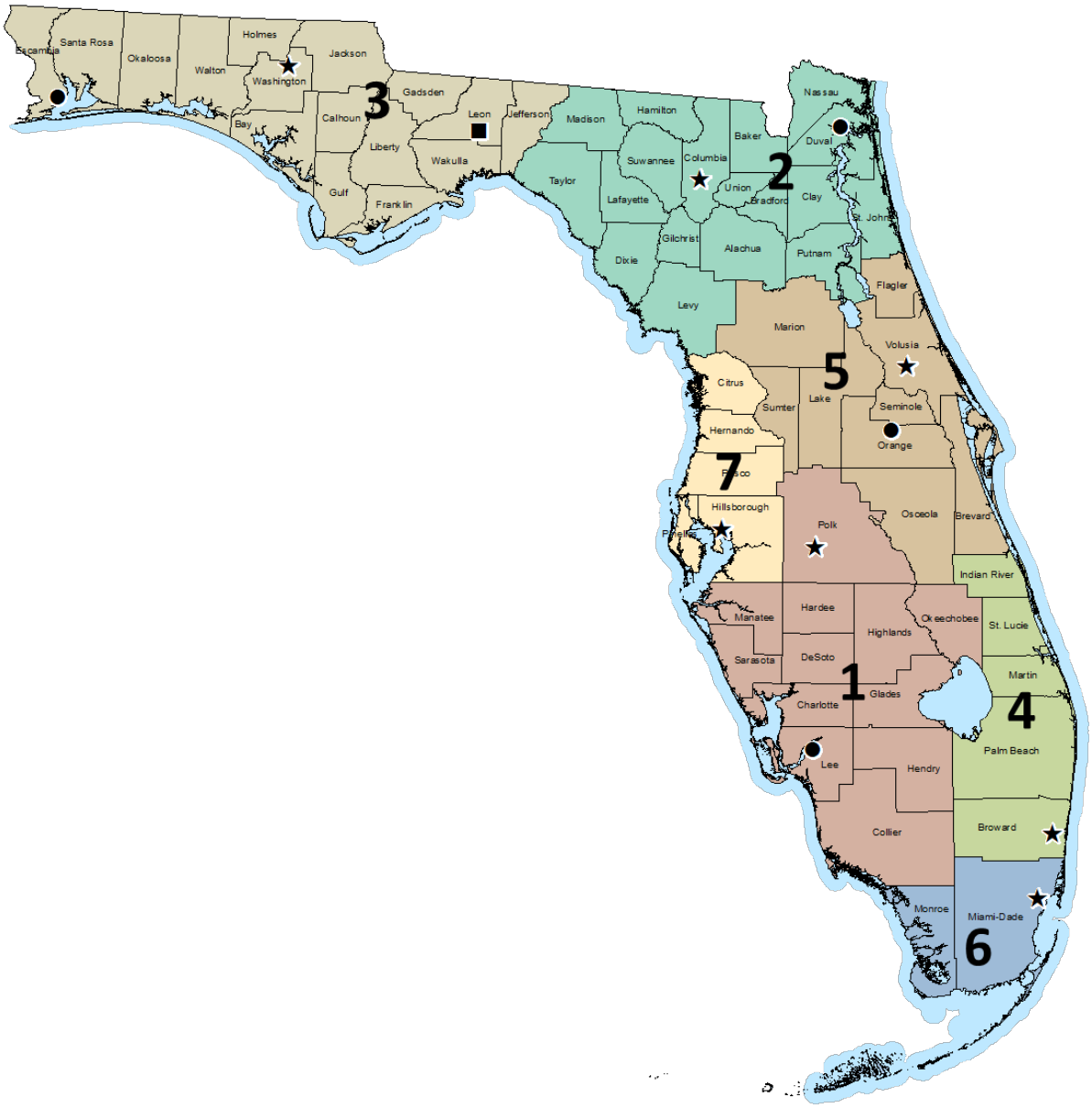
The Department is a decentralized agency led by the Secretary who reports directly to the Governor of Florida. The Department's continuing mission is to provide a safe transportation system that ensures the mobility of people and goods, enhances economic prosperity, and preserves the quality of our environment and communities. This mission is accomplished by planning and developing (either directly or indirectly) Florida's robust transportation system. Central to the success of the mission is management of the transportation assets.

To provide for efficient operations and to expedite the decision-making process, the operations of the Department are organized into seven districts (Figure 1) each headed by a District Secretary and a Turnpike Enterprise, headed by an Executive Director. The Central Office establishes departmental policies, rules, procedures, and standards and ensures uniform compliance and quality performance by the districts and central office units that implement the transportation programs.

The Department primarily manages infrastructure on the SHS, which carries over half of all traffic within Florida and includes approximately 78 percent lane miles of the NHS. The SHS has over 45,000 lane miles of roadway, over 7,000 bridges, 20 commercial airports, 15 deep water seaports, 8 active spaceports, 31 urban transit systems, 19 rural transit systems, over 7,000 miles of bicycle facilities, over 3,500 miles of pedestrian facilities, and over 2,700 miles of mainline railroad tracks.

Although the SHS includes all modes, the TAMP focuses only on the entire NHS pavement and bridge assets.

Figure 1: FDOT Districts and Offices



Department Offices		
■ Central Office	★ District Headquarters	● District Urban Area Offices
Tallahassee	District 1 – Bartow District 2 – Lake City District 3 – Chipley District 4 – Ft Lauderdale District 5 – Deland District 6 – Miami District 7 – Tampa	District 1 – Ft Myers District 2 – Jacksonville District 3 – Pensacola District 5 – Winter Park
Turnpike District: Ocoee – Administrative Office and Pompano – Operations Office		

1.3 Federal Requirements

The Moving Ahead for Progress in the 21st Century Act (MAP-21) under 23 U.S.C. 119 and the Fixing America's Surface Transportation (FAST) Act under 23 C.F.R. 515 contain specific content requirements for the TAMP. They include:

- A summary listing of the pavement and bridge assets on the NHS in the state, regardless of ownership, including a description of the condition of those assets.
- Asset management objectives.
- Asset management measures and State DOT targets for asset condition.
- Performance gap identification.
- Lifecycle costs.
- Risk management analysis.
- A financial plan.
- Investment strategies.

In addition, the Infrastructure Investment and Jobs Act (IIJA), Section 11105, requires states to have TAMP development processes and TAMP evaluations that include consideration of extreme weather and resilience as part of the life cycle planning and risk management analyses.

1.4 TAMP Development and Update

To meet the federal requirements, the Department's executive leadership established a Transportation Asset Management (TAM) Steering Committee to facilitate the development and oversee the review and update of the TAMP.

The committee operates by consensus and consists of a diverse group of personnel from across the Department that reflects the financial, planning, and other technical areas TAM influences.

Table 1: TAM Steering Committee

Role	Title, Organization
TAM Co-Champion	Director, Office of Maintenance
TAM Co-Champion	Transportation Performance Measures Coordinator
Safety	Safety Office
Transit	Public Transit Office
Pavement and Pavement Condition	State Materials Office
Policy	Office of Policy Planning
Bridge and Bridge Condition	Structures Operations
Finance and Programming	Office of Work Program and Budget
Asset Data	Transportation Data and Analytics Office
Traffic Management and Deployments	Traffic Engineering and Operations Office
Metropolitan Planning Organizations (MPOs)	Executive Director, Metropolitan Planning Organization Advisory Council (MPOAC)

The responsibilities of the committee and select personnel on the committee are to:

- Update and modify the TAMP as necessary to ensure Department policies and processes are current.
- Bring leaders from across the Department together to direct asset management policies and efforts, including:
  - Confirm definitions, descriptions, roles, and responsibilities in accordance with Federal rulemaking processes and executive direction.
  - Confirm investment strategies during the development of the annual Work Program.
- In between update cycles of the TAMP:
  - Monitor the progress of FHWA certification of the TAMP.
  - Update the inventory and condition information for TAM purposes on a schedule.
  - Gather feedback on how TAM should evolve over time.
  - Communicate TAM practices within the Department and to partner agencies, including Metropolitan Planning Organizations (MPOs).
  - Assess progress on implementing the TAMP including the risk mitigation strategies.

In addition, the various technical areas across the Department track and review the following information to support the development of further iterations of the TAMP:

- Pavement and bridge performance and trends.
- Population, economic, environmental, climate, or technology trends that are likely to impact transportation asset management practices.
- The influence of a changing state on the risk register, including assessing whether risks have changed and whether the likelihood and consequence scores should be updated.
- Pavement and bridge planning and management practices, including whether there are new data, systems, or practices in place that would influence transportation asset management.

These activities and schedule support the continued improvement of the Department's asset management practices and enable the Department to continue to provide solid stewardship of Florida's transportation assets.

1.5 TAMP Use

The TAMP is a comprehensive policy document that tells the story of how the Department practices TAM for all pavements and bridges. It also sets the stage for TAM enhancements and represents a model for asset management practice that other asset owners can follow. The document provides a comprehensive snapshot of decision-making practices, including how TAM influences the Five-Year Work Program and other key documents for planning and budgeting.

The TAMP meets the federal requirements of MAP-21/FAST Act for states to develop a risk based TAMP for all pavements and bridges on the NHS and the Infrastructure Investment and Jobs Act (IIJA) to consider extreme weather and resilience as part of the lifecycle planning and risk management analyses within the TAMP. It also details the performance of the bridges and pavements (measures and targets) established in the performance management regulations.

1.6 TAMP Organization

To help facilitate understanding of the Department's asset management practices, the TAMP has been organized as follows:

Chapter 2 Transportation Asset Management (TAM)

This chapter describes the Department's asset management objectives, ongoing integration, and implementation activities, including details on other relevant documents and how they link to TAM practices.

Chapter 3 Inventory, Measures and Conditions

This chapter summarizes the inventory and condition of the pavement and bridge assets, the state of good repair for the assets, and how performance measures are used to communicate with stakeholders and decision makers.

Chapter 4 Lifecycle Planning (LCP)

This chapter describes the Department's lifecycle plans for each asset type, including the pavement and bridge management systems, and consideration of extreme weather and resilience in lifecycle planning strategies.

Chapter 5 Managing Risk and Creating Resilience

This chapter describes risk and how it is incorporated into TAM practices, including identifying top priority risks, mitigation strategies, and monitoring.

Chapter 6 Revenues and Financial Plan

This chapter describes the Department's revenue sources, asset valuation process, process and key documents, and funding allocations.

Chapter 7 Performance Assessment and Investment Strategies

This chapter describes the targets driving the investment strategies, projected trends toward goals using existing budget, gaps between current asset condition and targets and tools used to capture and analyze data for performance monitoring.

Chapter 8 Asset Management Enhancements

This chapter describes the results of previous findings and process adjustments, including improvements to transportation asset management activities.

Chapter 9 Appendices

This chapter contains the glossary and other detailed information on documents discussed or referenced in the TAMP.

CHAPTER 2
Transportation Asset Management (TAM)

Asset management is a central tenet of the Department's long-range planning process and has a well-established philosophy, supported by statutes, to preserve 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, this philosophy serves as a solid foundation to meet and build upon federally required asset management focused practices.

Currently, there are several groups throughout the Department dedicated to managing their respective assets by collecting quality data on asset condition, applying best-practice analytical models for use in predicting condition trends given different budget scenarios, and prioritizing capital projects on state-owned assets as well as those owned by others.

2.1 Asset Management Objectives

The Department's asset management objectives set the direction for how assets are managed and are clearly defined and consistent among the agency's suite of plans, policies, and reports. The principal objectives for asset management are:

- **Safety and Security**. Ensure the safety and security of transportation customers.
- **Reliability**. Minimize damage to infrastructure from vehicles.
- **Preservation**. Achieve and maintain a state of good repair for the transportation assets.
- **Resilience**. Reduce the vulnerability and increase the resilience of critical infrastructure to impacts from sea level rise, extreme weather, and events.

2.2 TAM Integration and Implementation

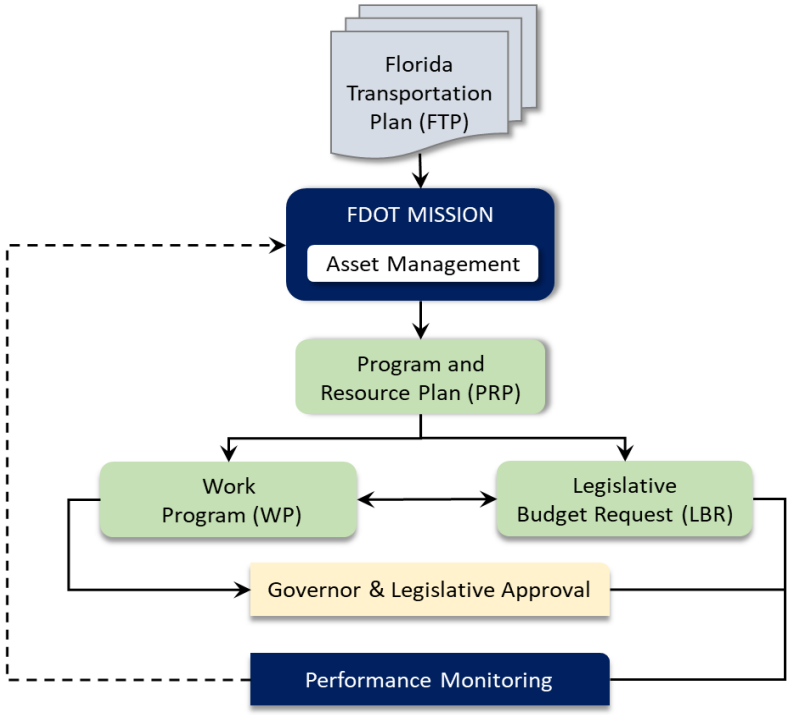
The Department's asset management practices are mission-driven, supporting the statewide goals of safety, mobility, economic development, and a quality environment and communities. The Department uses performance measures to:

- 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.

In fact, much of the Departments' asset management story is told throughout existing policy statements, plans and reports which are used to effectively manage the transportation assets.

Figure 2 provides a graphical representation of the Department's asset management process. Descriptions of key policies, plans and reports that support the asset management objectives are provided below.

Figure 2: FDOT Asset Management Process



Source: FDOT, Office of Work Program and Budget

The Florida Transportation Plan (FTP)

The FTP is the single overarching plan guiding Florida's transportation future.

The Policy Element, the core of the FTP, defines goals, objectives, and strategies to guide the Department and partners to develop and implement policies, plans, and programs to keep the transportation system safe and reliable. It also establishes the framework for expenditure of state and federal transportation funds flowing through the Department's Work Program.

Several goals in the Policy Element focus on the performance of Florida's transportation system:

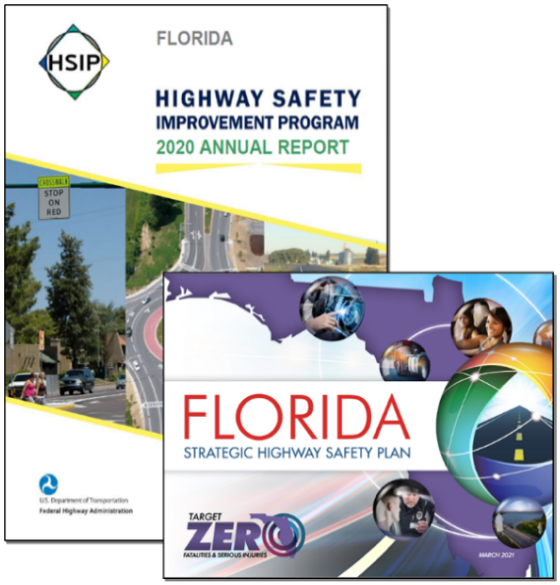
- **Safety and Security**. This is one of Florida's longstanding priorities; to ensure the safety and security of transportation customers. This goal also addresses how transportation can support broader needs. For example, response to and recovery from extreme weather events.
- **Infrastructure**. This goal focuses on maintaining existing physical infrastructure for all modes in good repair and emphasizes responsiveness to changing technology and resilience to risks.
- **Mobility**. This goal focuses on reducing delay to making the entire transportation system more efficient and reliable, including all modes as well as supporting regulatory processes.

The goals and objectives of the FTP not only set the stage for performance reporting but also provide statewide policy guidance for accomplishing the Department's mission to protect the State's transportation infrastructure investment.

The FDOT Mission

The mission of the Department is to provide a safe transportation system that ensures the mobility of people and goods, enhances economic prosperity, and preserves the quality of our environment and communities. The FDOT Mission is informed by our values, the goals and objectives of the FTP, is supported by statutes and is the beginning of the Department's transportation asset management approach.

The following documents highlight the alignment and support of the Department's asset management objectives:



Highway Safety Improvement Program (HSIP)

The HSIP is a core Federal-aid program with the purpose to achieve a significant reduction in traffic fatalities and serious injuries on all public roads. It is a main component of the Florida Strategic Highway Safety Plan (SHSP) developed in close coordination with the FTP.

The FTP establishes the goal of safety and security of the system for the transportation customers with the target of zero transportation fatalities or serious injuries for all modes. In addition to the 4E's (Engineering, Education, Enforcement, and Emergency Response) to reduce fatalities and serious injuries, the SHSP introduces Florida to a "Safe System" approach promoted by FHWA to address all elements of a safe transportation system in an integrated manner.

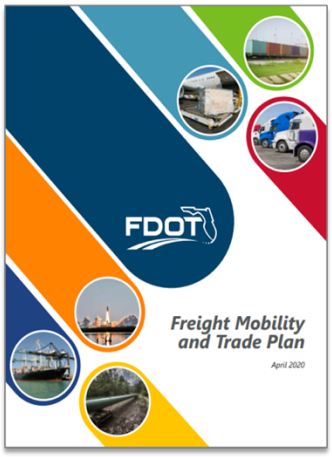
The approaches are:

- **Information Intelligence.** Quality and timely data to identify and apply strategies and countermeasures that are most likely to reduce fatalities and serious injuries. Key strategies include:
  - Promote the collection, analysis, distribution, and use of quality and timely crash data so state, regional, and local stakeholders can make appropriate and timely decisions on reducing and responding to crashes.
  - Improve data analysis tools and methodologies and strengthen business intelligence capabilities among traffic safety partners.
  - Identify high risk locations and behaviors related to fatal and serious injury crashes through a systematic approach.
- **Innovation.** Advancements in traffic management, monitoring, and systems operations can connect data from the roadway, signs, or traffic signals to vehicles; improve traffic management and flow; improve system connectivity for trips; and enhance clearance of incidents on roadways. Key strategies include:

  - Accelerate the implementation of new safety countermeasures including roadway, in-vehicle, and app-based safety systems.
  - Develop, test, and deploy emerging connected and automated vehicle technology to ensure road crashes do not lead to serious or fatal injuries.
- **Insight into Communities.** Achieving zero fatalities and serious injuries involves systemic approaches to reshape transportation systems and communities to create a safer environment and a greater emphasis on more equitable access for people and all modes of travel. Key strategies include:
  - Create safer communities through data-driven decisions that include partner and community member input, with the goal of more coordinated land use, design, planning, and traffic operations decisions that reflect the unique context, needs, and preferences of each community.
  - Promote a broader range of safe transportation choices consistent with community visions including identifying more alternatives for safe travel.
- **Investments and Policies.** Investments must be strategically prioritized to achieve the greatest gain and policies considered that support the safety of the transportation system. Key strategies include:
  - Prioritize projects that provide a demonstrated reduction in fatalities and serious injuries.
  - Pursue legislation and policies that have proven to reduce traffic fatalities and serious injuries (such as speed cameras).

Freight Mobility and Trade Plan (FMTP)

The FMTP is a comprehensive plan that identifies freight transportation facilities critical to the state's economic growth and guides multimodal freight investments in the state. The plan helps drive innovation to provide a safe, efficient, and resilient transportation system that enhances Florida's economy and communities while preserving the quality of the environment.

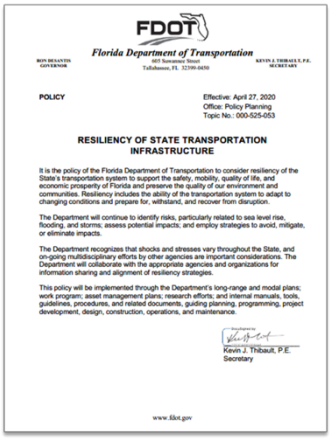


The NHS is one of the most important networks, carrying the heaviest truck traffic linking goods and commerce to and from major population centers and intermodal hubs.

The measures used to evaluate and document the condition and performance of the state's freight transportation systems and assets are consistent with the FTP goals and the TAMP objectives including state and federal performance measures.

Resilience Policy

This policy sets the direction for resilience of the state's transportation infrastructure. Resilience includes the ability of the transportation system to adapt to changing conditions and prepare for, withstand, and recover from disruption. Disruptions are events and conditions that are often characterized as shocks and stresses.


FDOT
Florida Department of Transportation

POLICY

Effective: April 27, 2020
Office: Policy Planning
Topic No.: 000-525-053

RESILIENCY OF STATE TRANSPORTATION INFRASTRUCTURE

It is the policy of the Florida Department of Transportation to consider resiliency of the State's transportation system to support the safety, mobility, quality of life, and economic prosperity of Florida and preserve the quality of our environment and communities. Resiliency includes the ability of the transportation system to adapt to changing conditions and prepare for, withstand, and recover from disruption.

The Department will continue to identify risks, particularly related to sea level rise, flooding, and storms; assess potential impacts; and employ strategies to avoid, mitigate, or eliminate impacts.

The Department recognizes that shocks and stresses vary throughout the State, and on-going multidisciplinary efforts by other agencies are important considerations. The Department will collaborate with the appropriate agencies and organizations for information sharing and alignment of resiliency strategies.

This policy will be implemented through the Department's long-range and modal plans; work program; asset management plans; research efforts; and internal manuals, tools, guidelines, procedures, and related documents, guiding planning, programming, project development, design, construction, operations, and maintenance.

Kevin J. Thibault, P.E.
Secretary

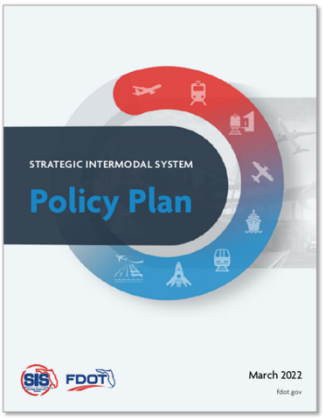
www.fdot.gov

The Department continuously identifies risks, particularly related to sea level rise, flooding, and storm events, to assess potential impact and employ strategies to avoid, mitigate, or eliminate impacts. The Department also recognizes that shocks and stresses vary throughout the state, and on-going multidisciplinary efforts by other agencies are important considerations.

Therefore, collaboration with the appropriate agencies and organizations for information sharing and alignment of resilience strategies is critical.

This policy is implemented through the FTP and modal plans, Work Program, asset management plans, research efforts, and internal manuals, tools, guidelines, procedures, and related documents.

Strategic Intermodal System (SIS) Policy Plan



The SIS Policy Plan establishes the framework for planning and managing Florida's high priority network of transportation facilities important to the state's economy and mobility.

The system is a primary focus of the Department's capacity and mobility investments to implement the goals of the FTP.

The SIS serves 70 percent of all truck traffic and 55 percent of total traffic on the SHS. It includes all Interstates and 39 percent of the total non-Interstate NHS mileage statewide.

Therefore, the focus on improving performance of the SIS goes hand-in-hand with improving the performance of the NHS.

The Program and Resource Plan (PRP)

The PRP establishes the programming framework by which the Work Program is developed.

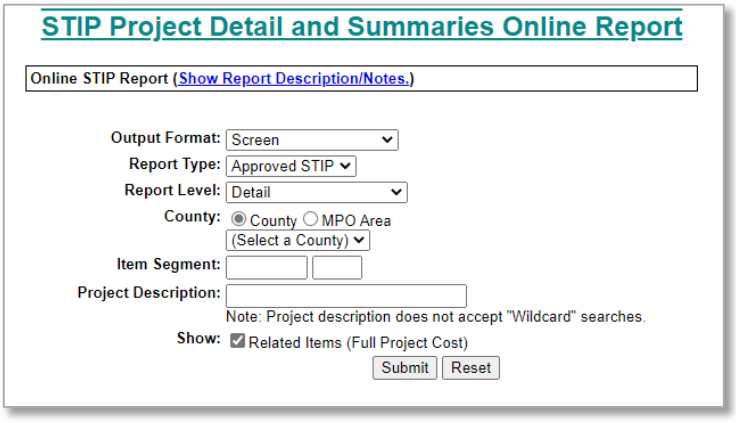
The summary document provides the 10-year planned funding levels by fiscal year for all major Department functions and to accomplish program goals and objectives within expected revenue.

The PRP contains the specific long-range goals and objectives from the FTP, as well as selected operating policies and performance measures, which guide the development of each program in the Department.

The PRP links the Work Program and the Legislative Budget Request (LBR) to accomplish the mission of the Department.

The Work Program (WP)

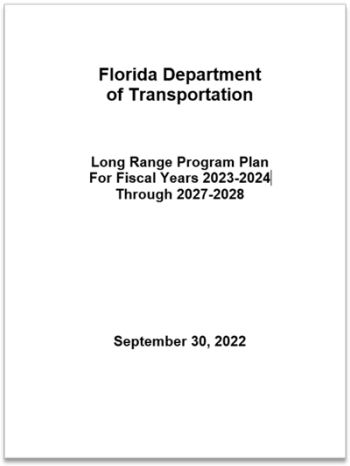
The WP is the Department's State Transportation Improvement Program (STIP) which is a federally mandated document which must include a listing of projects planned with federal participation. During the development of the WP, assessments of prior year's performance and projections for future performance are reviewed to ensure preservation related performance objectives and targets will be met as outlined in the plan and beyond.



Local projects are also incorporated into the STIP through the states Metropolitan Planning Organizations (MPOs) who work in coordination with the Department's district offices. In non-metropolitan areas, the Department programs projects in cooperation with affected local elected and appointed officials. The assessment of needs includes safety considerations and identification of highly congested roadways.

The Legislative Budget Request (LBR)

The LBR is the Department's request to the Governor and Legislature for spending authority to do the work of the agency for the next fiscal year.


Florida Department
of Transportation

Long Range Program Plan
For Fiscal Years 2023-2024
Through 2027-2028

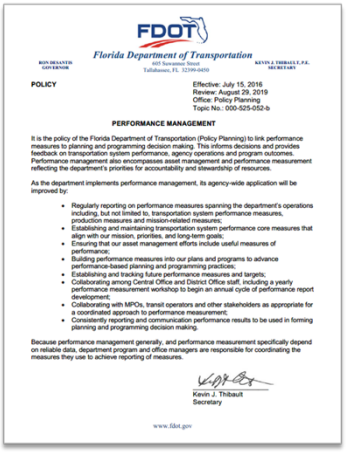
September 30, 2022

This request is informed by the Department's Long Range Program Plan (LRPP) which is developed on an annual basis as required by s. 216.013 and 216.023, Florida Statutes.

The plan provides the framework and context for the LBR and includes performance indicators for evaluating the impact of programs and agency performance. The goals of the plan align with the goals of the FTP and have a five-year planning horizon.

In addition to describing the Department's response to anticipated conditions over the five-year period of the plan, the LRPP provides an opportunity for a detailed look at more immediate programmatic and budget needs.

Performance Monitoring


FDOT
Florida Department of Transportation

POLICY

Effective: July 15, 2016
Review: August 29, 2019
Office: Policy Planning
Topic No.: 000-525-052-b

PERFORMANCE MANAGEMENT

It is the policy of the Florida Department of Transportation (Policy Planning) to link performance measures to planning and programming decision making. This informs decisions and provides feedback on transportation system performance, agency operations and program outcomes. Performance management also encompasses asset management and performance measurement reflecting the department's priorities for accountability and stewardship of resources.

As the department implements performance management, its agency-wide application will be improved by:

- Regularly reporting on performance measures spanning the department's operations including, but not limited to, transportation system performance measures, production measures and mission-related measures;
- Establishing and maintaining transportation system performance core measures that align with our mission, priorities, and long-term goals;
- Ensuring that our asset management efforts include useful measures of performance;
- Building performance measures into our plans and programs to advance performance-based planning and programming practices;
- Establishing and tracking future performance measures and targets;
- Collaborating among Central Office and District Office staff, including a yearly performance measurement workshop to begin an annual cycle of performance report development;
- Collaborating with MPOs, transit operators and other stakeholders as appropriate for a coordinated approach to performance measurement;
- Consistently reporting and communication performance results to be used in forming planning and programming decision making.

Because performance management generally, and performance measurement specifically depend on reliable data, department program and office managers are responsible for coordinating the measures they use to achieve reporting of measures.

Kevin J. Thibault
Secretary

www.fdot.gov

Performance monitoring is conducted using both qualitative and quantitative measures to show progress towards the attainment of the Department's goals and objectives.

The Department's performance management policy links performance measures to planning and programming decision making. This informs decisions and provides feedback on the transportation system performance, agency operations and program outcomes. Performance management also encompasses asset management and performance measurement reflecting both the Department's priorities for accountability and stewardship of resources and the federal performance measures directed by MAP-21/FAST Act and IIJA for the federal-aid highway and transit programs.

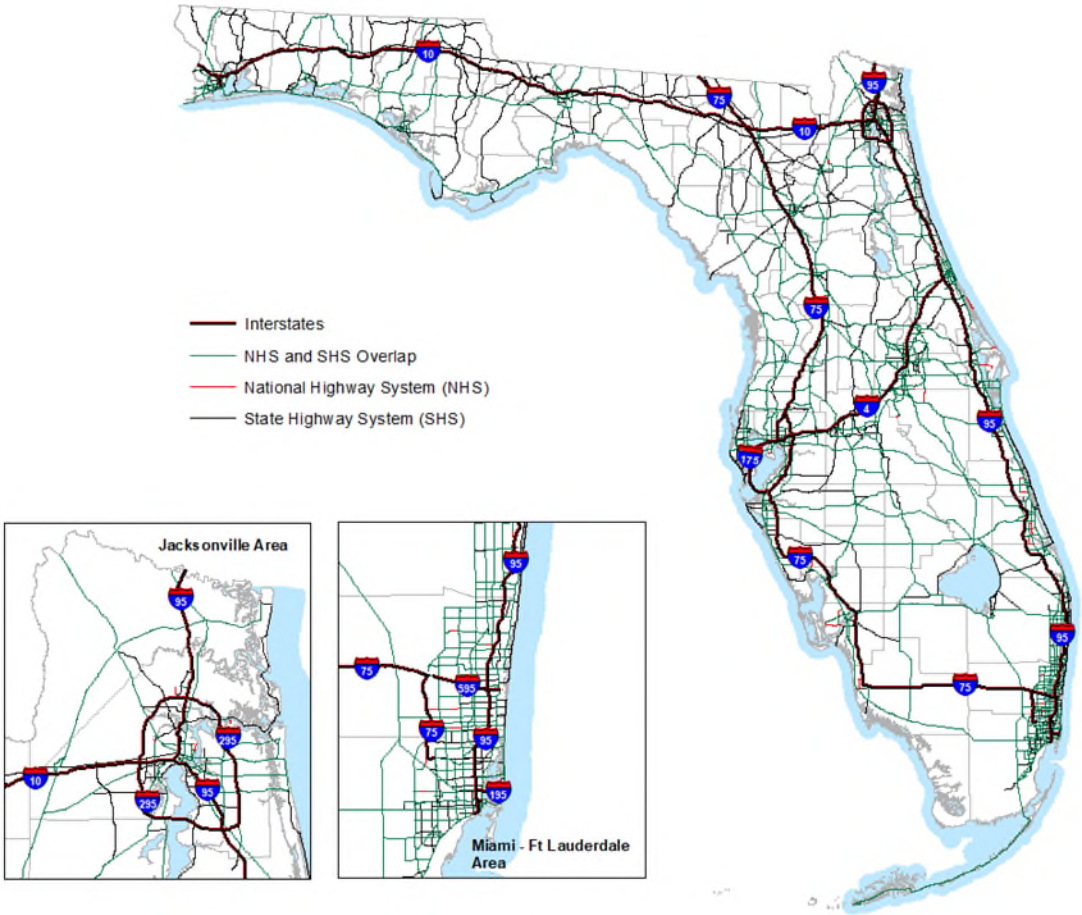
CHAPTER 3
Inventory, Measures and Conditions

The practice of developing an inventory and condition assessment sets the stage for all other phases of asset management. Therefore, to manage transportation 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?

3.1 Pavement Assets

The Department manages infrastructure on the SHS, which carries over half of all traffic within Florida and includes approximately 78 percent lane miles of the NHS.

Figure 3: State and National Highway Systems



3.1.1 Pavement Inventory

The FHWA defines the NHS as the "Interstate Highway System and other roadways critical to economy, defense, and mobility. The table below provides an inventory of the pavements on the SHS (state-owned and maintained) and the entire NHS, which includes off-SHS system pavements (local-owned and maintained). The information is presented in centerline miles (CLM), which represent the length of the road, and lane miles (LM), which represent the length and lane count for a road.

Table 2: Pavement Inventory Summary

	SHS		NHS Total		Interstate		Non-Interstate NHS	
	CLM	LM	CLM	LM	CLM	LM	CLM	LM
State	12,121	45,221	8,228	35,136	1,495	8,723	6,733	26,413
Local	0	0	585	2,490	0	0	584	2,490
Total	**12,121**	**45,221**	**8,813**	**37,626**	**1,495**	**8,723**	**7,317**	**28,903**

Note: Due to rounding totals may not agree.
Source: FDOT, Transportation Data & Analytics Office and Sate Materials Office, Pavement Condition Survey (2022).

For the non-Interstate NHS pavements that are off the SHS-system (local-owned and maintained), the following table shows mileage by jurisdiction, Metropolitan Planning Organization (MPO) or County.

Table 3: Off-System Non-Interstate NHS Pavements

FDOT District	MPO Planning Boundary or County	Non-Interstate NHS	
		CLM	LM
1	Charlotte Co-Punta Gorda MPO	0.999	4.052
	Polk TPO	0.717	1.369
	Lee County MPO	27.140	126.084
	Collier MPO	13.564	79.422
	Sarasota/Manatee MPO	16.452	77.728
	Total	**59**	**289**
2	North Florida TPO	12.934	38.159
	Braford County	3.766	7.532
	Columbia County	0.969	2.019
	Total	**18**	**48**
3	Okaloosa-Walton TPO	0.488	0.976
	Bay County TPO	2.856	5.873
	Florida-Alabama TPO	7.103	15.053
	Capital Region TPA	3.127	7.093
	Total	**14**	**29**
4	Broward MPO	61.106	321.479
	Indian River County MPO	28.614	95.058
	Martin MPO	5.289	15.292
	St Lucie TPO	36.790	137.572
	Palm Beach TPA	73.708	422.171
	Total	**206**	**992**
5	Space Coast TPO	56.074	207.569
	Ocala/Marion County TPO	8.220	32.846
	Metroplan Orlando	84.822	366.000
	River To Sea TPO	50.143	152.888
	Lake-Sumter MPO	3.990	7.980
	Heartland Regional TPO	1.647	3.294
	Total	**205**	**771**

FDOT District	MPO Planning Boundary or County	Non-Interstate NHS	
		CLM	LM
6	Miami-Dade TPO	27.544	116.836
Total		**28**	**117**
7	Hernando/Citrus MPO	4.447	9.123
	Hillsborough MPO	7.315	18.547
	Pasco County MPO	4.689	17.191
	Forward Pinellas	40.104	200.531
Total		**57**	**245**

Note: due to rounding totals may not agree.
Source: FDOT, Transportation Data & Analytics Office, 2021 HPMS submittal data.

3.1.2 Pavement Data Management

The Department conducts an annual Pavement Condition Survey (PCS) to collect data, monitor, and report on the performance and condition of pavements on the SHS per Florida Statutes 334.24, 334.046 and 335.07 and the FHWA/FDOT Federal Aid Partnership Agreement (No. 700-000-005).

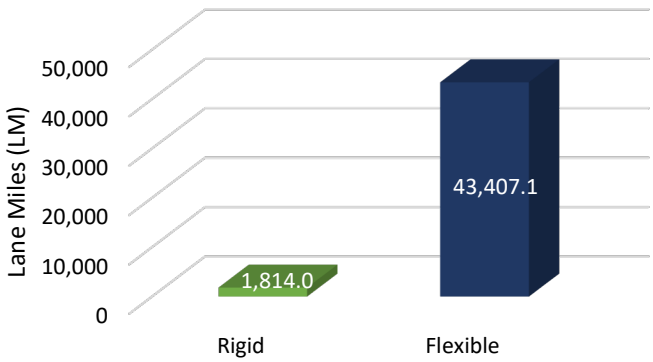
Pavement condition data is collected on parts of the NHS that are not on the SHS over a two-year period using the same equipment and processes. The SHS is comprised of 96 percent flexible (asphalt) pavement, with the remaining consisting of rigid (concrete) pavement at 4 percent. For the off-system NHS, 99.9 percent is flexible pavement and 0.1 percent is rigid.

The Department has developed handbooks for each pavement type (flexible and rigid) to guide personnel responsible for conducting the PCS and to ensure consistency among raters.

The handbooks describe the procedures for conducting a visual, mechanical, and automated condition evaluation of the pavements. They also contain the survey field workbook used by the rater in the field to record data and comments as well as any changes in mileposts or pavement type.

Figure 4: SHS Pavement Composition

In addition, as required by the federal regulations (23 CFR 490.319) the Department has developed and utilizes a Data Quality Management Plan (DQMP) to address the quality of all pavement condition data collected. The data collected meets the Highway Performance Monitoring System (HPMS) requirements and pavement performance measures established by MAP-21.



Source: FDOT, State Materials Office, Pavement Condition Survey (2022)

The plan identifies key steps and processes to be completed and monitored before, during, and after data collection. The table below provides a brief description of each section included in the plan.

Data quality personnel monitor the quality of the data, according to the methods presented in the DQMP, through acceptance testing. Any data exceptions are reported to the data collection team as soon as possible, but no later than weekly. Data quality measures include daily weekly and monthly validation checks of data collection equipment and sampling of selected roadways to ensure repeatability and reproducibility of measurements.

To document all data quality actions, the Department maintains a comprehensive log of all data issues, resolutions, and findings. This information is presented in an annual report to recommend improvements to address data issues, shortcomings, or improved technology and reporting methods for pavement data collection. The report is reviewed internally and by FHWA prior to completion.

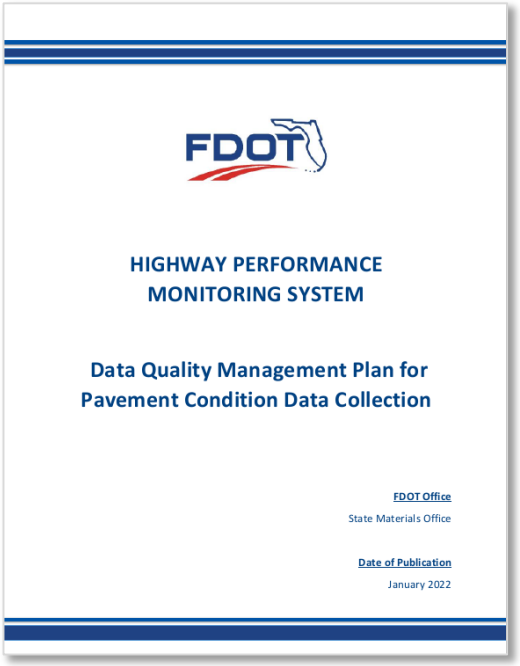


Table 4: DQMP Plan Section Descriptions

Plan Section	Description
Deliverables, Protocols, and Quality Standards	Deliverables subject to quality review, protocols used to collect the pavement data, and the quality standards used to determine a successful deliverable.
Quality Control	Quality control activities that monitor, provide feedback, and verify that the data collection deliverables meet the defined quality standards.
Acceptance	Acceptance testing that will be used to determine if quality criteria are met and the corrective actions that will be taken for any deliverables not meeting the prescribed criteria.
Quality Team Roles and Responsibilities	Related roles and responsibilities of the data collection and reporting team members.
Quality Reporting Plan	Documentation of all quality management activities including quality standards, quality control, acceptance, corrective actions, and the format of the final report.

Source: FDOT, State Materials Office, January 2022

3.1.3 Pavement State of Good Repair (SOGR)

The Department is mandated by statute, s. 334.046, to preserve the state's transportation infrastructure to specific standards. The standards for pavements, were derived over time, from the Department's use of output measures and engineering input, to evaluate the performance of the transportation system, long before outcome-based measures were required.

For purposes of the TAMP, the Department defines the SOGR as follows:

- 80 percent of pavement on the SHS by lane mile is in a SOGR. In maintaining this SOGR, it is expected that 95 percent of the NHS pavements will remain in Good or Fair condition.

Pavement condition measurements on the SHS and NHS are performed using the same equipment and methodologies. However, the methods to summarize performance data and applied thresholds are slightly different. The TAMP will focus on the measures used for the NHS and will describe the SHS measures and methods where needed for completeness.

3.1.4 Pavement Performance Measures

FDOT SHS Pavement Performance Measures

The Department's pavement management system, coupled with a thorough reporting and review process ensures systemwide performance remains at standard. The measure used to assess the condition of the pavement on the SHS is as follows:

- Percent of SHS pavement lane miles in Excellent or Good condition.

The Department's annual Pavement Condition Survey (PCS) monitors and reports on the performance and condition of pavements on the SHS. Three metrics (ride quality, rutting, and crack severity) are rated on a ten-point scale. Pavements with all three metrics rated as 6.5 or greater are considered to be in Good or Excellent condition. Pavements with one or more metrics rated below 6.5 are considered to be in Fair or Poor condition. These pavement ratings are averaged along the entirety of the segment, which can vary in length. The ratings for the SHS are shown below:

- Excellent condition: all three ratings ≥ 8.5
- Good condition: all three ratings = 6.5 to 8.4
- Fair condition: one or more ratings ≤ 6.4
- Poor condition: one or more ratings ≤ 4.4

Table 5: SHS Pavement Condition Rating Criteria

Metric	Non-Deficient	Deficient
Ride Rating	≥ 6.5 (IRI ≤ 125 in/mile)	< 6.5 (IRI > 125)
Rut Rating	≥ 6.5 (Rut ≤ 3/8 in)	< 6.5 (Rut > 3/8 in)
Crack Rating	≥ 6.5	< 6.5

FHWA NHS Pavement Performance Measures

The FHWA regulations (23 CFR 490 Subpart C) define the national performance management measures for assessing the condition and reporting on targets established for the pavements on the NHS. The measures are:

- Percent of Interstate pavement by lane mile in Good condition.
- Percent of Interstate pavement by lane mile in Poor condition.
- Percent of non-Interstate NHS pavement by lane mile in Good condition.
- Percent of non-Interstate NHS pavement by lane mile in Poor condition.

Table 6: FHWA NHS Pavement Condition Rating Criteria

Metric		Good	Fair	Poor
IRI (in/mile)		< 95	95 – 170	> 170
Rutting (in)		< 0.20	0.20 – 0.40	> 0.40
Cracking (%)	Asphalt	< 5	5 – 20	> 20
	JPCP	< 5	5 – 15	> 15
Faulting (in)		< 0.10	0.10 – 0.15	> 0.15

The overall condition of each 0.1-mile segment of pavement on the NHS pavements are based on the ratings for roughness (IRI), rutting, cracking percent, and faulting. The segment of pavement is considered to be in Good condition if all three metrics (IRI, rutting or faulting, and cracking percent) meet the criteria for Good. The segment is considered to be in Poor condition if two of the three metrics are rated to be Poor; and Fair if the segment does not meet the criteria for either Good or Poor condition.

3.1.5 Pavement Targets

The table below presents the targets for the pavement assets. The Department's target for the SHS is mandated by statute (s., 334.046). In accordance with the federal regulations, the Department established statewide targets in coordination with the state's MPOs, to the extent practicable, for each FHWA pavement performance measure. The condition/performance of the NHS pavement assets will be assessed by FHWA based on these targets.

Table 7: Pavement Targets

Asset	FDOT Performance Measure	Target	FHWA Performance Measure	2023 Target	2025 Target
Pavement	Percent of SHS pavement lane miles in Excellent or Good condition.	80.0%	Percent of Interstate pavement by lane mile in Good condition.	60.0%	60.0%
			Percent of Interstate pavement by lane mile in Poor condition.	5.0%	5.0%
			Percent of non-Interstate NHS pavement by lane mile in Good condition.	40.0%	40.0%
			Percent of non-Interstate NHS pavement by lane mile in Poor condition.	5.0%	5.0%

Source: FDOT, State Materials Office

The targets for the FHWA pavement condition performance measures were initially established after review and analysis of NHS pavement condition survey data collected during 2015 through 2017. Data during this period was collected using methodologies that were a significant departure from the ones required in federal regulation. Interstate pavement condition data has been collected since 2018 using the federally required methodologies and summarized to meet both Department and FHWA rating systems. Non-Interstate NHS pavement data continued to be collected with older technology until 2021.

Table 8 shows the percent lane miles expected to meet the Good and Poor rating criteria defined by the FHWA for every lane mile rated by the Department criteria. This relationship was developed using the Interstate data collected using both rating criteria during 2018 through 2021.

Table 8: FDOT and FHWA Rating Relationship (% Lane Miles)

Department Rating Criteria	Federal Rating Criteria			
	Good		Poor	
	Interstate	Non-Interstate	Interstate	Non-Interstate
Excellent	84.6	85.8	0.0	0.0
Good	60.8	52.6	0.1	0.3
Fair	28.0	11.6	3.3	2.5
Poor	17.5	17.7	9.0	6.3

As a demonstration of how the above relationship can be used, for every 100-lane miles of Interstate pavement rated as Excellent using the Department criteria, one can expect 84.6 lane miles of Interstate pavement rated as Good and zero lane miles rated as Poor using the FHWA criteria. As described earlier, only one year of data is available using the federally required methodology for non-Interstate pavements. In addition, the Department's Crack Rating score is a visual assessment which includes raveling and patching.

Therefore, in consideration of the differences in data collection requirements used by the Department and those federally mandated, no change has been made for the for the Interstate and non-Interstate NHS pavement condition targets. It is anticipated that more direct and robust relationships and forecasting methods for FHWA metrics will be established as more data is collected and as the Department fully transitions to the new pavement condition measurement technology.

Note: per the regulations (23 CFR 490.13) no more than 5 percent of Interstate pavement can be in Poor condition. There are no minimum condition requirements for the non-Interstate NHS pavements.

3.1.6 Pavement Condition

NHS Pavement Condition Based on FHWA Performance Measures

FHWA determines the overall condition of the NHS pavements based on ratings for roughness (IRI), cracking percent, rutting, and faulting. Data is summarized in 0.1-mile segments and as mentioned before, it is considered to be in Good condition if all three metrics (IRI, rutting or faulting, and cracking percent) meet the criteria for good. The segment is considered to be in Poor condition if two of the three metrics are rated to be Poor; and it is considered to be Fair if the segment does not meet the criteria for either Good or Poor condition.

Ride Quality Rating:

International Roughness Index (IRI) is the rating system required by FHWA in annual highway inventory summaries. Ride quality is what the motorist experiences (i.e., smoothness of the ride). This index is derived from a pavement surface longitudinal profile as measured using vehicle-based equipment (Figure 6) operating at highway speed.

Figure 5: Ride Quality

Figure 6: Data Survey Vehicle

The IRI value is generated using a standard algorithm (AASHTO M328-14) and is reported in units of inches per mile (in/mi) and is scaled with zero (0) being the smoothest and the upper limit being infinite. Higher values indicate worse ride quality. As shown in Table 6, FHWA considers a segment to be in good condition if the IRI is less than 95 in/mi, fair if it is between 95 and 170 in/mi, and poor if the IRI is greater than 170 in/mi.

Rut Rating:

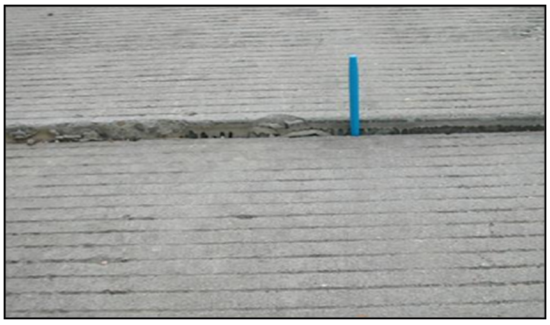
Figure 7: Rutting

According to the HPMS Field Manual, a rut is defined as longitudinal surface depressions in the asphalt pavement derived from measurements of a profile transverse to the path of travel on a highway lane. The same vehicle-based equipment used for Ride Quality measurements also measures rutting for flexible pavements and reports rut depth in compliance with AASHTO R87 as required by FHWA.

As shown in Table 6, FHWA considers a segment to be in good condition if the rutting is less than 0.2 inches, fair if it is between 0.2 and 0.4 inches, and poor if it is greater than 0.4 inches.

Fault Rating:

Figure 8: Faulting



Source HPMS Field Manual

Instead of rutting, FHWA requires faulting for rigid pavements. Faulting is defined as the differential vertical displacement of adjacent slabs at joints creating a "step" deformation in the pavement surface as can be seen on Figure 8. Likewise, FHWA considers a segment to be in good condition if the faulting is less than 0.10 inches, fair if it is between 0.10 and 0.15 inches, and poor if it is greater than 0.15 inches.

Crack Rating:

Figure 9: Cracking

Crack severity, or "cracking", refers to the deterioration of the pavement, which leads to loss of smoothness and ultimately, deterioration of the road base.

For flexible (asphalt) pavement, FHWA defines percent cracking as the percentage of the total area exhibiting visible fatigue type cracking in the wheelpath in each section.

For rigid (concrete) pavement, FHWA defines percent cracking as the percentage of slabs within the section containing one or more transverse cracks extending for at least one-half the lane width, divided by the total number of slabs in the section.

As shown in Table 6, FHWA considers a segment to be in Good condition if the cracking percent is less than 5 percent, Fair if it is between 5 and 20 percent (15 percent for rigid pavements), and Poor if the cracking percent is greater than 20 percent (15 percent for rigid pavements).

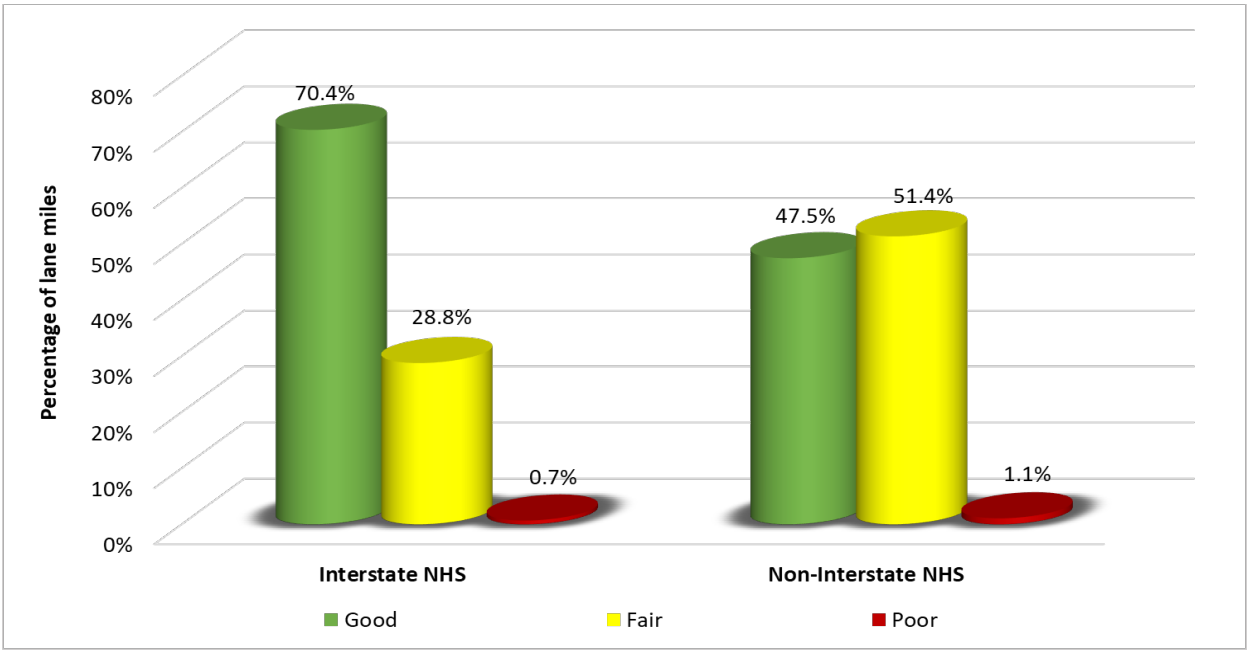
NHS Pavement Condition Survey Results

The figures below present the condition of the entire NHS pavements based on the FHWA performance measures.

Data collected on Interstate and non-Interstate pavements in 2021, using the approaches and technologies mandated in the regulations, were used to generate the values. Non-Interstate data prior to 2021 was collected using traditional technology but is still shown as a reference. Additionally, off-SHS non-Interstate NHS data is typically collected in a two-year cycle. Non-Interstate data was not collected in 2020, but all required pavements were surveyed in 2021.

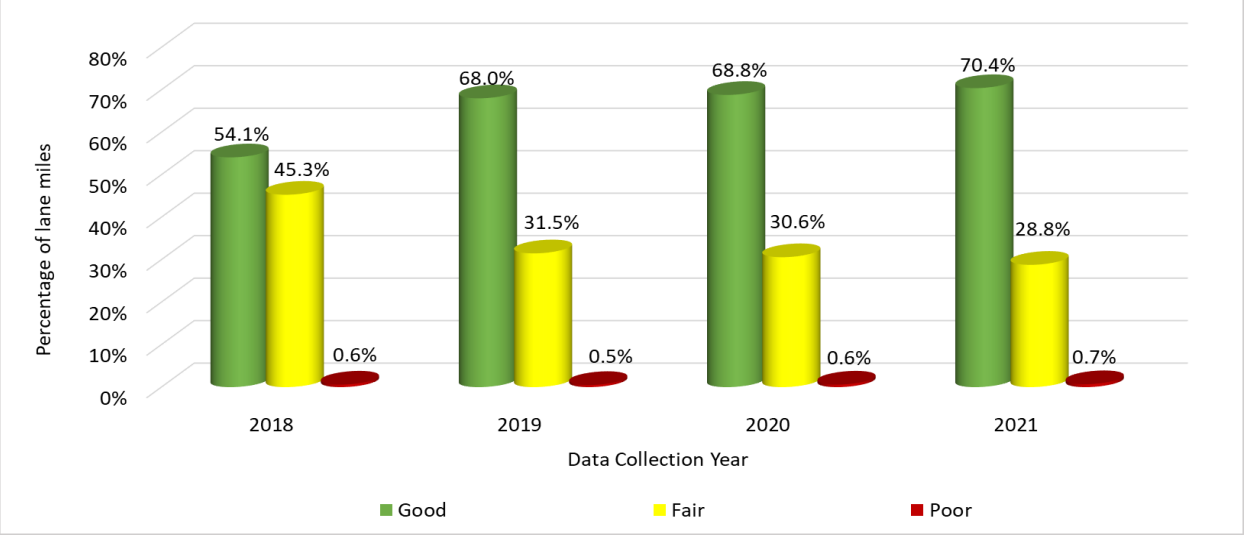
Overall, pavements on the NHS are in Good and Fair condition with relatively few lane miles in Poor condition.

Figure 10: NHS 2021 Pavement Condition Survey Results



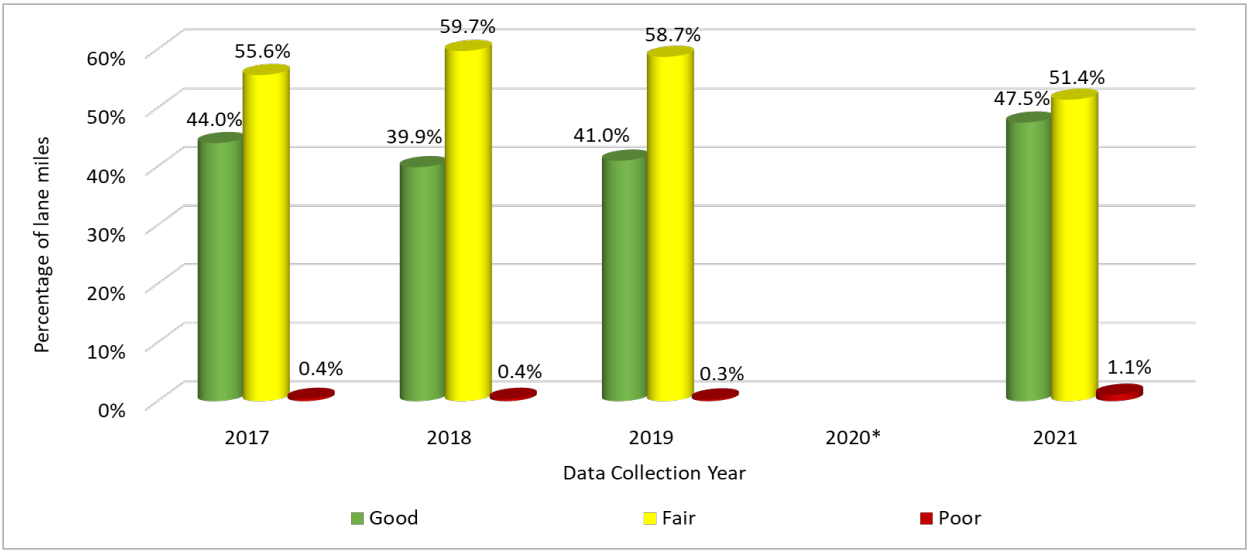
Source: FDOT, State Materials Office, Pavement Condition Survey (2021).

Figure 11: NHS Historic Interstate Condition



Source: FDOT, State Materials Office, Pavement Condition Survey (2021).

Figure 12: NHS Historical Non-Interstate Condition



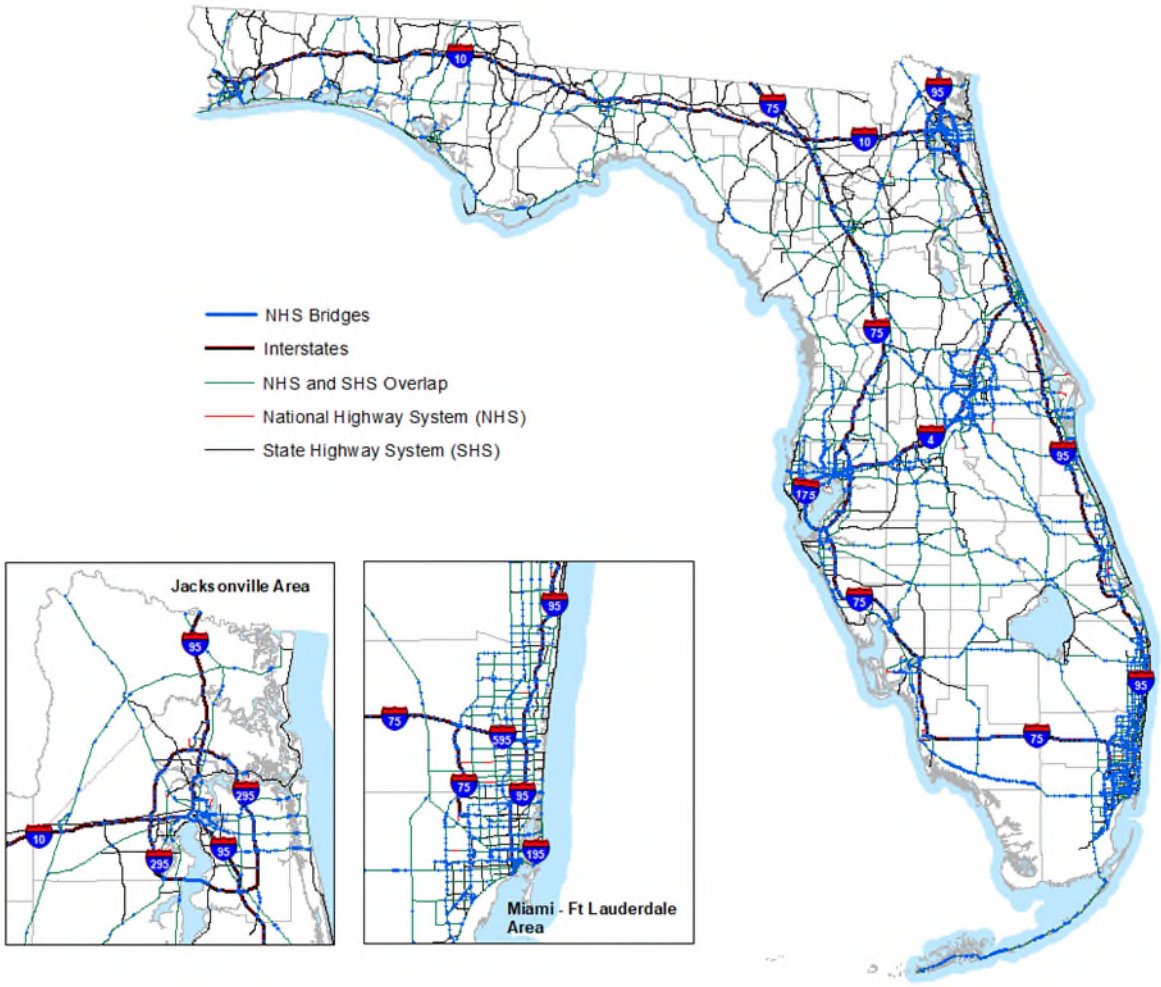
**Note: off-SHS non-Interstate NHS data is typically collected in a two-year cycle. Non-Interstate data was not collected in 2020 but all required pavements were surveyed in 2021.*

Source: FDOT, State Materials Office, Pavement Condition Survey (2021).

3.2 Bridge Assets

The Department is responsible for inspecting and rating most of the bridges in Florida. Currently, there are approximately 12,500 bridge-structures in the Department's Bridge Management System (BMS); 5,700 of which are NHS bridge-structures.

Figure 13: NHS Bridge Assets



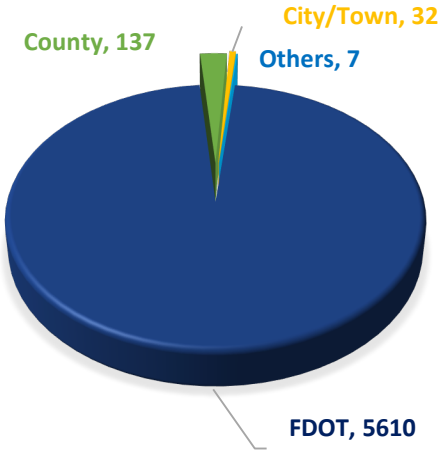
Source: FDOT, Transportation Data & Analytics Office. October 2022

3.2.1 Bridge Inventory

The FHWA defines NHS bridges as "NHS bridges carrying the NHS." The table below provides an inventory of the state's bridge assets. The largest group includes all bridges maintained by the Department, followed by those maintained by county governments.

The Department hires consulting engineers to inspect and rate the county and city/town bridges while the responsibility for maintaining the bridges remains with the individual county government and city/town. Maintenance of the remainder of the inventory is done by state agencies other than the Department, other local agencies, the federal government, railroads, private citizens, and organizations.

Figure 14: NHS Bridge Inventory by Maintenance Responsibility



Source: FDOT, Office of Maintenance, Structures Operations. Bridge Inventory 2022 – Annual Report

The bridge superstructure is the most common method used by bridge engineers to categorize bridges. Superstructures are the unsupported component of a bridge that carries the intended loads across the span opening. Superstructure types are generally described by their structural configuration along with their material of construction. As a result, superstructure types can accurately define a bridge's service life, performance, and maintainability.

For ease of understanding, the superstructure and material types are presented in twelve specific categories in the table below, with a thirteenth (other) category for unusual and seldom used superstructure types.

Table 9: NHS Bridge Inventory by Superstructure Type

	FDOT	County	City / Town	Other State	Other Local	Federal	Others	Total
RC Slab	638	26	4	0	0	0	0	668
PSC Slab	216	34	7	0	0	0	0	257
RC Beam	57	0	0	0	0	0	0	57
PSC Beam	3,052	50	11	0	0	0	2	3,115
Steel Beam	537	4	2	0	0	0	0	543
Timber Beam	0	0	0	0	0	0	0	0
RC Box	3	0	0	0	0	0	0	3
PSC Box	129	0	0	0	0	0	0	129
Steel Box	132	1	0	0	0	0	0	133
Truss	3	1	0	3	0	0	0	7
Movable	34	2	1	0	0	0	0	37
Culvert	805	19	3	2	0	0	0	829
Other	4	0	4	0	0	0	0	8
Total	**5,610**	**137**	**32**	**5**	**0**	**0**	**2**	**5,786**

Source: FDOT, Office of Maintenance, Structures Operations.

Slabs

These superstructure types are characterized by having a generally constant, rectangular cross-section using concrete as the main building component. They include both reinforced concrete slabs and prestressed concrete slabs.

Beams and Girders

Most of the bridges in Florida can be considered as beam or girder ridges. These superstructure types are composed of either singular or groups of individual linear elements positioned either in the direction of traffic or transverse to the direction of traffic. The categories used for this type include reinforced concrete beam, prestressed concrete beam, steel beam, timber beam, reinforced concrete box, prestressed concrete box, steel box, and movable spans.

Trusses

The members of a truss work in either tension or compression. Bending is assumed not to occur in this type of bridge superstructure. The external loads from the deck and traffic are applied only at the joints of a truss.

Culverts

A culvert is typically a buried drainage structure. When the overall opening of the culvert is at least twenty feet it is considered a bridge by the federal government, and hence is treated like a bridge for inspection and maintenance purposes.

Movables

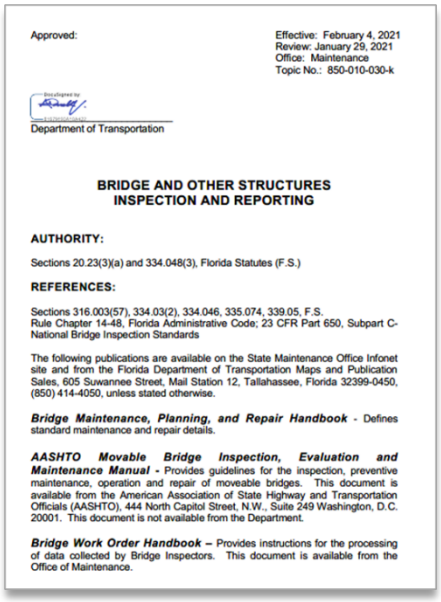
This general classification includes the specific superstructure type describing the way a bridge moves. For example, bascule, swing, or lift bridge. The movable bridge can either sand alone or include fixed approach spans.

3.2.2 Bridge Data Management

The Department collects inventory and condition data for all state and local-owned bridge assets.

The Department's Bridge and Other Structures Reporting Procedure establishes inspection and reporting requirements for bridges and other structures under the responsibility of the Department. The Structures Inspection Program identifies bridge deficiencies and other deficiencies that are critical enough to endanger public safety. Non-critical deficiencies are also identified.

By correcting non-critical deficiencies, the structure's service life is lengthened, total maintenance costs are reduced, and the public receives a better return on their investment.



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Office: Maintenance
Topic No.: 850-010-030-k

Department of Transportation

BRIDGE AND OTHER STRUCTURES INSPECTION AND REPORTING

AUTHORITY:

Sections 20.23(3)(a) and 334.048(3), Florida Statutes (F.S.)

REFERENCES:

Sections 316.003(57), 334.03(2), 334.046, 335.074, 339.05, F.S.
Rule Chapter 14-48, Florida Administrative Code; 23 CFR Part 650, Subpart C-National Bridge Inspection Standards

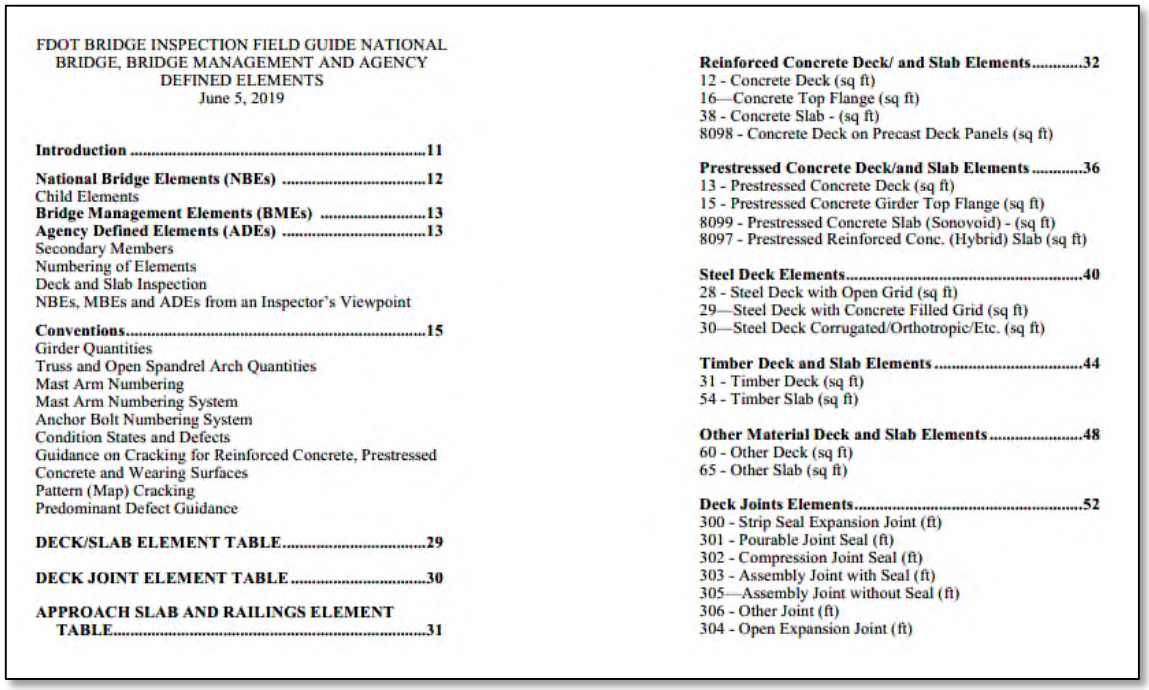
The following publications are available on the State Maintenance Office Infonet site and from the Florida Department of Transportation Maps and Publication Sales, 605 Suwannee Street, Mail Station 12, Tallahassee, Florida 32399-0450, (850) 414-4050, unless stated otherwise.

Bridge Maintenance, Planning, and Repair Handbook - Defines standard maintenance and repair details.

AASHTO Movable Bridge Inspection, Evaluation and Maintenance Manual - Provides guidelines for the inspection, preventive maintenance, operation and repair of moveable bridges. This document is available from the American Association of State Highway and Transportation Officials (AASHTO), 444 North Capitol Street, N.W., Suite 249 Washington, D.C. 20001. This document is not available from the Department.

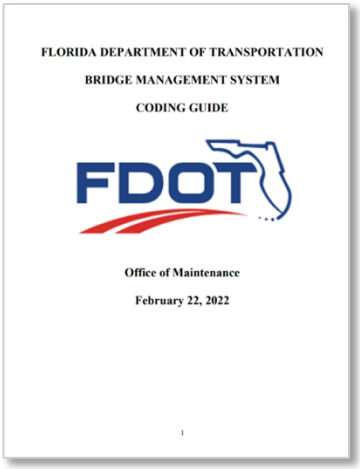
Bridge Work Order Handbook – Provides instructions for the processing of data collected by Bridge Inspectors. This document is available from the Office of Maintenance.

The Department's Bridge Inspection Field Guide provides guidance for inspectors in selecting elements and assigning quantities to condition states for selected elements.



FDOT BRIDGE INSPECTION FIELD GUIDE NATIONAL BRIDGE, BRIDGE MANAGEMENT AND AGENCY DEFINED ELEMENTS
June 5, 2019

The element listing includes a description, a commentary, condition state language, and a unit of measurement for each element. The element descriptions also consider material composition. Protective systems for the elements are generally separate elements but are assigned to specific elements.



FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
CODING GUIDE

Office of Maintenance
February 22, 2022

The Departments Bridge Management System Coding Guide provides instructions for coding data items required by FHWA for the NBI and non-NBI items for the Department's bridge management system.

Updates to the data occurs daily as a result of bridge inspections. The districts also perform Quality Assurance (QA) reviews to ensure the integrity of the data and QAs for bridge inspection are performed yearly for each District by the Central Office.
Therefore, depending on the inspection cycles and QA checks, data from the Department's bridge management system database will vary over time.

3.2.3 Bridge State of Good Repair (SOGR)

The Department is mandated by statute, s. 334.046, to preserve the state's transportation infrastructure to specific standards. The standards for bridges were derived over time, from the Department's use of output measures and engineering input, to evaluate the performance of the transportation system, long before outcome-based measures were required.

For purposes of the TAMP, the Department defines the SOGR as follows:

- 90 percent of bridges on the SHS by number of bridges is in a SOGR

The TAMP will focus on the measures used for the NHS and will describe the SHS measures and methods where needed for completeness.

3.2.4 Bridge Performance Measures

FDOT SHS Bridge Performance Measures

The Department's bridge management software and bridge inspection program help to ensure bridge conditions remain at standard. The measure used to assess the condition of bridges is:

- Percent of SHS bridges by number of bridges with condition rating of Excellent or Good.

The Department uses the National Bridge Inventory (NBI) rating as its primary performance measure for the condition of bridges (see Table 10). Condition is determined by inspection of a bridge's primary elements (deck, superstructure, and substructure), and is based on the lowest rating of these items on a scale ranging from 0-9. The Department considers bridges to be in Excellent condition if the NBI rating is 9 or 8; Good condition if the NBI rating is 7 or 6; Fair condition if the NBI rating is 5; and Poor condition if the NBI rating is 4 or less.

Table 10: FDOT Bridge Condition Rating Criteria

Excellent		Good		Fair	Poor			
9	8	7	6	5	4	3	2	1

FHWA NHS Bridge Performance Measures

The FHWA regulations (23 CFR 490 Subpart D) define the national performance management measures for assessing the condition and reporting on the targets established for bridges on the NHS. The measures are:

- Percentage of NHS bridges by deck area in Good condition.
- Percentage of NHS bridges by deck area in Poor condition.

The FHWA uses the NBI rating as its primary performance measure for the condition of bridges. However, as shown in the table below, the rating criteria varies from what is used by the Department. The FHWA considers bridges to be in Good condition if the NBI rating is greater than or equal to 7; Fair condition if the NBI rating is 6 or 5; and Poor condition if the NBI rating is 4 or less.

Table 11: FHWA NBI Condition Rating Criteria

Good			Fair		Poor			
9	8	7	6	5	4	3	2	1

3.2.5 Bridge Targets

The table below shows the targets for the bridge assets. The Department's target for the SHS is mandated by statute (s., 334.046) and in accordance with the federal regulations, the Department established statewide targets in coordination with the state's MPOs, to the extent practicable, for each NHS pavement and bridge performance measure. The condition/performance of the NHS bridge assets will be assessed by FHWA based on these targets.

The targets for FHWA NHS bridge condition performance measures were established after review and analysis of the last five years of the Department's bridge data collected through the annual bridge inventory process.

Table 12: FHWA NHS Bridge Targets

Asset	FDOT Performance Measure	Target	FHWA Performance Measure	2023 Target	2025 Target
Bridge	Percent of SHS bridges by number of bridges in Excellent or Good condition.	90.0%	Percent of NHS bridges by deck area in Good condition.	50.0%	50.0%
			Percent of NHS bridges by deck area in Poor condition.	10.0%	10.0%

Source: Office of Maintenance, Structures Operations.

As shown in Table 11, FHWA considers bridges to be in Good condition if the NBI rating is 7 or more. In contrast, the Department considers bridges to be in Good condition if the NBI rating is 6 or 7.

The Department's internal process is to have no more than 10 percent of its bridges in Poor condition. The Department does not program any significant bridge work for bridges with a NBI rating of 5 or more but does actively perform routine maintenance and repairs. An evaluation of historical bridge data over the last few years show the condition of bridges on the NHS is slowly moving from Good condition to Fair condition (NBI 5 or 6 per FHWA definition), which is to be expected as the Department's bridge inventory is slowly growing older. However, the Department programs bridges for repair or replacement work to begin within 6 years of reaching deficient status (NBI 4) or becoming posted.

Recently the Department has formed a Bridge Performance Group consisting of FDOT Personnel and Industry to consider how data at the element level can be used to track bridge condition and the effectiveness of element level repairs over time. The goal is to determine when repairs are needed, and which repairs are the most effective to extend the bridge service life. This will be an on-going effort to develop, monitor, and draw conclusions. It is anticipated that as data is collected, deterioration models will be refined, which should lead to long term cost savings and longer lasting bridges over time.

The Department identifies bridge maintenance needs during bridge inspections, and programs bridge maintenance and repair work to address these needs. Bridges are programmed for rehabilitation or replacement to begin within 6-years of being identified as being in Poor condition. The Department plans to continue with these internal processes, meet targets as established herein per FHWA criteria, and use the same targets for the 2 and 4-year cycle.

3.2.6 Bridge Condition

The performance of maintenance and repair activities in a timely manner keeps bridges in good condition, avoids more expensive repair or replacement costs in the future, and ensures that the bridges are safe for use by the public.

The identification of bridge work needs generally begins with the bridge inspection. The Department's program is large in scope, well organized, and professionally managed. The guidelines for inspection condition rating have evolved to increase uniformity and consistency of inspections. The data collected from bridge inspections is critical input into a variety of analyses and decisions within the Department to determine the most cost-effective mix of preventive maintenance, routine maintenance, repair, rehabilitation, replacement, and other actions over the life of the bridges.

NHS Bridge Condition Based on FHWA Performance Measures

The FHWA uses a rating criterion of Good, Fair and Poor and the condition of the bridge is calculated using deck area. As shown in Table 11 bridges are considered to be in Good condition if the NBI rating is greater than or equal to 7; Fair condition if the NBI rating is 6 or 5; and Poor condition if the NBI rating is 4 or less.

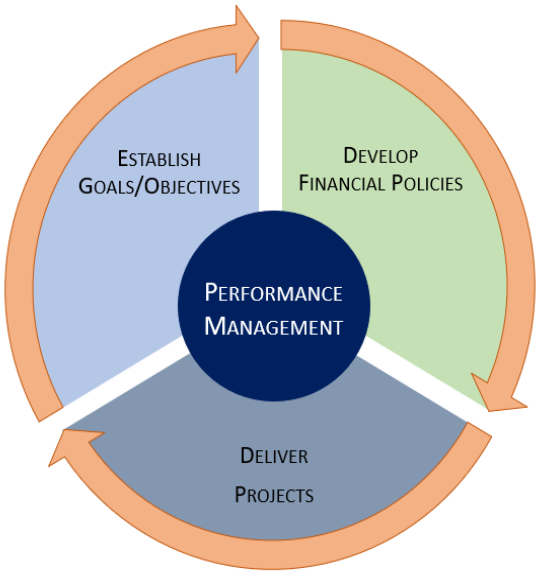
Table 13: NHS Structural Condition by Maintenance Responsibility

	FDOT	County	City / Town	Other State	Other Local	Federal	Others	Total
Good	3,894	99	22	4	0	0	2	4,021
Fair	1,681	36	10	1	0	0	0	1,728
Poor	35	2	0	0	0	0	0	37
Total	**5,610**	**137**	**32**	**5**	**0**	**0**	**2**	**5,786**

Source: FDOT, Office of Maintenance, Structures Operations Bridge Inventory 2022 – Annual Report

3.3 Communication and Reporting

Because Florida's transportation system needs exceed available funding, it is the policy of the Department to link performance measures to investment policies and project programming decision-making.



Performance measures help to inform decisions and provide feedback on transportation system performance, agency operations and program outcomes. They also reflect the Department's priorities for accountability and help ensure resources are invested in the most strategic, effective, and efficient ways possible.

At the strategic level, performance measures help to establish and inform goals, objectives, and strategies as well as to monitor the achievement of the Department's mission.

Performance measures also communicate progress toward achieving goals in transportation plans and programs such as the Florida Transportation Plan (FTP), the Strategic Highway Safety Plan (SHSP), the Freight Mobility and Trade Plan (FMTP), and the Transportation Asset Management Plan (TAMP).

At the decision-making level, performance measures are used to inform and assess the financial policies for allocating funds among programs such as safety, highway preservation, operations and maintenance, system expansion, and public transportation.

At the project delivery level, performance measures help to monitor the efficiency and effectiveness of projects and services in the Five-Year Work Program (WP) and in the capital plans of other agencies and partners. The measures also help identify organizational and operational improvements.

Information on progress towards achievement of established targets for state as well as federal performance measures for Florida's transportation system are shared with agency stakeholders (both internal and external) by various methods, including through the Department's Performance Website.

The state performance measures are linked to the Department's multimodal performance report, The Source Book, which is published annually and is the Department's trusted source of transportation system safety, mobility performance, and innovation trends. It is an on-line compendium of multimodal trends and measures that has expanded to include system preservation, economic indicators, and emerging transportation technologies. The Source Book provides mobility performance measures at a segment level. The federal measures are presented using interactive dashboards and include both the statewide and MPO targets for each of the federal performance measures.

3.3.1 Coordination with Other Entities

Coordination with other stakeholders is essential to meeting the Department's asset management objectives and targets.

3.3.1.1 Metropolitan Planning Organizations (MPOs)

The Department established statewide targets in coordination with the state's Metropolitan Planning Organizations (MPOs), to the extent practicable, for the NHS pavement and bridge performance measures.

As part of this process, the Department and the Metropolitan Planning Organization Advisory Council (MPOAC) developed the Transportation Performance Measures Consensus Planning Document. This document describes the general processes through which the Department, the MPOs, and providers of public transportation in MPO planning areas will cooperatively develop and share information related to transportation performance management.

Each individual MPO adopted the Consensus Planning Document by incorporation in their annual Transportation Improvement Program (TIP) or by separate board action as documented in a resolution or meeting minutes, which also serves as documentation of agreement by the provider(s) of public transportation in the MPO planning area to carry out their roles and responsibilities as described in the document.

The Department and MPOAC also developed model language for inclusion of performance measures and targets in the MPO Long-Range Transportation Plan (LRTP) and TIP. The document is consistent with the Consensus Planning Document and the MPO may incorporate the model language and adapt it as needed for the update of their LRTP and TIP.

The Department also developed a Metropolitan Planning Partner Site for use by the MPOs and Federal Partners to not only assist with the transportation performance measures, but also provides an easy way to make information and resources available to external agencies.

3.3.1.2 Federal Lands Management Agencies

The Eastern Federal Lands Highway Division (EFLHD) Transportation Improvement Program is an essential component of the Federal Lands Planning Program. It is developed cooperatively between Federal Lands Highway Division offices and the Federal Land Management Agencies (FLMA) and provides a list of transportation improvements for a four-year period among the primary programs administered by the Office of Federal Lands Highway, the Federal Lands Transportation Program, and the Federal Lands Access Program.

The projects are considered a part of Florida's STIP and are included in the STIP by reference, and may be found at the following link: Eastern Federal Lands Highway Division (EFLHD) TIP. Projects on this list that are in a MPO area are included in the local MPO TIP in which they are geographically located.

CHAPTER 4
Lifecycle Planning (LCP)

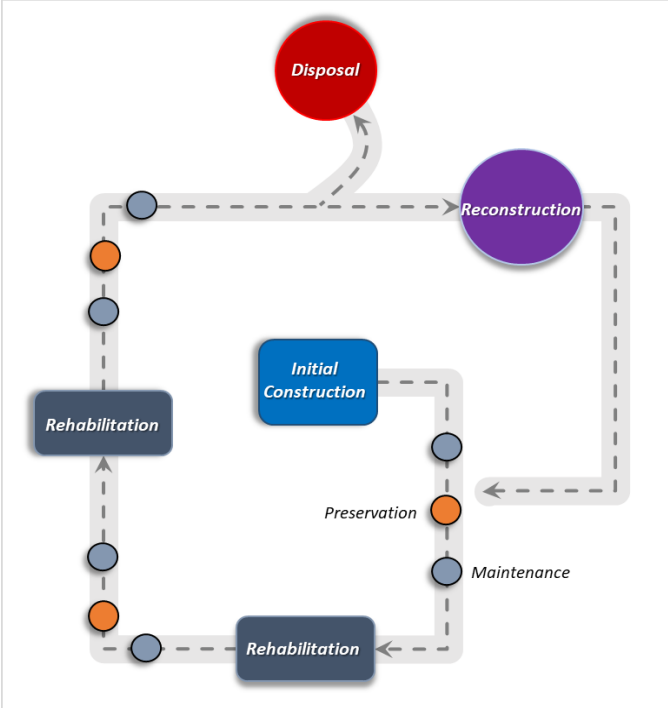
The overriding principle in project selection is meeting established performance standards. The Department has a well-established philosophy, codified in statute, to direct funding in order to maintain the pavement and bridge assets to standards. The Department also determines the condition of NHS assets off the SHS and coordinates strategies with local governments. The life cycle approaches described here supplement that decision making process and ensure that Florida's pavements and bridges remain at or above the established standards.

4.1 Overview

Lifecycle cost (LCC) is the cost of managing an asset class or asset sub-group for its whole life, from initial construction to its replacement. Lifecycle planning (LCP) is a process to estimate the cost of managing an asset class, or asset sub-group over its whole life with consideration for minimizing cost while preserving or improving condition (23 CFR 515.5).

Typically, LCC analysis is conducted at the project-level to compare two or more alternatives for a single project while LCP analysis is conducted at the network level for all the assets in the system or subset of the system.

Figure 15: Stages of an Asset Life Cycle



The LCP analysis helps to identify projects and treatments at each stage of an asset's life, that offer the best value investment for the asset to achieve and sustain the desired SOGR at a minimum practical cost.

The analysis is usually conducted using available tools, such as pavement and bridge management systems, to analyze different asset scenarios and investment strategies.

Per the federal requirements (23 CFR 515.7), a life cycle planning process at a minimum will include the following:

1. The State DOT targets for asset condition for each asset class or asset sub-group.
2. Identification of deterioration models for each asset class or asset sub-group, provided that identification of deterioration models for assets other than NHS pavements and bridges is optional.
3. Potential work types across the whole life of each asset class or asset sub-group with their relative unit costs.
4. A strategy for managing each asset class or asset sub-group by minimizing its lifecycle costs, while achieving the State DOT targets for asset condition for NHS pavements and bridge under 23 U.S.C. 150(d).

4.2 Pavements

Pavement in Florida is 96 percent flexible (asphalt) pavement that is mostly an even split between open- and dense-graded asphalt types.

- **Open-graded asphalt** is a very porous mix which allows surface water to drain away.
- **Dense-graded asphalt** is relatively impermeable.

Regardless of type, the Department measures the pavement condition on the SHS and NHS to ensure they not only meet Department SOGR standards but also the established targets for the FHWA pavement performance measures (see Chapter 3). While the Department is responsible for managing the pavements on the SHS, the Department shares pavement condition measures with local authorities and coordinates performance targets and rehabilitation strategies. All pavement condition data on the SHS and NHS is collected using the same equipment and methodologies.

Pavement Lifecycle Cost Assumptions

The Department currently designs pavements with a standard design life of 20 years. This allows for statewide consistency in pavement life, although there have been expected differences between pavements in the various regions of the State.

For economic valuation, the Department assumes the following:

- A discount rate of 3.5 percent on all pavement treatments.
- A construction cost inflation rate as shown in the table below. The construction cost inflation factors may be adjusted due to site-specific factors.
- No depreciation expense is reported for Florida infrastructure assets, nor are amounts capitalized relating to improvements that lengthen the lives of such assets, unless the improvements also increase their service potential.

Table 14: Construction Cost Inflation Factors

Fiscal Year	Inflation Factor	*PDC Multiplier
21/22	Base	1.000
22/23	2.7%	1.027
23/24	2.8%	1.056
24/25	2.9%	1.086
25/26	3.0%	1.119
26/27	3.1%	1.154
27/28	3.2%	1.191
28/29	3.3%	1.230
29/30	3.3%	1.270
30/31	3.3%	1.312
31/32	3.3%	1.356
32/33	3.3%	1.400
33/34	3.3%	1.447

**Present Data Cost (PDC)*
Source: FDOT, Office of Work Program & Budget

Pavement Lifecycle Cost Tracking and Use in Material and Project Selection

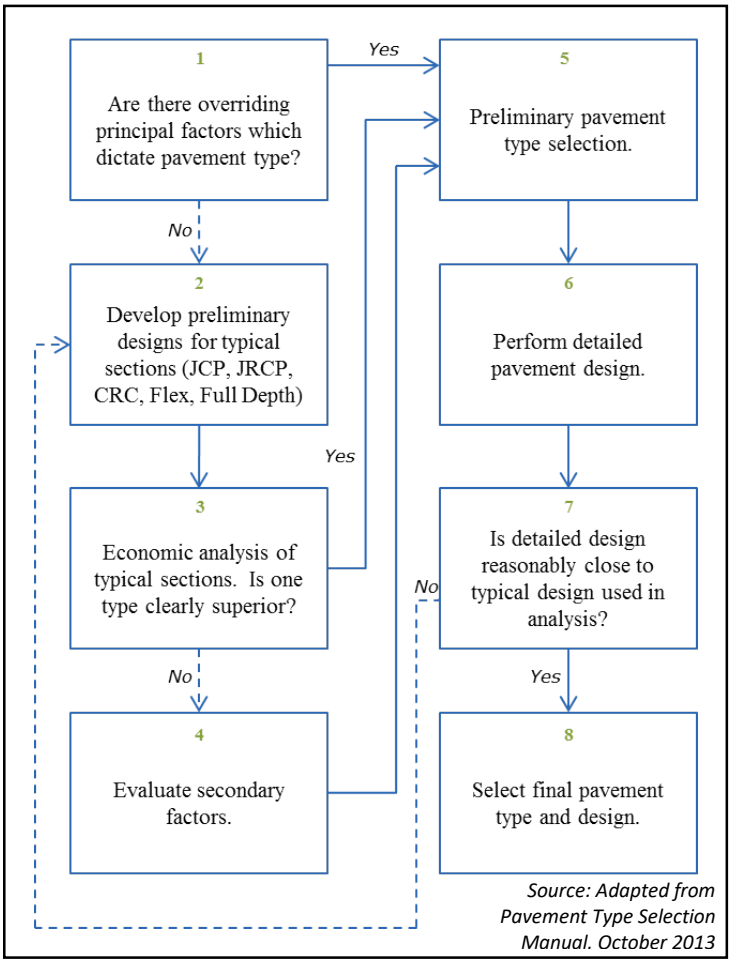
The Department tracks the capital costs of pavement projects as well as the costs to maintain pavement to a specific level of service. Reliable cost data for maintenance activities have not always been available historically. A more focused effort on improving cost information related to all pavement construction and rehabilitation activities is in progress to address these gaps.

The Department follows the processes outlined in the Pavement Type Selection Manual to select the most appropriate pavement material for each project. This selection is based on many factors such as traffic, soils, weather, materials, construction, economic costs, maintenance, and environment. This includes consideration for resilience to storms, flooding, and sea level rise. The pavement type selection may be dictated by an overriding consideration for one or more of these factors.

Where there are no overriding factors and several alternate pavement treatments or types would serve satisfactorily, the Department uses cost comparison to assist in determining pavement type. These comparisons include the initial cost of the pavement and the cost to maintain the service level desired. It should be recognized that such procedures are not precise since reliable cost data for maintenance, subsequent stages of construction, or corrective work and salvage value are not always available, and costs often need to be projected to some future point in time.

The figure below shows the typical approach for pavement selection decision making within the Department. In step three of the process, the economic costs are considered, including the maintenance cost component. User costs are not typically considered in this analysis. Costs are compared based on the net present value incorporating the construction cost inflation and discount rate.

Figure 16: Pavement Type Selection Process



The Department selects pavement type based on the factors mentioned previously, with a few exceptions as described by AASHTO. Replacement or reconstruction is required when an asset has reached the end of its service life and can no longer be extended through resurfacing, repair, or rehabilitation. New resurfacing projects are programmed three years into the future and resurfacing dollars are allocated for the new 5th year of the Five-Year Work Program based on expected pavement condition ratings.

Pavement Lifecycle Planning Process

The Department uses an in-house-developed Pavement Management System (PMS) to manage and select replacement treatments for the pavement assets.

Each year, pavement condition surveys (PCS) are conducted to monitor and collect the performance and condition of the entire SHS, in support of the Department's pavement management program. Condition data for NHS pavements which are off the SHS are collected over a two-year period. SHS and NHS pavement data is collected using the same equipment and processed and stored in the PMS database which contains more than 40 years of historic pavement condition data.

With such robust historic information, the Department has a very good understanding of how the state's pavements deteriorate

The Department has recently developed two pavement performance models and applies a consensus approach to establish recommended pavement targets. Both approaches use historical condition data to develop either 1) a family of performance curves or 2) the probability of failure given current condition and other pavement parameters.

The models have been successfully used for the last three years. Initially, the models were primarily based on forecasting deterioration due to cracking, which represents over 90 percent of all deficient pavements. Ride quality and rutting models have been added since the initial model was developed. Future opportunities for improvements to pavement management and life cycle planning are listed below.

- Complete the transition to a full fleet of 3D pavement imaging systems. The Department has invested in technology that fully meets all federal guidelines and is committed to collecting pavement condition data for the entire SHS and NHS with this equipment. Collection of Interstate pavement condition data using this technology was implemented in 2018, but non-Interstate data collection using this technology was not initiated until 2021. The use of consultants was required to complete all data collection in previous years.
- Continue to improve pavement performance models and develop more robust and direct relationships with FHWA pavement condition metrics as more data is collected. Currently, a crosswalk between Department and FHWA Interstate pavement condition rating systems has been developed but limited non-Interstate data was available to extend this relationship.
- A review of the Department's pavement management program has been initiated by the FHWA. It is expected that findings and recommendations from this review will be implemented in a continuing effort to improve Florida's pavement management processes.

Pavement Treatments

As pavements deteriorate, the Department selects treatments that slow or repair that deterioration based on engineering judgment, resource availability, and budgets. Strategies are selected from the following categories of treatments to maintain and rehabilitate its pavements:

- New construction includes the complete and full development of a pavement system when a new alignment or additional lanes are required.
- Maintenance is the known, ongoing, and often proactively scheduled repair and preventive maintenance activities to extend the useful life of the pavement. An example of a typical maintenance activity is repairing localized surface distresses such as potholes to improve the

serviceability and ensure the safety of the traveling public throughout the service life of a pavement section.

- Rehabilitation, reconstruction, and preservation is a process of restoring the existing pavement to its full serviceability. This concerns the upper layers of a pavement system, or the full reconstruction of the entire pavement structure within the same alignment. Examples of rehabilitation strategies include partial or full depth milling of an asphalt layer along a pavement section; or slab replacement, cracks, and joints resealing, and grinding of concrete pavements, as in the case of resurfacing work; or the entire asphalt layer and a predetermined depth of the base material is removed and replaced or reworked and strengthened to meet the current governing structural design and construction specifications and requirements such as in the case of a full depth reclamation; or removal and replacement of concrete slabs and a predetermined depth of the supporting material, then surface grinding as in the case of concrete pavements.

Because most Florida pavements experience deterioration initiating near the surface (e.g., top-down cracking and raveling), it has been the Department's standard practice to rehabilitate through milling and resurfacing. The pavement condition rating that "triggers" a resurfacing project is set such that the cracks have not propagated down to the base, allowing water to weaken the supporting layers by the time the pavement is resurfaced. It is anticipated that thin overlays will become more common as the Department leverages the digital survey vehicle technology to identify pavements with raveling but minimal crack and rutting. Historically, visual assessment methods were not sufficient to identify these pavements.

4.3 Bridges

The Department must ensure that bridge conditions not only meet Department SOGR standards but also the established targets for the FHWA bridge performance measures (see Chapter 3).

Bridge Lifecycle Cost Assumptions

As stated in Florida Statute 335.181, "Regulation of access to the State Highway System is necessary in order to protect the public health, safety, and welfare, to preserve the functional integrity of the State Highway System, and to promote the safe and efficient movement of people and goods within the state". In response to this conclusion, policies, programs, and statutes have been put in place to ensure a high level of service from the SHS.

1. Through the Florida Transportation Plan and the Strategic Intermodal System, highway corridors are identified and prioritized to maximize economic development and sustainability.
2. Florida Statute 334.046(4)(a)2 requires that 90 percent of department-maintained bridges meet department standards.
3. FDOT department policy has been adopted to prioritize the preservation of state highway road and bridge assets.

State system bridge repair funding is based on a fixed cost per structure for the asset class sub-groups of movable bridges, fender systems, and tons of paintable steel, and the inventory by deck area of bridges with an overall NBI rating of 6 or less.

Department policy requires state system bridge structures reaching an overall NBI rating of 4 or less, or state system bridge structures load posted to be programmed for repair or replacement withing 6 years. Department policy allows state system bridge structures found to be more economical to replace than to continue to repair to be programmed for replacement within 9 years.

The Department implemented an exhaustive statewide study of the wave and storm vulnerability of state system bridges in 2010. Through the study using computer modelling, all vulnerable bridges were identified. For those bridges identified as vulnerable, response action plans involving the affected bridge(s) and surrounding areas were created and are updated annually. Areas where these vulnerable

bridges were identified include: the Tampa Bay area; the Florida Keys; the Jacksonville area; and the Panhandle area. Life cycle analysis are performed to inform how these action plans need to evolve to maintain these structures in the best condition while better utilizing available resources, including consideration for these bridges to be added to the economy replacement program. Bridges programmed for replacement are designed taking their vulnerability into account and are removed from the Emergency Response Action Plans as appropriate.

In the 2021 fiscal year, 5483 state system bridges were inspected under Asset Maintenance Contracts. For the same fiscal year, 5349 state system bridges were maintained under Asset Maintenance contracts. These Asset Maintenance contracts are all performance based in nature where the contractors are required to maintain the bridges under their responsibility at a stipulated condition state.

The Department collects inventory and condition data for the locally owned assets through the Department's bridge inspection program, which includes the locally owned bridges on the NHS. Updates to the data occurs daily as a result of bridge inspections. The Districts also perform Quality Assurance (QA) reviews to ensure the integrity of the data and QAs for bridge inspection are performed yearly for each District by the Central Office.

Locally owned bridges on the NHS are maintained by Counties or the Metropolitan Planning Organizations (MPOs) in which they are located.

The bridges owned by the MPOs are managed based on the principles set by Florida Statute 339.175, which requires MPOs to develop transportation plans for metropolitan areas based upon the prevailing principles provided in statute 334.046, which as stated above, sets the standards for state owned bridges. The MPOs develop their list of priority projects in coordination with the Department's District Offices.

Transportation projects owned by local authorities are programmed by the Department based upon local priority, funding availability, and project schedules. Project needs are identified by the Department's District Offices in conjunction with local officials. These projects priorities serve as the basis for the district-wide prioritization process. The Department's Central Office reviews the District's programming of projects to ensure adherence to Department's policies and procedures, established performance measures, and federal requirements. The final list of projects becomes the Department's Five-Year Work Program.

Bridge Lifecycle Cost Tracking and Use in Project Selection

Lifecycle cost tracking for state highway system bridges begins with the bridge safety inspection program. Using inspection report documentation and data, the condition of bridge component systems is tracked over time.

Each of the districts and the Turnpike conduct monthly reviews via the Feasible Action Review Committee (FARC) meetings to evaluate and prioritize current bridge work needs. These meetings are chaired by each District Structures Maintenance Engineer (DSME), or a delegate.

The FARC consists of representatives from the engineering, inspection and repair groups as assigned by the DSME. The final programming decisions made by these committees are always the expertise and knowledge of the committee members. However, the Department has developed tools to assist in the decision-making process.

These tools include:

1. **AASHTOWare BrM Optimization Tool:**

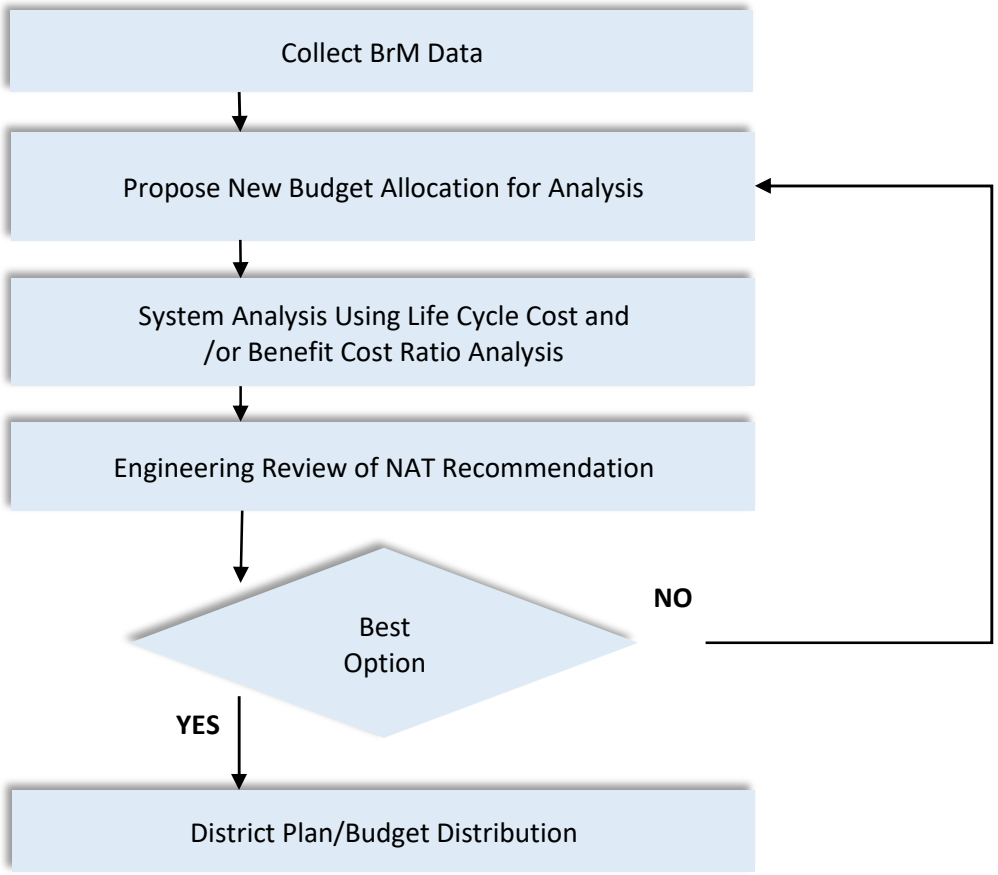
   Using BrM inspection report historical bridge condition data, the system calculates deterioration models for element components, super-element components, and for the entire structure. These models allow the districts to consider data driven scenarios based on either addressing

deterioration or choosing to do nothing. The system is also being used to evaluate and generate priority lists for optimum bridge replacement projects.

For a system level analysis of a bridge (either District or Statewide) the objective is to coordinate the overall bridge inventory condition with the budgetary needs. The Office of Maintenance will periodically perform statewide system analysis to review overall system performance versus budgetary needs.

This includes looking at tradeoffs between funding and performance of the system or various subsets of the system. The District Structures Maintenance Offices in each District also periodically performs a districtwide system analysis to assist each District in managing its bridge inventory. This level of analysis may also provide a general view of weaknesses and strengths in the inventory, and areas of work to emphasize to achieve maximum performance. A flow chart of the system level analysis process is shown below.

Figure 17: Bridge - System Level Performance Analysis



Source: FDOT, Office of Maintenance, Structures Operations.

Flowchart Element Descriptions

Collect BrM Data – The data in BrM is collected as part of the bridge inspection process. This data is an input into analyses performed by various software.

Propose New Budget Allocation for Analysis – The analysis process uses an assumed budgetary value input into the system. Because of the analysis, the budget may change to support the performance objectives.

System Analysis Using Life Cycle Cost and/or Benefit Cost Ratio Analysis – The System Analysis may utilize one or both Life Cycle Cost Analysis and Benefit Cost Ratio Analysis to produce its conclusions. This process is run internally.

Engineering Review of Network Analysis Tool (NAT) Recommendations – District or Central Office personnel will consider the recommendations to objectives, priorities, and budgetary restraints. If the recommendations are acceptable, the program will proceed. If the recommendations are not acceptable, input parameters are modified, and the analysis is rerun for new recommendations.

District Plan/Budget Distribution – Once the recommendations are accepted, a budget will be established, and work need priorities will be established.

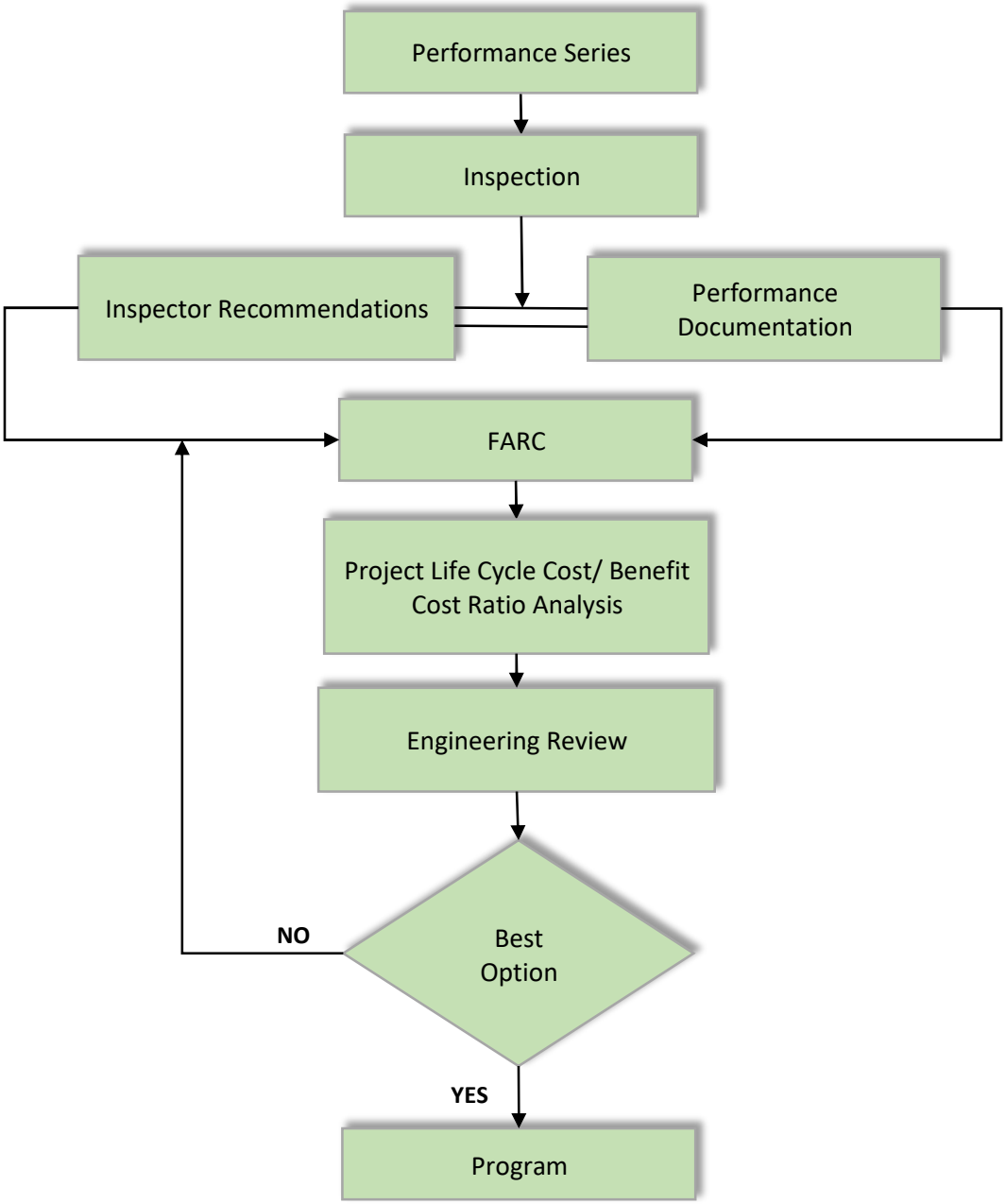
The Department also uses the Project Level Analysis Tool (PLAT) to conduct bridge project level analysis. This is also an Excel based tool that was developed through Department sponsored research. It uses data from the BrM database and performs lifecycle analysis at the bridge level. PLAT automatically analyzes three scenarios; do nothing, repair and replace.

Risks of natural and man-made hazards are quantified as social costs to the public and the Department. User costs due to functional deficiencies and delays are estimated. Benefits are determined by the reduction in social and user costs due to the actions performed. This is compared to the costs of the proposed project to determine a benefit cost ratio.

PLAT also allows the user to customize and evaluate the impact of the timing of projects. The user can place proposed projects in any year of a ten-year period and the tool will project the element level deterioration until the project is executed. The elements that are part of the project are assumed to return to Good condition (or state 1) and deterioration is assumed to begin again. This allows the user to observe the associated impacts of the project and adjust as necessary.

The figure below illustrates the Department's project level analysis for bridges.

Figure 18: Bridge - Project Level



Source: FDOT, Office of Maintenance, Structures Operations

Flowchart Element Descriptions

Performance Series – The performance of the bridge as an entire system, or the individual bridge elements is measured against numerous external affects. A Performance Series is an incremental change in the bridge condition that can be measured, as a result of these external affects. These conditions can act slowly, such as with rusting steel, or they can act quickly, such as with wave impact from storm surge. The Series represents a chronological history of the system, sub-system or element performance based on condition or functionality. With regard to risk management, the Performance Series represents the fundamental unit of measure for establishing risk and Lifecycle Costs.

Inspection – The bridge inspection process identifies changes in bridge element condition, performance of bridge preservation systems, and performance of the bridge system and bridge elements. Through the generated bridge inspection report the updated inspection information is recorded into the BrM system.

Inspector Recommendations - The Inspection Report lists work need recommendations based on the inspection observations. These work needs may involve either structural repairs or preservation needs.

Performance Documentation – Historical documentation relating to structural performance of the bridge elements for the specific bridge and related bridges will be accessed and used in the decision-making process.

FARC – The Feasible Action Review Committee (FARC) consists of District bridge maintenance personnel and, as necessary, asset maintenance personnel. The Committee's primary purpose is to identify, prioritize, and schedule bridge (and other ancillary structure) work needs. As part of the decision-making process the FARC will utilize input from various sources, including modal plans. The FARC will have responsibility for executing the final decisions concerning bridge work needs.

Project Life Cycle Cost and Benefit Cost Ratio Analysis – As part of the decision-making process the FARC will reference BrM and PLAT asset management programming concerning Life Cycle Cost and Benefit Cost Ratio Analysis. Results of the analyses will be recorded and referenced in the final decision process.

Engineering Review – The FARC will coordinate with District production and operations management during the Project Level decision-making process. Decisions will be modified as necessary to align with the goals and objectives of the District and the FTP. The FARC will record results of the coordination meetings.

Best Option – The FARC will consider input from: the inspectors; bridge element performance history; Life Cycle Cost and Benefit Cost Ratio Analysis; and District and State planning goals and objectives. The FARC will decide whether the work action sufficiently satisfies all inputs. If the work action sufficiently satisfies the requirements, the work action is prioritized and programmed. If the work action does not satisfy the requirements, the committee will consider an alternative course of action.

Program – The District Bridge Maintenance Office will assign the work action for disposition to the appropriate group: maintenance yard; internal personnel; consultant or asset maintenance contractor. A key component of the Department's bridge management system is the consideration of short and long-term budgeting needs for bridge repair and replacement. These needs are developed at the District level and are based on the bridge inspection process and NBI inspection data stored in the BrM system.

Each District bridge maintenance office conducts periodic meetings to review inspector recommendations from inspection reports and to identify work needs. The work needs are then prioritized by District staff and candidate construction projects are created, including project budgets. The Department's Central Office collects all the District bridge work needs and creates a statewide Bridge Work Plan. That statement of needs is submitted to the Office of Work Program and Budget and is included for discussion at the Department's annual summer Program Planning Workshops for development of the Five-Year Work Program.

2. **Element Level Performance Tracking Tool:**

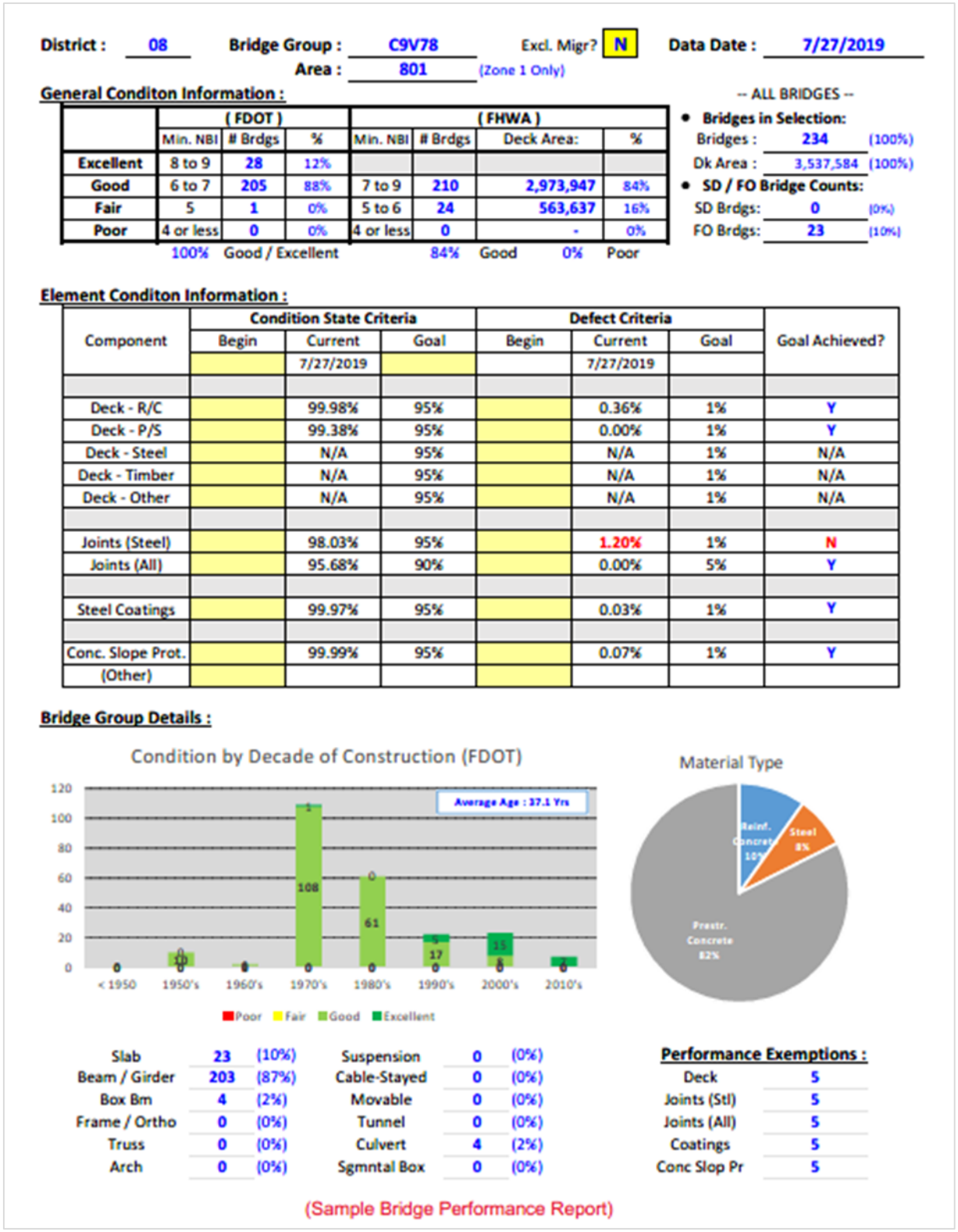
   To promote effective strategies for maintaining and preserving bridges, the department is developing performance goals related to common bridge elements. Criteria has been established which is focused on maintaining the *functionality* of elements considered to be more *protective* in nature and can extend the life of primary structural components.

   The performance measures are based on condition data generated through on-going bridge inspections. Reporting on element data is used to identify trends and support cost-effective strategies to promote health and longevity of bridges over the long term. Items such as

expansion joints, protective coating systems, bridge slope protection and bridge decks are a focus within this program.

A tool has been developed and implemented to provide periodic performance reporting using current BrM inspection data. See Figure 19.

Figure 19: Element Level Bridge Performance Tool



District : 08 Bridge Group : C9V78 Excl. Migr? N Data Date : 7/27/2019
Area : 801 (Zone 1 Only)

General Conditon Information :

	(FDOT)			(FHWA)			
	Min. NBI	# Brdgs	%	Min. NBI	# Brdgs	Deck Area:	%
Excellent	8 to 9	28	12%				
Good	6 to 7	205	88%	7 to 9	210	2,973,947	84%
Fair	5	1	0%	5 to 6	24	563,637	16%
Poor	4 or less	0	0%	4 or less	0	-	0%

100% Good / Excellent 84% Good 0% Poor

-- ALL BRIDGES --
- Bridges in Selection:
  - Bridges : 234 (100%)
  - Dk Area : 3,537,584 (100%)
- SD / FO Bridge Counts:
  - SD Brdgs: 0 (0%)
  - FO Brdgs: 23 (10%)

Element Conditon Information :

Component	Condition State Criteria			Defect Criteria			Goal Achieved?
	Begin	Current	Goal	Begin	Current	Goal	
		7/27/2019			7/27/2019		
Deck - R/C		99.98%	95%		0.36%	1%	Y
Deck - P/S		99.38%	95%		0.00%	1%	Y
Deck - Steel		N/A	95%		N/A	1%	N/A
Deck - Timber		N/A	95%		N/A	1%	N/A
Deck - Other		N/A	95%		N/A	1%	N/A
Joints (Steel)		98.03%	95%		1.20%	1%	N
Joints (All)		95.68%	90%		0.00%	5%	Y
Steel Coatings		99.97%	95%		0.03%	1%	Y
Conc. Slope Prot.		99.99%	95%		0.07%	1%	Y
(Other)							

Bridge Group Details :

Slab	23	(10%)	Suspension	0	(0%)
Beam / Girder	203	(87%)	Cable-Stayed	0	(0%)
Box Bm	4	(2%)	Movable	0	(0%)
Frame / Ortho	0	(0%)	Tunnel	0	(0%)
Truss	0	(0%)	Culvert	4	(2%)
Arch	0	(0%)	Sgmntal Box	0	(0%)

Performance Exemptions :

Deck	5
Joints (Stl)	5
Joints (All)	5
Coatings	5
Conc Slop Pr	5

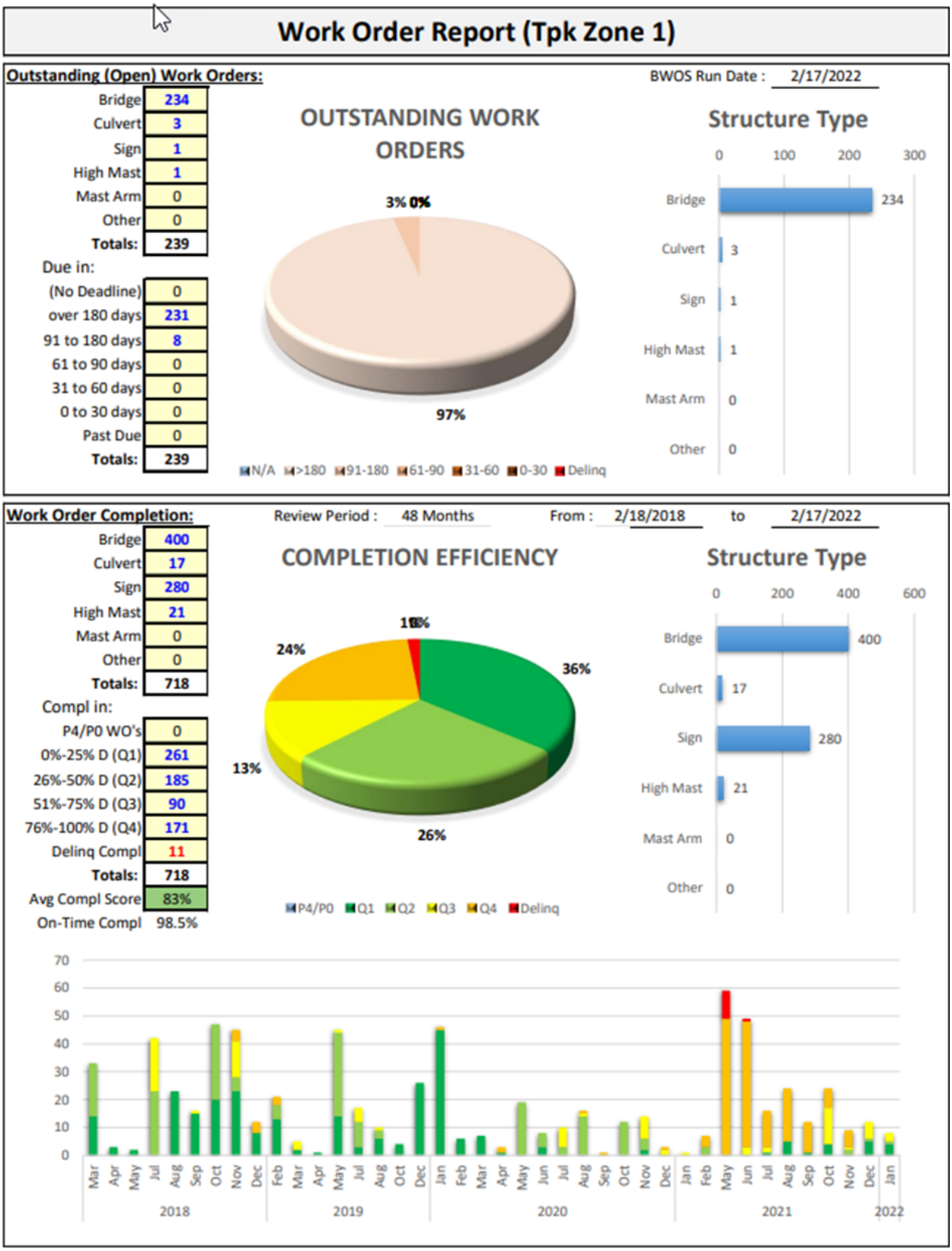
(Sample Bridge Performance Report)

Source: FDOT Office of Maintenance, Structures Operations

3. **Bridge Work Order Tracking Tool:**

   This tool is used in the monitoring of the bridge work activities and the evaluation of work completion performance based on preset performance measures. The tool graphically shows where work is being performed and the quantity of work performed. It shows the execution rate of the work orders based on type of work performed, and the priority level of the work order types. This data-driven tool will show in a graphical manner areas of strengths and weaknesses for work efforts, and using this information becomes a decision-making tool for allocation of work effort. See Figure 20.

Figure 20: Bridge Work Order Tracking Tool



Source: FDOT, Office of Maintenance, Structures Operations

Bridge Lifecycle Planning Process

The primary mission of the Department is to provide a safe transportation system for the traveling public. Therefore, issues of safety such as strength and functionality for state highway bridges are addressed in a timely manner. By Florida statute and Department policy, safety related work needs are prioritized to be addressed in a timely manner. Concerning work needs involving bridge preservation, more evaluation and cost benefit analysis are required to maximize service life for the least cost.

Each district maintenance office conducts regularly scheduled FARC meetings with the appropriate department, consultant, and contractor personnel in attendance. The committee reviews current bridge inspection reports and the inspector recommended work needs. The committee then identifies, prioritizes, and assigns the work needs for the appropriate execution. The committee utilizes the AASHTOWare BrM program planning module as a tool to evaluate and prioritize the work needs.

The Element Level Performance Tracking Tool and the Bridge Work Order Tracking Tool are developed and implemented on an on-going basis. These tools provide data-driven information to assist in the management decision process of identifying strengths and weaknesses in the maintenance program and where to make adjustments in the Work Program (WP).

The bridge maintenance office has adopted a philosophy that, in general, bridge preservation costs can be minimized by keeping the bridge condition at a high level. Therefore, the Department calculates the allocation of bridge repair funds based on the amount of bridge inventory with an overall NBI condition rating of less than seven. Otherwise, bridge repair allocation includes fixed amounts for each unit of inventory including movable bridges, fender systems, and tons of paintable steel. The amount of these unit costs is evaluated and adjusted on a regular basis.

The Department continuously engages in efforts of identification and response to top priority risks to ensure bridges are in a SOGR. These risks are considered and incorporated in the Department's financial plan and investment strategies.

Risks at the asset level affect the condition of specific assets. Those identified as top priority involved hurricanes and other water-related damages. The districts have identified these specific structures in their corridors and the asset condition is discussed at annual FARC meetings that take place at the beginning of the year. At these meetings, discussions are held to plan the funding requests needed to address repairs, rehabilitation and replacement needs over the next cycles (2, 6 and 10 years) as described in Section 6.4.

The Department also periodically reviews and if necessary, updates its design standards to enhance resilience of the transportation system infrastructure. These enhancements are accounted for in the BrM system which utilizes cost information, inflation factors and other data when conducting analyses. The success of these enhancements and the resilience of our bridges has been tested and proven year after year during hurricane events.

Bridge Treatments

Having a decentralized organization allows each district maintenance office to optimize their means, methods, and materials to match their specific conditions. As each district maintenance office is responsible for managing their maintenance budget, they are better able to optimize cost-benefit analysis and programming work needs.

While normal bridge maintenance operations follow standard accepted practices for means, methods, and materials, the district bridge maintenance offices are not bound by standard Qualified Product List when addressing bridge maintenance, repair, or preservation. This allows each district to consider various new products and techniques through field testing under their specific field conditions. Through collaboration between the districts, the knowledge gained by performing these pilot projects is shared with all the districts.

If an issue rises to the level of affecting multiple districts, a statewide program may be initiated through the Office of Maintenance or the State Materials Office to analyze, evaluate, and generate statewide policy statements with the intension of improving bridge performance. Past examples of such programs have included: epoxy coated reinforcing steel; the use of fiberglass pile jackets in saltwater environment; culvert siltation; precast deck panel cracking and delamination; rusting of superstructure external tendons; and the hydraulic scouring of unknown bridge foundations.

Bridge Results

To optimize project selection, the Department uses engineering judgment in conjunction with the BrM optimization tool to analyze tradeoffs between funding and performance of the bridge inventory. For bridges, the Department defines the financial investment categories as follows.

Construction: complete replacement of existing bridge structure.

Reconstruction: major repairs of existing bridge structure based on the original design standards.

Preservation and Rehabilitation: work performed to protect or extend the service life of the bridge structure, such as painting; crack sealing; joint repair or replacement; or scour countermeasures.

Maintenance: minor repair or replacement of bridge components such as patching spalls; lubrication of moving parts; replacement of lost or damaged parts; or deck cleaning.

Table 15: Typical Pavement and Bridge Treatments and Unit Costs

FHWA Work Types		Typical Pavement Treatments	Typical Bridge Treatments	Average Unit Cost ($ in Millions)
Construction	Pavement: the complete and full development of a pavement system on a new alignment. Bridge: the complete construction of a new bridge on a new alignment.	Placement of different pavement system layers on top of new subgrade to meet current governing design and construction specifications and requirements.	Construct a new bridge on new alignment.	$17.100
Preservation	Bridge: work that is planned and preformed to sustain the condition of a bridge in a state of good repair, or restoration of an existing bridge, including all its appurtenances, to a condition which meets current standards (rehabilitation).	See Rehabilitation	• Crack sealing • Joint repair/replacement • Painting • Scour countermeasures	$1.303
Rehabilitation	Pavement: a process of restoring the existing pavement to its full serviceability. This concerns the upper of a pavement system, or the full reconstruction of the entire pavement structure within the same alignment.	• Mill (partial/full depth) • Crack seal • Slab replacement • Joint resealing	See Preservation	$0.499
Reconstruction	Bridge: The complete replacement of an existing bridge on an existing alignment.	See Rehabilitation	Replace existing bridge structure	$26.813

Maintenance*	The known, ongoing, and often proactively scheduled repair and preventive maintenance activities to extend the useful life of the asset.	Repair localized surface distresses such as potholes to improve serviceability and ensure safety.	• Patching spalls • Deck cleaning • Lubricate moving parts • Replace damaged parts	Varies

Source: FDOT, Office of Work Program & Budget

*Note: Maintenance activities are performed by in-house crews and contractor crews using a combination of work directed contracts and performance-based contracts. The performance-based contracts are lump sum contracts and typically cover large geographic areas of the state or corridors. Since performance-based contracts are lump sum, it is not possible to separate individual maintenance activities and costs.

4.4 Incorporating Resilience & Extreme Weather into Lifecycle Planning and Investment Decisions

Resilience and extreme weather factor into investment decisions in several ways, including geographically (based on the locations of facilities in vulnerable areas) and temporally (based on asset deterioration due to extreme weather and other climate impacts such as increased frequency and magnitude of hazard events).

Investment decisions related to resilience and lifecycle are made during the scoping phase of a project. Once Maintenance has identified needs, projects are reviewed using a Priority Project Programming Process (4P process) that utilizes a multi-disciplinary team including program management, estimates, permitting, planning and environmental staff, traffic operations, survey, design, drainage, structures, modal, materials, and maintenance. It is within the data gathering and concept development phases that resilience and lifecycle considerations are evaluated. The scoping team evaluates hazards using historical and predicted conditions, while considering the lifecycle of the improvements and balancing limited resources. The graphics below show the process that is utilized in evaluating projects and investment decision for both internal and external projects (note: graphics from FDOT 4-P Training).

Figure 21: Scoping Overview

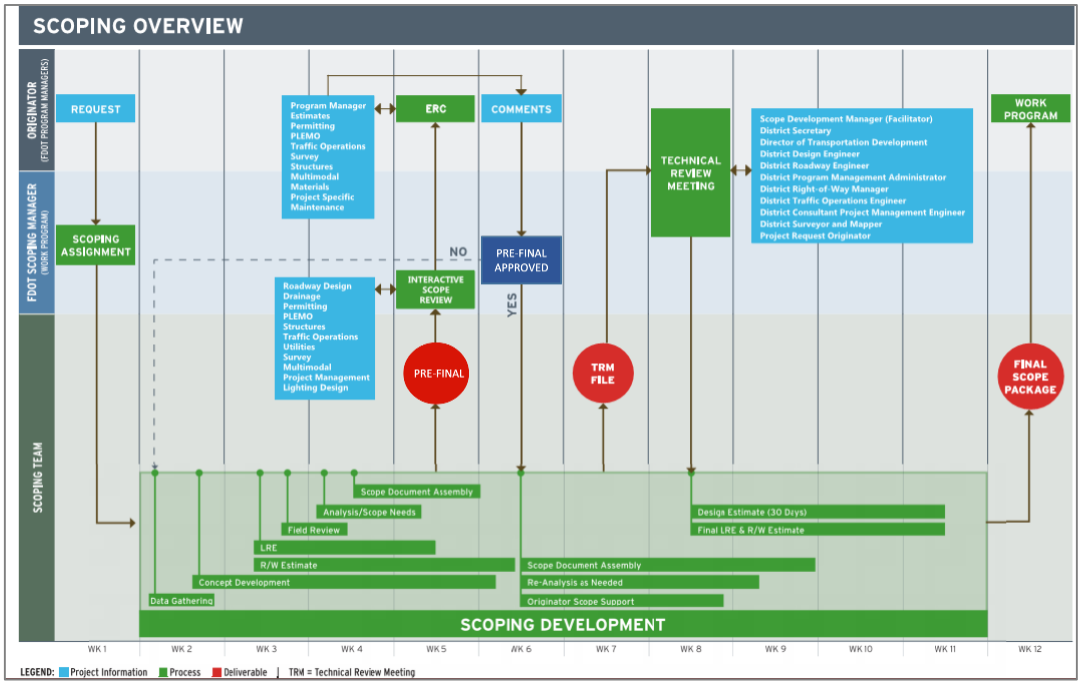
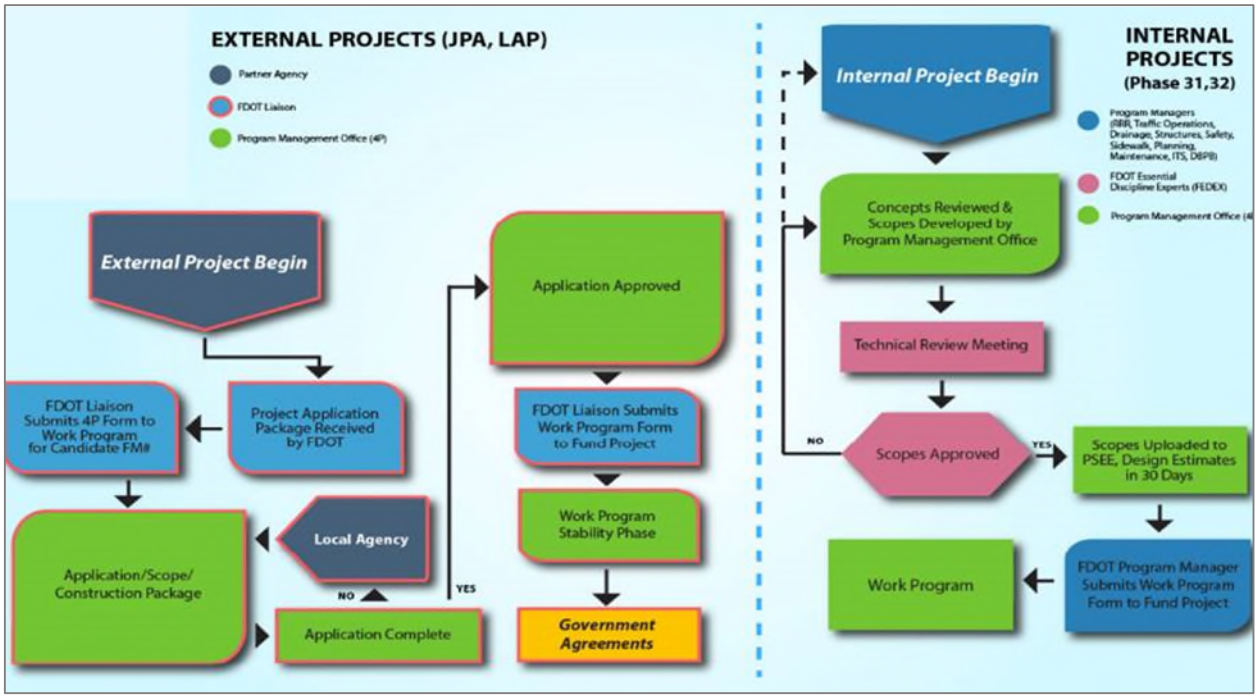


Figure 22: External Projects



The Department is currently developing a Resilience Action Plan (see Chapter 5 for more information) that will identify high priority areas for incorporating considerations for resilience and extreme weather. The RAP will identify facilities located in vulnerable areas, prioritization criteria, and strategies for evaluating and addressing facilities to increase resilience. Future enhancements will develop more detailed data and analysis to assess cost savings/benefits over the asset's life cycle.

CHAPTER 5
Managing Risk and Creating Resilience

FHWA defines risk as "the positive or negative effects of uncertainty or variability upon agency objectives." Accounting for this uncertainty is essential to effective asset management. Applying an enterprise risk management approach allows the Department to foster responsible and informed risk-taking and communicate the benefits of doing so to partners and the public.

This chapter documents the Department's enterprise risk management approach; and identifies risks that could directly cause asset damage, interrupt service, or limit the Department's ability to accomplish its NHS pavement and bridge programs and meet its performance objectives and targets. It also presents the Department's ongoing efforts to measure, monitor, manage, and mitigate these risks while implementing and solidifying a shared risk management culture throughout the organization. The chapter closes with a discussion of vulnerable assets that satisfies 23 CFR Part 667: "Periodic Evaluation of Facilities Repeatedly Requiring Repair and Reconstruction Due to Emergency Events."

The Department addresses the link between performance and decisions at every level. Performance management ensures the most efficient investment of transportation funds by increasing accountability, providing transparency, and linking investment decisions to key outcomes. As discussed in Chapter 3, section 3.3, performance measures provide useful feedback and are integrated into the Department's and partners' business practices at the strategic level, the decision-making level and at the project delivery level.

5.1 FDOT's Enterprise Risk Management Approach

This section describes the Department's risk posture and tolerance, as well as efforts supporting risk management. This consists of roles and responsibilities on risk management, how risk tolerance is determined and communicated from FDOT executives, and who feels comfortable or permitted to take which types of risks. This section discusses risks in four key areas: policy, funding, project, and asset maintenance.

5.1.1 Policy

The state's long-range transportation plan, the Florida Transportation Plan (FTP), establishes a long-range goal for "agile, resilient, and quality transportation infrastructure." One intent of this goal is to evaluate and adapt infrastructure to become more resilient to risks. Related objectives in the FTP include:

- Maintain Florida's transportation assets in a state of good repair for all modes
- Increase the resilience of infrastructure
- Meet customer expectations for infrastructure quality and service

To accomplish these objectives, one of 12 key strategies in the FTP is to "identify and mitigate risks to Florida's transportation system". This strategy acknowledges the importance of identifying system vulnerabilities; improving the agility of the transportation system; addressing the long-term costs of known vulnerabilities; adapting transportation planning, design, construction, and maintenance techniques; improving overall infrastructure and community resilience; transitioning infrastructure and development away from vulnerable areas; and preparing, responding to, recovering from, and mitigating increasing intensity and severity of extreme weather events and other risks.

The FTP was developed under the guidance of a 36-member steering committee, with decision-makers representing other state and Federal agencies, Florida's cities and counties, environmental groups, industry and economic partners, and modal partners. During the development of this FTP, the steering committee established a Resilience Subcommittee, which provided input on objectives, strategies, and

actions related to risk and resilience. The Subcommittee considered trends and conditions and discussed strategies in four areas: weather, environmental changes, economic shifts, and operational disruptions.

In 2019, Governor DeSantis named Florida's first Chief Resiliency Officer and created the Office of Resiliency and Coastal Protection at the Department of Environmental Protection. Since then, the Governor, with support from Florida's Legislature, has created a Resilient Florida Grant Program, established a Statewide Office of Resiliency under the Executive Office of the Governor, and passed legislation to require the Department to complete a Resilience Action Plan by June 30, 2023.

The Resilience Action Plan requires the Department to complete a vulnerability assessment on the State Highway System (SHS) and, considering current and future conditions, identify commensurate design and construction strategies and update other project development processes, manuals, or guidance. The Department is currently finishing a detailed assessment of our internal practices to help us identify areas of improvement. The Resilience Action Plan also requires the Department to identify resilience projects; in most cases, resilience is incorporated into project development and design, yet there are some projects, like those involving nuisance flooding, that may stand alone. The intention is that the Resilience Action Plan will also meet the federal requirements for a Resilience Improvement Plan, as required by the Infrastructure Investment and Jobs Act. The Department will review USDOT guidance, when it is released to ensure that plan requirements are met.

Within the Department, resilience is guided by the Resiliency Policy (000-525-053), which states that the department will continue to identify risks, particularly related to sea level rise, flooding, and storms; assess potential impacts; and employ strategies to avoid, mitigate, or eliminate impacts. The Department recognizes that shocks and stressors vary throughout the State, and ongoing multidisciplinary efforts by other agencies are important considerations. This policy is implemented through the Department's long-range and modal plans; work program; asset management plans; research efforts; and internal manuals, tools, guidelines, procedures, and related documents guiding planning, programming, project development, design, construction, operations, and maintenance.

Many of the Department's partners, including MPOs, regional collaboratives, and local governments, have major resilience initiatives underway. The Department works with these partners, as well as its sister agencies, like the Florida Department of Environmental Protection, and Federal agencies, like FHWA and the U.S. Army Corps of Engineers.

5.1.2 Funding

In addition to the FTP key strategy mentioned above, two other key strategies in the FTP are to "strategically align investments with goals" and "provide sustainable and reliable transportation funding sources."

The related actions for "strategically align investments with goals" include:

- Evaluating the allocation of resources among program areas
- Prioritizing investments among projects that support the progress toward FTP goals
- Rightsizing investments to accommodate changing needs and circumstances
- Identifying investment opportunities that would help accomplish multiple goals
- Allowing more flexibility in use of funds
- Updating resource allocation and project prioritization methods, tools, and data

The related actions for "provide sustainable and reliable transportation funding sources" include:

- Diversifying the portfolio of transportation revenue sources
- Preparing for the potential decline in the value of motor fuel taxes by researching or piloting other funding alternatives

- Providing more stability in transportation investment during economic and fiscal cycles, including more flexibility to address unanticipated needs during economic downturns or following major emergencies
- Expanding public/private and state/regional/local partnerships

Section 339.135, Florida Statutes, authorizes and sets the guidelines for the Department to develop a Work Program annually. The Central Office and District Offices work together to develop and adopt the 5-Year Work Program, a listing of all transportation projects planned by the Department for the following five fiscal years. The District Offices each develop a District Work Program that Central Office combines into the Tentative Work Program (TWP). Each District holds public hearings on the TWP, providing an opportunity for the public and partners to identify additional risks or needs.

Each year, the new TWP provides an update of the first four years of the existing Adopted Work Program (AWP) and adds project programming for the new fifth year. For example, a TWP being developed in the fiscal year beginning July 1, 2020, is for the next five fiscal years starting in 2021. By committing to a five-year work program, the Department reduces potential risk associated with ups and downs of revenue, political will, and costs.

Revenues are estimated by the state's Revenue Estimating Conference each year. In addition, the Department provides revenue estimates for use by the MPOs to ensure fiscal constraint of long-range transportation plans. These revenue estimates help identify variabilities and risks in future funding. If estimates project a decline in revenue, the Department can (and has) deferred projects to mitigate risks to the Work Program as a whole. When revenue is projected to increase, the Department may also accelerate projects.

Federal discretionary grants can also provide additional funding for resilience projects. The Department intends to leverage PROTECT formula and discretionary funding to address nuisance flooding and other resilience needs and intends to encourage local and regional agencies to apply for PROTECT discretionary funding.

5.1.3 Project

Risk is assessed and managed through each project phase, as required by the Department's Resiliency Policy.

The Department developed the Sea Level Scenario Sketch Planning Tool that provides roadway impact information for a range of climate and flooding scenarios and projections such as the percentage of a roadway segment affected by sea level rise under the NOAA intermediate projection for 2050. The Department sponsored the development of the tool in collaboration with the University of Florida GeoPlan Center. Additional research funding is being provided by the Department to the GeoPlan Center to facilitate custom analysis of the potential impacts of multiple flood events on transportation facilities at finer geographic scales. This "on-demand" analysis capability and new data will be incorporated into the existing Area of Interest Environmental Screening Tool (EST) for use during project planning and development by June 2023.

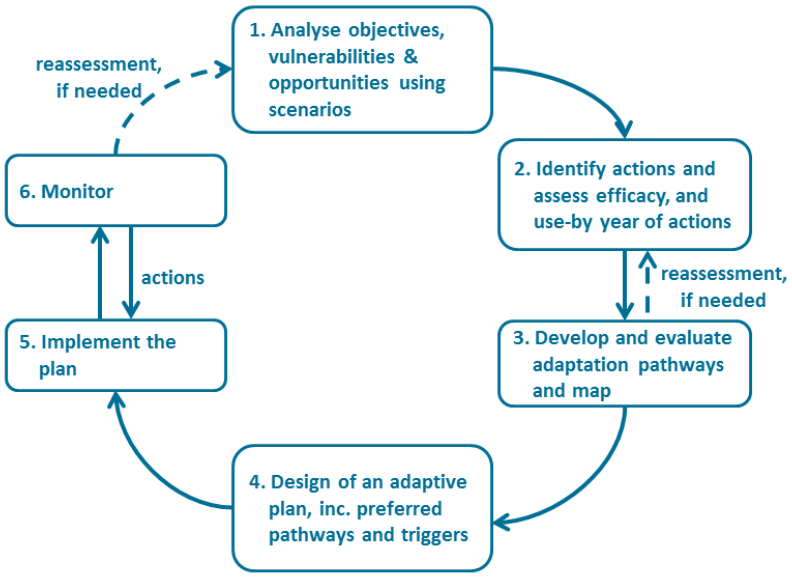
The EST is an interactive database and mapping application that demonstrates the effects projects have on the human and natural environment and is a key component of the Department's Efficient Transportation Decision Making Tool (ETDM). This analysis provides an opportunity to consider climate considerations earlier in our project development process.

In several regions of the state, local governments and other partners have joined together to create regional resilience coalitions to collaboratively address extreme weather and climate trends. These regional coalitions provide opportunities for communities to work together to identify hazards and risks, develop data, and identify regional solutions to address these concerns. District staff have been active in these coalitions, providing data and assisting in the development of strategies. The Department works collaboratively with local and regional organizations to ensure that transportation improvements consider local knowledge and to consider network and community solutions as part of project development activities.

The Department's stormwater and drainage design procedures incorporate uncertainty associated with precipitation and storm events and allow for changing conditions due to sea level rise. The Department's Drainage Manual requirements follow the latest national guidance on Sea Level Rise, FHWA's HEC-17, and HEC-25. For flooding events, the Department evaluates and engineers systems to convey the design event without damage to our facilities.

To address sea level rise, the Department requires a sea level rise analysis to assess the vulnerability of flooding over the design life of the facility. Section 161.151, Florida Statutes, requires FDOT to perform a Sea Level Impact Projection (SLIP) Study for state-financed construction in areas that are within the Coastal Building Zone. This includes any transportation facility within the Coastal Building Zone. Guidance is provided in the Project Development and Environment Manual.

To best evaluate investment in resilience, understanding current impacts and future impacts is critical. The investment in infrastructure may evolve incrementally to address resilience needs. The concept of Dynamic Adaptive Policy Pathways was utilized during the evaluation of projects on SR-A1A in District 4 that are aimed at mitigating the impacts of chronic tidal flooding in Hollywood. Tidal flooding was determined to be caused by king tide stages higher than the low back of sidewalk elevations along SR A1A, a few low seawall tops below the October 2019 king tide elevation, and backflow through storm sewer systems to low inlets on side streets.



Initially, small pump stations were recommended to alleviate backflow device head and infiltration issues. To accommodate future needs, the structures that will be designed to house stormwater pump equipment could be sized so that the pumps could be scaled up in future decades to improve their effectiveness after additional sea level rise and potentially more severe precipitation. The pump installations are seen as a mid-term solution to address drainage issues along the corridor—with the long-term potential of reconstructing/raising SR A1A still viable after pump station installation.

This approach supports decision-making over time and sequences of decisions or pathways under uncertainty of future conditions. It supports devising dynamic adaptive plans with short-term actions, long-term options, and adaptation signals.

The Department continues to enhance and expand its knowledge and best practices regarding resilience and is learning that green solutions are as important as gray solutions. For example, the Department has constructed natural shoreline/coastline solutions that provide environmental and community benefits while helping to protect transportation infrastructure. Additionally, in Melbourne, a U.S. 1 Erosion Study noted that areas of erosion are located where there are “voids” or spaces in the rip-rap.

The Indian River Lagoon is a shallow system, waves are wind-driven, and there is very little tidal influence. There is also very little natural shoreline left in this system. Results from this assessment included a recommended alternative (wave attenuation device sill with plantings) that is currently under consideration.

5.1.4 Asset Management

The Department has a long-standing commitment to maintaining state of good repair for its roads and bridges. S. 334.046, Florida Statute, requires that at least 80 percent of pavement on the SHS meet Department standards, at least 90 percent of Department-maintained bridges meet Department standards, and that the Department achieves 100 percent of the acceptable maintenance standard on the SHS. The statewide pavement and bridge measures are similar to the national measures, with some differences in system coverage (SHS rather than NHS) and methodology.

To accomplish this, the Department prioritizes investments in preservation. Safety is the top priority, followed by preservation of assets, then capacity improvements.

The Department uses inspections of pavement and bridge condition and the pavement and bridge management systems to inform programs and project selection. In addition, as required by 23 CFR Part 667, the Department conducts statewide evaluations of facilities repeatedly requiring repair and reconstruction due to emergency events (see discussion on page 60). The Department coordinates with the MPOs on project priorities identified by the MPOs on these facilities for potential inclusion in the Work Program, and also considers this information in updates to the TAMP.

5.2 Scope of Risk Management

The scope of risk management refers to the types of risk to be managed by the Department. Risks at the Department were identified and categorized at the agency-, program-, and asset-level.

- **Agency-Level Risks**: affect the mission, vision, and overall results of the asset management program. For example, legislative actions or economic changes.
- **Program-Level Risks**: affect the Department's ability to deliver projects and meet targets within a program. For example, construction cost variations, materials price volatility or data quality.

- **Asset-Level Risks**: affect the scope, cost, schedule, quality of projects or the condition of specific assets. They relate to specific projects. For example, cost overruns, material and workmanship deficiencies, or climatic events.

5.3 Risk Registers and Tolerance

Although the concept of risk management sometimes is viewed as obscure, tools to identify and evaluate risks can be very simple. A risk register can serve as a tool for evaluation and analysis of risk management elements. The register is a simple excel spreadsheet that lists the risks that have been considered, including their rankings.

The Department's risks were scored using a risk rating matrix in terms of likelihood and consequence using a severity ranking of one through five. Consensus scores were determined by using the mode (most popular single response) when possible.

Risk tolerance is how much risk an agency will accept before a response is necessitated. For the Department, all risks are a concern but risks that fall into the moderate to high range are more closely examined.

Table 16: Risk Rating Matrix

Likelihood		Consequence				
		1	2	3	4	5
Level	**Descriptor**	**Negligible**	**Minor**	**Major**	**Critical**	**Extreme**
5	**Almost Certain**	Moderate	Moderate	High	High	High
4	**Very Likely**	Moderate	Moderate	High	High	High
3	**Likely**	Low	Moderate	Moderate	High	High
2	**Unlikely**	Low	Low	Moderate	Moderate	High
1	**Rare**	Low	Low	Moderate	Moderate	Moderate

The likelihood descriptors are defined as follows:

- **Rare:** seldom or never happens.
- **Unlikely:** could happen at some point.
- **Likely:** might happen at some time.
- **Very Likely:** will probably happen in most circumstances.
- **Almost Certain:** sure to happen in most circumstances.

The TAM Steering Committee, which is comprised of representatives from across the Department reflecting the financial, planning, and other technical areas asset management influences, reviews the risk register every two-years, as well as prior to every required submittal and update of the TAMP. This ensures the Department is well positioned to address any emerging issues and update the register if necessary.

The Department's initial risk registers were developed in 2014 in preparation for the asset management plan final rule. Literature reviews, workshops, meetings, and discussions were held with key groups across the Department that manage the transportation assets. After the rule was finalized, the registers and prioritizations were updated and included in the 2019 TAMP submittal to FHWA (see Appendices).

In early 2021, the identified risks were reviewed by select subject matter experts from the TAM Steering Committee, to ensure the Department is well positioned to continue providing continuity of service for the state's transportation system. In some instances, scores changed or remained the same. Risks were also re-stated to clarify meaning or were combined with other risks that were similar, and new risks were also identified.

The results of the review and updates are presented below in the 2022 Risk Registers. The updated risks were presented to and approved by Executive Management.

Table 17: 2022 Agency-Level Risks

Event/Occurrence	Likelihood	Consequence Score				Other Considerations					Risk Score
		Safety	Mobility	Asset Damage	Other Financial Impact	Funding	Insurance	Regulatory	Political	Reputation	
State and Federal funding are significantly reduced across the board for transportation.	2	2	4	2	4	√		√	√	√	**7**
State funding for project delivery is not sufficient due to changes of agency and political priorities.	1	3	4	3	3	√		√	√	√	**4**
Flexibility with Federal funding is reduced due to failure to meet regulatory standards.	1	3	3	2	2	√		√	√	√	**3**
Funds are not sufficient for capital and maintenance projects due rising costs.	3	2	4	2	4	√	√	√	√	√	**11**
Revenue is not sufficient for capital and maintenance projects due to failure to accurately predict funding.	3	2	4	2	3	√		√	√	√	**10**
Funds are not sufficient for capital and maintenance projects due to failure to accurately predict costs.	3	2	3	2	4	√	√	√	√	√	**10**
Asset management at FDOT is not mature enough to support planning and operational data-driven decision.	1	2	3	1	3	√			√	√	**3**
FDOT incurs extensive short-term operating and maintenance costs after extreme weather or other unforeseen events and circumstances.	5	2	4	4	4	√		√	√	√	**23**
Workforce development and change management is unable to support business operations or performance knowledge transfer	3	2	3	1	3	√			√	√	**8**
If the State experiences a budget crisis, then staff and/or consultants may be laid off.	2	1	1	4	2	√			√	√	**5**
If the Legislature earmarks or allocates funding to specific projects, then FDOT's ability to fund priorities is reduced.	2	2	3	2	3	√			√	√	**6**
If data systems are affected by a cybersecurity attack, then technology-based infrastructure may not function.	2	4	3	2	3				√	√	**7**
If data systems are affected by weather or climate events, then technology-based infrastructure may not function.	2	4	3	2	3				√	√	**7**

Table 18: 2022 Program-Level Risks

Event/Occurrence	Likelihood	Consequence Score				Other Considerations					Risk
		Safety	Mobility	Asset Damage	Other Financial Impact	Funding	Insurance	Regulatory	Political	Reputation	
FDOT's ability to efficiently deliver programs is undermined due to unfunded Federal mandates.	3	3	4	2	3	√		√	√	√	11
FDOT's ability to efficiently prioritize and program projects is undermined due to diversion of funds to earmarks or special interest projects.	2	3	3	3	3	√	√		√	√	7
FDOT's ability to efficiently deliver programs is undermined due to shortages of skilled transportation workers.	4	4	4	2	4			√	√	√	16
FDOT's ability to efficiently deliver programs is undermined due to inadequate or unreliable data management systems and strategies.	2	3	3	3	3			√		√	7
FDOT's ability to efficiently deliver programs is undermined due to decision making which deviates from the department's mission statement.	2	3	3	3	3			√	√	√	7
FDOT's ability to efficiently deliver programs is impacted by a change in investments or priorities.	2	4	3	4	3	√	√	√	√	√	9
FDOT's ability to fully deliver programs is undermined due to construction costs or supply chain disruption.	4	2	4	2	3	√	√	√	√	√	14

Table 19: 2022 Asset-Level Risks

Event/Occurrence	Likelihood	Consequence Score				Other Considerations					Risk Score
		Safety	Mobility	Asset Damage	Other Financial Impact	Funding	Insurance	Regulatory	Political	Reputation	
Assets are damaged or destroyed due to hurricanes.	5	4	5	5	4	√	√	√	√	√	**28**
Bridges and roadways are damaged or destroyed due to flooding, sea level rise and wet weather events.	4	4	4	5	4	√	√	√	√	√	**21**
Assets are damaged or destroyed due to tornadoes.	2	2	2	3	2		√			√	**5**
Assets are damaged or destroyed due to wildfires.	2	2	2	3	1	√	√		√	√	**5**
Assets are damaged or destroyed due to vehicle impacts and/or hazardous materials spills.	3	2	2	3	2	√	√	√		√	**8**
Bridges are damaged or destroyed due to scour.	2	2	3	4	3	√	√			√	**7**
Assets may be damaged or destroyed due to failure of ITS and traffic safety equipment.	1	3	3	1	1		√			√	**2**
Bridges fail due to other unforeseen impacts.	2	3	3	4	2	√	√		√	√	**7**
Buried structures fail resulting in damage to other assets.	3	2	3	4	2	√	√			√	**9**
Sinkholes emerge under or near roadway sections compromising assets.	3	3	3	4	3				√	√	**11**
FDOT'S ability to construct/maintain assets is compromised due to unanticipated increase of project scope.	2	1	2	1	3	√	√			√	**4**
If asset information is not reliable or available, then reporting and decision-making requirements will not be adequate.	3	3	3	3	4	√	√	√	√	√	**12**

5.4 Risk Mitigation and Monitoring

There are several groups throughout the organization dedicated to managing and monitoring their respective assets to ensure impacts from potential risks remains low.

The tables below summarize the top risks identified through this process, along with mitigation strategies, responsible party, and frequency of monitoring. The risk score on the risk register does not necessarily correlate with the top priority risks identified in the table at each level. The top priority risks were selected based on discussions, subject matter expertise, and experience.

Agency-Level Risks: affect the mission, vision, and overall results of the asset management program. In total, thirteen risks were identified ranging from uncertainty of revenue to cybersecurity attack. The high priority risks involve uncertainty of revenue.

Table 20: Agency-Level Risk Mitigation and Monitoring Plan

High Priority Risk	Mitigation Plan			Monitoring		
Event/Occurrence	**Mitigation Strategy**	**Responsibility**	**Projected Implementation**	**How Implemented**	**Frequency**	**Responsibility**
FDOT incurs extensive short-term operating and maintenance costs after extreme weather or other unforeseen events and circumstances. Risk Score: 23	• First use any available cash balances until reimbursements are received. • Defer capacity related projects. • Adjust and reallocate resources to ensure operating and maintenance costs are covered.	• Work Program & Budget • Maintenance Office	As necessary	• Statute • Policy	As necessary	• Work Program & Budget • Maintenance Office
Funds are not sufficient for capital and maintenance projects due to rising costs. Risk Score: 11	• Defer capacity related projects. • Adjust and reallocate resources to ensure operating and maintenance costs are covered.	• Work Program & Budget • Maintenance Office	As necessary	• Statute • Policy	As necessary	• Work Program & Budget • Maintenance Office
State and federal funding are significantly reduced across the board for transportation. Risk Score: 7	• Make every effort to honor capacity projects already in the queue. • Defer capacity related projects. • Adjust and reallocate resources to ensure operating and maintenance costs are covered.	• Work Program & Budget • Project Management Office	As necessary	• Statute • Policy	As necessary	• Work Program & Budget
Revenue is not sufficient for capital and maintenance projects due to failure to accurately predict funding. Risk Score: 10	• Make every effort to honor capacity projects already in the queue. • Re-prioritize and defer capacity related projects. • Adjust and reallocate resources to ensure operating and maintenance costs are covered.	• Revenue Estimating Conference (REC) • Work Program & Budget	As necessary	• Statute • Policy	Continuous	• Work Program & Budget

Program-Level Risks: affect the Department's ability to deliver projects and meet targets within a program. In total, seven risks were identified that included organizational and systematic issues as well as revenue and economic uncertainties that in general cause projects to be delayed. These causes are not related to any specific project. The high priority risks are a mix of organizational issues and economic uncertainty.

Table 21: Program-Level Risk Mitigation and Monitoring Plan

High Priority Risk	Mitigation Plan			Monitoring		
Event/Occurrence	**Mitigation Strategy**	**Responsibility**	**Projected Implementation**	**How Implemented**	**Frequency**	**Responsibility**
FDOT's ability to efficiently deliver programs is undermined due to shortages of skilled transportation workers. Risk Score: 16	• FDOT's Attract, Retain, Train (ART) initiative • Succession planning. • Cross-training. • Documentation of desk procedures and processes. • Targeted workforce development programs such as Statewide Construction Workforce Development Program, Construction Career Days, Commercial Driver's License training. • Initiative programs for Small and Disadvantaged businesses. • $41 million allocated by 2022 Florida Legislature to assist with employee retention.	• Executive Team • Organization Development Office • All FDOT employees • Human Resources	On-going	• Initiative programs • Marketing • Training • Mentoring • Advertisement • Recruitment	On-going	• Organizational Development Office • Human Resources • Managers
FDOT's ability to fully deliver programs is undermined due to construction costs or supply chain disruption. Risk Score: 14	• Monitor trends in construction cost indicators. • Incorporate changes into construction estimates. • Index costs of fuel and bituminous. • Procure supply via contracting methods. • Stockpile construction materials to ensure availability. • Re-prioritize and defer projects. • Reallocate resources.	• Work Program & Budget • Procurement Office • Program Management Office	As necessary	• Policy • Procedure • Contracting	As necessary	• Work Program & Budget • Program Management Office
FDOT's ability to efficiently deliver programs is undermined due to unfunded federal mandates. Risk Score: 11	• Accelerate project readiness to ensure projects are in the pipeline to take advantage of anticipated funding opportunities. • Adjust and reallocate resources to ensure operating and maintenance costs are covered.	• Work Program & Budget • Program Management Office	As necessary	• Statute • Policy	As necessary	• Work Program & Budget
FDOT's ability to efficiently deliver programs is impacted by a change in investments or priorities. Risk Score: 9	• Defer capacity related projects. • Adjust and reallocate resources to ensure operating and maintenance costs are covered.	• Work Program & Budget • Program Management Office	As necessary	• Statute • Policy	As necessary	• Work Program & Budget

Asset-Level risks: relate to specific assets. These risks affect the scope, cost, schedule, or the condition of the specific assets. In total, twelve risks were identified ranging from natural events to third-party damage to structural failure or deterioration. The high priority risks involve impacts from natural events and other water-related damages.

Table 22: Asset-Level Risk Mitigation and Monitoring Plan

High Priority Risk	Mitigation Plan			Monitoring		
Event/Occurrence	**Mitigation Strategy**	**Responsibility**	**Projected Implementation**	**How Implemented**	**Frequency**	**Responsibility**
Assets are damaged or destroyed due to hurricanes. Risk Score: 28	• Continue to protect and harden to enhance resilience. • Update/develop new design criteria • Continue to prioritize operations and maintenance activities. • Continue to increase redundancy (i.e., parallel facilities or alternative models. • Relocate assets to lower risk areas where benefits of relocation outweigh the costs.	• Maintenance Office • Design Office • Work Program & Budget	As necessary	• Statute • Resiliency Policy • Procedures	As necessary	• Maintenance Office
Bridges and roadways are damaged or destroyed due to flooding, sea level rise and wet weather events. Risk Score: 21	• Continue to protect and harden to enhance resilience. • Update/develop new design criteria to reflect changing conditions. • Continue to prioritize operations and maintenance activities. • Relocate assets to lower risk areas where the benefits outweigh the costs.	• Maintenance Office • Design Office • Work Program & Budget	As necessary	• Statute • Resiliency Policy • Procedures	As necessary	• Maintenance Office
If asset information is not reliable or available, then reporting and decision-making requirements will not be adequate. Risk Score: 12	• Ensure data collection equipment is calibrated to FDOT standards. • Regularly update process and procedural handbooks to ensure consistency of data collection. • Ensure data collectors are trained on FDOT processes and procedures. • Continue internal QA checks of the data. • Limit access of data entry into central databases.	• Maintenance Office • State Materials Office • Transportation Data & Analytics Office	• As necessary • As scheduled	• Policy • Procedures • Processes	Continuously	• Maintenance Office • State Materials Office • Transportation Data & Analytics Office

Asset-Level Risk Mitigation and Monitoring Plan continued

High Priority Risk	Mitigation Plan			Monitoring		
Event/Occurrence	**Mitigation Strategy**	**Responsibility**	**Projected Implementation**	**How Implemented**	**Frequency**	**Responsibility**
Buried structures fail resulting in damage to other assets. Risk Score: 9	• Continue to prioritize operations and maintenance activities. • Update/modify design criteria to reflect changing conditions.	• Maintenance Office • Construction Office	• As necessary • During regular renewal cycle • As a component of scheduled projects	• Statute • Procedures	As necessary	• Maintenance Office
Assets are damaged or destroyed due to vehicle impacts and/or hazardous materials spills. Risk Score: 8	• Review and update as necessary the design standards. • Registration requirements for anyone hauling hazardous materials through the state. • Designation of routes for the transport of hazardous materials in the National Hazardous Materials Route Registry (NHMRR). • FDOT has authority to issue permits for over-dimensional and overweight vehicles. • Haulers required to use FDOT's automated system that tells them which routes to use for their overweight vehicles. • Over-dimensional vehicles exceeding 16 ft need District approval to ensure no maintenance, construction, or other event scheduled before permit is granted. • Penalties for violations.	• Motor Carrier Size & Weight Office • Maintenance Office • Florida Highway Patrol (FHP) Vehicle Enforcement Unit	• Continuously • As necessary	• Statute • Policy • Procedures • Processes and Practices • Contracting	As necessary	• Motor Carrier Size & Weight Office • FHP Enforcement Unit
Sinkholes emerge under or near roadway sections compromising assets. Risk Score: 11	• Monitor sites where karst geology is present. • Continue working with partners, such as FL Geological Survey on strategies to minimize risks. • Inventory sub-surface infrastructure and monitor age and condition. • Utilize fiber optics or other nano-sensing technology to remotely monitor infrastructure.	• Maintenance Office • Construction Office	As necessary	• Resiliency Policy • Procedures	Continuously	• Maintenance Office

5.5 Emergency Events -23 CFR Part 667

Title 23, Code of Federal Regulations (CFR) Part 667 requires the Department to identify and conduct statewide evaluations to determine if there are reasonable alternatives to NHS roads, highways and bridges that have required repair and reconstruction activities on two or more occasions due to emergency events.

In addition, beginning on November 23, 2020, the Department must also prepare an evaluation that conforms to Part 667 for all other roads, highways, and bridges (non-NHS) in the state prior to including any project affecting the facility in the Statewide Transportation Improvement Program (STIP). As explained in the regulations, the "evaluations for other roads, highways and bridges are required only when there is some reasonable likelihood work will be performed on those facilities."

An emergency event is defined as "a natural disaster or catastrophic failure resulting in an emergency declared by the Governor of the State, or an emergency or disaster declared by the President of the United States." Repair and reconstruction refer to "permanent repairs" that restore roads, highways, and bridges to their pre-disaster conditions.

Reasonable alternatives include options that could partially or fully achieve the following:

- Reduce the need for Federal funds to be expended on emergency repair and reconstruction activities;
- Better protect public safety and health and the human and natural environment; and
- Meet transportation needs as described in the relevant and applicable Federal, State, local, and tribal plans and programs. Relevant and applicable plans and programs include the Long-Range Statewide Transportation Plan, Statewide Transportation Improvement Plan (STIP), Metropolitan Transportation Plan(s), and Transportation Improvement Program(s) (TIP) that are developed under part 450 of this title.

The period covered for every evaluation is January 1, 1997, through December 31 of the prior year.

5.5.1 Approach and Project Analysis

The first step in this process was to identify all state and national emergency declaration events for the period January 1, 1997, through December 31 of the prior year. All executive orders for the gubernatorially-declared disasters and Florida's federally declared disasters which include major disaster declarations; emergency declarations; fire management assistance declarations; and fire suppression authorizations.

Next, was project identification. Within the Department, the Office of Work Program and Budget (OWPB) is responsible for the development and management of the Adopted Work Program. All projects, including projects due to emergency events, are stored in the Financial Management (FM) Database. Using filters, all emergency projects that received federal funds for the period January 1, 1997, through December 31 of the prior year are extracted and used in combination with other roadway information (such as functional classification) to build geographic information system (GIS) line and point data.

This allows the impacted locations to be shown electronically on a map, providing a visual context to assist the Design and Structures Maintenance Engineers in the districts with analysis of projects with permanent repairs. An added benefit is that it also helps to track problem areas, and aids with treatment options by allowing other GIS layers to be overlaid onto the area (i.e., topography) to help mitigate future damage from occurring.

In accordance with the Federal Highway Administration (FHWA) Emergency Relief Manual, permanent repairs usually occur after emergency repairs have been completed. Emergency repairs are *"those repairs including temporary traffic operations undertaken during or immediately following the disaster occurrence*

for the purpose of 1) minimizing the extent of the damage, 2) protecting remaining facilities, or 3) restoring essential traffic."

Examples of emergency repairs are:

- Erection and removal of barricades and detour signs
- Flagging and pilot cars during the emergency period
- Construction of temporary roadway connections (detours)
- Erection of temporary detour bridges
- Temporary substitute highway traffic service, including ferry or transit service
- Removal of debris
- Removal of slides
- Removal of drift piling up on bridges
- Placing riprap around piers and bridge abutments to relieve severe on-going scour action
- Placing riprap on the downstream slopes of approach fills to prevent scour from overtopping
- Replacement of washed-out embankments and approach fills
- Regrading of roadway surfaces, roadway fills, and embankments
- Restoring final roadway surfaces when needed to restore essential traffic

Permanent repairs typically require the development of plans, specifications, and estimates. Permanent repairs also include *"...restoring pavement surfaces, reconstructing damaged bridges and culverts, and replacing highway appurtenances."*

Using project files, detailed damage inspection reports (DDIRs), bridge records and by consulting with long time Department team members, the Design and Structures Maintenance Engineers are able to cross-check the projects to identify the roads, highways, and bridges with permanent repairs. The report of facilities requiring permanent repairs due to repeated damage can be found on the Department's performance website.

Project Analysis

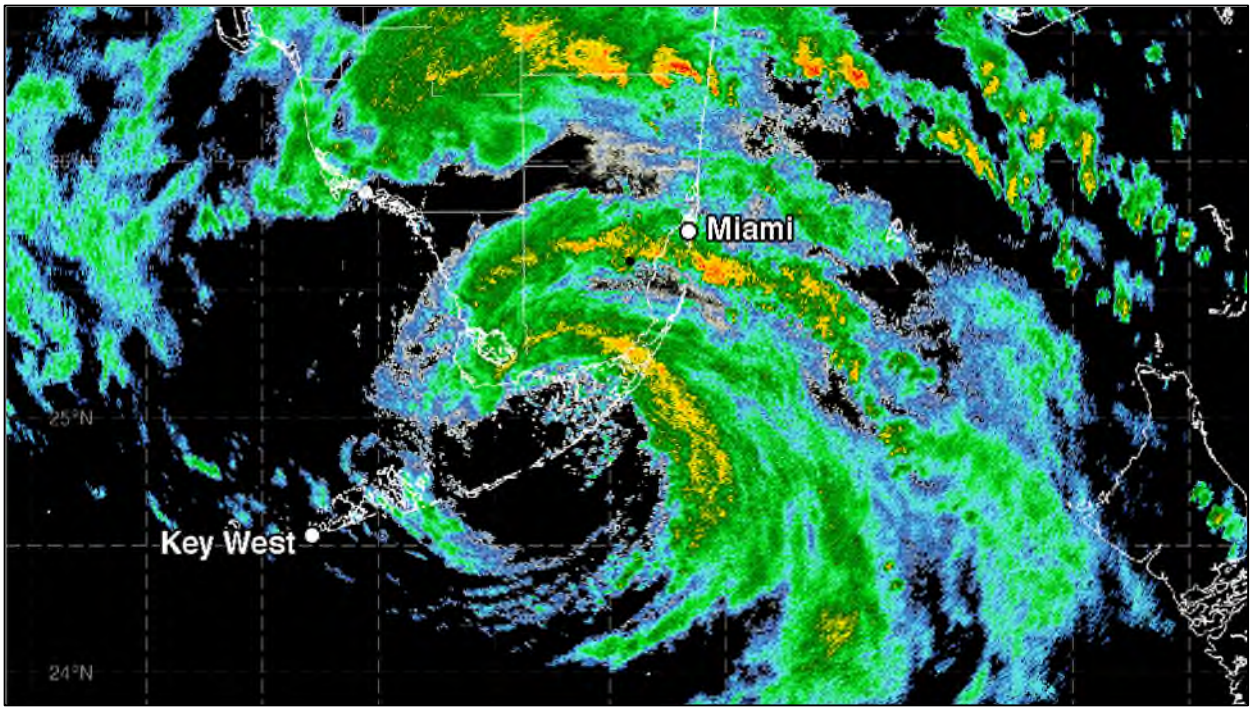
In the Department's 2019 TAMP, several facilities were identify as having sustained damage on two or more occasions due to emergency events. In particular, SR-5/US-1 (Overseas Highway) in the Florida Keys was damaged due to past hurricane events.

Although the entire stretch of the Overseas Highway in the Florida Keys is susceptible to storm damage, the District identified the stretch of roadway around mile marker (MM) 75 as the most critical segment for hurricane damage. That area is known as the Sea Oats Beach/The Fills area.

The permanent way to address future sea level rise and hurricane damage to the pavement in that area is to raise the highway. However, as an interim measure, projects were implemented and completed over the last couple of years to restore and reinforce the roadside/embankments along the highway to enhance erosion protection.

This mitigation effort was put to the test on November 8, 2020, when Tropical Storm Eta made landfall on Lower Matecumbe Key in the Florida Keys. This is the same area as the Sea Oats Beach/ The Fills area. Eta's sustained winds were reported at 52 -53 miles per hour (mph) with gust up to 63 mph. After the storm had moved out of the area, there were no repairs required to the highway. This demonstrates the success of the Department's storm mitigation efforts.

Figure 23: Tropical Storm Eta



Source: Mark Nissenbaum, Florida State University

5.5.2 Tracking and Updates

All projects that require repair and reconstruction activities due to emergency events are stored and tracked in the Department's Financial Management (FM) Database. Project information is updated in the database after every emergency event, as necessary. The Department also updates the project evaluations on a regular 4-year cycle as explained in the regulations (23 CFR 667.7(a)), and after an emergency event for the purpose of adding newly qualifying roads, highways, or bridges or modifying information on facilities already in the evaluation.

CHAPTER 6
Revenues and Financial Plan

Understanding the process for fund allocations and for determining the amount of funding available for asset management activities is a crucial step in TAMP implementation.

6.1 Revenue Sources

Since 1985, the Consensus Estimating Conference (CEC) process has been formally forecasting state revenue and workload cost figures. This process allows policymakers to evaluate policy options with an agreed upon forecast without having to debate fiscal impacts. The information developed at these conferences is used for state planning and budgeting.

- There are over thirty conferences each season, with three seasons per year. A person designated as a Principal at a CEC presides over, reviews, and officially adopts the estimate developed during an estimating conference. Meanwhile, a Participant supplies data and develops an independent forecast at the request of the Conference Principals.

The Department receives revenue that is estimated at three conferences:

- **General Revenue Estimating Conference** is where documentary stamp taxes are estimated.
- **Highway Safety Licenses and Fees Revenue Estimating Conference** is where title fees, initial registrations, and motor vehicle license fees are forecasted.
- **Transportation Revenue Estimating Conference** is where highway fuel taxes, aviation fuel taxes, and rental car surcharges are estimated.

The Department is a participant in the Highway Safety Licenses and Fees and Transportation Revenue Estimating Conferences. As a participant in two revenue estimating conferences, Department staff are required to prepare and present an independent forecast of revenues. All or part of the independent forecast may be included in the official forecast adopted by the conference principals. When preparing the forecast, the Department must assume current law and administrative practices will remain in effect. Each participant reviews the most recent data available to observe current year trends. The current year forecast is adjusted based upon this observation and the historical portion of the data represents the total annual amount.

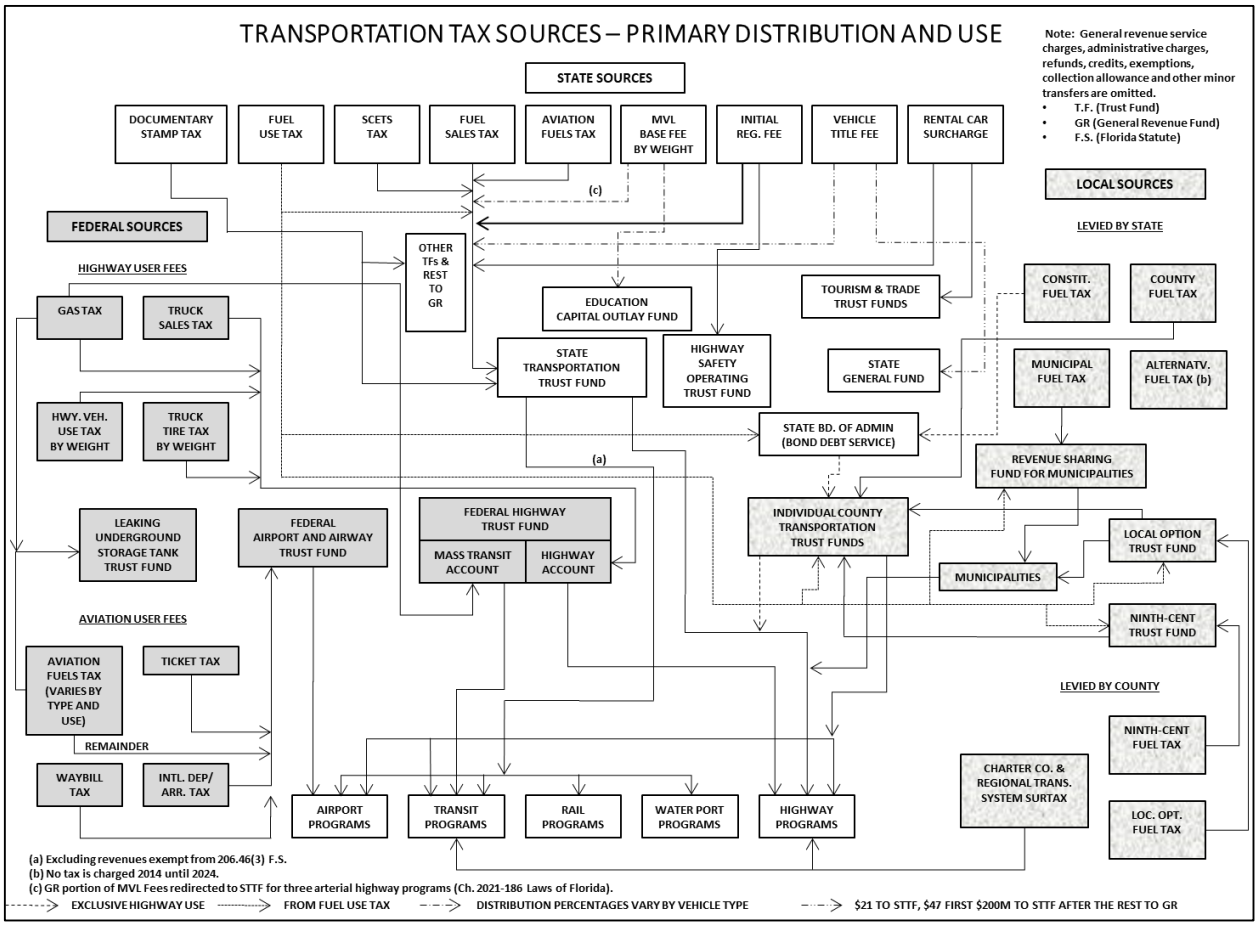
In addition, participants use the official information adopted by the state's Demographic and Economic Estimating Conferences as assumptions when preparing their independent forecasts; however, each participant may use their own judgment when choosing which variable from the conferences to use when forecasting a given tax source and how much weight each variable is given.

6.1.1 Transportation Funding

Chapter 334, Florida Statutes (F.S.), authorizes the Florida Department of Transportation (FDOT) to assume the responsibility for coordinating the planning of a safe, viable, and balanced state transportation system serving all regions of the state, and to assure the compatibility of all components, including multimodal facilities.

In carrying out its duties, the Department adopts a 5-year Work Program which is a list of transportation projects planned for each fiscal year. State taxes and fees, along with federal aid, make up the primary funding sources for the work program. Other funding sources include tolls collected in certain facilities, proceeds from bond issuances, and local taxes and fees.

Figure 24: Transportation Tax Sources

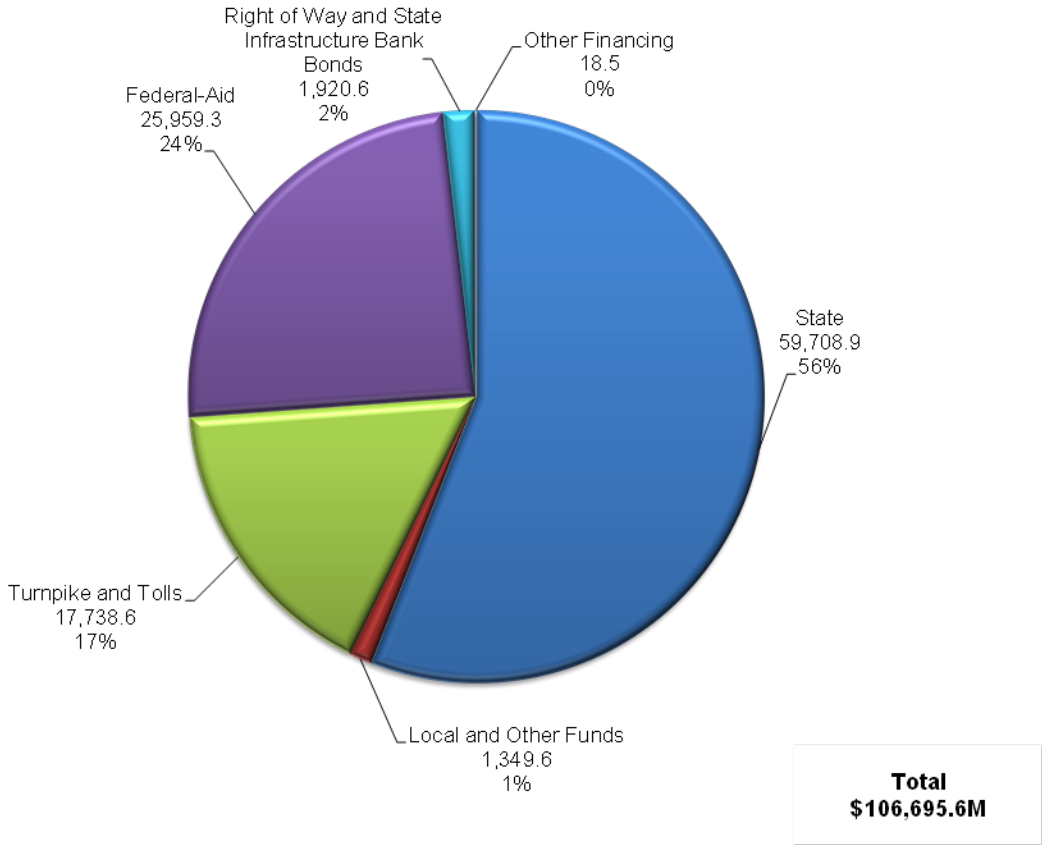


Source: Office of work Program & Budget, Florida's Transportation Tax Sources: A Primer

Section 206.46, F.S., authorizes the creation of the State Transportation Trust Fund (STTF), which is used by the Department to account for the administration of the maintenance and development of the state highway system and other transportation related projects. The STTF is the primary trust fund for the Department and includes federal reimbursements as well as revenue from state taxes and fees including fuel taxes, motor vehicle license related fees, and documentary stamp taxes. Transportation revenue receipts from fuel taxes make up over 50 percent of the state revenue portfolio; state fuel taxes are indexed to offset the impacts of inflation each January. Based on movement in the Consumer Price Index (CPI), Florida's State Highway Fuel Sales Tax and the State Comprehensive Enhanced Transportation System (SCETS) Tax are adjusted annually. The other major fuel tax sources (i.e., county fuel tax, aviation fuel tax) are not adjusted annually, however, and their buying power diminishes over time.

The remaining revenue portfolio is comprised of motor vehicle registration fees, tag and title fees, documentary stamp taxes, and Turnpike and other Department owned toll facilities.

Figure 25: Total Funding by Source (FY2022-2031)



Source: Office of Work Program & Budget

6.1.2 Local Programs

Nationwide, approximately 75% or 2.9 million total miles of roadway are owned and operated by local public agencies. Local grant programs provide transportation funding authorized by Florida State Statutes and/or by the United States Department of Transportation (USDOT).

The Department administers several grant funding programs for subrecipients more commonly known as "local agencies". Local agencies have jurisdiction over a transportation facility and include but are limited to a municipality, county, expressway, or transportation authority, special district, or regional governmental unit. The Local Agency Program or “LAP” is the Department's primary delivery mechanism for local agency projects to develop, design, and construct transportation facilities with Federal-Aid funds. The Department is the steward of the Federal-aid funds and is responsible for oversight of federally funded projects on behalf of the Federal Highway Administration (FHWA).

LAP agencies prioritize and fund local projects (through their respective MPO or governing board) and are then eligible for reimbursement for the services provided to the travelling public through compliance with applicable Federal statutes, rules, and regulations. In order for a local agency to participate, they must be certified to deliver LAP projects. The local agencies are required to perform a series of assessments to ensure financial and staffing capability, as well as the ability to comply with Federal and state regulations. Resources on how to get certified, including trainings, bulletins, manuals, and forms can be found on the Department’s Local Programs website.

The areas in which a local agency may be certified are:

- **Planning**
- **Design**
- **Construction/Construction Administration**

Based on the results of the certification review, a local agency will be granted one of two levels of certification:

- **Project Specific Certification (typically limited to off-system roadways)**
  - For local agencies that will perform an inconsistent number of projects.
  - Certification applies for the life of the project.
  - Step-by-step oversight by FDOT staff.
  - Mandatory training requirements.
  - Local Agency must "Re-Certify" to perform another project.
- **Full Certification**
  - For local agencies that will perform a consistent number of projects.
  - Certification applies for three (3) years.
  - Increased delegation of oversight from FDOT to local agency based on performance.
  - Mandatory training requirements.

There are several state-funded grant programs that local agencies can apply to receive:

- **County Incentive Grant Program (CIGP)**

  The County Incentive Grant Program (CIGP) was created for the purpose of providing grants to counties, to improve a transportation facility including transit which is located on the State Highway System (SHS) or which relieves traffic congestion on the SHS, per Section 339.2817, Florida Statutes. Such projects may include resurfacing and paving dirt local roads as long as the statutory requirement is clearly met. For example, if an application is received for CIGP funds to pave a dirt road, the justification must indicate how paving the dirt road would relieve congestion on the SHS.

  The Department funds up to 50 percent of the project cost. Match waivers are also available. Each eligible project must be consistent to the maximum extent feasible with the Florida Transportation Plan, Metropolitan Planning Organization Plan where applicable, and any appropriate local government comprehensive plan. Counties may submit projects that are not in the Metropolitan Planning Organization Long Range Transportation Plan or local government comprehensive plan; however, if selected, the projects must be amended into these plans within six months and supporting documentation should be provided to the Department.

- **Small County Outreach Program (SCOP)**

  The purpose of this program is to assist small county governments in repairing or rehabilitating county bridges, paving unpaved roads, addressing road-related drainage improvements, resurfacing, or reconstructing county roads, or constructing capacity or safety improvements to county roads. Small counties shall be eligible to compete for funds that have been designated for the small County Outreach Program (SCOP) for projects on county roads. Available funds are allocated to the districts based on the number of eligible counties.

  For example, if a district has 12 counties eligible for SCOP/Small County Economic Development (SCED) and Small County Growth Management (GRSC), and there is a total of 38 eligible counties statewide, then the district's allocation would be approximately 31.57 percent of the total

available funding. The Department shall fund 75 percent of the cost of projects on county roads funded under the program. Any initial bid costs or project overruns after the letting that exceed the Department's participation as stated, will be at the county's expense. This will help ensure that the funds are utilized on as many projects as possible.

Subsequent to the Department's selection of a project for inclusion in SCOP, a joint participation agreement (JPA) must be executed. Districts shall use the standard boilerplate JPA. Any changes to the financial provisions in this agreement must be approved by the Office of Comptroller.

- **Small County Outreach Program for Municipalities and Communities**

  SCOP for "Municipalities" is available to Rural Areas of Opportunity designated under *Section 288.0656(7)(a), Florida Statutes (F.S.)*. The transportation facility must be publicly owned and maintained by the municipality. Funds are available to assist in the repair and rehabilitation of bridges, paving unpaved roads; addressing road-related drainage improvements; resurfacing or reconstruction of roads and constructing safety improvements to roads.

- **Small County Road Assistance Program (SCRAP)**

  The purpose of the SCRAP program is to assist small county governments in resurfacing and reconstructing county roads. The Department funds up to 100 percent of the project cost. Beginning in FY 2000 until FY 2010, and beginning again with FY 2013, up to $25 million annually is available to be allocated for the purposes of funding this program. Available funds are allocated to the districts based on the number of eligible counties. For example, if a district has 10 counties eligible for SCRAP, and there is a total of 31 eligible counties statewide, then the district's allocation would be approximately 32.26 percent of the total available funding.

  Per Section 339.2816, Florida Statutes, the term "small county" (specifically for the SCRAP) means any county that has a population of 75,000 or less according to the 1990 Federal census data. Small counties shall be eligible to compete for funds that have been designated for the SCRAP for resurfacing or reconstruction projects on county roads that were part of the county road system on June 10, 1995. Capacity improvement on county roads shall not be eligible for funding under the program.

- **Transportation Regional Incentive Program (TRIP)**

  The purpose of the TRIP program is to encourage regional planning by providing state matching funds for improvements to regionally significant transportation facilities identified and prioritized by regional partners. State funds are available throughout Florida to provide incentives for local governments and the private sector to help pay for critically needed projects that benefit regional travel and commerce. The Department will pay up to 50 percent of the non-federal share of project costs for public transportation facility projects.

6.2 Asset Valuation

Pursuant to the Governmental Accounting Standards Board Statement No. 34 (GASB 34)[1] the Department has adopted the modified approach to recording infrastructure. GASB 34 defines infrastructure as "long-lived capital assets that normally are stationary in nature and normally can be preserved for a significantly greater number of years than most capital assets.

Under this modified approach, the Department has made the commitment to maintain these assets at levels established by the Department and approved by the Florida Legislature. The state is required to:

[1] This statement establishes new financial reporting requirements for state and local governments throughout the United States. For the first time, governments audited financial statements contain information about the full cost of providing public services, including infrastructure.

- Maintain an asset management system that includes an up-to-date inventory of eligible infrastructure assets.
- Perform condition assessments of eligible assets and summarize the results using a measurement scale.
- Estimate each year the annual amount to maintain and preserve the assets at the condition level established and disclosed by the state.
- Document that the assets are being preserved approximately at, or above, the established condition level.

Once built, infrastructure assets remain in the accounting records at historical cost and no depreciation is realized, nor are amounts capitalized in connection with improvements that lengthen the lives of these assets, unless the improvements also increase their service potential. Any replacements of infrastructure assets are expensed in the year paid. Any new capacity or new efficiency is capitalized and recorded as infrastructure. For example, a two-lane road is resurfaced and widened to four-lanes. Resurfacing costs for the existing lanes are expensed and costs associated with the two additional lanes would be capitalized as infrastructure.

As required by generally accepted accounting principles (GAAP), the Department annually updates its valuation of infrastructure assets based upon robust project costing activities. Annual expenditures are analyzed in detail by various project attributes, such as transportation system, phase, program, work mix, and funding source to appropriately classify expenditures as infrastructure or expense in accordance with GASB 34 as discussed above.

The following tables and charts provide current and historical valuation amounts for roadways and bridges, right-of-way, and work in progress for the State Transportation Trust Fund (STTF) and Turnpike Fund.

6.2.1 State Assets

Table 23: Current Value of State Assets (FY21)

	Value	Work in Progress	Right of Way	Total
Roadways & Bridges	41.5	3.5	11.6	56.6
Turnpike	8.9	1.5	1.0	11.4

Figure 26: Historic STFF Values

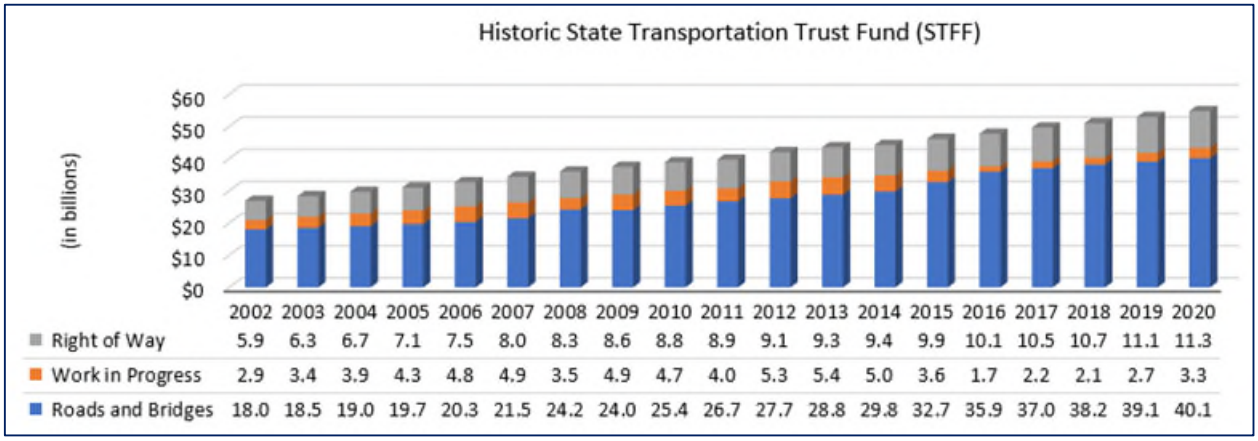
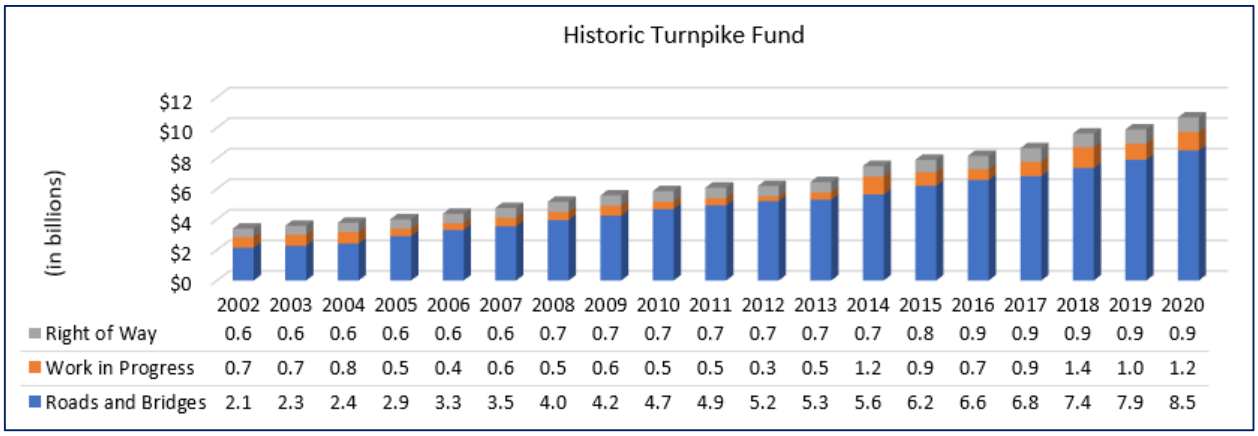


Figure 27: Historic Turnpike Values



6.2.2 Local Assets

The Department does not have the resources nor manhours to contact, research, and analyze the financial data for the local agencies NHS pavement and bridge assets. Therefore, to maintain consistency and to align with the Department's methodology, the current value of the local-owned and maintained NHS pavement and bridge assets was determined as follows.

Using the Department's value for infrastructure from the State Transportation Trust Fund (STTF) in Table 31, an average cost per centerline mile was determined. Note, the Department does not segregate its roadway and bridge values, so the number derived is the total average cost per centerline mile for state roadways and bridges. The cost was then applied to the total local NHS centerline miles to come up with an estimated value for the local-owned and maintained assets. Right of way was estimated similarly.

Calculation of Average Costs

Roadway & Bridge Costs per CLM	=	(Infrastructure) ÷ CLM
where: Infrastructure	=	value of FDOT infrastructure
CLM[2]	=	number of state centerline miles
Roadway & Bridge Costs per CLM	=	($41.5B) ÷ (12,121 CLM)
	=	$3.4 million per CLM
Right of Way Costs per CLM	=	(ROW) ÷ CLM
where: FDOT ROW	=	value of state right of way
CLM	=	number of state centerline miles
Right of Way Costs per CLM	=	($11.6B) ÷ (12,121 CLM)
	=	$957 thousand per CLM

[2] The number of CLM for the SHS was obtained from the Transportation Data & Analytics Office, 2021 HPMS submittal data.

Table 24: Current Value of Local Assets (FY21)

	Off-System CLM	Cost per CLM	Total
Roadways & Bridges	585	3.4	1,989
Turnpike	585	957	559.8
			2,548.8

6.3 Investment Priorities

To preserve transportation infrastructure investments, the Department resurfaces and rehabilitates roads; inspects, repairs, and replaces bridges; and conducts routine maintenance activities such as patching, mowing, litter removal, maintenance of pavement markers and sign replacement. Regular maintenance and preservation of the transportation system keeps it operating efficiently, extends its useful life, and postpones the need for costly reconstruction or replacement.

Included in Florida Statutes are requirements which must be considered as the Department plans and develops an integrated, balanced statewide transportation system. Preservation of the existing transportation infrastructure is of the upmost importance. Section 334.046(4), Florida Statutes, specifies that preserving the state's transportation infrastructure includes:

- Ensuring that 80 percent of the pavement on the State Highway System (SHS) meets Department standards.
- Ensuring that 90 percent of Department-maintained bridges meet Department standards.
- Ensuring that the Department achieves 100 percent of the acceptable maintenance standard on the SHS.

To adhere to the statutory guidelines, the Department prioritizes funding allocations to ensure the investments made in the current transportation system are adequately preserved and maintained before funding is allocated for capacity improvements. Thus, the Department addresses both preservation and capacity needs systematically. This approach is specified in the FTP, as well as in Florida Statutes as noted above.

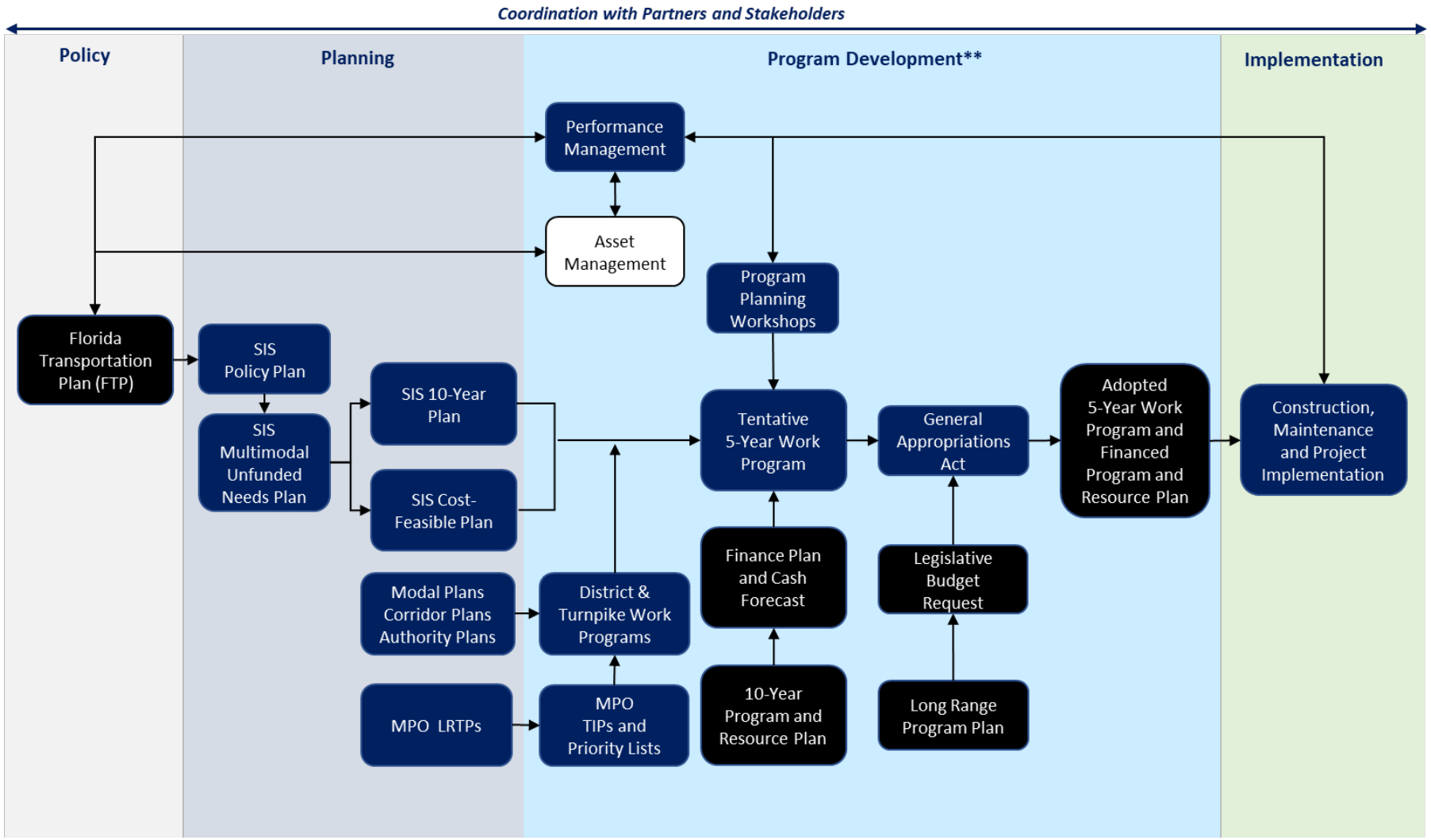
6.3.1 Process and Key Documents

There are several critical processes and documents (some previously mentioned in Chapter 2) generated that provide overall financial guidance for the Department.

- **Florida Transportation Plan (FTP):** provides the long-term vision for the State and sets broad policy guidance for all future Department initiatives.
- **Program and Resource Plan (PRP):** is a summary document providing the 10-year planned funding levels by fiscal year for all major Department functions within expected revenue.
- **The Work Program (WP):** provides a five-year outlook identifying which projects and services will be provided using available revenue.
- **Finance Plan and Cash Forecast:** provides assurance the Department's planned program is financed.
- **Legislative Budget Request:** is the request for spending authority to do the work of the agency.
- Long Range Program Plan: is developed annually and provides the framework and context for preparing the annual Legislative Budget Request.

The following figure illustrates the relationship between the financial processes and documents.

Figure 28: Processes and Key Documents



*** A Program and Resource Plan, Finance Plan and Cash Forecast are created with every version of the Work Program to ensure the program is financially viable. Development of the Operating Budget and Fixed Capital Outlay (FCO) Buildings and Grounds budget are not shown to simplify this illustration.*

Florida Transportation Plan (FTP)

The Policy Element of the FTP establishes the framework for expenditure of state and federal transportation funds flowing through the Department's Work Program. The goals and objectives of the plan also provide guidance to all other transportation partners as they develop and implement future policies, plans and projects to meet the changing needs of the state.

The plan includes:

- Trends, innovations, and opportunities and challenges shaping Florida's transportation present and future.
- Seven interrelated goals and objectives to guide Florida's transportation decisions, along with enhanced approaches to build on existing activities related to each goal.
- Specific indicators Florida will use to track progress toward the goals and objectives, including performance measures required by federal law.

Program and Resource Plan (PRP)

The PRP establishes the programming framework by which the Department's Work Program is developed. It is produced annually and consists of a complete 10-year projected budget for all major agency functions and programs. The PRP also serves as a link between the FTP, a planning document, and the Adopted and Tentative Work Plans, documents listing all FDOT projects and expected spending out to a five-year horizon.

While an annual document, the PRP can be modified during the course of a Fiscal Year as the Work Program is being developed.

To develop the fund allocations and program targets, the Department conducts a series of Program and Planning workshops statewide, typically in May, June, and July. These annual workshops provide an opportunity for the Executive Team (the FDOT Secretary, Assistant and District Secretaries) to set priorities, and establish policy direction for the needs-based programs.

During the workshops, presentations are made which provide an assessment of prior years' performance, projection for future performance, and recommended funding levels which ensures all preservation related performance objectives will be met annually as outlined in the Work Program and beyond.

For example, each year the State Materials Office conducts Pavement Condition Survey (PCS) for all roads on the SHS, which includes 83.2 percent lane miles of the NHS. During this process, data is objectively gathered to determine the existing pavement condition. The Department's Pavement Management System (PMS) is used along with planned construction data to help set lane-mile allocations for each district. Each individual district is provided a lane-mile allocation through the outcomes of these workshops. Each district however does have flexibility within its allocation to program projects in the Work Program.

Allocations for bridge repair and replacement, as well as routine maintenance, follow a similar process. Bridge information, gathered from inspections, is input into the Department's Bridge Management System (BrM), and is fed into the process in conjunction with engineer recommendations to fund needed repairs or replacements.

After funding levels and allocations have been established, discussions on project selection and prioritization commences. Local projects are included in those discussions.

The state's 27 Metropolitan Planning Organizations (MPOs) develop their list of priority projects in coordination with the Department's District Offices. In non-metropolitan areas, the Department programs projects in cooperation with affected local officials and Regional Transportation Planning Organizations, where applicable.

The Department programs transportation projects into the Work Program based upon local priority, funding availability, and project schedules. The Department's assessment of needs includes an identification of highly congested roadways, safety and security considerations, access to business and industry, links to military facilities and improvements to major economic assets such as seaports, airports, and rail facilities. Project needs are identified by the Department's District Offices in conjunction with local officials with responsibility for transportation. The Department also consults with non-MPO local officials to ensure consideration is given to the special needs of seniors and individuals with disabilities in meeting their transportation needs.

These project priorities serve as the basis for the district-wide prioritization process. The Department's Central Office reviews the district's programming of projects to ensure adherence to the Department's policies and procedures, established performance measures, and federal requirements.

The final list of projects that result from the project selection and prioritization process becomes the Department's adopted Five-Year Work Program.

After the June workshop, all policy-related issues are settled, and cash flow rates and available roll-forward funding are included in the plan. These figures are used in the fall for programming discretionary projects in the Tentative Work Program.

Following the completion of the legislative session, new fund codes or priority programs could be brought forward. These are fed into updated PRPs and form the basis for the following year's Tentative Work Program.

The Work Program (WP)

The WP is the five-year outlook that identifies which projects and services will be provided during the relevant five-year period by the Department. It is developed jointly each year by the Department with the Metropolitan Planning Organizations (MPOs), local governments, and the FHWA.

The purpose of the Work Program is to maximize the Department's production and service capabilities through innovative use of resources, increased productivity, reduced cost, and strengthened organizational effectiveness and efficiency. A Tentative Work Program is provided to the legislature and becomes the guiding Adopted Work Program following legislative approval. Both the Tentative and Adopted Work Programs are based on a complete, balanced financial plan for the State Transportation Trust Fund and other Department funds.

Developing the Work Program: Process

The process of developing the Tentative Work Program begins with the Program Planning Workshops, during which policy and preliminary funding decisions are made.

The Office of Work Program and Budget (OWPB) updates the Work Program Instructions (WPI) annually. The WPI reflect any policy changes approved by the Executive Team and reflect changes in technical guidelines arising from system modifications and/or revisions to applicable Federal and state laws, regulations, and administrative rules. Changes to the WPI are reviewed at workshops held in late August or early September, after which the instructions are finalized.

A Tentative Work Program is opened from July to January for Districts/Turnpike and Rail Enterprises and Central Office to update or add to the projects currently programmed in the Work Program Administration System within the Tentative Work Program years. The Tentative Work Program cycle allows districts to make modifications that reflect the most up-to-date factual information. This could include emergency responses, changes to legislation, or project scheduling. District level reviews by District Secretaries, followed by district-wide public hearings, are conducted prior to final closing of the Tentative Work Program period.

After the closing of the Tentative Work Program period, the Central Office Work Program staff reviews the district and statewide Work Programs for compliance with the WPI, Federal and state laws and regulations, administrative rules, and any other applicable guidelines. Other offices such as Intermodal Systems Development, Engineering and Operations, and Production Management also participate in the Central Office review. Review results are discussed with the districts and statewide program managers, and the Work Program Administration system is opened to allow Central Office staff to make necessary changes. Conferences or teleconferences are then scheduled for District Secretaries to review the district work programs with the Secretary. Additional modifications may take place as a result of these reviews.

The Tentative Work Program is developed by the Central Office based on the submissions of the seven districts and the Turnpike and Rail Enterprises. A preliminary version is submitted to the Executive Office of the Governor and the Legislature at least fourteen (14) days prior to the start of the legislative session (as required by section 339.135(4)(f), F.S.). This typically takes place in February.

The Florida Transportation Commission (FTC) also is charged with reviewing the draft submission. The FTC is required to hold a statewide public hearing on the Tentative Work Program prior to submission to the legislature.

Fourteen days after the start of the session (typically in March), the Department must submit the Tentative Work Program for legislative consideration based on comments and review. The legislature ultimately approves or modifies the Work Program through the General Appropriations Act. Prior to the start of the new Fiscal Year on July 1st, the Department will adopt a final Work Program. The Adopted Work Program may include only those projects submitted as part of the Tentative Work Program plus any projects that are separately identified by specific appropriation in the General Appropriations Act and any roll forwards.

The following figure shows the Work Program development schedule.

Figure 29: Work Program Development Schedule

ACTIVITY	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL NEW FY
MPO Establish Priorities															
Executive Team Policy and Funding Decisions															
Statewide & District Programs Identify Projects															
Public Hearings															
Compliance and Executive Review															
Transportation Commission Review and Public Hearing															
Submit Tentative Work Program to Governor & Legislature															
Approve Budget															
Adopt Work Program															

Source: Office of Work Program & Budget

Finance Plan and Cash Forecast

The Department regularly produces four finance plans, one each for the State Transportation Trust Fund (STFF), the Right of Way Acquisition and Bridge Constructions Trust Fund, the Turnpike Enterprise Revenue Funds, and the Turnpike Enterprise Bond Funds. The purpose of the Finance Plans is to show that projected revenues are sufficient to cover planned expenditures for the ensuing five-year period.

Submitted formally in October of each year with the Department's Legislative Budget Request, the Office of Work Program and Budget updates the Finance Plans on an ongoing basis. The plans provide a general snapshot of the financial health of the Department by testing whether the existing and planned commitments can be financed based on a comparison of revenue estimates and expenditures for a five-year period.

They are used to establish capacity related fund allocations for the Department and help show the Department is fully utilizing the resources which are available. The plans provide summary level revenue estimates and planned expenditures across high-categorical levels, including Administration/In-House Operations, Maintenance, Consultant Support, Right-of-Way, Construction, Freight Logistics and Passenger Operations, Miscellaneous Expenditures, and Fixed Capital Outlay (FCO).

The Finance Plans include Federal aid reimbursements, state, and bond funded programs to provide a complete funding perspective.

The Department's Cash Forecast section is responsible for projecting the monthly cash needs for the agency's five-year Work Program. The Department is the only state agency that operates on a "cash flow" basis; that is, for most transportation projects in Florida, the Department begins design and construction before the total amount of cash is available to fund the project.

The Department anticipates that future revenues will be available to finance current projects. The Department is not required to have funds "on hand" to cover all existing contractual obligations and it may let contracts against revenue it expects to receive in the future. In order to manage the Department's available cash in the future, the Department is required by law to forecast its future expenditures, obligations, and revenue.

This forecast method is used to maximize revenues to fund transportation projects for multiple year periods. The Department forecasts monthly cash receipts and disbursements for a ten-year time span. Since the cash balance can vary as much as $300 million in one day, a reasonable cash balance and accurate forecast are critical. Florida Statutes require the Department to maintain a minimum cash balance at the end of each quarter of $50 million.

Key Statutory Requirements:

- The work program must include a balanced 36-month forecast of cash and expenditures and a 5-year finance plan supporting the work program. S. 339.135(4)(b), F.S.
- The tentative and adopted work programs required by subsections (4) and (5) shall be based on a complete, balanced financial plan for the State Transportation Trust Fund and the other funds managed by the Department. S. 339.135(3)(a), F.S.
- In the operation of the State Transportation Trust Fund, the Department shall have at the close of business, which closing shall not be later than the 10th calendar day of the month following the end of each quarter of the fiscal year, an available cash balance (which shall include cash on deposit with the treasury and short-term investments of the department) equivalent to not less than $50 million, or 5 percent of the unpaid balance of all State Transportation Trust Fund obligations at the close of such quarter, whichever amount is less. S. 339.135(6)(b), F.S.

- The budget for the turnpike system shall be so planned as to provide for a cash reserve at the end of each fiscal year of not less than 5 percent of the unpaid balance of all turnpike system contractual obligations, excluding bond obligations, to be paid from revenues. S.338.241, F.S.

Although Florida Statutes require a 36-month forecast, the Cash Forecast section prepares a ten-year monthly cash forecast for the Department. The Cash Forecast section provides cash forecasts for all Department trust funds. The monthly cash forecast report includes the following funds: State Transportation Trust Fund (STTF), Right of Way Acquisition and Bridge Construction Trust Fund, Turnpike Revenue Fund, Turnpike General Reserve Fund, Turnpike Renewal and Replacement Fund, various Turnpike Bond Funds, Federal Advanced Construction Program, 4 Escrow Accounts, Federal Softmatch and the State Infrastructure Bank (SIB).

Legislative Budget Request (LBR)

The Legislative Budget Request is the Department's request to the Governor and Legislature for spending authority to do the work of the agency for the next fiscal year. The request includes proposed revenues and expenditures for operational and fixed capital outlay needs to accomplish the Department's objectives in the ensuing fiscal year.

The LBR requests legislative authority to finance the first year of the Five-Year Work Program and includes a balanced 36-month forecast of cash and expenditures and a five-year finance plan.

The budget request conforms to the Tentative Work Program, which is also submitted to the legislature for approval.

Long Range Program Plan (LRPP)

Each Florida state agency is required by Florida Statute 216.013 to develop a LRPP on an annual basis. The plan provides the framework and context for preparing the annual legislative budget request. The plans are goal-based with a five-year planning horizon and focus on agency priorities in achieving the goals and objectives of the state. Performance indicators are included to evaluate the impact of programs and agency performance.

In addition to describing the agency's response to anticipated conditions over the five-year period, the plan provides agencies with a vehicle for a detailed look at more immediate programmatic and budget needs. It requires agencies to describe what they are currently doing and what they expect to accomplish over the next five years. The plan provides information for programs, and services and the financial information included in the Legislative Budget Request (LBR).

6.4 Funding Allocations

The Program and Resource Plan (PRP) contains the approved program alternatives and funding levels by fiscal year to accomplish program goals and objectives within expected revenue. However, the information is not reported by work type (i.e., construction, preservation, rehabilitation, reconstruction, maintenance) as required in the federal regulations. Instead, financial investments are reported and organized by the Department's program areas.

It would require significant resources and man-hours that are currently not available to configure the Department's databases to store and report funding allocations by work types for the NHS. Therefore, to assist with understanding of the funding allocations, a crosswalk between the FHWA work types and the Department's program areas is provided.

Table 25: Crosswalk Between FHWA Work Types and FDOT Program Areas

FHWA Work Types	FDOT Definition of the FHWA Work Types	Typical FDOT Pavement Treatments	Typical FDOT Bridge Treatments*	Corresponding FDOT Program Areas
Construction	Pavement: the complete and full development of a pavement system on a new alignment. Bridge: the complete construction of a new bridge on a new alignment.	Placement of the different pavement system layers on top of a newly and properly prepared subgrade to meet the current governing design and construction specifications and requirements as in the case of added capacity.	Construction of a new bridge on new alignment.	State Highway System (SHS) Added lanes
Preservation	Bridge: consists of work that is planned and performed to sustain the condition of a bridge in a state of good repair, or restoration of an existing bridge, including all its appurtenances, t a condition which meets current standards (rehabilitation).	See Rehabilitation	23 – strengthen bridge 41 – rebuild movable 42 – major deck repair 43 – major superstructure repair 44 – major substructure repair 54 – replace deck 56 – rehabilitate deck 57 – rehabilitate superstructure 45 – replace paint system 46 – replace joints 47 – overlay deck/slab 48 – scour countermeasures 49 – fender repair	Bridge Repair
Rehabilitation	Pavement: a process of restoring the existing pavement to its full serviceability. This concerns the upper layers of a pavement system, or the full reconstruction of the entire pavement structure within the same alignment.	Partial or full depth milling of an asphalt layer along a pavement section; or slab replacement, cracks, and joints resealing, and grinding of concrete pavements, as in the case of resurfacing work; or the entire asphalt layer and a predetermined depth of the base material is removed and replaced or reworked and strengthened to meet the current governing structural design and construction specifications and requirements such as in the case of a full depth reclamation; or removal and replacement of concrete slabs and a predetermined depth of the supporting material, then surface grinding as in the case of concrete pavements.	See Preservation	Resurfacing

FHWA Work Types	FDOT Definition of the FHWA Work Types	Typical FDOT Pavement Treatments	Typical FDOT Bridge Treatments*	Corresponding FDOT Program Areas
Reconstruction	Bridge: The complete replacement of an existing bridge on an existing alignment.	See Rehabilitation	11 – strength bridge replacement 12 – economy bridge replacement	Bridge Replacement
Maintenance	The known, ongoing, and often proactively scheduled repair and preventive maintenance activities to extend the useful life of the asset.	Repairing localized surface distresses such as potholes to improve the serviceability and ensure the safety of the traveling public throughout the service life of a pavement section. Repairing localized surface distresses such as potholes to improve the serviceability and ensure the safety of the traveling public throughout the service life of a pavement section.	31 – joint maintenance and repair 32 – deck maintenance and repair 33 – railing maintenance and repair 34 – superstructure maintenance and repair 35 – substructure maintenance and repair 36 – channel maintenance and repair 37 – electrical maintenance and repair 38 – mechanical maintenance and repair 39 – movable structure maintenance and repair	Maintenance

Sources: FDOT, Office of Maintenance and State Materials Office

6.4.1 Construction

Under the Department's SHS program area, the Lanes Added function corresponds to the Construction work type. The scopes of work included in this program area are the construction, addition or improvement of lanes, interchanges, entry/exit ramps, feeder roads, toll collection facilities and motorist service facilities which are on or planned to be on the SHS, which includes approximately 78 percent lane miles of the NHS. Functionally obsolete bridges needing widening to meet standards or for capacity improvements within a transportation corridor are also included in this program area.

Table 26: Construction – SHS Funding Allocations

	($ Millions)			
	Interstate Construction	Turnpike	Other SHS	SHS Traffic Operations
FY21/22	923	416	1,166	125
FY22/23	1,721	671	2,192	82
FY23/24	1,562	1,094	347	54
FY24/25	1,095	808	732	60
FY25/26	822	899	674	48
FY26/27	755	558	603	17
FY27/28	1,165	42	654	46
FY28/29	1,025	278	538	47
FY29/30	686	216	795	49
FY30/31	742	1,286	582	50

Source: Office of Work Program & Budget.

Table 27: Construction – NHS Funding Allocations

	($ Millions)			
	Interstate Construction	Turnpike	Other SHS	SHS Traffic Operations
FY21/22	911	378	904	59
FY22/23	1,276	348	1,756	41
FY23/24	1,292	1,040	163	16
FY24/25	700	622	560	7
FY25/26	469	680	486	6
FY26/27	408	517	381	0
FY27/28	408	517	381	0
FY28/29	408	517	381	0
FY29/30	408	517	381	0
FY30/31	408	517	381	0

Source: Office of Work Program & Budget.

6.4.2 Preservation

The Department's Bridge Repair program area correspond to the Preservation work type. The Department's bridge program policies direct resources to repair bridges with some degree of structural deterioration. The allocation of funds helps ensure at least 90 percent of the Department maintained bridges meet Department standards and that all bridges which are open to the public are safe for travel.

Table 28: Preservation - SHS Funding Allocations

	($ Millions)		
	Repair – On System	Local Bridge	Turnpike
FY21/22	110	1	0
FY22/23	137	1	22
FY23/24	81	3	13
FY24/25	78	8	3
FY25/26	223	4	3
FY26/27	100	0	3
FY27/28	92	0	2
FY28/29	95	0	2
FY29/30	98	1	2
FY30/31	101	0	0

Source: Office of Work Program & Budget.

Table 29: Preservation - NHS Funding Allocations

	($ Millions)		
	Repair – On System	Local Bridge	Turnpike
FY21/22	83	0	0
FY22/23	54	0	16
FY23/24	36	0	10
FY24/25	26	0	0
FY25/26	154	0	0
FY26/27	3	0	0
FY27/28	3	0	0
FY28/29	3	0	0
FY29/30	3	0	0
FY30/31	3	0	0

Source: Office of Work Program & Budget.

6.4.3 Rehabilitation

The Department's Resurfacing program area corresponds to the Rehabilitation work type. The program provides for pavement resurfacing, rehabilitation, minor reconstruction, and pavement milling and recycling. In this program area, the Department allocates funds to ensure at least 80 percent of pavement on the SHS, which includes approximately 78 percent lane miles of the NHS, meets Department standards. These activities are intended to preserve the structural integrity of highway pavements.

Table 30: Rehabilitation - SHS Funding Allocations

	($ Millions)			
	Interstate	Arterial & Freeway	Off-System	Turnpike
FY21/22	200	748	2	45
FY22/23	219	1,047	0	59
FY23/24	217	1,015	1	46
FY24/25	249	1,109	0	52
FY25/26	223	1,179	0	61
FY26/27	230	1,279	0	61
FY27/28	209	1,230	0	65
FY28/29	216	1,255	0	70
FY29/30	223	1,298	0	70
FY30/31	230	1,325	0	70

Source: Office of Work Program & Budget.

Table 31: Rehabilitation - NHS Funding Allocations

	($ Millions)			
	Interstate	Arterial & Freeway	Off-System	Turnpike
FY21/22	200	574	0	45
FY22/23	219	651	0	47
FY23/24	217	614	0	42
FY24/25	249	729	0	49
FY25/26	66	178	0	0
FY26/27	28	101	0	0
FY27/28	28	101	0	0
FY28/29	28	101	0	0
FY29/30	28	101	0	0
FY30/31	28	101	0	0

Source: Office of Work Program & Budget.

6.4.4 Reconstruction

The Department's Bridge Replacement program area corresponds to the Reconstruction work type. The Department's bridge program policies direct resources to replace bridges with some degree of structural deterioration. The allocation of funds helps ensure statutes are met. In addition, a small percentage of the federal bridge replacement funds must be used for the inspection and replacement of local bridges off the federal-aid highway system.

Table 32: Reconstruction - SHS Funding Allocations

	($ Millions)		
	Replace – On System	Local Bridge	Turnpike
FY21/22	352	158	0
FY22/23	106	49	8
FY23/24	276	25	0
FY24/25	54	20	18
FY25/26	201	21	0
FY26/27	454	25	0
FY27/28	254	16	1
FY28/29	254	16	1
FY29/30	259	18	1
FY30/31	254	17	0

Source: Office of Work Program & Budget.

Table 33: Reconstruction - NHS Funding Allocations

	($ Millions)		
	Replace – On System	Local Bridge	Turnpike
FY21/22	216	126	0
FY22/23	64	5	8
FY23/24	202	0	0
FY24/25	39	0	18
FY25/26	28	0	0
FY26/27	341	0	0
FY27/28	341	0	0
FY28/29	341	0	0
FY29/30	341	0	0
FY30/31	341	0	0

Source: Office of Work Program & Budget.

6.4.5 Maintenance

The Department's Maintenance program area corresponds to the Maintenance work type. The Maintenance program is a needs-zero based budget development process which includes the operating and work program budget needs of each District, Turnpike Enterprise, and Central Office to carry out maintenance programs. The program provides for individual maintenance work activities which are grouped into roadway and structures, shoulder maintenance, traffic services, drainage maintenance, turf management and litter control on the SHS.

Maintenance activities are performed by in-house crews and contractor crews using a combination of work directed contracts and performance-based contracts. The performance-based contracts are lump sum contracts and typically cover large geographic areas of the state or corridors. Since performance-based contracts are lump sum, it is not possible to separate individual maintenance activities. Highway maintenance conditions are assessed using the Maintenance Rating Program (MRP) to grade five highway components (roadway, roadside, vegetation/aesthetics, traffic services and drainage) to arrive at a maintenance rating of 1 to 100. The Department's standard is to achieve and maintain an overall maintenance rating of 80.

The Department does not project future maintenance conditions; instead, sufficient funding is provided annually to ensure 100 percent of the maintenance standard is achieved. To determine the funding allocations for the NHS, a ratio based on centerline miles of NHS to centerline miles of the SHS was calculated and applied to the Maintenance budget as follows:

Ratio and NHS Budget Calculation

On-system Ratio = (Total NHS CLM) ÷ (Total SHS CLM)

where: CLM = Centerline Miles

On-system Ratio = (8,228 CLM) ÷ (12,121 CLM)

= 0.6788 or 67.9%

NHS Allocation = (Maintenance Budget) x (On-system Ratio)

Note: CLM data for the NHS and SHS obtained from 2021 HPMS submittal data.

Table 34: Maintenance - Funding Allocation (FY22/23)

	Maintenance Budget ($ Millions)	NHS Budget ($ Millions)
Operations & Maintenance	997	677
In-House	269	183
M&O Contracts	688	467
Consultants/Contracts	40	27

Source: Office of Work Program & Budget.

6.5 Investment Strategies and Risks

The Department continuously engages in efforts of identification and response to top priority risks at the Agency, Program and Asset Levels to ensure pavements and bridges are in a SOGR. These risks are considered and incorporated in the Department's financial plan and investment strategies.

Risks at the Agency Level affect the mission, vision, and overall results of the asset management program.

Risks involving impacts and uncertainty of revenue were identified as the top priority. As mandated by statute, the Department allocates funding directly "off the top" to keep the existing transportation system safe and to standards. If the Department were to experience impacts and uncertainty of revenue, capacity projects would be reprioritized and/or deferred. This would minimize the financial and budget risks associated with maintaining the SOGR for the transportation system.

Risks at the Program Level affect the Department's ability to deliver projects and meet targets within a program. These risks include organizational and systematic issues, including revenue and economic uncertainties that cause projects to be delayed. Any impacts to funding, whether due to construction cost increases, supply chain disruptions, unfunded Federal mandates, directed investments or changes in priority would be mediated the same as described at the Agency Level; capacity projects would be deferred and other adjustments made, as necessary, to preserve the existing transportation system to standards. In addition to the "off the top" funding allocations, the Department monitors trends in construction cost indicators and indexes the costs of fuel and bituminous. Those changes are incorporated into estimates to allow time to prepare for possible increases/decreases in costs. This information is used in conjunction with the pavement management system (PMS) and bridge management system (BrM) analyses to inform funding projections.

Risks at the Asset Level affect the condition of specific assets. Those identified as top priority involved hurricanes and other water-related damages. To address these risks, the Department first utilizes any available cash balances until reimbursements are received. If those balances are not sufficient to cover the short-term needs, the Department mitigates the risks as described at the Agency Level; capacity projects are deferred and other adjustments made, as necessary, to preserve the existing transportation system. Over the years, this has proven to be a very effective strategy. The Department would also seek reimbursement from the federal government for costs incurred by the weather-related events. Additionally, the Department periodically reviews and if necessary, updates its design standards to enhance resilience of the transportation system infrastructure. These enhancements are accounted for in the PMS and BrM systems which utilize cost information, inflation factors and other data when conducting analyses.

6.6 Infrastructure Investment and Jobs Act (IIJA)

The Bipartisan Infrastructure Investment and Jobs Act of 2021, aka Bipartisan Infrastructure Law (BIL), was signed into law on November 15, 2021. The BIL allocates $550 billion in new federal spending over five years to transportation projects, water, and power infrastructure, in addition to regular annual spending on infrastructure projects.

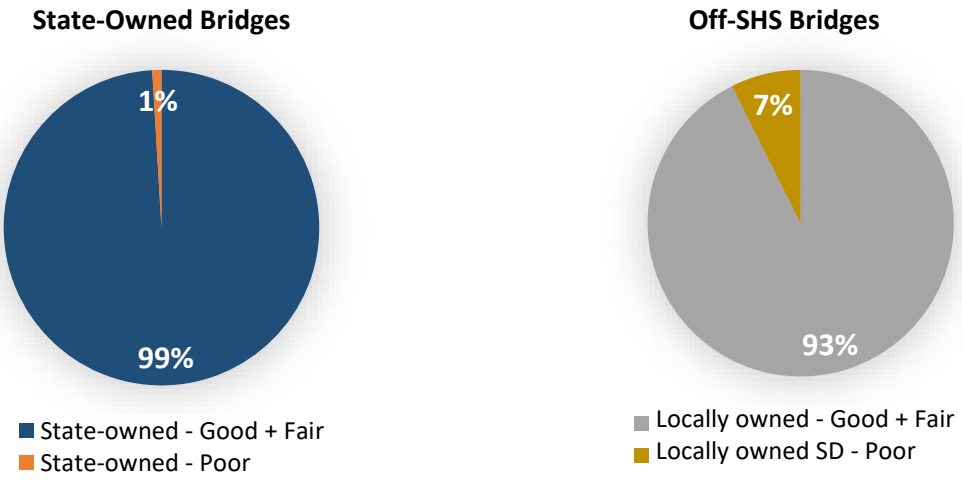
The BIL's Bridge Formula Program (BFP) will provide $26.5 billion for states to replace, rehabilitate, preserve, protect, and construct highway bridges. The Department is the recipient of approximately $263 million of funding over 5 years through the program, which is less than 1 percent of the total support going to states.

Based on this limited funding and looking at the condition of the bridges in the state, the Department is focusing on bridges in poor condition owned by local agencies, that are not on the State or Federal Highway systems. Historically this list of bridges remains near 250 and the Department's yearly funding can only replace 4 or 5 bridges per year.

Table 35: Florida Bridge Inventory and Condition

	Florida Bridge Inventory - As of June 3rd, 2022	
	On State Highway System	Off State Highway System
Total Number of Bridges	7,334	5,343
Bridges in Poor Condition	70	395*

** 244 located off federal aid roads.*



The following criteria was used to select the bridges:

1. Bridges are in poor condition.
2. Ability of Districts and owners to deliver the projects by the end of Fiscal Year 2026.
3. Distribution of projects throughout the State, to avoid overloading one County or District.

Using the BFP funding and working with the Districts and local agencies, the Department has identified and prioritized 32 bridge projects across 20 Florida counties in addition to the roughly 20 bridges the Department would project to replace with typical funding over the same 5-year period. Project totals of over $110 million, plus contingencies, that are set to be funded through Florida's program distribution are summarized per county in the table below.

Table 36: Bridge Formula Program Spending by County

County	Project Total per County	Bridge Projects per County
Baker	$18,034,133	3
Broward	$18,825,773	4
Collier	$620,973	1
DeSoto	$121,150	1
Duval	$2,005,365	1
Escambia	$8,466,675	1
Gadsden	$18,368,904	2
Gulf	$7,807,671	1
Hendry	$101,487	1
Holmes	$6,560,217	2
Jackson	$1,001,000	1
Lee	$223,666	1
Miami-Dade	$5,494,765	3
Monroe	$1,661,230	2
Nassau	$1,436,280	1
Pinellas	$420,000	2
Sarasota	$169,699	1
Taylor	$2,376,984	1
Walton	$15,427,803	2
Washington	$1,055,320	1
Total	**$110,179,096**	**32**

6.7 Summary

The primary source of funding for Florida's asset management activities comes from state-generated revenues. Approximately twenty-four percent of funding comes from federal sources. As mandated by statute, the Department allocates funding directly "off the top" to ensure investments made in the current transportation system are adequately preserved and maintained before funding is allocated for capacity improvements.

The amount of funding allocated is informed by the analyses conducted using the Department's pavement and bridge management systems which utilize historical data, current inventory and condition data, past funding allocations, performance history and other data as input to help optimize project selection for decision-makers. These systems ensure there is no gap between the existing conditions and SOGR of pavements and bridges on the SHS, which includes approximately 78 percent lane miles of the NHS. The Department does coordinate on performance , to the extent practicable, with other NHS owners. However, local agencies manage the portions of the NHS that are not on the SHS.

The Department's top priority risks at the Agency, Program and Asset Levels are also considered and incorporated into the financial plan and investment strategies. Any impacts to funding, whether due to construction cost increases, supply chain disruptions, unfunded Federal mandates, directed investments or changes in priority are mediated by reprioritizing or deferring capital projects and making other adjustments as necessary to preserve the existing transportation system to standards.

To date, Florida has achieved an envious state of being able to maintain performance on highways and bridges above Department standards. This helps to support progress towards achievement of the established targets for the Interstate pavements, non-Interstate NHS pavements and NHS bridges. In doing so, the Department will continue to provide a safe transportation system that ensures the mobility of people and goods, enhances economic prosperity, and preserves the quality of Florida's environment and communities. That is the mission of the Department, which reflects the national goals for the federal-aid highway program.

National Goals:

- **Safety**: to achieve a significant reduction in traffic fatalities and serious injuries on all public roads.
- **Infrastructure Conditions**: to maintain the highway infrastructure asset system in a state of good repair.
- **Congestion Reduction**: to achieve a significant reduction in congestion on the NHS.
- **System Reliability**: to improve the efficiency of the surface transportation system.
- **Freight Movement and Economic Vitality**: to improve the National Highway Freight Network, strengthen the ability of rural communities to access national and international trade markets and support regional economic development.
- **Environmental Sustainability**: to enhance the performance of the transportation system while protecting and enhancing the natural environment.
- **Reduced Project Delivery Delays**: to reduce project costs, promote jobs and the economy and expedite the movement of people and goods by accelerating project completion through eliminating delays in the project development and delivery process, including reducing regulatory burdens and improving agencies' work practices.

CHAPTER 7
Performance Assessment and Investment Strategies

One of the Department's main responsibilities is to keep the SHS in a State of Good Repair (SOGR). The system is currently in good condition, based on many national surveys which consistently rate Florida as having the nation's best pavements and bridges. This is a direct result of the Department inspecting and maintaining the pavement and bridge assets to Department standards, which supports progress towards achieving the established targets for asset condition and performance of the NHS.

7.1 Overview

The Department utilizes strong management tools for pavements and bridges, coupled with a thorough reporting and review process to ensure systemwide performance meets target levels. The Department's iterative, system-wide approach to programming and prioritizing pavements and bridges, addresses risk, prevents gaps, and is built on strong financial planning and investment strategies to ensure the right needs are addressed at the right time.

Table 37: NHS Pavement and Bridge Measures – Actual Performance

Federal Measures	Targets		Actual Performance			Targets	
NHS Pavement Measures	**Year 2019**	**Year 2021**	**2019**	**2020**	**2021**	**Year 2023**	**Year 2025**
% of Interstate pavements in Good condition	60.0%	60.0%	68.0	68.8	70.4	60.0%	60.0%
% of Interstate pavements in Poor condition	5.0%	5.0%	0.5	0.6	0.7	5.0%	5.0%
% of non-Interstate NHS pavements in Good condition	40.0%	40.0%	41.0	41.0	47.5	40.0%	40.0%
% of non-Interstate NHS pavements in Poor condition	5.0%	5.0%	0.3	0.3	1.1	5.0%	5.0%
NHS Bridge Measures	**Year 2019**	**Year 2021**	**2019**	**2020**	**2021**	**Year 2023**	**Year 2025**
% of NHS bridges classified as in Good condition by deck area	50.0%	50.0%	66.6	65.5	64.1	50.0%	50.0%
% of NHS bridges classified as in Poor condition by deck area	10.0%	10.0%	1.2	0.5	1.4	10.0%	10.0%

This continuous record of high performing pavements and bridges affirms the strength of the agency's long-standing, existing asset management approach.

7.2 Pavement Performance Gap

The Department allocates funds to ensure 80 percent of pavement, regardless of system designation (SHS or NHS) meet the Department's SOGR standards. While maintaining Department standards, Federal targets will also be met. As described in Chapter 3, a crosswalk has been developed to convert between the Department and Federal metrics. The amount of funding allocated is informed by the Department's high priority risks and the analysis conducted using the Department's pavement management system (PMS). The PMS also uses current inventory as well as system growth projections to aid in forecasting future deficient lane mile levels for budgeting purposes.

In establishing a gap analysis, several steps must be considered. The Department inventories pavement condition on an annual basis and forecasts needs based on Department standards. However, NHS pavements and targets must also be considered as part of this process. Current condition, targets, and budget were critical factors in the analysis. The gap analysis will consider two scenarios:

- **Scenario 1:** Projected performance using existing budget required to maintain pavements at 80% meeting Department standards
- **Scenario 2:** Budget needed to meet Federal performance goals

7.2.1 Pavement Condition Inventory

The collection of SHS and NHS pavement condition data starts in January each year and is typically completed by the end of October. This schedule allows for periodic reviews and resurveying of roadways that do not meet quality standards required in the Data Quality Management Plan.

Starting in 2018, all Interstate data was collected using digital survey vehicles that meet all Federal requirements. Non-interstate data was collected using this equipment starting in 2021. The use of consultants was required from 2018 to 2021 to assist with data collection as the Department had not yet procured sufficient vehicles to complete the entire survey.

Pavement data not collected with the new digital survey equipment was collected using traditional Department methods that included a three-laser inertial profiler for rut depth measurement and a visual survey for crack assessment. In addition, visual surveys were continued throughout this period for consistency with traditional Department metrics. All data in 2022 and beyond will be collected using Department owned (see Figure 28) equipment meeting the Federal requirements.

Figure 30: FDOT Pavement Condition Digital Survey Vehicle

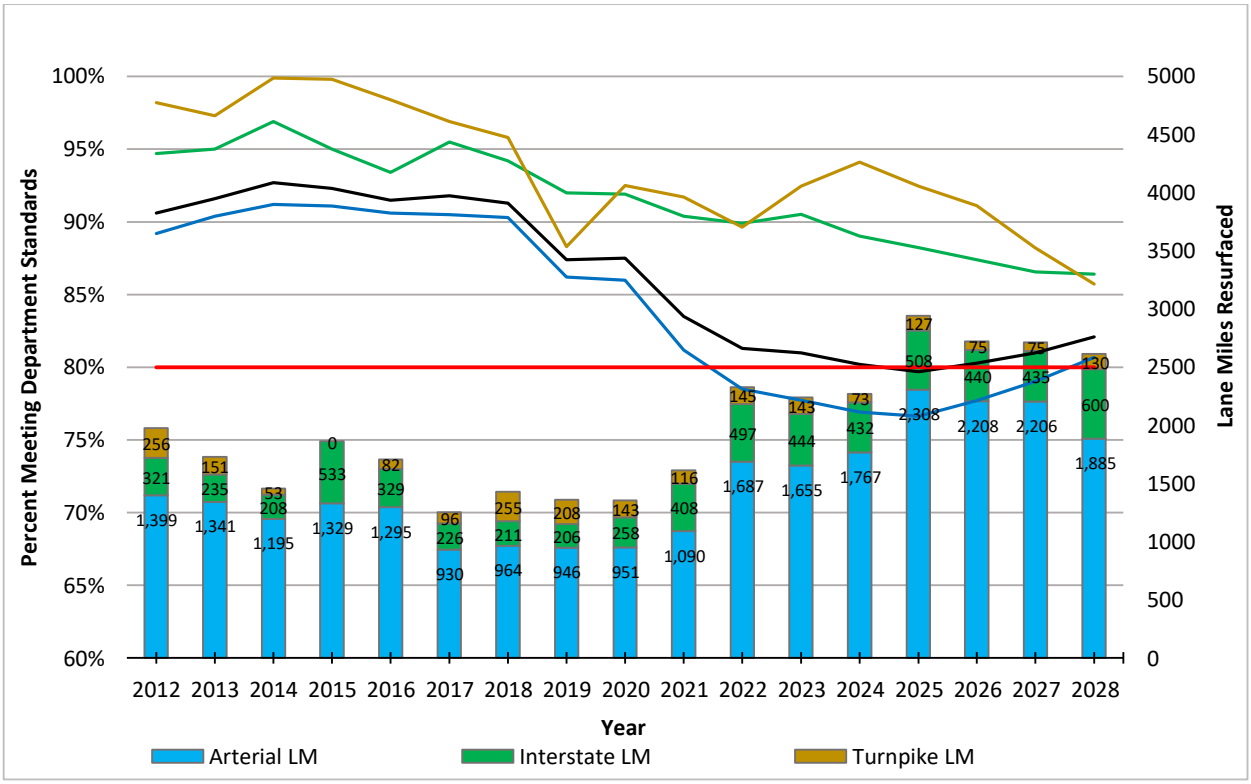
Ongoing work is being finalized to transition the Department's visual crack survey to the semi-automated and objective machine-based survey methods. These changes will offer more flexibility and efficiency in the collection of pavement data, allow tighter control on data quality, and provide more direct conversions between Department and Federal requirements.

Data is stored in a SQL database for efficient retrieval and analysis. The database can be linked to other data sources such as Work Program, RCI, and construction costs. A web-based Power BI dashboard has recently been developed to assist with tracking of the progression of the annual pavement condition survey. Using this tool, Department staff can easily track when roadways in Counties and Districts are surveyed, and data is ready for use. Another web-based GIS tool was also recently developed that can be used to perform desk reviews of roadways. The tool integrates the Departments roadway basemap and Google Maps. Reviewers can assess and compare images and routes to pavement condition data. Other tools and resources are being developed to efficiently and accurately collect and process data.

7.2.2 Current and Forecasted Pavement Condition

The Department develops a Five-Year Work Program based on the current and forecasted pavement condition, pavement inventory, costs, and funding. As previously described, legislation requires that 80 percent of the SHS meet Department standards. Figure 29 shows the historical SHS pavement conditions and resurfaced lane miles as well as the projected SHS pavement conditions and required resurfaced lane miles to meet Department standards over the Five-Year Work Program.

Figure 31: Historical and Projected SHS Pavement Conditions and Department Standards



The chart shows that the resurfacing budget was decreased starting in 2012 and recently increased to slow and reverse the decreasing SHS pavement condition before it dips below 80 percent. Projections show that the overall pavement condition will be at its lowest in 2025 and slowly improve in later years based on the projected required budget to reverse the overall downward trend. The resurfacing lane miles shown in this figure reflect changes in Department priorities. Capacity projects were prioritized in the past while overall pavement conditions were well above the Department sufficiency requirement of 80 percent.

In addition to the Five-Year Work Program, projected pavement conditions and budgets are reviewed over a 10-year period for strategic planning. Interstate resurfacing is coordinated with the 10-year Strategic Intermodal System (SIS) Plan. The forecasted budget and resurfacing requirements for the final five-years of non-Interstate pavements are assumed to be constant based on the amount of lane miles required to maintain the SHS sufficiency target. Figures 30 and 31 show the projected pavement condition based on Federal standards using the required resurfacing budget to meet Department standards for the next ten-years. In general, the current NHS conditions are expected to remain stable over the next 10-year period given the expected budget. Pavements off the SHS but part of the NHS were included in this analysis.

Figure 32: Projected Interstate Pavement Condition using Federal Standards

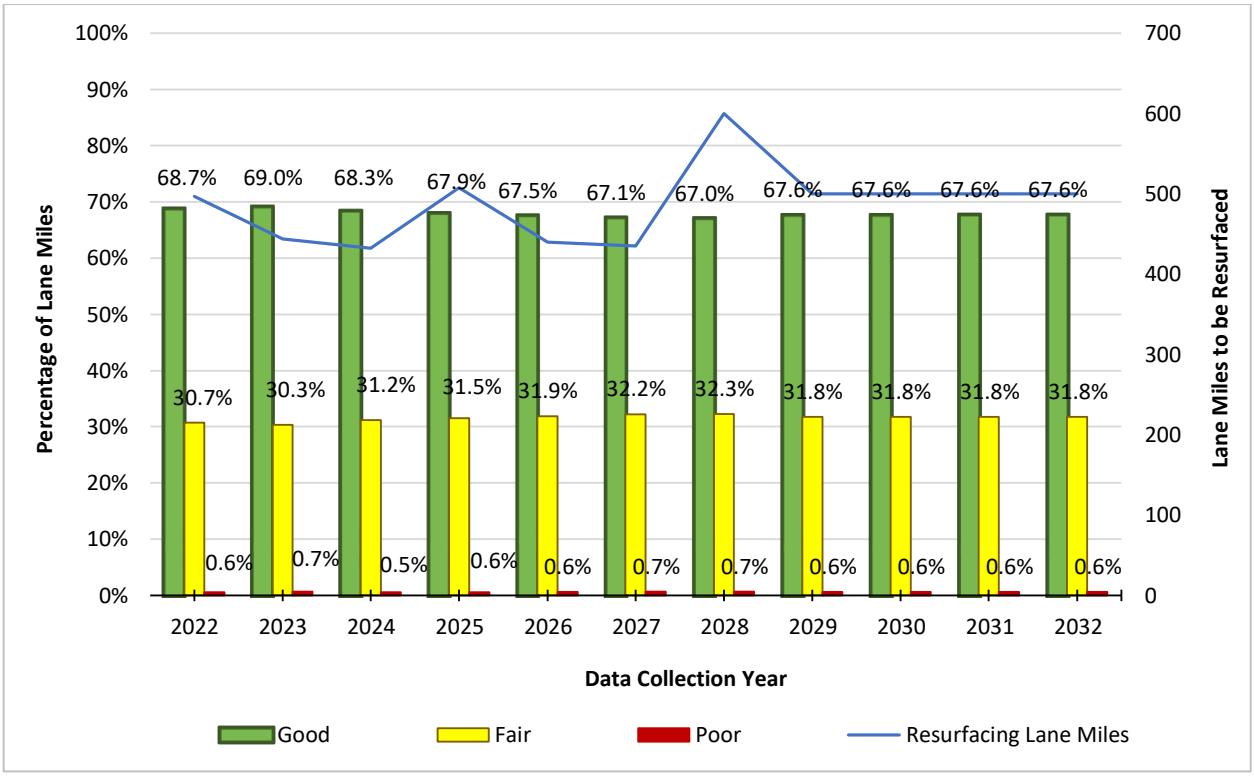
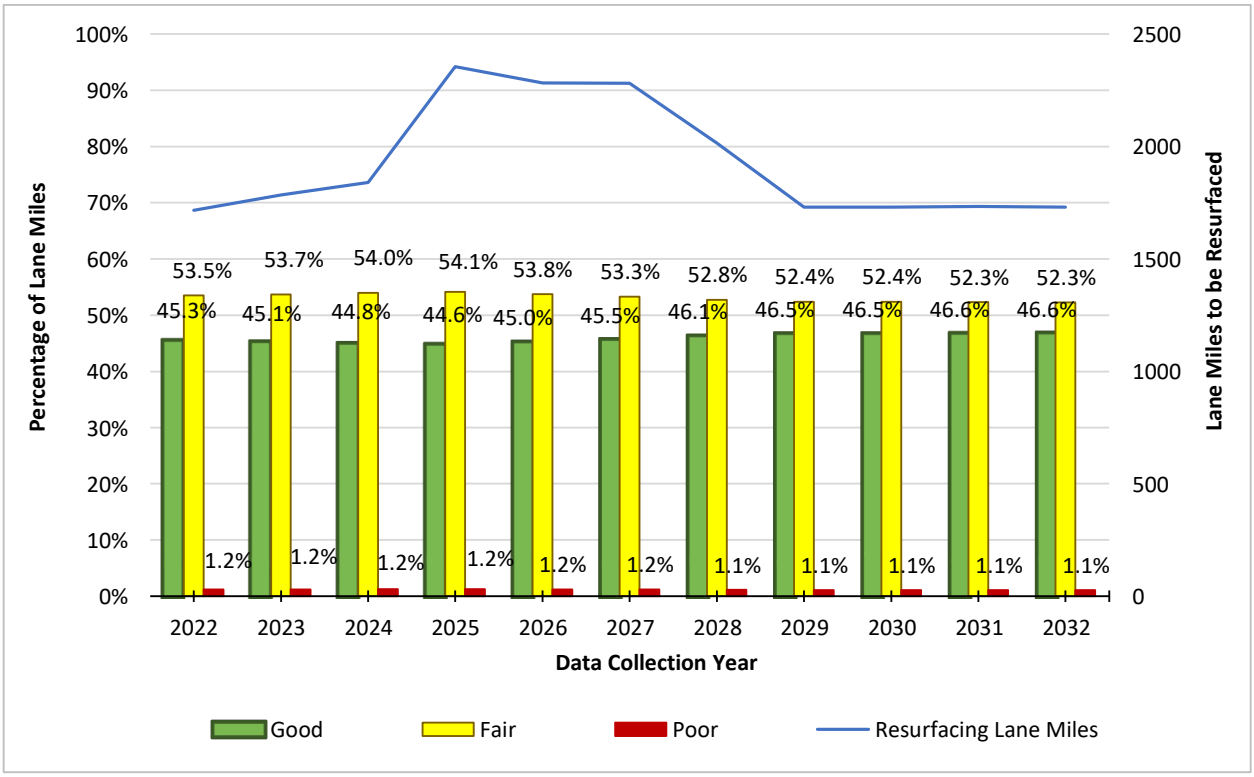


Figure 33: Projected Non-Interstate Pavement Condition using Federal Standards



7.2.3 Pavement Performance and Budget Analysis

Based on the forecasted conditions and the expected budget, an analysis of performance targets can be conducted. The budget and forecasts account for anticipated system growth and is based on resurfacing being the primary rehabilitation method. Table 38 summarizes the gap analysis based on the two scenarios presented earlier and shows the average forecasted pavement condition over the 10-year period and the required lane miles to be resurfaced based on the given scenario.

Table 38: Pavement Performance Gap Analysis

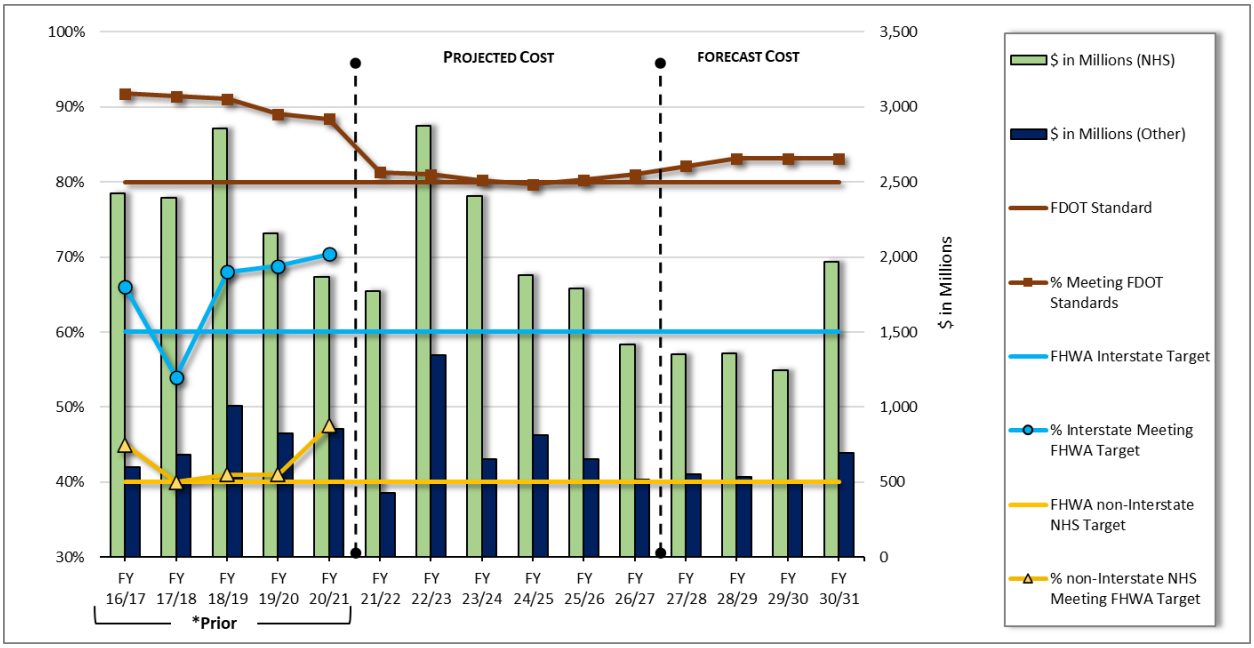
	Required Lane Miles Resurfaced Over Ten-Year Period	Percent Lane Miles Meeting Federal Standards		
		Good	Fair	Poor
Interstate Pavements				
Scenario 1	5,360	67.7	31.7	0.6
Scenario 2	4,085	61.2	37.5	1.3
Difference (Gap)	-1,275	-6.5	5.8	0.6
Non-Interstate NHS Pavements				
Scenario 1	21,200	45.7	53.1	1.1
Scenario 2	15,820	41.2	57.3	1.5
Difference (Gap)	-5,380	-4.5	4.2	0.3

Little change is expected in the pavement condition using Federal metrics in scenario 1. This scenario uses the expected budget required to reverse the overall decrease in pavement condition based on Department standards. Alternatively, scenario 2 is based on simply meeting the Federal targets. In this scenario, less lane miles are required to be resurfaced over the 10-year period to maintain 60% and 40% of the Interstate and non-Interstate NHS pavements in good condition. This analysis shows that NHS targets will be met given the expected budget and resurfacing requirements. As more data is collected using the new digital survey equipment; particularly on non-Interstate pavements, more comprehensive conversions between the Department and Federal standards will be developed. Once this is completed, performance targets could be revised with more confidence. The Department will ensure continued high levels of performance for pavement condition through strategies such as:

- Balance the programming of resurfacing projects in relation to needs and optimize the timing of projects through the pavement management system.
- Coordinate with the Department's Motor Carrier Size and Weight Office and the Florida Highway Patrol's Office of Commercial Vehicle Enforcement to minimize the illegal operation of overweight commercial motor vehicles on Florida's public roads and bridges. Facilitate training and technical assistance to support local governments in conducting pavement condition surveys and ratings.
- Identify and where practicable, implement practices which reduce the time and cost of preserving the NHS and SHS.
- Promote research, development, and deployment of state-of-the-art materials, technology, and methodologies for transportation infrastructure design, construction, maintenance, and operations.
- Incorporate the risks of extreme weather and other environmental conditions into planning, project development, design, and operations.

- Through the TAMP, coordinate the Department performance metrics with the FHWA performance metrics to ensure the FHWA performance target metrics are achieved.

Figure 34: Pavement Projected to Meet Standards and Targets & Amount of Funding Planned



Note: FY16/17 through FY20/21 information is from the prior adopted Work Program for July 1, 2018. The information for FY21/22 is from the currently adopted program.

7.3 Bridge Performance Gap

The Department allocates funds to ensure at least 90 percent of Department maintained bridges meet the Department's SOGR standards and that all bridges which are open to the public are safe for travel. That established standard is NBI rating of 6 or better. While maintaining Department standards, Federal targets will also be met. As described in Chapter 6, a crosswalk has been developed to convert between the Department and Federal metrics. The amount of funding allocated is informed by the Department's high priority risks and the analysis conducted using the Department's bridge management system, AASHTOWare™ Bridge Management Software (BrM).

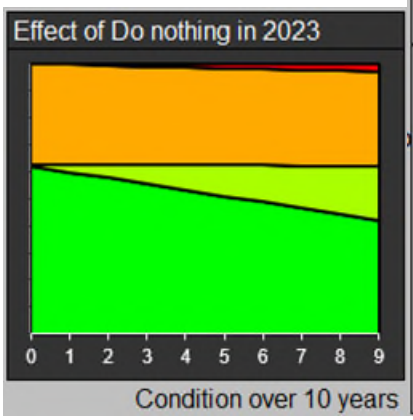
For the gap analysis, two scenarios will be considered:

- Scenario 1: Projected performance using existing budget required to maintain pavements at 90 percent meeting Department standards
- Scenario 2: Budget needed to meet Federal performance goals

7.3.1 Bridge Condition Inventory

Bridge inventory and condition data for both on and off-system assets is collected during each inspection event and after construction that results in changes to the inventory. This data is stored and processed in the BrM database, which also contains historical data. This data along with other research was used to develop the Department's current bridge deterioration curves. For example, the figure below shows the deterioration curves for bridges with steel open girders. There are different curves based on the bridge composition. These curves are integral in helping the Department maintain bridges in the SOGR, which helps support progress towards achieving the targets established for FHWA performance measures for NHS bridges.

Figure 35: Sample Deterioration Curves for Element 107 – Steel Open Girder



Forecast condition of the selected element

Year	Condition states 1	2	3	4
0	62.08	0.59	37.33	0.00
1	59.86	2.80	37.00	0.33
2	57.64	5.01	36.69	0.66
3	55.40	7.21	36.39	1.00
4	53.17	9.39	36.11	1.33
5	50.94	11.55	35.85	1.66
6	48.71	13.69	35.60	2.00
7	46.48	15.81	35.37	2.34
8	44.27	17.89	35.16	2.68
9	42.07	19.95	34.96	3.02

7.3.2 Bridge Current and Forecasted Condition

The Department uses a combination of BrM and in-house developed Project Level Analysis Tool (PLAT) for Benefit Cost and Life Cycle Cost Analysis. In order to perform this analysis, and as detailed in Chapter 4, Section 4.3, the following steps are performed:

1. Run the optimization tool for each District independently to determine repair and rehabilitation needs and compare these results with the recommendations set by the PLAT programming spreadsheet.
   - The performance targets in BrM are set to match the TAMP targets.
   - The Department developed, thru research, deterioration curves for element data and a conversion tool from element condition to NBI component.
   - The budget is set by planned allocation of funds for Maintenance and Repair activities for each District.
2. The results from the run are given to the Districts in January of every year
   - The districts take the results for consideration to the scheduled planning meetings held at the beginning of the year, as well as to FARC meetings held throughout the year.
   - In early December, the Office of Maintenance schedules meetings with each District to go over the program recommendations and understand why some activities were included/excluded in the program (i.e., future planned projects, engineering judgement).
   - The Office of Maintenance works to incorporating changes to the BrM programming tool based on meetings with the Districts.

Figure 36: PLAT Calculations Showing NBI Condition Changes

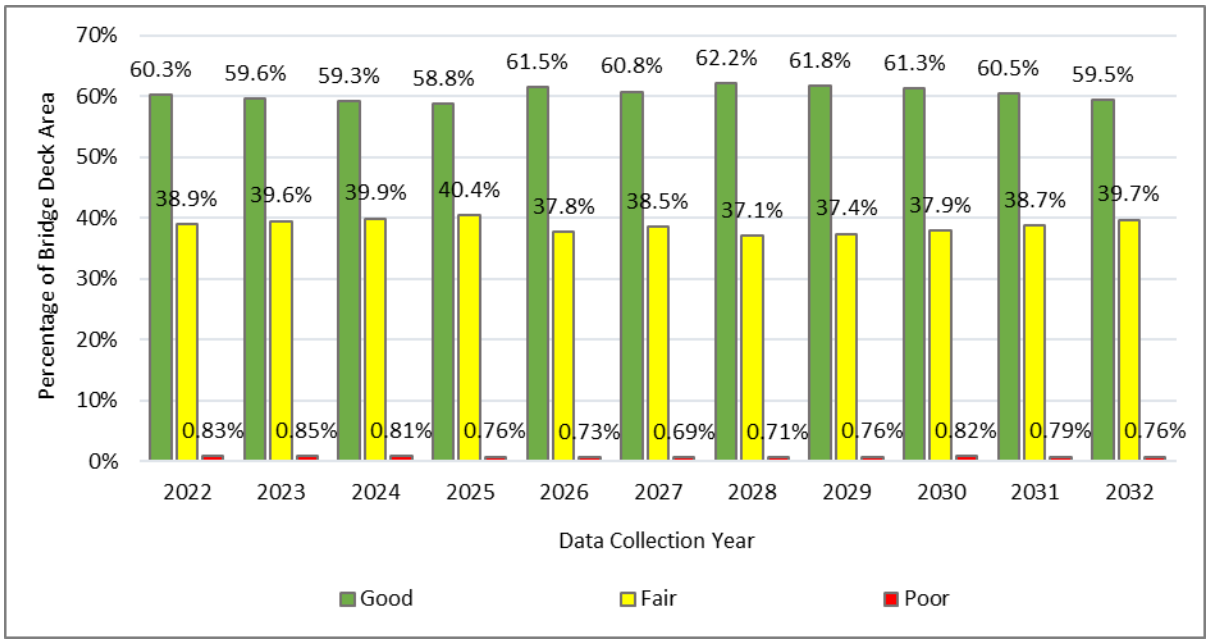
The figure above illustrates the PLAT analyses with three candidate types that are always automatically generated. In addition, it shows how the structure's NBI is expected to change after performing one of the candidate actions in the first year. For example:

- Do Nothing (blue line): no action is taken in any year of the planning period.
- Auto MRR&I (yellow line): do a reasonable set of actions in response to all maintenance, repair, rehabilitation, and improvement needs on the bridge, in one year of the period (a separate life cycle activity profile is generated for each of nine possible implementation years).
- Auto Replace (pink line): replace the bridge in one year (again a separate definition for each of the 9 years)

The process for generating the Auto Maintenance, Repair, Rehabilitation, and Improvements (MRR&I) candidates is to use life cycle cost analysis to identify preservation actions on each element an using level-of-service standards to identify functional improvements.

The figure below shows the forecasted condition of bridges on the NHS by deck area, as required by the regulations. This forecast takes into consideration bridges not owned by the Department. The analysis includes a projection maintaining the current annual budget for maintenance and repair activities and also incorporates planned bridge replacements in the outer years, which are those beyond the current 5-year Work Program and that fall under the Economy Replacement program. The Department is also currently in the beginning stages of retooling the bridge deterioration curves and maintenance costs to improve the forecasting abilities of BrM (see Chapter 8).

Figure 37: Projected NHS Bridge Condition Using Federal Standards



7.3.3 Bridge Performance and Budget Analysis

The Department's bridge management system, AASHTOWare™ Bridge Management Software (BrM), ensures there is no gap between the existing conditions and SOGR conditions. Bridges are inspected at least once every two years. Bridges in poor condition are inspected more frequently. Funds are set aside for both bridge repairs and replacements. Routine repairs help extend the life of the Department's bridges. Each year the five-year allocation of bridge repair funding is evaluated to ensure all the needed repairs can be accomplished with the funding provided. In addition, the Department has a policy that a structure is programmed for corrective action within six years of being identified as structurally deficient or weight restricted.

As shown in the figures below, the investment strategies have kept bridges above the 90 percent standard for well over a decade and are projected to remain so in the future. They also help support progress towards achieving the established NHS bridge targets.

Figure 38: Historical SHS Bridge Conditions

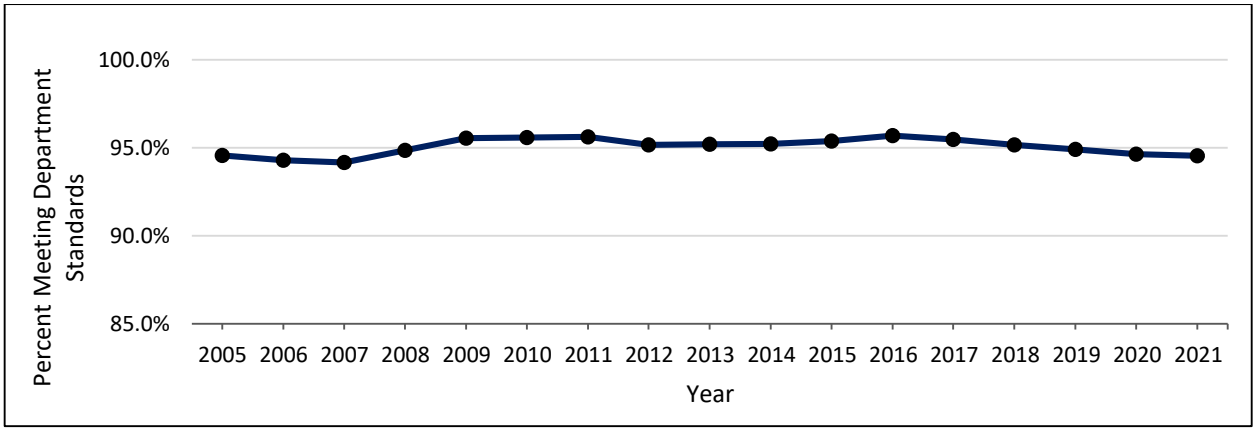
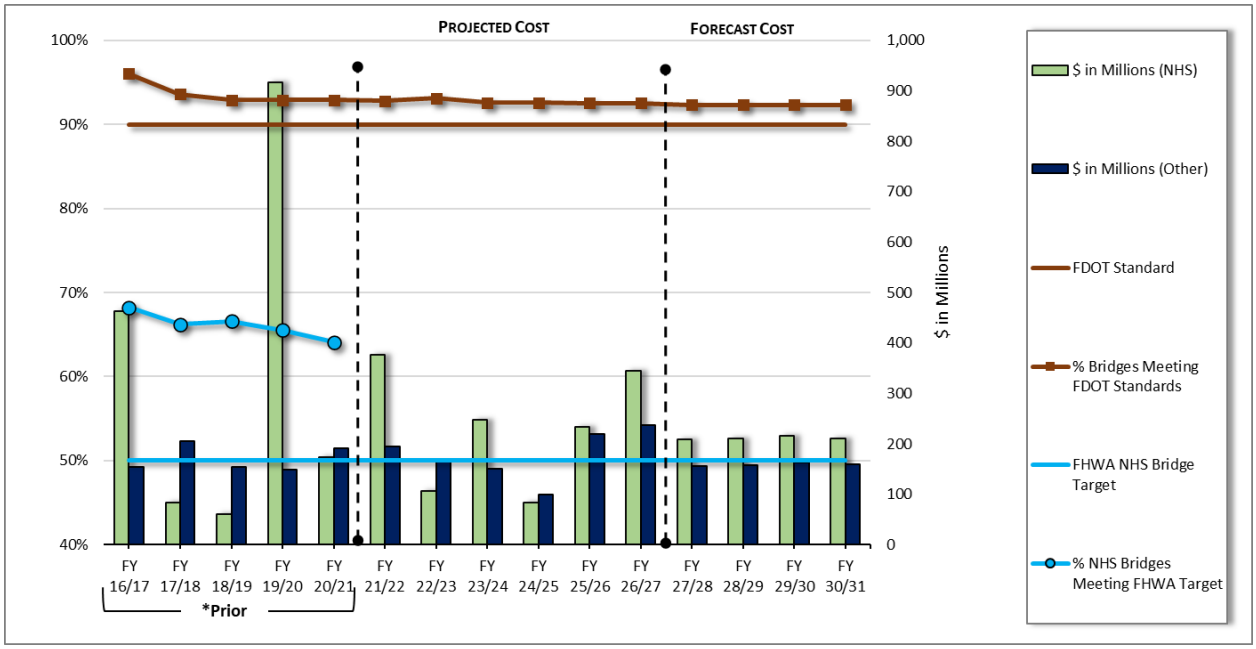


Figure 39: Bridges Projected to Meet Standards and Targets & Amount of Funding Planned



Note: FY16/17 through FY20/21 information is from the prior adopted Work Program for July 1, 2018. The information for FY21/22 is from the currently adopted program.

The Department will ensure continued progress to maintain its core measures of bridge condition through strategies such as:

- Program priority repair projects for all Department-maintained bridges in the Work Program.
- Program the replacement or repair of all structurally deficient Department-maintained bridges and those bridges posted for weight restriction within six years of deficiency identification.
- Program the replacement of all other Department-maintained bridges designated for economy replacement within nine years of identification, particularly for large bridges in extremely aggressive environments.
- 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 overweight commercial motor vehicles 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.
- Pursue research, development, and deployment of state-of-the-art materials, technology, and methodologies for transportation infrastructure design, construction, maintenance, and operations.
- Incorporate the risks of extreme weather and other environmental conditions into planning, project development, design, and operations.
- Through the TAMP, coordinate the Department performance metrics with the FHWA performance metrics to ensure the FHWA performance target metrics are achieved.

7.4 Off-System Assets

There is a small percentage of off-system (locally owned) pavement and bridge assets that are part of the NHS but are under the jurisdiction of the local governments and located within the boundaries of the Metropolitan Planning Organizations (MPOs). For pavement, it's approximately 7 percent of the total NHS centerline miles and for bridges, it's approximately 3 percent of the total NHS bridges and 3 percent of the total NHS bridge deck area.

The Department collects data for the locally owned assets through its pavement and bridge management systems. This information is used to inform the list of local priority projects, which are developed by the MPOs in coordination with the Department's District Offices (see section 6.3.1). These project priorities serve as the basis for the districtwide prioritization process, which feeds into the development of the statewide Work Program.

This helps to ensure the Department is adequately addressing the needs of the entire NHS (both on-system and off-system). State and/or federal funds are used by the Department to supplement local agencies' efforts for managing and maintaining their assets. So, even if the off-system assets were to fall below standards, the risk associated with not meeting the FHWA performance measures and targets would be minimal.

CHAPTER 8
Asset Management Enhancements

The Department is always striving to improve its asset management processes and practices. The following presents some of the on-going activities to help keep the transportation system in a SOGR.

8.1 Communication and Coordination

Florida recognizes that communication and coordination with TAMP stakeholders is essential in meeting the demands and requirements of a successful asset management program. Below are examples of the importance of good communication and coordination.

- In years prior to 2020, Florida did not collect pavement condition data on roadways that were currently under construction even in lanes that were accessible. This data collection process often resulted in more than 5 percent missing lane miles reported to the FHWA. After discussions with the FHWA and reviews of possible data collection practices, a new process was implemented that met the needs of all parties. This new process resulted in pavement condition data with missing lane miles of less than 1 percent.
- Florida's pavement data collection program operates from the State Materials Office in Gainesville while pavement management activities were conducted in Tallahassee. While these groups have historically worked together very closely, it is often difficult to perform as efficiently as one could if working out of the same office. These groups were combined at the State Materials Office in 2021. Work has begun to streamline data quality practices and accelerate timelines to be more proactive to customer needs.
- Florida recently requested the FHWA to review its pavement management program to identify successful areas and gaps that need to be addressed. While this review is not yet complete, it is anticipated that significant improvements to the pavement management program will be initiated.

8.2 Technology and Data

It is critical that infrastructure investments are made based on data-driven decisions. Florida surveys asset conditions on an annual basis and relies on this data to properly implement strategies and budget to maintain pavements and bridges in good condition. It is essential that the technology used to inventory and rate asset conditions are appropriate. Significant technology and data improvements have been made over the last few years.

- Florida has invested in procuring 3D pavement data collection systems that fully meet all FHWA performance measurement requirements. The use of consultants was required to collect all or partial pavement condition data during the 2018 through 2021 surveys. The 2022 survey will mark the first year the use of a consultant was not required. Owning and operating this equipment provides Florida more flexibility in testing schedules and allows more detailed analysis of the data. In addition, this equipment replaces visual crack surveys with automated and objective machine-based crack identification which will greatly improve performance modeling and other analysis.
- A method to automatically identify raveling using 3D pavement surface data and machine learning was developed under research contract BE939. This methodology was implemented during the 2022 pavement condition survey. As more data is collected using 3D pavement data collection systems, a more straightforward conversion to Federal metrics will be possible since raveling will be easily separated from the Department's rating methodology.

- Each year, the Data Quality Management Plan that establishes quality requirements for pavement condition data has been improved through communication and coordination with stakeholders including the FHWA. A comprehensive statistical approach to verify rut, crack, fault, and IRI measurements at field verification sites was implemented in 2021. In addition, IRI acceptance criteria was reviewed and revised after coordination with the FHWA in 2019 and again in 2020.
- A semi-automated approach for percent cracking of rigid pavements was implemented in 2019. All rigid sections are manually reviewed to validate or correct the joint and crack detection of the equipment. Further enhancements to the rigid pavement cracking analysis protocol are still required to match the level of reliable automation observed with flexible pavements.
- A web-based tool that integrates the Department's GIS basemap with Google Maps was developed to perform desk reviews of pavement condition data. This tool allows a quick and efficient review of site conditions that impact pavement performance.
- A Power BI dashboard was created to assist in tracking the progress of the pavement condition data collection survey. The dashboard allows managers, staff, and District customers the ability to easily track when data collection in a specific county or District is completed, the data is reviewed, and when the data is considered complete.

8.3 Structures

To enhance our Asset Management process, we are currently looking at the following activities:

- Structural Health Monitoring: The Department is in the process of stablishing a monitoring program for our bridges located on emergency evacuation routes. This is a program that is being implemented in 2022, and for the initial round 10 bridges will be selected to install scour monitoring devices. During the following years, the Department will continue to assess the feasibility of monitoring and consideration will be given to different technologies that could monitor different components and for different issues, such as vertical and lateral displacement, corrosion, and strain.
- Economy Replacements: The Department continues to improve processes to analyze and program larger bridges for replacements in the 9th year, following identification. The BrM Optimization tool is being used to develop an initial candidate list of bridges that are predicted to move from a substructure NBI of 5 to 4. This initial list is provided to the Districts, who then select projects for consideration, based on their maintenance needs, and including a Life Cycle Cost Analysis report in their justification. The Districts' list is then compiled and prioritized by the Office of Maintenance.
- Element Level Performance Management: The Turnpike continues to implement the Element Level Performance measures in their Asset Maintenance contracts. The Office of Maintenance will be reviewing the results of this implementation to determine how successful it has been in protecting and preserving our bridges in good condition. Pending the results, the Department will look for upcoming Asset Maintenance contract advertisements to implement these measures and requirements in other Districts.
- BrM Modelling: A research project is ongoing to update the modelling parameters in BrM. This project will look at the latest inspection cycles to update the element deterioration curves, since they were developed in 2015 using the CoRe elements. The project will also incorporate updated Unit Cost models, look for ways to make use of Risk Models in the prioritization process, review BrM's Life Cycle Cost Analysis method and calculations to incorporate this tool as part of our Project Level analysis, and determine the need to update the Department's Element to NBI conversion equation. This project will be a continuation of a previously performed project when the department initially incorporated the deterioration curves currently in use in the forecasting

calculations. The report for this previous effort and the details for its incorporation can be found at the following link: https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/research/reports/fdot-bdv30-977-07-rpt.pdf

8.4 Pavement Performance Modeling

As mentioned previously, the Department has invested in state-of-the-art pavement data collection systems to ensure accurate and reliable data is available for performance modeling. Interstate data has been collected using this technology since 2018 but collection of non-Interstate data did not begin until 2021. More data is needed to begin fully adapting performance models and developing a fully comprehensive crosswalk between the former and new systems.

Two newly developed pavement condition forecasting methods are currently being used to manage and select pavement rehabilitation strategies. The outcomes from the pavement performance models are compared against performance targets and SOGR goals, and directly used to set budgetary needs to ensure both are met (see section 7.2.2). A consensus-based approach is currently used, but a single method taking the best elements from both models will be implemented in the future. These methods are a significant improvement in both processing time and accuracy when compared to their predecessor. District level forecasts are currently being performed immediately after data collection rather than waiting until the statewide data collection process is complete.

8.5 Research Implementation

The Department is nearing the end of the construction phase of a nearly 2.5-mile concrete pavement test road located on US-301 in Clay County. The test road is expected to open to traffic early in 2023. The US-301 test road will allow for a comprehensive in-service performance assessment of emerging concrete pavement technologies and innovative concepts while giving a full consideration to the interaction between factors such as traffic loading, design features, materials properties, construction practices, and environmental conditions. A facility of this type, coupled with the Department's well-recognized and established Accelerated Pavement Testing (APT) program, demonstrates the Departments commitment to innovation and advancement of pavement engineering knowledge and practices.

Appendix

9.1 Glossary

Disruptions – The events and conditions that are often characterized as shocks and stresses.

Florida Transportation Plan – The Florida Transportation Plan (FTP) is the single overarching plan guiding Florida's transportation future. Updated every five years, the FTP is a collaborative effort of state, regional, and local transportation partners in the public and private sectors.

Indicator – A single quantitative or qualitative statement that reports information about the nature of a condition, entity, or activity. This term is used commonly as a synonym for the word "measure."

Infrastructure Investment and Jobs Act (IIJA) – The reauthorization of the FAST Act and provides $973 billion in funding over five years from FFY 2022 through FFY 2026, including $550 billion for new investments for all modes of transportation, water, power and energy, environmental remediation, public lands, broadband, and resilience.

Intermodal – Relating to the connection between any two or more modes of transportation.

Legislative Budget Request (LBR) – A request to the Legislature, filed pursuant to Section 216.023, Florida Statutes, or supplemental detailed requests filed with the Legislature, for the amounts of money an agency or branch of government believes will be needed to perform the functions that it is authorized, or which it is requesting authorization by law, to perform.

Long Range Program Plan (LRPP) – A plan developed on an annual basis by each state agency that is policy-based, priority-driven, accountable, and developed through careful examination and justification of all programs and their associated costs. Each plan is developed by examining the needs of agency customers and clients and proposing programs and associated costs to address those needs based on state priorities as established by law, the agency mission and legislative authorization. The plan provides the framework and context for preparing the legislative budget request and includes performance indicators for evaluating the impact of programs and agency performance.

Metropolitan Planning Organization (MPO) – An organization made up of local elected and appointed officials responsible for developing, in cooperation with the state, transportation plans and programs in metropolitan areas containing 50,000 or more residents. MPOs are responsible for the development of transportation facilities that will function as an intermodal transportation system and the coordination of transportation planning and funding decisions.

Partners, Transportation – Those parties with interests in transportation facilities and services including the public, local governments, metropolitan planning organizations, public and private sector users and providers, Native American Nations, the Florida Department of Transportation, and other federal and state agencies.

Program and Resource Plan (PRP) – A 10-year plan that establishes financial and production targets for Florida Department of Transportation programs, thereby guiding program funding decisions to carry out the goals and objectives of the FTP.

Resilience – The ability for the transportation system to adapt to changing conditions and prepare for, withstand, and recover from disruptions.

Shocks – Unexpected disruptions or short-term deviations from long-term trends that can have a range of substantial negative effects.

Standard – The level of performance of an outcome or output.

State Highway System (SHS) – A network of approximately 12,000 miles of highways owned and maintained by the state or state-created authorities. Major elements include the Interstate, Florida's Turnpike and other toll facilities operated by transportation authorities, and arterial highways.

Stresses – Sustained trends or pressures that undermine the stability of a system and increase vulnerability.

Unit Cost – The average total cost of producing a single unit of output.

9.2 Literature Review List (2014)

In preparation for the Asset Management Plan final rule, the Department hired a consultant team in 2014 to conduct a literature review of previously published information from the Department and FHWA to refine and confirm the risks to be included and presented in the TAMP. These included, among others:

- Development of Risk Models for Florida's Bridge Management System (Sobanjo and Thompson, 2013);
- Unknown Foundation Bridges Pilot Study (2010);
- Risk-Based Management Guidelines for Scour at Bridges with Unknown Foundations, NCHRP Document 107 (2006);
- Federal Highway Administration, Executive Strategies for Risk Management by State Departments of Transportation – Executive Summary (2011);
- Federal Highway Administration, Risk-Based Transportation Asset Management Literature Review (2012);
- Lifecycle Engineering, Accounting for Risk in Your Asset Management Strategy (2013);
- Federal Highway Administration, Risk-Based Transportation Asset Management Report 1: Evaluating Threats, Capitalizing on Opportunities (2012);
- Federal Highway Administration, Risk-Based Transportation Asset Management Report 2: Examining Risk-Based Approached to Transportation Asset Management (2012);
- Federal Highway Administration, Risk-Based Transportation Asset Management Report 3: Achieving Policy Objectives by Managing Risks (2012);
- Federal Highway Administration, Risk-Based Transportation Asset Management Report 4: Managing Risks to Critical Assets (2013); and
- Federal Highway Administration, Risk-Based Transportation Asset Management Report 5: Managing External Threats through Risk-Based Asset Management (2014).

9.3 Risk Registers (2014)

	Event/Occurrence	Likelihood	Consequence Score				Other Considerations					Risk Score
			Safety	Mobility	Asset Damage	Other Financial Impact	Funding	Insurance	Regulatory	Political	Reputation	
Agency Risks												
A	State and Federal funding are significantly reduced across the board for transportation.	2	3	4	3	4	√		√	√		8
B	State funding is reduced to FDOT due to poor public perception of the agency.	1	2	4	1	3	√		√	√	√	3
C	Flexibility with Federal funding is reduced due to failure to meet regulatory standards.	1	2	2	2	2	√		√	√	√	2
D	Funds are not sufficient for capital and maintenance projects due to inflation in construction costs.	2	2	4	3	4	√	√	√	√	√	7
E	Funds are not sufficient for capital and maintenance projects due to failure to accurately predict funding.	2	2	4	3	3	√			√	√	7
F	Funds are not sufficient for capital and maintenance projects due to failure to accurately predict costs.	1	2	4	3	3		√		√	√	3
G	Asset management at FDOT is inefficient or ineffective due to a lack of communication with staff.	1	2	1	1	1	√			√	√	1
Program Risks												
H	FDOT's ability to efficiently deliver programs is undermined due to unfunded Federal mandates.	2	3	4	2	3	√		√		√	7
I	FDOT's ability to efficiently deliver programs is undermined due to diversion of funds to high-profile projects.	1	3	3	3	3	√	√		√	√	4
J	FDOT's ability to efficiently deliver programs is undermined due to staff turnover and loss of expertise/experience.	3	3	3	2	3				√	√	9
K	FDOT's ability to efficiently deliver programs is undermined due to poor data management systems and strategies.	1	3	3	3	3						3
L	FDOT's ability to efficiently deliver programs is undermined due to poor management.	2	3	3	3	3			√		√	7
M	FDOT's ability to deliver programs is impacted by a new statute requiring capacity-related investment.	2	3	3	2	3	√	√		√	√	6
N	FDOT's ability to efficiently deliver programs is undermined due to unpredicted variation in construction costs.	2	3	3	2	3	√	√			√	6

	Event/Occurrence	Likelihood	Consequence Score				Other Considerations					Risk Score
			Safety	Mobility	Asset Damage	Other Financial Impact	Funding	Insurance	Regulatory	Political	Reputation	
Asset Risks												
O	Assets are damaged or destroyed due to hurricanes.	4	4	4	4	4		√		√	√	18
P	Assets are damaged or destroyed due to flooding (often associated with hurricanes).	4	4	4	4	4		√		√	√	18
Q	Assets are damaged or destroyed due to tornadoes.	2	1	2	3	2		√			√	5
R	Assets are damaged or destroyed due to wildfires.	2	2	2	3	1	√	√		√	√	5
S	Assets are damaged or destroyed due to vehicle impacts and/or hazardous materials spill.	3	2	2	3	2	√	√			√	8
T	Assets are damaged or destroyed due to retaining wall failure, landslides, or rockfalls.	1	1	2	2	1		√	√		√	2
U	Bridges are damaged or destroyed due to scour.	2	2	3	4	3	√	√			√	7
V	Assets are damaged or destroyed due to failure of ITS and traffic safety equipment.	1	2	2	1	1		√			√	2
W	Bridges fail for reasons other than impacts and scour.	1	3	3	4	2	√	√		√	√	4
X	Culverts and other drainage facilities fail (blockages or overtopping) unexpectedly.	3	2	3	4	2	√	√			√	9
Y	Sinkholes emerge under or near roadway sections compromising foundation.	3	3	3	3	2				√	√	9
Z	FDOT'S ability to construct/maintain assets is compromised due to unanticipated increase of project scope.	2	1	2	1	3	√	√			√	4

9.4 Risk Registers (2019)

	Event/Occurrence	Likelihood	Consequence Score				Other Considerations					Risk Score
			Safety	Mobility	Asset Damage	Other Financial Impact	Funding	Insurance	Regulatory	Political	Reputation	
Agency Risks												
A	State and Federal funding are significantly reduced across the board for transportation.	2	3	4	3	4	√		√	√		8
B	State funding is reduced to FDOT due to poor public perception of the agency.	1	2	4	1	3	√		√	√	√	3
C	Flexibility with Federal funding is reduced due to failure to meet regulatory standards.	1	2	2	2	2	√		√	√	√	2
D	Funds are not sufficient for capital and maintenance projects due rising costs.	2	2	4	3	4	√	√	√	√	√	8
E	Revenue is not sufficient for capital and maintenance projects due to failure to accurately predict funding.	2	2	4	3	3	√			√	√	7
F	Funds are not sufficient for capital and maintenance projects due to failure to accurately predict costs.	1	2	4	3	3		√		√	√	3
G	Asset management at FDOT is inefficient or ineffective due to a lack of communication with staff.	1	2	1	1	1	√			√	√	1
New	FDOT incurs extensive short-term operating and maintenance costs after extreme weather events.	4	3	3	3	3	√			√	√	14
Program Risks												
H	FDOT's ability to efficiently deliver programs is undermined due to unfunded Federal mandates.	2	3	4	2	3	√		√		√	7
I	FDOT's ability to efficiently deliver programs is undermined due to diversion of funds to high-profile projects.	3	3	3	3	3	√	√		√	√	11
J	FDOT's ability to efficiently deliver programs is undermined due to workforce issues in the transportation industry.	4	4	4	2	3				√	√	14
K	FDOT's ability to efficiently deliver programs is undermined due to poor data management systems and strategies.	1	3	3	3	3						3
L	FDOT's ability to efficiently deliver programs is undermined due to poor management.	2	3	3	3	3			√		√	7
M	FDOT's ability to efficiently deliver programs is impacted by a change in investments or priorities (i.e., preservation).	3	3	3	2	3	√	√		√	√	10
N	FDOT's ability to efficiently deliver programs is undermined due to construction costs or supply chain disruption.	3	3	3	2	3	√	√			√	9

	Event/Occurrence	Likelihood	Consequence Score				Other Considerations					Risk Score
			Safety	Mobility	Asset Damage	Other Financial Impact	Funding	Insurance	Regulatory	Political	Reputation	
Asset Risks												
O	Assets are damaged or destroyed due to hurricanes.	4	4	4	5	4	√	√		√	√	20
P	Assets are damaged or destroyed due to flooding, sea level rise and wet weather events.	4	4	4	5	4	√	√		√	√	20
Q	Assets are damaged or destroyed due to tornadoes.	2	1	2	3	2		√			√	5
R	Assets are damaged or destroyed due to wildfires.	2	2	2	3	1	√	√		√	√	5
S	Assets are damaged or destroyed due to vehicle impacts and/or hazardous materials spill.	3	2	2	3	2	√	√			√	8
T	Assets are damaged or destroyed due to retaining wall failure, landslides, or rockfalls.	1	1	2	2	1		√	√		√	2
U	Bridges are damaged or destroyed due to scour.	2	2	3	4	3	√	√			√	7
V	Assets are damaged or destroyed due to failure of ITS and traffic safety equipment.	1	2	2	1	1		√			√	2
W	Bridges fail for reasons other than impacts and scour.	1	3	3	4	2	√	√		√	√	4
X	Culverts and other drainage facilities fail (blockages or overtopping) unexpectedly.	3	2	3	4	2	√	√			√	9
Y	Sinkholes emerge under or near roadway sections compromising foundation.	3	3	3	3	2				√	√	9
Z	FDOT'S ability to construct/maintain assets is compromised due to unanticipated increase of project scope.	2	1	2	1	3	√	√			√	4

9.5 Program and Resource Plan Summary

23ADOPT01b

23ADOPT01b
WORK PROGRAM
FILE: 1-July-2022

FLORIDA DEPARTMENT OF TRANSPORTATION
2021/22 PROGRAM AND RESOURCE PLAN SUMMARY
FISCAL YEARS 2022/23 TO 2030/31
(MILLIONS OF $)

OWPB
22-July-2022
10:00 AM

PROGRAM AREAS	ACTUAL 20/21	PLAN 21/22	First Five Years 22/23	23/24	24/25	25/26	26/27	TOTAL	Next Four Years 27/28	28/29	29/30	30/31	TOTAL	10 YR. TOTAL
I. PRODUCT	4,568.1	5,673.2	9,632.1	6,952.7	6,043.7	6,227.1	5,927.5	**34,783.1**	5,670.3	5,741.4	5,849.0	6,861.4	24,122.1	**64,578.4**
A. State Highway System (SHS)	1,673.5	2,197.2	4,219.8	3,058.0	2,693.9	2,442.3	1,933.6	14,347.7	1,906.7	1,888.7	1,745.8	2,660.0	8,201.3	24,746.1
B. Other Roads	309.2	408.8	759.2	459.2	442.3	447.5	416.8	2,525.0	449.6	452.8	459.3	465.8	1,827.5	4,761.4
C. Right of Way Land	317.2	309.2	1,292.0	421.0	197.9	201.6	152.9	2,265.4	160.6	150.4	170.1	197.1	678.2	3,252.8
D. Aviation	317.0	335.7	379.6	380.1	298.8	325.7	302.6	1,686.8	321.6	331.4	341.9	352.1	1,347.1	3,369.6
E. Transit	395.2	419.8	776.7	464.6	380.8	387.1	395.2	2,404.4	456.6	466.1	476.1	485.9	1,884.7	4,708.9
F. Rail	180.4	149.0	221.1	140.8	122.8	102.6	139.9	727.1	133.6	137.1	140.7	144.3	555.7	1,431.8
G. Intermodal Access	62.3	17.6	115.8	76.2	86.2	154.0	178.1	610.2	112.9	142.3	277.5	288.1	820.9	1,448.7
H. Seaports	142.2	155.3	142.4	121.3	95.6	113.2	111.3	583.9	115.4	119.0	122.8	126.6	483.7	1,222.9
I. Safety	210.2	165.3	201.5	154.0	132.6	137.9	145.6	771.6	144.4	144.6	144.8	144.9	578.7	1,515.6
J. Resurfacing	558.0	943.7	1,251.2	1,279.2	1,410.3	1,463.0	1,569.7	6,973.3	1,504.0	1,541.1	1,591.2	1,625.1	6,261.4	14,178.4
K. Bridge	402.9	571.6	272.9	398.2	182.5	452.1	581.9	1,887.6	364.7	367.9	378.8	371.4	1,482.8	3,942.0
II. PRODUCT SUPPORT	1,649.6	1,783.6	2,613.5	1,734.7	1,599.9	1,433.8	1,330.7	**8,712.5**	1,576.7	1,569.2	1,601.2	1,705.7	6,452.8	**16,948.9**
A. Preliminary Engineering	936.2	1,017.6	1,326.8	848.5	787.2	674.8	637.8	4,275.2	844.9	785.0	810.5	822.7	3,263.0	8,555.8
B. Construction Eng. Inspection	413.8	466.1	805.5	569.8	513.9	457.6	402.4	2,749.3	400.3	437.7	447.4	535.2	1,820.6	5,036.0
C. Right of Way Support	72.3	84.1	178.8	85.4	67.9	63.3	58.1	453.5	71.1	78.5	72.1	76.7	298.4	836.1
D. Environmental Mitigation	7.5	12.4	28.0	4.2	5.2	1.6	1.7	40.7	2.6	6.1	2.6	1.5	12.8	66.0
E. Material & Research	44.9	44.4	57.9	53.8	52.8	54.4	56.0	274.9	59.2	61.2	63.2	65.3	249.0	568.3
F. Planning & Environment	158.7	142.7	198.5	154.3	153.4	161.9	153.7	821.7	176.8	178.0	181.8	179.6	716.2	1,680.6
G. Public Transport. Ops.	16.1	16.2	17.9	18.7	19.4	20.2	21.0	97.2	21.8	22.7	23.6	24.6	92.7	206.2
III. OPER. & MAINTENANCE	1,326.1	1,460.6	1,815.1	1,744.1	1,756.2	1,802.7	1,804.5	**8,922.6**	1,782.3	1,808.8	1,843.2	1,854.2	7,288.3	**17,671.5**
A. Operations & Maintenance	821.0	896.4	997.5	1,007.2	1,003.4	1,034.7	1,071.4	5,114.1	1,053.1	1,081.9	1,116.0	1,148.3	4,399.3	10,409.7
B. Traffic Engineering & Opers.	219.3	268.8	346.5	318.7	338.5	342.2	319.7	1,665.7	333.7	338.6	347.2	355.4	1,374.9	3,309.4
C. Toll Operations	285.8	295.4	471.2	418.2	414.3	425.8	413.4	2,142.9	395.5	388.2	379.9	350.5	1,514.2	3,952.4
IV. ADMINISTRATION	156.4	158.0	179.8	192.5	194.2	200.5	207.8	**974.8**	216.7	224.9	233.4	242.2	917.3	**2,050.1**
A. Administration	94.8	96.6	107.3	110.1	114.1	118.4	122.7	572.6	127.3	132.0	136.9	142.1	538.3	1,207.6
B. Fixed Capital Outlay	7.5	6.1	13.0	20.4	15.6	15.1	15.4	79.6	17.0	17.5	18.1	18.7	71.4	157.0
C. Office Information Systems	54.1	55.3	59.6	61.9	64.4	67.0	69.7	322.6	72.5	75.4	78.4	81.5	307.7	685.5
TOTAL PROGRAM	7,700.2	9,075.4	14,240.5	10,623.9	9,593.9	9,664.1	9,270.6	**53,393.0**	9,246.0	9,344.3	9,526.8	10,663.5	38,780.5	**101,248.9**
V. OTHER	307.1	1,259.4	1,241.1	391.8	359.0	390.2	373.1	**2,755.1**	365.4	351.0	357.0	358.9	1,432.2	**5,446.7**
A. Local Govt. Reimbursement	12.6	9.7	8.7	26.0	5.6	19.2	8.5	68.0	16.8	12.7	13.0	13.3	55.8	133.5
B. Other	294.6	1,249.7	1,232.4	365.8	353.4	370.9	364.6	2,687.1	348.6	338.2	343.9	345.6	1,376.4	5,313.2
TOTAL BUDGET	8,007.3	10,334.7	15,481.6	11,015.7	9,952.9	10,054.3	9,643.7	**56,148.1**	9,611.3	9,695.2	9,883.8	11,022.5	40,212.8	**106,695.6**
HIGHLIGHTS:														
1. Construction	2,978.3	4,093.9	6,473.9	5,154.7	4,653.8	4,740.4	4,451.0	25,473.8	4,168.7	4,189.7	4,109.6	5,052.3	17,520.4	47,088.1
2. Modal Dev. (w/o TD Comm)	1,032.0	1,023.2	1,575.1	1,118.2	919.4	1,017.7	1,062.2	5,692.6	1,075.3	1,131.0	1,294.3	1,332.2	4,832.7	11,548.6
3. Product Support Consultant	1,264.4	1,399.0	2,043.5	1,309.8	1,185.0	1,006.3	907.5	6,452.2	1,110.6	1,087.6	1,112.1	1,206.1	4,516.4	12,367.6
a. Preliminary Engineering	829.5	910.8	1,206.4	723.2	656.9	539.4	496.9	3,622.8	698.3	632.6	652.0	657.9	2,640.8	7,174.4
b. Construction Eng. Inspection	413.8	466.1	805.5	569.8	513.9	457.6	402.4	2,749.3	400.3	437.7	447.4	535.2	1,820.6	5,036.0
c. Right of Way Support	21.1	22.0	31.6	16.7	14.2	9.3	8.2	80.1	12.0	17.3	12.7	13.0	55.1	157.1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