Louisiana Department of Transportation and Development

Initial Transportation Asset Management Plan (Pilot Version February 2015)

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Federal Legislation

In July 2012, Congress enacted legislation titled Moving Ahead for Progress in the 21st Century or more commonly referred to as MAP-21. MAP-21 is the latest in a line of funding and authorization bills that govern the federal surface transportation program, each leading to the next step of the ongoing transformation of policy and planning to improve accountability. The primary goal of this legislation is to improve how federal transportation funds are allocated with a concentrated focus on asset sustainability.

MAP-21 provides certain mandates that are designed to transform the framework for making investments in transportation infrastructure, while seeking to maximize preservation strategies. It further codifies the ongoing move towards a performance-based highway asset management program with additional life cycle cost requirements as well as requiring a new documented focus on risk management.

This law includes the requirement to develop a risk-based transportation asset management plan for pavements and bridges on the National Highway System. This document provides the initial response to the MAP-21 mandates.

This Transportation Asset Management Plan (TAMP) focuses on pavement and bridge assets owned by the Louisiana Department of Transportation and Development (LADOTD). It documents the objectives for LADOTD's asset management, the current condition and operation of the transportation assets including management challenges and potential 10-year end conditions, a description of how LADOTD manages its assets throughout their lifetimes, an analysis of key risks and their possible mitigation strategies, a summary of expected funding and a discussion of how assets are managed followed by investment strategies for achieving condition and performance targets. The TAMP concludes with a plan for improving the State's asset management process in the future.

LADOTD Support

LADOTD strongly embraces the MAP-21 legislation and the direction that it provides. In fact, LADOTD's executive management believes that it very nearly mirrors and justifies the ongoing efforts to move asset preservation to the forefront, increases the opportunity to more fully use Life Cycle costs in the project selection process and provides the means to improve our long term asset sustainability.

The mission of LADOTD is to deliver transportation and public works systems that enhance quality of life and facilitate economic growth. LADOTD continues to make significant strides to provide a world class transportation system that fosters economic growth, international and domestic commerce, and tourism. The MAP-21 mandates and the required development of this TAMP is expected to only enhance this effort.

1.0 Introduction

Asset Management principles have been discussed worldwide by transportation agencies since the late 1990's. One of the earliest and still one of the most relevant definitions of Asset Management was provided by The American Public Works Association Asset Management Task Force in 1998 as,

> "…a methodology needed by those who are responsible for efficiently allocating generally insufficient funds amongst valid and competing needs."[1]

This definition certainly still holds true with respect to LADOTD's ongoing Transportation Asset Management requirements and funding availability.

1.1 GUIDING PRINCIPLES OF LADOTD'S ASSET MANAGEMENT PROGRAM

The goals of transportation asset management (TAM) are to:

- Build, preserve, and operate facilities more cost-effectively with improved asset performance. Assets will be managed through their lifecycles and for the long-term (considering growth forecasts and changes in user expectations).
- Deliver to an agency's customers the best value for the public tax dollar spent. Maximize the benefits delivered by the network while the costs of providing; maintaining and using the network are minimized.
- Enhance the credibility and accountability of the transportation agency to its governing executive and legislative bodies. Deliver agreed levels of service through financial programs and using effective management and reporting systems.

LADOTD has certainly been using and has clearly embraced asset management principles throughout the years. This is evidenced by the Department's early adoption and consequently mature pavement and bridge management systems and the implementation of maintenance management software solution that is interfaced with the Department's financial system as well as the road and bridge management systems. Investing its limited funding resources in the right place, at the right time, to produce the best life cycle performance for the given investment is the goal of LADOTD's asset management philosophy.

[1] FHWA Office of Asset Management, Asset Management Primer, December 1999

With MAP-21, LADOTD's existing TAM strategy is propelled forward with a greater urgency to integrate the interdisciplinary knowledge and techniques into a new business model where a holistic approach is applied to asset management issues. This includes both technology upgrades and modifications to business policies and practices.

1.2 MAP-21 REQUIREMENTS

"The cornerstone of MAP-21's highway program transformation is the transition to a performance and outcome-based program. States will invest resources in projects to achieve individual targets that collectively will make progress toward national goals."[2]

"The Secretary, in consultation with States, MPOs, and other stakeholders, will establish performance measures for pavement conditions and performance for the Interstate and NHS, bridge conditions, injuries and fatalities, traffic congestion, on-road mobile source emissions, and freight movement on the Interstate System. States (and MPOs, where applicable) will set performance targets in support of those measures, and State and metropolitan plans will describe how program and project selection will help achieve the targets.

States and MPOs will report to DOT on progress in achieving targets. If a State's report shows inadequate progress in some areas – most notably the condition of the NHS or key safety measures – the State must undertake corrective actions, such as the following:

- NHPP: If no significant progress is made toward targets for NHS pavement and bridge condition, the State must document in its next report the actions it will take to achieve the targets.
- HSIP: If no significant progress is made toward targets for fatalities or serious injuries, the State must dedicate a specified amount of obligation limitation to safety projects and prepare an annual implementation plan.

In addition, due to the critical focus on infrastructure condition, MAP-21 requires that each State maintain minimum standards for Interstate pavement and NHS bridge conditions. If a State falls below either standard, that State must spend a specified portion of its funds for that purpose until the minimum standard is exceeded."[3]

"MAP-21 establishes a performance basis for maintaining and improving the NHS.

- States are required to develop a risk- and performance-based asset management plan for the NHS to improve or preserve asset condition and system performance; the plan development process must be reviewed and recertified at least every four years. The penalty for failure to implement this requirement is a reduced Federal share for NHPP projects in that year (65 percent instead of the usual 80 percent).

[2] FHWA Office of Policy and Governmental Affairs, Moving Ahead for Progress in the 21st Century Act (MAP-21): A Summary of Highway Provisions, July 17, 2012

[3] ibid

- The Secretary will establish performance measures for Interstate and NHS pavements, NHS bridge conditions, and Interstate and NHS system performance. States will establish targets for these measures, to be periodically updated.
- MAP-21 also requires minimum standards for conditions of Interstate pavements and NHS bridges by requiring a State to devote resources to improve the conditions until the established minimum is exceeded. The Secretary will establish the minimum standard for Interstate pavement conditions, which may vary by geographic region. If Interstate conditions in a State fall below the minimum set by the Secretary, the State must devote resources (a specified portion of NHPP and STP funds) to improve conditions. MAP-21 establishes the minimum standard for NHS bridge conditions – if more than 10 percent of the total deck area of NHS bridges in a State is on structurally deficient bridges, the State must devote a portion of NHPP funds to improve conditions."[4]

MAP-21 also mandates that each State DOT maintain assets in a "State of Good Repair". A state of good repair is defined by the FHWA as "A condition in which the existing physical assets, both individually and as a system (a) are functioning as designed within their useful service life, (b) are sustained through regular maintenance and replacement programs."[5]

At this time, the Secretary of Transportation and the FHWA has not established the performance measures noted above. These measures are expected to be published via the Notice of Proposed Rulemaking (NPRM) in the Federal Register. LADOTD will monitor the Federal Register, make appropriate comments during the comment period and implement the rules after they are published.

1.3 TAMP REQUIREMENTS

MAP-21 requires that each State department of transportation (DOT) develop a risk-based TAMP to improve and preserve the condition of assets on the NHS, that contains the following elements:

- A summary listing of the pavement and bridge assets on the National Highway System in the State, including a description of the condition of those assets
- Asset management objectives and measures
- Performance gap identification
- Life cycle cost and risk management analysis
- A financial plan
- Investment strategies

[4] ibid

[5] Secretary Mary Peters July 25, 2008 letter to Congress on this topic.

This Transportation Asset Management Plan (TAMP) explains the roles, responsibilities, and processes related to establishing and executing transportation asset management activities at LADOTD. The plan covers the breadth of asset management practices at LADOTD.

The TAMP is a living document which will be reviewed and updated regularly. Following the principles of continuous improvement, a feedback loop from observed performance to planning and programming decisions will ensure that decisions are supported by sound information.

It is important to note here that LADOTD long ago defined the term "Preservation of an Asset" as all possible treatments for an asset, from the lowest level such as chip seals or minor repairs all the way to full the replacement of an asset. Since national definitions of preservation generally refer to minor betterments or repairs, LADOTD intends to redefine the definition of preservation to match the national definition.

1.4 TAMP OVERSIGHT AND MANAGEMENT

To facilitate this effort, LADOTD's leadership created a new position located in the Office of Multimodal Planning, with the working title of Asset Management Engineer (AME). The AME has a primary responsibility for implementing, maintaining and updating the TAMP.

The AME coordinates and conducts all activities necessary to maintain compliance with the MAP-21 guidelines including monitoring the ongoing Notice of Proposed Rulemaking (NPRM) in the Federal Register. The AME coordinates the submittal of comments to the docket during the review periods.

With active participation by the Secretary's Executive Staff, as identified via the Asset Management Business Structure, and engagement of all divisions of LADOTD and the FHWA as well, the successful TAMP is owned by the Department and not by a particular division or group in the Department.

1.5 INITIAL SCOPE OF THE TAMP

LADOTD's initial TAMP focuses on pavement and bridge assets and plans to address additional assets in subsequent versions of the TAMP. The desire is to start with the two infrastructure assets of highest significance to LADOTD and systematically expand to include additional assets over time. The initial TAMP exceeds the minimum NHS pavement and bridge asset system requirements under MAP-21 as it includes all State-owned pavement and bridge assets. It addresses pavement and bridge assets as follows:

- Pavements: National Highway System (NHS) and other State-owned pavements
- Bridges: NHS and other State-owned bridges

While a potential list of additional assets within the highway right-of-way may be included in future asset management planning cycles, it is most appropriate to note that the data requirements to support such inclusions are not currently available. LADOTD has partial data sets for signals, intelligent transportation system equipment, sign trusses, guard rails,

cable barriers, crash attenuators, sound walls, shoulders, high mast lighting and signs; however, these data sets will require significant improvement to allow for addition into the TAMP. Since data gathering is an expensive endeavor, setting priorities for this data collection will have to be considered. The AME will coordinate all matters related to this effort and provide appropriate information to the Executive Champion and TAM Steering committee for future asset selection and inclusion.

1.6 TAMP STRUCTURE

In order to meet these requirements, this TAMP is presented as follows:

- **Chapter 2 - Asset Management Structure, Plans, and Tools** describes LADOTD's asset management business structure, policies, and practices and examines the current TAM tools in use at LADOTD. It also defines condition targets for pavements and bridges.
- **Chapter 3 - Asset Inventory and Performance Measures** summarizes the inventory of the State's pavements and bridges. It also examines overall demand on the system by the traveling public.
- **Chapter 4 – Performance Targets and Conditions** describes the performance targets for assets and their conditions.
- **Chapter 5 - Whole Life Management** presents the principles of life cycle management used by LADOTD and explains the process used to prioritize projects under this philosophy.
- **Chapter 6 - Risk Management Analysis** outlines the process used to assess risk, and presents a risk register that lists priority risks and associated mitigation activities.
- **Chapter 7 – Financial Plan, Gap Analysis and Sustainability** describes the current performance of the system and identifies the expected performance based on current funding strategies.
- **Chapter 8 - Investment Strategies** describes LADOTD's investment strategies related to asset management.
- **Chapter 9 - Asset Management Process Enhancements** defines specific improvement areas LADOTD will be pursuing in the near term and lays out an agenda for future improvements to asset management policy and practices as well as the TAMP.

2.0 Asset Management Structure, Plans, and Tools

This section summarizes LADOTD's organizational processes supporting asset management, the relationship between the TAMP and other business plans, and provides an overview of the information systems and tools that support TAM.

2.1 ASSET MANAGEMENT BUSINESS STRUCTURE

LADOTD has been using asset management principles throughout the years. This is evidenced by the mature pavement and bridge management systems and the implementation of an asset management software package that is interfaced with the Department's financial system as well as the road and bridge management systems. Prior to the emphasis on developing a TAMP which began in 2012, there were many in the Department that believed asset management was simply another term for maintenance management. However, the departmental culture has changed and now there is widespread understanding of the definition of TAM and the value that it can bring to the Department in managing assets to ensure that funds are spent efficiently and effectively.

The TAMP is considered a business plan describing stewardship responsibilities for highway infrastructure. This TAMP is owned by the Department and not by a particular division or group in the Department. It tells the story of the services the agency delivers to its customers and how it utilizes and manages the assets it has under its control for this purpose.

The TAMP is managed by the Asset Management Engineer (AME) who resides in the Data Collection and Management Systems section within the Office of Multimodal Planning. The role of this position is as follows:

The AME serves as LADOTD's statewide expert in matters pertaining to asset management. This involves developing, implementing, and maintaining a comprehensive asset management plan. The AME has knowledge of the Department's pavement management, bridge management and maintenance management systems. The AME uses data driven decision making processes that examines both financial and technical issues and considers asset condition, performance and risk factors to identify the best maintenance and improvement investments. The AME has the ability to work with complex computer software and databases and stays abreast of changes in technology associated with asset data inventories and management systems.

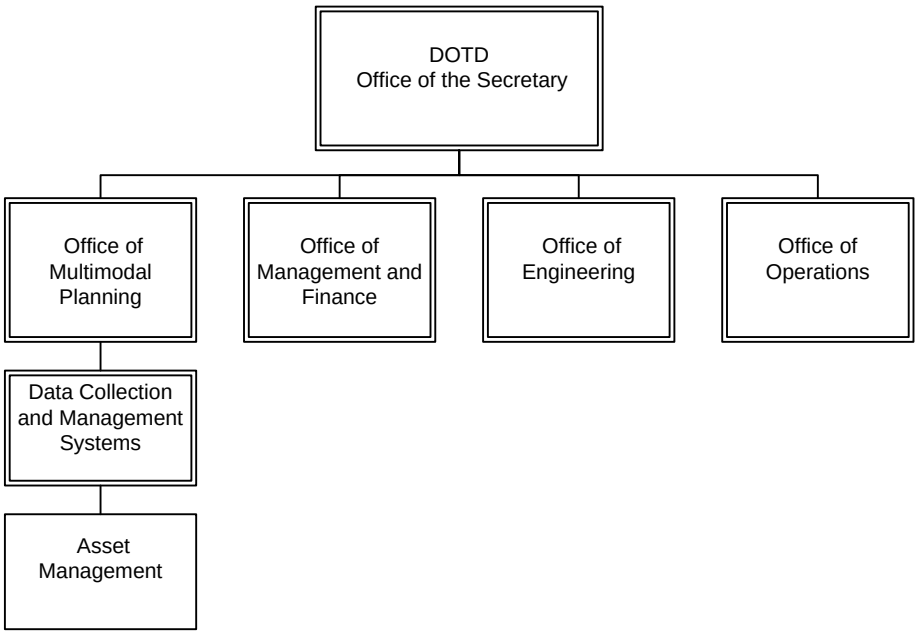
The AME leads the development and implementation of the risk-based TAMP. The position coordinates among the Department's Pavement, Bridge and Maintenance Management Engineers and conducts analyses and prepares reports on current and future asset conditions. A primary function includes working closely with Department personnel from the Executive Staff, DOTD Districts, Design, Construction, Maintenance, Research, Budget

and Finance, and Information Technology sections, as well as the Federal Highway Administration to ensure quality data availability and analysis capabilities.

The AME also recommends strategic planning preservation goals in regard to infrastructure quality, and implements directives in accordance with planning and organizational goals. Expertise is provided in the area of management system principles so as to properly correlate appropriate inventory, condition states, deterioration rates, treatment points and types and treatment costs. These analyses and reports provide strategies to optimize asset condition at the network level within a predefined budget. Analysis and reports are also prepared for setting DOTD's long-term, network level asset condition goals.

The responsibility for the management of the TAMP is located in the Data Collection and Management Systems Section which is under the Office of Multimodal Planning. The AME reports to the Section Head who in turn reports directly to the Assistant Secretary for Multimodal Planning. The organizational chart is show in Figure 2.1.

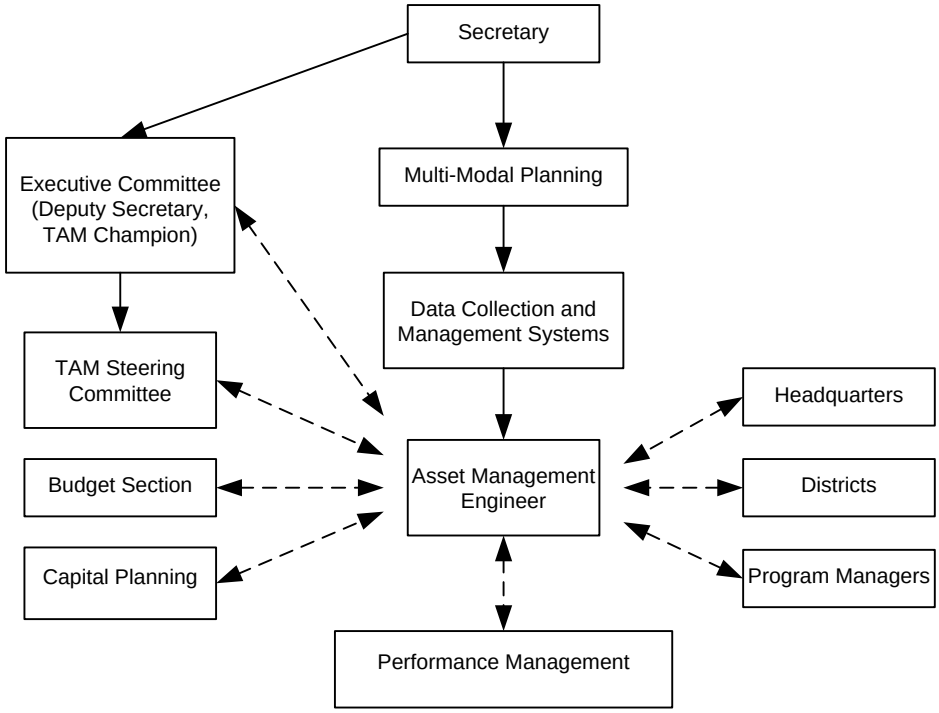
Figure 2.1 LADOTD Asset Management Organization Chart



LADOTD's leadership decided to locate the TAMP responsibilities in the Office of Multimodal Planning because of the TAMP's relationship to the other departmental plans, most of which are developed and managed by the Office of Multimodal Planning. The STIP and the annual Highway Priority Program of projects are overseen by the planning engineers in this office as well. Furthermore, it was logical to locate the TAMP responsibilities in the Data Collection and Analysis Section due to the fact that much of the TAMP depends on data and analysis from the road and bridge management systems, which are a responsibility of this section. In addition, the management of the road and bridge location reference system falls in this section.

The AME position has no subordinates. Since TAMP management is a primary duty of this position and asset management is carried out throughout the Department (transportation planners, budget director, program managers, strategic planners, operations), the AME performs various data and technical analyses, identifies trends, identifies policy and procedural gaps and makes various TAM related recommendations to the TAM Steering committee. That is, the AME works with the different parts of the organization and as necessary elevates relevant issues to a higher authority to seek support and resolution. In addition to the direct chain of command, the AME has other support resources such as the TAM Steering Committee and the Executive Asset Management Champion, who has direct access to the Secretary as shown in Figure 2.2 below.

Figure 2.2 Asset Management Support Structure



As mentioned above, the AME is supported by the Executive Champion, currently the Deputy Secretary, and the TAM Steering Committee. The TAM Steering Committee is comprised of representatives from across LADOTD and functions as a review board whose recommendations are taken to the Executive Committee made up of the Secretary and the Division Heads, which includes the Executive Champion. The Executive Champion is also the TAM Steering Committee Chairman.

2.2 TAM RELATIONSHIP TO OTHER BUSINESS PLANS

For many years, LADOTD has been a Department that embraces the concepts of written policies and procedures to maintain consistency and transparency. A number of plans, manuals, guides, memorandums, policy statements, standard operating procedures and

design standards, along with Engineering Directives and Standards, exist to ensure adherence to this cultural philosophy.

The TAMP is a document that doesn't replace these plans, but coordinates with these plans and tells the story of the Department in relation to its mission. The TAMP, combined with the existing plan strategies and goals, guides LADOTD in its effort to most effectively manage its transportation assets. The various plans are referred to throughout the TAMP.

Existing Plans

The TAMP draws from several pre-existing LADOTD plans. These plans include:

1. The Louisiana Statewide Transportation Plan (originally developed in 1996, updated in 2003, 2008, and 2015)
2. Louisiana: Vision 2020 – The State's long-term strategic economic development plan
3. 2014-2019 Five Year Strategic Plan
4. The Highway Project Selection Process
5. Annual Highway Priority Program
6. Annual Highway Budget Partitions
7. Annual Operations Budget

A description of each of these plans follows:

Louisiana Statewide Transportation Plan

The Louisiana Statewide Transportation Plan documents a long-range multimodal transportation strategy to meet the goals and objectives for the State's transportation and infrastructure system. The Louisiana Investment in Infrastructure for Economic Prosperity (LIIEP) Commission approved these goals and they were then published, following public comment. In 2008, the goals were re-evaluated and examined in the context of the issues the State faced. The goals for Louisiana's transportation system are to:

1. Develop and maintain an innovative, balanced, safe, equitable, and integrated system of transportation facilities and services.
2. Provide essential passenger transportation services at reasonable public expense, meeting the diverse needs of the people of Louisiana, regardless of their geographic location, physical condition, economic status, or service requirements.
3. Provide a transportation system that fosters diverse economic and job growth, international and domestic commerce, and tourism through prudent investment in the facilities and services that improve mobility and access. The system should use flexibility and choice to respond to free markets and to user needs and expectations in a competitive, multimodal environment.
4. Provide a regulatory and comprehensive policy framework that promotes partnerships, coordination, and cooperation among transportation users and providers in a competitive, multimodal environment.

5. Improve safety in all transportation modes via the timely maintenance of existing infrastructure, development of new infrastructure, enhancement of operational controls of both passenger and freight movements, and expanded public education and awareness.
6. Develop an efficient transportation system that improves air, water, and noise indices to acceptable levels, as defined by regulatory standards; reduces dependency on foreign energy sources; preserves historic, cultural, and environmentally sensitive sites; promotes the natural beauty of the State; raises the quality of life for Louisiana's citizens; incorporates smart growth development principles to efficiently use land resources; and promotes and implements the context-sensitive design of transportation infrastructure.
7. Develop stable but flexible transportation financing that provides adequate funds for both the preservation of existing and the construction/implementation of new facilities and services.

Louisiana: Vision 2020

Louisiana: Vision 2020, the State's long-term strategic economic development plan, is based on three primary goals:

1. The learning experience: Become a learning enterprise, in which all Louisiana businesses, institutions, and citizens are actively engaged in the pursuit of knowledge.
2. The culture of innovation: Build a thriving economy driven by innovative, entrepreneurial, and globally competitive companies that productively use technology and the State's human, educational, and natural resources.
3. A top ten State: Achieve a standard of living among that of the top ten States in America.

Each goal has an associated set of objectives. The State's transportation system is the focus of the objective, "To develop and promote Louisiana's transportation infrastructure." Six benchmarks are employed to track progress toward the achievement of the objective, including:

1. Elements of the Louisiana Statewide Transportation Plan fully implemented or funded
2. Elements of the Transportation Infrastructure Model for Economic Development (TIMED) fully implemented
3. Percentage of State highway miles with pavements in poor condition
4. Number of parishes with a public transportation system
5. Number of Louisiana ports in top ten US ports (based on total foreign and domestic cargo tonnage)
6. Direct air service between Louisiana airports and external locations (foreign cities, domestic hub cities, and domestic non-hub cities)

Five Year Strategic Plan

LADOTD recently published its latest five year strategic plan, effective through June 2019. The plan continues to adapt and evolve to meet new federal and State policy changes and requirements that govern transportation spending. The plan currently outlines:

- Department goals
- Strengths, weaknesses, opportunities, and threats
- Strategic goals for the Department and the associated performance indicators
- Processes to monitor and evaluate performance

The Highway Project Selection Process

The Highway Project Selection Process Manual presents the standard operating procedure that LADOTD's Office of Multimodal Planning uses for the Highway Project Selection Process. It includes the steps and tasks for identification, prioritization, and selection of highway projects in the State. It is currently being updated to address requirements of federal and State legislation, including MAP-21 requirements.

The manual currently identifies four categories of highway projects.

- System Preservation
- Operations/Motorist Services
- Traffic Safety
- Additional Capacity/New Infrastructure

Projects are identified by gathering and analyzing data on condition, operations, safety and congestion. LADOTD also seeks customer input from the public, state and local elected officials, Metropolitan Planning Organizations, Rural Consultation Process, regional/local planning officials, other state agencies and federal agencies.

When all of this information is gathered, LADOTD districts and MPO officials rank projects based on technical analysis and customer input. The various project selection teams then make the final selections based on district recommendations, technical analysis, customer input, available funding and the Statewide Transportation Plan.

The project selection teams are comprised of people with certain expertise including LADOTD headquarters officials, representatives from other state agencies, LADOTD district official in some cases and representatives from Federal, local and private-sector associations in some cases.

In accordance with State law, the project selection teams consider the following factors in prioritizing projects for selection:

- Alignment of existing roads
- Width and/or elevation of existing roadway and shoulder surfaces
- Width of right-of-ways

- Cost of construction
- Type and volume of traffic
- Condition of structures and drainage
- Accident rate
- Geographic distribution of construction/reconstruction projects
- Population growth in each parish and existing state highway infrastructure to support population increases
- Economic development potential
- Evacuation

When each of the project selection teams has completed their project selection list, the final steps, show below, are taken to determine the highway program.

Recommended (selected) projects assembled into proposed Highway Program

Proposed Highway Program submitted to House & Senate Transportation Committees

Joint Transportation Committee holds public hearings throughout State for the Program and STIP

Final decision on Highway Program rests with House & Senate Transportation Committees and ultimately full Legislature

In 2013, the FHWA approved the LADOTD policy document, Selection of Treatments and Projects for Pavement Preservation, which outlines the adoption of this information for use in the Preservation/Rehabilitation/Replacement Program (PPR) and specifically the Pavement Preservation (Road Preventive Maintenance) (PRR-PM) ancillary program. This document expands the Highway Project Selection Process Manual to include data driven processes to select pavement preservation projects and treatments to ensure selections are cost effective and meet the goals of the program.

It should be noted that this new policy document focuses only on a small part of the pavement preservation budget partition, but is included here primarily to reference the existence of this germane policy document. It is expected that this policy may be included

in the update and become part of the updated Highway Project Selection Process Manual when that effort is completed.

Annual Highway Priority Program

The Annual Highway Priority Program identifies projects that are scheduled for construction letting during the year and projects which are in various stages of planning and preparation. The Legislative Joint Transportation, Highway, and Public Works Committee along with the Office of Multimodal Planning presents the program to the public in each of the nine Districts to receive comments on the program and to take requests for future projects. The Legislative Joint Transportation, Highway, and Public Works Committee then approves the program to be included into HB2 and the program is distributed to the entire legislature for approval and Governor's signature.

Annual Highway Budget Partitions

LADOTD utilizes a technique for partitioning its capital budget into categories based on a combination of historical funding levels and needs. The Annual Highway Budget Partitions detail funding levels on transportation system projects that relate to several areas, including:

- Preservation
- Operations
- Safety
- Capacity
- Miscellaneous

A copy of the SFY 14-15 budget partition, as shown in the appendix "LADOTD SFY 14-15 Budget Partition," also identifies the funding sources (e.g. federal or State funds, bonds, tolls, etc.).

The TAMP relevant budget partition sub-partitions include the following:

Preservation

- Non-Interstate (Pavement)
- Non-Interstate (Pavement) (Non-Federal Aid)
- Interstate (Pavement)
- Bridge (On System, Interstate, Toll Credits & NFA)

Operations

- Movable Bridge Preventive Maintenance

Annual Operations Budget

LADOTD operations budget includes all statewide personnel services, non-capital professional services, operating services, supplies and equipment acquisitions. The

operating budget funding competes with the funding for the capital budget and is typically funded first.

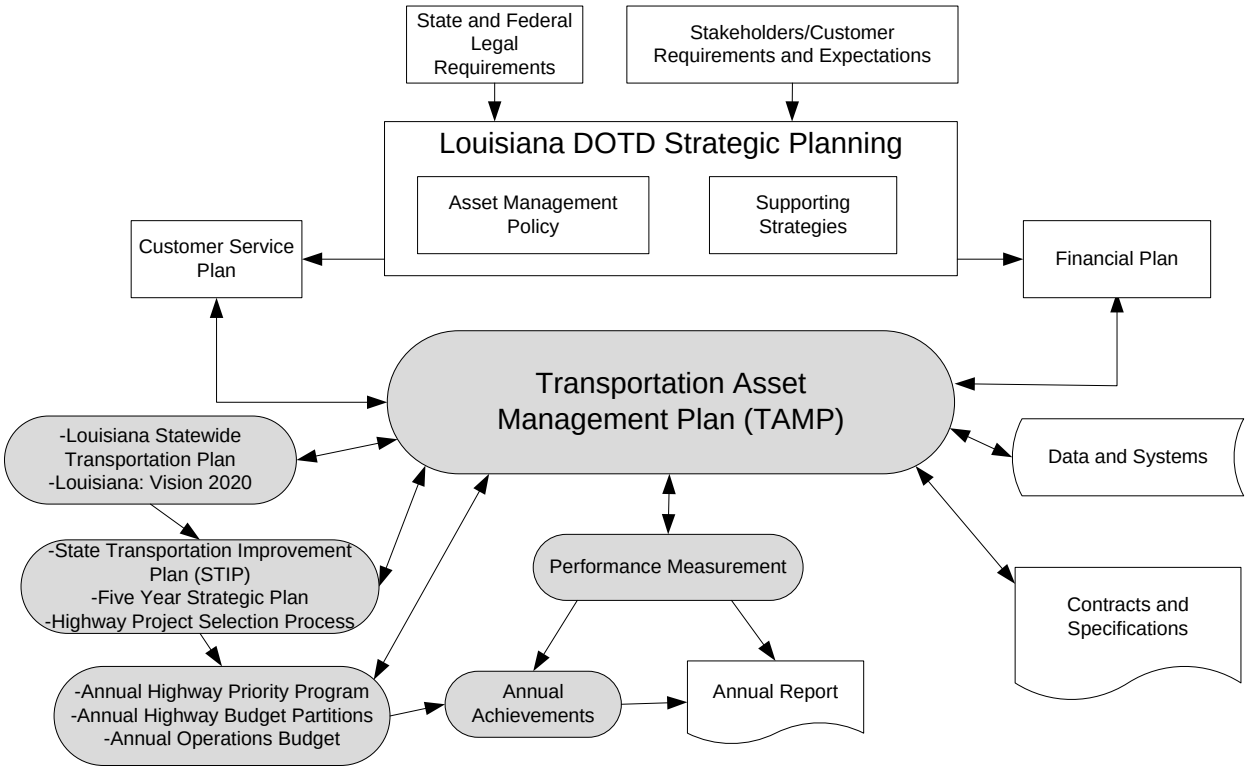
The operating budgets for the nine Districts and the HQ statewide maintenance sections are then determined from the overall operations budget with a distribution based partly on historical budget levels and specific requests.

From the District operating budgets, the expenditure of funding for the routine and preventative maintenance of roads and bridges is then determined by those staff with a focus based on priorities but also with the necessary adjustments relating to the needs of the daily operations. Expenditures for routine and preventive maintenance of roads and bridges are managed by the Maintenance Management System AgileAssets along with the LAGOV Financial Management System.

Interaction of TAMP and Other Plans

The diagram in Figure 2.3 is a modified version of the original found in the AASHTO Transportation Asset Management Guide, A Focus on Implementation. It depicts the interrelationships between the TAMP and the other plans in LADOTD. The TAMP is a document which brings all of these together into a single plan which tells the story of the agency in relation to its mission.

Figure 2.3 Interrelationship Between TAMP and other DOT Plans



2.3 TAM TOOLS

Over the years, LADOTD has developed or procured a number of data systems and software solutions to support the Department's long time TAM objectives. LADOTD's initial focus on pavement and bridge assets resulted in implementation of the following major systems:

- dTIMS (Deighton Total Infrastructure Management System) CT – comprehensive asset management software used for pavement management analysis.
- TAHI (Highway Inventory Database) – custom mainframe internal highway inventory database used to track various highway data requirements.
- HPMS (Highway Performance Monitoring System) - is a FHWA national level highway information system, started in 1978, that includes data on the extent, condition, performance, use and operating characteristics of the nation's highways. HPMS is a reporting system for State DOTs.
- TAND (Highway Needs Database) – custom mainframe internal highway needs database used to track various details relating to the needs analysis of pavements.
- PONTIS – current bridge management software provided by the American Association of State Highway and Transportation Officials. Used for element level analysis. Soon to be upgraded to the next version called AASHTOWare™ Bridge Management software (BrM).
- STRM (Structure Inventory Database) – custom mainframe internal bridge structure inventory database used for mandatory component level National Bridge Inventory data analysis and reporting requirements.
- Bridge Inspection Solution – custom application for field devices used to capture both National Bridge Inventory component inspection data for STRM and element inspection data for PONTIS.
- AgileAssets – comprehensive asset management software used as a maintenance management system for transportation assets. Implemented as part of the LaGov project with multiple interfaces to the financial management system SAP.
- Scorecards – custom internal application designed to track performance measures for individual sections including strategic performance measures.
- ESRI Roads and Highways – software solution currently being acquired that will eliminate the need for duplicate data in various data silos and will help to mitigate data inconsistencies. This complex solution is expected to take three years to implement.
- ARAN (Automated Road Analyzer) – multi-function data collection vehicle provided by Fugro Roadware. Captures data for pavement analysis and right-of-way images that can be used for a variety of applications including asset data capture, i.e. guardrail, signs, etc.

- iVision - a web application that offers synchronized viewing of ARAN collected pavement management data while allowing user to view synchronized right-of-way video log, pavement images, and the users choice of collected pavement management and condition data.
- LaGov – the financial management system and project management system built using SAP. LaGov provides fleet and facilities asset management functionality and also provides AgileAssets with data for personnel and fleet resources and determines costing for work orders.

3.0 Asset Inventory and Performance Measures

This section summarizes asset inventory information for the pavement and bridge assets maintained by LADOTD. It answers two primary questions that are the foundation of asset management: (1) what does LADOTD manage and (2) what performance measures are used to determine the condition of those assets?

3.1 LADOTD SYSTEM

LADOTD maintains over 16,000 center line miles of roadway and just fewer than 8,000 bridges. For budgeting and analysis purposes, State-owned pavement and bridge assets are now classified using the following categories:

Interstate - Interstate Highway System

State NHS - Non-Interstate National Highway System, does not include Local NHS

SHS - Statewide Highway System, State-owned, Non-National Highway System, Federal Aid System

RHS - Regional Highway System, State-owned, Non-National Highway System, Non-Federal Aid System

Local NHS - Local National Highway System, Non-State-owned

It is noted that the LADOTD budget and analysis definition of State NHS outlined within this document is not to be confused with the Federal Highway Administration definition of National Highway System.

The FHWA NHS definition "includes the Interstate System, all principal arterials (including some not previously designated as part of the NHS) and border crossings on those routes, highways that provide motor vehicle access between the NHS and major intermodal transportation facilities, and the network of highways important to U.S. strategic defense (STRAHNET) and its connectors to major military installations."[6] In short, the FHWA NHS designation would include the Interstate, NHS and Local NHS categories designated above.

The analysis in this document focuses on the snapshot of data, taken at the end of the 2013-2014 state fiscal year, identified in the asset inventory table below (Table 3.1) and includes all categories except for the Local NHS.

[6] FHWA Office of Policy and Governmental Affairs, Moving Ahead for Progress in the 21st Century Act (MAP-21): A Summary of Highway Provisions, July 17, 2012

Table 3.1 State Fiscal Year 2013-14 Asset Inventory

FY 2013-14 State Asset Inventory					
Category	**Center Line Miles**	***Analysis Lane Miles**	**Lane Miles**	**Bridge Count**	**Bridge Deck Area**
Interstate	926	1556	3948	1,419	68,001,559
State NHS	2072	2982	7143	1,415	39,160,556
SHS	6203	6243	12736	3,123	22,882,131
RHS	7442	7427	15400	1,930	7,876,947
Totals	**16643**	**18207**	**39227**	**7,887**	**137,921,193**
****Local NHS**	197	n/a	394	18	7,961,753
* = Pavement and Budget Analysis mileage is determined from the primary direction of travel for all undivided roadways and both directions for multi-lane divided roadways, excluding bridges, gravel and brick surfaces.					
** = Includes the estimated "Enhanced Local NHS" mileage					

The FHWA recently authorized an increase of 87 miles of locally owned, non-State maintained, NHS routes (Local NHS) resulting in an increase of this mileage in Louisiana from 110 miles to a new total of 197 miles. LADOTD now plans to categorize both of these non-State-owned, "original" and "enhanced" NHS roadways and bridges, into a new separate budget and analysis category called "Local National Highway System" or Local NHS as shown in Table 3.1 above.

LADOTD has not previously captured pavement data for the 87 miles of additional, or "enhanced", Local NHS routes. LADOTD will collect (3) three data cycles for these new roadways in order to create deterioration curves and identify valid performance measures and intends to report baseline information in the TAMP version submitted for certification following the publishing of the final NPRM rules.

While LADOTD has inspection and inventory data for all bridges within the state, we must validate that the roadway name is correct, for all Local NHS bridges, before these bridges can be included for analysis. Local NHS assets are excluded from all charts and figures that follow but will be reported in the TAMP version submitted for certification.

3.2 SYSTEM DEMAND

In the recently available 2011 Federal Highway Statistics, Louisiana's State maintained highway system experienced 36.8 billion vehicle miles of travel (VMT) while the overall statewide total, including all local roads, was 46.5 billion VMT. Since 2001, the entire system reflected a ten (10) year growth of slightly more than 7.6% while the State maintained system saw a growth of 3.9%.

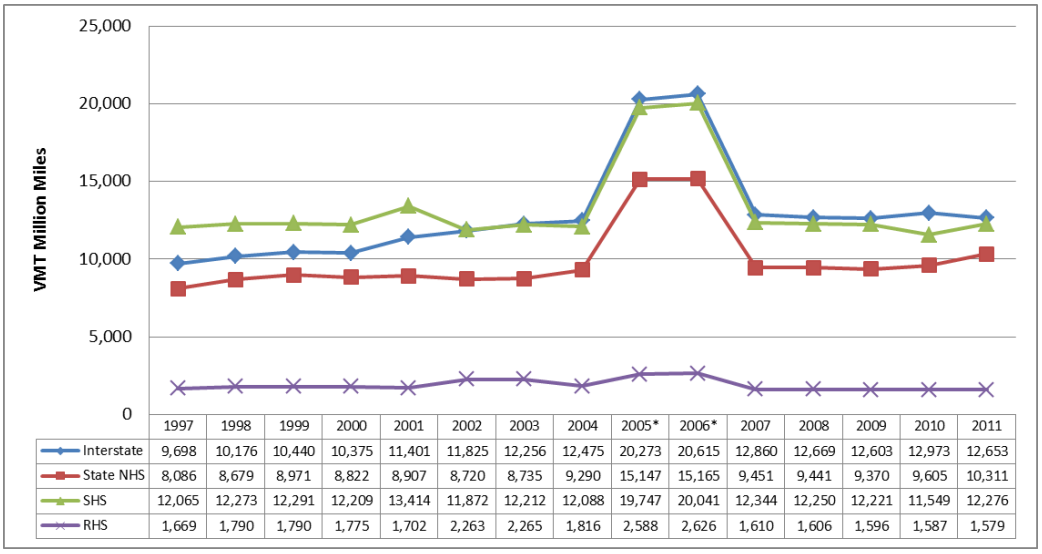
It is interesting to note that while the Interstate represents only 10.0% of the total state maintained network lane mileage, during the past 10 years it carried an average of 35.1% of the total state maintained volume. Similarly, the State NHS represents only 18.2% of the total state maintained network lane mileage , but carried an average of 26.1% of the total

state maintained volume. These two systems combined represented only 28.2% of the total state maintained network lane mileage but carried an average of 61.2% of the total state maintained volume.

In direct contrast to the Interstate, the RHS represents 39.3% of the total state maintained network lane mileage, but carried only 4.9% of the total state maintained volume. The SHS represents 32.5% of the total state maintained network lane mileage and carried 33.9% of the total state maintained volume.

The yearly state maintained VMT by state highway category is shown in Figure 3.1 with the aftermath of the Katrina-Rita hurricanes clearly reflected in the 2005 and 2006 spike in traffic volume.

Figure 3.1 Yearly VMT by State Highway Category
(by federal reporting year)



	1997	1998	1999	2000	2001	2002	2003	2004	2005*	2006*	2007	2008	2009	2010	2011
Interstate	9,698	10,176	10,440	10,375	11,401	11,825	12,256	12,475	20,273	20,615	12,860	12,669	12,603	12,973	12,653
State NHS	8,086	8,679	8,971	8,822	8,907	8,720	8,735	9,290	15,147	15,165	9,451	9,441	9,370	9,605	10,311
SHS	12,065	12,273	12,291	12,209	13,414	11,872	12,212	12,088	19,747	20,041	12,344	12,250	12,221	11,549	12,276
RHS	1,669	1,790	1,790	1,775	1,702	2,263	2,265	1,816	2,588	2,626	1,610	1,606	1,596	1,587	1,579

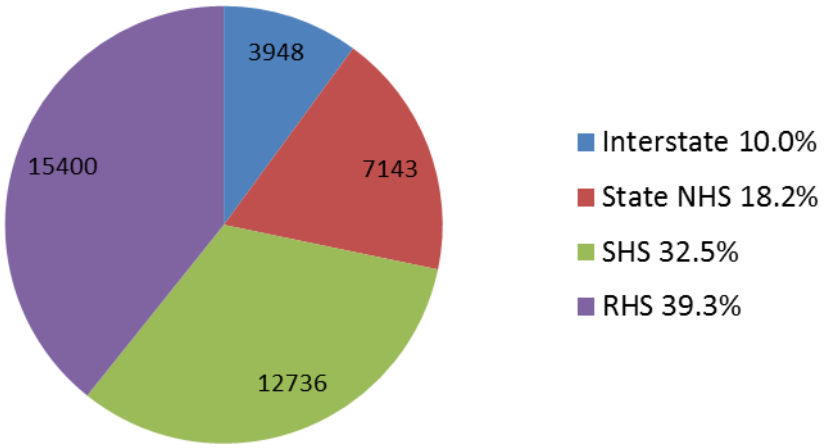
*= Katrina/Rita aftermath

3.3 PAVEMENTS

Inventory

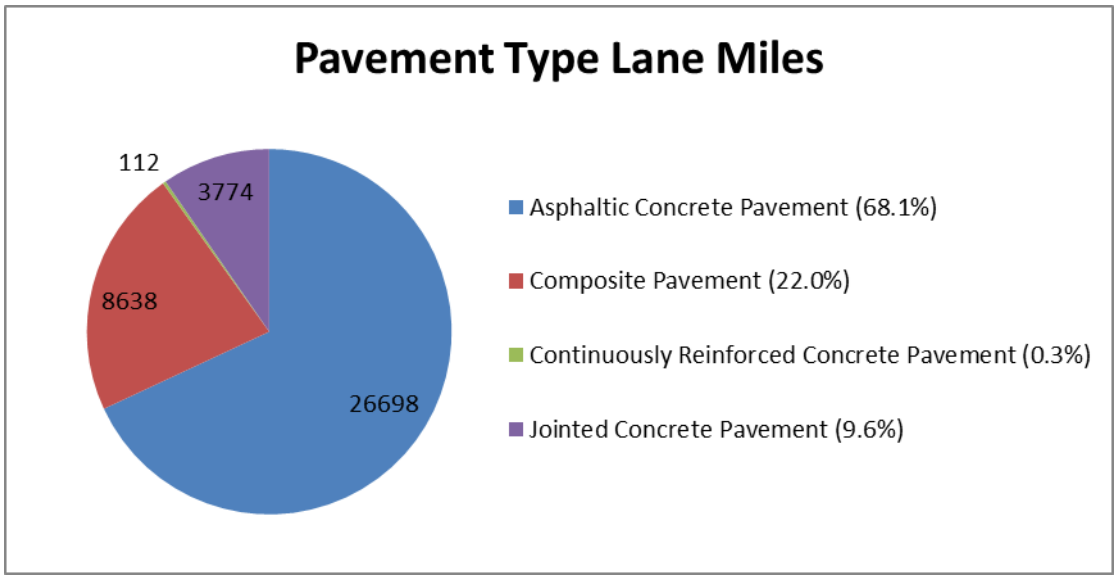
LADOTD is responsible for a 16,643 centerline-mile highway system, which includes 39,227 total lane-miles of pavement. The breakdown of lane-mileage by state highway category is shown in Figure 3.2.

Figure 3.2 Percent of Lane-Miles by State Highway Category



The chart found in Figure 3.3 shows the current breakdown of Louisiana's pavement inventory by pavement type for the 39,227 total lane-miles of roadway on the State system. Note that data does not exist at this time for the Local NHS routes.

Figure 3.3 Percent of Lane Miles by Pavement Type



Since 2000, the State maintained highway system measured along the centerline has expanded a fractional amount over 1%, while total lane miles have expanded at almost exactly 2%. During that same time, changes in roadway classification due to urbanization and expansion have resulted in a decrease of rural mileage by 4% and an increase of urban mileage by 21%. Eighty-two percent of the State maintained system is still classified as

rural. Therefore, the future trend for growth or expansion of the pavement network is considered to be low.

Age of Pavements

The average pavement age, based solely on the most recent pavement treatment and not the length of the pavement's existence, is shown in Table 3.2 below. Maintenance activities and minor preservation treatments, such as chip seals, crack sealing, etc. do not reset the pavement age, but clearly extend the life of pavements as inferred by the extended average age of pavements shown here. Pavement treatments that reset the pavement age also reset the various indexes identified in the following section.

Table 3.2 State Fiscal Year 2013-14 Average Pavement Age

Highway Category	*Average Age
Interstate	16.8
State NHS	16.7
SHS	20.8
RHS	23.5
* = Age is based on last pavement treatment reset, not time since original pavement construction	

Condition Data Assessment

Since 1995, LADOTD has been collecting pavement condition data on a variety of pavement distress types. Currently the following pavement distresses and data are captured at least every (2) years:

- Rutting
- Faulting
- International Roughness Index (IRI)
- Longitudinal/Transverse Cracking
- Fatigue (alligator) Cracking
- Patching
- Friction
- Texture

LADOTD's Pavement Management System (PMS) uses all of these pavement condition data to assess the overall condition of a pavement segment and then uses this information to identify the most appropriate pavement treatments for the individual segment of roadway. For a list of PMS pavement treatments, see the Appendix "LADOTD Pavement System Treatments."

Performance Measures Used in Reporting

While LADOTD uses all of the pavement condition distress data to determine treatments, currently federal reporting requirements for pavement condition are limited to the IRI. It should be noted that all treatments that result in a reset of the pavement's age will also reset the IRI. The IRI is summary statistic computed from the ARAN road profiler and is reported in standard units of inches per mile (0 means the road profile is perfectly flat, and there is no theoretical upper limit to IRI). For analysis and reporting purposes, LADOTD converts the IRI values to a Pavement Roughness Index, sometimes referred to as a Performance Index, with a scale of 0 to 100 (100 is best) for each segment of road using the relationship shown in Figure 3.4. As noted above, pavement treatments that reset the pavement age also reset the IRI and Pavement Roughness Indexes.

Figure 3.4 Pavement Roughness Index versus IRI

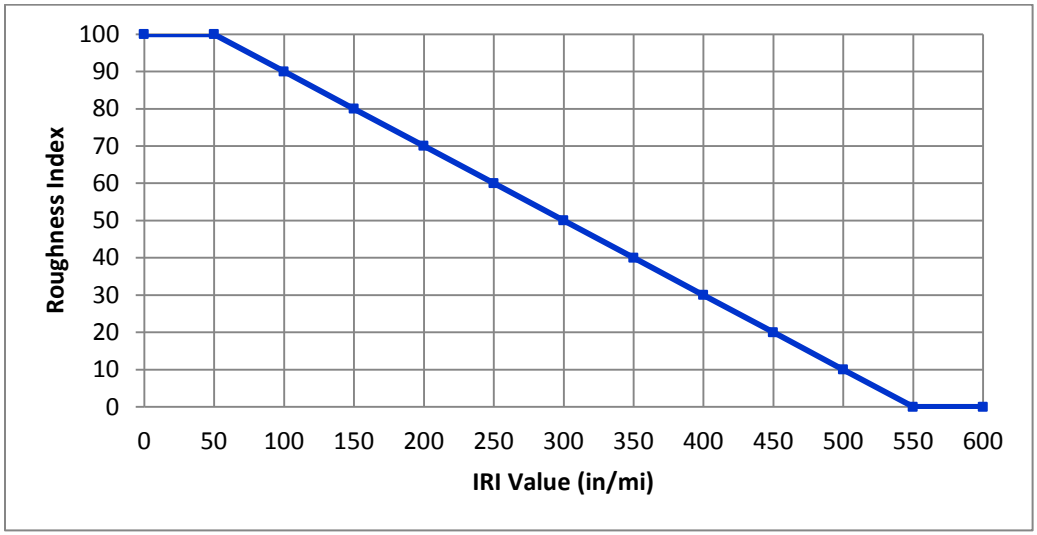


Table 3.3 below defines the condition ranges of the Roughness Index for the various pavement categories. Please note that the different pavement categories have different ranges for the Pavement Condition.

Table 3.3 Pavement Roughness Index Condition Ranges

Pavement Condition	Interstate	State NHS	SHS	RHS	Local NHS
Very Good	100-96	100-95	100-95	100-95	To Be Determined
Good	95-90	94-88	94-85	94-85	
Fair	89-76	87-70	84-65	84-65	
Poor	75-65	69-60	64-50	64-50	
Very Poor	64-0	59-0	49-0	49-0	

Challenges

The old axiom of "you measure what you have to report" applies to IRI. Using IRI or the Pavement Roughness Index as the primary performance measure is actually a poor indicator of overall pavement condition with respect to the concept of Life Cycle Cost Analysis (LCCA), more fully described in chapter 5.0 "Whole Life Management". For instance, preservation treatments such as chip seals and crack sealing are relatively minor treatments that don't generally improve the IRI, but are designed to very slightly improve the condition of the pavement, while very cost effectively extending the life of the pavement. LADOTD uses the other distress and condition data as triggers in the PMS, and makes adjustments in the project selection process to help overcome this limitation.

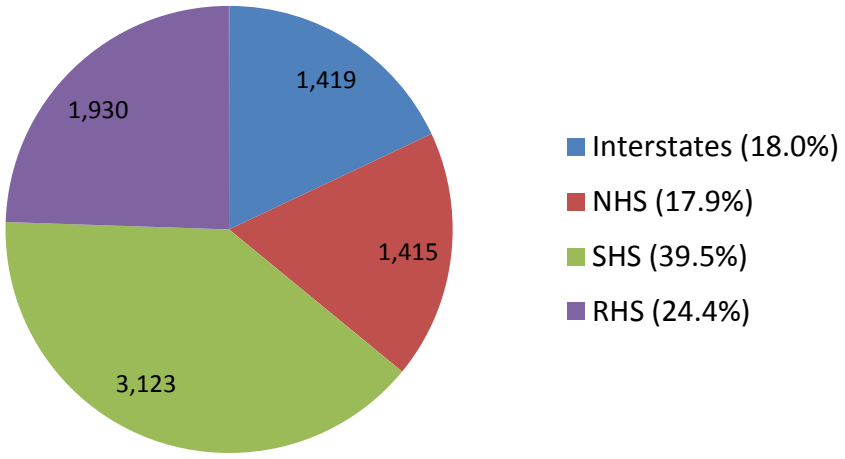
In this case the challenge is to identify a better measure, or combination of measures, that would most appropriately support LCCA. The Notice of Proposed Rulemaking (NPRM) for MAP-21 is expected to include additional performance measures. When these rules are finalized, LADOTD will make any necessary changes to align with the new rules and address this GAP.

3.4 BRIDGES

Inventory

A bridge or a culvert over 20 feet in length, as measured along the centerline of the roadway, that meets AASHTO criteria, is defined as a bridge. 7,887 structures met that criteria and were being maintained by the State at the end of SFY 13-14. The chart in Figure 3.5 shows the current breakdown of Louisiana's bridge inventory by state highway category.

Figure 3.5 Bridge Asset Inventory



Since 2003, the total number of bridges owned and maintained by LADOTD has increased by significantly less than 1% (0.11%) or a total of 9 bridges. Table 3.4 below outlines the increases and decreases by state highway category and largely mirror roadway reclassification changes. It should be noted, the percentage reduction for the 127 fewer Interstate bridges was (-8%) along with a (-12%) reduction for the 264 RHS bridges. The percent increase for the additional 360 State NHS bridges was 34%.

Table 3.4 Bridge Inventory Changes Since 2003

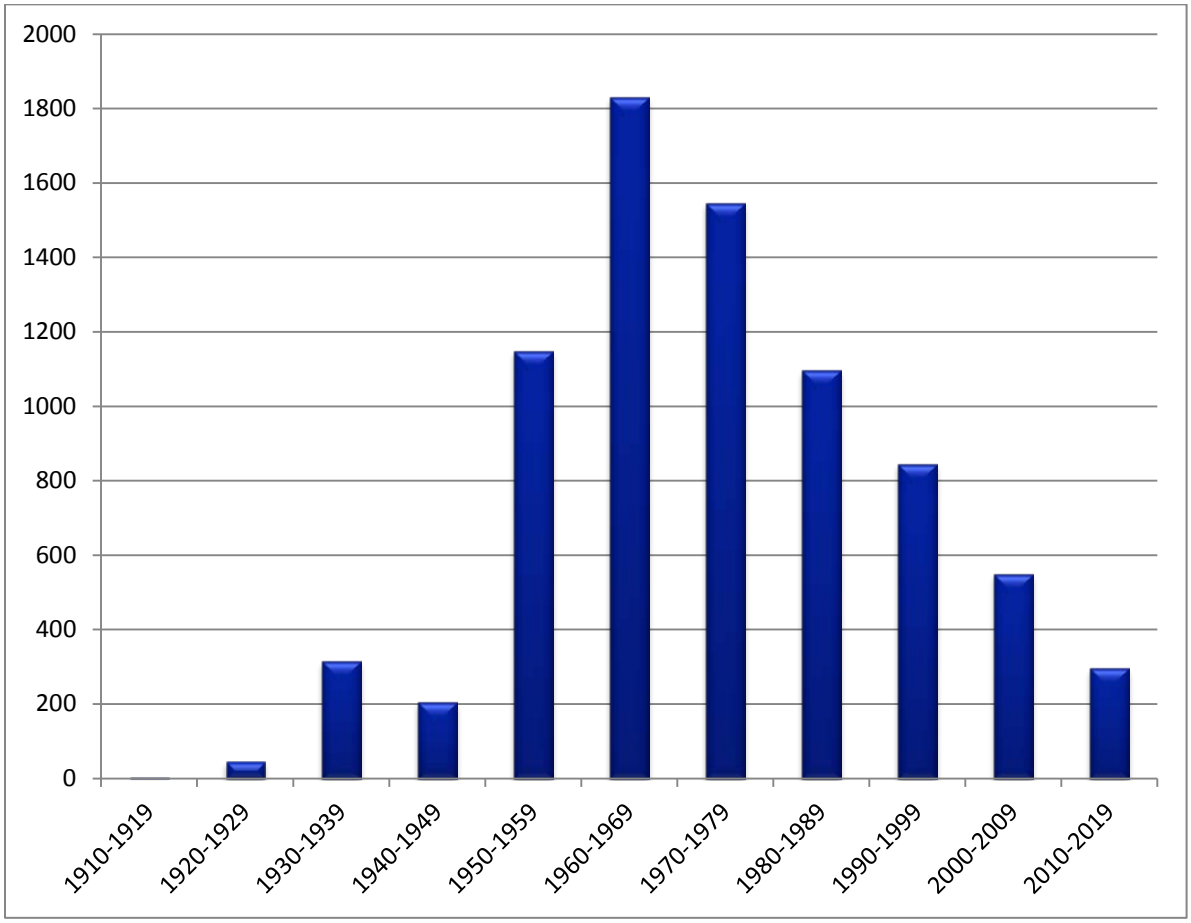
Highway Category	Change
Interstate	-127
State NHS	360
SHS	40
RHS	-264
Total Bridges	**9**

The reduction in Interstate bridges was primarily the result of a correction in how skewed culverts, or culverts not at a right angle to the pavement surface, were physically measured. This resulted in the removal of culverts that do not meet the criteria to be considered a bridge, i.e. 20 feet long. Additional changes can be attributed to the completion of some TIMED program bridges and the reclassification of Interstate overpasses and frontage roads along with adjustments made due to the Road Transfer Program outlined in another section of this document.

Age of Bridges

The age of State maintained bridges by decade built is shown in Figure 3.6. The creation of the Interstate system had a significant influence on the number of bridges built in the 60's and 70's. Analysis shows that 45% of our bridges are over 40 years old and 65% were built before 1980. The opportunity to repeat this enormous effort will not come again due to the extra ordinary cost factors. Preservation of these assets is critical to meeting the transportation needs going into the future. These assets must be managed through their lifecycles and for the long-term.

Figure 3.6 Number of Bridges Built By Decade



Condition Data Assessment

LADOTD is responsible for federal mandated inspections on all bridges in Louisiana. Bridge inspections are currently based on federal National Bridge Inventory (NBI) "component level" (superstructure, substructure, deck) data collection requirements. LADOTD also collects "element level" (girders, decks, piles, etc.) data in support of its Bridge Management System (BMS), PONTIS. LADOTD uses its BMS to provide condition rating information for bridges based on the "element level" inspection data.

Federal Bridge Reporting Requirements

The NBI reporting requirements currently result in the capture and digital submittal of over 100 "component, inventory, and appraisal level" data items for each bridge.

The FHWA expanded data collection requirements into the "element level" area on October 1, 2014. State DOTs will be required to capture "element level" data for federal submittals due on April 1, 2015 for bridges on the Interstate, State NHS and Local NHS segments.

The proposed April 2015 "element level" submittals will include National Bridge Elements (NBE) and Bridge Management Elements (BME). The NBEs are the primary structural

components of bridges needed to determine the overall condition and safety of the primary load carrying members. The BMEs include joints, deck surfaces, and protective coatings. Special Agency Developed Elements (ADE) are also provided for in the new requirements.

LADOTD has proactively collected three cycles, (2 years per cycle), of "element level" data for Bridge Management purposes and will be able to comply with these new data requirements.

Performance Measures Used in Reporting

Historically the performance measure for bridges has been the number of Structurally Deficient (SD) bridges. According to the FHWA, a bridge is structurally deficient if the load-carrying elements are in diminished condition due to deterioration and/or damage. Bridges identified as "structurally deficient" are not unsafe, but could require traffic and/or load posting restrictions. Bridges considered unsafe are closed until they can be repaired or replaced.

Over the past decade, several major hurricane events in Louisiana have impacted bridges. LADOTD undertook a massive reconstruction effort to restore or rebuild a number of bridges and culverts that were damaged or destroyed. These events led LADOTD to reevaluate and revise the performance measure from number of structurally deficient bridges to percent of structurally deficient bridges by deck area.

LADOTD will closely monitor the MAP-21 Notice of Proposed Rulemaking (NPRM) for any potential changes to the bridge condition reporting requirements and will make the necessary adjustments to meet any new requirements.

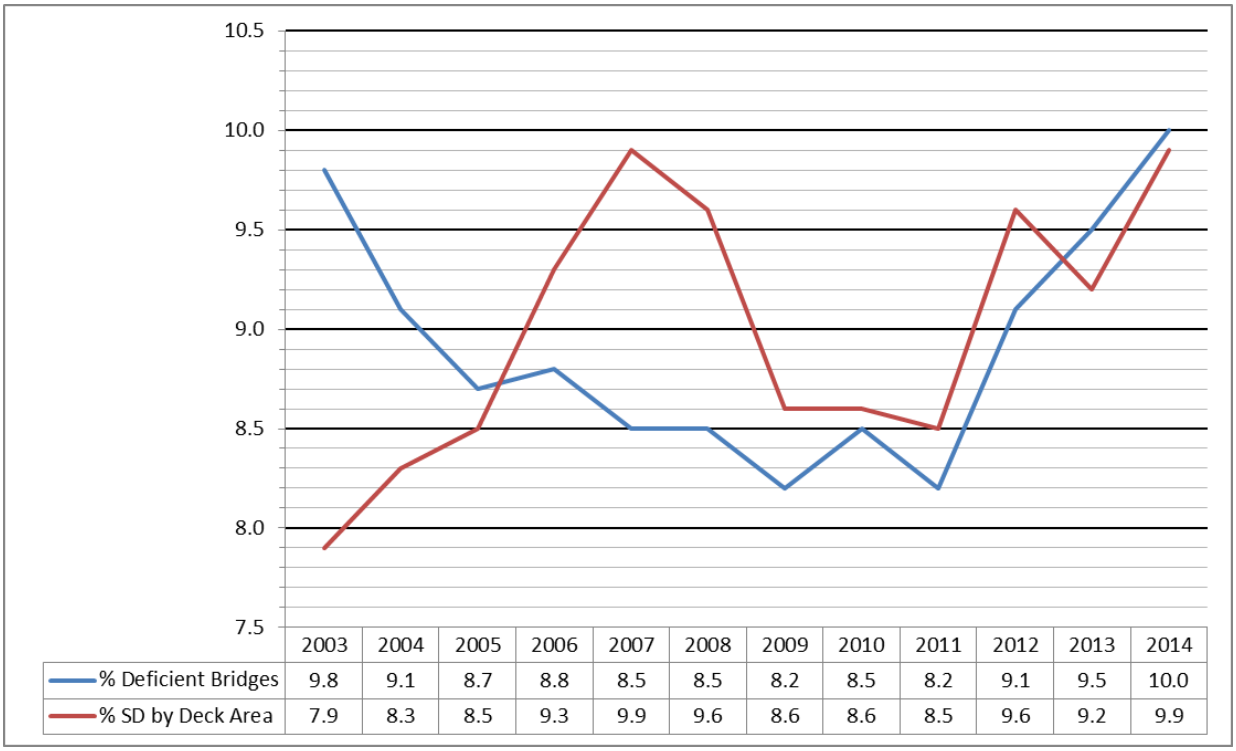
Challenges

Shift to Structurally Deficient Deck Area

As documented above, LADOTD made the performance goal switch from "number of deficient bridges" to "structurally deficient deck area" following Hurricanes Katrina and Rita in 2005. Those storms resulted in the destruction of a number of bridges, but most significantly it resulted in the loss of the twin 5.5 mile long I-10 bridges over Lake Pontchartrain. The chart in Figure 3.7 dynamically shows the very large increase in "% Structurally Deficient Deck Area" after 2005. Interestingly, the impact of losing over 3.5 million square feet of deck area, representing 2.3% of the total bridge deck area in the State is not at all reflected in the "% Deficient Bridges". This tremendous loss of these 2 bridges only represented 0.03% or 3 hundredths of a percent, of the total number of State bridges, so oddly enough for that year, the performance measure actually improved and exposed the inadequacy of this measure.

The switch from "% Deficient Bridges" to "% Structurally Deficient Bridges by Deck Area" appears to efficiently allow for a consequential impact to the performance measure if one of these very large bridges is negatively impacted, as it should if the bridge is removed from service or requires replacement.

Figure 3.7 Historical Comparison of Percent Deficient Bridges vs Percent Structurally Deficient Bridges by Deck Area (by state fiscal year)



	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
% Deficient Bridges	9.8	9.1	8.7	8.8	8.5	8.5	8.2	8.5	8.2	9.1	9.5	10.0
% SD by Deck Area	7.9	8.3	8.5	9.3	9.9	9.6	8.6	8.6	8.5	9.6	9.2	9.9

Investigating the details of deck area on Louisiana reveals the following statistics. Of the 7887 bridges currently on the State system, 118 have a deck area exceeding 175,000 square feet. These 118 bridges, while representing only 1.5% of the total number of bridges, represent over 47% of the total deck area on the system. Ironically, this becomes a new problem, or creates another potential issue, when a bridge inspection results in the designation of "structurally deficient" on one of these 118 bridges.

This "repurposing" of the structurally deficient data measure, originally intended for traffic and/or load posting restrictions, now exposes a new issue in the use of bridge inspection data as it is currently collected. During a bridge inspection, if any span on a bridge is deemed structurally deficient, the entire bridge is designated as structurally deficient, in accordance with FHWA guidelines and exactly as one would expect for the intended load posting restrictions.

So the current strategic performance measure could now easily be in jeopardy due to the current data definition and reporting requirements of FHWA and the penal impact of these exceptionally large bridges. It is expected that the Notice of Proposed Rulemaking (NPRM) will provide guidance in this matter.

Concept of Outliers

In report number FHWA-HEP-12-046, "Asset Sustainability Index: A Proposed Measure for Long-Term Performance" issued in July 2012 by the FHWA, the concept of infrastructure assets that are not typical are defined as "Outliers". The following excerpt is taken from the report.

> "These outliers could include the maintenance, preservation and repair/replacement costs of items such as aged, high-cost unique bridges, or the repair of pavements in very high volume highways, or the replacement of structures under very-high traffic volumes. These types of assets can have much higher-than-average costs that skew the basic unit costs used in these calculations."
>
> "One typical way to address this issue is to separately categorize and plan for these high cost facilities as a separate class of assets. States have grouped their unique and high-cost bridges and planned for them separately. Each such unique structure generally requires a more detailed engineering analysis to determine its preservation needs and costs for a long horizon, such as 10 years. By categorizing these structures and assessing them individually a more accurate planning estimate for their investment can be developed."

LADOTD will continue to investigate the concept of "Outlier" bridges with its FHWA partners to determine if this concept provides a reasonable approach to these issues.

3.5 POTENTIAL STATE ASSET INVENTORY REDUCTION

The cyclical economic downturns over the past few decades have clearly sent the message that the early concept of infrastructure expansion as a primary tool for future economic development and prosperity, had to give way to a focus on the long term requirements of life cycle cost based sustainability.

Recognition of these hard facts by LADOTD management years ago has led to ongoing efforts to change the culture and inform stakeholders of this move away from capacity projects toward preservation. One of the most recent innovative efforts to address this in Louisiana is the Road Transfer Program (RTP) described in the April 2013 policy document "Right-Sizing the State Highway System: A Voluntary Road Transfer Program."

This program was initiated to address the fact that the State owns over 27 percent of the public road mileage in Louisiana, while the national average is approximately 19 percent. We also again reference the fact that the RHS carries only 4.9% of the total state maintained VMT volume. The goal of the RTP is to right-size the overall State Highway System to achieve the national average of 19 percent State ownership of public road mileage.

LADOTD has identified approximately 5000 miles of State roads that do not fit the State's role in the highway network. The program involves transferring ownership of these roads to local governments. This opportunity is viewed as a way to reduce the size of LADOTD assets, rectify inequities in the distribution of State highway miles among parishes, and empower local governments through the right-sizing of the State highway system. Participation in the program is voluntary. Roads are repaired prior to transfer and the receiving local governments are credited for 40 years of routine and capital maintenance, which can be applied to any highway capital project(s). The program has so far appealed to

those parishes and municipalities that have the capacity for additional day-to-day road maintenance, but lack the resources for capital improvements.

4.0 Performance Targets and Conditions

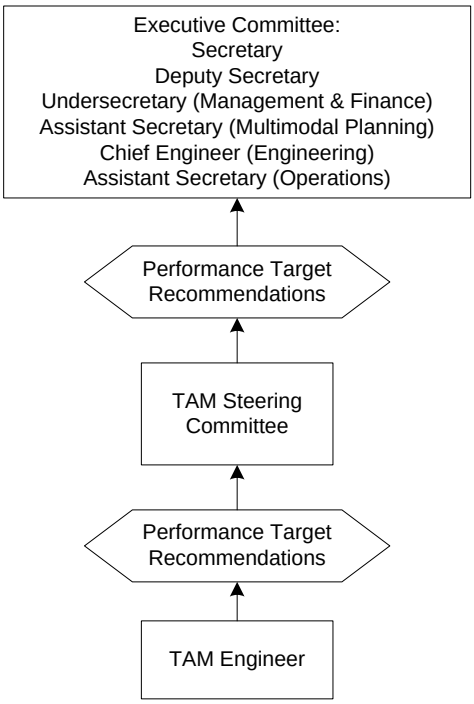
This section presents performance targets for LADOTD's asset management program and outlines the current condition of those assets.

4.1 PERFORMANCE TARGETS

LADOTD's strategic plan for State Fiscal Year (SFY) 2014-2019 sets forth performance targets for pavement and bridge condition as described in section 4.2 and 4.4 below. In the past, performance targets were reviewed annually and were periodically adjusted when funding and data analysis suggested changes were necessary. In the future, the TAM Steering Committee, led by the Executive Champion, will consider TAM relevant performance target recommendations from the TAM Engineer, and then make its recommendations to the Executive Committee as shown in Figure 4.1.

Performance targets will continue to be approved by the Executive Committee which is comprised of the Secretary, the Deputy Secretary, the Undersecretary of Management and Finance, the Assistant Secretary of Multimodal Planning, the Chief Engineer, and the Assistant Secretary of Operations.

Figure 4.1 Performance Target Recommendations



4.2 PAVEMENT PERFORMANCE TARGETS

LADOTD has established the performance targets for pavement condition, based on pavement roughness index condition ranges, for each of the four budget and analysis categories.

The following question arises about the performance targets, are they "reasonable" or "aspirational" targets? LADOTD executive management is committed to these targets and will at this time make every attempt to define them in the "reasonable" category. As explained in more depth later in the chapter 7.0 "Financial Plan, Gap Analysis and Sustainability," the ability of LADOTD to meet the condition targets is dependent upon the future funding resources that are made available for pavement preservation.

While these targets might have been met in the past, it is important to note that these achievements were aided significantly by American Recovery and Reinvestment Act of 2009 (ARRA) funding and State General Fund Surplus funding, both of which are not projected to reoccur in future funding scenarios. These "reasonable" condition targets will be periodically reassessed as the funding picture becomes clearer.

As documented below, our targets are currently based on "Fair or Better" condition assessments. LADOTD has the ability to segregate this data as needed to show Good, Fair or Poor and as the NPRM rules are finalized these targets will change to address those requirements.

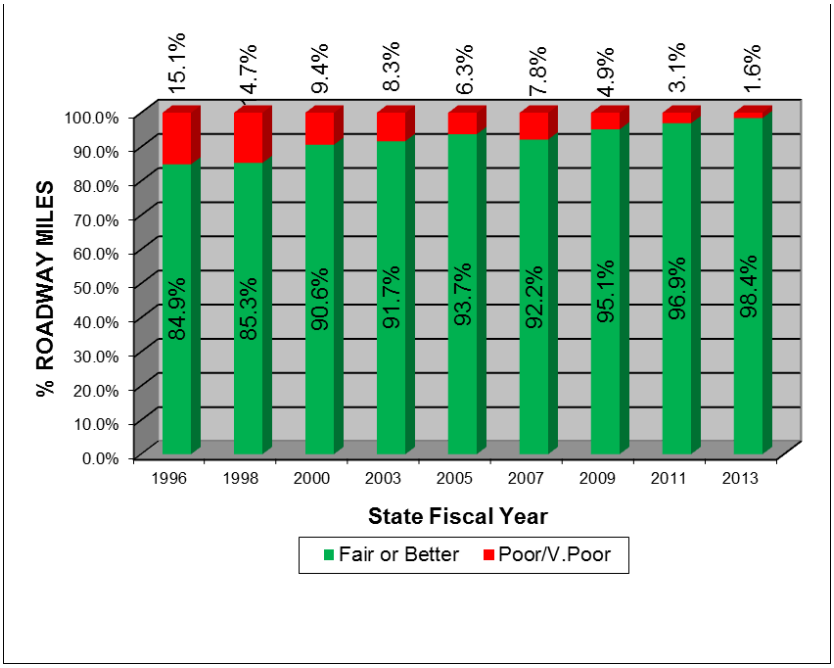
Interstate Performance Target

- Effectively maintain and improve the Interstate Highway System so that 97% of the system pavement stays in fair or better condition each fiscal year.

In a review of the pavement roughness index condition range for the Interstates, recall that Table 3.3 Pavement Roughness Index Condition Ranges identifies the range of fair or better to be 100 to 76, or an equivalent IRI range of 0 to 170.

The Interstate target of 97% in fair or better condition was adjusted upward from a previous target of 95% in SFY 09-10. Figure 4.2 indicates that Interstate pavement condition target of 97% in fair or better condition has only recently trended toward the upper end of this target, nearly meeting the target in 2011 and easily meeting the target in 2013. The previous target of 95% was met in 2009 just prior to the SFY 09-10 target increase.

Figure 4.2 Historical Interstate Pavement Conditions
(percent in fair or better condition by state fiscal year)



State National Highway System Performance Target

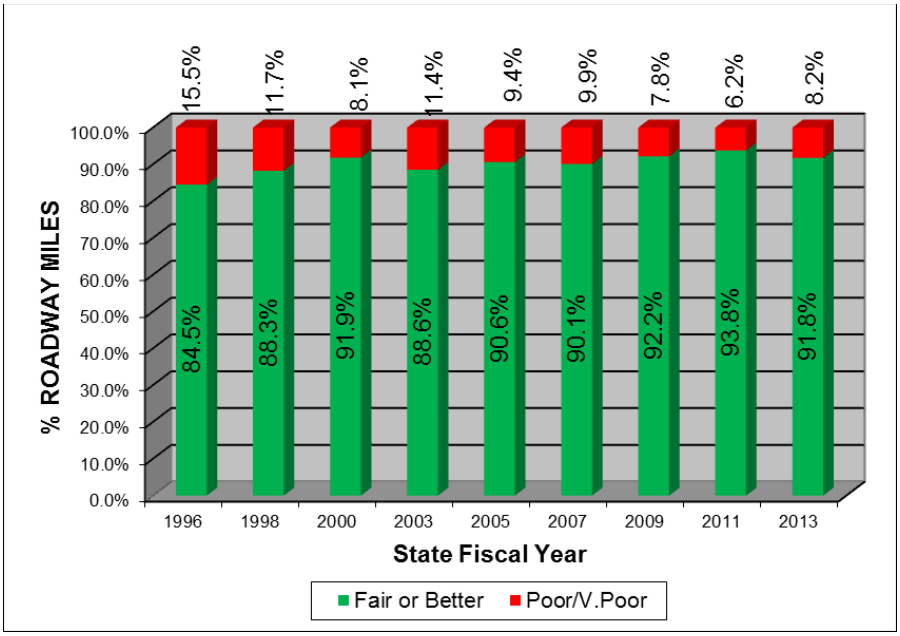
- Effectively maintain and improve the State-Owned National Highway System (State NHS) so that 95% of the system pavement stays in fair or better condition each fiscal year.

In a review of the pavement roughness index condition range for the Interstates, recall that Table 3.3 Pavement Roughness Index Condition Ranges identifies the range of fair or better to be 100 to 70, or an equivalent IRI range of 0 to 200.

The State NHS target of 95% in fair or better condition was adjusted upward from a previous target of 93% in SFY 09-10. Figure 4.3 indicates that the State NHS pavement condition target of 95% in fair or better condition has never been met. The previous target of 93% was first achieved in SFY 09-10 the year the target was increased to 95%.

We note here that while a separate State NHS pavement analysis category is shown in Figure 4.3, LADOTD has never had a separate budget category for these pavements. State NHS system projects are also very large projects and would have required each district to take the unprecedented step of using an entire years' budget on only one or two projects. LADOTD intends to separately fund the State NHS category, with the new vehicle sales tax revenue when it becomes available, and to select projects using the same process for which Interstate projects are selected. Unfortunately this new vehicle sales tax is not projected to be available for LADOTD to use until SFY 20-21. Until that time, LADOTD will look for opportunities to fund NHS pavement preservation projects on a case by case basis.

Figure 4.3 Historical State NHS Pavement Conditions
(percent in fair or better condition by state fiscal year)



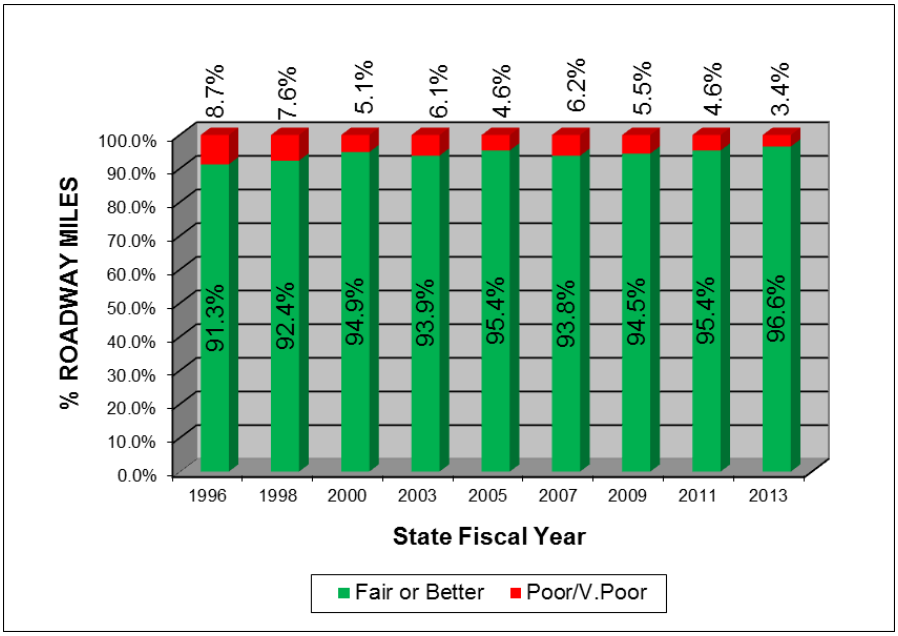
Statewide Highway System Performance Target

- Effectively maintain and improve the Statewide Highway System (SHS) (Non-NHS, Federal Aid Eligible) so that 90% of the system pavement stays in fair or better condition each fiscal year.

In a review of the pavement roughness index condition range for the Interstates, recall that Table 3.3 Pavement Roughness Index Condition Ranges identifies the range of fair or better to be 100 to 65, or an equivalent IRI range of 0 to 225.

The SHS target of 90% in fair or better condition is a very recent upward adjustment from a previous target of 80%. Figure 4.4 identifies that the SHS pavement condition target of 90% in fair or better condition has consistently been met since 1996.

Figure 4.4 Historical SHS Pavement Conditions
(percent in fair or better condition by state fiscal year)



Regional Highway System Performance Target

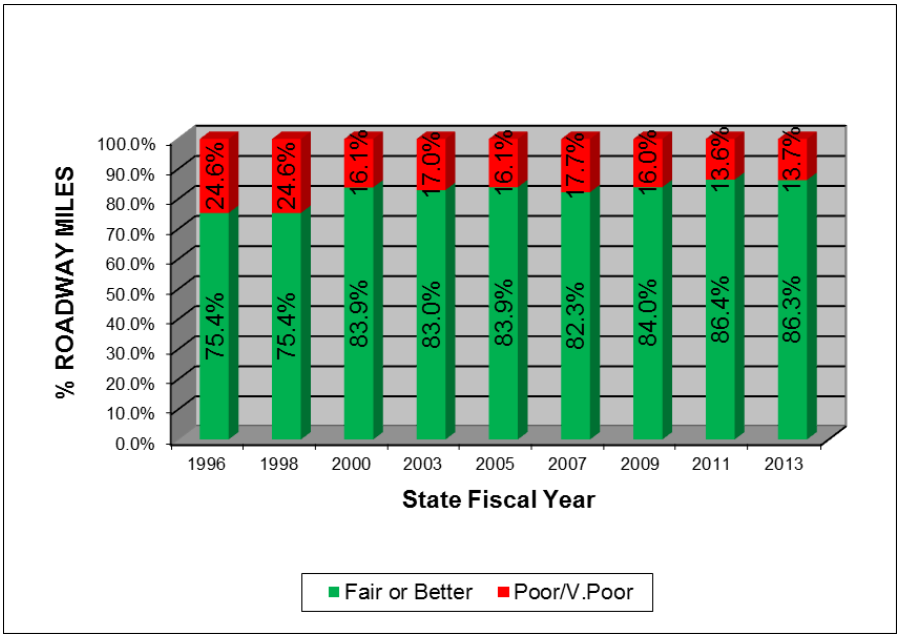
- Effectively maintain and improve the Regional Highway System (RHS) (Non-NHS, not Federal Aid Eligible) so that 70% of the system pavement stays in fair or better condition each fiscal year.

In a review of the pavement roughness index condition range for the Interstates, recall that Table 3.3 Pavement Roughness Index Condition Ranges identifies the range of fair or better to be 100 to 65, or an equivalent IRI range of 0 to 225.

Figure 4.5 identifies that the RHS pavement condition target of 70% in fair or better condition has been consistently met since 1996. It is important to note that ARRA funding could not be used on these pavements. Please also note the Road Transfer Program describe earlier specifically targets a reduction in the number of RHS pavements.

The RHS target of 70% in fair or better condition is a very recent downward adjustment from a previous target of 80%. The previous target of 80%, while consistently met since 2000, is now clearly "aspirational' and can no longer be considered "reasonable" with the projected ten year budget. Further details as to the shortfall that resulted in this decision are found in the analysis identified in Table 7.5 Projected Budget vs. Steady State Funding Analysis.

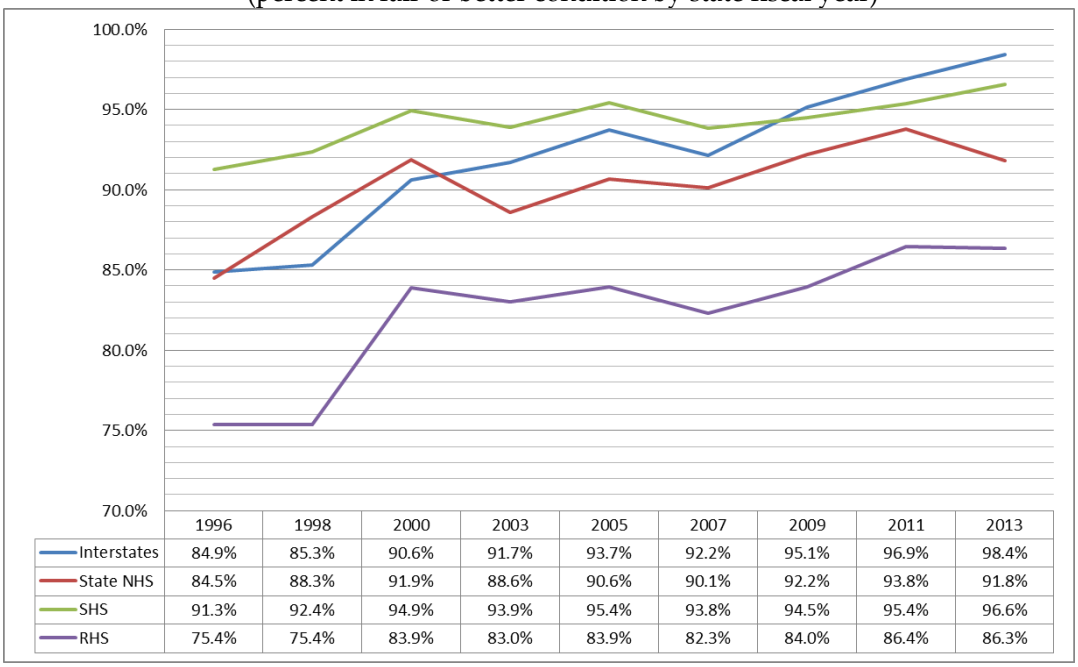
Figure 4.5 Historical RHS Pavement Conditions
(percent in fair or better condition by state fiscal year)



4.3 PAVEMENT CONDITION SUMMARY

Using the pavement condition ranges from Table 3.3 Pavement Roughness Index Condition Ranges, all of the segments of pavement for each state highway category are combined to determine the overall condition for a pavement category. Show below, in Figure 4.6, is the combined historical pavement conditions with respect to the performance targets identified above. Note once again that pavement data has been collected on 2 year cycles since the mid 1990's.

Figure 4.6 Historical Condition for Pavements
(percent in fair or better condition by state fiscal year)



	1996	1998	2000	2003	2005	2007	2009	2011	2013
Interstates	84.9%	85.3%	90.6%	91.7%	93.7%	92.2%	95.1%	96.9%	98.4%
State NHS	84.5%	88.3%	91.9%	88.6%	90.6%	90.1%	92.2%	93.8%	91.8%
SHS	91.3%	92.4%	94.9%	93.9%	95.4%	93.8%	94.5%	95.4%	96.6%
RHS	75.4%	75.4%	83.9%	83.0%	83.9%	82.3%	84.0%	86.4%	86.3%

4.4 BRIDGE PERFORMANCE TARGETS

LADOTD has established a performance target for bridge condition as follows:

- Effectively maintain and improve the State-Owned bridges so that the structurally deficient deck area constitutes not more than 10% of the total bridge deck area for all bridges.

Again the question arises about the performance target, is it a "reasonable" or an "aspirational" target? LADOTD executive management remains committed to this target and will continue to make every attempt to define it in the "reasonable" category. This "reasonable" condition target will be periodically reassessed as the funding picture becomes clearer.

The ability of LADOTD to meet the condition targets is dependent upon the funding resources that are made available for bridge preservation. It is very important to note that bridge conditions deteriorate slowly over time, and using a 10 year projection in this case provides a false sense of security. In reality, a longer projection is better determined using the funding gap or steady state analysis found in chapter 7.0 "Financial Plan, Gap Analysis and Sustainability."

It should be noted that MAP-21 establishes a minimum standard for Federal NHS bridge conditions. This is the Federal NHS category and would technically include the bridges in the LADOTD budget and analysis categories of Interstates, State NHS and Local NHS. If more than 10% of the total deck area of Federal NHS bridges in a State is on structurally deficient bridges for three consecutive years, the State must devote National Highway Performance Program funds in an amount equal to 50% of the State's FY 2009 Highway

Bridge Program apportionment to improve bridge conditions during the following fiscal year (and each year thereafter if the condition remains below the minimum).[7]

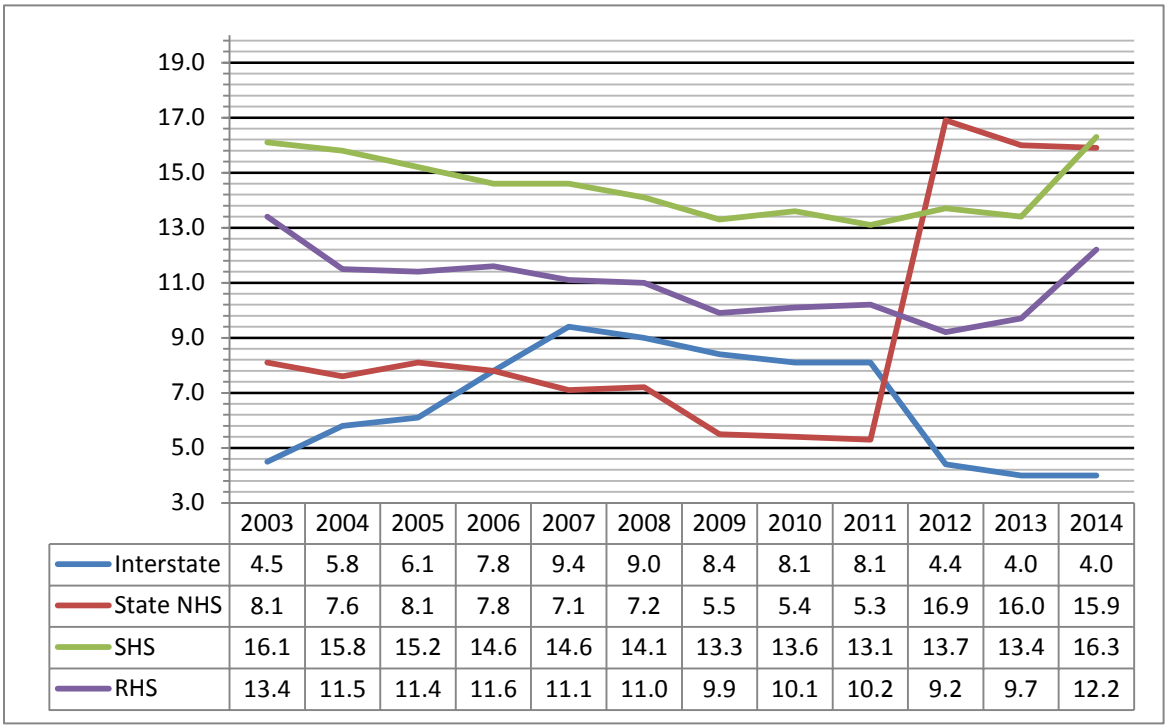
While the new Federal performance measure definition identifies "10% of the total deck area of Federal NHS bridges" as the performance measure, clarification must be made in this measure since current inspections don't actually determine what actual percent of deck area of a multi span structure is deficient. Currently when one span is deficient, out of any number of spans, the entire bridge deck area is deficient. Is that the intent for this measure? Again it is expected that the Notice of Proposed Rulemaking (NPRM) will address this matter. In either case, LADOTD will make the necessary adjustments to address this MAP-21 requirement.

4.5 BRIDGE CONDITION SUMMARY

Figure 4.7 identifies the bridge condition assessment by state highway category. Once again, when one of the 118 large deck area bridges becomes structurally deficient, it has an immediate and noticeable negative impact on the performance target. This is clearly shown for the State NHS bridges with a spike from 5.3 percent structurally deficient in 2011 to 16.9 percent structurally deficient in 2012.

[7] http://www.fhwa.dot.gov/map21/factsheets/nhpp.cfm

Figure 4.7 Percent Structurally Deficient by Deck Area
(by state fiscal year)



	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Interstate	4.5	5.8	6.1	7.8	9.4	9.0	8.4	8.1	8.1	4.4	4.0	4.0
State NHS	8.1	7.6	8.1	7.8	7.1	7.2	5.5	5.4	5.3	16.9	16.0	15.9
SHS	16.1	15.8	15.2	14.6	14.6	14.1	13.3	13.6	13.1	13.7	13.4	16.3
RHS	13.4	11.5	11.4	11.6	11.1	11.0	9.9	10.1	10.2	9.2	9.7	12.2

LADOTD has not evaluated bridges via separate categories prior to this effort and will consider the idea of developing performance measures for each category of bridges, Interstate, State NHS, SHS, RHS and Local NHS, that would be similar to the pavement approach discussed herein.

Table 4.1 below shows the most recent data associated with the structurally deficient deck area for bridges. In the existing case, it should be noted that the current performance of 9.9% just meets the LADOTD's structurally deficient by deck area performance measure goal of 10%.

Table 4.1 SFY 2014 Bridge Performance Data

Category	Total Count	Total Deck Area	Structurally Deficient Area	Percent Structurally Deficient by Deck Area
Interstate	1,419	68,001,559	2,732,068	4.0
State NHS	1,415	39,160,556	6,255,392	15.9

SHS	3,123	22,882,131	3,736,836	16.3
RHS	1,930	7,876,947	961,595	12.2
Total	**7,887**	**137,921,193**	**13,685,890**	**9.9**

With respect to the MAP-21 minimum standard for Federal NHS bridge classification conditions, which would combine Interstate and State NHS categories in Table 4.1, as noted above, Table 4.2 below shows that, for the relevant MAP-21 years, performance easily met the requirement of 10%. We note here that LADOTD will have to also include the Local NHS bridges in future analysis when that data becomes available.

Table 4.2 Federal NHS Classification of Bridge Performance Data
(by state fiscal year)

Deck Area	2009	2010	2011	2012	2013	2014
Interstate Deck Area	65780476	66151187	66099714	68406113	67853447	68001559
State NHS Deck Area	32836578	34558363	33713619	34126685	37918441	39160556
Total Deck Area	**98617054**	**100709550**	**99813333**	**102532798**	**105771888**	**107162115**
Interstate SD Deck Area	5532960	5410149	5382266	3025014	2719813	2732068
State NHS SD Deck Area	1809123	1896579	1796210	5773997	6078825	6255392
Total Structurally Deficient Deck Area	**7342084**	**7306728**	**7178475**	**8799011**	**8798637**	**8987460**
% Structurally Deficient by Deck Area	**7.4%**	**7.3%**	**7.2%**	**8.6%**	**8.3%**	**8.4%**

5.0 Whole Life Management

The concept of Life Cycle Cost Analysis (LCCA) requires a focus on all costs associated with the life of an asset and provides a systematic approach to ensure the most appropriate choices are made to maximize the value of an asset.

The concept of LCCA has been a practice of LADOTD but has not been formally applied agency-wide in a policy driven manner. For instance, construction decisions that only consider immediate costs of a project, and fail to consider long term preservation and operations cost, don't provide the best value for an asset. Following that rationale, consider the fact that the Department may build most of the small fixed bridges using concrete and do not use timber anymore, even though the initial cost of a timber bridge would be a fraction of a concrete bridge cost. It is known that timber bridges have limited load capabilities, can wear out quickly, and require almost continuous maintenance. Compared to the life span of a concrete bridge, there would be a need to probably rebuild the timber bridge a dozen or more times. LCCA appropriately factors in all the down time, user detour and delay costs, material cost, labor cost, replacement cost, life expectancy, etc. to help determine that the concrete bridge is a superior long-term decision. Sound agency decisions are supported via the LCCA concept.

Typically, an asset is well-maintained when it is maintained at a level that minimizes long term costs, and is still kept in good condition. Over the life of an asset, well-timed preservation activities can cut life cycle costs by as much as half when compared to a policy where no preservation is performed. In relative terms, you want to repaint your house at the most appropriate time, but not too soon, to allow you to maximize the value of your previous paint job, but not result in exposure of wood to long term damage. Preservation treatments in this context will include repaint, repair and repaint, replace and repaint with each having a higher long term cost. If you do nothing and let the roof cave in, you will have to completely reconstruct.

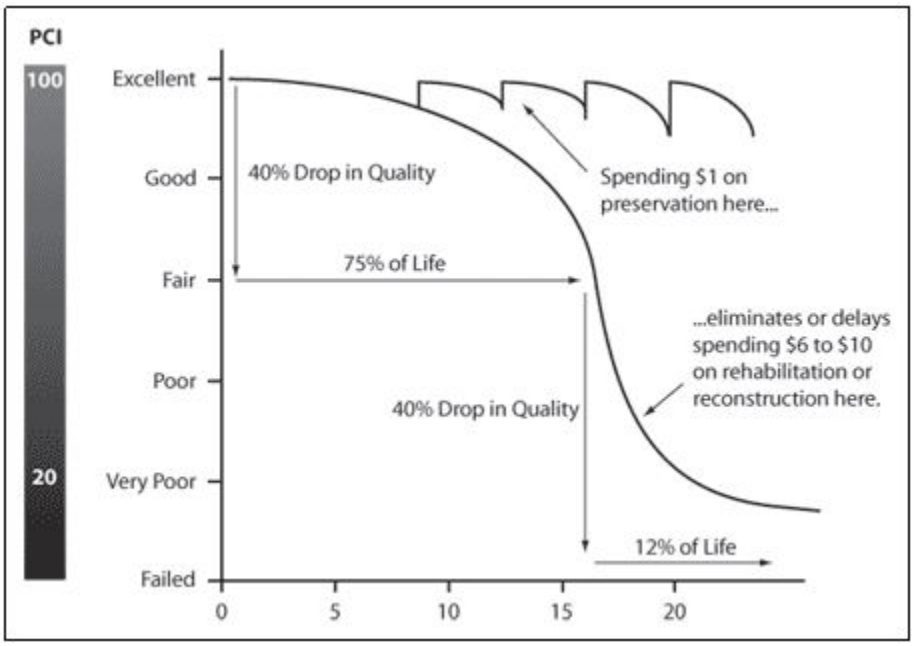
While these simple examples illustrate the concept, in reality, the decisions are not always that simple, plus they need to be applied to many asset choices.

To ensure appropriate choices are made, LCCA endeavors to find the optimal level of preservation where long term costs are minimized. Ideally, preservation expenditures should neither be applied to frequently nor delayed too long. Figure 5.1 shows that optimal expenditures, early in the life of a pavement asset, are relatively inexpensive and maintain the asset in nearly excellent condition while effectively extending the life of the initial investment significantly. By the same token, the "do nothing" approach does not allow the asset to reach its expected life cost effectively and also has the consequence of very rapid deterioration later in the asset's life.

When faced with budget limitations, LCCA requires the difficult decision that some of the assets that are nearing the rapid deterioration phase, and thus requiring major rehabilitation and large expenditures, be sacrificed and allowed to reach their end of life (and very poor condition) in order to more appropriately spend the available dollars to get the maximum

cost benefit for the entire asset pool. The tools in the Pavement Management System provide for the capability of evaluating this trade-off.

Figure 5.1 Life Cycle Cost and Maintenance Interval

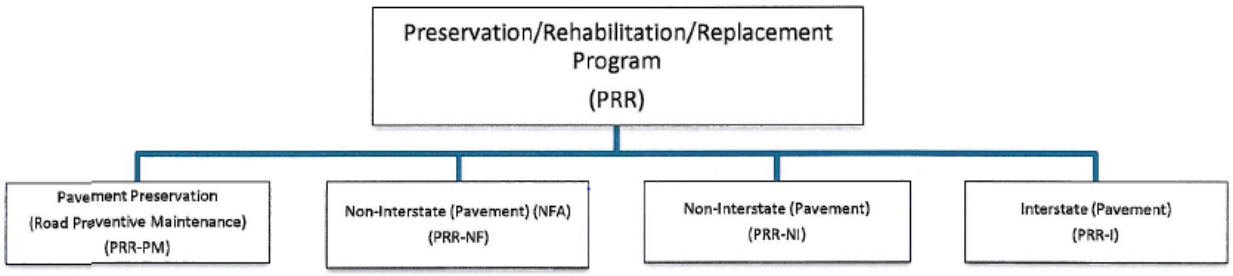


5.1 PAVEMENT MANAGEMENT

LADOTD's Pavement Management System (PMS) was established to collect and analyze data for use in improving the performance, planning, design, construction, rehabilitation and maintenance of the State highway network. PMS is fundamentally a life cycle cost and modeling tool designed to meet LADOTD's goal of optimizing the use of available funding. Data collected on the highway network, pavement conditions and highway inventory are analyzed to forecast long-term and short-term funding needs, evaluate existing conditions, accumulate historical data to evaluate performance, prioritize projects, and supply research with such data.

The FHWA approved the 2013 LADOTD policy document, Selection of Treatments and Projects for Pavement Preservation, which outlines the adoption of this information for use in the Preservation/Rehabilitation/Replacement Program (PPR) (see Figure 5.2) and specifically the Pavement Preservation (Road Preventive Maintenance) (PRR-PM) ancillary program. Please note again that this new policy document focuses only on a small part of the pavement preservation budget partition, but is included here primarily to reference the existence of this germane policy document. This document also states that the Highway Project Selection Process Manual is expanded to include, via this new policy document, data driven processes to select pavement preservation projects and treatments to ensure selections are cost effective and meet the goals of the program.

Figure 5.2 Preservation/Rehabilitation/Replacement Program (PPR) Components



Pavement preservation treatments are generally non-structural treatments designed to extend the life of good pavements, preserve the existing conditions of the pavements, and retard future deterioration. The treatments typically include sealing joints and cracks, restoring load transfer, patching, filling minor ruts grinding/grooving, surface treatments and thin overlays.

Routine maintenance, while not eligible for this funding, still receives attention and focus in this policy document. Specifically identified maintenance activities include pothole patching, bump grinding, spot leveling, and machine leveling.

LADOTD uses the dTIMS software for pavement management analysis. One of the most important aspects of LADOTD's PMS is the comprehensive analysis of the various pavement condition indexes, and their use as triggers, identifying timely preservation or rehabilitation treatments that enhance and maximize potential life cycle cost benefits.

Pavement distress data is currently collected every two years using the ARAN provided by Fugro Roadware (see TAM Relationship to Other Business Plans). The PMS software is used to analyze this data to determine a recommended treatment for each segment of roadway based on unlimited funds, essentially defining the base need. Recommended treatments have a fixed life, because the pavement continues to deteriorate, so the next step is to generate recommended treatments, for a given time period, based on a defined budget.

The list of prioritized roads and their recommended treatments to be applied within the next five year period is provided to each District annually. Included in the package is the information used in the project selection along with current and past distresses for comparison.

When there is a need to select a treatment contrary to the PMS recommendation, the District must justify and document the request. For instance, the PMS data could be up to two years old and field conditions could have significantly changed. If a minor preservation treatment is recommended, and oil/gas water fracking trucks have traveled over that pavement, the recommended preservation treatment might no longer be a valid selection and must be adjusted.

The Preservation Selection Committee, as defined in the Highway Project Selection Process Manual, has final approval of the project selection. These are the documented factors that could justify an engineering judgment exception:

- Other funding sources included in project, for example safety, ER (emergency relief), drainage, etc.
- One treatment selection vs. various PMS recommendations for the project length (project level scope may not match network level scope in PMS recommendation)
- Variations in observed data vs. PMS data (PMS data can be up to 2 years old and do not reflect conditions as they currently exist)
- Maintenance Costs
- Physical constraints (curb & gutter, numerous driveway entrances, overpasses, etc.)
- Environmental issues (geographic location, residential areas, high traffic, % trucks very high, etc.)
- Land usage change

5.2 BRIDGE MANAGEMENT

Similar to pavements, life cycle costing is an objective way to summarize all the costs that can be expected over the life of a bridge. When a new road is built, the State commits itself not only to the initial construction costs, but also to the future costs to maintain that road. Over a bridge's life, the future costs can be greater than the initial cost.

When bridge work is prioritized on a "worst-first" basis and focuses on structurally deficient bridges, the work on each bridge is relatively expensive and comparably few bridges can be addressed in any given year. At the same time that a small number of bridges are restored to good condition, a similar or even greater number of bridges may deteriorate into the structurally deficient state, which makes it very difficult to get ahead of deterioration and control the life cycle.

A benefit of LCCA is that it identifies bridges that are not yet structurally deficient and supports the planning of relatively inexpensive projects that can prevent those bridges from entering a state of deficiency, which thus extends their lives. This approach can be used to address more bridges, which more significantly reduces the number of deficient bridges. In the long-term, this saves money and keeps the inventory in better condition.

LADOTD uses the PONTIS bridge management system to store inventory and condition data, deterioration and cost parameters, as well as compute and manage life cycle costs. LADOTD conducts periodic bridge inspections to keep information in PONTIS up-to-date. Condition data is collected and reported within PONTIS for both NBI component ratings as well as element level condition states. PONTIS analysis is used to estimate long range forecasting for both future bridge network condition and budget allocation scenarios. These analyses are used as input for the Long Range Plan, Budget Partition and the Life Cycle Cost estimation for Road Transfer credits when bridges are located along a route being transferred to another jurisdiction.

The NBI component ratings are exported to the existing mainframe structures database (STRM). This database remains the system of record for bridge reporting and basic prioritization based on deficiency, sufficiency rating calculations and condition ratings of

the deck, superstructure and substructure. LADOTD has continued to collect this information during field inspections to maintain the consistency of historical NBI ratings instead of relying on the PONTIS element translator to generate these values.

LADOTD identifies candidate bridges by querying the STRM system for a selected criteria to achieve program goals. Projects and proposed actions such as rehabilitation, replacement, repair, removal, preventive maintenance, etc., are tracked within the PS Module of the LaGov management system. This allows the generation of potential candidates and removal of any structures that are currently programmed regardless of funding source. The candidate bridges are those that qualify for replacement, rehabilitation, preservation and protection funding under the new MAP-21 guidelines.

A list of potential candidate bridges is distributed to the Districts for their review. The Districts submit a list of priorities based on potential candidates and other needs, along with a Stage 0 Structural Site Survey form providing vital information for preparing a parametric cost estimate, evaluating constructability, and to aid in prioritization. The District is the source of information collected from the public, the MPO and the Legislators. A priority list is established based on District input and consideration is given to truck routes, average daily traffic, structure age, timber structures, structure condition, route continuity and traffic crash data. The PONTIS database is used as a source of information for element level conditions and specific inspector notes captured during the inspection process.

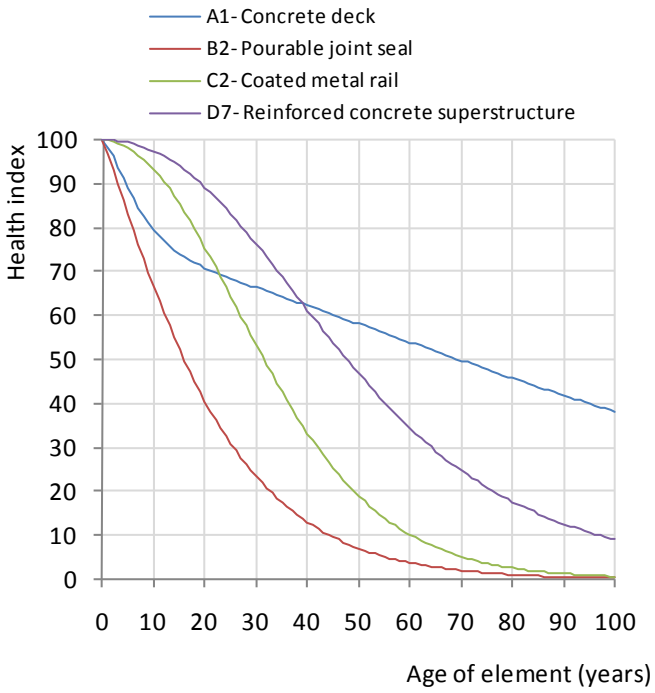
A more refined candidate list is established that meets the Districts needs and equitable distribution of the funding to all Districts. The candidate structures are grouped into potential projects and presented to the Bridge Preservation Project Selection Team for approval.

As needed, the Bridge Management Section will run a network analysis taking into account programmed bridge projects to determine if appropriate structures and actions are consistent with Department goals.

There is a lack of confidence in the analysis capabilities of previous versions of PONTIS to drive the project selection process. Although it is not used for selection, the work candidate list from PONTIS can be generated as another source for the Project Selection Team Plan. LADOTD intends to implement AASHTO's newest versions of PONTIS, AASHTOWare™ Bridge Management software (BrM), which considers not only life cycle cost, but also mobility, safety, risk and other performance concerns.

In PONTIS, the basis of LCCA is a deterioration model (Figure 5.3). For each structural element in the Louisiana inventory, PONTIS contains an estimate of the median amount of time it takes to deteriorate from each condition state to the next-worst state. Expert judgment was used to develop these estimates for LADOTD. PONTIS uses this basic information to generate curves that forecast the change in condition over a long period of time.

Figure 5.3 Example Bridge Deterioration Models



Each time an element deteriorates to its next condition state, one or more treatments become feasible, such as repairs or rehabilitation. Many of these treatments can potentially extend the service life of the bridge, but each also has a cost. PONTIS estimates the life cycle cost to keep the bridge in service, with and without the treatment, in order to see which alternative minimizes costs in the long term.

Eventually, each bridge deteriorates to an advanced stage where replacement becomes necessary. Naturally, the owner of a facility wants to postpone this cost as much as possible. If costs can be postponed, then the money saved can be put to more important uses. In LCCA, this preference is quantified as a discount rate. A typical real discount rate is 2.3 percent. The term "real" means that the effects of inflation are removed from the computation in order to make the cost tradeoffs easier to understand. This discount rate divides any cost by a factor of 1.023 for each year the cost is delayed.

Although it is attractive to delay costs as much as possible and take advantage of the discount rate, there are limits. When maintenance is delayed or deferred, the condition of each asset gets worse and eventually affects the serviceability or even the safety of the infrastructure. Also, certain kinds of preventive maintenance actions are highly cost-effective, but only if performed at the optimal time. For example, painting a steel bridge at the right time is highly effective in prolonging its life. If painting is delayed, at some point, too much of the steel is eaten away by rust, painting is no longer effective, and a much more expensive rehabilitation or replacement action is required.

PONTIS identifies bridges that are already in a structurally deficient condition, as well as bridges that represent cost-effective life extension opportunities. It uses a benefit-cost ratio

to prioritize all of these candidate projects, where the benefit of a project is the estimated savings in life cycle cost if an action is taken. Since funding is always constrained, only the highest priority bridges can be addressed. All other bridges are postponed until the following year or later, until they move up in priority and can be funded.

As LADOTD implements AASHTO's new and expanded bridge management software, it will need to upgrade its bridge inspection process and prepare forecasting models compatible with the new inspections and software. MAP-21 specifies the most important inspection process improvements, and the FHWA is currently preparing a new manual to document the improved process. LADOTD will need to update its models of deterioration, treatment selection, costs, and action effectiveness to correspond to these changes. This will enable more advanced analysis of bridge deterioration and will also enable LADOTD to quantify project benefits that affect risk, safety, mobility, and other performance concerns.

6.0 Risk Management Analysis

The international standard ISO 31000 defines risk as "the effects of uncertainty on objectives." It its simplest terms, risk is anything that could be an obstacle to the achievement of goals and objectives. However, risks are more than just threats. Risks can be anything that may impede an objective or create a new opportunity. These risks may include, but are not limited to:

- Threats
- Variability
- Change
- Uncertainty
- Opportunity

Risk management is an important and relatively new component required in the TAMP. These risks can affect many aspects from budget allocation to retrofitting the design of a bridge to mitigate extreme weather threats. All levels of risks will be considered throughout the process in order to manage the Department's assets with the most efficient and effective strategies and methods.

Provided below is LADOTD's documentation and ratings for each risk. Potential causes for each risk were recognized, and controls, tools, and actions to use to address the risks were documented.

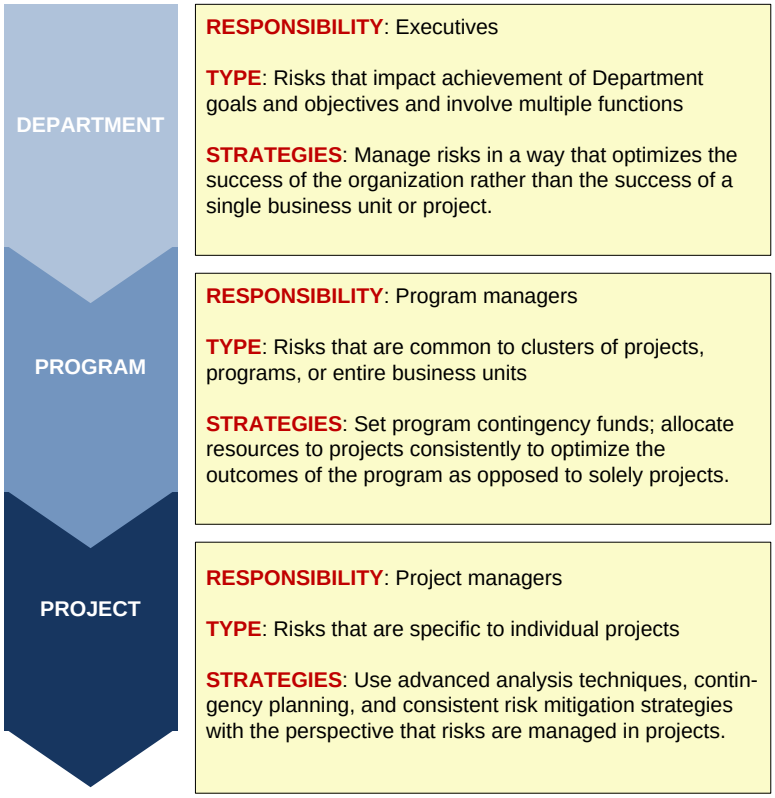
6.1 Risk Management and Risk Register Compilation Process

Certainly after the 2005 and 2008 hurricane seasons, risk management has become a prime concern in all areas of LADOTD and has received appropriate attention. With the MAP-21 mandate for ongoing risk management analysis, LADOTD has formally created risk registers for three levels of risk (Department Level, Program Level, and Project Level). Figure 6.1 differentiates between these three risk levels.

Department level risks affect the achievement of the Department's strategic objectives and are represented by items such as funding issues or changes in regulatory policies. The resulting changes in design standards required after Hurricanes Katrina and Rita is an example of risks of this type experienced at LADOTD. Executives must manage departmental risks in a manner that optimizes the success of the organization.

Program level risks affect the different funded programs in the Department such as the pavement or bridge preservation program or the safety program. These risks could be funding, lack of personnel for program delivery, or rapid deterioration of the program's asset. The mitigation strategies for these risks would be accomplished in a manner to optimize the programs efficiency and effectiveness.

Figure 6.1 Levels of Risk



Project level risks are generally unique to a specific project. Examples of project level risks include geotechnical issues or right-of-way purchase delays. The mitigation strategies for these risks would be accomplished in a manner to optimize the projects efficiency and effectiveness.

The Department's risk registers were developed through the following steps:

1. **Risk Education –** LADOTD created working groups for the three risk levels (Department, Program, and Project). These working groups were educated on risk registers, how to create risk registers, and how risk registers will be used by the Department.
2. **Risk Identification –** Separate workshops were held with the three working groups to determine the possible risks for their assigned risk level. The workshop participants also determined the proper description of the risk and possible causes of the risk.
3. **Risk Analysis** - Workshop participants assessed the relative likelihood and consequences of each risk, which helped to rate them on a scale of "low impact" to "critical." Mitigation strategies were then discussed for the highest risk items. Figure 6.2, the risk rating chart, was used to determine the risk rating.

Figure 6.2 Risk Rating Chart

Likelihood	Consequence				
	Insignificant	Minor	Moderate	Major	Catastrophic
Rare	Low	Low	Low	Low	Low
Unlikely	Low	Low	Low	Medium	Medium
Possible	Low	Low	Medium	High	High
Likely	Low	Medium	High	High	Critical
Almost Certain	Medium	Medium	High	Critical	Critical

4. **Risk Evaluation, Risk Mitigation, and Risk Finalization** - A smaller core team reviewed each risk register to evaluate the risks to determine the possibility of combining risks as the same risks could be in Department, Program, and/or Project Level. This working group also determined which risk level is the most appropriate and also looked at the mitigation strategies to determine if mitigation strategies could impact and reduce other risks. Finally, the team performed a prioritization of the risks and finalized the risk registers.

6.2 INITIAL RISK REGISTER

Tables 6.1 through 6.3 are LADOTD's initial risk registers. These risk registers are the risks associated with the Department, Programs, and Projects. In addition to the risks, the risk ratings and risk mitigation strategies and listed.

Table 6.1 Departmental Level Risk Register

#	Risk Description	Consequence	Likelihood	Risk Rating	Mitigation
D1	Lack of operating funding	Major	Almost Certain	Critical	Educate elected officials on funding needs. Employ strategic thinking and continuous improvement for efficiency within the Department. Elimination of low priority services. Possible reduction of staff.
D2	Loss of staff	Major	Almost Certain	Critical	Employ succession planning strategies to keep productive employees and focus on recruiting to attract new employees. Continue to cross train employees for the ability to continue delivering services when key employees retire or resign. Continue to employ the workforce development program and structured training to advance the ability of our workforce. Outsource when necessary to fill void of reduced staff.
D3	Cut in federal funding	Major	Possible	High	Adopt an alternate priority program that postpones project lettings. Sell GARVEE bonds to fund needed programs and projects.
D4	Insufficient match for federal funds	Major	Likely	High	Restructure State highway program to allow for maximum funding for match to the federal program. Cut the following programs: • Port and Flood Control • Parish Transportation Fund

#	Risk Description	Consequence	Likelihood	Risk Rating	Mitigation
					• State Police • LADOTD Operating Budget Use toll credits as match for federal funds. Apply for General Obligation bonds and State General Fund monies to offset reductions. Possible reduction in the level of service.
D5	Weather events (Hurricanes, Floods, Ice Storms, etc.)	Moderate	Almost Certain	High	Implement design standard changes and infrastructure hardening to mitigate possible damages. Dedicated and fully functional emergency preparedness program and staff. Fully support to the local levee districts and flood control programs. Improve data for elevations to better predict possible flooding. Implement and maintain a comprehensive disaster recovery plan.
D6	Bridge failure	Major	Possible	High	Fund and fully implement the truck weight enforcement program. Continue to strictly control the issuance of truck permits to control overweight trucks. Focus funding on bridge preservation. Continue to operate a comprehensive bridge inspection program.
D7	Adverse legislative actions to priority programs	Major	Possible	High	Continue to implement a transparent project selection process. Encourage the continence of strong statutory controls.

#	Risk Description	Consequence	Likelihood	Risk Rating	Mitigation
					Continue active liaison efforts and legislative education/outreach.
D8	Negative public opinion	Moderate	Possible	Medium	Continue to have a proactive public relations program. Continue active liaison efforts and legislative education/outreach. Executive management enforces high performance from all groups of the Department.
D9	Changes in regulatory policy	Moderate	Possible	Medium	Monitor regulatory policies for early recognition of changes in the requirements (stage 0). Employ design decisions to avoid impact of the policy changes. Train employees on current regulatory policies.
D10	Continuity of operations	Major	Rare	Low	Implement the Department's Continuity of Operations Plan (COOP).
D11	Terrorist/criminal acts	Catastrophic	Rare	Low	Continue to implement the following security: • Rest area security • Building security Install and monitor cameras in critical areas. Monitor and implement traffic control. Control access to as-built plans. Continue to have a pre-employment drug screen and random screening for critical safety positions.

Table 6.2 Program Level Risk Register

#	Risk	Consequence	Likelihood	Risk Rating	Mitigation
PM1	Lack of reliable traffic loading data decreases confidence and effectiveness of pavement design	Major	Almost certain	Critical	Collect permanent WIM data at 20 locations across the State which will determine regional loading factors that can be used for design.
PM2	Increased allowable truck weights increase deterioration rates of existing infrastructure.	Major/ Catastrophic	Likely/Almost Certain	High/Critical	The Department shall aggressively communicate implications to infrastructure. Educate legislature on impact to the pavement and bridge system.
PM3	Unexpected sustained revenue decreases	Major (pavement) Catastrophic (bridge)	Possible	High (pavement), Critical (bridge)	Educate the legislature on the implications in meeting our performance indicators. Shift bridge projects to rehab and repair instead of replacement. Use the performance indicators shown in the TAMP to help determine funding needs for our assets.
PM4	Public demand for low construction impacts increases costs and decreases quality	Moderate	Almost Certain	High	Educate legislature and public on the impacts to the cost to a project that minimizes impacts to users. Identify alternatives to closing lanes.
PM5	Lack of personnel for program delivery	Moderate	Likely	High	Employ succession planning strategies to keep productive employees and focus on recruiting to attract new employees. Continue to cross train employees for the ability to continue delivering services when key employees retire or resign. Continue to employ the workforce development program and structured

#	Risk	Consequence	Likelihood	Risk Rating	Mitigation
					training to advance the ability of our workforce. Possible outsourcing needed to fill void of reduced staff.
PM6	Emerging technologies improve efficiencies	Moderate	Possible	Medium	Attend training and keep updated on all new technologies. Incorporate industry improvements into plans and specifications.
PM7	Diversion of work force to other activities (e.g., storm response)	Minor	Likely	Medium	Continue to monitor the progress of all plan development to ensure timeliness of program. Cross train employees in order to have the ability to provide assistance in other areas to maintain timeliness of program.
PM8	Increased lane miles increases long term preservation costs	Moderate	Unlikely/Possible	Low/Medium	Implement life cycle cost analysis on all projects that add lane miles and include in operating budget.
PM9	Unexpected revenue increase in program level that cannot be covered by projects on the shelf	Minor/moderate	Possible	Low/medium	Continue to design projects to increase number of projects on shelf. Maintain a reasonable level of federal advance construction projects that can be converted.
PM10	Political pressure for suboptimal projects	Moderate	Unlikely	Low	Educate legislature on impact to infrastructure level of service. Enforce statute that requires project selection to follow the annual highway priority process.

Table 6.3 Project Level Risk Register

	Risk	Consequence	Likelihood	Risk Rating	Mitigation
PR1	Railroad Agreement (or lack thereof) can delay project	Major	Almost certain	Critical	Start working with railroad early. Work on developing better relationships with the railroad companies.
PR2	Scope creep on projects that increase cost	Major	Possible-Likely	High	Improved scoping skills of the project managers. Continue to improve communication among groups within the department. Enforcement of existing policies.
PR3	Poor contractor quality	Major	Possible	High	Continue to improve enforcement of specifications. Implement a contractor pre-qualification process.
PR4	Public Involvement delays/kills the project	Major	Possible	High	Involve the public earlier and more frequently throughout the life of the project. Recruit your supporters. Continue to use public relations unit to analyze outreach methods.
PR5	Lack of experience of project delivery staff	Moderate to major	Likely	High	Employ succession planning strategies to keep productive employees and focus on recruiting to attract new employees. Continue to cross-train employees for the ability to continue delivering services when key employees retire or resign.
PR6	ROW acquisition problem or delay	Major	Possible	High	Start working with Right-of-Way section earlier.

	Risk	Consequence	Likelihood	Risk Rating	Mitigation
PR7	Utility relocation problem or delay	Major	Likely	High	Work with utility companies early to try and mitigate any issue.
PR8	Environmental document and permitting	Moderate to major	Likely	Medium-high	Start working with environmental section earlier.
PR9	Overworked project delivery staff decreases efficiency	Minor	Likely	Medium	Work to keep staffing level at maximum. Cross train employees in order to have the ability to provide assistance in other areas to maintain timeliness of program.
PR10	Large change orders increase cost	Moderate	Possible	Medium	Implement a QA/QC unit to review plan quality.
PR11	Lack of contractor availability increase cost	Major	Unlikely	Medium	Work with contracting companies to get an idea of contractor availability. Distribute the projects regionally.
PR12	Lack of control of Design-Build projects (quality issue)	Moderate	Possible	Medium	Continue to improve the design build process to minimize issues.
PR13	Low estimates	Minor	Unlikely	Low	Train design personnel on better estimating of projects.

6.3 ROLE OF RISK MANAGEMENT IN THE ASSET MANAGEMENT PROCESS

All three of LADOTD's risk registers will be used throughout the asset management process, when setting the budgets, prioritizing projects and revising asset management guidance. The following describes how each of the risk registers will be used in the process:

- Department and Program Level Risks – The Executive Staff meets once a year to set the Departments goals and objectives and to set the funding appropriations for the various programs. During this meeting, the Departmental risks, which are the global level risks, are considered when setting the funding levels for the various programs in a manner that the Department can most effectively meet our asset performance targets.
- Project Level Risks – As per the Department's Highway Project Selection Process Manual, there are project selection committees for each of the funded programs. These selection committees meet once each year to prioritize the projects for the next year's program of projects. During this meeting, the project selection committees will review the Project Level risks and then will be consider these risks when prioritizing the projects so that the program will efficiently and effectively appropriate the funding to meet the Department's performance targets.

Existing policies and procedures will be adjusted, and if necessary, new policies will be generated to support this requirement. The roles of the risk management and risk registers will help the Department become more efficient managing transportation assets.

6.4 UPDATING THE RISK REGISTER

The Department's Asset Manager will re-establish the working groups for each of the risk levels after the Notice of Proposed Rules are established and work to comply with those rules. In addition, a yearly review and update of the risk registers will follow the initial compliance and acceptance by the FHWA. The working groups will re-evaluate the Risk Registers to determine if any changes need to be made in the Risk Registers and if so will then go through the same process as listed in 6.1 of this section.

7.0 Financial Plan, Gap Analysis and Sustainability

The financial plan provides the link between the agency's strategic objectives and the improvement programs that identify projects. Therefore, it is important that it convey, as much as possible, that the agency has a credible plan for achieving its goals. The financial components in the TAMP also provide an opportunity for the agency to convey to outside stakeholders that it is managing assets effectively using preservation strategies that help to maintain asset conditions. This improves agency accountability and transparency.

The federally legislated requirement to incorporate long-term financial plans into a TAMP has raised the importance of the financial plan and strengthened the link between the financial plan and the improvement programs for physical assets such as pavements and bridges. In addition, there is an increasing focus nationally on financial sustainability and there are several financial metrics that enable transportation agencies to better communicate with decision makers. As a result of these factors, individuals involved in asset management are becoming more aware of the need for long-term financial planning and its impact on agency goals and funding allocations.

For LADOTD, the overall investment strategies must tie into LADOTD's mission to deliver transportation systems that enhance quality of life and facilitate economic growth. With regard to LADOTD's primary asset classes included in this TAMP (roadways and bridges), this means the strategies must enhance quality of life and economic growth by enabling individuals and businesses to efficiently and effectively travel the State's system of roads and bridges in a safe manner. In doing so, LADOTD will accomplish its mission.

Investing its limited funding resources in the right place to produce the largest return for the given investment is the goal of LADOTD's TAM program. In order to do so, the Department will use its existing state-of–the-art pavement and bridge management systems with predictive capabilities that provide levels of service for various long-term funding scenarios. This allows the Department to iteratively analyze various funding scenarios and the resulting effect on level of service. If there is insufficient funding to meet performance targets, the funding mix can be changed for one or more of the other road and bridge classifications until there is a consensus that the adopted scenario will be the best solution to achieve the Department's mission within funding constraints.

LADOTD has developed, and included in this TAMP, a financial plan with a ten-year horizon to account for life cycle costs of assets and to allow for more precise needs and revenue estimates than are possible within the thirty year horizon of the Statewide Transportation Plan. Specifically, LADOTD's financial plan includes the following elements:

- Financial resources
- Budget allocation

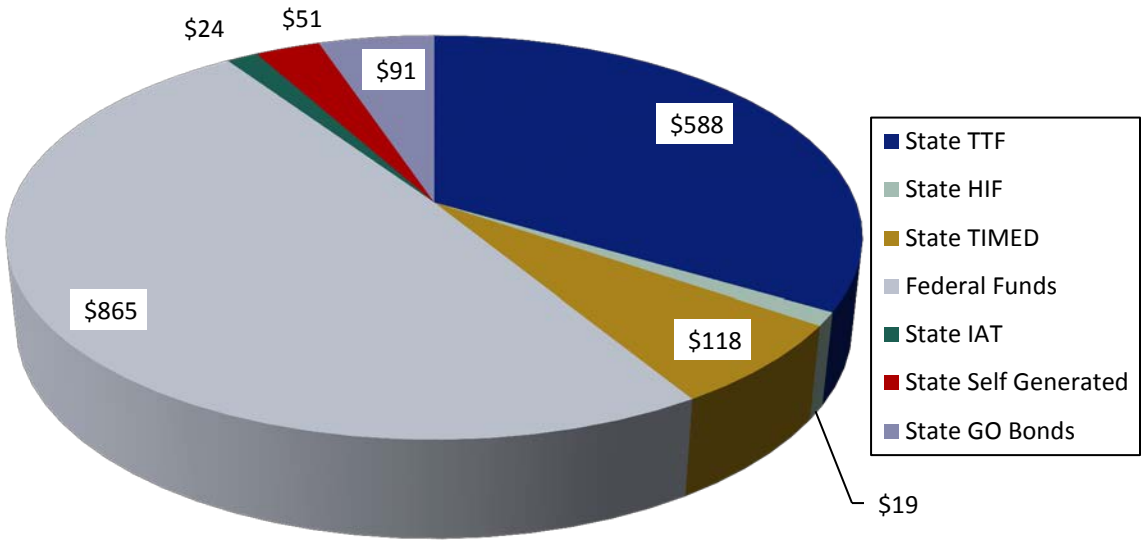
- Historical funding levels for pavement and bridge
- Forecasted funding and condition levels for pavement and bridge
- Gap funding needs assessment
- Asset sustainability
- LADOTD asset valuation methodology

7.1 Overall Financial Resources

The funding that LADOTD has available for pavement and bridge preservation is part of the overall annual funding allocation that it receives from the Legislature. There are many revenue sources that make up the overall annual operating and capital budgets. A detailed list of the LADOTD funding sources can be found in the appendix, "LADOTD Revenue and Budget Allocation Descriptions" while the projected revenues and expenditures for the next ten years can be found in the appendix, "LADOTD 10 Year State Revenue and Budget Projection."

Figure 7.1 shows the SFY 2014-2015 overall funding for the Department which totals $1.756 billion.

Figure 7.1 LADOTD SFY 2014-2015 Financial Resources (millions)



7.2 Overall Budget Allocation Process

The Financial Plan Development Process begins with a forecast of federal and State funding. The Statewide Transportation Plan includes a 30 year revenue forecast based on four scenarios which are detailed in the appendix "LADOTD Revenue Scenarios." These four

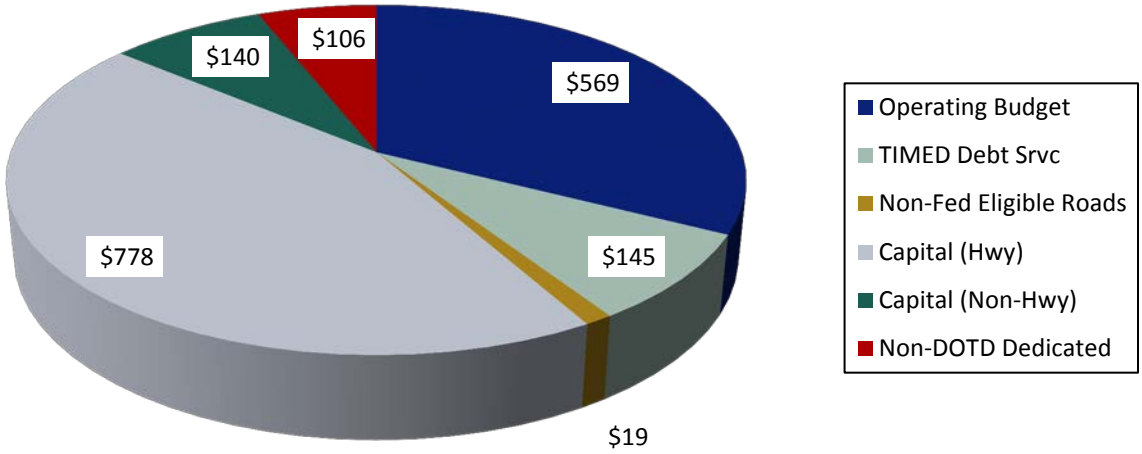
scenarios are level funding, reduced federal funding, moderate growth and robust growth. The TAMP ten year financial plan utilizes some of the assumptions in the Statewide Transportation Plan financial forecast but will first start off by utilizing the five year State forecast from the State Revenue Estimating Conference. This group is composed of the President of the Senate, Speaker of the House, Commissioner of Administration and an economist from Louisiana State University (LSU). The Legislative Fiscal Office economist and the Division of Administration economist both present their five year forecasts to the Conference members at meetings conducted a minimum of twice per year and the selected forecast becomes the official revenue for the State as well as the TAMP. The financial forecast for the TAMP uses the moderate growth scenario from the Statewide Transportation Plan. This is less risky as the department can easily delay projects but will have more difficulty pulling up projects in the program if more funding than expected becomes available. These assumptions are adjusted annually.

Once the revenue forecasts for the next ten years are agreed upon by LADOTD's Project Development Steering Committee and the Executive Committee, LADOTD's Budget Office goes through an iterative process whereby the funding needed for the operating budget (personnel services, professional and consulting contracts, supplies, equipment, etc.) is funded first and then the remaining amount is deemed available for the other programs and constitutionally permitted uses of the Transportation Trust Fund. The resulting document is the TTF Distribution Worksheet and is maintained by LADOTD's Budget Director. The TTF Distribution Worksheet that covers SFY 14 through SFY 23 can be found in the appendix "LADOTD 10 Year State Revenue and Budget Projection."

The capital program for the highways and bridges is called the Highway Priority Program. The funding available for the Highway Priority Program, determined by the previous step, is partitioned into categories and subcategories based on the different types of assets and/or needs of the system. This effort is performed by the Transportation Planning section in the Office of Multimodal Planning with Executive Committee oversight and uses inputs from the management systems to model budget impacts on systems. This document is called the Budget Partition and is maintained by the Office of Multimodal Planning. The budget partition for SFY 14-15 can be found in the appendix "LADOTD SFY 14-15 Budget Partition" The funding levels available for pavement and bridges are broken down into the four classifications of highways. The funding levels are set based on available funding, historical funding levels, and goals of the Statewide Transportation Plan, investment strategies and performance targets. Once the budget partitions are set and the capital funding available for the different subcategories of the budget partition are known, the projects in the Annual Highway Priority Program are determined using the process set forth in LADOTD's Highway Project Selection Process Manual.

The overall budget allocation for SFY 2014-2015 is $1.756 billion. The allocation of these funds is shown in Figure 7.2. Of particular interest is the allocation for the Department's Operating Budget of $569 million and the Capital Budget for highways of $778 million. A detailed description of each budget allocation can be found in the appendix "LADOTD Revenue and Budget Allocation Descriptions."

Figure 7.2 SFY 2014-2015 Budget Allocation (millions)



7.3 TAMP Related Budget Partitions

LADOTD's budget partitions are outlined in chapter 2.2 "TAM Relationship to Other Business Plans" under the section Annual Highway Budget Partitions. These budget partitions identify the funding expenditure by the defined major categories. A copy of the SFY 14-15 budget partition is included in the appendix "LADOTD SFY 14-15 Budget Partition."

In Table 7.1 we review the "Budget Recap" or historical expenditures for the previous five years and see the various funding amounts along with the percentage each of these represent in the total budget partition funding. Included in Table 7.1 are the sub-partitions that are relevant to the TAMP.

It should be noted that the overall percentage of expenditures for the Preservation budget partition (which includes preservation, rehabilitation and replacement of assets) has averaged 56.1% of the total budget partition for the past five years. Unfortunately, the "Budget Recap" in Table 7.1 does not currently have a mechanism to include ARRA economic stimulus funding nor does it include the State General Fund Surplus funding, both of which positively impacted the preservation funding partition. LADOTD is working, at the request of the local FHWA office, to rectify this issue.

Please note also that the Miscellaneous budget partition is a catch all partition that includes, but is not limited to, expenditures for TIMED, Enhancement Projects, Urban Systems, Congestion Mitigation and Air Quality, Federal Earmarks, Outside Funding (Parish funded projects), Road Transfers and Intermodal Connectors.

Table 7.1 Relevant Historical TAMP Recap of Budget Partitions
(millions by state fiscal year)

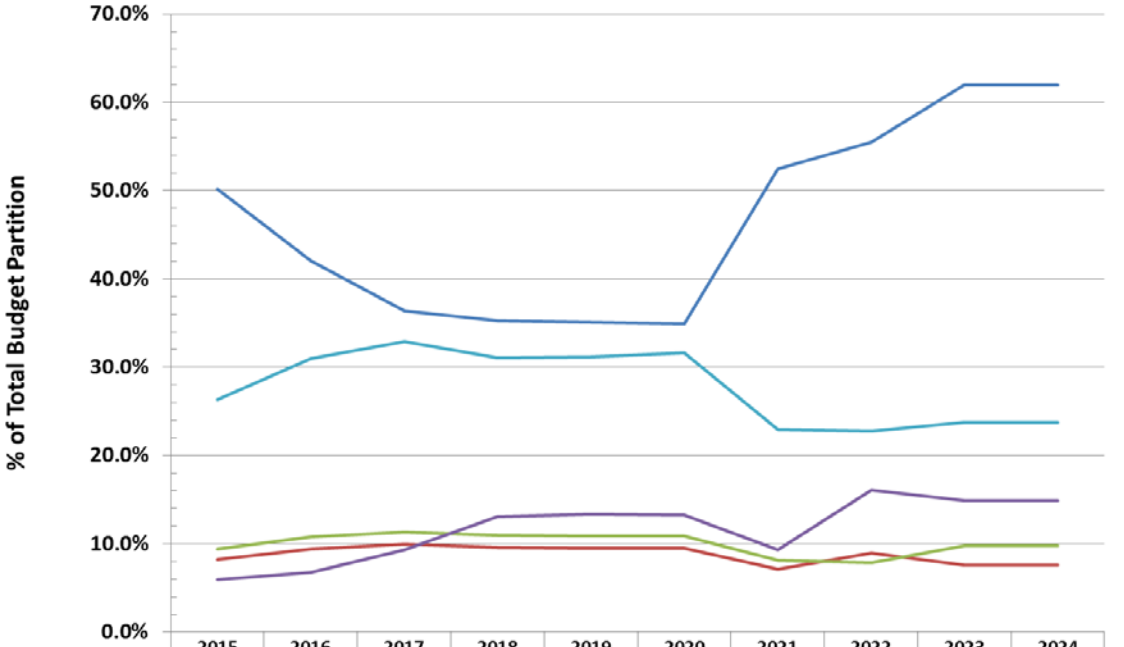
Budget Recap TAMP Specific Sub-Categories	2010		2011		2012		2013		2014	
	Funding	% of Grand Total	Funding	% of Grand Total	Funding	% of Grand Total	Funding	% of Grand Total	Funding	% of Grand Total
Preservation Total	**382.3**	**55.1%**	**351.3**	**49.3%**	**452.2**	**70.8%**	**346.4**	**58.8%**	**471.7**	**46.5%**
Non-Interstate - Pavement	88.8	12.8%	123.7	17.4%	143.2	22.4%	133.6	22.7%	26.5	2.6%
Non-Interstate - Pavement - Non-Fed Aid	28.5	4.1%	24.4	3.4%	38.4	6.0%	94.4	16.0%	136.7	13.5%
*Contract Maintenance (Not TAMP Relevant)	7.5	1.1%	10.4	1.5%	10.2	1.6%	9.8	1.7%	11.0	1.1%
Interstate - Pavement	69.6	10.0%	76.6	10.8%	46.7	7.3%	48.3	8.2%	85.3	8.4%
Bridge - On System	165.6	23.9%	88.6	12.4%	193.3	30.3%	45.6	7.7%	209.6	20.6%
*Bridge - Off System (Not TAMP Relevant)	22.3	3.2%	27.6	3.9%	20.4	3.2%	14.6	2.5%	12.5	1.2%
Operations Total	**19.0**	**2.7%**	**72.4**	**10.2%**	**39.4**	**6.2%**	**7.0**	**1.2%**	**41.0**	**4.0%**
Movable Bridge Rehab/ Preventive Maint	2.0	0.3%	0.7	0.1%	2.0	0.3%	1.1	0.2%	1.0	0.1%
Safety Total	**23.6**	**3.4%**	**34.5**	**4.8%**	**32.0**	**5.0%**	**34.9**	**5.9%**	**69.2**	**6.8%**
Capacity Total	**45.0**	**6.5%**	**76.4**	**10.7%**	**9.4**	**1.5%**	**43.0**	**7.3%**	**29.7**	**2.9%**
****Miscellaneous Total**	**224.2**	**32.3%**	**177.7**	**24.9%**	**105.7**	**16.5%**	**110.3**	**18.7%**	**403.9**	**39.8%**
Grand Total	**694.1**		**712.3**		**638.8**		**588.8**		**1015.5**	

* Included to show all preservation totals

** Includes TIMED funding, Enhancement Projects, Urban System & CMAQ, Federal Earmarks, Outside Funding, Road Transfers, Intermodal Connectors, etc.

In Figure 7.3, we see LADOTD's continuing trend of focusing as much future funding as possible on the Preservation budget partition, with respect to the other project categories. The inability to gain access to the vehicle sales tax until SFY 20-21 is clearly shown here; however, when this tax finally becomes available, the Preservation partition will be significantly impacted.

Figure 7.3 Future Budget Partition Percentages
(percent by state fiscal year)



	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Preservation	50.2%	42.0%	36.4%	35.3%	35.1%	34.9%	52.5%	55.5%	61.9%	61.9%
Operations	8.2%	9.4%	10.0%	9.6%	9.5%	9.5%	7.1%	9.0%	7.6%	7.6%
Safety	9.4%	10.8%	11.4%	10.9%	10.9%	10.8%	8.2%	7.8%	9.8%	9.8%
Capacity	5.9%	6.8%	9.4%	13.1%	13.3%	13.2%	9.3%	16.0%	14.9%	14.9%
Miscellaneous	26.3%	31.0%	32.9%	31.1%	31.1%	31.6%	22.9%	22.8%	23.8%	23.8%

7.4 HISTORICAL FUNDING LEVELS FOR PAVEMENT AND BRIDGE

The Department has been focusing on preservation (preservation, rehabilitation & reconstruction) as opposed to capacity projects for the past 4 to 5 years due to limited funding. The 2003 update to the Statewide Transportation Plan stated that if additional revenue for transportation was not secured, the funding of capacity projects using the traditional federal and State sources would be suspended in 2010. However, LADOTD has incorporated capacity projects into the program using non-traditional funding as it becomes available. An example of this is the I-49 North project which is funded with federal earmarks, State General Fund Surplus funds, State bonds and a small amount of federal formula funds.

Figure 7.4 and Figure 7.5 represent the ten year history of funding for pavements and bridges. Pre-construction costs are not included.

The Local NHS funding was not included due to the lack of data. It is estimated that it will be 6 years (2020), three data collection cycles, before we have enough data to make reasonable predictions on this highway classification.

Figure 7.4 Historical Funding for Pavements
(millions by state fiscal year)

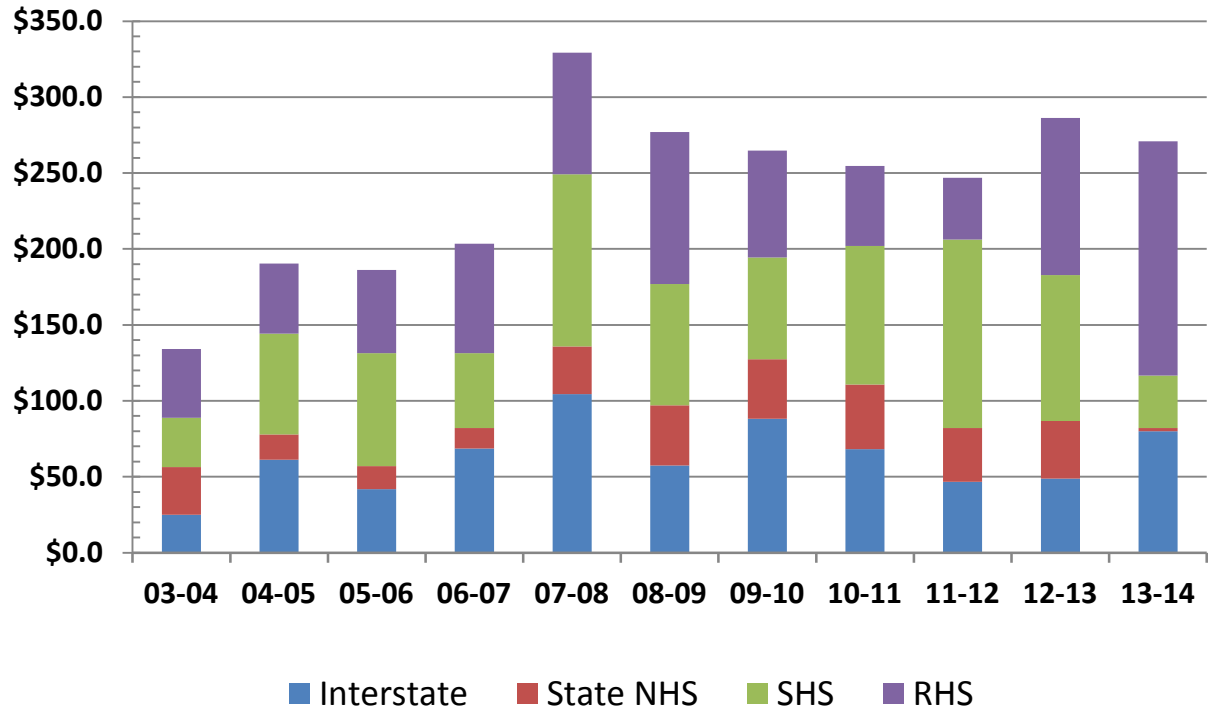
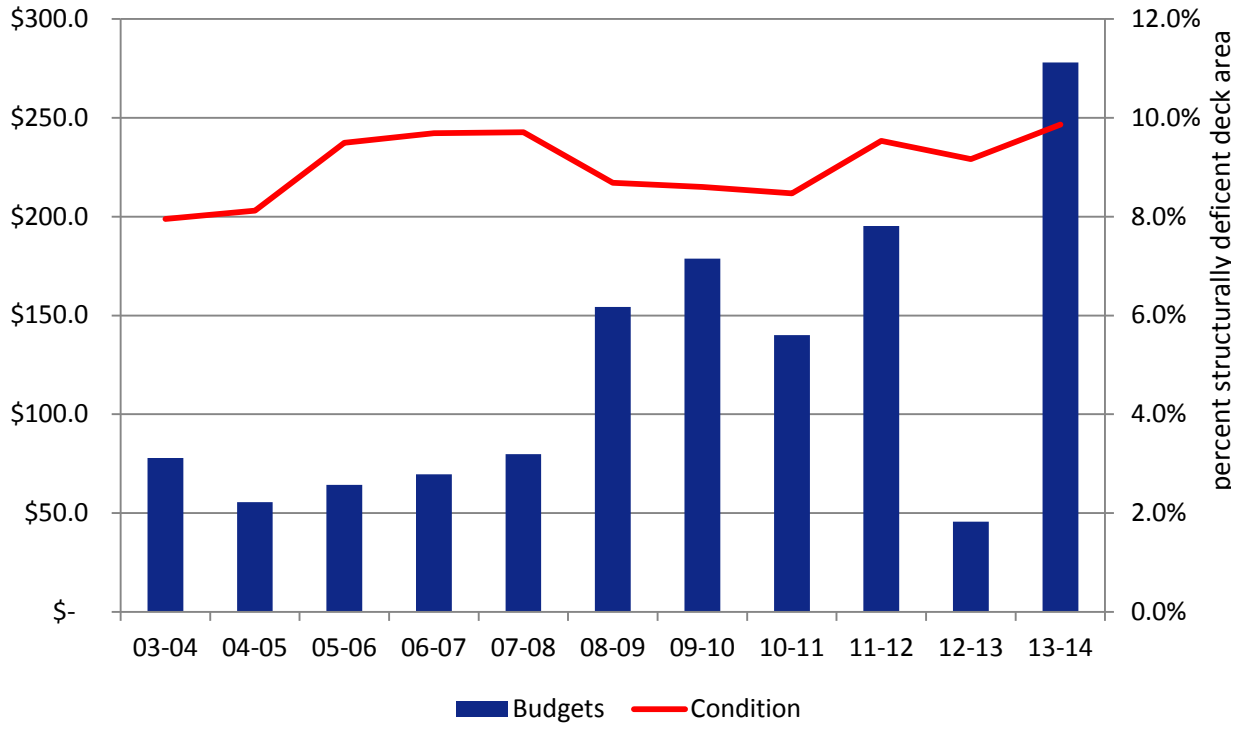


Figure 7.5 Historical Funding Levels and Condition for Bridges
(millions by state fiscal year)

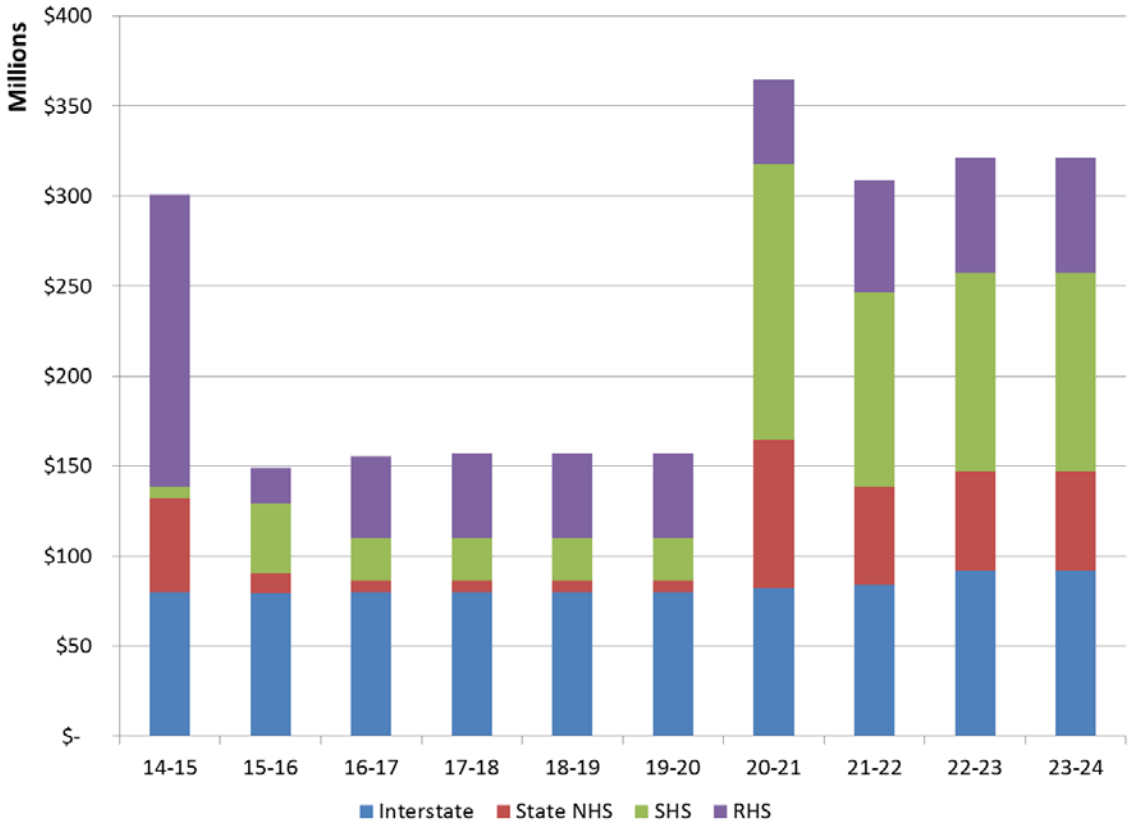


7.5 PAVEMENT BUDGET ALLOCATION AND CONDITION FORECAST

The pavement preservation, rehabilitation and replacement budgets for the next ten years have been developed through a process that considers the objectives in the Statewide Transportation Plan, system needs and condition, project development stages and others factors. The Planning Section of the Office of Multimodal Planning takes the lead on developing the budget allocation by using goals and objections set forth in the Statewide Transportation Plan and also using policies and processes set forth in LADOTD's Project Delivery Manual, the Highway Project Selection Process Manual, direction of the Executive Committee and finally, Legislated requirements in statute.

Figure 7.6 shows the projected budget allocation for pavements for the next ten years based on the moderate increase revenue scenario, which is the most likely scenario. We note here that the funding increases identified in SFY 20-21 assumes that the vehicle sales tax begins flowing to LADOTD. If that assumption comes true, SFY 20-21 will be the first time that LADOTD will be able to dedicate funds specifically to the State NHS budget and analysis category. These predictions are revisited every year when LADOTD's Highway Priority Program is developed and submitted to the Legislature.

Figure 7.6 Projected Pavement Preservation Budget Allocations
(by state fiscal year)



In summary, the projected ten year budget allocation shown above in Figure 7.6, and Figure 7.7 below, will result in the following performance results for state budget and analysis categories:

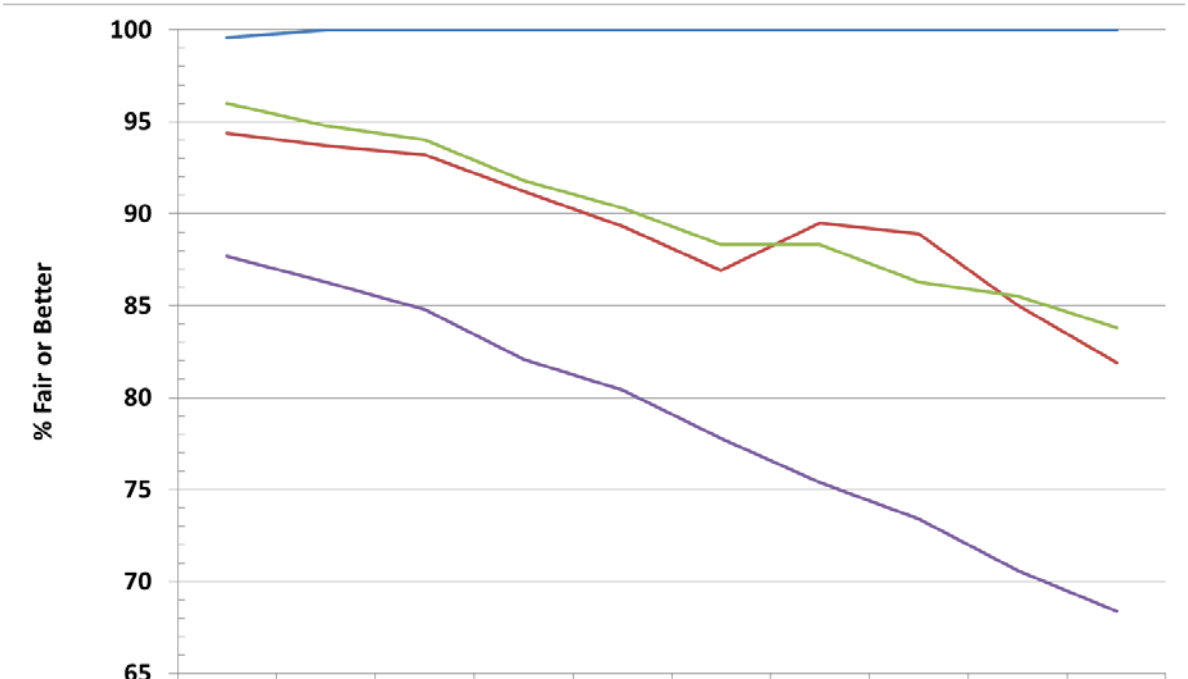
- The Interstate Highway System condition exceeds the target in all years.
- The State National Highway System never meets the target and continues to trend away from the target for the analysis period.
    - The State NHS target of 95% in fair or better condition was adjusted upward from a previous target of 93% in SFY 09-10.
    - The previous target of 93% was first achieved in SFY 09-10 the year the target was increased to 95%. See Figure 4.3 Historical State NHS Pavement Conditions for reference.
    - One of LADOTD's potential strategies is to take Interstate pavement preservation funding to zero in the last 5 years of the analysis period and shift those funds to State NHS to enhance LADOTD's ability to meet this target.
- The Statewide Highway System meets the target until SFY 19-20 and continues to trend away from the target for the remainder of the analysis period.

- The Regional Highway System meets the target in all but the final year but trends severely downward to the target for the entire analysis period.
    - The RHS target of 70% in fair or better condition is a very recent downward adjustment from a previous target of 80%.
    - While the historical target of 80% had always been met, see Figure 4.6 "Historical Condition for Pavements", with the projected ten year budget, the target of 80% is clearly "aspirational' and can no longer be considered "reasonable".
-

Table 7.2 LADOTD Pavement Performance Targets
(Percent in Fair or Better Condition**)**

Interstate Highway System	97% Fair or Better
State National Highway System, Non-Interstate	95% Fair or Better
Statewide Highway System, non-NHS, Fed Aid	90% Fair or Better
Regional Highway System, non-NHS, non-Fed Aid	70% Fair or Better

Figure 7.7 Predicted Pavement Condition based on Current Budget Allocation
(% pavement in fair of better condition by state fiscal year)



	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24
Interstate	99.6	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
State NHS	94.4	93.7	93.2	91.2	89.3	86.9	89.5	88.9	85.0	81.9
SHS	96.0	94.8	94.0	91.8	90.3	88.3	88.3	86.3	85.5	83.8
RHS	87.7	86.3	84.8	82.1	80.4	77.8	75.4	73.4	70.6	68.4

7.6 BRIDGE FUNDING ALLOCATION AND CONDITION FORECAST

The funding allocation for bridge preservation (preservation, rehabilitation and reconstruction) is developed in much the same way as it is for pavement preservation. The Planning Section of the Office Multimodal Planning takes the lead on developing budget allocations by using policies, procedures and plans that take into consideration available funding, needs, project delivery as well as other factors. The ten year funding allocation for bridge preservation is shown in Figure 7.8.

LADOTD inspects, gathers element level condition data and rates all bridges in the State at least every two years, and more often if conditions warrant. Data from the bridge inspections along with funding levels forecasted to be available for the bridge program are used by the Department's bridge management system (BMS) to produce a forecast of condition levels.

As part of its Strategic Planning Process, LADOTD utilizes a bridge condition performance measure target of not more than 10% of all state maintained on-system bridge deck area can be structurally deficient.

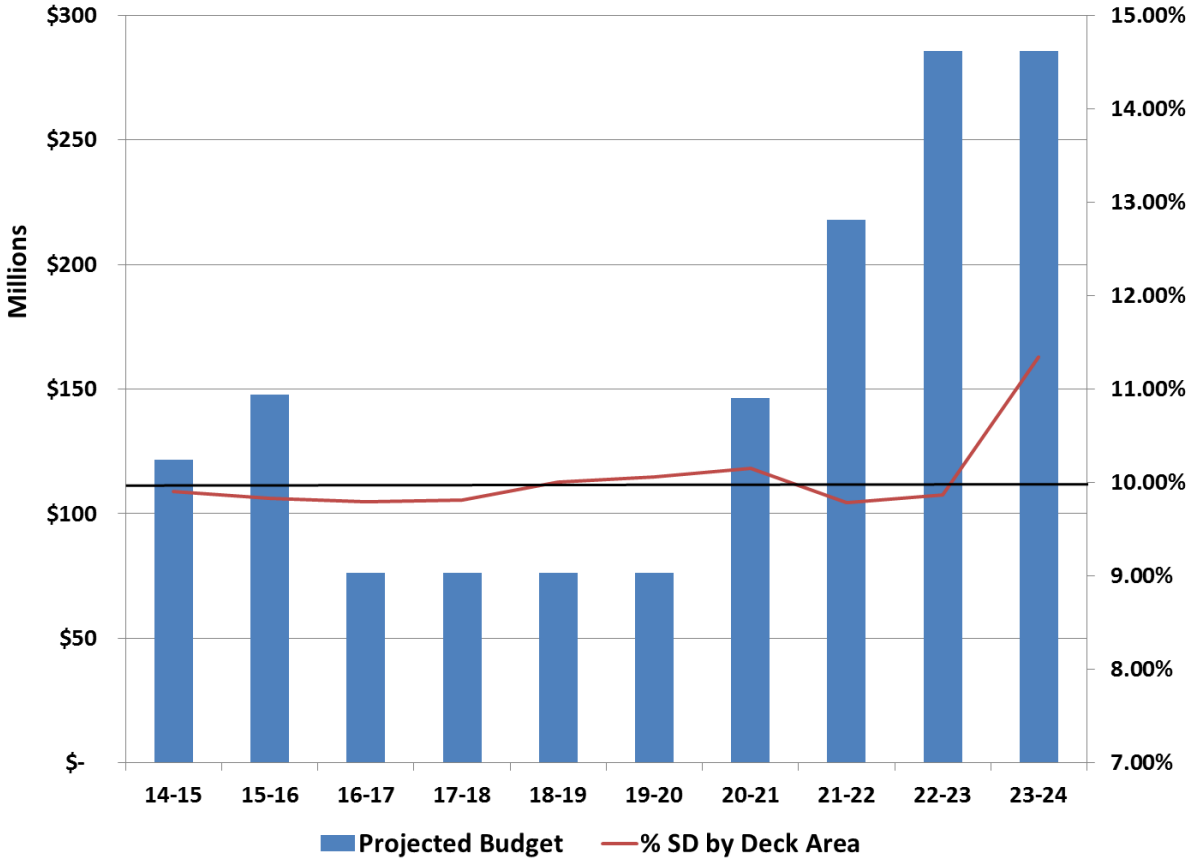
Using the funding allocation for bridge preservation, the bridge management system has forecasted the bridge condition for the next ten years as shown in Figure 7.8 below. As one can see from the figure, the bridge performance target of less than 10% structurally deficient by deck area hovers around the performance target until the final year when it reaches a value over 11% structurally deficient by deck area.

A planned future enhancement to the TAMP will be to set performance targets for bridges for Interstate, State NHS, SHS, RHS and Local NHS budget and analysis categories similar to the pavement categories defined in chapter 3.1 "LADOTD System."

LADOTD has limited confidence in the analysis capabilities of PONTIS. A great deal of debate transpired as to whether to include analysis information from PONTIS in the TAMP, with the final decision being made to include the data. A substantial effort was made to validate and substantiate these numbers, with adjustments being made to correlate with actual historical data. In the end, historical bridge data referenced in the TAMP is accurate while the PONTIS projected bridge analysis data should only be considered reasonable and trend worthy. That being said, the long term trend is clearly not acceptable as evidenced by the GAP analysis and the Steady State Funding analysis found later in this chapter.

It is expected that the future implementation of the replacement solution for PONTIS, AASHTOWare™ Bridge Management software (BrM), will improve the bridge management analysis capabilities.

Figure 7.8 Bridge Preservation Funding and Condition
(all state maintained bridges by state fiscal year)



7.7 PAVEMENT AND BRIDGE FUNDING GAP ANALYSIS

One of the most informative analyses is the funding gap analysis. By using the budget allocation processes and the pavement and bridge management systems that have been described earlier in this document, the following figures have been developed to graphically show the funding gap between the proposed budget and the target budget with the resulting effect on condition. Through an iterative process, the amount of funding needed to achieve and maintain the condition performance measure targets was determined and plotted along with the "programmed" budget allocation. The resulting condition for both funding scenarios is shown.

PAVEMENTS

Interstate

Figure 7.9 shows the Interstate "programmed" budget allocation of approximately $829.4 million over the ten year TAMP financial plan results in a pavement condition level that easily exceeds the 97% fair or better condition performance target in all years of the plan horizon. As such, this could present an opportunity to reduce the funding for the Interstate

after SFY 18-19 by approximately $430.2 million and redirect this funding to other pavement or bridge asset groups for those final five years.

If this reduction is made, the Interstate pavement condition level will still exceed the condition performance target; however, it must be noted that other strategies now come into play besides just meeting the condition target. For instance, LADOTD wants to continue its strategy of maximizing the federal match funding necessary to receive all available federal funding. In this particular situation, reducing the funding for Interstates will jeopardize the potential federal match funding because it will require additional State TTF funding for that match and TTF funding is in very short supply without the proposed vehicle sales tax. If this TTF funding limitation could be overcome immediately, instead of after SFY 18-19, an additional 29.2 million could be redirected to other pavements and bridges over the first five years.

While it appears that LADOTD is over allocating funds to the Interstate to accomplish the executive goal to maximize the federal match, it should be noted that the PMS cannot currently assign treatments to Interstate ramps, which currently number 1999 and account for just over 600 miles of pavement. LADOTD currently has only one data collection cycle for Interstate ramps and will need two more cycles of data to provide predictive modeling for treatments. So there is a limited quantitative ability to determine funding requirements for Interstate ramps at this time; however, funding will be required for these Interstate pavement assets.

Another caveat with respect to pavements, PMS is designed to only provide for treatments when necessary, so Figure 7.10 is also provided below to show the actual budget numbers consumed in the PMS analysis. LADOTD plans to redirect the funds not used on the Interstate ramp improvements.

Figure 7.9 Interstate Pavement Funding Gap Analysis
(by state fiscal year)

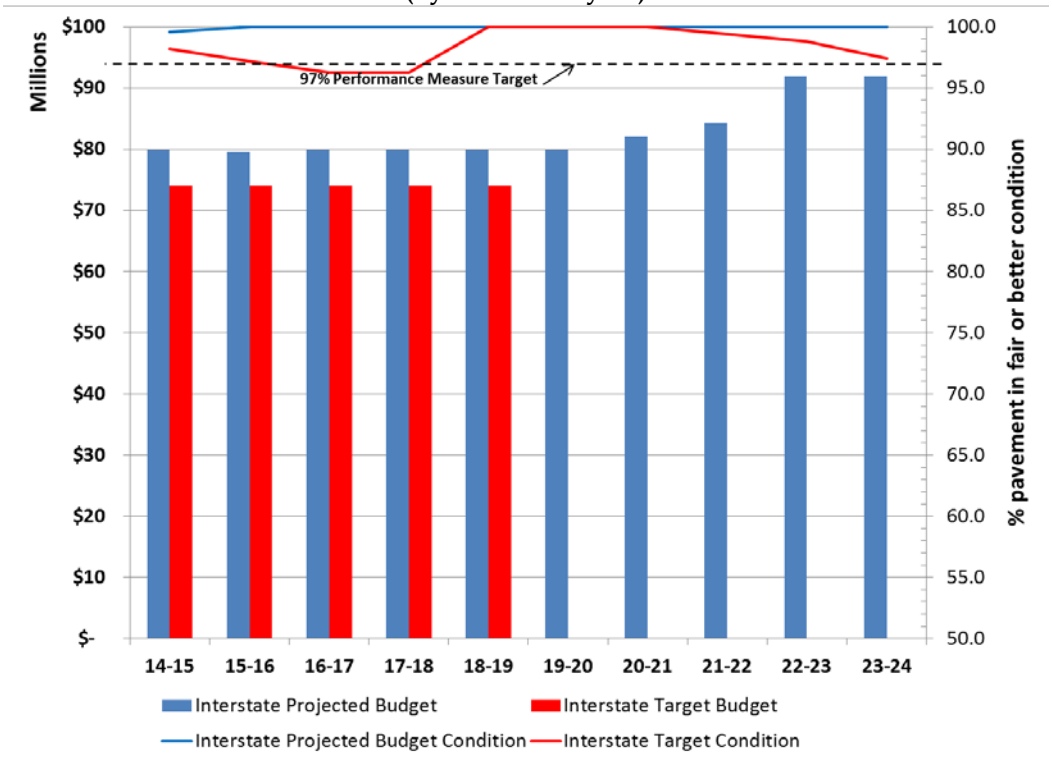
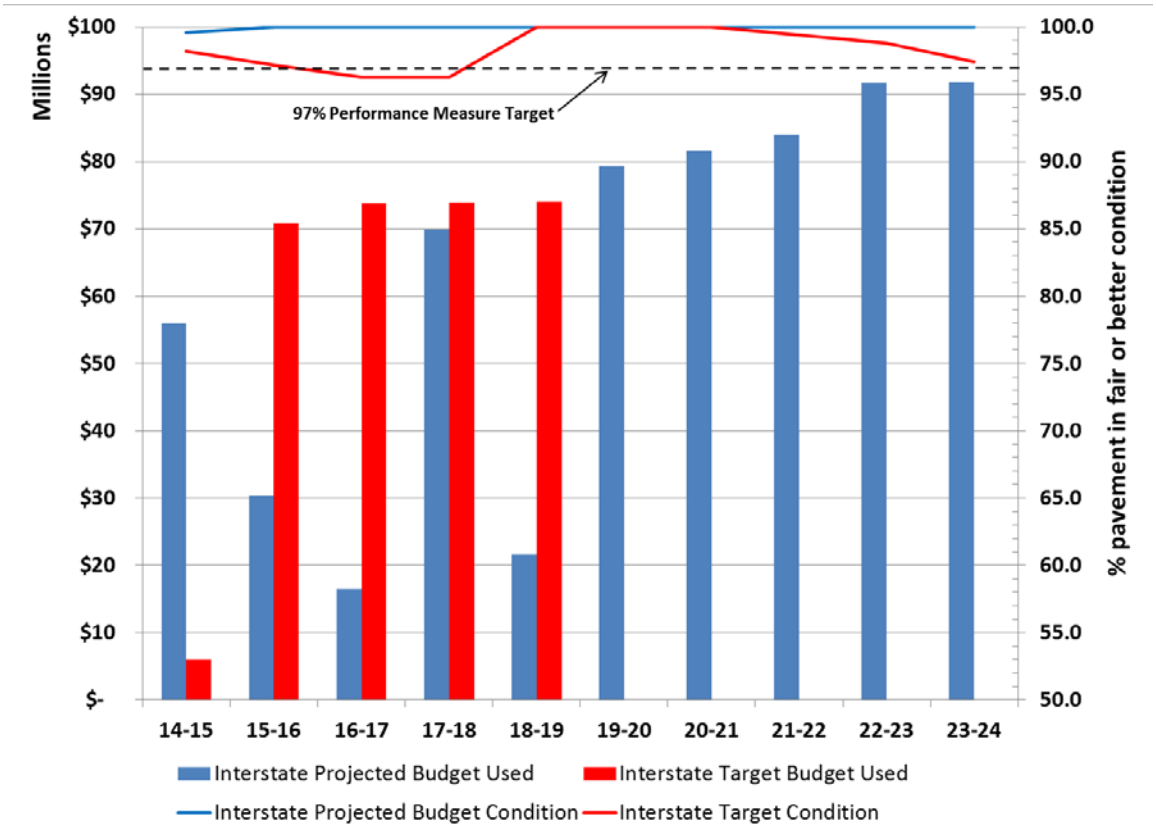


Figure 7.10 Interstate System PMS Actual Funding
(by state fiscal year)

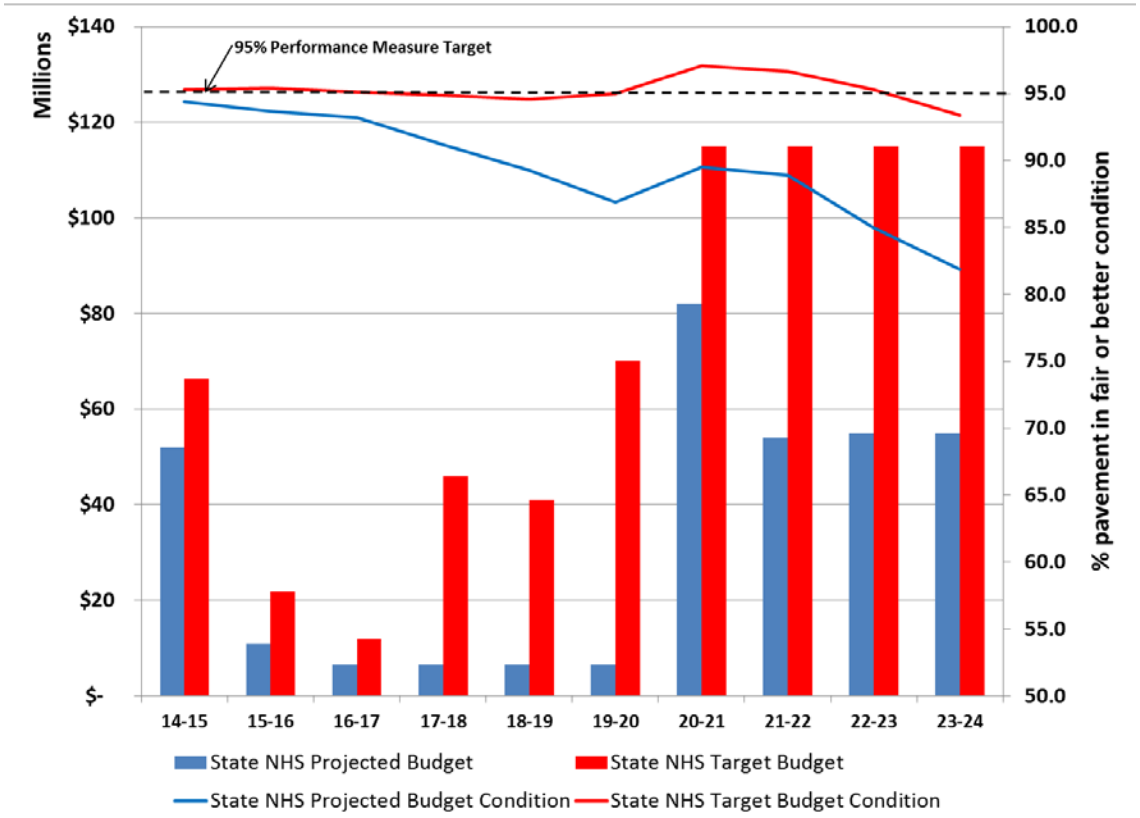


State National Highway System

Figure 7.11 graphically shows the State National Highway System "programmed" budget allocation of $335.8 million over the ten year period of the TAMP financial plan results in a pavement condition level that never meets the 95% fair or better condition target. In fact, by the end of the ten year period, the pavement condition continues to decline to 81.9% of the State NHS in fair or better condition. The increase of expected funds in SFY 20-21 from the vehicle sales tax arrives too late to achieve the target; however, shifting some of the Interstate budget to State NHS in the last five years of the analysis period may allow the target to be reached.

The figure also graphically shows the funding that is necessary to improve the pavement condition enough to meet the condition performance target at the end of the analysis period. This additional funding, over the ten year period, amounts to approximately $381.4 million.

Figure 7.11 State National Highway System Funding Gap Analysis
(by state fiscal year)

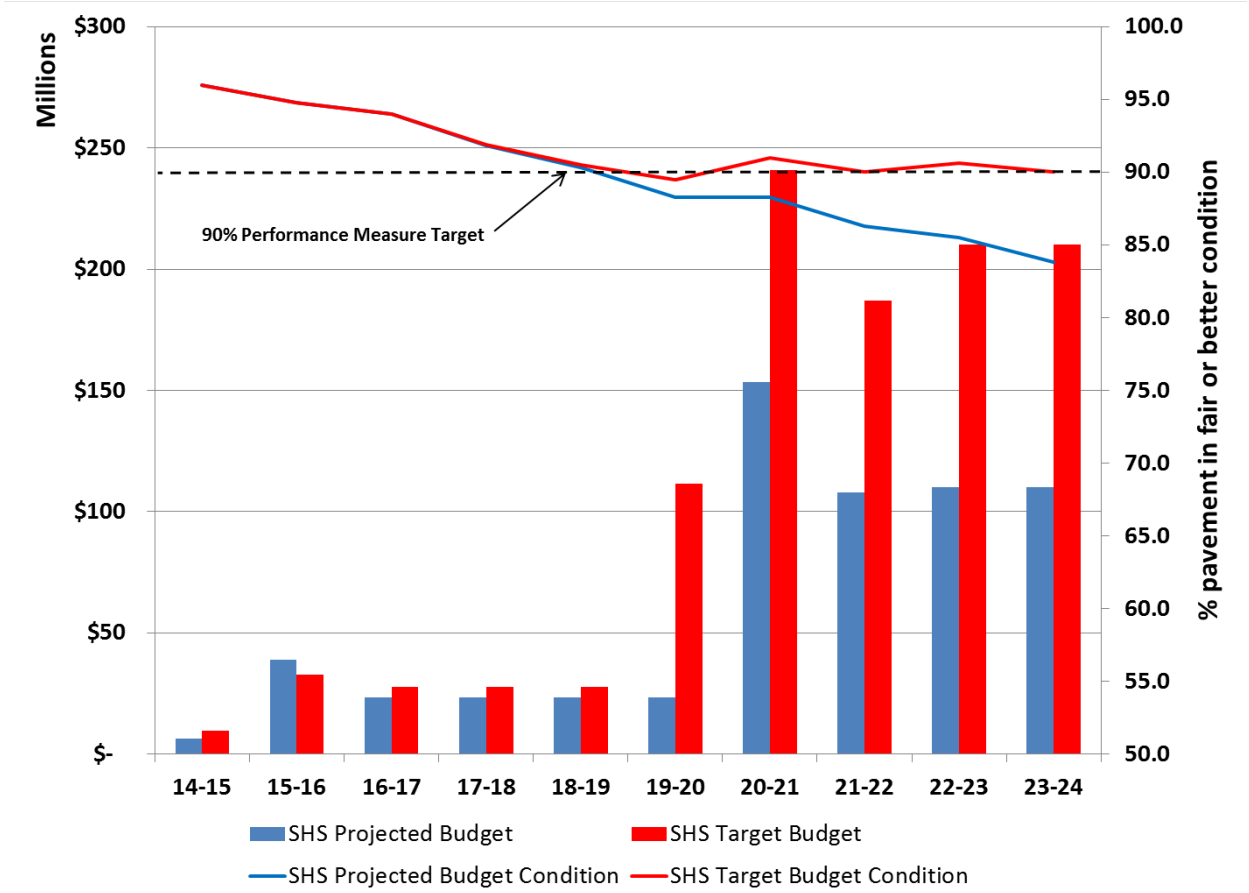


Statewide Highway System

Figure 7.12 graphically shows the Statewide Highway System "programmed" budget allocation of $620.8 million over the ten year period of the TAMP financial plan results in a pavement condition level that does not maintain the 90% fair or better condition target by the end of the ten year analysis period with the pavement condition falling to 83.8% of the SHS system in fair or better condition. However, shifting some of the Interstate budget to the SHS in the last three or four years of the analysis period may allow the target to continue to be achieved.

The figure also graphically shows the target funding that is necessary to maintain the pavement condition at levels that meet the condition performance target at the end of the analysis period. If the target condition levels are acceptable, again noting that the low end of the fair or better pavement roughness index condition range for SHS is 65 or an equivalent IRI of 225, then the additional funding needed over the ten year period amounts to approximately $463.9 million.

Figure 7.12 Statewide Highway System Funding Gap Analysis
(by state fiscal year)

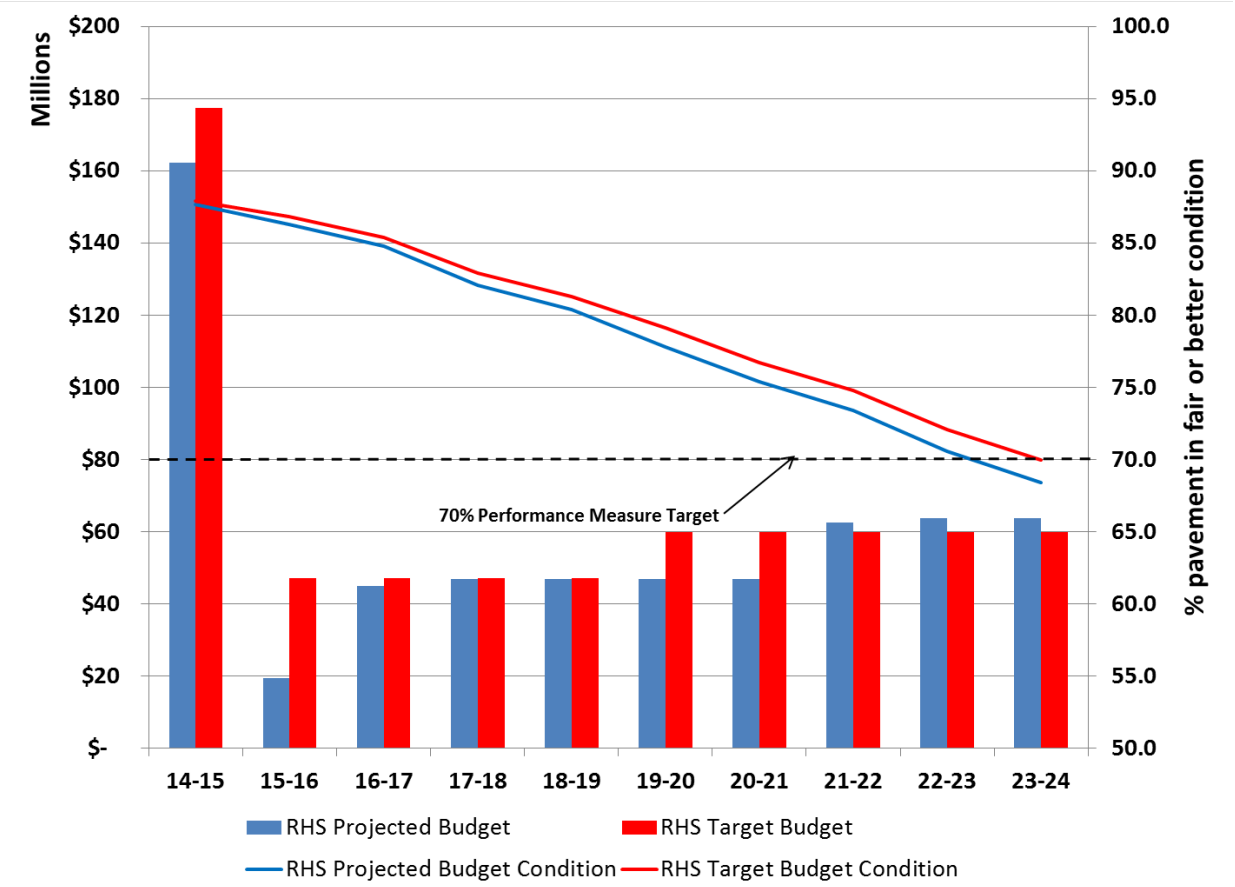


Regional Highway System

Figure 7.13 graphically shows the Regional Highway System "programmed" budget allocation of $604.2 million over the ten year period of the TAMP financial plan results in a pavement condition level that exceeds the 70% fair or better condition target in all years except the final year. It should again be noted that the RHS is not eligible for federal aid but has a proposed dedicated funding stream from truck registration fees and funding from $325 million in bonds which were sold in SFY 13-14.

The figure also graphically shows the funding that is necessary to continue to maintain the pavement condition to meet the condition performance target at the end of the analysis period. If the target condition levels are acceptable, again noting that the low end of the fair or better pavement roughness index condition range for RHS is 65 or an equivalent IRI of 225, then the additional funding needed over the ten year period amounts to approximately $61.5 million.

Figure 7.13 Regional Highway System Funding Gap Analysis
(by state fiscal year)



BRIDGES

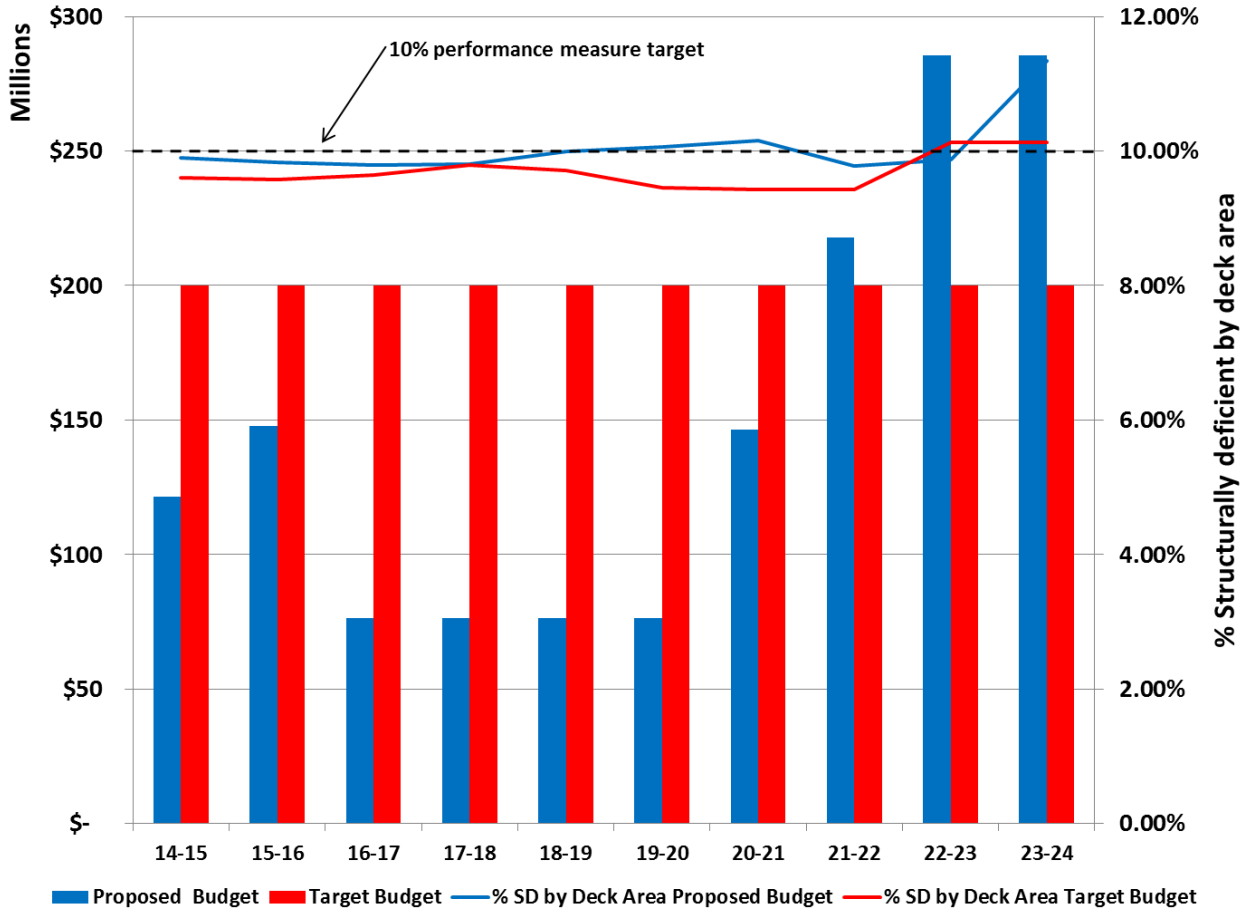
Figure 7.14 graphically shows that the State-owned bridge preservation "programmed" budget allocation of $1,509 million, over the ten year period of the TAMP financial plan, results in a bridge condition level that nearly meets the target of less than 10% structurally deficient by deck area for all years; however, in the final SFY 23-24 rises to approximately 11.3% structurally deficient by deck area.

The figure also graphically shows the funding that is necessary to improve the bridge condition enough to meet the condition performance target. That additional funding needed over the ten year period amounts to approximately $490 million.

It should be noted that a ten year period for bridge analysis is an extremely short time frame, with most relevant analysis going out to thirty years. Extending this analysis out to the thirty year period for these projected budget numbers indicate a significant increase in deterioration in the final years of the analysis. Again while this is a projected analysis by PONTIS, and thus carries the warning made previously in chapter 7.6 "Bridge Funding

Allocation and Condition Forecast," the analysis with respect to the proposed and target budgets is relatively accurate, meaning the funding GAP is legitimate.

Figure 7.14 Bridge Funding Gap Analysis
(all state maintained bridges by state fiscal year)



TEN YEAR FUNDING GAP

Figure 7.15 graphically shows that over the ten year horizon of the TAMP financial plan, over $937.6 million in funding is needed to enable all four state highway categories, as well as the bridges, to meet their respective condition performance targets at the end of the ten year period. The funding GAP would have been larger if the Interstate highway group was not able to have its funding reduced and if the RHS target had not been significantly lowered from 80% fair or better condition to 70% fair or better condition.

Some funding adjustments can be done between highway groups and bridge preservation to put more emphasis on one over the other; however, the large funding gap clearly

identifies the need for additional funding. Without additional funding, the condition performance targets will not be met.

Figure 7.15 Budget vs. Target Total Ten Year Funding Gap

7.8 PAVEMENT AND BRIDGE STEADY STATE FUNDING

Another interesting budget analysis effort is to determine how much funding is needed to maintain the status quo with respect to pavement and bridge conditions. In other words, what would it cost to keep the system at current condition levels? In contrast, the target GAP analysis allows for pavement and bridge conditions to decline and still meet the respective targets.

With respect to the Governmental Accounting Standards Board (GASB) Statement 34 accounting practices, "To be in compliance with Statement 34, governments must report capital assets—including infrastructure—at historical cost and then depreciate those assets over their useful lives. However, if infrastructure assets are maintained so as to preserve remaining service potential, the "modified approach" may be employed instead of reporting depreciation for the assets. GASB recognizes that when assets are consistently maintained

and renewed so as to ensure essentially an indefinite life, they are not being "used up" as is assumed under traditional depreciation rules.

Under the modified approach, governments must inventory and assess the condition of the assets comprising a network (or subsystem), *decide on a minimum level of acceptable condition, estimate the amount necessary to maintain and renew the assets, and then demonstrate that investment has been sufficient to maintain the target condition level established by the government.* If these requirements are met, the government may report as expense the cost of maintaining and preserving or renewing the asset network as opposed to reporting depreciation."[8]

At this time, LADOTD has chosen to use the depreciation method rather than the modified approach. The following analysis provides a reasonable measure of LADOTD's potential to switch to the modified approach. In the case of pavements, it is also appropriate to analyze the data with a focus on average roughness rather than the percentage in fair or better condition since the target condition levels aren't being used here. By doing the analysis in this manner, it allows LADOTD to demonstrate how closely the current investments measure up to maintaining the assets at the current average condition level.

PAVEMENT STEADY STATE FUNDING

In Table 7.3 we identify the approximate budget required to maintain the average roughness near the current measure for the entire analysis period, noting that a fixed budget will slightly vary the Average Roughness value depending on the pavement needs for that year.

Table 7.3 Steady State Budget Average Roughness Index
(by state fiscal year)

Budget Category	Steady State Budget Per Year	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	Average
Interstate	$ 48,000,000	93.6	92.8	92.1	91.7	91.8	91.8	91.9	91.8	92.2	93.3	92.3
State NHS	$ 60,000,000	88.4	88.5	88.4	88.1	87.7	87.6	87.4	87.2	86.9	86.6	87.7
SHS	$ 100,000,000	87.9	87.8	88.0	87.9	87.9	88.0	88.1	88.2	88.4	88.1	88.0
RHS	$ 110,000,000	82.9	82.7	82.6	82.5	82.5	82.5	82.6	82.6	82.3	81.9	82.5

In Table 7.4 the average roughness index for each year's expenditure of the proposed budget is identified. The ten year average is also shown for both expenditures and average roughness index for each state highway category.

[8] U.S. Department of Transportation Federal Highway Administration, Office of Asset Management, Primer: GASB 34, November 2000

Table 7.4 Projected Budget Average Roughness Index
(by state fiscal year)

Category	Interstate		State NHS		SHS		RHS	
Fiscal Year	Budget	Average Roughness	Budget	Average Roughness	Budget	Average Roughness	Budget	Average Roughness
14-15	$ 79,900,000	93.8	$ 51,982,000	88.2	$ 6,318,000	86.6	$ 162,200,000	83.5
15-16	$ 79,600,000	93.2	$ 10,934,000	86.9	$ 38,766,000	85.6	$ 19,400,000	82.3
16-17	$ 79,900,000	92.2	$ 6,644,000	85.6	$ 23,556,000	84.4	$ 45,000,000	81.3
17-18	$ 79,900,000	91.1	$ 6,644,000	84.2	$ 23,556,000	83.1	$ 46,900,000	80.4
18-19	$ 79,900,000	90.0	$ 6,644,000	82.8	$ 23,556,000	81.9	$ 46,900,000	79.4
19-20	$ 79,900,000	90.4	$ 6,644,000	81.5	$ 23,556,000	80.6	$ 46,900,000	78.5
20-21	$ 82,100,000	91.6	$ 82,100,000	82.2	$ 153,300,000	81.5	$ 46,900,000	77.5
21-22	$ 84,200,000	92.3	$ 54,000,000	82.0	$ 108,000,000	81.6	$ 62,600,000	76.7
22-23	$ 92,000,000	93.4	$ 55,100,000	81.7	$ 110,100,000	81.8	$ 63,700,000	75.8
23-24	$ 92,000,000	96.1	$ 55,100,000	81.3	$ 110,100,000	81.7	$ 63,700,000	74.8
10 Year Average	**$ 82,940,000**	**92.4**	**$ 33,579,200**	**83.6**	**$ 62,080,800**	**82.9**	**$ 60,420,000**	**79.0**
10 Year Total	**$ 829,400,000**		**$ 335,792,000**		**$ 620,808,000**		**$ 604,200,000**	

The ten year comparison between the projected budget and the steady state funding requirement are shown in Table 7.5. If LADOTD moves $349.4 million of Interstate funding, the current projected budget will fall short of maintaining a steady state condition for pavements by $789.8 million, or $79 million per year, over the ten year analysis period.

Analyzing Table 7.5 a little further identifies that it would take an additional $64.4 million per year in State NHS funding to raise the Average Roughness Index by one point on State NHS pavements for the ten year period. Similarly for SHS and RHS pavements, an additional $74.4 million per year and 141.7 million per year respectively would be required to raise the Average Roughness Index by one point for each of these pavement categories.

This analysis clearly shows that LADOTD's current projected budget answers the GASB-34 depreciation question and clearly indicates that LADOTD is not in a position to consider moving to the modified accounting approach for these assets.

It should be noted here that since the projected budget is similar to historical budgets, it is reasonable to conclude that the effects of the unplanned ARRA and State General Fund Surplus funding clearly enhanced LADOTD's ability to reach historical performance targets.

Table 7.5 Projected Budget vs. Steady State Funding Analysis
(for Average Roughness Index)

Budget	Interstate		State NHS		SHS		RHS	
Fiscal Year	Budget	Average Roughness	Budget	Average Roughness	Budget	Average Roughness	Budget	Average Roughness
Total Steady State	$ 480,000,000	**92.3**	$ 600,000,000	**87.7**	$ 1,000,000,000	**88.0**	$ 1,100,000,000	**82.5**
Total Projected	$ 829,400,000	**92.4**	$ 335,792,000	**83.6**	$ 620,808,000	**82.9**	$ 604,200,000	**79.0**
Funding Gap	**$ (349,400,000)**	**(0.1)**	**$ 264,208,000**	**4.1**	**$ 379,192,000**	**5.1**	**$ 495,800,000**	**3.5**
Average $ / 1 Roughness Index Point Increase			**$64,440,976**		**$74,351,373**		**$141,657,143**	

BRIDGE STEADY STATE FUNDING

The ten year comparison between the projected bridge budget and the steady state funding requirement are shown in Table 7.6. LADOTD would have to spend an additional $2,240 million over and above the projected $1,509 million to maintain the state owned bridges at their current condition. Again please note that this is a projected analysis by PONTIS and thus carries the warning made previously in chapter 7.6 "Bridge Funding Allocation and Condition Forecast."

The current projected budget achieves an average of 10.05 percent structurally deficient by deck area during the analysis period; however, the long term trend, with a $ 224 million budget gap per year, clearly indicates the severity in the lack of steady state preservation sustainability for bridges.

Table 7.6 Projected Budget vs. Steady State Bridge Funding Analysis

Fiscal Year	Projected Budget	Steady State Budget	Steady State vs Projected Budget Gap	% SD by Deck Area Projected Budget	% SD by Deck Area Steady State Budget
14-15	$ 121,600,000	$ 375,000,000	$ 253,400,000	9.90%	9.65%
15-16	$ 147,800,000	$ 375,000,000	$ 227,200,000	9.83%	9.59%
16-17	$ 76,300,000	$ 375,000,000	$ 298,700,000	9.79%	9.23%
17-18	$ 76,300,000	$ 375,000,000	$ 298,700,000	9.81%	9.21%
18-19	$ 76,300,000	$ 375,000,000	$ 298,700,000	10.00%	9.18%
19-20	$ 76,300,000	$ 375,000,000	$ 298,700,000	10.06%	9.23%
20-21	$ 146,400,000	$ 375,000,000	$ 228,600,000	10.15%	9.30%
21-22	$ 217,800,000	$ 375,000,000	$ 157,200,000	9.78%	9.33%
22-23	$ 285,500,000	$ 375,000,000	$ 89,500,000	9.87%	9.41%
23-24	$ 285,500,000	$ 375,000,000	$ 89,500,000	11.34%	10.20%
Totals	**$ 1,509,800,000**	**$ 3,750,000,000**	**$ 2,240,200,000**	**10.05%**	**9.43%**

7.9 ASSET SUSTAINABILITY

LADOTD is investigating the new concept of Asset Sustainability. For US transportation systems, the concept of Asset Sustainability was established in the July 2012 report, FHWA-HEP-12-046, "Asset Sustainability Index: A Proposed Measure for Long-Term Performance." This report seeks to establish asset sustainability metrics that address the long term performance of highway assets based upon expected expenditure levels.

It is well documented that performing relatively inexpensive preservation treatments early in the life of an asset, substantially focuses on a long term higher quality condition of the asset and extends the life of the asset. This is a fundamental concept that LCCA is predicated upon.

While the funding gap analysis provides a quantitative determination of underfunding, ongoing efforts to convey underfunding consequences to stakeholders look to development leading measures that illustrate the likely consequences of today's actions on future conditions. Asset Sustainability is the latest proposed measure intended to accomplish this.

An Asset Sustainability Index (ASI) is a composite metric computed by dividing the amount of funding budgeted on infrastructure maintenance and preservation over time by the amount of funding needed to achieve a specific infrastructure condition target.

It should be noted that these indexes and ratios are proposed to be planning, programming, communication and long-term budgeting tools. As such, they represent generalized models. They are not intended to possess the detail needed to satisfy short-term accounting reports or engineering estimates.

As shown below, these simple formulas reduce a complex concept into very simple and understandable terms.

Pavement Sustainability Ratio

$$\frac{\text{Pavement Budget}}{\text{Pavement Needs}}$$

Bridge Sustainability Ratio

$$\frac{\text{Bridge Budget}}{\text{Bridge Needs}}$$

Asset Sustainability Index

$$\frac{\text{Amount Budgeted}}{\text{Amount Needed}}$$

Very simply put, when an Asset Sustainability Index or Ratio is below 1.0, the Asset investment is not enough to sustain the asset.

With LADOTD's existing Pavement and Bridge Management Systems, the pavement needs and bridge needs are quantitatively determined. These systems provide a dependable and verifiable means for determining these needs assessments.

The following calculations are based on the ten year financial plan, the moderate increase revenue scenario and the needs analysis determined by the Pavement Management System and the Bridge Management System. It becomes clear that the expected available budget will not be enough to sustain the Assets.

LADOTD Pavement Sustainability Ratio	0.86
LADOTD Bridge Sustainability Ratio	0.59
LADOTD Asset Sustainability Index	0.74

LADOTD intends to continue to investigate these measures, and any others that may come to the forefront, to determine if they will prove beneficial in conveying the consequences of underfunding assets.

8.0 Investment Strategies

According to MAP-21, a TAMP should include investment strategies that support the organization's financial situation and the expected level of service. The investment strategy is based on an estimate of the preservation and renewal activities that accomplish the expected outcomes using the available funding. The development of investment strategies for an organization is an iterative process that considers income projections and targeted levels of service using pavement and bridge management systems with predictive capabilities. The strategies also consider changes in factors such as growth trends, technology, design and construction.

In Louisiana, the Annual Highway Budget Partitions provides the investment strategy that serves as the link to the agency's tactical plans that are represented in the Annual Highway Priority Program. Louisiana projects these highway budget partitions out for ten years.

8.1 OVERALL STRATEGIES

LADOTD will incorporate several overall strategies into its process when allocating funding for roads and bridges:

- Update all appropriate policies and procedures as necessary to ensure that both department, program and project risk registers will be used throughout the asset management process. This includes but is not limited to setting investment strategies and budgets, prioritizing projects and revising asset management guidance.
- Investigate performance measures that more fully address the concepts of Transportation Asset Management and Life Cycle Cost Analysis and consider either supplementing or replacing existing performance measures. Address the appropriate investment strategies that are affected by this effort.
- Address any requirements that result from the Notice of Proposed Rulemaking (NPRM) that directly impact investment strategies.
- Investigate investment strategies, and allocate sufficient funding, for the relevant TAM related maintenance activities, performed by district forces or contract staff, that supports pavement and bridge preservation.
- Investigate investments on selected transportation corridors: The I-10/I-12 corridor and the I-20 corridor are the primary east-west routes through the State and as such should receive sufficient funding to ensure bridges do not have to be load posted and the pavement condition is meeting the targeted level of service. As funding is available beyond the current funding stream (State Capital Outlay or State General Fund Surplus), improvements that address congestion should be funded.
- Investigate investments on interstates to maximize use of federal funds: The limited amount of State funds available to match federal funds drives this investment strategy which maximizes the federal match rate by doing more projects on the interstate system and freight network. A strategic goal of LADOTD is to never leave FHWA funding on the table.
    - LADOTD's local FHWA partners are seeking to mitigate and minimize this economic "federal match" strategy and transition to a TAM based strategy as the current situation pits one strategic objective against another.
- Capacity projects will only be funded with non-traditional sources, such as: State General Obligation bonds, State General Fund Surplus, vehicle sales tax, federal stimulus (ARRA), federal TIGER grants, etc.
- Investigate and consider adopting Performance Based Practical Design (PBPD).

8.2 PAVEMENT SPECIFIC STRATEGIES

The pavement asset specific strategies are:

- Allocate sufficient funding in the annual budget partition for pavement preservation and minor rehabilitation treatments, as defined in the Appendix "LADOTD Pavement System Treatments."
- Balance the funding to the performance targets for the four classifications of highways every two years by trading-off investments on certain highway functional classifications in order to increase condition levels on others. As condition levels of service for certain highway functional classifications reaches performance targets, the funding will be moved to other functional classifications that require additional funding to meet targets.
- Require HQ and District project selection teams to utilize Pavement Management System recommendations for the preservation projects selected for the annual Highway Priority Program unless there is documented justification to do otherwise.
- Create a dedicated funding category for State NHS projects.
- Move State NHS project selection to the HQ project selection team to mirror the Interstate project selection process.
- Incorporate logical termini of project limits and simplify type of construction. That is, don't have multiple treatment types on different sections of the same project just to conform to PMS recommendations.
- Consider including life cycle cost in the determination of low bidder on construction projects that include alternate pavement designs (asphalt or concrete).

8.3 BRIDGE SPECIFIC STRATEGIES

The bridge asset specific strategies are:

- Investigate additional data collection needs, or data coordination with other data stores, which could provide more enhanced and practical condition assessments that enable better predictive budgetary planning scenarios. i.e. higher traffic requires work scheduling around peak times, in some cases significantly increasing the overall cost and time to complete bridge preservation efforts.
- Maximize the useful service life of the bridge by allocating funding aimed specifically at preservation and rehabilitation treatment projects recommended by the BMS in lieu of bridge replacements. As an example, for a steel bridge, preservation could include cleaning and spot painting and rehabilitation could include rehabilitating a member or replacing a member. Designating funds for these treatments would extend the useful service life of the existing bridge prior to allowing the deterioration to reach the point of requiring a complete bridge replacement.
- Consider alternatives to full replacement of bridges.
- Right size the bridge project by more closely considering the attributes of the connecting roadway. That is, don't replace a 30 foot wide bridge with a 40 foot wide

bridge when the connecting roadway has 2-11 travel lanes with 4 foot shoulders, and is not planned to be widened in the future

- Require HQ and District project selection teams to utilize bridge management system recommendations for the preservation projects selected for the annual Highway Priority Program unless there is documented justification to do otherwise.
- Balance the funding to the performance targets for the bridges on the four classifications of highways every two years by trading-off investments on certain highway functional classifications in order to increase condition levels on others. As condition levels of service for the bridges on certain highway functional classifications reach performance targets, the funding will be moved to other functional classifications that require additional funding to meet targets.
- Develop specific internal guidance when rehabilitation cost might no longer be feasible with a focus on extending lifecycle cost analysis for all bridge preservation activities.

8.4 INVESTMENT STRATEGY DEVELOPMENT PROCESS

Annually, LADOTD's Secretary and Division Heads meet to review the investment strategies that have been and will be used to update the annual budget partitions that are projected for the next ten years. The process includes a review of the following information:

- Past performance of the system
- Pavement and bridge needs
- Available funding
- Policies supporting asset management and a whole life approach
- Asset inventories
- Pavement and bridge scenario forecasts
- Level of service targets

Using this information and considering the recommendations of the Asset Management Engineer and the TAM Steering Committee, the Secretary and the Division Heads will consider whether or not to adjust the investment strategies. The final set of investment strategies are communicated to LADOTD's personnel via the Annual Highway Budget Partitions and the project selections within the Annual Highway Priority Program.

9.0 Asset Management Process Enhancements

This TAMP has demonstrated the need for a set of enhancements to LADOTD tools and business processes which can substantially improve the effectiveness of its asset management processes. The Department is in a good position to proceed with a set of steps that can yield clear benefits over the next several years.

9.1 IMPROVEMENT PLAN

Prior to MAP-21, LADOTD recognized that duplicated data in various mainframe and client server data silos causes many issues. A three year project is underway to replace or connect these data silos to minimize these data issues using ESRI's Roads and Highways. This GIS based solution is expected to provide the means for efficient data sharing and thus provide one true shared source for various asset data attributes. The necessary data validation and cleanup required for a project of this type will also improve the accuracy of the data. The project manager for this software implementation will be the direct supervisor of the AME, which ensures that every effort will be made to incorporate TAMP improvement requirements within this solution to mitigate identified Maturity GAPs identified in the chapter 9.2 "Asset Management Process Enhancements."

While a list of potential additional assets can be provided to be included in future asset management planning cycles, it is most appropriate to note that the limited existing data for these assets does not currently support inclusion into the TAMP. LADOTD existing data sets, for ancillary features now being classified as assets, were created for inventory purposes and not for comprehensive asset management purposes. LADOTD has partial data sets for signals, intelligent transportation system equipment, sign trusses, guard rails, cable barriers, crash attenuators, sound walls, shoulders, high mast lighting and signs; however, these data sets will require significant improvement to allow for addition into the TAMP.

Since data gathering is an expensive endeavor, setting priorities for this data collection will have to factor in the requirements of the NPRMs as they are identified and released. Then funding sources will need to be identified to capture the appropriate attribute data needed to support asset management.

A review of the existing software solutions or databases housing these various data sources, in many cases will require either significant upgrades or complete replacement to meet the needs of the TAMP. The recent consolidation of the Departments IT staff under the Division of Administration may further complicate these efforts. The AME will be heavily involved in this effort.

9.2 ASSET MANAGEMENT PROCESS ENHANCEMENTS

TAMP Maturity Analysis

As part of this implementation plan, Agencies are expected to implement measures and tools to continuously refine the plan. GAP analysis, redefined here as "Maturity" GAP Analysis by LADOTD, is one of those tools to accomplish this. While LADOTD has taken the necessary steps to implement and go forward with the TAMP, it should be noted that there is still room for improvement. It appears that the initial and proposed Maturity GAP analysis tools are much more detailed than the initial self-assessment survey. Diving down to a more detailed level will help to uncover the potential maturity GAPs that might not be as obvious at the higher self-assessment level. LADOTD's Asset Management Engineer will be responsible for conducting the ongoing maturity GAP analysis process and implementing the necessary changes to mitigate the maturity GAPs.

The concept of "Maturity" GAP Analysis was detailed in the AASHTO Transportation Asset Management Guide: A Focus on Implementation (January 2011). The AASHTO document dedicates part of a chapter and a full appendix to this subject. The chapter section provides an explanation of a prototype spreadsheet tool developed for use on highway networks and the appendix provides a detailed explanation of that tool along with a link to the tool for users to download.

The TAM Guide further describes the TAMP maturity level Self-Assessment process which is used to identify a range of useful processes, tools and approaches for the agency to pursue for its TAMP. Then it recommends the TAMP Maturity GAP analysis process be used to create the step by step methodology to transform the TAMP maturity level. It is essentially the basis for a TAMP Improvement Plan.

The maturity GAP analysis cycle may be repeated as frequently as every six months in the early stages in conjunction with an early and rapid TAMP development and improvement. Then as the maturity level of the TAMP is improved, the cycle could occur every three to five years.

The prototype spreadsheet tool is suggested as a starting point to determine the target level of TAMP performance and the period over which it is to be reached. The workbook provides a terminology crosswalk from the terminology used in the original solution to the terminology proposed by US federal agencies.

The Maturity Scale concept is defined as a (5) five level range from Initial, Awakening, Structured, Proficient, to Best Practices. A matrix is provided with the (5) five level vertical axis range each divided into (2) sub-levels or a 1 to 10 scale with 1 and 2 representing Initial. The other axis of the matrix evaluates Processes, Frequency, Sub-Element Emphasis, Process Formality, Data & Technology and Outputs & Results. This well thought out matrix provides excellent descriptions to help determine the maturity level for each element the agency decides to use.

The tool also breaks down the gap analysis into six major areas with the identified number of elements and criteria designated below.

- Policy Guidance – 13 elements & 15 criteria
- Planning and Programming – 10 elements & 38 criteria
- Program Delivery – 7 elements & 31 criteria
- Information and Analysis – 15 elements & 72 criteria
- Life-Cycle Management and TAM – 11 elements & 59 criteria
- Legislative Compliance – 6 elements & 11 criteria

As an example, under Planning and Programming, one of the ten Elements identified is "Demand Forecasting Processes". The agency then can determine if it will use each of the (4) four Criteria under that Element. A numeric maturity level goal is assigned for each Criteria and then a self-assessment GAP Analysis, based on the Maturity Scale matrix, determines the current maturity level for each Criteria.

Criteria for this example include:

- Demand forecasts are based on latest district/growth planning forecasts of population growths and development areas
- Demand forecasts include assessment of all components that make up demand (e.g. demand influences, pricing, customer types, consumption trends)
- Demand forecasts allow for changed level of service requirements in the future
- Demand forecast scenarios are developed and associated risks are understood

NCHRP research project 08-90A Phase 1 recently developed a TAMP Maturity GAP analysis tool. The tool is a spreadsheet application based on the prototype spreadsheet tool identified above in this section and is expected to incorporate refinements responsive to (a) requirements of MAP-21 and subsequent FHWA rulemaking and (b) institutional and technical characteristics of U.S. transportation system management practices.

It is LADOTD's intention to evaluate the final solution for the NCHRP 08-90 project and either use it, or at the very least use it as a primary basis for developing a maturity GAP analysis tool. Formal policies and procedures will be developed, in conjunction with the final maturity GAP analysis tool, to ensure the continuous improvement process will become part of LADOTD's normal business. An early review of the maturity GAP analysis spreadsheet tool, which will result from NCHRP 08-90, appears to be very favorable for use at LADOTD and will be very strongly considered upon its release for public use.

In September of 2013, LADOTD conducted a Transportation Asset Management Self-Assessment Survey using the approach outlined in the Transportation Asset Management Guide (NCHRP Project 20-24(11)). The survey was designed to answer four primary questions.

- How does policy guidance benefit from improved asset management practices?
- Do resource allocation decisions reflect good practices in asset management?
- Are appropriate program delivery processes that reflect industry good practices, being implemented?

- Do information resources effectively support asset management policies and decisions?

In summary, 55 questions were scored by staff and management across the agency with answers based on Strongly Disagree, Disagree, Agree, and Strongly Agree. The results are summarized below with the percent showing the average combined score of Agree and Strongly Agree.

- 11 Policy Guidance questions – 80.0% average (agree & strongly agree)
- 13 Resource Allocation Decision questions – 82.1% average (agree & strongly agree)
- 11 Program Delivery questions – 84.0% average (agree & strongly agree)
- 20 Information Resource questions – 80.1% average (agree & strongly agree)

The survey results very clearly reflect the outcome one would expect from an agency that long ago established a cultural philosophy that focuses on a policy and procedural driven TAM approach based on appropriate data. While there may be some confusion with regard to the actual status of TAM, there is no confusion that efforts to continue to enhance and improve the concepts outlined within this plan are accepted and expected by the respondents.

9.3 SUMMARY OF PLANNED ENHANCEMENTS

This section summarizes LADOTD's plans for future improvements related to the asset management program and the TAMP.

Notice of Proposed Rulemaking (NPRM)

LADOTD plans to fully address any requirements that result from the Notice of Proposed Rulemaking (NPRM).

Redefine LADOTD Definition of Preservation

Since national definitions of preservation generally refer to minor betterments or repairs, LADOTD intends to redefine its definition of preservation to match the national definition.

Investigate New Potential Performance Measures

The current pavement and bridge performance measures are not comprehensive enough to support the transformation towards total TAM based asset management. LADOTD plans to investigate performance measures that more fully address the concepts of Transportation Asset Management and Life Cycle Cost Analysis and consider either supplementing or replacing existing performance measures.

Expand Bridge Performance Targets

LADOTD plans to expand performance targets for bridges by the LADOTD budget and analysis categories Interstate, State NHS, SHS, RHS and Local NHS. As noted herein all state maintained bridges are currently combined for one performance target.

Maintenance Management Strategies

Determine how to incorporate into the overall TAM strategies, the relevant TAM related maintenance activities, tracked in the maintenance management system, that support pavement and bridge preservation.

Additional Asset Classes

LADOTD's AME will coordinate the investigation into which asset classes will be added to the future TAMP. These could include, but are not limited to, culverts, signals, intelligent transportation system equipment, sign trusses, guard rails, cable barriers, crash attenuators, sound walls, shoulders, high mast lighting, dams and signs.

Asset Data Collection and Inspection Enhancements

LADOTD will investigate state of the art, emerging field data collection solutions in an effort to significantly expand and improve, in a cost effective manner, the asset inventory data collection and associated inspection capabilities. The goal would be to significantly increase the available staff and capabilities for inventory and inspection without requiring extensive technical skills of that staff. This is not to be confused with, or encroach upon, the existing mandated bridge inspections requirements. For instance, a field crew trained to inspect culverts could also capture data on embankments, slopes, and retaining walls.

LADOTD intends to leverage this effort with the goal of quickly adjusting to the various changes that could occur with then NPRM efforts for MAP-21.

Information Systems Enhancements

Enterprise GIS

Implement, as appropriate to support Asset Management and improve the TAMP, the recommendations of the "IT Enterprise GIS Planning Report". This report was the source of the recommendation to implement the previously identified ESRI Roads and Highways as noted in chapter 2.3 "TAM Tools."

Louisiana Roadway Data Improvement Program

The FHWA Office of Safety under contract DTFH61-10-D-0002 prepared a report for LADOTD designed to help improve the quality of their roadway data to better support safety and other engineering initiatives. The RDIP focused on the process and practices used by LADOTD for collecting, managing, and utilizing roadway data. While this investigation was specific to improving safety related data, it included a review of transportation asset related data as well.

The recommendations of the report, which focused on Roadway Data Collection/Technical Standards, Data Analysis Tools and Uses, Data Management and Governance, and Data Sharing and Integration, will be investigated for its potential application to all aspects of transportation asset management data.

AASHTOWare Bridge Management (BrM) System

Upgrade from the existing PONTIS system to a full implementation of the AASHTOWare™ Bridge Management software (BrM), including software installation, customization of reports and manuals (including the element inspection manual), implementation of a field data collection capability, development or updating of analysis parameters, integration with related systems (especially maintenance management and geographic information), and training of users of the system.

Ongoing business processes which are necessary for the success of this system are: a periodic risk-based inspection process; training and certification for inspectors; governance and maintenance processes for the databases; and quality assurance processes for incoming data.

In addition, investigate additional data collection needs, or data coordination with other data stores, that could provide more enhanced and practical condition assessments that enable better predictive budgetary planning scenarios.

Investigate Performance Based Practical Design[9]

LADOTD, in conjunction with its local FHWA partners, is investigating Performance Based Practical Design (PBPD) in an effort to deliver a greater number of projects as a result of realizing cost savings by utilizing flexibility that exists in current design guidance and regulations.

PBPD can be articulated as modifying a traditional design approach to a "design up" approach where transportation decision makers exercise engineering judgment to build up the improvements from existing conditions to meet both project and system objectives. In other words, improvements don't always have to meet every single detail in the current design standards.

A concern of PBPD is that agencies may overemphasize short-term cost savings without a clear understanding of how such decisions could impact other objectives (such as safety and operational performance, context sensitivity, life-cycle costs, long-range corridor goals, livability, and sustainability). To address this concern, agencies can make more informed decisions by evolving towards a Performance-Based Practical Design (PBPD) approach grounded in a performance management framework. By using appropriate performance-analysis tools, both short and long term project and system goals can be met while addressing project purpose and need.

[9] http://www.fhwa.dot.gov/design/pbpd/documents/pbpd_brief.cfm

Notable Attributes

- PBPD focuses on performance improvements that benefit both project and system needs.
- Agencies make sound decisions based upon performance analysis.
- By scrutinizing each element of a project's scope relative to value, need, and urgency, a PBPD approach seeks a greater return on infrastructure investments.
- PBPD strengthens the emphasis on planning-level corridor or system performance needs and objectives when planning, scoping and developing individual projects.
- PBPD can be implemented within the Federal-aid Highway Program regulatory environment utilizing existing flexibility. PBPD does not eliminate, modify, or compromise existing design standards or regulatory requirements.

Performance Measures for Maintenance Management System

LADOTD has developed a set of "level of service" and "performance indexes" to be used within its Maintenance Management System, AgileAssets as noted in chapter 2.3, "TAM Tools." This effort focuses on maintenance activities and low cost preservation efforts. The intent of this enhancement effort is to introduce performance measures within this area with the intent to improve field staff performance, capture detailed information for LCCA, and inevitably help to maintain the condition of LADOTD assets in a state of good repair.

Risk Assessment

LADOTD will insure that Risk Assessment will be used throughout the asset management process, when setting the budgets, prioritizing projects and revising asset management guidance. This could include policy and procedural changes on the Department Level, Program Level, and Project Level.

LADOTD has scheduled two (2) NHI Risk Management classes and will use the pertinent information gained from those classes to assist in further developing the Risk Assessment and Risk Management efforts.

Expand Risk Assessment of Structures

LADOTD recently identified the most critical at-risk bridge structures and developed a short document outlining the approach that was used in the process. LADOTD intends to review this analysis procedure, to make any NPRM related adjustments, and then to extend or enhance this process to evaluate each state maintained bridge. It is intended that a scoring mechanism will be devised with potential mitigation actions, and this will be housed within the AASHTO BrM software.

Policy and Procedural Support

LADOTD will review and adjust all internal policy and procedure documents, including developing new policies and procedures where appropriate, to ensure uniform Statewide implementation of TAM objectives and MAP-21 mandates.

This could include, but is not limited to reviews of information systems, performance measures, quality assurance criteria, certification requirements, accountability for specific measurable objectives, maintenance of life cycle cost analysis assumptions and metrics, risk assessments, procedures for STIP development, and procedures for ensuring adequate budgeting and staffing of necessary infrastructure maintenance.

Communication Plan

LADOTD will further enhance its existing communication strategy by making the best use of the data and analysis results to communicate the implications of asset management decisions to stakeholders and the public. In particular, these asset management capabilities should enable Department officials to be more proactive in working with the State Legislature and other external stakeholders to optimize funding and foster a clear understanding of the linkage between funding and performance.

Off-System Infrastructure

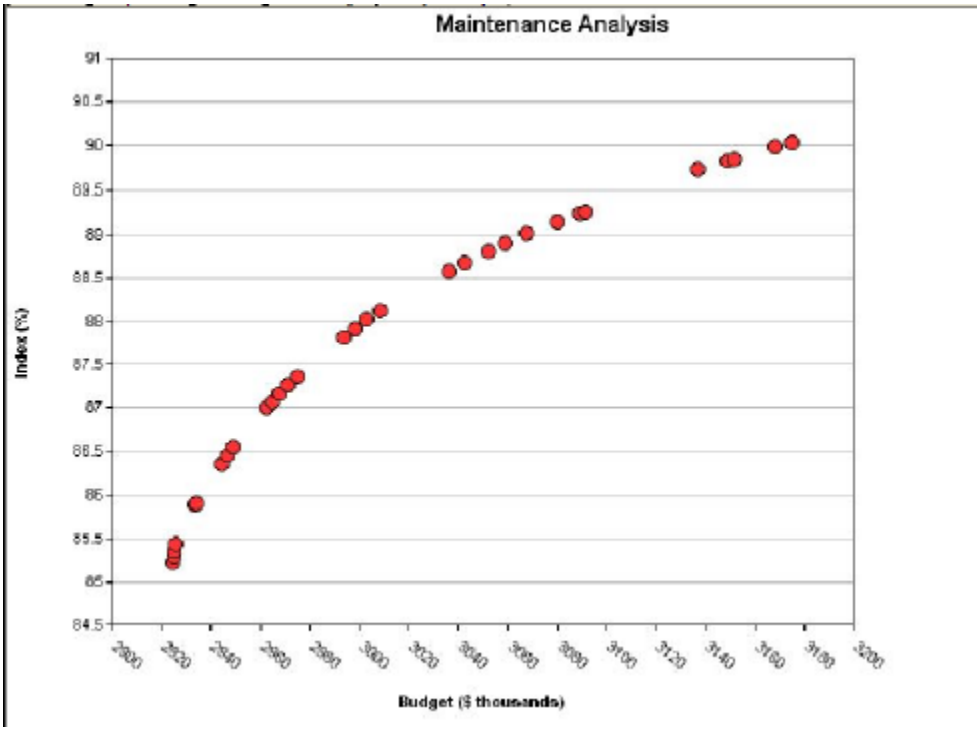
LADOTD has a contractor currently collecting minimal pavement data and right-of-way imaged for all local roads with the state. The intent of this contract it to capture a snapshot of the off system roadway inventory for use by LADOTD in various studies and other potential investigations. The contractor is collecting additional data beyond the contract that would be useful to jurisdictions with management system capabilities and has offered this data to the various MPO's and larger cities.

LADOTD has offered and provided technical assistance and guidance, in an outreach to parish and municipal governments, to encourage asset management to take root at the local level.

Trade-Off Analysis

LADOTD's long term asset management goal is to accomplish Comprehensive Trade-Off Analysis between roadway, bridge, maintenance and safety requirements. The intent of trade-off analysis is to allow maximum benefit to be gained at the most appropriate spending levels, across various asset types, while incorporating various requirements including LCCA. Essentially as you spend more money on an asset, you get a diminished percent improvement for the additional dollars spent, or the improvement curve flattens out as shown in Figure 9.1 below. The best investment would require asset spending, as you reach the flat part of the curve, to be redirected to another assets where spending is achieving a performance somewhat lower on the vertical part of the curve.

Figure 9.1 Maintenance Analysis Curve



Trade-Off analysis will require additional software solution modules to be implemented. For example, this could include the requirement for a Safety Management System. While existing tools track all the safety management reporting requirements, a comprehensive module that ties all safety requirements together along with the pavement, bridge and maintenance systems is needed to eventually meet the requirements of a Comprehensive Trade-Off Analysis solution.

Quality and Continuous Improvement Program (QCIP)

To further illustrate the importance LADOTD places on the policy and procedural driven approach based on appropriate data, LADOTD instituted a "Change Management Program" in October 2004. This program is charged with supporting the Department's goal to institutionalize an organizational culture of change with a mission to lead, facilitate, support, and enable continuous quality improvements in the Department. The Change Management team first began conducting 12 major processes improvement studies aimed at revising every major aspect of project development.

The following guiding principles provide the benchmarks with the intent to transform LADOTD operations:

- Improve responsiveness to our customers and stakeholders.
- Establish a culture of accountability.
- Provide for cost-effective and timely project delivery in an environmentally sensitive way.

- Optimize use of DOTD's scarce resources (people and funding) by focusing them on key products and services.
- Provide for decentralized decision making as close to the customer as possible.

The scope of the process improvement and communication initiative includes:

- Assessing major DOTD business functions.
- Identifying opportunities for process simplification and streamlining those that have the largest potential payback.
- Prioritizing improvement opportunities based on a number of factors including return on investment, risk, and time to implement.
- Developing conceptual models of the recommended new processes and barriers to implementation.
- Developing detailed implementation plans.
- Implementing proposed recommendations.

The section responsible for the program was renamed the Quality and Continuous Improvement Program (QCIP) to more appropriately identify their ongoing responsibilities. QCIP's role has expanded to include strategic planning for the Department, and other various support roles. It is expected that QCIP will play a major role in addressing the ongoing needs of the TAMP with respect to helping to improve upon gaps identified via the GAP analysis process.

As an example, following LADOTD's initial Design Build project, QCIP conducted a final project SWOT analysis. This is a structured method used to evaluate the strengths, weaknesses, opportunities, and threats involved in a project. In this case it involved determining if the agencies objectives were met by the project and included identifying the internal and external factors that were favorable and unfavorable to achieving that objective. It should be noted that Design Build projects must somehow be modified to guarantee the LCCA concept becomes a fundamental part of the process since the entire premise of Design Build predicates a focus on immediate savings in time and initial costs at the expense of the life cycle costs.

9.4 TAMP UPDATE PROCESS

Transportation asset management, and the processes, procedures and details outlined in the TAMP, clearly show that a sustained and ongoing effort will be required by LADOTD.

After the MAP-21 Notice of Proposed Rule Making are released, LADOTD will analyze its current TAMP and make the necessary minor adjustments, if any, to the existing TAMP to ensure compliance. The updated TAMP will then be submitted for FHWA certification. LADOTD has the full expectation that in the future, as worldwide TAM efforts mature, so will the rules and system required to support them.

With this in mind, LADOTD intends to update the TAMP on an 18 month cycle for at least 2 updates. After the second update, the TAMP would then be updated every 3 years. This planned schedule will certainly be modified if appropriate reasons to do so become evident.

The update cycles will be concurrent with the work outlined in the TAMP, meaning that the actual work of TAM will continue non-stop for the foreseeable future, with the TAMP providing the roadmap to success.

10.0 Appendices

A. LADOTD Revenue and Budget Allocation Descriptions

The table that follows in the Appendix, "LADOTD 10 Year State Revenue and Budget Projection" is the ten year financial plan for State revenue. The table includes a ten year projection of the revenues as well as the budgeted expenditures. A description of the contents of the TTF Distribution line items is as follows:

Revenue

- State Transportation Trust Fund (TTF): This includes the 16 cent per gallon motor fuel excise tax, automobile registration fees, interest and aviation fuel sales tax. The State constitutionally permitted uses of TTF include: the construction and maintenance of the Statewide highway system; the Port Priority Program; the Flood Control Program; the Parish Transportation Fund; transit; and State police for traffic control. The amount used for programs other than the construction and maintenance of the Statewide highway system cannot exceed 20%.
- State Highway Improvement Fund (SHIF): This includes the registration fees collected on trucks and trailers that operate in the State. The revenue can only be used for projects on the State-owned system that are not eligible for federal funds.
- Transportation Infrastructure Model for Economic Development (TIMED) TTF: This includes the collections from the 4 cent per gallon motor fuel excise tax. This revenue stream is dedicated to debt service for the 16 projects listed in the constitution.
- Interagency transfers: This includes payments from other State agencies such as the Highway Safety Commission and GOHSEP/FEMA.
- Self-Generated funds: This includes toll revenue from Statewide ferries, oversized/overweight truck permits, overweight truck fines, outdoor advertising/junk yard sign permits, and right of way permits.
- Unclaimed Property Funds: This is an allocation of $15 million annually from the unclaimed property funds collected by the State Treasury. These funds can only be used for the costs associated with the completion of I-49 North and South.
- General Obligation Bonds: The Legislature occasionally appropriates funding for specific projects that are not typically included in the annual highway priority program or other programs that are administered by LADOTD.

Expenditures

- Regular Operating – State funding allocated to operating budget

- Aviation Operating – State aviation tax revenue allocated to aviation operating budget
- Highway Program – Matching funds current year – match required for FHWA funding
- Highway Program – State funded and other – State funding on projects not funded with FHWA funds
- Take up projects – funds available for miscellaneous close-out items.
- Retainer Contracts – funds for contracts that span many projects and are Statewide in nature
- Hot Mix, Pipe, Bridge Materials – funds for materials used in capital projects handled by district personnel
- Secretary Emergency Fund – funds for emergency projects such as critical movable bridge mechanism failure, culvert failure, etc.
- TIMED Program - $0.04 tax – Debt service on TIMED program bonds paid from $0.04 tax
- TIMED Debt Service – paid from $0.016 cent tax – debt service on TIMED program bonds paid from $0.16 tax
- Non-Fed Eligible Roads – funding from highway improvement fund (registration fees on trucks and trailers)
- Flood Control Program – funding for flood control program.
- Port Priority Program – funding for Port Priority program
- Airport Priority Program – Aviation fuel sales tax funding for Aviation Priority Program
- Facilities Major Repair – funding for major repairs to LADOTD buildings, pump stations, etc.
- Ferry Repairs – funding for capital repairs to ferries
- State Police – funding for State Police for traffic control purposes
- Capital Outlay Parish Transportation – funding for Parish Transportation Fund (parish road fund, transit fund and off-system bridges match program)

B. LADOTD 10 Year State Revenue and Budget Projection

TTF DISTRIBUTION (Updated 1/15/14 dcj)										
REVENUES	**FY 13-14 REC 1/15/14**	**FY 14-15 REC 1/15/14**	**FY 15-16 REC 1/15/14**	**FY 16-17 REC 1/15/14**	**FY 17-18 REC 1/15/14**	**FY 18-19 REC 1/15/14**	**FY 19-20 REC 1/15/14**	**FY 20-21 REC 1/15/14**	**FY 21-22 REC 1/15/14**	**FY 22-23 REC 1/15/14**
$0.16 Tax	472.0	470.1	481.2	486.0	488.2	490.6	493.1	495.6	498.0	500.5
$0.04 Tax (TIMED)	118.0	117.5	120.3	121.5	122.1	122.7	123.3	123.9	124.6	125.2
Vehicle License Tax	41.5	40.7	41.2	41.7	42.2	42.4	42.6	42.8	43.1	43.3
Dedicated VST							27.2	378.0	477.6	489.5
Aviation Fuels	29.8	29.8	29.8	29.8	29.8	29.8	29.8	29.8	29.8	29.8
Interest & Weights Fines	28.6	26.8	26.8	26.8	26.8	26.9	27.1	27.2	27.3	27.5
TOTAL TTF	**689.9**	**684.9**	**699.3**	**705.8**	**709.1**	**712.5**	**743.1**	**1,097.3**	**1,200.4**	**1,215.8**
Highway Improvement Fund	42.1	18.9	19.4	19.8	20.3	20.4	20.5	20.6	20.7	20.8
Undesignated Fund Balance from prior years		13.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL REVENUE	**732.0**	**717.4**	**718.7**	**725.6**	**729.4**	**732.9**	**763.6**	**1,117.9**	**1,221.1**	**1,236.6**
EXPENDITURES										
Operating										
Regular Operating	347.3	359.0	366.5	369.9	371.7	373.5	375.4	377.3	379.2	381.0
Aviation Operating	1.3	1.4	1.4	1.4	1.4	1.5	1.5	1.5	1.5	1.5
TOTAL OPERATING	**348.7**	**360.4**	**368.0**	**371.4**	**373.1**	**375.0**	**376.8**	**378.7**	**380.6**	**382.5**
Capital Outlay - Highways										
Highway Program - Matching Funds	29.6	11.2	72.6	73.5	75.2	75.3	73.5	336.5	371.3	373.2
Highway Program - State Funded	0.0	5.0	5.0	5.0	5.0	5.0	5.1	5.1	5.1	5.1
Take Up Projects	0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Retainer Contracts	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Hot Mix, Pipe, Bridge Materials	0.0	5.0	5.0	5.0	5.0	5.0	5.1	5.1	5.1	5.1
Secretary Emergency Fund	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.6	3.6	3.6
TIMED										
TIMED Program - $0.04 tax	118.0	117.5	120.3	121.5	122.1	122.1	122.7	123.3	124.0	124.6
TIMED Debt Service - paid from $0.16 tax	17.3	27.1	26.2	26.8	27.9	29.8	31.2	32.4	33.8	35.2
Capital Outlay - Non-Fed Eligible Roads										
Non-Fed Eligible Roads	42.1	18.9	19.4	19.8	20.3	20.4	20.5	20.6	20.7	20.8
Capital Outlay - Non-Highways										
Flood Control Program	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9
Port Priority Program	16.1	19.7	19.7	19.7	19.7	19.7	19.7	19.7	19.7	19.7
Airport Priority Program	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5
Facilities Major Repair	1.5	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Ferry Repairs	2.0	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
TOTAL CAPITAL OUTLAY	**268.3**	**250.8**	**314.6**	**317.7**	**321.6**	**323.7**	**324.1**	**589.2**	**626.2**	**630.2**
STO Adjustment										
STATE POLICE	45.9	59.8	45.9	45.9	45.9	45.9	45.9	45.9	45.9	45.9
Capital Outlay - Parish Transportation	43.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4	46.4
TOTAL EXPENDITURES	**706.3**	**717.4**	**774.9**	**781.4**	**787.0**	**791.1**	**793.3**	**1,060.2**	**1,099.1**	**1,105.1**
Undesignated Fund Balance at FYE	**25.7**	**0.0**	**(56.2)**	**(55.8)**	**(57.6)**	**(58.2)**	**(29.7)**	**57.7**	**122.0**	**131.5**

C. LADOTD Revenue Scenarios

LADOTD is currently updating its long-range transportation plan (LRTP) which should be completed by the end of calendar year 2014. As part of the LRTP, four revenue scenarios have been developed:

- Low Scenario (1B) – This scenario assumes that federal revenues will grow at 0.5% and state revenue will be the State Revenue Estimating Conference (REC) forecast through State Fiscal Year (SFY) 2018 and beyond that will grow at 0.5%. This scenario does not assume that the vehicle sales tax will flow to LADOTD at any point in the future.

- Reduced Scenario (Federal Cliff) (2B) – This scenario assumes that federal revenues will be reduced in Federal Fiscal Year (FFY) 15 due to the insolvency of the Federal HTF. The federal funding will rebound in FFY 16 but only to a level of two-thirds of the FFY 14 level. The federal revenues will grow at 0.5% beyond FFY 15. The state revenues will be the REC forecast through SFY 18 and beyond that will grow at 0.5%. The vehicle sales tax will not flow to LADOTD.

- **Modest Growth Scenario (3B)** – This scenario assumes that Congress funds the federal highway trust fund at FFY 14 levels, federal revenue grow at 0.5% and state revenue will be the REC forecast through SFY18 and beyond that will grow at 0.5%. This scenario assumes that the vehicle sales tax begins flowing to LADOTD in SFY 2020.

- High Growth Scenario (4B) – This scenario assumes that Congress funds the Federal Highway Trust Fund at FFY 14 levels and federal revenues grow at 0.5% through FFY 20. In 2020, Congress will supplant the Highway Trust Fund with an new revenue source such that Louisiana receives an additional $300 million annually which grows at the rate of inflation. State revenues will be the REC forecast through SFY18 and beyond that will grow at 0.5%. This scenario assumes that the vehicle sales tax begins flowing to LADOTD in SFY 2020.

For purposes of the TAMP financial plan, the Modest Growth scenario is considered the most likely and is used in the analysis in chapter 7.0 “Financial Plan, Gap Analysis and Sustainability.”

D. LADOTD SFY 14-15 Budget Partition

THIS IS NOT AN ACCOUNTING DOCUMENT. IT IS TO BE USED FOR PROGRAMMING PURPOSES ONLY.
BUDGET PARTITION FY 14-15 (July 24 2014)

	SUB-CATEGORY	LETTINGS							CONTINGENCY/CONSTUCTION ENGINEERING					ENGR, R/W, UTIL											GRAND TOTAL
		FED FUNDS	STATE FUNDS	TIMED	NFA	BONDS	TOLLS / LOCAL	SUB-TOTAL	FED FUNDS	STATE FUNDS	TIMED	NFA	BONDS	SUB-TOTAL	FEDERAL FUNDS					STATE FUNDS	TIMED	NFA	BONDS	TOLLS / LOC	SUB-TOTAL	
															ENGR	R/W	UTIL	IND.	SUB-TOT FEDER							
PRESERVATION	NON-INTERSTATE (PAVEMENT)	6.0	1.5					7.5	0.5	0.1		0.0		0.6				0.7	0.7						0.7	8.8
	Non-interstate (pavment)(TIMED routes)	37.2		9.3				46.5	3.0	0.0	0.7	0.0		3.7				4.3	4.3						4.3	54.5
	NON-INTERSTATE (PAVEMENT NFA)	37.0			24.6	92.6		154.2	3.0			2.0	7.4	12.3				4.3	4.3							166.5
	CONTRACT MAINTENANCE (ROAD)	6.0	1.5					7.5	0.5	0.1				0.6				0.7	0.7	0.0					0.7	8.8
	INTERSTATE (PAVEMENT)	66.6	7.4					74.0	5.3	0.6				5.9				7.7	7.7	0.0					7.7	87.6
	BRIDGE (ON SYSTEM)*(toll credits)	29.4						29.4	2.4					2.4				3.4	3.4						3.4	35.2
	BRIDGE (ON SYSTEM)*	39.2	9.8					49.0	3.1	0.8				3.9	4.5	5.5	2.1	5.8	17.9	3.0					20.9	73.8
	BRIDGE (INTERSTATE)	13.8	0.7					14.5	1.1	0.1		0.1		1.3				1.6	1.6	0.0					1.6	17.4
	BRIDGE (NFA)				15.8			15.8	0.0	0.0		1.3		1.3	0.5	1.5		0.2	2.2	0.5		0.5			3.2	20.3
	BRIDGE (OFF SYSTEM)	10.4					2.6	13.0	0.8					0.8	0.8			1.3	2.1					0.4	2.5	16.3
	SUB-TOTAL	245.6	20.9	9.3	40.4	92.6	2.6	411.4	19.6	1.7	0.7	3.3	7.4	32.8	5.8	7.0	2.1	29.9	44.8	3.5		0.5	0.0	0.4	44.9	489.1
OPERATIONS	ITS (regular)	9.4	1.6					11.0	0.8	0.1				0.9	0.9			1.2	2.1	0.2					2.3	14.2
	TRAFFIC CONTROL DEVICES	14.8						14.8	1.2	0.0				1.2				1.7	1.7						1.7	17.7
	ROADWAY FLOODING	3.0	0.7					3.7	0.2	0.1				0.3				0.3	0.3	0.0					0.3	4.3
	WEIGH STATIONS	1.8	0.1					1.9	0.1	0.0				0.1				0.2	0.2	0.0					0.2	2.2
	REST AREAS	10.0	1.1					11.1	0.8	0.1				0.9				1.2	1.2	0.0					1.2	13.2
	MOVABLE BRIDGE PM	1.5	0.4					1.9	0.1	0.0				0.1				0.2	0.2	0.0					0.2	2.2
	Ferries/major repairs		3.5					3.5	0.0	0.3				0.3												3.5
	ACCESS MANAGEMENT	6.5	1.6					8.1	0.5	0.1				0.6	1.0			0.9	1.9	0.3					2.2	10.9
	INTERSTATE LIGHTING	2.5	0.3					2.8	0.2	0.0				0.2				0.3	0.3	0.0					0.3	3.3
	TSM	4.2	3.1					7.4	0.3	0.2				0.5				0.5	0.5						0.5	8.4
	SUB-TOTAL	53.7	12.4		0.0		0.0	66.2	4.2	0.9				5.1	1.9	0.0		6.4	8.3	0.5					8.8	80.1
SAFETY	HWY. PROGRAM	46.9	2.5					49.4	3.8	0.2				4.0	1.0	4.0	1.0	6.0	12.0	0.7					12.7	66.1
	LOCAL RD. SAFETY	2.6					0.3	2.9	0.2	0.0				0.2	0.2				0.2						0.2	3.3
	SAFE RDS. TO SCHOOLS	2.3					0.1	2.4	0.2	0.0				0.2	0.2				0.2					0.0	0.2	2.8
	RR Grade Seperations	7.4	0.4					7.8	0.6	0.0				0.6				0.9	0.9	0.0					0.9	9.3
	RR CROSSING UPGRADES	8.2						8.2	0.7	0.0				0.7	0.1			1.0	1.1	0.0					1.1	10.0
	SUB-TOTAL	67.4	2.9				0.4	70.7	5.5	0.2				5.7	1.5	4.0	1.0	7.9	14.4	0.7					15.1	91.5
CAPACITY	REGULAR PROGRAM	0.0	0.0					0.0	0.0	0.0				0.0	1.1			0.1	1.2	0.3					1.5	1.5
	CORRIDOR/intersate UPGRADE	43.7	2.3					46.0	3.5	0.2				3.7	1.1			5.1	6.2	0.1					6.3	56.0
	SUB-TOTAL	43.7	2.3		0.0	0.0		46.0	3.5	0.2				3.7	2.2	0.0	0.0	5.3	7.5	0.4		0.0	0.0		7.9	57.6
MISC.	FED ENHANCEMENT PROJECTS	9.6					2.4	12.0	1.0					1.0	0.0									0.1	0.1	13.1
	FEDERAL TRAILS	1.5					0.4	1.9	0.2					0.2												2.1
	URBAN SYSTEMS	49.6	2.0				10.4	62.0	4.0	0.2				4.2	2.0	6.7	0.5		9.2	0.1				2.8	12.1	78.3
	CMAQ	7.4	0.4				1.4	9.2	0.6	0.0				0.6					0.0					0.2	0.2	10.0
	DEMAND MANAGEMENT	1.0					0.2	1.2	0.1	0.0				0.1												1.2
	INTERMODAL CONNECTORS	6.8	0.8					7.5	0.5	0.1				0.6	0.2	0.6	0.2	0.9	1.9	1.4					3.3	11.4
	FED EARMARKS (DEMO,...)		0.1							0.0															0.0	0.0
	TIMED PROGRAM														20.0			2.1	22.1					5.0	27.1	27.1
	STATE BONDS																			0.0			14.0		14.0	14.0
	TOLLS, LOCAL, OTHER	7.4	1.9					9.3	0.6	0.1				0.7				0.9	0.9						0.9	10.9
	ROAD TRANSFER	9.3	2.3		11.5			23.1	0.7	0.2				0.9				1.1	1.1	0.0					1.1	25.1
	**DEBT SERVICE, REIMB. SEED, SEC EMER FUND,													0.0				0.0	0.0	27.7					27.7	27.7
	Take up projects																			1.0					1.0	1.0
	State Funded Retainer Contracts																			1.0					1.0	1.0
	Hot Mix, Pipe, Bridge materials																			5.0					5.0	5.0
	Urban Transit	5.0					1.3	6.3																	0.0	6.3
	A/C CONVERSION																								0.0	0.0
	PLANNING ,TRAINING, RESEARCH														22.2				22.2						22.2	22.2
	SUB-TOTAL	97.6	7.4		11.5	0.0	16.1	132.5	7.7	0.6		0.0		8.3	44.4	7.3	0.7	4.9	57.3	36.2		0.0	14.0	8.1	115.6	256.3
	GRAND TOTAL	507.9	46.0	9.3	51.9	0.0	19.1	726.8	40.5	3.6	0.7	3.3		55.6	55.8	18.3	3.8	54.3	132.2	41.3		0.5	14.0	8.5	192.2	974.5
																									974.5	

REGULAR FEDERAL:	$	680.6	$ 648.9	$ (31.7)	TTF:	$ 63.2 Match
						DEBT SERVICE, REIMB. SEED, SEC
FEDERAL DEMO FUNDS:					73.8	$ 27.7 EMER FUND, **
TOTAL FEDERAL:	$	680.6				$ 55.7 NFA fund
						$ 146.6 total

*Includes $3 million preventive maintenance, & $3 million for inspections
** Includes $24.2 million for TIMED debt service

E. LADOTD Pavement System Treatments

Emergency Repair

This describes work activities generally necessary to return a pavement back to a minimum level of service following a significant event. Examples include:

- PCC Blowups
- Road Washouts

Corrective Maintenance

This is maintenance performed once a deficiency occurs in the pavement. Examples include:

- Pothole Filling
- Spall Repair

Pavement Preservation

This is a defined program employing a network level, long-term strategy that enhances pavement performance by using an integrated, cost-effective set of practices that extend pavement life and improve pavement surface conditions.

Routine Maintenance

This is defined as repair work typically performed by Department forces that is planned and carried out on a scheduled basis to maintain the pavement in serviceable condition. Examples include:

- Spot Leveling
- Pothole Patching
- Bump Grinding
- Machine Leveling

Preventive Maintenance

This maintenance is a planned strategy of cost-effective, non-structural treatments to existing pavements that preserve the current condition and retard future deteriorations. Examples include:

- Micro-Surfacing
- Chip Seals
- Joint Resealing

- Crack Sealing
- Ultra-Thin Overlay (<1.5″)
- Thin Overlays (<2″)

Light Minor Rehabilitation

This consists of non-structural improvements or repairs made to existing pavement sections to address pavement distresses. Examples include:

- PCC Pavement Patching
- Asphaltic Pavement Patching
- Asphaltic Concrete Single Lift Overlays (≤2″)
- Pavement Grooving/Grinding
- Load Transfer Restoration

Minor Rehabilitation

This consist of single lift Overlays (≤2″) of which existing pavement requires prior preparation such as cold planing or patching. Examples include:

- Patching with Single Lift Overlay (≤2″)
- Cold Plane with Single Lift Overlay (≤2″)

Major Rehabilitation

This consists of structural enhancements that extend the service life of an existing pavement system and/or improve its load carrying capacity. These pavements would generally be designed for a minimum of 10-15 years design life within the existing crown. Examples include:

- Rubbilization & Overlay
- Bonded Concrete Overlay
- Whitetopping
- Single or Multi Lift Asphaltic Concrete Overlay (>2″)
- In-Place Recycling
- Base Rehabilitation (stabilized or treated) and Overlay
- Geometric Changes to Alignment
- Addition and/or Lengthening of Turn Lanes and Ramps

Replacement

This is the replacement of the entire existing pavement structure by the placement of an equivalent or increased pavement structure generally within the existing crown. These pavements would typically be designed for a 20 year life. Examples include:

- PCC Pavement
- Full Depth Asphaltic Concrete Pavement