New Mexico DOT Transportation Asset Management Implementation Plan

final

plan

February 23, 2015

report

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1.0 Introduction

1.1 BACKGROUND

The mission of the New Mexico Department of Transportation (NMDOT) is to provide a safe and efficient transportation system for the traveling public, while promoting economic development and preserving the environment of New Mexico. To further this mission, NMDOT is committed to integrating a risk-based asset management approach into its business practices, the primary objective being to improve the management of its transportation assets over time, increase transparency in agency decision-making, and promote accountability with New Mexico taxpayers. Of critical importance, the approach will allow the department to transition to policy-driven management strategies that clearly define what assets need to be improved, timeframes for effective improvement, and realistic priorities for the department given available resources.

In support of the improvement process, NMDOT conducted a transportation asset management (TAM) gap assessment for highway assets as part of a Federal Highway Administration (FHWA) project. The FHWA is assisting 10 state DOTs with this type of assessment. NMDOT's objectives for the assessment were to compare current practices with state-of-the-art best practices used in other states, identify and prioritize gaps in these practices, and define a set of activities to address the most significant gaps. This report documents the results of the gap assessment and provides guidance for implementation.

NMDOT manages a wide range of assets to meet the public's transportation needs. However, as an initial step, this implementation plan focuses only on NMDOT's bridges and pavements. NMDOT will expand its TAM practices to other types of assets over time.

This implementation plan was developed in four steps:

- **Step 1. Conduct self-assessment survey.** Nearly 30 NMDOT staff members completed a TAM self-assessment survey. The survey was based on the one provided in Volume I of AASHTO's *Transportation Asset Management Guide*. The survey defines asset management best practices and asks respondents to rate the degree to which DOT practices are consistent with these practices. Participants were also asked to rate the degree to which they should be consistent.
- **Step 2. Conduct interviews**. Over 50 NMDOT staff members participated in a series of face-to-face interviews. The objective of these interviews was to discuss existing practices in more detail.
- **Step 3. Facilitate self-assessment workshop.** Based on the results of the self-assessment survey and the interviews, the consultant team identified an initial set of policy and process practice gaps and presented them to NMDOT

staff at a workshop. The objective of the workshop was to discuss the gaps, determine priorities, and identify viable options to address them.

- **Step 4. Develop implementation plan.** This document is based on the results of the first three steps. The implementation plan is designed to provide NMDOT with guidance to improve its asset management program. The plan can also be used as a component of NMDOT's initial transportation asset management plan (TAMP), which is currently under development.

It is recommended that NMDOT revisit this plan periodically and revise it to reflect accomplishments, emerging challenges, unexpected opportunities, and evolving priorities.

1.2 IMPLEMENTATION PLAN ORGANIZATION

The remainder of this report is organized as follows:

- Section 2 defines asset management and presents a series of business needs that reflect best practices;
- Section 3 summarizes current asset management practice at NMDOT;
- Section 4 establishes a vision and goals for implementing transportation asset management;
- Section 5 recommends an asset management work plan with practical implementation steps that support the vision and goals.

2.0 Asset Management Overview

2.1 WHAT IS ASSET MANAGEMENT?

The Moving Ahead for Progress in the 21st Century Act (MAP-21) defines transportation asset management (TAM) as:

> A strategic and systematic process of operating, maintaining, and improving physical assets, with a focus on engineering and economic analysis based upon quality information, to identify a structured sequence of maintenance, preservation, repair, rehabilitation, and replacement actions that will achieve and sustain a desired state of good repair over the lifecycle of the assets at minimum practicable cost.[1]

2.2 THE PRINCIPLES OF ASSET MANAGEMENT

TAM should not be considered as a separate new program or initiative, overlaid upon existing procedures, and in competition with other items on agency's agenda. Rather, it represents a way of doing business. In this view, the principles of good asset management can be visualized as affecting simultaneously, the philosophy, processes, and technical tools that underlie NMDOT business practices.

The following statements describe good TAM:

- TAM is a philosophy
- TAM is a process to fuel decision making and business improvement
- TAM is a set of management tools; and
- TAM is a resource allocation and utilization process.

TAM Is a Philosophy

- Asset management represents an approach to managing infrastructure that is strategic and proactive, and places a premium on good information in all aspects and in all agency units.
- Asset management is holistic. It entails a comprehensive view across a range of assets. It encourages consideration of a full range of options to solve

[1] 23 U.S.C. 101(a)(2), MAP-21 § 1103, July 2014.

problems or meet needs. Tradeoffs are explicitly considered among programs, modes, or strategies.

- Asset management is driven by policy goals and objectives based upon performance. Strategies are analyzed in terms of objective assessments of costs, benefits, long-term performance, risks to both agency and system performance, and other impacts on the transportation system and levels of service provided to transportation users.
- Asset management takes a long-term view of infrastructure performance and cost. The benefits of different actions are assessed throughout the infrastructure service life, applying economic as well as technical criteria.
- Asset management is proactive. An agency has the latitude to make decisions based on merit and consider factors such as cost effectiveness, risks, and practical considerations, among others.
- Asset management policy is influenced and informed by good information. This information describes current and projected system condition and performance that would result from different policies or strategies. It also encompasses user perceptions of system condition and performance, as obtained through surveys or focus groups.
- Asset management is explicit and visible, and serves to clarify and communicate the process and outcomes of resource allocation and program delivery. Asset management, by virtue of its rational and objective qualities, demystifies and fosters confidence in those decision processes that influence the allocation and utilization of scarce resources. In doing so, asset management fosters increased stakeholder participation, buy-in, and adherence to adopted strategies and decisions.
- Viewed as "a way of doing business," asset management is pervasive, affecting the business practices of every organizational element involved in the functions to which it is applied.

TAM is a Process to Promote Better Agency Decision-Making and Continuous Business Improvement

The principles of good asset management suggest ways in which NMDOT's decision making, business processes, and organizational roles can be strengthened. These process improvements can occur in those activities prior to budget approval – i.e., planning and program development – and in the program delivery and system performance monitoring phases subsequent to budget approval. Major principles governing process improvements are listed below.

- Investment choices and decisions on allocating and applying resources are policy and performance-driven. Procedures to reach these decisions are consistent with objective information and criteria based on merit. Performance measures consistent with policy goals and objectives are established for management review of both system performance and

program delivery. TAM takes a long-term view of performance and manages assets over the whole life.

- Investment choices and decisions on allocating resources are based upon explicit tradeoffs among modes, programs, or strategies. Trade-offs assess the impacts of more or less investment in a mode, program, or strategy, and help to craft final recommendations on how resources will be allocated across competing needs. Managers also understand the implicit trade-offs in their programs and budgets, and the consequences thereof.
- Asset management entails the translation of policies and plans into optimized investment strategies, and the translation of investment strategies into optimized program delivery. The essence of asset management involves a combination of resource allocation decisions and program delivery strategies that are optimized in relation to specific policy-driven criteria and these decisions/strategies consider risk over the entire life-cycle of an asset and over the entire network.
- Organizational roles and responsibilities regarding asset management are developed to encourage more strategic and integrated approaches. While strong vertical organizational units may exist to maintain core expertise, managed business processes and decisions involve wider participation.
- Asset management is interdisciplinary. Decisions on investment choices and resource allocation are based upon expertise and judgment from several quarters of an Agency. Assets are managed for delivery of the desired level-of-service for the least practical cost.
- Asset management requires effective communication within and outside the Agency. Within the Agency, strong communication channels are needed both across divisions and disciplines as well as within divisions.
- External communications need to inform policy-makers and other stakeholders of the status of transportation assets and recommended policies and their benefits.
- The Agency strives for more effective program delivery. The Agency explores innovative methods to deliver the range of projects and services required. All available methods are considered, including use of departmental employees, intergovernmental agreements, outsourcing or managed competition, and privatization.

TAM is a Set of Management Tools

Effective management systems and complete, current, and accurate information on transportation infrastructure are practical necessities in meeting the policy and process requirements of asset management. Good asset management implies a systematic, integrated approach to project selection, analysis of tradeoffs, and program and budget decisions. It also implies that the right information be available to the right levels of management at the right times.

The principles below support the availability and application of better information to make better decisions in asset management.

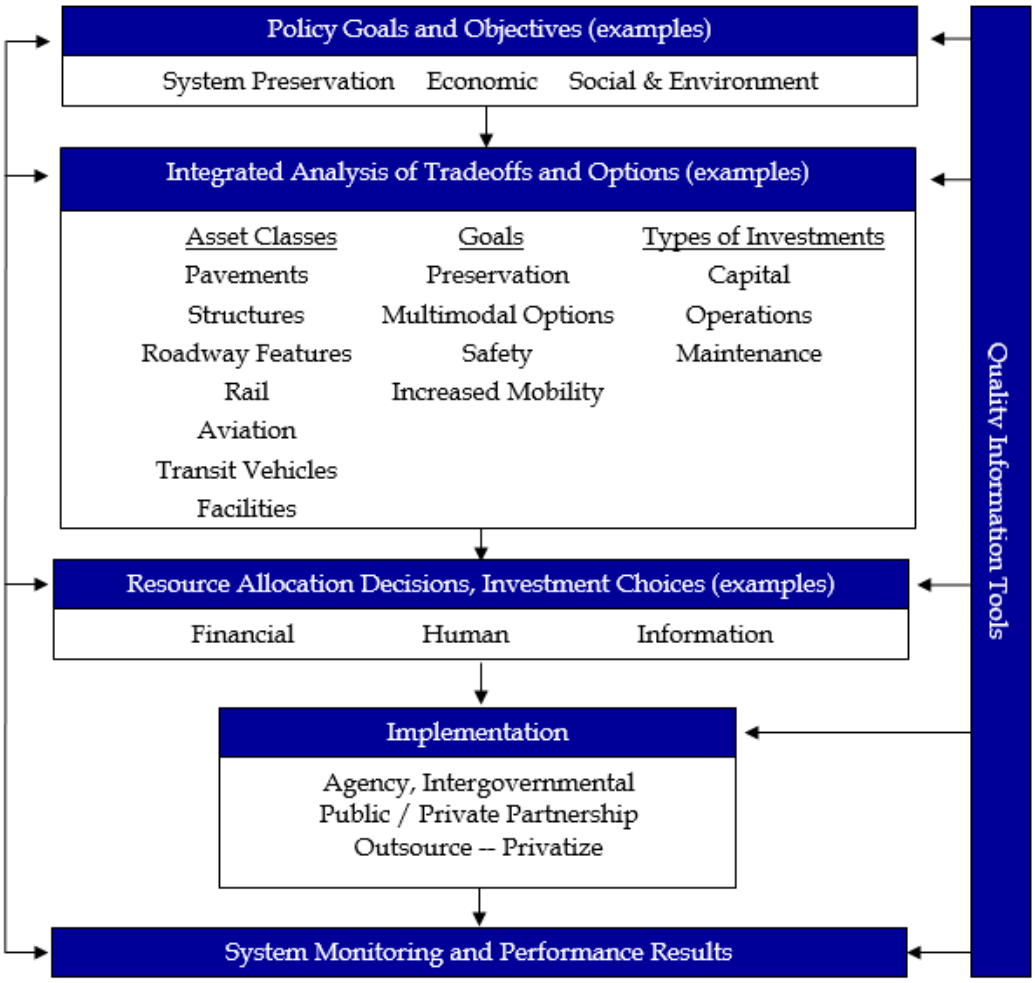
- Complete, current, and accurate information on transportation infrastructure assets, including descriptions, location, usage, unique or specialized characteristics, functional and other classification, and data needed for management systems.
- An appropriate suite of management systems and databases informs the Agency of the status, trends, and needs regarding its infrastructure assets. Typical capabilities of these systems include the following:
- Organization of information within databases describing infrastructure inventory, condition, and performance;
- Information ownership identifying the business group responsible for updating asset information including condition ratings, frequency of data updates, detailed condition rating methodology, and the method of data collection.
- Metadata containing a dictionary of the data fields collected for each asset, data values, data validation rules, linear referencing system used, and data flow/integration with other information systems.
- Analytic models that predict the rate of future change in condition or performance, enabling the agency to forecast future infrastructure needs;
- Decision rules or procedures for applying treatments or actions to maintain, preserve, rehabilitate, replace, or expand transportation infrastructure, with analytic models of resulting costs, benefits, and other impacts including an emphasis on a preservation based approach to strategy implementation
- Reports tailored to different organizational levels of management, including senior and executive levels, as well as for public distribution.
- Information on system performance in terms of both proposed targets and values actually achieved in the field.
- Specialized technical applications that support an Agency's asset management procedures. These will vary by Agency, but may include advances such as use of geographic information systems (GIS) as a system/data integration platform, economic analysis applications (e.g., generalized life-cycle benefit-cost procedure), trade-off analysis between assets, and other decision-support tools.
- Applications that assist in program and service delivery, including financial applications (e.g., to compute "total" or "true" cost of Agency and contracted services), and management systems for construction project pipeline and construction delivery.

TAM is a Resource Allocation and Utilization Process

Asset management is, at its core, a process of resource allocation and utilization. Resources in this context are interpreted broadly, encompassing financial, human, information, material, and equipment inputs to the management of the physical transportation infrastructure. The process of assigning or distributing these resources and applying them to the Agency's mission is likewise interpreted broadly, encompassing not only the traditionally understood functions in planning, program development, and budget approval, but also program delivery, system monitoring, data analysis, and input to policy formulation.

Figure 2.1 illustrates a strategic, integrated, systematic, and interdisciplinary approach to asset management for physical transportation infrastructure. The approach is cast as a resource allocation and utilization process. The entries in Figure 2.1 are examples, defined broadly and comprehensively to illustrate how the process could work in a general case.

Figure 2.1. Transportation Asset Management Framework



2.3 ASSET MANAGEMENT BUSINESS NEEDS

As described above, transportation asset management is a comprehensive process that spans across several agency departments, and addresses decisions that the agency makes throughout an asset's life. Given this broad reach, it is informative to break asset management practice down into a set of concrete business needs. These needs reflect state-of-the-art asset management decision making. The following needs are based on MAP-21 requirements, guidance provided through national research efforts, and best practices by DOTs throughout the U.S. They are organized around the TAMP requirements in MAP-21. The needs provide a basis for assessing existing practices at NMDOT and identifying potential business process enhancements.

To have a state-of-the-art asset management program, NMDOT needs to:

Inventory and Condition

1. Have access to complete, current, and accurate inventory of bridges and pavements on the NHS and State-owned system.
2. Have access to historic condition information at both the network and asset levels.
3. Have access to complete and accurate information regarding current passenger and commercial vehicle traffic volumes.
4. Project future traffic volumes and assess their impact on network conditions.

Asset Management Objectives and Measures

5. Document goals that guide resource allocation.
6. Understand the public's expectations for the transportation system.
7. Define performance measures to communicate system condition, assess progress being made in programmatic activities, identify and prioritize projects, and aid in the efficient and effective allocation of funds to programs.

Performance Gap Identification

8. Understand the relationship between funding levels and future asset conditions.
9. Develop condition targets.

Lifecycle Cost Considerations

10. Incorporate lifecycle cost considerations when modeling future asset condition.
11. Incorporate lifecycle cost considerations when selecting maintenance activities and construction projects.
12. Define key work activities, document their typical unit costs, and detail their ideal timing and sequencing.
13. Determine the long-term cost implications of adding new assets (i.e., maintenance costs) and consider these costs when prioritizing network expansion activities (e.g., highway, pedestrian, or bicycle facilities).
14. Document how projects are prioritized and selected for construction.

Risk Management

15. Identify agency-level risks that could impact implementation of asset management programs (e.g., funding uncertainty and major weather events).
16. Identify program-level risks that could impact implementation of specific programs, such as the bridge program (e.g., an age distribution of the bridge network that will result in a large number of bridges reaching the end of their design life at the same time).
17. Evaluate the agency- and program-level risks in terms of their likelihood of occurrence, the consequences should they occur, and use the results to prioritize the risks.
18. Identify strategies for mitigating the highest priority risks.

Financial Planning

19. Have access to complete and accurate information regarding historic expenditures at the project, work type, and program levels.
20. Project future funding that will be available for asset management over a minimum timeframe of 10 years.
21. Explicitly consider the relationship between the capital and maintenance programs, and use this information to inform budgeting decisions.
22. Allocate the available funds to program areas based on the objectives from Item #5, public perception from Item #6, performance implications defined in Item #8, lifecycle cost considerations from Items #10 and #13, and risk mitigation strategies from Item #18.
23. Document the entire resource allocation process and timeline.
24. Determine the transportation network's current value, and describe how funding levels and investment strategies will impact its future value.

Investment Strategies

25. Compile, prioritize, and communicate investment strategies that define how the agency will use the funds identified in Item #22.

Asset Management Systems

26. Use state-of-the-art asset management systems to conduct the analysis required for the above business needs. These systems enable agencies to manage inventory and condition data, evaluate the relationship between funding and future conditions, identify treatments based on an analysis of lifecycle costs, and evaluate the expected impact of selected on the condition of the network.

3.0 TAM at NMDOT

This section summarizes current (2014) TAM practices at NMDOT related to pavements and bridges. The consultant team derived the information in this section from an online survey, in-depth interviews with NMDOT staff, and the results of NMDOT's TAM self-assessment workshop.

Following is an asset management maturity scale presented in Volume II of AASHTO's *Transportation Asset Management Guide*. This scale provides a convenient mechanism for assessing existing asset management practices.

1. Initial - No effective support from strategy, processes, or tools. There can be lack of motivation to improve.
2. Awakening - Recognition of a need and basic data collection. There is often reliance on heroic efforts of individuals.
3. Structured - Shared understanding, motivation, and coordination. Development of processes and tools.
4. Proficient - Expectations and accountability drawn from asset management strategy, processes, and tools.
5. Best Practice - Asset management strategies, processes, and tools are routinely evaluated and improved.

Table 3.1 provides an assessment of NMDOT's asset management maturity using the business needs defined in Section 2. This information is used as the basis for the work plan presented in Section 5.

Table 3.2 Assessment of NMDOT TAM Practices

#	Business Need	Bridge Maturity	Pavement Maturity	Comments
1	Have access to complete, current, and accurate inventory of bridge and pavements on the NHS and State owned system	4	4	NMDOT conducts regular bridge inspections consistent with best practices. NMDOT conducts pavement inspections and collects information on ride quality and pavement distresses. Historically, the inspections were done manually. There are significant concerns about the quality of these historic data. NMDOT has recently shifted towards automated data collection, which will improve the accuracy of, and confidence in. the data. NMDOT staff identified the need to improve access to bridge and pavement data.
2	Have access to historic condition information at both the network and asset levels	4	3	
3	Have access to complete and accurate information regarding current passenger and commercial vehicle traffic volumes	4	4	NMDOT staff are split in their level of confidence in current traffic counts. Those closest to the data tend to have higher confidence in it, which indicates a need to improve communication about the existing data. NMDOT staff identified a need to improve future projections. Although the state's population is projected to remain relatively stable, deeper analysis indicates significant changes will occur in regional demographics and areas of economic development.. NMDOT staff identified a need to ensure that these changes are captured in future traffic projections.
4	Project future traffic volumes and assess their impact on network conditions	3	3	
5	Document goals that guide resource allocation	3	3	The lack of clear goals guiding resource allocation decisions was cited as a gap by several NMDOT staff. NMDOT is working to address this issue as part of an ongoing long range transportation plan activity..
6	Understand the public's expectations for the transportation system	2	2	NMDOT staff flagged this as an area for improvement in the online survey.
7	Define performance measures to communicate system condition, assess progress being made in programmatic activities, identify and prioritize projects, and aid in the efficient and effective allocation of funds to programs.	3	3	NMDOT has defined measures for external reporting, but they are not used internally to inform resource allocation decisions. The primary bridge measure is structural deficiency (SD) status. NMDOT staff is developing new pavement measures that can be reported on a good/fair/poor basis.

#	Business Need	Bridge Maturity	Pavement Maturity	Comments
8	Understand the relationship between funding levels and future asset conditions.	2	3	NMDOT staff identified the ability to model future asset condition as a high priority. This capability will be available for pavements once NMDOT's new pavement management system is implemented. For bridges, NMDOT is waiting for the updated version of AASHTO's bridge management to become available.
9	Develop condition targets	2	3	NMDOT does not have condition targets. NMDOT staff's work on updating pavement data and the pavement management system will support the development of targets for its pavements.
10	Incorporate lifecycle cost considerations when modeling future asset condition	2	3	Similar to #8. NMDOT cannot currently model bridge or pavement condition. It has identified this as an opportunity for improvement and has the data required to support this type of analysis.
11	Incorporate lifecycle cost considerations when selecting asset management projects	2	2	Bridge and pavement projects are identified and selected by NMDOT District officials, based on their knowledge of local conditions and engineering judgment. By and large there is a desire to be more proactive and less reactive when it comes to projects and strategies. NMDOT performs rehabilitation and preventive maintenance activities on its bridges. However, decisions on funding these activities are difficult because NM DOT is working in an environment in which the current backlog of work on SD bridges significantly exceeds current funding levels.
12	Define key work activities, and document the typical unit cost and ideal timing	2	2	The need for improved documentation was cited by NMDOT staff through the gap assessment effort.
13	Determine the long-term cost implications of adding new assets and consider these costs when prioritizing network expansion activities	2	2	NMDOT's capital program is focused largely on the preservation of the existing network, so improvement in this area was not flagged as a priority.
14	Document how projects are prioritized and selected for construction	2	2	The project identification and selection processes vary largely by District. The need for improved documentation to inform project decisions was cited by NMDOT staff through the gap assessment effort.

#	Business Need	Bridge Maturity	Pavement Maturity	Comments
15	Identify agency-level risks that could impact implementation of asset management programs	2	2	NMDOT staff considers risk informally as part of the project development process. However, NMDOT does not have a systematic, formal process for evaluating risks associated with its asset management programs.
16	Identify program-level risks that could impact implementation of specific programs	2	2	
17	Evaluate the agency- and program-level risks in terms of their likelihood of occurrence, the consequences should they occur, and use the results to prioritize the risks	2	2	
18	Identify strategies for mitigating the highest priority risks	2	2	
19	Have access to complete and accurate information regarding historic expenditures at the project, work type, and program levels	3	3	NMDOT has information on historic spending at the project level. It would take some effort to categorize these expenditures by program, and be very difficult to do this at the project level, because projects are not tied to specific assets.
20	Project future funding that will be available for asset management over a minimum timeframe of 10 years	4	4	NMDOT projects future revenue for 5 years. NMDOT is confident in its projections for the State contribution to the transportation budget, but not the Federal contribution.
21	Explicitly consider the relationship between the capital and maintenance programs, and use this information to inform budgeting decisions	3	3	Similar to item #11. These tradeoffs are considered implicitly by Districts during the programming and budgeting process. There is a desire on the part of NMDOT staff to better understand and formally connect this relationship.
22	Allocate the available funds to program areas based on the objectives from Item #5, public perception from Item #6, performance implications defined in Item #8, lifecycle cost considerations from Items #10 and #13, and risk mitigation strategies from Item #18	2	2	NMDOT allocates funding to its districts based on population and size of the transportation network. The Districts have discretion to allocate these funds to specific program areas based on knowledge of local priorities and engineering judgment.. There is a strong desire on the part of NMDOT staff to improve the resource allocation process. NMDOT is addressing this issue in the long range planning process.
23	Document the entire resource allocation process	2	2	The need for improved documentation was cited several times by NMDOT staff throught the gap assessment effort.
24	Determine the transportation network's current value, and describe how funding levels and investment strategies will impact its future value	1	1	NMDOT assesses network value through the GASB-34 process based on straight line depreciation. NMDOT has not made any link between the value of the system and asset management decisions.

#	Business Need	Bridge Maturity	Pavement Maturity	Comments
25	Compile, prioritize, and communicate investment strategies that define how the agency will use the funds identified in Item #22	2	2	NMDOT has not formally identified investment strategies. Also, related to item #21, there is an opportunity to improve existing strategies by pursuing more proactive investment strategies.
26	Use state-of-the-art asset management systems to conduct the analysis required for the above business needs.	2	3	NMDOT uses a bridge management system to assist with the management of inspection data, but not use this for asset analysis. NMDOT is currently implementing a new pavement management system that will support several of the above items.

4.0 TAM Vision and Goals

This section defines a vision for risk-based TAM at NMDOT, and presents a set of goals to guide its implementation.

4.1 TAM Vision Statement

The following vision statement combines NMDOT's mission statement with MAP-21's definition of asset management.

"Transportation asset management at NMDOT is a strategic and systematic process of operating, maintaining, and improving New Mexico's transportation system. NMDOT will identify a structured sequence of actions that will enable it to cost effectively achieve and sustain a desired state of good repair, and to provide a safe and efficient transportation network."

The TAM program will provide a bridge between NMDOT's long range plan and its 6-year construction program. The structured evaluation of system conditions, performance targets, life cycle cost considerations, risks, and funding scenarios will inform the development of the 6-year program, and enable NMDOT to cost effectively achieve its mission.

4.2 TAM Goals

The goals of the TAM program over the period 2015-2020 are as follows:

- Create a culture through training and communication where TAM is viewed as the way of doing business.
- Develop policies, goals and performance targets that inform asset management decisions.
- Create a process that enables NMDOT to develop budget requests based on expected system conditions, and communicate the implications of underfunding preservation activities.
- Find a balance between proactive, preservation-first and reactive, worst-first strategies.
- Provide NMDOT staff with improved access to accurate, timely, consistent and complete asset data and information.

5.0 TAM Work Plan

This section presents an asset management work plan for NMDOT. It describes the following practical steps that support the vision and goals defined above.

- Initiative 1. Develop a TAM Strategic Plan;
- Initiative 2. Enhance the Ability to Analyze Pavements and Bridges;
- Initiative 3. Establish Performance Targets and Incorporate them into the Budgeting Process;
- Initiative 4. Develop a Process for Allocating a Portion of Pavement and Bridge Funds based on Statewide Priorities;
- Initiative 5. Improve Asset Management Communication and Documentation;
- Initiative 6. Improve Data Access, Sharing and Mapping;
- Initiative 7. Integrate Risk Management into the Asset Management Process.

The plan also includes a timetable and a preliminary cost estimate for each activity. Implementing the work plan will require a mixture of indirect and direct costs. Indirect costs cover the resources required for current NMDOT staff to perform work. Direct costs cover the resources required to engage consultants. Consultants may be brought in to add expertise or to address workload constraints within NMDOT. This work plan represents one implementation scenario, which combines both internal and outsourced work. For the majority of the initiatives, the plan provides a preliminary cost estimate (low < $50K, medium = $50–$100K, and high > $100K) associated with engaging a consultant. Indirect costs have not been estimated. The final cost of implementing the work plan will decrease if NMDOT performs more work in-house and increase if consultants are relied upon more heavily.

The work plan makes no presumption of the relative priority of this initiative with respect to other projects at NMDOT. Rather, it presents activities, timeframes, and budgets as if the implementation of asset management at NMDOT has full financial backing.

Implementing TAM will take patience. In some cases, the recommendations will result in a fundamental shift in the way NMDOT does business, in particular ensuring cooperation and transparency between internal and external stakeholders designed to facilitate desired outcomes. TAM at its core is an ever evolving continuous improvement process. To that end, several of the initiatives involve initial steps in the developing approaches, frameworks and strategies that will be implemented on an ongoing basis.

5.1 RECOMMENDED INITIATIVES

Initiative 1. Develop a TAM Strategic Plan

The objective of Initiative 1 is to formalize and document how TAM will be implemented at NMDOT. The Strategic Plan should be brief and build from this document and from NMDOT's TAMP Work Plan. The plan should do the following:

- Include the goals and objectives defined in Section 4 of this document.
- Define which assets will be included in the TAM effort. NMDOT's initial focus will be all state-owned pavements, pavements on the expanded NHS, and all bridges over 20 feet.
- Identify a TAM champion. The champion should be someone from the senior management team that is responsible for ensuring that effort has executive support.
- Identify a TAM coordinator. The coordinator will be responsible for the day-to-day oversight of implementation activities and for working with the various groups throughout NMDOT that will be involved in them. NMDOT has identified a lead for its initial TAMP. It is recommend that this responsibility expand beyond TAMP development.
- Identify a TAM steering committee. Again, this activity should be consistent with any committees developed for the TAMP effort.
- Present a TAM training plan. This plan should identify who requires TAM training, the type of training each stakeholder requires, and an approach for providing the training focused on specific tasks required to achieve defined outcomes. Examples include developing NMDOT specific training materials and taking advantage of training materials from the FHWA National Highway Institute (NHI).

Timing: 2 months

Preliminary Cost Estimate: Indirect/consultant (low)

Initiative 2. Enhance the Ability to Analyze Pavements and Bridges

NMDOT currently use a management system for storing and managing inventory and condition data. Its asset management practices could be significantly improved by using the analytical capabilities of these systems. Towards this end, NMDOT is watching the progress of AASHTO's bridge management system and is in the process of implementing a new pavement management system. It is recommended that NMDOT continue its pavement management system effort, and take a more formal look at its bridge

management needs and develop a plan for implementing a bridge management system.

NMDOT's objectives for these systems should be to: evaluate the relationship between funding levels and future conditions; identify treatments based on an analysis of lifecycle costs; determine the optimal split between proactive; preservation activities and reactive activities aimed at addressing assets that are already deficient, and evaluate the impact that the projects selected by the Districts for implementation will have on the condition of the network.

Once the systems are implemented, it is recommended that NMDOT work to update its planning and programming processes to take advantage of the new analytic capabilities. An important part of this effort will be working with the Districts to create buy-in for the analysis approach and confidence in the analysis results and system-generated recommendations.

Timing:

- Pavement management system implementation – 12 months
- Bridge management system implementation – 12 months
- Incorporate management systems results into planning and programming processes - ongoing

Preliminary Cost Estimate: Internal/consultant (high).

Initiative 3. Establish Performance Targets and Incorporate them into the Budgeting Process

The objective of this initiative is to encourage a more performance-based approach to the overall planning and programming functions at NMDOT, emphasizing an accurate and consistent assessment of department assets. In this context, "planning and programming" refers to an agency-wide process rather than a project specific process. To meet this objective, it is recommended that NMDOT complete the following activities:

- Use the management systems described in Initiatives 2 to analyze future asset conditions based on various funding scenarios.
- Use these scenarios to inform the budgeting process, and to establish fiscally constrained, network level performance targets.
- Provide analytically sound targets to the Districts along with guidance and recommendations from the management systems on how to achieve them.
- Develop a process for formally tracking existing conditions and comparing them against these targets.

Timing: It is recommended that NMDOT perform an initial round of target setting through its TAMP development process. Interim modeling approaches may be needed depending on the timing of this effort and the management

system activities described in Initiative 2. From there, the process is ongoing, so that NMDOT can make adjustments to its measures, targets, and business process over time as its management system capabilities improve.

Preliminary Cost Estimate: Initial costs will be included in the TAMP development effort. Going forward, the costs will be largely internal.

Initiative 4. Develop a Process for Allocating a Portion of Pavement and Bridge Funds Based on Statewide Priorities

This initiative represents a fundamental shift in how NMDOT prioritizes and selects projects. Currently, the DOT allocates funds to the Districts based on a formula that considers population, network extent, and other characteristics. The Districts then allocate these resources based on local knowledge, engineering judgment, and local priorities. Earlier initiatives that address the use of management systems, and the development of targets that influence programming decisions will improve existing practices. This initiative goes further by envisioning a statewide prioritization process for at least a portion of the pavement and bridge budgets.

There are several options for statewide prioritization. Examples include:

- Separating major projects (for example, projects that exceed a defined cost threshold) for statewide prioritization.
- Identifying statewide priority corridors and focusing the statewide prioritization on these facilities.
- Generating work recommendations with pavement and bridge managements systems, providing them to the Districts, and giving the Districts the flexibility to determine which projects from the recommended list will be implemented.

Key activities for this initiative will include determining: 1) which portion of funding should be prioritized statewide versus at the District level; 2) if there should there be a transition period from the current approach to the new, statewide approach; and 3) how to strike a balance between a desire for optimal spending and maintaining some level of geographic equity between the Districts, while ensuring public safety.

Timing: 12 months

Preliminary Cost Estimate: Internal/consultant (medium)

Initiative 5. Improve Asset Management Communication and Documentation

This initiative addresses two themes that came out of the gap assessment. The first is a need to communicate asset management needs externally, and to explain the consequences of underfunding preservation activities. For example, what will pavements look like in ten years under current funding levels? How will

this impact the traveling public and the state's economy? How much money is required to maintain existing conditions? How much money is required to improve them?

The second theme is the desire to improve documentation on how funds are allocated and how the construction program is developed. Additional documentation will improve the transparency of the decision making processes, and provide accountability for how decisions are made and the results of these decisions.

As an initial step for this initiative, it is recommended that NMDOT develop a TAM communications plan. This plan should identify who requires TAM communication (Legislature, within the Agency, partners including MPOs and municipal agencies), the type of communication each stakeholder needs, the frequency of communication, appropriate communications channels, and key messages and talking points, and important data needs.

NMDOT will address a large part of its documentation need through the TAMP development effort. One of the overall goals of a TAMP is to document the asset management process.

Timing:

- Development of the communications plan – 2 months
- Implementation of the communications plan – ongoing
- Improved documentation – initially as part of TAMP effort and then ongoing

Preliminary Cost Estimate:

- Development of the communications plan – internal/consultant (low)
- Implementation of the communications plan – internal
- Improved documentation – addressed through the ongoing TAMP effort

Initiative 6. Improve Data Access, Sharing and Mapping

NMDOT has made recent advances in data and information systems related to asset management. In addition, it has several ongoing efforts aimed at further improving these resources. It is recommended that NMDOT build off these efforts to ensure that decision makers can easily access data and information needed to support asset management decisions.

This initiative includes the following activities:

1. Identify and document data and information needed to support the asset management process. What data is needed? How often? In what format? And by whom?
2. Once the new linear reference system (LRS) has been implemented, work to reference the key data sets identified in activity #1.

3. Develop a data governance plan that identifies responsibility for collecting, managing and updated core data items, defines a source of record for each item, and documents a data QA/QC process.
4. Develop a systems architecture that illustrates how core systems interact, and defines how systems should related to each other so that no additional geocoding is necessary when moving data from one system to another.
5. As new systems come on line, such as a new pavement management system and bridge management system, ensure that they are implemented in a way that supports the overall systems architecture.
6. Develop a web-based Geographic Information System (GIS) that enables staff to querying data from multiple sources and generate custom maps that combine inventory, condition, and project information.

Timing: 24 months

Preliminary Cost Estimate: Internal/consultant (high)

Initiative 7. Integrate Risk Management into the Asset Management Process

Decisions about what work to perform on an asset can be driven by a number of factors. Examples include condition thresholds, performance targets, policies and priorities, lifecycle cost considerations, crash and other safety data, project delivery considerations (e.g., work on drainage features while resurfacing a roadway), and risk considerations (e.g., strengthen bridges in a seismic zone). The objective of this initiative is to improve NMDOT's asset management process by integrating risk management into it.

This initiative entails developing a risk management process to account for agency-level and program-level risks related to asset management. It is recommended that NMDOT's initial TAMP include an initial risk register that identifies priority risks and defines mitigation strategies for them. This is an important first step. NMDOT will be able to use this register to communicate key risks and track mitigation efforts.

Longer term, NMDOT should develop a more comprehensive approach for considering risk in the asset management process. For example, NMDOT could evaluate funds required for priority risk mitigation strategies during the budgeting process. Another option is for NMDOT to consider risk when it prioritizes potential bridge and pavement projects, and/or when it defines investment strategies.

Initiative 7 entails the following steps:

1. Compile examples of how other agencies have incorporated risk into their asset management program.
2. Identify NMDOT's objectives and priorities for a risk management program.

3. Develop a custom risk management framework that meets these needs.
4. Implement the framework through subsequent planning and programming cycles.

Timing. Consistent with the TAMP development schedule, then ongoing

Preliminary Cost Estimate. Internal/consultant (medium) for steps 1 through 3

5.2 SUMMARY

Following is a summary of the initiatives described above, with an estimated start and end dates for each initiative. Taken collectively, these initiatives would enable NMDOT to make significant improvements to its asset management program over the next couple of years.

1. Develop a TAM Strategic Plan
   - Preliminary cost estimate – Low
   - Timing (months) – 2
   - Schedule notes – this should be the first activity
2. Enhance the Ability to Analyze Pavements and Bridges
   - Preliminary cost estimate – Medium
   - Timing (months) – 12
   - Schedule notes – These capabilities will support initiatives 3,4 and 5
3. Establish Performance Targets and Incorporate them into the Budgeting Process
   - Preliminary cost estimate – Indirect
   - Timing (months) – Consistent with FHWA rule-making process and TAMP schedule, the ongoing
4. Develop a Process for Allocating a Portion of Pavement and Bridge Funds Based on Statewide Priorities
   - Preliminary cost estimate – Medium
   - Timing (months) – 12
5. Improve Asset Management Communication and Documentation
   - Preliminary cost estimate – Low
   - Timing (months) – Consistent with the TAMP schedule, then ongoing
6. Improve Data Access, Sharing and Mapping
   - Preliminary cost estimate – High
   - Timing (months) – 24

7. Integrate Risk Management into the Asset Management Process
   - Preliminary cost estimate – Indirect
   - Timing (months) – Consistent with TAMP schedule, then ongoing