

# ***Transportation Asset Management (TAM) Plans including Best Practices: Synthesis***

**Prepared for  
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*Transportation Synthesis Reports (TSRs) are brief summaries of currently available information on topics of interest to WSDOT staff. Online and print sources may include newspaper and periodical articles, NCHRP and other TRB programs, AASHTO, the research and practices of other state DOTs and related academic and industry research. Internet hyperlinks in the TSRs are active at the time of publication, but host server changes can make them obsolete.*

## **Request for Synthesis**

WSDOT is developing a Transportation Asset Management (TAM) Plan. Pat Morin, Program Manager, Systems Analysis, in the WSDOT Capital Program Development Office requested information and examples of best practices in Transportation Asset Management Plans, including those with successful implementation and communication components. The Best Practices in TAMs identified in sources are state DOT's, regional, local agencies, and internationally are included as available. Those TAMs that were successful in terms of implementation and were well communicated are provided where information was available. Two examples of communicating TAMs programs are documents from the Montana Department of Transportation, [\*TranPlan21 Montana DOT 2008 Transportation Plan Brochure\*](#), and the City of Edmonton Alberta, Canada, [\*Thinking Outside the Gap: Infrastructure Strategy Report\*](#).

## **Databases Searched**

- TRID - A Transportation Research Database at the Transportation Research Board (TRB)
- Research in Progress (RiP) – A Database of Current Transportation Research at TRB
- Previous Synthesis Reports on WSDOT Research Website
- Google
- Wisconsin DOT Transportation Synthesis Reports
- Federal Transit Administration (FTA) website
- Federal Highway Administration (FHWA) website
- International Transportation and other Research Websites

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## ***State DOT Transportation Asset Management***

### **Colorado DOT**

#### ***CDOT Tiering Workshops December 14, 2011 & January 18, 2012***

Colorado Transportation Commission; PPP Slide Presentation; December 14, 2011 & January 18, 2012

Session 1: December 14, 2011 Workshop

What is Tiering?

Identification of various levels of priority for corridors or programs

- Each tier has expressed targets or standards for condition and/or service level.
- Criteria for tiering relate to overall system goals and objectives.
- To best allocate limited resources.
- To best address volatile revenues.
- How to allocate sudden, one-time inflows (e.g. ARRA).
- How to allocate when there are large fluctuations from year to year.
- To prioritize allocations
- How and when to shift priorities.
- How to make prioritization and flexibility compatible.
- To define performance goals for the system

Session 2: January 18, 2012 Workshop, Presented by: Scott McDaniel

- Review of current CDOT practices regarding tiering
- Potential approaches for tiering
- Discussion of scenarios for further development

[http://www.coloradodot.info/programs/statewide-planning/documents/stac-meeting-materials/stac-2012/STACTiering\\_Workshop-Feb2012%20FINAL.pdf](http://www.coloradodot.info/programs/statewide-planning/documents/stac-meeting-materials/stac-2012/STACTiering_Workshop-Feb2012%20FINAL.pdf)

#### ***Asset Management Implementation Plan and Tiered System Process 2001-2013***

Author(s) Michael J. Markow, PE (CS); Joe Racosky, PE (BRW); Cambridge Systematics, Cambridge, MA; BRW, Inc., Denver, CO; Colorado Department of Transportation (CDOT); 2001

Abstract

This study has developed a five-year transportation asset management plan for the Colorado Department of Transportation (CDOT). This study has also developed a proposed tiering structure of the

state highway system to support asset management. Asset management represents a strategic approach to managing transportation infrastructure. It embodies a set of principles to improve how an agency conducts business, how it reaches decisions, and how it processes, uses, and communicates information. CDOT, in consultation with the Colorado Transportation Commission, has already taken a number of steps toward improved asset management. A unique Investment Category approach organizes program investments within a policy-oriented framework incorporating explicit measures of performance. Other steps taken by CDOT include updates of the statewide planning process and the program prioritization process, establishment of maintenance program levels of service, institution of customer surveys, and updates of relevant information technology applications. The recommended transportation asset management plan builds upon these established concepts, methods, information, and tools to propose specific actions over the next five years in the following areas: (1) completion of all elements of the Investment Category structure; (2) incorporation of asset management principles in CDOT's planning and programming processes, building on a tiered structuring of CDOT assets that has also been recommended in this study; (3) integration of asset management information on a GIS platform, and renewal of Information Technology strategic planning to support asset management department-wide; and (4) strengthening of program delivery mechanisms and measures. The recommended tiering of the state highway system is built around the concept of interregional corridors, because CDOT is the sole provider of significant interregional highway transportation.

<http://www.coloradodot.info/programs/research/pdfs/2001/assetmanagement.pdf/view>

## **Connecticut DOT**

### ***Applying Transportation Asset Management in Connecticut***

Nicholas Lownes, PhD, Study Manager, Adam Zofka, PhD, Study Manager, The Connecticut Academy of Science and Engineering; For The Connecticut Department of Transportation; December 2008

#### **Abstract**

The study consists primarily of a detailed review of those states that utilize transportation asset management systems that may be applicable for Connecticut's consideration, and includes as well the identification of a comprehensive pavement life-cycle analysis tool. The primary conclusion of this study is that, across the United States, states are finding the shift to Transportation Asset Management Systems worthwhile and productive; as they are steadily seeing the condition of their assets improve and their resource allocation decisions galvanizing around an increasingly coherent vision for their transportation infrastructure. The findings indicate that ConnDOT should consider utilizing five concepts (Clarity, Communication, Champion, Consistency, and Comprehensive), the 5Cs, as a strategy for TAM implementation. The 5Cs provide a focus for ConnDOT's development of a sustainable TAM program to guide the state's investment in the acquisition, construction, repair, and preservation of the state's transportation assets.

<http://www.ct.gov/dot/LIB/dot/documents/dresearch/CT-2258-F-08-9.pdf>

## **Florida DOT**

### ***Florida's Transportation Asset Management Program***

Florida's Asset Management PPP Slide Presentation; FLDOT; 2011

Florida's Asset Management Program is:

- Process Policy-Driven –
- Strong statutory policy framework –

- Preservation/Capacity program tradeoffs made at the policy level supported by Data – Management Systems –
- Performance-Based programming and budgeting -
- Systematic approach to decision making –
- Continuous Cycle approach including evaluation and feedback

<http://www.transportation.org/sites/planning/docs/planning%20mon/Llort-SCOP%20asset%20management.pdf>

## **Florida Turnpike Enterprise**

### ***Florida's Turnpike Enterprise's Answer to Asset Management***

D. L., Blake, PBS&J, Ocoee, FL; IABMAS'10 Proceedings of the Fifth International IABMAS Conference, Philadelphia, USA, 11-15 July 2010; Edited by Dan M. Frangopol, Richard Sause, and Chad S. Kusko; CRC; Taylor & Francis Group, London, Print ISBN: 978-0-415-87786-2 eBook ISBN: 978-0-415-89137-0; 2010

This paper explains how the Turnpike Enterprise Asset Management System (TEAMS) has been implemented at the Florida Turnpike Enterprise.

#### **Abstract**

Florida's Turnpike Enterprise has an application called the Turnpike Enterprise Asset Management System, or TEAMS as it is commonly referred. The mission of TEAMS is to provide an improved approach to management and preservation of infrastructure assets, to protect bondholder investment, and sustain system performance. TEAMS was developed as a web-based computerized means to catalogue Florida's Turnpike Enterprise's assets, evaluate current conditions, predict time to renewal and replacement, and develop appropriate periodic maintenance budgets. The system resides in centralized servers and users access it via the Florida's Turnpike Enterprise Intranet using a graphical web browser interface. The system is comprehensive, customizable, user friendly and compatible with other legacy systems currently in place. The asset management system gives Florida's Turnpike Enterprise a highly efficient means of identifying, tracking, and maintaining the performance history of right-of-way assets, generates lists of detailed periodic maintenance needs, and develops renewal and replacement budget forecasts at the user's desktop.

This paper focuses on how asset management principles have been implemented at Florida's Turnpike Enterprise in the form of the TEAMS application. Discussion will start with the history of Florida's Turnpike Enterprise, lead to the early stages of asset management at the agency, and then to the development of the asset management system. Afterwards the current state of TEAMS and an analysis of its future at Florida's Turnpike Enterprise will be discussed.

<http://www.crcnetbase.com/doi/abs/10.1201/b10430-171>

### ***What is the Florida Turnpike Enterprise? Innovation Breeds Success***

Florida's Turnpike Enterprise; FTE Website; 2012

An innovative experiment combining the best of both the government and business worlds, Florida's Turnpike Enterprise utilizes the best practices of the private sector while operating in the public interest. Operating as a separate business unit of the Florida Department of Transportation (FDOT), Florida's Turnpike has expanded and increased revenue, while continuing to protect bondholders and improve customer service across the board. The results have been improved efficiency, cost-effectiveness and timely project delivery.

Over the past 12 years, Florida's Turnpike has made substantial improvements to the existing road system, acquired and assumed responsibility for a project completed by a local expressway authority, delivered six expansion projects, contracted most in-house functions to the private sector, promoted customer service, maintained financial stability and improved bond ratings.

Florida's Turnpike is now responsible for all operations on every FDOT-owned and operated toll road and bridge. This represents about 600 miles of roadway and 80 percent of all toll facilities in Florida. Florida's Turnpike strives to ensure every customer who travels these toll roads and bridges receives first class service on every trip.

[http://www.floridasturnpike.com/about\\_enterprise.cfm](http://www.floridasturnpike.com/about_enterprise.cfm)

<http://www.floridasturnpike.com>

#### ***Florida Turnpike Enterprise 50 Year Celebration Folio***

Florida Turnpike Enterprise and Florida Department of Transportation; FTE Website; 2007

. . . The last 50 years of Florida's Turnpike were built upon a solid foundation of constructing, widening, and improving facilities to meet the insatiable demand of Florida's residents, businesses, and visitors. The next 50 years of Florida's Turnpike will be marked by major investments in technology and a broader distribution of user-financed transportation products throughout the state. In 20 years, paying tolls with cash on Turnpike roads will be a thing of the past as the Turnpike becomes all electronic, and toll roads and interchanges constructed in the future will not accommodate cash transactions. . .

<http://www.floridasturnpike.com/downloads/50thBookFinal.pdf>

#### ***Florida Turnpike Association Asset Management Process PPP Slide Presentation Asset Management: Big & Small***

Moderator: Bill Thorp, Florida's Turnpike Enterprise; Bo Sanchez, PBS&J; Dave Dennis, KPMG, LLC; PPP Slide Presentation; IBTTA.org; 2010

[http://www.ibtta.org/files/PDFs/Dennis\\_Sanchez%20%5BRead-Only%5D.pdf](http://www.ibtta.org/files/PDFs/Dennis_Sanchez%20%5BRead-Only%5D.pdf)

#### ***Florida's Turnpike Enterprise: Operational and Institutional Impacts of the Integration of a Computerized Maintenance Management System and Asset Management System***

Florida Turnpike Enterprise and Florida DOT, PPP Presentation Asset Management; TRB.org; 2007

<http://onlinepubs.trb.org/onlinepubs/archive/conferences/preservation-asset/presentations/11-1-Cerasari.pdf>

### **Georgia DOT**

#### ***Best Practices in Selecting Performance Measures and Standards for Effective Asset Management***

Author(s): Adjo Amekudzi, Ph.D., Michael Meyer, Ph.D., P.E., Georgia Tech Research Corporation, Georgia Institute of Technology, School of Civil and Environmental Engineering Atlanta, GA; Georgia Department of Transportation; June 2011

Abstract:

This report assesses and provides guidance on best practices in performance measurement, management and standards setting for effective Transportation Asset Management (TAM). The study is conducted through a literature review, a survey of the 50 state DOTs, an internal assessment of Georgia Department of Transportation's TAM capabilities and performance measurement and management procedures, and a review of risk applications in TAM with a case study demonstrating the impacts of uncertainty on project prioritization. The study isolates three generations of agencies as far as performance management is concerned. The study recommends conducting a review of GDOT's

performance measurement and management process and procedures using current standards; benchmarking against similar and more mature state agencies; developing metrics for evaluating progress toward strategic goals; linking performance metrics with resource allocation decisions; developing analytical and data capabilities for evaluating tradeoffs in resource allocation decision making; refining measures for use in broad agency functions; refining performance communication tools; addressing uncertainties in performance metrics and management in TAM, and upgrading existing performance procedures and capabilities to meet state audit requirements.

[http://www.dot.state.ga.us/doingbusiness/research/projects/Documents/0903\\_Asset\\_Mgt.pdf](http://www.dot.state.ga.us/doingbusiness/research/projects/Documents/0903_Asset_Mgt.pdf)

## Indiana DOT

### ***Transportation Asset Management: The Indiana Experience***

FHWA and INDOT; FHWA Website; 2006

The TAM case study series is the result of partnering between State departments of transportation and the Federal Highway Administration's (FHWA's) Office of Asset Management. FHWA provides the forum, and the States furnish the details of their experiences with asset management. For each case study, FHWA representatives interview State transportation staff and compile the information, and the State approves the resulting material. Thus, the case study reports rely on the agencies' own assessment of their experience. Readers should note that the reported results may not be reproducible in other organizations. The focus of this case study features Indiana's experience.

. . . Overall, Indiana has made great strides in developing its asset management program since the inception of HERS-IN in 1998. The following are some of the highlights:

- **Fiscally-Constrained Long-Range Transportation Plan (LRTP).** The plan provides a footprint for highway capacity improvements and the distribution of Federal and State funds over the next 25 years.
- **Route Concept Reports.** These urban Interstate reports help determine when major reconstruction projects will be needed and how adding travel lanes will reduce disruptions to motorists. Route concept reports build upon the HERS-IN analysis by providing additional details such as route characteristics, data from original construction and subsequent projects, additional pavement history data, socio-economic data, field check findings, a listing of existing projects/scheduled improvements, and estimated project costs.
- **Planning Studies.** INDOT is conducting a series of planning studies that have system-wide impacts to various highway facilities. They include an access management study and a statewide interchange planning study.

Major Moves Criteria for Highway Projects:

1. Cost Effectiveness Index
2. Corridor Completion
3. Road Classification
4. Mobility
5. Intergovernmental Agreements
6. Safety Criteria
7. Economic Development Criteria
8. Customer Input Criteria
9. External Funding of Projects (Earmarks)

- 10. Bypass Project Selection Criteria
- 11. Urban Revitalization

The biggest accomplishment . . . is finalization of the 10-year production/construction plan known as *Major Moves*. Introduced in May 2006, this subset of the INDOT LRTP is the first completely funded 10-year plan in INDOT's history. The *Major Moves* plan was developed using INDOT's May 2005 initiative for prioritizing highway construction projects. The rating system is based on 11 critical criteria, including a project's potential for contributing to economic growth. HERS-IN was utilized to rank the Major Moves projects.

<http://www.fhwa.dot.gov/infrastructure/asstmgmt/csin06.pdf>

## **Michigan DOT**

### ***Michigan DOT - Asset Management***

Asset Management at MDOT; MDOT Asset Management Website; March 2012

Asset management is a process to strategically manage our transportation system in a cost-effective and efficient manner.

It consists of five major elements:

1. Developing policy goals and objectives.
2. Data collection.
3. Planning and programming.
4. Program delivery.
5. Monitoring and reporting results.

[http://www.michigan.gov/mdot/0,4616,7-151-9621\\_15757---,00.html](http://www.michigan.gov/mdot/0,4616,7-151-9621_15757---,00.html)

### ***Introduction: Transportation Asset Management at the Michigan Department of Transportation***

Michigan DOT; TAM Brochure; MDOT Website; 1999

(MDOT) is responsible for overseeing and maintaining a vast infrastructure. MDOT customers are Michigan's residents, businesses and visitors who expect transportation professionals to manage transportation assets in an effective, efficient and reliable manner. They rely on us to be good stewards of the resources entrusted to us. MDOT accomplishes this through a process known as asset management. The asset management process is predicated on the principles of stewardship of public resources, accountability to customers and continuous improvement. It is based on managing for results by focusing on performance.

As noted by the organization, National Performance Review, "Most public managers work in environments that have echoed for years with rising demands for performance, accountability, and results. Citizens and elected officials are demanding tangible returns on the dollars they invest. Managers at every level of the intergovernmental system are moving toward improved accountability by managing for results."<sup>2</sup>

As good stewards, we can no longer be content to simply account for assets. Rather, we must aggressively ensure proper use and performance of those assets. This booklet introduces you to MDOT's transportation asset management process. It will show you that asset management is the way we do business!

[http://www.michigan.gov/documents/introsources\\_16533\\_7.pdf](http://www.michigan.gov/documents/introsources_16533_7.pdf)

***Historical Background: Transportation Asset Management at MDOT***

Michigan DOT; Asset Management Brochure; MDOT Website; 2000

Brochure provides historical perspective of Asset Management at MDOT and communicates current activities.

[http://www.michigan.gov/documents/historical\\_16503\\_7.pdf](http://www.michigan.gov/documents/historical_16503_7.pdf)

***Implementing the Program: Transportation Asset Management at MDOT***

Michigan DOT; Asset Management Brochure; MDOT Website; 2001

Brochure provides information on how MDOT Implements TAM

Implementation involves getting done what you intended to do. MDOT's goal is to let the construction program within the first six months of a fiscal year. For MDOT to achieve identified goals and objectives, construction activities must be kept in line with the overall strategic plans.

[http://www.michigan.gov/documents/implement\\_16596\\_7.pdf](http://www.michigan.gov/documents/implement_16596_7.pdf)

**Minnesota DOT**

***Minnesota Comprehensive Freight and Passenger Rail Plan***

2010 Transportation Planning Excellence Awards Award Winners: Categories: Freight Planning, Planning Leadership, and Public Involvement and Outreach; FHWA and FTA 2010 Transportation Excellence Awards; FHWA Website; 2010

In 2008, the Minnesota Legislature and Governor charged the Minnesota Department of Transportation (MnDOT) with the task of creating a Statewide Comprehensive Freight and Passenger Rail Plan, through an open public process, to be amended to the Minnesota State Transportation Plan upon adoption. The resulting plan, the Minnesota Statewide Comprehensive Freight and Passenger Rail Plan, was one of the very first State rail plans in the Nation to be developed with Passenger Rail Improvement and Investment Act of 2008 (PRIIA) requirements and principles integrated into the scope and work plan. The public outreach associated with the development of the plan, which included industry, shipper, traveler, labor, and other stakeholder input, was conducted at an unprecedented level. Over 150 organizations and individuals had an active role in the Plan's advancement through participation in forums, steering committees, technical advisory committees, and open houses. The evolution and outcome of the Plan was directly influenced by the public's extensive involvement in these various activities. . .

<http://www.fhwa.dot.gov/planning/tpea/tpea2010winner.htm#mnrailplan>

**Missouri DOT**

***MoDOT's Smooth Roads Initiative Program***

Transportation Invest In Our Future - State DOT Performance Management Programs: MoDOT Report of the Performance Based Highway Program Task Force to the National Surface Transportation Policy and Revenue Study Commission; AASHTO; 2007

Missouri tracks the condition of their existing major and minor roads as well as bridges on major and minor roads. This is an important measure because Missourians have indicated in customer surveys that the condition of the system should be of the highest priority. In response, Missouri's Smooth Roads Initiative (SRI) program recognized the relationship between pavement performance, quality and

customer satisfaction. The SRI focused important resources to 2,200 miles of Missouri's most heavily traveled highways in order to bring them to "Good" condition.

## **Montana DOT**

### ***MDT Asset Management***

Montana Department of Transportation; MDOT Asset Management Website; 2012

The Montana Transportation Commission and Montana Department of Transportation (MDT) use a transparent, data-driven asset management process to distribute limited funding to address highway improvement needs on Montana's major highways.

Based on overall policy goals and actions established through TranPlan 21, Montana's statewide transportation plan, the Performance Programming Process (P3) uses safety, congestion, bridge, and pavement data from MDT's management systems to help the Commission and MDT determine the most cost-effective distribution of Federal and State funding to highway systems and improvement categories. MDT's District Administrators then propose projects, based on public input, that conform to these overall funding distribution decisions.

The public has an additional opportunity to comment on proposed projects through the annual Statewide Transportation Improvement Program (STIP), a five-year list of projects. Finally, MDT adjusts the schedule of projects through the Tentative Construction Program (TCP) annually to reflect funding constraints or delays in project development.

MDT also uses information from its management systems and input from the public during the development of Corridor Planning Studies.

[http://www.mdt.mt.gov/pubinvolve/active\\_projects.shtml](http://www.mdt.mt.gov/pubinvolve/active_projects.shtml)

### ***TranPlan21 Montana DOT 2008 Transportation Plan Brochure***

Montana DOT; MDT Asset Management Website; 2012

Montana's Multimodal Transportation Plan, 2008

[http://www.mdt.mt.gov/pubinvolve/docs/tp21\\_brochure.pdf](http://www.mdt.mt.gov/pubinvolve/docs/tp21_brochure.pdf)

## **New Jersey DOT**

### ***New Jersey Asset Management Plan: Asset Management Decision Support System Model***

William Robert, Dmitry Gurenich, Jocelyn Hoffman. Cambridge Systematics, Inc.; 2010

#### **Abstract**

The objective of this research effort was to assist the New Jersey Department of Transportation (NJDOT) Office of Capital Investment Strategies (CIS) in developing an asset management decision support model for use in its resource allocation decisions. This effort both integrates with and builds off of NJDOT's existing asset management program.

Best practices in asset management were first reviewed followed by an assessment of asset management systems currently in place at NJDOT. These findings helped the research team formulate an appropriate decision support model that would inform NJDOT's project prioritization strategy and assist the NJDOT in its cross-asset resource allocation decisions.

The result of this research effort is an asset management decision support model that calculates the utility for a user-specified project. The model specifies how NJDOT should use asset management data

and systems to support integrated high-level resource allocation decisions and also focuses on how to use available data to prioritize identified problems (also termed “candidate projects” or “project alternatives” in this report), as well as planned projects.

[http://www.state.nj.us/transportation/about/asset/pdf/final\\_dsm.pdf](http://www.state.nj.us/transportation/about/asset/pdf/final_dsm.pdf)

## North Carolina DOT

### ***Asset Management at NCDOT***

NC DOT, Division of Highways; NCDOT Asset Management Website; 2012

#### Asset Management

- Recommends to the Board of Transportation the distribution of Maintenance and Resurfacing Funds across 14 Divisions and 100 counties.
- Manages and supports the following central units:

##### Bridge Management Unit

- Responsible for the inspection, analysis, inventory, and administration of maintenance policies and procedures for all structures on the State Highway System.

##### Fleet and Material Management Unit

- Supports NCDOT's equipment and material needs for the operation of the state's transportation system.

##### Pavement Management Unit

- Provides adequate and economical designs for new pavements and rehabilitation designs. Maintains records of pavement history, service life, skid, profile, features and conditions of existing paved roadways.

##### Secondary Roads Unit

- Maintains the inventory of secondary roads, as well as paved and unpaved roads, on the NCDOT system. Manages priority status for unpaved roads to be paved and responds to the public's inquiries regarding additions and deletions of roads to the state-maintained system.

##### State Road Maintenance Unit

- Implements and manages programs for maintaining roads on the NCDOT system.

<http://www.ncdot.gov/doh/>

### ***Laying the Foundation for a Successful Transformation: North Carolina Department of Transportation***

Transformation Management Team: Final Report McKinsey & Company; North Carolina Department of Transportation; Volume Eight; October 2007

. . . This report is written as a recap of the diagnostic and transformation effort. As a backdrop, the report begins with a brief discussion of the project objective and the project approach. It then discusses the diagnostic findings that created the fact base upon which the transformation program was built; the five transformation initiatives, describing plans, progress, and next steps for each; and overall next steps. Appendix A provides additional detail on the diagnostic, and Appendix B provides additional detail on the transformation initiatives.

Considering the complexity of the NCDOT organization, it is important to note that the report must be considered in its entirety, including the two appendices. This material, while thorough, does not represent the totality of our transformation capacity building or contribution. It also reflects efforts

while McKinsey was present. It does not reflect the ongoing evolution and progression of NCDOT's transformation efforts planned for the next 12 to 18 months.

<http://www.ncdot.org/download/performance/Volume8.pdf>

## **Oregon DOT**

### ***Oregon DOT Strategic Asset Management Plan***

ODOT, 2010 Update – Approved May 2011; May 2011

The ODOT Transportation Integrated Asset Management Plan combines three plans into one. What were once separate documents, a Strategic Plan, Implementation Plan and Communication Plan, now one integrated document, superseding these three previously approved in 2006. This document serves as a blueprint to guide systematic Asset Management efforts at the Oregon Department of Transportation (ODOT). As such, it includes an Executive Summary, a Strategies section, an Implementation section, a Communications section and a Technology Strategy. Appendices include the approved Asset List, Decision Diagram, Guidelines and the current Work Plan. It should be noted that ODOT's asset list is long, but the current emphasis will remain on the assets and features that make up the state transportation system, beginning with the highway system.

[http://www.oregon.gov/ODOT/TD/asset\\_mgmt/docs/Plans/04-AMSP-10-111711\\_FINAL.pdf](http://www.oregon.gov/ODOT/TD/asset_mgmt/docs/Plans/04-AMSP-10-111711_FINAL.pdf)

## **PENN DOT**

### ***Transportation Asset Management Case Studies Data Integration: The Pennsylvania Experience: How Did PENNDOT Get There?***

Federal Highway Administration; FHWA Asset Management Website; 2011

#### **Overall Approach**

PENNDOT is simultaneously implementing top-down and bottom-up approaches to data integration. The central component of this process is a series of projects to update the department's highway, bridge, and maintenance management practices, and the legacy systems that support them. From the top, strategic guidelines drive these business process improvements. This approach will help ensure that the ensuing management systems are all compatible with one another from a business process point of view. At the same time, PENNDOT is working on the technical mechanisms required to integrate individual data items from the improved systems. This work will help ensure that PENNDOT is able to combine data and analytical results from the updated management systems and provide the integrated information to decision makers across the department.

<http://www.fhwa.dot.gov/infrastructure/asstmgmt/dipa05.cfm>

### ***Transportation Asset Management Case Studies: Data Integration: The Pennsylvania Experience: What Has PENNDOT Learned?***

Federal Highway Administration; FHWA Asset Management Website; 2011

#### **Asset Management Implementation**

When managing a transportation network as large as PENNDOT's, there are several opportunities to improve efficiency by applying the principles of Asset Management.

Agencies should not wait until their entire wish list of rigorous and sophisticated analysis tools are in place before implementing Asset Management.

The ability to track some measure of customer satisfaction can be helpful in a variety of decision making contexts.

For a large agency such as PENNDOT, a department-wide champion for Asset Management may be advisable to provide vision and day-to-day encouragement for timely implementation of Asset Management.

<http://www.fhwa.dot.gov/infrastructure/asstmgmt/dipa07.cfm>

## Utah DOT

### ***Asset Management Manual of Instruction (MOI)***

Utah Department of Transportation; UTDOT Website; March 2012

Contents:

- Cross Asset Prioritization
- Safety Index
- Pavement Condition & Planning Statistics Data Collection
- Pavement Management
- The Pavement Management web page has additional information and links to our dTIMS pavement condition modeling and pavement condition information.
- Bridge Management

Transportation asset management is a strategic approach to managing the existing transportation infrastructure. It promotes more effective resource allocation and utilization, based upon quality information, to address facility preservation, operation, and improvement. This concept covers a broad array of UDOT functions, activities, and decisions: e.g., transportation investment policies and priorities; relationships and partnerships between UDOT and public and private groups; long-range, multimodal transportation planning; program development for capital projects and for maintenance and operations; delivery of agency programs and services; and real-time and periodic system monitoring and data processing. All of these actions are accomplished within the limits of available funding.

<http://www.udot.utah.gov/main/f?p=100:pg:0:::1:T,V:982>

## Virginia DOT

### ***VTrans2035: Virginia's Long-Range Multimodal Transportation Plan: Report to the Governor and General Assembly***

Prepared for: Commonwealth Transportation Board; Prepared by: Office of Intermodal Planning and Investment; VDOT; January 2010

Stewards of Assets

How Virginia is doing in terms of transportation can be identified by reviewing current assets, noted in the *VTrans2035 Transportation in Virginia Report*, and performance, identified in the *Transportation Performance Report – 2007*. Both reports, as well as the recently released *Transportation Performance Report – 2008*, are available on the OIPI's website ([www.vtrans.org](http://www.vtrans.org)).

. . . Stewardship of Assets

Virginia's transportation agencies are stewards of a vast array of transportation assets. This responsibility is becoming increasingly challenging as financial and staff resources are shrinking. Virginia's extensive multimodal system includes the third largest state-maintained highway system in

the nation, two Class I railroads, 9 Class III railroads, two intercity rail passenger services, 59 public transit systems (bus, rail, and ferry) including two major regional transit systems, 56 human service transportation systems, 18 transportation demand management agencies, the third largest port on the East Coast, 66 public-use airports, and 7 ferry services. Exhibit 3 provides a look at Virginia's transportation system at a glance. . .

[http://vtrans.org/resources/VTrans\\_2035\\_Report.pdf](http://vtrans.org/resources/VTrans_2035_Report.pdf)

## **Washington State DOT**

### ***Transportation Invest In Our Future - State DOT Performance Management Programs: Select Example: WSDOT***

Report of the Performance Based Highway Program Task Force to the National Surface Transportation Policy and Revenue Study Commission; AASHTO; 2007

WSDOT's Lowest Life Cycle Cost Management Approach to Pavement

The Washington State Department of Transportation (WSDOT) annually assesses pavement conditions as part of the department's asset management program. WSDOT uses a combination of pavement ratings to determine when pavement is due for rehabilitation, based on Lowest Life Cycle Cost (LLCC) management. Pavement performance measures used to make specific investment decisions include structural condition (PSC), rutting condition and roughness (International Roughness Index [IRI]). WSDOT also measures the relationship between vehicle miles traveled (VMT) and pavement condition. WSDOT's combined pavement rating for 2005 shows that 93.5 percent of all pavement is in "Good" condition.

<http://www.transportation1.org/tif6sreport/managment.html>

## ***US County and Regional Transportation Asset Management Plans***

### **Cole County, Jefferson City, Missouri**

#### ***FHWA Current Practices in Transportation Asset Management: Cole County, Jefferson City, Missouri***

From Federal Highway Administration, Asset Management Overview, Current Practices in Transportation Asset Management; FHWA Website; 2012

Cole County, Jefferson City, Missouri

The Cole County Public Works Department has cited two reasons for moving toward asset management. The first was the agency's dependence on the experiences and memories of its workers. As workers aged and retired, the county's management information systems were literally walking out the door. Asset management provided tools that could be used to capture some of that information before the workforce retired. The second reason, which is frequently reported by agencies, was the county's need to comply with the provisions of GASB Statement 34. The new accounting rules highlighted the importance of assets and provided an opportunity to improve management procedures while meeting the reporting requirements . . .

[http://www.fhwa.dot.gov/asset/if08008/amo\\_06.cfm](http://www.fhwa.dot.gov/asset/if08008/amo_06.cfm)

#### ***Cole County/Jefferson City Missouri Natural Hazard Mitigation Plan 2011***

Prepared by: Mid-Missouri Regional Planning Commission, Ashland, MO; 2011

Plan updates available online at [www.mmrpc.org](http://www.mmrpc.org)

## Hillsborough County, Florida

### ***FHWA TAM Case Studies: How Did Hillsborough County Implement its Asset Management Program?***

Transportation Asset Management Case Studies: Economics in Asset Management, the Florida Experience; FHWA TAM Website; 2011

#### Overall Approach

In 1997, the Public Works Department assembled two management teams to launch its Asset Management program, focusing initially on creating comprehensive inventories of the department's infrastructure assets. Three asset categories were defined:

Roadway: Traffic devices, pavements, markings, lighting, bridge and intersection infrastructure, signals, poles, etc.; Road-edge: Sidewalks, shoulders, curbs and gutters, inlets, driveways; and Roadside: Stormwater pipes, ditches, vegetation, boundaries, topography.

One team, consisting of Public Works Department staff from its Engineering, Transportation Maintenance, and Traffic Divisions, was charged with establishing the scope of services for contracts to develop inventories of the first two categories (collectively referred to as the "Roadway Asset Inventory"). The department's Engineering Division's Stormwater Management Section was charged with developing a separate scope of services for the stormwater and drainage asset inventory contract (the "Stormwater Asset Inventory").

#### Establishing the Inventories

The goal for establishing the inventories was not only to number and locate the infrastructure assets, but also to develop a condition assessment for each of these assets. To accomplish this feat, the scopes of services for the roadway and stormwater asset inventories required the use of innovative, state-of-the-art data collection techniques. . .

<http://www.fhwa.dot.gov/infrastructure/asstgmt/difl06.cfm>

### ***Infrastructure Asset Management in Hillsborough County, Florida***

Michael N. Maltezos, Hillsborough County Public Works Department, Tampa, FL; Proceedings of the 2009 Mid-Continent Transportation Research Symposium, Ames, Iowa, August 2009; Iowa State University; 2009

#### Abstract

The American Society of Civil Engineers (ASCE) 2009 Report Card for America's Infrastructure offers an assessment of the state of our nation's infrastructure, with grades based on the most up-to-date information available. . .

. . . The desired outcome from the development and publication of this Infrastructure Report Card is for the state legislature and U.S. Congress to allocate funding for state infrastructure at levels that meet the need identified by this Report Card, to support infrastructure funding that promotes economic growth and a high quality of life in local governments throughout the state, and to obtain Florida voter support for infrastructure funding initiatives and fees. In Hillsborough County, Florida, the Public Works Department performed analyses and developed recommendations to "Raise the Grade" in each applicable infrastructure category. As such, we have developed and initiated an Asset Management Program in accordance with GASB 34. Ottawa, ON This initiative encompasses the areas of operations

and maintenance (O&M) and overall asset management planning and will be measured to improve the “whole life” cycle of assets.

<http://www.intrans.iastate.edu/pubs/midcon2009/MeltezosInfrastructure.pdf>

***Selecting & Implementing a Comprehensive Asset Management System: Hillsborough County, FL***

Celine A. Hyer, Associate, Malcolm Pirni Engineers, Tamp, FL; Article presented as a technical paper at the AWWA/WEF Joint Management Conference in February 2006 and at the Florida Water Resources Conference; April 2006.

. . . WRS worked with the bond engineer to formulate an advanced asset management strategy that included design and procurement of an enterprise-wide, sophisticated computerized maintenance management system (CMMS) as the heart of a larger CAMS. This article outlines the strategic planning, design, procurement process, and ongoing implementation process for CAMS at Hillsborough County WRS . . .

**Strategic Planning**

Implementing a philosophy of asset management at a utility the size of Hillsborough County can be an overwhelming task. To begin the process, WRS formulated goals for the project that would tie into its mission statement: “The mission of WRS is to produce, treat, and deliver quality potable water; to collect and treat wastewater and distribute reclaimed water in unincorporated Hillsborough County. The mission includes providing these services in conformance with state, and federal regulations in an environmentally sensitive, cost conscious manner utilizing contemporary quality processes to meet customer requirements.” Everyone saw that asset management tied into the cost-effective management of the assets from the existing mission statement, so no changes would be needed in the statement. On the other hand, the processes necessary to carry out this mission, including optimizing maintenance costs and renewal and replacement programs, as well as providing the performance data, would have to be included into the new CAMS. The following goals were also specifically set for the system so that staff had a clear direction as the project progressed:

- 1) Provide organization-wide systems developed, suited, and used by all sections and teams.
- 2) Define and inventory all WRS assets.
- 3) Maintain current asset information, including maintenance data.
- 4) Report asset information in a useful format for various management needs, including tracking performance.
- 5) Identify short-term (two to 10 years) and long-term (10 to 50 years) R&R needs and funding strategies.
- 6) Assist WRS in complying with upcoming CMOM regulations.

**Evaluating Current Systems**

As a beginning step in determining the Hillsborough County asset management system philosophy and implementation plan, the functionality of WRS’s existing IT systems was reviewed. . .

[http://www.fwrj.com/TechArticle07/0407%20FWRJ\\_t4.pdf](http://www.fwrj.com/TechArticle07/0407%20FWRJ_t4.pdf)

**Grand Valley Metropolitan Council in Grand Rapids, MI**

***The Evolution of GVMC’s Pavement Management Data Collection System***

Grand Valley Metropolitan Council, Grand Rapids, MI; <http://www.gvmc.org/transportation> Website; 2012

What is a Pavement Management System?

Grand Valley Metro Council's Pavement Management System (PaMS) is a tool that enables local and state transportation officials to make better, more efficient use of resources, save time and make more informed decisions about which repairs to use on our region's roads and bridges and when to use them. The cost of repairs to a road or bridge skyrockets if they are not performed at the appropriate time. It is therefore less expensive and more efficient to keep good roads and bridges in good shape.

GVMC's new, advanced technology PaMS will help decision makers at area cities and villages, the Kent and Ottawa County Road Commissions (on behalf of area townships) and the Michigan Department of Transportation select the proper repair treatment and apply it at the appropriate time.

As the Metropolitan Planning Organization (MPO) for the Grand Rapids metropolitan area, the GVMC uses a collaborative, cooperative process to leverage federal transportation dollars and share equipment and operational costs among the MPO members. That saves money for our region's taxpayers.

[http://www.gvmc.org/transportation/documents/PaMS\\_Fact\\_Sheet.pdf](http://www.gvmc.org/transportation/documents/PaMS_Fact_Sheet.pdf)

## **Kent County Road Commission, Michigan**

### ***Kent County Road Commission's Asset Management Program***

Steve Warren, Deputy Director; Presentation, Kent County Roads Commission (KCRC); 1996

So who isn't dealing with the challenges of a rapidly deteriorating road system and inadequate revenues to handle the job? My guess is very few. Instead, most of us find ourselves with the dilemma of having to make tough choices between large numbers of immediate needs regardless of the long-range implication those investments represent. . .

. . . Establishing an annual investment target for preservation allows KCRC to more accurately estimate funds available for other needed improvements. This proves to be very valuable during the annual budget process when the KCRC Five-Year Road Improvement Program is updated. As part of the update cycle, investment targets for road preservation work are established for each of the five years consistent with achieving the long-range goal for system condition. Investment levels for intersections and bridges are likewise established. Candidate reconstruction and capacity improvement projects are then prioritized according to existing and projected traffic, functional classification, and availability of federal and/or state grants. Typically, these higher cost projects are either included or drop out based upon the availability of funds after the other investment targets are accounted for in the five year program.

<http://www.kentcountyroads.net/downloads/PPJ.pdf>

## **Ohio-Kentucky-Indiana Regional Council of Governments**

### ***Case Study: The Ohio-Kentucky-Indiana Regional Council of Governments Experience***

FHWA Transportation Asset Management; FHWA TAMS Website; 2012

The Transportation Asset Management Case Study Series is the result of a partnership between State departments of transportation, local government agencies, and the Federal Highway Administration's (FHWA's) Office of Asset Management. FHWA provides the forum from which to share information, and the individual States and local government agencies provide the details of their experiences. For each case study report, State or local government agency transportation staffs were interviewed by FHWA, and the State or local government agency approved the resulting material. As such, the case studies rely on the agencies' own assessment of their experience. Readers should note that the reported results may or may not be reproducible in other organizations.

<http://www.fhwa.dot.gov/infrastructure/asstmgmt/wsoki0701.cfm>

## **South East Michigan Council of Governments (SEMCOG)**

### ***SEMCOG Transportation Management Systems***

South East Michigan Council of Governments; SEMCOG Website; 2012

SEMCOG uses transportation management systems to manage and maintain data on the region's infrastructure assets, like pavement. Through a coordinated planning process, the data are then used to assist local decision-makers in developing and selecting cost-effective policies, programs, and projects to preserve and improve the transportation infrastructure. . .

. . . In Michigan, asset management is defined as "an ongoing process of maintaining, upgrading, and operating physical assets cost-effectively, based on a continuous physical inventory and condition assessment." Asset management consists of a set of business principles and practices for improving resource allocation decisions. It requires a shift from a traditional tactical project management approach to a strategic, comprehensive systems management concept.

<http://www.semco.org/Pavement.aspx>

## ***US City Transportation Asset Management Plans***

### **City of Portland, OR, Office of Transportation (FHWA Best Practice)**

#### ***Asset Management: The Portland Bureau of Transportation (PBOT)***

Asset Management; City of Portland, Bureau of Transportation Website; 2012

The Portland Bureau of Transportation (PBOT) manages transportation assets with a replacement value of \$9 billion. Improved streets, the sidewalk system, bridges, traffic signals (signal hardware), and streetlights make up 93% of the dollar value (\$8.4 billion). In addition to these key assets, the City of Portland owns other assets that ensure the safety and movement of people and goods: streetcars; an aerial tram; various support facilities; traffic calming devices; signs; parking meters; parking garages; pavement markings; bikeways; guardrails; retaining walls; the Harbor Wall; stairways; and traffic signal computer controllers. These assets are worth \$567 million.

#### **Asset Management Approach**

Transportation utilizes asset management as a way to effectively and efficiently allocate resources, measure performance, and track infrastructure needs. PBOT's Asset Management Advisory Committee (which includes engineers and operations staff as well as maintenance, finance, and information technology managers) sets the priorities for asset management within the bureau and helps implement those priorities into business practices.

<http://www.portlandonline.com/transportation/index.cfm?c=47266>

### **City of Redmond, Washington**

#### ***FHWA Current Practices in Transportation Asset Management: City of Redmond, WA***

From Federal Highway Administration, Asset Management Overview, Current Practices in Transportation Asset Management; FHWA Website; 2012

City of Redmond, Washington

. . . Redmond's asset management program currently has four principal elements: a GIS, pavement management system, park trail tracking system, and project cost system. Considerable effort was devoted to strategic planning when the system was established and, subsequently, to education and training of the GIS, engineering, and financial technicians who maintain the system. Similarly, considerable effort is dedicated to keeping the information system current and compatible with the State's financial reporting system, particularly with respect to capital projects, contributed assets (e.g., facilities or rights-of-way), and abandoned assets. . .

[http://www.fhwa.dot.gov/asset/if08008/amo\\_06.cfm](http://www.fhwa.dot.gov/asset/if08008/amo_06.cfm)

## ***International Transportation Asset Management Plans***

### **Austrroads (Australia)**

#### ***About Austrroads***

Austrroads Asset Management; Austrroads Website; 2012

Assets

Aims to develop and deliver a program of research that will assist road and transport agencies in their efforts to minimize the whole of life cost of road infrastructure assets.

<http://www.austrroads.com.au/about-austrroads/programs>

#### ***Austrroads Guide to Asset Management***

Austrroads Asset Management; Austrroads Website; 2012

AGAM01-09 Guide to Asset Management Part 1: Introduction to Asset Management

This document introduces the Austrroads Guide to Asset Management, the aim of which is to offer guidance on how to best manage physical road infrastructure. The guide covers various aspects of asset management including how to determine and plan to accommodate stakeholder/community. . .

AGAM02-09 Guide to Asset Management Part 2: Community and Stakeholder Requirements

This document is Part 2 of Guide to Asset Management, and provides guidance on how community and stakeholder requirements can and should influence asset management undertaken by road agencies. As roads are provided as a service to the community, community and stakeholder requirements. . .

AGAM03-09 Guide to Asset Management Part 3: Asset Strategies

The aim of Part 3 of the Austrroads Guide to Asset Management (Asset Strategies) is to provide guidance on the frameworks and principles of asset strategies. Asset strategies articulate the proposed management of the capacity, condition and use of road system assets to achieve the level of road system. . .

AGAM04-09 Guide to Asset Management Part 4: Program Development and Implementation

This guide gives practitioners guidance for decision making with respect to good practice asset management at a network level for program development and implementation. Program development involves identifying asset requirements, setting appropriate levels of service for maintenance. . .

AGAM05-09 Guide to Asset Management Part 5: Pavement Performance

Part 5: Pavement Performance, of the Guide to Asset Management is designed to assist the practitioner in navigating through the Part 5 sub-parts of the Austroads Guide to Asset Management. It contains a brief overview of the topic without going into detail, as detailed discussion on key issues. . .

#### AGAM05A-09 Guide to Asset Management Part 5A: Inventory

These guidelines are intended to assist asset managers and pavement asset managers in collecting and managing data. Part 5A addresses issues of data management, processing and location referencing. The section on data types reviews the frequently used data types in a structured form. . .

#### AGAM05B-07 Guide to Asset Management Part 5B: Roughness

This report contains guidelines for, and background notes on, the conduct of response type and profile-based roughness measurement for road network management purposes in Australia and New Zealand. The guidelines define roughness as being concerned with road surface profile wavelengths. . .

#### AGAM05C-07 Guide to Asset Management Part 5C: Rutting

This document contains guidelines for, and background notes on, measurement and reporting of rutting or transverse profiles for road network management purposes in Australia and New Zealand. The guidelines define rutting as a longitudinal surface depression usually in a wheel path. . .

#### AGAM05D-08 Guide to Asset Management Part 5D: Strength

This document contains guidelines for, and background notes on, network level measurement and reporting of deflection data, for road network management purposes in Australia and New Zealand. The guidelines discuss the frequency and scope of network deflection surveys, including issues. . .

#### AGAM05E-06 Guide to Asset Management Part 5E: Cracking

This document contains guidelines for and background notes on network level measurement and reporting of pavement cracking data for road network management purposes in Australia and New Zealand. The guidelines discuss the types and causes of cracking, the frequency and scope of network. . .

#### AGAM05F-09 Guide to Asset Management Part 5F: Skid Resistance

Part 5F contains guidelines for and background notes on the collection of skid resistance data for road network management purposes in Australia and New Zealand. The guide should be viewed in parallel with the Austroads Guide 1 Management of Road Surface Skid Resistance (2009). . .

#### AGAM05G-09 Guide to Asset Management Part 5G: Texture

Part 5G promotes the collection of road surface texture data as an important component of site investigative and road network management in Australia and New Zealand. The guide primarily focuses on one measure of texture, namely macrotexture, due to its important contribution. . .

#### AGAM05H-09 Guide to Asset Management Part 5H: Performance Modelling

Part 5H: Performance modeling of the Guide to Asset Management provides guidance on the selection, formulation and calibration of pavement performance models for application in the management of road networks. The modeling considered is intended to facilitate reporting of current condition. . .

#### AGAM06-09 Guide to Asset Management Part 6: Bridge Performance

The focus of this document is on how to best manage the physical bridge assets. It provides guidance on the establishment and maintenance of bridge asset inventories, and on the monitoring of asset performance. It discusses the need for agencies to measure asset performance against objectives. . .

#### AGAM07-09 Guide to Asset Management Part 7: Road Related Assets Performance

The aim of Part 7 of the Guide to Asset Management is to provide guidance on the application of asset management concepts and principles for the management of a broad range of diverse road related assets. The strategy framework is applicable to all road system assets. Guidance on managing. . .

AGAM08-09 Guide to Asset Management Part 8: Asset Valuation and Audit

Asset Valuation and Audit is the title of Part 8 of the Austroads Guide to Asset Management. It provides a comprehensive guidance for asset managers in the road industry. Part 8 Asset Valuation and Audit provides guidance on how to undertake an asset valuation to assist the asset manager. . .

<https://www.onlinepublications.austrroads.com.au/collections/agam/guides>

## **Australia, Canada, England, and New Zealand**

### ***Transportation Asset Management in Australia, Canada, England, and New Zealand***

Prepared by the International Scanning Study Team: David R. Geiger, FHWA (Co-Chair); Paul T. Wells, New York State DOT, (Co-Chair); Patricia Bugas-Schramm, Portland Transportation Maintenance Bureau; Lacy D. Love, North Carolina DOT; Dr. Sue McNeil, University of Illinois at Chicago; Dennis L. Merida, FHWA; Dr. Michael Meyer, Georgia Institute of Technology, (Report Facilitator); Robert Ritter, FHWA; Kirk T. Steudle, Michigan DOT; Donald R. Tuggle, FHWA; Larry Velasquez, New Mexico DOT; and American Trade Initiatives, Inc., for Federal Highway Administration; American Association of State Highway and Transportation Officials; National Cooperative Highway Research Program (Panel 20-36) of the Transportation Research Board; November 2005

FHWA International Technology Exchange Program

The Federal Highway Administration's FHWA Technology Exchange Program accesses and evaluates innovative foreign technologies and practices that could significantly benefit U.S. highway transportation systems. This approach allows for advanced technology to be adapted and put into practice much more efficiently without spending scarce research funds to recreate advances already developed by other countries. . .

. . . International Technology Scanning Program has resulted in significant improvements and savings in road program technologies and practices throughout the United States. In some cases, scan studies have facilitated joint research and technology-sharing projects with international counterparts, further conserving resources and advancing the state of the art. Scan studies have also exposed transportation professionals to remarkable advancements and inspired implementation of hundreds of innovations. The result: large savings of research dollars and time, as well as significant improvements in the Nation's transportation system.

<http://international.fhwa.dot.gov/assetmanagement/>

## **Canada**

### ***Canada - Asset Management Overview: Current Practices in Transportation Asset Management***

FHWA Asset Management; FHWA Website; 2006

Asset management systems are one of five strategic research and development initiatives named in the Transportation Association of Canada's (TAC's) Final Report: *A National Agenda for Technological Research and Development in Road and Intermodal Transportation*, which reports Canada's current progress and activities. The government's focus in the near future will be on rehabilitation and maintenance, since Canada's road system is well-developed and further expansion is unlikely for some time. Canada's assets represent billions of dollars in replacement value alone, and the ongoing costs to

build, maintain, and operate the road network are considerable. Related to asset management, TAC's Final Report addresses trends, opportunities and needs, and research and development projects. Trends include the following (pp. 20—21):

- Increasing public demand for accountability – efficient utilization of public resources.
- Continuing shifting and re-balancing between funding of new facilities and preservation of existing facilities. Increasing movement toward privatization of financing, operating, and maintaining highway infrastructure.
- Emergence of “absentee” owners” (i.e., asset owners develop goals, plans, and budgets while actual maintenance and operation of highway infrastructure is done by agents acting on behalf of the owners).

[http://www.fhwa.dot.gov/asset/if08008/amo\\_06.cfm](http://www.fhwa.dot.gov/asset/if08008/amo_06.cfm)

***Transportation Association of Canada: A National Agenda for Technological Research and Development in Road and Intermodal Transportation***

Transportation Association of Canada; TAC, Ottawa, ON; [www.tac-atc.ca](http://www.tac-atc.ca) ; ISBN 1-55187-127-0/nra-report.pdf, Final Report; 2010

Executive Summary

This report documents the conclusions of the TAC initiative to develop a National Agenda for Road and Intermodal Transportation in Canada. The agenda identifies trends, opportunities and needs, as well as specific high priority R&D projects, relevant for advancing Canadian highway transportation. The focus of the Agenda is on identifying R&D opportunities to optimize the management of the road system and intermodal transportation, and minimize the cost of road transport while maintaining or improving safety. The Agenda can be also used to identify opportunities for collaboration between research agencies on common issues and problems, and to reduce duplication of effort between agencies. The Agenda was developed by a team of ten highway technology experts through a widely-based consultative process. Input for the agenda was systematically solicited from provincial, territorial, municipal, academic, and industry representatives. The consultative process was achieved through direct contacts by the project team members, a questionnaire presented to over 40 Canadian highway transportation professionals and an Open Forum held during the 1999 TAC meeting in Toronto.

The results are presented in the following nine technology sections addressing all key areas of road and intermodal transportation:

- Strategic issues
- Asset Management
- Vehicle technology and environment
- Transportation of goods
- Pavement technology
- Structures
- Safety and human factors
- Traffic management and ITS
- Winter maintenance operations

Information presented for the nine technology sections is systematically organized and identifies technology-specific trends, opportunities and needs, as well as over 50 specific R&D projects recommended for implementation. The recommended R&D projects are described in terms of proposed solution, expected benefits, partnership opportunities, and resources required Transportation Association of Canada.

<http://www.tac-atc.ca/english/resourcecentre/readingroom/pdf>

**Great Lakes St. Lawrence Seaway Corporation**

The St. Lawrence Seaway System — <http://www.greatlakes-seaway.com/en/>; 2012

***The St. Lawrence Seaway Management Corporation: Moving Forward in a Changing Environment 2010-2011 Annual Report***

SLSMC; <http://www.greatlakes-seaway.com/en/>; Website; 2011

The St. Lawrence Seaway Management Corporation (the “SLSMC” or the “Corporation”), the successor to the St. Lawrence Seaway Authority, was established in 1998 as a not-for-profit corporation by the Government of Canada, Seaway users and other key stakeholders. In accordance with provisions of the Canada Marine Act, the Corporation manages and operates the assets of the St. Lawrence Seaway for the Federal Government under a long-term agreement with Transport Canada.

[http://www.greatlakes-seaway.com/en/pdf/slsmc\\_ar2011\\_nar\\_en.pdf](http://www.greatlakes-seaway.com/en/pdf/slsmc_ar2011_nar_en.pdf)

***St. Lawrence Seaway Management Corporation Asset Renewal Program (ARP)***

SLSMC; <http://www.greatlakes-seaway.com/en/>; Website; 2011

Starting in 2009, the SLSMC initiated its 10-year U.S. Seaway Asset Renewal Program (ARP) for its navigation infrastructure and facilities. The ARP projects and equipment included in the ARP Capital Investment Plan (CIP) address various needs for the two U.S. Seaway locks, the Seaway International Bridge connecting Ontario and New York, maintenance dredging, operational systems, and Corporation facilities and equipment. None of these investments will result in increases to the authorized depth or width of the navigation channel or to the size of the two existing U.S. locks. The ARP marks the first time in the Seaway’s history that a coordinated effort to repair and modernize the U.S. Seaway infrastructure has taken place.

For the FY 2013-2017 time frame, the Seaway ARP/CIP includes 39 projects and equipment estimated at \$94.8 million with total funding for each year of the plan constrained to funding targets for those years as estimated and approved by the Office of Management and Budget (OMB). Dollar amounts for ARP projects are “project feasibility” estimates and can vary by an industry-recognized 20-30 percent. Project estimates and schedules may fluctuate at various points in the lifespan of the ARP and will be revised as needed and on a continuing basis throughout the length of the ARP.

In the first three years of ARP funding (FYs 2009-2011), the SLSMC obligated \$49.7 million on 39 separate ARP projects. These projects included maintenance dredging in the U.S. portion of the navigation channel, lock culvert valve machinery upgrade to hydraulic operation, structural rehabilitation and corrosion prevention work on the Seaway International Bridge, gatelifter upgrades, and upstream miter gate rehabilitation, as well as various other structural and equipment repairs and/or replacement. FY 2012 ARP obligations are estimated at \$15.6 million. The first large-scale lock-related projects of the ARP, which were funded in both FYs 2009 and 2010, were started during the Seaway’s winter non-navigation period, beginning in late December 2010.

The ARP is resulting in not only modernized infrastructure and new equipment to ensure the long-term reliability of the St. Lawrence Seaway, but it is also having a positive and significant impact on the Upstate New York economy. In fact, approximately 70 percent of the ARP funds obligated during the program’s first three years, totaling nearly \$35 million, were awarded within the region. In addition to these contracts, the ARP is producing approximately \$2.5 million in additional economic benefits to the region (local permanent and temporary hires, local spending on supplies and equipment, lodging, meals, etc.) each year.

<http://www.greatlakes-seaway.com/en/management/slscd/asset/>

***SLSDC FY 2013-17 Asset Renewal Program (ARP) Capital Investment Plan (CIP) 2013:***

[http://www.greatlakes-seaway.com/en/pdf/SLSDC\\_Asset\\_Renewal\\_Plan2013.pdf](http://www.greatlakes-seaway.com/en/pdf/SLSDC_Asset_Renewal_Plan2013.pdf)

**Transport New Zealand**

***New Zealand State Highway Asset Management Plan 2012–2015***

New Zealand Transport Agency; 2012

This plan describes the services that our state highway system provides now and in the future, how we intend to manage the assets we use, and how we intend to fund the work that is needed.

<http://www.nzta.govt.nz/resources/state-highway-asset-management-plan/docs/state-highway-asset-mgmt-plan-2012-2015.pdf>

**Transport Scotland**

***Road Asset Management Plan for Scottish Trunk Roads: April 2007 – March 2009***

Produced for the Scottish Government by RR Donnelley; the Scottish Government, Edinburgh, Scotland; 2007

Executive Summary

Maintaining a Vital Asset

The Scottish trunk road network is estimated to have a construction value of over £15 billion. Its value to Scotland's economy and way of life is many times greater. The operation and maintenance of this vital national asset must support our country by delivering the required service to road users and by using public money wisely. Scotland's trunk road network includes around 3,500 route kilometers of motorways and main roads and 1,900 bridges. It carries over 30% of all traffic and over 60% of all heavy goods vehicles but is actually less than 10% of the total Scottish road network. Transport Scotland is the national transport agency for Scotland and is responsible for operating and maintaining the trunk road network. Transport Scotland was launched in January 2006 and is directly accountable to Scottish Ministers. Our Directorates and their responsibilities are set out in our Corporate and Business Plans.

Adopting Best Practice – Asset Management

Transport Scotland, like all public bodies, is being placed under increasing pressure to justify investment and to demonstrate that best use is being made of resources. We fully appreciate this situation and are taking positive and innovative steps to ensure our management practices are up to the challenge. Current best practice for the management of large infrastructure networks is set out in recent publications by the Department for Transport and the British Standards Institution. These publications recommend that infrastructure organizations adopt a formal asset management approach. The definition we have adopted is:

*Asset management is a strategic approach that identifies the optimal allocation of resources for the management, operation, preservation and enhancement of the road infrastructure to meet the needs of current and future customers.*

The main benefits of adopting asset management are the ability to make better use of resources, this is demonstrated by:

- providing the same or better service at a reduced cost; or
- providing a better service for the same or marginally increased cost.

In order to embed asset management within Transport Scotland we have developed a three-year *Asset Management Improvement Programme* which commenced in May 2006. The *Asset Management Improvement Programme* is designed to improve practices in a manner that will provide real benefits to road users, including improved safety and journey reliability together with more efficient use of public money. The completion of this programme will place Transport Scotland at the forefront of UK and International practice in road management. Central to the Asset Management Improvement Programme is the production of the Road Asset Management Plan (RAMP). The RAMP sets out what we aim to achieve with the trunk road network and describes how we will do this, the latter being described by long-term work and financial plans.

#### Listening To You

The majority of us, in one form or another, are road users. As road users we expect safe and reliable journeys. These are not unreasonable expectations. Central to asset management is actively engaging with road users and other interested parties to understand their views about the service they expect from the trunk road network. This relates to road condition, winter maintenance, journey reliability or lighting provision, to name but a few. In February and March 2007, as part of the Asset Management Improvement Programme, we undertook a survey of a representative sample of road users to identify trunk road issues that are important to them and the service they expect or desire. The initial findings from this survey are reported in the RAMP. We are using the survey results to identify your priorities for road management and maintenance. We will use these priorities to inform our decision making and the allocation of resources. We expect to undertake further surveys, focusing on issues that are of concern to you.

#### Making Best Use of Resources

An important part of asset management is lifecycle planning. A lifecycle plan is a long-term plan for managing an asset with the aim of providing the required service while minimizing Whole Life Costs (or maximizing Whole Life Value). Developing lifecycle plans will help us to make long-term predictions of network deterioration and maintenance needs. This will allow us to compare the impact of alternative lifecycle plans and to adopt the approach that delivers the required service but also makes best use of resources. The RAMP describes the approach we will use to develop our lifecycle plans.

#### Work and Financial Plans

An important function of the RAMP is to present the agreed long-term work and financial plans. The work plan presents the general volumes of work, for example, kilometres of carriageway surfacing, and when they are required, while the financial plan presents the expenditure required to deliver the work plan. A key objective for the next version of the RAMP will be to present robust and agreed work plan and financial plan figures. Delivering the Asset Management Improvement Programme will enable us to include these figures in the next version of the RAMP.

#### Improving the RAMP

This is the first version of our RAMP. We recognise there is still much to do, but we have already made significant progress and learnt much through the development of this first version of the RAMP. We intend to publish the second and fully populated version of the RAMP in spring 2009. Thereafter the RAMP will be updated every two or three years, or more frequently if required, and will highlight the progress made by and benefits realized through the Asset Management Improvement Programme. Most importantly, the RAMP will keep you informed about our ongoing and evolving management practices and plans for the trunk road network.

<http://www.transportscotland.gov.uk/files/Road Asset Management Plan-April07-March09.pdf>

### **Roads Asset Management Project**

Society of Chief Officers of Transportation in Scotland; PPP; 2009

Roads Authorities, SCOTS, Audit Scotland, Scotland's Response

In early 2007 SCOTS took on board the role of delivering a Rudimentary Road Asset Management Plan that could be used and be further developed by all the 32 local authorities in Scotland.

<http://www.apse.org.uk/presentations/2010/06/scottish-roads-lighting-avisory-group/eddie%20piress%20glasgow%20city%20council.pdf>

### **Sweden**

#### ***Where Does All The Money Go? The Need for Better Ex Post Reviews and Enhanced Public Sector Efficiency***

Swedish National Road and Transport Research Institute (VTI), VTI Website; March 2012

VTI (the Swedish National Road and Transport Research Institute) has released a report that explores ways to potentially enhance the cost effectiveness of infrastructure investments in the public sector.

<http://www.vti.se/en/publications/where-does-all-the-money-go-the-need-for-better-ex-post-reviews-and-enhanced-public-sector-efficiency/>

### **United States**

#### ***Asset Management Planning to Support the Business Mission: Completing the Real Property Puzzle for the United States Government***

By Gary P. Evans, MRICS; Graphic Systems, Inc.; August 15, 2005

On February 4, 2004 President Bush signed Executive Order #13327, "Federal Real Property Asset Management" to promote efficient and economical use of the US Federal Government's real property assets. The inclusion of "Real Property" as part of the President's Management Agenda with its quarterly scorecard is currently providing a major focus for all US Federal Government departments.

The Executive Order placed an emphasis on the development of Asset Management Plans. It brought about the creation of the Federal Real Property Council (FRPC) that is made up of the Senior Real Property Officers responsible for each US Federal Government department. Briefly, an Asset Management Plan consists of an interlocking series of procedural components. It describes a process that starts with a strategic plan and ends up with a real property technology plan. It takes into account the total life cycle of the asset and how business goals and action plans are derived from the strategic plan to determine data; performance metrics and a technology plan.

[http://www.graphicssystemsbiz.com/gsi/articles/RICS\\_Real\\_Property\\_Puzzle.pdf](http://www.graphicssystemsbiz.com/gsi/articles/RICS_Real_Property_Puzzle.pdf)

### ***International City Transportation Asset Management Plans***

#### **Brisbane, Queensland, Australia**

***FHWA International SCAN Report: Chapter Four - Brisbane, Queensland, Australia - Asset Management - International Programs***

FHWA International SCAN Report: Asset Management: Local Experience With Asset Management; FHWA Website; 2004

Brisbane, Queensland, Australia

[www.brisbane.qld.gov.au](http://www.brisbane.qld.gov.au)

#### Context

With a population close to 900,000 and an area of 1,327 km<sup>2</sup> (512 mi<sup>2</sup>), Brisbane is the largest local government authority in Australia. As such, it is responsible for providing a large number of public services, ranging from water and sewerage to public transit. Not surprisingly, the Brisbane City Council considers infrastructure delivery and asset management one of its major responsibilities. Since 1994, given the growth in population, the amount of paved road surface (measured in square meters) has grown 2.4 percent per year. With Brisbane expected to be one of the fastest-growing cities in Australia in the next several decades, road surface and public transit infrastructure are likely to continue to grow at a fast rate.

Brisbane's transportation plan emphasizes not only efficient management of the road network, but also renewed investment in public transportation and the use of demand management strategies to reduce transport demand. Similar to other Australian cities, Brisbane is placing greater emphasis on tolls or user charges for major investments in the transportation network. The preferred model is privately owned toll roads under a 30-year franchise. If a suitable project offer does not emerge from the tender process, the proposed ownership model is reviewed. An example of a proposed public-private partnership is TransApex, a plan for major investment in new river crossings, connecting major arterials with new roads and tunnels, and enhancing public transportation services developed in response to several transportation challenges facing Brisbane. Increasing congestion, limited general revenue funding, public perceptions of little or no progress in solving transportation problem, and aging of the infrastructure have led city officials to consider innovative funding strategies and develop a comprehensive asset management approach to city assets.

[http://international.fhwa.dot.gov/assetmanagement/chp4\\_a\\_brisbane.htm](http://international.fhwa.dot.gov/assetmanagement/chp4_a_brisbane.htm)

#### ***British Columbia Municipalities: Infrastructure Asset Management***

Federation of Canadian Municipalities; Sustainable Communities Conference and Trade Show, Victoria, BC, Canada; 2011

#### Session Summary

Failing infrastructure is demanding more resources from local governments and our communities. B.C.'s Local Government Asset Management Working Group helps communities share knowledge, develop tools and implement strategies for asset management. The group will address alternatives for identifying and reducing community infrastructure deficits, while leveraging green infrastructure funding to improve sustainability. Tools have been developed to help and support smaller communities. The City of Victoria's Dockside Green development will be explored as a triple bottom line case study of green infrastructure. Hear how the city's land development concept attracted a sustainable developer to purchase and develop 15 acres of contaminated land adjacent to the downtown. The first two phases have been awarded the highest LEED point total in the world and will be GHG negative with district utilities.

#### Presentations:

- [Asset Management BC](#) 
- [Sustainable Infrastructure – Dockside Green Development](#) 

<http://fcm.ca/home/events/past-events/2011/victoria-sustainable-communities-conference/infrastructure-asset-management.htm>

## **Edmonton, Alberta, Canada**

### ***FHWA International SCAN Report: Chapter Four - Edmonton, Alberta, Canada, - Asset Management International Programs***

FHWA International Programs Asset Management: Local Experience with Asset Management; FHWA Website; 2004

Edmonton, Alberta, Canada, [www.edmonton.ca](http://www.edmonton.ca)

The city of Edmonton, Alberta's capital, has just over 700,000 people in a metropolitan area of about 1 million. Strategically located to serve the natural resources industry, Edmonton is expected to capture a large share of future investment in the province. For example, Can\$13 billion (US\$10.4 billion) of the Can\$100 billion (US\$80 billion) in construction announced or underway in the province is occurring in Edmonton. Growth in population and employment is expected to place tremendous pressure on the 12 asset areas for which the city is responsible.

Edmonton defines the replacement value of its assets as the cost of infrastructure if it were replaced in today's dollars (estimated at Can\$19.2 billion (US\$15.4 billion)). The second-largest component of this estimate is transportation and streets, with a nearly Can\$7.5 billion (US\$6 billion) replacement value. [http://international.fhwa.dot.gov/assetmanagement/chp4\\_b\\_edmonton.htm](http://international.fhwa.dot.gov/assetmanagement/chp4_b_edmonton.htm)

### ***Thinking Outside the Gap, Opportunities to Address Edmonton's Infrastructure Needs, Infrastructure Strategy Report 2004***

City of Edmonton, Alberta; [www.edmonton.ca](http://www.edmonton.ca) Website; 2004

Municipal infrastructure is a critical component to achieving economic prosperity, creating vibrant neighbourhoods and culturally rich communities, and committing to conscientious and responsible environmental stewardship. The state of infrastructure defines a city's capacity to deliver services to its citizens and provide a desirable quality of life. Many Canadian cities, like Edmonton, have limited revenues to address aging infrastructure, much less respond to demands for new infrastructure. A gap exists between the funding required to address infrastructure needs and the funding available to do so. Edmonton must manage this gap and become a "best-value" provider of sustainable infrastructure.

Managing infrastructure is becoming increasingly challenging and City Council and citizens alike face difficult decisions. *Thinking Outside the Gap: Opportunities to Address Edmonton's Infrastructure Needs – Infrastructure Strategy Report 2004* provides the inventory and state and condition of city infrastructure and explores the following potential funding and strategic management opportunities to address the gap:

Closing the Gap examines methods of generating new revenue for long-term infrastructure investments and reinvestment strategies. Major prospects to reduce the infrastructure gap are now emerging and the City of Edmonton will be prepared to seize the following funding and partnership opportunities:

- Anticipated Revenue Opportunities:

- ~ Municipal Rural Infrastructure Fund (MRIF - federal / provincial): *Through this program, Edmonton could receive up to a total of \$12 million from the other two orders of government to apply to infrastructure projects.*

- ~ GST rebate (federal): *Over the next 10 years, up to \$80 million may be available through this rebate to fund infrastructure projects.*

- ~ Gasoline tax rebate (federal): *The City of Edmonton could receive about \$300 million through this rebate over the next ten years.*
- Possible Resource Opportunities from the Province:
  - ~ Education tax: *Capping the education tax may provide an additional \$370 million over the next decade to fund infrastructure.*
  - ~ Legislative changes to allow cities to impose taxes: *With greater authority to generate tax revenues the City could increase revenues for essential infrastructure projects.*
  - ~ Matching responsibilities with resources: *The provincial government could significantly reduce the fiscal burden on cities by taking back responsibility for services such as emergency medical services and affordable housing.*
  - ~ Revenue sharing with municipal governments: *This policy could provide a stable, sustainable source of funding to municipalities.*
  - ~ Provincial infrastructure funding: *This proposed provincial funding of up to \$1 billion would be significant in addressing Edmonton's infrastructure issues.*
- Opportunities Requiring Action by the City:
  - ~ Smart Debt: *Incorporate sustainable borrowing tools through: - Tax-supported debt for next 3 years (2005, 2006, 2007) — generates an additional \$150 million*
  - ~ Arterial road levy: *Approximately \$60 million in savings over the next decade could be realized if developers fund the full four-lane arterials to service new developments.*
  - ~ User pay — development/improvement fees: *Property owners are less hesitant to pay user fees when the actual improvements are visible and reflect the true cost of providing the service.*
  - ~ User pay — self-financing utilities: *A self-financing utility can sustain the actual costs to deliver services.*

<http://www.edmonton.ca/InfraPlan/Infra/City%20Docs/Infrastructure%202004%20v3.pdf>.

**Asset Management and Public Works: Overview: City of Edmonton, AL, CA**

City of Edmonton, Alberta, CA; [www.edmonton.ca](http://www.edmonton.ca) Website; 2010

*Stewardship of the City's land, buildings, parks and utilities through environmental leadership, responsive service to the community, and integrated service to the organization*

Asset Management and Public Works (AMPW) manage the City's land assets, including undeveloped land, civic buildings, parks, and natural areas. The department also manages the City's utilities: sanitary and land drainage, and waste management.

AMPW is one of the largest departments in the City, with the proposed 2010 operating budgets for the department programs totaling \$467 million in revenues and \$518 million in expenditures. The approved 2010 capital budget, including proposed supplementary budget adjustments, is \$337 million. AMPW is a diverse department, with a staffing complement of over 1,900 full time equivalents undertaking functions in a wide variety of operations.

Citizens access AMPW's services when they enjoy a river valley park, visit a City facility, or drop off household hazardous materials at an Eco Station. In the background, AMPW is also managing the City's wastewater collection system; its storm sewer system; its recycling and composting operations; the acquisition of land for future City growth; and the preservation of biodiversity within City boundaries, among many other activities.

**Quick Facts**

- Corporate Properties is responsible for maintenance of nearly 700 City facilities valued at over \$3.28 billion.

- Edmonton's drainage system is over 5,000 kilometers long.
- There are more than 4,500 hectares of turf in Edmonton's parks.
- Waste and recyclables are collected from approximately 320,000 Edmonton households.

[http://www.edmonton.ca/city\\_government/documents/AMPWApprovedDeptBudget.pdf](http://www.edmonton.ca/city_government/documents/AMPWApprovedDeptBudget.pdf)

## **City of London, England, UK**

### ***FHWA International SCAN Report, Chapter Four – London, England – Asset Management – International Programs – London, England, UK***

FHWA International SCAN Report: Asset Management: Local Experience With Asset Management; FHWA Website; 2004

London, England; [www.tfl.gov.uk](http://www.tfl.gov.uk) Website; 2004

#### Context

Just over 27 million trips are made in greater London every day, 8.5 million on public transport, 11 million by car or motorcycle, 7 million on foot, and 0.3 million by bicycle. Transport for London (TfL), created in 2000, is the agency responsible for much of the transportation system used by these 27 million trips. Transport for London manages London's buses, subway system, Docklands Light Railway (DLR), and London Trams. It also runs London River Services, Victoria Coach Station, and London's Transport Museum. Only TfL's Street Management Division participated in the presentations during this scanning study, so the team's observations focus on road assets rather than TfL's considerable public transit assets.

[http://international.fhwa.dot.gov/assetmanagement/chp4\\_c\\_london.htm](http://international.fhwa.dot.gov/assetmanagement/chp4_c_london.htm)

### ***Transport for London: Highway Asset Management Plan***

Mayor of London; City of London, UK; 2007

#### Executive Summary

The Transport for London Road Network (TLRN), consisting of 580km of London's main roads, has an indicative value of £5bn, making it among the most valuable assets owned by Transport for London (TfL). Almost every resident, worker and visitor in London uses the TLRN, whether as a pedestrian; on a bicycle or motorcycle; in a bus, taxi, or car; or as a goods vehicle driver. Although they are main thoroughfares for distribution of people throughout the Capital, these streets also form key social spaces: those browsing sidewalk fruit stalls or shop window displays, enjoying a snack at an outdoor café, or taking a break on a bench beside the footway are also stakeholders of the TLRN. Maintenance of this network affects the lives of millions of people.

This Highway Asset Management Plan (HAMP) has been written to provide all interested stakeholders with an overview of the policy drivers and investment decisions that affect maintenance of the TLRN. The HAMP demonstrates and informs the process of keeping the TLRN network safe and serviceable while achieving value for money.

Key conclusions are identified regarding effective and efficient maintenance of these roads and associated assets, and continuous improvement actions are laid out for the future.

<http://www.tfl.gov.uk/assets/downloads/businessandpartners/HAMP-2Oct.pdf>

## **City of Portsmouth, UK**

### ***City Council of Portsmouth, UK: Highway Asset Management Plan, 2006 - 2008***

City of Portsmouth City Council, UK; Colas; Chris Britton Consultancy; 2008

This document is the first Highways Asset Management Plan (HAMP) for the City of Portsmouth City Council's (PCC's) highway network. Highway Asset Management is relatively new to local authorities in the UK, and the approach now being promoted is formally set out in the CSS/TAG document "Framework for Highway Asset Management," published in 2004. Portsmouth has embraced this approach by developing the Highway Management PFI contract into a Plan. The introduction of the culture and process involved in better asset management has already started through the PFI contract. However, it will take some time to fully embed this culture into the organization, and further actions towards this goal are set out in the Plan. . .

. . . the highway is the most valuable publicly owned asset managed by the Council but that, prior to the PFI contract, it had not received the attention nor funding required to maintain it in the optimal state of repair, and operation, or to effectively take account of the needs of all our customers. . .

<http://www.buildingbrighterfutures.org.uk/files/HighwaysAssetManagementPlan.pdf>

## **Wellington, New Zealand**

### ***Transport Asset Management Plan Summary 2010/11–2019/20***

Wellington City Council; Wellington, New Zealand; 2010

The TAM Manual consists of three sections:

The Introduction explains how Total Asset Management fits within whole-of-government planning.

The TAM Overview includes strategies and 'how to' guidelines to develop the five asset plans which comprise the Total Asset Management Strategy. NSW Government agencies are required to prepare these plans each year as part of their business planning and budget processes.

The Assessment & Decision Tools provides a set of tools to assist agencies to develop and implement their Total Asset Management strategies.

Each guideline in the Manual has an introductory web page which gives access to the full guideline in Adobe Acrobat PDF format. Internet links are provided to those asset related guidelines that reside outside of the TAM Manual.

<http://www.wellington.govt.nz/plans/policies/transportation/pdfs/2010-transport-amp.pdf>

## **New South Wales, Australia**

### ***New South Wales Government Asset Management***

NSWG Transportation Asset Management Guide; NSW Government Asset Management Committee Website; 2012

TAM - An Overview

Total Asset Management is the strategic management of physical assets to best support the delivery of agency services.

With constant reference to whole-of-government planning, the agency's Corporate Plan, and its Service Delivery Strategy, the TAM approach requires asset managers to assess what assets are needed to

support successful service delivery. It then calls for detailed plans for the management of those assets which are to be acquired, maintained or disposed of.

Agencies are required to submit an Asset Strategy to Treasury in support of submissions for funding. This section contains guidelines for:

- The [Asset Strategy](#) which determines whether assets should be acquired, upgraded, maintained or disposed of.
- The [Office Accommodation Strategy](#) that is an Asset Strategy restricted to Office Accommodation assets only. Its purpose is to capture the benefits of a whole-of-government approach to the management of office accommodation.
- The [Capital Investment Strategic Plan](#) which explains how new assets will be acquired or existing assets upgraded.
- The [Asset Maintenance Strategic Plan](#) which gives a structured process for planning the maintenance of existing assets.
- The [Asset Disposal Strategic Plan](#) which identifies assets that are surplus to requirements and how the disposal process will be managed

<http://www.gamc.nsw.gov.au/tam/default.asp?PageID=69>

## ***Published Literature Sources***

### ***Beyond the Short Term: Transportation Asset Management for Long-Term Sustainability, Accountability and Performance***

Message from the Director, Butch Wlaschin, Director, Office of Asset Management, FHWA; FHWA TAM Website; March 2012

Transportation Asset Management (TAM) has long been recognized as a sound, long-term approach to managing infrastructure. It provides decision makers with a rational, long-term systematic process for making difficult and complex decisions about how to achieve the highest system condition levels for the lowest cost, over the longest term. . .

. . . This report re-examines TAM as a system for sustainability and as a system for accountability. It also includes advice on Change Management practices to expand TAM practices within a department of transportation. Along with the update to the Asset Management Guide, this report helps transportation officials expand their use of Asset Management.

[http://www.fhwa.dot.gov/asset/10009/tam\\_topr806\\_message.cfm](http://www.fhwa.dot.gov/asset/10009/tam_topr806_message.cfm)

### ***Use of Transportation Asset Management Principles in State Highway Agencies***

NCHRP Synthesis 20-05/Topic 43-01 [Active (Synthesis); NCHRP 20-05 (Synthesis of Information Related to Highway Problems); TRB Contact, Jon Williams; Active 2012

#### **Final Scope**

The American Association of State Highway and Transportation Officials (AASHTO) recently published Volume 2 of the Asset Management Guide – A Focus on Implementation. The new Guide builds on the principles of Transportation Asset Management (TAM) identified in Volume 1 and provides a step-by-step process that will enable agencies to align their investment decisions to their strategic goals. It will also help agencies develop the plans, processes, and tools to support the agency's performance

management philosophy. The Guide stresses the importance of a Transportation Asset Management Plan as well as the use of performance measurement, asset valuation, and risk assessment tools to support investment decisions. . .

. . . This synthesis will help document the state of practice and the extent to which agencies have shifted their organizational cultures and business processes to support performance-based decisions that consider long-term investment options based on quality data.

At a minimum, the synthesis will gather and summarize the following information:

- A self –assessment of asset management in each agency, using Volume 1 of the Guide, (using a web-based survey).
- A second survey to address the following- The degree to which performance data are driving decisions within the organization at different levels (e.g., strategic, network, and project) and for different asset classes.
- The strategies that have been used to promote asset management principles among elected officials and upper executives.
- An assessment of maturity in SHAs using the maturity scale included in Volume 2 of the Guide (with anonymity promised to respondents).
- Changes that have been made, or are planned, to apply TAM practices within and across all asset classes.
- The availability and use of a Transportation Asset Management Plan (as defined in the Volume 2 Guide). Examples may be included in the report.
- The length of planning horizon periods for TAM, and how varying lengths impact expected performance metrics.
- How TAM is used for short and long-term planning.
- A subjective assessment of the completeness and quality of the asset inventory for assets other than pavements and bridges.
- The use of risk assessment and management tools to evaluate investment options.
- The methods used to determine asset value and the degree to which asset value is used to convey investment needs.
- Available software and whether and how it is used.
- Next steps that agencies are planning to take within the next five years to advance their asset management activities, including implementation plans.
- Challenges that agencies have (or have not) overcome.

The [San Diego TAM Conference in April 16 – 18, 2012](#) will be an opportunity for conducting a focus group made up of pooled-fund states and other attendees. The logistics of organizing this may be handled by the conference planning committee. The consultant will facilitate the discussion of focus group, including assigning pre-conference questions to the attendees. This event will be used to identify preferred practices.

The synthesis report will focus on the practices of state highway agencies within the United States, from the survey, follow-up interviews, and focus group, and will include examples of how mature practices have been used for a variety of assets, including roadway hardware (e.g., signs and guardrails), ITS, bridges, and pavements. The two surveys will be sent to the TAM contact for each agency, from the FHWA list. A preliminary survey will be sent to that list to confirm the currency of the contact list.

<http://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=3211>

### ***FHWA Life-Cycle Cost Analysis (LCCA) Information***

Federal Highway Administration, Washington, DC; FHWA Website; Updated 2012

FHWA promotes Life-Cycle Cost Analysis (LCCA) as an engineering economic analysis tool that allows transportation officials to quantify the differential costs of alternative investment options for a given project. LCCA can be used to study either new construction projects or to examine preservation strategies for existing transportation assets.

<http://www.fhwa.dot.gov/infrastructure/asstgmt/lcca.cfm>

### ***AASHTO Transportation Asset Management Today Website***

American Association of Highway Transportation Officials; AASHTO TAM Website; 2011

Welcome to The Transportation Asset Management Today website, the knowledge site sponsored by the AASHTO Subcommittee on Transportation Asset Management! Visit the topic areas below and enjoy the experience. Click on any of the topic area names to join a discussion in progress, initiate a new discussion, or check out the reference documents and links. For regular email updates about each topic, fill out the "e-Mail Notification" form accessible above. Once registered, you will receive daily notification of any new reference materials or discussion topics posted in your areas. You also have the option of including your name in the site's growing directory.

<http://assetmanagement.transportation.org/tam/aashto.nsf/home>

### ***AASHTO Transportation Asset Management Guide—A Focus on Implementation***

American Association of Highway Transportation Officials; AASHTO: ISBN Number: 1-56051-499-2; 2011

This guide aims to encourage transportation agencies to address strategic questions as they confront the task of managing the surface transportation system. Drawn from both national and international knowledge and experience, it provides guidance to state DOT decision makers, as well as county and municipal transportation agencies, to assist them in realizing the most from financial resources now and in the future, preserving highway assets, and providing the service expected by customers. Divided into two parts, Part One focuses on leadership and goal and objective setting, while Part Two is more technically orientated.

This document is also available in web-based, subscription format. . .

Order URL: [https://bookstore.transportation.org/Item\\_details.aspx?id=1757](https://bookstore.transportation.org/Item_details.aspx?id=1757)

(WSDOT Library has a copy)

### ***Transportation Asset Management Pooled Fund Research Program 2002-2011***

Jason Bittner, Deputy Directory, National Center for Freight & Infrastructure Research and Education; Midwest Regional University Transportation Center; Final Report No. 0092-02-18; MRUTC; Wisconsin DOT; December 2011

#### **Abstract**

This report details the overall management and related activities of the Transportation Asset Management Pooled Fund Research Program. The TAM Pooled Fund Research Program was established in 2002 as a partnership between the states of Michigan and Wisconsin. Administered by the University of Wisconsin's Midwest Regional University Transportation Center, the Pooled Fund conducted several research projects. Among the featured projects supported by the pooled fund were the Maintenance Quality Assurance Peer Exchanges, the National Transportation Asset Management Conferences and Workshops, and an assessment of capital preventive maintenance in the states of the upper Midwest

region. This report summarizes the operation of the Pooled Fund and traces its history and contributing partners.

For more information on the Transportation Asset Management Pooled Fund Research Program, please refer to: <http://www.wistrans.org/mrutc/research/asset-management-pooled-fund/>.

Link to Final Report: [http://www.wistrans.org/mrutc/files/TAMPF\\_Final\\_Report.pdf](http://www.wistrans.org/mrutc/files/TAMPF_Final_Report.pdf)

### ***AAPA Finance Committee Webinar on Strategic Asset Management***

American Association of Public Ports; PPP Slide Presentation at AAPA Webinar; Led by Erik Stromberg, Port Industry Consultant, AAPA; February 23, 2011

#### Agenda

What's Strategic AM?

- Who's doing it? Why?
- Other US and Canadian public infrastructure owners
- International ports
- North American ports
- Approaches to SAM development
- Process
- Regional collaboration?
- Discussion

[http://aapa.files.cms-plus.com/PDFs/11FINANCECOMM\\_Stromberg\\_Erik.pdf](http://aapa.files.cms-plus.com/PDFs/11FINANCECOMM_Stromberg_Erik.pdf)

### ***Transportation Asset Management: Quality Related Accounting, Measurements and Use in Road Management's Processes***

Jonsson, Berth; KTH, School of Architecture and the Built Environment, Real Estate and Construction Management, Building and Real Estate Economics, Doctoral thesis, monograph; 2010

Abstract:

Today there are shortcomings in monitoring, control, analyses, learning and reporting of the results of activities and operations in the road management processes. There are also shortcomings in transparency and verifiability, in knowledge of road management's costs and life cycle costs, of the road capital's standard and condition and in measures of quality deficiency costs, productivity and maintenance backlog. . .

. . . A model has been designed with the transport policy's requirements at the focus for all sub-processes' applications without repeating errors as regards internal control, use of standard values and index adjustments. For each component, the model provides quality-related information about its current condition and condition value, acquisition value, replacement value and standard target value with the effects of measures carried out. Changes in standard and condition of new construction, improvements, maintenance and consumption can be shown in the model. Information can also be found on a component's consumption cost, index adjustment and successively accumulated life cycle costs. Quality deficiency costs, inefficiencies, maintenance backlog, cost drivers, productivity and, for example, expected funding needs can be calculated by computer. The model has been tested and this document also describes the model's implementation project at the Swedish National Road Association (SNRA). . .

The information makes it possible to consider and stipulate requirements regarding the development of components' accumulated life cycle costs in procurements. . . The concept of quality-related accounting of road capital should be a part of the international discussion around models for Transportation Asset Management (TAM).

Record URL: <http://urn.kb.se/resolve?urn=urn:nbn:se:kth:diva-12151>

Find a library where document is available Order URL: <http://worldcat.org/isbn/9789197730297>

### ***Transportation Invest In Our Future***

National Surface Transportation Policy Commission; AASHTO; Final Report; 2010

Asset Management

State DOT Performance Management Programs: Select Examples

The goal of an asset management program is to minimize the life-cycle costs for managing and maintaining transportation assets, including roads, bridges, tunnels, rails, and roadside features. This approach focuses on business and engineering practices for resource allocation and utilization, with the objective of better decision making based upon quality information and well-defined objectives.

The performance measures in the following case studies are integral components of infrastructure asset management. Measures are linked to budget considerations where goals and strategic plans are developed to ensure acceptable quality and efficiency. The implementation of an effective and successful transportation asset management program relies on the use of performance measures to enable data-driven investment decisions.

Select State Examples:

- FDOT's Pavement Condition Criteria
- Maryland's Ride Quality Performance Measurement
- MnDOT's Pavement Preservation Program
- MoDOT's Smooth Roads Initiative Program
- WSDOT's Lowest Life Cycle Cost Management Approach to Pavement

<http://www.transportation1.org/tif6sreport/managment.html>

### ***Government Performance and Results Act (GPRA) Related Materials***

Federal Office of Management and Budget; OMB Website; 2010

OMB guidance to agencies:

- [Refer to OMB Circular A-11, Part 2](#), Preparation and Submission of Strategic Plans, Annual Performance Plans, and Annual Program Performance Reports

Other reference documents:

- [Government Performance and Results Act of 1993 \(GPRA\)](#)
- [Government Performance and Results Modernization Act of 2010](#)
- [OMB Testimony on GPRA Modernization Act](#) (7 pages, 125 kb)
- [Memorandum: Delivering on the Accountable Government Initiative and Implementing the GPRA Modernization Act of 2010](#) (04/14/2011) (4 pages, 835 kb)
- [Senate Committee on Governmental Affairs GPRA Report](#)

<http://www.whitehouse.gov/omb/mgmt-gpra/gplaw2m.html>.

### ***Asset Management: Strategic Workshop for Department of Transportation Executives***

Ted Ferragut, TDC Partners, Ltd; Sue McNeil, University of Delaware; Transportation Research Circular Number E-C131; Sponsored by Task Force on Accelerating Innovation in the Highway Industry, Transportation Asset Management Committee, Transportation Research Board, In Cooperation with Joint AASHTO–FHWA–NCHRP International Technology Scanning Program, American Association of State Highway and Transportation Officials Subcommittee on Asset Management; November 2008

#### Summary

In April 2005, a team of U.S. executives participating in an International Technology Scanning Program looked at transportation asset management practices in some of the leading countries in the world. The scan clearly showed that these organizations have used asset management data to compete for government resources both inside their agencies and with legislative bodies.

The Transportation Research Board Task Force on Accelerating Innovation believed that these findings, along with several major asset management advancements in the United States, would be worthy of further discussion by U.S. state departments of transportation (DOTs). The sponsors, along with other asset management organizations and committees, sponsored an executive session on asset management. DOT executives and asset management program managers met with key international officials to discuss advancements in asset management that might be adopted in the United States.

The executive forum was held December 13, 2006, in Washington, D.C. Fifteen DOTs and FHWA were represented, along with officials from the United Kingdom, Canada, New Zealand, and Australia. Most nations of the world have made significant investments in transportation infrastructure. In the United States alone, such investment is estimated at more than \$1.75 trillion. However, as this infrastructure is used and exposed to natural forces, its condition will deteriorate.

Asset management is a strategic and systematic process of maintaining, upgrading, and operating physical assets effectively throughout their life cycle. It focuses on business and engineering practices for resource allocation and utilization, with the objective of better decision making based on quality information and well-defined objectives. The scan team identified several overarching themes from the scan:

- Agencies are moving away from “worst first.”
- The focus is on preservation first.
- Agencies recognize data as an asset.
- Asset management supports enhanced communication.
- Asset management provides a strong justification for funding.
- Asset management is implemented through a variety of organizational structures.
- Agencies use performance measures.

Participating DOTs presented their state of the practice of asset management, ranging from relatively mature to just getting started. Nearly all of the DOTs have implemented an inventory program, adding new elements and refining those already in existence. Most admitted they need to work on refining information and simplifying its presentation.

Many DOTs voiced interest in presenting the asset management information to legislators to show the impact of funding improvements or shortfalls on the network. Many are using the information to justify additional revenue, though not always successfully. Many also expressed a desire to show the significance of preservation, admitting it is important but not glamorous. Other DOTs were at the point

of developing techniques to show trade-offs from funding in specific program areas and showed significant interest in the Missouri software.

Several DOTs were looking for ways to show trade-offs among programs—pavements versus bridges versus safety programs, for example. This presents a difficult challenge. The United Kingdom has a long history of asset management. Officials credit it with influencing decisions on preservation strategies and public financing initiatives. Alberta, Canada, is reaping great financial benefits from new oil revenue. Officials publish an annual business plan that uses performance measures, outcomes, and targets identified in a 3-year plan. They merge all public works into this document, not just transportation. They also have a comprehensive data retrieval system with advanced optimization tools. Admittedly, however, they still have institutional issues such as legislative desire for new facilities over preservation that under finance this key element of their systems. New Zealand uses performance measures as the foundation for asset management, with funding dependent on the asset management plan, levels of service, agreements on performance, and annual and 10-year forecasts. The plans are based on a hierarchy of performance measures ranging from the vision to strategic to operational and tactical measures.

Asset management has a growing role in public–private partnerships, as shown on the CityLink project in Australia. CityLink is a toll road that also includes communications assets. Although most of the assets are new, the facility does have some old structures. From the beginning the focus has been on managing the whole package, including the initial asset, operation, and maintenance. This includes development, delivery, management, and operation, with the investor acting as an active participant in all stages. TransUrban, the operator of the system, developed a comprehensive asset management system to manage the facilities, including many older structures.

The DOTs and international guests discussed many detailed questions, including the following:

- Was it more dollars or better use of dollars that improved the system?
- Was industry a key partner in supporting asset management approaches?
- How is risk identified?
- How are benchmarks and performance standards established? What is “good” and “bad?”
- Are the data collected too much or too little, or is the collection effort too expensive?
- Do spikes in construction funding always lead to a spike in preservation needs?

FHWA, in partnership with AASHTO, has extensive resources to help DOTs progress in asset management.

Most states at the workshop reported that the next step is continued implementation with a focus on external presentation of information. The forum provided many resources and ideas, and Florida, Michigan, Ohio, and Utah indicated they are willing to provide technical assistance, information, and contacts.

While the major goal of the executive forum was to exchange information, several key topics for future program development surfaced from the discussion:

- Successful case studies to address external use of asset management information between DOTs and elected officials;
- Methods to show that preservation funding is as critical as or more critical than new construction to demonstrate its value to elected officials;
- Methods to show trade-offs between funding and system performance, again to demonstrate to elected officials the value of additional finances. Missouri DOT has a system that could be considered in other states;

- Better methods to show funding trade-offs between assets such as pavements and bridges; and
- Continuing exchanges between DOT executives as much of the application of asset management in the near future is one of education and storytelling.

<http://onlinepubs.trb.org/onlinepubs/circulars/ec131.pdf>

***U.S. Domestic Scan Program: Best Practices in Transportation Asset Management, SCAN-TOUR Report***

NCHRP Project 20-68, U. S. Domestic Scan Program: Sponsored by The American Association of State Highway and Transportation Officials Federal Highway Administration National Cooperative Highway Research Program; Cambridge Systematics Inc.; Cambridge, Massachusetts, With Michael D. Meyer, Georgia Institute of Technology; Transportation Research Board; February 2007

Executive Summary

*“Asset management tied to performance measures catalyzes action, helps define goals, prioritizes action and aligns efforts...we don’t think about it as asset management, it simply is what you are supposed to do.”* ...Gordon Proctor, Director, Ohio DOT

The purpose of this scan was to identify best case examples of the application of asset management principles and practice in U.S. transportation agencies. The scan was sponsored by American Association of State Highway and Transportation Officials (AASHTO), the Federal Highway Administration (FHWA), and the National Cooperative Highway Research Program (NCHRP). The scan participants included FHWA officials, representatives from state transportation agencies in Michigan, North Carolina, Ohio, Oregon, and Vermont, a university professor in transportation engineering and planning, and a consultant support staff.

The scan team met with a range of organizations, including:

- State transportation agencies (Florida, Michigan, Minnesota, Ohio, Oregon, and Utah);
- A city transportation department (Portland, Oregon);
- Two metropolitan planning organizations (the Southeast Michigan Council of Governments in Detroit and the Grand Valley Metropolitan Council in Grand Rapids, Michigan);
- Two county transportation departments (Hillsborough County, FL and Kent County, Michigan);
- A tollway authority (Florida’s Turnpike Enterprise); and
- Two statewide asset management associations (the Michigan Transportation Asset Management Council and the Pacific Northeast Asset Management User Group, Oregon).

Specific questions relating to different aspects of the agency’s experience with asset management were sent to each agency beforehand. In most cases, the scan team received written responses to these questions, and in all cases, the scan team obtained information from interviews with key staff members at each site.

[http://onlinepubs.trb.org/onlinepubs/trbnet/acl/NCRHP2068\\_Domestic\\_Scan\\_TAM\\_Final\\_Report.pdf](http://onlinepubs.trb.org/onlinepubs/trbnet/acl/NCRHP2068_Domestic_Scan_TAM_Final_Report.pdf)

***Best Practices in Transportation Asset Management: U.S. Experience***

Presentation at Louisiana Transportation Engineering Conference, Baton Rouge, Louisiana; Lacy D. Love, Director of Asset Management; North Carolina Department of Transportation; February 2007; Cambridge Systematics; 2007

A *PowerPoint* Slide presentation on the Scan Tour of State DOT's and lessons learned and Best Practices in selected states. The Scan team visited selected national governmental transportation agencies that have implemented asset management principals in their agencies. The agencies reviewed included six State transportation agencies –Florida, Michigan, Minnesota, Ohio, Oregon, and Utah; one city – Portland, OR; two MPOs –SEMCOG in Detroit and Grand Valley Metropolitan Council in Grand Rapids, MI; 2 counties –Hillsborough County, FL and Kent County, MI; one tollway authority – Florida's Turnpike Enterprise; and two statewide asset management associations – Michigan Transportation Asset Management Council and the Pacific Northeast Asset Management User Group, OR. The purpose was to learn from national leaders on how they implemented asset management and to share with other States and local road agencies the team's findings.

[http://www.ltrc.lsu.edu/tec\\_07/presentations/Best%20Practices%20in%20Transportation%20Asset%20Management%20-%20US%20Experience.pdf](http://www.ltrc.lsu.edu/tec_07/presentations/Best%20Practices%20in%20Transportation%20Asset%20Management%20-%20US%20Experience.pdf)

### ***Asset Management Overview***

FHWA-IF-08-008; Federal Highway Administration, Washington DC; December 2007

What Is Transportation Asset Management?

Asset management in the transportation industry is a relatively new concept. It means many things to many organizations, but its practices provide a solid foundation for programs that optimize the performance and cost-effectiveness of transportation facilities. At its core, asset management is a business process. The application of asset management principles often means a change in thinking at every level in an organization: to base decisions on information and on getting results.

<http://www.fhwa.dot.gov/asset/if08008/index.cfm>

### ***Data, Survey Methods, Traffic Monitoring, and Asset Management***

Transportation Research Record No. 1993, Transportation Research Board, Washington, DC (Accession No. 01077529); 2007

TRB's Transportation Research Record: Journal of the Transportation Research Board, No. 1993 includes 22 papers that explore revenue risk mitigation in transportation project financing, traffic sign asset management, estimating highway investment requirements, estimating design hourly volumes, traffic prediction, digital dashboards, random count site selection, wireless location technology-based traffic monitoring, traffic flow impact on travel time variability, and transferability of National Household Travel Survey data. This issue of the TRR also examines the impact of non response and weighting in a travel survey, data integration impact on travel behavior indicators, iterative proportional fitting algorithm for combining traffic count data with missing dimensions, an electronic freight theft management system using Internet-based mapping, and regional routing model for strategic waterway analysis. It also reviews the Highway Capacity Manual adjustment factor for annual weekday to annual average daily traffic, automated consensus-based data verification, enhancing truck data accuracy using dual-loop event data, video-based vehicle detection and classification system, gross vehicle weight distributions from weigh-in-motion data, detection and tracking of vehicle base fronts for traffic counts and speeds, and customizing quality assessment techniques for traffic data archives.

<http://www.trb.org/Main/Public/Blurbs/159318.aspx>

### ***Improving Conceptual Model of Transportation Asset Management: Lessons Learned From Local Level***

Vincent Louis Bernardin, and Pablo Luis Durango-Cohen; Transportation Research Board Annual Meeting, 2007, Paper #07-0285; Transportation Research Board. Washington, DC. 2007

## Abstract

The Midwest Regional University Transportation Center partnered with the Northwestern University Transportation Center to engage in a study of transportation asset management at the level of local government, with an emphasis on smaller municipal and county agencies. The study resulted in a report, *Transportation Asset Management for Local Government Agencies: Threshold Levels and Best Practice Guide*, which was directed toward local government agencies. However, several lessons from the study are valuable beyond just the local level and may help broaden and enrich our view of asset management. Most notably, the experience of local agencies' attempts to improve the management of their assets underscores the importance of investing attention and effort in management strategies for efficiency. The importance of institutional learning and developing an awareness and understanding of their situation evolving in time, beyond simply data collection, also was apparent. These insights motivated a new take on our conceptual model of transportation asset management and enrich the understanding of the discipline which largely evolved first in the context of the state and federal transportation agencies. This paper presents the conceptual model which evolved from the study of asset management at the local level as well as several of the most interesting lessons which motivated it.

Order URL: [http://gulliver.trb.org/news/blurb\\_detail.asp?id=7286](http://gulliver.trb.org/news/blurb_detail.asp?id=7286)

### ***Transportation Asset Management for Local Government Agencies***

Authors: Vincent L. Bernardin, Jr., and Pablo Durango-Cohen, Ph.D; Midwest Regional University Transportation Center, University of Wisconsin-Madison; U.S. Department of Transportation; Support from the Wisconsin Department of Transportation; March 31, 2006

## Abstract

The Federal Highway Administration defines transportation asset management as "a systematic process of operating, maintaining, and upgrading infrastructure cost-effectively." The objective of this report is to help county and municipal-level agencies implement transportation asset management techniques. The report represents a synthesis of the current literature on asset management relevant to local governments as well as a significant contribution to the subject. The report represents an important reference and resource for local government agencies and functions as a synthesis by (1) reviewing and re-presenting the concepts, strategies and tools of asset management, (2) identifying other important transportation asset management references and resources for local agencies, and (3) documenting the successful implementation of asset management techniques by local governments. The report makes important new contributions to the field by (4) identifying strategies, such as coordinated maintenance and group purchasing, particularly important for asset management at the local level, (5) reviewing commercially available software tools, (6) recommending standards of practice for agencies of various sizes, and (7) identifying future work important to advancing the state of the practice of asset management at the local government level. The report was based upon an extensive review of both the academic and professional literature, including online/web resources; a review and meta analysis of surveys of local agencies on the topic of transportation asset management supplemented by a new, limited survey; a survey of software vendors providing asset management software to county and municipal governments; and the input of practitioners and experts in the field.

. . . This guide presents a variety of both strategies and tools to help small agencies in the task of managing their transportation assets. However, the first aid the guide offers is a conceptual framework for understanding this task itself. This framework will be used to organize the management strategies

presented in the guide and also of value in helping to untangle the key components of the job of transportation asset management which can easily become obscured at the level of practice by the definitions of the various organizations and programs involved.

The model of transportation asset management presented in this guide is structured around the basic questions that must be answered in any coherent attempt at transportation asset management. These are the six basic questions used to structure the process of asset management:

- What are we trying to do?
- How are we doing?
- Can we do better?
- What are we doing?
- How are we doing it?
- How do we know?

If an agency cannot answer these fundamental questions, it cannot effectively manage the public's assets. The quality of an agency's answers to these questions is a good measure of the quality of its asset management practices. . .

. . . Asset Management Success Stories

Asset Management enabled several agencies to obtain additional funding:

- Jackson County, Missouri, obtained a 30-percent "add back" to budget as a result of asset management information.
- Wisconsin DOT used asset management data to justify a funding request that would result in current conditions being maintained.
- Michigan DOT used a road quality forecasting system to justify an increase in pavement preservation funding.
- Asset management information supported the need for a gas tax increase that was approved recently in Ohio.
- Asset management practices produced notable system condition improvements:
- The share of poor pavement in Michigan has been reduced by 11 percent since 1996, and the average remaining life has increased by 26 percent.
- Jackson County, Missouri, has seen a shift from 70 percent of all roads in poor or fair condition in 1992 to 75 percent of all roads currently in fair to excellent.

[http://www.wistrans.org/mrutc/files/MRUTC\\_05-01\\_FR.pdf](http://www.wistrans.org/mrutc/files/MRUTC_05-01_FR.pdf)

***6th National Conference on Transportation Asset Management, November 1—3, 2006 Kansas City, MO.***

Transportation Research Circular Number E C093; T Edited by Kathryn A. Zimmerman and Leslie A. Sweet, *Applied Pavement Technology, Inc*; Asset Management Committee, Transportation Research Board, Washington, DC; American Association of State Highway and Transportation Officials, Midwest Transportation Consortium, and National Association of County Engineers; Transportation Research Board; March 2006

. . . The conference was held in conjunction with the 1st National Conference on Roadway Pavement Preservation and provided an opportunity for asset management, maintenance, and other transportation practitioners to share information, acquire new skills, and network with other professionals in this field. . . sessions cited pavement preservation programs as an excellent example of applied asset management concepts and illustrated how such programs make cost-effective use of

available funds with treatments that provide an improved level of service, fewer disruptions to the traveling public, and improved safety characteristics.

. . . Conference featured presentations and facilitated discussions that supported the conference theme: *Making Asset Management Work in Your Organization*. . . sessions were organized to address the special needs of large, complex organizations, small organizations, and transit and rail issues. Other sessions covered asset management applications in varied transportation agencies, establishing and using performance measures, analytical issues in asset management, and best practices in transportation asset management (TAM).

. . . Applications from a recent international scanning tour on asset management were highlighted to illustrate the possible applications of asset management concepts in transportation agencies. . .

This circular summarizes the content of the conference's sessions and presentations. The moderator for each session prepared a summary of his or her session as well as summaries of the individual topics included in the session. The intent of this circular is to provide a record and reference of the conference topics so that future deliberations and conferences can build on these efforts.

<http://onlinepubs.trb.org/onlinepubs/circulars/ec093.pdf>

### ***Performance Measures and Targets for Transportation Asset Management***

Cambridge Systematics, Inc., MD; with PB Consulting, Inc., NY; Texas Transportation Institute; (NCHRP Report 551), Transportation Research Board, Washington, DC; 2006

#### Executive Summary

. . . The objectives of this project were to develop an understanding of what set of performance measures can best serve the principles of good asset management and to recommend procedures that help an agency apply this understanding. This study has developed a practical methodology that enables a transportation agency:

- To identify measures of transportation system performance that are best suited to good asset management, covering a range of investments for system preservation, operations, and capacity expansion; and
- To select specific performance measures and set targets for these measures that are consistent with the needs of the agency and with good asset management practice.

This report is Volume I of a two-volume set presenting the results of research conducted for Project 20-60 and includes:

- Results of a literature review and interviews with 15 transportation agencies, describing the range of performance measures now used or proposed for use by domestic and international agencies, the criteria that now govern performance measure selection, and how performance measures are applied in different agencies.

[http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp\\_rpt\\_551.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_551.pdf)

### ***Integrating Asset Management into the Metropolitan Planning Process: A Peer Exchange, 2006***

(FHWA-HEP-07-013), Proceedings of a peer exchange held in Traverse City, Michigan, July 18—19, 2006; Federal Highway Administration, Washington, DC. ; 2006

## Introduction

This report summarizes the proceedings of *Integrating Asset Management into the Metropolitan Planning Process*, a peer exchange organized by the Federal Highway Administration's (FHWA) Office of Asset Management and Office of Planning. It was held in Traverse City, Michigan on July 18-19, 2006. The goal of the peer exchange was to bring representatives from state departments of transportation (DOTs) together with representatives of metropolitan planning organizations (MPOs) to discuss the use of Asset Management techniques in the metropolitan planning process. Participants were chosen to ensure a diverse group, with representatives for all parts of the country as well as from jurisdictions of various sizes. In addition, participants were chosen to bring together representatives with a range of experience in Asset Management.

[www.fhwa.dot.gov/planning/statewide/intassetmgmt.htm](http://www.fhwa.dot.gov/planning/statewide/intassetmgmt.htm)

### ***Transportation Asset Management for Local Government Agencies: Threshold Levels and Best Practice Guide***

Author(s) Bernardin, Vincent Jr.; Durango-Cohen, Pablo; Czepiel, Edward; Midwest Regional University Transportation Center, Madison, WI; Wisconsin Department of Transportation; University of Wisconsin-Madison; Northwestern University; DTRS 99-G-0005; May 2006

#### Abstract

The Federal Highway Administration defines transportation asset management as "a systematic process of operating, maintaining, and upgrading infrastructure cost-effectively." The objective of this report is to help county and municipal-level agencies implement transportation asset management techniques. The report represents a synthesis of the current literature on asset management relevant to local governments as well as a significant contribution to the subject. The report represents an important reference and resource for local government agencies and functions as a synthesis by (1) reviewing and re-presenting the concepts, strategies and tools of asset management, (2) identifying other important transportation asset management references and resources for local agencies, and (3) documenting the successful implementation of asset management techniques by local governments. The report makes important new contributions to the field by (4) identifying strategies, such as coordinated maintenance and group purchasing, particularly important for asset management at the local level, (5) reviewing commercially available software tools, (6) recommending standards of practice for agencies of various sizes, and (7) identifying future work important to advancing the state of the practice of asset management at the local government level. The report was based upon an extensive review of both the academic and professional literature, including online/web resources; a review and metaanalysis of surveys of local agencies on the topic of transportation asset management supplemented by a new, limited survey; a survey of software vendors providing asset management software to county and municipal governments; and the input of practitioners and experts in the field.

Permanent link <http://www.mrutc.org/research/0501/>

Permanent link <http://digital.library.wisc.edu/1793/6962>

### ***Why Your Agency Should Consider Asset Management Systems for Roadway Safety***

(FHWA-HRT-05-077), Federal Highway Administration, Washington, DC; 2005

#### Introduction

Why Include Roadway Safety Elements in Your Asset Management System?

This primer provides a general overview of asset management systems for roadway safety elements including hardware and initial guidance for agencies beginning to consider such systems. The evolution of formal asset management programs in government. Since the 1980s, advocates for business standards have called for the application of standard business accounting practices to the oversight of government agencies. These advocates have noted that the financial reports of State and local governments should have sufficient information to assess agencies' financial decisions and the cost of government services. The demand for increased financial accountability for publicly owned assets, coupled with the growing need to carefully shepherd scarce government resources, has motivated government agencies to develop more formal asset management programs.

Recently, the information technology (IT) revolution has simplified gathering inventory, condition, and performance data, as well as applying economic, performance, and behavioral models to support decisions on resource allocation. As a result, highway agencies have new tools for managing roadway assets.

Asset management for highway agencies: It's time to move beyond pavement and bridge management

Roadway infrastructure is one of the largest investments of State governments. State transportation agency officials who manage major highway assets face many challenges. As travel demand escalates, system users expect high-quality service; yet in most States transportation agency funding is constrained. In general, the Nation's highways are an aging asset, so maintenance, repair, and replacement costs are increasing as resources shrink.

Transportation agencies have embraced the asset management decision making framework to help them highlight both the significance of highway infrastructure as an investment and the cost-effectiveness of systematic condition and performance monitoring and maintenance programs. During the past 10 to 15 years, most State departments of transportation (DOTs) have implemented pavement and bridge management systems. These systems provide the timely information and "what if" analyses that State DOTs need to justify program funding and to make cost-effective resource allocation decisions about these high capital-cost assets.

While pavements and bridges are the "big ticket" capital outlay assets in our roadway infrastructure inventory, the highway system's safety and efficiency depend on the performance of roadway safety elements. Cost-effective maintenance, rehabilitation, and replacement of roadway elements such as signs, signals, lighting, guardrails, barriers, crash cushions, pavement markings, and detectors are vital. Yet, because of the pressure of other needs and priorities, most State DOTs have not yet developed adequate asset management systems for roadway safety hardware.

Asset management is a strategic approach to managing transportation infrastructure assets. It provides a systematic process for maintaining, upgrading, and operating physical assets cost effectively.

<http://www.tfsrc.gov/safety/pubs/05077/05077.pdf>

### ***Transportation Asset Management in Australia, Canada, England, and New Zealand***

Author(s) David Geiger, Paul Wells, Patricia Bugas-Schramm, Lacy Love, Dr. Sue McNeil, Dennis Merida, Dr. Michael Meyer, Robert Ritter, Kirk Steudle, Donald Tuggle, Larry Velasquez, American Trade Initiatives, Alexandria, VA; (FHWA-PL-05-019); Federal Highway Administration, Washington, DC; November 2005

Abstract

A significant challenge for U.S. transportation agencies is managing the transportation asset base while funding expansions of the network to meet increasing demands. The Federal Highway Administration, American Association of State Highway and Transportation Officials, and National Cooperative Highway Research Program sponsored a scanning study of asset management experience, techniques, and processes in Australia, Canada, England, and New Zealand.

In its study, the U.S. team observed that asset management as an organizational culture and decision making process is critical to transportation programs facing significant capital renewal and preservation needs and that successful programs require top-level commitment. The team also learned that agencies in the countries studied used asset management practices to obtain funding for transportation infrastructure. The team's recommendations for possible implementation in the United States include using asset management principles to assess and invest in the Interstate System, creating a National Asset Management Steering Committee to distribute information and provide training, developing a Web-based asset-management toolbox, and conducting research on asset management topics.  
<http://international.fhwa.dot.gov/assetmanagement/2005tam.pdf>

***A New Deal for Trunk Roads in England: Guidance on the New Approach to Appraisal, 1998, and A New Deal for Trunk Roads in England: Understanding the New Approach 2005***

UK Department for Transport, London, UK; 2005

Overview

The Study Process - The Appraisal Framework

Appraisal is the process of checking that value for money is achieved in delivering Government aims, including investment in transport to solve problems. The New Approach to Transport Appraisal (NATA) was developed following the Government's White Papers, *A New Deal for Transport and A New Deal for Trunk Roads*.

Throughout the NATA process the Government's five objectives for transport as outlined in the White Paper are central:

- to protect and enhance the built and natural environment;
- to improve safety for all travelers;
- to contribute to an efficient economy, supporting sustainable economic growth in appropriate locations;
- to promote accessibility to everyday facilities for all, especially those without a car; and
- to promote the integration of all forms of transport and land use planning, leading to a better, more efficient transport system.

<http://www.dft.gov.uk/webtag/documents/overview/unit1.1.php>

***Analytical Tools for Asset Management***

Cambridge Systematics, Inc., Cambridge, MA; PB Consulting, Washington, DC; System Metrics Group, Inc., San Francisco, CA; NCHRP Report 545 (Project 20-57), 2005, Transportation Research Board, Washington, DC. ; 2005

. . . This report presents two tools developed to support tradeoff analysis for transportation asset management. These software tools and the accompanying documentation are intended for state departments of transportation (DOTs) and other transportation agencies to help them improve their ability to identify, evaluate, and recommend investment decisions for managing the agency's infrastructure assets. A gap analysis conducted in the first phase of the study revealed that many existing asset management systems are not being used to their full potential. A need was identified for

tools that could be integrated with existing systems to improve an agency's ability to analyze and predict the impacts of investments at the network and program levels on overall system performance. This report and software will be very useful tools for analysts and decision-makers in three major functional areas within state DOTs: (1) policy, planning, and program development; (2) engineering (construction, maintenance, and operations); and (3) budget and finance.

[http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp\\_rpt\\_545.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_545.pdf)

***Relationships Between Asset Management and Travel Demand: Findings and Recommendations from Four State DOT Site Visits***

(FHWA-IF-07-016); Federal Highway Administration, Washington DC; 2005

Chapter 1. Executive Summary

1.1 Background

For more than 80 years, growth in highway travel in the United States has exceeded the growth of the public roadway network (see Exhibit 1-1). Over time, this divergence has resulted in increasing traffic congestion, travel time delays, and infrastructure deterioration, which have in turn generated a range of responses by both providers and users of the nation's highways (e.g., capacity expansions, new construction materials, and both spatial and temporal changes in travel demand). Despite these efforts, the nation's motorists and the trucking industry continue to experience ongoing reductions in roadway performance, increasing travel times, and lost productivity. In response, state highway departments (departments of transportation), county governments, and local agencies continually seek new ways to address ongoing growth in highway travel demand.

<http://www.fhwa.dot.gov/infrastructure/asstmgmt/vmt.cfm>

***Roadway Safety Hardware Asset Management Systems Case Studies***

(FHWA-HRT-05-073), Federal Highway Administration, Washington, DC; 2005

Forward

Since the early 1990s, the term "asset management" has grown to embrace a broad array of tasks and activities aimed at identifying, assessing, prioritizing, evaluating, maintaining, rehabilitating, renewing, preserving, improving, and managing assets. This report addresses asset management of roadway safety hardware in the United States. Increasingly refined and complex tools such as modern bridge and pavement inventory management systems have been developed and adopted by many State departments of transportation (DOTs), as well as some of the larger departments of county and municipal governments. Many of these management systems have been developed cooperatively by pooling funds and in other ways, such as assistance from the Federal Highway Administration (FHWA).

Through maintenance and enhancement efforts, these software systems are growing in their robustness and capability to deal effectively with complex, real-world issues and conditions. One software management area that has not advanced as rapidly is roadway safety hardware inventory, which includes an array of signs, signals, roadway lighting luminaries, support structures for signs, guardrails, pavement markings, and deployed detecting devices—all vital to safe, efficient highway operations.

This study provides information to State DOTs on roadway safety hardware management systems that would help increase their use of state-of-the-practice techniques. This report was developed for State DOT personnel, particularly chief engineers and other top management, involved with the planning, funding, and execution of roadway safety hardware management systems.

<http://www.tfhr.gov/safety/pubs/05073/>

***Linking Strategic Goals and Asset Management for Resource Allocation and Decision Making Using Pavement Management***

McNeil, S. Professor and Director Urban Transportation Center, University of Illinois at Chicago, Chicago, IL; Ogard, E. , Principal, Prime Focus, LLC, DePere, WI; Pagano, A., Associate Professor; Morreale, A., Schermann, J., Berner, J., Research Assistants; Urban Transportation Center, University of Illinois at Chicago, Chicago, IL; Pal, S., Assistant Transportation Planner, LSA Associates Inc.; 6th International Conference on Managing Pavements (2004); Transportation Research Board Committee AFD10 on Pavement Management Systems; TRB; 2004

**Synopsis**

Asset management is a strategic business management approach to maintain transportation infrastructure, allocate system and financial resources and improve performance and utilization of state owned assets. The objective of establishing a strong asset management system is to facilitate the processes of building, preserving and operating facilities while delivering the best value for each dollar spent. The practice of asset management enhances the credibility of the agencies' analytical process and public accountability, to both internal and external stakeholders. Each agency's needs, resources, goals, leadership and stakeholders shape the asset management process. While there is no single approach to asset management, there are various concepts, which emerge as a result of an asset management program. Agencies strongly committed to an asset management program, have a more strategic view of their transportation system, integrate more performance based measures and analytical tools in the evaluation of projects and have a more integrated information management system to evaluate trade-offs between investment and maintenance activities. Finally, a strong asset management program often becomes an agency wide, permeating culture. Strategic plans commonly focus on process management, and long-term goals. Today the strategic planning process must integrate an increasing number of stakeholders varied goals. Regional projects and common asset management issues are often not measured or managed with common metrics, often leading to inconsistent implementation. In order to maximize performance and customer satisfaction a common measurement system is often needed. Linkage of asset management theories to the strategic planning process is essential. States with strong pavement management systems seem well prepared with tools and in state and local transportation agencies, researchers in academic institutions, and other members of the transportation research community. The information in this paper was taken directly from the submission of the author(s). management concepts to help in this task. Pavement management programs provide a sound foundation upon which many asset management systems have been built. In some cases, pavement performance measures are now found in strategic planning goals. Our research team conducted a comprehensive information search to identify strategic planning goals, evidence of performance measurement and the inclusion of asset management programs, in each of the 50 states. Twelve states were identified as innovative, with highly developed performance measurements, sophisticated strategic planning goals and well-developed asset management programs. An eight member, expert panel comprised of State DOT officials and university professionals guided the final selection of five agencies. The final screening criteria gave preference to programs that had been in place for eighteen months or longer, with clearly defined objectives and evidence of measurable goals. Programs with comprehensive scope and application were given preference. Three sets of interviews were developed to capture program specific information about strategic planning, asset management and performance measurements and their linkage to each other. Agency visits and extensive cross-functional interviews

were conducted over a two-day period. Management systems and relationships between stakeholders and the agencies were analyzed. Specific information was gathered about agency's structure, performance measurement methods, asset management programs and strategic planning practices. Legislation, organizational structure and corporate culture were assessed. Best practices were acknowledged and elements from programs in use today in Florida, Maryland, Michigan, Montana and Pennsylvania were investigated.

<http://pavementmanagement.org/ICMPfiles/2004076.pdf>

***Asset Management in Planning and Operations: A Peer Exchange, September 7–8, 2004***

Prepared by Patricia Hendren; Transportation TRB Electronic Circular E-C076; Transportation Research Board, Washington, DC. ; June 2005

. . . The Asset Management in Planning and Operations Peer Exchange, sponsored by the Federal Highway Administration (FHWA), was hosted by the Transportation Research Board (TRB) Committee on Statewide Multimodal Transportation Planning (ADA10), Performance Measurement Committee (ABC30), and Transportation Asset Management Committee (ABC40). The peer exchange was organized jointly by representatives of TRB, the American Association of State and Highway Transportation Officials (AASHTO) Standing Committee on Planning, the Standing Committee on Highway, the subcommittee on Asset Management, and the FHWA.

Asset Management (AM) in planning and operations was selected as the peer exchange focus because of the expanding role of AM as a comprehensive approach to managing agency resources and transportation systems.

. . . Lance Neumann, Cambridge Systematics, Inc. began the peer exchange with a brief overview of available AM resources and observations from state department of transportation (DOT) implementation of AM. The recently released AASHTO report Transportation Asset Management Guide (available online at <http://downloads.transportation.org/amguide.pdf> ) was noted as a useful document that clearly defines AM, identifies key business principles, provides guidance on “good AM practice” in key functional areas, contains a self-assessment tool, and presents selected examples. An additional AM training resource discussed was the National Highway Institute (NHI) course based on the AASHTO Transportation Asset Management Guide. . . . Kirk Steudle, Michigan DOT, gave an update on the AASHTO subcommittee on Asset Management. . . AASHTO has helped produce the AASHTO Transportation Asset Management Guide, and the Transportation Asset Management Community of Practice website (<http://assetmanagement.transportation.org>). The current mission of the subcommittee is to advance the AM state of the practice and to guide the evolution of AM into a standard for state DOTs. To accomplish this mission, the subcommittee has identified five goals:

1. Promote development of tools.
2. Communicate with and inform member states on how to use AM.
3. Assist member states in assessing and implementing AM.
4. Develop and document an understanding of AM and share with member states.
5. Develop partnerships with other organizations, for example, the American Public Transportation Association and the Association of Metropolitan Planning Organizations.

<http://onlinepubs.trb.org/onlinepubs/circulars/ec076.pdf>

***Best Practices for Linking Strategic Goals to Resource Allocation and Implementation Decisions Using Elements of a Transportation Asset Management Program***

Anthony M. Pagano, Sue McNeil, Robert Johns, and Libby Ogard; Midwest Regional University Transportation Center; 2004

The research described in this report assembles a set of tools based on experiences and best practices in a diverse set of states for linking strategic goals to resource allocation and implementation decisions using aspects of asset management. A survey of practices in each of the state DOTs that explores documents and synthesizes both strategic planning processes and asset management was conducted. With input from an expert advisory panel, five states were for detailed analysis. These are Florida, Maryland, Michigan, Montana and Pennsylvania. Each of the states was visited by a project team that spent two days on site. Information on the strategic planning and asset management process was obtained through personal interviews with DOT officials and the acquisition of materials describing these processes. Based on detailed documentation of the practices in each of these states, a synthesis of best practice of strategic planning, asset management and the linkage between the two was developed. A model process for linking asset management to strategic planning is then developed. The model process that results does not represent any particular state, but incorporates elements from all five states. This model process can provide useful guidance to states interested in augmenting their existing processes.

Download PDF: <http://minds.wisconsin.edu/handle/1793/6883> See also Infrastructure Corporation of America (<http://www.ica-onramp.com>): Florida Asset Management Program.

***Federal Highway Administration Asset Management Position Paper***

FHWA, Washington, DC; FHWA Asset Management Website; 2004

Background

FHWA has been working with AASHTO, TRB and other partners to develop and advance asset management. The concept of asset management that has emerged is very broad and represents a set of business principles for making more effective resource allocation decisions. While much of the early application of asset management principles focused on infrastructure preservation activities, the principles apply equally to all functions and the entire life cycle of decision-making from defining policy objectives to planning, programming, budgeting, program and project development and design, operations, construction, maintenance, and system monitoring. In discussing this view of asset management with a wide variety of individuals across FHWA's program offices, the terms "total performance management" and "total system management" were used to describe the broad concept of asset management that currently exists. Irrespective of the term used to describe the business principles that are at the heart of asset management, it represents a comprehensive approach to managing resources and the transportation system.

<http://www.fhwa.dot.gov/infrastructure/asstmgt/ampp.htm>

***Integrated Asset Management Guidelines for Road Networks***

Austrroads; Sydney, Australia; Pub. No. AP-R202/02, TRB; 2002

This document contains guidelines for integrating road network asset management into a road agency's overall business planning cycle. The guidelines are intended to assist large and small road agencies develop and implement stakeholder driven strategies to provide direction and support for the overall asset management task. The guidelines describe a generic process for managing a road network investment program, covering planning, implementation, audit and review. Emphasis is given to the

integration of strategic planning at the road network level, based on the requirements of the road agency and other stakeholders. The integrated asset management process is described as comprising seven distinct but inter-related phases. The guidelines recognise that agencies may have their own detailed processes and analytical tools, and so asset management processes are not described in detail. The concepts of level of service and target performance standards are explained in the context of road network asset management. A glossary of the specific terms used is included.

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<https://www.onlinepublications.austroroads.com.au/items/AP-R202-02>

### ***FHWA Life-Cycle Cost Analysis Primer***

(FHWA-IF-02-047); Federal Highway Administration, Washington, DC; 2002

Introductory message from:

Tommy L. Beatty

Acting Director, Office of Asset Management

The Federal Highway Administration's (FHWA's) Office of Asset Management is pleased to present this Life-Cycle Cost Analysis Primer. This Primer is intended to provide sufficient background for transportation officials to investigate the use of life-cycle cost analysis (LCCA) to evaluate alternative infrastructure investment options. Additionally, the Primer demonstrates the value of such analysis in making economically sound decisions.

LCCA is an engineering economic analysis tool useful in comparing the relative merit of competing project implementation alternatives. By considering all of the costs— agency and user—incurred during the service life of an asset, this analytical process helps transportation officials to select the lowest cost option. Additionally, LCCA introduces a structured methodology that accounts for the effects of agency activities on transportation users and provides a means to balance those effects with the construction, rehabilitation, and preservation needs of the system itself.

LCCA's value as a decision-support tool is contingent upon its proper use. While the economic concepts that support this type of analysis are fairly straightforward, their application presents a number of challenges. Frequently there are uncertainties as to when and how LCCA should be employed and what assumptions should be made during the course of the analysis. By carefully describing the LCCA methodology and process and by addressing the uncertainties, this Primer is intended to encourage a broader application of this important investment tool.

. . . In the Fall 1996, FHWA initiated a technology Office of Asset Management, Infrastructure Core Business Unit, Federal Highway Administration transfer effort under Demonstration Project 115, "Life-Cycle Cost Analysis in Pavement Design." This project resulted in an LCCA instructional workshop that has since been delivered to more than 40 State transportation agencies. In 1998, FHWA issued an Interim Technical Bulletin on LCCA, Life-Cycle Cost Analysis in Pavement Design. FHWA . . . provide technical assistance and training to assist individual transportation agencies as they explore the use of LCCA for pavement design decisions.

<http://isddc.dot.gov/OLPFiles/FHWA/010621.pdf>

### ***Transportation Asset Management Case Studies (ongoing series)***

Federal Highway Administration; FHWA Website; 2002 on

- Bridge Management: California, Florida, South Dakota
- Culvert Management Systems: Alabama, Maryland, Minnesota, Shelby County

- Comprehensive Transportation Asset Management: North Carolina, Washington State
- Data Integration: Arizona, Colorado, Michigan, Pennsylvania, Virginia
- Economics: Florida, New York, Ohio-Kentucky-Indiana Regional Council of Governments
- HERS-ST: Indiana, New Mexico, Oregon
- Life-Cycle Cost Analysis: Pennsylvania
- Pavement Management Systems: Kansas, Minnesota, Oklahoma, Washington State

<http://www.fhwa.dot.gov/infrastructure/asstmgmt/casestudies.cfm>

### ***Transportation Asset Management Guide***

Prepared by Cambridge Systems, Inc. with Parsons Brinckerhoff Quade & Douglas, Inc., Ray Jorgenson Associates, Inc., Paul D. Thompson, Consultant; (NCHRP 20-24(11)), Pub. Code: RP-TAMG-1; American Association of State Highway and Transportation Officials, Washington, DC; November 2002

#### Introduction

. . . The objectives of this study have been to gather information on asset management practices in the United States and overseas, develop a framework for transportation asset management, and apply this framework to produce a Transportation Asset Management Guide. The study has been organized in two phases: Phase I encompassed information gathering, framework development, and recommendation of a research program; and Phase II has produced this Guide. The work in Phase I was documented in three reports:

1. A comprehensive framework for transportation asset management that established the basis for developing this Guide;
2. A synthesis of current information and practices in asset management; and
3. A prioritized program of research in asset management.

This Guide builds on this earlier work to provide state DOTs and other transportation agencies guidance on implementing asset management concepts and principles within their business processes. At its core, asset management deals with an agency's decisions in resource allocation and utilization in managing its system of transportation infrastructure. Asset management is a way of looking at an agency's "way of doing business" to see if there are better ways to reach decisions in infrastructure management – e.g., by basing decision methods and criteria on current policy guidance, considering a range of alternatives, focusing on outcomes of decisions, and applying more objective information to decisions. Asset management therefore relates to existing agency functions – e.g., participating in and informing the development of transportation policies, long-range planning, priority programming and development of the statewide transportation improvement program (STIP), delivering programs and services, and monitoring system condition. It is not a separate function on its own, nor is it a complete departure from current practice. In fact, while all agencies reflect good asset management to some degree in their daily operations, all have room for improvement: "Everyone is doing something, but no one is doing everything." The intent of this Guide is to provide individual agencies with the flexibility to tailor and customize their asset their resource allocation and utilization processes and decisions. Since transportation asset management is a continually and rapidly evolving field, the AASHTO Strategic Plan envisions periodic updates of this to be able to report current DOT experiences and practices. The Strategic Plan also recommends a number of tasks and research efforts, results of which will likewise be useful additions to future versions of this Guide. . .

<http://downloads.transportation.org/amguide.pdf>