DYE MANAGEMENT GROUP, INC.
City Center Bellevue • Suite 1700 • 500 108th Avenue NE • Bellevue, WA 98004-5500
T: (425) 637-8010 F: (425) 637-8020 • www.dyemanagement.com

Transportation Performance Audit Board

Review of WSDOT's Use of Performance Measurement

November 12, 2004

Washington State

Transportation Performance Audit Board

Review of WSDOT's Use of Performance Measurement

Table of Contents

■

Executive Summary

■

This is the executive summary of a review of the Washington State Department of Transportation's (WSDOT) use of performance measurement conducted for the Transportation Performance Audit Board of the Washington State Legislature (TPAB).

A. Review Objectives and Scope

The review addresses the provisions of RCW 44.75.070, enacted in 2002, that direct TPAB to evaluate WSDOT's use of performance measurement. The TPAB specified a series of questions that are answered in Exhibit E-1.

B. Approach

The following approach was taken to address the review questions:

- The state of the practice for the use of performance measurement by government, and by state transportation agencies in particular, was assessed. There is an extensive body of literature and practitioner experience with performance measurement. The state of the practice suggests a series of criteria or tests to determine whether WSDOT is using performance measurement to good effect. According to these criteria, performance measures should be:
  - Aligned with government policy and user priorities.
  - Used by management throughout the management cycle.
  - Used to communicate to internal and external audiences.
  - Used to evaluate cause and effect.
- Fact-finding interviews were conducted with WSDOT managers and legislative staff to inventory documented policies, strategic plans, performance measures, and other reports used to manage performance.
- Fact-finding interviews were conducted with WSDOT managers to identify how they use performance measures within their areas of responsibility.
- Interview results and the inventoried documents were reviewed and assessed against the criteria established for the use of performance measurement by state transportation agencies.

C. Overall Findings

These findings provide a snapshot assessment of the current performance measurement system that WSDOT has implemented and is continuing to develop. It is important to recognize that WSDOT is still developing its system; however, the current level and use of performance measurement to provide accountability compares favorably to the situation four years ago. This study also found that WSDOT compares favorably to other state departments of transportation in the effective use of performance measurement.

1. Strengths

WSDOT has established an effective system of measurement to manage and provide accountability for the delivery of products and services. WSDOT should continue to use this system and develop it further. Within WSDOT, there is a rich use of performance measurement.

- WSDOT compares well with other state departments of transportation.
- There is top-down support, organizational alignment, and use of performance measures.
- Performance measurement is helping to create a culture of performance.
- Performance measure development has targeted what is most important.

2. Opportunities

WSDOT is now positioned to build on the current department-wide performance measurement system. These criteria are:

- Systematically reporting on the outcomes from WSDOT programs against the business plan.
- Measuring and reporting on efficiency and effectiveness.
- Improving the effectiveness with which performance measures are communicated to policymakers and the public.

D. Use of Performance Measurements

At the policy level, both the executive and legislative branches of state government have moved toward the use of performance measurement in government, especially in the budget process. A series of evaluation criteria for the effective use of performance measurement by government were developed that are consistent with Washington's overall Priorities of Government framework. Exhibit E-1 reports whether WSDOT meets these criteria.

Exhibit E-1: Application of Evaluation Criteria

	Evaluation Criteria							
	Alignment with Government Policies and User Priorities		Used by Management Throughout the Management Cycle			Used to Communicate Effectively		Used to Evaluate Cause and Effect
	Policy Goals	User Priorities	To Provide Leadership	To Provide Management and Employee Accountability	Measures Aligned with Business Processes	To Internal Audiences	To External Audiences	In Support of Program Evaluation
Overall Performance Management System	Yes	Partially, addressed by WTP update	Yes	Yes	Yes	Yes	No	Yes
Project Delivery	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Developing
Highway Maintenance	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Traffic Operations	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Safety	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Equipment and Facilities	Yes	No	No	No	Yes	No	No	No
WSF	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

1. Managing the Delivery of Products and Service

Findings:

- WSDOT uses performance measurement to provide leadership, set direction, establish a performance-oriented culture, and ensure manager accountability in a highly effective way.
- Across all major program areas, measurement is in place to track the delivery of products and services.
- In a number of program areas, there is measurement of accomplishments, efficiency, and effectiveness across the management cycle.
- In some business areas, measurement is used to monitor and report outcomes, efficiency, and effectiveness across the business areas.

Over the past four years, WSDOT has placed great management importance on establishing and continuing to refine the use of performance measurement to provide accountability to the Legislature and to Washington taxpayers for the delivery of projects and for the operation and maintenance of the transportation system. The review finds that the department-wide performance measurement system provides an effective tool that is understood and aligned with the measurement and management of different business areas within WSDOT. The performance measurement system is establishing a performance-oriented culture and providing management with the tools necessary to manage performance.

2. Communicating Accomplishments and Challenges of Product and Service Delivery

Findings:

- WSDOT has performance measures that provide accountability for the delivery of products and service.
- WSDOT has successfully addressed the priority need to provide accountability for the "Nickel" program.
- The Gray Notebook includes performance measures that provide accountability, but as a communications vehicle, it is difficult for policymakers and external audiences to use.

WSDOT uses performance measurement in support of management's priority to provide accountability to and improve communications with policymakers and the public for delivery. The reporting system for project delivery, especially the project status information on the WSDOT Web site, accomplishes this.

The Gray Notebook contains a great deal of material on WSDOT business and its performance. However, it is difficult to use as a report card on the performance of

WSDOT against citizen goals and objectives, and then against managements' goals and objectives. There is a great variation in the contents from quarter to quarter.

3. Understanding Cause and Effect

Findings:

- WSDOT uses performance measurement systematically across its program areas to understand cause and effect.
- At the transportation system level, the Washington Transportation Plan process is using measurement to assess cause and effect, and to improve WSDOT program effectiveness.
- WSDOT's project programming and prioritization uses performance measures to prioritize projects.

There is a widespread use of performance measurement to understand the relationship between the work WSDOT performs and how this work results in better outcomes for the public. Performance measurement is also used to develop and refine programs. WSDOT is positioned to use information about performance in the budgeting process to allocate resources and to enable policymakers to understand the outcomes of funding programs at different levels.

4. Monitoring Transportation System Performance Over Time

Findings:

- Reporting on the performance of the transportation system against Washingtonians' overall economic, mobility, and other goals and priorities is fragmented.
- The Washington Transportation Plan process sets goals and objectives for the transportation system over which WSDOT has jurisdiction.
- The Transportation Benchmarks do not provide a full framework for monitoring overall system performance.

There is a state interest in how Washington's transportation system performs because it affects those things that are most important to the citizens – the economy, quality of life, and the environment, among others. Reporting on this performance provides information to engage citizens in the policy process and to improve policymaking.

Legislation requiring transportation benchmarking, RCW 47.01.012, sought to provide information on how Washington's transportation system performs. This legislation does not fully accomplish this. There is performance information in the specified benchmark areas but the statutorily driven approach does not reconcile competing policy goals or set priorities among them. The Washington Transportation Plan update process can provide a framework to establish system-level priorities and to measure performance. Such information enables citizens to understand where the transportation

system stands as measured against the issues that are most important to them. This is different than providing information on how well WSDOT is performing.

E. Review Questions – Findings

The answers and findings regarding each question addressed in this review are summarized in Exhibit E-2.

Exhibit E-2: Review Questions and Answers

Have the Legislature and the Transportation Commission established clear mandates, strategic plans, mission statements, and goals and objectives? **Yes**, for the delivery of projects, and the operation and maintenance of the system by WSDOT. The project-specific direction given to WSDOT, its strategic plan and business plan together, provide clear goals and objectives. **Partially**, for the state's transportation policy goals and objectives. RCW 47.01.012 provides a partial set of policy goals and objectives for the overall performance of the transportation system. The Transportation Commission is directed to develop performance measures to ensure transportation system performance. The Washington Transportation Plan process can provide a mechanism to address this.
Are the performance and outcome measures of WSDOT's highways and ferries programs consistent with legislative mandates, Transportation Commission policies, strategic plans, mission statements, and goals and objectives? **Yes.** Performance measurement used in the budget process, as reported in the Gray Notebook and the Transportation Benchmarks implementation report, are consistent. The use of measurement provides accountability.
Have the WSDOT's highways and ferries programs established clear performance benchmarks and/or standards for assessing the overall performance of WSDOT? **Yes, for most business areas.** WSDOT has established department-wide standards for management priorities focusing on the on-schedule and in-budget delivery of projects, and efficient maintenance and operations of the system. Not all programs and business areas have established performance benchmarks or standards for efficiency and effectiveness.
How are WSDOT's management and the Transportation Commission using performance measurement data to improve WSDOT's organization, budget planning, and allocation of resources? **WSDOT is using performance measurement to align resources with management priorities.** At the program level, performance measurement is used systematically across most business areas to improve effectiveness. The 2005–2007 budget identifies measurable outputs and outcomes by program area. More broadly, executive management is using performance measurement to provide leadership, accountability, and establish a performance-oriented culture.

Are WSDOT's current reporting requirements contributing to the efficiency of the department and are they cost effective?

It is not evident that all of WSDOT's reporting requirements result in efficiency improvements. WSDOT does not report many efficiency measures. In the area of maintenance, there are measures that do contribute to efficiency.

Yes, reporting is cost effective. WSDOT has taken a sound business approach to reporting, and existing management and reporting procedures are leveraged to meet reporting requirements. New procedures address business priorities such as establishing a project control system.

Are the Gray Notebook (see Section VIII, "Resources" on Page 6) and associated quarterly reports to the Transportation Commission meaningful, cost-effective tools?

Yes, The reports are a cost-effective mechanism for reporting on WSDOT activities. The Gray Notebook incorporates measurement and other information from WSDOT's management and oversight processes. The reports, particularly those regarding project performance, are used by the commission to provide oversight and ensure accountability.

Are WSDOT's reports being utilized by their targeted user groups?

Yes, with regard to internal WSDOT uses and by the commission. The commission uses the reports and finds them extremely valuable.

There is no evidence from which to determine whether they are used by the public.

How are the WSDOT's highways and ferries programs using performance and outcome measures to manage resources in an efficient and effective manner?

WSDOT's Highways Program used measurement extensively to improve program effectiveness especially in the selection and prioritization of projects. For highway maintenance, there is a long-standing effective program (the Maintenance Accountability Process). WSF has emulated this system for vessel maintenance.

Washington State Ferries uses performance measures to manage the resources required to meet policy goals for levels of service and to meet regulatory requirements. WSF should expand on its efforts to set goals for the financial returns from investments in ships and terminals.

What performance benchmarks have been used in other states to measure the performance of transportation agencies? How do they compare with those used by WSDOT?

Other states use performance measurement to monitor transportation system performance, provide accountability to policymakers and the public, support strategic management, and with differing levels of intensity, to manage efficiency and effectiveness across their organizations.

Washington compares favorably with many other state departments of transportation in the use of measurement to provide leadership and accountability for delivery. WSDOT aspires to develop its approach further to become a national leader in the use of performance measurement at the department level and by business area.

Is WSDOT's information technology capability adequate to provide management with the information necessary to monitor performance data?

No. WSDOT management is constrained in its ability to have current and integrated data for measuring performance. WSDOT has a wealth of data, but it can often involve a lot of work or a research project to measure and report on a frequent basis.

F. Recommendations

Recommendation 1: Change RCW 47.01.012 to establish an overall set of transportation system performance goals and measures that address Washington's desired outcomes for the performance of the system.

This includes amending the RCW 47.01.012 legislation so that specific performance benchmarks are removed and directing the Washington Transportation Commission to establish a set of measures that address the performance of the state's overall transportation system. We understand that the Washington Transportation Plan update underway is identifying citizen issues and priorities. The statutory change would direct the performance measures to address these types of issues and the broad policy goals and priorities of Washington's citizens with respect to the performance of the transportation system. The commission would provide these measures and report on them. It is important to note that this is a different set of measures than those that address the effectiveness of WSDOT's contribution to the state's overall transportation system performance goals.

Recommendation 2: Continue to refine the WSDOT performance measurement system and establish an overall plan that considers policymaker priorities for its future development.

The intent of this recommendation is to recognize the advances that have been made in the use of performance measurement to provide accountability. WSDOT is continuing to refine this system. The recommendation is that WSDOT establish a plan for the refinement of the performance measurement system. This plan should identify the types of performance measurements used, the information that policymakers believe is most important, and the format in which the information would be presented.

Recommendation 3: Improve the usability of performance measurement information and the communication of this information to policymakers, the public, and business partners.

WSDOT's reporting of performance information through the Gray Notebook and on associated Web pages provides considerable detail that is highly valued by the Transportation Commission and WSDOT business partners. The intent of this recommendation is that WSDOT develop a format that is more accessible for policymakers, the public, and business partners. Such an approach could be brief and in the form of an annual, or more frequent, report that enables the reader to see the status of WSDOT's performance compared to the goals set by WSDOT.

Recommendation 4: Strengthen the ability of WSDOT's information technology to support performance measurement and provide management information.

This recommendation recognizes the constraints that WSDOT faces in assembling timely and accurate information from multiple databases for performance reporting and management. It is recommended that WSDOT's planned Critical Systems Assessment study is funded. As part of this study, WSDOT should define a plan that will make the recording and reporting of performance data timely and efficient. Other recommended actions to support performance measurement include:

- Establishing and publishing standard definitions and usage for key project data items.
- Developing an integrated database for project data, for use by multiple divisions and offices that rely on this data.
- Expanding the use of WSDOT's project scheduling system (PDIS) by project engineers and project managers.

I. Introduction

■

This report presents the results of a review of performance and outcome measures of the Washington State Department of Transportation (WSDOT). The review addresses the provisions of RCW 44.75.070, enacted in 2002, that directs TPAB to address a series of questions regarding the type of performance measures that are used and how they are used by WSDOT. The overall purpose of this review is to allow the Transportation Performance Audit Board to: "Ensure the Legislature will have the means to adequately and accurately assess the performance and outcomes of those agencies [WSDOT and WSF]."[1]

In its early formulations of this scope of work TPAB had envisioned that the review could use the results of WSDOT's performance measurement to "determine if performance audits are necessary; and determine the focus and scope of performance audits." While the work conducted as part of this review and Dye Management Group, Inc.'s prior performance audit experience with other state departments of transportation can provide some insight into these questions. WSDOT's performance measurement data does not in itself provide the basis for identifying performance audit areas.

The focus of the review is an assessment of how effectively WSDOT is using performance measures, not what performance measures indicate about how well WSDOT is delivering its programs. The scope of the review is to include the performance and outcome measures of the WSDOT's highways and ferries programs. The scope of work distinguishes between Washington State Ferries (WSF) as one of the operating divisions of WSDOT and the highways program.

A. Review Questions

The TPAB specified a series of questions for the review to answer. The questions are listed below:

- Have the Legislature and the Transportation Commission established clear mandates, strategic plans, mission statements, and goals and objectives?
- Are the performance and outcome measures of WSDOT's highways and ferries programs consistent with legislative mandates, Transportation Commission policies, strategic plans, mission statements, and goals and objectives?
- Have the WSDOT's highways and ferries programs established clear performance benchmarks and/or standards for assessing overall performance of the WSDOT?

[1] Transportation Performance and Audit Board. Request for Proposals for Review of Performance and Outcome Measures of the WSDOT highways and ferries Programs. May 2004.

- How are WSDOT's management and the Transportation Commission using performance measurement data to improve WSDOT's organization, budget planning, and allocation of resources?
- Are WSDOT's current reporting requirements contributing to the efficiency of the Department and are they cost effective?
- Are the "Gray Notebook" (see Section VIII, "Resources" on Page 6) and associated quarterly reports to the Transportation Commission meaningful, cost-effective tools?
- Are WSDOT's reports being utilized by their targeted user groups?
- How are the WSDOT's highways and ferries programs using performance and outcome measures to manage resources in an efficient and effective manner?
- What performance benchmarks have been used in other states to measure the performance of transportation agencies? How do they compare with those used by WSDOT?
- Is WSDOT's information technology capability adequate to provide management information necessary to monitor performance data?

B. Approach

The analysis and assessment presented in this report is based on the following key premise:

- Performance measures and performance measurement are tools.

These are not ends in themselves. Therefore, to evaluate performance measurement the questions become what are we using performance measurement for? How effectively are we using performance measures? What are the outcomes or the results from the use of performance measurement? What would make performance measurement a more effective tool?

Our approach to answering these questions involves first outlining the following based on our assessment of the state of the practice:

- The role one would expect for the use of performance measurement.
- The success factors that need to be in place for performance measurement to be effective.
- The types of performance measures and the uses to which they are put.
- The audience for the performance measures.

Then we evaluate the extent to which performance measurement.

- Reports on government's accomplishments in addressing the citizens' goals and objectives.
- Is used by management throughout the management cycle to provide leadership and accountability, and to ensure efficiency and effectiveness.

- Is used to communicate to internal and external audiences.
- Is used to evaluate cause and effect.

1. Work Steps

The following work steps were taken to address the review questions:

- **Review the state of the practice to identify evaluation criteria.** The state of the practice for the use of performance measurement by government and state transportation agencies. This involved conducting a review of the literature and conference papers detailing findings regarding best practices.

  Two sets of secondary source materials were reviewed. First, the general public administration and public sector management literature was received to identify any current or emerging industry standards for successful performance measurement. Second, articles, conference proceedings, state surveys regarding the application of performance measurement by state transportation agencies, and other secondary source materials were reviewed. These sources were used to establish a series of criteria against which to assess Washington's use of performance measurement.

- **Conduct fact-finding interviews** with WSDOT managers and legislative staff to inventory documented policies, strategic plans, performance measures, and other reports used to manage performance.
- **Conduct fact-finding interviews** with WSDOT managers to identify how they use performance measures within their areas of responsibility.
- **Review WSDOT practice against evaluation criteria.** The documented materials, interview results, secondary source materials, and Dye Management Group, Inc.'s professional judgment were used to evaluate WSDOT's performance measurement system to answer the review questions.

2. Benchmarking

The review addresses how well WSDOT uses performance measures; not what the performance indicators say as to how well WSDOT is doing its job. that the latter would involve benchmarking. Benchmarks are any reported measure that can be compared across agencies or programs. A benchmark can be, but does not need to be, a performance measure. Similarly, performance measures can be, but do not have to be, benchmarked. To be useful in comparisons, benchmarks must measure the same things in the same way across all of the agencies or programs that are to be compared; as a result, benchmarks tend to be generic measures. Performance measures, on the other hand, must be relevant to an agency's objectives and standards, which usually, are not generic. In practice, performance measures are among the most difficult measures to benchmark across several agencies or programs.

C. Report Organization

The report is organized into the following sections:

Section II. Background on Performance Measurement. This section establishes the basis for the criteria against which WSDOT's performance measurement is assessed. The section provides background on the use of performance measurement by government, defines the types of performance measures that are used, and shows how performance measures are used by successful governmental organizations.

Section III. WSDOT's Overall Performance Measurement System. This section details and then assesses WSDOT's overall performance measurement system.

Section IV. Highways Program. This section provides an assessment of WSDOT's use of performance measurement across the principal business areas in the highways program: planning and programming, project delivery, and maintenance and operations.

Section V. Washington State Ferries (WSF). This section provides an assessment of WSF's use of performance measurement across its principal business areas.

Section VI. Information Technology Supporting Performance Measurement. This section provides the results of the assessment of the ability of WSDOT's information systems to support performance measurement.

Appendix A. State of the practice in State Department of Transportation Performance Measurement. This appendix provides a more detailed description of standards for best practice. It includes a review of the state of the practice in the use of performance measurement in other states.

Appendix B. Source Material. This appendix lists information system descriptions.

Appendix C. Source Material. This appendix lists the primary sources reviewed for this study.

II. Background on Performance Measurement

■

This section provides background on the use of performance measurement by government agencies in general and state departments of transportation in particular. This background is used to provide the basis for the analysis conducted in this review.

A. Introduction

To conduct this review, it is important to provide a concise explanation of the state of the practice that we use as the standard against which the assessment of WSDOT is made. This requires that we provide a definition of terms, some background on performance measurement, and an overview of the state of the practice.

Our state of the practice draws heavily on two sources:

- First, there is a considerable body of research and practitioner experience in the development and use of performance measurement by governmental and private enterprises that goes back more than 30 years.[2] There is a rich body of experience across governmental agencies to draw on. The public administration and related practitioner literature is summarized well in *The Governmental Accounting Standards Board (GASB) Special Report: Reporting Performance Information: Suggested Criteria for Effective Communication* (Pages 1–24). This report provides a concise description of the history of performance measure reporting, best practices for providing accountability through performance measurement, and the managing for results movement in government for which performance reporting is a pivotal element. [3]
- Second, Dye Management Group, Inc. has first-hand knowledge of the use of performance measurement by many state departments of transportation obtained from our business improvement consulting work for many of these agencies. This is supplemented by a state department of transportation practices review conducted for this study that draws on the papers presented at a national conference on transportation agency performance measurement conducted in August 2004 plus a very limited number of telephone interviews with other states.[4] (See Appendix A.)

[2] Entering "performance measurement for governmental accountability" into a search engine yields numerous sources, examples, and resources.
[3] GASB uses the terminology Service Efforts and Accomplishments for performance measures.
[4] 2nd National Conference on Performance Measures to Improve Transportation Systems, August 2004, Irvine, California, organized by the Transportation Research Board.

B. Types of Performance Measure

The following sections provide, by way of background, different classifications of performance measures. In general terms, the performance measures used by a state department of transportation can be classified and defined in the same dimensions as those used to classify and define performance measures in any enterprise.

There is no universal definition of a "performance measure" beyond the obvious: it is a measure of performance. "Performance" in the public sector is generally taken to mean "the manner and effectiveness in which something or somebody functions, operates, or behaves in carrying out a given task"[5] that results in a service provided or a public policy objective achieved. Most public sector performance measures are a qualitative or quantitative measure that can be used to assess the contribution that a program makes towards reaching a goal or providing an accepted standard of service.

Most definitions and applications of performance measures rely on the concepts of "input," "output," "outcomes," "accomplishments," "efficiency," and "effectiveness" that are outlined below.

Based on the sources listed previously, performance measures can be categorized as depicted in Exhibit II-1.

Exhibit II-1: Classification of Department of Transportation Performance Measures

	Measurement Elements	Definition	Examples
Measures of Inputs (Effort)	Inputs	Measures of the effort or the inputs consumed to produce outputs	Dollars, labor, materials
Measures of Accomplishment	Outputs	What is provided to customers	Construction project
	Outcomes	The utility enjoyed by customers, what outcome the output results in	Free flowing traffic, smooth roads

[5] Government Accounting Standards Board (GASB), Performance Measurement for Government, 2004. http://www.seagov.org/aboutpmg/index.shtml.

	Measurement Elements	Definition	Examples
Measures that Relate Inputs to Accomplishment	Efficiency measures	Output per unit of input	Resurfacing costs per mile
	Effectiveness measures	Relates outcomes to inputs	Cost of smooth roads
Measures of Transportation System Performance Against Customer and Government Priorities	User priorities	Safety, mobility, quality of life, other	System level performance measures

There is often considerable confusion in the use of terminology surrounding performance measurement and, more importantly, in its reporting. The use and reporting of performance measures should be consistent and recognize the distinctions between:

- Inputs.
- Outputs.
- Outcomes.
- Efficiency.
- Effectiveness.
- Performance benchmark.
- Performance standard.

The following highlights the key features of the different types of measures.

1. Measures of Outcomes, Outputs, and Inputs

Measurements of the performance of any producer of a good or service follow the process of production: the provider obtains inputs, combines them, and changes them into outputs, and the outputs result in outcomes for consumers. In transportation services, inputs are generally the same as those of any enterprise: capital, raw materials, energy, and labor. Outputs are more specific to the industry: lane-miles of highway, the number of buses on a transit route, or the number of ferry sailings in a service day. Outcomes are the benefits, or lack thereof, that consumers enjoy from their consumption of the outputs; in short, the consumers' utility. In the transportation sector, these are centered on mobility: consumers' travel times, their safety, and the price they pay.

2. Measures of Efficiency and Effectiveness

Measurements of performance frequently used for the internal management relate inputs to outputs and outcomes. Efficiency measures generally relate the outputs to the inputs. For example, the unit cost to operate a snowplow on a lane-mile of interstate per hour or the miles of interstate plowed per hour are efficiency measures. Effectiveness measures address the desired outcome; in this case, "bare pavement" measures of effectiveness relate the effort to the accomplishment of this type of desired outcome.

3. Strategic Versus Operational Measures

Performance measures can be differentiated by their purpose, as well as by their place in the process of production and consumption. Some performance measures are directional, in that they indicate the progress of an enterprise from its current state towards some changed and future state, usually defined by a set of goals and the strategies chosen to achieve them. Other performance measures are operational, in that they monitor the day-to-day activities and processes of the enterprise that generally stay the same, regardless of strategic direction.

4. Performance Benchmarks and Standards

Benchmarks are any reported measure that can be compared across agencies or programs. Performance standards can be used across the management cycle. They can be established as an efficiency standard; for example, lanes striped per hour by a unit of labor. Performance standards can relate to how long it takes to complete work; for example, standards can be set for clearing right-of-way during project delivery. Management can then report on the accomplishment against this standard. The standard can be used in turn to establish budget levels or resource requirements to perform a task.

C. Measurement of Transportation System Performance

Somewhat unique to transportation agencies and very different from private enterprise is the measurement, analysis, and reporting on the performance of the overall transportation system against customer and government priorities. In the case of WSDOT it does not own, does not operate, nor have financial control or influence over many of the factors that affect the overall performance of the transportation system. Nonetheless, it is this overall performance of the system about which customers are concerned.

Government transportation agencies tend to be held accountable for explaining, if not directly managing, outcomes over which an agency has limited direct control. Each of the outcomes that WSDOT attempts to manage are determined by a combination of factors: some being outputs from WSDOT activities, some being factors over which government has some control, and some that are independent of any government intervention.

For each desired outcome, there are several causes. The performance results that are measured will be the sum of those controlled and uncontrollable causes. An uncontrollable cause can mask the positive impact of a government intervention: a prolonged spell of bad weather may coincide, for example, with enhanced highway patrols to curb speeding. Some positive community outcomes have adverse transportation impacts: consumer demand for transportation in a region is driven by the type and level of economic activity, for example, and if the economy is growing then, all other things being equal, there will be increased congestion.

1. Understanding Cause and Effect

The pervasive influences of those causes that are beyond government's control are not just a measurement issue, dealt with in the collection and calculation of data. It requires that performance measures be designed from a thorough understanding of cause and effect, as well as of the uncertainties that are introduced into effects by uncontrollable causes.

Performance measurement plays a key role in understanding the relationship between cause and effect. This cannot only improve the measurement process, it can also directly improve program effectiveness.[6] For WSDOT, improving program effectiveness strengthens the relationships between its outputs, the outcomes from these outputs, and the broader policy goals set for the agency. It does this by targeting thinking on this relationship and by defining the magnitude of the relationships through the application of the correct statistical and research methods.

For example, consider the use of intelligent transportation systems (ramp meters, closed circuit television, traffic operation centers) for the active management of freeway operations. Performance measurement would involve measuring and monitoring the outcome that can be affected by the use of such systems. These systems can increase the productivity of the freeway system as measured by the movement of people or vehicles per lane-mile per hour. If travel demand in the corridor exceeds capacity, mobility can only be improved up to the maximum productivity that can be yielded.

This type of systematic measurement and reporting increases understanding about the measurable extent to which a program can achieve desired outcomes. Over time, it produces trend data that can be used to establish measurement standards for such relationships to determine whether programs are being managed as effectively as possible. For example, engineering research has defined a set of standards for minimum driveway separations in different speed zones that will produce the best safety outcomes. This is known; therefore, once these standards are established, performance measurements can track whether variances are granted that result in a less safe outcome.

[6] As mentioned earlier, the roots of contemporary performance measurement in government are in the applied program evaluation research performed by the Urban Institute, among others.

Isolating each of the causes that affects an outcome, and understanding the parameters of the relationship between each cause and each outcome, requires large amounts of data.

2. Examining Trends Over Time to Understand Cause and Effect

Aside from its importance in understanding cause and effect, monitoring performance over time is also a direct measurement of a government's progress. In this role, the performance measurement provides trends over time in the operation and performance of the transportation system that addresses the priorities and issues of the users. Also, the state uses data collected over time in forecasting future travel demands, analyzing how these demands can be addressed by public and private transportation providers, and developing plans to address these demands.

3. Measures of Transportation System Performance Against Customer and Government Priorities

A further and equally important consideration is that the products and services provided by WSDOT are from both the governmental and customer perspective, not an end in themselves. For example, in a policy sense, the conditions and performance of the transportation system are a means towards accomplishing broader quality-of-life, economic, and community objectives. Therefore, other aspects of performance measurement reflect the monitoring and reporting of transportation system conditions and WSDOT performance against these broader objectives. Part of the transportation planning work of WSDOT involves monitoring transportation system conditions, assembling trend data, and forecasting future conditions. In this way, measuring the performance of the system itself is a work product provided by WSDOT.

D. Uses of Performance Measures

The prior section detailed the different categories of performance measurement. The real world is not so simple that a single measure can be categorized differently depending upon the perspective of the observer or that they fall into discrete categories. The same measure can be used for a number of different purposes. In this section, we summarize the range of uses to which one would expect to see performance measurement put within an agency. We address all levels of management, from strategic policy by elected officials to the supervision of operations by middle- and first-level managers.

In the case of transportation agencies, one of the services that government provides is monitoring the performance of the transportation system against government and citizen objectives. This information is used internally by the agency as part of its planning, but it performs a broader role. There are many aspects of performance over which the agency has limited direct control, and there can be limited direct relationship between the performance and the actions of government. For example, consumer demand for transportation in a

region is driven by the type and level of economic activity. If the economy is good, other things being equal, there will be more measured congestion.

Exhibit II-2 identifies the uses to which performance measurement are put within state departments of transportation. Appendix A provides a more detailed discussion.

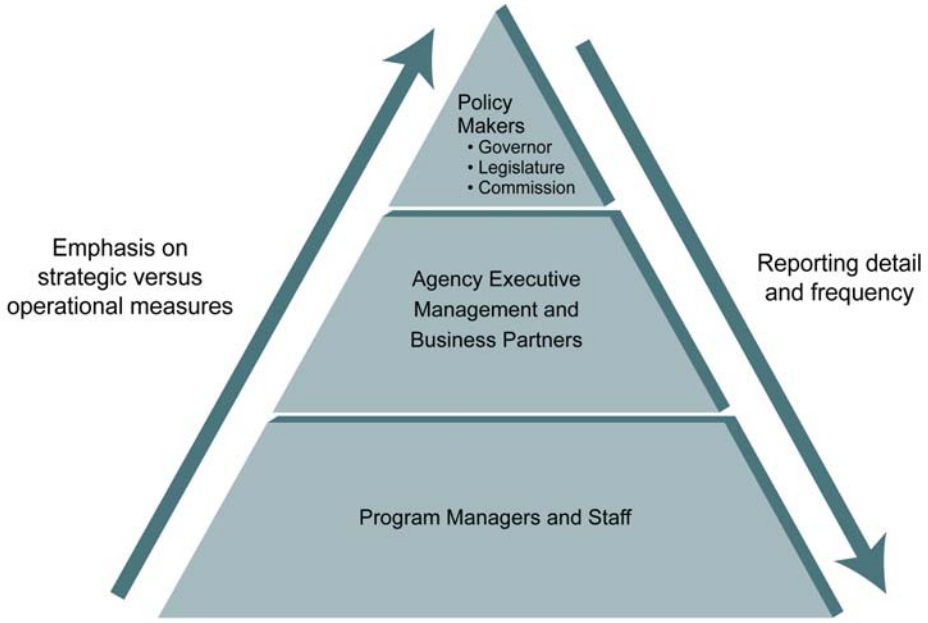
Exhibit II-2: Uses of Performance Measurement

Use	Audience
By Implementing Agency: To Manage the Delivery of Products and Services for the Facilities Under Its Jurisdiction	
Provide leadership by setting organizational direction and performance-oriented culture.	Internal – all employees
Provide accountability for managers and employees.	Performance management – employee appraisal system
Monitor and ensure efficiency and effectiveness across the management cycle.	Internal – senior and line management
By Implementing Agency: To Communicate Objectives, Accomplishments, and Challenges of Product and Service Delivery	
Provide accountability to public and policymakers by monitoring and reporting accomplishments externally.	External – policymakers, taxpayers, and customers
Provide accountability to public and policymakers by monitoring and reporting constraints, risks, and trends affecting product and service delivery.	External – policymakers, taxpayers, and customers
Provide leadership and organizational clarity on objectives and their accomplishments at all levels within the enterprise.	Internal – all levels of management and employees
By Implementing Agency and Policymakers: To Understand Cause and Effect	
Improve program effectiveness.	Program managers Business partners – other state, federal, and local agencies
Support the budget process by evaluating the outcomes – the performance level achieved through different budget allocations and funding levels.	Program managers Policymakers

Use	Audience
By Policymakers: To Monitor Transportation System Performance Over Time Against the State's Overall Policy Goals	
Provide information on the overall performance of the state's transportation system against state policy goals and priorities. Report the status of transportation system performance over time – are conditions getting worse or better as they affect policy goals and priorities? Provide information to improve policymaking and citizen participation in government. Informing understanding of current and future travel demands and overall transportation system performance against citizen priorities.	External – Policymakers and public

Exhibit II-3 illustrates that for the hierarchy of oversight and hence users of performance measures, there is an increasing emphasis on strategic versus operational measures. The strategic measures tend to focus more on outcomes and outputs.

Exhibit II-3: Strategic Versus Operational Measures



E. Evaluation Criteria for WSDOT Use of Performance Measures

The state of the practice analysis suggests a series of tests to determine whether WSDOT is using performance measurement to good effect. According to these tests, performance measures should be:

- Aligned with government policy and user priorities.
- Used by management throughout the management cycle.
- Used to communicate to internal and external audiences.
- Used to evaluate cause and effect.

1. Aligned with Government Policy and User Priorities

Performance measures should be aligned with the mission, the goals, and the objectives, and with the strategies to achieve those objectives. All of these, in turn, should be clustered around the priorities and values of the stakeholders. Policymakers establish the policy goals through commission action, the budget, and the legislative process.

The principal stakeholders of transportation systems are their users, whose priorities are arranged below in what psychologists would recognize as a hierarchy of needs:

- Safety from accidents and from the crimes and misdemeanors of other travelers.
- Travel times that are as short as possible.
- Service, both in terms of the courtesy of service and the choice of services made available.
- Community, in that the transportation service supports the environment and society.

2. Used by Management Throughout the Management Cycle

The management cycle is a continuous process that is accomplished through the repetition of four steps: (1) setting goals, strategies, and objectives; (2) allocating the resources and planning the programs necessary to achieve those objectives; (3) executing those programs; and (4) measuring the performance and results of those programs, which leads back to a reassessment of goals, strategies, and objectives.

Management cycles are used from the top to the bottom of any organization, from the highest levels of overall policy and governance down to the first line of supervision. Ideally, the management cycles at lower levels would be aligned with cycles above them in the commonality of their goals and objectives, and in the similarity of the processes themselves: their timing, their information requirements, and the nature of the decision making within them.

The performance measure is a necessary and useful element of the management cycle. Aside from their value as information on which to assess results, managers also use performance measures to lead others in the organization: in defining a performance measure, a manager illustrates the expectations that he or she is placing upon others. Taking the next step, managers then can use performance measures as part of the mechanisms by which they hold their subordinates accountable. Performance measures also can link among the management cycles of different activities in the organization: for example, they can serve equally well in assessing the effectiveness of market strategies and in personnel appraisal systems.

To be effective in its management cycles, WSDOT's collection of performance measures must be aligned with the organization's business process; that is, the measures must span the inputs, output, and outcomes of the business. The measures must also be focused on the key variables and decisions that management must consider and control. Put another way, the performance measures must clearly mark out the cause and effect throughout the business process.

Performance measures should be used at the enterprise level and within different units to provide leadership and accountability mechanisms. The performance measures should also be aligned with the core business processes and work activities so that inputs, outputs, and outcomes, and efficiency and effectiveness measures, align with the business processes of the organization.

The following provide evaluation criteria for the use of performance measurement across the management cycle:

- Use to provide leadership.
- Use to provide accountability mechanisms.
- Alignment of measures with business process.

3. Used to Communicate to Internal and External Audiences

Performance measures should provide the basis for effective communication to internal and external audiences. For the internal audience, performance measurement communicates and reinforces management priorities and direction. In addition, performance measurement provides a straightforward mechanism to communicate expectations throughout the organization in a common language and in the same metrics. The criteria for assessing the use of performance measures for internal communication are widespread understanding and awareness of the measures and use of the measures for managing people.

To provide the basis for evaluating WSDOT's performance reporting to external audience, the study used 16 criteria suggested by the Governmental Accounting Standards Board in their report titled *The Governmental Accounting Standards Board Special Report: Reporting Performance Information: Suggested Criteria for Effective Communication*. Although these 16 are only suggested criteria, they represent the

results of a significant research effort by the leading practitioners in the field. The criteria address three main objectives for external reporting:

- The external report should provide a basis for understanding the extent to which WSDOT has accomplished its mission, goals, and objectives, as well as the context for them.
- Performance information reported should help to communicate the extent to which WSDOT programs, services, and strategies have contributed to goals, and objectives.
- A reasonably informed, interested user should be able to learn about the availability of the reports, as well as access, understand, and use the information.

4. Used to Evaluate Cause and Effect

Although monitoring cause and effect is a continuous part of the management cycle, performance measurement when used intensively by organizations like WSDOT is a critical element of program evaluation. Performance data collected over time can provide trend information and is an integral part of program evaluation. For example, the data on pavement conditions monitored and maintained over many years for different types of pavement in different parts of the state can be used to evaluate the effectiveness of different pavement treatments for specific sets of circumstances.

The criterion used for the evaluation is whether or not performance measurement is being used to evaluate cause and effect to develop new strategies and refine existing ones.

III. WSDOT's Overall Performance Measurement System

■

The section describes WSDOT's overall performance measurement system and then evaluates the overall use of performance measurement for each evaluation area.

A. WSDOT's Performance Measurement System

Transportation agencies including WSDOT have used performance measures for many years. WSDOT has had in place various management systems for monitoring and reporting the performance of the transportation system. Pavement performance, bridge conditions, and safety outcomes have been long monitored and reported. Additionally, the Legislature through the Legislative Transportation Committee has had a long-standing interest in the use of performance measurement in the budgeting process.

1. Performance Measurement System Overview

During the course of the work of the Blue Ribbon Commission on Transportation, an ad hoc Benchmark Committee was established to examine a range of issues around performance measurement. These issues had arisen because the Blue Ribbon Commission members had seen no systematic performance measurement framework in place for providing oversight and accountability for the work of WSDOT. The Benchmark Committee's Final Report recommended a series of benchmarks that address the physical condition of the system, safety, mobility, and cost efficiency.[7] Other areas were identified for further work.

Since the work of the Blue Ribbon Commission on Transportation, WSDOT has come a long way in developing a department-wide performance measurement system that provides accountability, leadership, and sets the organizational direction for efficiency and effectiveness improvements. It appears that WSDOT's priorities for the use of performance measurement have been to provide improved accountability and engender the trust of policymakers and the public.

The primary elements of performance measurement conducted by WSDOT are highlighted in turn.

- **2003–2007 Business Directions, Business Plan Document, May 2004 Update.[8]**

  This document constitutes WSDOT's department-wide business plan. The document specifies WSDOT's goals, the work to be performed, and the

[7] The Blue Ribbon Commission on Transportation, Benchmark Committee Final Report, November 22, 2000.
[8] http://www.wsdot.wa.gov/accountability/default.htm.

performance measures that are used to report accomplishments as measured against the goals. The business plan includes six individual goal areas:

- Goal 1. Plan and build capital investment projects for our transportation systems in accordance with the instructions of the Legislature.
- Goal 2. Maintain and operate the transportation facilities and systems placed under the department's responsibility making cost-effective use of the appropriations provided by the Legislature from citizens' taxes.
- Goal 3. Optimize the operational efficiency and safety of the transportation systems and facilities committed to WSDOT's charge.
- Goal 4. Report to the Transportation Commission, citizens, other officials and the Legislature on achievements, shortcomings, and challenges in WSDOT's performance.
- Goal 5. Support the State Transportation Commission in preparing proposed budgets and plans for transportation systems and facilities.
- Goal 6. Assure the capability and efficiency of WSDOT's workforce.

Under each goal area there is a list of activities that constitute the work to be performed by WSDOT under the business plan. Under each goal area there is a listing of performance measures that relate to the goals that are published in the Gray Notebook.

- **The Gray Notebook: Measures, Markers and Milestones, WSDOT's quarterly report to the Washington State Transportation Commission.**[9]

  WSDOT's goal for the Gray Notebook is to keep the agency accountable to the Transportation Commission and the public. This document has been published quarterly since April 2001 and is currently in its 14th edition. The content of the report has changed over time. The current and prior Gray Notebook reports are accessible to the public at WSDOT's Web site. For WSDOT it is a work in progress.

  The report provides performance measures organized mainly around WSDOT program areas. In some cases there are performance measures that are reported every quarter, although some are required less frequently, and there are new measures. There is an index that can be used to see which measures have been reported across reporting periods.

- **The Gray Notebook: Beige Pages – Project Reporting on the 2003 Transportation Funding Package.**
- **Project pages.**

[9] http://www.wsdot.wa.gov/accountability/default.htm

- **Quarterly progress reports.**

  New in the August 2004 edition, the current Project Highlights and Accomplishments Section of the Gray Notebook provides quarterly status reporting on projects funded by the 2003 Transportation Funding Program. At the summary level, the reporting in narrative form identifies project by project changes in schedule and budget. In addition, a "watch list" of projects in which there are risks to schedules and budgets are identified. The reporting includes a project page for each project that is on the WSDOT Web site and provides detail on each project. The status of each project is then reported in a quarterly project report that provides a range of metrics on the projects.

- **Employee Performance Management Appraisal System.**

  From the top down, WSDOT managers establish performance plans with their direct reports. These performance plans specify performance goals, objectives, performance measures, strategies, and actions to accomplish them. With the recent civil service reform and the implementation of the state's new human resource management system, WSDOT is instituting a new employee performance and appraisal system that will align employee performance management with WSDOT's performance measurement system.

- **Transportation System Performance - Performance Benchmarks.**[10]

  Following the Blue Ribbon Commission on Transportation recommendations in January 2002, the Washington State Legislature enacted Engrossed Substitute House Bill 2304. Part I of the act, "Establishment of Transportation Performance Measures," directs the Transportation Commission to develop benchmarks based on policy goals for the operation, performance of, and investment in the state's transportation system. The provisions took effect on July 1, 2002, and are codified in Revised Code of Washington 47.01.012.

  According to RCW 47.01.012, the following policy goals are the basis for establishing detailed and measurable performance benchmarks:

  - Improving safety.
  - No interstate highways, state routes, and local arterials shall be in poor condition.
  - No bridges shall be structurally deficient, and safety retrofits shall be performed on those state bridges at the highest seismic risk levels.
  - Traffic congestion on urban state highways shall be significantly reduced and be no worse than the national mean.
  - Delay per driver shall be significantly reduced and be no worse than the national mean.

[10] http://www.wsdot.wa.gov/accountability/benchmarks/BenchmarksImplementationReport.pdf.

- Per capita vehicle miles traveled shall be maintained at 2000 levels.
- The non-auto share of commuter trips shall be increased in urban areas.
- Administrative costs as a percentage of transportation spending shall achieve the most efficient quartile nationally.
- The state's public transit agencies shall achieve the median cost per vehicle revenue hour of peer transit agencies, adjusting for the regional cost of living.

WSDOT established a series of performance measures that address this requirement. These measures are reported in the Gray Notebook. The work performed to address this requirement is detailed in the *Transportation Benchmarks Implementation Report* that was adopted by the Washington State Transportation Commission in August 2003. WSDOT produces the benchmark report annually to document how the Washington State Transportation Commission and WSDOT address RCW 47.01.012.

This document establishes some measures that address the goals and, in some cases, identifies conflict between the policy goals and other laws, and in other cases establishes a true benchmark by comparing WSDOT to other states. There is considerable discussion and thoughtful practical and theoretical analysis of the value of the goals and measures established in the statute.

2. Statutory and Policy Driven Requirements for Performance Measurement

There are a number of statutes that provide direction and requirements to WSDOT regarding performance measurement. The requirements and WSDOT's approach to compliance are listed in turn.

- RCW 43.88090 Subsections (2) through (6) Requirements for Strategic Planning.

  This statute requires that state agencies:

  - Define their mission.
  - Establish measurable goals.
  - Develop clear timelines to achieve goals.
  - Establish program objectives for each major program in their budgets.
  - Establish objectives that are consistent with mission and goals and as practicable outcome-based and measurable.
  - Conduct self-assessment using the mission, goals, objectives, and measurements.

- Link budget proposals to their mission, goals, and objectives.
- Include performance measures in budget proposals that allow them to determine success in achieving their goals.

WSDOT meets this requirement through the 2003-2007 Business Directions, Business Plan Document, May 2004 Update. The document is published as a draft because it is frequently subject to revision and refinement. The document includes a mission statement, six goals, and a listing of activities that fall under each of the goals. These activities are provided to meet the statutory requirement to specify objectives. Performance measures are reported for each goal area through the Gray Notebook and not by activity.

- **Biennial budget process – performance measurement in the 2005-2007 budget development effort.**

  The state's biennial budget process outlines an overall performance-based framework for budget decisions. *Operating Budget Instructions, Part 1: Guidelines for Strategic Plans and Performance Measures, 2005–07 Biennium.* The Governor's Office of Financial Management manages the budget development process. The budget process incorporates Governor Locke's Priorities of Government approach. The Priorities of Government process establishes statewide results against which all state spending should be measured.

  There are 11 specified results along with high-level indicators in the 2005 guidelines. The WSDOT 2005–2007 business plan and budget identifies activities that support the following Priorities of Government:

  - Improve economic vitality of business and individuals.
  - Improve statewide mobility of people, goods, information, and energy.
  - Improve safety of people and property.

  WSDOT business plan activities support one or more of these goals. The performance measurement reported in the Gray Notebook is the measurement component of WSDOT's alignment with the Priorities of Government process.

- **Agency performance measures for the biennial budget.**

  As part of the budget process, WSDOT is required to submit performance measures. For the 2005–2007 budget, the intent is to establish activity-based measures as opposed to goals based in the prior budget. The budget directions provided by the Office of Financial Management distinguish between outcome measures, output measures, and efficiency measures. As part of the budget process, a series of goals are established in the biennial budget process and outcome measures are tied to them. The outcome measures used and reported by quarter are a limited subset of those included in the Gray Notebook.

- **Governor's performance agreement.**

  By Executive order, WSDOT, like all agencies, has an annual performance agreement that details initiatives that are planned and then updated quarterly. Targets are set and associated performance measures used for tracking them. They specify an objective and actions, and track by quarter. WSDOT populates this using measurement from the Gray Notebook. These are the agency measures for the biennial budget described above.

- **Other legislatively driven reporting requirements.**

  WSDOT has documented all of its mandatory reporting requirements to other governmental agencies. These agencies are at the federal, state, and other levels. There are a large number of reporting requirements and in a number of cases the reporting either explicitly or effectively provides performance information. The reports that might provide performance measures are listed in Exhibit III-1.

Exhibit III-1: Other Reporting Requirements

Reported To	Requirement and Reporting Mechanism	Content	Performance Measurement
Governor's Affirmative Action Policy Committee	RCW 41.06.150 Affirmative Action Plan A four-year plan with biennial updates	Reports WSDOT's program Identifies progress and actions	
Legislature and WSDOT Executives	Provide maintenance accountability, known as the Maintenance Accountability Process (MAP)	Outcome-based performance measures Relates maintenance outcomes to budget level	34 outcome-based performance measures Performance based on condition of highway system features
Legislature	SSB 5248 To be developed	Working with the Association of Washington Cities report preservation rating on arterials	Indicators of arterial condition

Reported To	Requirement and Reporting Mechanism	Content	Performance Measurement
OFM and LTC	RCW 43.88 OFM 10-Year Capital Plan WSF must follow the Governor's 10-year capital planning process requirements	This plan includes capital project information that includes scope, schedule, budget WSF reports on performance against backlog of capital preservation work	To be identified from the documents
Washington Traffic Safety Commission	Annual collision reporting Collision location and analysis system	Collision location information by location	Can use data to derive collision performance

Source: Report on WSDOT's Reporting Requirements and Responsibilities to Other Governmental Entities, April 2, 2004.

Excluded from this list are:

- Federal government reporting requirements that are a condition of federal funding. These provide data items and indicators that can be used to report performance.
- Reporting and performance measurement that are attached as conditions of environmental approvals by the U.S. Army Corps of Engineers and the Washington State Department of Ecology.
- Financial performance information required by the State Treasurer or commercial rating agencies.
- WSF's specific reporting requirements. WSF differs from other programs in WSDOT in that authorities independent of the Legislature regulate WSF, most notably the U.S. Coast Guard.
- WSF reporting under RCW 47.60 which includes biannual tariff equity reviews.

B. Criterion 1: Alignment with Policy Goals and User Priorities – Overall at the Enterprise Level

There are two criteria by which the alignment of performance measures with policies and priorities are assessed:

- First, whether performance measures are associated with the policy goals that have been set by government for WSDOT.

- Second, whether the performance measures reported by WSDOT provide a complete picture of the outcomes that are universally important to the users of the state's transportation system.

1. Alignment with Policy Goals

Policy goals for transportation are established in statute, by the governor, and the Transportation Commission. The following sources provide the broad policy goals:

- RCW 47.01.012 (Transportation benchmarks intent) lists transportation policy goals. These goals primarily address improving safety, preservation, and maintenance of the highway system, and mobility.
- The current Priorities of Government are defined by the Governor's Office as education, job creation, protection of families, enhancing natural resources, and efficient government. One of the subsidiary "spotlights" under job creation is entitled: "Making Transportation Work." It contains three major planning statements: "preserve and protect what we already have"; "use what we have most efficiently"; and "replace and expand critical parts of the system."[11]
- WSDOT 2003–2007 Business Directions lists policy goals for WSDOT.
- In progress is the Washington Transportation Plan, which, when complete, will establish the Transportation Commission's policy goals for the transportation system. There are a number of emphasis areas for this planning that are specified in statute. They include congestion relief, preservation of existing investments, traveler safety, efficient freight and goods movement, modal integration, preservation of downtowns, and the ability to attract or accommodate planned population and employment growth.
- **WSDOT's goals and performance measures in general align with the state's priorities.**

  WSDOT's overall goals as articulated in the business directions document are aligned with the state's policy priorities as shown in Exhibit III-2. This exhibit aligns performance measures used at the department-wide level against policy goals for WSDOT and WSDOT's business plan goals.

  In general, the policy goals and business plan goals are not comprehensively defined with measurement embedded in them. The measurement tends to provide lots of interesting information and detail on how WSDOT is doing its job but does not always concisely explain why the work is done and what WSDOT is trying to accomplish.

[11] http://www.governor.wa.gov/transportation/transport.htm.

Exhibit III-2: Policy Priorities, WSDOT Goals, and Performance Measures

Priorities of Government and RCW 47.01.012	
WSDOT Goal	**Associated Outcome Measures**
Replace and expand critical parts of the system	
Plan and build capital investment projects	Planned versus actual projects advertised measured for each program type Project-specific narratives and status in the Beige Pages
Improve statewide mobility/traffic congestion/driver delay	
Traffic congestion on urban highways shall be significantly reduced and be no worse than the national mean (benchmark goal) Delay per driver shall be significantly reduced and be no worse than the national mean (benchmark goal) WSDOT goals to come from Washington Transportation Plan update	Travel times on 12 Puget Sound corridors Incidence response times Travel time reliability
Improve the safety of people and property/improve safety	
Optimize the operational safety of WSDOT's systems and facilities	Incidents by type, severity, and cause Customer and employee safety
Improve the quality and productivity of the workforce	
Assure the capability and efficiency of WSDOT's workforce	Injury rate for employees Safety training rate Human resources training rate

Priorities of Government and RCW 47.01.012	
WSDOT Goal	**Associated Outcome Measures**
Preserve and protect what we have/bridge pavement condition	
Maintain and operate WSDOT's facilities making cost effective use of appropriations	Percentage of MAP targets achieved Pavement condition measures Bridge condition measures
Improve the ability of the government to achieve its results effectively and efficiently/administrative efficiency	
Maintain and operate WSDOT's facilities making cost effective use of appropriations Assure the capability and efficiency of WSDOT's workforce	Report training

- **Performance measurement is well aligned with the state's output priorities.**

  In brief, the performance measurement system that is being put in place systematically tracks and reports on WSDOT's accomplishments in delivering the outputs (products and services) that it is directed to provide through statute and the budget process. In this way, the measurement system provides accountability for capital project delivery, maintenance and operations, operational efficiency, and safety.

  The emphasis in WSDOT's performance measurement system is on providing accountability for the delivery of agreed products and services. For example, the Gray Notebook beginning with the 10th edition provides detail on a project by project basis for projects funded under the 2003 Transportation Funding Package. In addition, at the project level, individual project detail is now provided at the WSDOT Web site. This is reinforced by the personnel performance management system by which, from the top down in the organization, managers' performance plans, the delivery of products and services in budget and on schedule.

- **WSDOT is moving toward performance reporting that is aligned with the direct outcomes of WSDOT actions at the program level.**

  Currently, there is a partial reporting of outcome measures against each program area and activity at the department-wide level. Within a number of WSDOT program areas such performance measures exist and are used by line managers.

At the department-wide level, the performance measurement system does not systematically report on the outcomes that have been accomplished in each of the program areas. However, WSDOT has such performance measures at the program level. The measures are used to drive project programming and prioritization. The 2005–2007 budget now identifies outcomes that tie to each program area and could be measured. WSDOT will be able to report these measures. Similarly, in the area of maintenance, the maintenance accountability process has a systematic set of outcome measures tied to each maintenance activity.

2. Measures Organized Around Customer Priorities

The second test is whether the performance measurement is organized around what is most important to the users of the transportation system. To a large extent, policymakers express such priorities. The statewide transportation planning process provides an ongoing process to identify and address such priorities. Users care most about the ability of the transportation system to address their travel demands in a safe and efficient manner.

In general, the priorities of users are:

- Safety.
- Travel times or mobility.
- Service.
- Other quality of life considerations.

WSDOT performance measure reporting, through the Gray Notebook, addresses the broad safety goal of no deaths or injuries by 2030 but does not include a set of similar goals and measures that address other policy goal outcomes. Overall, it is understood that to an extent this will be addressed as part of the Washington Transportation Plan update. For example, there are not a set of performance measures that report on the overall performance of the system as measured against other mobility or economic goals such as those identified in the Priorities of Government.

Within individual program areas such as pavement management, bridge management, and maintenance, there is a systematic reporting on both the outcomes as well as the outputs that are important to customers. Users as customers care about cost. They assume that, at whatever level of service they purchase, the agency is managed in an efficient and effective way.

C. Criterion 2: Used by Management

The three tests for the use of performance measurement by management – to provide leadership, establish management and employee accountability mechanisms, align of measurement with business processes are addressed in turn.

1. Leadership

- **WSDOT's performance measurement system provides leadership, sets direction, and establishes a performance-oriented culture.**

  Across WSDOT's management team and down through line management the aphorism "what gets measured gets managed" consistently applies. Further, there is a strong alignment between the Department's overall leadership and management direction provided at different levels in the organization. An example of this is the performance reporting of worker safety. This cuts across all program areas yet interview results show that what is measured and reported at the department-wide level is translated into line management attention and employee awareness.

  Across WSDOT business areas, there is a common understanding of WSDOT's business goals and progress is measured against them. The performance measurement system supports this and line managers are now using their managerial discretion to institute changes that will enable them to be successful in performing tasks necessary for overall WSDOT performance. The review finds that the performance measurement system at the department-wide level provides an effective tool that is understood and is aligned with the measurement and management of different business areas within WSDOT.

2. Management and Employee Accountability

- **Performance measurement is providing a clear, unambiguous, measurable set of expectations for WSDOT managers and employees.**

  Department-wide performance measures are included in the performance plans for senior managers and their direct reports. The sample of Manager Development Performance Plans reviewed identified a direct link between what they are held accountable for and the department's performance objectives.

  WSDOT plans to use the new flexibility provided by civil service reform and the capability of the state's new human resource management system, which is currently being implemented, to strengthen its employee performance appraisal practices. When implemented, these changes should further align the management of people with the organization's goals.

3. Alignment of Measures with Business Process

- **Across all major program areas, measurement is in place to track the delivery of products and services.**

  In a number of program areas, there is measurement of accomplishments, efficiency, and effectiveness across the management cycle. The 2005-2007 Current Law Budget proposal provides a good indicator that WSDOT continues to frame its business objectives as measurable outcomes. As this happens, it is

possible to provide accountability for the expenditure of dollars and for customers and policymakers to assess what they "are buying through the budget." For example, the Traffic Operations program summary states that this program is "responsible for accomplishing the highest usage of the existing transportation system" and the program uses a combination of strategies such as ITS and incident management to this end. The impact of expenditures on these objectives can be measured and reported. WSDOT has started to do so.

Over the past four years, WSDOT has placed great management importance on establishing and continuing to refine the use of performance measurement to provide accountability to the Legislature and Washington tax payers for the delivery of projects, their operation, and the maintenance of the transportation system. The performance measurement system is establishing a performance oriented culture and providing management the tools to manage performance by. There are opportunities to strengthen the approach by using measurement more intensively across a number of business areas so that goals are consistently established as measurable outcomes and efficiency and effectiveness managed and reported across all business areas.

The following major sections for this report (IV. Highway Program Business Areas and V. Washington State Ferries) provide more detail on the use of performance measurement across the management cycle in different business areas.

D. Criterion 3: Used to Communicate to Internal and External Audience

- **WSDOT has prioritized the use of performance measurement in support of management's priority to provide accountability and improve communications to policymakers and the public for delivery.**

  This is considered by WSDOT management to be an important part of building trust and demonstrating that, entrusted with new funding programs, WSDOT can and will be seen to deliver. The criteria for assessing the use of performance measures for internal communication are widespread understanding and awareness of the measures and use of the measures for managing people. The 16 criteria suggested by the Government Accounting and Standards Board for effective performance reporting are applied to assessing WSDOT's external reporting.

  In the managing for results model and in the WSDOT's Gray Notebook, the external reporting of performance measures is built into the policy goal setting and management cycle to provide accountability and alignment of the Department's work with citizen priorities. In the most direct way, the evaluation of communication with external audiences can be accomplished by asking the targeted users whether the measurement meets their needs for accountability. As part of this study, policymakers and members of the legislature were not systematically canvassed on this question; however, legislative staff indicated that, as reported in the Gray Notebook, it is difficult for members to have a general picture across program areas of where

WSDOT stands as measured against their goals and objectives. The example cited is employee safety statistics without much context and, while important, that is more of a management issue. This sentiment was also expressed by a number of TPAB members. The overall conclusions in this report regarding the desirability of providing summary level, easy access information are based on the systematic application of the *Governmental Accounting and Standards Board Special Report Reporting Performance Information: Suggested Criteria for Effective Communication*.

Internal and external reporting is considered in turn:

1. Internal Communications

WSDOT's performance measurement system serves as a highly effective tool for internal communications. Interviews across the agency found a high awareness of the measurement system and understanding that it relates strategic direction to the work performed by the employees on a day-to-day basis. Additionally, the measurement system is actively used to communicate, monitor, and refine work activities.

2. External Audience

A primary objective for WSDOT is the use of the performance measurement system as reported in the Gray Notebook to provide accountability to an external audience. This audience is comprised of policymakers and the general public who are the users of the system. This study finds that, while the Gray Notebook includes performance measures that provide accountability, it is difficult for policymakers and external audiences to use as a communications vehicle.

To provide the basis to this conclusion, the study used 16 criteria suggested in the *Governmental Accounting and Standards Board Special Report Reporting Performance Information: Suggested Criteria for Effective Communication*. Although they are only suggested criteria, they represent the results of a significant research effort by the leading practitioners in the field. The criteria address three main objectives for external reporting:

- The external report should provide a basis for understanding the extent to which WSDOT has accomplished mission, goals, and objectives and the context for them.
- Performance information reported should help to communicate the extent to which WSDOT programs, services, and strategies have contributed to goals and objectives.
- A reasonably informed, interested user should be able to learn about the availability of the reports, have easy access to them, and be able to understand and use the information.

Exhibit III-3 provides an overall assessment of WSDOT against these criteria. This assessment is based on reviewing the Gray Notebook / website performance reporting

and is judgmental on the part of the consultant; however, there are many examples from other states to point to. The overall conclusions as measured against the evaluation criteria are:

- The components of the Gray Notebook largely conform to the suggested criteria regarding content and types of measurement.
- The information within the reports provides performance information on how WSDOT programs contribute to outcomes.
- The most important opportunity areas for improvement are in how the information is structured and organized so that an external audience can reach conclusions about the performance of the organization.

Exhibit III-3: Assessment of WSDOT Against GASB Criteria for External Reporting of Performance Information

Criteria	Gray Notebook/Web Site	Observations
1. Purpose and scope of report stated clearly with information about completeness in coverage of major programs and services.	Purpose is stated. Does not provide a road map to completeness with respect to major programs and services.	Information is available on programs and services but the reader has to work to find it.
2. Report states major goals and objectives and their source.	Goals are available on Web site. Gray Notebook provides goals.	
3. Report explains who set the goals and how.	Report indicates that goals largely legislative.	Can be difficult to distinguish between legislative directives and goals set by management.
4. Multiple levels of reporting with relationship explained.	Clear link between levels for delivery and other areas.	Not apparent that there are summary roll up measures reported across all business areas.
5. Analysis of results and challenges.	Clear communication of reporting period results and challenges.	
6. Focus on key measures for critical programs. External report concise yet comprehensive.	Gray Notebook measures address major programs.	There is no concise summary or overview of performance.
7. Reporting should provide information for readers to assess reliability of information.	Gray Notebook sections provide strong substantiation of data reliability.	
8. Performance measures reported should be relevant to goals and	Gray Notebook addresses goals accomplishment	

	Criteria	Gray Notebook/Web Site	Observations
	objectives to provide understanding of goals accomplishment.	measures.	
9.	Report resources used, costs of programs, and services. Potentially reporting efficiency and effectiveness.	Measurement tends to focus on inputs such as expenditures by project or other activities and outputs. Program area analysis provides useful information on outcomes from expenditures.	Opportunity to define and report on efficiency and effectiveness measures
10.	Citizen and customer perceptions of major programs reported.	This information is reported for WSF and maintenance.	
11.	Report comparative information such as trends or against targets.	Gray Notebook reports trend information across a number of areas. However measurement changes and other factors mean that there is not trend data for all areas.	Opportunity to provide summary information extracted from different areas. External audience needs to be able to answer questions such as is that good, satisfactory, or bad – requires a frame of reference.
12.	Report discusses factors internal and external impacting results.	Gray Notebook provides this information that enables users to understand factors affecting WSDOT performance.	
13.	Reported information aggregated or disaggregated based on users needs.	There is dialogue between Commission and legislature regarding their information needs.	WSDOT Performance measurement reporting would benefit from additional requirements definition involving external policymakers.
14.	Reported performance measures should be consistent from period to period to enable comparison from period to period and users to become more familiar.	Gray Notebook reporting has been subject to considerable change in content from quarter to quarter. This makes it more difficult for external users to assess performance.	While much of the change has been due to the performance measurement system being under developed, WSDOT would now benefit from stabilizing the measurement and reporting on a standardized core set of measures.
15.	Performance reports available, widely communicated, and accessible.	WSDOT's Gray Notebook is widely communicated and easily accessible by all interested parties.	
16.	Reporting information should be reported on a regular basis.	WSDOT provides quarterly reports as soon after the reporting period as possible.	

E. Criterion 4: Used to Evaluate Cause and Effect

This criterion addresses the use of performance measurement to evaluate cause and effect and is at the core of program evaluation. Program or business area managers conduct their business planning to make sure that their business procedures use resources efficiently and effectively to reach desired outcomes. Performance measurement improves the basis of information from which to assess cause and effect. In this way it can be used to support resource allocation between program areas and within program areas. In general, there is a wide spread use of performance information to assess cause and effect. Program managers monitor the relationship between their programs and measured outcomes.

Within a state department of transportation, use of performance measurement to address cause and effect takes place through the following:

- **The transportation planning process.** This process evaluates and defines the implementing actions for government to address transportation policy goals. It typically is used to make decisions regarding the transportation strategies that are pursued and their priority. For example, plans determine targets for the levels of maintenance or condition of pavements and bridges based on funding constraints and competing priorities for mobility or safety. Then within programs, plans define strategies for addressing plan goals. For example, to accomplish mobility goals, plans decide which systems and facilities to target investments on or how much emphasis to put on the use of ITS. Performance measurement can be used to prove information on the contribution these programs or strategies make to performance goals.

  The Washington Transportation Plan update that is in process has a series of working papers that address cause and effect. Within the plan approach is the measurement of the relationship between desired outcomes and WSDOT actions. In this way, WSDOT is using performance measurement to assess cause and effect. Other examples include the travel time monitoring or the incident response analysis now conducted that has been reported in the Gray Notebook.

- **Program management of each business area such as pavement, safety, bridge, or maintenance.** Program area managers responsible for pavement management, bridge management, safety, and other programs use performance measurement intensively at WSDOT. In each of these areas, there is a sophisticated use of data for the management analysis of how specific improvements meet overall program objectives. For example, pavement performance objectives are tracked and assessed at the system and technical analysis defines the types of pavement improvement that will provide the most cost effective way for preserving the system. Interview results and the review of technical documentation across the organization find a rich use of outcome related performance measurement at the program level. The incident response clearance times reported in the Gray Notebook provide a further example of this.

- **Resource allocation through project selection and prioritization.** A further use of cause and effect analysis is in the procedures that are used to select and prioritize projects. These are the most significant resource allocation decisions that WSDOT

makes. WSDOT has a transparent measurement-driven approach to this process.[12] Interviews with program area managers indicate that there is an intensive use of measurement to make sure that the projects that are selected have the necessary design attributes and can result in the most cost effective outcome over which WSDOT has control.

State statute provides direction for this use of performance measurement. RCW 47.05 Priority Programming for Highway Development directs WSDOT to "Determine the performance that each project can provide and at what price. Look at alternatives to find the most cost effective action."[13]

[12] See Washington State Department of Transportation Prioritization Process for State Highway Projects, submitted to: The Legislative Transportation Committees of the Senate and House of Representatives, February 2004.
[13] State Law Chapter RCW 47.05.03

IV. Highway Program Business Areas

■

This section applies the evaluation criteria across the following WSDOT business areas:

- Project delivery.
- Maintenance.
- Safety.
- Traffic Operations.
- Equipment and Facilities.

A. Project Delivery

WSDOT has instituted a comprehensive performance measurement system for project delivery. This review is based on the following snapshot:

- The goal for delivery of "Plan and deliver capital investment projects for our transportation systems in accordance with the instructions of the Legislature."
- Performance measures as published in the Gray Notebook. These include reporting for the Nickel projects of the schedule and budget status against the original baseline.
- Project reporting as instituted in the June 30, 2003, Gray Notebook. This now includes project pages that provide detailed and updated information.
- Quarterly project reports that provide scope, schedule, budget, and risk information.
- WSDOT implementation of a project control and reporting system that monitors and measures project delivery performance for the purposes of project control.

1. Criterion 1: Alignment with Policy Goals

- WSDOT project delivery performance measurement is aligned with policy goals as illustrated in

Exhibit IV-1.

Exhibit IV-1: Alignment of Delivery Goals and Performance Measures

Policy Goals	Performance Measures
Deliver capital investment projects in accordance with legislature's instructions	Projects advertised
	Planned versus actual advertisements
	Projects completed
Projects delivered "on time, on budget, no surprises"	Proposed and potential changes to schedule and budget
	Proposed and potential adjustments to delivery planning
	Project projects on watch list – projects with cost and schedule concerns
	Project status (schedule and budget) against initial schedule and budget[14]

- WSDOT's performance measurement is aligned with the policy goals established for delivery by the legislature through the Nickel Program and the other projects included in WSDOT's capital program. The goals are expressed as projects that are "on time, on budget, no surprises" with an associated performance measurement system.

2. Criterion 2: Used Throughout the Management Cycle

The WSDOT performance measurement system for project delivery is effective in providing leadership, accountability, and communicating management priorities across the organization. It provides clear and consistent lines of accountability. The primary focus of measurement is on meeting delivery goals and providing information on changes. The use of performance measurement to manage and report on efficiency and effectiveness is not yet developed. However, with the implementation of a new project management system, WSDOT is positioned to measure and report on project expenditure by major function such as right-of-way, survey, design, and by category of expenditure such as labor or property acquisition. These types of data can generate efficiency measures. Such measurement can be applied across the different elements of delivery to provide project- and program-level financial performance information. Similarly, project cycle time measures can be established.

[14] These are the measures WSDOT has prepared to address statutory reporting requirements specified for project reporting in Engrossed Substitute House Bill 2474 enacted March 31, 2004.

a. Use to provide leadership

WSDOT's project delivery performance measures provide leadership across the organization. Interview results found a clear and very consistent understanding by managers of WSDOT's delivery goals and the associated organizational importance. Interviewees articulated their success factors in terms of the role their unit plays in meeting the organizations delivery objectives. The department's goal of "on time, on budget, and no surprises" is aligned down through the organization.

The communication process is an effective and two-way process. WSDOT conducts quarterly project delivery meetings that involve senior management meeting in each region with the respective project engineers for project status reports. These meetings identify leadership interventions that can be taken to address project risks. Their agenda is driven by project status against performance measures reported in the Gray Notebook.

b. Used to provide accountability mechanisms

Project specific performance measurement provides very direct accountability across the organization. Region administrators, through their performance plans, are directly accountable for the on schedule delivery of projects. Region administrators' direct reports have similarly clear delivery expectations in their performance plans.

The performance measures and performance plans are then actively used as part of management. There are quarterly meetings in each region that are organized around the project delivery performance measurements of the department. These meetings are used to proactively manage and address issues that can put WSDOT at risk with respect to meeting individual project goals. Through interviews with region administrators and their staff, it was learned that these meetings are extremely important and provide a direct mechanism for accountability down the organization.

In turn, the quarterly meeting objectives cascade down in each region in monthly meetings and more direct accountability on the part of project engineers and the technical support disciplines. For example, the Northwest Region produces Monthly Confidence Reports for each project that drill down that report status and are then used as part of meetings with design and construction personnel for early identification of risks to schedule and budget so that they can be addressed. This is further aligned with project status reports that one of the regions showed have updated weekly information. In this way, performance measurement and the performance management system is ensuring that employees at different levels are held accountable to a common set of aligned performance measures.

c. Alignment of measures with business processes

At the aggregate level, measurement aligns with WSDOT's major business process, which is the delivery of projects. The level and detail of reporting in the Gray Notebook or identified through the interviews did not reveal a systematic use of performance measurement by management across the major business processes involved in delivery. These business processes would be those involved in project delivery and include, for example, design, right-of-way, environmental assessment, survey, and construction engineering for example. Currently, the performance measurement focuses predominantly on outputs, namely project delivery on time on budget. There is reporting in areas such as right-of-way, but this, too, focuses mainly on outputs such as parcels acquired and condemnation rates. With the recent implementation of a new project management system (PDIS), WSDOT can be positioned to measure and report efficiency and effectiveness measures across the delivery business process.

Exhibit IV-2 below identifies some of the measures one would expect to see used to manage delivery in a state department of transportation and their reporting use by WSDOT.

Exhibit IV-2: Measures to Manage Delivery

Expected Measures	Type	Publicly Reported?	Internally Managed?	Data Available?
Projects delivered to letting against baseline delivery plan – schedule	Strategic	Gray Notebook Beige Pages	√	√
Projects delivered to letting against baseline delivery plan – budget	Strategic	Gray Notebook Beige Pages	√	√
Construction projects completed – open to traffic Actual time for completion	Strategic	X Completed reported	√	√
Construction projects – Final cost to award amount to engineer's estimate	Strategic	Gray Notebook Beige Pages	√	√
Environmental Compliance – mitigation actions	Strategic	Gray Notebook	√	√
Environmental Compliance permit provision violations during construction	Strategic	Gray Notebook	√	√

Expected Measures	Type	Publicly Reported?	Internally Managed?	Data Available?
Project development support costs to budget for right-of-way, environmental, and design work by project and at program level	Strategic	X	√	√
Measures of cycle time for project delivery elements – length of time to complete project milestones such as prepare environmental documents	Operational	√	√	√

3. Criterion 3: Used to Communicate to Internal and External Audiences

a. Internal audiences

Interviews with employees across WSDOT indicate that the project delivery performance measurement system provides an effective mechanism for communicating project delivery performance goals and their accomplishments. The goals to be accomplished – on time, on budget, no surprises – are built into the project control and reporting system for Nickel Projects. As an internal communications system, this is highly effective. Employees explained how they use the measurement and the high-level of attention that they apply to individual project reporting.

b. External audience

The current approach provides effective information at the individual project level. It provides all the information on the key metrics at the project level. This information is greatly valued by the Transportation Commission. WSDOT has worked with legislative staff to develop project specific reporting formats that address legislator's priorities.

An opportunity area is to strengthen the summary level reporting to provide for more effective communication to an external audience at the program level. It is quite difficult for an external reader or policy maker to assess from the current reporting WSDOT's overall performance. The overall objectives are difficult for a reader to identify and then assess where WSDOT is. For example, the context is not explained for delivery and the overall scope, schedule, and budget objectives of WSDOT identified and then WSDOT's performance compared to

them. The types of measurement that provide this type of summary level reporting includes, among other measures, the proportion of the program delivered on schedule, and the aggregate change in scope or budget across the program among other measures. Exhibit IV-3 below provides some examples of summary measures used in a number of other states.

Exhibit IV-3: Selected Examples of Summary Reporting

Measure	State	Publicly Reported?
Percent of programmed projects for which design is completed on schedule	California	Annual performance report[15]
Percent of programmed projects designed, measured in terms of dollars delivered	California	Annual performance report
Capital cost growth indicator – final estimate for all projects divided by total programmed dollars. This is a composite measure to indicate overall success in delivering projects within budget over the entire project life cycle	California	Annual performance report
Percentage of projects awarded compared to dollars programmed for award, per quarter (target of delivery within 5% of dollars programmed)	Missouri	Semi-annual report[16]
90% of all MnDOT projects in first year of current approved STIP will be let in that planned FY.	Minnesota	Annual report[17]
80% of all projects will be turned in by established target dates (x weeks prior to letting, by type of job) prior to letting.	Minnesota	Annual report

4. Criterion 4: Used to Evaluate Cause and Effect

WSDOT reports trend information on outputs, such as construction contracts completed, and construction expenditure compared to award amount. However, WSDOT does not yet have historical data to evaluate performance trends, such as the impact on project delivery performance from the implementation of the new project change control system.

[15] 2001–2002 Performance Report, Caltrans, 2002. http://www.dot.ca.gov/hq/projmgmt/perf_report01_02a.htm.
[16] Missouri, http://www.modot.state.mo.us/about/DashboardPerformanceMeasures.htm.
[17] Minnesota Department of Transportation, Target-Setting Framework, Performance Measures, Targets and Policy Guidance, Chapter 6 of Statewide Transportation Plan, 2003.

B. Highway Maintenance

The use of performance measurement for highway maintenance by WSDOT has changed over the past years and is still under development. This review is based on the following snapshot:

- The goal for maintenance to "Maintain and operate the transportation facilities and systems placed under the department's responsibility making cost-effective use of the appropriations provided by legislature from citizens' taxes"
- The goal for operations to "Optimize the operational efficiency and safety of the transportation system and facilities committed to WSDOT's charge."
- Performance measures as published in the Gray Notebook.
- Monthly maintenance and operations reports.
- Semi annual MAP reports.

The fundamental basis for performance measurement in the maintenance area is the Maintenance Accountability Process (MAP). The MAP process was implemented in 1997 as a result of a legislatively mandated project, the Maintenance Management and Administration Study. Since that time, the WSDOT has been diligent in implementing, evolving and using this measurement system throughout the management and decision making processes. Although the level of acceptance and use of MAP has varied over time, it has institutionalized performance measurement in the maintenance function. Further, MAP is often held up as a model nationally on how to do performance measurement in maintenance.

1. Criterion 1: Alignment with Policy Goals

- **Maintenance performance measurement is aligned with WSDOT's overall policy goals.**

  WSDOT has established a set of performance objectives for maintenance and operations. The highway maintenance office has defined and tracks some thirty four performance measures through its MAP. Each of the maintenance performance measures is aligned with two or more policy objectives which at the same time are aligned with the policy goals established for maintenance and operations by the legislature. For example, snow and ice operations align with safety as it increases vehicle traction which prevents accidents. It also aligns with operations as snow can road closures. Exhibit IV-4 illustrates for a subset of these measures the alignment between WSDOT policy goals, maintenance and operations policy objectives and the performance measurement.

Exhibit IV-4: WSDOT Policy Goals Align with Maintenance Performance Measurement

Policy Goals	Maintenance Policy Objectives	Performance Measure Examples
Maintain and operate transportation facilities	Safety of traveling public and employees	Safety patrol (hours per center line mile)
Optimize the operational efficiency and safety of the transportation system	Operate the highway system and keep the roads open	Shoulder maintenance (% with deficiencies)
	Meet environmental responsibilities	Noxious weed control (% of roadside area with Class A or Class B weed present)
	Maintaining infrastructure	Structural bridge repair (% of priority one deficiencies deferred longer than one year)
	Contribute to comfort, aesthetics or convenience	Sweeping and cleaning (% of shoulder area with sand and debris)

2. Used by Management Throughout the Management Cycle

WSDOT performance measurement system is effective in providing leadership, accountability and communicating management priorities across the organization. It provides clear and consistent lines of accountability.

The primary focus of highway maintenance performance measurement is the measurement of outcome. The use of performance measurement to manage and report on effectiveness is well developed for highway maintenance through MAP and is consistent with WSDOT Strategic Plan. MAP currently includes 34 maintenance activities and it is used through the management cycle in a six step process.

- Identify customer expectations through surveys or focus groups.
- Identify and prioritize maintenance activities according to policy objectives.
- Establish desired level of service (outcome).
- Build budget based on desired level of service.
- Implement maintenance program.
- Evaluate program effectiveness through a random sampling.

One of the main components of this process is that a specific outcome (level of service) is established before performing maintenance activities. Using historical data it is possible to determine the cost of implementing different outcomes and make investment decisions based on the desired outcome.

a. Use to provide leadership

WSDOT's highway maintenance performance measures provide leadership across the organization. Interview results found a clear and very consistent understanding by managers of WSDOT's highway maintenance goals and the associated organizational importance. Since MAP was implemented, there have been several directors of the maintenance function and all have expressed support for MAP. Conversations with most of these have indicated strong support for and advocacy of MAP over time. Interviews revealed that that the Secretary of Transportation has recently required developing efficiency measures to improve performance measures over time. This indicates interest by top management in the continued improvement of MAP performance measurement.

Interviews with regional engineers reported their success factors in terms of the role their unit plays in meeting the organizations highway maintenance objectives.

b. Used to provide accountability mechanisms

Highway-maintenance-specific performance measurement provides very direct accountability across the organization. Region administrators through their performance plans are directly accountable for the maintenance and operation activities. Region administrators' direct reports have similarly clear expectations for accomplishing MAP goals in their performance plans.

The MAP approach allocates to each region the responsibility to meet specific goals for each of the 34 maintenance activities. Every region manager responsible for maintenance and operations has MAP targets and these roll down to maintenance supervisors. Each region tracks the maintenance activities target as part of their scorecard[18]. A standard format allows for clear communication across the organization. The appropriate region managers are involved in the revision of the targets for each maintenance activity.

Interviews revealed that some managers in the regions were first resistant to using MAP to manage highway maintenance activities because they were not convinced that MAP would help them do their job. To solve this problem, management invited managers who were resistant to be involved in improving performance measures. This has improved their acceptance of the MAP process.

Twice a year, field inspections are conducted in every region to measure level of service conditions. These are then compared against the targeted level of service to determine effectiveness. Through interviews with region administrators and their staff this process is very important and provides a direct mechanism for accountability down the organization.

[18] WSDOT South Central Region Business Accountability Scorecard – Overall Mission Level Strategies, June 2004

In this way performance measurement and the performance management system is ensuring that employees at different levels are held accountable to a common set of aligned performance measures.

c. Alignment of measures with business processes

At the aggregate level measurement aligns with maintenance and operations. The level and detail of reporting in the Gray Notebook or identified through the interviews revealed a systematic use of performance measurement by management across the major business processes involved in highway maintenance to monitor and report on their effectiveness.

When field inspections are done, results are measured, recorded and compared to the MAP criteria to determine the level of service (outcome) delivered. These results are reported every year, in the fourth quarter report, on a region and statewide basis. A report on specific activities varies from quarter to quarter and can be obtained for most of the activities.

Customer surveys are being performed every five years as part of the MAP process to identify customer expectations. It would be more beneficial to identify customer expectations on shorter periods of time (2-3 years). In addition, conducting focus groups to identify customer expectations would provide qualitative information.

3. Criterion 3: Used to Communicate to Internal and External Audiences.

a. Internal audience

Interviews with employees across WSDOT indicate that the maintenance performance measurement system provides an effective mechanism for communicating maintenance performance goals and their accomplishments. Results from the MAP process are reported internally through all levels of management though the Secretary of Transportation to assess effectiveness and support budget decisions. For management purposes at all levels and for different geographic areas there are clear easy to use performance measurement results that communicate where WSDOT stands against MAP goals.

b. External audience

External audiences include the legislature who review on an ad hoc basis the target and delivered levels of services.

The MAP process is being used to evaluate highway maintenance program by the legislature to target funding. For the 2001–2003 biennium goals were set and funds allocated to each highway maintenance activity. Through conditions

surveys across the state each activity was rated using performance measures and results reported back to the legislature. Based on these results, legislators focused on increasing specific outcomes.[19] For example the structural bridge repair outcome met the planned level of service C and the Legislature then required WSDOT to maintain or exceed this level of service. The following example shows the actions taken to meet the proviso.

Exhibit IV-5: Actions Taken to Meet Proviso

Proviso: Meet or exceed the target for structural bridge repair on a statewide basis
Region Actions to Meet Proviso
1. Redirect Statewide Funding: $566,500
2. Convert seasonal bridge crews to full time
3. Place emphasis on repairing priority 1 repairs
4. Region-wide crews to work more efficiently with area level crews
MAP Performance Measurement Actions:
The accuracy of the performance measure for structural bridge repair was improved to capture more of the work that maintenance does for this activity. Previous measure was based on a small part of the structural bridge repair work.

4. Criterion 4: Used to Evaluate Cause and Effect

The Maintenance Accountability Process allows determining the resources needed to accomplish a specific outcome. The MAP process is being used to evaluate cause and effect through the systematic application of the process. For each activity performance measures are continually being updated through research to better reflect the input necessary required achieving desired results to reflect efficiency of the maintenance work.

C. Traffic Operations

The use of performance measurement for traffic operations by WSDOT has changed over the past years and is still under development. This review is based on the following snapshot:

- The goal for operations is to "Optimize the operational efficiency and safety of the transportation system and facilities committed to WSDOT's charge."
- Performance measures as published in the Gray Notebook.
- M&O Strategic Plan for Traffic Operations.
- Signal retiming plan by region.

[19] Legislative Proviso 03-05 Biennium.

- Biennial evaluation and reporting of the Ram Metering (Flow) system.
- Biennial evaluation and reporting of the HOV lane system in the Northwest Region.

The WTP update is evaluating the contribution that traffic operations strategies can make to mobility by increasing the productivity of the highway system

1. Criterion 1: Alignment with Policy Goals

The performance measures reported for traffic operations are aligned against policy goals in Exhibit IV-6.

Exhibit IV-6: Operations Related Performance Measures

Policy Goals	Performance Measures
Optimize the operational efficiency and safety of the transportation system and facilities committed to WSDOT's charge	Incident response clearance time measures.
Transportation Commission goals expressed as a measurable target for HOV lane system – operating speed of at least 45 miles per hour 90% of the time.	Clearance of major incidents within 90 Minutes. Number of signal retiming (before and after travel times). Number of 511 calls and 1-800-695 ROAD calls. HOV lane performance.

The safety areas of traffic operation are covered in the safety section.

2. Criterion 2: Used by Management throughout the Management Cycle

Performance measurement is used to manage elements of the system, such as the HOV lanes, incident response, and as of recently ramp metering. Traffic operations primary focus of measurement is output. For example, incident clearance time or number of signals retimed. The use of performance measurement to manage and report on efficiency and effectiveness is underway. The traffic operations office is in different stages of developing new performance measures. WSDOT is using performance measurement to manage for results for a number of activities in the operations area. For example, WSDOT has established a 90-minute clearance goal that it manages against. Accomplishments against the goal are reported in the Gray Notebook.

a. HOV lane management

The Washington State Transportation Center (TRAC), a cooperative transportation research agency, reports on a biennial basis on HOV lane performance for WSDOT. These biennial updates report the following primary and secondary performance measures:

- Primary performance measures for traffic volume, person volume, average vehicle occupancy, speed and trip reliability, and travel time.
- Secondary performance measures including HOV lane violations and public opinion.

According to the Washington State Freeway HOV System policy of 1992, adopted by the Transportation Commission in 1996 and included in the Washington Transportation Plan in 1997 "HOV lane vehicles should maintain or exceed an average speed of 45 mph or greater at least 90 percent of the times they use that lane during the peak hour (measured for a consecutive six-month period)." This goal is reported in the biennial report using the speed and trip reliability performance measures. The 2002 HOV lane performance monitoring is accessible at the TRAC website.

b. Ramp meters

WSDOT Northwest Region's Traffic Systems Management Center uses three performance measures to evaluate efficiency of ramp meters: traffic volumes, accident reduction, and congestion. Ramp meter efficiency is evaluated by comparing the before and after traffic conditions. There are individual goals for each project (according to interviewee) but these are not reported. For example, a study on SR 520 showed a 30 percent decrease in rear end and sideswipe crashes, a 20 mph speed increase, and 10 percent increase in traffic flow. WSDOT provides a freeway network usage and performance report.

c. Signal retiming

Adequate signal retiming is a proven measure to reduce congestion on arterial roads. WSDOT measures performance on signal retiming as the number of traffic signals retimes. A schedule to retime traffic signals is set at the beginning of the calendar year and tracked on a monthly basis. Currently there is no measure to determine the efficiency of the signal retiming work. The number of signals and required full-time employees required to retime signals is the basis to request funding for signal retiming

3. Criterion 3: Used to Communicate to Internal and External Audiences

When there is measurement, it is communicated internally and externally. The traffic operations performance measures report includes incident response data, travel times, and travel information dissemination. Historical trends and actions taken are reported for a number of activities, such as the goals set for incident clearance or HOV lane operating speeds, goals are set and used to communicate WSDOT objectives. Progress against them is reported.

4. Criterion 4: Used to Evaluate Cause and Effect

WSDOT is building a data set that will allow for the evaluation of cause and effect. Historical data on ramp metering, traveler information or HOV utilization exist and performance measures are in the process of being defined. These will enhance management and enable such performance measures as the percentage of traffic signals retimed at the optimal interval to be reported.

D. Safety

WSDOT addresses traveler safety through the Traffic Operations Office and worker safety through the Safety and Health Office. The use of performance measurement for safety by WSDOT is still under development. This review is based on the following snapshot:

- The goal for operations is to "Optimize the operational efficiency and safety of the transportation system and facilities committed to WSDOT's charge."
- Target Zero is a multi-agency strategic plan for highway safety.
- Performance measures as published in the Gray Notebook.
- Yearly incident reports.
- WTP safety update, August 2004.

1. Criterion 1: Alignment with Policy Goals

WSDOT reports safety performance as it relates to employee safety and the safety of the transportation system. The alignment of WSDOT policy goals and performance measurement is illustrated in Exhibit IV-7.

Exhibit IV-7: WSDOT Policy Goals and Safety Performance Measurement

Policy Goals	Target	Performance Measures
Optimize the operational efficiency and safety of facilities and the transportation system	System safety	Collisions before and after construction of safety projects
		Delivery of low cost enhancement projects
		Fatality Rates
		Accidents per VMT
		Safety Construction Program: planned vs. actual project advertisements
No deaths or disabling injuries by 2030		Before and after collision safety corridor projects

Policy Goals	Target	Performance Measures
Specified in Safety and Health Strategic Plan	Employee Safety	Workers receiving safety training
		Injury and illness rates
		Recordable injuries per 100 workers

WSDOT's performance measurement is aligned with the policy goals established for safety in the Safety and Health Strategic Plan, WTP and legislative mandates.

2. Criterion 2: Used by Management throughout the Management Cycle

WSDOT performance measurement system is effective in providing leadership, accountability and communicating management priorities across the organization. It provides clear and consistent lines of accountability. The primary focus of measurement is on accident reduction of both travelers and workers. The use of performance measurement to manage and report on efficiency and effectiveness is not yet developed. Exhibit IV-8 shows the number of maintenance and engineering accidents in fiscal years 2002–2004 and the goals set for each year.

Exhibit IV-8: Maintenance and Engineering Accidents 2002–2004

	Maintenance		Engineering	
FY	Goal	Actual	Goal	Actual
2002	12.79	8.82	1.88	2.35
2003	9.83	7.00	1.69	2.10
2004	8.84	8.17	1.70	1.50
2005	8.20		1.60	

These results clearly show that management has a high commitment to worker safety as more aggressive goals are set every year. This process has required safety mangers and other managers to understand the type and cause of accidents to develop a set of actions to reduce injury rates and achieve safety goals.

This year, WSDOT's Safety and Health office received an excellence achievement award for the reduction in the lost workday case incident rate for all employees during 2003. The number of lost workdays cases per 100 full time workers in 2003 was 1.5 compared to the national average of 2.3.

a. Use to provide leadership

WSDOT's safety performance measures provide leadership across the organization. Interview results found a clear and very consistent understanding by managers of WSDOT's safety goals and the associated organizational

importance. Interviewees articulated their success factors in terms of the role their unit plays in meeting the organizations safety objectives. The Target Zero plan is an important management initiative and WSDOT's performance compared to the nation is reported.

b. Used to provide accountability mechanisms

Safety specific performance measurement provides very direct accountability across the organization. Region safety managers through their performance plans are directly accountable for the safety activities. Region administrators' direct reports have similarly clear safety expectations in their performance plans. The performance measures and performance plans are then actively used as part of management.

The safety and health office set the target of reducing the number of workers injuries by 10 percent. Each region is accountable to achieve this target. During monthly safety meetings each region reviews the most frequent causes of reported injuries to take actions towards reducing them. In this way performance measurement and the performance management system is ensuring that employees at different levels are held accountable to a common set of aligned performance measures.

c. Alignment of measures with business processes

At the aggregate level measurement aligns with safety. The level and detail of reporting in the Gray Notebook or identified through the interviews indicates that there is considerable monitoring and reporting on the location, type, and severity of accidents. The WTP update includes analysis of the actions that WSDOT can take at the transportation system level to address safety goals.

3. Criterion 3: Used to Communicate to Internal and External Audiences

a. Internal audiences

Interviews with employees across WSDOT indicate that the safety performance measurement system provides an effective mechanism for communicating safety performance goals and their accomplishments. Worker safety has been given high prominence in the Gray Notebook reporting and the communication of management priorities.

It appears the aphorism "what gets measured gets managed" is true for worker safety. For example, managers interviewed in the regions indicated that maintenance employees are addressing safety concerns and this is resulting in fewer accidents. Regions report on their accountability scorecards the number and cause of accidents on a semi-annual basis. These reports include historical

data and expected target on reportable injuries by year. For example, the south central region reported through June 2004, 23 reportable injuries compared to the state average of twenty-five in a six month period. The current target is to end the year with no more than 42 injuries. Graphs are generated to show the cause of the injuries and historical averages. These reports then are centralized to estimate statewide averages.

b. External audience

The current approach provides effective information at the regional and state level. As the first section of the quarterly gray notebook reports, it highlights the importance WSDOT gives to safety. In both cases worker safety and highway safety there are summary measures and information that meets the GASB criterion for effective communication to an external audience at the program level. For example, workforce training, statewide highway fatality rates, and corridor safety program. The current reporting of highway and worker safety allows the external reader or policy maker to assess WSDOT's overall performance. The state has established the goal of a "transportation system with no deaths or disabling injuries."[20]

In the case of workers safety, the overall objectives are easy for a reader to identify and then assess where WSDOT is. For example, the number of workers injuries is reported on a yearly basis, compared to previous years and benchmarked against a national average. Specific actions taken towards reducing accident rates are also included in the Gray Notebook. The types of measurement that provides this type of summary level reporting includes: the proportion of the worker receiving training and recordable injuries per 100 workers of different types.

In the case of highway safety, the overall objectives are difficult for a reader to identify and then assess where WSDOT is. Most of the reporting on safety construction projects is done with a focus on delivery. There are few reports that show the effect of the safety construction projects on the overall safety of the highway system. For example, the safety construction program data was recently updated in the Gray Notebook Edition #12 (Page 35). The Gray Notebook reports the number of fatalities. It shows the combined average effect of 21 safety projects in accident reduction using data 18 months before the project and 12 months after completion of the project.[21] The combined result was a 37 percent reduction on the number of collisions per year.

4. Criterion 4: Used to Evaluate Cause and Effect

WSDOT does considerable work to analyze cause and effect between design changes and safety outcomes. These are also reported in before and after analysis. Statewide

[20] Target Zero: A Strategic Plan for Highway Safety, 2000, page 5.
[21] WSDOT, WTP update process, Draft Background Paper – Safety. August 2004.

accident data is used to identify the High Accident Location, High Accident Corridors and Pedestrian Accident Locations. This information is used to prioritize projects that will bring a reduction in accidents. One example of trend data is the installation of cable median barrier. A study quantified the number and type of accidents before and after installing the barrier.

In the case of workers safety, information is available on worker training and accidents. Relationship between these two sets of data could be established using statistical methods.

E. Equipment and Facilities

The use of performance measurement for managing equipment and facilities by WSDOT is still under development. This review is based on the following snapshot:

- The goal for maintenance to "Maintain and operate the transportation facilities and systems placed under the department's responsibility making cost-effective use of the appropriations provided by legislature from citizens' taxes"
- The goal for operations to "Optimize the operational efficiency and safety of the transportation system and facilities committed to WSDOT's charge."
- Performance measures as published in the Gray Notebook.
- Operations Transportation Equipment Fund (OTEF) manual.
- Equipment performance measures.

This section addresses the management of the fleet of light vehicles and specialized maintenance equipment that WSDOT uses to perform maintenance activities and for day-to-day operations. This represents a large capital investment. The facilities include region offices and specialized maintenance facilities that are used to store and maintain equipment.

1. Criterion 1: Alignment with Policy Goals

Exhibit IV-9 below illustrates the types of performance measurement that are used to manage equipment and facilities. These measures are used by the business area managers and are typically not at the level that merits reporting in the Gray Notebook.

Exhibit IV-9: Alignment of Performance Measures with Policy Goals

Policy Goals	Performance Measures
Optimize the operational efficiency and safety of facilities	Facilities condition and backlog
	Project status (schedule and budget planned vs. actual)

Policy Goals	Performance Measures
Maintain and operate the transportation facilities and systems	Equipment utilization rates
	Time to place in service
	Equipment downtime
	Average time to repair
	Rental rates
	Percent of preventive maintenance jobs done within 30 days of due date
	Fuel consumption

In general's WSDOT's performance measurement is aligned with the policy goals established for equipment and facilities in the OTEF operating rules and by the Legislature.

2. Criterion 2: Used by Management throughout the Management Cycle

The primary focus of measurement for the management of equipment and facilities is outputs. For example, in the case of equipment, the number of hours a piece of equipment was used in a given month is recorded or in the case of facilities the number of projects delivered. The use of performance measurement to manage and report on efficiency and effectiveness is not yet developed. Equipment and facilities offices are in different stages of developing performance measuring systems. The equipment and facilities office uses many performance measures to determine equipment utilization and delivery of facilities but there are no goals specified from which to assess effectiveness.

a. Use to provide leadership

It is difficult to identify the management or business objectives for equipment management or facilities management. For example, in some states goals are expressed in terms of ensuring the lowest lifecycle costs of ownership across classes of equipment or the fleet. Other measures address goals for the condition or service life of equipment by class of equipment.

b. Used to provide accountability mechanisms

Equipment and facilities specific performance measurement does not provide direct accountability for equipment and partially for facilities across the organization. Region Administrators through their performance plans are directly responsible for the equipment, as defined in the OTEF operations manual, and facilities delivery but goals for each and associated performance measures have not been established. Further more, management reported their concern that the adequate performance measures are not being used for equipment.

Each region is responsible to report equipment utilization including downtimes and fuel consumption on a monthly basis. Current performance measurement does not allow assessing effectiveness of the equipment utilization.

Every month meetings are set up with the regions to update a project delivery plan for major maintenance and construction of facilities across the state. Regional engineers participate in setting schedules for projects making them accountable for delivery of the projects. But there are no performance measures, such as projects delivered or advertised that ensures that employees at different levels are held accountable to a common set of aligned performance measures.

c. Alignment of measures with business processes

At the aggregate level performance measurement aligns with equipment. The level and detail of reporting in the Gray Notebook or other management performance reports identified through the interviews did not reveal a systematic use of performance measurement by management across the major business processes (procurement, maintenance and financial management) involved in equipment to monitor and report on their efficiency and effectiveness. The performance measurement provides useful information on output (for example equipment downtime) but there are no goals to assess effectiveness of equipment maintenance. For example, a performance measure on cost per unit (total cost of ownership), availability of equipment or remaining service life was not found. Best practice is to apply the price mechanism to management decisions involving equipment. This requires the identification of the total costs for the use of equipment back to the activities that it is used for.

In the case of facilities performance measurement aligns with delivery. The performance measurement focuses predominantly on outputs. Interviewees suggested that the application of MAP type concepts for facilities management would improve performance.

3. Criterion 3: Used to Communicate to Internal and External Audiences

a. Internal audiences

Interviews with employees across WSDOT indicate that the equipment and facilities performance measurement system does not provide an effective mechanism for communicating equipment and facilities performance goals. WSDOT's Fleet and Equipment Management System (FEMS) provides a wide range of inventory, cost distribution, assignment, and utilization reports for vehicles and equipment in the OTEF inventory, but goals are have not been developed to communicate effectiveness.

b. External audience

The equipment and facilities office only reports to external audiences on equipment and safety rest areas. Equipment reports include inventory and sales trends but do not provide to the reader a measure that reflects the efficient use of the equipment such as cost per unit. We did not find examples of these data being reported. The equipment management business area does not warrant Gray Notebook reporting; however, equipment is a large capital investment and has operating costs that together represent a large element of the cost of maintenance. Data on facilities was only included in one gray notebook report by briefly describing the projects for safety rest areas. The lack of metrics associated with these projects does not allow readers to assess WSDOT effectiveness in delivering rest area maintenance and construction projects.

4. Criterion 4: Used to Evaluate Cause and Effect.

The equipment and facilities office records a large amount of data on both, but especially on equipment. Establishing adequate performance measures would allow using this data to determine cause and effect. For example the cost per unit for equipment could be computed to determine if it should be retained or replaced. In the case of facilities, the proportion of the program delivered on schedule, the aggregate change in scope or budget across the program among other measures.

V. Washington State Ferries

■

Washington State Ferries (WSF) is assessed in considerable detail and the results are provided separately for a number of reasons. Among the reasons is that the scope of work for this study distinguished at the outset between highway and ferry programs. In addition, WSF, while an operating division within WSDOT, is subject to different regulatory reporting requirements and has a unique set of operational management activities.

The physical aspects of the ferry system are obviously different, but the management of it is essentially the same as a highway system: the customer priorities are the same, the policy issues are comparable, and many of the business processes are the same. The principal necessity for the separate treatment of ferry and highway systems is found in their regulation, which is substantially different State department of transportations set their own safety and operating standards, by and large, but the maritime safety and common carrier operations of ferries are regulated by federal authorities. WSF receives direction from, and must report its performance to, multiple authorities.

A. Overall Findings for WSF

The same performance measurement evaluation criteria were applied to WSF. The following are the overall findings:

- **Washington State Ferries is producing the information needed to measure performance and progress on government's priorities and goals.**

  Starting with its "Momentum" strategic plan, WSF began systematic and goal-oriented performance measurement in 1996, about five years before the advent of the Gray Notebook. In that strategic plan, WSF exercised the good discipline of building its performance measures into its strategic goals. Similarly, the 1998 long-range plan is based on measurable level of service[22] standards.

  WSF has tested the alignment of its goals, and their associated performance measures, against the "Priorities of Government." WSF has a solid base of business information such that, should those priorities change, it could produce new measures to align with

[22] A measure of the time required to make a journey, taking into account scheduled travel time, the wait between scheduled sailings, and boat waits due to congestion. In Washington State Ferries level of service goals, only the boat waits are used in setting standards for the level of service, the other measures are assumed to be fixed in the short term by schedules

the new priorities. To start building the case for time-of-day pricing, WSF should begin reporting on capacity utilization[23] by route and time of day.

The Gray Notebook does not report all of the performance measures needed to fully assess WSF's progress in meeting its strategic goals. These measures, like the goals themselves, are scattered through several documents. WSF continues to measure, and internally manage, performance measures around levels of service and its "5+5+5" business plan that are not reported in the Gray Notebook. Consolidating all of these measures in a comprehensive annual report would be beneficial, but only if such a report could replace, rather than add to, some of the existing report requirements.

The middle and senior managers in WSF understand the concepts and the values of performance measurement. Culturally, the organization understands and supports the measurement of performance and progress towards achieving these goals – as well it should given that the strategic goals spring largely from its own operating and management issues.

- **Washington State Ferries is using performance measures to manage its operations.**

  WSF managers use performance measures in their day-to-day operations, although they may not think of them as such. These measures properly span the inputs, outputs, and outcomes of ferry operations and are focused on the key decisions that must be made to manage those operations. The existing operational measures are sufficient to understand the cause and effect relationships in each area of the business and to define effectiveness and efficiency measures, although effectiveness and efficiency measures are not always made explicit.

  The managers use operating performance measures for leadership purposes at lower levels in the organization. Performance measurements are also used in personnel assessment and accountability down to the first level of supervision.

- **The quality of Washington State Ferries' performance measurement ranks well with its peers in other countries.**

  The ability to benchmark WSF against peer organizations is very limited. There are no combination vehicle and passenger ferry services of its size in the United States. Its peer organizations are found in Canada and the United Kingdom, where different regulatory and governance regimes impose different costs. Also, the performance measures applied to WSF are typical of those of a government department, whereas the performance measures applied to its peers in other countries are more suited for their governance as public authorities or state-owned enterprises. To the extent they can be compared within these limitations, WSF's use of performance measures is on a level with the best practices of its peers.

[23] Deck space utilization. The proportion of the vehicle-carrying decks of a ferry that are occupied by vehicles on each sailing: a full ferry is 100% utilized and an empty ferry is 0% utilized. Utilization is often summed for all sailings in a day, a week, or a month.

- **Investment decisions are driven more by achieving standards than by improving efficiency.**

  Traditionally, the design and maintenance of ferry vessels and terminals operated by governments follow the design ethic: "Design and maintain to meet the level of service, then incorporate any efficiencies that you can find." Private sector ferry operators, whose best practices are found in Northern Europe, reverse that ethic: "Design and maintain to meet the required return on investment, then we'll deliver the resulting level of service – as long as it's as good as our competitors' levels of service." WSF is trying, as are its public sector peers in Canada and the United Kingdom, to shift towards some middle ground on which providing a financial payback is as important an investment objective as reducing downtime and "boat - waits." Defining a set of investment goals that contain the inherent conflict between service quality and efficiency will be difficult and will require more extensive measurement of internal rates of return than is currently practiced at WSF.

B. Criterion 1: Alignment with Policy Goals and User Priorities

There are two criteria by which the alignment of performance measures with policies and priorities are assessed: 1) whether performance measures are associated with the policy goals that have been set by government for WSF; and 2) whether the performance measures reported by WSF provides a complete picture of the outcomes that are important to the users of any ferry system.

1. Measures Organized around Broad Policy Goals

To test this criterion, each of the strategic goals that pertain to WSF is examined to determine whether there is a measure specified with it, either in the goal itself, in the Gray Notebook, or in another public report.

The current Priorities in Government are defined by the Governor's Office are education, job creation, protection of families, enhancing natural resources, and efficient government. One of the subsidiary "spotlights" under job creation is entitled: "Making Transportation Work." It contains three major planning statements: "preserve and protect what we already have," "use what we have most efficiently," and "replace and expand critical parts of the system."[24]

The goals that government has articulated for WSF, with their performance measures, align with the Priorities of Government as follows shown in

[24] http://www.governor.wa.gov/transportation/transport.htm.

Exhibit V-1:

Exhibit V-1: Goals and Their Performance Measures

Priorities of Government	
Washington State Ferries Goal	**Associated Outcome Measures**
Improve statewide mobility	
Customer satisfaction	Complaints by customers
Distribution capability	Level of service, boat waits[25], overloads[26]
On-time performance	Cancellations and delays
Improve the safety of people and property	
Customer safety and employee safety	Incidents: frequency and cause
Improve the quality and productivity of the workforce	
Productive work environment	Employee surveys
	Labor productivity
Improve the ability of the government to achieve its results effectively and efficiently	
Financial responsibility	Farebox recovery percent of costs (ridership revenues)
	New revenues per passenger mile
	Costs per passenger mile
	Cost efficiencies, percent of budget
	Service reductions, percent of budget
	Life cycle maintenance percent attainment
	Capital replacement versus plan

- **WSF's goals in general align with the state's priorities.**

  WSF's overall goals, as articulated in the plan documents described in Subsection 2 below, are aligned with the state's policy priorities in

[25] The number of sailings that a vehicle or passenger arriving just before loading a vessel is completed must wait through before all those who arrived before them have been loaded and there is space for them to be loaded also.
[26] The number of passengers or vehicles that arrived at a terminal in time to be loaded on a given sailing but, because that sailing was fully loaded, were left behind when the vessel departed.

Exhibit V-1. Because most of WSF's goals include performance measures, those measures also could be mapped back to the associated Priorities of Government.

- **Where policy goals specific to WSF have been defined, they have been defined clearly.**

  Most of the strategic goals developed by and for WSF have, embedded in the goal itself, the performance measure that will determine whether the goal has been attained. To include a measure of success in the goal itself is an excellent practice that is often neglected, but not in the case of WSF. Labor productivity may be the one exception: among deck crews and vessel engineers, staffing levels are regulated.

  It is outside the purview of this review to assess whether the goals defined by and for WSF are comprehensive or relevant.

- **More measures than those defined in the policy goals are needed to properly assess whether those goals have been achieved.**

  Customer satisfaction surveys, which were explicit in the "Momentum" 1996 strategic plan, are not conducted regularly. Customer surveys are also required to assess their feeling of security. There are no measures of mode choice or of propensity to travel, such as rider ship per capita, to assess the popularity of the service. Under distribution capability, there are no measures of connectivity, which was an explicit part of the goal in "Momentum" 1996 strategic plan, nor is the *utilization* of deck space reported.

The Gray Notebook, as the principal report of performance toward achieving goals specified by government for WSF, contains a dedicated section on ferries. The measures in the ferry section of the Gray Notebook are mapped against WSF' goals and the associated priorities of government in Exhibit V-2.

Exhibit V-2: Goal Associated Measures in the Gray Notebook

Outcome Measures (from Exhibit V-1)	Gray Notebook
Improve statewide mobility	
Complaints filed by customers	Trends of complaints by cause
Level of service: boat waits, overloads	Not reported
Cancellations and delays	Trip cancellations, delays

- **The ferry-specific measures in the Gray Notebook do not report all of the measures defined in WSFs' strategic goals.**

  Most the goal associated performance measures that are reported in the Gray Notebook are operational measures; and the associated goals are, for the most part, operational as well: success is measured by meeting an operating standard that is better than the current measure.

  The largest group of goal associated performance measures that are not reported in the Gray Notebook are those that directly assess achievement of the "5 + 5 + 5" business plan and the concurrent improvement funds available for capital investment: arguably the most significant strategic shift taking place in Washington State Ferries at the moment.

  Beyond the Gray Notebook, WSF publishes several reports that contain performance measures that are associated with their strategic goals. These are summarized in Exhibit V-3.

Exhibit V-3: Goal-Associated Measures in All Reports

Outcome Measures (from Exhibit V-1)	Where Reported
Improve statewide mobility	
Complaints filed by customers	Gray Notebook
Level of service: boat waits, overloads	
Cancellations and delays	Gray Notebook
Improve the safety of people and property	
Employee surveys	Not reported
Labor productivity	Not reported

Outcome Measures (from Exhibit V-1)	Where Reported
Improve the ability of the government to achieve its results effectively and efficiently	
Farebox recovery percent of costs	WSF Progress Report and Gray Notebook #12
New revenues per passenger mile	Internal report to WSDOT
Costs per passenger mile	Federal Transit Administration
Cost efficiencies, percent of budget	Internal report to WSDOT
Service reductions, percent of budget	Budget submissions to OFM
Life cycle maintenance percent attainment	Gray Notebook
Capital replacement versus plan	Gray Notebook

- **Several WSDOT and WSF reports, taken together, cover most of Washington State Ferries' strategic goals.**

  There is, throughout the reports listed in Exhibit V-3 as well as other reports, at least one of the performance measures associated with each of WSFs' strategic goals. If these were consolidated into a single report, they would provide a comprehensive assessment of WSDFs' progress towards achieving its goals.

  While some aspect of performance is measured for all of the goals, there are some goals for which the reported performance measures are not enough: ridership and revenues alone do not adequately measure farebox recovery or connectivity; sailing[27] cancellations and delays are but one aspect of mobility and boat waits, overloads and utilization are other necessary indicators; the severity and cause of injuries to passengers and employees, as well as the frequency of injuries, should be reported.

  WSF began a performance measure program in the late 1990s. Several of the measures on which WSF previously reported have been diverted to other reports since its performance reporting was rolled into the WSDOT Gray Notebook. Some of these measures – boat waits, capacity utilization, and some labor productivity indicators – would still be relevant to WSFs' strategic goals today.

2. Background on Washington State Ferries Strategic Goals

There is no consolidated statement of policy goals and directions for WSF, although such a statement is likely to be in the forthcoming update of WSF's long-range plan. Reflecting the processes through which they evolved, they are currently scattered

[27] One scheduled departure of one ferry on one route.

through several documents, the principal of these being described in the subsections below.

a. "Momentum": strategic plan, 1996

The goals in this strategic plan, generated by Washington State Ferries, were the following:

- Increased customer satisfaction measured by positive trends in customer survey ratings for on-time performance, facilities, amenities, and customer service.
- On-time performance measured by delays and cancellations from the schedule.
- Safety measured by targeted reductions in and comparisons to benchmarks for customer injuries, customer damage claims, and vessel accidents and property damage.
- Productive work environment measured by positive trends in employee surveys.
- Financial responsibility measured by productivity, fuel efficiency, maintenance, inventory and construction of vessels and terminals.
- Distribution capability, in terms of both travel time and connections, measured by level-of-service standards.

The 1996 strategic plan also defined strategies for achieving these goals: building a customer service ethic, developing managers and employees, strengthening the organization, improving decision making and measurement, developing a technology strategy, and refine business processes.

b. Systems plan for 1999–2018

This plan was brought forward by WSF and adopted by the Washington State Transportation Commission in December 1998. It is currently the operative long-term plan for the capital investments and the ongoing operations required so that WSF can sustain the service levels that are specified in it. WSF is currently in the early stages of updating this plan.

The plan is based upon the policy objectives adopted by the Washington State Transportation Commission in the late 1990s that, in turn, reflect the uniform priorities of safety, travel time, service quality, and community contribution:

"The commission will pursue the following objectives subject to available funding:

- Protect our investments by keeping our transportation infrastructure in sound operating condition.

- Operate transportation systems to work reliably and responsibly for the customer.
- Improve safety through continuous reduction in the societal costs of accidents.
- Provide viable mobility choices for the customer and expand the system to accommodate growth.
- Meet environmental responsibilities.
- Cooperate and coordinate with private and public transportation partners so that systems work together cost effectively.
- Continuously improve the efficient and effective delivery of agency programs."[28]

The plan specifies level-of-service standards in terms of the number of boat waits at different times of the day for each route across Puget Sound, and in terms of the percentage of sailings that overloaded on the San Juan Islands and international routes. The plan also provides estimates of the outputs, in terms of service schedule and in terms vessel and terminal construction, and estimates of the financial inputs required to produce those outputs.

c. Approval of Initiative 695 and the Joint Task Force on Ferries, 2001

In November 1999, voters approved Initiative 695. This changed WSF plans dramatically by abolishing the Motor Vehicle Excise Tax. WSF's business planning changed from the planned introduction of passenger only ferries to assessing how to maintain current service. With the abolishment of the Motor Vehicle Excise Tax through initiative 695, questions about the financial sustainability of WSF came to a head in the 1999–2001 Washington State budget process. The Legislature formed a group of elected officials and representatives of stakeholder groups to recommend future directions for the Washington State Ferry system. Their report made many recommendations, of which the following could be considered as strategic goals that, if achieved, would improve WSF's financial prospects:

- Fares should cover 80 percent of operating costs, rather than the 62 percent they covered in 1999 and, towards this end, make the investments required to implement time of day and day of week pricing.
- Increase state funding for capital preservation requirements.
- Continue, through 2001–2003, the service reductions made in the 1999–2001 budget.

[28] Washington State Ferries. Systems Plan for 1999 – 2018. June, 1999.

d. 2002 strategic plan and the "5 + 5 + 5" business plan

Intended to expand upon, rather than replace, the goals in the 1996 "Momentum" plan, the goals defined in the 2002 strategic plan are more like strategies: improve and refine business processes; broaden revenue base and reduce costs; promote and assist in planning of regional transportation centers; and redefine who they are.

The 2002 strategic plan was the vehicle through which WSF brought forward a proposed "5 + 5 + 5" business plan into several venues for planning and public discussion. It is this business plan that contains measurable goals, namely efficiency savings of 5 percent, fare increases of 5 percent, and new revenues of 5 percent. These three improvements to WSF' operating budget, plus savings from service reductions and the retirement of inefficient vessels, are to raise sufficient funds for the replacement of critical capital.

The "5 + 5 + 5" business plan was supported by the Washington State Ferry Tariff Policy Committee in its report on the 2002–2003 Tariff Review and, subsequently, adopted by the Washington State Transportation Commission.

3. Measures Organized around Customer Priorities

The priorities of WSF customers differ from those of highway customers – vehicle operators on state highways – in only one respect: Washington State Ferry customers expect service quality in ferry facilities, amenities and in on-board or in-terminal services.

The exhibits below summarize what performance measures of outcome are expected to be found around each of these priorities, if the expected measures are currently reported and, whether currently reported or not, WSF has the data available to report them. These exhibits do not include the many output measures and input measures that are associated with these customer priorities.

a. Expected outcome measures with respect to safety

Exhibit V-4: Safety Outcome Measures

Measure	Type	Publicly Reported?	Internally Managed?	Data Available?
Passengers' sense of security	Operational	√	√	Requires regular surveys
Passenger safety complaints	Operational	Gray Notebook	Customer response	√
Passenger, vehicle incidents; claims for damage or injury	Operational	√	Incident reports, settlement costs	√
Employee Injury or Occupational Illness	Operational	Gray Notebook	Incidence of claims	√

- The degree to which passengers "feel safe" is not assessed.

  Passengers place high value on being kept safe. Passengers on ferries want also to be kept safe from their fellow passengers, although this is less of an issue than as in subway trains, and stations. Passengers may have security-based fears that are important to assess.

b. Expected outcome measures with respect to mobility (travel time)

Exhibit V-5: Mobility Outcome Measures

Measure	Type	Publicly Reported?	Internally Managed?	Data Available?
Propensity to travel: choice of ferry mode and trips per capita	Strategic	Ridership only in Gray Notebook	√	Need regular surveys
Congestion: boat-waits	Strategic	WSF Performance Report	√	√
Unscheduled sailing delays	Operational	Gray Notebook	√	√
Scheduled connection time	Strategic	√	√	Need transit connection data
Scheduled turn-	Strategic	√	√	√

Measure	Type	Publicly Reported?	Internally Managed?	Data Available?
around time				

- **Only the operational measures of mobility performance are given prominent profile in regular reporting.**

  The ease of mobility across Puget Sound, and thus the popularity of WSF as a choice for travel, is not comprehensively monitored. It can be monitored directly in terms of trips per capita and surveys of mode choices made by travelers in the region. Also, the strategic management of mobility, measured in *levels of service*, is not reported upon despite the level of service standards that were established for each route in the 1999–2018 long-range plan. Connectivity with other modes, while explicit in the strategic goals, is not reported.

c. Expected outcome measures with respect to service quality

Measure	Type	Publicly Reported?	Internally Managed?	Data Available?
Customer complaints	Operational	Gray Notebook	Response to complainant	√
Customer ratings of the quality of each amenity or service	Operational	X	X	Need regular surveys
Customer ratings of the quality of each amenity or service	Operational	X	X	Need regular surveys
Value and volume of service sales	Operational	X	√	Concession leases

- **Several WSDOT and WSF reports, taken together, cover most of WSF's strategic goals.**

  Customer complaints should be the last measure of customer satisfaction, not the first: when a customer complains, they have already been dissatisfied for some time and, when they stop complaining, it may be because they are not only dissatisfied but resigned to being ignored. Without surveys, the government will not hear from them again until the next election. WSF uses focus groups to test customer reaction to new services, and makes extensive and intensive efforts to support many route-

based customer and stakeholder advisory groups. In addition, WSF conducts periodic customer surveys.[29]

d. Expected outcome measures with respect to community values

Measure	Type	Publicly Reported?	Internally Managed?	Data Available?
Community awareness and appreciation	Strategic	X	X	Need media assessments, surveys
Activist/stakeholder endorsement	Strategic	X	X	X

- **WSF presumes, rather than measures, when its environmental and community programs have built enough support.**

  WSF reports on its activities to protect the environment and to improve good will in the communities that it services. Most governments consider such output measures to be sufficient but, for those that do not, there are measurement methods available to assess the outcomes of these activities.

e. Expected outcome measures with respect to cost, i.e., the cost paid by the customer.

Exhibit V-6: Expected Outcome Measures

Measure	Type	Publicly Reported?	Internally Managed?	Data Available?
Fare equity benchmarks	Strategic	Biennial Tariff Policy Committee	√	√
Fare affordability, benchmarked per unit mile	Strategic	Federal transit data	√	√
Operating and capital cost per unit mile	Strategic	Federal transit data	√	√
Fare box recovery of operating costs	Strategic	Biennial Progress Report	√	√
Subsidy per unit mile	Strategic	X	X	√

- **All of the expected performance measures for fares are reported.**

[29] Amenity Concept and Customer Satisfaction Study Final Report. http://www.wsdot.wa.gov/ferries/pdf/amenitystudy.pdf.

While taxpayers have a general interest in the cost of providing service (i.e. its efficiency), passengers have a direct interest in the fares they must pay, both in the absolute terms of what they can afford and in the relative terms of what others pay (i.e. the equity). As long as elected officials are accountable to fares and costs, as well as for subsidy, they share that direct interest.

If the accountability of elected officials for WSF were to shift from fares and levels of service to the extent of subsidy, then that measure could be reported also.

4. Criterion 2: Use of Measures in Management Cycles

To assess the use of performance measurement across the management cycle in WSDOT three business areas were examined in detail. The three business areas were chosen for this sampling approach to: capture some of the unique features of a ferry operation; include business areas where management can exercise significant degrees of discretion; and span short-term, medium-term and long-term time horizons.

These three cases lead to some general conclusions about the use of performance measures in the management cycles of WSF. Management in WSF has a good understanding of the cause and effect relationships among their inputs, their outputs, and their outcomes. They have been using performance measures in a systematic way since 1996 for the purposes of external accountability and they are, for the most part, familiar with the concepts of performance measurement.

WSF managers use performance measures in their day-to-day operations, although they may not think of them as such. Many operational measures, while not compiled and formally reported, are available to and widely used by managers. The managers use operating performance measures for leadership purposes at lower levels in the organization: everyone on the terminal knows the importance of turnaround time. Performance measurements are also used in personnel assessment and accountability down to the first level of supervision.

Middle managers understand the strategic goals of WSF, generally support them; and they see how their activities, and the measurement of their activities, relates to them.

The following sub-sections summarize the three business processes upon which these general observations are based.

5. Scheduling of Terminal Staff

- Performance measures are used extensively and intensively throughout the management process of scheduling terminal staff.

- The outcomes data, vessel turnaround times and customer complaints, are currently not integrated and the timely availability of this performance data throughout the organization could be improved.

WSF uses its own staff to process vehicles and passengers into the terminals and onto the appropriate vessels before they sail. Terminal staff must process incoming passenger and vehicles promptly and correctly, otherwise vessel departures are delayed and incoming traffic can clog the roads approaching the terminals. If the number of terminal staff on a shift is too low then traffic will not be processed promptly. If too many terminal staff are on a shift, labor productivity falls. The management objective, therefore, is to have as few staff on shift as is required to process the expected traffic. Mundane it may be, yet scheduling terminal staff is the largest discretionary operating decision management can make on a day-to-day basis since the size of vessel crews is almost entirely determined by U.S. Coast Guard regulations.

Staff hours at individual terminals are line items in the legislative budget and, therefore must be budgeted for each year. These budgets are established with an allowance to exceed the budgeted hours by 3 percent, using forecasts of expected traffic on each day of the year on each route. Operations managers then track actual incoming traffic against the forecast and, where variances are expected, they raise or lower the number of staff within the 3 percent budget constraint and the requirements of the collective agreements. The terminal staffing schedule is formally reviewed each quarter and is determined by terminal managers on a weekly basis. Once staff are called in, terminal managers cannot send them home but, when traffic is lower than expected, can pull staff away from front-line operations for training or cash handling duties.

Outcomes are measured in terms of vessel delays caused by slow turnarounds in the terminal and road congestion outside the terminals. Outputs are the number of transactions. Inputs are labor hours. Effectiveness, therefore, is the turnaround time of a vessel when the number of transactions equals a full load, and efficiency is measured as transactions per labor hour or as seconds per transaction.

These performance measures used on a weekly basis to control the decision in the business process and those measures span outcomes, outputs and inputs. The outcome performance measure, vessel turnaround time, is used effectively in the leadership of terminal staff and the input measure, transaction times, are used in holding staff accountable.

Customer complaints about late sailings are a lagging indicator of slow vessel turnaround: by the time customer complaints about turnaround times on a particular route have been submitted and registered, a problem causing slow turnarounds may be several days old. Yet, sometimes, customer complaints are the first indicator that that senior management sees to indicate a problem. At those times, a string of customer complaints will spur management to query the operational database to look for evidence of problems. Management's awareness and response to this sort of problem

would be improved with a "dashboard"-type report that made this information available on a real-time basis.

6. Vessel Maintenance

- Marine maintenance depends heavily on the conservative and costly means of design standards and physical inspections to measure what maintenance jobs must be done, and how frequently, to keep vessel downtime at acceptable levels.
- WSF's new maintenance management system is improving the measurement of efficiency, i.e. the inventory and labor required to accomplish maintenance jobs. Over time, the maintenance management system should also generate the data required to improve effectiveness, i.e. the number and frequency of jobs that must be done.

Like all ferries, WSFs' vessels are a complex collection of structural, mechanical, electrical, electronic, hydraulic and pneumatic systems. Because the safety of passengers and crew depend on proper function of these systems, their maintenance is highly but not entirely regulated by the U.S. Coast Guard. Aside from being a very costly exercise in itself, on which WSF spends over $20 million annually, there is a significant opportunity cost when a vessel must be taken out of service. Regulated inspections alone can take a vessel out of service for up to 15 days over a five-year period. The maintenance management objective in WSF is to perform regulated maintenance at minimum cost and perform discretionary maintenance at the point of balance between the cost of removing a ship from service and the cost of more intensive maintenance.

The outcome performance measure is downtime: unscheduled downtime due to breakdown and scheduled downtime for maintenance and inspections. Output measures are difficult to define with any uniformity in a job-order system: generally, outputs are the number of jobs required to maintain one system, e.g. the hull system, and the frequency with which each job must be done. Inputs are parts, or inventory, and labor. Effectiveness, defined as outcome per unit of output, is the downtown suffered due to a maintenance program consisting of certain jobs that are done with some frequency. Efficiency is the cost, in parts and labor, of a job each time it is performed.

The key variable to be managed in maintenance is the minimizing the number of jobs, and the frequency of jobs, required to keep downtime down to an acceptable level. Maintenance engineers, ideally, would replace a component one second before it fails; and they have three methods available to estimate the time of failure.

1. Engineers estimate the failure rate at the design stage and set a standard frequency with which each job should be done;
2. Physical inspections can determine the rate of deterioration of some systems; and
3. A sufficient history of actual failures can be used to forecast, statistically, when a component will fail.

Marine engineering, with a long tradition of maintaining structural and mechanical systems, depends heavily of design standards and physical inspections. The former are conservative, the latter are costly and both, as systems more complex, become less dependable. However, it is a daunting statistical exercise to abandon the "standard" and measure the actual outcomes, or breakdowns, per unit of output. Despite having operated vessels for almost 60 years, WSF does not have this data, for two reasons: (1) their downtime standard is so high that components are rarely in place long enough to fail; and (2) until implementing the maintenance management system (MMS) three years ago, they did not have the means to effectively collect and analyze the data.

Marine maintenance staff, long accustomed to operating "by the book," are adapting as the book itself changes. As the MMS accumulates reliability data, and ties job-orders to inventory and labor productivity tracking, WSF may be able to continue to cope with its aging fleet by re-defining its output standards.

7. Vessel Deployment

- The keen and competitive interest among communities for the biggest and newest ships enforces a discipline on WSF to be very scientific in its use of capacity performance measures when it deploys its vessels among its routes.
- If WSF implements time-of-day pricing then capacity *utilization,* a more sophisticated measure than lift-off[30] capacity, will become a performance measure with a high public profile.

Ferries have operational lives of over 40 years – those of WSF are among the oldest in the world – and, as the traffic patterns for which ships were built change over time, a particular vessel may no longer be the most efficient vessel for the route to which it was assigned. As new vessels are added to the fleet, opportunities arise to shift vessels from one route to another, providing for a different disposition of the fleet among the routes may improve levels of service. Such redeployments usually occur in WSF once every three to five years.

The redeployment of vessels is a budget decision and redeployments are taken forward as a budget decision package. Long prior to submitting the package, WSF consults with communities, route-based advisory groups and customers, all of whom take a keen interest in the vessel deployments that will affect the level of service on their routes for several years. Throughout this consultation process, WSF analyses different options to determine which option is the most:

1. Effective, i.e. provides the best match between the output of lift-off capacity and the outcome of expected traffic across the sum of all routes; and,
2. Equitable, i.e. the level of service on one route is rationally comparable to the level of service on another.

[30] The daily traffic-carrying capacity of a single route, calculated as the vehicle-carrying or passenger-carrying capacity of each vessel on the route multiplied by the number of scheduled sailings that each vessel makes during one service day.

The outcome performance measures are boat-waits which, at a given level of capacity, equate to expected traffic. The principal outcome measure is lift-off capacity, which is a product of the capacity of the vessels and the length of the service day: the longer the day, the more sailings. The input measures are costs: costs of the vessels, both capital and maintenance, and operating costs, mostly crew and fuel. The measure of effectiveness, therefore, is utilization: traffic carried per unit of lift-off capacity which, as utilization rises towards 100 percent, translates to percentage of traffic that is overloaded. Efficiency is measured by the cost of providing one unit of lift-off capacity.

WSFs' management has an intimate understanding of cause and effect among these variables, as do the community stakeholders who watch the deployment planning process so intently. The principal lines of leadership and accountability for vessel deployment lie not among the managers but between WSF itself, the regional and municipal planning organizations, the Washington State Transportation Commission, and the interested citizens of the communities.

If the government implements variable time-of-day pricing on WSF routes, the measurement of effective vessel deployment will become more complicated. Time of day pricing should result in shifts of traffic: shifts from one time to another on a given route, shifts from one route to another, and an overall change in traffic levels due to price elasticity. Variable pricing should increase utilization, and total traffic carried, without increasing lift-off capacity, thus improving both effectiveness and efficiency. Ongoing measures of utilization can be expected to have a higher profile in public reporting if variable pricing is introduced.

VI. Information Technology Supporting Performance Measurement

■

This section provides detail on the findings regarding the capability of WSDOT's information technology (IT) to provide the management information necessary to monitor performance. Dye Management Group, Inc. assessed WSDOT's current IT capabilities in relation to their ability to provide performance measurement information that has the following characteristics:

- Well defined and well structured.
- Current, accurate, and complete.
- Frequently reported and easily available to management and other users.
- Retained over a sufficient period to enable trend analysis.

A. WSDOT's Current IT Capabilities - Findings

The main technical issues affecting IT system support for WSDOT performance measurement are the following:

- Lack of compatibility and integration among various systems and databases.
- Outdated technology base for some of the most significant systems that provide this data
- Cumbersome processes and specialized technical skills required to extract the data.
- Poor alignment between IT data delivery systems and the information needs of the Gray Notebook and department-wide performance reporting in general.

The data required to support Gray Notebook reporting is captured in WSDOT systems at the program level. The situation with regard to performance measurement around project delivery illustrates the limitations that WSDOT's IT capabilities place on the use of performance measurement for management and accountability reporting. Most systems on which the Project Control and Reporting Office and the Strategic Assessment Office staff rely for data are not organized around project accountability data. This presents a significant challenge for compiling project-oriented performance data for the Gray Notebook.

1. WSDOT's Related IT Direction and Goals

WSDOT's Office of Information Technology has established some goals and directions which can address a number of the constraints listed above. These include the following:

- **Data marts and a data warehouse environment, which can improve ease of access to data.** Data marts have been established for financial, collision, roadway, and other databases. A project tracking data mart may provide an effective way of improving integration and ease of access for project scheduling, cost, and risk data. The PDIS project team, as well as staff within the PCRO, are beginning to develop data mart-like databases which bring together data about multiple aspects of a project.
- **A data catalog program for defining data in business terms, using a Web-based application and supporting database that is accessible to management and staff throughout WSDOT.** This can improve the quality and accessibility of data, by developing a standardized definition and set of standards for what is recorded in WSDOT databases, and then making it easier to locate data.
- **Planned assessment of its critical systems, including many of the systems examined here.** This assessment is intended to point the way to improving integration and ease of use for these systems and their databases.
- **Additional applications to fill important gaps in project tracking and reporting.** One example of this is a new Commitment Tracking System (CTS) being developed by the Environmental Services Office in cooperation with the Office of Information Technology.

2. Recommendations

Based on these findings, Dye Management Group, Inc. recommends that WSDOT take the following steps to improve IT support for its performance measurement program.

- **Use the planned Critical Systems Assessment effort to develop a strategy for enhancing and/or redeveloping systems critical to WSDOT's performance reporting.**

  The Critical Systems Assessment study should point the way to increased integration, updated technology, increased usability, and greater data accessibility for systems used for recording and reporting performance data. Integration among systems used to track projects should receive high priority as this "critical system" effort moves forward. At the same time, this assessment should consider ways to improve the alignment between IT systems and WSDOT's performance reporting needs, including the Gray Notebook.

- **Establish and publish standard definitions and usage for key project data items.**

  Although some data used for performance reporting are seen as clear and well defined, in other areas the lack of consistent definitions and usage is causing difficulty in reporting performance. (One example cited below is the use of Program Item Numbers and Work Item Numbers.) Data standards, including standard, business-oriented definitions, for project data can significantly improve

the timeliness and accuracy of performance reporting using IT systems. The existing data catalog can be a useful tool for establishing these standards.

- **Develop an integrated database for project data, for use by multiple divisions and offices that rely on this data.**

  WSDOT should leverage the current efforts to develop integrated databases of project data. WSDOT has a successful track record of deploying data marts to provide ease of access and increased integration for data in various business areas. WSDOT should consider using its data mart technology to consolidate and improve access for its project data.

- **Expand the use of the project scheduling system (PDIS) by project engineers and project managers.**

  PDIS appears to be the most widely used software tool for project scheduling and for recording detailed tasks and actual progress on projects. The challenge that the department of transportation face with project scheduling systems is in ensuring that they are used as project management tool by project managers consistently and that project status is updated. WSDOT should continue to train project engineers, managers and other staff in its usage, so that nearly all projects are using it. In combination with integrating PDIS data with project expenditure and data from other sources, expanding the use of PDIS will significantly improve the ability of WSDOT to track project data.

- **Pursue short-term opportunities to improve IT support for performance measures.**

  As projects are undertaken over the next year or two to improve or replace IT systems which support performance reporting, WSDOT should look for opportunities to address the issues identified here. This includes filling reporting gaps, improving data accessibility, increasing system and data integration, updating technology and improving system usability.

B. Framework for Assessment

To assess the adequacy of IT to support performance measurement, Dye Management Group, Inc. considered the primary areas in which WSDOT seeks to measure and report performance. These areas were drawn from the Gray Notebook which WSDOT publishes quarterly to report progress on transportation projects and other program efforts.

These areas are as follows:

- Project delivery (including principal project phases – planning/programming, preconstruction, construction, etc.).
- Financial performance (including effective and efficient use of public resources).
- Program management.

- Public safety.
- Congestion.
- Maintenance.
- Operations.
- Workforce safety and training.

Systems supporting each of these performance measurement areas were identified, based on interviews with WSDOT staff that use these systems to build specific components of the Gray Notebook. Appendix B provides a description of each system referred to in this section.

Exhibit VI-1 indicates which systems support each performance measurement area. Performance measurement areas included in this exhibit have been grouped based on whether they are addressed within the Beige Pages or White Pages sections of the Gray Notebook. A check mark (√) in a cell indicates that the IT system supports the performance area.

Exhibit VI-1: Systems Supporting Performance Areas Within the Gray Notebook

	Beige Pages			White Pages				
IT Systems	Project Delivery	Program Management	Financial Performance	Public Safety	Congestion	Maintenance	Operations	Workforce Safety and Training
Capital Program Management System (CPMS)	√	√	√	√				
Project Delivery Information System (PDIS)	√							
Transportation Executive Information System (TEIS)			√					
Electronic Work Order Authorization (WOA/ACORDE)								
Project Summary		√						
Priority Array Tracking System (PATS)								
Transportation Reporting and Accounting Information System (TRAINS)		√	√			√		√
Financial Information Retrieval System (FIRS)		√	√			√		
Estimate and Bid Analysis System (Ebase)	√							
Primavera	√							
Microsoft Project (MS Project)	√							
Transportation Information Planning and Support System (TRIPS)				√				

IT Systems	Beige Pages			White Pages				
	Project Delivery	Program Management	Financial Performance	Public Safety	Congestion	Maintenance	Operations	Workforce Safety and Training
Collision Location and Analysis System (CLAS)				√	√		√	
Highway Performance Monitoring System (HPMS)				√	√		√	
Loop detectors					√		√	
WITS (incidents)					√		√	
Maintenance Accountability Program (MAP)						√		
Maintenance Productivity Enhancement System (MPET)						√		
ATMS								√
Geographic Information Systems (GIS)							√	
511 System							√	
Compliance Suite Safety Management Software								√
WSDOT Payroll System								√
WSF Payroll System								√
Signals Maintenance Management System (SIMMS)						√		

Based on facilitated discussions and interviews with both technical and business representatives, the primary enterprise systems supporting the Beige Pages were assessed for quality of data provided by those systems. These systems are:

- Capital Program Management System (CPMS).
- Project Delivery Information System (PDIS).
- Transportation Reporting and Accounting Information System (TRAINS).
- Financial Information Retrieval System (FIRS).
- Estimate and Bid Analysis System (EBASE).

For business area managers and users of performance measures, the components of data quality were used as a focal point of discussions of IT systems capabilities in regard to delivering performance data.[31]

Data quality is based on three dimensions:

- **Definition quality.**
  - Meaning of data is clearly defined and understood by those who maintain it.
  - Business rules are clearly defined (including sets of valid values).
  - Architecture has been analyzed and documented in a data model.
- **Content quality.**
  - Complete – All the necessary facts are recorded and available electronically; data is recorded at the correct level of detail (granularity).
  - Unduplicated – A single fact exists in a single database, not in multiple databases.
  - Accurate – Data recorded in databases match the real world, and the experience of people doing the work.
  - Valid – Recorded values conform to business rules.
- **Delivery quality.**
  - Timely – Data is delivered by automated systems quickly enough to satisfy the operational and decision making needs of those using the data.
  - Accessible – Knowledge workers and managers can get the data when they need it, without undue manual intervention, assembly, and quality assurance time. The data is easily transportable between systems; that is, what is recorded in one system shows up in other systems that rely on the same information.
  - Understandable – Presentation format is clear and efficient, and makes the data easily understood.

These dimensions of data quality, and how they affect IT system capability for WSDOT performance measurement system, can be summarized by the following test or evaluation criterion:

- Do the IT systems have the capability of delivering data that is well defined and understood; that is accurate, consistent, reliable; and that is available and usable?

To assess system support for the WSDOT's performance measurement needs, each of the systems listed above was assessed in regard to the data quality criteria identified above.

[31] These components are drawn from the article, "Total Information Quality Management," by Larry English, published in Guidelines to Implementing Data Resource Management, Data Management Association, 2002.

This assessment was accomplished through interviews with managers within WSDOT's Strategic Assessment Office and within WSDOT's Project Control and Reporting Office responsible for gathering data from these systems and incorporating that data into appropriate sections of the Gray Notebook.

In addition, the Gray Notebook for the second quarter of 2004 (June 30, 2004) contains a section on management information systems and needs. This section identifies system gaps and needs. These needs were considered when developing the current assessment.

C. Issues Identified

In conducting the above assessment, several issues with current IT systems were identified. These IT system issues are described below, categorized by the three broad data quality dimensions discussed above.

1. Definition Quality

Interviewees from both the Strategic Assessment Office and the Project Control and Reporting Office who are involved in developing content for the Gray Notebook believe that the data produced by most systems they rely on is clearly defined and well understood. The exception to this was the Estimate and Bid Analysis System (EBASE); the data for that system is considered not well defined.

WSDOT recently implemented its data catalog system, as its enterprise-wide data dictionary. It contains physical data information, including database, file, and field names for all five systems being assessed here. However, business-oriented, or "common," data definitions have not been recorded within the data catalog for any of these systems. The process of developing common data definitions is still in its early stages within WSDOT. To date, these definitions have been developed for collision data, and WSDOT has hired a data catalog administrator to work with individual offices and branches to develop definitions for their databases.

It appears that data structures within various systems used to describe projects (PDIS, CPMS, and others) are not adequate to support current business requirements for tracking and reporting progress. One example of this is the use of Program Item Numbers (PINs) and Work Item Numbers (WINs) to identify projects and project components. Projects are at times re-configured, either by combining two or more projects into a super project, or by dividing a project up into smaller projects. PINs and WINs are used interchangeably to identify projects and project components; however, because of possible project reconfigurations, a PIN can be associated with multiple WINs and a WIN can be associated with multiple PINs. Current data structures do not support these associations, and there are no commonly used practice for how PINs and WINs are used. Since project start dates and milestones can be associated either with a PIN or a WIN, this makes it difficult to track milestones in a uniform way for all projects. It also creates difficulty when cross referencing projects to the list of projects shared with LEAP.

A specific insight into the limitations upon performance measurement reporting due to the data structures is shown in the case study section below.

2. Content Quality

Data provided by the TRAINS, FIRS and EBASE systems are considered complete, accurate, and reliable. However, for the purposes of supporting the Gray Notebook, CPMS and PDIS do not provide complete information.

In the case of CPMS, the data is captured and organized at the program level, whereas the Gray Notebook requires data at the project level. Because PDIS is a relatively new application for WSDOT, it is still being rolled out to project managers and other users. As a result, it does not contain data for all projects, and is not a reliable source of data for the Gray Notebook.

Finally, there is significant duplication of data among the various systems used to track projects. Basic facts about projects (for example, project identifier, name, and budget) are retained in several enterprise and desktop systems.

3. Delivery Quality

a. Integration among systems and databases

The data storage and file systems are not uniform among systems supporting the project control and performance tracking process. There are few or no automated interfaces for transferring data among these systems. This makes it difficult to share data among these systems. As a result, there is a large volume of manual work on the part of systems and program analysts who extract and analyze the data to produce various sections of the Gray Notebook.

Some examples of this integration issue are as follows:

- The PDIS system records data in a proprietary format that hampers sharing with other WSDOT systems (for example, CPMS).
- Because the EBASE system and database is separate from CPMS, and there are no automated interfaces between the two, providing certain kinds of information for the Gray Notebook requires accessing data in each system separately, and combining the two sets of data together. This is a time-intensive, manual process.

b. Alignment Between IT Systems and the Gray Notebook

Current IT systems capture and report specific pieces of data. Many of them capture data at the program level. WSDOT's performance reporting increasingly requires data at the project level.

The Gray Notebook presents information in narrative form, with individual pieces of data used to support the narrative. To develop these narrative descriptions requires significant time investment on the part of the Project Control and Reporting Office, the Strategic Assessment Office, and other business units. In addition, locating and compiling the data required to support the narrative descriptions often requires searching and comparing data from multiple systems.

4. Ease of Use and Accessibility

Ease of use and data accessibility are significant issues for all five of the systems discussed here. Some examples of this problem are described below:

- CPMS provides a significant amount of the data used to assemble the Gray Notebook. Technical specialists are required to extract this data, it is not easy to access that data, and it is difficult to modify to address new requirements.
- The FIRS system uses newer technology but requires significant training before users can be productive.

5. Uneven Usage of Systems

Usage of key systems is not uniform throughout the department:

- The performance measures capability within TEIS is not currently being used by WSDOT. No WSDOT performance measures have been added to TEIS for 12 months.
- As a relatively new system, PDIS is gaining users rapidly, but it is still not used by all project engineers to manage projects. As a result, the data contained in this system is incomplete.

This can lead to delays in data availability and to data inconsistency.

6. Report Timing

Because regions only report monthly (there is a cut-off at the end of the month), headquarters must wait for the CPMS monthly run to get complete data about projects. Visibility of project management information

Current systems (for example, CPMS) are focused on program-level data, rather than project-level data. There is an increasing need to capture and report data at the project level, integrating financial, scheduling, task, and human resource data. The new PDIS system is building these connections, but because the system is still in its implementation phase, its data is incomplete.

7. Additional Time Required to Perform Quality Assurance on Reports

Ensuring the accuracy of data on key management reports requires additional staff time. This issue is likely related to the lack of system integration among key data and workflow systems, and to lack of consistency between database and narrative information.

D. Case Study Illustrating IT Constraints on Performance Measurement Reporting

In order to create the project performance sections of the Gray Notebook, data is extracted from CPMS and other systems. This data is then used by the project engineer and other regional staff as part of the development of the project narrative, and to create a project control form. Headquarters office staff compile and edit this information, and there are various stages of review, approval, and quality control within the Project Control and Reporting Office and within the Strategic Assessment Office. Finally, after review and approval by WSDOT's executive management, the Gray Notebook is presented to the Transportation Commission.

Producing the Gray Notebook is a complex and time-consuming process. Lack of alignment between current systems and performance reporting requirements of the Gray Notebook is an important contributor to the complexity of the process.

To illustrate the impact of these issues on performance measurement and reporting for WSDOT, the U.S. 395 North Spokane Corridor project was selected as a case study. In the following discussion, gaps in system support for project performance reporting are described, focusing on the CPMS system.

The U.S. 395 North Spokane Corridor project is composed of eight sections:

- Section 1: Francis Avenue to Farwell Road.
- Section 2: U.S. 2 to Wandermere & U.S. 2 Lowering.
- Section 3: Spokane River to Francis Street Improvements.
- Section 4: Spokane River to Hawthorne Road.
- Section 5: Francis Avenue to Wandermere.
- Section 6: Trent Avenue to Francis Avenue.
- Section 7: I-90 North Access Connection.
- Section 8: Collector Distributor System.

Only Sections 1 and 2 have been fully funded.

Section 1, in turn, is composed of four subsections:

- Farwell lowering.
- Gerlach to Wandermere grading.
- Francis Avenue to U.S. 2 structures.
- Francis Avenue to U.S. 2.

The following issues have arisen related to CPMS capabilities and reporting for this project:

1. Transfer of Funds Between Sections

In order to complete Sections 1 and 2, a portion of Section 5 must be completed. Because the CPMS system doesn't allow application of funds to construction without completion of project engineering, this Section 5 work was funded out of Section 1. There is no automated function within CPMS for transferring funds between project components. This required extra work to transfer these funds within CPMS, and is likely to create some confusion later about how much money is required for Section 5 when funding decisions are made for that section.

2. Relationships Between Projects and Project Phases (Sections)

In June of 2003, the project was scoped down from four lanes to two lanes. This affected the design of multiple sections and sub-projects. CPMS does not support tracking relationships between projects and project phases. This meant that coordinating alignments between project sections must be handled through the knowledge and awareness of individual project engineers, and through conversations with one another. This creates a risk that a small change in alignment or design for one section will not be communicated to the other section project engineers, leading to significant re-work and cost overruns. It also makes it difficult to track schedule and cost impacts one project or phase may have on the next project or phase. Automated supports, including reminders as well as cost and schedule impact analyses, would significantly reduce project risk and improve performance reporting.

3. Tracking Project Dollars by Milestone

In January 2004, the first of the four contracts for Section 1 was advertised, and in March the bid was awarded. The award was for $4.9 million. However, CPMS is only capable of recording a bid award for Section 1 as a whole. In addition, dollars and schedule are tracked by one of three milestones for each section. These milestones are: project engineering, right of way, and construction. Based on the costs estimated for all four contracts in Section 1, for project engineering, and for right of way, the system shows $47.9 million spent based on this bid award. In order to accurately reflect project spending and obligations, project engineers must manipulate the data to "fool" the system.

4. Reporting Only Approved Project Changes

In June 2004, money was reduced from what had been allocated to the right-of-way milestone for Section 1 and transferred to another section of the project. However, this decision had not been approved by the commission, and so the financial adjustments were not recorded in CPMS. CPMS has no capability for recording planned or proposed changes in project expenditures. This has led staff within the Project Control and Reporting Office to develop a database that will allow them to record and report out this information for the Gray Notebook.

5. Assumed Relationship Between Advertise and Construction Dates

When the initial advertisement date was set for the first component of Section 1 (Farwell lowering), CPMS required that a construction start date be established. This is difficult to predict at that point in the project, because it can depend on the outcome of negotiations with the successful bidder, as well as weather and other factors beyond the control of either WSDOT or the successful bidder. As a result, project engineers often enter the bid date as the construction start date. This leads to inaccurate data, and it could lead users of the system or its reports to draw very inaccurate conclusions. CPMS should be modified either to allow for a range of construction start dates or to eliminate the requirement that a construction start date be entered.

Appendix A:

State of the Practice in State Department of Transportation Performance Measurement

■

This appendix provides a synthesis from published sources and conference papers of the state of the practice in the use of performance measurement by state departments of transportation. This provides a frame of reference for this review of WSDOT's use of performance measurement.

States use performance measurement for management, communications, to understand cause and effect, and to monitor transportation system performance over time. Each element is discussed in turn.

A. Use of Performance Measurement

There are three principal ways that performance measurement is used for management by government agencies. These uses overlap and can rely on the same measures. The uses are listed in turn.

- **Leadership setting organizational direction and culture.** The phrase what "gets measured gets managed "is well known." However, when an organization establishes, from the top down, a set of overarching, enterprise-wide performance objectives, the accomplishment of which are measured, prominently reported, and reflected in the performance management of employees, the performance measurement system is a tool for providing leadership. Through these mechanisms, performance measurement plays an important role in establishing and maintaining the organizational culture by stating and reinforcing what is most important to the organization. For example, senior management can establish a strategic objective such as "we say what we do and we do what we say" and then reinforce this through measuring and reporting on the accomplishment of stated goals and objectives. In this way, measurement reinforces the organization's priorities and sets the tone.
- **Accountability mechanisms.** An effective performance measurement system itself establishes a culture of accountability. It provides accountability at different levels – at the enterprise level for the overall performance of the organization, at the departmental level for the performance of that department, and at the personal level for the performance of the individual. Where the accomplishment of the organization's objectives are linked to measurable objectives in employees performance plans, measurement further serves as a management tool.
- **Within the management cycle.** For all levels in an enterprise, performance measurement is a key element within the management cycle. This is discussed below

in the context of government managing for results. Put simply, performance measurement is used to measure and monitor whether performance standards are met and the efficiency and effectiveness with which business processes are performed.

The state of the practice, or the closest to a "standard," for the use of performance measurement in the management of a governmental organization such as WSDOT is the managing for results process. This process, which developed over a number of decades is central to the theory and practice of good public sector management. Managing for results has its antecedents in the early 1970s with Peter Drucker's *Management: Tasks, Responsibilities, and Practices*. In this book, he laid out the management cycle and suggested that successful organizations must establish clear missions and goals, set priorities, measure performance, and evaluate results. Other key elements in the development of this approach are found in *Reinventing Government: How the Entrepreneurial Spirit is Transforming the Public Sector*, Osborne, David, and Gaebler, Ted 1992, and a number of books by Harry Hatry, most recently *Performance Measurement: Getting Results,* 1999. Washington state's Priorities of Government process reflects the contemporary application of this approach.

Managing for results combines the basic principles from management science with public sector program evaluation, performance measurement, and the customer-driven focus of the quality movement. Management for Results is becoming increasingly important because of the demands for more accountability in government that arose in the 1990s. Today, the managing for results framework is the standard for good performance management practice. There are annual conferences sponsored by *Governing Magazine* that involve practitioners from across the country who are involved in performance measurement and managing for results.

There are seven basic steps in managing for results, summarized in Exhibit VI-2, and performance measurement plays a part in each of the steps. The steps are part of a continuous management cycle and are not separate. There are different ways in which the approach is implemented by government agencies. The basic approach involves:

- Plans that focus government on real needs and desired outcomes.
- Programs and services that address those needs.
- Performance measures for gauging how efficiently and effectively government is working toward fulfilling the needs and achieving the desired outcomes.
- Adjusting strategies (programs and services) and budgets based on what needs to be done and the data flowing back to decision makers. [32]

[32] The following discussion borrows heavily from the Governmental Accounting and Standards Board Special Report Reporting Performance Information: Suggested Criteria for Effective Communication.

Exhibit VI-2: Performance Measurement in Managing for Results

Managing for Results Components	Performance Measurement
Planning for results (strategic planning).	
Develops broad set of goals and objectives for government, based on a clear understanding of the needs government is supposed to be addressing as established by policymakers, ideally in response to citizen inputs. These goals and objectives address identified needs or may simply be a list of the principal areas where government wants to see progress. Planning process may also include developing clear policy directions and directives that begin to push the overall plan down to the operational level.	Provides a set of measures for progress toward government's goals and objectives. Communicates strategic direction across all business areas. Provides strategic direction for government so that the planning process evaluates and establishes programs that will move most effectively towards objectives. Provides information on the magnitude of the overall needs that government is addressing to inform policy making.
Program planning.	
Evaluating how products and services are delivered. Evaluating how products and services contribute to achieving the government's broader goals and objectives. Often involves specifying a set of specific departmental and program goals and objectives, and a set of services (strategies) for producing outputs necessary for achieving those goals and objectives. Setting work standards for product and service delivery.	Supports program evaluation. Measures accomplishment of objectives across different program areas. Provides basis for establishing work standards.
Developing meaningful performance measures.	
The process through which measures are developed and the technically sound measurement practices are central to managing for results. Involves relevant departments from top management to front-line staff, and in some cases citizens and customers to develop measures of progress (or lack thereof) in meeting goals and objectives.	Full set of measures supports the different elements of the Managing for results cycle.

Managing for Results Components	Performance Measurement
A full set of measures will include data on activities. Governments generally develop input, output, efficiency, service quality, and outcome indicators to track the extent to which program and activity goals and objectives and desired outcomes are being achieved.	
Budgeting for results.	
Allocates resources based on negotiated priorities that take into consideration the government's stated goals and objectives. Budgets allocate resources based on strategies for achieving outcomes associated with the goals and objectives that the government has determined it wants to achieve. Budgets often include associated outcomes.	Provides a measurable link between budget and outcomes. Supports negotiation of budget priorities by providing information on the implications for outcomes.
Collecting and using the data to manage work processes.	
Collects and reports management information (data) at the desired program or activity level that can be used weekly or monthly to monitor the extent to which goals and objectives are being achieved. Provides management information to monitor how efficiently and effectively programs are operating. The results of these continuing assessments are then used at the operational level to make adjustments to programs, services, and spending.	Management information systems report performance measurement information for operational purposes and management control and oversight.
Evaluating and responding to results.	
Conduct periodic overall assessments of what the data are telling government about the effectiveness and efficiency of the programs and services. Assessments typically are formal periodic reports to upper-level career and appointed officials and elected officials. Evaluations are used in setting policies and budgets for future operating years.	Performance measurement supports the evaluation of results and management responses to them.

Managing for Results Components	Performance Measurement
Reporting results.	
Involves communicating to elected and appointed officials and constituents a comprehensive set of clear, decipherable performance measures. Reporting involves communicating the extent to which the government's goals and objectives are being achieved with the information to assist users in assessing the efficiency and effectiveness of the program(s).	Performance measurement reporting is the focal point for communicating results.

1. Use of performance measurement for communications

Performance measurement used to communicate objectives, accomplishments, and challenges in the managing for results framework. There are different audiences that are communicated with using performance measures at different levels. Successful performance reporting has different requirements for the different audiences. There are external and internal audiences:

- **External policy maker audiences for planning and oversight.** In the case of WSDOT, these are the Transportation Commission, legislators, and the governor.
- Some performance measures are intended to provide satisfaction to policymakers that the problems are real, that additional resources might be needed, and that existing resources are being used efficiently and effectively. Performance reporting thus provides accountability and information to inform policymaking.
- **External customers and the broader citizen audience for education and awareness.** For a public enterprise like WSDOT, it is important that highway users, passengers, and taxpayers see that the enterprise is responding to their needs and is acting as a good corporate citizen; without public awareness, there will be little public support for the enterprise.
- **Internal audiences for leadership, education, and awareness.** Senior management often uses performance measures to communicate strategic priorities and goals to the workforce. This ensures that priorities and objectives are clear and understood at all levels across the organization.
- **Internal audiences for communication of expectations for performance and the extent to which expectations are met.** In this way, measurement communicates an unambiguous metric for what is expected of the organization, managers, and employees. Performance measures provide feedback on the accomplishment of objectives. They communicate the extent to which objectives are met and the efficiency and effectiveness of business processes. For individual employees, they communicate performance against expectation set for them.

Measurement reinforces this because it provides measurable feedback on whether managers and employees are meeting their individual objectives.

For both external and internal audiences performance measures are used by transportation agencies to report on:

- **Accomplishments.** These are the outcomes and outputs delivered by the enterprise.
- **Priorities.** These are policy, citizen, and organizational.
- **Progress against policy goals and priorities.** These are where the agency and its organizational units stand against the overall goals and objectives that are set.
- **Trends in the performance of the transportation system**. These are how the system is performing against citizens priorities.
- **Cause and effect.** The relationships between government action and desired outcomes and progress to policy goals and objectives
- **Communicating trends over time to the public.** These measures apply to the transportation system, the performance of the system, and the agency.

A successful external performance measurement reporting system is one which:

- Provides accountability to policymakers, citizens, and management.
- Increases citizen engagement in government.
- Enables citizens to better analyze, interpret, and evaluate WSDOT performance – understand cause and effect etc what WSDOT has control over.
- Improves decision-making by individual citizens and other organizations as it affects transportation system performance.
- Increases citizens' confidence in government by making it more transparent.

A successful internal performance measurement reporting is one that:

- Provides timely information to support the management cycle.
- Is relevant to the day to day work.

2. Use of performance measurement to understand cause and effect

Performance measurement plays a key role in understanding the relationship between cause and effect. This can directly improve program effectiveness.[33] For WSDOT improving program effectiveness strengthens the relationships between its outputs, the

[33] Indeed as mentioned earlier the roots of contemporary performance measurement in government are in the applied program evaluation research performed by the Urban Institute among others. In the late 1960s and early 1970s many government agencies established program evaluation units that conducted experimental research using performance indicators.

outcomes from these outputs, and the broader policy goals set for the agency. It does this by targeting thinking on this relationship and by defining the magnitude of the relationships through the application of the correct statistical and research methods.

Understanding cause and effect focuses management on the programs it administers and their contribution to improving performance. For example, consider the problem of congestion on urban freeway systems such as in central Puget Sound. Given that everyone agrees that reducing congestion is a priority of government. The public policy question is what government can do about it. The question for WSDOT whose role is to address the travel demands of citizens using its revenue stream and governance authority becomes how can we most cost effectively meet the travel demands of Washington's citizens. Program evaluation that assesses the options that are available.

The use of intelligent transportation systems (ramp meters, CCTV, traffic operation centers) for the active management of freeway operations is a strategy for addressing travel demands and reducing congestion on a freeway system. Performance measurement would involve measuring and monitoring the outcomes that can be affected by the use of such systems. The outcomes are timely incident response or the calibration of ramp meters. These systems can increase the productivity of the freeway system as measured by the movement of people or vehicles per lane mile per hour. If travel demand in the corridor exceeds capacity, mobility can only be improved up to the maximum productivity that can be yielded for the existing highway.

This type of systematic measurement and reporting increases understanding about the measurable extent to which a program can achieve desired outcomes. Over time it produces trend date than can be used to establish measured standards for such relationships that can then be used to determine whether we are managing our programs as effectively as possible. For example, engineering research has defined a set of standards for minimum driveway separations, in different speed zones, that will produce the best safety outcomes. This is known, therefore performance measurement can track once these standards are established, whether variances are granted that reduce in a less safe outcome.

3. Use of performance measurement to monitoring transportation system performance over time

A prominent use of performance measurement by state transportation agencies for monitoring the overall performance of the transportation system over time. This performance measurement reflects the somewhat unique role that state transportation agencies play in addressing the public interest in a transportation system that supports citizens' economic, community, and quality of life priorities. In this role, the performance measurement provides trends over time in the operation and performance of the transportation system that addresses the priorities and issues of the users. In many cases the measurement involves reporting aspects of transportation system performance over which the state agency does not have direct control or, put another

way, control of all the factors of its own success. This is because the state does not supply or fund the facilities or services that affect overall transportation system performance. However, the state does play a role in forecasting future travel demands, analyzing how these demands can be addressed by public and private transportation providers, and developing plans to address them.

In the example provided earlier, state government has an interest in monitoring and reporting on congestion at the system level. Absent capacity increases, if the travel demands in the state on a congested system continues to increase, the performance of that system will fall. Ultimately this affects the economic well being and quality of life. Performance measurement is used by government to monitor and report on such indicators. In this role, performance measurement provides information to:

- **Improve policymaking.** Measuring and tracking the performance of the system over time provides improved information on the magnitude of needs and the courses of action open to addressing them against user and government priorities. It also provides information on funding needs and informs the policy debate regarding the public benefits from funding transportation infrastructure. It provides information on overall transportation system performance as measured against citizen priorities.
- **Increase citizen participation in government.** The 1990s were characterized by an increasing distrust and skepticism with the efficacy of government. Performance information increases the understanding regarding the actions that state transportation agencies can and can not take to improve transportation system performance. The provision of information on current and future travel demands and the associated trends through such performance measurement increases understanding of the magnitude of future demand for services that government must address and the future levels of performance with current funding.
- **Status of community-wide goals.** Addressing overall areas of performance against community goals and reporting what actions citizens can take to accomplish the goals is a further use of performance measurement. Examples include individual actions to improve air quality, reduce travel demand, or ensure that other organizations actions can contribute to improve transportation system performance.

B. Overview

From their inception, all state departments of transportation (DOTs) have gathered substantial amounts of data on transportation facilities, equipment, materials, program activity, operations, finances, travel patterns, safety, and other areas. Today's state of the practice for applying performance measures, however, finds most DOTs at one of three distinct stages, according to information presented at the 2004 Transportation Research Board (TRB)-sponsored *National Conference on Measures to Improve Transportation Systems*:[34]

[34] Larson, M., Organizing for Performance-Based Management, Second National Conference on Performance Measures to Improve Transportation Systems, 2004.

- **Stage 1 - Basic Performance Tracking.** In this stage, state DOTs develop and use measures to assess past performance, but results are not systematically used for accountability or business improvement purposes. Measures typically consider inputs (e.g. hours of labor or materials used) rather than outputs or outcomes, and they are usually disconnected from policy goals and customer needs. Measurement methodologies are robust and well defined, but they tend to be narrowly focused on internal responsibilities for operating and maintaining highway systems. Results are often highly technical and are not widely distributed. Not surprisingly, many DOTs have progressed beyond this stage.
- **Stage 2 - Beginning to Manage with Performance Measures.** In this stage, state DOTs begin to align measures with broader efforts to guide strategic policy direction, and to address accountability. In this environment, leadership from senior management takes on greater importance. Measurement of outputs and outcomes (e.g. project delivery cycle time or smoother pavement) that are directly linked to organizational goals take priority over measurement of inputs. Agencies often expand their roster of measures to include efforts to address issues important to external stakeholders, such as economic development, congestion, and environmental quality. Communication of performance results receives greater attention, with regular performance reporting in clearer formats and a stronger link between results and decision-making. Many DOTs are at, or entering, this stage.
- **Stage 3 - Accountability-Driven Resource Allocation.** In this stage, state DOTs use performance measures to clearly establish the link between past performance and future outcomes. Analytic tools are explicitly developed to measure performance outcomes and enable sophisticated analysis of performance trade-offs among policy options. Frameworks are in place, organization-wide to collect, analyze, and respond to performance data on a wide range of input, output, and outcome measures. Regular reviews enable updating and adjustment of agency course and clear communication with stakeholders. Under this approach performance measurement is tied to annual business planning and states are moving towards performance-based budgeting. Only a handful of DOTs are implementing enterprise-wide measurement that fully fit within this performance measurement approach. Those that are learning how to tie measurement to business planning and the work performed.

The state of the practice is characterized by DOT performance measurement programs that are evolving at different rates through each of the three stages described above. Four characteristics are often observed as this evolution occurs:

1. Performance measurement becomes more aligned with government policy and user priorities;
2. Senior DOT managers make greater use of performance results throughout the management cycle;
3. Communication about performance results with internal and external audiences increases; and

4. Performance measures are more frequently used to evaluate cause and effect.

The state of the practice in how DOTs use performance measures systems varies widely. Every DOT is different: some DOTs run motor vehicle licensing operations and others run ferries; some are decentralized and others are not; and demographics and transportation system characteristics vary from state to state, as do legislative mandates. Not surprisingly, their performance measurement programs look different too. As the state of the art continues to evolve, however, most DOTs' programs appear to follow broadly similar stages: basic measurement, managing with performance measures, and accountability-driven resource allocation.

Strong leadership is an important characteristic of all successful performance measurement programs. Likewise, successful programs tend to place a strong emphasis on linking strategic management with performance measures, as well as alignment of measures with governmental or user priorities. Performance-based analytical tools are being developed by some DOTs to integrate strategic decision-making and performance. Almost all DOTs' performance measurement systems, regardless of sophistication, however, tend to be best at addressing traditional goals such as infrastructure condition and safety, while other important goals such as environmental quality, quality of life, and congestion relief are proving harder to measure.

The following subsections describe each stage of performance measurement in more detail.

C. Performance Measurement Systems in Other States

The three generalized levels of development of performance measurement systems in state departments of transportation are outlined in turn.

1. Stage 1 - Basic Performance Tracking

In this stage, basic performance measures are introduced in the DOT, but are not closely integrated with decision-making. Most agencies concentrate on measuring basic operational concerns, such as whether roads and bridges meet acceptable standards, efficiency of maintenance, and travel safety for users. Key measurement focus areas include facility conditions, system serviceability, maintenance productivity, and safety.

System Serviceability Measures. Every DOT is responsible for a statewide system of roadways and bridges. Basic measures are used routinely to provide an assortment of descriptive information about overall serviceability of the highways and bridges under the DOT's control. System serviceability measures typically fall within three major categories:

- ***Design and Engineering Adequacy.*** These measures address the adequacy of existing infrastructure in terms of design and engineering characteristics, usually in terms of consistency with accepted American Association of State Highway

and Transportation Officials (AASHTO) highway and bridge standards for design speed, lane width, sight distances, etc.

- ***Pavement and Bridge Condition.*** These measures address deficiencies in pavement and bridge condition using widely accepted techniques such as the International Roughness Index. A deficiency is measured as the difference between a technical standard and the actual condition. Such measurement is technical and not policy driven.
- ***System Capacity.*** These measures track traffic congestion on a site-specific basis for project planning purposes and on a more systematic basis at sample road segments over time. Level of Service ratings compare actual traffic volume to infrastructure capacity.

Many elements of system serviceability data are reported to USDOT and measures in this area are generally consistent among states. Because there are federal requirements for reporting the measures often are used as for performance reporting because they are already collected and reported. Most states, however, tailor measures to meet their own needs. For example, regions where seismic activity is a concern may also apply non-standard bridge sufficiency measures.

Maintenance Productivity Measures. Almost all DOTs have extensive responsibilities for maintaining highways and bridges within their states. Traditional maintenance management systems provided a basis for allocating labor, materials, and capital (equipment) to perform maintenance. Therefore information to report inputs was frequently available and frequently reported. For example, tons of asphalt used for pot hole patching. Consequently, maintenance functions, such as snow removal, pothole patching, mowing, and signage usually account for a large share of a DOT's operating budget and many agencies have developed a roster of performance measures that assess productivity of their maintenance activities and needs. While features of individual states' measures vary widely, they often address hours, costs, and accomplishments. Data is often analyzed at a micro geographic scale, but can be "rolled up" on a highly aggregate basis for reporting to management.

User Safety Measures. Maintaining safety on state highways has been a serious concern for DOTs for a long time. All DOTs collect a considerable amount of data on safety. Typical measures include data on safety-related improvements, as well as crashes by type, and injury/death rates per unit of travel over time. Some data are reported to federal tracking systems, which has resulted in some standardization of safety data collected by DOTs. Agencies, however, often tailor data collection to emphasize special concerns, such as truck/passenger car collisions, seatbelt use, or drunk driving.

Almost every DOT now has considerable experience in tracking basic measures of transportation performance. Data provide a backward-looking perspective of performance. Measurement techniques, based on methodologies that have been refined over many years, are robust. Measure results, however, are rarely given widespread consideration outside organizational units where they are generated. Measures are not

linked with decision-making about strategic organizational direction. Leadership commitment to measurement is often weak, and awareness among employees about measures is low.

2. Stage 2 - Beginning to Manage with Performance Measures

A synthesis report on performance measurement in state departments of transportation found that a broader use of performance management first emerged among some DOTs in the late 1980s and early 1990s, marking a clear break with traditional measurement approaches.[35] Facing budget pressures, demands for greater accountability, new legislative directions, concerns about environmental impacts, increasing travel demand, and globalization of economies leaders in many DOTs have turned to performance measurement as a management tool. These are some of the factors that pushed state departments of transportation to use performance measurement as part of the Managing for Results framework described in Section II of this report. In this stage, measures emphasize outputs and outcomes linked to agency and user needs identified in strategic plan documents, and their focus expands beyond system operations. New institutional frameworks are created to give performance measures greater visibility internally and externally. Key attributes include:

- **Linking Performance Measurement and Strategic Management.** Several DOTs have sought to integrate performance measurement with their strategic management efforts. A recent AASHTO guide on this topic suggests that strategic performance measurement can be the catalyst for energizing strategic management efforts, maintaining leadership focus, and enabling organizational change.[36] Examples of frameworks that link measurement and strategic direction include Pennsylvania DOT's Moving Pennsylvania Forward, and Minnesota DOT's Statewide Transportation Plan. Terminology varies, but DOTs' strategic plans usually cover a set time period and include an overarching vision and/or mission statement that guide a set of strategic goals and objectives. Agency-wide strategic plans may be accompanied by more detailed business plans at a division level, and action plans at a unit level. Measures are often organized hierarchically, with a small set of top-level measures that link to high level goals and objectives in the strategic plan and many more measures that relate to day-today activities covered in business and action plans. Strategic plans and/or measurement programs vary widely from agency to agency and also evolve over time.

[35] Poister, T., NCHRP Synthesis 238: Performance Measurement in State Departments of Transportation, Transportation Research Board, National Research Council. 1997.

[36] TransTech Management, Inc., NCHRP Report 20-24 (20): Strategic Performance Measures for State Departments of Transportation – A Handbook for CEOs and Other Executives, Transportation Research Board.

a. Expanding measurement focus areas

As DOTs have sought to link measurement with strategic management, they have begun to push the boundaries of their measurement efforts. Three areas of interest to most DOTs at this stage include:

- *Performance-Based Program Management.* Performance-based program management helps DOTs guide the project and program planning and selection process. It provides accountability for project selection decisions, and it can help agencies link project selection to organization-wide strategic goals more effectively. Common measures used to support program management include system serviceability (e.g., pavement and bridge condition, and level of service) and safety. Agencies also are starting to use measures that address other important strategic issues such as congestion, environmental quality, and economic development. NCHRP Report 446, *A Guidebook for Performance Based Transportation Planning*, provides a snapshot of DOT practices in performance based program management.
- *Performance-Based Program Delivery.* Performance-based program delivery describes the use of performance measures to influence key attributes of project delivery, such as cost, schedule, and quality. Performance-based program delivery is a corollary to performance-based program management. The latter ensures the right projects and programs go forward, while the former ensures they are developed efficiently.
- *Performance-Based Operations and Maintenance.* Performance-based operations and maintenance efforts are usually focused on outcomes and are intended to improve customer satisfaction as well as efficiency.

Many DOTs are growing more proficient in their use of performance measures to manage. Program hallmarks include strong leadership focus and high employee awareness that increase the influence of performance measurement throughout the business cycle, greater alignment of measures with strategic organizational direction, and high profile reporting of results that emphasizes internal and external customer needs.

3. Stage 3 – Accountability-Driven Resource Allocation

As DOTs have had more experience with the concept of managing with performance measures, several are experimenting with increasingly sophisticated techniques for strengthening the link between performance and resource allocation decisions. In this stage, performance measurement is expanded to focus on potential outputs and outcomes in the future, as well as the past. Analytic tools enable DOTs to predict performance outcomes of potential investment decisions before they are made, make trade-offs, optimize decisions, and report results directly to policymakers and customers. They offer a promise of accountability that is often sought by state legislatures. Selected examples of approaches now being developed include:

- **Programming Trade-off Analysis Techniques.** Some DOTs are developing decision-support tools or management systems capable of estimating performance in key areas, based on resource allocation decisions. This information is then used to develop a program of projects. Montana DOT's *Performance Programming Process* (P^3) for example, uses management system tools to predict performance among key goal areas as a function of funding over time, and it seeks to optimize funding distribution across areas. Minnesota DOT measures "performance gaps" in key areas of strategic performance and uses the information to inform decision-making about resource allocation. Florida DOT's Performance-Based Resource Allocation Program seeks to provide a systematic approach to decision making by integrating data from sophisticated pavement, bridge, and capacity management systems to provide the basis for making trade-offs among program and project investment decisions.
- **Performance based budgeting**. Either driven by management objectives or the requirements of the state budget agency a number of DOTs have been working at building performance based budgets. This provides a direct tie between the input which is the state budget and the outcomes. Colorado Department of Transportation has oriented its strategic and business planning against overall transportation investment objectives. In this way the business plan for each part of the organization is tied to performance measures that address the agency's overall transportation investment objectives. In the area of maintenance WSDOT's maintenance accountability process has been adopted as a national best practice for performance based budgeting in DOTs and emulated by many states.

Accountability-driven performance measurement systems fill a gap in the management cycle that is not traditionally met by more basic performance measurement approaches. Experience among DOTs with accountability-driven performance measurement systems remains limited, and many opportunities for continued improvement exist.

D. Use of Performance Measurement in State Departments of Transportation

The following provides perspective on how state departments of transportation are using performance measurement.

1. Aligning Performance Measurement with Government Policy and User Priorities

State departments of transportation (DOTs) are increasingly invested in planning, implementing, evaluating, and updating strategic agendas that align their decision-making activities with wider priorities, particularly those of users. All 24 state DOTs and six Canadian provincial DOTs responding to a 2003 National Cooperative Highway Research Program (NCHRP)-sponsored survey indicate they have completed

a strategic planning effort within the last 5 years.[37] Many DOTs' strategic plans are strongly influenced by customers' needs. Anecdotal evidence suggests effective strategic management practices have helped many DOTs respond more effectively to challenges in an era of fast-moving change.

Many DOTs' strategic management efforts are beginning to include performance measures that are aligned with strategic priorities. National-level discussion of the topic at AASHTO's CEO Leadership Forum in 2000 led to development of NCHRP Report 20-24 (20): *Strategic Performance Measures for State Departments of Transportation – A Handbook for CEOs and Other Executives*, published in 2004. The 2003 NCHRP survey, meanwhile, found that 26 of 30 respondents have created specific performance measures for gauging success in achieving individual strategic goals and objectives.

Aligning strategic management and performance measurement has several core benefits:

- Framework for measurement. By aligning performance measures with strategic management efforts, many DOTs have improved the clarity of their measurement efforts. Hierarchical performance measurement frameworks are common, with a handful of top-level measures tracked at the highest organizational level that roll down to a wider array of measures tracked at the division- or unit-level.
- Business improvement. Static strategic planning goals and objectives that otherwise risk "gathering dust on a shelf," are given greater visibility when they are linked to regularly monitored performance measures. As agency leadership becomes more invested in measurement, it takes on a greater priority agency-wide. Leaders can track progress towards achieving top priorities and adjust strategies accordingly, while managers and staff understand where to focus their work efforts.
- Greater accountability. Strategic performance measures give state DOTs a means for reporting to stakeholders and customers on key issues. Accountability is an increasingly vital attribute for DOTs as they seek to manage their programs and systems in an era of fiscal constraints and closer public scrutiny of government. It can mean internal staff accountability and, or external accountability to stakeholders.

Following are three examples from states that have linked performance measurement and strategic management.

[37] Poister, T, *NCHRP Synthesis 326, Strategic Planning and Decision-Making in State Departments of Transportation – A Synthesis of Highway Practice.* Transportation Research Board of the National Academies, Washington, D.C. 2004.

a. Kentucky Transportation Cabinet's pathways to progress

The Kentucky Transportation Cabinet's (KTC) strategic planning document is called *Pathways to Progress*. The KTC recently underwent a change in administration and its approach to performance is currently under review, however, the agency's experience with Pathways to Progress provides a good example of how many departments link strategic planning and performance measurement. KTC's performance measurement efforts are overseen by an Office of Quality, which provides agency-wide coordination of strategic management, performance measurement, and quality improvement initiatives. The Pathways to Progress strategic plan is a high-level document that establishes four overarching strategic goals: managing congestion, improving safety, ensuring environmental stewardship, and improving organizational performance. Each goal is supported by multiple strategic objectives, for which performance measures have been established. Measure results are reported annually in a public document called *The Path.* A committee consisting of senior managers oversees the Path. Key measures in the 2003 Path report included:

- **Managing Congestion.** Measures that address maintenance activity results, pavement smoothness, pavement and bridge condition, work zone traffic control, project delivery, and public transportation ridership.
- **Improving Safety.** Measures that address highway and pedestrian fatalities, collision rates, commercial vehicle inspections, and OSHA-recordable incidents.
- **Ensuring Environmental Stewardship.** Measures that address wetland banking, stream restoration, and inter-agency relationship building.
- **Improving Organizational Performance.** Measures that address customer satisfaction, employee satisfaction, transportation security/emergency response, succession planning, training, absenteeism, employee turnover, workers' compensation claims, information technology funding, and equal employment opportunities.

b. Pennsylvania DOT – Strategic focus areas, goals, and objectives

Pennsylvania DOT (PennDOT) first started its strategic planning efforts in the early 1980s and has constantly adapted and refined its approaches through subsequent changes in political leadership. PennDOT's current strategic plan draws heavily on customer expectations that are gathered via regular customer surveys, focus groups and targeted stakeholder interviews.

PennDOT has established eight *Strategic Focus Areas* that form the basis for its current plan. They include maintenance first, quality of life, mobility and access, customer focus, innovation and technology, safety, leadership, and relationship building. The Strategic Focus Areas are supported by 13 *High-Level Goals* (e.g. for the maintenance first Focus Area, Strategic Goals include "smoother roads" and "cost-effective highway maintenance investment"). The Goals are matched

to 21 *Strategic Objectives*. Division-level business plans, and unit-level action plans cascade from the Strategic Focus Areas. Measures with targets and milestones are used at all levels throughout this hierarchy. Monitoring of measures is achieved with scorecards that provide regular feedback on targets and milestones that have been set and help agency management understand progress on Strategic Focus Areas, Goals, and Objectives.

c. Minnesota DOT – Strategic directions and policies

Minnesota DOT (Mn/DOT) has been engaged in strategic planning since the early 1990s. The current Statewide Transportation Plan, developed in 1997, has three core goals for strategic direction including *safeguard what exists*, *make the network operate better*, and *make Mn/DOT work better*. Ten strategic policies and 41 measures and indicators support these goals.

Mn/DOT has developed a hierarchical format for aligning performance measures and strategic management efforts. At the highest level, senior management uses a handful of top-level, long-term measures to report on the STP's core goals and policies. At the next level down, district and modal managers have additional measures to meet their needs in implementing STP goals and policies. At the bottom of the pyramid, biannual business plans and annual work plans are supported by many short-term operating measures used by individual units. Measures are used to set targets and identify "performance gaps." This information is used to inform decisions on where to apply more resources or new strategies.

Mn/DOT's approach is demonstrated in the following example. One of Mn/DOT's three strategic goals is to "make the network operate better." Current policy for achieving this goal includes "enhancing mobility in interregional travel corridors." The top-level measure of performance for this policy is "average travel speed," with 90 percent of targeted roads meeting target speeds by 2023. The two-year business plan and one-year action plans identify multiple interim performance measures related to achieving the overall goal, including number of Corridor Management Plans adopted, as well as targets for project letting and right-of-way acquisition for selected projects.

2. Communicating Performance Results to Internal and External Audiences

As states link their performance measures to strategic management and seek to use them for business improvement and accountability, communication of performance results has grown in importance. Systems for reporting performance results are consequently growing in sophistication. Audiences and functions for communicating results fall into two distinct categories that heavily influence agencies' communication strategies:

1. Business Improvement – Communication with internal audiences. The purpose of communicating performance results with internal audiences is primarily business improvement-oriented. Agency leaders and managers require timely and clear communication of performance results to support their decision-making. Internal communication of results is also a vital tool for reinforcing messages to staff about strategic direction and work priorities. Communication tools should facilitate macro and micro-level analysis of results that enable audiences to "drill down" to an appropriate level of detail.

2. Accountability – Communication with external audiences. The purpose of communicating performance results with external audiences is primarily to strengthen accountability. Communication should be honest, frequent, and clear. External audiences frequently seek a big picture perspective on specific issues of topical interest, targeted macro-level analysis of results is therefore often most appropriate.

   Regardless of the audience, communication strategies among DOTs often incorporate similar principles:

- Regular reporting schedules. Different measures require different reporting schedules. For a subset of measures, such as congestion conditions, real-time reporting may be appropriate. Other individual measures, particularly those used routinely to support activity at a unit-level, may be reported on a daily, weekly, or monthly schedule. Summaries of overall performance that offer insight on strategic direction are generally reported on a quarterly, biannual, or annual basis.
- Clarity of reporting formats. Formats for reporting results vary depending on appropriate audiences. Information can be communicated internally or externally via user accessible software systems, web pages, face-to-face meetings, and reports. Graphical techniques help audiences interpret quantitative information. For example, "dashboards" that give an at-a-glance overview of key results, using red, green, or yellow symbols, are popular with many DOTs.

Following are two examples of how states are communicating performance results to internal and external audiences.

a. Virginia DOT's Project Dashboard

Virginia DOT is a relative newcomer to strategic performance measurement. The agency's first performance targets were set in 2003, partially in response to serious external allegations about the adequacy of the agency's financial management processes. VDOT leadership perceives the new measurement framework to be a powerful tool for strengthening internal business management practices at every level, and improving accountability to stakeholders, and communication of performance results is a central theme of their new approach.

The DOT has invested in new electronic systems that make performance data accessible on a real time basis. The centerpiece of VDOT's system is its *Project Dashboard,* an online tool that is updated on a daily basis and contains information on all active construction projects and projects scheduled to be advertised for competitive bids. The Dashboard reflects a strong focus on improving the Department's ability to deliver projects on time and on budget. Users can access information about project costs and schedule. A series of screen views give information by district, county, and road system, while red, green, and yellow lights indicate project status. The VDOT commissioner conducts monthly videoconferences with senior managers at headquarters and in district offices to review Dashboard results. Meetings are used to identify and address potential problem areas. The agency also publishes a regular Report Card that summarizes key performance results and real-time information is provided on the VDOT website.

b. New Mexico DOT's compass report

Over an eight-year period, New Mexico DOT (NMDOT) has used a document called *The Compass* to report performance measurement results internally and externally. The Compass has become a vital tool for communicating the agency's performance results externally, but perhaps more importantly it is a way for the CEO to communicate priorities and strategic direction to agency managers and staff. The NMDOT recently underwent a change in administration and its approach to performance is currently under review, however, the agency's experience with The Compass provides valuable lessons.

The Compass provides quarterly reports on more than 80 measures to both internal and external audiences. Many measures included in The Compass are tracked over time, however, a flexible approach measures are dropped or added as needed. Charts and graphics are used to help convey data, but given the internal focus of The Compass, they are not always highly polished. Quarterly meetings of the CEO and all senior managers are used as an opportunity to review measure results internally and address problems.

3. Making Greater Use of Performance Results Throughout the Management Cycle

As state DOTs embrace performance measurement by aligning measures with their strategic management efforts and communicating results internally and externally, they are seeking to use performance results throughout the management cycle. Among DOTs, a new generation of sophisticated performance systems is emerging; they are designed to support capital budgeting, particularly planning, programming and delivery of projects. Key components of the management cycle for programming and project delivery include:

- Establishing policies, goals, priorities, and budgets.
- Predicting performance and needs.
- Developing a program of projects.
- Delivering projects.

A growing handful of DOTs are devising ways to use performance measures to help decision makers set priorities, analyze trade-offs, and allocate resources. The new generation of systems relies on sophisticated electronic systems that link information about funding, strategic direction, and performance to further enhance DOT decision-making effectiveness and accountability. Systems are in their infancy and are likely to continue evolving. Following are two examples of states that are making progress in using such systems.

a. Montana DOT – Performance Programming Process

Montana DOT (MDT)'s Performance Programming Process (P^3) optimizes planning, programming, and delivery of the state's highway improvements given available and anticipated resources and based on established strategic goals. Performance data on system condition (e.g. bridge and pavement condition, roadway congestion, ride quality, crashes, etc.) are used to predict the impact of different investment scenarios, and to track actual performance after investments are made. Using P^3, decision-makers at MDT rely on performance information to make initial resource allocations, to verify their impact, and to adjust strategic direction accordingly.

b. Florida DOT – Performance-based asset management

Over the last five years, Florida DOT (FDOT) has experienced numerous institutional changes, such as a 22 percent cut in its workforce, as well as significant privatization of many core business functions, such as planning, design, construction, and maintenance. In the face of change, maintaining and enhancing business efficiency and accountability have proven key concerns for agency management. The Department has responded by developing a comprehensive electronic system that combines performance results from its pavement, bridge, and congestion management systems and uses results to set targets, analyze trade-offs, and make resource allocation decisions. Strategic objectives, often guided by legislative mandates are used to establish overall direction. For example, the state has an objective of ensuring 90 percent of FDOT-maintained bridges meet Department standards and all bridges open to the public are safe. The system provides a tool for conducting trade-off analysis to identify the best investment mix for reaching this goal, as well as continuous feedback, enabling managers to adjust course as they go.

Appendix B:

Information System Description

■

System Name	System Acronym	System Description
Capital Program Management System	CPMS	A mainframe application used to track the schedule and cost of projects in WSDOT's Improvement and Preservation programs. While CPMS was not designed to manage individual project details, it does provide a tool for planning and monitoring the overall construction program, measuring progress, and delivering the program.
Project Delivery Information System	PDIS	PDIS is a project scheduling tool which uses SciForma's PS8 software package. It incorporates the Project Management Institute's Project Management Body of Knowledge, and supports WSDOT's internal project management standards and principles. It is used by project engineers in the regions to schedule and track projects.
Transportation Reporting and Accounting Information System	TRAINS	Accounts for all WSDOT revenues, expenditures, receipts, disbursements, resources, and obligations. It is a highly customized version of an American Management systems (AMS) softare package. The system includes WSDOT's in-house budget tracking system, TRACS.
Financial Information Retrieval System	FIRS	FIRS is a client server application developed by WSDOT's Information Technology organization. FIRS provides easy access to accounting, budgeting, and work order information from TRAINS and TRACS. Data from these systems is loaded into a database nightly and accessed through FIRS using Microsoft Excel.
Estimate and Bid Analysis System	EBASE	Used to develop estimates and reports for transportation construction projects, to provide easy entry of contractor bid data, and to award apparent successful bidders based on those estimates. It also automatically uploads estimate and bid information to the CAPS systems. The system provides WSDOT with accurate engineer's estimates and contract bid history information.

System Name	System Acronym	System Description
Transportation Executive Information System	TEIS	TEIS is used for legislative budget planning and oversight. It supports budget preparation and provides summary information about transportation activities to the transportation committee staff from both house and senate.
Electronic Work Order Authorization (using Optika's Acorde software)	WOA/ACORDE	WOA/Acorde is a web-based system which automates the Work Order Authorization process, from initial input, through tracking, and review and approval. This allows WSDOT to accommodate process differences between modes and regions while ensuring uniform data input and process outcomes.
Project Summary/Environmental Review Summary		The Project Summary system contains project information collected during the initial part of the project scoping process. It documents the WSDOT commitment for scope of work and communicated design, programming, and environmental decisions. The Environmental Review Summary (ERS) portion of the Project Summary application provides the list of environmental commitments and expectations for a project. It identifies NEPA/SEPA requirements, permits likely to be required, and ESA issues to be aware of.
Priority Array Tracking System	PATS	PATS collects, maintains, and tracks WSDOT's capital highway program deficiencies to support development of the capital highway construction program. The system is used by regional and headquarters program management staff to identify the state's highest priority deficiencies in order to scope projects that will address them.
Primavera		Primavera is s proprietary, vendor-provided project scheduling and management software package used by some regional staff to manage projects.
Microsoft Project	MS Project	MS Project is a proprietary, vendor-provided project scheduling and management software package used by some regional staff to manage projects
Transportation Information Planning and Support System	TRIPS	TRIPS maintains and processes current and historical data about the WSDOT roadway network, traffic volumes and classifications, collisions, and collision severity.

System Name	System Acronym	System Description
Collision Location and Analysis System	CLAS	CLAS is a system used to record and process data about collisions which occurred from 2002 forward. It includes data from officer reports, citizen reports, and city and county data feeds.
Highway Performance Monitoring System	HPMS	HPMS is used to report conditions of state highways to the Federal Highway Administration.
Region Traffic Systems Network		The Traffic Systems Management Centers (TSMC) in the region headquarters operates a network application of several traffic management systems. The Northwest Region network application operates over 100 miles of optical fiber on Interstate 5, Interstate 90, Interstate 405 and SR 520 and SR 167. This system records traffic data through a series of loop detectors placed at half mile intervals on major highways.
Maintenance Accountability Program	MAP	This uses information from a number of sources the maintenance management system and data collection procedures.
Geographic Information Systems	GIS	Geographic Information Systems track and display the geographic location of events or features important to transportation projects.
511 System		The 5-1-1 system provides real time traffic conditions to commuters using a cell phone and voice commands. Data is retrieved from this system to develop traveler information performance measures.
WSDOT Payroll System		This is the current payroll system that is being replaced by the statewide human resource management system project
WSF Payroll System		This is the current payroll system that is being replaced by the statewide human resource management system project
Maintenance Productivity Enhancement System	MPET	This is an off-the-shelf maintenance management system that is used for preventive maintenance in the Seattle-area urban tunnels. This software is also being deployed for tracking preventive maintenance for moveable bridges. MPET information is used to determine some MAP Level of Service ratings that are reported in the GNB.
Signals Maintenance Management System	SIMMS	Maintenance and repair of signals and intelligent traffic system components are managed through SIMMS. This system also provides data used in MAP which is reported in the GNB.

Appendix C:

Source Material

■

A. Documents and Sources

- WSDOT 2003-2007 Business Directions (Strategic Plan) - TPAB Draft ftp://ftp.wsdot.wa.gov/incoming/WSDOT_Strategic_Assessment/TPAB_07_13_04/WSDOT_2003-2007_Business_Directions_TPAB_Draft.pdf.
- WSDOT 2004 Enacted Supplemental Budget (includes legislative budget provisos under the "Budget Bills" tab) ftp://ftp.wsdot.wa.gov/incoming/WSDOT_Strategic_Assessment/TPAB_07_13_04/WSDOT_2004_Enacted_Supplemental_Budget.pdf.
- 2005-2007 Current Law Budget Briefing Paper, prepared for the July 2004 Transportation Commission meeting (work plan, not yet adopted) ftp://ftp.wsdot.wa.gov/incoming/WSDOT_Strategic_Assessment/TPAB_07_13_04/2005-07_Budget%20Book_July_2004.pdf.
- WSDOT's Organization for Programs and Projects (Draft) ftp://ftp.wsdot.wa.gov/incoming/WSDOT_Strategic_Assessment/TPAB_07_13_04/WSDOT's_Organization_for_Programs_and_Projects.pdf.
- WSDOT Reporting Requirements – Final ftp://ftp.wsdot.wa.gov/incoming/WSDOT_Strategic_Assessment/TPAB_07_13_04/WSDOT_Reporting_Requirements_final.pdf.
- WSDOT Summary of Pre-Nickel and Nickel Capital Projects ftp://ftp.wsdot.wa.gov/incoming/WSDOT_Strategic_Assessment/TPAB_07_13_04/WSDOT_Summary_of_Pre-Nickel_and_Nickel_Capital_projects.pdf.
- WSDOT's Organization for Programs and Projects ("A work in progress presentation to the Legislative Transportation Performance Accountability Board") - November 14, 2003.
- Report on WSDOT's Reporting Requirements and Responsibilities to Other Governmental Entities – April 2, 2004.
- Summary of Pre-Nickel and Nickel Capital Projects – May 7, 2004.
- SCR – Strategic Plan & Performance Measures.
- Maintenance accountability process Manual.
- 2003-2007 Business Directions (May 2004 update).

- Snow and Ice Plan – Sep 2003.
- Operations Transportation Equipment Fund (OTEF) – overview.
- OTEF Business Plan – May 2004.
- OTEF Operating Rules – January 2004.
- Facilities Program Delivery – Binder.
- FY 2004-2005 Strategic Plan Development Form.
- Washington Transportation Commission WSDOT WTP Update Process Draft Background Paper on Safety (Draft 2004).
- Target Zero, A Strategic Plan for Highway Safety 2000 – Publication.
- Decision Making Process for Maintenance and Operations – Diagram.
- Memorandum – 2003-2005 CLB Highway Maintenance Budget
- Legislative Proviso 03-05 biennium.
- Highway Maintenance and operations plan vs. actual expenditures by sub-program through July 2004 – table.
- 2003-2005 Maintenance Program M2 – Monthly report through July 2004.
- Maintenance activities – priority matrix.
- Statewide Activity service level targets and services levels delivered – CY 2003.
- Maintenance Strategic action expenditure forecast biennium 05-07 through 13-15.
- Gray Notebook, December 2003.
- Maintaining Roadside Vegetation – March 2004.
- Maintenance and operation – Power point presentation – by Gummada Murthy.
- Performance and expectations feedback draft.
- Washington State Ferries Strategic Plan.
- Maintenance and operations Plan – Strategic areas, objectives and strategies for facilities Major Capital Construction Activities Capital facilities (power point presentation draft).
- Facilities Capital Plant construction program delivery report.
- OTEF Equipment Purchase plan – June 2004 – Table.
- OTEF Six-year financial plan – June 2004 – Table.
- OTEF Planned vs. actual expenditures by region FY 2004.
- OTEF – Performance measures (Web sample).
- OTEF – Light and heavy equipment utilization by region and category – FY 2005.

- WSDOT Southwest Region Quarterly.
- Project Delivery Presentation for Quarters Ending 9/30/03 through 6/30/04.
- Environmental and engineering Programs organizational chart.
- Program Delivery Tracking Sheet for ESA Section 7 Consultation.
- Traffic Operations Strategic Plan for Maintenance and operations plan.
- Employee accident reports (3).
- Incident Response Program Measures Statewide Totals, Response and Clearance Times – tables.
- Signal Retiming Plan Statewide – tables.
- Call For Projects – Target Zero Federal Safety Incentive Funds – brochure.
- Toby Rickman's Manager Development and Performance Plan.
- Q Program Biennium Tracking Sheet.
- Headquarters Safety Office Budget Tracking FY 03-05 – Table and graphs.
- WSDOT Safety Excellence Achievement Award – Narrative.
- Accident prevention goals for work record able injuries FY 01–03 vs. FY 02–05 – Table.
- Employee Safety and Health Performance Measures – One page narrative.
- NAATSHO Injury Rate Comparison 2003 – Table.
- Completed Manager Development and performance Plans for a sample of South Central Region managers.
- Pre-contract Engineering Activities Schedule Revised 8/5 – South Central Region by project.
- South Central Region Strategic Plan – January 2004.
- South Central Region Project Status Report – August 24, 2004 (a weekly report sample).
- South Central Region financial planning summary report by project Excel spreadsheet generated using CPMS outputs.
- Washington State Legislature's Joint Task Force on Ferries, final report January 15, 2001.
- Southwest Region Quarterly Project Delivery Presentations For Quarters Ending 9/30/03 through 6/30/04.
- Anderson, N; McSwain, H.T. *On the Right Track: Using Customer-Based Performance Measures to Evaluate Transit Service*. Proceedings of the 1997 APTA Bus Operations, Technology & Management Conference, American Public Transit Association.

- Auckland Regional Council. Annual Report 2003. Auckland, New Zealand.
- British Columbia Ferry Corporation. Annual Report 2002/03. September 2003. Victoria, Canada.
- Caledonian MacBrayne Limited. Annual Report and Accounts, 2002 2003. Glasgow, United Kingdom.
- Cambridge Systematics, Incorporated. *A Guidebook for Performance-Based Transportation Planning*. NCHRP Report Issue: 446. Project B8-32(2)A FY '94. Transportation Research Board, 2000.
- Color Group. Annual Report 2003. Oslo, Norway.
- Federal Transit Administration. 2002 National Transit Database. U.S. Department of Transportation.
- Fountain J., Campbell W., Patton T., and Epstein P. Reporting Performance Information: Suggested Criteria for Effective Communication. Government Accounting Standards Board, 2003.
- Gihring, C.K. and Greene, W. *Washington State Ferries: Performance Measures and Information Support*. Transportation Research Record, No. 1704. 2000.
- Khan, S.I.; Eubanks, L; Mueller, M; Robles, J. Common Performance Measures Practitioner's Guidebook. Report No: CDOT-UCD-UCCS-99-7. Colorado Department of Transportation, University of Colorado, Federal Highway Administration, 1999
- New South Wales, Ministry of Transport. Annual Report 2003. April, 2004. Sydney, Australia.
- Neumann, L.A.; Markow, M.J.. *Performance-Based Planning and Asset Management*, Public Works Management & Policy, Volume: 8 Issue: 3. American Public Works Association, 2004
- OFM, Budget Division. Operating Budget Instructions, Part 1: Guidelines for Strategic Plans and Performance Measures, 2005–07 Biennium. October 2003.
- OFM. 2003-05 Performance Progress Report, for the quarter ending December 2003.
- Scandlines Aktiengesellschaft. Annual Report, 2003. May 2004.
- Shaw, T. *Performance Measures of Operational Effectiveness for Highway Segments and Systems*. NCHRP Synthesis of Highway Practice, Issue 311. Project 20-5 FY 2000 Transportation Research Board, 2003.
- Transportation Research Board. Performance Measures to Improve Transportation System and Agency Operations: Report of a Conference: Irvine, California, October 2000. Transportation Research Board; National Transit Institute; American Association of State Highway and Transportation Officials; and Federal Highway Administration.
- WSDOT. 2003-2007 Business Directions: May 2004 Update.

- WSDOT. Measures, Markers and Mileposts: The Gray Notebook. Issues ranging from the September 2001 to March 2004.
- WSDOT. Department of Transportation 2005-2007 Operating Budget and Ten-Year Financial Plan. (Excerpts) July 2004.
- WSDOT. 2005-2007 Current Law Budget. August 2004.
- WSF. Momentum: Washington State Ferries Strategic Plan. 1996.
- WSF. Two-Year Operations Report for 1995/1997.
- WSF. Systems Plan for 1999-2018. WSDOT, June 1999.
- WSF. Two-Year Operations Report for 1997/1999.
- WSF. 1999 Travel Analysis Survey. Parsons Brinkerhoff, June 2000.
- WSF. Capital Plan, Version 2001-4. WSDOT, February 2001.
- WSF. Two-Year Operations Report for 1999/2001.
- WSF. Major Goals for Washington State Ferries. July 2002.
- WSF. Customer Complaint Report. Various from 1996 to 2002.
- WSF. Trip Reliability Index and Causes of Cancellation Reports. Various from 1996 to 2002.
- WSF. Customer Claims Reports, Various from 1998 to 2001.
- WSF. Amenity Concept and Customer Satisfaction Survey. Northwest Research Group, December 2002.
- WSF. Rationale for Vessel Assignments and Reductions. January 2003.
- WSF. Strategic Plan. WSDOT, May 2003.
- WSF. Boat Wait Measurements. WSDOT, September 2003.
- WSF. Operating Program Detail. Fall 2003.
- WSF. Progress Report: July 1, 2001 – June 30, 2003.
- WSF. Capital Plan, Version 2005-1. WSDOT, November 2003.
- WSF. Route Financial Statement Summaries. 1996-2003.
- WSF. Service Efficiency and Productivity Reports. 1998-2003.
- WSF. Vehicle Capacity Utilization Summaries. 1998-2003.
- WSF. Quarterly Financial Presentations. 2001-2003.
- WSF. 2005-2007 Budget Request. March 2004.
- WSF. Operating Program 2004 Supplemental Budget. April 2004.
- WSF. Monthly Program Budget Analysis. May 2004.

- WSF. Service Plan Hours, 2004/05. June 2004.
- WSF. Service Schedule. Summer 2004.
- WSF. Traffic Statistics Rider Segment Report. June 2004.
- WSF. Fuel Budget Calculation and Forecast Fuel Prices. August 2004.
- WSF. Average Fuel Consumption 2002-2004. August 2004.
- WSF. Operating Program Strategic Plan, Scenario F. August 2004.
- WSF. Appraisal of External Environment. Not dated.
- WSF Tariff Policy Committee. Tariff Review 2002-03: Summary Report. WSDOT, September 2003.
- Washington State Legislature. Engrossed Second Substitute Senate Bill 6499 (Transportation Funding -- Appropriations). May 2000.
- Washington State Legislature. Report of the Legislature's Joint Task Force on Ferries. January 2001.
- Washington State Legislature. Engrossed Substitute House Bill 2474 (Transportation Funding). March 2004.
- Washington State Legislature. RCW 44.56: *State Toll Bridges, Tunnels and Ferries.*
- Washington State Legislature. RCW 47.60: *Puget Sound Ferry and Toll Bridge System*.
- Washington State Legislature. RCW 47.61: *Acquisition of New Ferry Vessels Under Urban Mass Transportation Act of 1964*.
- Washington State Legislature. RCW 47.64: *Marine Employees – Public Employment Relations.*
- Washington State Legislature. WAC 468-300: *State Ferries and Toll Bridges*.
- Washington State Legislature. WAC 468-310: *Prequalification of Ferry System Construction*.
- Washington State Legislature. WAC 468-320: *Washington State Ferry Vessel Construction*.
- Western Australia, Public Transit Authority. Outcomes, Outputs and Performance Information. 2004. Perth, Australia.
- World Bank. Discussion Paper on Performance Indicators, Report 446.
- Worldwide Publishing. Worldwide Ferry Services 2001-2002.
- The *Gray Notebook* Archives http://www.wsdot.wa.gov/accountability/Archives/default.htm.
- Transportation Benchmarks Implementation Report http://www.wsdot.wa.gov/accountability/benchmarks/.

- 2003-2004 Governor's Performance Agreement and Agency Scorecard, Quarter 3 Update (For the Office of the Governor) ftp://ftp.wsdot.wa.gov/incoming/WSDOT_Strategic_Assessment/TPAB_07_13_04/2003-04_Performance_Agreement_Quarter3.pdf.
- 2003-2005 Budget Performance Measures (For the Office of Financial Management) ftp://ftp.wsdot.wa.gov/incoming/WSDOT_Strategic_Assessment/TPAB_07_13_04/WSDOT_Budget_Performance_Measures_03-05.pdf.