U.S. Department of Transportation
Federal Highway Administration

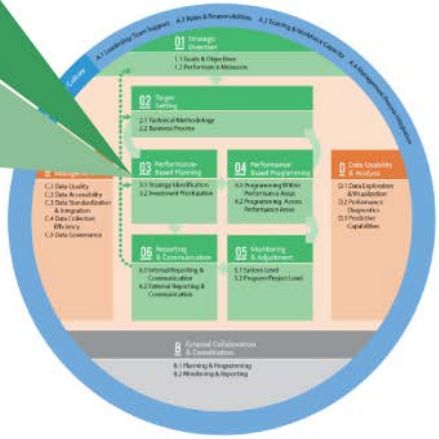
COMPONENT 03

PERFORMANCE-BASED PLANNING

This chapter provides assistance to transportation agencies with the "Performance-Based Planning" component of Transportation Performance Management (TPM). It discusses where performance-based planning occurs within the TPM Framework, describes how it interrelates with the other nine components, presents definitions for associated terminology, provides links to regulatory resources, and includes an action plan exercise. Key implementation steps are the focus of the chapter. Guidebook users should take the TPM Capability Maturity Self-Assessment (located in the TPM Toolbox at www.tpmtools.org) as a starting point for enhancing TPM activities. It is important to note that federal regulations for performance-based planning may differ from what is included in this chapter.

03 Performance-Based Planning

3.1 Strategy Identification
3.2 Investment Prioritization



Performance-Based Planning is the use of agency goals and objectives and performance trends to drive the development of strategies and priorities in the long-range transportation plan and other performance-based plans and processes. The resulting planning documents become the blueprint for how an agency intends to achieve its desired performance outcomes.

INTRODUCTION

Performance-based planning is an integral component within transportation performance management, a strategic approach that uses data to support decisions that help to achieve performance goals. Performance-based planning is the use of a strategic direction (goals and objectives) and performance trends to drive the development of agency strategies and priorities in the long-range transportation plan (LRTP) and other performance-based plans (e.g., safety, asset management, mobility/operations and freight). The identified strategies and priorities in these plans lead to the programming of projects selected to make progress toward performance targets, objectives and goals.

The main distinctions between a performance-based planning approach and a non-performance-based approach are:

1. The use of performance trends to identify areas of focus and evaluate portfolios of strategies;
2. Clear linkage between strategies and goals to determine investment priorities; and
3. The identification of the relative priority of strategies.

Performance-based planning builds on the foundation established by the Strategic Direction (Component 01) and Target Setting (Component 02). The planning process provides a forum to discuss, both internally and externally, how to turn strategic goals into actions on the ground. For each strategic goal, agencies examine performance trends to identify focus areas, derive strategies to address performance challenges and/or maintain existing results, and analyze alternative scenarios. Ensuing tradeoff discussions determine which strategies will be pursued and become concrete projects during the programming phase. The resulting planning documents become the blueprint for how an agency intends to achieve its goals and in turn its desired performance levels.

Performance-based planning is based on several main ingredients:

- **Data and measures:** Data and measures used to establish targets (Component 02) will be documented, reiterated within performance-based plans, and used to drive the development of strategies;
- **Stakeholder input:** Along with data, the plans are developed with visioning input from public engagement and the input of external partners;
- **Policy considerations:** Identified strategies must reflect the policies and procedures of local, state, and Federal partners; and
- **Sharing data and information among silos:** By its nature, the planning process facilitates communication and understanding among silos of expertise. The evaluation of strategies across performance areas requires open communication and exchange of information to better understand tradeoffs and the likelihood of success within a particular context.

While developing performance-based plans, agencies need to maintain a strong linkage to their strategic goals and study how these plans will guide programming. Planning involves the identification of strategies that are included in a variety of documents, which together drive the selection of projects in the programming phase. These two elements (planning and programming) of transportation performance management are combined and discussed in depth in FHWA's "*Performance Based Planning and Programming Guidebook*."[1]

> Performance-based planning and programming (PBPP) refers to the application of performance management within the planning and programming processes of transportation agencies to achieve desired performance outcomes for the multimodal transportation system. This includes a range of activities and products undertaken by a transportation agency together with other agencies, stakeholders, and the public as part of a 3C (cooperative, continuing, and comprehensive) process. It includes development of:

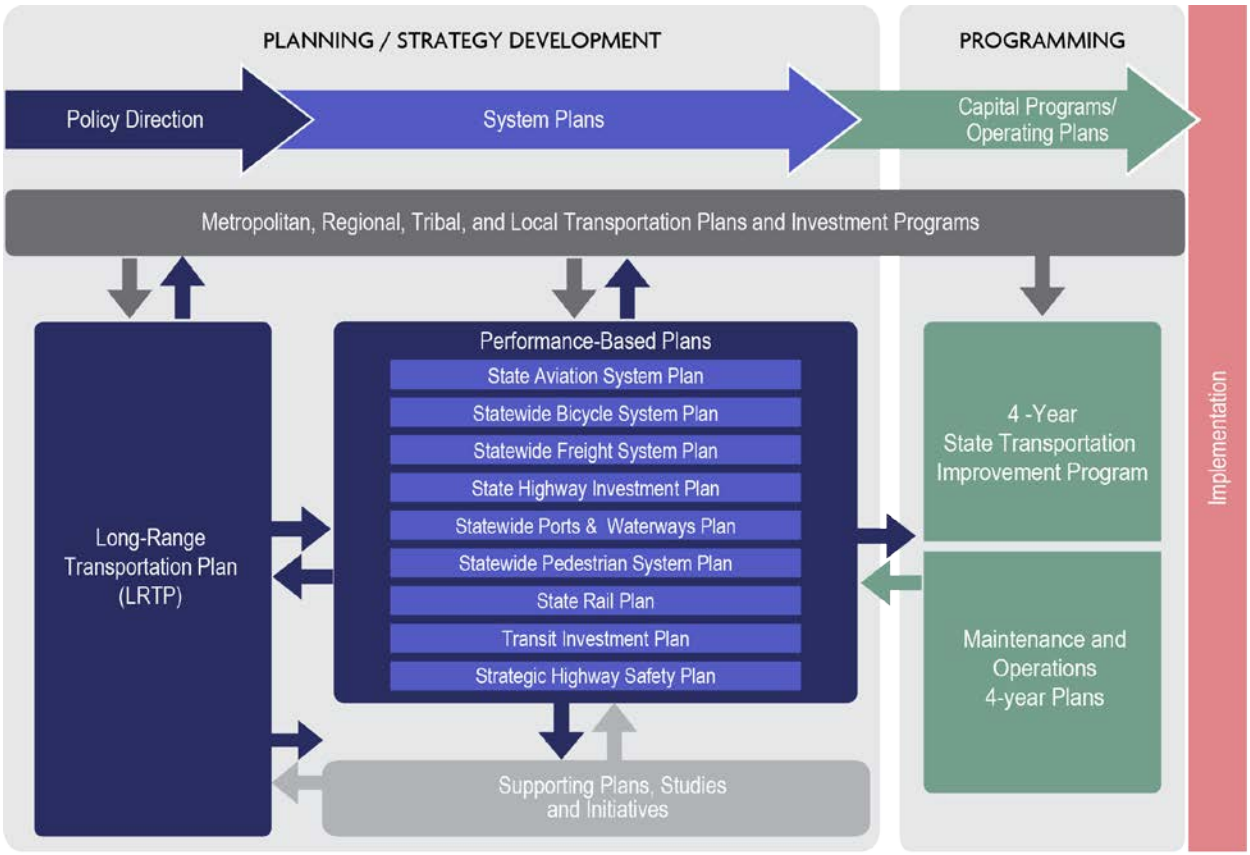
[1] FHWA. (2013). *Performance-Based Planning and Programming Guidebook* (FHWA Publication FHWA-HEP-13-041). Washington, DC.

long range transportation plans (LRTPs), other plans and processes (including those Federally-required, such as Strategic Highway Safety Plans, Asset Management Plans, the Congestion Management Process, Transit Agency Asset Management Plans, and Transit Agency Safety Plans, as well as others that are not required), and programming documents, including State and metropolitan Transportation Improvement Programs (STIPs and TIPs). PBPP is intended to ensure that transportation investment decisions are made - both in long-term planning and short-term programming of projects - based on their ability to meet established goals.

While the PBPP Guidebook discusses these elements together because of their extensive linkages, this TPM Implementation Guidebook separates them to articulate the unique implementation steps related to planning (Component 03) versus programming (Component 04). As demonstrated in Figure 3-1, planning starts agencies down the path toward implementation through the development of long-range and other performance-based plans. The resulting family of planning documents is then fed into programming activities to create the state transportation improvement program, business plans and budget documents.

Figure 3-1: Model of DOT Planning and Programming Relationships

Source: Adapted from Minnesota Department of Transportation's Family of Plans[2]

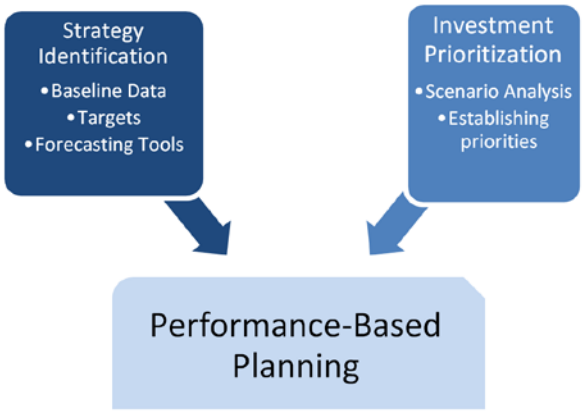


[2] Minnesota Department of Transportation - Family of Plans. June 3, 2016. http://www.dot.state.mn.us/minnesotago/index50yearvision.html

SUBCOMPONENTS AND IMPLEMENTATION STEPS

Figure 3-2: Subcomponents for Performance-Based Planning

Source: Federal Highway Administration



The definition of performance-based planning is: The use of agency goals and objectives and performance trends to drive the development of strategies and priorities in the long-range transportation plan and other performance-based plans and processes. The resulting planning documents become the blueprint for how an agency intends to achieve its desired performance outcomes. The performance–based planning component is comprised of two subcomponents as Illustrated in Figure 3-2:

- **Strategy Identification:** The development of a range of strategies for achieving desired outcomes through the use of available baseline data trends, forecasting tools, economic analysis tools, and management systems (e.g., pavement management system). Strategies may include operational, expansion, asset management, and enhancement approaches.
- **Investment Prioritization:** The evaluation of tradeoffs across alternative investment scenarios based on consideration and comparison of their impacts on performance targets and goals.

Strategy identification is where agencies answer the question, "*How will we achieve our agreed-upon goals, objectives and targets"?* By examining performance trends and using a range of forecasting tools during the target setting process (Component 02), agencies evaluate different approaches to making progress toward the goals identified in the Strategic Direction (Component 01). Once a menu of strategies has been developed, agencies begin to bundle strategies under different scenarios to assess tradeoffs across performance areas through the investment prioritization process. The risks associated with individual strategies and portfolios of strategies are also evaluated to determine the likelihood of unforeseen events impacting (positively and negatively) the predicted outcomes. To provide direction for the selection of projects, agencies determine the relative priority of different goals and performance outcomes. The resulting planning documents outline an investment prioritization method from which future programming decisions can be made. Table 3-1 lists the steps necessary to implement performance-based planning.

Table 3-1: Performance-Based Planning Implementation Steps

Source: Federal Highway Administration

Strategy Identification	Investment Prioritization
1. Clarify internal and external roles and responsibilities for effective collaboration	1. Assign internal roles and responsibilities
2. Identify key performance issues for each strategic goal and objective	2. Develop scenarios to evaluate strategies
3. Assess a strategy's effect on outcomes	3. Establish relative importance of strategic goals to guide strategy prioritization
4. Define and evaluate strategies against desired characteristics	4. Document investment prioritization process
5. Document strategy identification process	

Performance-based planning should be viewed as an exploratory exercise, with creativity welcomed but firmly grounded in performance data, strategic goals, and risk assessment. The planning process encourages discussion and exploration, but rests on an analysis of influencing factors and a prioritization process that is well understood by stakeholders. The resulting plans should clearly communicate strategies that will be used to attain targets established during target setting (Component 02).

CLARIFYING TERMINOLOGY

Table 3-2 presents the definitions for the performance-based planning terms used in this Guidebook. A full list of common TPM terminology and definitions is included in Appendix C: Glossary.

Table 3-2: Performance-Based Planning: Defining Common TPM Terminology

Source: Federal Highway Administration

Common Terms	Definition	Example
Goal	A broad statement of a desired end conditions or outcome; a unique piece of the agency's vision.	A safe transportation system.
Objective	A specific, measurable statement that supports achievement of a goal.	Reduce the number of motor vehicle fatalities.
Risk	Threats to and opportunities for achieving strategies, goals, and targets.	An extreme weather event causes unanticipated costs.
Strategy	A well-defined pathway toward reaching a target, goal, or objective.	Increasing bridge inspections to decrease % falling into SD category.
Target	Level of performance that is desired to be achieved within a specific time frame.	Two % reduction in the fatality rate in the next calendar year.
Transportation Performance Management	A strategic approach that uses system information to make investment and policy decisions to achieve performance goals.	Determining what results are to be pursued and using information from past performance levels and forecasted conditions to guide investments.
Visioning	The process of setting or confirming goals and objectives.	Envisioning the characteristics of a transit agency providing equitable, efficient, and dependable service.

RELATIONSHIP TO TPM COMPONENTS

The ten TPM components are interconnected and often interdependent. Table 3-3 summarizes how each of the nine other components relate to the performance-based planning component.

Table 3-3: Performance-Based Planning Relationship to TPM Components

Source: Federal Highway Administration

Component	Summary Definition	Relationship to Performance-Based Planning
01. Strategic Direction	The establishment of an agency's focus through well-defined goals/objectives and a set of aligned performance measures.	The purpose of the strategies developed during the performance-based process is to make progress toward the goals and objectives defined under the strategic direction.
02. Target Setting	The use of baseline data, information on possible strategies, resource constraints and forecasting tools to collaboratively establish targets.	Targets define the results the strategies in the plans are striving to achieve.
04. Performance-Based Programming	Allocation of resources to projects to achieve strategic goals, objectives and performance targets. Clear linkages established between investments made and their expected performance outputs and outcomes.	Performance-based planning develops the criteria for prioritizing projects for programming, and for evaluating the efficacy of the delivered projects.
05. Monitoring and Adjustment	Processes to monitor and assess actions taken and outcomes achieved. Establishes a feedback loop to adjust programming, planning, and benchmarking/target setting decisions. Provides key insight into the efficacy of investments.	Strategy Identification (subcomponent 3.1) is informed by the analysis of the effectiveness of alternative strategies (before/after analysis) with respect to established goals. Monitoring provides crucial insights about what adjustments are necessary and when new strategies are needed.
06. Reporting and Communication	Products, techniques and processes to communicate performance information to different audiences for maximum impact.	Planning documents provide an opportunity not only to communicate agency goals and objectives, but also to clarify "how" an agency proposed to make progress toward agreed upon performance outcomes.
A. TPM Organization and Culture	Institutionalization of a TPM culture within the organization, as evidenced by leadership support, employee buy-in, and embedded organizational structures and processes that support TPM.	The performance-based planning process provides a forum to discuss internally and externally how to turn strategic goals into actions on the ground. A collaborative planning process is important to foster buy-in internally and externally to agency programming decisions.
B. External Collaboration and Coordination	Established processes to collaborate and coordinate with agency partners and stakeholders on planning/ visioning, target setting, programming, data sharing, and reporting.	Performance-based planning is a collaborative process through which strategies are jointly developed with external partners. Resulting planning documents reflect regional policies and priorities.

Component	Summary Definition	Relationship to Performance-Based Planning
C. Data Management	Established processes to ensure data quality and accessibility, and to maximize efficiency of data acquisition and integration for transportation performance management.	High quality data must be gathered and made available for monitoring system conditions and evaluating the impacts of previous strategies in order to feed this information into the ongoing cycle of planning, which informs the prioritization of strategies.
D. Data Usability and Analysis	Existence of useful and valuable data sets and analysis capabilities, provided in usable, convenient forms to support TPM.	The usability of data and its place in developing quality analyses plays a significant role in the ability to determine strategies toward reaching agency targets.

REGULATORY RESOURCES

This Guidebook is intended to assist agencies with implementing transportation performance management in a general sense, and not to provide guidance on compliance and fulfillment of Federal regulations. However, it is important to consider legislative requirements and regulations when using the Guidebook. In many cases, use of this Guidebook will bring an agency in alignment with Federal requirements; however, the following sources should be considered the authority on such requirements:

Federal Highway Administration

- Transportation Performance Management: http://www.fhwa.dot.gov/tpm/links_fhwa.cfm
- Fact Sheets on Fixing America's Surface Transportation (FAST) Act: https://www.fhwa.dot.gov/fastact/factsheets/
- Fact Sheets on Moving Ahead for Progress in the 21st Century (MAP-21): https://www.fhwa.dot.gov/map21/factsheets/
- Resources on MAP-21 Rulemaking: https://www.fhwa.dot.gov/tpm/rule.cfm

Federal Transit Administration

- Fact Sheets on FAST Act: https://www.transit.dot.gov/funding/grants/fta-program-fact-sheets-under-fast-act
- Resources on MAP-21: https://www.transit.dot.gov/regulations-and-guidance/legislation/map-21/map-21-program-fact-sheets

ASSESSING RISK

Risk refers to the positive or negative effects of uncertainty or variability of any influencing factor (both threats and opportunities) to achieving strategies, goals, and targets. Given that performance-based planning focuses on future outcomes, the inclusion of risk in the development of strategies and investment prioritization is crucial. Assessing and managing risk means determining the likelihood of influencing factors occurring, as well as understanding and planning for their associated impacts. This is a key consideration in any planning effort, as part of those plans must address impacts that could cause them to derail. Risks may be positive or negative and generally can be defined as hazard, financial, operational, or strategic risks as summarized in Table 3-4.[3] Risk is discussed at length in NCHRP 806: Guide to Cross-Asset Resource Allocation and the Impact on Transportation System Performance (2015) and FHWA's Risk-Based Transportation Asset Management: Evaluating Threats, Capitalizing on Opportunities (2012).

Table 3-4: Summary of Key Definitions of Risk Types

Source: Federal Highway Administration

Risk Type	Definition	Management
Hazard	The risk of uncertain performance due to condition and/or age of infrastructure or vulnerability to extreme events.	Addressed via contingency funding, specific strategies regarding improving condition, or reducing vulnerability to weather events. These may include prioritizing projects to achieve state of good repair (SGR), simulating deterioration probabilities, or constraining project list to the most critical.
Financial	The risk of a financial shift, such as a cut in revenues or a change in project cost.	Addressed via revenue source and trade-off understanding and simulation of various investment levels.
Operational	The risk that a prediction or strategy is incorrectly calibrated, leading to issues such as inaccurate forecasts or a lack of intended impact.	Addressed by a good feedback loop and review of forecasting abilities.
Strategic	The risk that management or specific programs have unforeseen weaknesses impacting the achievement of their intended purpose.	Addressed by understanding the sensitivity of performance preferences, targets, and resource allocation strategies. Strategy options may include silo versus integrated management, fixed versus flexible budget allocation, and worst first versus proactive preservation.

To guide the risk assessment and management piece of performance-based planning, consider the steps outlined as an International Organization for Standardization standard (ISO 31000)[4] and used by the FHWA *Risk-Based Transportation Asset Management* guide (Figure 3-3). This can be a formal or informal process.

- **Establish the context:** Understanding the social, legislative, economic, and environmental factors that may impact the agency or a particular goal, strategy, or target. This is an analogous step to the factor assessment that takes place for target setting.

[3] Definitions summarized from *NCHRP 806: Guide to Cross-Asset Resource Allocation and the Impact on Transportation System Performance,* pg. 20. http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_806.pdf

[4] ISO 31000 – Risk Management. http://www.iso.org/iso/home/standards/iso31000.htm

- **Identify risk:** Determine which type of risk is possible out of the options above.
- **Analyze risk:** Understand the probability of the risk and its impact. This can be a basic understanding or rating, or it can be modeled for a more specific analysis.
- **Evaluate risk:** Recognize the sensitivity of the agency to the impacts; interpret the severity of the impacts that the risk may cause.
- **Manage risk:** "Treat, tolerate, terminate, transfer, or take advantage of the risk."[5] In the context of performance-based planning, this means incorporating these steps into the planning process and developing strategies with an understanding of the risks, moving forward into the programming stage with flexibility to accommodate the kind of risks described above.

Figure 3-3: Risk Management Complements Other Management Frameworks

Source: Risk-Based Transportation Asset Management: Evaluating Threats, Capitalizing on Opportunities[6]

[5] New York State Department of Transportation. (2014). Transportation Asset Management Plan Draft v 05-02-14 (External Review). http://www.tamptemplate.org/wp-content/uploads/tamps/023_newyorkstatedot.pdf

[6] Federal Highway Administration. (2012). Risk-Based Transportation Asset Management: Evaluating Threats, Capitalizing on Opportunities. http://www.fhwa.dot.gov/asset/pubs/hif12035.pdf

IMPLEMENTATION STEPS

3.1 STRATEGY IDENTIFICATION

The following section outlines steps agencies can follow to define strategies aimed at progressing toward performance goals, and building a list of potential projects to be programmed in the performance-based programming component (Component 04).

1. Clarify internal and external roles and responsibilities for effective collaboration
2. Identify key performance issues for each strategic goal and objective
3. Assess a strategy's effect on outcomes
4. Define and evaluate strategies against desired characteristics
5. Document strategy identification process

> "Planning provides a state DOT with the skills to define a consensus-based, collaborative, long-term vision for transportation reflecting the perspectives of both internal [staff] and external stakeholders."
>
> Source: NCHRP Report 798: The Role of Planning in a 21st Century State DOT—Supporting Decisionmaking

STEP 3.1.1	Clarify internal and external roles and responsibilities for effective collaboration

Description

The planning process begins when the roles and responsibilities are defined. This often results in the formation of a task force or leadership committee, representing diverse performance areas of the organization. It should be well supported by, and connected with, agency leadership. It is important to establish the momentum and mutual understanding of a continual effort, as performance-based planning provides direction for programming decisions.

The diverse group assembled should foster a collaborative approach and enable the evaluation of strategies across multiple goals and performance targets. This also is designed to result in the development of a broad array of strategies. In order to reflect regional context and align regional planning processes, the group should collaborate with and learn from external partners.

Table 3-5: Key Roles to Determine

Source: Federal Highway Administration

Process Leadership	Lead, coordinate, and marshal the performance-based planning process.
Input Providers	Drive the conversation by making recommendations and suggestions for the duration of the process. Primarily internal staff but may also include external collaborators.
Feedback Contributors	Review recommendations and suggestions, but for sake of expediency, provide feedback on ideas rather than additional input.
Trackers	Collect and analyze data used to establish and monitor performance targets.
Decision Makers	Determine and decide the final strategies for inclusion.

STEP 3.1.1	Clarify internal and external roles and responsibilities for effective collaboration
	The PlanWorks resource created by FHWA is a valuable tool for use throughout the planning process, and includes information relevant to assigning roles and responsibilities.[7] It is essential that the above roles have a common understanding of how the plan will be formed, how strategies will be developed, prioritized, and included, and how the final plan will be used and communicated. All participants must also understand who is charged with decision-making and accountability, to ensure a clear chain of command and preclude confusion and false starts. **Items to tackle while assigning internal roles and responsibilities include:** • Identify key groups and champion for each • Determine ownership of each step • Ensure common understanding and support of framework • Confirm timeline and expectations
Examples	Colorado's **Statewide Transportation Plan (2015-2040)** provides an example of the involvement of many different groups:[8] **Transportation Commission: (process leadership)** Provides a policy directive, revenue projections, and continuity of leadership into programming (and with DOT goals and objectives). Commissioners serve in a leadership capacity as a board of directors for CDOT. The commission is comprised of 11 commissioners who represent specific districts. Each commissioner is appointed by the Governor, confirmed by the Senate, and serves a four-year term. To provide continuity, the commissioners' term expiration dates are staggered every two years. **DOT staff: (input providers, feedback contributors)** For each of the agency's performance areas, including safety, mobility, economic vitality/ planning, and maintenance. **Statewide Transportation Advisory Committee (STAC): (input providers, feedback contributors)** A group of elected or appointed officials representing five metropolitan planning organizations (MPOs) and 10 rural Transportation Planning Regions throughout the state. **Advocacy groups: (input providers, feedback contributors)** Rocky Mountain Wild, Colorado Natural Heritage Program, Southwest Energy Efficiency Project, The Nature Conservancy **State and Federal agencies represented: (feedback contributors)** • Federal Highway Administration (FHWA)

[7] FHWA. PlanWorks, LRP-1: Approve Scope of LRTP Process. https://fhwaapps.fhwa.dot.gov/planworks/DecisionGuide/Step/1
[8] Colorado DOT. (2015). Transportation Matters: Statewide Transportation Plan 2040 Executive Summary. http://coloradotransportationmatters.com/wp-content/uploads/2015/07/CDOT-SWP-Executive-Summary-2015-07-01.pdf

STEP 3.1.1	Clarify internal and external roles and responsibilities for effective collaboration

- US Bureau of Land Management (BLM)
- Colorado Department of Public Health and Environment (CDPHE)
- US Fish and Wildlife Service (FWS)
- State Historic Preservation Office (SHPO)
- US Department of Housing and Urban Development (HUD)
- Federal Transit Authority (FTA)

Tribal Governments: (input providers, feedback contributors)

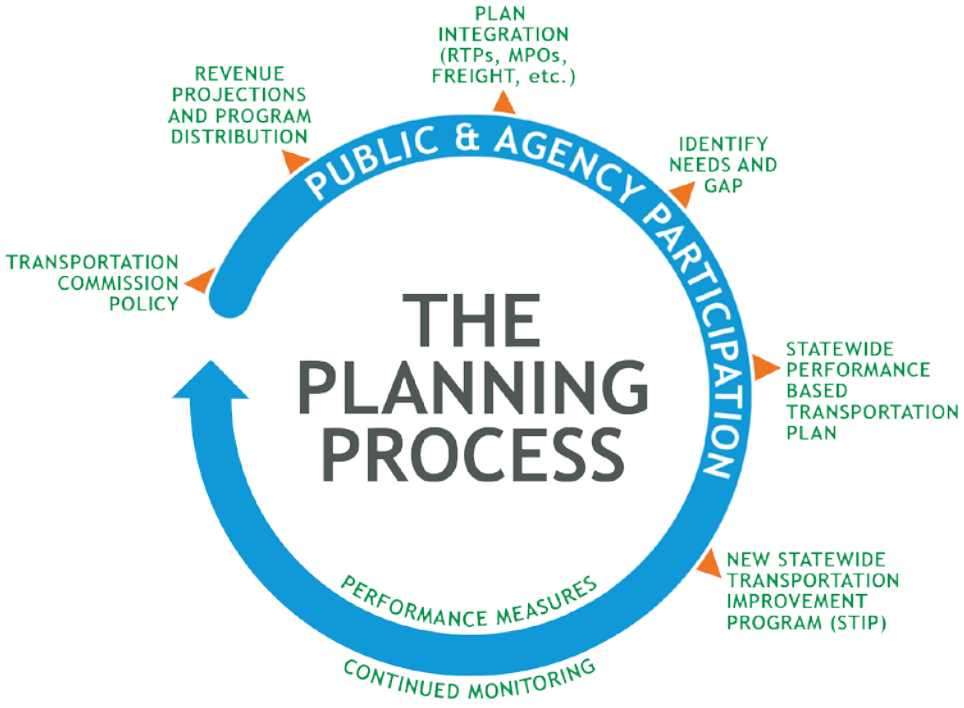
Southern Ute Tribe, Ute Mountain Ute Tribe

Public: (feedback contributors)

Over 60,000 members of the public provided input.

Figure 3-4: The Planning Process Cycle

Source: Transportation Matters: Statewide Transportation Plan 2040 Executive Summary[9]



The role of each group can be seen in the planning process graphic from the CDOT plan. The Transportation Commission, as process leadership, kicks off the planning process with their policy directive. They also contribute the revenue projections and program distribution. Then the STAC and other organizations bring their own plans and input to the table, identifying needs and gaps. The final plan is then approved and adopted by the Transportation Commission.

[9] Colorado DOT. (2015). Transportation Matters: Statewide Transportation Plan 2040 Executive Summary. http://coloradotransportationmatters.com/wp-content/uploads/2015/07/CDOT-SWP-Executive-Summary-2015-07-01.pdf

STEP 3.1.1	Clarify internal and external roles and responsibilities for effective collaboration
Linkages to Other TPM Components	Component A: Organization and Culture (See TPM Framework) Component B: External Collaboration and Coordination

STEP 3.1.2	Identify key performance issues for each strategic goal and objective

Description

This step requires the examination of current performance results related to each strategic goal and objective to identify the performance needs to be addressed. Having S.M.A.R.T. objectives, as discussed in the PBPP Guidebook[10] and in Strategic Direction (Component 01), may help an agency determine key performance issues. Baseline information should be examined to provide context on key issues and trends, whether those trends are negative or positive, and the sources of the information.[11] An understanding of baseline data and past conditions, as well as future needs, is vital to identify where the plan's strategies should focus. For example, if baseline data on pavement condition showed declining trends, it would be flagged as a key concern. A resulting strategy could be to resurface a specific number of miles of pavement per year.

In addition to relying on baseline data, key issues or concerns may be driven by agency priorities (e.g., safety) or legislative mandates (e.g., % of structurally deficient bridges). To better understand the context of these key issues and concerns, and to anticipate potential future issues, the agency should review the internal/external factors identified during target setting. As a reference, the table below lists potential influencing factors for performance:

Table 3-6: Internal and External Factors Influencing Performance

Source: Federal Highway Administration

Internal	External
Funding	Economy
Staffing constraints	Weather
Data availability and quality	Politics/Legislative requirements
Leadership	Population growth
Capital project commitments	Demographic shifts
Cultural barriers	Zones of disadvantaged populations
Agency priorities	Vehicle characteristics
Agency jurisdiction	Modal shares
Senior management directives	Gas prices
Policy directives (e.g., zero fatalities)	Land use characteristics
Cross performance area tradeoffs	Driver behavior
Collaboration across agency	Traffic

[10] FHWA. (2013). *Performance-Based Planning and Programming Guidebook* (FHWA Publication FHWA-HEP-13-041). Washington, DC.
[11] FHWA. (2013). *Performance-Based Planning and Programming Guidebook* (FHWA Publication FHWA-HEP-13-041). Washington, DC. Page 31.

STEP 3.1.2	Identify key performance issues for each strategic goal and objective

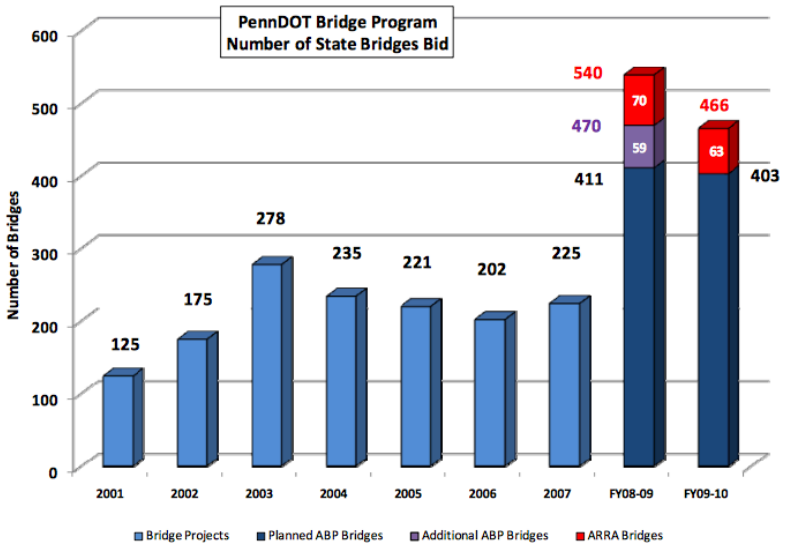
Examples

Pennsylvania Department of Transportation's Prioritization of Bridge Needs

With 25,000 state owned bridges, Pennsylvania has the third-largest number of bridges in the nation. The state has led with the highest number of bridges classified as structurally deficient (SD); at the peak, PennDOT had 6,034 SD bridges. Recognizing this as a key system issue, PennDOT identified bridge maintenance as a strategy to improving their bridge system condition. While the number of bridge projects bid upon between 2001 and 2007 varied between 125 and 278 per year, beginning in 2008-2010 the number increased significantly to 540, including those funded by Accelerated Bridge Program (ABP) and American Recovery and Reinvestment Act (ARRA) funding.[12]

Figure 3-5: 2010 Report Card for Pennsylvania's Infrastructure

Source: Bridges: 2010 Report Card for Pennsylvania's Infrastructure: Bridges[13]



While this means that bridge work did accelerate over the following years, it also means that resources directed toward bridges were not directed toward other areas, resulting in a tradeoff. As funds were funneled into maintenance, fewer resources were available for other areas such as mobility. As seen in Figure 3-6, below, during the time that funding was increasing for bridge repair, the percentage of mobility (capacity adding) projects of the total dropped dramatically.[14]

[12] Pennsylvania Department of Transportation. (2014). Bridges: 2014 Report Card for Pennsylvania's Infrastructure. http://www.pareportcard.org/PARC2014/downloads/PA_2014_RC_Bridges.pdf

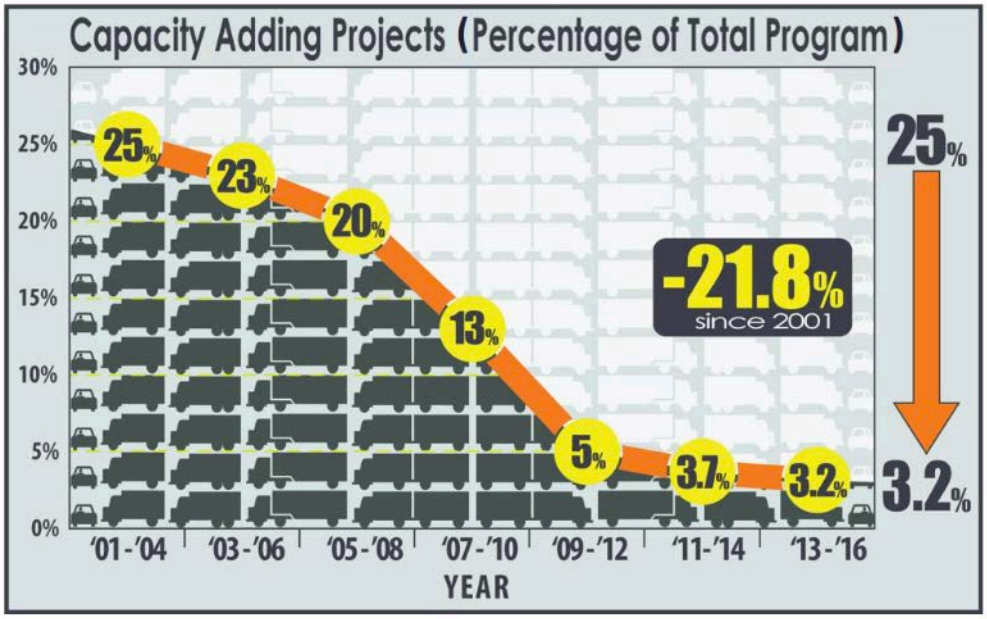
[13] Pennsylvania Department of Transportation. (2010). Bridges: 2010 Report Card for Pennsylvania's Infrastructure. http://www.pareportcard.org/PDFs/Bridges%20w%20Nat%20final.pdf

[14] Pennsylvania Department of Transportation. (2014). Bridges: 2014 Report Card for Pennsylvania's Infrastructure. http://www.pareportcard.org/PARC2014/downloads/PA_2014_RC_Bridges.pdf

STEP 3.1.2	Identify key performance issues for each strategic goal and objective

Figure 3-6: Data from the Pennsylvania Transportation Performance Report 2013

Source: Bridges: 2014 Report Card for Pennsylvania's Infrastructure [15]



This example illustrates how an agency develops strategies to address a prevalent performance issue and how those decisions can affect other performance areas. PennDOT prioritized repair to improve aggregate bridge condition over adding new capacity, a sensible approach since one must maintain what one builds. Nonetheless, this is a tradeoff: as a plus, they are working toward improving the total system condition; as a negative, they may be falling behind in adding capacity needed to keep up with demand.

Linkages to Other TPM Components

Component 01: Strategic Direction

Component 02: Target Setting (See TPM Framework)

Component 04: Performance-Based Programming

Component C: Data Management

Component D: Data Usability and Analysis

STEP 3.1.3	Assess a strategy's effect on outcomes

Description

In this step, agencies analyze how specific strategies will affect future performance outcomes using forecasting tools, economic analyses, and management systems. The purpose is to determine if a specific strategy provides the means to go from current conditions/baseline data toward achievement of performance goals. Agencies may find it beneficial to define various scenarios to test if the effect of a strategy may be to enhance or to throw off track.

[15] Pennsylvania Department of Transportation. (2014). Bridges: 2014 Report Card for Pennsylvania's Infrastructure. http://www.pareportcard.org/PARC2014/downloads/PA_2014_RC_Bridges.pdf

STEP 3.1.3	Assess a strategy's effect on outcomes
	In order to gain additional perspective on setting strategies, it is beneficial to review the efficacy of past strategies on achieving projected performance outcomes and making progress toward strategic goals. This before and after analysis will provide continuity between different iterations of long term plans. An agency's ability to assess strategies will depend on the resources (both staff time and tools) available. During this step, an agency assesses the risk regarding each strategy developed. Assessing risk means understanding the potential impacts of internal and external factors, their likelihood, and their severity for each strategy. Addressing risk means acknowledging these potential impacts and creating strategies that have the flexibility to accommodate these events or at least mitigate their effects. **Strategies are typically assessed in a range of planning documents:**[16] • MPO LRTP • State DOT LRTP • Asset management plans • State supporting planning documents (SHSP, state investment plan, etc.) • Non-metropolitan regional transportation planning organizations (often known as RTPOs or RPOs) • Transit operators, often through a transit development plan (TDP) • From local governments • Public "calls for projects" issued by State DOTs or MPOs
Examples	**Florida DOT's Road Ranger Program**[17] The Florida Department of Transportation (FDOT) recognized the need to address nonrecurring congestion caused by traffic incidents in order to make progress toward their mobility goal. A proposed strategy to address nonrecurring congestion was the development of the Road Ranger Program, a system of incident response that would address all districts along the Florida Turnpike. Between its implementation in 2000 and a study conducted in 2005, the FDOT Road Rangers provided more than two million assists to motorists over more than 1,000 centerline miles of Florida's busiest roadways. Assists include lane clearance and traffic control during incidents, fuel and tire changing assistance, cell phone calls for car service, and other quick fixes to get disabled vehicles off the freeway and reduce the potential for secondary incidents and extended resultant congestion. **To assess the efficacy of the Road Rangers as a strategy, FDOT collects the following performance measures:** • Number of assists provided to motorists • Number of miles of freeways covered • Incident duration • Travel time reliability • Customer satisfaction

[16] FHWA. (2013). *Performance-Based Planning and Programming Guidebook* (FHWA Publication FHWA-HEP-13-041). Washington, DC.
[17] SHRP2. (2011). *Integrating Business Processes to Improve Travel Time Reliability* (SHRP2 Report S2-L01-RR-1). Washington, DC. http://onlinepubs.trb.org/onlinepubs/shrp2/SHRP2_S2-L01-RR-1.pdf

STEP 3.1.3	Assess a strategy's effect on outcomes

FDOT has found that the Road Rangers patrols have a significant and cost-effective impact on these performance areas, saving 1,138,869 vehicle hours of delay and 1,717,064 gallons of fuel during the study period. FDOT also found that, although the program cost approximately $1.1 million statewide, it has added up to about $29.2 million in savings. The cost-benefit ratio is much better than other traditional mobility enhancement projects such as construction of new or expansion of existing roadways.[18]

Table 3-7: FDOT Road Ranger Program Analysis

Source: Federal Highway Administration

Category	Details
Performance Area	• Mobility
Performance Measurements	• Number of assists • Number of miles covered • Hours of delay • Incident duration • Additional gallons of fuel used • Customer satisfaction
Performance Goals	• Improve customer assistance and satisfaction • Reduce hours of delay • Reduce incident duration • Reduce fuel consumption
Target	• Specific numbers assigned to performance goals above
Strategy	• Provide free roadside assistance along the most travelled route in the state, 24/7
Results	• Positive impact on all performance measures • Excellent cost/benefit ratio

Linkages to Other TPM Components

Component 01: Strategic Direction

Component 02: Target Setting

Component C: Data Management

Component D: Data Usability and Analysis

(See TPM Framework)

STEP 3.1.4	Define and evaluate strategies against desired characteristics

Description

This step ensures that the plan spells out a clear connection between strategies and strategic goals.

[18] State Traffic Engineering and Operations Office. Road Rangers: A Free Service Provided by the Florida Department of Transportation, http://www.dot.state.fl.us/trafficoperations/traf_incident/rrangers/rranger.shtm.

STEP 3.1.4	Define and evaluate strategies against desired characteristics

Define the characteristics of each strategy including:

- **Scope:** What is the geographic reach? What is the timeframe? (For strategies these can vary within the typical statewide 30-year scope of a plan document)
- **Owner:** Who is the leader of this strategy, who implements it, and who tracks it?
- **Mode:** Passenger, freight, automobile, pedestrian, etc.

Explain why the strategy will work, offering information to back up its importance and its anticipated effects. This builds on the data examined in the previous step to create a narrative fully explaining each strategy. Define the anticipated outcome, and determine how the outcome will be evaluated. Include how efficacy will be measured, linking back to performance measurements, and specifying the exact measures applying to each strategy. During evaluation, it should be easy to answer yes or no as to whether the goal was accomplished and the strategy was effective. An agency's ability to evaluate strategies will depend on the resources (both staff time and tools) available.

Examples

What Moves You Arizona, the Arizona Department of Transportation's statewide long-range transportation plan, was selected as a model LRTP by FHWA. One of the plan's many strengths is its connection between strategies and goals. Figure 3-7 below illustrates strategies under consideration by goal area and Figure 3-8 lists strategies that connect back directly to the agency's list of Goals and Performance levels. The plan defines each of the strategies, current usage and efficacy, and other information to illustrate the reasoning behind them. It also provides implementation strategies for each.

Figure 3-7: Building a Bridge between Goals and Strategic Plans

Source: What Moves You Arizona: Long-Range Transportation Plan 2010-2035[19]

Plan Goal Area	Potential Policies/Strategies
Mobility, Accessibility, and Connectivity	Access Management Complete Streets Methods, Models, and Data Research
Preservation and Maintenance	Expansion Maintenance and Operations Policy
Economic Development	Job creation/retention Access Management Complete Streets Demand Management System Modernization (Bottleneck Reduction, System Operations, Traffic Signal Timing)
Transportation and Land Use	Access Management
Natural, Cultural, and Environmental Resources	Context Sensitive Solutions Education and Outreach "Green" certification
Safety and Security	System Modernization (Rural Safety) Education (Distracted Driving, Seat Belt Usage)
Performance Measurement and Management	Methods, Models, and Data Research

[19] Arizona Department of Transportation. (2011). What Moves You Arizona: Long-Range Transportation Plan 2010-2035, *88*. http://www.azdot.gov/docs/default-source/planning/lrtp-2011-1129.pdf?sfvrsn=2

STEP 3.1.4	Define and evaluate strategies against desired characteristics

Figure 3-8: Measuring Goals with Performance Measures

Source: What Moves You Arizona: Long-Range Transportation Plan 2010-2035[20]

Plan Goal	Performance Measures
Improve Mobility and Accessibility	Congestion, speed, and travel delay
Preserve and Maintain the State Transportation System	Pavement and bridge deficiencies; maintenance spending
Support Economic Growth	Congestion, speed, travel delay, and resources available for economic initiatives Job growth/job retention
Link Transportation and Land Use	Congestion, speed, travel delay, and improved access management
Consider Natural, Cultural, and Environmental Resources	Change in vehicle-related emissions, level of environmental certification
Enhance Safety and Security	Fatalities and serious injuries
Strengthen Partnerships	N/A – Focus on implementation policies
Promote Fiscal Stewardship	N/A – Focus on implementation policies

Linkages to Other TPM Components

Component 01: Strategic Direction (See TPM Framework)

Component 02: Target Setting

STEP 3.1.5	Document strategy identification process

Description

This step calls for documenting the strategy identification process. While this step is listed last, documentation should begin with the first step and continue throughout the process of implementing performance-based planning. The completion of this step means that an agency developing strategies has a good understanding of its current status regarding key issues or concerns surrounding their goals and respective strategies as well as its forecasting tools, economic analyses, and management systems.

The documentation step builds a record of how the strategy identification and planning process was conducted, who the stakeholders are, and why certain approaches were chosen. This reiterates the agency's overall goals for the planning process, can be rolled into a section of the LRTP, and serves as an important communications element with stakeholders. This documentation ensures that the planning and prioritization methodology will be well-defined and replicable for future plan updates. With each iteration of the LRTP, this documentation should be updated. As strategies are implemented, new understanding of their effects will come to light.

Specific topics to document include:

- Roles and responsibilities of involved staff
- Outline of business process milestones and schedule
- Process flow map
- Recommended adjustments for future target setting cycles
- Specific issues related to each implementation step

[20] Arizona Department of Transportation. (2011). What Moves You Arizona: Long-Range Transportation Plan 2010-2035, *3*. http://www.azdot.gov/docs/default-source/planning/lrtp-2011-1129.pdf?sfvrsn=2

STEP 3.1.5	Document strategy identification process

Table 3-8: Consistent and Comprehensive Documentation

Source: Federal Highway Administration

Strategy Identification Step	Topics to Document
Clarify internal and external roles and responsibilities	• Stakeholder and staff list and responsibilities • Collaboration procedures
Identify key issues or concerns	• Data source • Current performance results and issues identified in these • Baseline data
Assessment of a strategy's effect on outcomes	• Tools and methods used and why chosen • Assumptions • Future projections • Discussion and review of past strategies
Evaluating strategies	• Connection of strategies to desired outcomes/intent • Defined timeframe • How efficacy will be measured

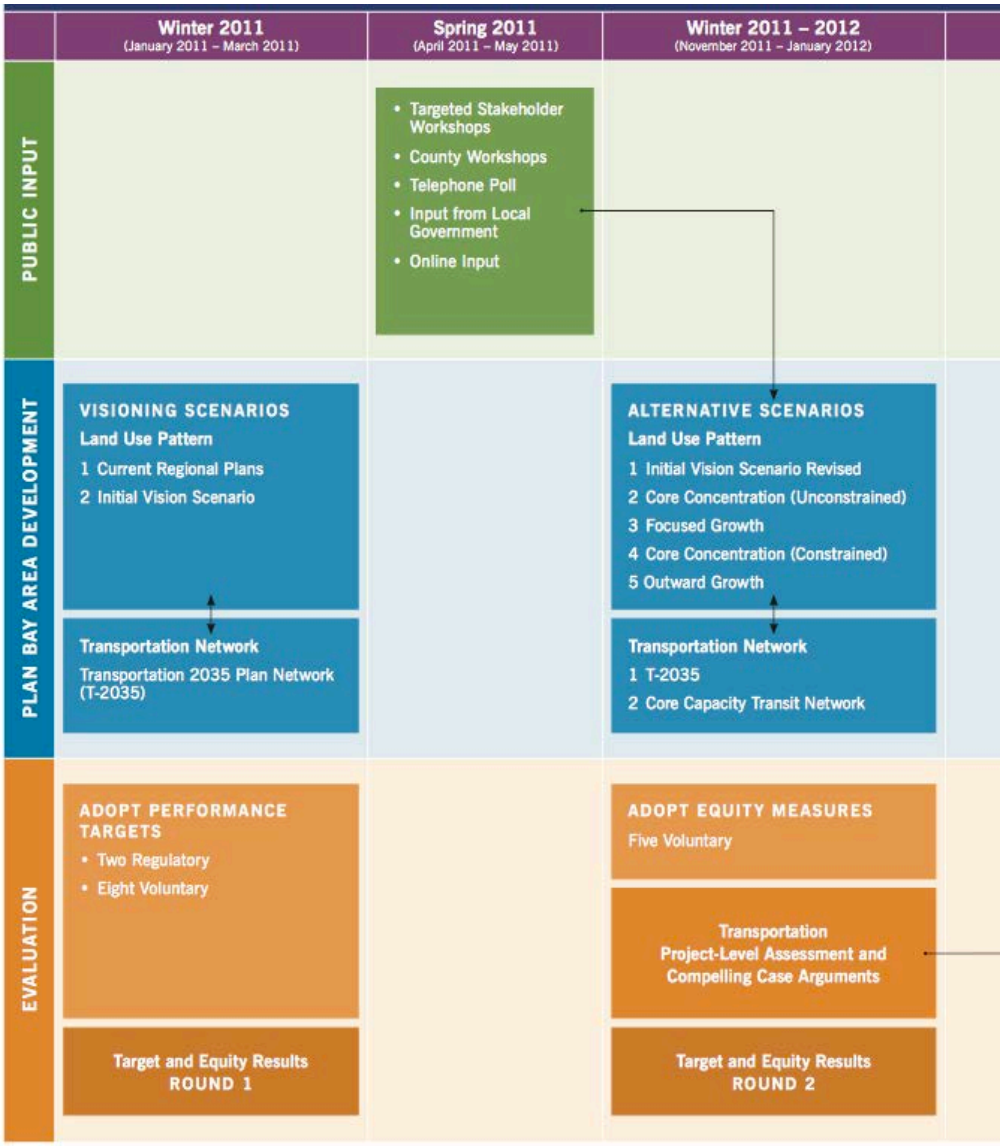
Examples

Plan Bay Area, adopted in 2013 by the Metropolitan Transportation Commission (MTC), the MPO for the San Francisco Bay Area, and the Association of Bay Area Governments (ABAG), provides an excellent documentation example. The plan spends the first several pages describing the agencies' process for collecting input from a variety of sources to develop a list of agreed-upon targets, then exploring strategies within them. It provides an extensive narration of how the plan was developed, including all of the elements listed above, as well as a graphical representation in Figure 3-9 and Figure 3-10 below. The charts display how and when information was gathered, scenarios built and tested, and those implemented measured and evaluated.

STEP 3.1.5	Document strategy identification process

Figure 3-9: Plan Bay Area Development Process

Source: Plan Bay Area[21]

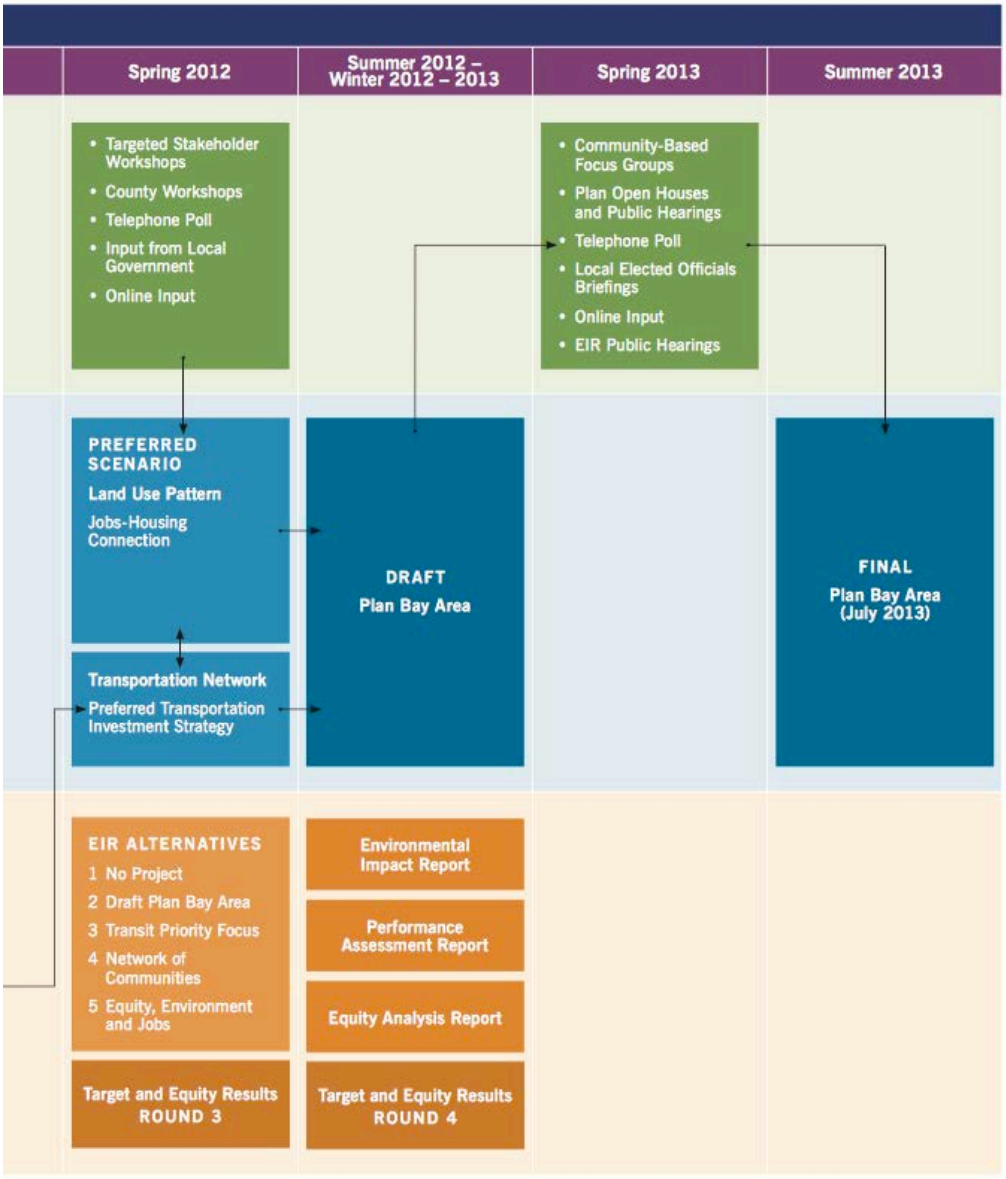


[21] Metropolitan Transportation Commission, Association of Bay Area Governments. (2013). Plan Bay Area: Strategy for a Sustainable Region, *24*. http://files.mtc.ca.gov/pdf/Plan_Bay_Area_FINAL/Plan_Bay_Area.pdf

STEP 3.1.5	Document strategy identification process

Figure 3-10: Plan Bay Area Development Process Continued

Source: Plan Bay Area[22]



Linkages to Other TPM Components	Component 01: Strategic Direction Component 04: Performance Based Programming	(See TPM Framework)

[22] Metropolitan Transportation Commission, Association of Bay Area Governments. (2013). Plan Bay Area: Strategy for a Sustainable Region, *25*. http://files.mtc.ca.gov/pdf/Plan_Bay_Area_FINAL/Plan_Bay_Area.pdf

3.2 INVESTMENT PRIORITIZATION

The following section outlines steps agencies can follow to prioritize and finalize the list of potential strategies that were drafted in subcomponent 3.1: Strategy Identification. Through this series of steps, an agency develops an understanding of how tradeoffs across agency performance areas are part of the prioritization process.

1. Assign internal roles and responsibilities
2. Develop scenarios to evaluate strategies
3. Establish relative importance of strategic goals to guide strategy prioritization
4. Document investment prioritization process

> "Prioritizing investments across new construction, operational improvements, and modes will promote a more cost-effective and sustainable transportation system."
>
> Source: NCHRP Report 798: The Role of Planning in a 21st Century State DOT—Supporting Decision-making

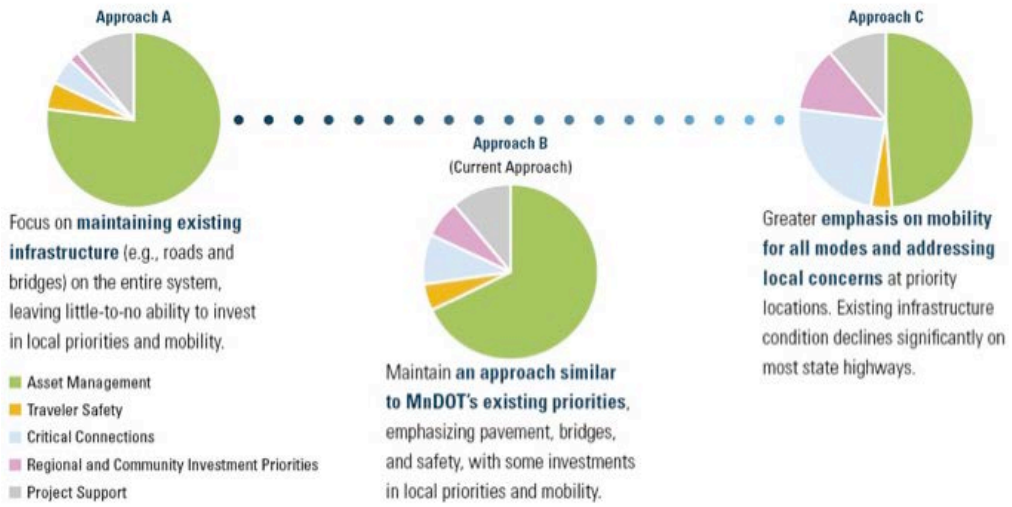
STEP 3.2.1	Assign internal roles and responsibilities
Description	This step specifies staff and designates roles and responsibilities. Staff taking part in the process of investment tradeoff and strategy prioritization should be sourced from across performance areas in order to achieve multiple goals and understand the tradeoffs between them. There should be overlap, if not congruency, between this group and those discussed in subcomponent 3.1 in order to foster coordination and consistency. The group members must have a common understanding of the strategic direction and its goals and objectives, as well as established performance measures and targets. A leadership role must be defined and understood as to who will marshal this part of the process along. It should be clear who makes final decisions and how results will be utilized toward making programming decisions.
Example	See Step 3.1.1.
Linkages to Other TPM Components	Component A: Organization and Culture (See TPM Framework)

STEP 3.2.2	Develop scenarios to evaluate strategies
Description	This step involves bundling strategies into groups or scenarios, understanding how performance areas rank in priority, and determining what tradeoffs are necessary to move the agency toward attainment of strategic goals as identified in Strategic Direction (Component 01). This step focuses on prioritization of performance areas, whereas the following step focuses on prioritization of goals. Staff decides what funding levels are likely and which should be evaluated. Portfolios of strategies should be evaluated together using scenario planning. Scenario planning is an analytical approach to evaluating how various combinations of strategies (scenarios) could potentially impact system performance at full scope of a performance-based plan, usually

STEP 3.2.2	Develop scenarios to evaluate strategies
	statewide.[23] Refer to FHWA's PlanWorks resource for further information about scenario planning and developing strategies.[24] This expands the comparison of goals to baseline projections to involve scenarios tested against performance outcomes rather than singular strategies. The combination of strategies within scenarios and consideration of those scenarios should be an interactive process with all stakeholders (including the public) and guides the conversation about making tradeoffs within the constraints of different funding levels. An agency's ability to assess scenarios will depend on the resources (both staff time and tools) available.
Example	**Minnesota DOT** developed three scenarios in its recent Strategic Highway Investment Plan (MnSHIP). During this stage of the planning process, MnDOT developed scenarios to understand the investments needed to meet its performance targets. The agency created a range of performance level options within each investment area. These were clearly illustrated to stakeholders in order to guide the discussion on tradeoffs required in each combination of performance levels and investment levels.

Figure 3-11: Evaluating Investment Approaches

Source: MinnesotaGO: 20-Year State Highway Investment Plan, Executive Summary[25]



[23] FHWA. (2013). *Performance-Based Planning and Programming Guidebook* (FHWA Publication FHWA-HEP-13-041). Washington, DC.
[24] FHWA. PlanWorks, LRP-7: Approve Plan Scenarios. https://fhwaapps.fhwa.dot.gov/planworks/DecisionGuide/Step/7
[25] Minnesota Department of Transportation. MinnesotaGO: 20-Year State Highway Investment Plan, Executive Summary, *ES-13*. St. Paul, MN. http://www.dot.state.mn.us/planning/mnship/pdf/executive-summary.pdf

STEP 3.2.2	Develop scenarios to evaluate strategies

Table 3-9: MnDOT Scenario Planning

Source: Federal Highway Administration

Scenario	A: Focus on maintaining existing infrastructure	B: Maintain existing approach	C: Focus on mobility for all modes and on local concerns
Pro	Improving performance regarding system preservation	Seemingly more equitable distribution of investment	More funding for mobility and local priorities
Con	Little funding left available for mobility enhancements (system expansion) and/or local priorities	Business as usual, less progress toward some performance goals	Significant deterioration of conditions on state highways

The development and discussion of these scenarios showed the public and other stakeholders what the tradeoffs were within the funding constraints. Funding levels raised in one area must naturally fall in another, revealing how meeting local demands would cause the agency to fall out of Federal guidelines in another.

The result of MnDOT's scenario planning efforts includes an updated approach on a 20-year plan, with an emphasis on risk. The plan splits priorities between two 10-year periods, rather than embrace one set of priorities for the full 20 years, acknowledging the need to respond to governmental requirements and adjust existing priorities and assumptions. This balanced approach allows MnDOT the ability to make progress in all investments in the short-term, while continuing to focus on existing infrastructure for the longer term.

Figure 3-12: MnDOT Investment Strategies in Relation to Expected Outcomes

Source: MinnesotaGO: 20-Year State Highway Investment Plan, Executive Summary[26]

Investment Category		Years 1-10 (2014-2023) Investment	Anticipated Outcome in 2023	Years 11-20 (2024-2033) Investment	Anticipated Outcome in 2033	Total 20-Year Investment
Asset Management	Pavement Condition	$2.89 billion	NHS conditions remain stable; 2% of Interstates and about 4% of other NHS routes are in Poor condition. Non-NHS condition worsens from 7-8% today to 11-12% Poor.	$5.41 billion	Interstates are at 2% Poor; other NHS and non-NHS roads are at 11-13% Poor, which is 2-3 times worse relative to today. Negative impact on freight movement, vehicles, and bicycles.	$8.30 billion
	Bridge Condition	$1.53 billion	NHS bridge conditions remain stable at 2-3% Poor. Non-NHS conditions worsen from 2% today to 4-6% Poor.	$1.89 billion	NHS bridges decline to 6-8% Poor and Non-NHS bridges decline to 8-10% Poor. Some weight restrictions and closures impact freight movement.	$3.42 billion
	Roadside Infrastructure Condition	$670 million	The condition of more culverts, signals, signs, lighting, rest areas, and retaining walls are expected to deteriorate.	$820 million	The condition of more culverts, signals, signs, lighting, and retaining walls is expected to deteriorate further. Several rest areas likely to close.	$1.49 billion

Linkages to Other TPM Components

Component 02: Target Setting (See TPM Framework)

Component 05: Monitoring and Adjustment

Component 06: Reporting and Communication

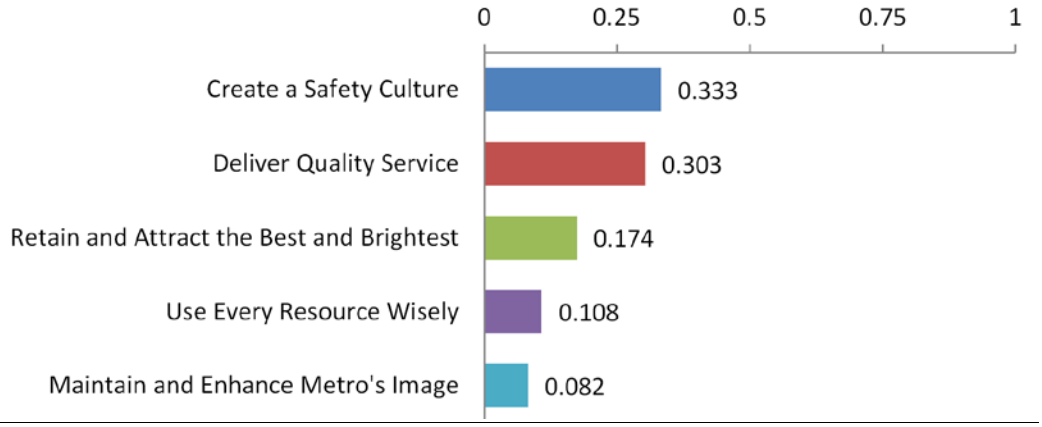
[26] Minnesota Department of Transportation. MinnesotaGO: 20-Year State Highway Investment Plan, Executive Summary, *ES-16*. St. Paul, MN. http://www.dot.state.mn.us/planning/mnship/pdf/executive-summary.pdf

STEP 3.2.3	Establish relative importance of strategic goals to guide strategy prioritization
Description	In this step, an agency develops a methodology for determining the relative priority of different goals and performance outcomes. This is necessary for the plan to provide a clear strategic direction for the agency and support decision-making. In order to do this, the tradeoff analysis developed in the scenarios above should be considered in addition to the relative need across performance areas. The most important part of this step is selection of the final strategies to be included in the long-range transportation plan or other performance-based plans, chosen from the list of strategies developed in subcomponent 3.1, and confirmed as feasible by the scenario planning in the previous step. The final list of strategies must be strongly connected back to the performance measures and goals. The list of strategies, scenarios, and measures should be reaffirmed by all stakeholders and then drafted into the final plan format.
Examples	To ensure its American Recovery and Reinvestment Act of 2009 funds would address the agency's longer-term goals, the **Washington Metropolitan Area Transit Authority** (WMATA) conducted a new agency-wide structured strategic capital planning process to select the most high-impact ready-to-go projects for stimulus funding. A strategic prioritization approach was necessary because WMATA identified $530 million in capital needs that were eligible for the $202 million ARRA funds the agency received. WMATA prioritized the $530 million list of potential projects in a process grounded in the agency's five strategic goals: create a safety culture, deliver quality service, use every resource wisely, retain and attract the best and the brightest, and maintain and enhance WMATA's image. A key step in the selection of stimulus projects was the weighting of the agency's five strategic goals. To accomplish this, the WMATA planning staff facilitated a discussion with the executive leadership team where, as a group, the executives walked through each goal, making the case for why a particular goal should be weighted higher than another. The result of the facilitated workshop was a set of weights that were later used to calculate a score for each project (Figure 3-13). The project score represented its role in achieving WMATA's strategic goals. The score calculation was based on the goal weight and how significantly each potential ARRA project contributed to each strategic objective (critical, very important, important, marginal or no contribution). The open dialogue about the goal weights not only created the structure to identify ARRA projects, but it also increased executive buy-in to the overall project selection process. In addition, WMATA was able to communicate to the Board of Directors the relationship between the selected ARRA project and its contribution to agency goals.

STEP 3.2.3	Establish relative importance of strategic goals to guide strategy prioritization

Figure 3-13: WMATA Priority Setting

Source: Federal Highway Administration[27]



Linkages to Other TPM Components	Component 01: Strategic Direction (See TPM Framework) Component 02: Target Setting Component 06: Reporting and Communication

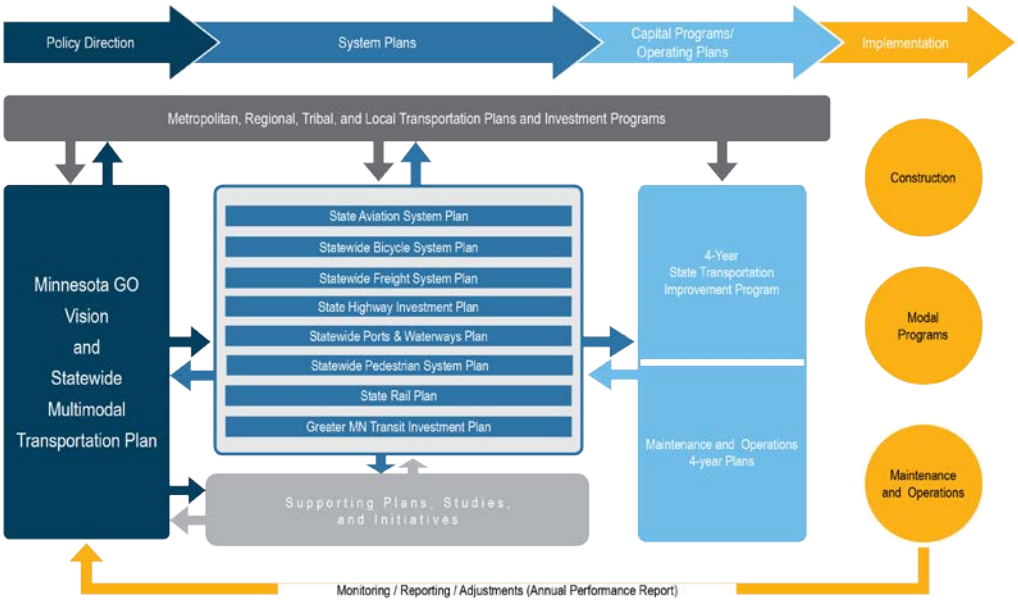
STEP 3.2.4	Document investment prioritization process
Description	This step necessitates documenting the work done to complete the steps in this subcomponent. Like the document step 3.1.5 in subcomponent 3.1, this step begins with the first step and continues throughout. Documentation created here should be included in the Long Range Transportation Plan. **Accomplishments from the above implementation steps must be documented, including:** • Defined methodologies and processes for analyzing tradeoffs and prioritizing strategies • Relationship between strategies and established goals and priorities • Staff roles and responsibilities • Data and analysis capabilities to analyze tradeoffs across alternative investment scenarios • Linkages between planning documents • How results of tradeoff analysis and strategy prioritization will be used in programming (Component 04) • How processes will be evaluated to ensure that planning documents are easy to use and are guiding decisions clearly and efficiently into the programming process
Examples	This diagram from the **Minnesota Department of Transportation** (MnDOT), included in their Minnesota GO long-range plan (http://www.dot.state.mn.us/minnesotago/index50yearvision.html), illustrates the relationships between its plans and programs. While the rest of the plan document addresses documentation of the elements listed above, this diagram is an efficient way to quickly document and display the process and flow of information involved.

[27] Illustrative example created using WMATA's strategic goals and theoretical weights.

STEP 3.2.4	Document investment prioritization process

Figure 3-14: MnDOT Plans and Programs

Source: Family of Plans[28]



At the top, the overall process leads from policy to plan to program to implementation. Beneath this, the interrelated metro, regional, and local transportation plans are interconnected, documenting how information flows from one to another and is used in input into the LRTP at left ("Minnesota GO"). From there, the information cycles to the STIP and maintenance and operations plans. Finally, at far right, the process moves into implementation steps and then completes a feedback loop via evaluation in the next iteration of the LRTP.

Linkages to Other TPM Components	Component 06: Reporting and Communication	(See TPM Framework)

[28] Minnesota Department of Transportation - Family of Plans. June 9, 2016. http://www.dot.state.mn.us/minnesotago/index50yearvision.html

RESOURCES

Resource	Year	Link
TPM Toolbox	2016	www.tpmtools.org
Performance Based Planning and Programming Guidebook	2013	http://www.fhwa.dot.gov/planning/performance_based_planning/pbpp_guidebook/
Model Long-Range Transportation Plans: A Guide for Incorporating Performance-Based Planning	2014	http://www.fhwa.dot.gov/planning/performance_based_planning/mlrtp_guidebook/fhwahep14046.pdf
Integrating Business Processes to Improve Travel Time Reliability	2011	http://onlinepubs.trb.org/onlinepubs/shrp2/SHRP2_S2-L01-RR-1.pdf
NCHRP 806: Guide to Cross-Asset Resource Allocation and the Impact on Transportation System Performance	2015	http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_806.pdf
Risk-Based Transportation Asset Management: Evaluating Threats, Capitalizing on Opportunities	2012	http://www.fhwa.dot.gov/asset/pubs/hif12035.pdf
FHWA Scenario Planning Guidebook	2011	http://www.fhwa.dot.gov/planning/scenario_and_visualization/scenario_planning/scenario_planning_guidebook/
PlanWorks	2015	https://fhwaapps.fhwa.dot.gov/planworks/Home

ACTION PLAN

1. Of the TPM subcomponents discussed in this chapter, which one would you like to work on?

   ❑ 3.1 Strategy Identification ❑ 3.2 Investment Prioritization

2. What aspect of the TPM process listed above do you want to improve?

3. What "steps" discussed in this chapter do you think could help you address the challenge noted above?

Strategy Identification

- ❑ Clarify internal and external roles and responsibilities for effective collaboration
- ❑ Identify key performance issues for each strategic goal and objective
- ❑ Assess a strategy's effect on outcomes
- ❑ Define and evaluate strategies against desired characteristics
- ❑ Document strategy identification process

Investment Prioritization

- ❑ Assign internal roles and responsibilities
- ❑ Develop scenarios to evaluate strategies
- ❑ Establish relative importance of strategic goals to guide strategy prioritization
- ❑ Document investment prioritization process

4. To implement the "step" identified above, what actions are necessary, who will lead the effort and what interrelationships exist?

Action(s)	Lead Staff	Interrelationships

5. What are some potential barriers to success?

6. Who is someone (internal and/or external) I will collaborate with to implement this action plan?

7. How will I know if I have made progress (milestones/timeframe/measures)?

FIGURE INDEX

TABLE INDEX