MinnesotaGO
A Collaborative Vision for Transportation

20-Year State Highway Investment Plan

2014-2033

December 2013

MINNESOTA DEPARTMENT OF TRANSPORTATION

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20-Year State Highway Investment Plan

December 2013

Dear People and Businesses of Minnesota,

I am pleased to share with you the Minnesota State 20-Year Highway Investment Plan (MnSHIP). This plan is the result of extensive collaboration over the past two years between the Minnesota Department of Transportation and residents, stakeholders and partners throughout the state. I want to thank everyone who took the time out to participate in our outreach meetings and provide input on this plan.

MnSHIP is MnDOT's vehicle for determining and communicating capital investment priorities for the system for the next 20 years. It is not the vision for Minnesota's state highway system however it does provide a fiscally constrained plan that follows the principles established in the Minnesota GO Vision and Statewide Multimodal Transportation Plan.

In developing this plan, MnDOT strengthened its planning process with a more robust public input process, integrating risk-based planning as a means to better understand the trade-offs associated with various funding levels, and classifying projects into 10 investment categories; all intended to better track and analyze the impact of these important investments. In addition, MnSHIP identifies planned projects for three years beyond the commitments in the four-year State Transportation Improvement Program.

The investment priorities in MnSHIP clearly illustrate the increasing constraints on highway planning in Minnesota. Growth in construction costs continues to outpace growth in revenue and, as the highway system ages, these needs are increasing. In particular, investments in the second ten years do not address many of the system needs. MnDOT will continue to explore innovative methods to use highway funds efficiently however without additional revenue, performance of the highway system is projected to decline.

The success of Minnesota's transportation system depends on the coordinated efforts of many public and private providers, and the investment priorities outlined in this plan provide a framework for those improvements. The need is significant and these are complex issues. MnDOT welcomes the continued involvement of residents, stakeholders and partners in the implementation of this plan and in future policy decisions. Working together we can work toward our vision of a well maintained and integrated multimodal transportation system that meets the needs of our citizens and business community alike.

Sincerely,

Charles A. Zelle
Commissioner

Minnesota Department of Transportation
395 John Ireland Blvd
Saint Paul, MN 55155

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Executive Summary

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EXECUTIVE SUMMARY

Overview

Minnesota's 12,000-mile state highway system plays a critical role in supporting the state's economic vitality and quality of life. Economic vitality, as well as quality of life, depends upon a strong, well-connected transportation network. To compete economically and to position Minnesota for the future, MnDOT needs to maintain the state highway system. The size and the age of Minnesota's transportation system demonstrate the scope of the state highway system's investment need:

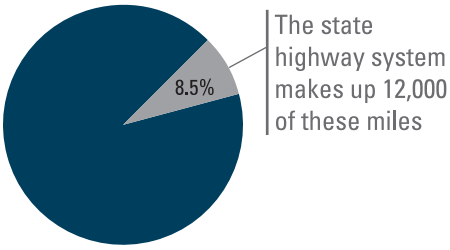
- 50 percent of state highway pavements are more than 50 years old.
- 35 percent of state highway bridges are more than 50 years old.
- Compared to other states, Minnesota ranks in the bottom half for Interstate pavement condition (38th out of 50).
- Minnesota ranks 9th nationally for bridge condition on state highways.

The Minnesota Department of Transportation (MnDOT) is directly charged with constructing, operating, maintaining, and managing this system, which is 74 percent of the State's capital assets. The **Minnesota 20-Year State Highway Investment Plan (MnSHIP)** is MnDOT's vehicle for deciding and communicating capital investment priorities for the system for the next 20 years. MnSHIP is a fiscally constrained plan, meaning its planned expenditures must align with expected revenues, which total $18 billion. Meanwhile, the projected transportation needs on the state highway system total $30 billion.

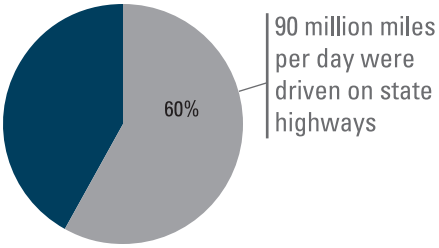
MnDOT must account for many factors when setting priorities, including federal and state law, system conditions, and public input. The result is a set of investment priorities that vary over the next 20 years. MnDOT's priorities for the next 10 years balance preservation of existing infrastructure with investments in safety, new connections for multiple modes of transportation, and other projects that advance economic development and quality of life objectives.

However, investments in the second 10 years focus almost exclusively on preserving existing infrastructure. Despite this focus, the number of roads and bridges in poor condition will more than double and perhaps even triple within 20 years. Given the projected $12 billion funding gap, there will be many unfunded priorities within the 20-year horizon.

There are more than 141,000 miles of roadways in Minnesota



In 2010, more than 155 million miles per day were driven on Minnesota's roads

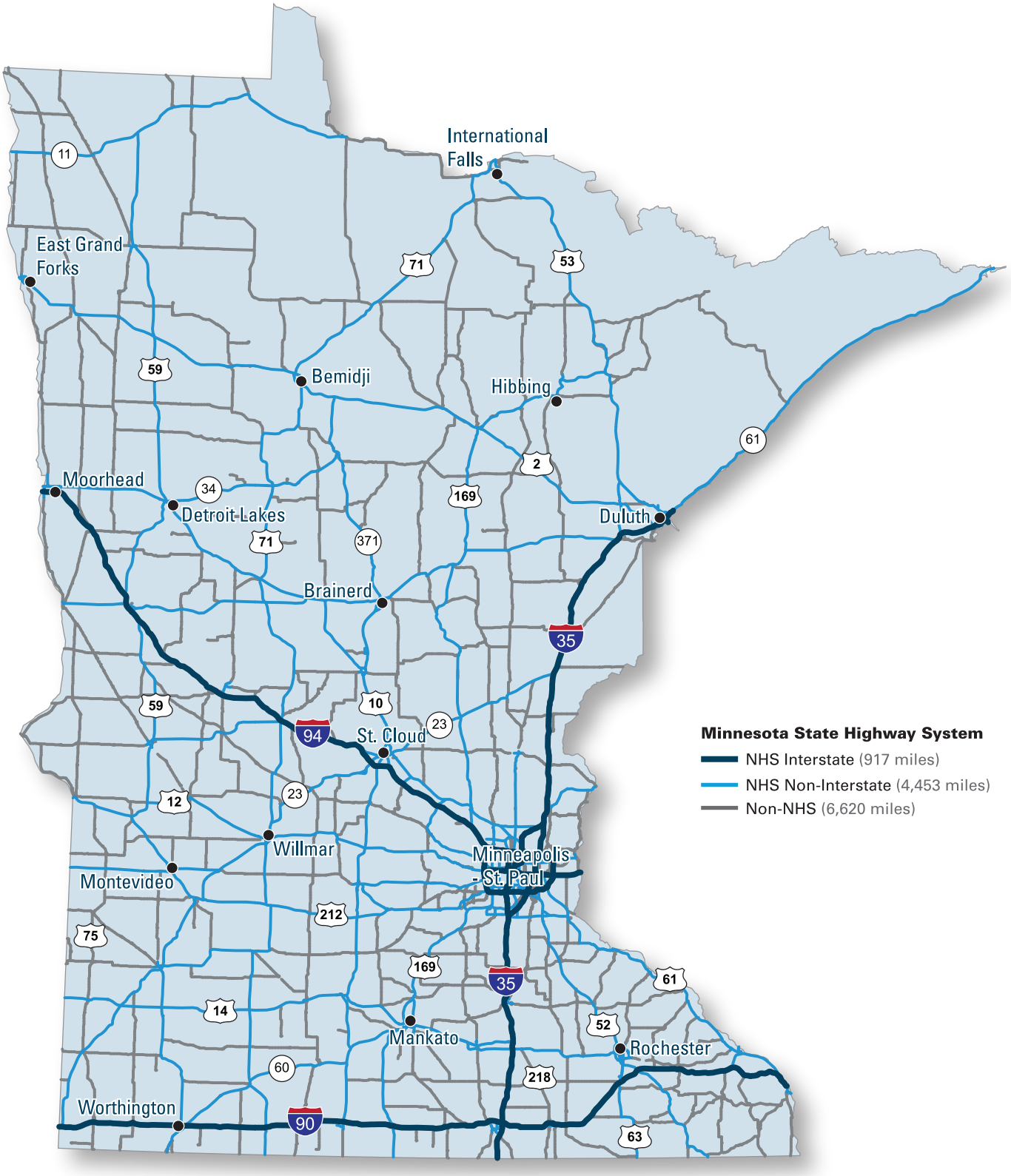


Minnesota's State Highway System

Minnesota's state highway system includes the **National Highway System (NHS)** as well as other important roads. The NHS includes Interstates, most U.S. highways, and other principal arterials (see **Figure ES-1**). Like most transportation systems, state highways are aging and require a significant level of investment to simply maintain existing infrastructure.

The importance of the state highway system is demonstrated by its use. It comprises just 8.5 percent of Minnesota's total roadway miles, yet carries almost 60 percent of the miles traveled as well as the majority of the freight being moved on Minnesota's roads. It connects people to school, work, healthcare, and recreational activities. It is the system businesses rely on to move their goods to store shelves; raw materials to manufacturers; and agricultural products to processors and markets throughout the state, country, and world. The multimodal network serves many transportation users—passenger vehicles, freight carriers, transit providers, bicyclists and pedestrians—and connects them to other transportation options and networks.

Figure ES-1: Minnesota State Highway System



Source: MnDOT

The Purpose of MnSHIP

The **Minnesota 20-Year State Highway Investment Plan (MnSHIP)** is MnDOT's vehicle for deciding and communicating capital investment priorities for the system for the next 20 years. MnSHIP is a fiscally constrained plan and is updated every four years to respond to changing conditions and assumptions. MnSHIP details how MnDOT will use available resources efficiently and effectively in addressing agency objectives.

Notable changes and improvements in MnSHIP relative to the last state highway investment plan update—completed in 2009—include:

- Evolving revenue distribution and programming processes to respond to a new federal transportation bill that focuses federal money on the National Highway System and establishes performance requirements to make progress in seven national goal areas;
- Identifying planned projects for three years beyond commitments in the four-year **State Transportation Improvement Program (STIP)** to respond to a 2010 state law as well as to improve coordination with local units of government;
- Classifying projects into 10 investment categories to better track and analyze the impact of investments on performance targets and other goals;
- Pursuing a more robust public input process to influence planning decisions—an approach to decision-making that reflects the feedback MnDOT received during the multi-year Minnesota GO outreach process;
- Integrating risk-based planning as a means to better understand the trade-offs associated with various funding levels; and
- Identifying two new investment categories, Bicycle Infrastructure and Accessible Pedestrian Infrastructure, to better account for investments that support non-motorized modes of travel.

Key Factors and Assumptions

MnDOT accounted for several key factors in setting investment priorities for the state highway system.

KEY FACTOR: MINNESOTA GO POLICY DIRECTION FOR MNSHIP

MnSHIP is part of a multi-year planning and outreach process—and connects policy to improvements made on the state highway system. The process began with the Minnesota GO 50-Year Statewide Vision[1], adopted in 2011, which established eight guiding principles for a multimodal transportation system that maximizes the health of people, the environment, and the economy.

Minnesota GO Guiding Principles

Leverage public investments to achieve multiple purposes. The transportation system should support other public purposes, such as environmental stewardship, economic competitiveness, public health, and energy independence.

Ensure accessibility. The transportation system must be accessible and safe for users of all abilities and incomes and provide access to key resources and amenities.

Build to a maintainable scale. Consider and minimize long-term obligations – do not overbuild; reflect and respect the surrounding physical and social context.

Ensure regional connections. Key regional centers need to be connected to each other through multiple modes of transportation.

Integrate safety. Systematically and holistically improve safety for all forms of transportation; be proactive, innovative, and strategic in creating safe options.

Emphasize reliable and predictable options. The reliability of the system and predictability of travel time are frequently as important as or more important than speed.

Strategically fix the system. Some parts of the system may need to be reduced while other parts are enhanced or expanded to meet changing demand.

Use partnerships. Coordinate across sectors and jurisdictions to make transportation projects and services more efficient.

1 http://www.dot.state.mn.us/minnesotago/index.html

The Statewide Multimodal Transportation Plan[2], adopted in 2012, identified objectives and strategies to make progress toward the **Minnesota GO Vision.** The plan focused on multimodal solutions that ensure a high return-on-investment.

Statewide Multimodal Transportation Plan Objectives

Accountability, transparency, and communication. Make transportation system decisions through processes that are open and supported by data and analysis; provide for and support coordination, collaboration, and innovation; and ensure efficient and effective use of resources.

Traveler safety. Safeguard travelers, transportation facilities, and services; apply proven strategies to reduce fatalities and serious injuries for all modes of travel.

Transportation in context. Make fiscally responsible decisions that respect and complement the context of place; integrate land uses and transportation systems.

Critical connections. Identify essential transportation connections; maintain and improve these connections; consider new connections.

Asset management. Strategically maintain and operate transportation assets; rely on system data, partners' needs, and public expectations to inform decisions; put technology and innovation to work to improve efficiency and performance; and recognize that the system should change over time.

System security. Reduce system vulnerability and ensure system redundancy to meet essential travel needs during emergencies.

KEY FACTOR: NEW FEDERAL AND STATE REQUIREMENTS

At both the federal and state levels, evolving transportation law establishes policy guidance and performance requirements for the state highway system.

General Policy Requirements

At the federal level, the new surface transportation bill, **Moving Ahead for Progress in the 21st Century (MAP-21)**, established new requirements for federal highway programs. MAP-21 expanded the number of highways in the NHS to now include Interstates, most U.S. Highways, and other principal arterials in Minnesota, totaling about 45 percent of the state highway system. The bill establishes national goals and requires USDOT to establish performance measures for the NHS in several categories.

2 http://www.dot.state.mn.us/minnesotago/SMTP.html

A 2010 state law defined requirements for MnSHIP. In part, MnDOT must analyze and track the impact of recent investments, identify needs, establish priorities for projected revenue, and identify strategies to ensure the efficient use of resources.

Performance Requirements

MAP-21 requires states to report progress in achieving performance targets for each of the yet-to-be established measures. As a leader in performance-based planning, MnDOT is well positioned to meet this requirement. Under USDOT's current schedule for MAP-21 implementation, draft national performance measures are to be proposed in stages starting in late 2013. A single effective date for all MAP-21 measures is expected in Spring 2015. MnDOT made assumptions about pending performance criteria based on available information, but many requirements will not be integrated into MnSHIP until the next update. A performance measure assessing freight movement on Interstates is one example of a yet-to-be-defined requirement.

Federal and state performance requirements have a strong influence on MnDOT's priorities for the state highway system.

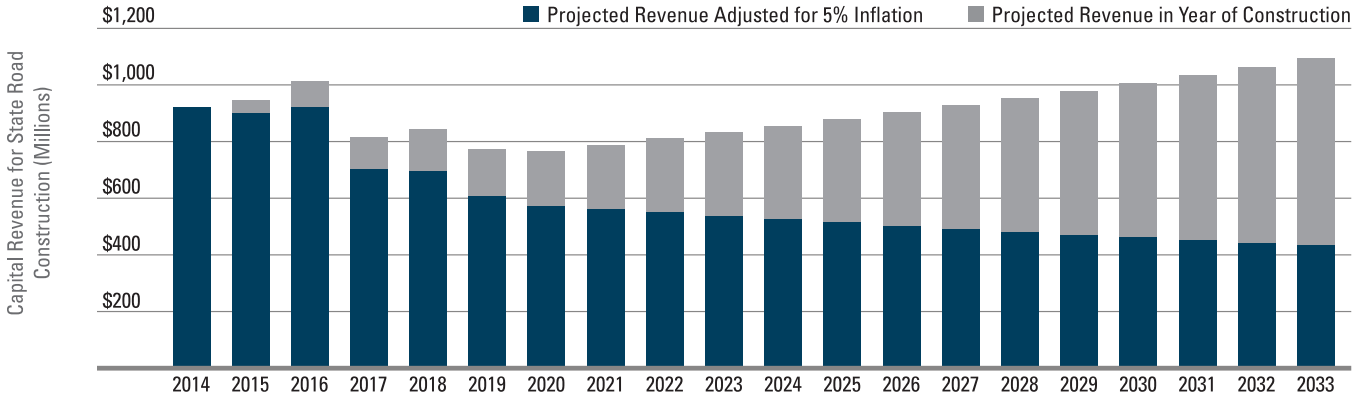
At the state level, Minnesota adopted the **Government Accounting Standards Board Statement 34 (GASB 34)** financial reporting requirements for the value and condition of its major infrastructure assets in 2001. MnDOT set performance thresholds for highway infrastructure, such as the condition of pavements and bridges. This infrastructure must be at or above GASB 34 thresholds or resulting financial actions could negatively affect Minnesota's future bond rating, which could negatively impact state and local units of government by increasing the cost of borrowing money. In addition, system conditions falling below GASB 34 thresholds would be indicative of other adverse outcomes occuring system-wide, such as pavement failures requiring expensive fixes, more bridges with weight restrictions, and increased travel costs for all users.

KEY FACTOR: CONSTRUCTION COSTS AND SLOW REVENUE GROWTH

MnDOT estimates that it will have approximately $18 billion in federal and state revenues to invest toward capital highway improvements over the next 20 years. This amount will lose buying power over time as unit construction costs (e.g. fuel, raw materials, equipment, and labor) continue to grow at an annual rate of approximately five percent, exceeding the annual revenue growth rate of approximately two percent. **Figure ES-2** shows anticipated nominal, year of construction revenue (grey bars) and illustrates the impact of inflation on annual buying power (blue bars), demonstrating how buying power will be

Lower revenues and rising costs will result in a funding gap of approximately $12 billion over the next 20 years.

Figure ES-2: Anticipated Construction Revenue by Year Including Adjustments for Inflation



Source: MnDOT

reduced by nearly 60 percent by 2033 given the above assumptions. MnDOT would need approximately $4 billion to maintain today's buying power over the next 20 years.

Trends that are contributing to slow revenue growth include the following:

- Fuel efficiency is improving for all vehicles, leading to less available revenue for highway improvements. While fewer emissions are a positive trend for the environment, motor vehicle gas tax is one of the major sources of both federal and state revenue and less revenue is available for highway improvements.
- The usage of the highway system, as measured by **vehicle miles traveled (VMT),** peaked in 2004 and has since declined slightly. An aging population and a younger generation that is driving less suggest this trend could continue, limiting growth in gas tax revenues for state highway improvements.
- Vehicle sales tax revenues are expected to grow slowly – in the two to three percent range – over the next 20 years. While this growth is an improvement over past years, it is not enough to compensate for falling gas tax revenues.

Transportation Needs

MnDOT's capital improvement needs span 10 categories of investment. An estimated $30 billion is needed across all categories over the next 20 years (see **Figure ES-3**). This level of investment would ensure the state highway system meets all federal and state performance requirements and makes progress toward realizing the **Minnesota GO Vision.** Below is a brief summary of each investment category. Given $18 billion in revenue over the same period, a funding gap exists of approximately $12 billion.

Figure ES-3: Transportation Needs Over Next 20 Years by Investment Category

Investment Category		20-Year Outcomes Based on Aspirational Performance Targets or Other Key System Goals	20-Year Need	Total (%)
Asset Management	Pavement Condition	Meet pavement performance targets of 2% Poor condition and 70% Good condition on NHS and 3% Poor condition and 65% Good condition on non-NHS roads.	$10.76 billion	35.6%
	Bridge Condition	Invest in state highway bridges at optimal points in their life cycles; meet performance targets of ≤2% Poor condition and ≥84% Good or Satisfactory condition on NHS bridges, ≤8% Poor and ≥80% in Good or Satisfactory condition on non-NHS bridges.	$5.11 billion	16.9%
	Roadside Infrastructure Condition	Reduce the number of poor culverts, maintain rest areas, and meet federal standards.	$1.71 billion	5.7%
Traveler Safety		Meet an aggressive traffic fatalities target by implementing District Safety Plans more quickly than current rate (2012), address most sustained crash rate locations, and invest $3 million/year for Toward Zero Deaths programming.	$1.34 billion	4.4%
Critical Connections	Twin Cities Mobility	Implement the Metropolitan Council's Transportation Policy Plan, which includes Active Traffic Management, spot mobility improvements, implement the MnPASS system vision, and strategic capacity enhancements.	$3.90 billion	12.9%
	Interregional Corridor Mobility	Meet system performance targets by completing major improvements on three of four underperforming corridors (I-94, US 10, US 63, and MN 210).	$810 million	2.7%
	Bicycle Infrastructure	Strategically improve the bicycle network and continue implementing bicycle accommodations as part of pavement and bridge projects.	$540 million	1.8%
	Accessible Pedestrian Infrastructure	Install accessible pedestrian signals at all signalized intersections by 2030, bring all intersections into compliance with Americans with Disabilities Act (ADA) curb ramp standards, and fund identified priority pedestrian projects.	$490 million	1.6%
Regional + Community Improvement Priorities (RCIP)		Partner with stakeholders to address regional and local priorities through several stand-alone projects and design add-ons, deliver projects that respond to non-performance-based needs and enhance the state's transportation network, and allocate money for statewide and district-level programs.	$1.75 billion	5.8%
Project Support		Efficiently deliver projects through adequate consultant services, supplemental agreements, construction incentives, and right-of-way acquisition.	$2.88 billion	9.5%
Small Programs		Continue to fund unforeseen issues and one-time specialty program needs.	$900 million	3.0%
			TOTAL	$30.19 billion

Plan Development Process and Public Input

In the process of developing MnSHIP, MnDOT built on the previous Minnesota GO planning efforts and accounted for many factors, including state and federal law, MnDOT policy, current and projected conditions, risk-based planning, and stakeholder input. There were three central planning approaches that MnDOT used to develop MnSHIP:

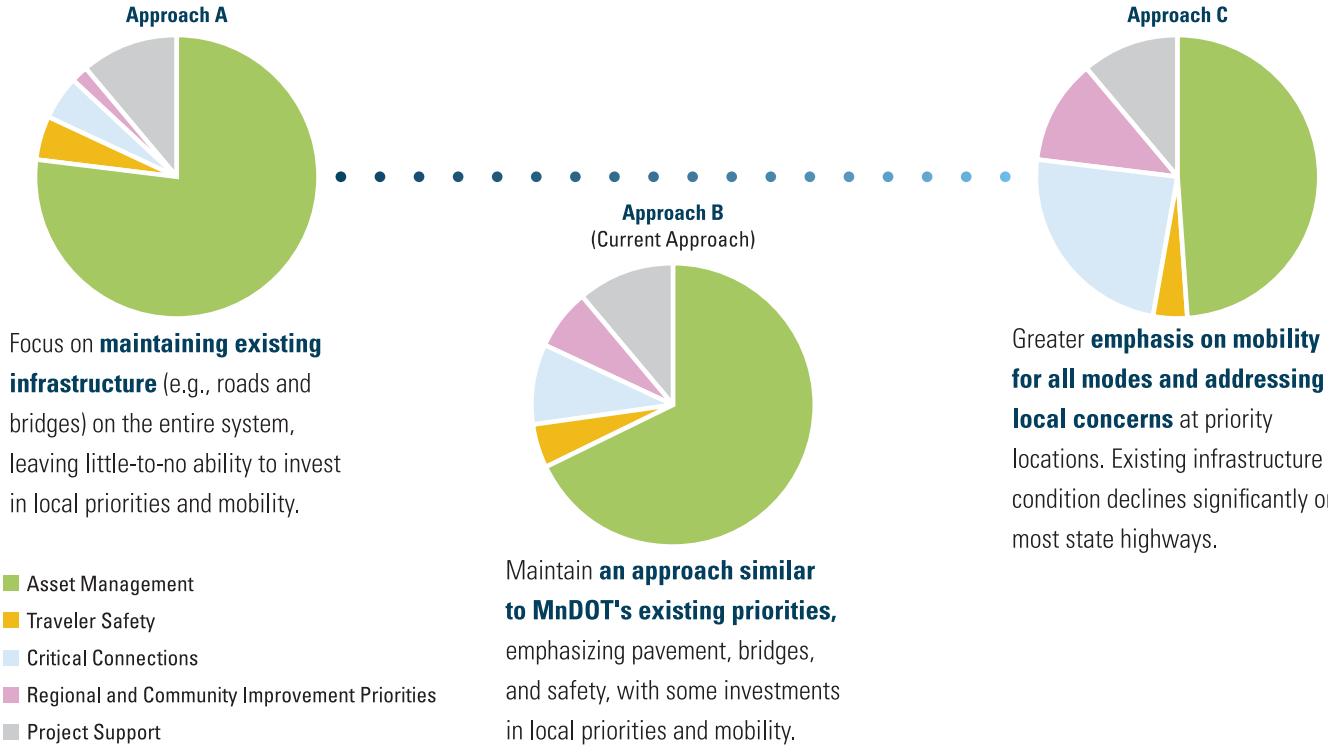
- **Performance-based planning:** MnDOT used performance measures, targets, and trends to identify its future investment needs on the state highway system and examine its ability to meet its performance goals;
- **Scenario planning:** To evaluate the performance and risk trade-offs associated with different funding levels, MnDOT developed three alternative investment approaches (Approach A, B, and C [see **Figure ES-4**]) for internal and external evaluation; and
- **Risk-based planning:** MnDOT systematically identified the likelihood and impact of different risks (defined in MnSHIP as uncertain events related to policy objectives, finance, infrastructure condition, and stakeholder input) to assess the trade-offs associated with various investment mixes.

PUBLIC INPUT

In the fall of 2012, MnDOT engaged the public and transportation stakeholders in an innovative scenario planning and outreach process to inform the MnSHIP investment priorities. MnDOT used a variety of communication and outreach techniques to educate and receive feedback from the public, including statewide public outreach meetings, an interactive website tool, and educational webinars. In the meetings and on the online tool, stakeholders selected their preferred approach from Approaches A, B, and C and gave feedback on what they liked and disliked about the outcomes associated with each. MnDOT also established a Partnership Advisory Committee composed of representatives of **Metropolitan Planning Organizations (MPOs), Regional Development Commission (RDCs),** counties, cities, and other key stakeholders from across the state. The 30-person committee helped to steer the public outreach process and general plan development, and to ensure consistency with other plans.

Interested stakeholders were updated on participation opportunities and plan updates via web, e-mail, and social media.

Figure ES-4: Investment Approaches Developed for Scenario Planning



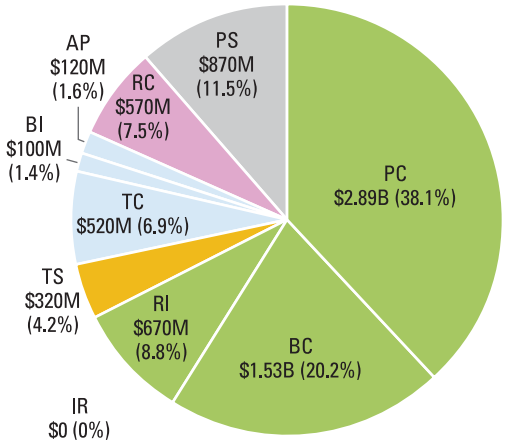
20-Year Investment Priorities Summary

MnDOT established different investment priorities for the first 10 years of MnSHIP than the second 10 years. This approach differs from previous updates, which adopted a single set of priorities for the entire 20-year period. The two primary reasons for this change are 1) greater certainty associated with the assumptions for the first 10 years and 2) the need to respond to and manage risk related to federal and state performance requirements. The result is a diversified approach that makes progress in all investment areas in the early years and focuses on maintaining existing infrastructure in the later years.

Years 1-10 (2014-2023): Making Progress in All Investment Areas

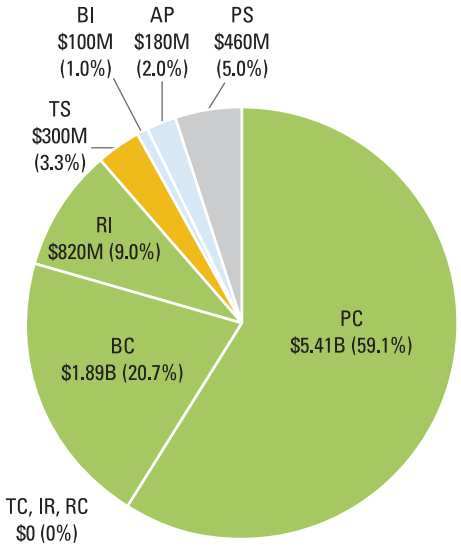
The first 10 years represents a direction similar to the approach taken in the past four years, which addressed high-priority improvements in all investment categories (see **Figure ES-5**). This approach reflects stakeholder input and adequately manages key capital investment risks in the near-term. MnDOT will honor its commitment to building the projects listed in the 2014-2017 STIP. The projects anticipated for 2018-2023 represent a general plan of improvements, which are not yet commitments and are subject to change. If a major capacity-adding project is not listed in the first 10 years, MnDOT does not anticipate having the budget available to complete the project. In these

Figure ES-5: Investment Priorities, Years 1-10



PC	Pavement Condition
BC	Bridge Condition
RI	Roadside Infrastructure
TS	Traveler Safety
TC	Twin Cities Mobility
IR	Interregional Corridor Mobility
BI	Bicycle Infrastructure
AP	Accessible Pedestrian Infrastructure
RC	Regional + Community Investment Priorities
PS	Project Support

Figure ES-6: Investment Priorities, Years 11-20



instances, MnDOT could further study the feasibility and scope of the project. However, the **Federal Highway Administration (FHWA)** will not sign environmental documents for projects that do not have at least one future post-**National Environmental Policy Act (NEPA)** phase (right-of-way purchase or construction) listed in the STIP.

Biggest Strengths

This approach makes progress toward goals in all investment areas, excluding Project Support.

- **Asset Management:** Conditions of roads, bridges, and roadside infrastructure remain stable on NHS routes (45 percent of the system). Known and anticipated federal and state performance requirements are met.
- **Traveler Safety:** Continuation of focus on lower cost, proactive treatments aimed at preventing fatalities and serious injuries.
- **Critical Connections:** Pedestrians and bicyclists accommodated at priority locations. A few investments to improve vehicular system capacity and economic vitality are implemented.
- **Regional and Community Improvement Priorities:** Address local concerns through partnerships, design add-ons, and a few stand-alone projects to support economic competitiveness and quality of life.

Biggest Drawbacks

This approach offers a limited response to growing infrastructure and multimodal needs.

- **Asset Management:** Conditions of roads, bridges, and roadside infrastructure decline on non-NHS routes (55 percent of the system).
- **Traveler Safety:** Only a select number of locations with a sustained crash history are addressed.
- **Critical Connections:** Number and scope of system capacity improvements decrease.
- **Regional and Community Improvement Priorities:** Number and scope of projects to address local concerns do not match stakeholder expectations as expressed during outreach.

Years 11-20 (2024-33): Asset Management Focus

The approach for the second 10 years reflects a narrower set of priorities and completes a gradual shift toward a primary focus on the preservation of existing assets (see **Figure ES-6**). This approach is necessary to respond to and manage risks related to federal and state performance and finance requirements, and to ensure that MnDOT's asset conditions do not negatively affect Minnesota's bond rating. Specific projects are not listed in this period, but not being listed does not preclude a project being considered or programmed in the future as priorities change or more revenue becomes available.

During the second 10 years, MnDOT will focus investments primarily on existing roads and bridges.

Biggest Strengths

The investment mix for Years 11-20 places assets at GASB 34 condition thresholds and is assumed to meet MAP-21 targets.

- **Asset Management:** Federal and state performance and finance requirements are met.
- **Traveler Safety:** Continuation of focus on lower cost, proactive treatments aimed at preventing fatalities and serious injuries.
- **Critical Connections:** Required pedestrian and bicyclist accommodations implemented concurrently with pavement and bridge projects to best leverage funds and address legal requirements.
- **Regional and Community Improvement Priorities:** Address those concerns which can be handled through project timing of asset management projects.

Biggest Drawbacks

MnDOT will be unable to make appreciable progress toward non-asset management goals. Assets will continue to decline faster than they can be repaired or replaced. The investment mix is not well-aligned with the public's preferences.

- **Asset Management:** Conditions of existing roads, bridges, and roadside infrastructure worsen on NHS routes, leading to increased pressure on maintenance activities to keep system infrastructure in a safe and operable condition.
- **Traveler Safety:** Annual fatalities and serious injuries are likely to decline but at a slower rate. Unable to respond to locations with a sustained crash history.
- **Critical Connections:** No capacity is added across all modes.
- **Regional and Community Improvement Priorities:** No flexibility to partner or address specific local concerns and opportunities.

Investments and Outcomes by Investment Category (2014-2033)

Figure ES-7 summarizes the level of investment and associated outcomes in each of the 10 investment categories for both time periods.

Figure ES-7: Investments and Outcomes by Investment Category for the Next 20 Years

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
Traveler Safety		$320 million	Annual fatalities likely to continue decline. Investments emphasize lower cost, high benefit treatments. Address several locations with a crash history. Continue to partner in TZD initiative.	$300 million	Annual fatalities likely to continue decline, but at a slower rate. Investments focus almost exclusively on lower cost, high-benefit treatments. Continue to partner in TZD initiative.	$620 million
Critical Connections	Twin Cities Mobility	$520 million	Congestion and reliability issues likely to worsen. Focus on Active Traffic Management, spot mobility improvements, implementation of MnPASS system, and strategic capacity improvements.	$0	Congestion and reliability issues worsen. No ability to address spot or operational issues.	$520 million
	Interregional Corridor Mobility	$0	IRC system performance target met, although several corridors see decreasing average speeds.	$0	IRC system performance target not met due to decreasing average speeds on four corridors.	$0

(Continued on next page)

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
Critical Connections (continued)	Bicycle Infrastructure	$100 million	Bridge and pavement projects accommodate bicyclists as appropriate. Stand-alone projects are focused at high-priority locations.	$100 million	Investments to accommodate bicycles are concurrent with pavement and bridge projects only. No stand-alone bicycle improvements are made.	$200 million
	Accessible Pedestrian Infrastructure	$120 million	Investments to accommodate pedestrians are generally concurrent with pavement and bridge proejcts. Most curb ramps and signalized intersections are maintained to ADA standards.	$180 million	Investments to accommodate pedestrians are generally concurrent with pavement and bridge projects and focus investment to meet ADA requirements.	$310 million
Regional + Community Improvement Priorities		$570 million	Address economic vitality and quality of life through partnerships, design add-ons, and a few stand-alone projects each year.	$0	MnDOT districts have little-to-no ability to address local concerns, partner, add capacity, or spur economic development.	$570 million
Project Support		$870 million	Invest the amount necessary to deliver projects in the other categories. Expenditures are consistent with recent averages but expected to decrease by 2023.	$460 million	Invest the amount necessary to deliver projects in the other categories. Expenditures decline with a shift toward an asset-focused program.	$1.33 billion
Small Programs		$370 million	Maintain flexibility to respond to unforeseen issues, one-time needs, or changes in policy/ funding.	$530 million	Maintain flexibility to respond to unforeseen issues, one-time needs, or changes in policy/ funding.	$900 million
TOTALS		**$8 billion**		**$10 billion**		**$18 billion**

Implementing MnSHIP

To implement the plan, MnDOT will face many difficult decisions given the constrained funding. MnDOT will pursue targeted actions and strategies in a cost-effective manner and will seek to leverage available revenues to achieve multiple purposes. These strategies will help MnDOT manage investment risks and ensure projects provide a high return on investment.

EVOLVE THE CONNECTION BETWEEN PLANNING, PROGRAMMING, AND PROJECT SELECTION

For many years, MnDOT has allocated most revenue to its eight districts to make progress toward performance targets and key objectives and to address district-specific risks. With the passage of MAP-21, federal policy and performance requirements direct the majority of federal funds to the NHS. Continuing to allocate all revenue to the districts may not meet statewide NHS targets in an optimal way. In addition, MnDOT must manage the risk that deteriorating state highway assets could negatively affect Minnesota's bond rating. MnDOT developed the **Statewide Performance Program (SPP)** and **District Risk Management Program (DRMP)** to respond to these changes.

The SPP focuses on federal performance requirements identified in MAP-21, which require MnDOT to make progress toward pavement, bridge, safety, and congestion performance targets. Failure to do so results in the loss of some federal funding flexibility. MnDOT's functional and district offices work collaboratively to select SPP projects, which primarily include rehabilitation and replacement fixes for existing pavement, bridges, and roadside infrastructure on NHS roads. The SPP also funds select projects that improve safety and mobility.

The DRMP focuses on non-NHS highways and addresses unique conditions at the district level. The DRMP allocates funding to MnDOT districts, which identify and prioritize projects under this program. However, project selections are evaluated statewide through a collaborative process to ensure that each district is balancing district-level risks while making progress toward statewide goals. DRMP projects focus on pavement, bridge, roadside infrastructure on low-volume roads, and fund the majority of safety and mobility improvements.

As with the previous programming process, project selection in both programs (SPP and DRMP) will continue to require coordination with local and regional units of government and the eight **Area Transportation Partnerships (ATPs)** as well as outreach and information sharing with other stakeholders and the general public.

OPTIMIZE AVAILABLE RESOURCES IN EACH INVESTMENT CATEGORY

MnDOT has identified strategies that help make progress toward performance targets and key objectives in the 10 investment categories. The strategies were identified from several sources, including policy plans such as the **Statewide Multimodal Transportation Plan,** supporting documents such as the **Strategic Highway Safety Plan,** or as a part of the development of MnSHIP. These strategies apply only to improvements on the state highway network.

MnDOT will implement new and proven strategies in each investment category that optimize resources while making progress toward its goals and objectives.

Examples

Pavement Condition. Design and schedule fixes to align with a roadway's life-cycle needs whenever possible.

Traveler Safety. Pursue system-wide, cost-effective safety investments on the state highway system that address fatal and serious injury crashes.

Moving Forward

Each MnSHIP update is a snapshot in time and responds to changes in policy and plan assumptions. As with the 2009 MnSHIP update, maintaining the existing condition of today's infrastructure requires significant investment. Even greater investment in all categories is necessary to meet goals and objectives consistent with the **Minnesota GO Vision.** Given the projected $12 billion funding gap, there will be many unfunded priorities within the next 20 years.

SOURCES OF REVENUE

New revenue for state highway improvements can come from one-time, temporary, or permanent sources. An example of a one-time source is a solicitation from the Federal Highway Administration for projects that meet certain criteria. Issuing trunk highway bonds is an example of a common source of a temporary increase, but bonds need to be repaid with interest. While bonding is a key financing tool to expedite the delivery of projects, there are practical limits on debt. In the absence of new revenue, MnDOT will approach its current policy limit of 20 percent of annual state revenues going toward debt repayment in the next 10 years. An example of a permanent revenue increase is raising the state motor vehicle fuel tax.

PRIORITIES FOR ADDITIONAL REVENUE

The **Transportation Finance Advisory Committee (TFAC)** was established by Governor Mark Dayton in 2012 to analyze potential revenue sources and non-traditional approaches to transportation funding and finance. The committee recommended pursuing a revenue increase that supports an

For more information on TFAC and its work, please visit http://www.dot.state.mn.us/tfac.

economically competitive, world-class transportation system. For capital improvements on the state highway system, this means closing the $12 billion funding gap. Consistent with TFAC recommendations, **Appendix I: Illustrative List of Unmet Needs** contains a list of the types of projects that could be supported if the $12 billion funding gap were closed. While this list is illustrative and totals less than $12 billion, it demonstrates that there are unmet needs in all investment categories, including existing infrastructure, new connections for all modes, and investments to improve economic vitality.

Corridors of Commerce is a new Minnesota program, established by the Legislature in 2013, that targets transportation routes identified as vital links for regional and statewide economic growth. The Legislature authorized $300 million in trunk highway bonds focused on statewide expansion and completion projects determined from objective criteria and return on investment analysis, among other factors. In the absence of any new, non-bond revenue, the bonds would have to be repaid, with interest, from the $18 billion in revenue available for MnSHIP. MnSHIP does not reflect the projects selected as part of the 2013 Corridors of Commerce solicitation (announced in November, 2013). For more information, visit http://www.dot.state.mn.us/corridorsofcommerce/.

POLICY-ORIENTED STRATEGIES TO STRETCH PROJECTED REVENUE

In the absence of or in addition to new revenue, MnDOT will pursue a mix of internally and externally oriented strategies that would stretch existing revenue to accomplish additional priorities beyond those identified in the plan. In some instances, MnDOT could not or would not pursue a strategy without significant collaboration with other transportation stakeholders. Examples would include:

- Adjusting performance expectations where possible.
- Continuing to employ performance-based designs.
- Reporting life-cycle cost of highway system improvements.
- Focusing one-time additional funding on highest risks.
- Reevaluating the jurisdictional alignment of the state highway system
- Initiating a review of GASB 34 thresholds.
- Reviewing the federal program and allocation of revenues as MAP-21 rulemaking concludes.
- Advocating for flexible design standards and specifications.

NEXT STEPS

By state law, MnDOT must update MnSHIP again by 2017. Between now and then and independent of any revenue increases and policy changes, MnDOT will continue to refine its planning and programming processes and investment priorities to best address evolving conditions. MnDOT will work to better define improvements that benefit freight and non-motorized users as well as those investments that improve the economy and quality of life in communities. MnDOT will continue to pursue innovative solutions to get a high return on the dollars invested in state highways. MnDOT will also continue to keep an open dialogue with stakeholders, pursue transparent planning processes, and be accountable in its decision-making. Pursuing these actions, as well as other strategies identified in the **Statewide Multimodal Transportation Plan,** will be critical to MnDOT's success in its stewardship of the state highway system.

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20-Year State Highway Investment Plan

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20-Year
State Highway
Investment Plan

Chapter 1

PLAN OVERVIEW

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PLAN OVERVIEW

Minnesota's 12,000-mile state highway system plays a critical role in supporting the state's economic vitality and quality of life. It is the primary system that businesses rely on to move their goods, raw materials, and agricultural products throughout the state. In addition, state highways connect Minnesotans to other transportation options and networks and to state, national, and global markets.

The Minnesota Department of Transportation (MnDOT) is directly charged with constructing, operating, maintaining, and managing this system, which is 74 percent of the State's capital assets. The **Minnesota 20-Year State Highway Investment Plan (MnSHIP)** is MnDOT's vehicle for deciding and communicating capital investment priorities for the system for the next 20 years. This chapter provides an overview of Minnesota's state highway system and describes the role of MnSHIP in managing this important transportation network.

MnSHIP is MnDOT's vehicle for deciding and communicating capital investment priorities for the state highway system.

The key messages of Chapter 1 are:

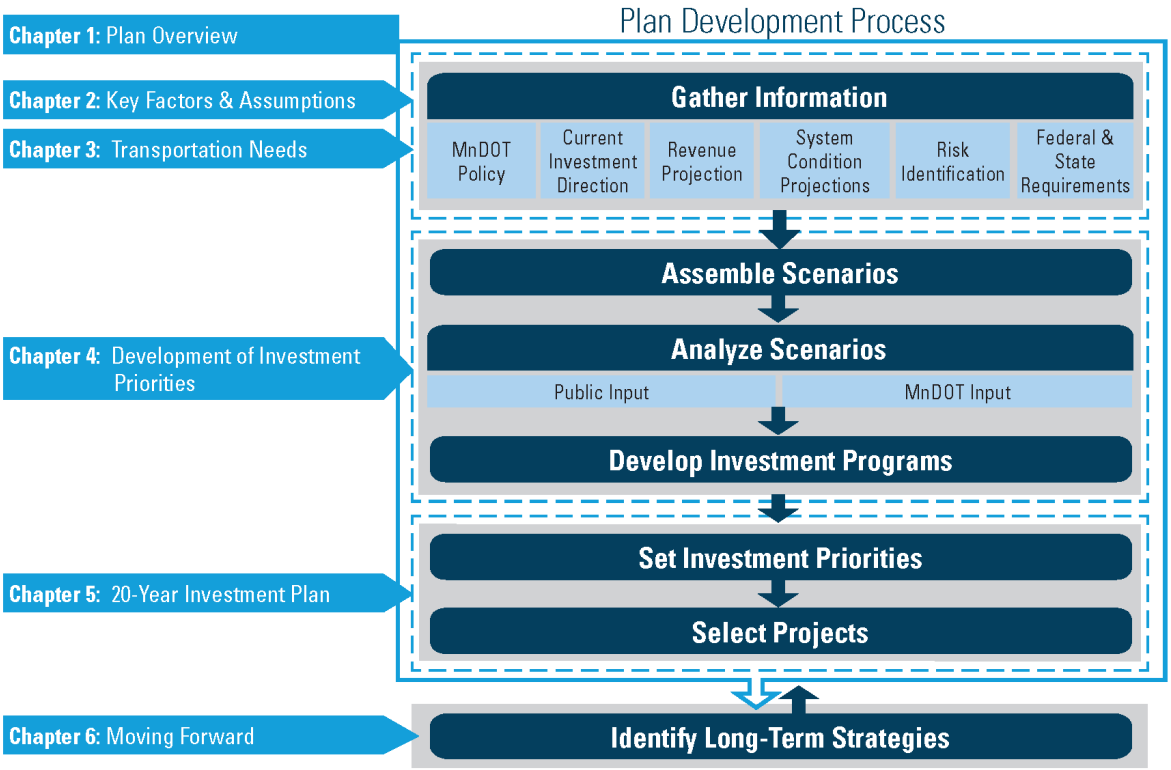
- *MnSHIP identifies capital investment priorities based on projected funding for Minnesota's 12,000-mile state highway system.*
- *MnDOT updates MnSHIP every four years to reflect changes in policy, transportation needs, construction costs, and revenue.*
- *MnSHIP provides a strong linkage between policies that have been formulated in the Minnesota GO 50-Year Vision and the Statewide Multimodal Transportation Plan with investment priorities and project selection.*
- *Investments on the state highway system are allocated into 10 categories that make up five investment areas: Asset Management, Traveler Safety, Critical Connections, Regional and Community Improvement Priorities, and Project Support.*

ORGANIZATION OF CHAPTERS

The chapters in this plan are based on the steps in the plan's development process, presented together in **Figure 1-1.**

MnSHIP is the product of a comprehensive planning process that incorporated MnDOT policy, technical information on system conditions, performance, revenue, and risks. It also considered stakeholder input that was gathered through a robust and innovative public outreach process. Scenario planning played a central role in helping MnDOT and its stakeholders explore various options for investing available revenues in the state highway system. Finally, with feedback and direction from its public outreach and internal input efforts, MnDOT worked to formally establish the 20-year investment priorities found in this plan.

Figure 1-1: MnSHIP Chapters and Development Process



Minnesota's State Highway System

The state highway system is an integrated, multimodal network serving many different transportation users, including passenger vehicles, freight carriers, transit providers, bicyclists, and pedestrians. It also connects these users to other transportation systems, such as transit networks, rail, aviation, and waterways, as well as county and city road networks.

The importance of the state highway system is demonstrated by its use. At 12,000 miles, it comprises only 8.5 percent of Minnesota's total roadway miles, yet carries almost 60 percent of the **vehicle miles traveled (VMT)** and moves the majority of freight being moved on Minnesota's roads. State highway roads are central to many communities in Minnesota and their conditions directly affect residents' quality of life, whether they travel by car or use non-motorized modes in their daily lives. Minnesota industries rely on the state highway system's capacity, connections, and asset conditions to efficiently carry freight loads throughout the region.

Economic vitality, as well as quality of life, depends upon a strong, well-connected transportation network. To compete economically and to position Minnesota for the future, MnDOT needs to maintain and improve the state highway system. The size and the age of Minnesota's transportation system demonstrate the scope of the state highway system's investment need:

- 50 percent of state highway pavements are more than 50 years old.
- 35 percent of state highway bridges are more than 50 years old.
- Compared to other states, Minnesota ranks in the bottom half for Interstate pavement condition (38th out of 50).
- Minnesota ranks 9th nationally for bridge condition on state highways.

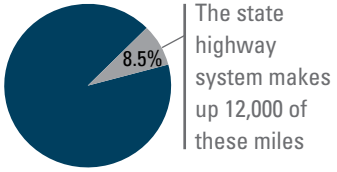
The preservation and improvement of this heavily traveled network requires a comprehensive and coordinated effort. In 2012, MnDOT spent an estimated $940 million on capital highway investments and $240 million in maintenance and operations activities, such as plowing, guardrail repair, and filling potholes.

WHICH ROADS MAKE UP THE STATE HIGHWAY SYSTEM?

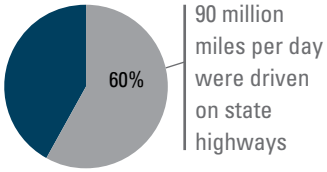
The state highway system includes all Interstate highways, U.S. highways, and Minnesota state highways (these roads are frequently referred to as "trunk highways"). These roads fall into two categories: **National Highway System (NHS)** roadways and non-NHS roadways. NHS roadways serve statewide and inter-state travel and are the primary connections between urban areas throughout the state. Non-NHS roadways provide important connections for regional and local travel and generally carry lower traffic volumes.

Minnesota's state highway carries 60 percent of vehicle miles traveled and is critical to supporting the state's economy and quality of life.

There are more than 141,000 miles of roadways in Minnesota



In 2010, more than 155 million miles per day were driven on Minnesota's roads



At the federal level, the **Federal Highway Administration (FHWA)** has designated MnDOT's principal arterials as part of the NHS due to recent federal legislation. In July of 2012, President Obama signed into law the **Moving Ahead for Progress in the 21st Century (MAP-21)** Act, a reauthorization of the federal surface transportation bill. MAP-21 focuses federal transportation funding on the NHS. This focus is the result of the new National Highway Performance Program, which prioritizes federal funding on the NHS. However, states may reallocate funds toward other roadways if national performance requirements are achieved on NHS roads. **Figure 1-2** shows the extent of the state highway system.

MnDOT'S ORGANIZATION AND MANAGEMENT OF THE STATE HIGHWAY SYSTEM

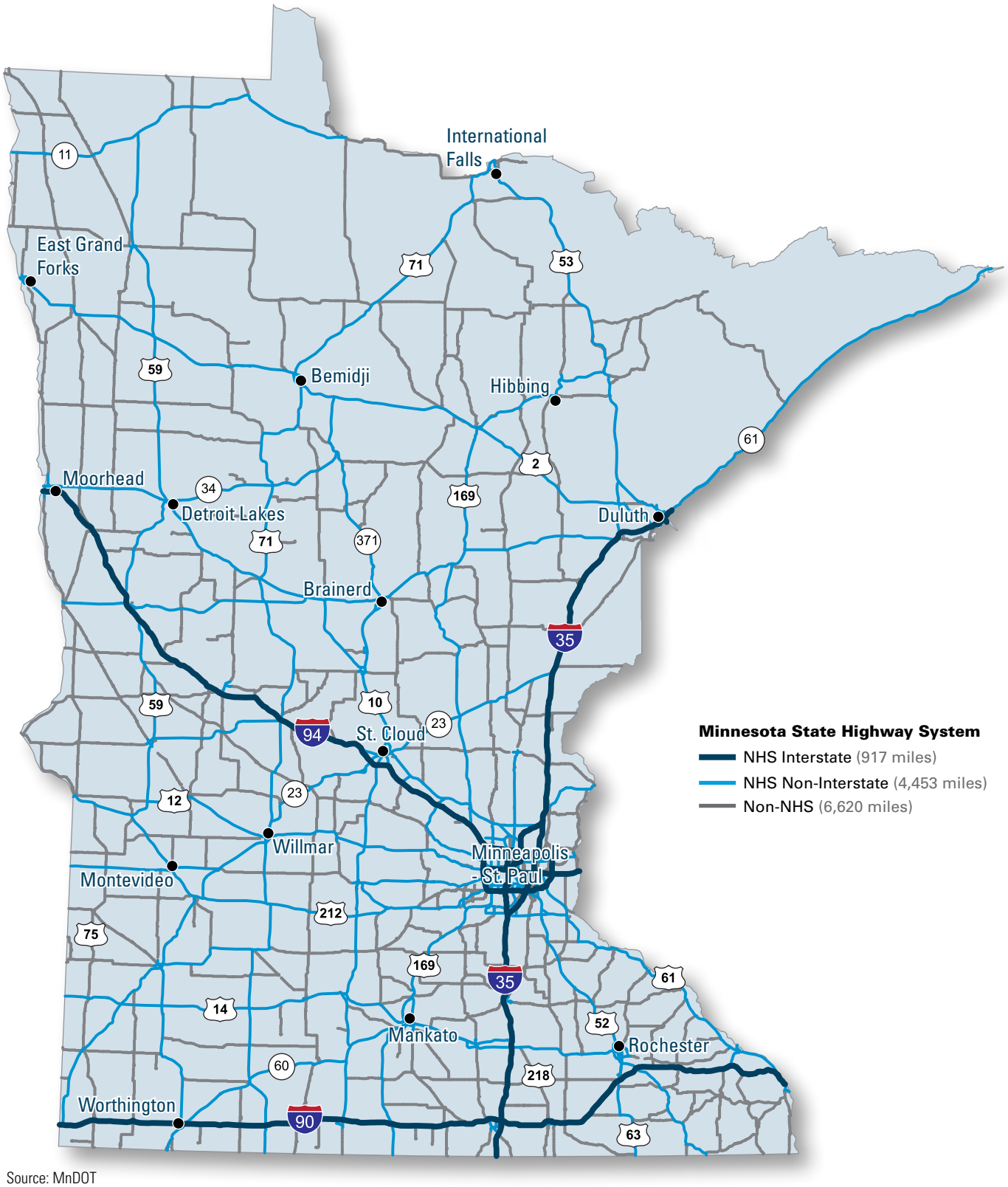
MnDOT divides the responsibility for state highway construction and maintenance into eight districts, each of which are under the supervision of a district engineer. **Figure 1-3** maps MnDOT's district boundaries, which generally follow county lines but in some instances split counties based on geographical features or other factors.

HOW IS HIGHWAY USE CHANGING IN MINNESOTA?

The **Minnesota GO 50-Year Statewide Vision** (the "Minnesota GO Vision," adopted in 2011) and the **Statewide Multimodal Transportation Plan** (adopted in 2012) identified the challenges and opportunities facing Minnesota's transportation. Because transportation infrastructure can last up to 50 years or longer, it is important for MnDOT to monitor and assess the trends related to usage and conditions on the state's transportation system, and adapt its designs and operations as needed. Included in these considerations are:

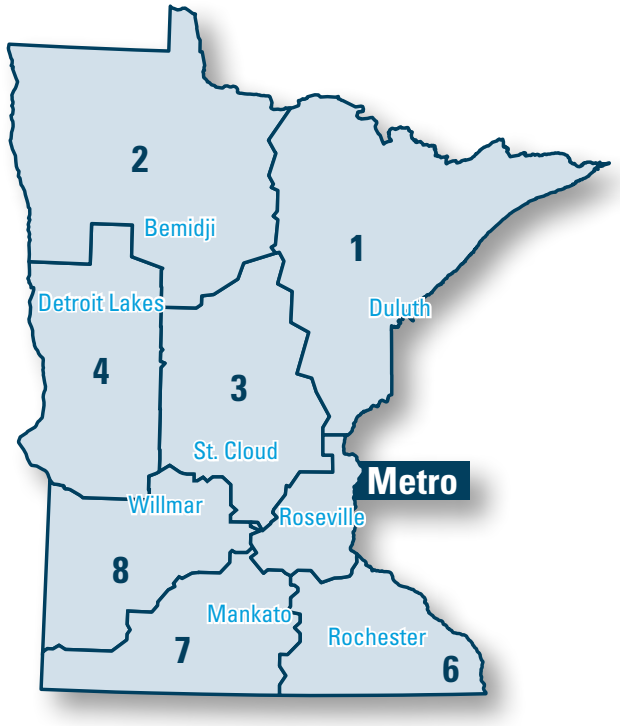
- **An aging population.** Over the next 20 years, the peak of the baby-boom generation will move past the age of 65. Though many will continue to drive personal vehicles, the frequency and destinations of their travel will likely change. Many Minnesotans also live with a physical or cognitive disability, which can affect their transportation needs.
- **More Minnesotans living in urban settings.** A greater percentage of Minnesota's population is living in urban areas. According to the 2010 U.S. Census, 70 percent of Minnesotans live in towns and cities, with more than 50 percent of the state's population living in the Twin Cities metropolitan area. These trends are anticipated to continue and will further increase demand for transportation in urban areas.

Figure 1-2: State Highway System



Source: MnDOT

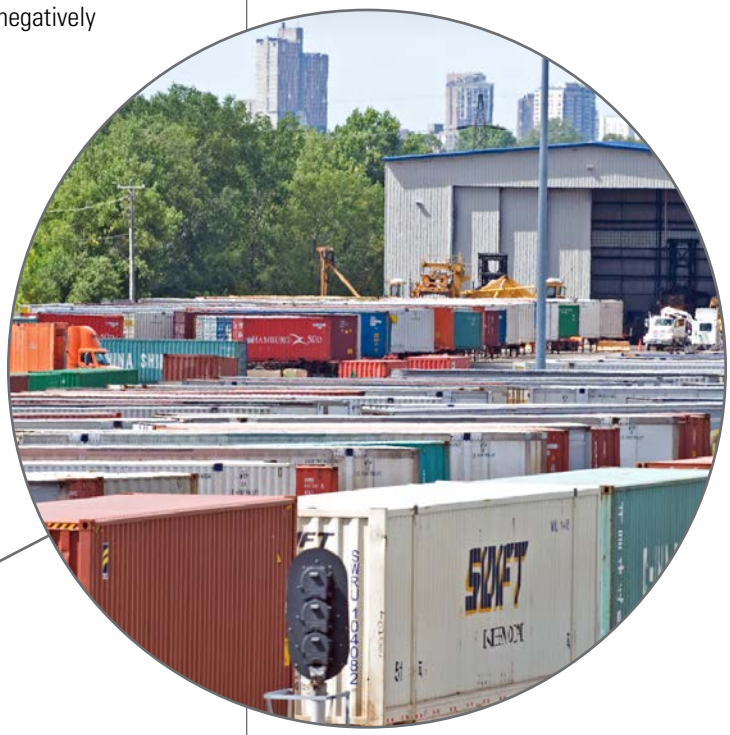
Figure 1-3: MnDOT District Boundaries and their headquarters



- **Energy shifts.** Due in large part to global demand, the price of gasoline in Minnesota has more than doubled since 2002, while the stability of supply and prices has become increasingly erratic. Drivers have adapted by driving less, switching to more efficient vehicles, or using different fuels.
- **Transportation technology.** Technology for vehicles, traffic signals, transit systems, and other areas of transportation is improving and becoming more integrated. These improvements increase efficiency, improve safety, and reduce emissions.
- **Persistent budget challenges.** In the face of transportation funding challenges (discussed in detail in **Chapter 2, "Key Factors and Assumptions"**), MnDOT and its partners are placing more focus on innovative design, shared services, and other collaborative solutions to address and prioritize transportation needs.
- **Health impacts.** Transportation choices, such as bicycling and walking, bring health benefits and are seeing increased popularity. Along with more Minnesotans living in urban settings, a focus on higher density, mixed-use development, changing travel demand, and transportation choices are creating new opportunities to design for and encourage healthier transportation options.

- **Increased global competition.** An efficient transportation system enables Minnesota to support a diversified economy that offers the opportunity to compete globally, attract human capital, and maintain innovation and competitiveness.
- **Changing work environments, telecommunications, and access to services.** Businesses are taking advantage of options for telecommuting and flexibility in work arrangements for employees. Through participation in the eWorkPlace program (www.eworkplace-mn.com), a state-sponsored program focused on telecommuting and flexible work practices for Twin Cities metropolitan-area employers, employees at 48 businesses reduced their combined travel by an average of 150,000 miles each week over a two-year period.
- **Floods and water quality.** Flooding can dramatically damage roads and other transportation facilities, which, in turn, can result in costly detours and delays for users. During the past decade, Minnesota spent an average of almost $2 million dollars a year fixing flood-damaged roads. Transportation infrastructure also presents risks for water quality by increasing runoff and impairing infiltration into the soil, negatively affecting Minnesotans' quality of life.

eWorkPlace



The Purpose of MnSHIP

MnSHIP's primary purpose is to guide capital investment on Minnesota's state highway system. The plan is fiscally constrained, meaning that it must identify investment priorities given current and expected funding. It is updated every four years, as required by the Minnesota State Legislature. This MnSHIP update spans the 20-year planning period from 2014 to 2033.

MnDOT takes into account numerous factors in developing MnSHIP, some of which pose substantial challenges to effectively managing the state highway system. MnSHIP prioritizes future investments to address the widening gap between highway revenues and construction-related costs, federal and state laws, MnDOT policy, and current and expected future conditions on the state highway system. These factors are described in more detail in **Chapter 2, "Key Factors and Assumptions."**

In addition to capital improvements, MnDOT also uses operations and maintenance activities to manage conditions on the state highway system. Operations and maintenance activities are equal in importance to capital investments in MnDOT's successful stewardship of the state highway system. Investments in these activities are not prioritized through MnSHIP; however, capital investments and the work of operating and maintaining the highway system are mutually reinforcing. Together, they enable MnDOT to undertake both the large improvements and day-to-day fixes that extend the usable life of highway infrastructure. Additional detail with respect to operations and maintenance can be found in the Highway Systems Operations Plan 2012-2015[1].

RELATIONSHIP TO MNDOT'S PLANS AND PROGRAMS

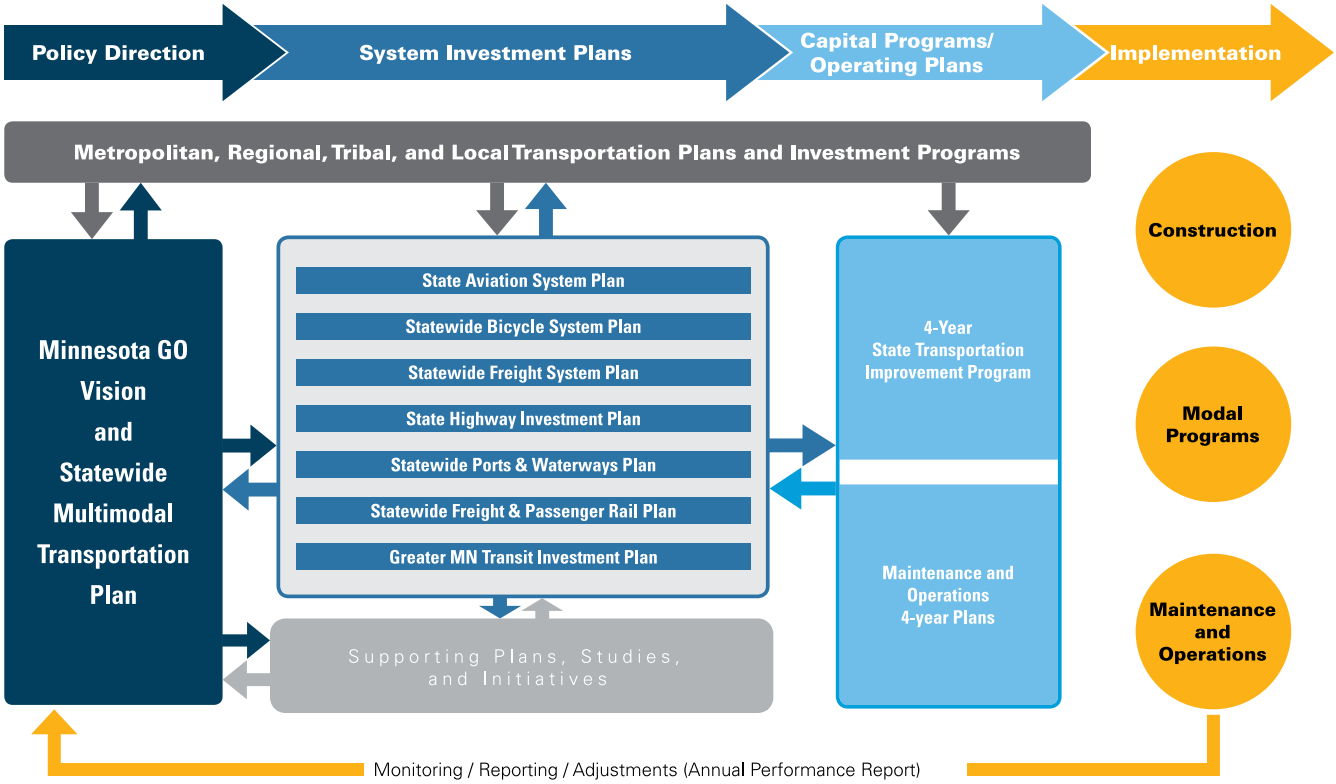
MnSHIP is part of a coordinated, ongoing planning and outreach process that connects policy direction to improvements made on the state highway system. This coordinated process is rooted in the Minnesota GO Plans and Programs as shown in **Figure 1-4**. These plans provide policy and investment direction for different transportation systems (for example, highways, rail, waterways, and aviation) and users (for example, transit, bicycles, and pedestrians). Together the plans serve as a framework for planning and implementing an integrated, multimodal transportation system throughout Minnesota.

The Minnesota GO Vision is for a transportation system that maximizes the health of the people, the economy, and the environment in Minnesota.

The **Statewide Multimodal Transportation Plan** is updated every four years. It describes statewide objectives and strategies designed to help MnDOT and its partners make progress toward the **Minnesota GO Vision.** Relevant objectives and strategies from the **Statewide Multimodal**

1 http://www.dot.state.mn.us/maintenance/hsop/

Figure 1-4: Plans and Programs



Transportation Plan are carried forward into MnDOT's system investment plans, which include MnSHIP[2], the State Aviation System Plan[3], the Statewide Bicycle System Plan[4], the Statewide Freight System Plan[5], the Statewide Ports & Waterways Plan[6], the Statewide Freight & Passenger Rail Plan[7], and the Greater Minnesota Transit Investment Plan[8], as well as a collection of supporting plans. These investment plans use measures and targets to assess system performance, identify needs, and develop investment priorities. MnDOT's system investment plans are updated every four to six years. MnSHIP represents the most mature application of performance-based decision-making within MnDOT's Plans and Programs to date. As a system investment plan, MnSHIP serves to link the **Minnesota GO Vision** and the **Statewide Multimodal Transportation Plan** objectives and strategies with capital investments on the state highway system. MnSHIP is fiscally constrained, which has heightened the need for investments to be driven by existing and emerging performance-based criteria.

2 http://www.dot.state.mn.us/planning/mnship/index.html
3 http://www.dot.state.mn.us/aero/avoffice/planning/sasp.html
4 http://www.dot.state.mn.us/bike/system-plan.html
5 http://www.dot.state.mn.us/ofrw/PDF/MN_SFP_Final_Report_05.pdf
6 http://www.dot.state.mn.us/ofrw/pwp.html
7 http://www.dot.state.mn.us/planning/railplan/
8 http://www.dot.state.mn.us/transit/reports/investmentplan/

Figure 1-5: Policy to Projects

MnDOT Policy

Minnesota GO Vision and Statewide Multimodal Transportation Plan

Investment Priorities

Prioritization based on performance and risk

Project Selection

Evaluation of projects and refinement of project selection based on desired outcomes

RELATIONSHIP OF MNSHIP INVESTMENT PRIORITIES TO PROJECT SELECTION

Guided by the **Minnesota GO Vision** and the **Statewide Multimodal Transportation Plan,** MnSHIP's investment priorities are set through a comprehensive planning process.

At the outset of this process, a number of technical work groups met to discuss current and projected conditions along state highways relative to goals and objectives consistent with the **Minnesota GO Vision.** MnDOT used quantitative measures and qualitative assessments to evaluate how different highway investments might make progress toward the **Minnesota GO Vision** and the **Statewide Multimodal Transportation Plan.** MnDOT used scenario planning to translate that information into alternative investment approaches and to solicit input from the public and MnDOT staff on investment priorities.

After establishing investment priorities, MnDOT selected projects that would make progress toward its goals and objectives and ensure that the public is getting value for the investments being made using the investment priorities. MnDOT developed a 10-Year Work Plan that includes four years of committed projects in the State Transportation Improvement Program[9] **(STIP)** and six years of planned investments.

MnDOT districts work closely with a broad range of stakeholders in **Area Transportation Partnerships (ATPs)** to foster a collaborative decision-making process in the selection of projects that are recommended to receive federal funds and provide a local perspective on potential state-funded projects. This iteration of MnSHIP is the first time MnDOT identified potential planned projects in the three years beyond the STIP. While these projects are a draft of what MnDOT anticipates doing with available revenue, MnDOT districts will continue to work with ATPs and other local agencies to adjust the timing and scope of these projects to best leverage public funds for transportation purposes.

Projects are implemented annually through the STIP, which documents the projects that MnDOT will fund and deliver over the upcoming four years. Annual updates of the STIP allow MnDOT to make timely changes that incorporate new investment decisions based on new plan strategies, investment priorities, and reports on system condition and performance. Ultimately, the eight MnDOT districts are responsible for designing, delivering, and constructing selected projects.

MnDOT's policies and priorities ultimately guide the selection of projects on the highway system (see **Figure 1-5**).

9 http://www.dot.state.mn.us/planning/program/stip.html

Investment Category Descriptions

MnDOT invests in the state highway system through various types of capital improvement projects. Some projects add to or enhance the condition of existing infrastructure, whereas others add new infrastructure to the system. There are many competing priorities for investment along the state highway system, and MnDOT is responsible for selecting investments that balance these best. This task is made especially challenging by the widening gap between MnDOT's projected transportation revenues and investment needs.

MnDOT's capital investments on the state highway system are separated into five major investment areas and 10 distinct categories, as illustrated in **Figure 1-6.**

Figure 1-6: MnSHIP Investment Areas and Categories

Asset Management	Traveler Safety	Critical Connections	Regional + Community Improvement Priorities	Project Support
• Pavement Condition • Bridge Condition • Roadside Infrastructure Condition	• Traveler Safety	• Twin Cities Mobility • Interregional Corridor Mobility • Bicycle Infrastructure • Accessible Pedestrian Infrastructure	• Regional + Community Improvement Priorities	• Project Support

ASSET MANAGEMENT: CATEGORY DESCRIPTIONS

Asset Management includes three investment categories: Pavement Condition, Bridge Condition, and Roadside Infrastructure Condition.

Pavement Condition

MnDOT's largest and most widely used asset is its pavements. On an average day, there are more than 90 million vehicle miles traveled on Minnesota state highways. Most new pavements last approximately 20 years before deteriorating to a level that requires rehabilitation.

Every year, MnDOT updates its pavement condition data for all state highways by measuring the **Ride Quality Index (RQI),** or smoothness, of each section of road. MnDOT tracks and manages its performance in Pavement Condition by evaluating the percentage of pavements in "Good" condition (RQI 2.1 to 5.0) and "Poor" (RQI 0.0 to 2.0) condition. Using RQI data, along with the expected effects of investments already programmed in the STIP, MnDOT estimates what pavement conditions will be in future years through its **Pavement Management System (PMS).** MnDOT staff collaboratively plan and prioritize pavement improvements by considering the improvements and their timing recommended by PMS.

MnDOT measures the smoothness of its pavements by tracking the Ride Quality Index (RQI) on each section of road.

MnDOT measures the percentage of bridge deck area in Good, Satisfactory, Fair, and Poor condition.

Management System (PMS). MnDOT staff collaboratively plan and prioritize pavement improvements by considering the improvements and their timing recommended by PMS.

MnDOT preserves the structural integrity and smoothness of its pavements through investment in the Pavement Condition category. It seeks to maximize the share of state highway pavement in Good condition and minimize the share in Poor condition by undertaking a balanced mix of preventive maintenance, rehabilitation, and replacement. Once pavements fall into Poor condition, the costs associated with effectively repairing them increase significantly. As a result, larger capital investments are necessary if MnDOT wants to achieve smooth pavement conditions and minimize the costs associated with preserving its pavements. Typical improvements to pavements include overlays, mill and overlays, full-depth reclamation, and reconstruction projects.

Bridge Condition

More than 4,500 of the state's 20,000 bridges are on the state highway system and are maintained by MnDOT. If maintained and invested at optimal intervals, bridges typically last 70 to 80 years before needing replacement. The inspection, maintenance, and construction of MnDOT bridges are the responsibility of MnDOT districts under the general direction of the MnDOT Bridge Office. The districts and the Bridge Office work together to identify both near-term and long-range investments that preserve bridges in a safe condition and extend their useful life. By planning its bridge investments in a timely and cost-effective manner, MnDOT is able to maintain the state's vital connections.

MnDOT tracks its performance in preserving bridge infrastructure by rating the structural condition of its bridges and measuring the percentage of bridge deck area in Good, Satisfactory, Fair, and Poor condition. Bridge investments are managed through MnDOT's **Bridge Replacement and Improvement Management (BRIM)** system. Typical improvements include replacement, rehabilitation, and painting. The Bridge Condition category does not include surrounding or supporting elements for bridges, such as signs, pavement markings, or lighting.

Roadside Infrastructure Condition

Roadside Infrastructure Condition includes an array of assets found on the Minnesota state highway system that support the safe, informed, comfortable, and efficient movement of people and goods throughout the state. MnDOT also uses information systems, such as its "HydInfra" hydraulic information system, to manage its inventory of investments.

Roadside infrastructure elements include:

- Drainage and culverts that carry water away from or under the road
- Guardrails, including attenuators, cable-median barriers, and fencing that protect people and infrastructure
- Traffic signals, lighting, and **Intelligent Transportation Systems (ITS)** that enhance safety and provide information
- Overhead and other structures, such as noise walls, retaining walls, reinforced earth systems, and concrete barriers
- Rest areas
- Signage, including traffic and directional signs
- Pavement markings

Improvements are often completed in conjunction with a pavement or bridge project, although MnDOT also conducts stand-alone projects, such as culvert replacement projects along segments of road with poor drainage or failing culvert structures.

TRAVELER SAFETY: CATEGORY DESCRIPTION

Vehicle crashes are the leading cause of death for people under the age of 35 and the fifth leading cause of death overall in the nation. Crash-related deaths and serious injuries create significant costs for individuals, families, and society. The **Highway Safety Improvement Program (HSIP)** is a federal program that was established in 2005 to fund programs that reduce fatalities and serious injuries on all roads. In Minnesota, these funds are distributed among MnDOT districts and local agencies. HSIP and state funds, together, represent MnDOT's Traveler Safety investments. MnDOT and its partners have made reducing fatalities and serious injuries a top priority through:

- **The Toward Zero Deaths (TZD) initiative.** MnDOT and its partners use a data-driven, multi-disciplinary "four Es" approach – education, engineering, enforcement, and emergency services – to target and reduce fatalities and serious injuries. By implementing the TZD[10] approach, the state of Minnesota has seen a dramatic decline in traffic fatalities over the past decade.
- **Proactive lower cost, high-benefit safety features.** Lower cost safety improvements may be newly installed as part of a pavement project, including edge treatments (rumble stripes and rumble strips), guardrail, and pavement markings, or as stand-alone projects. MnDOT has also

10 http://www.minnesotatzd.org/

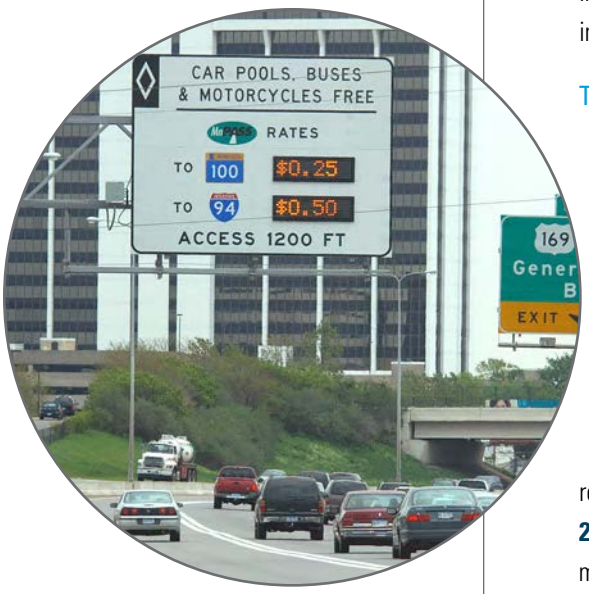
developed **District Safety Plans (DSPs)** for each MnDOT district over the past four years. The DSPs refer to crash data to prioritize proactive strategies at high-risk locations and identify appropriate treatments that are proven to reduce fatal and serious injury crashes. They also serve as the engineering component to the TZD initiative.

- **Improvements at sustained crash locations.** These are locations with a consistently high crash rate over a five-year period compared to similar locations across the state. Improvements at these locations tend to be higher-cost intersection improvements and can be targeted for motorized and non-motorized modes. Projects in this category include improvements such as roundabouts and passing lanes.

Typical improvements in the Traveler Safety category include lower cost, high-benefit engineering solutions, such as rumble stripes, lighting, signage, new cable median barriers, and dynamic warning signs. MnDOT uses higher cost treatments, such as four-way stop signs, signals, and reduced conflict intersection improvements (for example, roundabouts, median refuges, and J-turns), to address sustained crash locations.

CRITICAL CONNECTIONS: CATEGORY DESCRIPTIONS

There are four main areas in which MnDOT invests to improve mobility, multimodal connections, and accessibility: Twin Cities Mobility, **Interregional Corridor (IRC)** Mobility, Bicycle Infrastructure, and Accessible Pedestrian Infrastructure. These investment categories compose the Critical Connections investment area.



Twin Cities Mobility

Congestion plays a major role in the daily lives of people in the Twin Cities metropolitan area. Managing congestion improves quality of life, safety, and air quality. While the focus of MnSHIP is on identifying improvements in highway infrastructure, this infrastructure accommodates many users, including passenger vehicles, freight carriers, transit providers, bicyclists, and pedestrians.

Roughly half of all roadway travel in Minnesota occurs within the Twin Cities metropolitan area, which contains just nine percent of the total roadway miles in the state. In 2010, the Metropolitan Council completed its **2030 Transportation Policy Plan.** Due to constrained funding, this plan marks a shift away from a reliance on major capacity expansion projects toward more cost-effective strategies. MnDOT now pursues the following strategies to address regional mobility issues:

- **Active Traffic Management (ATM).** Operational improvements to help manage the effects of congestion, which include variable message signs (traveler information systems), freeway ramp metering, dynamic signing and re-routing, dynamic shoulder lanes, reversible lanes, dynamic speed signs, and lane specific signaling.
- **Spot mobility improvements.** Lower cost, high-benefit projects that improve traffic flow and provide bottleneck relief at spot locations. These projects include freeway and intersection geometric design changes, short auxiliary lane additions, and traffic signal modifications to ease merging and exiting traffic.
- **Priced managed lanes.** Priced managed lane projects that provide a predictable, congestion-free travel option for transit users, those who ride in carpools, or those who are willing to pay. In the Twin Cities, this system is called MnPASS[11], which currently operates on I-394 and I-35W. During rush hour periods, MnPASS lanes are free for buses, carpools, and motorcycles; single-occupant vehicles are charged an electronic fee.
- **Strategic capacity enhancements.** Projects in the form of new interchanges, non-priced managed lanes, and limited general-purpose lanes that may be needed to address corridor congestion and/or provide lane continuity for existing facility or to complete an unfinished segment of the Metropolitan Highway System. The unfinished connection between existing MN 610 and I-94 in Maple Grove is an example of a high-priority strategic capacity enhancement project.

The strategies used to address Twin Cities Mobility needs also benefit transit in many ways. An example of this is the implementation of transit advantages on the highway system. Transit advantages include bus-only shoulders, high occupancy vehicle bypass ramps, and priced managed lanes.

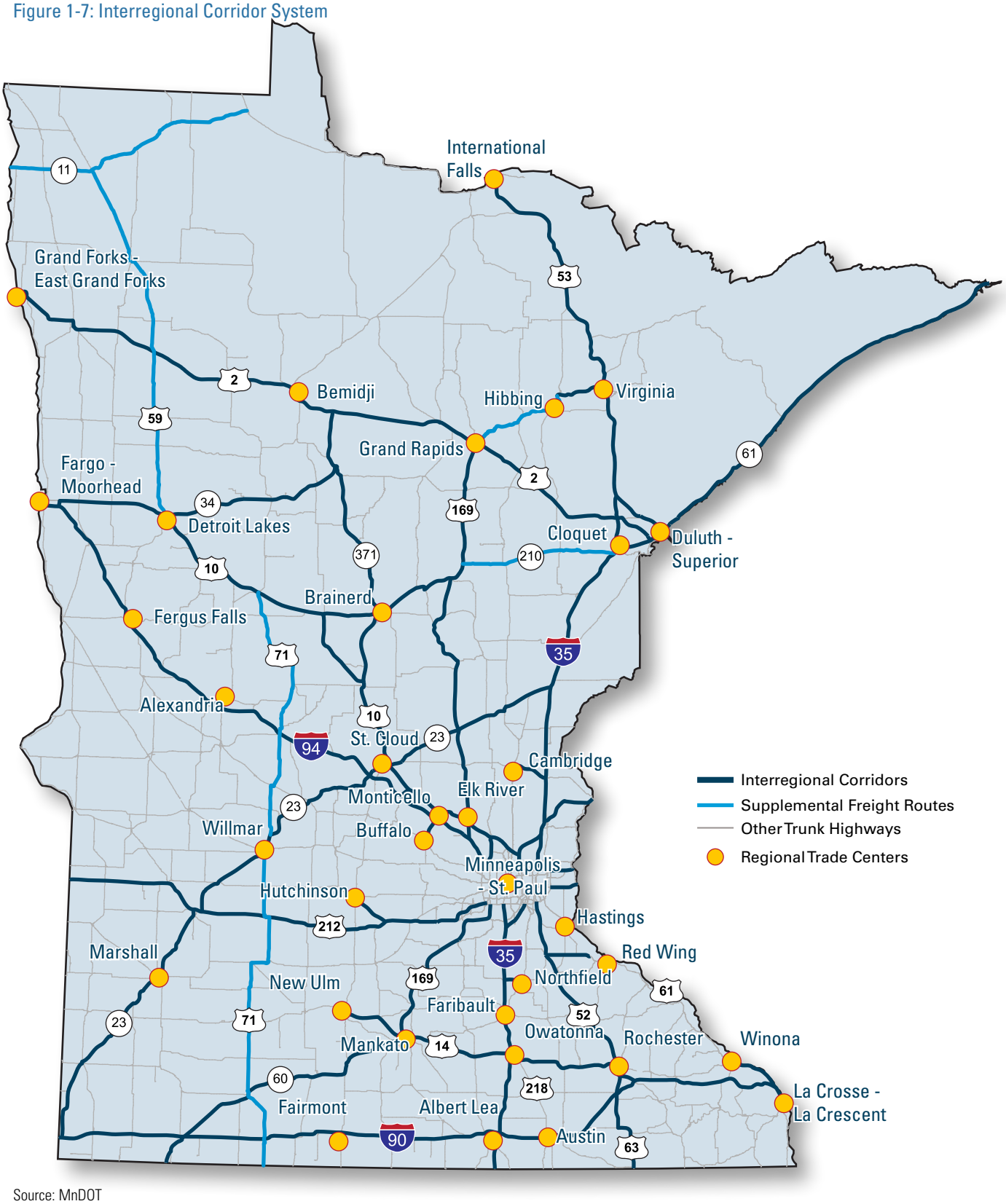
Interregional Corridor Mobility

Minnesota's IRC system is a subset of the NHS, connecting the largest regional trade centers in Minnesota with each other and with neighboring states and Canada, as shown in **Figure 1-7**. This system consists of Greater Minnesota's most heavily traveled roads, accounting for only 2.5 percent (3,000 miles) of the state highway system, yet carrying about 30 percent of all statewide travel. As will be defined and discussed later, while all IRCs are on the National Highway System (NHS), not all NHS routes are on the IRC system. MnDOT may modify the size of the IRC system and its measure for IRC system performance as MnDOT monitors MAP-21 rulemaking.

MnDOT created two new categories – Bicycle Infrastructure and Accessible Pedestrian Infrastructure – to track investments in these areas and measure progress toward key objectives.

11 http://www.mnpass.org

Figure 1-7: Interregional Corridor System



Source: MnDOT

MnDOT completed a review of the IRC system in 2011. Several recommendations were incorporated into MnSHIP:

- Removed the distinction between medium and high priority corridors.
- Identified supplemental freight routes that provide sufficient connectivity for freight movements in western and northern Minnesota. However, these routes are not considered part of the IRC system at this time.
- Raised the interstate speed target from 60 miles per hour to 65 miles per hour and removed stub connectors from mainline performance calculations to better relate the performance measure to user experience.
- Used passenger car equivalents (PCEs) in place of AADT in mainline performance calculations to better account for freight movements.

The IRC system is an essential transportation network for moving freight and supporting businesses. Safe and efficient IRC connections provide access to markets and services and facilitate recreational travel, improving quality of life. Congestion on IRCs negatively impacts travel time, reliability, safety conditions, fuel costs, and the state's economic competitiveness. Typical improvements on these corridors include low-cost solutions, such as intersection improvements, as well as major projects, such as roadway capacity improvements.

Bicycle Infrastructure

Bicycle facilities are an important and growing part of the multimodal transportation network. Major bridge projects that are funded with **Chapter 152** bonds are required to accommodate bicycling and walking needs in urban areas or near the existing bicycle network. MnDOT has the authority to add bicycle facilities on or across state highways and coordinates bicycle planning efforts with local units of governments to improve the state bicycle network.

Historically, MnDOT has invested in bicycle infrastructure projects as a part of other infrastructure investments, such as pavement rehabilitation or bridge reconstruction. Beginning with this MnSHIP update, MnDOT will track bicycle infrastructure investments separately in order to better assess and address bicycle investment needs. MnDOT is currently undertaking a **Statewide Bicycle System Plan,** which will provide a statewide inventory of current and planned bicycle facilities. The study will identify a priority network for bicycling throughout the state. It will also help MnDOT prioritize Bicycle Infrastructure investments as it implements MnSHIP.

Typical Bicycle Infrastructure improvements include bike lanes, signage for bicycle routes, crossings over or under state highways, at-grade crossings, and maintaining shoulders on identified routes.

MnDOT works with local partners to coordinate bicycle and pedestrian improvements and promote safety and awareness through the Share the Road campaign. For more information, please visit http://www.dot.state.mn.us/sharetheroad.

Accessible Pedestrian Infrastructure

Pedestrian infrastructure is also an important and growing part of MnDOT's multimodal network. The **1990 Americans with Disabilities Act (ADA)** requires MnDOT to provide an accessible system for those using a wheelchair or other assistive devices. MnDOT works with its ADA Accessibility Advisory Committee to comply with ADA regulations. In 2010, MnDOT completed an **ADA Transition Plan** (revised in 2011) to prioritize policies and improvements and to ensure that its facilities, activities, and programs are accessible to all.

MnDOT frequently coordinates Accessible Pedestrian Infrastructure improvements with other scheduled bridge and pavement projects to maximize the efficiency of MnDOT investments. MnDOT's pedestrian network is composed of more than 100 pedestrian bridges, more than 20,500 curb ramps, and almost 400 miles of sidewalk. Typical improvements include projects to bring curb ramps into compliance with ADA standards; installation of **Accessible Pedestrian Signals (APS)**; and pedestrian improvements such as crosswalks, sidewalks, signals, curb extensions, benches, and pedestrian refuges.

REGIONAL AND COMMUNITY IMPROVEMENT PRIORITIES: CATEGORY DESCRIPTION

Regional and Community Improvement Priorities (RCIPs) are collaborative investments that respond to regional and local concerns beyond system performance needs. The RCIP investment category assists MnDOT in delivering a well-rounded transportation investment program that advances objectives for which MnDOT may not have statewide performance targets, such as improving multimodal connections, community livability, economic competitiveness, environmental health, and quality of life in Minnesota.

Typical improvements include intersection improvements that increase traffic flow or facilitate efficient freight movement, projects that support multimodal connectivity, bypass or turning lanes, access management solutions, improvements that support Complete Streets, and regional or spot capacity expansion projects.

PROJECT SUPPORT: CATEGORY DESCRIPTION

Project Support is critical to ensuring timely and efficient delivery on all projects constructed on the state highway system. It helps MnDOT deliver these projects by targeting dollars to areas that contribute to efficient project

implementation and improved user outcomes. Resources are needed in a number of areas to effectively work with partners on improvements, deliver quality capital projects, and optimize MnSHIP investment.

Project Support includes the following types of investments:

- Acquisition of right-of-way for travel lanes, drainage ponds, shoulders, and so on. Acquisition can be permanent (by easement or fee) or temporary (for construction staging or project completion purposes only)
- Consultant services used to supplement MnDOT staff and provide special expertise in completing preliminary engineering, detailed design work, and construction administration
- Supplemental agreements to address unanticipated issues that develop during construction
- Construction incentives to promote or increase the likelihood of a desired outcome, such as early completion through weekend or night work, or paying for certain performance outcomes

SMALL PROGRAMS: CATEGORY DESCRIPTION

The Small Programs investment category includes investments that are not specifically identified or prioritized within MnSHIP, but make up a part of MnDOT's overall capital investment each year.

Small Programs dollars typically respond to short-term, unforeseen issues or are used to fund one-time specialized programs which do not fit well into the traditional long range planning process. A prime example of a short-term, unforeseen issue is the need to replace highway drainage culverts after a major flooding event or other natural disaster. Examples of one-time specialized programs include ITS deployments, weigh station upgrades, removal of hazardous guardrail, roadway research, and historic structure preservations.

More information on investment areas and categories can be found in **Appendix F: Investment Category Folios.**

Notable Changes in this MnSHIP

Notable changes and improvements in MnSHIP relative to the last state highway investment plan update, completed in 2009, include:

- Evolving revenue distribution and programming processes to respond to a new federal transportation bill that focuses federal money on higher priority routes and establishes performance requirements to make progress in seven national goal areas.
- Identifying planned projects for three years beyond commitments in the STIP to respond to a 2010 state law as well as to improve coordination with local units of government.
- Disaggregating projects into 10 investment categories to better track and analyze the impact of investments on performance targets and other goals.
- Pursuing a more robust public input process to influence planning decisions—an approach to decision-making that reflects the feedback MnDOT received during the multi-year Minnesota GO outreach process.
- Integrating risk-based planning as a means to better understand the trade-offs associated with various funding levels.
- Identifying two new investment categories, Bicycle Infrastructure and Accessible Pedestrian Infrastructure, to better account for investments that support non-motorized modes of travel.

Chapter 2

KEY FACTORS AND ASSUMPTIONS

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KEY FACTORS AND ASSUMPTIONS

MnDOT considered or accounted for several key factors in establishing investment priorities for the state highway system. Some of these factors pose substantial challenges both to managing the existing infrastructure and making improvements to the system. They include a widening gap between highway revenues and construction-related costs, federal and state legislative and performance requirements, MnDOT policy, and a large and aging highway system in need of repair and reconstruction. MnDOT analyzed these and other factors to guide the development of MnSHIP.

The key messages of Chapter 2 are:

- *MnDOT will have approximately $18 billion to invest in state highways over the next 20 years, compared to approximately $30 billion in needs.*
- *The recent federal bill, MAP-21, expands the extent of the NHS and requires significant investment from MnDOT to make progress toward statewide performance targets on the NHS.*
- *State law requires a fiscally constrained, performance-based 20-year capital investment plan for the state highway network every four years.*
- *MnDOT policy emphasizes investment toward the Minnesota GO Vision to maximize the health of the people, the environment, and the economy.*
- *State highway pavements and bridges must be maintained to a certain condition to avoid potential negative impacts to Minnesota's bond rating.*
- *Because of its age, the state highway system will need increased capital improvements as well as additional maintenance in the years ahead.*
- *The changes MnDOT has made to MnSHIP compared to the previous state highway investment plan help align future investments with federal and state laws, MnDOT policies, and changing asset conditions.*

Revenue Outlook

MnSHIP is a fiscally constrained plan, meaning it sets investment priorities only for the revenues that are expected to be available over the next 20 years. MnDOT identified the various revenue sources that are used to fund the state highway system and analyzed the trends affecting these revenues. This analysis provided the information necessary to develop revenue assumptions and projections for the 20-year planning period. **Appendix E: Revenue Forecast** presents an in-depth review of Minnesota's state highway funding.

Transportation improvements on Minnesota's state highways are funded by taxes and fees from four main revenue sources. These sources are:

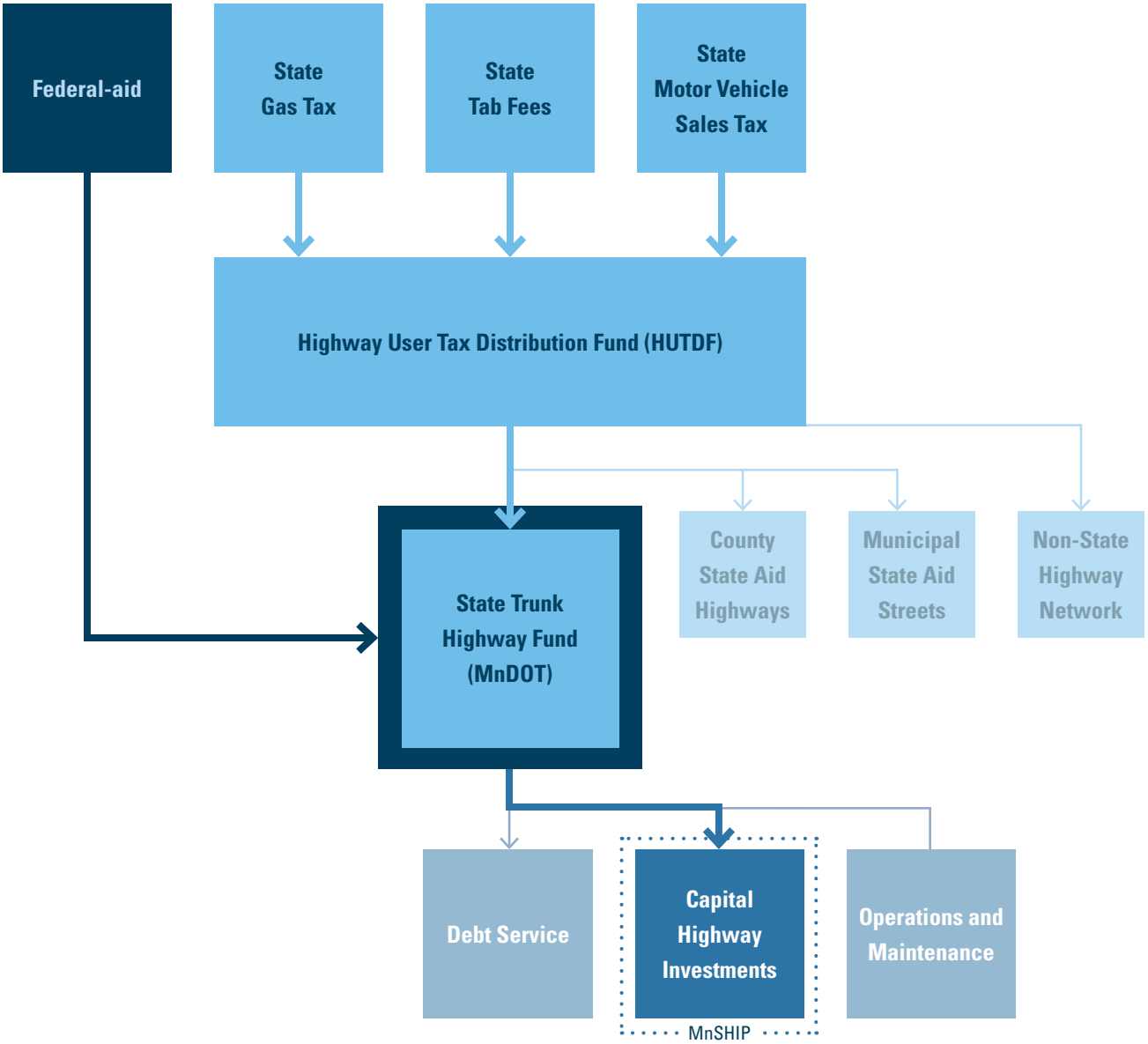
- **Federal-aid** (gas tax and General Funds)
- State gas tax (motor fuel excise tax)
- State tab fees (motor vehicle registration tax)
- State motor vehicle sales tax

The revenues from Federal-aid go directly to the State Trunk Highway Fund (see **Figure 2-1**), which funds capital improvements on the state highway system. Revenues from the main state sources, as well as smaller various revenues, are pooled into the **Highway User Tax Distribution Fund (HUTDF)** and divided between state highways, county roads, and city streets based on a constitutional formula. Approximately five percent of these funds are set aside for the Non-State Highway Network (which includes the Flexible Highway Account, Township Roads Account, and Township Bridges Account). The remaining 95 percent is split among the State Trunk Highway Fund, County State Aid Highways, and Municipal State Aid Streets. The portion allocated from the HUTDF to the State Trunk Highway Fund (62 percent) must first go toward any existing debt repayment and is then divided among operations and maintenance activities and capital improvements on state highways.

WHAT IS THE IMPACT OF TRANSPORTATION BONDS ON MNDOT'S REVENUES?

In addition to the four main sources of funding, Minnesota also sells transportation bonds to support highway improvements. However, bonds should be understood as a financing approach, as they must be repaid with interest. For example, a notable series of transportation bonds were authorized in Minnesota Laws of 2008, **Chapter 152** (also known as the "Chapter 152 Bridge Program") for $1.2 billion in bridge improvements on the state highway system through 2018. To repay its Chapter 152 bonds, Minnesota currently has a 3.5 cent per gallon surcharge on top of its 25 cent per gallon gas tax rate. More recently, Corridors of Commerce authorized $300 million in bonds. In the

Figure 2-1: Revenue Sources



absence of any new, non-bond revenue, the bonds would have to be repaid, with interest, from the $18 billion in revenue available for MnSHIP.

The primary purpose of these and other transportation bonds is to enable MnDOT to accelerate the delivery of projects and avoid construction cost increases due to inflation. While bonding is an important financing tool, there are practical limits to using debt to fund transportation improvements. MnDOT's current policy is to allow no more than 20 percent of annual state revenues to go toward debt repayment. Over the next 10 to 15 years, MnDOT will reach or be approaching this level of repayment, equating to close to $200

million during its highest years. Further, Minnesota state law requires MnDOT to make its annual debt repayments prior to making any other investments.

20-YEAR REVENUE PROJECTION

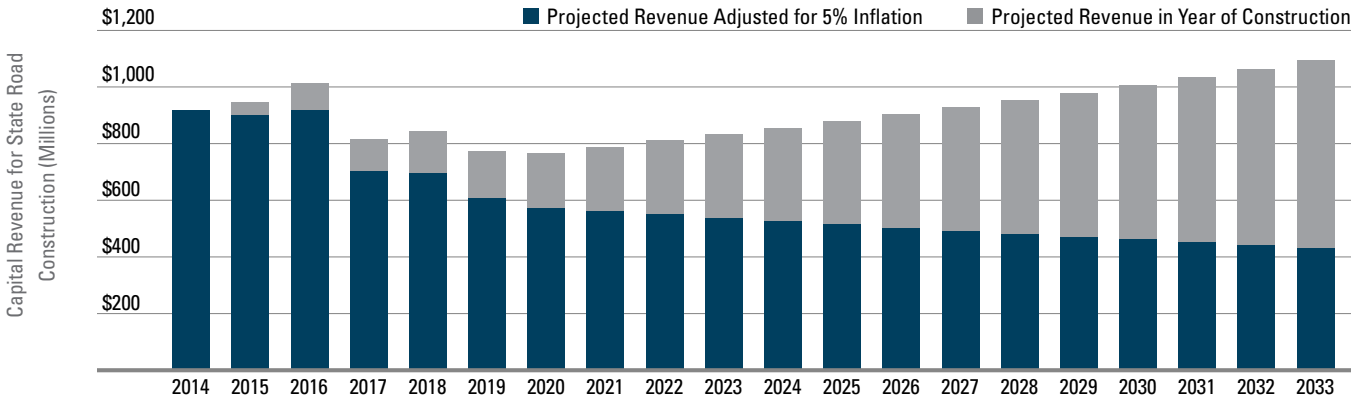
Over the next 20 years, MnDOT estimates that $18 billion in revenue will be available for capital investment on the state highway system – approximately $900 million per year. This estimate is based on the assumption that no new major sources of revenue will be introduced and that the majority of MnDOT's future revenues will originate from the four main revenue sources shown in **Figure 2-1**. Furthermore, the estimate assumes that temporary funding sources will have been drawn down or expired completely by the end of the decade. Specifically, the four-year, $357 million Better Roads for a Better Minnesota program will have mostly concluded by 2015, and the Chapter 152 bond authorization will expire in 2018.

MnDOT does anticipate that the actual amount of funding it receives from the State Trunk Highway Fund will increase on an annual basis over the next 20 years by approximately 2 percent per year. However, two key trends will make it increasingly difficult for MnDOT to sustain current conditions on the state highway system:

- **Construction costs are growing more quickly than revenues.** Expected revenues will lose buying power over time as unit construction costs (e.g., fuel, raw materials, equipment, and labor) continue to grow at an annual rate of approximately five percent—a trend that has been sustained since 1999—exceeding the annual revenue growth rate of approximately two percent (see **Appendix E: Revenue Forecast**). This imbalance was also a factor in the 2009 state highway investment plan and is expected to persist as a long-term planning challenge. **Figure 2-2**

Rising construction prices – such as for oil used in bituminous pavement – have driven costs up while larger investments are needed to maintain the system's aging highway infrastructure.

Figure 2-2: Anticipated Construction Revenue by Year Including Adjustments for Inflation



Source: MnDOT

illustrates the impact of five percent inflation on annual buying power (blue) versus nominal revenues (grey) in future years of construction. The net effect is that inflation will erode the buying power of revenues by nearly 60 percent by 2033, given the assumptions stated above.

- **Revenue growth has slowed relative to previous decades.** There are several explanations as to why MnDOT expects revenues to grow more slowly between 2014 and 2033 as compared to previous years. These include:

  Vehicle fuel efficiency is improving. Minnesotans, as well as Americans in general, are driving more fuel-efficient vehicles and consuming less gasoline. Increased fuel efficiency has been required by the federal government through the **Corporate Average Fuel Economy (CAFE)** program. While lowered emissions have a positive impact on the environment, the gas tax is one of the major sources of both federal and state revenue.

  Conversions are occurring to non-taxable energy sources. Due to advances in engine and battery technologies, more conversions are occurring from gasoline to non-taxable energy sources. These conversions ultimately result in a loss of transportation revenue: electric and hybrid vehicles, whose lowered emissions are more environmentally friendly, consume less or no fuel and so they contribute fewer revenues toward the State Trunk Highway Fund.

  People are driving less. While there was significant growth in the number of miles traveled on the highway system in the 1990s and early 2000s, this growth leveled off in 2004 and **vehicle miles traveled (VMT)** has slightly declined over the last seven to eight years. Total VMT is still expected to increase along with economic and population growth, but per capita VMT is projected to remain relatively flat over the next 20 years due to demographic, technological, and behavioral changes. As a result, it is not likely that state motor fuel excise taxes will grow appreciably. Federal-aid revenues, based on motor fuel excise taxes and transfers from the U.S. General Fund, are also expected to grow slowly over the next 20 years; increases in recent years are far less than decades past.

  New vehicle sales have slowed. Consumers are keeping their cars longer, decreasing the amount of revenues generated by the number and price of vehicles sold. It also means lower vehicle registration tax (tab fee) revenues, as these taxes are based on the underlying value of registered vehicles. As the fleet of registered vehicles ages, the state is less able to generate new revenue from these sources. MnDOT expects modest annual growth in motor vehicle sales tax and tab fee revenues.

MAP-21 brings increased emphasis on the NHS, which includes Interstates, other NHS routes, and all of MnDOT's other principal arterials.

Federal Law

The new federal surface transportation bill, **Moving Ahead for Progress in the 21st Century (MAP-21),** was signed into law on July 6, 2012. It authorized approximately $52 billion per year in federal funding for transportation projects through 2014 and introduced several key changes to how federal funding would be apportioned to states. Minnesota's apportioned amount is highly consistent with the previous federal surface transportation bill, the **Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU).**

Perhaps the biggest change stemming from MAP-21 is the requirement that states achieve or make substantial progress toward national performance goals for the **National Highway System (NHS).** MAP-21 retains the ability of the states to shift funding to other program areas. However, if a state does not meet a national performance goal and is unable to show that it is making progress toward meeting that goal, the state will not be allowed to shift the funding away from the NHS. Furthermore, the provisions of MAP-21 call for the required transferring of funds from other MAP-21 programs to the NHS program if a state is unable to meet or make progress toward national goals. In Minnesota, 99 percent of the state's NHS is under the responsibility of MnDOT. The remaining one percent of the NHS is under the jurisdiction of either county or city governments.

Together, the changes in MAP-21 will impact MnDOT, as well as MnDOT's transportation partners, in several ways. **Appendix D: Federal Legislative Requirements** details the role the **Statewide Multimodal Transportation Plan** and MnSHIP have in addressing known MAP-21 planning requirements.

IMPACT OF MAP-21 ON MNSHIP

1. **Emphasizes the NHS.** MAP-21 brings increased emphasis on the NHS and expands the extent of the highways that fall within the NHS to include Interstates, U.S. Highways, and all other principal arterial state highways in Minnesota. It also directs the majority share of federal resources to the NHS.

   How MnSHIP responds —

   As of October 1, 2012, all of MnDOT's principal arterial roads are now part of the NHS, and all state highways have accordingly been labeled as either "NHS" or "non-NHS" in MnSHIP (refer to **Figure 1-2**). Based on this newly expanded definition, 45 percent of Minnesota's state highway system roads are now classified as NHS routes. The methods and criteria used to distribute resources between these two systems were analyzed

to set investment priorities in MnSHIP. As MAP-21 federal rulemaking continues, MnDOT will continue to review the distribution of funds and have conversations with its partners as necessary.

2. **Requires states to make progress toward seven national goals for the NHS.** The national goal areas are (1) safety, (2) infrastructure condition, (3) congestion reduction, (4) system reliability, (5) freight movement and economic vitality, (6) environmental sustainability, and (7) reduced project delivery delays. MAP-21 cites improving the accountability and transparency of use of federal revenue as the reason for identifying these national goals.

   How MnSHIP responds —

   MnDOT is committed to making progress toward the seven national goals that have been identified for the NHS. To do this, it has integrated many of these goals into its policies and processes. In addition, it has created a **Statewide Performance Program (SPP)**[1] to help direct and measure its progress toward these goals. The program is intended to align investments on this system with MAP-21 performance measures and targets. A single effective date for all MAP-21 measures is expected in Spring 2015. MnDOT made assumptions about pending performance criteria based on available information, but many requirements will not be integrated into MnSHIP until the next update. A performance measure assessing freight movement on interstates is one example of a yet-to-be-defined requirement.

MnDOT created the Statewide Performance Program to align outcomes on the state highway system with pavement, bridge, and congestion-related performance targets.

3. **Requires states to adopt a long-range 20-year statewide transportation plan that establishes and uses a performance-based approach to transportation decision-making to support the national goals.** MAP-21 identifies many requirements for the statewide transportation plan and requires the plan be developed in cooperation with local units of government and **Metropolitan Planning Organizations (MPOs).** Prominent among these requirements is the use of performance management to ensure the efficient investment of federal transportation revenue as well as to improve planning and project selection processes.

   How MnSHIP responds —

   MnDOT's Plans and Programs represents statewide planning efforts undertaken by MnDOT (refer to **Figure 1-4**). Taken together, the Family of Plans addresses most known MAP-21 requirements (see **Appendix D: Federal Legislative Requirements**). MnDOT has also used performance-based planning for more than a decade and is well positioned to integrate the requirements of MAP-21 into its

1 For more information on the SPP, see page 87.

state highway investment planning through MnSHIP. MnDOT's Annual Minnesota Transportation Performance Report[2] tracks performance on the state transportation system and is a helpful tool that informs decision-making. In projecting its needs and outcomes, MnDOT refined applicable performance measures identified in the Annual Minnesota Transportation Performance Report and highlighted where additional measures are needed (see **Chapter 3, "Transportation Needs"**). MnDOT is well positioned to integrate new MAP-21 performance measures as they are developed.

4. **Creates new performance requirements for the NHS.** MAP-21 relies on performance management to ensure the most efficient investment of federal revenue as a mechanism to ensure that progress is being made toward all national goals. It authorizes USDOT to establish performance measures to ensure progress toward the seven national goal areas. The legislation sets the target for NHS bridges in Poor condition and USDOT will set targets for interstate pavement condition. States will set performance targets for most measures in coordination with MPOs and providers of public transportation. For example, MAP-21 will require adoption of a measure for metropolitan area congestion and system reliability on NHS roads. MnDOT will work with metropolitan planners to identify appropriate targets after **Federal Highway Administration (FHWA)** establishes the national measures. A single effective date for all MAP-21 measures is expected in Spring 2015. States adopt targets in coordination with MPOs within one year after final rulemaking; MPOs adopt targets within 180 days after states. In the interim, MnDOT is currently collaborating with the Metropolitan Council as part of a national pilot study to evaluate potential travel time reliability performance measures and indicators.

How MnSHIP responds —

Fully using and allowing flexibility of federal revenue has always been a top priority at MnDOT. For many years, MnDOT has allocated most revenue to its eight districts to make progress toward agency performance targets and key objectives and to address district-specific risks. In response to the increased emphasis on NHS performance in MAP-21, MnDOT developed the SPP and the **District Risk Management Program (DRMP)**[3] as a means to help make investment decisions and select projects.

2 http://www.dot.state.mn.us/measures/

3 For more information on the DRMP, see page 88.

The SPP focuses on making progress toward NHS performance targets in the most optimal and efficient way. It aims to manage risks associated most clearly with statewide travel. The DRMP focuses on mitigating risk on non-NHS highways to address both performance-based and non-performance-based needs. More information about these programs is presented in **Chapter 5, "20-Year Investment Plan."**

State Requirements

State policy and legislative requirements had a strong impact on the development of MnSHIP. State legislative requirements for MnSHIP are contained in Chapter 174, Section 3 of the 2012 Minnesota Statues.

In addition to state legislative requirements, state performance requirements were a key factor for MnSHIP. In 2001, Minnesota adopted the **Government Accounting Standards Board Statement 34 (GASB 34)**[4] financial reporting requirements for the value and condition of its major infrastructure assets. GASB is a private, nonprofit organization established in 1984 by the Financial Accounting Foundation. GASB establishes generally accepted accounting principles that are utilized by auditors charged with evaluating state and local government financial statements. Among other provisions, GASB 34 "Basic Financial Statements—and Management's Discussion and Analysis—for State and Local Governments" requires that major infrastructure assets acquired or having major additions or improvements in fiscal years beginning after June 15, 1980, be capitalized in financial statements. In addition, the cost of maintaining the assets must be reflected. One of the primary purposes of GASB 34 is to demonstrate to the public, and others, that the agency is maintaining its infrastructure in an acceptable condition and does not have any undisclosed liabilities looming in the future. MnDOT set performance thresholds for the condition of the state's pavements and bridges for GASB, which are incorporated into the state's annual financial reports.

MnDOT is also responsible for carrying out programs initiated by the Minnesota State Legislature for projects on the state highway system, such as the **Safety and Mobility Program (SaM)** and the Chapter 152 Bridge Program.

One of the primary purposes of GASB 34 is to demonstrate to the public that the agency is maintaining its infrastructure in an acceptable condition.

IMPACT OF STATE REQUIREMENTS ON MNSHIP

1. **State Legislative Requirements.** In 2010, state law further defined requirements for the statewide highway 20-year capital investment plan (i.e., MnSHIP). These requirements direct MnDOT to create a fiscally constrained, performance-based 20-year capital investment plan for the state highway system every four years. As part of the capital investment

4 For more information on MnDOT's GASB 34 targets for pavements, see page 102.

plan, MnDOT must analyze and track the impact of recent investments, identify needs, establish priorities for projected revenue, and identify strategies to ensure the efficient use of resources.

How MnSHIP responds —

MnSHIP currently meets the state legislative requirements related to developing a fiscally constrained, performance-based 20-year capital investment plan. MnSHIP examines performance measures and targets, identifies investment needs, and projects available funding. The plan establishes investment priorities and strategies that ensure funds are used efficiently, while also identifying performance targets that are not likely to be met. It also explores alternative strategies and provides an illustrative list of projects that could be used to manage this shortfall should more funding be available.

Two primary changes were made in this MnSHIP update to further align MnDOT's capital investment priorities with state legislative requirements. First, MnDOT responded to the requirement that MnSHIP present a schedule of major projects or improvement programs by identifying projects for three years beyond the commitments in the four-year State Transportation Improvement Program. Identifying planned investments through Year 7 of the plan represents a significant planning effort, as districts must account for funding uncertainty, limited information on future needs, and unanticipated events that affect the timing and scope of the identified projects. Including this extended schedule is a step toward a transparent, reliable, and predictable planning process that enables the public to better understand MnDOT's decision-making process. It also aids in achieving better transportation outcomes.

Second, MnDOT separated its capital investment projects into 10 investment categories to better track and analyze the impact of investments on performance targets and other agency goals. This new approach played a strong role in helping MnDOT establish its state highway investment priorities. By breaking projects down into different investment categories, MnDOT can more reliably associate the amount of resources it expends to achieve specific outcomes and goals of the agency. Because MnDOT did not previously track its investments in this manner, MnSHIP does not present information on past investment levels and their associated performance outcomes in this update. However, future updates of MnSHIP will incorporate the impact of investment in each category now that MnDOT has developed the 10 investment category system.

Future updates of MnSHIP will incorporate the impact of investment in each category now that MnDOT has developed the 10 investment category system.

Figure 2-3: Chapters in MnSHIP Addressing Minnesota Legislative Requirements for MnSHIP

2012 Minnesota Statutes for MnSHIP (Chapter 174, Section 3, Subd. 1c)		Location in MnSHIP
(2)	Incorporates performance measures and targets for assessing progress and achievement of the state's transportation goals, objectives and policies identified [in this statute] for the state trunk highway system and those goals, objectives, and policies established in the Statewide Multimodal Transportation Plan.	• Chapter 3 • Appendix F
(3)	Summarizes trends and impacts for each performance target over the past five years.	• Chapter 2 • Chapter 5
(4)	Summarizes amount and impact of investments over the past five years on each performance target, including a comparison of prior plan projected costs with actual costs.	• Chapter 2 (see text on opposite page)
(5)	Identifies the investments required to meet the established performance targets over the next 20-year period.	• Chapter 3 • Appendix F
(6)	Projects available state and federal funding over the 20-year period, including any unique, competitive, time-limited, or focused funding opportunities.	• Chapter 2 • Appendix E
(7)	Identifies strategies to ensure the most efficient use of existing transportation infrastructure, and to maximize the performance benefits of projected available funding.	• Chapter 4 • Chapter 6
(8)	Establishes investment priorities for projected funding, including a schedule of major projects or improvement programs for the 20-year period together with projected costs and impact on performance targets.	• Chapter 5 • Appendix H
(9)	Identifies those performance targets identified under clause (1) not expected to meet the target outcome over the 20-year period together with alternative strategies that could be implemented to meet targets.	• Chapter 6

State legislative requirements specific to MnSHIP and the MnSHIP chapter in which they are addressed are presented in **Figure 2-3.**

In addition to the state legislative requirements specific to MnSHIP, the Minnesota State Legislature has also identified 16 goals of the state transportation system. These goals have guided the development of MnDOT's Family of Plans. **Appendix D: Federal and State Legislative Requirements** includes a table that lists each goal and its connection to the **Minnesota GO Vision, the Statewide Multimodal Transportation Plan,** and MnSHIP.

10. **State Performance Requirements.** MnDOT reports to GASB by measuring the average **Pavement Quality Index (PQI)** of its principal and non-principal arterials roads. PQI is a composite index that combines the measurement of a pavement's roughness—**Ride Quality Index (RQI)**—with the measurement of the visible distress of the pavement (the pavement's surface rating). The higher the PQI rating for roadways,

the higher the overall quality of the state's pavements. For the purposes of GASB 34, MnDOT established that state highway pavements will be maintained at the following minimum condition levels:

» Principal arterial system (NHS): Average PQI of 3.0 or higher
In MnSHIP, this means that no more than 12-13 percent of NHS roads may be in Poor condition.

» Non-principal arterial system (Non-NHS): Average PQI of 2.8 or higher
In MnSHIP, this means that no more than 13 percent of non-NHS roads may be in Poor condition.

MnDOT rates its bridges as Good, Satisfactory, Fair, or Poor to track its performance in bridge condition. The GASB 34 targets for bridge condition on both principal and non-principal arterials roads are as follows:

» Principal arterial system (NHS): 92 percent in Fair to Good condition
In MnSHIP, this means that the percentage of NHS bridges in Poor condition must be below 8 percent.

» Non-principal arterial system (Non-NHS): 80 percent in Fair to Good condition
In MnSHIP, this means that the percentage of NHS bridges in Poor condition must be below 20 percent.

Similar to when a home-owner uses their house as collateral for a loan and must maintain their house as a condition of that loan, state bond holders expect that the owners of the state's pavements, bridges, and other assets maintain these elements at minimum GASB 34 condition levels.

MnDOT owns 74 percent of the state's capital assets. State bond holders issue bonds with the expectation that the state's assets be maintained at or above certain condition levels. In Minnesota, MnDOT has committed to maintaining its infrastructure at or above its established GASB 34 condition thresholds. Allowing the state's assets to deteriorate beyond these thresholds could increase the cost of borrowing money for all state and local units of government in Minnesota, as the condition of those assets influences the bond rating of the entire state—not just that of MnDOT. In addition, system conditions falling below GASB 34 thresholds would indicate that other adverse outcomes are occurring on state highways, such as pavement failures requiring expensive fixes, more bridges with weight restrictions, and increased travel costs for all users.

How MnSHIP responds —

MnDOT established different investment priorities in MnSHIP during the first 10 years than the second 10 years of this plan to ensure that it is meeting GASB 34 performance thresholds. The investment direction in the second 10 years of the plan is focused on asset management. This is in direct response to meeting state performance and financial requirements, as well as federal requirements, to ensure that the condition of MnDOT's assets do not negatively impact Minnesota's bond rating.

MnDOT Policy

MnSHIP is one of MnDOT's system investment plans and is a member of MnDOT's Family of Plans. MnDOT's Family of Plans includes three tiers of planning. The first two tiers of planning are the **Minnesota GO Vision** and the **Statewide Multimodal Transportation Plan.** The third tier consists of system investment plans, which use the Guiding Principles, objectives, and strategies from the **Minnesota GO Vision** and **Statewide Multimodal Transportation Plan** to guide investment decisions on the various transportation systems that MnDOT oversees.

The policy framework established in the Minnesota GO Vision and Statewide Multimodal Transportation Plan are the result of extensive stakeholder and public input.

MINNESOTA GO VISION AND STATEWIDE MULTIMODAL TRANSPORTATION PLAN

The Minnesota GO planning framework starts with the **Minnesota GO Vision.** Adopted in 2011, the Vision established eight guiding principles to serve as a compass to move toward a multimodal transportation system that maximizes the health of people, the environment, and the economy. These principles are to be used collectively, are intended to guide policy and investment direction, and are listed in no particular order:

Minnesota GO Guiding Principles

Leverage public investments to achieve multiple purposes. The transportation system should support other public purposes, such as environmental stewardship, economic competitiveness, public health, and energy independence.

Ensure accessibility. The transportation system must be accessible and safe for users of all abilities and incomes and provide access to key resources and amenities.

Build to a maintainable scale. Consider and minimize long-term obligations – do not overbuild; reflect and respect the surrounding physical and social context.

Ensure regional connections. Key regional centers need to be connected to each other through multiple modes of transportation.

Integrate safety. Systematically and holistically improve safety for all forms of transportation; be proactive, innovative, and strategic in creating safe options.

Emphasize reliable and predictable options. The reliability of the system and predictability of travel time are frequently as important as or more important than speed.

Strategically fix the system. Some parts of the system may need to be reduced while other parts are enhanced or expanded to meet changing demand.

Use partnerships. Coordinate across sectors and jurisdictions to make transportation projects and services more efficient.

MnSHIP links the key objectives and strategies of the Statewide Multimodal Transportation Plan to improvements on the state highway system.

The planning process continued with the **Statewide Multimodal Transportation Plan.** Adopted in 2012, it identified objectives and strategies in six policy areas to make progress toward the Vision. The Plan focused on multimodal solutions that ensure a high return-on-investment. The objectives and strategies are listed in no particular order and all are critical focus areas for the upcoming years:

Statewide Multimodal Transportation Plan Objectives

Accountability, transparency, and communication. Make transportation system decisions through processes that are open and supported by data and analysis; provide for and support coordination, collaboration, and innovation; and ensure efficient and effective use of resources.

Traveler safety. Safeguard travelers, transportation facilities, and services; apply proven strategies to reduce fatalities and serious injuries for all modes of travel.

Transportation in context. Make fiscally responsible decisions that respect and complement the context of place; integrate land uses and transportation systems.

Critical connections. Identify essential transportation connections; maintain and improve these connections; consider new connections.

Asset management. Strategically maintain and operate transportation assets; rely on system data, partners' needs, and public expectations to inform decisions; put technology and innovation to work to improve efficiency and performance; and recognize that the system should change over time.

System security. Reduce system vulnerability and ensure system redundancy to meet essential travel needs during emergencies.

More information on these policy links can be found in **Appendix D: Federal and State Legislative Requirements**.

How MnSHIP responds —

MnSHIP supports the guiding principles from the **Minnesota GO Vision** and links the policies and strategies laid out in the **Statewide Multimodal Transportation Plan** to improvements on the state highway system. Notable changes were made to how MnDOT defines its investment areas to ensure consistency with the **Statewide Multimodal Transportation Plan.** These investment areas include Asset Management, Traveler Safety, and Critical Connections. In Critical Connections specifically, MnDOT consolidates regional vehicular mobility investments into two categories: Twin Cities Mobility and **Interregional**

Corridor (IRC) Mobility. MnDOT also created two new categories under the area of Critical Connections: Bicycle Infrastructure and Accessible Pedestrian Infrastructure. This change will help MnDOT better articulate and track investments in these areas, consistent with implementing a multimodal transportation network as described by the **Minnesota GO Vision, the Statewide Multimodal Transportation Plan,** and MnDOT's Complete Streets policy.

In addition, MnDOT used scenario planning in MnSHIP to better understand the trade-offs and risks associated with various investment mixes.[5] Risk-based planning is used in particular to help determine sustainable investment levels for various investment categories and to consider the trade-off between highway investment and operations and maintenance activities. MnDOT also uses innovative scenario planning to evaluate the performance and risk trade-offs associated with different funding levels in each investment category.

Some of the **Statewide Multimodal Transportation Plan** objectives and strategies were applied at a broad scale throughout the MnSHIP planning process. For example, while MnSHIP does not directly discuss environmental goals, it recognizes environmental stewardship as a guiding principle in determining highway investments. For more information, see **Appendix D: Federal and State Legislative Requirements.**

In the past, MnDOT has used more traditional public outreach techniques, such as open houses, to communicate ideas and concepts. This MnSHIP update used a variety of stakeholder engagement formats to better educate and engage the public in trade-off decision-making, and to better align the plan with MnDOT's objective of Accountability, Transparency, and Communication[6] (see **Chapter 4, "Development of Investment Priorities"**). In addition, the multimodal investments and collaborative strategies identified in MnSHIP work toward agency initiatives such as Complete Streets. MnDOT is in the process of finalizing a Complete Streets Policy aimed at creating an integrated, multimodal transportation system that is safe, accessible, and efficient for all users and is respective of context. The application of Complete Streets policy is relevant to all of MnDOT's activities, including MnSHIP.

5 For more information on MnDOT's risk-based planning effort, see pages 78-79.

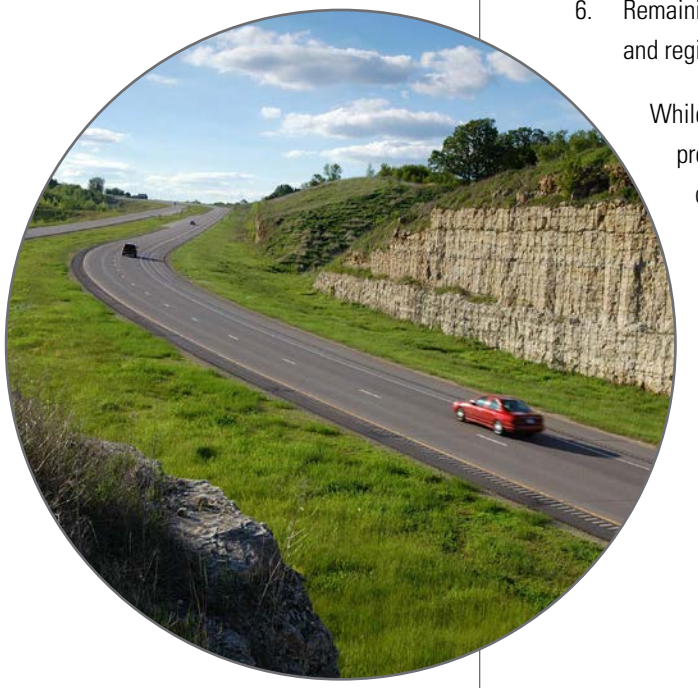
6 For more information on the MnSHIP stakeholder engagement efforts, see page 74.

Since 2009, MnSHIP has been refined to align with the Minnesota GO Vision and the Statewide Multimodal Transportation Plan, as well as with federal and state legislative requirements.

Previous State Highway Investment Plan

The previous state highway investment direction, set in 2009, was developed prior to the adoption of the **Minnesota GO Vision** and the **Statewide Multimodal Transportation Plan.** It established priorities in bridge preservation, traveler safety enhancements, and pavement preservation, with remaining funds distributed across other investment areas. Investments were prioritized based on the following directions, in order:

1. Legislative and agency directives, such as the Chapter 152 Bridge Program, interchange programs, and other directed investments should be fully funded.
2. Approximately 85 percent of remaining bridge preservation needs should be met.
3. Traveler safety should be funded at about three times each district's **Highway Safety Improvement Program (HSIP)** goal.
4. Seventy percent of the remaining funds should be directed to pavement preservation.
5. Appropriate investment should be made to maintain other infrastructure, such as drainage and **1990 Americans with Disabilities Act (ADA)** improvements.
6. Remaining funds are allocated among capacity improvements for mobility and regional and community priorities.



While the investment direction set in 2009 shaped the investment programs and priorities that are being implemented today, policy direction has evolved over the past four years. MnSHIP has been refined to align with the **Minnesota GO Vision** and the **Statewide Multimodal Transportation Plan** as well as with federal and state legislative requirements. In addition, MnDOT developed a coordinated outreach effort that incorporated feedback from the public and MnDOT stakeholders into the planning process. Their values and concerns were considered along with many other factors in developing MnSHIP.

Current System Conditions and Long-Term Trends

The state highway system is a large and aging network. It requires a mix of maintenance and capital investments in order to keep the system in a state of good repair. MnDOT actively seeks to minimize costs over the life of its assets through maintenance and capital investments. In particular, major challenges include a large number of bridges expected to need significant repair or rehabilitation within the next 20 years. MnDOT's pavements face a similar need for reconstruction over the life of the plan.

Since the early 1990s, MnDOT has used performance measurement to evaluate its services and to guide its plans, projects, and investments. MnDOT tracks the condition of the state highway system and publishes this information in its Annual Minnesota Transportation Performance Report.

Historically, MnDOT has set aspirational targets designed to achieve optimal or desired performance levels in particular investment categories. These targets have typically been based on lowest life-cycle costs, customer expectations, or a policy priority. Others have been trend-based – set by looking at trends and outcomes associated with historical spending levels. More recently, MnDOT has considered targets that it determines to be an acceptable risk. While MnDOT continues to use some of these targets to estimate its unconstrained investment needs, the current funding reality has made aspirational targets unachievable in most cases.

The following sections describe the conditions and long-term trends for each MnSHIP investment category.

ASSET MANAGEMENT: CONDITIONS AND TRENDS

Pavement Condition

Pavement deterioration is a serious risk facing MnDOT – more than half of its pavements were constructed 50 or more years ago. MnDOT measures pavement conditions by tracking the percentage of NHS and non-NHS system in Good and Poor condition and the percentage of all state highway roadway miles in Poor condition. Aspirational targets for NHS and non-NHS pavement condition are used to calculate needs (see **Chapter 3, "Transportation Needs"**). As of 2012, the target range for all state highway miles in Poor condition was between five and nine percent, which MnDOT determined to be an acceptable risk. MAP-21 will require MnDOT to assess NHS pavement conditions with yet-to-be established measures (and targets for Interstates) set by USDOT.

Aspirational targets enable MnDOT to articulate a level of performance for the system that goes above and beyond minimum, policy-related requirements.

As shown in **Figure 2-4**, the percentage of pavements in Poor condition increased in 2011 after an improvement in 2010. Overall, 5.6 percent (803 miles) of state highway miles were in Poor condition in 2012, compared to 6.6 percent in 2011. This falls within the five to nine percent risk-based target range for poor pavement. As of 2012, the percentage of Poor condition pavements varies between the three different types of state highway roads:

- **Interstate pavements:** 2.4 percent Poor
- **Other NHS pavements:** 4.3 percent Poor
- **Non-NHS pavements:** 7.5 percent Poor

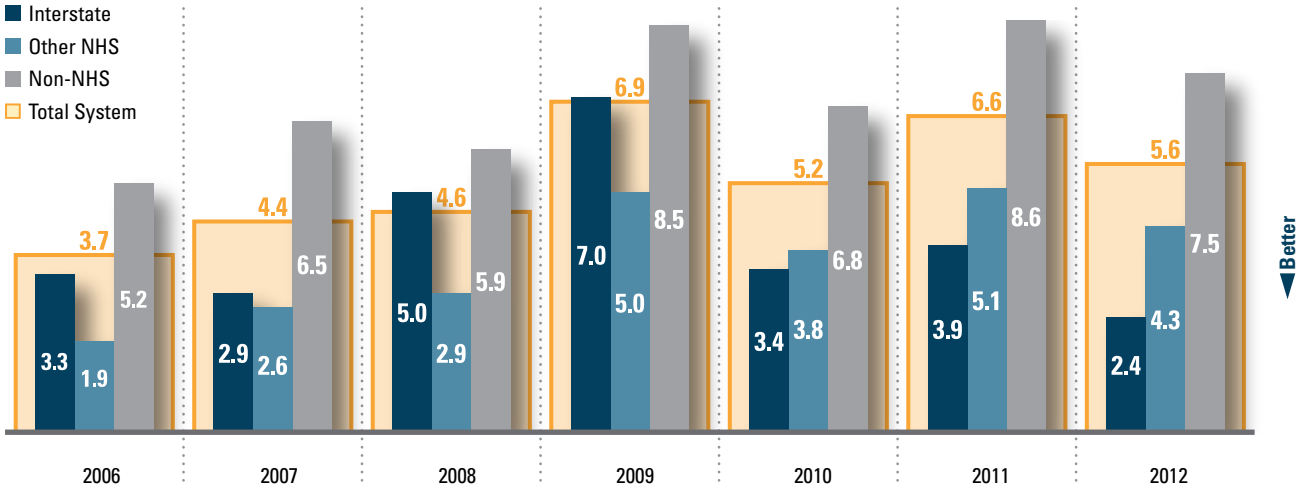
Pavement conditions are predicted to continue to decline to close to nine percent by 2015.

Bridge Condition

MnDOT is committed to a proactive regimen of condition assessment and preventive maintenance to keep its bridges in good condition. Approximately 35 percent of MnDOT's bridges are more than 50 years old. Like state highway pavements, aging bridges require more costly improvements to be maintained in serviceable condition.

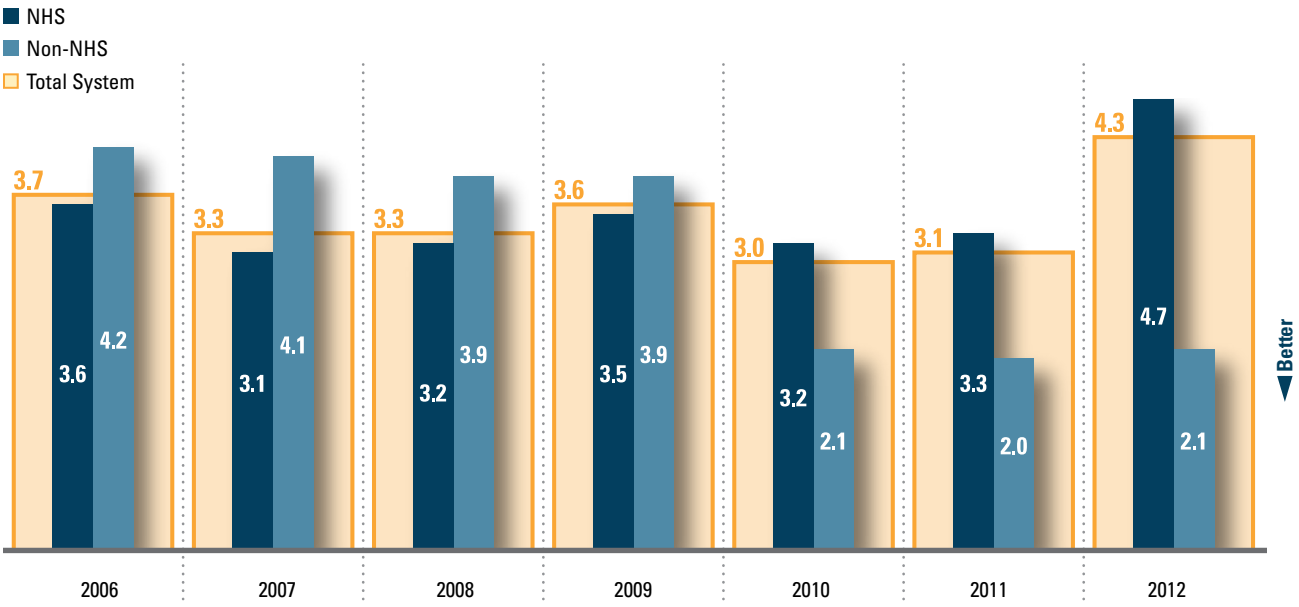
MnDOT measures its performance in Bridge Condition by tracking the structural condition of bridges on the state highway system. MnDOT has set a goal that the share of NHS bridges in good and satisfactory structural condition should be 84 percent and those in poor structural condition should be two percent or less, measured by deck area. Poor condition bridges are termed "structurally deficient" by USDOT; they are safe to drive on, but are approaching the end of their useful lives. Unsafe bridges are closed promptly.

Figure 2-4: Percentage of Pavement Miles on State Highway System in Poor Condition



Source: MnDOT

Figure 2-5: Percent of NHS Bridge Deck Area in Poor Condition



Source: MnDOT

MnDOT is not currently meeting its target for bridges in Poor condition, as shown in **Figure 2-5.** As of 2012, the percent of NHS bridges in Poor condition (4.7 percent) exceeded the maximum target of two percent Poor. Bridge conditions are expected to improve and come close to reaching their Poor condition targets by 2015 as a result of increased funding and emphasis.

Roadside Infrastructure Condition

MnDOT has not comprehensively tracked performance data for many elements that fall under Roadside Infrastructure Condition. Furthermore, many roadside infrastructure improvements are funded through the Operations and Maintenance budget as opposed to the capital improvements budget, for which MnSHIP is responsible. As part of the upcoming asset management plan, MnDOT will be able to more clearly identify its needs and track conditions related to roadside infrastructure.

Currently, MnDOT is able to address some of its roadside infrastructure needs as minor components of other projects. However, MnDOT has not been able to fix most assets at optimal points in their life cycles under the current investment program, such as poor-condition culverts and storm tunnels needing repair. Roadside infrastructure conditions will likely deteriorate unless additional investments are made.

As part of its upcoming asset management plan, MnDOT will more clearly identify its needs related to Roadside Infrastructure Condition.

2011 was the first year Minnesota had fewer than 400 traffic fatalities since 1944.

2011 Ranking of Most Congested Metropolitan Areas, Populations Greater than 1 million (47 total):*

. . .

15. *Atlanta GA*
    San Jose CA
    Pittsburgh PA
18. *Baltimore MD*
    Riverside-San Bernardino CA
    Nashville-Davidson TN
21. *San Francisco-Oakland CA*
22. ***Minneapolis-St. Paul MN***
23. *Tampa-St. Petersburg FL*
    Sacramento CA
    Cincinnati OH-KY-IN
    Virginia Beach VA
    Orlando FL
    Las Vegas NV
    Charlotte NC-SC
    New Orleans LA
31. *San Antonio TX*

. . .

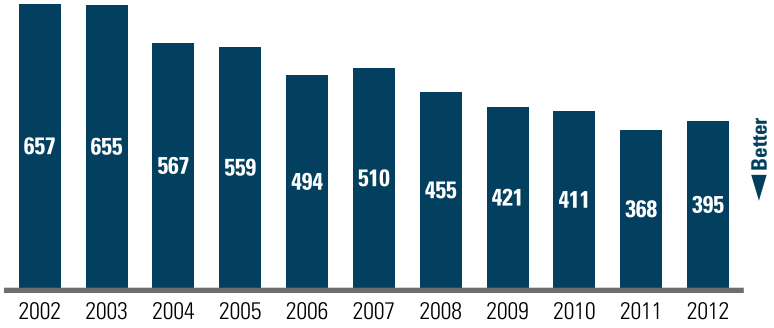
*Congestion calculated as ratio of peak travel to free-flow travel time.

Source: 2012 Texas Transportation Institute Urban Mobility Report

TRAVELER SAFETY: CONDITIONS AND TRENDS

MnDOT tracks total traffic fatalities and serious injuries from vehicle crashes. On an average day in 2012, at least one person died on Minnesota highways (395 deaths total [see **Figure 2-6**]). This vehicle crash-related fatality total is below the previous statewide **Toward Zero Deaths (TZD)** goal of fewer than 400 deaths per year, but above the 2014 TZD goal of 350 or fewer annual fatalities. With 1,159 serious injuries in 2011, Minnesota was below the TZD target of 1,200 or fewer serious injuries.

Figure 2-6: Minnesota Traffic Fatalities on All State and Local Roads



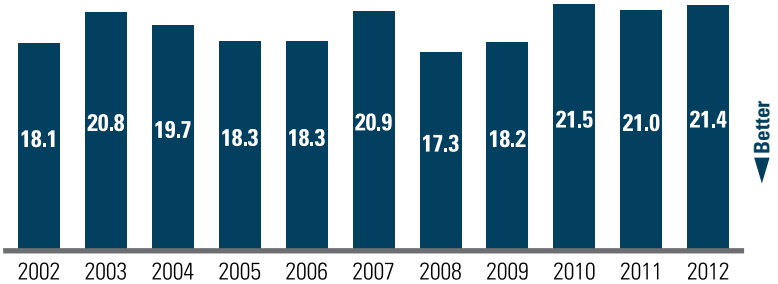
Source: Minnesota Department of Public Safety

CRITICAL CONNECTIONS: CURRENT CONDITIONS

Twin Cities Mobility

MnDOT tracks congestion on Twin Cities urban freeways by evaluating the percentage of miles vehicles are traveling below 45 miles per hour (mph) during morning or evening peak periods (5 to 10:00 A.M. and 2 to 7:00 P.M.). There was a slight increase in congestion between 2011 (21 percent) and 2012 (21.4 percent). As shown in **Figure 2-7**, 2010 through 2012 represent the highest levels in the last 10 years and congestion is expected to increase as economic activity increases in the future.

Figure 2-7: Percent of Congested Urban Freeways in the Twin Cities



Source: MnDOT

MAP-21 also requires MnDOT to adopt a system performance measure that advances the national goal of system reliability on the NHS. There is an additional requirement to develop a performance measure related to traffic congestion and on-road mobile source emissions in the Twin Cities metropolitan area. MnDOT will coordinate with the Metropolitan Council and other key stakeholders when it begins the process of developing the target.

Interregional Corridor Mobility

MnDOT monitors the performance of IRCs by tracking the percent of miles in Greater Minnesota that are within two miles per hour of average corridor travel speed targets. In 2011, 98 percent of the IRC system performed within two miles per hour of its corridor target. MN 210 from Motley to Aitkin is the only corridor that currently performs below the average travel time target for that corridor. However, beyond 2021, several corridors will continue to see declining average speeds. By 2033, declining speeds on several corridors are projected to cause the system to fall below MnDOT's current target.

There are a number of **Regional and Community Improvement Priorities (RCIP)** projects on IRCs which, when completed, will enhance the mobility of the corridor over and above the current corridor performance target. Because these are projects that address needs other than those triggered by the IRC Mobility performance measure, they are not categorized as IRC Mobility improvements.

Bicycle Infrastructure

MnDOT invests approximately two percent of pavement project costs and approximately three percent of bridge project costs, toward Bicycle Infrastructure improvements. While MnDOT does not currently measure statewide progress toward any specific performance measures related to bicycle facilities, it does track bicycle commuting trips within Minnesota's six most populous cities. Bicycle commuter trips increased by 38.9 percent in Minneapolis and by 2.2 percent throughout the state between 2006 and 2010.

MnDOT is in the process of developing a **Statewide Bicycle System Plan** that will provide direction for integrating bicycling into Minnesota's transportation network. This will include a plan for each of the eight MnDOT districts as well as tools for practitioners to use in selecting facilities to be included in projects. In addition, the **Statewide Bicycle System Plan** will recommend performance measures to help MnDOT prioritize and coordinate bicycle infrastructure investments on the state highway system.

The Statewide Bicycle System Plan will provide direction for integrating bicycling into Minnesota's transportation network.

Accessible Pedestrian Infrastructure

MnDOT has two performance measures to track progress in Accessible Pedestrian Infrastructure. MnDOT tracks the percent of signalized intersections with **Accessible Pedestrian Signals (APS)** installed and the percentage of sidewalk miles in poor condition. MnDOT is making progress toward its goal of equipping all signalized state highway intersections with APS by 2030. As of 2011, 21 percent of all intersections had APS installed and by 2012 that number increased to over 27 percent. As of 2012, four percent of MnDOT's sidewalk miles were in poor condition.

MnDOT also tracks the number of curb ramps in Greater Minnesota that comply with the Americans with Disabilities Act. MnDOT continues to face deficiencies in achieving its curb ramp accessibility targets due to funding and project timing constraints. Of the more than 20,500 curb ramps inventoried throughout the state, less than half (about 8,900) were completely or partially compliant as of 2012. MnDOT's policy is to replace ramps that are structurally deficient before addressing those that are functionally substandard or obstructed.

In addition, MnDOT is planning to inventory pedestrian facilities within MnDOT right-of-way and are continuing to reconstruct sidewalks as part of ADA projects, reconstruction projects, and cooperative agreements. MnDOT uses cooperative agreements to coordinate construction, traffic signals, lighting, detours, and landscaping with cities, counties, and other local units of government.

REGIONAL AND COMMUNITY IMPROVEMENT PRIORITIES: CONDITIONS AND TRENDS

MnDOT measures its progress with respect to RCIPs by conducting customer satisfaction studies and consistently seeking input and collaboration opportunities with stakeholders. Beginning in 2010, MnDOT has responded in part to regional concerns and collaboration opportunities through the use of the **Transportation Economic Development (TED)** Program, a collaborative program between MnDOT and the Minnesota **Department of Employment and Economic Development (DEED)** established for the purpose of supporting highway improvement and public infrastructure projects that create jobs and support economic development.

In 2012, MnDOT introduced the **Corridor Investment Management Strategy (CIMS),** which brings MnDOT together with its local, modal, and state partners to identify investment opportunities on Minnesota's state highways. This initiative offers a transparent, systematic, and collaborative approach to incorporating localized economic competitiveness, multimodal connections,

and quality of life considerations into MnDOT's planning process. In general, opportunities identified through CIMS that would not otherwise be addressed through performance-driven improvements will be eligible for potential through the RCIP investment category.

PROJECT SUPPORT: CONDITIONS AND TRENDS

Project Support is critical to ensuring timely and efficient delivery on all projects constructed on the state highway system. While performance is not measured for this category, MnDOT tracks how much it has spent on Project Support investments in the past as part of its overall investment program.

Historically, Project Support has accounted for approximately 11 percent of MnDOT's annual capital investment program. However, the Project Support percentage changes based on the mix of investments it supports. For example, when MnDOT delivers an improvement program that includes a number of expansion projects, it invests more in the area of Project Support, as well, due to the increased need for right-of-way acquisition, consultant services, and contractor incentives. When the majority of MnDOT's program is made of asset preservation projects, a smaller percentage of its overall program goes toward Project Support.

MnDOT strives to reduce the overall need for Project Support through innovative design, early project identification, and shared services.

Summary of Key Changes

Several key changes to investment policies and processes were incorporated in MnSHIP. These changes reflect the factors and assumptions discussed earlier in this chapter, based on an expected revenue gap, federal and state requirements and thresholds, MnDOT policy, and current conditions on the state highway system. These key changes are presented in **Figure 2-8** below.

Figure 2-8: Key Changes in MnSHIP

Key Change	Description	More Information
Responses to MAP-21 NHS definition	As required by MAP-21, MnDOT now categorizes all principal arterials as part of the National Highway System.	Chapter 2
Statewide and district investment programs	MnDOT has created new investment programs to address specific challenges posed by MAP-21 requirements, GASB 34 thresholds, and MnDOT's transportation vision.	Chapter 4
New schedule of major projects through Year 7	To meet state legislative requirements, MnSHIP includes a list of major projects through Year 7.	Chapter 5
Definition of projects by investment category	MnDOT is required by state legislature to track all investments and their impacts.	Chapter 5
Two 10-year planning periods	MnDOT will use two 10-year planning periods to respond to changing transportation investment needs within the 20-year timeframe of MnSHIP.	Chapter 5
Risk-based planning	MnSHIP incorporates risk to assess different outcomes based on various investment scenarios.	Chapter 4
Innovative scenario planning process	MnDOT took a traditional scenario planning process and incorporated the discussion of trade-offs and fiscal constraint in decision-making.	Chapter 4
Two new investment categories	MnDOT established the Bicycle Infrastructure and Accessible Pedestrian Infrastructure investment categories to establish and track investments in these areas.	Chapter 3

20-Year
State Highway
Investment Plan

Chapter 3

TRANSPORTATION NEEDS

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TRANSPORTATION NEEDS

Substantial capital investments are needed to keep Minnesota's 12,000-mile state highway system in sufficient condition to support a healthy economy and a high quality of life for Minnesotans. Chapter 3 provides a cost analysis of the investments needed on the state highway system through the year 2033 in five investment areas: Asset Management, Traveler Safety, Critical Connections, **Regional and Community Improvement Priorities (RCIPs),** and Project Support. Each investment area contains a breakdown of the investment need by investment category and explains how MnDOT developed its needs assumptions for MnSHIP. In addition, the types of improvements and needs analysis for Small Programs are described.

This chapter includes an estimate of the amount of revenue needed to achieve performance targets and other key objectives through the next 20 years in each investment category.

The key messages of Chapter 3 are:

- *MnDOT estimated its 20-year investment needs for the state highway system by aiming to achieve both aspirational performance targets and other key system goals consistent with the Minnesota GO Vision in 10 investment categories.*
- *Approximately $30 billion is needed over the next 20 years to achieve performance targets and other key system goals.*

Definition of Needs in MnSHIP

Transportation needs are defined as either the costs necessary to meet performance-based targets or the costs related to achieving key system goals. Satisfying both sets of transportation needs would enable MnDOT to align outcomes on the state highway system with the objectives outlined in the **Minnesota GO Vision** and the **Statewide Multimodal Transportation Plan** and/or managing the largest risks in an investment category by adjusting current levels of investment to respond to user demand or current system conditions. MnDOT calculated the needs of each investment category based on this definition.

To arrive at the costs associated with meeting performance-based targets and other key goals for the state highway system, technical work groups used both performance measures and risk to define four or five performance levels in each investment category. Each performance level captures a different amount of investment and corresponds with a different set of improvements, performance outcomes, risks, and risk management strategies. The highest performance level for each investment category typically corresponds to the transportation need described in this chapter. The total transportation need amount identified totals $30 billion over 20 years, compared to $18 billion in available revenue.

Appendix F: Investment Category Folios provides more detail regarding the performance levels for each category.

NEEDS ASSOCIATED WITH ACHIEVING PERFORMANCE TARGETS

As described in **Chapter 2, "Key Assumptions and Factors,"** MnDOT has used performance measures to help guide capital investment and operational decisions since the 1990s. The process of tracking, reviewing, and reporting on conditions on the state highway system helps MnDOT and the public evaluate the impact and effectiveness of MnDOT programs.

Every year since 2008, MnDOT has published the Annual Minnesota Transportation Performance Report, which contains detailed information on the areas in which MnDOT tracks performance. The report includes a description of historical trends, current conditions, how MnDOT makes progress toward achieving targets, and anticipated outcomes based on planned investments through the four-year **State Transportation Improvement Program (STIP).**

Historically, MnDOT has set aspirational targets designed to achieve optimal or desired performance levels in particular investment categories. These targets have typically been based on lowest life-cycle costs, customer expectations, or a policy priority. Others have been trend-based – set by looking at trends and

outcomes associated with historical spending levels. More recently, MnDOT has considered targets that it determines to be an acceptable risk. While MnDOT continues to use some of these targets to estimate its unconstrained investment needs, the current funding reality has made aspirational targets unachievable in most cases.

MnDOT used performance measures, performance indicators, and costs to implement performance-related strategies to develop its needs estimates in the following MnSHIP categories:

- Pavement Condition
- Bridge Condition
- Traveler Safety
- Twin Cities Mobility
- **Interregional Corridor (IRC)** Mobility
- Accessible Pedestrian Infrastructure[3]

MnDOT established MnSHIP investment category work groups to estimate the costs and outcomes associated with investing at different levels in each of these categories (see **Appendix F: Investment Category Folios**).

NEEDS ASSOCIATED WITH OTHER KEY SYSTEM GOALS

MnDOT's needs on the state highway system also include investments that are important for delivering an efficient and diversified program of capital improvements that achieves multiple benefits in its implementation. While the categories listed below do not currently have established performance measures or targets, they are critical in helping MnDOT to make progress toward the **Minnesota GO Vision,** which emphasizes a transportation system that maximizes the health of the people, the economy, and the environment in Minnesota:

- Roadside Infrastructure Condition
- Bicycle Infrastructure
- Accessible Pedestrian Infrastructure
- RCIP[4]
- Project Support

3 Note: needs related to ADA investment are based on performance measures while non-ADA pedestrian needs are calculated based on level of effort.

4 MnDOT did not establish MnSHIP investment category work groups for RCIPs or Project Support.

Without current performance measures or targets, MnDOT used alternative methods to estimate the needs for these categories. These needs were based on the following:

1. **The cost to achieve multimodal transportation objectives.** The investment needs for Bicycle Infrastructure, and a portion of the needs for Accessible Pedestrian Infrastructure improvements—those unrelated to **1990 Americans with Disabilities Act (ADA)** compliance—are based on advancing current levels of investment to more adequately promote a multimodal transportation network, as described in the **Minnesota GO Vision** and the **Statewide Multimodal Transportation Plan.**

2. **The cost to manage greatest risks.** MnDOT calculated needs for the categories of Roadside Infrastructure Condition and RCIPs by determining the amount needed to manage the greatest risks in these categories.

3. **The cost to support delivery of the capital program.** Project Support needs were calculated as the costs necessary to help meet the needs identified in the other nine investment categories based on historical expenditures in this area.

Asset Management Needs

MnDOT estimates that it would cost $17.58 billion to meet aspirational performance targets and other key objectives for Asset Management through 2033.

Asset Management	
Pavement Condition	$10.76 billion
Bridge Condition	$5.11 billion
Roadside Infrastructure Condition	$1.71 billion
Total	**$17.58 billion**

PAVEMENT CONDITION NEEDS

Using the **Pavement Management System (PMS)** model, MnDOT projected its future pavement needs for MnSHIP by calculating the 20-year investment needed to fulfill its aspirational performance goals. MnDOT used the following targets for **National Highway System (NHS),** including Interstates, and non-NHS roadway pavement miles:

- **Interstate pavements:** Two percent (or less) in Poor condition; 70 percent (or more) in Good condition.
- **Other NHS pavements:** Two percent (or less) in Poor condition; 70 percent (or more) in Good condition.
- **Non-NHS pavements:** Three percent (or less) in Poor condition; 65 percent (or more) in Good condition.

These are "aspirational targets" that would best position MnDOT to meet its federal and state NHS and non-NHS roadway pavement condition targets. MnDOT would need $10.76 billion to achieve these goals, which corresponds to Performance Level 4 in Pavement Condition. At this level of investment in Pavement Condition, MnDOT would be able to:

- Invest in all NHS and non-NHS roads to meet targets by 2023
- Maintain NHS and non-NHS targets through 2033.

MnDOT used aspirational targets to define Pavement Condition and Bridge Condition needs.

BRIDGE CONDITION NEEDS

MnDOT measures its bridge performance based on structural condition, and has established aspirational targets for bridges on NHS and non-NHS highways:

- **NHS bridges:** Two percent (or less) in Poor condition; 84 percent (or more) in Good or Satisfactory condition

- **Non-NHS bridges:** Eight percent (or less) in Poor condition; 80 percent (or more) in Good or Satisfactory condition

MnDOT uses the **Bridge Replacement and Improvement Management (BRIM)** prioritization tool to identify its bridge investments. The total need amount in Bridge Condition is based on investing in all state highway bridges at optimal points in their life-cycles over the next 20 years. BRIM also accounts for other factors in ranking priority for bridge projects, such as traffic volume, highway classification, and special vulnerabilities. If MnDOT were to invest in the fixes suggested by BRIM, it would meet its aspirational targets in all years of the plan.

The $5.11 billion Bridge Condition need corresponds with Performance Level 4. At this level of investment in Bridge Condition, MnDOT would be able to:

- Invest at optimal points in bridges' life-cycles.
- Meet 100 percent of performance-based bridge needs.

Figure 3-1: Aspirational Performance Targets Used to Estimate Needs for Pavement Condition and Bridge Condition

Investment Category	System	Aspirational Target (Desired Level of Service)
Pavement Condition	Interstate Other NHS	≤ 2% Poor ≤ 2% Poor
	Non-NHS	≤ 3% Poor
Bridge Condition	NHS	≤ 2% Poor
	Non-NHS	≤ 8% Poor

ROADSIDE INFRASTRUCTURE CONDITION NEEDS

MnDOT calculated its needs in Roadside Infrastructure Condition by estimating the cost of replacing culverts in the poorest condition, keeping all rest areas open and maintained to current ADA standards, meeting retro-reflectivity standards on all signs and pavement markings, and maintaining all other roadside assets in operable and safe condition through the next 20 years.

The $1.71 billion Roadside Infrastructure Condition need corresponds with the highest of four performance levels, Performance Level 3. At this level of investment in Roadside Infrastructure Condition, MnDOT would be able to:

- Continue improvements through pavement investments.
- Allocate a sizable amount of funding to strategic stand-alone Roadside Infrastructure investments.

MnDOT will continue to refine its approach to estimating needs in this category based on improving its investment tracking and inventories going forward. Typically, the Roadside Infrastructure Condition investment has been incorporated into pavement project costs to best leverage funds. While most Roadside Infrastructure improvements are implemented concurrently with pavement improvements, the needs in this investment category only relate to the repair, rehabilitation, and replacement of non-pavement roadside elements. The process of defining these needs as a separate category for MnSHIP will help MnDOT identify which roadside elements need investment in the future.

Traveler Safety Needs

MnDOT estimates that it would cost approximately $1.34 billion to meet its Traveler Safety needs through 2033.

Traveler Safety	
Traveler Safety	**$1.34 billion**

MnDOT estimated needs in Traveler Safety over the next 20 years by calculating the cost of implementing projects similar to those found in the **District Safety Plans (DSPs)** more quickly than the current rate. This would enable MnDOT to address many sustained crash locations and increase its investment in **Toward Zero Deaths (TZD)** programming, which focuses on reducing fatalities and serious injuries through the "Four E's" approach of education, engineering, enforcement, and emergency medical and trauma services.

The $1.34 billion Traveler Safety need corresponds with Performance Level 3 in Traveler Safety. At this level of investment, MnDOT would be able to:

- Continue making improvements in conjunction with pavement fixes.
- Implement lower cost, proactive projects more quickly than the current rate.
- Invest approximately $26 million per year toward sustained crash locations.
- Allocate $3 million per year for flexible TZD programming priorities.

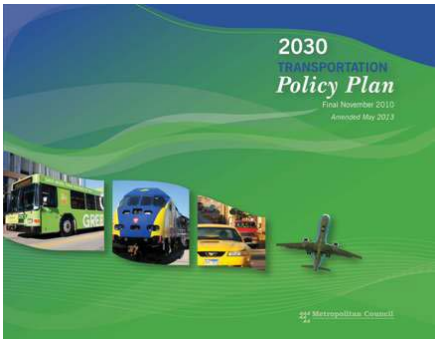
Critical Connections Needs

MnDOT estimates that it would cost approximately $5.75 billion to meet its targets and key objectives for Critical Connections through 2033.

Critical Connections	
Twin Cities Mobility	$3.90 billion
Interregional Corridor Mobility	$810 million
Bicycle Infrastructure	$540 million
Accessible Pedestrian Infrastructure	$490 million
Total	**$5.75 billion**

TWIN CITIES MOBILITY NEEDS

MnDOT calculated its 20-year needs for Twin Cities Mobility by projecting the cost of implementing the congestion mitigation strategies listed in the Metropolitan Council's **2030 Transportation Policy Plan.** In doing so, MnDOT would implement the MnPASS system vision, invest in Active Traffic Management, make spot mobility improvements at locations identified in MnDOT's **Congestion Management Safety Plan,** and complete the extension of MN 610 within the next 20 years. With new **Federal Highway Administration (FHWA)** performance measures expected in Spring 2015 for metropolitan-area NHS reliability or congestion, MnDOT and the Metropolitan Council may need to adjust some of these congestion mitigation strategies within the 20-year timeframe of MnSHIP.



The Metropolitan Council adopted the 2030 Transportation Policy Plan in November 2010. For the full document, visit http://www.metrocouncil.org/Transportation/Planning/2030-Transportation-Policy-Plan.aspx.

The $3.90 billion Twin Cities Mobility need corresponds with Performance Level 3. At this level of investment in Twin Cities Mobility, MnDOT would be able to undertake the following improvements through 2033:

- Improve mobility at 11 or more bottlenecks each year (yielding $100 million per year in traveler benefits).
- Implement the MnPASS system vision.
- Complete MN 610 to I-94 in Maple Grove.
- Construct/reconstruct four to six interchanges.

INTERREGIONAL CORRIDOR MOBILITY NEEDS

MnDOT established IRC Mobility needs by calculating the costs needed to make improvements to ensure at least 95 percent of IRC miles are within two miles per hour of the IRC speed performance targets. By 2033, MnDOT estimates that it would need to make improvements to portions of three of four underperforming IRCs (I-94 from St. Michael to MN 23; US 10 from MN 24 to Little Falls, including the segment of MN 24 between I-94 and US 10; US

63 from the state line to US 52; and MN 210 from Motley to Aitkin) that are expected to fall below the speed targets (see **Figure 3-2** on the next page). Improvements would consist of increased roadway capacity and operations to improve travel speeds and reliability of the corridors during peak travel periods.

The $810 million IRC Mobility need corresponds with Performance Level 2. At this level of investment in IRC Mobility, MnDOT would be able to:

- Implement major improvements on the two non-performing corridors with greatest peak period delays (I-94 and US 10).
- Undertake high return-on-investment projects on up to two other non-performing corridors (US 63 and MN 210).

The IRC mobility performance measure is an important indicator in monitoring travel speed on important corridors across the state. While all IRCs are on the NHS, not all NHS routes are on the IRC system. With the passage of **Moving Ahead for Progress in the 21st Century (MAP-21)** and identification of congestion reduction on the NHS as a national goal, MnDOT will monitor rulemaking and evaluate whether it should make additional modifications to the size of the IRC system and the current performance measure.

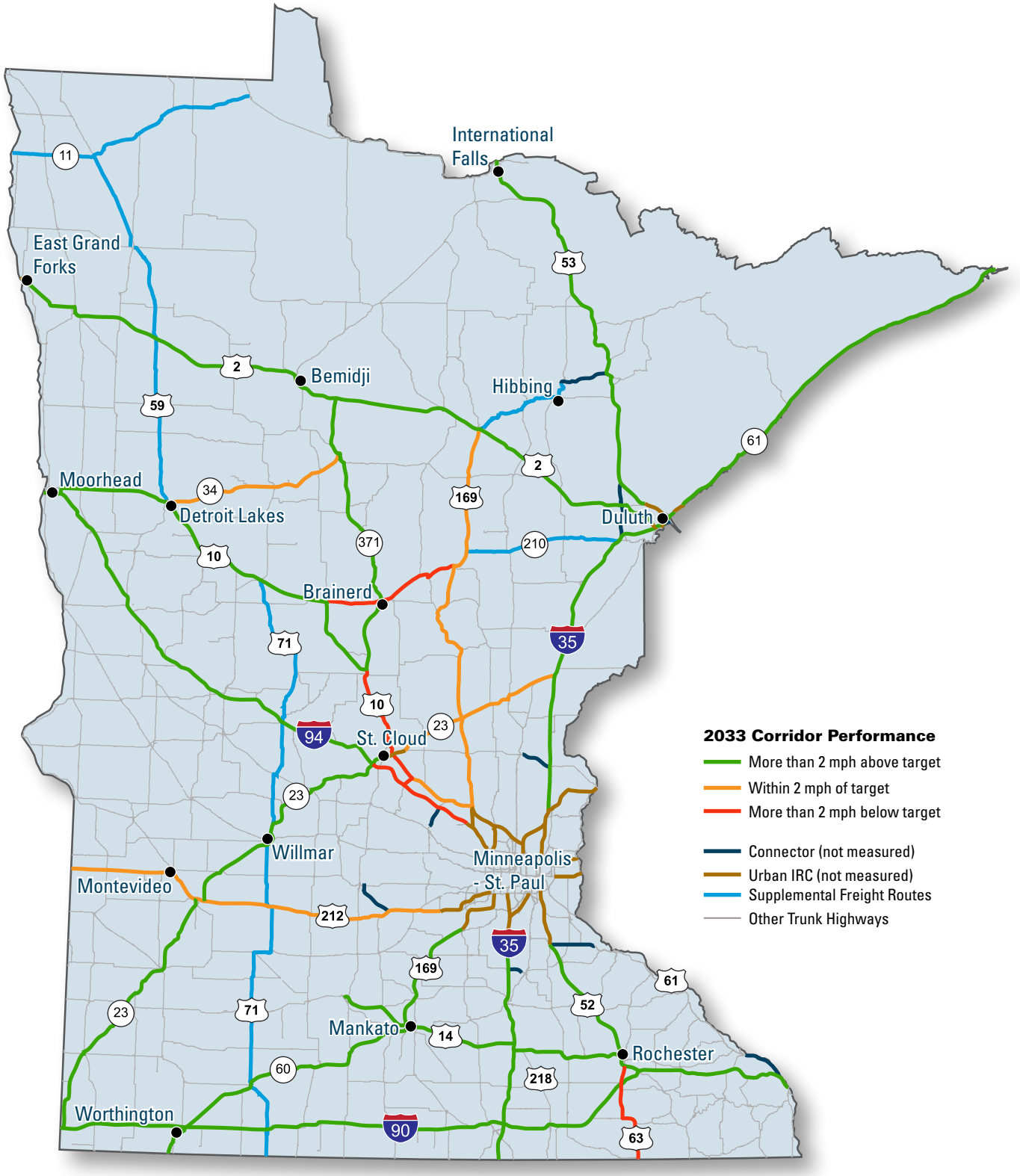
BICYCLE INFRASTRUCTURE NEEDS

To estimate its 20-year needs, MnDOT calculated the costs needed to continue to invest in bicycle facilities concurrently with bridge and pavement improvements, such as installing a separated bike lane on a bridge as it is reconstructed. In addition, MnDOT identified the costs associated with implementing stand-alone bicycle projects, such as bike lanes and route signage, as well as more significant investments like trail segments or highway crossings. These are examples of projects that would help MnDOT strategically improve multimodal access and increase non-motorized traveler safety.

The $540 million Bicycle Infrastructure need corresponds with Performance Level 3. At this level of investment in Bicycle Infrastructure, MnDOT would be able to:

- Continue to invest in the bicycle network concurrent with pavement and bridge projects.
- Add $15 million per year to construct new bikeway projects, such as bike lanes, sharrows, route signage, trail segments, and bicycle bridges or tunnels.

Figure 3-2: 2033 Interregional Corridor System Performance



Source: MnDOT

ACCESSIBLE PEDESTRIAN INFRASTRUCTURE NEEDS

MnDOT calculated the 20-year need for Accessible Pedestrian Infrastructure by determining the investment needed to bring all curb ramps into compliance with ADA standards, implementing **Accessible Pedestrian Signals (APS)** at all signalized intersections by 2033, undertaking strategic stand-alone projects, and supporting other pedestrian improvements as part of bridge and pavement projects, such as sidewalks in priority locations.

The $490 million Accessible Pedestrian Infrastructure need corresponds with Performance Level 3 in this investment category. At this level of investment in Accessible Pedestrian Infrastructure, MnDOT would be able to:

- Invest in the ADA and pedestrian network through pavement and bridge investments.
- Maintain ADA compliance for curb ramps and APS intersection treatments through 2033.
- Add $15 million per year to construct new stand-alone pedestrian projects, such as crosswalks, sidewalks, bridges, and tunnels.

Regional and Community Improvement Priorities Needs

MnDOT estimates that it would cost approximately $1.75 billion to meet its key objectives for RCIPs through 2033.

Regional and Community Improvement Priorities	
Regional and Community Improvement Priorities	**$1.75 billion**

RCIPs cover a range of improvements for which MnDOT does not have performance-based goals. MnDOT's objective in investing in RCIPs is to continue to partner with local stakeholders in supporting quality of life and economic competitiveness in Minnesota.

The investment need associated with this objective is based on MnDOT's recent efforts and expenditures in this area. Continuing to invest at this level will help MnDOT to continue to address local and regional concerns. MnDOT recognizes that the current level of spending likely does not capture the full array of non performance-based needs and opportunities across the state.

The $1.75 billion RCIP need corresponds with Performance Level 2. At this level of investment in RCIPs, MnDOT would be able to:

- Advance local economic competitiveness and quality of life objectives via design add-ons to infrastructure condition improvements and a limited number of stand-alone projects that address needs not associated with statewide performance targets.
- Continue to take advantage of local partnership opportunities.
- Administer a statewide program that funds several high return-on-investment projects each year given constrained resources.
- Allocate limited funding for district consideration of larger-scale mobility improvements beyond the costs required to meet system-wide performance targets.

Project Support Needs

MnDOT estimates that achieving its targets and key objectives in the areas of Asset Management, Traveler Safety, and Critical Connections would require approximately $2.88 billion in Project Support through 2033.

Project Support	
Project Support	**$2.88 billion**

MnDOT estimated the level of capital funds historically spent in this category to establish the proportion of the overall program that would be required to deliver capital improvements on the state highway network over the next 20 years. Approximately 11 percent of MnDOT's annual capital investment program typically goes to supporting the delivery of capital improvement projects on the state highway network.[5] Though MnDOT strives to reduce the overall need for Project Support through innovative design and early project identification, it is assumed the need for Project Support will total approximately $2.88 billion or 11 percent of the MnSHIP investment program going forward. This amount, however, will vary based on the types of investments that MnDOT makes each year.

5 9.5 percent before Small Programs is deducted from the total revenue amount.

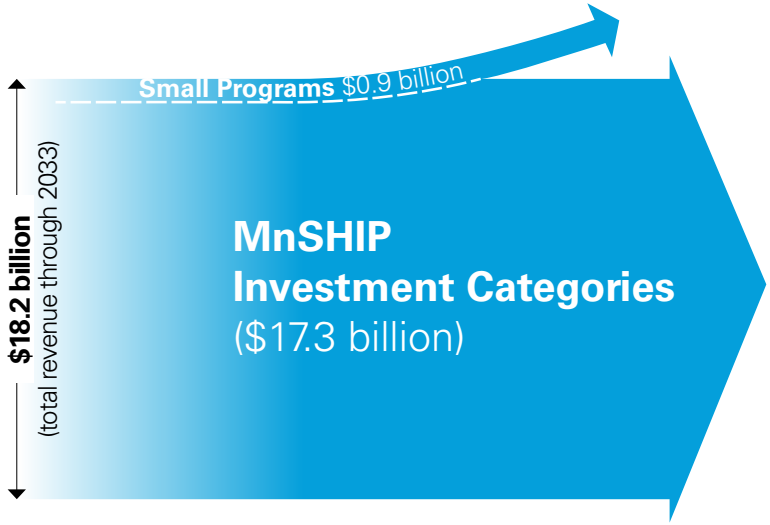
Small Programs represents a fixed portion of MnDOT's total investment dollars that are needed to cover unplanned future issues.

Small Programs Needs

MnSHIP assumes MnDOT will continue to need a fixed amount of funds throughout the 20-year timeframe to respond to short-term, unforeseen issues and one-time specialty program needs when they arise. A prime example of a short-term, unforeseen issue is the need to replace highway drainage culverts after a major flooding event or other natural disaster. Examples of one-time specialized programs include ITS deployments, weigh station upgrades, removal of hazardous guardrail, roadway research, and historic structure preservations. MnDOT currently plans $45 million per year or five percent of its total projected revenue to cover investments in the Small Programs area. Assuming that the current investment level is held constant throughout the next 20 years, approximately $900 million is needed to fund Small Programs. If MnDOT does not fully spend its annual allocation for Small Programs in a given year, it directs the funds toward its highest unaddressed risks in the capital program.

Figure 3-3 illustrates the process of Small Programs needs being addressed before the other investment category needs are addressed by the remaining projected revenue.

Figure 3-3: Small Programs Needs



Summary of Needs

In developing its assumptions for MnSHIP, MnDOT projected the investments necessary to meet state highway transportation needs through 2033 as defined by the costs needed to meet aspirational performance-based targets and other key system goals, such as advancing the state's economic vitality and supporting Minnesotans' quality of life.

The total need for the Minnesota state highway system is calculated to be approximately $30 billion over 20 years. **Figure 3-4** shows the distribution of this transportation need by investment category. This level of investment would ensure that the state highway system meets all federal and state performance requirements and makes progress toward realizing the **Minnesota GO Vision,** while allowing MnDOT to effectively manage its greatest risks in each investment category. **Figure 3-5** summarizes what MnDOT would be able to accomplish in each investment category under a program with no fiscal constraints.

Because MnDOT does not project having $30 billion in available revenues over the next 20 years, it will not be able to achieve all of the outcomes described in the table for each investment category. The current revenue projection shows $18 billion in available revenues, which represents a funding gap of $12 billion and requires MnDOT to prioritize its investments on the state highway system.

The current revenue projection shows $18 billion in available revenues, which represents a funding gap of $12 billion.

Figure 3-4: 20-Year Capital Highway Investment Needs by Investment Category ($30.19 billion)

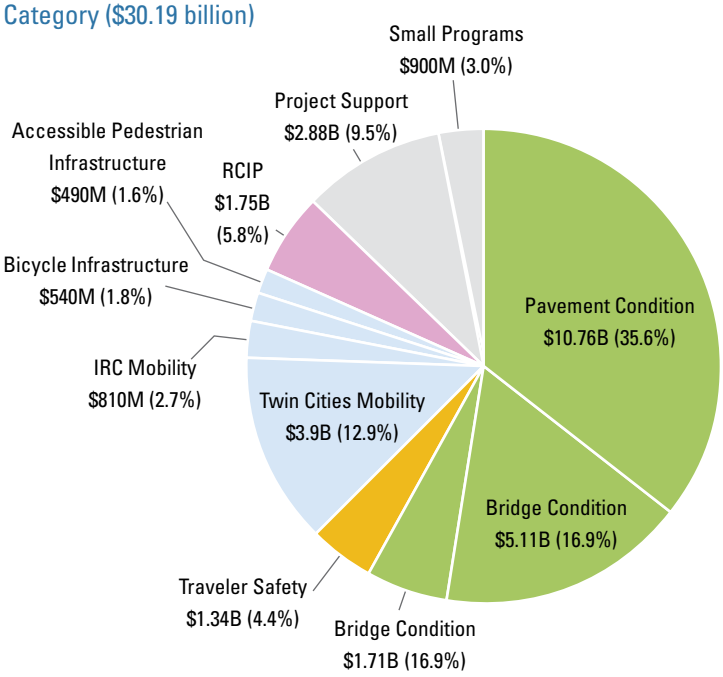


Figure 3-5: Transportation Needs Over the Next 20 Years by Investment Category

Investment Category		20-year Outcomes Based on Aspirational Performance Targets or Other Key System Goals	20-year Need	Total (%)
Asset Management	Pavement Condition	Meet pavement performance targets of 2% Poor condition and 70% Good condition on NHS, 3% Poor condition and 65% Good condition on non-NHS roads.	$10.76 billion	35.6%
	Bridge Condition	Invest in state highway bridges at optimal points in their life cycles; meet performance targets of ≤2% Poor condition and ≥84% Good or Satisfactory condition on NHS bridges, ≤8% Poor and ≥80% in Good or Satisfactory condition on non-NHS bridges.	$5.11 billion	16.9%
	Roadside Infrastructure Condition	Reduce the number of poor culverts, maintain rest areas, and meet federal standards.	$1.71 billion	5.7%
Traveler Safety		Meet an aggressive traffic fatalities target by implementing District Safety Plans more quickly than current rate (2012), address most sustained crash rate locations, and invest $3 million/year for Toward Zero Deaths programming.	$1.34 billion	4.4%
Critical Connections	Twin Cities Mobility	Implement the Metropolitan Council's Transportation Policy Plan, which includes Active Traffic Management, spot mobility improvements, implement the MnPASS system vision, and strategic capacity enhancements.	$3.90 billion	12.9%
	Interregional Corridor Mobility	Meet system performance targets by completing major improvements on three of four underperforming corridors (I-94, US 10, US 63, and MN 210).	$810 million	2.7%
	Bicycle Infrastructure	Strategically improve bicycle network and continue implementing bicycle accommodations as part of pavement and bridge projects.	$540 million	1.8%
	Accessible Pedestrian Infrastructure	Install accessible pedestrian signals at all signalized intersections by 2030, bring all intersections into compliance with ADA curb ramp standards, and fund identified priority pedestrian projects.	$490 million	1.6%
Regional + Community Improvement Priorities		Partner with stakeholders to address regional and local priorities through several stand-alone projects and design add-ons, deliver projects that respond to non performance-based needs and enhance the state's transportation network, and allocate money for statewide and district-level programs.	$1.75 billion	5.8%
Project Support		Efficiently deliver projects through adequate consultant services, supplemental agreements, construction incentives, and right-of-way acquisition.	$2.88 billion	9.5%
Small Programs		Continue to fund unforeseen issues and one-time specialty program needs.	$900 million	3.0%
			TOTAL = $30.19 BILLION	

Comparison to the Needs of the 2009 State Highway Investment Plan

MnDOT's previous 20-year state highway investment plan, published in 2009, identified a much larger funding need of $65 billion. The plan projected only $15 billion in available revenues, representing a $50 billion funding gap. The projected needs have been significantly reduced since 2009, due primarily to a refined approach to Twin Cities Mobility. The previous method, which relied heavily on highway expansion to eliminate congestion, required $43 billion in investment for Twin Cities Mobility alone. Since then, MnDOT and the Metropolitan Council have placed a greater emphasis on maximizing the benefits of in-place infrastructure over capacity expansion to address congestion in the Twin Cities. MnDOT and the Metropolitan Council developed a new strategy that focuses on lower-cost, high-benefit projects, including the expansion of the MnPASS system.

Meanwhile, the needs in other investment categories—primarily Asset Management categories—have grown since 2009. It is assumed these needs will continue to grow as the system ages and as highways continue to play an important role in Minnesotans' daily lives.

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20-Year
State Highway
Investment Plan

Chapter 4

DEVELOPMENT OF INVESTMENT PRIORITIES

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DEVELOPMENT OF INVESTMENT PRIORITIES

MnDOT used an extensive process to arrive at the MnSHIP investment priorities, which guide programming and project selection for the next 20 years. This process integrated policy goals and objectives, technical information on system conditions, performance management, revenue projections, and consideration of key risks. It also responded to stakeholder input that was gathered through an innovative public outreach process. The process of developing 20-year investment priorities helped MnDOT to articulate future outcomes for the state highway system, gauge the degree to which different investment scenarios align with stakeholder and agency expectations, and adjust its current investment approach to guide future capital investment programs.

The key messages of Chapter 4 are:

- *MnDOT developed three investment scenarios highlighting potential 20-year outcomes on the state highway system to generate feedback and help shape investment priorities.*
- *MnDOT conducted dual outreach processes with the public and agency decision-makers to gain valuable input on what MnDOT should continue or change about its current investment priorities.*
- *MnDOT analyzed the input received from the public and agency decision-makers, along with additional risk-based considerations, to arrive at a set of fiscally constrained 20-year investment priorities.*
- *MnDOT established different priorities for Years 1-10 and Years 11-20 of MnSHIP due to greater buying power constraints and emerging risks in the second half of the plan.*

Scenario Development

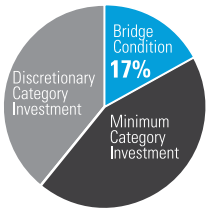
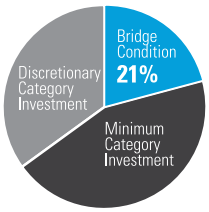
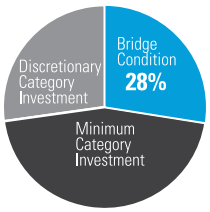
Maintaining existing infrastructure, alone, at today's condition levels for the next 20 years would require nearly all $18 billion of projected revenue. As MnSHIP is a fiscally constrained plan, MnDOT is responsible for investing in the state highway system in a way that balances numerous competing priorities for the users it serves. To illustrate the trade-offs of different possibilities for investing the $18 billion in the state highway system over 20 years, MnDOT developed performance levels for each investment category and then packaged different performance levels from each category into three scenarios, or "approaches."

Higher performance levels would enable MnDOT to manage the risks associated within a given investment category; lower performance levels indicate unmanaged risks.

DEVELOPMENT OF PERFORMANCE LEVELS

Four or five performance levels (Performance Level 0 to Performance Level 3 or 4) were established for each of the 10 investment categories. MnDOT used both performance measures and risk to define a potential range of investment in each investment category. Lower performance levels represent minimum levels of investment (i.e., the greatest risks that could reasonably be accepted given MnDOT's responsibility for public safety and basic system functionality). At the other end of the spectrum, higher investment levels allow MnDOT to make more progress toward the **Minnesota GO Vision** and limit the amount of risk that MnDOT would need to accept. As each performance level is the result of a different level of investment, each performance level corresponds with a different set of improvements, performance outcomes, risks, and risk management strategies (see **Figure 4-1**). For more information on how performance levels were developed, see **Appendix F: Investment Category Folios**.

Figure 4-1: Excerpt from the Bridge Condition Investment Category Folio

	Performance Level 2 *Moderate cost, moderate risk*	**Performance Level 3** *Greater cost, lower risk*	**Performance Level 4** *Greatest cost, lowest risk*
Investment Approach *(Scenario Planning Folio)*	**Approach C**	**Approach A** **Approach B** (approximate)	PL does not correspond with an Investment Approach
Investment Level *Total* *CH 152 -Yrs 5-10 (2017-2022)* *Other Br - Yrs 5-10 (2017-2022)* *Other Br - Yrs 11-20 (2023-2032)*	$2.50 B $77 M/yr $107 M/yr $140 M/yr 	$3.05 B $77 M/yr $121 M/yr $186 M/yr 	$3.95 B $77 M/yr $102 M/yr $289 M/yr 
Investment Description	• Complete Chapter 152 fixes • Invest in medium and high priority Other Bridges	• Complete Chapter 152 fixes • Invest in wide range of Other Bridges	• Invest at optimal points in bridge life cycle • Meet 100% of performance-based bridge needs

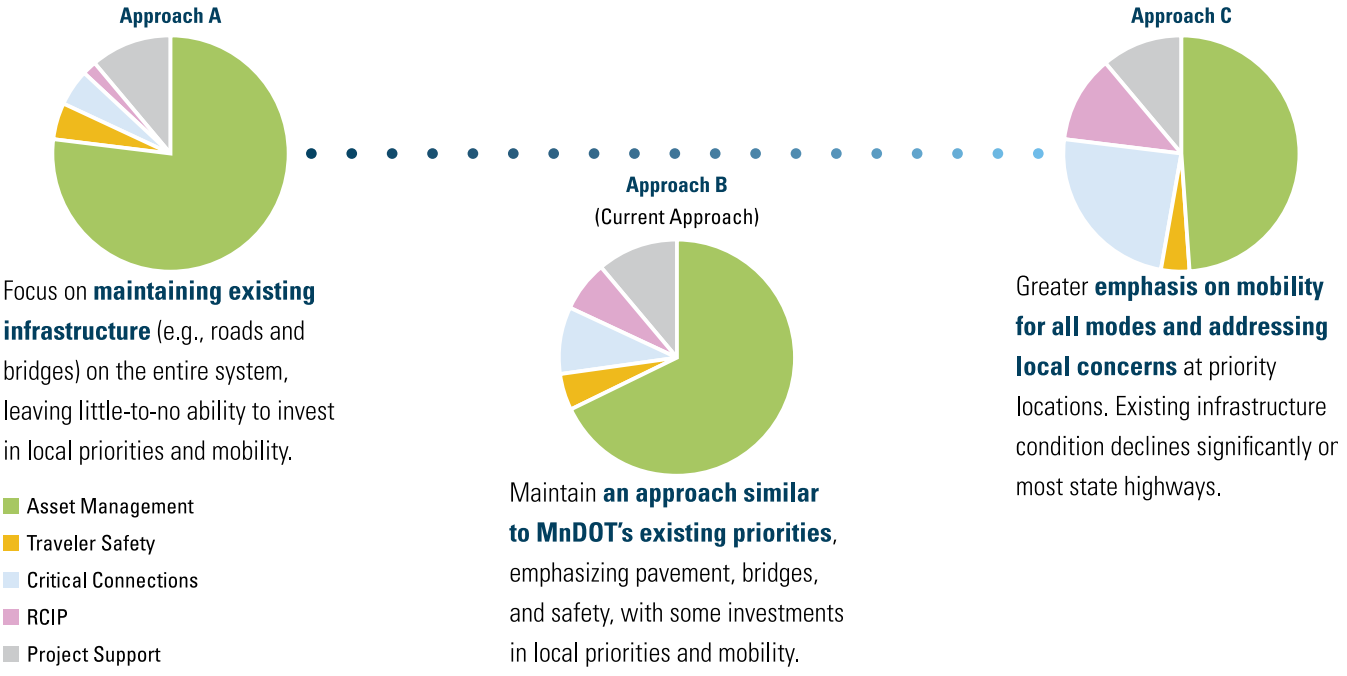
CONVERSION OF PERFORMANCE LEVELS INTO INVESTMENT APPROACHES

MnDOT packaged different combinations of performance levels for each of the 10 investment categories into three investment approaches: Approaches A, B, and C. Each approach was developed using the same baseline projections:

- $18 billion in revenue is available over the next 20 years (2014-2033).
- The size of the state highway system will not change.
- Each investment category must be funded at least to a pre-determined minimum level based on anticipated risks.
- The Project Support investment category requires 11 percent of total available revenue, based on historical spending patterns.
- Federal and state legislative requirements need to be met, and MnDOT will adjust its investment approach to reflect this as best as possible if new information becomes available during the planning process.

MnDOT used Approaches A and C to illustrate how available funding could be divided among the investment categories over the next 20 years compared to Approach B, which represents MnDOT's spending priorities as of 2012 (see **Figure 4-2**). The intent of comparing Approaches A, B, and C was to demonstrate a range of possible objectives that MnDOT could pursue through its 20-year investment priorities as well as the trade-offs in performance and risk management within each approach.

Figure 4-2: Investment Approaches Developed for Scenario Planning



Scenario Analysis

MnDOT used a variety of techniques to gather input on Approaches A, B, and C. A two-month public outreach process included nine stakeholder engagement meetings, an online interactive scenario tool, and a one-and-a-half day internal process involving key MnDOT staff. Participants in both the public and internal efforts were asked to select a preferred investment approach (A, B, or C) and explain how it would advance their priorities for the state highway system. MnDOT asked stakeholders to review and comment on the approaches, identify aspects of the state highway system that they felt were most important for investment, and identify the areas in which they would be willing to accept more risk or poorer performance levels, through less investment, in order to make progress in other investment areas.

This feedback helped MnDOT identify potential adjustments to current funding priorities based on participants' values and tolerance levels for possible outcomes and risks. The analysis also assisted MnDOT in deciding which implementation strategies would be appropriate to include in its investment plan.

PUBLIC INPUT

The MnSHIP public outreach process offered an opportunity for Minnesotans from across the state to provide feedback on how MnDOT should invest in the state highway system. MnDOT solicited public input through a number of methods during October and November of 2012. The primary avenues for public input were:

- **Stakeholder Engagement Meetings.** MnDOT hosted nine meetings across the state in October 2012. Each meeting consisted of a formal presentation, small group facilitated discussion, and an open house. A total of 217 participants provided input at the public meetings.
- **Online Interactive Scenario Tool.** This tool enabled participants to provide input through an online platform; the content on the online tool mirrored that covered in the small group discussions in the stakeholder engagement meetings (see **Figure 4-3**). Users could select their preferred scenario (Approach A, B, or C), rank categories to prioritize for increased or decreased investment relative to Approach B, and provide input based on the results. This was a new engagement method that MnDOT used to solicit public input on MnDOT's investment priorities and strategies. The site received more than 900 visits. Of those visits, 565 gave partial input and 448 selected Approach A, B, or C.

Stakeholders were given the opportunity to express preferences for different approaches to investing in the state highway system.

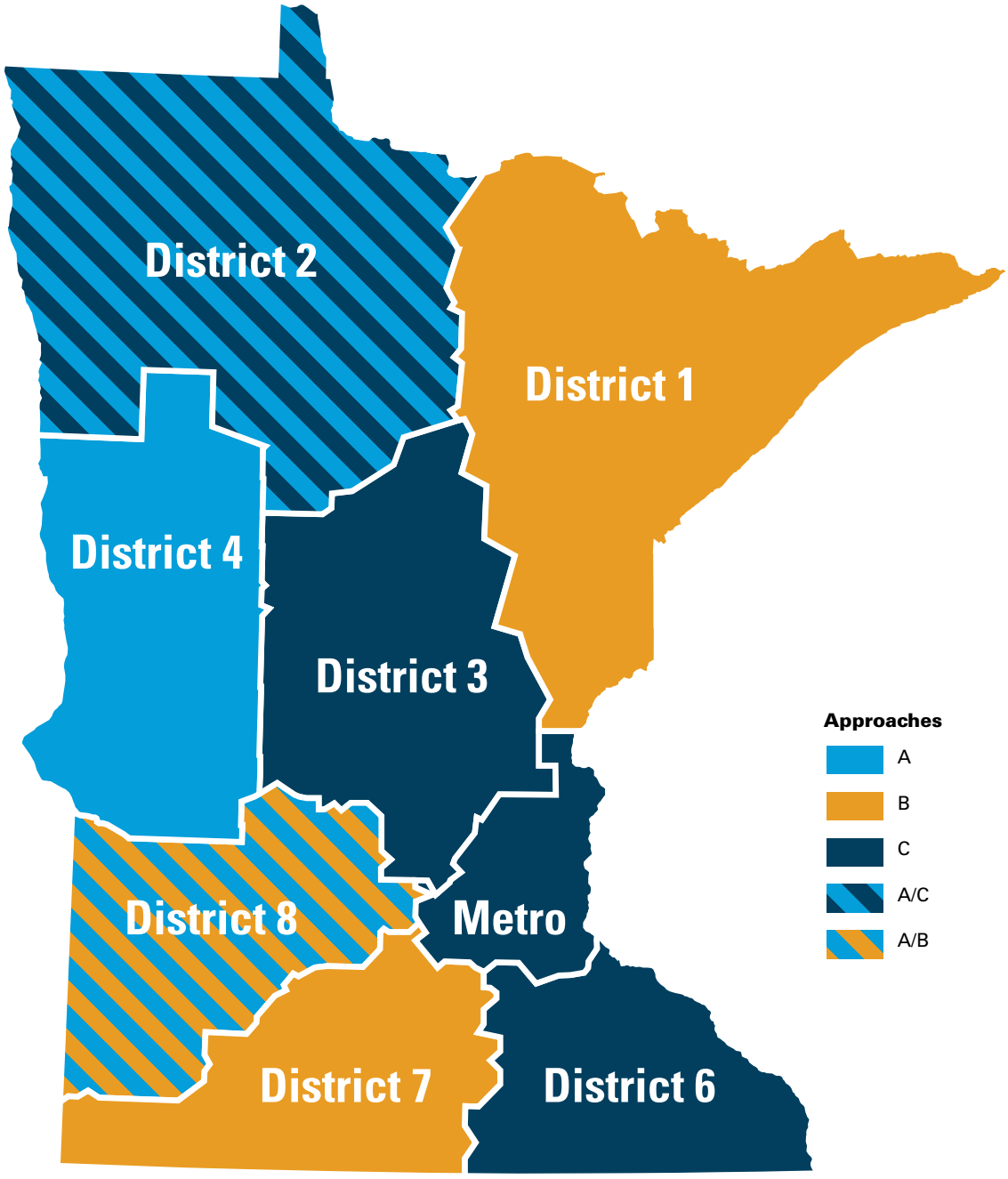
- **MnSHIP Partnership Advisory Committee (PAC).** This 30-person committee consisted of representatives of **Metropolitan Planning Organizations (MPOs), Regional Development Commission (RDCs),** counties, and cities. Many of these members are also key stakeholders with whom MnDOT works on a regular basis to develop policy, coordinate planning efforts, and program projects. The PAC helped steer the public outreach process and general plan development.
- **Comments submitted through the mail and e-mail or on the web.** MnDOT received 27 letters and 34 comments on the plan website between October 2012 and June 2013. The majority of the letter and web comments were related to project-specific requests or concerns.

Figure 4-3: Screenshot of the Online Interactive Scenario Tool

PUBLIC OUTREACH RESULTS

There was a slight preference for Approach C among the stakeholders who participated in the MnSHIP outreach meetings and online tool, indicating a preference for investments in mobility, safety, and other multimodal elements. However, there were noticeable differences between the preferences of Metro Area and Greater Minnesota participants (see **Figure 4-4** and **Figure 4-5**).

Figure 4-4: Most Frequently Selected Approach by District Meeting



Several key themes emerged as stakeholders indicated the investment categories to which they would allocate more or fewer resources under their preferred investment approach, as summarized in **Figure 4-6.**

Figure 4-6: Key Themes from Public Outreach Results

MnDOT should pursue a diverse investment program. Accept more miles of state highway in Poor condition to invest in other important investment categories such as Bicycle and Accessible Pedestrian Infrastructure, Interregional Corridor (IRC) and Twin Cities Mobility, and Regional and Community Improvement Priorities (RCIPs).

Address pavement needs strategically. Investments in pavements should be focused on the National Highway System (NHS).

Consider freight movement and regional accessibility. Prioritize key freight routes and intermodal connections for pavement and bridge investment and ensure that all regions of the state have adequate access to high-quality highways.

Mobility is key to economic competitiveness and quality of life. Prioritize IRC and Twin Cities Mobility improvements and develop broader strategies and measures for mobility improvements.

MnDOT must remain responsive to evolving needs. Continue to invest in Regional and Community Improvement Priorities, non-motorized facilities, and ADA improvements and amenities.

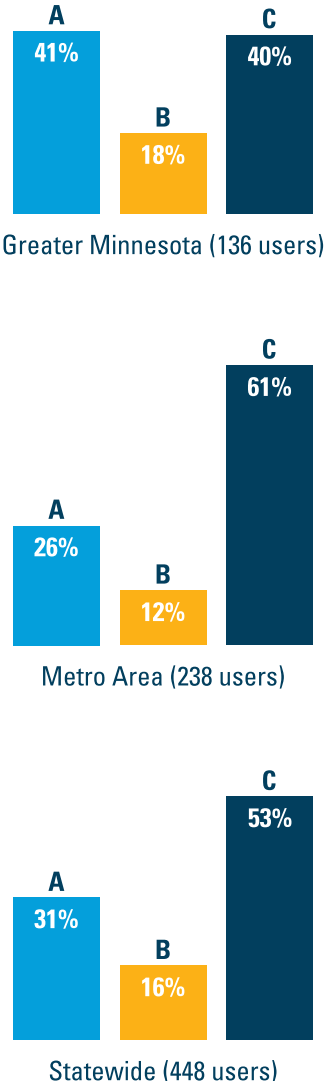
OTHER FORMS OF PUBLIC OUTREACH

MnDOT also provided the public with information about MnSHIP through a variety of online resources and smaller stakeholder meetings. These included:

- A plan website
- Social media and e-mail updates
- Four live and recorded webinars
- Investment category folios
- Presentations at the annual Minnesota American Planning Association Conference, the MnDOT Complete Streets External Advisory Committee, and other venues (see **Appendix A: Acknowledgments**).

A full public outreach summary can be found in **Appendix G: Public Outreach Summary.**

Figure 4-5: Most Frequently Selected Approach in the Online Tool



MnDOT staff considered key risks to its ability to manage and invest in the state highway system.

INTERNAL ANALYSIS RESULTS

Following the initial stakeholder and public outreach efforts, MnDOT leadership and key staff provided feedback to the MnSHIP project team on the different investment approaches and investment strategies. During this internal analysis phase, internal groups analyzed the scenarios in a manner that paralleled that of public outreach. The internal group was then asked to evaluate more specific outcomes and to comment on MnDOT's key risks related to implementing MnSHIP's capital investment priorities. The seven key risks are described in **Figure 4-7** (next page) in no particular order.

COMPARISON OF PUBLIC OUTREACH AND INTERNAL ANALYSIS

The public and MnDOT both expressed a desire to diversify investments across all categories to make progress toward all agency goals and objectives. In general, MnDOT staff leaned more toward an approach that focuses on maintaining existing infrastructure (Approach A), and the public leaned more toward greater investment in mobility for all modes and in local opportunities (Approach C). Please see **Figure 4-8** to see the distribution of MnDOT's approach preferences.

The public and MnDOT participants also differed in their prioritization of the investment categories within the context of the fiscally constrained investment scenarios. MnDOT staff placed a greater emphasis on increasing investment in Pavement Condition and Roadside Infrastructure Condition relative to the public.

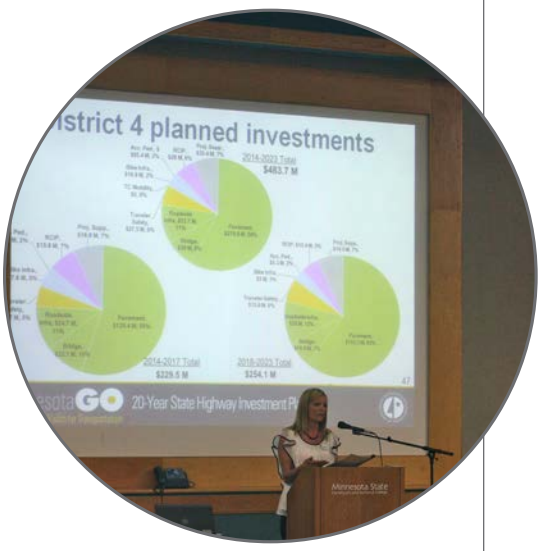
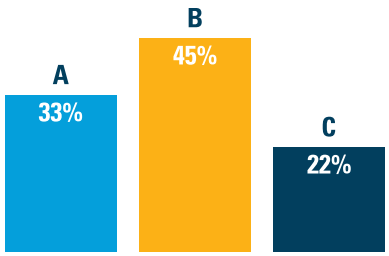


Figure 4-8: MnDOT Leadership and Staff Approach Preference



52 participants

Figure 4-7: Key Risks Related to MnDOT's Capital Investments

Government Accounting Standards Board 34 (GASB 34) and state bond rating

Risk statement – *"If bridge and pavement conditions deteriorate, then the state's bond rating may fall and the costs to borrow money may increase for state and local units of government."*

Explanation – GASB establishes standards for governments to be more accountable to users of the state's financial information, and provides government officials a tool to demonstrate long-term financial stewardship. In 2001, MnDOT established condition targets for roads and bridges as part of GASB 34 requirements. If MnDOT is not able to meet the minimum condition targets for its assets, it represents a higher risk for bond holders who invest in the state and could affect state bond ratings.

Implementation of federal policy, Moving Ahead for Progress in the 21st Century (MAP-21)

Risk statement – *"If MnDOT fails to meet the performance targets specified in MAP-21, then the agency may face increased federal oversight and less funding flexibility."*

Explanation – Under MAP-21, MnDOT is required to make progress toward pavement, bridge, and mobility performance targets on NHS roadways. If MnDOT fails to do so, the state and its local partners risk losing federal funding flexibility.

Implementation of MnDOT policy

Risk statement – *"If MnDOT's investment decisions do not reflect the Minnesota GO Vision and Statewide Multimodal Transportation Plan, then the public may not view the agency as a credible provider of multimodal transportation options."*

Explanation – MnSHIP must carry out the goals and strategies identified by the Minnesota GO Vision and the Statewide Multimodal Transportation Plan. The policies established in these plans are the result of extensive stakeholder and public input.

Bridge Condition

Risk statement – *"If MnDOT defers timely, life-cycle investment in bridges to address other investment needs, then the public and legislators may view investment priorities as unwise or unsafe."*

Explanation – Maintaining state highway bridges in good repair is required to avoid future bridge needs that may be financially unachievable. It is also important in retaining the public and legislature's trust in MnDOT following the tragic August 1st, 2007 I-35W bridge collapse.

Responsiveness to local issues, concerns, and opportunities

Risk statement – *"If MnDOT adopts a rigid investment strategy that avoids consideration of local transportation needs, then the agency may not be able to support local economic development and quality of life opportunities."*

Explanation – The Regional and Community Improvement Priorities (RCIPs) investment category is seen by the public as an important investment priority, as this category allows districts to be responsive and address emerging local issues and concerns. Funding some of these opportunities is crucial to being a good partner and to support economic development across the state. RCIP opportunities include partnering with local units of government to improve state highways that pass through center of towns, improving intersections as surrounding land uses change, or building amenities to help new economic development opportunities materialize throughout the state.

Operations budget

Risk statement – *"If MnDOT cannot make capital investments that minimize life-cycle costs, then transportation assets may fail prematurely and maintenance costs may rise to unsustainable levels."*

Explanation – State highway system assets require ongoing maintenance to ensure that the traveling public is safe. Without timely capital investments, the cost of maintenance and operations to keep highway assets in a safe condition could increase to an unmanageable level.

Public outreach and opinion

Risk statement – *"If MnDOT's transportation investments do not reflect the priorities identified during MnSHIP's public outreach, then the public may lose confidence in the agency."*

Explanation – MnDOT has a responsibility to address public expectations through its state highway investments. MnSHIP should respond to stakeholders' priorities to maintain trust with MnDOT partners and the public.

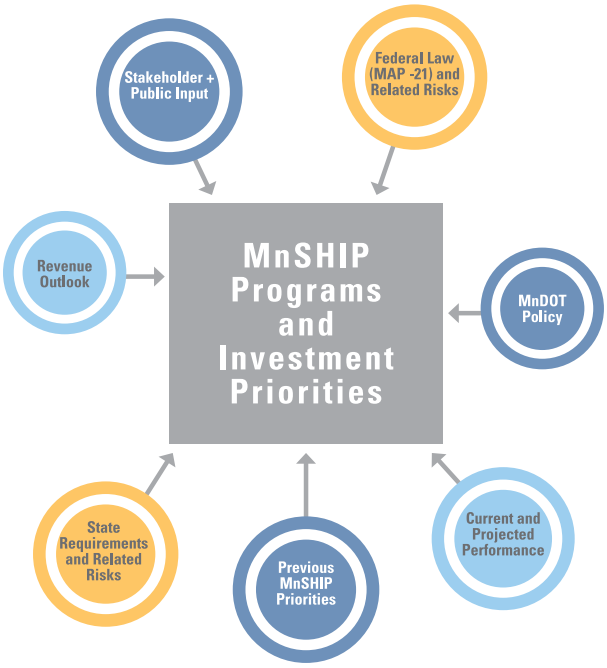
Influence of Scenario Analysis on MnDOT's Investment Priorities

With feedback and direction from its public outreach and internal analysis efforts, MnDOT worked to formally establish MnSHIP's 20-year investment priorities (see **Figure 4-9**). In doing so, MnDOT committed to mitigating the seven key risks for as long as possible. MnDOT arrived at planned investment category expenditures for the next 20 years by updating the previous planning and programming efforts in three ways:

1. Establishing two separate sets of priorities for Years 1-10 and 11-20 of the plan.
2. Adjusting priorities in each investment category.
3. Developing and using two new programs to select projects that meet new priorities.

The first two changes are described on the following pages, and the third is described on page 87.

Figure 4-9: Key Factors That Influenced MnSHIP Investment Priorities



TWO 10-YEAR PLANNING PERIODS

For more than a decade, unit construction costs (e.g., fuel, raw material, equipment, and labor) have grown more quickly than revenue. MnDOT expects this trend to continue, severely decreasing the buying power of available revenue by 2024. This loss in buying power poses severe constraints on annual revenues that will be available to address a growing set of highway needs between 2024 and 2033 and will make it increasingly challenging to mitigate all seven key risks over the 20-year life of the plan.

MnDOT's internal outreach process identified two primary, unacceptable risks to the state's transportation program: failure to implement federal policy set in MAP-21, and failure to preserve the state's bond rating by falling below the thresholds set in **Government Accounting Standards Board Statement 34 (GASB 34).** The potential impact on the state's bond rating and the impact of losing federal funding flexibility would be too great and would not position MnDOT to provide sound stewardship for the state highway system. Therefore, MnDOT's anticipated expenditures in each investment area vary between the first and second halves of the plan. This change in focus helps MnDOT address its greatest capital investment risks as they evolve over the 20-year period and carry out its stewardship responsibilities for the state's assets.

For Years 1-10, MnDOT adjusted its existing investment mix based on public input, internal analysis, and other considerations. The final mix for these years is most closely aligned with Approach B with certain aspects of Approach C. MnDOT's priorities for Years 1-10 reflect the public's emphasis on maintaining a diverse mix of improvements for as long as possible, as well as the public's support for investments that enhance mobility and MnDOT's ability to respond to evolving needs.

Public input played a less prominent role in shaping MnDOT's priorities for Years 11-20, as these priorities are largely an outcome of meeting expected MAP-21 and GASB 34 requirements. The investment mix for Years 11-20 most closely reflects the asset preservation focus of Approach A.

The final investment priorities are broken down into two distinct periods: Years 1-10 and Years 11-20.

INVESTMENT CATEGORY ADJUSTMENTS

The MnSHIP scenario analysis centered on public and internal participants recommending adjustments to existing investment priorities (based on the 2009 State Highway Investment Plan). **Figure 4-10** details how multiple factors contributed to the final set of investment priorities in Years 1-10 and Years 11-20. The table explains how greater investment in each category is needed to mitigate one or more of the seven key risks and why MnDOT's final priorities may deviate, if at all, from feedback received during the public input phase and during MnDOT's internal analysis.

Comparing priorities, as a percentage of total revenue, from 2009 to those in this MnSHIP update is a challenge. Several key changes help to explain this challenge, including two new investment categories (Bicycle Infrastructure and Accessible Pedestrian Infrastructure), a clarification of the definition of Traveler Safety (investment in this category focused on new or upgraded safety infrastructure preservation of existing safety infrastructure is categorized as asset management, as nearly all existing infrastructure has a safety benefit), and Project Support being included as part of other categories in 2009. The scope and type of projects included in the RCIP category has also narrowed, as some projects are better captured in other categories. Perhaps the most substantial difference, however, is the separation of capital projects into ten investment categories for this MnSHIP update. The 2009 priorities included in **Figure 4-10** therefore represent an approximation of what investments would have looked like had they been separated into investment categories. For some categories, like Pavement Condition, the estimation is likely of reasonable accuracy. Other new or not well-defined categories such as Bicycle Infrastructure, are little more than an educated guess. The ability to compare priorities between plans will improve by the next update.

Figure 4-10: Public Input, Internal Input, and Other Factors that Influenced the MnSHIP Investment Priorities

Investment Category		Existing Priorities[1]	Public Input	MnDOT Input
Asset Management	Pavement Condition	33.9%	A statewide network of well-maintained roads is critical to freight movement and regional access. Address needs strategically. Accept more miles in Poor condition to invest in other priorities.	Most popular category for increased investment. Declining condition is a concern. Stewardship of existing system is important. Be mindful of GASB 34 condition thresholds.
	Bridge Condition	18.3%	Limited feedback. General support for current approach.	Investment in bridges is important to ensure safety and to maintain public trust. Stewardship of existing system is important.
	Roadside Infrastructure Condition	9.1%	Limited feedback. Difficult to understand the role of roadside infrastructure assets in ensuring safe and efficient travel.	Declining condition is a concern. Investment lessens burden on maintenance activities to keep roads safe. Second most popular category for increased investment.
Traveler Safety		6.9%	General support for current approach. Strong support for TZD initiatives.	General support for current approach. Strong support for TZD initiatives. Address some locations with a crash history.
Critical Connections	Twin Cities Mobility	6.9%	High priority for additional funding. Focus on state's critical connections. Improve mobility for all modes.	Advance multimodal objectives. Continue current approach that advances multimodal objectives and maximizes current system.
	Interregional Corridor Mobility	0.0%	High priority for additional funding. Focus on and add capacity to state's critical connections.	Prioritize investment on these routes when need arises.
	Bicycle Infrastructure	2.3%	Polarizing category. Respond to evolving needs. When appropriate, focus on high-priority locations.	Need to establish and identify a priority bike network. Coordination with local units of government is essential.
	Accessible Pedestrian Infrastructure	1.6%	Polarizing category. Being responsive to evolving needs is important and improves quality of life in communities.	Address compliance issues. Invest in high-priority locations. Coordination with local units of government is essential.
Regional + Community Improvement Priorities		10.0%	High priority for additional funding. Being responsive to evolving needs is important. Respect unique regional challenges and opportunities.	Investment is critical for advancing all Minnesota GO objectives. Most feasible category to reduce in order to meet targets related to system preservation.
Project Support		11.0%	Not applicable.	Seek efficiencies to minimize costs.

1 Comparing priorities in 2009 to those in this update must be done with caution. Refer to text on previous page.

Risks Addressed[2]	Years 1-10 Priorities	Years 11-20 Priorities	20-Year Average	Rationale for Adjusting Existing Priorities
• GASB 34 • Federal policy • MnDOT policy • Operations budget	38.1%	59.1%	48.6%	Increase investment to mitigate risks, though conditions decline. The decision to maintain NHS routes in better condition and accept more miles of non-NHS routes in Poor condition to invest in other categories is consistent with most Public and MnDOT input.
• GASB 34 • Federal policy • MnDOT policy • Bridges • Operations budget	20.2%	20.7%	20.5%	Maintain approximate current investment, consistent with most Public and MnDOT input, though conditions decline. Maintain NHS bridges in better condition compared to non-NHS bridges in order to invest in other categories.
• MnDOT policy • Operations budget	8.8%	9.0%	8.9%	Prioritize investment on NHS concurrent with pavement and bridge projects. Proactively address high risk elements with stand alone projects.
• Federal policy • MnDOT policy	4.2%	3.3%	3.8%[3]	Maintain approximate current investment, consistent with most Public and MnDOT input. Limited ability to address sustained crash locations in Years 11-20 is inconsistent with most input.
• MnDOT policy • Responsiveness • Public input	6.9%	0.0%	3.5%	Maintain approximate current investment for Years 1-10, consistent most Public and MnDOT input. In Years 11-20, eliminate investment to mitigate asset management risks.
• MnDOT policy • Responsiveness • Public input	0.0%	0.0%	0.0%	No investment, though some RCIP projects improve mobility on IRCs. In Years 11-20 when needs arise, unable to invest due to focus on asset management. Inconsistent with public input.
• MnDOT policy • Responsiveness • Public input	1.4%	1.0%	1.2%[4]	Maintain approximate current investment, moderately consistent with Public and MnDOT input. In Years 11-20, narrow focus to maintaining priority network.
• MnDOT policy • Responsiveness • Public input	1.6%	2.0%	1.8%	Maintain approximate current investment, moderately consistent with Public and MnDOT input. Increased investment in Years 11-20 is consistent with greater focus on asset management.
• MnDOT policy • Responsiveness • Public outreach	7.5%	0.0%	3.8%[5]	Slight decrease in current investment in Years 1-10. Eliminate investment in Years 11-20 to mitigate asset management risks which does not align well with Public or MnDOT input.
• MnDOT policy	11.5%	5.0%	8.3%	Dependent on project mix. Transition to asset management in Years 11-20 reduces costs.

2 Refer to definition of risks on page 79.

3 Investment now focuses on new or upgraded safety infrastructure; preservation of existing safety infrastructure falls under asset management as nearly all existing infrastructure has a safety benefit.

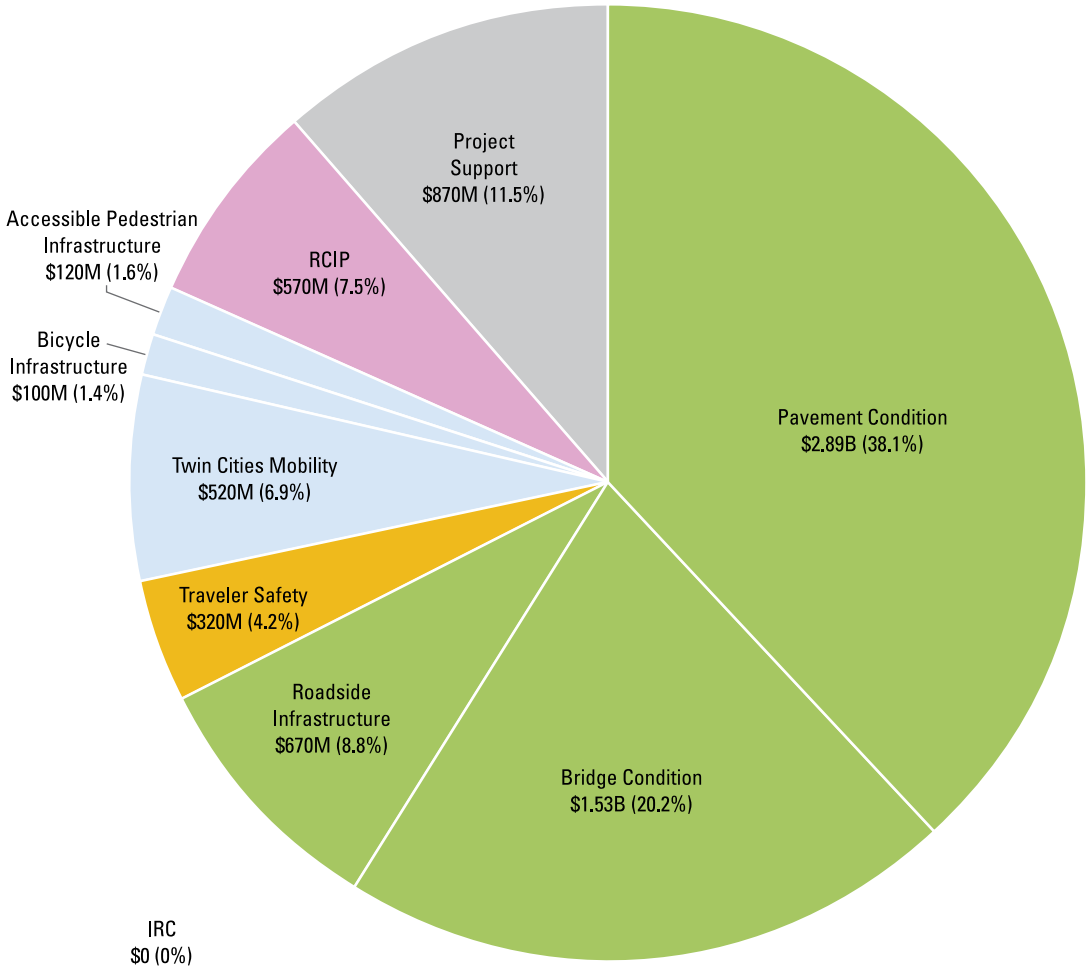
4 Bicycle investment was particularly difficult to estimate looking back to 2009. The 2013 priorities likely represent a closer representation of what actual investments looked like at that time.

5 The scope and type of projects included in the RCIP category has also narrowed as some projects are better captured in other categories.

Summary of 20-Year Investment Priorities

Years 1-10. For the first 10-year period, MnDOT will pursue priorities that are similar to those of the past four years, addressing high-priority improvements in all investment categories. **Chapter 5, "20-year Investment Plan,"** articulates the outcomes associated with these priorities and details the translation of priorities into projects. The expenditures in each category will allow MnDOT to adequately or partially mitigate all seven key risks as categorized in **Figure 4-11.**

Figure 4-11: Investment Priorities, Years 1-10



Years 11-20. During the second 10 years, MnDOT will focus its investment priorities on the preservation of existing assets. This change in focus is necessary to manage the GASB 34 and MAP-21 risks. As the system ages and buying power decreases, pavement and bridge conditions are likely to decline faster than they can be repaired or replaced, even though most of MnDOT's available highway revenues will be targeted toward these categories (see **Figure 4-12**). For this reason, MnDOT is unable to mitigate even these risks well and will likely have to accept greater risk and undesirable outcomes in the other investment areas.

Figure 4-12: Investment Priorities, Years 11-20

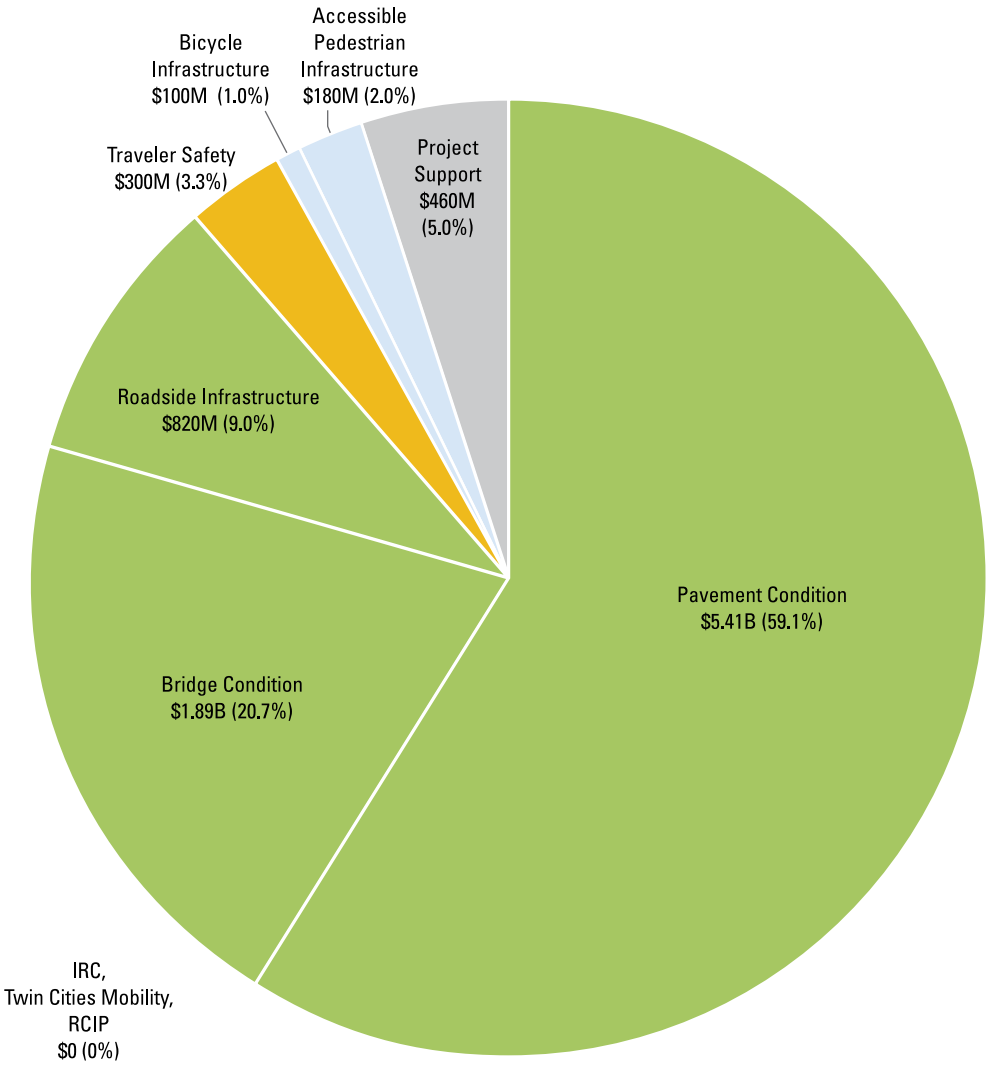


Figure 4-13 indicates the degree to which each of these two 10-year periods mitigates the seven key investment risks. MnDOT will not be able to mitigate the seven key risks in the second half of the plan as well as it can during the first half of the plan.

Figure 4-13: Risk Mitigation Through Year 10 and Year 20

Key Capital Investment Risks	Mitigated Risk Through Year 10 (of 3 ✓)	Mitigated Risk Through Year 20 (of 3 ✓)
GASB 34: pavement and bridge conditions deteriorate, jeopardizing state bond rating	✓✓	✓
Federal policy: failure to achieve MAP-21 performance targets on NHS reduces funding flexibility	✓✓✓	✓
MnDOT policy: misalignment with Vision and Statewide Multimodal Transportation Plan results in loss of public trust	✓✓	✓
Bridges: deferring bridge investments viewed as an unwise/unsafe strategy	✓✓✓	✓✓
Responsiveness: rigid investment priorities limits ability to support local economic development and quality of life opportunities	✓✓	—
Operations budget: untimely or reduced capital investment leads to unsustainable maintenance costs	✓✓	✓
Public outreach: investment inconsistent with MnSHIP public outreach results in loss of public trust	✓✓	—

✓✓✓	*Adequately mitigated* MnDOT mitigates most or all of the risk through its investment priorities
✓✓	*Partially mitigated* MnDOT mitigates most of the risk through its investment priorities, but must accept some risk
✓ or —	*Unmanaged or inadequately mitigated* MnDOT is unable to mitigate the risk well, and must accept much of the risk or transfer it to another agency

Project Selection

INFLUENCE OF NEW INVESTMENT PRIORITIES ON PROJECT SELECTION IN YEARS 1-3

Projects identified for 2014, 2015, and 2016 (Years 1-3) were developed based on investment priorities established in the 2009 state highway investment plan and on the existing **State Transportation Improvement Program (STIP),** covering 2013-2016. MnDOT considers projects listed in the STIP to be commitments. As a result, MnSHIP did not shape project selection for Years 1-3, though the timing and scope of these projects might have changed based on project development and coordination with local partners.

INFLUENCE OF NEW INVESTMENT PRIORITIES ON PROJECT SELECTION IN YEARS 4-10

MnSHIP investment priorities directly affect project selection in Years 4-10. Regarding Year 4, MnDOT developed the forthcoming annual update to the STIP covering projects in 2014-2017 concurrently with MnSHIP. Therefore, projects listed for Year 4 (2017) reflect MnSHIP investment priorities. Projects and priorities in Years 5-10 are similarly influenced, though they are still in the planning stages and not yet considered commitments. The timing and scope of these projects is subject to change according to MnDOT's ongoing evaluation of system conditions, project timing, and agency risks.

MnDOT created two programs that will guide project selection for Years 4-10 of MnSHIP going forward: the **Statewide Performance Program (SPP)** and the **District Risk Management Program (DRMP).** The purpose of establishing these two programs is to ensure the agency efficiently and effectively works toward common statewide goals—in particular, meeting GASB 34 thresholds for pavements and bridges and meeting MAP-21 performance targets—while maintaining some flexibility to address unique risks and circumstances at the district level.

Project Selection through the Statewide Performance Program

MAP-21, the new federal transportation bill, places greater emphasis on **National Highway System (NHS)** performance and requires MnDOT to make progress toward national performance goal areas, including those related to asset condition, safety, and congestion. Failure to do so results in the loss of some federal funding flexibility. Further, the scenario analysis highlighted the expectation that MnDOT maintain the state's most important routes in a state of good repair. In response, MnDOT developed the SPP to ensure that federal

The SPP primarily funds NHS improvements. The NHS accounts for 44 percent of state highway system miles.

and state performance targets are met on the NHS and that the condition of these routes meets public and MnDOT expectations. MnDOT also makes it a priority to use all federal funds and retain federal funding flexibility.

The SPP funds and provides a process for selecting projects that address risks related to statewide travel. Staff from MnDOT's central office, district offices, and specialty offices collaborated to develop a list of potential projects and planned investments to address these risks in Years 4-10 through the SPP. Similar to now, each MnDOT district will coordinate with **Area Transportation Partnerships (ATPs),** MPOs, and other key partners and recommend adjustments to project scope and timing. Upon final selection, each MnDOT district is responsible for designing and delivering selected projects. The following types of projects are prioritized through the SPP in MnSHIP:

- **Asset Management.** Rehabilitation or replacement of existing pavements, bridges, and roadside infrastructure elements on NHS roads.
- **Traveler Safety.** Lower cost, high-benefit strategies to improve traveler safety on NHS roads.
- **Critical Connections.** Improvements that address performance related to mobility and congestion mitigation in the Twin Cities metropolitan area. Also includes bicycle and pedestrian accommodations to be implemented concurrently with Asset Management projects on NHS roads.

The SPP also includes some revenue for statewide competitive solicitations that will fund projects that leverage local funds to provide economic, quality of life, and transportation benefits. Past examples, that may or may not be the basis for future solicitations, include the **Safety and Mobility (SaM), Transportation Economic Development (TED),** and **Corridor Investment Management Strategy (CIMS)** solicitations.

MnDOT used investment priorities for the NHS to determine the projects and project costs that would be necessary to meet SPP objectives for Years 4-10 of the plan. The result is that the SPP accounts for approximately 45 percent of annual revenue, or approximately $333 million per year, plus the cost of delivering those projects (Project Support). Planned projects and investments for Years 1-10 is presented in **Appendix H: District 10-Year Work Plans**. Going forward, MnDOT will continue to evaluate its expectations and funding levels for existing assets on the NHS and the statewide solicitation programs.

Project Selection through District Risk Management Program

Whereas the SPP focuses funding on addressing key performance targets on NHS routes, the DRMP focuses funding on all other non-NHS highways as well as other non-performance-based needs (RCIPs) on all state highways. The majority of the program supports pavement and bridge rehabilitation or

replacement projects. The DRMP project selection process is structured to give districts the flexibility to address their greatest regional and local risks. Districts are also able to make additional investments on the NHS system if the proposed project is in response to a high risk issue.

In the DRMP, each MnDOT district is responsible for selecting projects that mitigate their highest risks that are not addressed through the SPP in the areas of Asset Management, Traveler Safety, Critical Connections, and RCIPs. MnDOT distributes different levels of funding to the districts for this program based on a revenue distribution method that accounts for various system factors. MnDOT districts collaborate with ATPs, MPOs, and other key partners to select projects for Years 4-10.

MnSHIP directs 45 percent of MnDOT's annual revenues toward DRMP projects in Years 4-10, or approximately $333 million per year (plus the cost of delivering those projects Project Support). Coincidentally, this is the same annual amount that resulted from the SPP project selection process. The DRMP's share of MnDOT's annual program may vary in the future depending on the outcomes of MnDOT's ongoing risk-based and performance-based planning efforts. The investment category mixes for each district vary depending on the system characteristics and conditions unique to that area of the state.

Chapter 5, "20-Year Investment Plan," details how the final set of MnSHIP investment priorities are expected to translate into outcomes on the state highway system through 2033.

The DRMP primarily funds projects on non-NHS roads, which compose approximately 56 percent of state highway system miles.

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Chapter 5

20-YEAR INVESTMENT PLAN

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20-YEAR INVESTMENT PLAN

Chapter 5 describes the way MnDOT will prioritize its investments to align projects with statewide goals over the next 20 years. MnDOT determined its funding levels for each investment category based on public and internal input on transportation priorities and risks to the system over the next 20 years. The result is a diversified approach that makes progress in all investment areas in the early years and focuses on maintaining existing infrastructure in the later years.

Districts selected projects in a way that is consistent with the investment priorities established by MnDOT through the development of MnSHIP. Project lists were developed for two distinct time periods based on the planned timing of project delivery: Years 1-4 (2014-2017) and Years 5-10 (2018-2023).

The key messages of Chapter 5 are:

- *In Years 1-10, MnDOT will make progress in all investment areas and meet known and anticipated federal and state performance requirements.*
- *In Years 11-20, MnDOT will put most of its available revenues toward Asset Management to manage its most serious risks at the expense of making progress toward other key objectives.*
- *MnDOT will apply multiple strategies to optimize resources and achieve multiple purposes through its planned investments.*

If a project is listed in the STIP, it is a funding commitment and project delivery is in progress.

Projects Listed in MnSHIP

While MnSHIP sets MnDOT's investment priorities for a 20-year time period, MnDOT does not identify specific projects for all years of the plan. MnDOT is committed to delivering projects scheduled for Years 1-4 of MnSHIP, and projects identified to occur between Years 5-10 are in the budget, but project timing, scope, and cost are subject to change. Together, Years 1-10 comprise a 10-Year Work Plan that translates investment priorities and funding programs into potential projects and investment allocations that collectively achieve the outcomes of MnSHIP.

- **Years 1-4 = State Transportation Improvement Program (STIP) Years.** The STIP is the list of committed projects. Although some smaller programs do not list specific projects, all planned major projects are listed. If a major project is listed in the STIP, MnDOT is actively developing the project. STIP projects are in MnDOT's budget and are highly likely to be delivered.
- **Years 5-20 = Planning Years.** MnDOT's level of specificity in identifying its planned investments generally decreases as the plan approaches Year 20 (2033).
    - » **Years 5-7** list all major projects as well as some improvements by investment category. Major projects listed in Years 5-7 are subject to change, but are likely to be delivered within the Work Plan years. MnDOT may be pursuing preliminary study or scoping of projects in Years 5-7, but design, right-of-way, and environmental work likely have not begun.
    - » **Years 8-10** may include a few major projects which require advance study and coordination. Smaller projects will be specifically identified as the program year approaches, and the schedule and scope of all projects are subject to change. Major projects may yet be added to these years as the programming year approaches.
    - » **Years 11-20** does not include a list of projects. Investments are identified only by broad categories and dollar amounts that will achieve the MnSHIP outcomes. Projects will be identified in the future to fill in the funding categories with each new year of the Work Plan.

Each MnDOT district developed a 10-Year Work Plan. The 10-Year Work Plans illustrate how districts plan to invest at the project level for Years 1-4 and how they generally intend to invest in a mix of projects and improvements by investment category for Years 5-10 of the plan. Please see **Appendix H: District 10-Year Work Plans,** for more detail on MnDOT's planned investments for the first 10 years of the plan.

Investment Summary

MnDOT's anticipated expenditures in each investment area will undergo a shift at the end of Years 1-10. This shift is due to MnDOT's need to address its greatest capital investment risks as they evolve over the 20-year period.

YEARS 1-10: MAKING PROGRESS IN ALL INVESTMENT AREAS

The first 10 years represents a direction similar to the approach taken in the past four years, which addressed high-priority improvements in all investment areas. This approach reflects both MnDOT and stakeholder input and adequately manages key capital investment risks in the near-term. MnDOT's investment program for Years 1-10 includes both previously committed projects in the STIP (Years 1-4) as well as a new set of investment priorities that MnDOT developed in this MnSHIP update. **Figure 5-1** shows the distribution of expenditures between Years 1-10.[1]

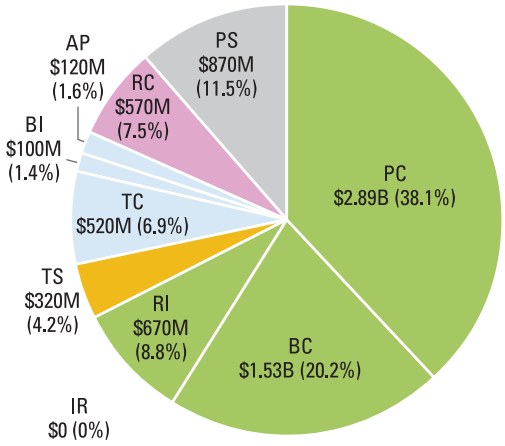
Biggest Strengths

This approach makes progress toward goals in all four investment areas, excluding Project Support. MnDOT's priorities reflect the public's input that calls for a diversified approach. Outcomes for each investment group include:

- **Asset Management:** Conditions of roads, bridges, and roadside infrastructure remain stable on **National Highway System** (**NHS**) routes (45 percent of the system). Known and anticipated federal and state performance requirements are met.
- **Traveler Safety:** Continuation of focus on lower cost, proactive treatments aimed at preventing fatalities and serious injuries.
- **Critical Connections:** Pedestrians and bicyclists accommodated at priority locations. A few investments to improve vehicular system capacity and economic vitality are implemented.
- **Regional and Community Improvement Priorities (RCIP):** Address local concerns through partnerships, design add-ons, and a few stand-alone projects to support economic competitiveness and quality of life.

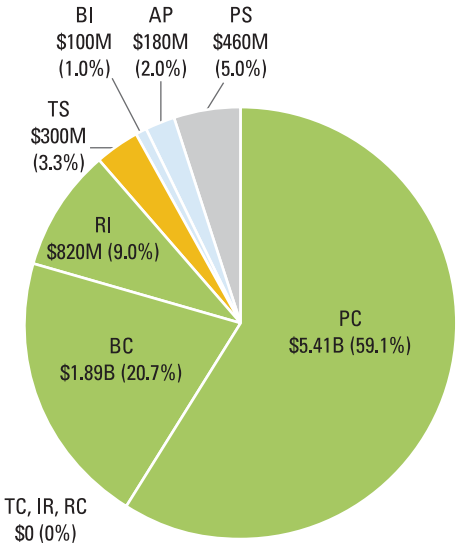
1 The investment totals for Years 1-10 and Years 11-20 exclude the Small Programs investment, which is estimated to total approximately $45 million per year and is not affected by MnSHIP priorities.

Figure 5-1: Investment Priorities, Years 1-10



PC	Pavement Condition
BC	Bridge Condition
RI	Roadside Infrastructure
TS	Traveler Safety
TC	Twin Cities Mobility
IR	Interregional Corridor Mobility
BI	Bicycle Infrastructure
AP	Accessible Pedestrian Infrastructure
RC	Regional + Community Investment Priorities
PS	Project Support

Figure 5-2: Investment Priorities, Years 11-20



Biggest Drawbacks

The approach during Years 1-10 offers a limited response to growing infrastructure and multimodal needs. In particular, the following outcomes are not ideal:

- **Asset Management:** Conditions of roads, bridges, and roadside infrastructure decline on non-NHS routes (55 percent of the system).
- **Traveler Safety:** Only a select number of locations with a sustained crash history are able to be addressed.
- **Critical Connections:** Number and scope of system capacity improvements decrease.
- **RCIPs:** Number and scope of projects to address local concerns do not match stakeholder expectations as expressed during outreach.

YEARS 11-20: ASSET MANAGEMENT FOCUS

The greatest disparity between MnDOT's available revenues and needs, and the greatest negative impacts on the state highway system, are apparent in the second half of MnSHIP. Years 11-20 will require MnDOT to put most of its available revenues toward Pavement Condition and Bridge Condition to manage its most serious risks in these years, which are related to complying with federal and state performance requirements and ensuring that the state's asset conditions do not violate GASB 34 thresholds and, thereby, potentially impact Minnesota's bond rating. **Figure 5-2** shows the distribution of expenditures between Years 11-20.

Biggest Strengths

The investment mix for Years 11-20 places assets at GASB 34 condition thresholds and is assumed to meet MAP-21 targets. However, assets continue to deteriorate faster than they can be repaired or replaced, despite most available resources being targeted toward these categories. The outcomes for each investment area include:

- **Asset Management:** Federal and state performance and finance requirements are met.
- **Traveler Safety:** Continuation of focus on lower cost, proactive treatments aimed at preventing fatalities and serious injuries.
- **Critical Connections:** Required pedestrian and bicyclist accommodations implemented concurrently with pavement and bridge projects to best leverage funds and address legal requirements.
- **RCIPs:** Address those concerns which can be handled through project timing of asset management projects.

Biggest Drawbacks

During Years 11-20, MnDOT will be unable to make appreciable progress toward non-asset management goals. Assets will continue to decline faster than they can be repaired or replaced, despite most available resources being targeted toward these categories. This is due to both the need for more expensive repairs as well as the loss of buying power from inflation of construction costs relative to the growth in available revenues. The investment mix is not well-aligned with the public's preferences. The following outcomes illustrate the limitations of the investment direction set for Years 11-20:

- **Asset Management:** Conditions of existing roads, bridges, and roadside infrastructure worsen on NHS routes, leading to increased pressure on maintenance activities to keep system infrastructure in a safe and operable condition.
- **Traveler Safety:** Annual fatalities and serious injuries are likely to decline but at a slower rate. Unable to respond to locations with a sustained crash history.
- **Critical Connections:** No capacity is added across all modes.
- **RCIPs:** No flexibility to partner or address specific local concerns and opportunities.

Maintaining the condition of today's infrastructure requires significant investment, and even greater investment in all categories is necessary to meet goals and objectives consistent with the **Minnesota GO Vision.** Given the projected $12 billion funding gap, there will be many unfunded priorities within the 20-year horizon. Consistent with the **Transportation Finance Advisory Committee (TFAC)** recommendations, **Appendix I: Illustrative Project List of Unmet Needs,** presents a list of the types of projects that could be supported if the $12 billion funding gap were closed. While this list is illustrative and totals less than $12 billion, it demonstrates that there are unfunded needs in all categories, including existing infrastructure, new connections for all modes, and investments to improve economic vitality throughout the state. See **Chapter 6, "Moving Forward,"** for more information on TFAC and its recommendations.

Figure 5-3 summarizes the level of investment and associated outcomes in each of the 10 investment categories for both time periods.

Specific projects are not listed for Years 11-20, but not being listed does not preclude a project from being considered or programmed in the future as priorities change or as more revenue becomes available.

Figure 5-3: Investments and Outcomes by Investment Category for the Next 20 Years

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
Traveler Safety		$320 million	Annual fatalities likely to continue decline. Investments emphasize lower cost, high benefit treatments. Address several locations with a crash history. Continue to partner in TZD initiative.	$300 million	Annual fatalities likely to continue decline, but at a slower rate. Investments focus almost exclusively on lower cost, high-benefit treatments. Continue to partner in TZD initiative.	$620 million
Critical Connections	Twin Cities Mobility	$520 million	Congestion and reliability issues likely to worsen. Focus on Active Traffic Management, spot mobility improvements, implementation of MnPASS system, and strategic capacity improvements.	$0	Congestion and reliability issues worsen. No ability to address spot or operational issues.	$520 million
	Interregional Corridor Mobility	$0	IRC system performance target met, although several corridors see decreasing average speeds.	$0	IRC system performance target not met due to decreasing average speeds on four corridors.	$0

(Continued on next page)

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
Critical Connections (cont.)	Bicycle Infrastructure	$100 million	Bridge and pavement projects accommodate bicyclists as appropriate. Stand-alone projects are focused at high-priority locations.	$100 million	Investments to accommodate bicycles are concurrent with pavement and bridge projects only. No stand-alone bicycle improvements are made.	$200 million
	Accessible Pedestrian Infrastructure	$120 million	Investments to accommodate pedestrians are generally concurrent with pavement and bridge proejcts. Most curb ramps and signalized intersections are maintained to ADA standards.	$180 million	Investments to accommodate pedestrians are generally concurrent with pavement and bridge projects and focus investment to meet ADA requirements.	$310 million
Regional + Community Improvement Priorities		$570 million	Address economic vitality and quality of life through partnerships, design add-ons, and a few stand-alone projects each year.	$0	MnDOT districts have little-to-no ability to address local concerns, partner, add capacity, or spur economic development.	$570 million
Project Support		$870 million	Invest the amount necessary to deliver projects in the other categories. Expenditures are consistent with recent averages but expected to decrease by 2023.	$460 million	Invest the amount necessary to deliver projects in the other categories. Expenditures decline with a shift toward an asset-focused program.	$1.33 billion
Small Programs		$370 million	Maintain flexibility to respond to unforeseen issues, one-time needs, or changes in policy/ funding.	$530 million	Maintain flexibility to respond to unforeseen issues, one-time needs, or changes in policy/ funding.	$900 million
TOTALS		**$8 billion**		**$10 billion**		**$18 billion**

Connection to MnDOT's Family of Plans

Minnesota GO Vision

Build to a maintainable scale – Consider and minimize long-term obligations and do not overbuild. The scale of the system should reflect and respect the surrounding physical and social context of the facility. The transportation system should affordably contribute to the overall quality of life and prosperity of the state.

Minnesota GO Vision

Strategically fix the system – Some parts of the system may need to be reduced while other parts are enhanced or expanded to meet changing demand. Strategically maintain and upgrade critical existing infrastructure.

Minnesota GO Vision

Leverage public investments to achieve multiple purposes – The transportation system should support other public purposes, such as environmental stewardship, economic competitiveness, public health, and energy independence.

Statewide Multimodal Transportation Plan

Objective: To strategically maintain and operate transportation assets; rely on system data, partners' needs, and public expectations to inform decisions; put technology and innovation to work to improve efficiency; and recognize that the system should change over time.

Asset Management

The investment priorities and programs established in MnSHIP are aligned with the objectives and strategies from the **Statewide Multimodal Transportation Plan,** which emphasize asset management on priority networks, keeping the transportation system on a sustainable track for the future, considering multiple needs in programming, and collaborating with partners.

Because MnSHIP is a fiscally constrained plan and must address MnDOT's responsibility to meet state and federal pavement and bridge performance requirements, MnDOT will not be able to invest in all assets at optimal points in their life-cycles. MnDOT prioritizes asset improvements on NHS routes and holds these roads to a higher performance standard than non-NHS routes throughout the 20-year plan. This approach allows MnDOT to comply with federal law and manage risks related to statewide travel. MnDOT's commitment to maintaining and prioritizing assets is even more apparent in the second half of the plan, when the majority of available revenues will go toward maintaining conditions on high-volume roads.

MnSHIP's emphasis on preservation in all Asset Management categories for the next 20 years will assist MnDOT in achieving multiple objectives through coordinated investments. For example, drainage infrastructure (Roadside Infrastructure Condition) helps pavements last longer, funding Bridge Condition at a high level of performance for all years of the plan supports traveler safety, and investing in Pavement Condition can enhance the bicycle network through shoulder repairs. MnDOT will ensure that the dollars spent in Asset Management achieve optimal outcomes through:

- **Innovation.** Developing new materials, design standards, and procedures.
- **Low-cost maintenance and repairs.** Using recycled materials, innovative design, and preventive maintenance treatments to extend life-cycles without increasing costs.
- **Alternate bidding.** Planning for two comparable repair strategies (concrete versus bituminous) in a construction plan so that contractors can bid the most cost-effective solution.

In addition to MnSHIP, MnDOT will continue to use planning and research to guide its stewardship of state highway assets. MnDOT is in the process of completing its first risk-based asset management plan that will assist in identifying and prioritizing capital improvements and maintenance strategies. The **Transportation Asset Management Plan (TAMP)** will help MnDOT coordinate pavement, bridge, and roadside infrastructure investments in order

to make the most effective use of limited dollars. MnDOT will also continue to be a leader in testing innovative materials and construction techniques at MnROAD, its world-class research facility in Albertville on Interstate 94.

INVESTMENT PRIORITIES

Figure 5-4 shows that Asset Management is expected to constitute approximately 67 percent ($5.09 billion) of MnDOT's overall program between Years 1-10 and 89 percent ($8.13 billion) of MnDOT's program in Years 11-20.

PAVEMENT CONDITION

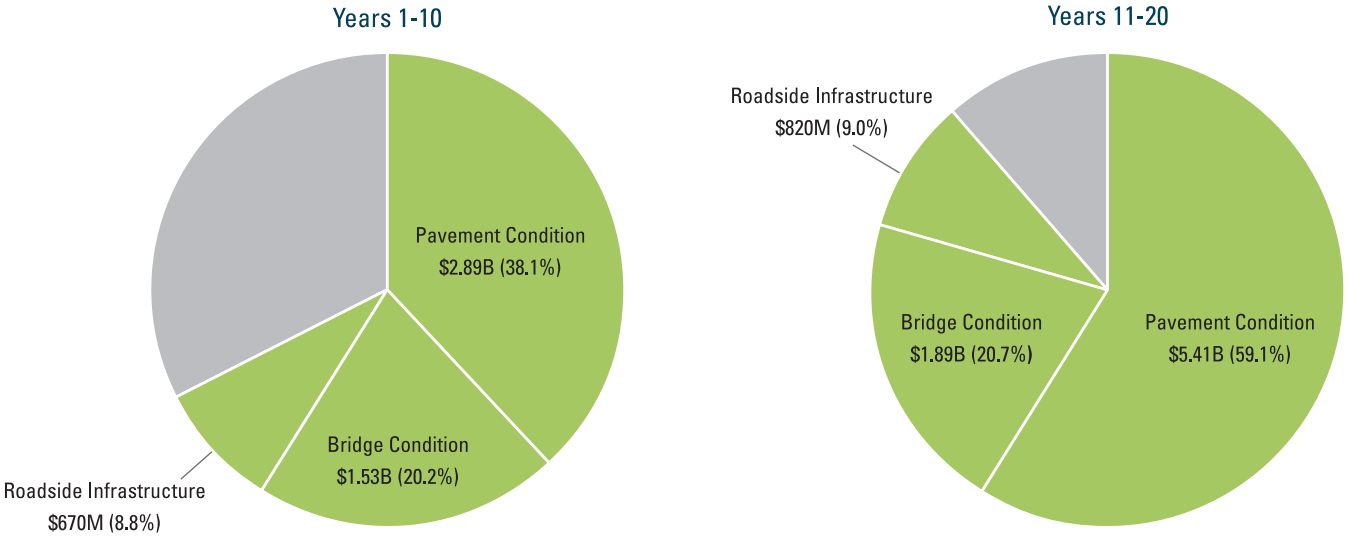
Projects that qualify as Pavement Condition improvements include overlays, mill and overlays, full-depth reclamation, and reconstruction of existing state highways.

Project Selection

MnDOT's 10-year planned priorities for Pavement Condition keep a lower percentage of NHS pavements in Poor condition compared to non-NHS pavements. This enables MnDOT to meet or exceed assumed MAP-21 targets for the NHS along with GASB 34 targets that apply to both the NHS and non-NHS. These condition levels also coincide with MnDOT's risk-based target (five to nine percent Poor) for all state highway miles and allows MnDOT to invest in other high priority needs.

MnDOT's Office of Materials and Road Research used its **Pavement Management System (PMS)** to predict future pavement conditions and develop a schedule of suggested fixes on NHS and non-NHS routes. The Office

Figure 5-4: Asset Management in MnSHIP



MnDOT will prioritize asset improvements on NHS routes (including Interstates) and hold these roads to a higher performance standard than assets on non-NHS routes.

MnDOT maintains the 12,000-mile state highway system:

NHS Interstates = 917 miles
NHS Non-Interstates (Other NHS) = 4,453 miles
Non-NHS = 6,620 miles

of Materials and Road Research based its funding assumptions on statewide investment goals in asset management. Using this preliminary 10-year list, the Office of Materials and Road Research worked with staff from MnDOT's central office and district offices to identify priority Pavement Condition investments on NHS routes. The districts suggested modifications to the project list based on a number of considerations, including local knowledge of conditions, input from stakeholders, and timing of other scheduled improvements in the area.

Districts planned Pavement Condition fixes on non-NHS routes through the **District Risk Management Program (DRMP).** Compared to the **Statewide Performance Program (SPP)** project selection process for NHS pavements, the districts had more flexibility to set priorities for non-NHS pavement projects provided that they collectively meet the GASB 34 threshold.

Years 1-10 Outcomes

Conditions on NHS pavements will remain stable through Year 10. In particular, fewer Interstate pavements will be in Poor condition relative to today. However, the condition of pavements on non-NHS roads will see a drop in performance relative to today, in large part to accommodate the federal emphasis on higher-volume, NHS roads. Overall, MnDOT expects that projected pavement condition levels will meet assumed MAP-21 targets and GASB 34 thresholds and remain within the agency's risk-based performance target of five to nine percent Poor for the whole system through 2023.

The percentage of Poor condition pavements are expected to be:

- **Interstate pavements:** Two percent (40 miles)[2]
  - » Meets aspirational target (two percent Poor or less)
  - » Likely to meet assumed MAP-21 target, to be established by USDOT
  - » Meets GASB 34 threshold (10 percent Poor or less for entire NHS)
- **Other NHS pavements:** Four percent (230 miles)
  - » Does not meet aspirational target (two percent Poor or less)
  - » Very likely to meet assumed MAP-21 target set by MnDOT, to be finalized at a later date
  - » Meets GASB 34 threshold (10 percent Poor or less for entire NHS)
- **Non-NHS pavements:** 11.8 percent (795 miles)
  - » Does not meet aspirational target (three percent Poor or less)
  - » Meets GASB 34 threshold (13 percent Poor or less)

2 Pavement Condition outcomes are reported as roadway miles for the state highway system (approximately 14,440 miles total). MnDOT uses centerline miles (approximately 12,000 miles total) to describe all other aspects of the plan.

Years 11-20 Outcomes

Non-Interstate pavements will decline relative to 2023 conditions, impacting freight movement, vehicles, and bicycles. However, MnDOT expects that it will also be able to meet its risk-based target of keeping the overall percentage of the system's pavements in Poor condition within five to nine percent. All roads will be at or be close to approaching current GASB 34 minimum condition thresholds.

The percentage of Poor condition pavements are expected to be:

- **Interstate pavements:** Two percent (40 miles)
  - » Meets aspirational target (two percent Poor or less)
  - » Likely to meet assumed MAP-21 target to be established by USDOT
  - » At GASB 34 threshold (10 percent Poor or less for entire NHS)
- **Other NHS pavements:** 11 to 13 percent (635-750 miles)
  - » Does not meet aspirational target (two percent Poor or less)
  - » Unclear if outcomes fall within an acceptable range for MAP-21 target
  - » At GASB 34 threshold (10 percent Poor or less for entire NHS)
- **Non-NHS pavements:** 11 to 13 percent (740-875 miles)
  - » Does not meet aspirational target (three percent Poor or less)
  - » At GASB 34 threshold (13 percent Poor or less)

Optimization Strategies

MnDOT will continue applying the following strategies to make the best use of resources when undertaking pavement projects:

- Design and schedule pavement projects to align with a roadway's life-cycle needs whenever possible.
- Use performance-based design to focus on projects that cost-effectively meet both pavement and safety performance needs.
- Continue preventive maintenance strategies, such as seal coats, joint seals, micro-surfacing, and thin overlays.
- Employ lower-cost strategies, such as full depth reclamation or unbonded concrete overlays, to stretch available dollars further.
- Evaluate innovative contracting methods and assess potential advantages of bundling projects to lower costs.

Risk Management Strategies

MnDOT may draw from the following strategies, when necessary, to prioritize projects and address risks that are associated with lower performance or investment in Pavement Condition:

- Defer long-term fixes.
- Limit life-cycle fixes to Interstates, high-priority routes, or highest priority non-NHS routes.
- Focus maintenance activities on avoiding hazardous conditions.

BRIDGE CONDITION

Bridge Condition investments include replacements, rehabilitation, and painting.

Project selection

As is the case with Pavement Condition, MnDOT's prioritizes more investments in Bridge Condition on high-volume NHS roads than on other state highways.

MnDOT's Bridge Office used the **Bridge Replacement and Improvement Management (BRIM)** process and statewide goals to recommend future bridge improvements based on condition and risk factors, including length of detour and traffic volume. The Bridge Office and district offices generated a list of bridge projects for both NHS (through the SPP) and non-NHS bridges (through the DRMP) based on the results of the BRIM process. In modifying the BRIM results, districts considered stakeholder input and local expertise to coordinate timing with other planned projects in the region.

Districts primarily chose projects with long-term fixes for NHS bridges and focused investment in non-NHS bridges on those in the greatest need of repair.

Years 1-10 Outcomes

Performance for bridges on the NHS will improve overall, while performance for non-NHS bridges will worsen. The condition of MnDOT bridges is expected to meet MAP-21 targets and GASB 34 minimum condition thresholds through 2023.

The percentage of bridge deck area in Poor condition is expected to be as follows in 2023:

- **NHS Bridges:** Two to three percent
  - » Likely to meet aspirational target (less than two percent Poor)
  - » Meets target established in MAP-21 legislation (10 percent Poor or less)
  - » Meets GASB threshold (less than eight percent Poor)

- **Non-NHS bridges:** Four to six percent
  - » Meets aspirational target (less than eight percent Poor)
  - » Meets GASB threshold (less than 20 percent Poor)

Years 11-20 Outcomes

Despite an increase in the share of total revenues going to Bridge Condition, there will be a higher proportion of NHS and non-NHS bridges in Poor condition in 2033 relative to today. This is due to increased construction costs, the expiration of Chapter 152 bridge funds, and growing needs due to the age of the system.

Bridges will remain safe, although some weight restrictions will impact freight movement and any unsafe bridges would be promptly closed until necessary repairs are completed. The projected condition of bridges in 2032 is expected to meet MAP-21 targets and GASB 34 minimum condition thresholds.

The percentage of bridge deck area in Poor condition is expected to be as follows in 2033:

- **NHS bridges:** Six to eight percent
  - » Does not meet aspirational target (less than two percent Poor)
  - » Meets target established in MAP-21 legislation (10 percent Poor or less)
  - » Meets GASB threshold (less than eight percent Poor)
- **Non-NHS bridges:** Eight to 10 percent
  - » May not meet aspirational target (less than eight percent Poor)
  - » Meets GASB threshold (less than 20 percent Poor)

Optimization Strategies

MnDOT will apply the following strategies to ensure that its bridges are structurally sound and safe for the traveling public:

- Conduct frequent and regular inspections.
- Invest in preventive maintenance.
- Invest in rehabilitation at appropriate times of a bridge's life-cycle.
- Refine BRIM to help identify improvements that minimize life-cycle costs, meet performance targets, and address the highest-risk bridges.
- Defer some long-term fixes and impose occasional weight restrictions to avoid hazardous conditions in Years 11-20, as needed.

Risk Management Strategies

MnDOT may draw from the following strategies, when necessary, to prioritize projects and address risks that are associated with lower performance or investment in Bridge Condition:

- Defer non-critical and/or long-term fixes.
- Impose weight restrictions on some bridges.
- Promptly close unsafe bridges promptly until necessary repairs are completed.
- Focus maintenance activities on avoiding hazardous conditions.

ROADSIDE INFRASTRUCTURE CONDITION

Roadside Infrastructure Condition elements include drainage and culverts, traffic signals, signs, lighting, retaining walls, fencing, noise walls, guardrails, overhead structures, rest areas, **Intelligent Transportation Systems (ITS),** and pavement markings.

Project Selection

In developing a list of projects through Year 10, districts included an estimate of the cost to implement Roadside Infrastructure Condition projects as part of other projects (such as Pavement Condition or Bridge Condition) or as stand-alone investments (such as rest areas). The distribution of MnDOT's Roadside Infrastructure Condition investment reflects the expectation that districts will implement more projects on NHS roads and bridges than on lower-volume roads.

Years 1-10 Outcomes

In general, the system's roadside infrastructure elements are expected to deteriorate relative to today's standards by 2023. However, NHS routes will receive more frequent upgrades to roadside infrastructure elements compared to non-NHS routes due to the relative frequency of pavement and bridge projects.

Years 11-20 Outcomes

Inflation and growing needs will combine to increase the risk of unmet roadside infrastructure needs through 2033. MnDOT will continue to prioritize its Roadside Infrastructure Condition investment on NHS assets in Years 11-20.

On non-Interstate roads, MnDOT will only repair or replace the most critical infrastructure that pose safety hazards by prioritizing investments on roads with the highest volume and would thus have the greatest user impact upon failure. The worst culverts will be repaired. Other roadside infrastructure, such as signs, lighting, and guardrail, will not be replaced as quickly as needed.

MnDOT will likely not meet safety and accessibility standards for these assets, leading to the possibility of decreased system reliability. As a result, several rest areas are likely to close in the second half of the plan.

Optimization Strategies

MnDOT will pursue several strategies to maximize its Roadside Infrastructure Condition investment:

- Continue to perform preventive maintenance to extend infrastructure life cycle.
- Coordinate investments with other projects where economies of scale exist to reduce unit costs.
- Manage culverts that have failed or are in the poorest condition.
- Maintain the most critical supporting infrastructure for pavement and bridge projects.
- Improve process for tracking inventory, performance, and identifying future capital needs for essential system assets, including signals, drainage, retaining walls, signage, and safety rest areas.
- Develop new ways to track and systematically improve electronic traffic management systems, which include the Regional Traffic Management Centers (RTMC) and Transportation Operations Communication Centers (TOCC).

Risk Management Strategies

MnDOT may draw from the following strategies, when necessary, to prioritize projects and address risks that are associated with lower performance or investment in Roadside Infrastructure Condition:

- Repair and replace failed infrastructure on a strategic and reactive basis.
- Prioritize work on NHS or on roads with greatest exposure to traveling public.
- Rely on maintenance budget to keep system in good repair.
- Respond to non-functional or very poor-condition elements only.
- Close lowest-priority rest areas.

ASSET MANAGEMENT GENERAL OUTCOMES

Pavement, bridge, and roadside infrastructure assets on NHS roads will be maintained at a higher level of performance compared to assets on non-NHS roads over the next 20 years. However, MnDOT may have difficulty meeting its aspirational targets for these asset categories in Years 1-10 and does not expect to meet its "aspirational" targets in the asset categories in Years 11-20, aside from Interstate pavements and possibly non-NHS bridges. These targets represent optimal or desired performance levels, typically based on lowest life-cycle costs, customer expectations, or policy priorities. MnDOT used these targets to calculate its estimated 20-year needs in these categories, as described in **Chapter 3, "Transportation Needs."**

Figure 5-5 shows MnDOT's aspirational performance goals for Pavement Condition and Bridge Condition. The anticipated 10- and 20-year pavement and bridge conditions on the state highway system are shown in the column on the far right. These outcomes are at or above the minimum thresholds established for GASB 34.

Figure 5-6 summarizes the expected condition of state highway assets based on MnDOT's investment priorities for MnSHIP and compares them to the previous set of priorities established in the 2009 plan.

Figure 5-5: Comparison of Aspirational Targets and Minimum Thresholds to 20-Year Pavement and Bridge Outcomes

Investment Category	System	Aspirational Target (Desired Level of Service)	GASB 34 Minimum Condition Thresholds	Anticipated Outcomes	
				Year 10	Year 20
Pavement Condition	Interstate Other NHS	≤ 2% Poor ≤ 2% Poor	≤ 10% Poor (all NHS)	2% Poor 4% Poor	2% Poor 11-13% Poor
	Non-NHS	≤ 3% Poor	≤ 13% Poor	11.8% Poor	11-13% Poor
Bridge Condition	NHS	≤ 2% Poor	< 8% Poor	2-3% Poor	6-8% Poor
	Non-NHS	≤ 8% Poor	< 20% Poor	4-6% Poor	8-10% Poor

Figure 5-6: Asset Management Outcomes and Annual Expenditures

Investment Category	Current Conditions (2012)	Years 1-10 (2014-2023)		Years 11-20 (2024-2033)	
	Description	Outcomes	10-Year Expenditure	Outcomes	10-Year Expenditure
Pavement Condition	• Recent targeting of unused project contingency and bid savings to additional pavement projects has slowed the deterioration of pavements statewide. • Many long-term fixes are being deferred to reduce the number of miles in Poor condition.	NHS conditions remains stable; road conditions on non-NHS roads deteriorate relative to today	$2.89 billion (38.1%)	Interstate conditions remain stable; road conditions on non-Interstate roads impact freight movement, vehicles, and bicycles. All roads approach GASB threshold.	$5.41 billion (59.1%)
	Interstates: 2.4% Poor (45 miles)	**Interstates:** 2.0% Poor (40 miles)		**Interstates:** 2.0% Poor (40 miles)	
	Other NHS: 4.3% Poor (250 miles)	**Other NHS:** 4.0% Poor (230 miles)		**Other NHS:** 11-13% Poor (635-750 miles)	
	Non-NHS: 7.5% Poor (505 miles)	**Non-NHS:** 11.8% Poor (795 miles)		**Non-NHS:** 11-13% Poor (740-875 miles)	
Bridge Condition	• Chapter 152 Bridge Program has been accelerated the repair and replacement of many structurally deficient bridges. • Many long-term fixes are being implemented.	NHS bridge conditions remain stable at 2-3% Poor. Non-NHS conditions worsen from 2% today to 4-6% Poor.	$1.53 billion (20.2%)	NHS bridges decline to 6-8% Poor and Non-NHS bridges decline to 8-10% Poor. Some weight restrictions and closures impact freight movement.	$1.89 billion (20.7%)
	NHS: 4.7% Poor	**NHS:** 2-3% Poor		**NHS:** 6-8% Poor	
	Non-NHS: 2.1% Poor	**Non-NHS:** 4-6% Poor		**Non-NHS:** 8-10% Poor	
Roadside Infrastructure Condition	Focus on NHS roads	Focus on NHS roads	$670 million (8.8%)	Focus on NHS roads	$820 million (9.0%)
	Investment concurrent with pavement projects	Condition of culverts, signals, signs, lighting, and retaining walls are expected to deteriorate		Condition of culverts, signals, signs, lighting, and retaining walls are expected to deteriorate further	
	Some stand-alone work			Several rest areas likely to close	
10-Year Total	--	**$5.09 billion (67.1%)**		**$8.13 billion (88.7%)**	
20-Year Total	--	**$13.21 billion (78.9%)**			

Connection to MnDOT's Family of Plans

Minnesota GO Vision

Integrate safety – Systematically and holistically improve safety for all forms of transportation. Be proactive, innovative, and strategic in creating safe options.

Statewide Multimodal Transportation Plan

Objective: To safeguard travelers, transportation facilities, and services and to apply proven strategies to reduce fatalities and serious injuries for all travel modes.

Traveler Safety

The level of funding for Traveler Safety in MnSHIP will allow MnDOT to continue its comprehensive approach to improving traveler safety on state highways. As described in **Chapter 1, "Plan Overview,"** MnDOT currently uses a combination of three types of safety investments in its effort to improve safety and reduce the number of annual fatalities and serious injuries on Minnesota roads:

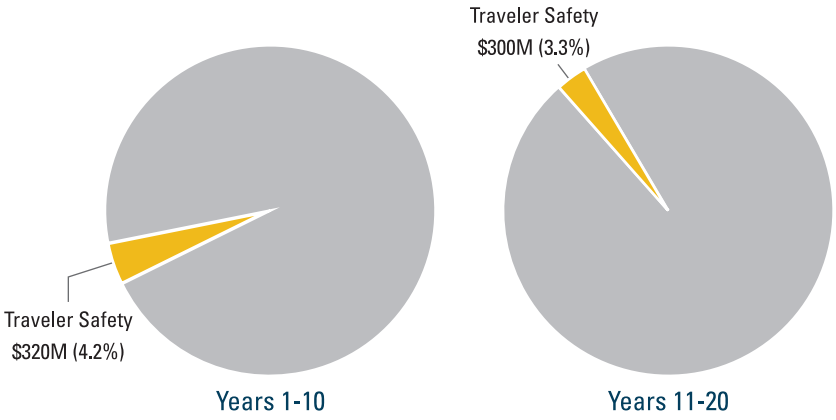
- Proactive lower cost, high-benefit safety features
- Sustained crash locations treatments
- The **Toward Zero Deaths (TZD)** initiative

In Years 1-10 of the plan, MnDOT will distribute its investment between making existing roads safer, proactively installing safety infrastructure at select locations, addressing some locations with a sustained crash history, and continuing participation in the TZD initiative to promote enforcement and education efforts with its partners. Years 11-20 fund Traveler Safety, but to a lesser extent due to funding constraints. MnDOT will be able to apply strategic safety solutions in the highest-risk areas while relying heavily on TZD to improve safety conditions for the traveling public.

INVESTMENT PRIORITIES

As shown in **Figure 5-7**, MnDOT anticipates spending approximately four percent of its program on Traveler Safety in Years 1-10 and three percent in Years 11-20.

Figure 5-7: Traveler Safety in MnSHIP



Traveler Safety projects include proactive lower cost, high-benefit strategies, and treatments at sustained crash locations.

Project Selection

Each district estimated its 10-year Traveler Safety investment on both NHS and non-NHS roadways. The mix of project types varied by district. Districts drew from two main sources to select planned investments for Years 1-10:

- **District Safety Plans (DSPs).** Each district used its DSP to prioritize proactive safety infrastructure projects and which strategic improvements should be implemented. In addition, MnSHIP includes investments identified as part of the **Highway Safety Improvement Program (HSIP).** HSIP is a federal program that emphasizes data-driven, strategic approaches to improving highway safety. HSIP projects correct a hazardous road location or address a highway safety problem.
- **Sustained crash locations list.** MnDOT's Office of Traffic, Safety, and Technology identified areas throughout the state that experience a high crash rate over a five-year period. Districts included high-priority projects at some of these locations.

The districts also estimated the costs associated with installing roadway safety infrastructure as part of other projects, namely pavement improvements, and built these into their 10-Year Work Plans.

Years 1-10 Outcomes

MnDOT districts will continue installing safety improvements as part of pavement projects and continue to implement their DSPs at the current rate. Lower cost, high-benefit safety infrastructure will be constructed at priority locations throughout the state highway system, and select moderate to high-cost projects will be funded to address sustained crash rate locations. MnDOT will continue to participate in the TZD program.

Fatalities have been reduced substantially over the past 10 years, and MnDOT expects that the number of annual fatalities and serious injuries on state and local roads will continue to decline year-over-year in Years 1-10 based on historical performance at this level of funding.

Years 11-20 Outcomes

Reduced investment in Traveler Safety for Years 11-20 will limit the amount of safety improvements MnDOT can complete. During these years, MnDOT will only be able deliver a select number of lower cost, high-benefit projects and will have limited ability to invest in higher cost improvements, such as roundabouts, left-turn lanes, and intersection improvements to address sustained crash locations. Therefore, MnDOT will rely heavily on existing safety infrastructure and collaboration with partners in the TZD program to reduce fatalities and serious injuries on Minnesota's highways.

MnDOT's reduced investment in Traveler Safety in Years 11-20 may cause the continued decline in the annual number of fatalities and serious injuries to slow or even reverse. The low fatality and serious injury rate goals set by the TZD program may be difficult to achieve without continued investment to support safety improvements. Other program resources – safety education, enforcement, and emergency services – will become more important in keeping fatality and serious injury rates low.

Optimization Strategies

MnDOT will continue investing to reduce fatalities and serious injuries through a combination of engineering and educational strategies, including:

- Update DSPs to identify priority locations for lower cost, high-benefit improvements.
- Pursue system-wide, cost-effective safety investments on the state highway system that address fatal and severe injury crashes. Investments will be data driven and incorporated into all applicable projects.
- Address sustained crash locations with appropriate fixes that cost-effectively reduce the identified types of crashes at that location.
- Support the TZD initiative and its comprehensive approach toward highway safety.

Risk Management Strategies

MnDOT may draw from the following strategies, when necessary, to prioritize projects and address risks that are associated with lower performance or investment in Traveler Safety:

- Continue to evaluate crash data to implement the highest-priority lower cost, proactive treatments.
- Install lighting only at highest-risk sustained crash locations.

Figure 5-8 summarizes expected Traveler Safety outcomes based on MnDOT's investment priorities for MnSHIP and compares them to current conditions.

Figure 5-8: Traveler Safety Outcomes and Annual Expenditures

Investment Category	Current Conditions (2012)	Years 1-10 (2014-2023)		Years 11-20 (2024-2033)	
	Description	Outcomes	10-Year Expenditure	Outcomes	10-Year Expenditure
Traveler Safety	Continuation of decade-long decline in fatalities/serious injuries on all roads; TZD target met	Annual fatalities and serious injuries likely to continue to decline	$320 million (4.2%)	Annual fatalities and serious injuries likely to continue to decline, but at a slower rate	$300 million (3.3%)
	Investments include lower cost, proactive projects, sustained crash locations, and TZD programming	Investments emphasize lower-cost, proactive treatments and TZD		Investments focus almost exclusively on lower-cost, proactive treatments and TZD	
		Address several sustained crash rate locations			
10-Year Total	--	**$320 million (4.2%)**		**$300 million (3.3%)**	
20-Year Total	--	**$620 million (3.7%)**			

Connection to MnDOT's Family of Plans

Minnesota GO Vision

Ensure accessibility – The transportation system must be accessible and safe to users of all abilities and incomes. The system must provide access to key resources and amenities throughout.

Minnesota GO Vision

Ensure regional connections – Key regional centers need to be connected to each other through multiple modes of transportation.

Minnesota GO Vision

Emphasize reliable and predictable options – The reliability of the system and predictability of travel times are frequently as important or more important than speed. Prioritize multiple multimodal options over reliance on a single option.

Statewide Multimodal Transportation Plan

Objective: To identify global, national, statewide, regional, and local transportation connections essential for Minnesotans' prosperity and quality of life, maintain and improve these connections by maximizing return-on-investment, given constrained resources; and consider new connections in the state highway network.

Critical Connections

Critical Connections includes mobility investments for many types of highway users, including automobiles, freight carriers, bicyclists, and pedestrians. MnSHIP's investment categories within Critical Connections recognize the importance of the multimodal connections detailed in the **Statewide Multimodal Transportation Plan.** The categories of Twin Cities Mobility and **Interregional Corridor (IRC)** Mobility reflect that the state's mobility needs vary by geographical region, road volume, and usage. MnDOT also developed two new investment categories in the 2013 MnSHIP: Bicycle Infrastructure and Accessible Pedestrian Infrastructure. These additions will help MnDOT better track its progress toward multimodal objectives on the state highway system.

MnSHIP supports mobility investments in all years of the plan. Years 1-10 give MnDOT the ability to invest in all categories with a projected need, while in Years 11-20 MnDOT will limit its investment to bicycle and pedestrian improvements that are completed concurrently with pavement and bridges projects. Twin Cities Mobility and IRC Mobility will not receive funding despite demonstrated need in Years 11-20.

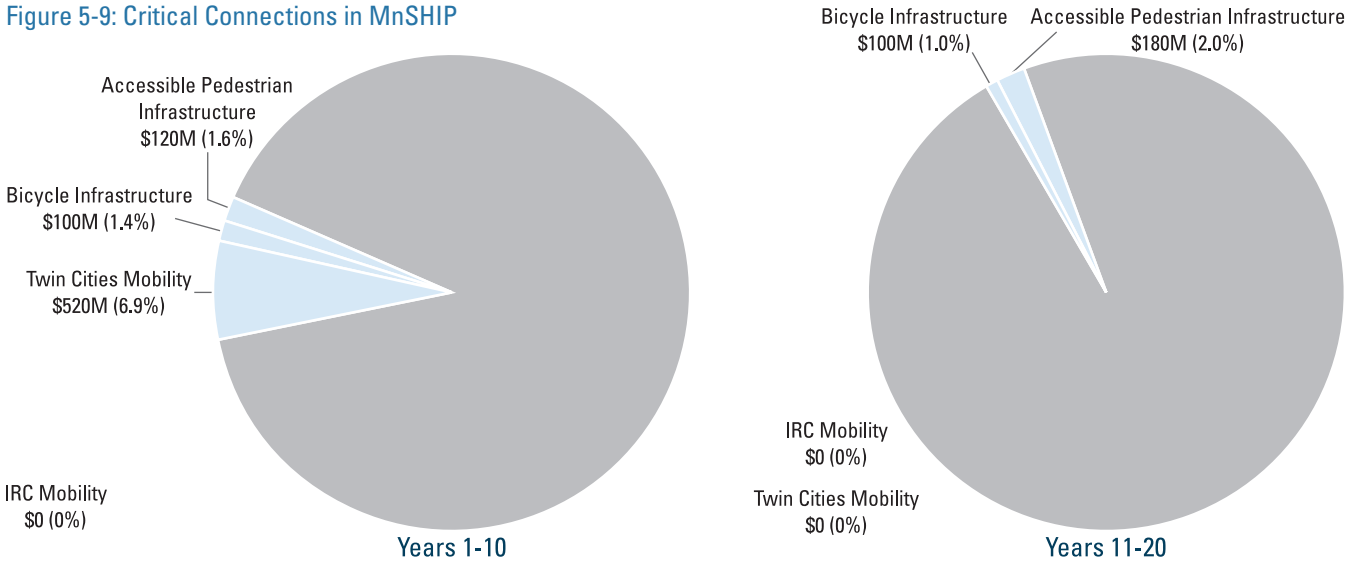
The priority networks established through plans and studies from MnDOT's Office of Freight, Office of Transit, and district offices, along with its regional and metropolitan planning partners, will help MnDOT prioritize and optimize mobility improvements funded through MnSHIP. Furthermore, MnDOT will continue to use performance measures to identify high-priority mobility needs as they evolve on Minnesota's state highways.

INVESTMENT PRIORITIES

Critical Connections is expected to constitute 9.8 percent of MnDOT's investment in Years 1-10 and three percent in Years 11-20 (see **Figure 5-9**).

Figure 5-10 on page 121 summarizes expected mobility outcomes on the state highway system based on MnDOT's investment priorities for MnSHIP and compares them to the previous set of priorities as established in the 2009 plan.

Figure 5-9: Critical Connections in MnSHIP



TWIN CITIES MOBILITY

MnDOT considers congestion in the Twin Cities metropolitan area a risk to statewide travel due to its widespread impacts on economic productivity and quality of life. The national goals laid out in MAP-21 include congestion reduction, system reliability, and freight movement. USDOT will establish measures for the following areas: traffic congestion on NHS roads in metropolitan areas, as part of the CMAQ program; performance of the NHS, which could include reliability; and a measure for freight movement on the Interstate System.

In Minnesota, NHS routes in the Twin Cities have the most extensive congestion issues and carry the most freight traffic. Therefore, MnSHIP sets aside funds for mobility improvements in the Twin Cities so MnDOT can make progress toward MAP-21 performance targets that it will establish once USDOT establishes the measures.

MnDOT's strategy for congestion management in the Twin Cities metropolitan area has moved away from traditional highway expansion to focus on operational efficiencies, bottleneck improvements, and priced managed lanes. The Twin Cities Mobility projects for Years 1-10 follow the strategies laid out in the Metropolitan Council's **2030 Transportation Policy Plan.** The strategies include four types of highway mobility improvements:

- **Active Traffic Management (ATM)**
- Spot mobility improvements
- Priced managed lanes
- Strategic capacity enhancements

MnDOT tracks duration and extent of congestion (travel speed under 45 miles per hour) on the Metropolitan freeway system. In addition to measures that USDOT will establish for NHS delay, reliability and freight movement, MnDOT is considering accessibility, throughput and arterial delay measures for future reporting.

Project Selection

MnDOT's Metro District worked in collaboration with the Metropolitan Council to develop a list of Twin Cities Mobility cost-constrained projects that align with statewide goals within MnSHIP, both in terms of addressing federal and state performance measures and investing in other strategies to improve mobility on Twin Cities-area highways through innovation, technology, and multimodal options.

Many identified projects in the Metro District's 10-Year Work Plan originated in previous planning efforts, such as the Metropolitan Council's **2030 Transportation Policy Plan,** MnDOT's **Congestion Management Safety Plan** (for potential spot mobility projects), and the 2005 MnPASS System Study.

Years 1-10 Outcomes

Over the first 10-year period, MnDOT and the Metropolitan Council will invest in Twin Cities Mobility to implement:

- A mix of ATM systems (five percent)
- Approximately three spot mobility improvements per year (35 percent)
- Completion of three MnPASS lanes (40 percent)
- One major strategic capacity enhancement (20 percent)

MnDOT plans to construct MnPASS lanes on the I-35E and up to three other corridors, and to complete the corridor between MN 610 and I-94 in Maple Grove. While these projects will help mitigate congestion issues, it is still anticipated that congestion and reliability issues are likely to worsen through 2023 relative to today due to the increase in mobility needs across the system.

Years 11-20 Outcomes

During the second 10 years, MnDOT will be unable to invest in Twin Cities Mobility improvements. MnDOT will rely on operational efficiencies, where possible, to mitigate increases in traffic congestion during this period.

Optimization Strategies

MnDOT and the Metropolitan Council, along with other transportation stakeholders in the metropolitan area, will jointly pursue the following strategies to address mobility concerns in the Twin Cities:

- Leverage existing resources for all available transportation modes in order to optimize mobility.
- Emphasize reliable and predictable travel options.

- Develop congestion performance measures that reflect the goals and objectives sought through the current congestion management strategies.
- Focus mobility investments on projects that address multiple objectives.

Risk Management Strategies

MnDOT may draw from the following strategies, when necessary, to prioritize projects and address risks that are associated with lower performance or investment in Twin Cities Mobility:

- Invest primarily in projects that address multiple objectives.
- Focus on completing missing elements of the highway system.

INTERREGIONAL CORRIDOR MOBILITY

Freight carriers and regional businesses rely on mobility on Minnesota's IRCs. The IRC system is performing at or above target when 95 percent or more of all IRC miles are performing within two miles per hour of their speed targets. MnDOT prioritizes investment in IRC Mobility when system targets not being met.

Project Selection

MnDOT did not select projects to be funded through IRC Mobility for Years 4-10, as the IRC system is expected to meet MnDOT's performance targets through 2023. If additional revenues become available, MnDOT would re-evaluate the feasibility of proactively addressing performance-based needs on the IRC system.

However, there are other projects listed in the 10-Year Work Plans that will improve safety and mobility on IRCs – these projects are categorized under RCIPs and Traveler Safety, depending on the types of improvements. They are categorized as such because they do not address the IRC performance-based need and are ineligible for IRC funding. Examples include two to four-lane expansion projects on US 14 and MN 371.

Years 1-10 Outcomes

MnDOT's IRC Mobility performance targets are expected to be met through 2023. However, MnDOT may need to revisit its measures for IRC needs after the MAP-21 rulemaking process establishes measures for the NHS system.

Years 11-20 Outcomes

Four IRCs (I-94, US 10, US 63, and MN 210,) are anticipated to fall below their individual travel time targets. Although system performance is expected to decline and trigger an investment need, MnDOT will be unable to prioritize investments to improve mobility on IRCs given funding constraints during this period.

Optimization Strategies

MnDOT will continue its approach to supporting mobility on the IRC system through the following set of strategies:

- Work with transportation partners to maintain and enhance mobility on the IRC system through investment in other categories, such as Traveler Safety and RCIPs.
- Continue the development of mobility performance measures that reflect the statewide goals and objectives of economic competitiveness, traveler safety, and quality of life along the interregional corridors.
- Continue to monitor corridor travel speeds.
- As MAP-21 rulemaking concludes, consider development of updated measures applying to mobility and freight.

Risk Management Strategies

MnDOT may draw from the following strategies, when necessary, to prioritize projects and address risks that are associated with lower performance or investment in IRC Mobility:

- Focus on traveler information and other travel demand strategies.
- Focus major investments and other projects on corridors with the greatest delay and broadest impact on users.

BICYCLE INFRASTRUCTURE

MnDOT typically constructs bicycle improvements concurrently with pavement and bridge projects, but also implements some stand-alone projects in urban areas or areas with high volumes of bicycle traffic.

Project Selection

MnDOT districts identified their investments in Bicycle Infrastructure for Years 1-10 based on their highest risks and planned bridge and pavement projects for these years.

The **Statewide Bicycle System Plan** will identify a priority bikeway network, which includes both state highways and local roads. This plan will help MnDOT districts select bicycle facilities projects on state highways going forward.

Years 1-10 Outcomes

MnDOT will invest in Bicycle Infrastructure through bridge and pavement projects as appropriate, much like the current approach. Districts will construct new bicycle facilities in their highest-priority locations, making progress on key multimodal objectives and outcomes.

Years 11-20 Outcomes

MnDOT will make little to no progress in the expansion of existing bicycle infrastructure during Years 11-20. Bicyclists will be accommodated with existing highway infrastructure, such as paved shoulders and general travel lanes at the highest priority locations.

Optimization Strategies

MnDOT will apply the following strategies to accommodate bicycles on state highways:

- Construct bicycle infrastructure concurrently with pavement and bridge projects to cost-effectively maintain and improve the bike network.
- Make stand-alone investments on state highways within the identified priority bicycle network.
- Support regional and local efforts to increase the share of non-motorized commuting trips through the development and maintenance of efficient, safe, and appealing non-motorized transportation systems.
- Coordinate education and bicycle planning efforts with transportation stakeholders, including the Share the Road campaign.

Risk Management Strategies

MnDOT may draw from the following strategies, when necessary, to prioritize projects and address risks that are associated with lower performance or investment in Bicycle Infrastructure:

- Collaborate with regional, local, and internal partners on bike projects and planning efforts.
- Ensure that shoulders are preserved on identified priority bike network.

ACCESSIBLE PEDESTRIAN INFRASTRUCTURE

Most pedestrian and **1990 Americans with Disabilities Act (ADA)** improvements are implemented as part of a pavement or bridge project. Stand-alone projects, especially ADA improvements, are implemented where needed.

Project Selection

As each district has varying pedestrian and ADA infrastructure needs, they selected their 10-year planned investments in this category based on planned bridge and pavement projects, ADA needs, and highest-risk pedestrian areas.

Years 1-10 Outcomes

Districts will fund a range of pedestrian and ADA projects during Years 1-10 based on their needs. Investments will be primarily lower cost, high-benefit improvements implemented concurrently with pavement and bridge projects. MnDOT will be able to maintain most curb ramps and signalized intersections to ADA standards, maintain the percentage of sidewalk miles in poor condition, and complete some stand-alone ADA improvements.

Years 11-20 Outcomes

MnDOT's investment in Accessible Pedestrian Infrastructure for Years 11-20 will be carried out concurrently with pavement and bridge projects and will almost exclusively address ADA requirements.

Optimization Strategies

MnDOT will apply the following strategies in delivering projects to meet pedestrian accessibility needs:

- Prioritize curb ramp projects that meet requirements of the ADA.
- Install **Accessible Pedestrian Signals (APS)** at all signalized state highway intersections by 2030.
- Continue to track performance toward curb ramp and APS targets.
- Refine system for tracking investments and measuring performance.
- Collaborate with transportation partners in identifying projects and promoting the Share the Road Campaign.

Risk Management Strategies

MnDOT may draw from the following strategies, when necessary, to prioritize projects and address risks that are associated with lower performance or investment in Accessible Pedestrian Infrastructure:

- Identify, address, and maintain most critical intersections and bridge connections.
- Collaborate with regional, local, and internal partners on pedestrian projects and planning efforts.

Figure 5-10: Critical Connections Outcomes and Annual Expenditures

Investment Category	Current Conditions (2012)	Years 1-10 (2014-2023)		Years 11-20 (2024-2033)	
	Description	Outcomes	10-Year Expenditure	Outcomes	10-Year Expenditure
Twin Cities Mobility	ATM investments	Addresses approximately 3 spot mobility issues per year	$520 million (6.9%)	No ability to address spot or operational issues	$0 (0%)
	Addresses 2+ spot mobility issues per year	Congestion and reliability issues likely to worsen		Congestion and reliability issues worsen	
	Congestion increasing and reliability decreasing	MnPASS lanes added on three corridors			
		MN 610 completed to I-94 in Maple Grove			
Interregional Corridor Mobility	IRC system performing above targets; minimal mobility investments	IRC system performance target met, although several corridors see decreasing average speeds	$ 0 (0%)	IRC system performance target not met due to decreasing average speeds on four corridors (I-94, US 10, US 63, and MN 210)	$ 0 (0%)
	Isolated segment and recreational peak mobility concerns				
Bicycle Infrastructure	Current bicycle network maintained due to pavement and bridge investment	Bridge and pavement projects accommodate bicyclists as appropriate (current approach)	$100 million (1.4%)	Investments to accommodate bicycles are concurrent with pavement and bridge projects only	$100 million (1.0%)
	Most replaced or reconstructed bridges accommodate bicyclists where appropriate	Focus stand-alone projects on high-priority locations		No stand-alone bicycle improvements	
Accessible Pedestrian Infrastructure	Investment is generally concurrent with pavement and bridge projects	Most curb ramps and signalized intersections maintained to ADA standards	$120 million (1.6%)	Investments are generally concurrent with pavement and bridge projects	$180 million (2.0%)
	Few non-ADA pedestrian safety or access improvements	Investment is generally concurrent with pavement and bridge projects		Focus investment to meet ADA requirements	
10-Year Total	--	**$740 million (9.7%)**		**$280 million (3.0%)**	
20-Year Total	--	**$1.02 billion (6.1%)**			

Connection to MnDOT's Family of Plans

Minnesota GO Vision

Leverage public investments to achieve multiple purposes – The transportation system should support other public purposes, such as environmental stewardship, economic competitiveness, public health and energy independence.

Minnesota GO Vision

Use partnerships – Coordinate across sectors and jurisdictions to make transportation projects and services more efficient. Coordinate across sectors and jurisdictions to make transportation projects and services more efficient.

Statewide Multimodal Transportation Plan

Objective: Support statewide economic vitality and create and maintain jobs through transportation infrastructure investments.

Statewide Multimodal Transportation Plan

Objective: Work with transportation partners to implement a transparent and collaborative approach to corridor investment along the state highway system.

Regional and Community Improvement Priorities

The **Minnesota GO Vision** and **Statewide Multimodal Transportation Plan** emphasize the importance of accountability, transparency, and communication. Although MnDOT pursues these objectives in all investment areas, RCIPs are the primary outlet for collaboration with local agencies. RCIPs can help MnDOT identify projects that enhance accessibility, increase communication with stakeholders, and deliver transportation projects that integrate design and context to maximize benefits to the community. Implementing RCIP projects allows MnDOT to partner with local agencies and leverage state resources to achieve multiple purposes.

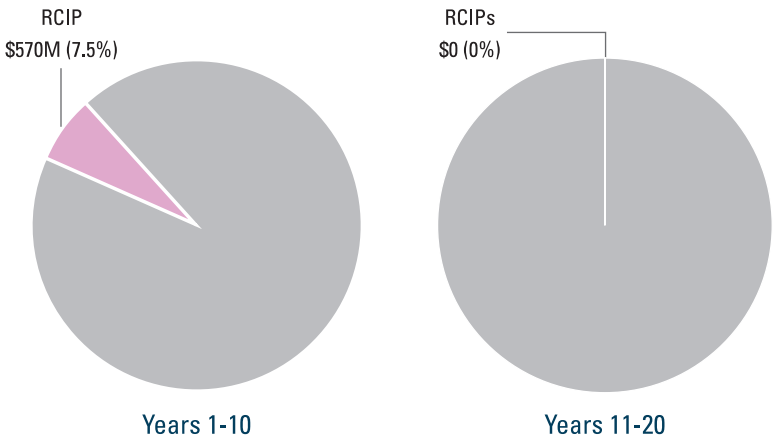
RCIP investments are an important part of MnDOT's overall highway investment, as they help MnDOT align the state's transportation system with the **Minnesota GO Vision** and strategies in the **Statewide Multimodal Transportation Plan.**

INVESTMENT PRIORITIES

MnDOT anticipates spending approximately seven percent of its program on RCIPs in Years 1-10 and zero percent between Years 11-20 (**Figure 5-11**).

RCIPs are projects that respond to local and regional transportation needs, including economic vitality and quality of life, and are outside of MnDOT's performance-based program.

Figure 5-11: RCIPs in MnSHIP



Project Selection

There are a variety of projects that fall under the category of RCIPs, including major projects of regional significance. Each district listed RCIP investments in their 10-Year Work Plans based on projects that MnDOT has committed to, projects that have been identified by stakeholders, and projects that address risks associated with regional travel.

Projects in these areas have not been identified in the districts' 10-Year Work Plans, as they are yet to be determined.

Years 1-10 Outcomes

MnSHIP will invest $530 million in RCIPs through 2023. Most investments will be completed through partnerships and design add-ons, but will also include a few stand-alone projects.

Examples of stand-alone expansion projects that MnDOT plans to complete before 2023 include:

- US 14 – Mankato to Eastern limits of Nicollet
- MN 60 – Windom to Mountain Lake
- MN 60 – Mountain Lake to Butterfield
- MN 371 – Nisswa to Jenkins

Additional examples of RCIP projects planned for the next 10 years include:

- MN 24 – Annandale urban reconstruction
- MN 68 – Canby to Marshall drainage project
- US 71 – Park Rapids intersection improvement at CSAH 15

MnDOT has implemented statewide and internal solicitations to partner with stakeholders and local jurisdictions to fund non-performance-based projects. MnDOT intends to continue facilitation of these types of programs through the RCIP investment over the next 10 years where funding is available. Examples of solicitations that may or may not continue include:

- **The Corridor Investment Management Strategy (CIMS).** The CIMS process was developed in 2012 to identify and prioritize high return-on-investment opportunities on state highways. The CIMS solicitation emphasizes projects that build and maintain a sustainable transportation system.

- **The Transportation Economic Development Program (TED).** The TED solicitation was developed in collaboration with the Minnesota **Department of Employment and Economic Development (DEED)** to fund projects that create jobs and support economic development.
- **Destination Innovation**. In an effort to create a culture that invites innovation and rapid adoption of new practices, MnDOT established the Destination Innovation program. This state road construction fund allows MnDOT to leverage funding opportunities to deliver innovative and creative proposals driven by MnDOT's Strategic Vision.[3]

Years 11-20 Outcomes

During the second 10 years of MnSHIP, MnDOT will be unable to invest in RCIPs. MnDOT will continue to coordinate with local agencies to achieve a high return-on-investment for investments, but there will be few additional elements incorporated into these projects. In the second half of the plan, MnDOT will have less ability to respond to local or regional concerns, to add capacity to the state highway system, or to make improvements that spur economic development compared to Years 1-10. As a result, public opinion of MnDOT is likely to decline during this period.

Optimization Strategies

MnDOT will employ a number of techniques to ensure that RCIP dollars are spent as effectively as possible:

- Work with users of the system to better understand what is important to meet their needs today and what will matter tomorrow.
- Educate stakeholders on system-wide and project-specific transportation issues.
- Improve early communication and coordination on projects.
- Promote partnerships with local agencies to leverage funding.
- Consider accessibility and safety for everyone traveling on, along, and across roads.
- Select projects that emphasize sustainability and high return-on-investment.
- Use low-cost operational strategies (such as signal timing and maintenance) to respond to local concerns.

Risk Management Strategies

MnDOT may draw from the following strategies, when necessary, to prioritize projects and address risks that are associated with lower performance or investment in RCIPs:

3 http://www.dot.state.mn.us/strategicvision/vision.html

- Schedule projects to leverage project timing and resources with that of local partners.
- Employ low-cost operational strategies (such as improving signal timing and road maintenance) to respond to local concerns.
- Engage stakeholders to identify and prioritize collaborative opportunities that respond to local and regional concerns.

Figure 5-12 summarizes the outcomes related to RCIP improvements on the state highway system based on MnDOT's investment priorities for MnSHIP and compares them to existing priorities.

Figure 5-12: Regional and Community Improvement Priorities Outcomes and Annual Expenditures

Investment Category	Current Conditions (2012)	Years 1-10 (2014-2023)		Years 11-20 (2024-2033)	
	Description	Outcomes	10-Year Expenditure	Outcomes	10-Year Expenditure
Regional and Community Improvement Priorities	Address economic vitality and quality of life needs through partnerships and design add-ons	Address economic vitality and quality of life needs through partnerships and design add-ons	$570 million (7.5%)	Very few opportunities to address local concerns through partnerships, design add-ons or adding capacity	$0 (0%)
	Several small- and large-scale improvements constructed each year	A few stand-alone projects		No standalone projects	
10-Year Total	--	**$570 million (7.5%)**		**$0 (0%)**	
20-Year Total	--	**$570 million (3.4%)**			

Project Support

Project Support includes components of projects that are critical to ensure the timely and efficient delivery of highway projects. These components include right-of-way costs, consultant services, supplemental agreements, and construction incentives. Historically, MnDOT has invested an average of 11 percent of total capital revenues on Project Support.

INVESTMENT PRIORITIES

MnDOT does not identify projects in this investment area; it estimates the total cost of delivering its planned projects and priorities. The total amount that MnDOT will spend on Project Support in Years 1-10 is expected to be higher (11.4 percent) than the amount it will spend in Years 11-20 (five percent) due to differences in the types of projects that MnDOT expects to deliver during each period (see **Figure 5-13** and **Figure 5-14**).

Years 1-10 Outcomes

MnDOT assumes that it will continue to spend approximately 11 percent of its funds in this category. This is consistent with recent averages due to the similarity in improvement types scheduled through 2023. MnDOT's capital investment program will include a number of expansion projects during these years and therefore will require more Project Support to support more right-of-way acquisition and more services from consultants and contractors compared to the second half of the plan.

Years 11-20 Outcomes

Project Support is expected to decrease as MnDOT's overall investment program in Years 11-20 changes focus to primarily maintaining existing infrastructure instead of constructing new projects.

Figure 5-13: Project Support in MnSHIP

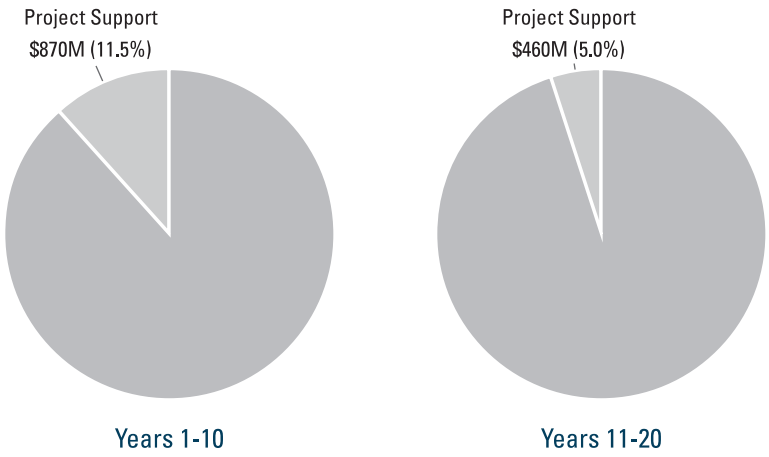


Figure 5-14: Project Support Outcomes and Annual Expenditures

Investment Category	Current Conditions (2012)	Years 1-10 (2014-2023)		Years 11-20 (2024-2033)	
	Description	Outcomes	10-Year Expenditure	Outcomes	10-Year Expenditure
Project Support	Historical average of the percentage of the MnSHIP investment spent on Project Support	Expenditures consistent with recent averages with an expected decrease by 2023	$870 million (11.5%)	Expenditures decline due to shift toward an asset preservation program focus	$460 million (5.0%)
10-Year Total	--	**$870 million (11.5%)**		**$460 million (5.0%)**	
20-Year Total	--	**$1.33 billion (7.9%)**			

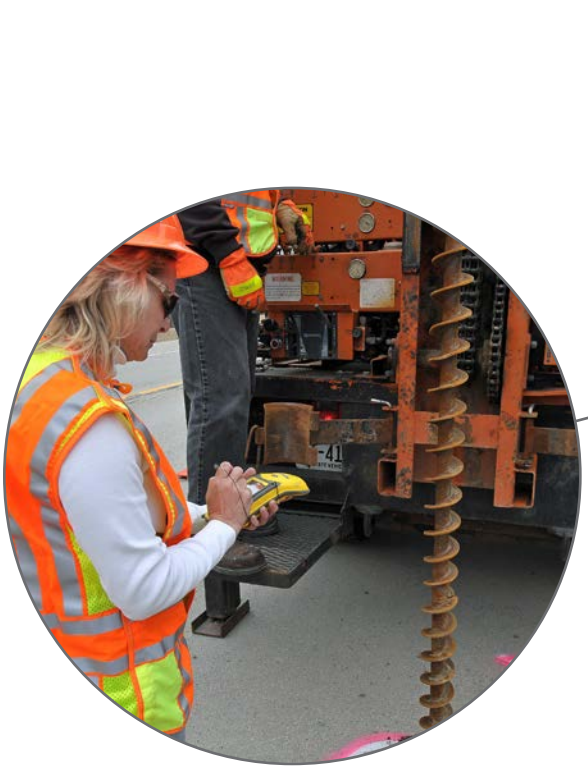
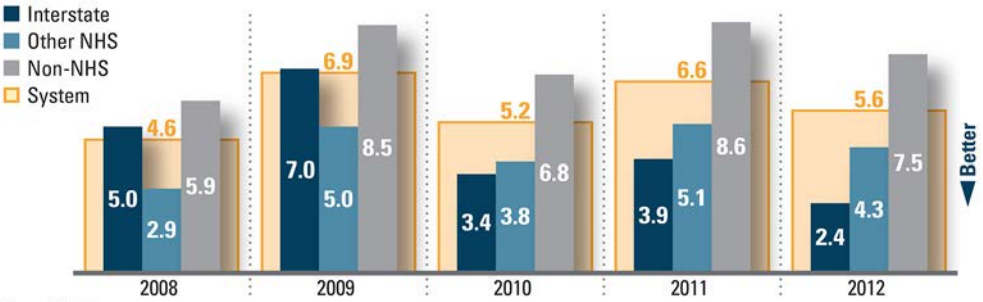


Figure 5-15: Performance Summary

	Aspirational Target (2012)	Result 2012	Revised Target (2014 - 2033)	Projected Result 2023	Projected Result 2033	Anticipated 20-Year Trend
Asset Management						
Pavement Condition Interstate: % Poor	2%	2.4%	2%	2%	2%	Better ↔ Performance expected to remain at a desirable level
Pavement Condition Non-Interstate NHS: % Poor	2%	4.3%	4%	4%	11-13%	Better ↗ Performance expected to worsen significantly
Pavement Condition Non-NHS: % Poor	3%	7.5%	--	12%	11-13%	
Pavement Condition All State Highway Miles: % Poor	--	5.6%	5%-9% performance band	7.5%	10.7%	Better ↗ Performance expected to worsen significantly

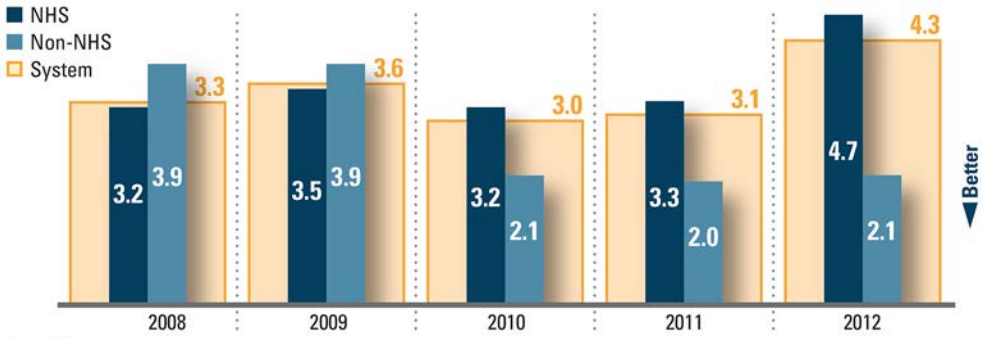


Source: MnDOT

PERCENT OF PAVEMENTS IN POOR CONDITION

Poor pavement decreased slightly in 2012 after increasing in 2011. MnDOT's Better Roads program is slowing the deterioration of pavements by improving nearly 700 miles of roads. This falls within the 5-9% range that represents an acceptable risk. Increased investment in pavement in response to MAP-21 will help MnDOT remain within this range through 2023.

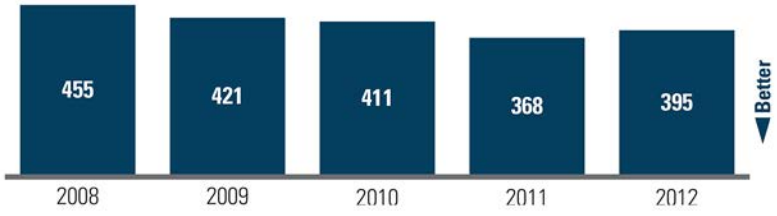
Bridge Condition: NHS, % Poor	2%	4.7%	2%	2-3%	<10%	Better ↗ Performance expected to worsen significantly
Bridge Condition: Non-NHS, % Poor	8%	2.1%	8%	6%	8-12%	



Source: MnDOT

The percent of bridge deck area on the National Highway System rated Poor rose in 2012, but is expected to decrease to near target level by 2015. Minnesota still has the 4th fewest structurally deficient or functionally obsolete state highway bridges in the nation. As future investments prioritize the NHS, the condition of bridges on non-NHS routes is expected to decline.

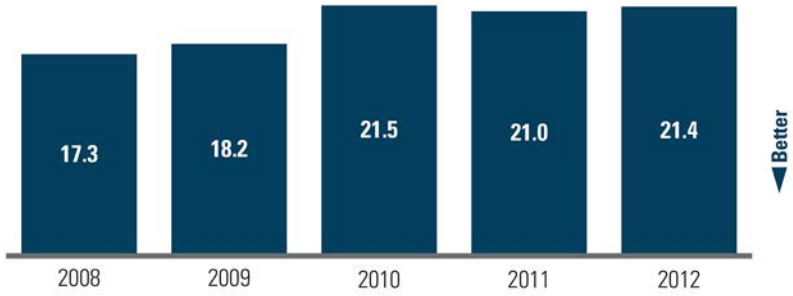
Traveler Safety						
Minnesota Traffic Fatalities: All state and local roads	350 by 2014	395	350 by 2014	--	--	Better ↘ Performance expected to improve, but at a less than desirable rate



Source: MN Department of Public Safety

Fatalities resulting from vehicle crashes increased from 368 in 2011 to 395 in 2012. This increase in traffic fatalities represents a departure from the dramatic decline experienced in recent years. Additional years of data are needed to determine whether 2012 represents a temporary setback or a flattening historical trend.

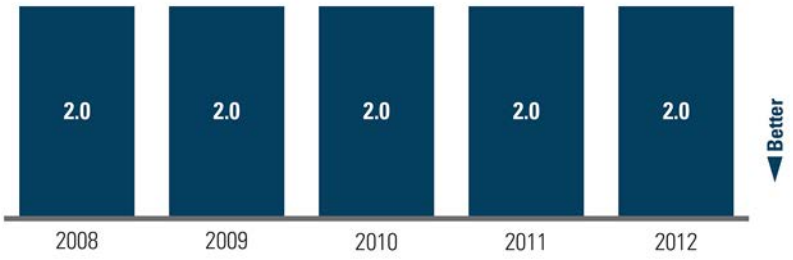
	Aspirational Target (2012)	Result 2012	Revised Target (2014 - 2033)	Projected Result 2023	Projected Result 2033	Anticipated 20-year Trend
Critical Connections						
Twin Cities Mobility: Urban Freeway System Congestion	Tracking Indicator	21.4%	N/A	--	--	Better ↔ Performance expected to continue at current levels



Source: MnDOT

Congestion is affected by economic conditions, population growth, fuel prices and other factors that increase travel demand. After dropping during the recession, the extent of congestion has risen back to its peak in the last few years.

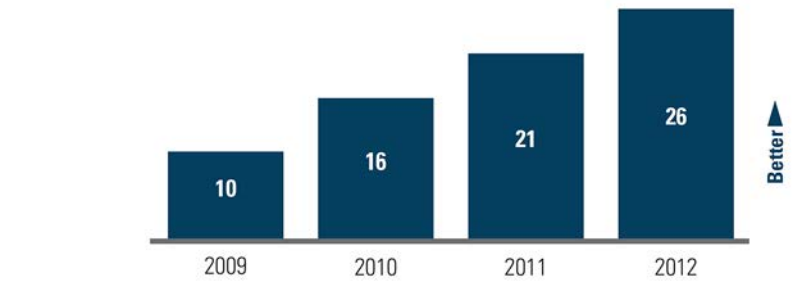
Interregional Corridor (IRC) Mobility: % of IRC centerline miles more than 2 mph below travel time target	5%	2%	5%	2%	7%	Better ↗ Performance expected to worsen moderately in the second 10 years of the plan



Source: MnDOT

98% of major interregional routes in Greater Minnesota can be driven within 2 mph of the corridor target speed. This performance is expected to remain stable through the first 10 years of the plan. MN 210 from Motley to Aitkin is the only corridor that currently performs below the average travel time target for that corridor.

Miles of sidewalk in Poor condition	Tracking Indicator	4%	N/A	--	--	Better ↔ Performance expected to continue at current levels
ADA: % of state highway intersections with accessible pedestrian signals	100% by 2030	26%	100%	● 70-80%	▲ 0%	Better ↗ Performance expected to achieve target by end of planning period



Source: MnDOT

Sidewalks are typically addressed as part of highway reconstruction projects. As a result, the percentage of sidewalks in poor condition is likely to remain unchanged as MnDOT foregoes full reconstructions in favor of lower cost mill and overlays. Accessible pedestrian signals (APS) will continue to be installed at state highway intersections as existing signals reach the end of their useful life. MnDOT anticipates achieving system-wide APS compliance by 2030.

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20-Year
State Highway
Investment Plan

Chapter 6

MOVING FORWARD

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MOVING FORWARD

MnDOT estimates that there will be $18 billion in revenues available over the next 20 years to address more than $30 billion in transportation needs, resulting in a funding gap of approximately $12 billion. Roughly one-third of this gap, or $4 billion, is due to a reduction in buying power attributable to the growth of construction-related costs continuing to outpace the growth in revenues. The remainder of the gap represents unfunded capital improvements needed to maintain aging infrastructure and meet Minnesotans' growing transportation needs over the life of this plan. Given this gap, there will be many unmet needs and priorities within MnSHIP's 20-year horizon.

These unmet needs will manifest themselves in a number of ways. By 2033, MnDOT will have a decreased ability to meet federal and state performance targets, meet multimodal system demands, keep up with needed maintenance and improvements, maintain an optimal bridge replacement schedule, and maintain funding levels for the Toward Zero Deaths safety initiative. Furthermore, there will be no funding for Twin Cities congestion, IRC mobility improvements, or RCIPs. To further illustrate the extent of the unmet needs on the state highway system, a list of the capital improvements that constitute a large portion of this $12 billion gap is presented in **Appendix I: Illustrative Project List of Unmet Needs**. If more funding becomes available, MnDOT would be able to consider these projects and others for construction.

The key messages of Chapter 6 are:

- *MnDOT does not expect to fund any investment category to its full needs amount through 2033.*
- *The state highway system's unmet needs will be greater for each investment category in Years 11-20 compared to Years 1-10.*
- *Per a recommendation from the Transportation Finance Advisory Committee (TFAC), MnDOT developed a list of projects to illustrate how the needs gap could be filled if additional funding became available.*
- *MnDOT has identified several internal and external policy-oriented strategies to make the greatest impact with available revenue.*
- *During a second round of public outreach, participants were somewhat satisfied with outcomes in Years 1-10 and generally not satisfied with outcomes in Years 11-20, though they understood the rationale behind the decisions.*
- *Policy, planning, and programming changes will continue to be communicated via outreach and incorporated in the 10-Year Work Plans.*

One-third of the $12 billion gap is attributable to construction costs increasing more quickly than revenue.

MnDOT does not expect to fully fund any investment category at a level that would meet all of its needs as defined in **Chapter 3, "Transportation Needs."**

Unmet Needs

The unmet needs presented in this chapter refer to the same set of needs presented in **Chapter 3, "Transportation Needs."** Due to the substantial differences that exist between investment needs and available revenues based on the anticipated expenditures and outcomes presented in **Chapter 5, "20-Year Investment Plan,"** MnDOT does not expect to fund any investment category to its full needs amount through 2033. Therefore, MnDOT does not expect to be able to deliver a program of capital improvements that wholly meets the expectations of both MnDOT and its stakeholders.

For the state highway system, the difference between the 20-year needs and the amount that MnDOT plans to invest in each investment category over this timeframe is shown in **Figure 6-1**. For many of the investment categories, both immediate needs and those needs expected to arise over the next 20 years will not receive adequate funding based on MnDOT's analysis of revenue trends and projected system conditions. As a result, MnDOT's progress toward performance-based goals, as well as its objectives in enhancing quality of life and economic competitiveness as outlined in the **Minnesota GO Vision,** will slow as 2033 approaches. A list of the capital improvements that could be supported if the $12 billion gap were closed is presented in **Appendix I: Illustrative Project List of Unmet Needs**.

EMERGING ISSUES IN YEARS 11-20

Although MnDOT will prioritize more investments toward asset management in Years 11-20 to manage key risks, system-wide pavement and bridge conditions are still expected to decline. The disparity between the condition of assets on Interstates and all other roads will become even more apparent during this time period. Despite its focused investment on assets during these years, it is possible that MnDOT could violate GASB 34 thresholds in Years 11-20 without altering its targets, system prioritization, and/or investments.

As MnDOT's first responsibility is to maintain a safe roadway for the traveling public, MnDOT will defer most long-term life-cycle fixes in Years 11-20 and instead focus its investment on lower-cost preservation activities to address hazardous conditions. MnDOT's maintenance costs are likely to increase to accommodate reactionary fixes on non-Interstate roads.

In non-asset categories, outcomes will also worsen and additional risks will arise due to the lack of investment as revenues are diverted toward pavement and bridge needs. Given the asset management focus during Years 11-20, MnDOT will dramatically reduce or eliminate investment in Traveler Safety, Critical Connections, and **Regional and Community Improvement Priorities (RCIPs)** for these years.

MnDOT will use optimization strategies to make the best use of available funding in each investment category for all projects on the state highway system (see **Chapter 5, "20-Year Investment Plan"**).

Figure 6-1: Summary of Unmet Needs Through 2033

Investment Category		20-Year Needs *Cost to achieve performance targets and/or system goals (Chapter 3)*	20-Year Expenditures *Total cost to implement plan (Chapter 5)*	Unmet Needs *Amount needed above planned expenditure to fully address needs*	Under-funded Improvements *Main needs that will not be adequately fulfilled through 2033*
Asset Management	Pavement Condition	$10.76 billion	$8.30 billion	**$2.46 billion**	Non-Interstate pavement condition
	Bridge Condition	$5.11 billion	$3.42 billion	**$1.69 billion**	Non-Interstate bridge condition
	Roadside Infrastructure Condition	$1.71 billion	$1.49 billion	**$220 million**	All non-NHS elements; culverts and rest areas
Traveler Safety		$1.34 billion	$620 million	**$720 million**	Sustained crash locations, proactive treatments
Critical Connections	Twin Cities Mobility	$3.90 billion	$520 million	**$3.38 billion**	Spot mobility treatments and operational solutions
	Interregional Corridor Mobility	$810 million	$0	**$810 million**	Improvements on all underperforming corridors
	Bicycle Infrastructure	$540 million	$200 million	**$340 million**	Stand-alone improvements
	Accessible Pedestrian Infrastructure	$490 million	$310 million	**$180 million**	Improvements other than ADA requirements
Regional + Community Improvement Priorities		$1.75 billion	$570 million	**$1.18 billion**	Significant investments to address local or regional quality of life and economic competitiveness
Project Support		$2.88 billion	$1.33 billion	**$1.55 billion**	not applicable
Small Programs		$900 million	$900 million	**$0**	not applicable
Total		**$30.19 billion**	**$17.65 billion**	**$12.53 billion**	

ASSET CONDITION: UNMET NEEDS

Pavement Condition

Based on the spending strategies outlined in **Chapter 5, "20-Year Investment Plan,"** pavement quality on all non-Interstates is projected to decline two- to threefold relative to today over the 20-year period. Poorer road conditions will negatively impact the movement of vehicles, freight, and bicycles. In turn, these impacts are expected to lead to decreased economic competitiveness and quality of life.

Bridge Condition

There will be a higher proportion of bridges in Poor condition in 20 years relative to today on both NHS and non-NHS routes. This will potentially result in the need for weight restrictions on some bridges, resulting in longer trips for carriers of critical goods and services.

Roadside Infrastructure Condition

Delay in response to growing culvert and underground drainage needs in particular will be a high risk. In addition, the burden to replace or repair many Roadside Infrastructure elements will transfer from capital to operations maintenance budgets. Compromised facilities will lead to decreased system reliability, investments will be reactive and less cost-effective, and there could be issues of non-compliance with safety and accessibility standards (at rest areas, for example).

TRAVELER SAFETY: UNMET NEEDS

Outcomes for Traveler Safety are difficult to project. Recent years have seen a substantial decline in the annual number of fatalities and serious injuries on Minnesota roads due to a robust program of safety improvements and **Toward Zero Deaths (TZD)** strategies. However, MnDOT's reduced investment in Traveler Safety over the next 20 years may cause this trend to slow or even reverse. The low fatality and serious injury rate goals set by the TZD program may be difficult to achieve without continued investment to support safety improvements. Other program resources – safety education, enforcement, and emergency services – will become more important in keeping fatality and serious injury rates low.

CRITICAL CONNECTIONS - UNMET NEEDS

Twin Cities Mobility

MnDOT will be unable to fund Twin Cities Mobility improvements in Years 11-20, leaving many anticipated needs unaddressed. Congestion in the metropolitan area will lead to greater freight issues and costs as well as

decreased quality of life and lost productivity for metro area residents. If travel demand grows during this period, MnDOT will not be well-positioned to address increasing congestion and reliability issues, resulting in unpredictable travel times and potential negative impacts to the regional economy.

Interregional Corridor Mobility

Improvements would be needed on three of four underperforming corridors (I-94, US 10, US 63, and MN 210) in order to meet systemwide performance measures through 2033. In the absence of major investments to improve mobility needs on the **Interregional Corridor (IRC)** system over the next 20 years, these corridors will be subject to greater congestion due to an anticipated increase in traffic and lack of investment. As a result, MnDOT will be unable to make progress towards a number of objectives in communities across Minnesota, including improving multimodal connections, community livability, economic competitiveness, environmental health, and quality of life. Several of these needs may be eligible for the new Corridors of Commerce Program, discussed on page 143.

Bicycle Infrastructure

In Years 11-20, MnDOT does not plan to invest in bicycle infrastructure beyond what is planned concurrently with pavement and bridge projects. Stand-alone bicycle improvements will not be funded during this period despite increasing demand for non-motorized transportation accommodations. State highways may continue to be barriers to bicycle movement in many locations, though they will continue to allow bicycle movement along them.

Accessible Pedestrian Infrastructure

Outside of fixing or installing curb ramps or making other improvements to meet **1990 Americans with Disabilities Act (ADA)** standards, there will be little to no funding available for additional improvements throughout the 20-year period. State highways may continue to be barriers to pedestrian movement in many locations.

REGIONAL AND COMMUNITY IMPROVEMENT PRIORITIES: UNMET NEEDS

MnDOT does not plan to fund RCIPs in Years 11-20. MnDOT will not be able to partner with local agencies on projects or take advantage of opportunities to advance regional and community-based economic competitiveness and quality of life objectives.

In the second half of MnSHIP, MnDOT does not expect to be able to invest in stand-alone bicycle infrastructure projects.

MnDOT will not be able to manage risks in Years 11-20 to the same extent as in Years 1-10.

Risk Management Results

In making investment decisions, MnDOT sought to mitigate seven key risks related to implementing MnSHIP's capital investment priorities. MnDOT will effectively manage its transportation risks across all categories in Years 1-10. MnDOT will address its highest risks in each investment category even though some transportation needs will not be fully funded. In Years 11-20, MnDOT will apply revenues to address its highest risks, but will not be able to mitigate them to the same extent as in Years 1-10. Six of the seven key capital investment risks that MnDOT aims to address through MnSHIP will be high risks by the end of the 20-year period.

Figure 6-2 broadly illustrates the degree to which key risks will or will not be addressed given MnSHIP's investment priorities (more information is presented in **Chapter 4,** "**Development of Investment Priorities"**). The seven risks vary in terms of their impact and require different amounts of resources to be partially or adequately mitigated. As discussed previously in this chapter, the risks associated with asset management are significant, more likely to occur, and the most costly to address.

There are six major risks areas that will go unmanaged or inadequately managed during Years 11-20 of the plan. These risks areas are:

1. **Government Accounting Standards Board 34 (GASB 34) and state bond rating**

   Risk statement. If bridge and pavement conditions deteriorate, then the state's bond rating may fall and the costs to borrow money may increase for state and local units of government.

   Explanation. GASB establishes standards for governments to be more accountable to users of the state's financial information, and provides government officials a tool to demonstrate long-term financial stewardship. If MnDOT is not able to meet the minimum condition targets for its assets, it represents a higher risk for bond holders who invest in the state and could affect state bond ratings. By year 2023, the condition of non-NHS pavements will be at the GASB condition threshold. By 2033, the condition of MnDOT's non-Interstate NHS pavements and bridges and non-NHS pavements will be at the minimum GASB condition threshold despite spending nearly all available resources on preserving existing assets during the second 10 years of the plan.

Figure 6-2: Risk Mitigation Through Year 10 and Year 20

Key Capital Investment Risks	Mitigated Risk Through Year 10 (of 3 ✓)	Mitigated Risk Through Year 20 (Of 3 ✓)
GASB 34: pavement and bridge conditions deteriorate jeopardizing state bond rating	✓✓	✓
Federal policy: failure to achieve MAP-21 performance targets on NHS reduces funding flexibility	✓✓✓	✓
MnDOT policy: misalignment with Vision and Statewide Multimodal Transportation Plan results in loss of public trust	✓✓	✓
Bridges: deferring bridge investments viewed as an unwise/unsafe strategy	✓✓✓	✓✓
Responsiveness: rigid investment priorities limits ability to support local economic development and quality of life opportunities	✓✓	—
Operations budget: untimely or reduced capital investment leads to unsustainable maintenance costs	✓✓	✓
Public outreach: investment inconsistent with MnSHIP public outreach results in loss of public trust	✓✓	—

✓✓✓	*Adequately mitigated* MnDOT mitigates most or all of the risk through its investment priorities
✓✓	*Partially mitigated* MnDOT mitigates most of the risk through its investment priorities, but must accept some risk
✓ or —	*Unmanaged or inadequately mitigated* MnDOT is unable to mitigate the risk well, and must accept much of the risk or transfer it to another agency

2. **Implementation of federal policy (MAP-21)**

Risk statement. If MnDOT fails to meet the performance targets specified in MAP-21, then the agency may face increased federal oversight and less funding flexibility.

Explanation. Under MAP-21, MnDOT is required to make progress on the NHS toward performance measures in seven national goal areas. If MnDOT fails to make progress in the seven national goal areas, the state as well as its local partners will risk losing federal funding flexibility.

MnDOT integrated known and assumed performance targets for Pavement Condition, Bridge Condition, Traveler Safety, and Twin Cities Mobility for NHS roadways in the development of MnSHIP. In the second 10 years of MnSHIP, performance in these investment categories will decline significantly. Until MAP-21 rulemaking concludes, it is unclear as to how the federal government will evaluate worsening outcomes in these categories. In addition, MnDOT will likely have to make progress toward performance measures in national goal areas that apply to these and other investment categories, potentially making progress toward all MAP-21 targets more challenging.

3. **Implementation of MnDOT policy**

Risk statement. If MnDOT's investment decisions do not reflect the **Minnesota GO Vision** and **Statewide Multimodal Transportation Plan,** then the public may not view the agency as a credible provider of multimodal transportation options.

Explanation. MnSHIP must carry out the goals and strategies identified by the **Minnesota GO Vision** and the **Statewide Multimodal Transportation Plan.** The policies established in these documents are the result of extensive stakeholder and public outreach and input. The lack of investment in multimodal improvements in MnSHIP will slow progress toward the **Minnesota GO Vision** and the **Statewide Multimodal Transportation Plan,** especially in the second half of the plan. MnDOT's limited ability to make progress in these areas means it will not be able to keep its transportation system in a condition that meets Minnesotans' expectations.

4. **Responsiveness to local issues, concerns, and opportunities**

Risk statement. If MnDOT adopts a rigid investment strategy that avoids consideration of local transportation needs, then the agency may not be able to support local economic development and quality of life opportunities.

Explanation. MnDOT values its ability to play a role in enhancing local economic development and quality of life. The RCIP investment category is seen by the public as an important investment priority, as this category allows districts to be responsive and address emerging local issues and concerns. While MnDOT plans investment in RCIPs in the first half of the plan, it does not plan to fund RCIPs in the second half of the plan, decreasing its ability to respond to emerging local issues.

5. **Operations budget**

Risk statement. If MnDOT cannot make capital investments that minimize life-cycle costs, then transportation assets may fail prematurely and maintenance costs may rise to unsustainable levels.

Explanation. State highway system assets require ongoing maintenance to ensure that the traveling public is safe. Without timely capital investments, the cost of maintenance and operations to keep highway assets in a safe condition could increase to an unmanageable level. Although MnDOT expects to expend a large portion of its capital budget on pavement and bridge needs, conditions are expected to decline through the 20-year period, and effective maintenance and operation activities will be increasingly relied upon to keep the system in working order. It is not suitable for this model to become the new normal, as it will disrupt internal funding mechanisms and the division of employee roles within MnDOT, creating long-lasting operational issues for the agency.

6. **Public outreach and opinion**

Risk statement. If MnDOT's transportation investments do not reflect the priorities identified during MnSHIP's public outreach, then the public may lose confidence in the agency.

Explanation. MnDOT has a responsibility to address public expectations through its state highway investments. MnSHIP should respond to stakeholder priorities to maintain trust with MnDOT partners and the public. The public expressed very clear messages during public outreach, including the desire to have MnDOT 1) pursue a diverse set of investment priorities, 2) address pavement condition needs strategically, 3) understand that a statewide network of well-maintained roads is critically important to freight movement and regional access, 4) invest more in mobility to promote economic competitiveness and quality of life, and 5) remain responsive to evolving needs. As the steward of the state highway system, MnDOT is tasked with responding to these messages and continuing to engage the public in planning state highway investments. However, the ability to balance these issues presents an additional challenge as MnDOT works to fund its competing transportation priorities.

Alternate Funding Scenarios and Priorities

MnDOT estimates that it will have $18 billion to spend on highway capital projects over the next 20 years. This amount is based on an analysis of MnDOT's projected revenue sources and the central assumption that, given realistic economic indicators (such as rising fuel costs and plateauing **vehicle miles traveled [VMT]**), key revenue sources are not expected to grow. Likewise, the revenue projection assumes that there will be no additional alternate, temporary, or permanent funding sources available.

The possibility of new revenue for state highway improvements could be considered as a means of attaining outcomes and managing risks identified in this plan.

However, the possibility of new revenue for state highway improvements could be considered as a means of attaining outcomes and managing risks identified in this plan. For example, new revenue could come from:

- **One-time sources,** such as a solicitation from the **Federal Highway Administration (FHWA)** for projects that meet certain criteria.
- **Temporary revenue increases,** such as the issuance of trunk highway bonds. However, it should be noted that bonds require a repayment method with interest. While bonding is a key financing tool to expedite the delivery of projects, there are practical limits on debt. In the absence of new resources, MnDOT is already expected to approach its current policy limit of annual state revenues going toward debt repayment (no more than 20 percent) within the next 10 years.
- **Permanent revenue sources,** such as legislative action that increases the state motor vehicle fuel tax rate or that establishes alternate funding sources.

PRIORITIES FOR ADDITIONAL FUNDING

For more information about the Minnesota Transportation Finance Advisory Committee website, please visit http://www.dot.state.mn.us/tfac/

The **Transportation Finance Advisory Committee (TFAC),** established by Governor Mark Dayton in 2012, analyzed potential revenue sources and non-traditional approaches to transportation funding and financing. An illustrative project list is presented in both the appendix of the committee's final report and in **Appendix I: Illustrative Project List of Unmet Needs.** This list details what projects could constitute the $12 billion gap between capital state highway transportation needs of $30 billion and projected revenues of $18 billion; this list is not comprehensive and totals less than $12 billion. If new funding were to become available for state highway projects, MnDOT would revisit the priorities on that list and involve the public in those decisions.

The TFAC final report recognized that, to increase revenues, the State of Minnesota would need to find additional revenue sources. The committee recommended a range of funding options for additional revenue. These proposed options for statewide highway funding included increasing the motor

vehicle registration fees and increasing the excise tax on motor fuels (among other options). Additional options for new revenue streams continue to be explored.

Corridors of Commerce is a new Minnesota program, established by the Legislature in 2013, that targets transportation routes identified as vital links for regional and statewide economic growth. The Legislature authorized $300 million in trunk highway bonds focused on statewide expansion and completion projects determined from objective criteria and return on investment analysis, among other factors. Many of the important projects discussed in **Appendix I: Illustrative Project List of Unmet Needs** are good candidates for potential funding under this program, including expanding US 14, Minnesota 23, and Minnesota 371; addressing congestion on I-94 from Rogers heading northwest; and extending Minnesota 610 in the north Twin Cities metropolitan area.

In the absence of any new, non-bond revenue, the bonds issued as part of Corridors of Commerce would have to be repaid, with interest, from the $18 billion in revenue available for MnSHIP. MnSHIP does not reflect the projects selected as part of the 2013 Corridors of Commerce solicitation (announced in November, 2013). For more information, visit http://www.dot.state.mn.us/corridorsofcommerce/.

PLANNING FOR LESS FUNDING

If future funding is less than projected, MnDOT would continue to apply risk-based planning to address performance and agency objectives in all investment areas. The condition of the state highway system would likely deteriorate more quickly than is currently projected. To meet MnDOT's greatest risks related to its capital investment program, such as meeting GASB 34 and MAP-21 targets, MnDOT districts would need to adjust their 10-Year Work Plans based on programming changes in the **Statewide Performance Program (SPP)** or **District Risk Management Program (DRMP).** MnDOT would also need to consider additional long-term strategies to accommodate the decrease in available revenues and stretch existing revenues further.

If future funding is less than projected, MnDOT will continue to apply risk-based planning to address performance and agency objectives.

Policy-Oriented Strategies to Stretch Projected Revenue

MnDOT will pursue a mix of internally and externally oriented strategies that would stretch existing revenue to accomplish additional priorities beyond those identified in MnSHIP. In some cases, these strategies may require significant investigation prior to implementation as well as support from MnDOT's transportation stakeholders. Whether these strategies are internal to MnDOT or rely on external decision-making, they could be considered as a possible means for achieving more desirable outcomes on the state highway system.

INTERNAL STRATEGIES

MnDOT expects that there will be various opportunities to improve system outcomes as projects, policies, and the MnDOT Family of Plans continue to develop. Examples of internal strategies that MnDOT could employ to supplement and strengthen its capital highway investment program are described in detail on in **Figure 6-3.**

By collaborating with other transportation stakeholders, MnDOT may be able to pursue additional strategies to stretch revenues and improve outcomes.

EXTERNAL STRATEGIES

In most instances, MnDOT cannot or would not employ a strategy without significant collaboration with the FHWA and other transportation stakeholders, such as other state agencies, local **Area Transportation Partnerships (ATPs),** and local units of government. **Figure 6-4** describes examples of external strategies to be considered by MnDOT.

Figure 6-3: Internal Strategies to Stretch Projected Revenue

Internal Strategies

Adjust performance expectations, where possible, to better match customer expectations with system performance. MnDOT sets its aspirational targets, in part, according to public expectations for the state highway system. This strategy would reevaluate these targets given emerging risks, aligning them with realistic expectations for system performance. Although this strategy does not address investment needs on the system directly, it would allow MnDOT to ensure its performance-based management efforts are concerted, efficient, and supported.

Pursue research and innovation to improve efficiency and minimize impacts to the traveling public. With all the challenges facing Minnesota's transportation system, innovation is imperative. Creativity and innovation need to permeate every aspect of transportation service delivery, from how revenues are generated to how projects are constructed. An example of recent MnDOT innovation was the use of a Self-Propelled Modular Transporter[1] in 2012 to move a bridge constructed off-site into place crossing I-35E in Saint Paul. This innovative construction method minimized roadway closures during construction.

Continue to employ high return-on-investment strategies that deliver the majority of benefits at a reduced cost. MnDOT has increased its use of performance-based designs throughout the agency. These designs help ensure MnDOT does not deliver projects beyond what is needed to meet agency performance targets or other key agency objectives. By continuing to expand the use of these designs, MnDOT will increase its ability to help manage project costs. As a part of this effort, MnDOT would evaluate changing design standards within the agency.

Report life-cycle cost of highway system improvements so stakeholders and policymakers can better understand the long-term costs of highway improvements. Life-cycle costs are the total expenditures over the entire lifespan of a highway. They include the initial capital costs of an investment, including engineering, procurement, and construction of the improvement as well as lifetime operating and maintenance costs of the improvement. MnDOT has traditionally only reported the cost of an improvement in terms of the initial capital costs of engineering, procurement, and construction of the improvement. To become more transparent, MnDOT will pursue ways to better report life-cycle costs on improvements to the system.

MnDOT has identified several internal strategies that would enable it to improve outcomes on the state highway system.

1 http://www.dot.state.mn.us/metro/projects/35estpaul/webcam.html

Internal Strategies (continued)

Evaluate the capital and operations revenue split to best use revenues in keeping state highways safe and operable. If decreased investments are made in capital infrastructure, operations and maintenance costs typically increase. Determining the appropriate balance between how much is invested in capital infrastructure versus how much will be deferred and used for operations and maintenance is an important consideration moving forward.

Focus one-time additional funding on the highest risks in each category instead of relying on conventional distribution. MnDOT would continue to use risk-based planning to identify its highest risks and determine how to best invest additional resources.

Manage investments to achieve multiple purposes such as improvements to transportation, economic competitiveness, public health, and energy independence. Early coordination and participation in the planning process helps MnDOT combine resources and leverage investments to achieve improved outcomes. For example, in most cases, it is far more cost-effective to include a bicycle element or a freight accommodation during construction of a larger bridge or highway project than as an independent project on a separate timeframe.

Increase attention given to analyzing and accurately tracking investments and performance measures in several investment categories. MnDOT can accomplish this through two general strategies:

- *Integrating MnSHIP investments with **Total Information Management System (TIMS)** software.* Implementing the new TIMS software is an important element of institutionalizing the tracking of smaller investments embedded within a larger pavement or bridge project. TIMS will allow project managers to break a project into its component parts and help to create a more accurate baseline for the next MnSHIP update.
- *Developing and tracking performance measures and setting targets* for particular investment categories that currently lack them. In particular, there is room to improve performance tracking for Roadside Infrastructure Condition, Bicycle Infrastructure, and the non-ADA components of Accessible Pedestrian Infrastructure investment categories.

Figure 6-4: External Strategies to Stretch Projected Revenue

External Strategies

Reevaluate the jurisdictional alignment of the state highway system to ensure transportation decisions occur at the right level of government. MnDOT, in conjunction with local governments across the state, is conducting a jurisdictional study that is looking at potential roadways for jurisdictional transfer. Additional policy and economic analysis are necessary to determine if this type of system refinement can increase long-term system sustainability and place transportation decisions at the right level of government.

Partners and key stakeholders

- Cities and counties
- State legislature

Initiate a review of GASB 34 thresholds to see if changes are feasible. Complying with GASB 34 performance targets for pavements and bridges significantly contributed to MnDOT's investment plan for the second 10 years of MnSHIP. Unlike MnDOT's performance targets, which can be adjusted internally, adjustments to the GASB 34 targets require the involvement and support of several external agencies, including the Minnesota Office of Management and Budget, because of their global impact to the State of Minnesota's financial accountability. MnDOT will initiate a review process to determine if there are justifications for pursuing reconsideration of the GASB 34 thresholds in the future.

Partners and key stakeholders

- Minnesota Management & Budget
- State legislature

Review the final rules of MAP-21 and allocation of revenues as MAP-21 rulemaking concludes. MAP-21 substantially changed the priority of the federal highway transportation program to one that is more heavily focused on the performance of the NHS. In response to this, MnDOT shifted the amount of federal funding dollars going to local units of government. MnDOT will continue to regularly review the distribution of federal transportation funding in Minnesota and adjust its programs if national priorities for the funding are not being achieved.

Partners and key stakeholders

- Cities and counties
- Metropolitan Planning Organizations
- Regional Development Commissions

Pursue public-private partnerships as an opportunity to improve the delivery, maintenance, and operations of highway improvements. Public-private partnerships are more likely to occur where local incentives and priorities most closely align with those of MnDOT. These partnerships could be particularly successful in the management of rest areas, which have performed well under the public-private partnership model in other states.

Partners and key stakeholders

- Private business interests

External Strategies (continued)

Coordinate with locals and other state agencies to best leverage funds to achieve better transportation outcomes for the public, transportation stakeholders, and partners. By improving local participation, MnDOT will be better positioned to engage in collaborative planning efforts with stakeholders and to pursue outcomes that achieve multiple purposes. Successful examples of this include MnDOT's collaboration with the Minnesota Department of Health in its Statewide Health Improvement Plan to encourage active transportation among youths. The Corridor Investment Management Strategies (CIMS) initiative is also an example of a transparent, inclusive planning process that uses partnerships to leverage multiple benefits when developing projects within a transportation corridor.

Partners and key stakeholders

- Cities and counties
- Metropolitan Planning Organizations
- Regional Development Commissions
- Minnesota Department of Health
- Department of Employment and Economic Development

Advocate for flexible design standards and specifications that maintain or improve safety but decrease the cost of pavement reconstruction and maintenance. Flexible design allows greater sensitivity to local needs and demands of the surrounding environment without prescribing unnecessary or burdensome improvements. By decreasing road width, for example, MnDOT also decreases the initial cost of the project as well as the amount of pavement that it will need to maintain. This strategy, balanced with safety and other operational considerations, would enable MnDOT to stretch highway funding to more projects on the state highway system.

Partners and key stakeholders

- Local units of government

Broaden the education of stakeholders and policymakers on the increasing fiscal limitations facing MnDOT. In particular, the transition to an asset management-focused strategy in the second half of the plan will create real challenges to sustaining positive relationships with key stakeholders and the public. By effectively engaging stakeholders and policymakers on the issue of a widening gap between revenues and cost, MnDOT will be better positioned to discuss what it can achieve with the revenues it has and what it could achieve if additional revenues are provided.

Partners and key stakeholders

- Stakeholders and other members of the public
- State legislature

Spring Public Outreach

Due to the extent of the unmet needs in MnSHIP and stakeholders' expressed desire to understand MnDOT's decision-making process, MnDOT conducted a second round of public outreach in Spring 2013. This phase included eight meetings across the state and two webinars to report on the results of Fall 2012 outreach and gauge participants' understanding and acceptance of the content and outcomes of key messages of the draft plan.

Participants were generally neutral about the outcomes in Years 1-10 and disappointed about the outcomes in Years 11-20. However, over 80 percent of participants thought the rationale behind the decisions was clear or very clear, signifying that MnDOT made progress toward a more transparent and accountable process. Although participants had divergent priorities and did not agree with all of MnDOT's decisions, they frequently stated their appreciation for the structure, conversation, and transparency of both the fall and spring outreach processes.

PROS: WHAT PARTICIPANTS LIKED ABOUT THE PLAN

- Asset Management emphasis.
- Diversity of investment to meet multiple purposes.
- MnDOT's continued, albeit limited, ability to partner with local agencies and stakeholders.

CONS: WHAT PARTICIPANTS LIKED LEAST ABOUT THE PLAN

- Funding levels are insufficient to meet stakeholder expectations.
- Limited ability to make optimal, long-term asset management improvements will result in unsustainable system improvement costs.
- Little flexibility remains for regional priorities and mobility projects.
- Concern that NHS focus will reduce pavement conditions on lower volume roads.
- Absence of specific projects in work plan, including the expansion of I-94 between Rogers and Saint Cloud and the expansion of US 14 from Nicollet to New Ulm.

OTHER TAKEAWAYS

- Need to educate stakeholders and legislators about funding shortfall.
- Coordination with local partners is critical
- Pursue strategies to stretch available resources.

Next Steps

MnSHIP covers the 20-year period between 2014 and 2033. It is updated every four years to reflect changes in federal and state policy, system conditions, and revenue projections, among other factors. The current MnSHIP update refined MnDOT's planning and programming process to address these changes. Between now and the next MnSHIP update, MnDOT will continue to update and improve this process and adjust investment priorities as conditions evolve. MnDOT has been implementing and will continue to work on the following efforts over the coming years:

Between now and the next MnSHIP update in 2017, MnDOT will continue to refine its planning and programming processes as well as its investment priorities.

- **Monitor programming of federal revenue and MAP-21 rulemaking.** At the federal level, more changes are expected as MAP-21 rulemaking concludes in 2014. Once this process has finished, the SPP and DRMP will be monitored and adjusted to ensure that they align with performance targets while also making progress toward the **Minnesota GO Vision.** Changes in state legislation or in MnDOT policy may also occur within the next four years; these can also be incorporated into the SPP and DRMP to ensure that they are reflected in MnSHIP investment priorities. Further, as MAP-21 performance measures take effect in Spring 2015, MnDOT will begin to evaluate how to integrate new measures into the next MnSHIP update.
- **Continue coordination of planned projects with partners.** Stakeholder engagement efforts will continue to ensure strong connections between the **Minnesota GO Vision** and, ultimately, project selection. Projects for Years 5-10 of MnSHIP will be the subject of additional project development conversations between MnDOT and its partners to ensure that funds leverage the highest possible outcomes. The use of corridor-specific strategies may take a more visible role in determining where and how MnDOT leverages high-return outcomes toward multiple modes and purposes. The **Corridor Investment Management Strategies (CIMS)** initiative sets an example of how MnDOT seeks to bring local, modal, and state partners together to identify opportunities for collaboration and innovative investment. Because the 10-Year Work Plans and the **State Transportation Improvement Program (STIP)** are both updated annually through collaboration among MnDOT offices, they also allow flexibility for MnDOT and its partners to best reflect evolving conditions and priorities.

The 10-Year Work Plans in **Appendix H: District 10-Year Work Plans** include the four-year list of STIP projects, as well as the next three years of planned investments (Years 5-7 of MnSHIP).

- **Complete the Transportation Asset Management Plan.** MnDOT was one of three states selected to complete a pilot **Transportation Asset Management Plan (TAMP)** by FHWA as part of MAP-21 rulemaking. This plan will help MnDOT to understand and report on the life-cycle costs of highway system improvements as well make investment decisions

in the next MnSHIP update. A more comprehensive understanding of life-cycle costs as well as improved coordination between all of MnDOT's capital, maintenance and operations activities will be crucial to delivering the highest quality state highway system given available resources.

MnDOT will build upon the success of the entire Minnesota GO public outreach process, including MnSHIP, to engage stakeholders and the general public about the importance of investing in a transportation system that supports a world class state. Stakeholders have frequently mentioned the need to make messages clear and concise for the average Minnesota resident who uses the state's transportation system but infrequently thinks about transportation policy, funding, and project development. One such message is that maintaining existing infrastructure at today's conditions will require nearly all available resources. Additional investments in Traveler Safety, Critical Connections, and RCIPs are critical to achieving the **Minnesota GO Vision** and advancing numerous other system objectives. As it is becoming increasingly challenging to pay for and maintain new system infrastructure, MnDOT's ability to engage in collaborative, sustainable transportation planning will remain vital to the success of MnSHIP.

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20-Year
State Highway
Investment Plan

Appendices

ADDITIONAL ONLINE RESOURCES

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ADDITIONAL ONLINE RESOURCES

More information on the Minnesota 20-Year Highway Investment Plan is available at http://www.mndot.gov/planning/mnship.

Appendix A. Acknowledgements

A-1: PROJECT MANAGEMENT TEAM

A list of the people and organizations who contributed to the development of this plan.

A-2: INVESTMENT CATEGORY WORK GROUPS

A list of the participants in each investment category work group.

A-3. PARTNERSHIP ADVISORY COMMITTEE

A list of the participants in the Partnership Advisory Committee.

http://www.mndot.gov/planning/mnship/pdf/acknowledgements.pdf

Appendix B. Related Links

B-1: MNDOT MODAL INVESTMENT PLANS

Access each of MnDOT's other modal plans and investment plans.
http://www.mndot.gov/planning/program/index.html
http://www.mndot.gov/minnesotago/familyofplans.html

B-2: 2011 ANNUAL MINNESOTA TRANSPORTATION PERFORMANCE REPORT

Click here for more detailed information on how MnDOT uses performance measures and targets to guide decision-making, and how Minnesota's transportation system is performing based on these measures.
http://www.mndot.gov/measures/index.html

Appendix C. Acronyms and Glossary of Terms

A list of acronyms and terms used in this plan and their definitions.
http://www.mndot.gov/planning/mnship/pdf/acronyms.pdf

Appendix D. Federal and State Legislative Requirements

D-1: FEDERAL LEGISLATIVE REQUIREMENTS

An overview of federal legislative requirements that are addressed through MnDOT's Family of Plans. The first table highlights the alignment of MnSHIP investment areas with MAP-21 national goals and the second table shows where these requirements are fulfilled in MnSHIP.

D-2: STATE TRANSPORTATION GOALS

A brief discussion of Minnesota's legislative goals for the transportation system along with a table summarizing each goal's connection to the **Minnesota GO Vision, Statewide Multimodal Transportation Plan,** and MnSHIP.

D-3: ENVIRONMENTAL JUSTICE ANALYSIS

An analysis of the state's disadvantaged populations and how investment priorities established in MnSHIP may positively or negatively impact those communities.
http://www.mndot.gov/planning/mnship/pdf/federal-state-legislative-requirements.pdf

Appendix E. Revenue Forecast

A detailed look at MnDOT's 20-year state highway revenue forecast.
http://www.mndot.gov/planning/mnship/pdf/revenue-forecast.pdf

Appendix F. Investment Category Folios

F-1: PERFORMANCE LEVEL DEVELOPMENT

A summary of how the MnSHIP investment category work groups developed performance levels for each investment category.
http://www.mndot.gov/planning/mnship/pdf/perfomance-level-investment.pdf

F-2: INVESTMENT CATEGORY FOLIO LIST

Background information on each of the ten MnSHIP capital highway investment categories and their performance levels.

Pavement Condition
http://www.mndot.gov/planning/mnship/pdf/pavement.pdf

Bridge Condition
http://www.mndot.gov/planning/mnship/pdf/bridge.pdf

Roadside Infrastructure Condition
http://www.mndot.gov/planning/mnship/pdf/roadside.pdf

Traveler Safety
http://www.mndot.gov/planning/mnship/pdf/safety.pdf

Twin Cities Mobility
http://www.mndot.gov/planning/mnship/pdf/twin-cities-mobility.pdf

Interregional Corridor Mobility
http://www.mndot.gov/planning/mnship/pdf/irc-mobility.pdf

Bicycle Infrastructure
http://www.mndot.gov/planning/mnship/pdf/bicycle.pdf

Accessible Pedestrian Infrastructure
http://www.mndot.gov/planning/mnship/pdf/pedestrian.pdf

Regional and Community Improvement Priorities
http://www.mndot.gov/planning/mnship/pdf/rcip.pdf

Project Support
http://www.mndot.gov/planning/mnship/pdf/project-support.pdf

MnSHIP Investment Approaches
http://www.mndot.gov/planning/mnship/pdf/approaches.pdf

Appendix G. Public Outreach Summary

G-1: STATEWIDE PUBLIC OUTREACH SUMMARY - FALL 2012

A statewide analysis of the public input received in Fall 2012 on the MnSHIP investment approaches.
http://www.mndot.gov/planning/mnship/pdf/public-outreach-summary.pdf

G-2: PARTNERSHIP ADVISORY COMMITTEE - FALL 2012

A summary of the feedback received from the MnSHIP Partnership Advisory Committee on September 21, 2012.
http://www.mndot.gov/planning/mnship/pdf/partnership-advisory-committee.pdf

G-3: DISTRICT MEETING SUMMARIES - FALL 2012

Summaries from stakeholder engagement meetings in each district from Fall 2012.

October 4 - Willmar (District 8)
http://www.mndot.gov/planning/mnship/pdf/D8.pdf

October 9 - Detroit Lakes (District 4)
http://www.mndot.gov/planning/mnship/pdf/D4.pdf

October 10 - Mankato (District 7)
http://www.mndot.gov/planning/mnship/pdf/D7.pdf

October 11 - Duluth (District 1)
http://www.mndot.gov/planning/mnship/pdf/D1.pdf

October 15 - St. Cloud (District 3)
http://www.mndot.gov/planning/mnship/pdf/D3.pdf

October 16 - Minneapolis (Metro District)
http://www.mndot.gov/planning/mnship/pdf/metro-mpls.pdf

October 17 - Rochester (District 6)
http://www.mndot.gov/planning/mnship/pdf/D6.pdf

October 22 - Bemidji (District 2)
http://www.mndot.gov/planning/mnship/pdf/D2.pdf

October 23 - Shoreview (Metro District)
http://www.mndot.gov/planning/mnship/pdf/metro-shoreview.pdf

G-4: ONLINE TOOL SUMMARY - FALL 2012

A summary of the Online Interactive Scenario Tool results from Fall 2012.
http://www.mndot.gov/planning/mnship/pdf/online-tool.pdf

G-5: STATEWIDE PUBLIC OUTREACH SUMMARY - SPRING 2013

A statewide analysis of the public input received in Spring/Summer 2013 on the preview of the draft plan and MnSHIP investment priorities.
http://www.mndot.gov/planning/mnship/pdf/spring-outreach.pdf

G-6: LETTER AND WEB COMMENTS SUMMARY

A summary of the comments received on the plan through June 2013.
http://www.mndot.gov/planning/mnship/pdf/letter-web-comments.pdf

Appendix H. District 10-Year Work Plans

Each MnDOT district's 10-year Work Plan details MnDOT's planned capital investments and/or programs through 2023.
http://www.mndot.gov/planning/mnship/pdf/districts-ten-year-work-plan.pdf

H-1: DISTRICT 1

http://www.dot.state.mn.us/planning/mnship/pdf/10yrworkplan-d1.pdf

H-2: DISTRICT 2

http://www.dot.state.mn.us/planning/mnship/pdf/10yrworkplan-d2.pdf

H-3: DISTRICT 3

http://www.dot.state.mn.us/planning/mnship/pdf/10yrworkplan-d3.pdf

H-4: DISTRICT 4

http://www.dot.state.mn.us/planning/mnship/pdf/10yrworkplan-d4.pdf

H-5: METRO DISTRICT

http://www.dot.state.mn.us/planning/mnship/pdf/10yrworkplan-metro.pdf

H-6: DISTRICT 6

http://www.dot.state.mn.us/planning/mnship/pdf/10yrworkplan-d6.pdf

H-7: DISTRICT 7

http://www.dot.state.mn.us/planning/mnship/pdf/10yrworkplan-d7.pdf

H-8: DISTRICT 8

http://www.dot.state.mn.us/planning/mnship/pdf/10yrworkplan-metro.pdf

Appendix I. Illustrative Project List of Unmet Needs

The illustrative list of recommended projects provided to the MnDOT's Transportation Finance Advisory Committee. Projects listed are not currently part of MnDOT's planned investments, but would be considered if additional funding were to become available.
http://www.mndot.gov/planning/mnship/pdf/illustrative-project-list.pdf

Appendix J. Plan Comments and Responses Summary

J-1: SUMMARY OF MNSHIP COMMENTS AND RESPONSES

A summary of the comments received during the month of July 2013.

J-2: RESPONSES TO PUBLIC COMMENTS

A table displaying public comments and their respective responses from MnDOT organized by theme. Comments requiring both responses and changes to MnSHIP are noted in the response.
http://www.mndot.gov/planning/mnship/pdf/plan-comments-responses.pdf

J-3: PUBLIC COMMENTS

All comments received on MnSHIP during the month of July 2013 presented verbatim.
http://www.mndot.gov/planning/mnship/pdf/plan-all-comments.pdf