



*Your Destination...Our Priority*

Minnesota Department of Transportation  
**Statewide 20-year  
Highway Investment Plan 2009-2028**







## Minnesota Department of Transportation

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### Transportation Building

395 John Ireland Boulevard  
Saint Paul, MN 55155-1899

August 2009

Dear Citizens of Minnesota,

I am pleased to share with you the Mn/DOT Statewide 20-year Highway Investment Plan 2009-2028. This plan is the result of extensive collaboration during the past two years between the Minnesota Department of Transportation and citizens, stakeholders and partners throughout Minnesota. I want to thank everyone who took the time to participate in our outreach meetings and provide comments and suggestions on the draft plan.

The 20-year Highway Investment Plan provides the link between the policies and strategies established in the Statewide Transportation Policy Plan, which was developed concurrently, and capital improvements made to the state highway system. It identifies investments required to achieve and maintain highway system performance targets and priorities for available funding. Although investment priorities will continue to evolve over time, there is no doubt that a safe, efficient and sustainable transportation system will remain essential to Minnesota's economic vitality and quality of life. As the state's transportation leader, Mn/DOT embraces its responsibility to uphold the vision and policies presented in this plan.

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 the framework for our joint efforts. Mn/DOT will continue to look for opportunities to involve citizens, stakeholders and partners in the implementation of this plan and future investment and policy decisions. Together, we can realize the shared vision of a safe, efficient and sustainable transportation system.

Sincerely,

Thomas K. Sorel  
Commissioner



# **Statewide 20-year Highway Investment Plan 2009-2028**

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Minnesota Department of Transportation

August 2009

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## Executive Summary

*The Highway Investment Plan links policies and strategies in the Statewide Policy Plan and capital improvements that are made to the state highway system.*

Concurrent with the Statewide Transportation Policy Plan (Statewide Policy Plan) update, Mn/DOT updates its Statewide 20-year Highway Investment Plan 2009-2028 (20-year Highway Investment Plan). It provides the link between the policies and strategies established in the Statewide Transportation Policy Plan and the capital improvements made to the state highway system. In providing this link, the 20-year Highway Investment Plan sets the framework for future capital improvements by satisfying two primary objectives:

- It identifies investments required to achieve and maintain highway system performance targets established in the Statewide Policy Plan; and
- It identifies priorities for available funding in four strategic priority areas: Traveler Safety, Infrastructure Preservation, Mobility, and Regional and Community Improvement Priorities (RCIPs).

Achieving and maintaining the system performance targets is the long-term vision for the state highway system.



Role of 20-year Highway Investment Plan in Mn/DOT's Highway Planning and Programming Process

The Statewide 20-year Highway Investment Plan covers three planning periods:

- The **2009 to 2012 State Transportation Improvement Program (STIP)** identifies projects generally considered commitments with well-developed scopes, cost estimates, and planned year of construction.
- The **2013 to 2018 Mid-Range Highway Investment Plan (Mid-Range HIP)** identifies investments in the planning stage though not yet considered commitments.
- The **2019 to 2028 Long-Range Highway Investment Plan (Long-Range HIP)** provides a very rough outlook on planned spending in the second 10-year planning period based on anticipated revenues and investment priorities.

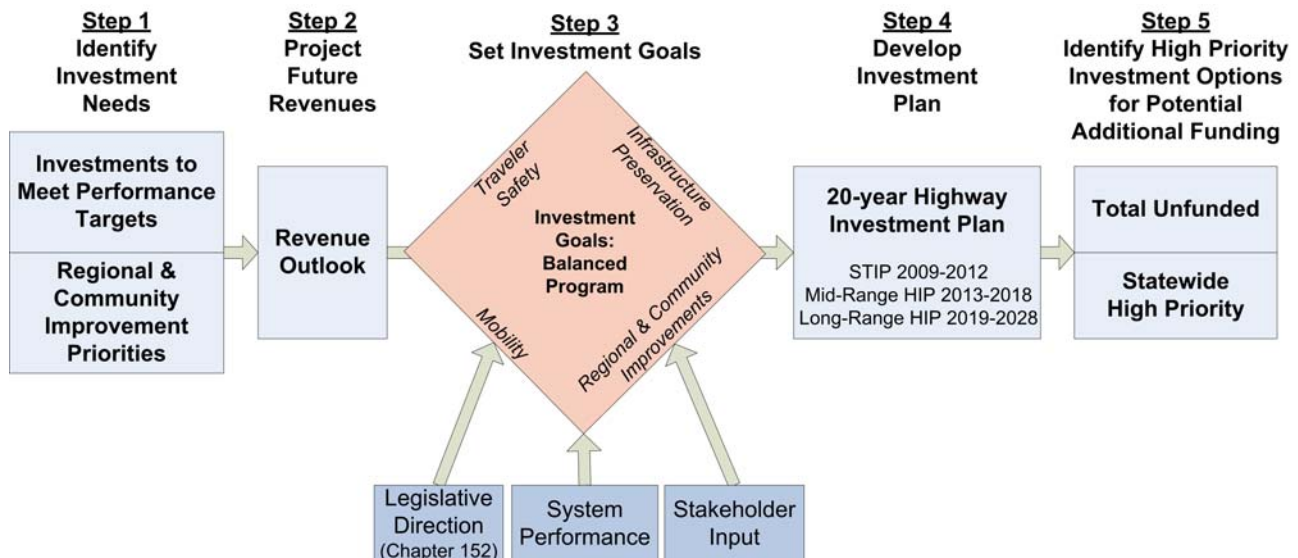
**Comparing the 2009 Plan to the 2004 Plan** – While the 2009 20-year Highway Investment Plan is similar in scope and purpose to the last update in 2004, it differs in at least two important ways. First, the 2009 plan lists investment needs in year-of-construction dollars whereas the 2004 plan does so in constant dollars. Second, methodologies to calculate investment needs have undergone several changes. For these reasons, total investment needs in 2009 and 2004 cannot be directly compared. Also, unlike the 2004 investment plan which was developed after the completion of the Statewide Policy Plan, the 2009 Highway Investment Plan and Statewide Policy Plan were developed concurrently, thereby providing immediate feedback on how the policies impacted investments.

Highway Investment Plan was developed in parallel with the Statewide Policy Plan and is the result of analysis and discussion over a two year period beginning in the spring of 2007. Stakeholders provided input on both plans at over 20 outreach meetings held throughout the state in March/April 2007, July 2008, and February/March 2009 and at two public hearings held in April 2009.

## Development of the Highway Investment Plan

*A five step process and investment guidelines ensured each district plan would be developed in a consistent, objective manner.*

The Statewide 20-year Highway Investment Plan aggregates eight Mn/DOT District 20-year Highway Investment Plans. A five step process and investment guidelines ensured each district plan would be developed in a consistent, objective manner and that planned improvements would address statewide goals and investment priorities.



**Mn/DOT 20-year Highway Investment Plan Development Process**

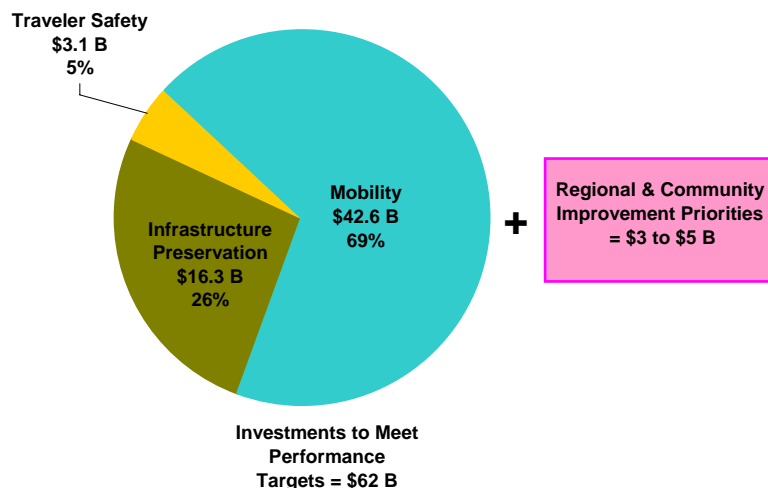
## Step 1 – Identify Investment Needs

Investment needs identified in Step 1 include improvements to:

- Achieve and maintain the highway system performance targets established in the Statewide Policy Plan for Traveler Safety, Infrastructure Preservation, and Mobility; and
- Address Regional & Community Improvement Priorities (RCIPs). RCIPs are highway improvements identified by the Districts to support local business or community development goals.

Statewide, investments to meet system performance targets during the 20-year period are estimated at approximately \$62 billion. Mobility needs related to interregional corridors and congestion mitigation in the Twin Cities and Greater Minnesota urban areas represent the largest portion, about \$43 billion, or 69 percent of the total. For now, congestion mitigation needs in the Twin Cities have been estimated based on previously identified needs from the 2004 Metro District Plan. The approach to Twin Cities mobility and congestion mitigation will be further examined in 2009 and will likely result in a revised estimate of need. Infrastructure Preservation accounts for about \$16 billion, or 26 percent, and roadway improvements targeted toward safety total about \$3 billion, or 5 percent of the total needs.

An additional \$3 billion to \$5 billion is needed to address RCIPs. This estimate reflects the sum of each district's understanding of local concerns expressed during the past several years and, as such, does not represent a comprehensive assessment of every potential local request. It does illustrate, however, that there are many demands on available transportation funding beyond the investments needed to meet established statewide performance targets.



### Investments to Meet Performance Targets and Community Priorities - \$65 Billion

Source: Mn/DOT Office of Investment Management

## Step 2 – Project Future Revenues

Statewide projected revenue for highway investments in Step 2 totals approximately \$15 billion from 2009-2028. The revenues were projected based on the trends in state and federal revenue sources for state highway construction. No new sources of revenue were assumed but the increased bond funding for trunk highways enacted by the 2008 Legislature was factored into the projection. Construction cost trends were also analyzed and projected so that investment needs and expenditures could be estimated in year-of-construction dollars. Given the volatility in both costs and revenues the projections assumed in this plan represent a snapshot in time and will need to be updated annually as long-range investments become programmed in the four-year STIP.

## Step 3 – Set Investment Goals

With investments to meet system performance targets of \$62 billion, \$3 billion to \$5 billion in RCIPs, and only \$15 billion in projected future revenue, statewide investment goals are necessary. Based on stakeholder input, statewide investment goals reflect a more balanced approach to investment across four strategic priority areas that include Traveler Safety, Mobility, Infrastructure Preservation, and RCIPs. After much discussion among District leadership, expert offices, and senior management, Mn/DOT's Transportation Program Investment Committee approved investment guidelines to further define the balanced program concept and promote consistency in approach to investment priorities across districts. These guidelines set the following priorities for the investment of each District's projected available funding over the 2009-28 timeframe:

1. **Bridge Preservation:** Allocate sufficient funding to support the Chapter 152 Bridge Program as well as support approximately 85 percent of district investment needs.
2. **Traveler Safety (Roadway Enhancements):** Allocate three times the District's Highway Safety Improvement Program Goal (including District match).
3. **Pavement Preservation:** Allocate funds as above, then Districts with adequate remaining funds to meet pavement preservation targets should do so. Districts that do not have sufficient funds to meet targets should invest about 70 percent of their remaining funds towards pavement.
4. **Other Infrastructure Preservation:** Allocate some minimum level of investment.
5. **Planned allocation** of remaining funds across the following areas is to be determined by the District in consultation with stakeholders:
  - Traveler Safety (Capacity Improvements)
  - Interregional Corridor (IRC) Mobility
  - Greater Minnesota Regional and Metropolitan Mobility
  - Twin Cities Mobility
  - Regional and Community Improvement Priorities

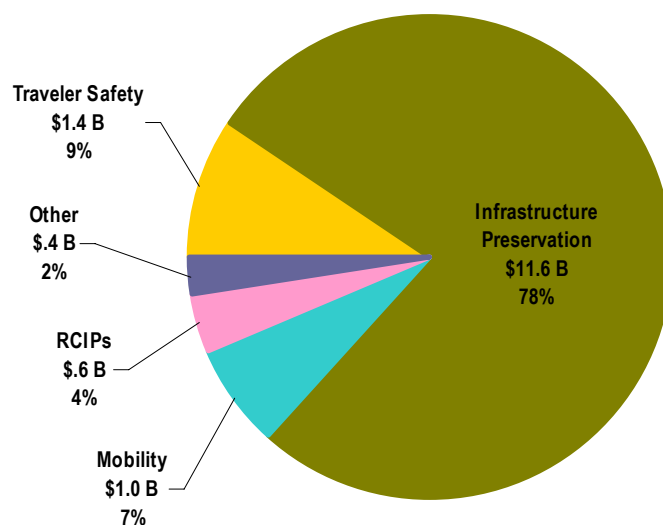
**Comparing the 2009 Plan to the 2004 Plan** – The statewide investment goals developed for the 2009 update of the Highway Investment Plan differ significantly from the 2004 plan. At that time, Mn/DOT identified Infrastructure Preservation as its top priority. Mn/DOT districts were directed to fully fund preservation needs before funding other priorities (e.g., Traveler Safety, Mobility and community priorities). The revenue and construction cost outlook in 2004 projected sufficient long term revenue to fully fund not only preservation needs, but to fund other areas of need as well. Since 2004, revenues have not grown as anticipated and construction costs have increased dramatically. Even with the increased transportation revenues provided through Minnesota Laws 2008, Chapter 152, the cost to fully preserve bridges, pavements, and other road infrastructure over the next 20 years will exceed projected revenue.

#### Step 4 – Develop Investment Plan

*About \$15 billion is projected to be invested statewide from 2009 to 2028.*

The 20-year Highway Investment Plan developed under Step 4 is a subset of the investments to meet system performance targets and community priorities identified in Step 1 given the projected revenues in Step 2.

About \$15 billion is projected to be invested statewide from 2009 to 2028. Costs are expressed in projected year-of-construction dollars. Investments to preserve pavements, bridges, and other infrastructure average 78 percent of the total for the 20 years. Roadway enhancements and capacity improvements for safety account for 9 percent of the total, with 7 percent planned to improve mobility and 4 percent to address community priorities. Approximately 2 percent of the total investments represent overarching investments such as right of way acquisition and consultant services. These investments are not directly attributed to any specific strategic policy area.



#### Planned Investments - \$15 Billion

Source: Mn/DOT Office of Investment Management

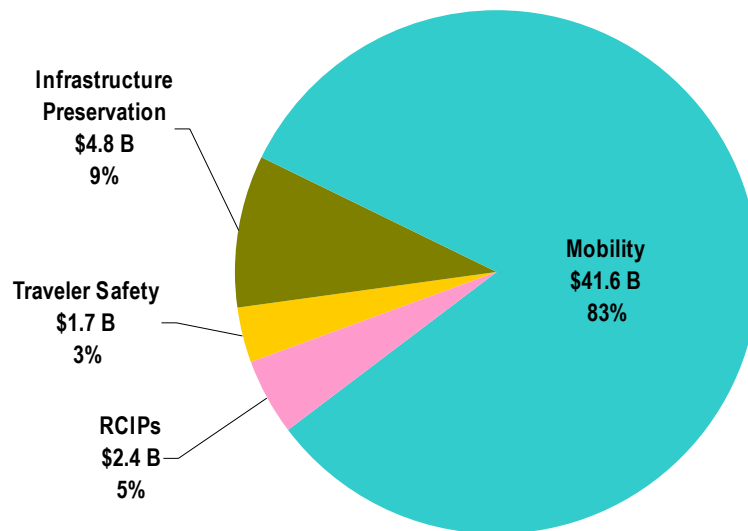
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*almost \$50 billion  
remains in unmet  
needs.*

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### Step 5 – Identify Investment Options for Potential Additional Funding

With a total estimated investment need exceeding \$65 billion during the next 20 years, and projected revenues of about \$15 billion, almost \$50 billion remains in unmet needs. To place this level of funding in perspective, every 5 cents on the motor vehicle fuel tax in Minnesota increases total revenues by \$150 million per year and provides just under \$100 million per year to the State Road Construction fund. To generate an additional \$2.5 billion in revenue over 10 years would require the equivalent of a 12.5-cent increase in the motor vehicle fuel tax.

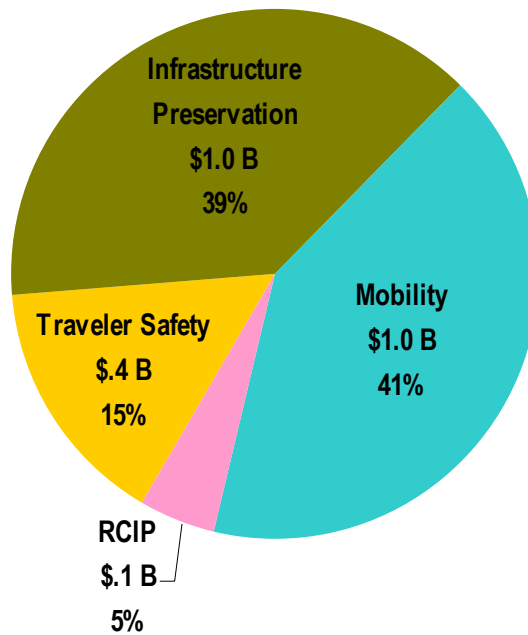


### Unfunded Investment Needs - \$50 Billion

Source: Mn/DOT Office of Investment Management

This plan fully acknowledges that future transportation funding will never be increased to meet almost \$50 billion in “unmet need.” This plan’s policies and strategies, therefore, emphasize a new approach to meeting system improvement needs through stronger partnerships and innovation. This is especially evident in the plan’s vision for mobility in the Twin Cities, calling for more comprehensive and fiscally realistic approach to congestion mitigation.

This plan also stresses the need to set priorities. Toward this end, Mn/DOT has identified 5 percent of the “unmet needs” as high priority investment options should additional revenue be available during the next 10 years. Additional funding, such as the American Recovery and Reinvestment Act, would likely carry specific eligibility criteria or investment direction. For this reason, the identified high priority unfunded investment options are distributed across all four strategic investment categories.



#### **High Priority Investment Options for Potential Additional Funding - \$2.5 Billion**

*Source: Mn/DOT Office of Investment Management*

Unfunded high priorities include the need to further address Traveler Safety on rural roads and metro freeways and to improvement mobility both on under performing Interregional Corridors and in metropolitan areas through lower-cost/high benefit congestion management programs. Additional investments would also be made in bridge and pavement preservation, limited capacity expansion projects, and partnership projects in support of local economic development efforts throughout Minnesota.

## **System Performance and Anticipated Outcomes**

Mn/DOT tracks investments using system performance targets and responds with appropriate changes to its investments on an annual basis. Anticipated project timing and expected system performance will change as revenues are realized and construction costs change. The investment plan, however, is a snapshot in time and therefore provides a framework to show how the policies and strategies within the Minnesota Statewide Transportation Policy Plan 2009-2028 guide investments and affect performance measures over the next 20 years.

Based on of the investments identified in the first ten years, 2009-2018, of the Statewide 20-year Highway Investment Plan, Mn/DOT anticipates:

- Repairing or replacing 120 fracture critical or structurally deficient bridges by 2018, consistent with Minnesota Laws 2008, Chapter 152;
- Meeting performance targets for the condition of all other bridges;
- Maintaining the number of state highway miles with pavement in good condition; however the number of miles with poor pavement condition is projected to triple, from 600 miles today to more than 1,600 miles by 2018;
- Systematically investing in other infrastructure such as signs, lighting, traffic signals, intelligent transportation systems, safety rest areas, and drainage;
- Reducing the number of fatalities and serious injury crashes on state highways through systematic lower-cost roadway enhancements such as median cable barriers and edge treatments, and cost-effective capacity improvement projects on high volume corridors;
- Meeting performance targets for Interregional Corridors, despite increasing the number of interregional corridor miles falling below target speeds;
- Complete spot improvements to maintain mobility on several urban corridors in Greater Minnesota Trade Centers;
- Optimizing throughput on the existing Twin Cities highway system; and
- Completing several RCIP projects ranging from shoulder widening and intersection reconstruction to major expansion.





## Introduction

The Statewide 20-year Highway Investment Plan 2009-2028 (20-year Highway Investment Plan) has been prepared by the Minnesota Department of Transportation (Mn/DOT). It is the result of analysis and discussion over a two year period beginning in the spring of 2007. The 20-year Highway Investment Plan has been developed collaboratively with stakeholders as part of Mn/DOT's decentralized planning and programming process and in parallel with the Minnesota Statewide Transportation Policy Plan 2009-2028 (Statewide Policy Plan). This process both establishes policies that direct Mn/DOT's districts and provides a list of transportation projects that are expected to be funded. This process is discussed more thoroughly in Chapter 2 of the Statewide Policy Plan.

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*The Highway Investment Plan links policies and strategies in the Statewide Policy Plan and capital improvements that are made to the state highway system.*

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The 20-year Highway Investment Plan provides the link between the policies and strategies established in the Statewide Policy Plan and the capital improvements that are made to the state highway system. In providing this link, it guides future capital improvements by satisfying two primary objectives. First, it identifies highway system needs required to achieve and maintain the highway system performance targets established in the Statewide Policy Plan. Second, it identifies priorities for available funding in four strategic priority areas: Traveler Safety, Infrastructure Preservation, Mobility, and Regional and Community Improvement Priorities (RCIPs).

The 20-year Highway Investment Plan supports the vision for transportation in Minnesota outlined in Chapter 1 of the Statewide Policy Plan. This document translates that vision to a number of performance-based needs and regional and community priorities. As such, fully meeting these needs and priorities is the long-term vision for the Minnesota state highway system.

## Stakeholder Input

Mn/DOT values highly public involvement and has taken considerable steps over the past decade to ensure everyone's voice is heard. *Hear Every Voice*, Mn/DOT's policy for public involvement, ensures department compliance with federal public involvement requirements.

The 20-year Highway Investment Plan was developed in parallel with the Statewide Policy Plan. Stakeholders provided input on both the Statewide Policy Plan and 20-year Highway Investment Plan at a series of three outreach meetings: March/April 2007, July 2008, and February/March 2009, and at two public hearings held in April 2009.

In March/April 2007, regional and local transportation stakeholders identified and discussed the transportation issues they felt were important to their region and state. In July 2008, Mn/DOT shared the results of the Steering Committee work, the implications of Chapter 152 of the 2008 Minnesota Legislative Session, and plan directions. The February/March 2009 effort provided stakeholders an opportunity to comment on both the draft Statewide Policy Plan and draft 20-year Highway Investment Plan.

## Comparison of 2009 and 2004 Highway Investment Plans

The 20-year Highway Investment Plan was last updated in 2004. At that time, it was developed after the adoption of the Statewide Policy Plan. In an effort to better link policies with capital investment decisions, the 2009 plan was developed in parallel with the Statewide Policy Plan.

The 2004 and 2009 20-year Highway Investment Plans are similar in their scope and purpose. Both aim to achieve and maintain key performance targets related to Traveler Safety, Infrastructure Preservation, and Mobility as well as address community priorities. Both plans also emphasize performance-based planning; the 2004 plan was the first such effort. Each plan focuses on the allocation of funds in the four strategic priorities across three planning periods. Major projects under development and in the plan are given an estimated cost range and construction year, though both are subject to change as project development proceeds.

The 2004 and 2009 plans also differ in at least three important ways.

First, the 2009 plan lists investment needs in year-of-construction dollars whereas the 2004 plan does so in constant dollars. For this reason, total investment needs in 2009 and 2004 cannot be directly compared. Discussing needs in year-of-construction dollars will match the presentation of projected revenue and, in the future, Mn/DOT anticipates this change will make the sizable needs of the highway system more transparent.

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*The 2009 goal is to have a balanced program, reflecting that since 2004 revenues have not grown as anticipated and construction costs have increased dramatically.*

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Second, this plan reflects a change in investment priorities. In 2004 system preservation was the top priority and Mn/DOT districts were directed to fully fund Infrastructure Preservation needs before other priorities, including Traveler Safety, Mobility, and local community priorities. At that time, the revenue and construction cost outlook projected sufficient funding to meet not only preservation needs, but other areas of need as well. The 2009 goal is to have a plan that reflects a more balanced approach to the four strategic priority areas of Traveler Safety, Infrastructure Preservation, Mobility and community priorities.

Third, methodologies to calculate investment needs have undergone several changes. This is discussed more thoroughly below in “Step 1 – Identify Investment Needs”.

## Outline

The remainder of the document has two primary sections. The first describes the five steps in the development of the plan: (1) identify investment needs, (2) project future revenue, (3) set investment goals, (4) develop investment plan, and (5) identify high priority investment options for potential available funding. The second identifies expected system performance and anticipated outcomes resulting from planned investments over the 20-year planning period.

## Development of the Highway Investment Plan

The Statewide 20-year Highway Investment Plan has been developed within the context of Mn/DOT's decentralized planning and programming process. Chapter 2 of the Statewide Policy Plan discusses this process in greater detail. In brief summary, each Mn/DOT district began with the policies and strategies established in the Statewide Policy Plan. The district applied those policies, statewide investment goals, and knowledge of local stakeholder needs to develop a highway investment plan that covers three planning periods. The first four years of the 20-year plan is also detailed in a separate, federally required document: the State Transportation Improvement Program. This program provides a project-level overview of anticipated expenditures, including projects in the forthcoming construction year (Figure 1).



**Figure 1 – Role of 20-year Highway Investment Plan in Mn/DOT's Highway Planning and Programming Process**

*Source: Mn/DOT Office of Investment Management*

The 20-year Highway Investment Plan covers three planning periods:

- **2009 to 2012 State Transportation Improvement Program (STIP):** Updated annually, planned spending in these four years includes specific projects identified in the current four-year STIP plus additional improvements that will be funded by Chapter 152 bonds in years 2011 and 2012 but have not yet been included in the STIP. Projects are generally considered commitments with well-developed scopes, cost estimates, and planned year of construction; however, if projected revenues are not realized, the timing of planned investments may change.
- **2013 to 2018 Mid-Range Highway Investment Plan (Mid-Range HIP):** Investments identified in these six years remain in the planning stage and represent a general spending plan but not a commitment. Major projects under development are given an estimated cost range and construction year but both are subject to change as project development proceeds. Much of the spending plan is comprised of funding allocations within the four strategic investment priority areas, such as roadway safety enhancements and pavement preservation. Specific projects for these funding allocations are generally not identified or fully scoped until the STIP. The Mid-Range HIP is updated annually.

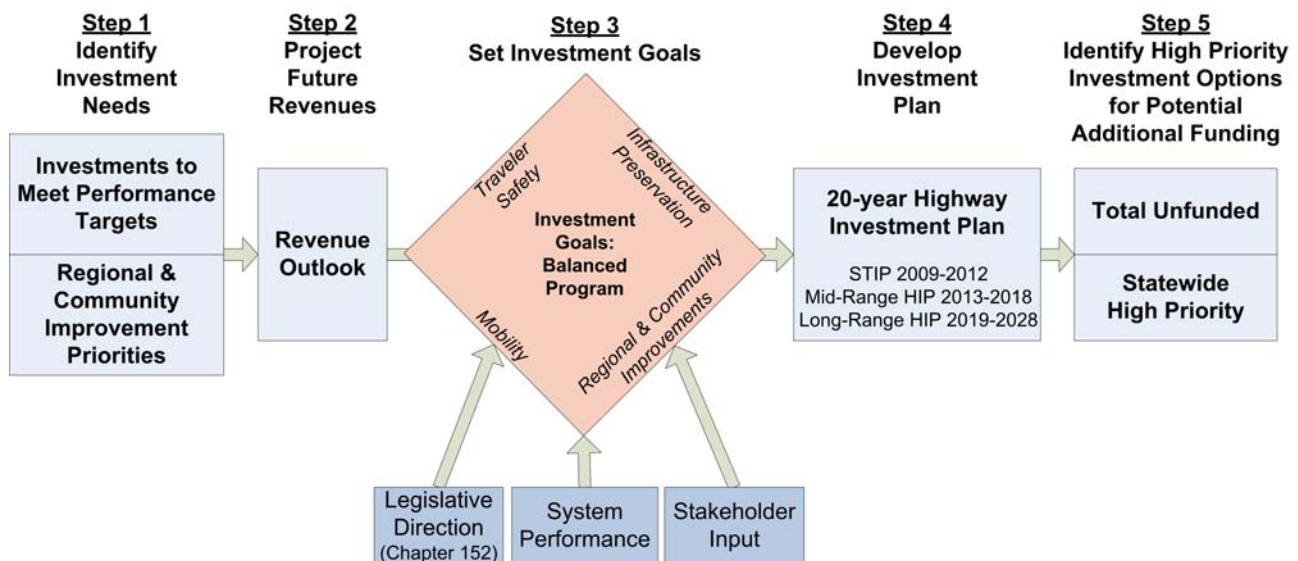


- **2019 to 2028 Long-Range Highway Investment Plan (Long-Range HIP):**  
Planned spending in this 10-year planning period represents a very rough, long-term outlook on revenues and investment priorities. The Long-Range HIP intends to provide a general comparison of projected revenues, given current trends and conditions, with long-term needs. Planned investments are associated with broad investment categories within the four strategic priorities. The final 10 years of the plan include only a very general outlook of investment estimates due to the high level of uncertainty associated with both revenue and costs in this period.

*A five step process and guidelines ensured each district plan would be developed in a consistent, objective manner...*

The Statewide 20-year Highway Investment Plan aggregates the eight individual Mn/DOT district 20-year Highway Investment Plans. As such, a five step process and guidelines ensured each district plan would be developed in a consistent, objective manner and that planned improvements would address statewide goals and investment priorities (Figure 2):

1. *Identify investment needs* that achieve and maintain the highway system performance targets established in the Statewide Policy Plan and address regional and community improvements.
2. *Project future revenues* for each of the three planning periods.
3. *Set investment goals* based on legislative direction, system performance, and stakeholder input as investment needs greatly exceed projected revenue.
4. *Develop investment plan* for each of the three planning periods.
5. *Identify high priority investment options for potential additional funding* over the next ten years.



**Figure 2 – Mn/DOT 20-year Highway Investment Plan Development Process**

Source: Mn/DOT Office of Investment Management

## Step 1: Identify Investment Needs

Investment needs fall into two categories:

1. Improvements to address system performance on roadways not meeting performance targets. These investments are called performance-based needs.
2. Improvements to support local economic development within Minnesota. These investments are called regional or community improvement priorities (RCIP).

The text below discusses the process used to identify needed improvements as well as total investment needs for each group. Step 1 concludes with a summary of all performance-based and RCIP needs identified within the state for 2009 - 2028.

### Performance-Based Needs

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*Meeting performance targets ensures a basic and consistent level of transportation safety, accessibility, and mobility across the state highway system...*

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Performance-based needs are capital improvements needed on roadways not meeting performance targets. A target is a numerical goal for a performance measure (a measure is tracked over time to monitor yearly performance levels). Performance targets were developed using historical data, customer research, engineering analysis (e.g., safety and optimization), economic analysis (e.g., benefit-cost and lowest life-cycle cost), fiscal trends (e.g., targets that may be attainable under some reasonably achievable scenario), and institutional values (i.e., Mn/DOT's vision). Meeting performance targets ensures a basic and consistent level of transportation safety, accessibility, and mobility across the state highway system, thereby supporting continued economic development and community livability throughout Minnesota.

Five of the ten policies discussed in Chapter 7 of the Statewide Policy Plan address system performance that can be directly affected by highway system capital investments:

- Policy 1: Traveler Safety
- Policy 2: Infrastructure Preservation
- Policy 5: Statewide Connections
- Policy 6: Twin Cities Mobility
- Policy 7: Greater Minnesota Metropolitan and Regional Mobility

In migrating from policies to investment needs a broad range of improvements were identified. While any specific capital highway improvement would likely address issues and trends associated within several policies, the improvements were categorized into specific policies for the purpose of identifying needs. Subsequent tables identify investment needs to meet performance targets by 2018 and maintain them thereafter through 2028. An investment need identified in '2009-2018' or '2019-2028' signals a roadway not meeting a performance target sometime within that period.

## Policy 1: Traveler Safety

Mn/DOT aspires to reduce the number of roadway-related deaths and serious injuries by supporting the Toward Zero Deaths (TZD) initiative in cooperation with partner agencies and groups. Mn/DOT tracks roadway-related deaths and serious injuries to identify investment needs, guide investment levels, and monitor progress. In addition, Mn/DOT and its partners pursue a comprehensive approach toward highway safety that targets the four “Es”: Engineering, Education, Emergency Response, and Enforcement.

### Performance Measures

Several performance measures were developed for Policy 1, including *Fatalities on All Roads*. This measure tracks annual roadway-related deaths on all state and local roads. Figure 3 shows an upward trend in the number of deaths on Minnesota roadways between 1995 and 2003, which changed to a downward trend following 2003 and ends with a 3-year average of 483 fatalities in 2008.

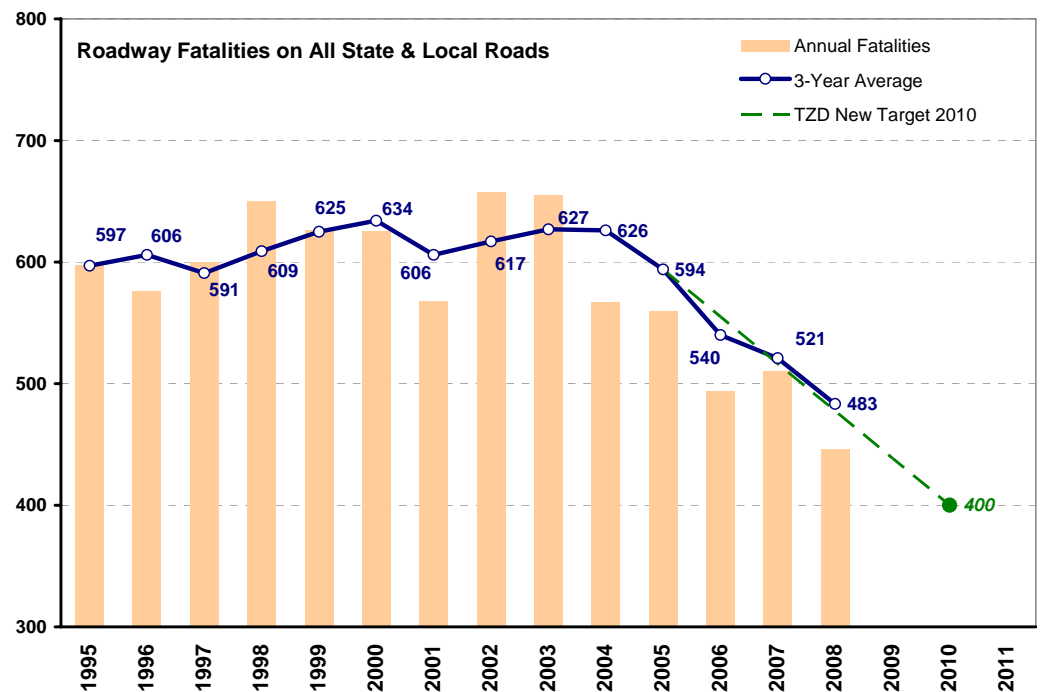


Figure 3 – Fatalities on All Minnesota State and Local Roads (& 3-year Average)

Source: Mn/DOT Office of Traffic, Safety, and Technology

### Performance Targets

The 2007 Strategic Highway Safety Plan set an initial target of 500 fatalities or fewer by 2008. As part of the TZD initiative this target was revised to 400 fatalities or fewer by 2010.

### *Investment Analysis*

To work toward the performance target, Mn/DOT developed a planning-level assessment of investments aimed at improving Traveler Safety. Investments emphasize specific system-wide, cost-effective strategies developed as part of Mn/DOT's Strategic Highway Safety Plan. This approach differs somewhat from the 2004 focus on corrective and preventive treatments. Investment needs in this plan fall into two broad categories:

- *Roadway Enhancements*: are lower-cost strategies applied system-wide to highways typically in conjunction with other types of projects. Improvements target the types of crashes occurring most frequently on rural highways in Greater Minnesota that presently account for 70 percent of the state's fatalities. Roadway enhancements include edge treatments centerline rumble strips, rural intersection enhancements, turn lanes, passing lanes, full shoulders, intersection geometric and control changes, and cable median barriers. Roadway enhancements are intended to be made to highways throughout the state system that meet or are anticipated to meet defined conditions such as having certain average annual daily traffic (AADT) or highway geometrics.
- *Capacity Improvements*: are higher-cost strategies most often initiated as stand alone projects. They intend to reduce or eliminate vehicle conflicts at locations exceeding specific traffic volume thresholds. Capacity improvements identified as performance-based needs address high volume corridors and high volume intersections.

A working group composed of Mn/DOT and FHWA safety and traffic engineers established the treatments, application criteria, and cost estimates for roadway enhancements summarized in Table 1 and capacity improvements presented in Table 2. The application criteria were used to assess all state highways and identify when and where improvements are needed.



**Table 1 – Methodology for Developing Roadway Safety Enhancement Needs**

<b>Treatment</b>	<b>Application Criteria</b>
<b>Category A:</b> These strategies represent proactive, systematic lower-cost treatments to be included in preservation and mobility projects.	
Edge treatments (e.g., rumble strips, wider shoulders, reflective lines)	Forecasted highway AADT > 1,500
Centerline rumble stripes	Forecasted highway AADT > 5,000
Rural intersection enhancements (e.g., lighting and enhanced signing)	Highway/Highway and Highway/County Road Intersections
Right- and left-turn lanes	Highway Intersections meeting Mn/DOT turn lane warrants
<b>Category B:</b> These strategies represent proactive, systematic midrange-cost treatments that may be included in preservation and mobility projects or initiated as stand alone projects.	
Passing lanes	Forecasted highway AADT between 8,000 and 11,200
Full standard shoulders	Interregional Corridors with forecasted AADT > 5,000
Geometric intersection changes/access management (e.g., active warning systems, median closures, right-in/right-out only intersections and J-turns)	Intersections with forecasted highway AADT > 15,000 and cross street AADT between 1,000 and 5,500
Intersection control revisions (e.g., roundabouts and signals)	Intersections with forecasted highway AADT > 9,000 and cross street AADT > 5,500
Median cable barrier	Divided highway with forecasted AADT > 40,000 and median widths < 70 feet

Source: Mn/DOT Office of Investment Management

**Table 2 – Methodology for Developing Safety-Based Capacity Improvement Needs**

<b>Location</b>	<b>Planning-Level Assessment</b>
High-Volume Highway Corridor	Undivided highways with forecasted AADT > 11,200
High-Volume Intersection	Intersections with forecasted highway AADT > 35,000 and cross street AADT > 10,000

Source: Mn/DOT Office of Investment Management

If a high-volume corridor or intersection meets the criteria shown in Table 2, an average cost is assigned based on a broad range of potential strategies and improvements. The specific improvement and cost will not be clearly defined until the project has gone through the scoping process to identify the appropriate and context sensitive solution and it is programmed in a future STIP. Potential strategies and improvements may include, but are not limited to, the following:

- For corridors: adding turn lanes or center turn lanes, improving sight distances, adding passing lanes, constructing a median, or adding lanes
- For intersections: changing intersection geometrics or control, constructing grade separation, or constructing an interchange.

### *Investments to Meet Performance Targets*

The costs to apply all Category A and B roadway enhancement treatments statewide totals \$791 million from 2009 to 2018 and \$797 million from 2019 to 2028 (Table 3). Furthermore, the cost to address capacity improvements varies markedly by District and totals \$990 million from 2009 to 2018 and \$560 million from 2019 to 2028 (Table 4). Statewide investments necessary to address roadway enhancements and capacity improvements total \$3,138 million over the 20-year planning period (Table 5).

**Table 3 – Roadway Enhancement Needs to Meet Safety Performance Targets**

Planning Period:	2009 to 2018		2019 to 2028		2009 to 2028	
District	Investment Need (\$ Millions)	Share of Total (%)	Investment Need (\$ Millions)	Share of Total (%)	Investment Need (\$ Millions)	Share of Total (%)
District 1	137	17	98	12	235	15
District 2	44	6	67	8	110	7
District 3	139	18	147	18	286	18
District 4	60	8	111	14	172	11
District 6	84	11	95	12	179	11
District 7	64	8	93	12	156	10
District 8	85	11	100	12	184	12
Metro District	180	23	87	11	267	17
Statewide	791	100	797	100	1,588	100

Note: Expressed in year of construction dollars.

Note: Percents and Totals may to be exact due to rounding.

Source: Mn/DOT Office of Investment Management

**Table 4 – Roadway Safety-Capacity Improvements to Meet Safety Performance Targets**

Planning Period:	2009 to 2018		2019 to 2028		2009 to 2028	
District	Investment Need (\$ Millions)	Share of Total (%)	Investment Need (\$ Millions)	Share of Total (%)	Investment Need (\$ Millions)	Share of Total (%)
District 1	13	1	15	3	28	2
District 2	3	0	0	0	3	0
District 3	265	27	253	45	518	33
District 4	3	0	74	13	77	5
District 6	12	1	69	12	81	5
District 7	93	9	28	5	120	8
District 8	7	1	6	1	14	1
Metro District	594	60	114	20	707	46
Statewide	990	100	560	100	1,550	100

Note: Expressed in year of construction dollars.

Note: Percents and Totals may to be exact due to rounding.

Source: Mn/DOT Office of Investment Management

**Table 5 – Total Investments to Meet Safety Performance Targets**

Planning Period:	2009 to 2018		2019 to 2028		2009 to 2028	
District	Investment Need (\$ Millions)	Share of Total (%)	Investment Need (\$ Millions)	Share of Total (%)	Investment Need (\$ Millions)	Share of Total (%)
District 1	150	8	113	8	269	8
District 2	47	3	67	5	113	4
District 3	404	23	400	29	804	26
District 4	63	4	186	14	249	8
District 6	96	5	164	12	260	8
District 7	156	9	120	9	276	9
District 8	92	5	106	8	198	6
Metro District	773	43	201	15	974	31
Statewide	1,781	100	1,357	100	3,138	100

Note: Expressed in year of construction dollars.

Note: Percents and Totals may to be exact due to rounding.

Source: Mn/DOT Office of Investment Management

Based on the criteria outlined above in *Investment Analysis*, the following corridors warrant consideration under Traveler Safety – Capacity Improvements (corridor length) and comprise roadway safety-capacity improvements listed in Table 4.

The previous plan identified investment needs to address high crash cost locations. For this plan the high crash locations were reviewed and it was determined that the majority of the locations were being accounted for under roadway enhancement (not shown) or the listed capacity improvement needs.

### **District 1**

#### **2018**

TH 2 La Prairie to Blackberry Township (5.5 miles)

#### **2028**

TH 135 Gilbert to Biwabik Township (1.2 miles)

TH 210 CSAH 28 to Atkins (3.4 miles)

### **District 2**

#### **2018**

TH 71 Hubbard-Beltrami County Line to TH 2 (1.2 miles)

### **District 3**

#### **2018**

TH 12	Meeker-Wright County Line to Cokato	(2.7 miles) *
TH 12	Howard Lake to Waverly to Montrose to Delano	(14.4 miles) *
TH 169	TH 27 north of Onamia to Wigwam Bay	(9.9 miles)
TH 25	Buffalo to Big Lake	(10.2 miles)
TH 55	Annandale to Maple Lake to Buffalo to Rockford	(20.9 miles)
TH 65	Cambridge to TH 107	(6.4 miles)
TH 95	Cambridge to North Branch	(9.2 miles) *
TH 210	Brainerd to Crow Wing CSAH 12 (Deerwood shortcut)	(7.8 miles)
TH 371	Nisswa to Jenkins	(10.5 miles)

#### **2028**

TH 12	Cokato to Howard Lake	(3.9 miles)
TH 169	Wigwam Bay to Garrison	(4.5 miles)
TH 15	Kimball to I-94 (St Cloud)	(12.7 miles)
TH 18	Crow Wing CSAH 23/CR 159 to Garrison	(10.5 miles)
TH 23	Paynesville to Richmond	(10.7 miles)
TH 24	Wright CSAH 6 to I-94 (Clearwater)	(9.9 miles)
TH 47	St Francis to Isanti CSAH 8	(2.0 miles)
TH 55	Wright CSAH 3 to Annandale	(2.7 miles)
TH 65	TH 70 to Mora	(4.5 miles)
TH 95	Mille Lacs CSAH 5 to Mille Lacs-Isanti County Line (Princeton Area)	(5.7 miles)
TH 210	Pillager to Baxter	(8.7 miles)
TH 371	Jenkins to Pine River	(3.0 miles)
TH 371	Hackensack to Cass CSAH 6	(3.1 miles)

### **District 4**

#### **2028**

TH 10	CSAH 75 to Wadena	(2.1 miles)
TH 59	CSAH 22 to Detroit Lakes	(5.7 miles)
TH 29	Alexandria to CSAH 5 (Carlos)	(9.0 miles)
TH 78	TH 108 to Perham	(1.8 miles)

### **District 6**

#### **2018**

TH 19	I-35 to TH 3 in Northfield	(5.0 miles)
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#### **2028**

TH 14	Waseca-Steele County Line to I-35 in Owatonna	(6.3 miles)
TH 14	Owatonna to TH 56	(15.5 miles)

### **District 7**

#### **2018**

TH 14	CSAH 17 to North Mankato	(3.0 miles)
TH 22	Mankato to TH 169	(6.8 miles)

#### **2028**

TH 14	New Ulm to Courtland	(4.4 miles)
TH 22	CSAH 8/CR 177 to Mankato	(4.3 miles)

### **District 8**

#### **2018**

TH 12	Dassel to Meeker-Wright County Line	(2.0 miles) *
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#### **2028**

TH 7	CSAH 1 to Carver-McLeod County Line	(2.0 miles) *
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### **Metro District**

#### **2018**

TH 10	US 61 to St Croix River (Wisconsin)	(2.8 miles)
TH 8	Forest Lake to Lindstrom	(8.5 miles)
TH 12	Delano to Orono	(6.5 miles) *
TH 61	Miesville to Jct. TH 50/TH 61	(3.1 miles)
TH 61	White Bear Lake to Hugo	(5.1 miles)
TH 61	US 8 to Wyoming	(2.2 miles)
TH 212	Norwood-Young America to Carver	(13.0 miles)
TH 3	Farmington to Eagan	(11.4 miles)
TH 5	Waconia to TH 41	(11.9 miles)
TH 5	Oakdale to Oak Park Heights	(3.6 miles)
TH 7	CSAH 33 to St Bonifacius	(10.0 miles)
TH 13	CSAH 8 (220 <sup>th</sup> St E) to CSAH 42 (Savage)	(6.5 miles)
TH 41	TH 169 to Chaska (River Crossing)	(1.2 miles)
TH 41	TH 212 to TH 7	(5.3 miles)
TH 55	TH 52 to Hastings	(6.6 miles)
TH 95	North Branch to I-35	(1.9 miles) *
TH 95	Bayport to I-94	(2.7 miles)
TH 97	I-35 to CSAH 1 (Scandia)	(8.7 miles)

#### **2028**

TH 8	Center City to Taylor Falls (St Croix River)	(6.7 miles)
TH 61	Hugo to TH 97 (Forest Lake)	(4.2 miles)
TH 7	McLeod-Carver County Line to CSAH 33	(2.1 miles) *
TH 95	TH 243 to TH 97	(5.7 miles)
TH 95	I-94 to CSAH 18	(3.0 miles)
TH 284	CSAH 140 to Waconia	(2.3 miles)
TH 316	CSAH 62 to Hasting	(4.4 miles)

*\* The segment extends into an adjacent district.*

Based on the criteria above, the following intersections warrant consideration under Traveler Safety – Capacity Improvements and comprise roadway safety-capacity improvements listed in Table 4:

### **District 3**

#### **2018**

TH 23 Junction TH 15 in Saint Cloud

### **District 4**

#### **2028**

TH 75 Junction I-94 in Moorhead

### **Metro District**

#### **2018**

TH 13 Junction TH 169/CSAH 101 in Savage  
TH 36 Junction TH 120 (Century Avenue) in North St Paul  
TH 36 Junction CSAH 36 (Hilton Trail) in Pine Springs  
TH 36 Junction CSAH 15 (Manning Avenue) in Lake Elmo  
TH 252 Junction CSAH 109 (85<sup>th</sup> Avenue North) in Brooklyn Park  
TH 101 Junction CSAH 144 (141<sup>st</sup> Avenue North) near Rogers  
TH 10 Junction CSAH 96 in Arden hills  
TH 10 Junction CSAH 57 (Sunfish Lake Boulevard) in Ramsey  
TH 169 Junction CSAH 30 (93<sup>rd</sup> Avenue North) in Brooklyn Park

#### **2028**

TH 10 Junction CSAH 83 (Armstrong Boulevard) in Ramsey

## **Policy 2: Infrastructure Preservation**

Policy 2 guides investments to ensure the structural integrity of the highway transportation system and includes pavement, bridge, and other infrastructure.

### ***Pavement Preservation***

A smooth ride on pavement is important to Mn/DOT customers, and Mn/DOT strives to meet highway pavement performance targets while minimizing life-cycle costs. Pavement preservation needs reflect an optimization of cost-effective improvements for the entire highway system. Strategies identified as performance needs include a range of treatments: crack sealing, pavement mill and overlay, and full reconstruction.

### **Performance Measure**

Ride Quality Index (RQI) has long been the measure of pavement ride quality. RQI is both a quantitative measure of ride quality (roughness) and a qualitative assessment correlating ride quality to public expectations. Smoothness of ride is quantified on a scale of 0 to 5. An RQI of “good” falls between 3.1 to 5.0, and an RQI of “poor” represents values that are less than 2.0.

The pavement measures are categorized into two subsets of state highways:

- Principal arterials (state highways that have the highest level of traffic and connect major trade centers), and
- Non-principal arterials (all other state highways).

### **Performance Targets**

Performance targets for pavement preservation have been established to maintain a percentage of road miles at or above the “good” target and at or below the “poor” target for both principal and non-principal arterials (Table 6).

**Table 6 – Present Ride Quality Index Performance Targets**

	Principal Arterials	Non-Principal Arterials
<b>Good Rating (3.0 to 5.0)</b>		
<b>Performance Target</b>	<b>≥ 70%</b>	<b>≥ 65%</b>
<b>Poor Rating (0.0 to 2.0)</b>		
<b>Performance Target</b>	<b>≤ 2%</b>	<b>≤ 3%</b>

*Source: Mn/DOT Office of Materials Services*

### **Investment Analysis**

Mn/DOT’s Pavement Management System (PMS) generates an estimate of pavement investment needs. PMS relies on a comprehensive set of pavement data, including measured condition, age, history, and traffic conditions. The PMS model evaluates and optimizes cost-effective alternative preservation fixes for the entire highway system, applying fixes that include a range of treatments from crack sealing to pavement overlay to full reconstruction. Its goal, and thus the performance-based need, is to reach performance targets by the year 2018 and maintain targets through 2028.

### **Investments to Meet Performance Targets**

District pavement needs vary and increase by 80 percent in the second 10-year period due to projected inflation (Table 7). The District share of total state pavement needs remains approximately the same between the two 10-year planning periods for Districts 1, 4, 7, and Metro; increases for Districts 2 and 3 and decreases for Districts 6 and 8. Pavement Preservation needs total \$3.6 billion from 2009 to 2018 and \$6.5 billion from 2019 to 2028.

**Table 7 – Total Investments to Meet Pavement Performance Targets**

Planning Period	2009 to 2018		2019 to 2028		2009 to 2028	
District	Investment Need (\$ Millions)	Share of Total (%)	Investment Need (\$ Millions)	Share of Total (%)	Investment Need (\$ Millions)	Share of Total (%)
District 1	659	18	1,185	18	1,844	18
District 2	265	7	806	12	1,071	7
District 3	304	8	769	12	1,073	8
District 4	447	12	846	13	1,293	12
District 6	559	16	722	11	1,281	16
District 7	329	9	502	8	831	9
District 8	471	13	588	9	1,059	13
Metro District	563	16	1,066	16	1,629	16
Statewide	3,596	100	6,484	100	10,080	100

Note: Expressed in year of construction dollars.

Source: Mn/DOT Office of Investment Management

### *Bridge Preservation*

Mn/DOT will continue to meet established bridge performance targets and will develop and implement a bridge program that meets requirements set forth by Minnesota Laws 2008, Chapter 152. The Chapter 152 Bridge Program includes the rehabilitation and reconstruction of 120 structurally deficient and fracture critical bridges by 2018. Structurally deficient\* bridges meet a specific condition rating for the bridge deck, superstructure, and substructure or culvert. Fracture critical\* bridges are those with a steel superstructure whose members are arranged in a manner in which if one fails, the bridge would collapse.

*\* Note, a bridge labeled structurally deficient or fracture critical does not imply the bridge is inherently unsafe.*

Other bridge preservation includes rehabilitation and reconstruction of all bridges not included in the Chapter 152 Bridge Program. Bridge improvements identified as performance needs include bridge and large culvert replacement, redecking, deck overlay, and preventative maintenance activities (e.g., painting).

### **Performance Measure**

The established bridge performance measure is a structural condition rating based on the National Bridge Inventory (NBI). The NBI is a 0 to 9 scale related to the structural integrity of the bridge and uses a combination of that scale value and appraisal rating to assign a “good”, “fair,” or “poor” condition rating.



### **Performance Target**

Performance targets for bridge preservation have been established to maintain the bridge system in good condition and thereby avoid expensive repairs. Table 8 shows the performance target for bridges in “good”, “fair and poor” and “poor” condition.

**Table 8 – Bridge Structure Rating Performance Targets**

	Principal Arterials	Non-Principal Arterials
<b>Good: Condition Code 7-9 and Appraisal Rating <math>\geq 6</math></b>		
<b>Performance Target</b>	<b><math>\geq 55\%</math></b>	<b><math>\geq 55\%</math></b>
<b>Fair &amp; Poor: Condition Code 0-6 and Appraisal Rating <math>\leq 5</math></b>		
<b>Performance Target</b>	<b><math>\leq 16\%</math></b>	<b><math>\leq 20\%</math></b>
<b>Poor: Condition Code 0-4 and Appraisal Rating <math>\leq 2</math></b>		
<b>Performance Target</b>	<b><math>\leq 2\%</math></b>	<b><math>\leq 8\%</math></b>

*Source: Mn/DOT Bridge Office*

### **Investment Analysis**

Two elements comprise total bridge performance-based need:

- **Investments to Address Chapter 152 Legislation:** A preliminary investment plan for the Chapter 152 Bridge Program was developed in the summer of 2008. The plan estimates that \$2.5 billion will be needed to rehabilitate or reconstruct 120 fracture critical or structurally deficient bridges over the 2009 to 2018 timeframe.
- **Investments to Meet Performance Targets:** Mn/DOT’s Bridge Office, in consultation with the District Offices, developed a decision framework to analyze future options to fully preserve the bridge system that considers bridge age, physical condition, and construction technology. Preservation activities include bridge and large culvert replacement, redecking, deck overlay, and painting.

## Investments to Meet Performance Targets

Statewide bridge needs are shown in Table 9.

**Table 9 – Investments to Meet Bridge Performance Targets**

Planning Period	2009 to 2019 Chapter 152 Bridges		2009 to 2018 Other Bridges		2019 to 2028 Other Bridges		2009 to 2028 All Bridges	
District	Investment Need (\$ Millions)	Share of Total (%)	Investment Need (\$ Millions)	Share of Total (%)	Investment Need (\$ Millions)	Share of Total (%)	Investment Need (\$ Millions)	Share of Total (%)
District 1	98	4	56	8	285	14	439	8
District 2	165	6	31	4	48	2	243	5
District 3	48	2	81	11	94	5	223	4
District 4	25	1	25	4	48	2	98	2
District 6	725	29	118	16	269	14	1,112	21
District 7	29	1	50	7	134	7	213	4
District 8	19	1	9	1	34	2	63	1
Metro District	1,411	56	354	49	1,092	54	2,858	55
Statewide	2,520	100	725	100	2,004	100	5,249	100

Note: Expressed in year of construction dollars.

Source: Mn/DOT Office of Investment Management

### *Other Infrastructure*

Investments of this type maintain additional infrastructure elements that are important to the overall function of the state highway system. Typical improvements focus on timely replacement in kind within or adjacent to right of way and include signs, lighting, traffic signals, intelligent transportation systems (ITS), safety rest areas, and drainage infrastructure.

### Performance Measures

Mn/DOT has established measures for traffic signs and safety rest areas and is developing a measure for drainage infrastructure:

- The traffic sign measure tracks the number of signs within their 12-year service life.
- The safety rest area measure tracks the condition ratings of rest area structures.

Mn/DOT will continue to improve the tracking and management of infrastructure elements and will establish new measures where practical.

### **Performance Target**

The performance target for traffic signs is to have no more than five percent of signs exceeding the 12-year service life. Mn/DOT plans to replace one-twelfth (approximately eight percent) of its sign inventory annually to achieve the target. The performance target for safety rest areas is to maintain 75 percent of Class I safety rest areas in satisfactory condition (composite facilities condition index (FCI) rating of 25 or lower).

### **Investment Analysis**

Estimates for other infrastructure preservation needs are based on, at a minimum, the number of units, expected useful life as derived from industry standards and expert knowledge, and known cost information. When additional information is available, need estimates will be expanded to include factors such as the location and age of each asset, current condition assessments of larger items such as safety rest areas and culverts, and performance targets.

### **Investments to Meet Performance Targets**

Performance-based needs estimated for other infrastructure are shown in Table 10.

**Table 10 – Investments to Meet Other Infrastructure Performance Targets**

Planning Period	2009 to 2018		2019 to 2028		2009 to 2028	
District	Investment Need (\$ Millions)	Share of Total (%)	Investment Need (\$ Millions)	Share of Total (%)	Investment Need (\$ Millions)	Share of Total (%)
District 1	23	7	49	7	71	7
District 2	16	5	38	6	53	5
District 3	43	13	74	11	118	12
District 4	25	7	52	8	77	8
District 6	69	20	126	19	195	20
District 7	31	8	53	8	84	8
District 8	16	5	34	5	49	5
Metro District	120	35	231	35	351	35
Statewide	342	100	656	100	998	100

Note: Expressed in year of construction dollars.

Source: Mn/DOT Office of Investment Management

### **Policy 5: Statewide Connections**

Policy 5 addresses mobility on the Interregional Corridors (IRCs) that link Greater Minnesota Trade Centers. IRCs are a set of primary highways that support a high level of mobility for longer trips between Minnesota's cities. IRCs total 2,939 centerline miles and represent 25 percent of the state's highway system or, alternatively, two percent of all Minnesota roadway centerline miles. They also carry one-third of all state vehicle miles traveled and the majority of freight traffic.

### *Performance Measure*

The measure for IRC performance was established in 1999 as part of the Interregional Corridor Study. In 2008, refinements were made to increase the measure's sensitivity and usefulness in determining corridor speed and performance. IRC speed and performance is forecast using a predictive model that takes into account speed limits; delays caused by congestion, traffic signals, and stop signs; and planned or programmed investments impacting mobility.

The IRC measure is the percent of IRC centerline miles performing within two miles per hour of the speed target or higher. The speed targets are 60 miles per hour (mph) for high-priority IRCs and 55 mph for medium-priority IRCs. It is the average corridor travel speed that is evaluated against the speed target. From the perspective of interregional mobility, it is acceptable if some segments of the interregional trip take place below the speed target, as long as there are enough other segments on the corridor operating sufficiently above target that the average corridor travel speed meets target.

### *Performance Target or Indicators*

The goal is to have 100 percent of the IRC corridors operating within two mph of the established speed targets or faster.

### *Investment Analysis*

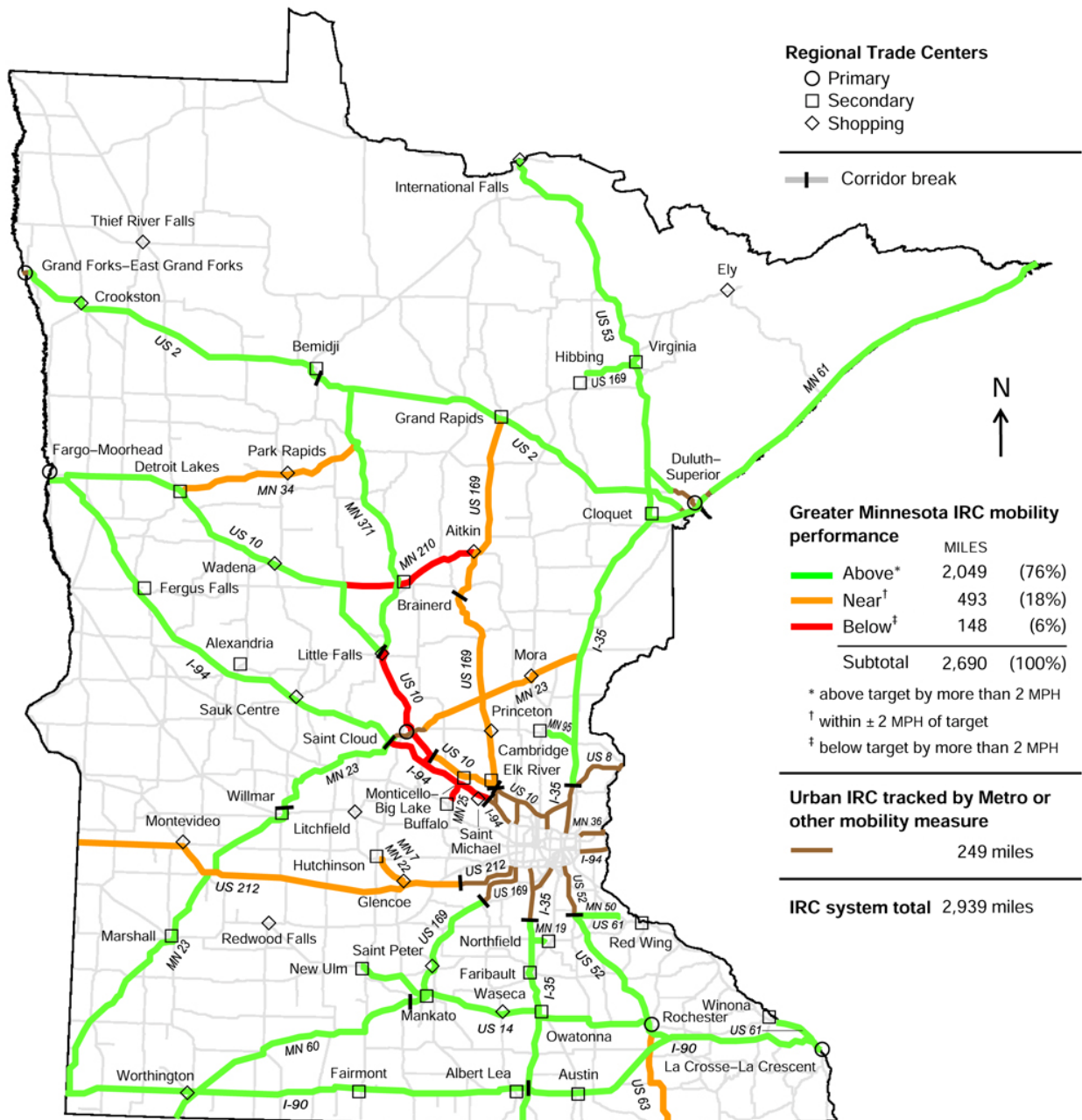
In 2008, 98 percent of the IRC system is operating within two mph of the established speed targets or faster. Taking into account improvements planned in the 2009 to 2012 STIP, performance is forecast to decline to 94 percent of the system performing with two mph of speed target or faster in 2018 and to 91 percent of the system performing with two mph of speed target or faster in 2028 (see Figure 4).

Corridors identified as performing below targets were reviewed by District staff and a range of corrective strategies were developed. Typical investments to address corridors performing below the speed targets include expansion, signal re-timing, signal elimination, lane extension, alignment changes, and access management changes. IRCs currently performing within two mph of target or forecast to fall within that range by 2028 will be tracked by the Districts to determine appropriate management strategies.

IRC performance needs in the Twin Cities Metropolitan Area are not considered in Policy 5; they are captured in Policy 6.

### *Investments to Meet Performance Targets*

District 3 is the only District with IRC performance needs, totaling \$1.7 billion in 2018 and \$1.8 billion in 2028.



**Figure 4 – Projected Interregional Corridor Performance in 2018**

Source: Mn/DOT Office of Investment Management

## **Policy 6: Twin Cities Mobility**

Mobility needs in the Twin Cities are considerable and determining a realistic set of performance-based needs is a challenge. The previous 20-year Highway Investment Plan, titled Metro District Transportation System Plan 2008-2030, contained an aggressive performance-based congestion mitigation plan for the region. This plan included many capacity improvements that, if implemented, would slow the growth rate of congestion on the metropolitan highway system. Central to this strategy was the removal of bottlenecks and completing three continuous lanes in each direction on the freeway system. Some of the significant capacity improvements included:

- Adding a lane to nearly every principal arterial highway (e.g., completion of a continuous six-lane beltway on the I-494/I-694 loop);
- Converting several signalized principal arterials to freeways (e.g., all or parts of state highways 36, 65, 169, 252, and 280); and
- Adding many new or reconstructed interchanges throughout the region.

In year of construction dollars, the cost to deliver these mobility projects in the Metro District Transportation System Plan is estimated at nearly \$40 billion. Clearly, the ability to address these needs is well beyond the reach of even the most optimistic funding premise. Consequently, the region is looking to redefine the performance-based needs scenario for mobility in a more realistic context.

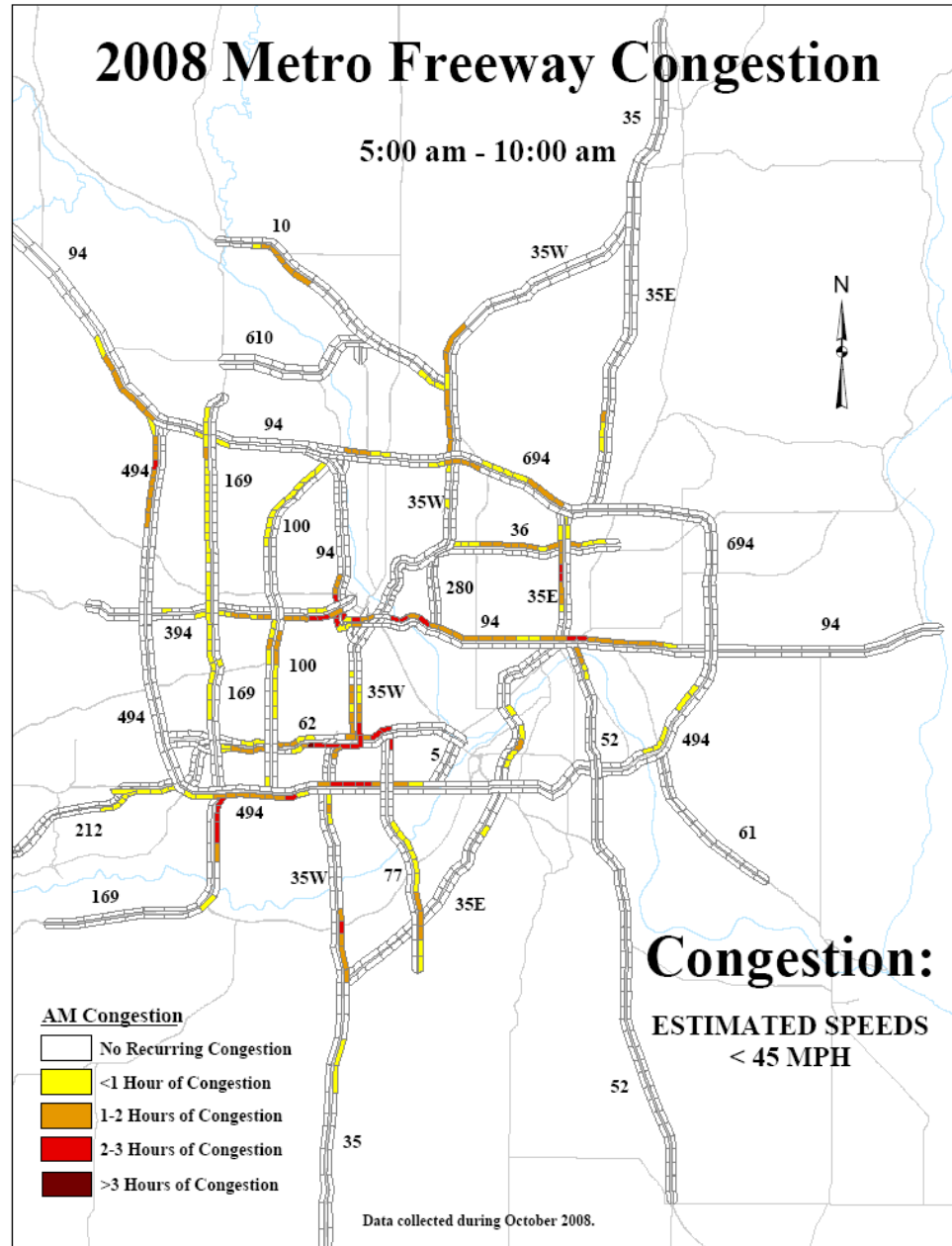
Because of the necessity to redefine the region's performance-based needs, the Metropolitan Council and Metro District will conduct what is being called a "Metro Highway System Investment Study (MHSIS)." The MHSIS builds upon the findings of the Principal Arterial Study with the goal of providing strategies for realizing the long-term vision for the Twin Cities Metro Area transportation system, including its future size, given the region's anticipated resources. The objectives include:

- The MHSIS will be the umbrella document that guides investment decisions affecting individual components of the transportation system (instead of making investment decisions for each transportation segment on a case-by-case basis);
- The MHSIS will cover the principal arterial system within Metro District's eight-county area;
- The MHSIS will not rely solely on modeling or any other analytical tool to rationalize the strategies used to achieve the vision; and
- The MHSIS will incorporate policy guidance from a prominent panel of key stakeholders who will provide oversight to this endeavor.

Several related efforts, including the Congestion Management and Safety Planning Study-Phase 2 and a reassessment of major capacity projects, will identify specific investments intended to help the Twin Cities move towards implementation of the strategies shown in the Statewide Policy Plan. The MHSIS will provide direction to fully utilize these investments in a coordinated manner.

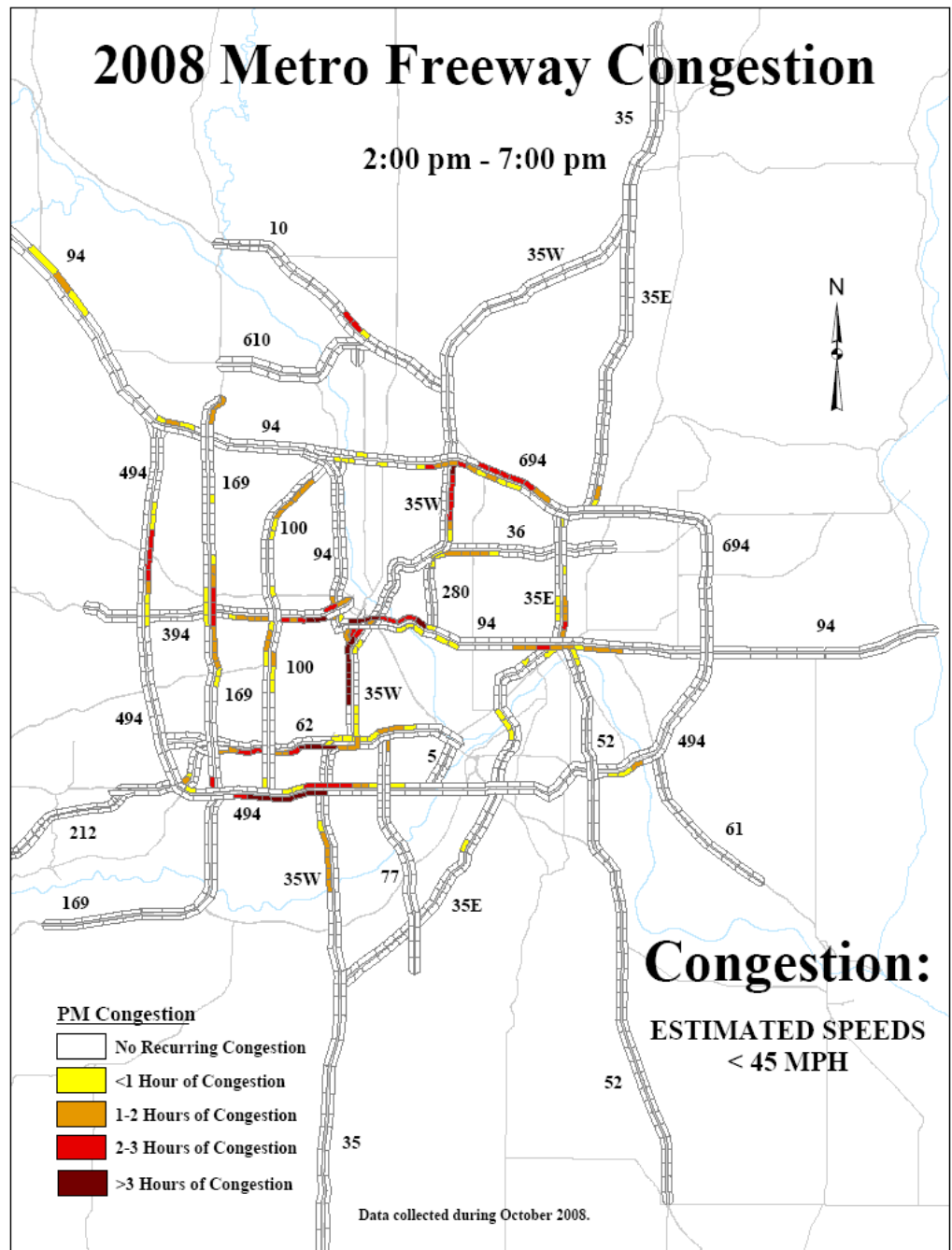
### Performance Measure

The Twin Cities mobility measure is the percent of congested directional urban freeway miles in the metropolitan area. Congested areas are shown in Figures 5 and 6. For this policy, “congestion” is defined as the percent of freeway system directional miles operating below 45 mph for at least one hour during peak travel periods (i.e., morning peak: 6:00 AM to 9:00 AM and evening peak: 2:00 PM to 7:00 PM).



**Figure 5 – Twin Cities Metropolitan Area Duration and Extent of Congestion, AM Peak Period**

Source: Mn/DOT Metro Regional Traffic Management Center



**Figure 6 – Twin Cities Metropolitan Area Duration and Extent of Congestion, PM Peak Period**

Source: Mn/DOT Metro Regional Traffic Management Center

### *Performance Target*

No specific performance target for congestion has been established in this update of the highway investment plan. As Mn/DOT and the Metropolitan Council intend to reassess performance-based needs, as discussed below, this update aims to meet targets established in the 2004 Statewide Transportation Plan. The goal is to reduce the rate of increase in congestion.



### *Investment Analysis*

In 2004, slightly more than 20 percent of the metropolitan freeway system was congested. At the time, it was projected that making no mobility improvements through 2030 would have increased congestion to nearly 50 percent on the freeway system. Recognizing that some growth in congestion was inevitable, the Performance-based Needs Scenario developed in the 2004 Statewide Transportation Plan assumed slowing the rate of growth in congestion to 33 percent of the freeway system at an estimated cost of almost \$20 billion (in 2004 dollars). This estimate included adding a lane to almost the entire metropolitan area freeway system and converting many signalized arterial highways to freeways. The cost, adjusted for inflation, would be approximately \$40 billion over the 2009 to 2028 timeframe.

### *Investments to Meet Performance Targets*

Mn/DOT and the Metropolitan Council will reassess the Performance-Based Needs Scenario as part of the MHSIS. It is anticipated that the MHSIS will identify additional performance measures such as person throughput and arterial delay (speed) akin to the one used for freeways.

Until the completion of the MHSIS, however, the Twin Cities Mobility performance needs will be based on the improvements identified in the 2004 Statewide Transportation Plan inflated to the year of construction dollars. The investment need is \$20 billion from 2009 to 2018 and \$19 billion from 2019 to 2028.

## **Policy 7: Greater Minnesota Metropolitan and Regional Mobility**

Where Policy 6 focuses on managing congestion in the Twin Cities, Policy 7 focuses on preserving mobility within Greater Minnesota urban areas and cities.

### *Performance Measure or Indicator*

This policy establishes a performance indicator for mobility based on the concept of Level of Service (LOS) as defined in the Transportation Research Board's *Highway Capacity Manual*. The performance indicator identifies a roadway corridor as warranting consideration for improvements when the forecasted average annual daily traffic (AADT) no longer provides satisfactory mobility (Level of Service falls below D). For the purpose of this plan, the AADT thresholds presented in Table 11 have been established to indicate when an urban corridor warrants further analysis and drivers are likely to experience LOS E.

**Table 11 – Regional Trade Center Urban Roadway Mobility Volume Threshold**

Roadway Type	2018 or 2028 AADT Congestion Threshold (vehicles per day)
2-lane Arterial	15,000
4-lane Arterial/Expressway	30,000
4-lane Freeway	75,000
6-lane Freeway	115,000
8-lane Freeway	155,000

Source: Mn/DOT Office of Investment Management

### *Performance Target*

No specific performance target for mobility has been established. The goal is to preserve mobility in Greater Minnesota Regional Trade Centers.

### *Investment Analysis*

Investment needs are based on corridors meeting the following conditions:

- The road segment is at least 0.5 miles in length;
- The road segment is located within a Greater Minnesota Level 1, 2, or 3 trade center (urban area or city); and
- The road segment meets AADT thresholds shown in Table 11 in either 2018 or 2028.

Any road segment meeting these conditions should undergo a planning study to determine the appropriate improvements. For the purposes of defining performance needs, a typical project cost of \$1,500,000 per mile was applied to each corridor.

### *Investments to Meet Performance Targets*

The Greater Minnesota Metropolitan and Regional Mobility needs are shown in Table 12. Total needs over the 20-year planning period are \$258 million.

**Table 12 – Investments to Meet Greater Minnesota Metropolitan and Regional Mobility Targets**

Planning Period	2009 to 2018		2019 to 2028		2009 to 2028	
District	Investment Need (\$ Millions)	Share of Total (%)	Investment Need (\$ Millions)	Share of Total (%)	Investment Need (\$ Millions)	Share of Total (%)
District 1	15	12	61	51	76	30
District 2	0	0	0	0	0	0
District 3	50	38	30	25	80	32
District 4	40	30	5	4	45	18
District 6	22	17	13	11	35	14
District 7	2	1	9	7	10	4
District 8	3	2	2	2	5	2
Metro District	n/a	n/a	n/a	n/a	n/a	n/a
Statewide	132	100	120	100	252	100

Note: Expressed in year of construction dollars.

Source: Mn/DOT Office of Investment Management

Based on the criteria identified in Table 11 the following corridors warrant consideration under Policy 7 Greater Minnesota Metropolitan and Regional Mobility (shown by district, year of need and corridor length) and comprise the investment needs listed in Table 12.

### **District 1**

#### **2018**

TH 61 London Road in Duluth	(3.8 miles)
TH 61 in Two Harbors	(1.4 miles)

#### **2028**

TH 53 Miller Trunk Highway in Hermantown	(3.7 miles)
TH 194 Central Entrance in Duluth	(1.9 miles)

### **District 3**

#### **2018**

TH 10 in Big Lake	(0.7 miles)
TH 10 in Elk River	(0.9 miles)
TH 12 in Waverly/Montrose	(3.4 miles)
TH 12 in Delano	(1.9 miles)
TH 15 in St Cloud/Sauk Rapids	(5.3 miles)
TH 23 in Waite Park/St Cloud	(7.2 miles)
TH 25 in Buffalo	(1.9 miles)
TH 25 in Monticello	(2.1 miles)
TH 25 in Big Lake	(0.8 miles)
TH 27 in Little Falls	(1.6 miles)
TH 55 in Buffalo	(3.2 miles)
TH 65 in Isanti	(1.5 miles)
TH 95 in Cambridge	(1.2 miles)
TH 371 in Baxter	(1.2 miles)

#### **2028**

TH 10 in Wadena	(0.9 miles)
TH 12 in Howard Lake	(1.2 miles)
TH 101 in Otsego	(4.6 miles)
TH 210 in Brainerd	(2.9 miles)

### **District 4**

#### **2018**

TH 75 in Moorhead	(3.5 miles)
TH 27 in Alexandria	(0.5 miles)

#### **2028**

TH 10 in Detroit Lakes	(1.2 miles)
TH 29 in Alexandria	(0.5 miles)

### **District 6**

#### **2018**

TH 63 in Stewartville	(0.6 miles)
TH 63 in Rochester	(8.8 miles)
TH 3 in Northfield	(1.7 miles)

#### **2028**

TH 14 in Rochester	(2.2 miles)
TH 61 in Winona	(1.3 miles)
TH 43 in Winona	(0.7 miles)

### **District 7**

#### **2028**

TH 169 in Mankato	(0.6 miles)
TH 169 in St Peter	(0.6 miles)
TH 22 in Mankato	(2.0 miles)

### **District 8**

#### **2018**

TH 12 in Willmar	(0.6 miles)
TH 15 in Hutchinson	(2.5 miles)

### **Statewide Summary of Performance-Based Needs**

Statewide investments to meet performance targets 2009 to 2028 total approximately \$62 billion (Table 13). Mobility needs are the largest proportion, totaling over \$42 billion or 68 percent of state need. For now, the estimated cost to reduce congestion in the Twin Cities has been based on an improvement strategy laid out in the 2004 Metro District Plan. That approach to mobility and congestion mitigation in the Twin Cities will be further examined in 2009 and will likely result in a revised estimate of need. Infrastructure preservation comprises \$16 billion in need, 26 percent of the state total, and Traveler Safety comprises \$3.4 billion or 6 percent of the overall need.

**Table 13 – Statewide Investments to Meet Performance-Based Highway Needs**

STRATEGIC INVESTMENT PRIORITY	PLANNING PERIOD					
	2009 to 2018		2019 to 2028		2009 to 2028	
	Need (\$)	% of Need	Need (\$)	% of Need	TOTAL (\$)	% of Total
<b>Traveler Safety</b>	<b>1,780</b>	<b>6%</b>	<b>1,360</b>	<b>4%</b>	<b>3,140</b>	<b>5%</b>
Roadway Enhancements	790		800		1,590	
Capacity Improvements	990		560		1,550	
<b>Infrastructure Preservation</b>	<b>7,080</b>	<b>23%</b>	<b>9,240</b>	<b>29%</b>	<b>16,320</b>	<b>26%</b>
Chapter 152 Bridge Program	2,420		100		2,520	
Other Bridge	720		2,000		2,720	
Pavement	3,600		6,480		10,080	
Other Infrastructure	340		660		1,000	
<b>Mobility</b>	<b>21,760</b>	<b>71%</b>	<b>20,840</b>	<b>66%</b>	<b>42,600</b>	<b>69%</b>
Interregional Corridors	1,740		1,840		3,580	
Greater MN Trade Centers	130		120		250	
Twin Cities Metro Area	19,890		18,880		38,770	
<b>Total Investment</b>	<b>\$30,620 M</b>		<b>\$31,440 M</b>		<b>\$62,060 M</b>	

Note: Dollars are in millions and are expressed in year of construction dollars.

Source: Mn/DOT Office of Investment Management

## Regional and Community Improvement Priorities

The second group of needs is made up of regional and community improvement priorities (RCIP) that are not needed to meet system performance targets, but rather support local economic development within Minnesota.

### Performance Measure

RCIPs have been identified by local communities and business groups as desirable and supportive of local economic or community development goals. RCIPs cover a wide range of improvements including two- to four-lane expansion, new or reconstructed interchanges or intersections, noise walls, and enhancements to pavement projects (e.g., curb and gutter, sidewalks, shoulders, and expanded utility work).

### Investment Analysis

Each District identified improvements that reflect their understanding of regional and local priorities heard from stakeholders over the last five to ten years.

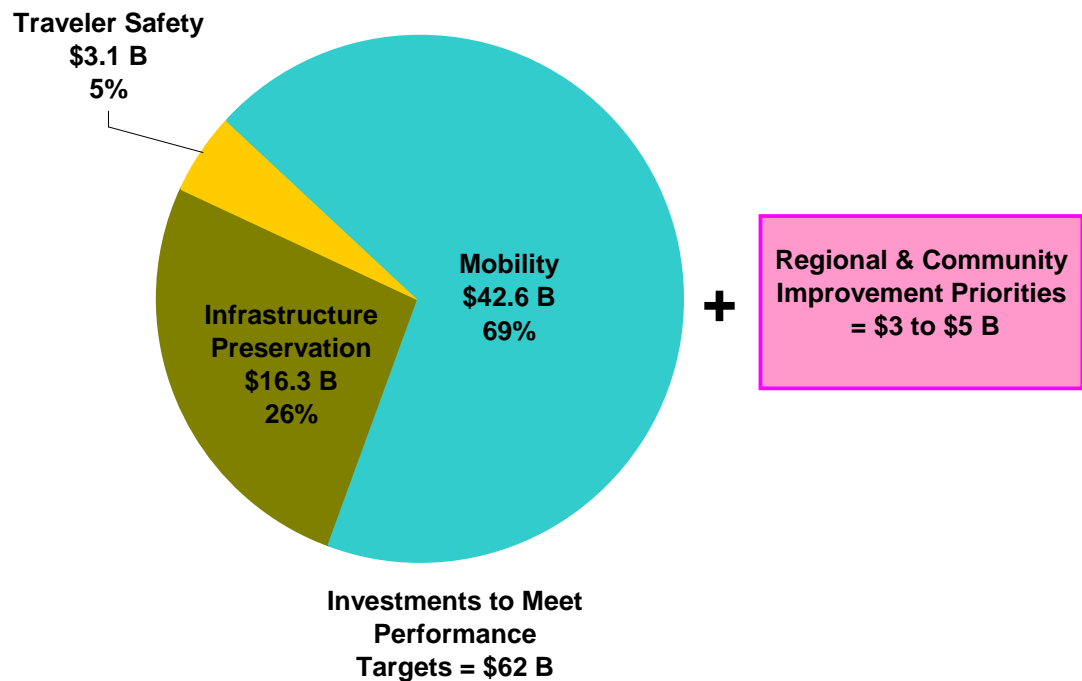
## **Investments to Address Regional and Community Priorities**

The RCIP improvements identified by the eight Districts were estimated to cost \$3 to \$5 billion (2009 dollars). This estimate reflects the sum of each district's understanding of local concerns expressed over the past several years and as such does not represent a comprehensive assessment of every potential local request. It does illustrate, however, that there are many demands on available transportation funding over and above the investments needed to meet established statewide performance targets. RCIP improvements include:

- Bypasses at \$200 to \$350 million
- Two- to Four-Lane Expansion at \$650 to \$1,000 million
- New or Reconstructed Interchanges at \$1,000 to \$1,800 million
- Intersection Reconstruction at \$150 to \$200 million
- Rural Road Segment Reconstruction at \$500 to \$800 million
- Noise Walls at \$50 to \$100 million
- Urban Road Segment Reconstruction at \$150 to \$250 million
- Agreements and Partnerships at \$100 to \$200 million

## **Statewide Summary of Investment Needs 2009 - 2028**

Statewide investment needs are estimated at approximately \$65 billion (Figure 7) over the 20-year planning period. Mobility needs related to IRCs, congestion mitigation in the Twin Cities, and mobility preservation in Greater Minnesota trade centers comprise the largest proportion, about \$42.6 billion or 65 percent of the total (\$65 billion). For now, the estimated cost to reduce congestion in the Twin Cities has been based on an improvement strategy laid out in the 2004 Metro District Plan. That approach to mobility and congestion mitigation in the Twin Cities will be further examined in 2009 and will likely result in a revised estimate of need. Infrastructure preservation needs are estimated at \$16 billion or 25 percent of the total (\$65 billion). Investments to improve Traveler Safety comprise \$3 billion or 5 percent of the total (\$65 billion), and an additional \$3 billion is needed to address RCIPs.



**Figure 7 – Total Statewide Highway System Investment Needs 2009 - 2028 (\$65 Billion)**

*Source: Mn/DOT Office of Investment Management*

## Step 2: Project Future Revenues

Future revenues were projected assuming no new sources of revenue or rate increases in existing state or federal revenue sources. Revenue forecasts were prepared in winter 2007 and are intended for long-range planning purposes. The bond funding authorized by Minnesota Laws 2008, Chapter 152 has been included in the forecasts. Statewide revenues were allocated to the Districts according to Mn/DOT's adopted target formula and bonds were allocated to bridges and other projects as outlined in Chapter 152.

Given the volatility in both construction costs and state and federal revenue sources, the revenue forecast represents a snapshot in time and will be updated annually for purposes of the four-year State Transportation Improvement Program (STIP). Chapter 5 of the Statewide Transportation Policy Plan provides a more complete description of revenue and cost trends and projections. Statewide projected revenue totals approximately \$15 billion over the 20-year planning period.

## **Step 3: Set Investment Goals**

### **Statewide Goals: A Balanced Program**

#### **Need for Investment Goals**

Statewide, the investment needs identified in Step 1 greatly exceed the projected future revenues identified in Step 2. Since all of the identified needs cannot be funded, it is necessary to set investment goals to guide how capital funds are spent. Based on input from stakeholders, investment goals should represent a balanced program of investments across the four strategic investment priorities of Traveler Safety, Mobility, Infrastructure Preservation, and Regional and Community Improvement Priorities; and result in a consistent, flexible and transparent approach across districts toward statewide system performance targets.

#### **2009 Statewide Highway Investment Priorities**

The investment priorities for the projected revenues over the next 20 years differ from those established in the 2004 plan. At that time, Mn/DOT identified Infrastructure Preservation as its top priority. Mn/DOT districts were directed to fully fund preservation needs before other priorities, including Traveler Safety, Mobility, and local community priorities. The revenue and construction cost outlook in 2004 projected sufficient long term funding to meet not only preservation needs, but to make substantial investments in other performance areas as well.

Since 2004, revenues have not grown as anticipated and construction costs have increased dramatically. Even with the increased transportation revenues provided through Minnesota Laws 2008, Chapter 152, the cost to fully preserve bridges, pavements and other road infrastructure over the next 20 years will exceed projected funding.

The new priorities reflect a more balanced approach to investment across four strategic priority areas of Traveler Safety, Mobility, Infrastructure Preservation, and community priorities. These strategic priority areas reflect three key considerations:

- The investment direction set forth in Chapter 152 by the 2008 Legislature;
- The stakeholder input gathered during the second round of outreach in June, 2008; and
- System performance trends.



While preservation of the existing system infrastructure will continue to be an important priority for Mn/DOT, particularly in light of Chapter 152 Legislative direction, it cannot be the exclusive priority. Investments to enhance roadway safety, manage congestion to promote mobility, and support local community development objectives will also be addressed through this balanced approach.

To further define the appropriate balance of investment across the four strategic objectives, the Department conducted a workshop in October of 2008 to evaluate alternative investment scenarios. After much discussion among District leadership, expert offices, and senior management, Mn/DOT's Transportation Program Investment Committee approved investment guidelines to define the balanced program concept and promote consistency in approach to investment priorities across districts. These guidelines set the following priorities for the investment of each District's projected available funding over the 2009-28 timeframe:

1. **Bridge Preservation:** Allocate sufficient funding to support the Chapter 152 Bridge Program as well as support approximately 85 percent of District investment needs.
2. **Traveler Safety (Roadway Enhancements):** The investment goal for each District should be three times the District's Highway Safety Improvement Program Goal (including District match).
3. **Pavement Preservation:** After allocating funding as above, Districts with adequate remaining revenues to meet pavement preservation targets should do so. Districts that do not have sufficient revenues to meet targets should invest about 70 percent of their remaining funds towards pavement preservation.
4. **Other Infrastructure Preservation:** Each District should identify some minimum level of investment.
5. **Allocation of remaining funds** across the following performance areas is to be determined by the District in consultation with stakeholders:
  - Traveler Safety (Capacity Improvements)
  - Interregional Corridor (IRC) Mobility
  - Greater Minnesota Metropolitan and Regional Mobility
  - Twin Cities Mobility
  - Regional and Community Improvement Priorities

## Step 4: Develop Investment Plan

The Statewide 20-year Highway Investment Plan is a subset of performance-based investment needs or investments to address RCIPs. The 20-year Highway Investment Plan is based on revenue forecasts discussed in Step 2 and is consistent with statewide goals and objectives for a balanced program discussed in Step 3.

### Statewide 20-year Highway Investment Plan

About \$15 billion is invested statewide over the next 20 years. Costs are expressed in projected year-of-construction dollars (Table 14). Investments to preserve pavements, bridges, and other infrastructure total \$11,580 million over the 20-year planning period or 78 percent of the total over the 20 years. Roadway enhancements and capacity improvements for Traveler Safety account for nine percent of the total, with seven percent planned to improve Mobility and four percent to address regional and community improvement priorities.

**Table 14 – Planned Investments for Available Funding 2009-2028**

STRATEGIC INVESTMENT PRIORITY	PLANNING PERIOD							
	2009 to 2012		2013 to 2018		2019 to 2028		2009 to 2028	
	STIP (\$)	% of STIP	HIP (\$)	% of HIP	LRP (\$)	% of LRP	TOTAL (\$)	% of Total
<b>Traveler Safety</b>	<b>450</b>	<b>12%</b>	<b>400</b>	<b>8%</b>	<b>540</b>	<b>8%</b>	<b>1,390</b>	<b>9%</b>
Roadway Enhancements	280		210		290		780	
Capacity Improvements	170		190		250		610	
<b>Infrastructure Preservation</b>	<b>2,250</b>	<b>61%</b>	<b>3,900</b>	<b>83%</b>	<b>5,450</b>	<b>84%</b>	<b>11,600</b>	<b>78%</b>
Chapter 152 Bridge Program	840		1,580		100		2,520	
Other Bridge	150		630		1,820		2,600	
Pavement	1,130		1,470		3,240		5,840	
Other Infrastructure	130		220		290		640	
<b>Mobility</b>	<b>400</b>	<b>11%</b>	<b>290</b>	<b>6%</b>	<b>340</b>	<b>5%</b>	<b>1,030</b>	<b>7%</b>
Interregional Corridors	80		-		-		80	
Greater MN Trade Centers	20		20		20		60	
Twin Cities Metro Area	300		270		320		890	
<b>Regional and Community Improvement Priorities</b>	<b>230</b>	<b>6%</b>	<b>160</b>	<b>3%</b>	<b>200</b>	<b>3%</b>	<b>590</b>	<b>4%</b>
<i>Right of Way, Consultants, Supplemental Agreements</i>	<b>370</b>	<b>10%</b>	<b>NA</b>		<b>NA</b>		<b>370</b>	<b>2%</b>
<b>Total Investment</b>	<b>\$3,700 M</b>		<b>\$4,750 M</b>		<b>\$6,530 M</b>		<b>\$15,000 M</b>	

Note: Dollars are in millions and for year of construction.

Source: Mn/DOT Office of Investment Management

## Anticipated Major Projects from 2009-2018

The following pages list anticipated major projects in the strategic investment priority areas of Traveler Safety, Mobility, Infrastructure Preservation, and Regional and Community Improvement Priorities. Anticipated projects address only the first planning period, 2009 to 2018, comprised of the STIP and Mid-Range HIP. The timing of investments is better known in 2009 to 2018 relative to 2019 to 2028; the latter period having a high level of uncertainty associated with revenue and costs. Mn/DOT updates the STIP and Mid-Range HIP annually in succession, STIP then Mid-Range HIP, as the new construction cycle begins.

The anticipated projects listed are typically greater than \$5 million in construction cost. If projected revenues are not realized, the timing of planned investments may change. This is particularly true in the Mid-Range HIP where projects remain in the planning stage and represent a general spending plan, but not a commitment. Figures 8 and 9 identify locations of anticipated major projects in the STIP and Mid-Range HIP, respectively.

### Traveler Safety

#### *Roadway Enhancement*

- District 1 – TH 61, Onion River to CR 34, Reconstruction (2009)
- District 1 – TH 61, Split Rock River to Chapins Curve, Reconstruction (2010)
- District 2 – TH 71, Hubbard CSAH 9 to 7th St, Reconstruction (2010)
- District 2 – TH 2, TH 89 Intersection safety improvements (2014)

#### *Capacity Improvement*

- District 3 – TH 23, TH 95 to Foley, 2 to 4 Lane (2012)
- District 3 – TH 25, Buffalo to Monticello, 2 to 4 Lane (2015)
- District 3 – TH 371, Nisswa to Jenkins, 2 to 4 Lane (2018)
- District 6 – TH 14, Steele County Line to Bridges 74001 and 74002, 2 to 4 Lane (2010)
- District 7 – US 14, Waseca CSAH 2 to Waseca/Steele Co. Line, 2 to 4 lane (2009)
- Metro District – TH 169, Devils Triangle Interchange (2009)

## Infrastructure Preservation

### *Pavement Preservation*

- District 1 – TH 2, Deer River to Cohasset, Unbonded concrete overlay (2009)
- District 1 – TH 53, Midway Road to Independence, Reconstruct (portion) and Thin unbonded concrete overlay (2009)
- District 1 – I-35, Pine County Line to Moose Lake, Unbonded concrete overlay (2010)
- District 1 – TH 169, Taconite to Pengilly, Reclaim/mill & overlay (2010)
- District 1 – TH 210, McGregor to Cromwell, Mill and overlay (2010)
- District 1 – I-35, Proctor (Boundary Avenue) to 26<sup>th</sup> Avenue East in Duluth, Concrete pavement replacement/repair (2010)
- District 1 – TH 65, Nashwauk to Togo (TH 1), Pavement reclamation (2010)
- District 1 – I-35, Hinckley to 17 miles north, Unbonded concrete/thick bituminous overlay (2011-2012)
- District 1 – TH 71, TH 1 to Margie, Pavement Reclamation (2011)
- District 1 – TH 169 Pengilly to Hibbing, Bituminous overlay (2012)
- District 2 – TH 71, Park Rapids to Menahga (2009)
- District 2 – TH 89, west of Grygla and portions of TH 1 & TH 219 (2009)
- District 2 – TH 11, Koochiching CSAH 4 to Indus (2010)
- District 2 – TH 9, Norman/Polk County Line to TH 2 (2011)
- District 2 – TH 34, Park Rapids to Akeley (2011)
- District 2 – TH 11, Red River to Karlstad (2012)
- District 2 – TH 75, Warren to Stephen (2012)
- District 2 – TH 200, TH 75 to Ada (2012)
- District 3 – TH 10, Wadena to Staples, Mill and Overlay (2009)
- District 3 – TH 10 westbound only, St Cloud to Clear Lake, Unbonded Concrete Overlay (2010)
- District 3 – TH 10, westbound only, Clear Lake to Big Lake, Unbonded Concrete Overlay (2011)
- District 3 – TH 10 westbound only, Big Lake to Elk River, Mill and Overlay (2011)
- District 3 – TH 371, Baxter to Nisswa, Mill and Overlay (2011)
- District 3 – TH 371, Nisswa to Pine River, Mill and Overlay (2012)
- District 4 – I-94, TH 336 to Downer, Unbonded concrete overlay (2010)
- District 4 – TH 55, Douglas County Line to TH 28 (2010)
- District 4 – TH 9, TH 10 to Felton, Milling and whitetopping (2011)
- District 4 – US 10, Detroit Lakes to Boyer Lake, Unbonded concrete overlay (2016)
- District 4 – I-94, Rothsay to Fergus Falls, Unbonded concrete overlay (2013-2018)
- District 4 – TH 9, West Junction TH 104 to Benson, Bituminous reclamation (2013-2018)
- District 4 – I-94, Osakis to Alexandria, Unbonded concrete overlay (2013-2018)
- District 6 – I-35, TH 30 North, Unbonded Concrete Overlay (2009)
- District 6 – I-90, Dexter to TH 63, Unbonded Concrete Overlay (2009)
- District 6 – TH 61, TH 14 (Winona) to TH 42 (Kellogg), Bituminous Mill and Overlay (2009)
- District 6 – TH 56, CSAH 34 to West Concord, Whitetopping (2010)

### *Pavement Preservation (continued)*

- District 6 – I-90, TH 74 to TH 43, Unbonded Concrete Overlay (2010)
- District 6 – I-90, TH 43 to TH 76, Unbonded Concrete Overlay (2011)
- District 6 – TH 52, I-90 to Chatfield, Reconstruction (2016)
- District 7 – TH 60, Concrete Rehabilitation from Windom to Butterfield (2010)
- District 7 – TH 169 Reconstruction in city of St. Peter (2010)
- District 7 – TH 60, Mill and overlay from I-90 to Wilder, EBL (2011)
- District 7 – TH 83, Reclaim bituminous pavement and mill and overlay from TH 30 to TH 22 (2011)
- District 7 – TH 60/169 Mill and overlay from Cray corner to Mankato (2012)
- District 7 – TH 169, Reconstruction in city of Blue Earth (2012)
- District 8 – TH 23, Russell to TH 19 (Marshall), Mill and Concrete Overlay (2010)
- Metro District – TH 47, 40<sup>th</sup> to CSAH 10 (2009)
- Metro District – I-35E, Jct 35E/35W to TH 8 (2009)
- Metro District – TH 61, Roselawn Ave to White Bear Ave (2010)
- Metro District – I-494, 10th St in Oakdale to Lake Road in Woodbury, Replace Concrete Pavement (2010)
- Metro District – I-94, Hennepin County Line to I-494, Concrete Pavement Repair (2010)
- Metro District – I-94, Nicollet Ave in Minneapolis to TH 280, Bituminous Mill & Overlay (2010)
- Metro District – I-694, 40th St N to 4th St N in Oakdale, Unbonded Concrete Overlay (2011)
- Metro District – I-35, MN 95 to CSAH 7, 7 mile PCC Overlay (2013-2018)
- Metro District – I-35E, from Lone Oak Rd to Ramsey Co. Line, 5 mile Overlay and CPR (2013-2018)
- Metro District – MN 3, Anne Marie Tr. to MN 110, 3.7 mile Mill and Overlay (2013-2018)
- Metro District – MN 47, Central Ave. to 27th Ave, 2.2 mile Resurface and Rehabilitate (2013-2018)
- Metro District – MN 65, Washington Ave. to 53rd Ave. N., 7 mile Mill and Overlay (2013-2018)
- Metro District – US 61, 12th St. to MN 96, 1.9 mile Mill and Overlay and Infrastructure Repair (2013-2018)
- Metro District – US 61, US 10 to CSAH 39, 8.4 mile Unbonded Overlay (2013-2018)

### *Bridge Preservation*

- District 1 – I-35, Freeway Bridges in Duluth (2009-2010)
- District 1 – TH 210, Jay Cooke Park, Bridge replacement (2012)
- District 2 – TH 11, Robbin/Drayton Bridge (2009)
- District 2 – TH 1, Bridge over Red River (Olso) (2013)
- District 2 – US 2B, Bridge over Red River (Sorlie) (2018)
- District 2 – TH 72, Bridge over Rainy River at Baudette (2018)
- District 3 – I-94, Replace Bridges #86813 and #86814 Wright CSAH 75 at Monticello (2010)
- District 3 – TH 95, Replace Bridge #9173 over Rum River in Cambridge (2013/2014)
- District 3 – TH 10, Replace Bridge #5955 over Lake Orono in Elk River (2014)

### *Bridge Preservation (continued)*

- District 3 – TH 24, Replace Bridge #6557 over Mississippi River in Clearwater (2016)
- District 2 – US 2, Bridge over Red River (Kennedy) (2018)
- District 4 – US 75, Bridge over Whiskey Creek (2016)
- District 6 – I-90, four bridges SE of TH 61 (Dresbach Township) (2009)
- District 6 – TH 60, Bridge over Straight River (Faribault) (2009)
- District 6 – I-90, Bridge over Mississippi River (Dresbach) (2012-2014)
- District 6 – TH 43, Bridge over Mississippi River (Winona) (2014-2015)
- District 6 – US 63, Bridge over Mississippi River (Red Wing) (2018-2019)
- District 7 – TH 99, Bridge replacement over MN River at St. Peter (2013)
- District 7 – TH 14, Bridge replacement over MN River at New Ulm (2018)
- Metro District – TH 280, at Larpenteur Ave in Lauderdale (2009)
- Metro District – TH 12, Maple Plain Bridge (2009)
- Metro District – TH 61, Bridges in White Bear Lake (2010)
- Metro District – I-694 in Oakdale (2010)
- Metro District – TH 61, Hasting Bridge (2010)
- Metro District – TH 52, Plato Blvd to I-94, Lafayette Bridge in St Paul (2011)
- Metro District – TH 5, Bridge over recreational trail in Victoria (2013)
- Metro District – I-35W, 94th St Bridge over I-35W (2013)
- Metro District – TH 36, New Bridge over St. Croix River in Stillwater (2014)
- Metro District – TH 36, Bridge over Lexington Ave (CSAH 51) in Roseville (2015)
- Metro District – TH 77, Bridge over Minnesota River & Black Dog (2015)
- Metro District – I-35E, Replacement of Cayuga Bridges in St Paul (2015)
- Metro District – TH 7 (CSAH 25), Bridge over TH 100 in St Louis Park (2016)
- Metro District – TH 100, Minnetonka Blvd Bridge over TH 100 in St Louis Park (2016)
- Metro District – I-35W, Southbound bridge over TH 65 in Minneapolis (2018)
- Metro District – I-94, Westbound ramp bridge over TH 65 in Minneapolis (2018)
- Metro District – TH 149, (Smith Ave) bridge over Mississippi River & Railroad (2018)
- Metro District – I-35W, County Road E2 (CSAH 73) Bridge over I-35W in New Brighton (2018)
- Metro District – TH 55, Bridge over Bassett Creek in Minneapolis (2018)
- Metro District – TH 77, Southbound collector road bridge over Killebrew Drive in Bloomington (2018)
- Metro District – US 10, Bridge over St. Croix River at Prescott (2018)
- Metro District – I-94, Southbound off-ramp bridge over Lyndale Ave in Minneapolis (2018)
- Metro District – I-94, Southbound on-ramp bridge over Glenwood Ave in Minneapolis (2018)

## **Mobility**

### *Interregional Corridors*

- District 3 – I-94, at TH 101 Add half-mile westbound auxiliary lane and improvement interchange. Funded by Metro District (2013-2018)
- District 8 – TH 23, Paynesville Bypass (2010)

### *Greater Minnesota Metropolitan and Regional Mobility*

- District 1 – TH 53, Miller Hill Mall Area Capacity, Intersection, and Access Management Improvements (2009)
- District 4 – I-94 and TH 75, Interchange Revision (2017)

### *Twin Cities Mobility*

- Metro District – I-35W, UPA Projects (2009)
- Metro District – I-35W, Crosstown Reconstruction (2009)
- Metro District – TH 10, Hanson Blvd to Egret Blvd (2009)
- Metro District – I-94, TH 61 to White Bear Avenue, Add eastbound auxiliary lane (2013-2018)
- Metro District – I-94, at TH 101 Add half-mile westbound auxiliary lane and improvement interchange. (2013-2018)

## **Regional & Community Improvement Priorities**

- District 1 – TH 1, Eagles Nest Area, Reconstruction & Passing Lane (2011 – HPP Funds)
- District 1 – TH 1, FR 553 to FR 424 (Phase 2) Reconstruction (2011 – Forest Highway Funds)
- District 1 – TH 53, 4 miles south of TH 1 to Cook, 2 to 4 Lane (2012 – HPP Funds)
- District 1 – TH 1, Kawishiwi River to FR 553 (Phase 3) Reconstruction (2014 – Forest Highway Funds)
- District 1 – TH 169, TH 53 to Tower, Thirteen Hills Reconstruction (2013-2018 – HPP Funds)
- District 2 – TH 11, Baudette to Clementson, Reconstruction (2011)
- District 2 – TH 200, Laporte West, Reconstruction (2013)
- District 2 – TH 59, First Street in Thief River Falls, Roundabout (2015)
- District 2 – TH 32, Greenwood Street in Thief River Falls, Intersection Reconstruction (2015)
- District 2 – TH 71, In Park Rapids, Construct frontage roads and channelization (2016)
- District 2 – TH 11, Warroad East, 12 miles of shoulder widening (2016)
- District 2 – TH 1, Thief River Falls, Channelization (2017)
- District 2 – TH 197, Hannah Avenue in Bemidji, Intersection revisions (2017)
- District 7 – TH 60, Bigelow to Worthington, 2 to 4 lane expansion (2010)
- District 7 – TH 60, Windom to St. James, 2 to 4 lane expansion (2013)
- Metro District – Metro District Cooperative Agreements and Noise Walls (2009-2018)

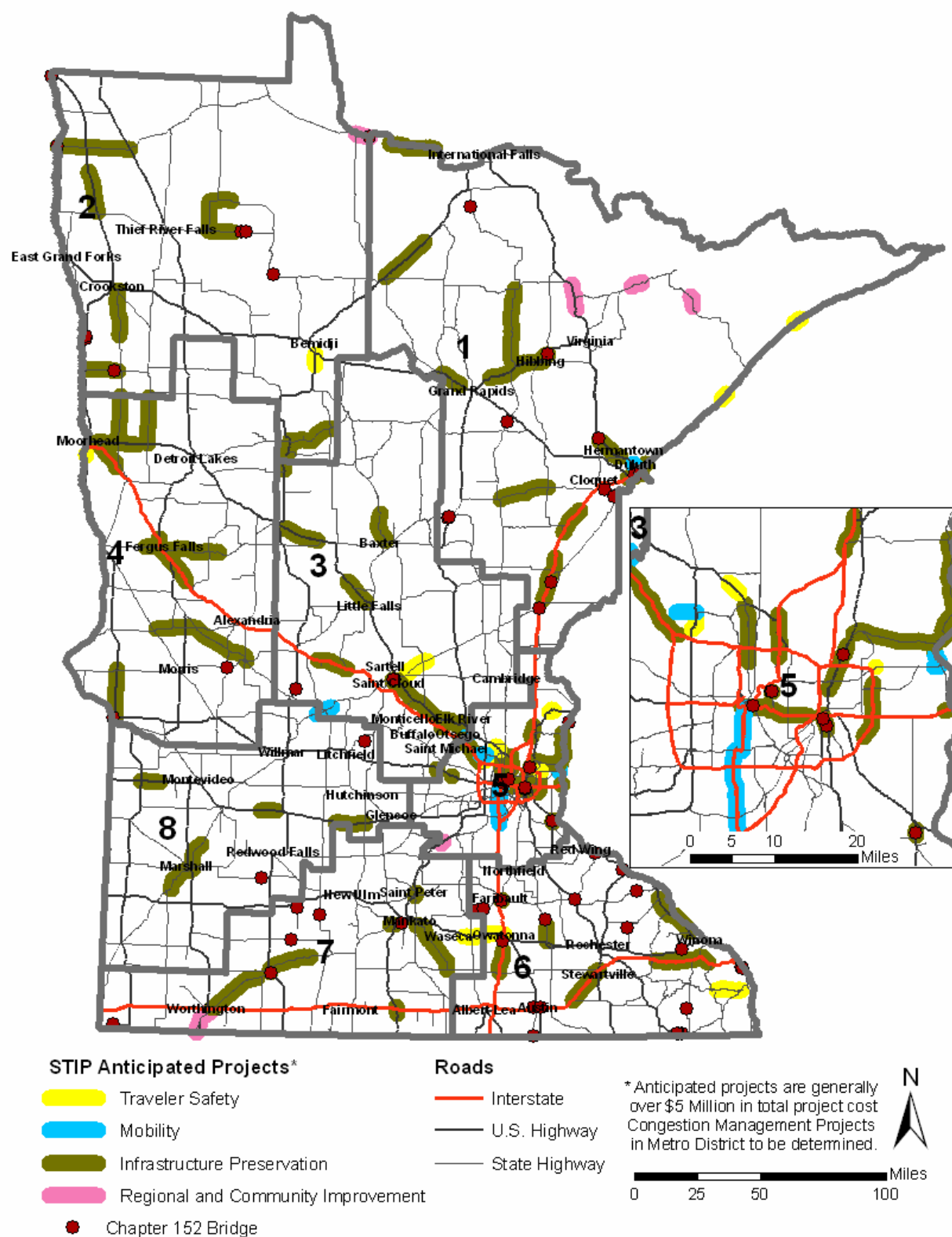


Figure 8 – Statewide Anticipated Projects for the STIP 2009 to 2012



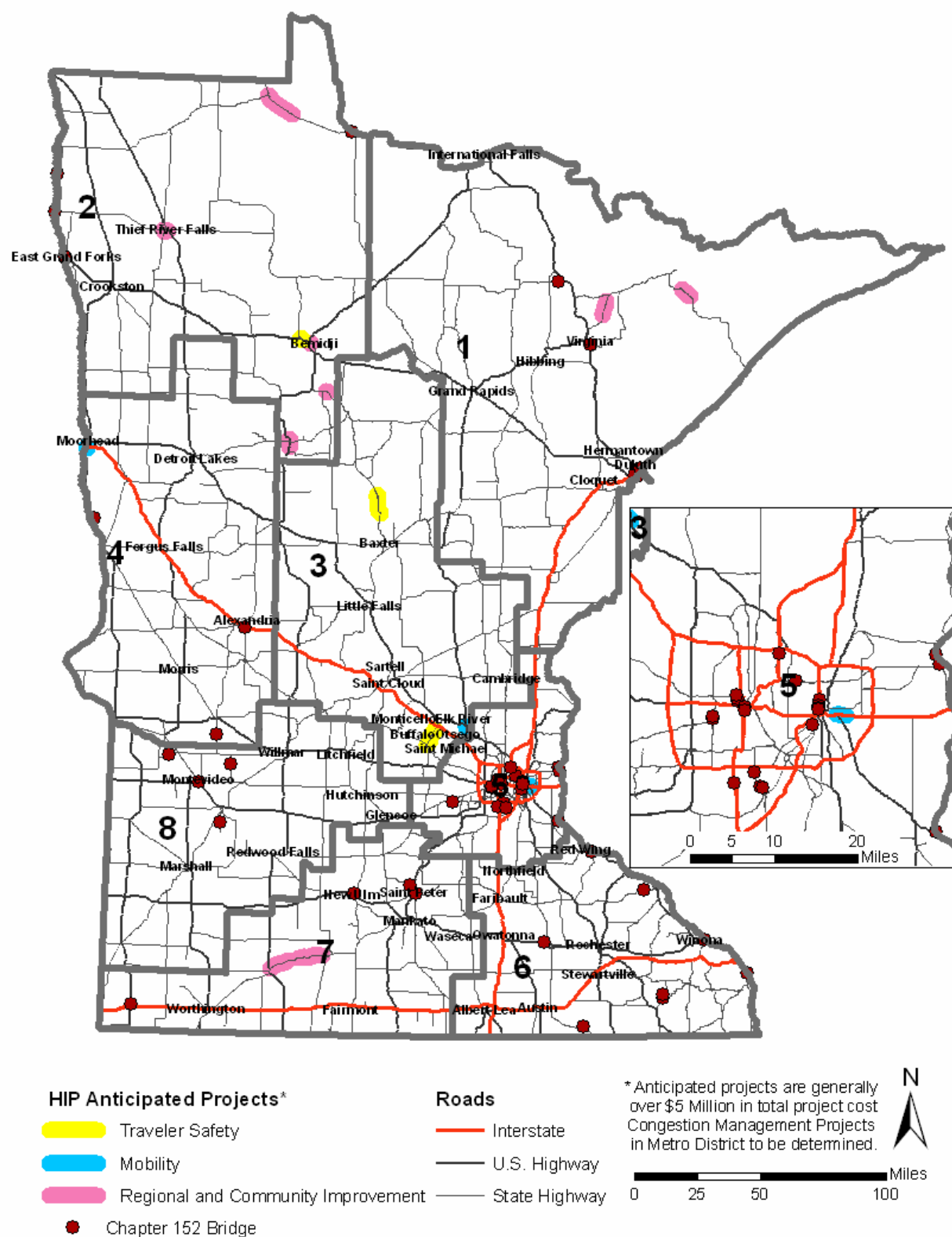


Figure 9 – Statewide Anticipated Projects for the Mid-Range HIP 2013 to 2018

## **Step 5: Identify High Priority Investment Options for Potential Additional Funding**

With a total estimated investment need exceeding \$65 billion during the next 20 years, and projected revenues of about \$15 billion, this analysis indicates that almost \$50 billion remains in “unmet needs.” To place this level of funding in perspective, every 5 cents on the motor vehicle fuel tax in Minnesota provides just under \$100 million per year to the State Road Construction fund. To meet five percent of the \$50 billion gap, or \$2.5 billion, over the next 10 years would require the equivalent of a 12.5-cent increase in the motor vehicle fuel tax.

### **Statewide Unfunded Investment Needs**

Statewide unfunded investment needs total \$50 billion and are distributed across the four strategic priorities as follows:

- 3 Percent – Improve Traveler Safety
- 82 Percent – Improve Mobility on Interregional Corridors
- 10 Percent – Preserve Infrastructure in Safe and Sound Condition
- 5 Percent – Support Regional and Community Improvement Priorities

### **Statewide High Priority Investment Options for Potential Additional Funding**

It is unlikely that future transportation funding will increase sufficiently to meet almost \$50 billion in “unmet need.” This plan’s policies and strategies, therefore, emphasize a new approach to meeting system improvement needs through stronger partnerships and innovation. This is especially evident in the plan’s vision for mobility in the Twin Cities, calling for a more comprehensive and fiscally realistic approach to congestion mitigation.

This plan also stresses the need to set priorities. Toward this end, Mn/DOT has identified five percent (\$2.5 billion) of the “unmet needs” as high priority investment options should additional revenue be available during the next 10 years. Additional funding, such as the American Recovery and Reinvestment Act, would likely carry specific eligibility criteria or investment direction. For this reason, the identified high priority unfunded investments are distributed across all four strategic investment categories.

Unfunded high priorities include the need to further address Traveler Safety on rural roads and metro freeways and to improvement mobility both on under performing Interregional Corridors and in metropolitan areas through lower-cost/high benefit congestion management programs. Additional investments would also be made in bridge and pavement preservation, limited capacity expansion projects, and partnership projects in support of local economic development efforts throughout Minnesota.

**Table 15 – High Priority Investment Options for Potential Additional Funding**

<b>Investment Type</b>	<b>Estimated Cost</b>	<b>Share of Total (%)</b>
<b>Improve Traveler Safety</b>	<b>\$385 Million</b>	<b>15</b>
Roadway Safety Enhancements <i>(35+ percent of unfunded roadway enhancements)</i>	\$210 Million	
Metro District Safety/Capacity <i>(Used to address high cost crash cost locations and capacity improvements; includes: intersection improvements, auxiliary lanes and ramp modifications)</i>	\$75 Million	
Fund high volume 2 to 4 lane capacity expansions TH 371 Nisswa to Jenkins and TH 55 (Buffalo to Rockford)	\$100 Million	
<b>Improve Mobility on IRCs and Congested Metro Freeways</b>	<b>\$1 Billion</b>	<b>40</b>
Interregional Corridor Projects Improvements to I-94 (Twin Cities to St. Cloud)	\$100 Million	
Metro Congestion – Major Capacity I-494/TH 169 interchange, improvements to TH 610 and part of I-494/I-694 beltway	\$430 Million	
Metro Congestion – Congestion Management (\$50 M/yr)	\$500 Million	
<b>Preserve Infrastructure in Safe and Sound Condition</b>	<b>\$970 Million</b>	<b>40</b>
Meet Pavement Targets by 2018	\$860 Million	
Meet Bridge Targets by 2018	\$60 Million	
Address Other Critical Infrastructure	\$50 Million	
<b>Support Regional and Community Improvement Priorities</b>	<b>\$115 Million</b>	<b>5</b>
Local Partnerships for Development	\$115 Million	

Source: Mn/DOT Office of Investment Management

## **System Performance and Anticipated Outcomes**

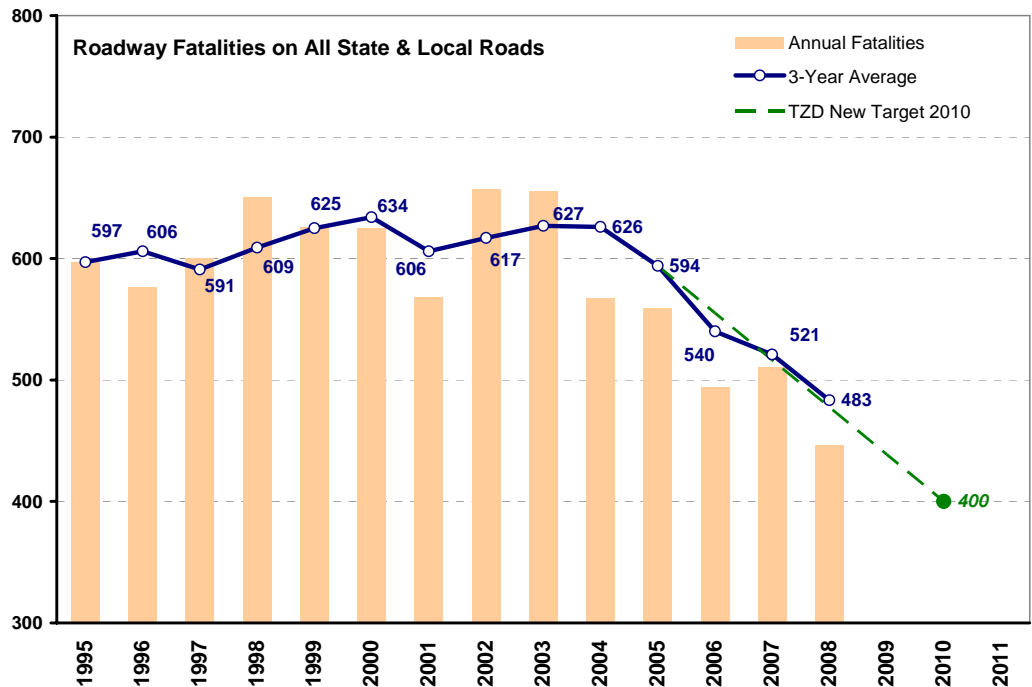
The 20-year Highway Investment Plan is a snapshot in time. Anticipated project timing and expected highway system performance will change as revenues are realized and construction costs change. Highway system needs will change as well, as Mn/DOT Districts complete their annual STIP/Mid-Range HIP update. As part of this annual process, Mn/DOT tracks investments using system performance targets and responds with appropriate changes to its investment plan. This section focuses on the first planning period, 2009 to 2018, comprised of the STIP and Mid-Range HIP. The timing of investments, and therefore the accuracy of outcomes and system performance, is better known in 2009 to 2018 relative to 2019 to 2028. A brief discussion of anticipated outcomes in 2019 to 2028 follows.

### **2009-2018 STIP/Mid-Range HIP Outlook**

#### **Traveler Safety**

To improve Traveler Safety, the planned investments in the first 10 years focus on both roadway enhancements such as median cable barriers and edge treatments as well as a few capacity improvements on high volume corridors. As a result of these safety investments, Mn/DOT anticipates:

- Reducing the number of fatalities and serious injury crashes on state highways through systematic lower-cost roadway enhancements such as median cable barriers and edge treatments, and cost-effective capacity improvement projects on high volume corridors. The number of fatalities on Minnesota roadways has been decreasing since 2003 (Figure 10). Lower-cost safety investments have been shown to address run-off-the-road, head-on, cross-median, and intersection-related crashes. These crashes are typical of those on rural highways where 70 percent of Minnesota's fatal crashes occur.
- In the Metro District, a decrease in the number of fatalities and serious injury crashes is also anticipated as the district uses a combination of lower-cost safety investments and congestion management techniques to address high crash cost locations.



**Figure 10 – Statewide Annual Fatalities on All Roads (& 3-year Average)**

Source: Mn/DOT Office of Traffic, Safety, and Technology

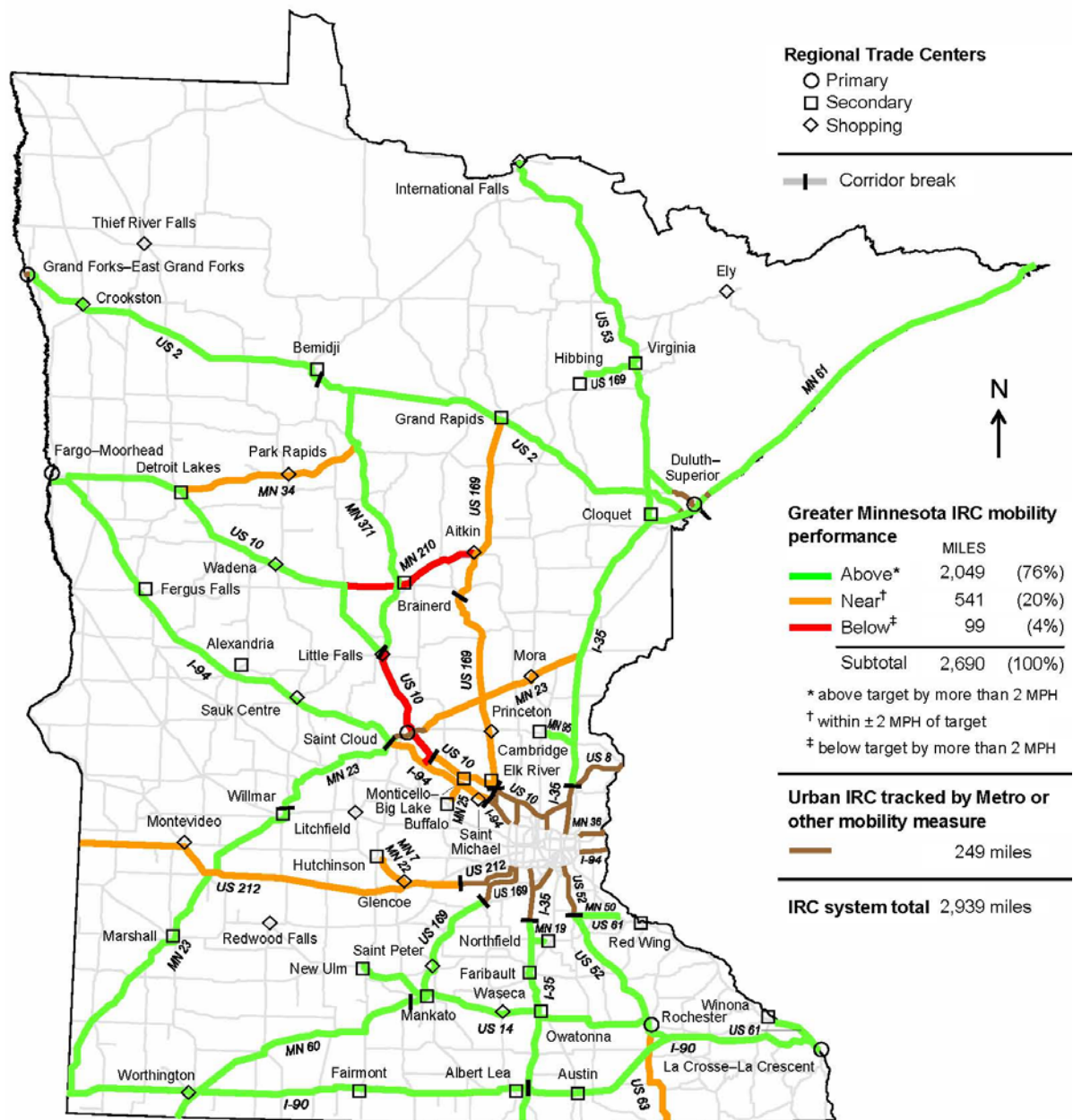
## Mobility

Mobility improvements are summarized for each of the three mobility investment categories.

### Statewide Connections

Statewide, few anticipated projects in the first ten years directly fund mobility improvements that address Interregional Corridors (IRCs) falling below performance targets. However, other anticipated projects will have mobility-related benefits. Mn/DOT anticipates the following IRC-related outcomes by 2018:

- Performance targets for mobility on Interregional Corridors will be met;
- Completion of the TH 25 Traveler Safety 2- to 4-lane expansion from Buffalo to Monticello will ensure the I-94 Saint Michael to Saint Cloud plus Buffalo connector IRC maintains “near” its performance target rather than falling “below” (Figure 11).
- The TH 14 2- to 4-lane expansion from Waseca to Owatonna and the TH 23 bypass around Paynesville will also improve IRC mobility.
- Despite these investments, the number of IRC miles falling below performance targets will increase from 52 miles in 2008 to 99 miles in 2018.



**Figure 11 – Interregional Corridor Performance in 2018 Forecast Based on Planned Improvements through the STIP and Mid-Range HIP**

Source: Mn/DOT Office of Investment Management

### *Twin Cities Mobility*

Investments to optimize throughput on the existing Twin Cities highway system will range from lower-cost/high benefit congestion mitigation project to major construction projects. Some of the key investments in the Twin Cities area planned over the next 10 years include the following:

- The I-35W/TH 62 Crosstown Commons Reconstruction project in Minneapolis and Richfield will be completed;
- A new interchange will be constructed at TH 169 and CSAH 81; and
- Additional investments in lower-cost, high benefit congestion mitigation projects will continue.

### *Greater Minnesota Regional and Metropolitan Mobility*

Spot improvements will be made to maintain mobility in Greater Minnesota urban areas. These investments range from improving coordinated traffic signal timing along busy corridors to adding additional capacity to interchanges. Anticipated outcomes in Greater Minnesota urban areas include:

- Intersection and access management improvements at TH 53 – Miller Hill in Duluth and I-94/TH75 interchange revisions in Moorhead; and
- Complete spot improvements to maintain mobility on several other urban corridors.

In addition to the investments listed above, the following Chapter 152 statewide investments are planned over the next 10 years:

- \$50 million will be invested in statewide transit facilities improvements; and
- \$20 million will be invested in interchanges to improve accessibility and mobility. Specific projects have not yet been identified.

## **Infrastructure Preservation**

### *Bridge Preservation*

The proposed investments over the first 10 years will allow for the repair or replacement of fracture critical or structurally deficient bridges consistent with the Chapter 152 legislative direction. In addition, another 4,000 state highway bridges receive needed repairs or reconstruction. Through these investments, Mn/DOT anticipates to:

- Meet performance targets for other bridge preservation, maintaining the number of state bridges in good condition and poor condition; and
- Repair or replace 120 fracture critical or structurally deficient bridges by 2018, consistent with the Chapter 152 legislative direction. Included are the following 11 major bridges:
  - TH 23 over the Mississippi River in St. Cloud (Desoto)
  - TH 11 over the Red River in Robbin
  - TH 61 bridge over the Mississippi River in Hastings
  - TH 52 Lafayette Bridge over the Mississippi River in Saint Paul
  - I-90 Dresbach Bridge over the Mississippi River in Le Crescent
  - TH 36 bridge over the St. Croix River in Stillwater
  - I-35E Cayuga bridge in Saint Paul
  - TH 43 over the Mississippi River in Winona
  - TH 63 over the Mississippi River in Red Wing
  - US TH 2 over the Red River in Grand Forks (Kennedy)
  - TH 72 over the Rainy River in Baudette

### *Pavement Preservation*

The anticipated investments over the first 10 years will allow for pavement repair and maintenance on Minnesota's highways. Mn/DOT anticipates to:

- Maintain the number of state highway miles with pavement in good condition (Figure 12); and
- Triple the number of state highway miles with pavement in poor condition, from about 600 miles today to more than 1,600 miles by 2018 (Figure 13).

### *Other Infrastructure Preservation*

The proposed investments will systematically invest in other infrastructure that includes signs, lighting, traffic signals, intelligent transportation systems, safety rest areas and drainage in every district.



### Predicted "Good" Ride Quality Index (miles with RQI > 3.0) Statewide Data

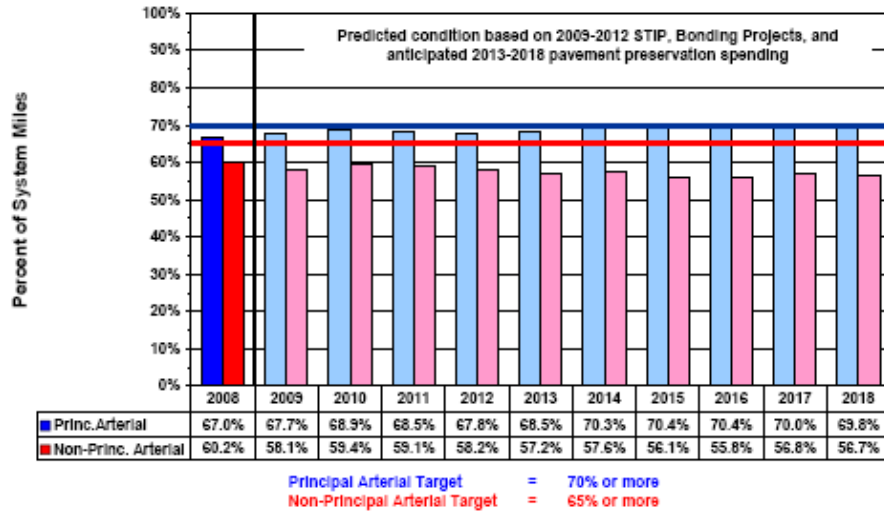


Figure 12 – Predicted "Good" Ride Quality Index Statewide

Source: Mn/DOT Office of Materials Services

### Predicted "Poor" Ride Quality Index (miles with RQI ≤ 2.0) Statewide Data

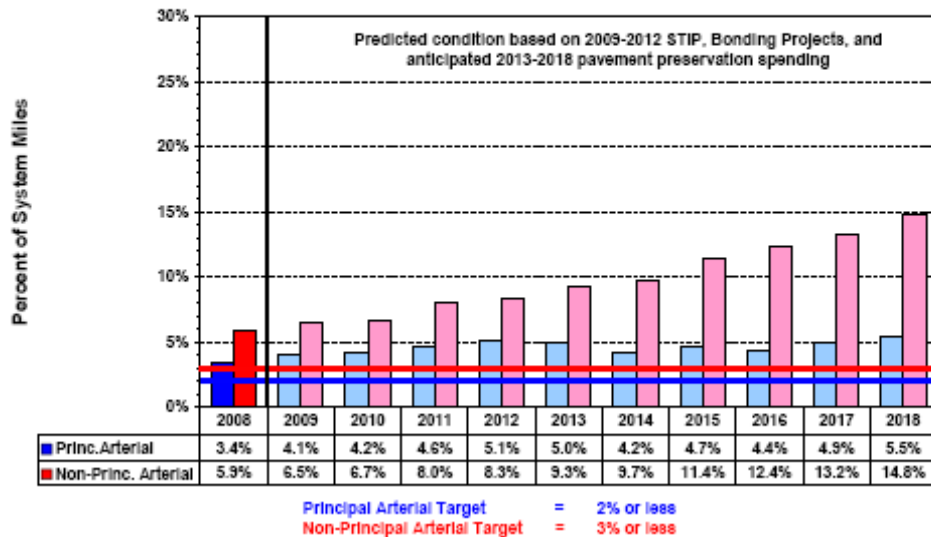


Figure 13 – Predicted "Poor" Ride Quality Index Statewide

Source: Mn/DOT Office of Materials Services

## **Regional and Community Improvement Priorities**

Several major Regional and Community Improvement Priority investments have been identified and included in the first 10 years of the plan. These projects are listed in the “Anticipated Major Projects 2009-2018” section of Step 4. The projects vary in size and illustrate that there are many demands on available transportation funding over and above the investments needed to meet established statewide performance targets. Some of the projects identified by the Districts include:

- TH 53 – Two- to four-lane expansion from TH 1 to south limits of Cook
- TH 60 – Two- to four-lane expansion from Bigelow to Worthington
- TH 60 – Two- to four-lane expansion from Worthington to Mankato
- TH 59 – New roundabout at First Street in Thief River Falls
- TH 11 – 12 miles of shoulder widening east of Warroad

## **The Role of the Highway Investment Plan**

The 20-year Statewide Highway Investment Plan 2009-2028 is the planning document that links the policies and strategies established in the Minnesota Statewide Transportation Policy Plan to the capital improvements made on the state highway system. Providing this link is becoming increasingly important as projected revenues are not rising with inflation, construction costs are increasing faster than inflation, and Mn/DOT strives to become more multimodal in its policies, strategies, and investments. Investment plans for other transportation modes are also under development.

The Highway Investment Plan is a key component of the long-range vision outlined in the Statewide Policy Plan. It builds upon existing plans and establishes a flexible, balanced approach to highway investments. This approach continues Mn/DOT's commitment to performance-based planning and incorporates stakeholder input received throughout the planning process.

The role of this plan is twofold. First it provides a framework to guide how Mn/DOT will invest available funding across the four strategic priority areas of Traveler Safety, Infrastructure Preservation, Mobility and community priorities. Second, it identifies the anticipated performance outcomes based on capital improvement investments thereby providing feedback to future planning efforts.

The needs, revenues and investments shown in this plan, however, represent a snapshot in time. Over the life of this plan, the specific project timing and expected highway system performance shown will change as revenues are realized and construction costs change. The 4-year STIP & 10-year HIP are updated annually. Despite these changes, the framework of this plan, specifically the methodology used to define the performance-based needs and the investment goals and guidance will remain applicable.