Thrive MSP 2040

TRANSPORTATION POLICY PLAN

Chapter 5:
Highway Investment Direction and Plan

2040

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Highway Investment Direction

Residents and businesses view a safe and efficient highway system as an essential part of a transportation system that serves a prosperous, livable, equitable region. Highways support nearly all travel in rural areas, and contribute to the variety of travel options that the federal government, state government, and the region acknowledge is required for a sustainable metropolitan area. Virtually all people use roads, and almost all freight travels on a road sometime during its trip.

The major highways in the region are designated as principal arterials, sometimes called the metropolitan highway system. All of these roads are also part of the federally designated National Highway System. MnDOT owns and operates the great majority of the principal arterials, while counties and Saint Paul own six principal arterials. These highways are supplemented by the next level of roadways, the A-minor arterials. Counties own the majority of A-minor arterials (70%), with MnDOT owning 20% and cities owning 10%. Together the principal and A-minor arterials make up the federal aid highway system for the seven county region. (See Appendix D for definitions of these terms and discussion of highway functional classification.)

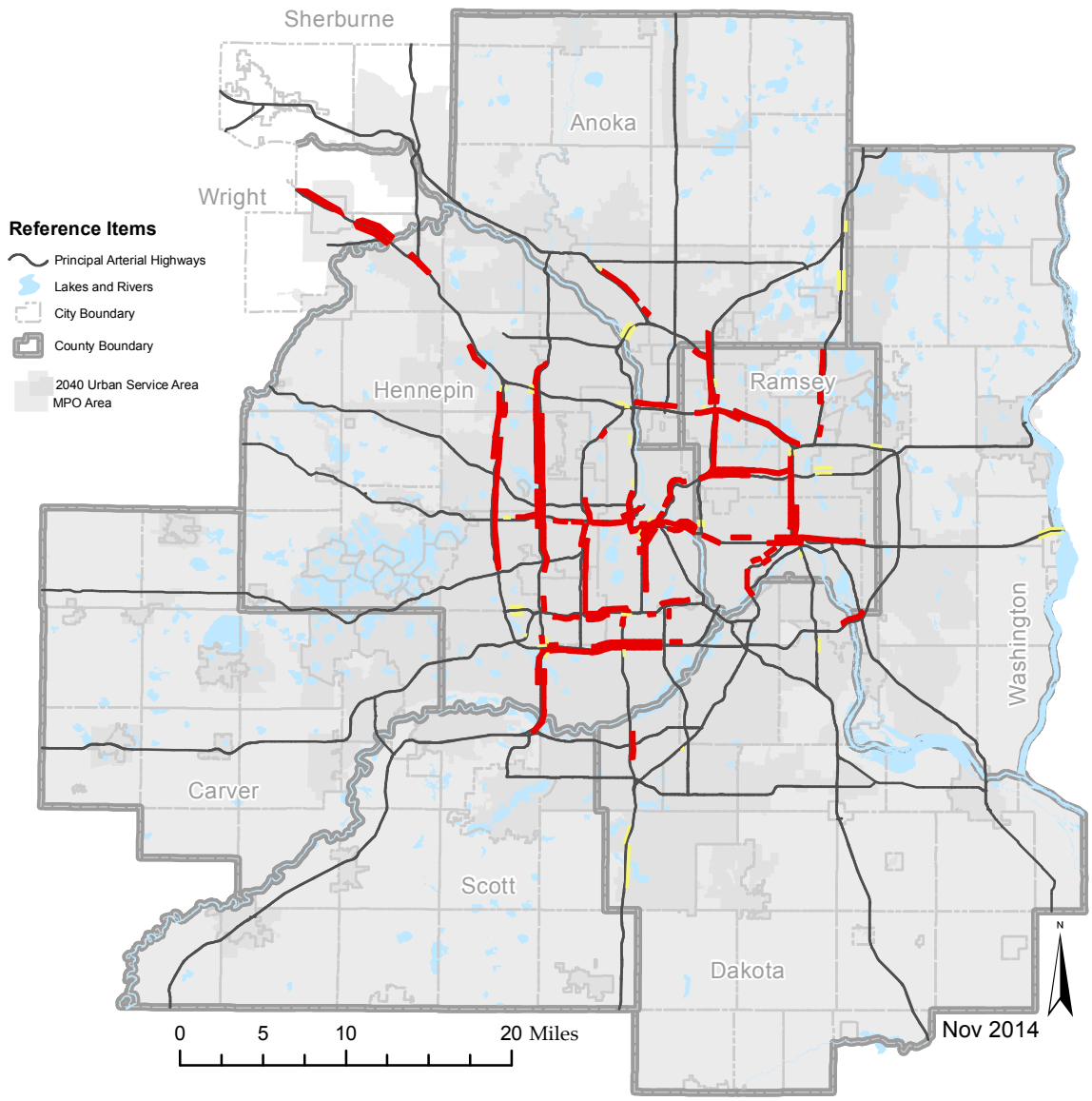
The region's principal arterial system has developed significantly since the 1950s and is now based on a well-developed and managed freeway system. Over the last decade, the region's approach to improving the system has changed. One of the most basic changes was to accept that congestion on the system will be a reality, and the system must be managed and optimized to the greatest extent possible to ease congestion.

A second change is the acceptance that funding for all highways is limited, and will be limited for the foreseeable future. This emphasizes the need to design and build strategic projects that manage risk and provide a high return on investment. A third major change is our emerging understanding of the large amount of funding required to operate, maintain, and rebuild the system that exists, especially as costs are anticipated to grow faster than revenues.

While the region must continue to operate, maintain, and rebuild the existing system – giving priority to the National Highway System – these investments alone will not accommodate the growing region. Anticipated population and job growth is forecast to push highway traffic to even higher levels. Table 5-1 shows that daily vehicle trips and miles traveled are forecast to increase 28% and 23%, respectively, by 2040. Figure 5-1 illustrates observed 2013 congestion and Figure 5-2 illustrates projected congestion on the principal arterial system in 2040. Additional investment performance outcomes are summarized in Chapter 12, "Transportation System Performance Evaluation."

Figure 5-1: Congested Principal Arterials 2013

Congested Principal Arterials 2013



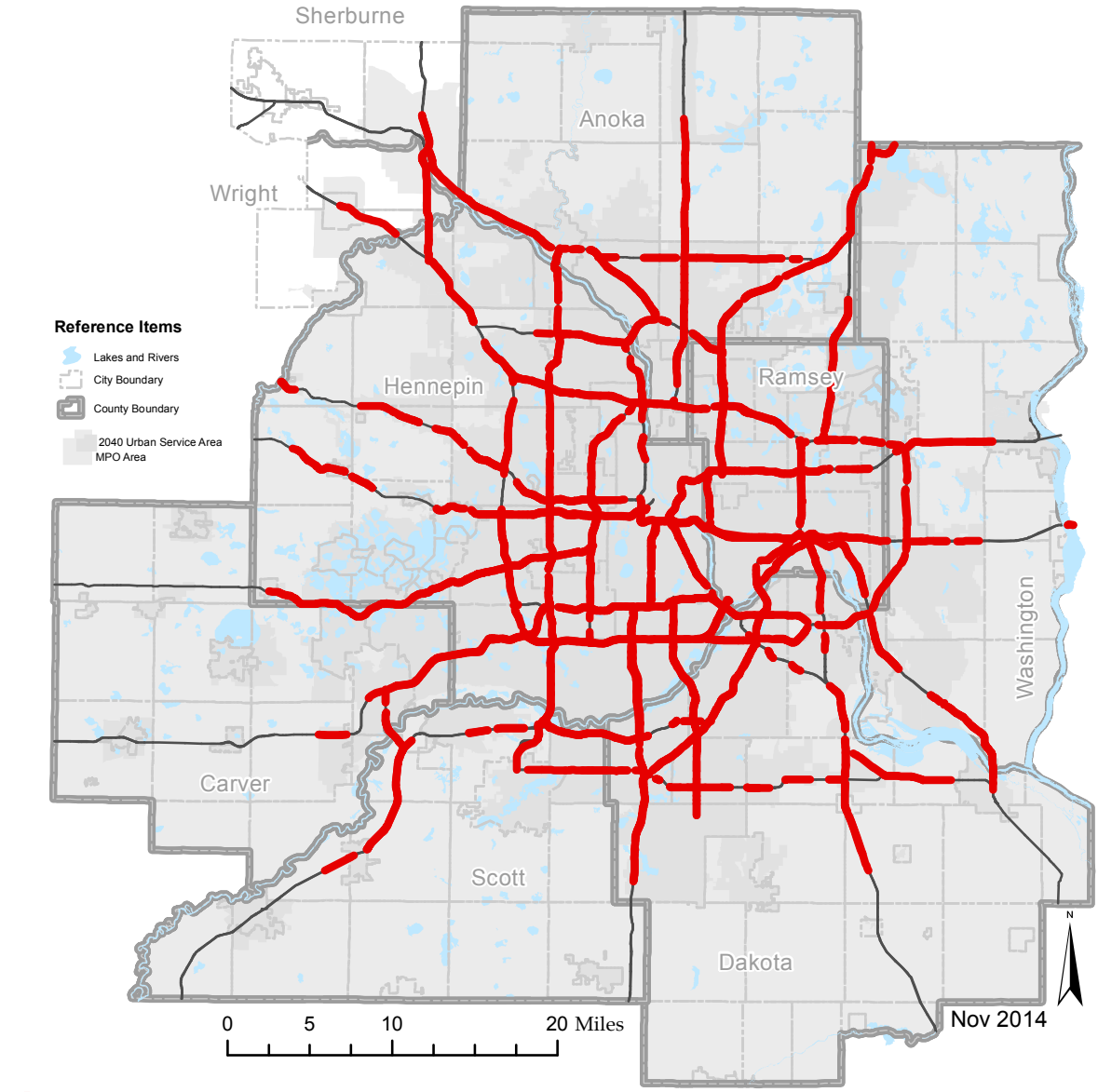
2013 Congested* Principal Arterial Segments

No data

**Congestion is where speed less than 45mph for at least one hour a day*

Figure 5-2: 2040 Congested Principal Arterials for Current Revenue Scenario

Congested Principal Arterials 2040



**Congested: the condition occurring when the modeled volume on a road equals or exceeds the theoretical capacity of the road at least one hour a day.*

Table 5-1: Daily Vehicle Trips and Miles Traveled, 2010 and 2040

	2010	2040 Current Revenue Scenario	Change	Percent
Population	2,850,000	3,673,860	+823,860	+29%
Daily Vehicle Trips	6,600,000	9,776,000	+2,152,000	+28%
Daily Vehicle Miles Traveled	72,900,000	89,420,000	+16,520,000	+23%
Daily Vehicle Miles Traveled per Resident	25.6 miles per resident within the 7-county region	24.3 miles per resident within the 7-county region	-1.3 miles per resident within the 7-county region	-5%

In order to be good stewards of public investments, the region must invest in highways strategically, focusing on affordable, multimodal, and flexible solutions that put priority on addressing existing problems throughout the regional highway system. The investments must also consistently work toward achieving the multiple outcomes, goals, and objectives identified in Thrive MSP 2040 and this plan. These goals and objectives include improving safety for all people and freight; managing highway travel demand; minimizing travel time; increasing trip reliability; enhancing travel options; and integrating with land use and other regional systems (Goals and Objectives). Implementing these solutions will require strong integration and collaboration among the region's transportation partners.

Prioritizing investments is mandatory in today's environment of limited resources. The metropolitan area is required by federal law to prepare a long-range transportation plan and a four-year Transportation Improvement Program (TIP) in which estimated revenues and proposed investments are balanced. This *2040 Transportation Policy Plan* refers to the balanced investment plan as the "Current Revenue Scenario." The Minnesota Department of Transportation (MnDOT), in cooperation with the Council, identified and estimated the revenues and costs for the state highway operations, maintenance, and capital investments in this plan.

Federal law also permits, but does not require, the identification of additional projects that would be funded if additional revenues were made available. This plan refers to these additional investments as the "Increased Revenue Scenario" (also known as the "illustrative scenario"). Table 5-2 summarizes the highway system investment prioritization factors that were ranked highest by policymakers, transportation professionals, and the general public during the extensive public engagement process. The first two factors listed below – safety and security and operate, maintain, and rebuild – are underlying requirements when planning for all regional highway investments and were used by the Council and MnDOT in developing the Current Revenue Scenario. All of the factors in Table 5-2 will be used to ensure investments in the "Increased Revenue Scenario" help meet the multiple outcomes, goals, and objectives identified in *Thrive MSP 2040* and this plan.

Table 5-2: Regional Highway System Investment Prioritization Factors

Highway System Investment Prioritization Factor	Description of Investment Factor and 2040 TPP Goals and Objectives Advanced	Primary Thrive Outcome Supported				
		Stewardship	Prosperity	Equity	Livability	Sustainability
Safety and Security Operate, Maintain, and Rebuild	These investment factors are requirements, not prioritization factors, for all regional highway investments. These types of investments advance all goals and objectives in the Transportation Policy Plan.	#	#	#	#	#
Improves Economic Vitality	Highways provide most of the access to and within our region. These types of investments advance the "Competitive Economy" goals and objectives.		#		#	#
Improves Critical Regional Highway System Connectivity	Our region has a well-developed and managed freeway system. We need to identify and address critical regional highway connections that are missing or inadequate in the system. These types of investments advance the "Access to Destinations" goal and objectives.		#	#		#
Increases Regional Highway System Travel Time Reliability	Investments like MnPASS and those made to minor arterial highways seek to provide an affordable and reliable alternative to highway congestion. These types of investments advance the "Access to Destinations" goal and objectives.		#	#		#
Supports Job/ Population Growth Forecasts and Local Comprehensive Plans	Highways provide foundational access to land. The region's principal and minor arterial highways addressed in this plan provide more limited access to larger areas of land, while local streets provide direct access to parcels. These types of investments advance the "Access to Destinations" and "Transportation and Land Use" goals and objectives.		#	#	#	
Regional Balance of Investments	Highway investments should be balanced across the region and over time, and benefits shared across all communities and users, to move toward the goals and objectives of "Healthy Communities"and "Stewardship."	#	#		#	

The Highway Investments section is divided into the "Current Revenue Scenario" plan and the "Increased Revenue Scenario" vision. Each of these scenarios includes 10 categories of highway investments which are described below.

Highway Investment Categories

1. Operate and maintain highway assets
2. Program support
3. Rebuild and replace highway assets
4. Highway safety improvements
5. Highway bicycle and accessible pedestrian improvements
6. Regional mobility improvements: Traffic management technologies
7. Regional mobility improvements: Spot mobility improvements
8. Regional mobility improvements: MnPASS system
9. Regional mobility improvements: Highway strategic capacity enhancement
10. Regional mobility improvements: Highway access investments

The first six categories of highway investment – operate and maintain; program support; rebuild and replace highway assets; specific highway safety improvements; highway bicycle and accessible pedestrian improvements; and traffic management technologies - are focused on the existing highway system. These investments improve the existing system but do not add physical highway capacity, although some of these improvements, such as traffic management technology, can improve traffic flow without adding physical capacity. Operating, maintaining, rebuilding, and replacing the significant public investment in the existing highway system is the highest priority for highway investment.

As the highway system is being operated, maintained, and rebuilt to a responsible level, cost effective capacity improvements can and should be considered. When highway capacity issues are identified, regional transportation partners should first work to apply traffic management technologies to improve traffic flow without adding physical highway capacity.

If physical capacity is needed, the next category of investment should be to investigate implementing lower cost/high-return-on-investment spot mobility improvements. Spot mobility improvements include smaller, lower-cost projects such as lane striping, improved signal timing, or adding turn lanes. If traffic management technologies and spot mobility improvements do not address the highway capacity issue identified, adding more physical capacity – expansion improvements – should be explored.

Expansion improvements include new or extended MnPASS lanes, strategic capacity enhancements, and highway access investments. The regional objective of providing a congestion-free, reliable option for transit users, carpoolers and those willing to pay through MnPASS lanes is the region's priority for expansion improvements. General purpose lane strategic capacity enhancements should only be considered if adding capacity through MnPASS lanes has been evaluated and found to not be feasible, the improvement is affordable, and the improvement is approached with a lower cost/high-return-on-investment philosophy.

This plan refers to the collection of traffic management technology investments, lower cost/high-return-on-investment spot mobility improvements, MnPASS lanes, strategic capacity enhancements, and highway access investment categories as "regional mobility improvements."

In addition to the 10 types of highway investments described here, three groups of supporting strategies/investments should be actively pursued in the region to reduce the need for additional highway capacity. These are key elements of the region's federally required "Congestion Management Process" (contained in Chapter 12):

1. Travel demand management (TDM) strategies including carpools, vanpools, staggered work hours, telework, and compressed work weeks.
2. Transit, bicycle, and pedestrian investments including new transitways, expanded and enhanced transit service, park-and-rides and enhanced bicycle facilities.
3. Land use changes including increased job and housing concentrations.

Combined, these supporting strategies can help ease congestion on the regional highway system by either reducing overall travel demand or by increasing the share of travel by modes other than the single-occupant automobile, particularly during the most congested times of the day. While the investment direction in this plan applies to all of the regional highway system the Highway Investment Plan section includes only investments on the metropolitan area's state highway system, those principal and A-minor arterials owned and operated by the Minnesota Department of Transportation, which is made up of the Interstate, U.S., and state trunk highways (abbreviated as "MN").

Several counties and cities also own and operate a small part of the principal arterial system and the majority of the A-minor arterial system. Highway investments made by the counties and cities on these systems are not shown in this section since they are largely funded by state and local taxes, as shown in Chapter 4, "Regional Transportation Finance" and are identified through the local comprehensive and capital improvement planning processes which is described in more detail in Chapter 3, "Land Use and Local Planning."

Within the seven-county region (Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, and Washington counties), the county and city-owned minor arterials and non-freeway principal arterials are eligible for federal funds awarded through the biennial Regional Solicitation process administered by the Transportation Advisory Board to the Metropolitan Council (Federal Highway Funds for Regional Solicitation). The Regional Solicitation awards federal funding allocated to the region to projects through a prioritization process that considers the outcomes, goals, and objectives of *Thrive MSP 2040* and this policy plan.

The Regional Solicitation has historically awarded in the range of $50 million of federal funds annually to local highway improvement and safety projects across the region. Because the Regional Solicitation selects projects only three to four years in advance of construction, long range projects are not shown in the text of this plan but are included in Appendices B, C and E in the regional Transportation Improvement Program (TIP), Long-Range Project List and in the regional air quality conformance analysis. Federal highway funds for county and city-owned highway projects in the contiguous, urbanized areas of Wright and Sherburne counties, and Houlton, Wisconsin are allocated through other processes, not the Regional Solicitation, and are also included in Appendices B, C and E.

Current Revenue Scenario Investments

The text that follows identifies and describes the highway investment anticipated between 2015 and 2040 under the Current Revenue Scenario for each of the 10 investment categories. All of the major state and local highway projects identified to date in the metropolitan transportation planning area – consisting of the seven-county region plus the contiguous, urbanized areas of Wright and Sherburne counties, and Houlton, Wisconsin – are listed in Appendices B, C, and E. The investments and projects included in the Current Revenue Scenario were identified through the work done for the *Minnesota State Highway Investment Plan 2014-2033* (MnSHIP) published by MnDOT in December 2013, which identified expected capital revenues and expenditures for all of the state highway system for the 20-year period. MnDOT published the plan after an extensive process integrating policy goals and objectives, technical information on system conditions, performance management, revenue projections, and consideration of key risks. It also responded to stakeholder input gathered through the effort's stakeholder and public involvement process.

The projects identified in the Current Revenue Scenario are illustrated in Figure 5-3 and listed in Appendices B and C. Projects in the first four years of the plan are identified in the 2015-18 TIP. The specific characteristics of projects identified in years 2019-2024 are less certain and will be refined as project development progresses. Specific projects have not yet been identified beyond 2024.

Table 5-7 at the end of this chapter summarizes the revenue and spending for both the Current Revenue and Increased Revenue Scenarios by category. This table shows that over the 2015-2040 period total revenues and spending for state highways under the Current Revenue Scenario are estimated at $11 billion (reported in year-of-expenditure dollars). Approximately $1.3 billion in federal highway funding is also forecast to be available through the Regional Solicitation for investment on state and local non-freeway principal and A-minor arterials. While the Regional Solicitation federal funds are available for expenditure on state highways, for simplicity and because the majority of this money will likely be awarded to local projects, this plan assumes the $1.3 billion in federal Regional Solicitation roadway funds will be spent on local projects, not MnDOT projects.

Operate and Maintain Highway Assets

Highway operations and maintenance is a high investment priority for the principal and A-minor arterial system. These investments are essential in achieving highway safety, access, and mobility for the traveling public and freight. Primary operation and maintenance activities include freeway and arterial traffic management; freeway incident response; pavement patching; pavement restriping; traffic signal, sign, and management system maintenance; lighting maintenance; guardrail and cable median barrier repair; snow and debris removal; roadway salting; drainage system maintenance (culverts, inlets, and underground pipes); bridge inspection and maintenance; and maintenance vehicle fleet management. Operations and maintenance costs have increased as traffic management has become more sophisticated and the average age of highway infrastructure has increased.

As shown in Table 5-7, MnDOT anticipates spending approximately $2 billion on state highway operations and maintenance in the Current Revenue Scenario. This is the first Transportation Policy Plan to identify long-term highway operations and maintenance costs, which are based on the findings in MnDOT's Highway Systems Operations Plan 2012-2015 (HSOP). Regional transportation partners will continue to work together to develop better understanding of, and costs for, highway operations and maintenance to be included in the update of HSOP, MnSHIP, and the next update of the Transportation Policy Plan (Work Program "Identify Regional Highway System Cost of Operations, Preservation and Maintenance.")

Program Support

Resources are also needed to support the delivery of quality highway projects. Program support activities are funded out of the capital budget and include right-of-way land acquisition, consultant services to supplement agency staff and provide special expertise, supplemental agreements to address unanticipated issues, and construction incentives to encourage highly desired outcomes like early completion. In the Current Revenue Scenario, MnDOT anticipates spending about $900 million on program support from 2015 to 2040 (see Table 5-7). This does not include internal MnDOT resources necessary for program delivery.

Rebuild and Replace Highway Assets

The first capital investment priority is to rebuild or replace the existing principal and A-minor arterial system. Like operations and maintenance, these investments are essential for highway safety, access, and mobility for the traveling public and freight. These kinds of activities are often called preservation, asset management, or modernization investments. Primary highway asset management activities include pavement and bridge rehabilitation and replacement.

Rebuilding and replacement is also needed for components beyond pavement and bridges, such as drainage systems, signs, lighting, signals, and other traffic management technologies. Highway preservation efforts create opportunities to cost-effectively implement system-wide safety and congestion mitigation improvements. These include improving transit advantages, adding bicycle or pedestrian facilities, or making existing pedestrian facilities accessible to people with disabilities. See "Transit Investment Direction and Plan (Chapter 6)" and "Bicycle and Pedestrian Investment Direction (Chapter 7)" for more information.

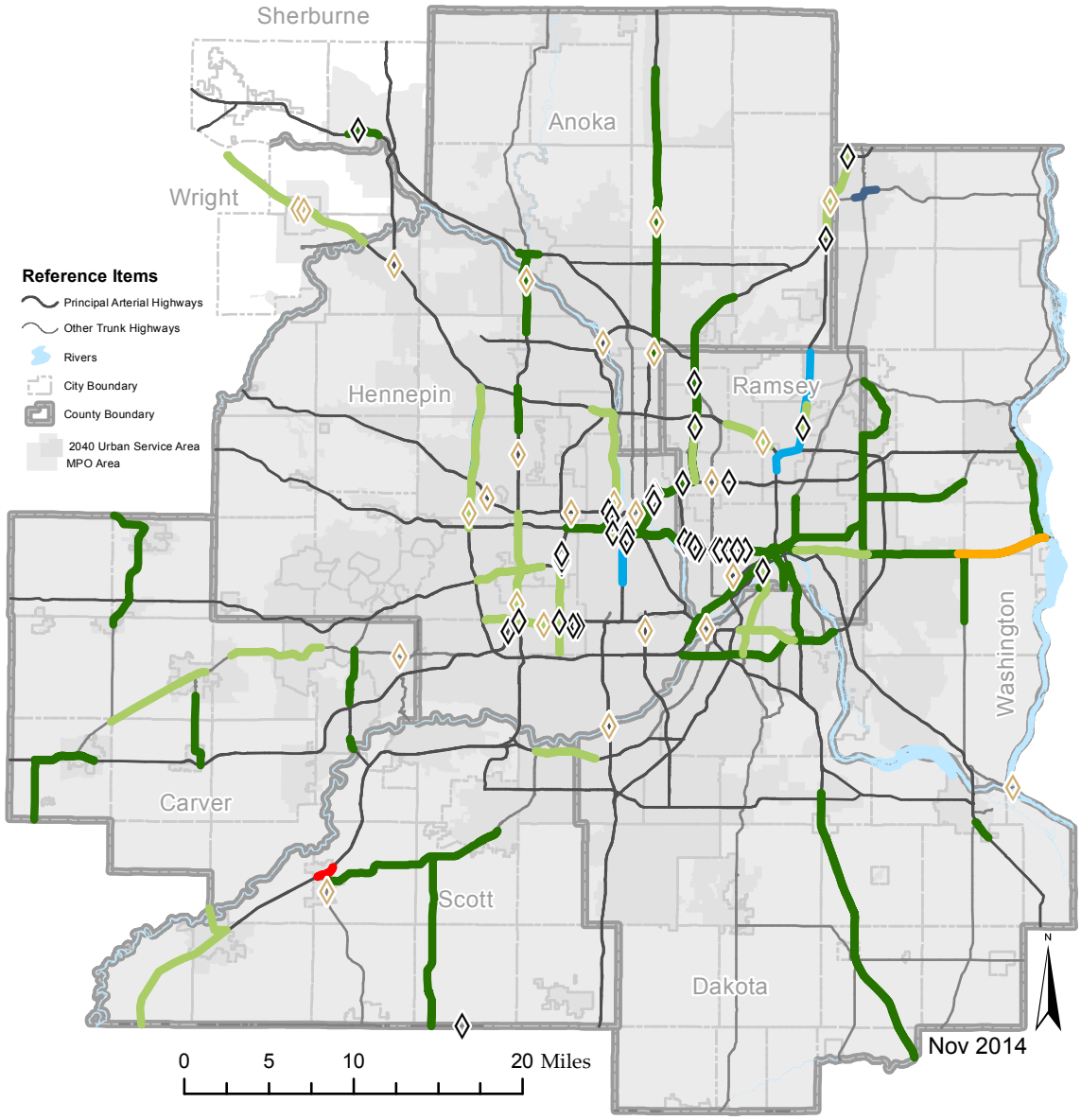
As shown in Table 5-7, the Minnesota Department of Transportation is anticipated to invest $6.9 billion toward rebuilding and replacing pavement, bridge, and roadside infrastructure between 2015 and 2040. This is approximately 62% of the total highway funding anticipated to be available in the Current Revenue Scenario. MnDOT has identified asset reconstruction and replacement projects for the first 10 years of the plan timeframe which are illustrated in Figure 5-3 and listed in Appendices B and C; specific projects to be rebuilt in 2025-2040 are not yet determined. The specific characteristics of projects identified in years 2019-2024 are subject to change, such as endpoints, but are likely to be delivered sometime within that timeframe. MnDOT may be pursuing preliminary study of projects shown in 2019-2024, but design, land acquisition, and environmental impact evaluation likely have not begun, and these projects may substantively change as they are developed.

Highway Safety Improvements

Highway safety is a priority for the region and is being pursued through all types of highway investments. While project designs for all highway projects need to identify and integrate affordable, effective safety improvements, the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) law first called for states to develop performance-based, data-driven plans to target specific improvements to improving the safety of the traveling public. This approach has been advanced in Moving Ahead for Progress in the 21st Century (MAP-21), the current federal transportation funding law. Minnesota's highway safety plans and collaborative interagency strategies for public education, enforcement, improved emergency medical and trauma services, and engineering solutions (the "4E's" of the Toward Zero Deaths initiative) have been remarkably successful, reducing statewide annual traffic fatalities to levels not seen since World War II even while travel has increased significantly.

Figure 5-3: Planned Pavement, Bridge, and Roadside Infrastructure Projects

Identified Pavement, Bridge, and Roadside Infrastructure Projects



Identified Pavement, Bridge, and Roadside Infrastructure Projects* 2015 - 2024 (Projects 2025 - 2040 TBD)

- 2015-2018 TIP Bridges
- 2019 - 2024 Bridges
- Roadside Infrastructure
- Roadside Infrastructure / Safety
- 2015-2018 TIP Pavement
- 2019 - 2024 Pavement Projects
- 2015 - 2018 Pavement / MnPass
- 2015 - 2018 Pavement / Safety

*Not intended to represent all projects until 2040. Includes only those projects identified by May 2014. Subject to change and amendment.

Despite this progress, there is still safety work to do and limited funding to do it. In the metropolitan area, specific highway safety investments will include proactive and reactive investments including lower-cost/high-return-on-investment treatments, sustained crash locations treatments, and continuing participation in the Toward Zero Deaths initiative aimed at preventing fatalities and serious injuries. Examples of these highway safety investments include adding turn lanes at intersections, especially left turn lanes; lengthening turn lanes at intersections; managing intersections on non-freeways by constructing frontage roads or reduced conflict intersections (restricting left or through movements off minor street); and installing edge-line rumble strips or cable median barrier.

MnDOT is anticipated to invest $400 million, or about 4% of the Current Revenue Scenario (see Table 5-7), in specific highway safety investments between 2015-2040. These funds will be supplemented by other safety investments funded through programs like the federal Highway Safety Improvement Program (HSIP) and local sources.

Highway Bicycle and Accessible Pedestrian Improvements

The region is also committed to providing facilities for all people to safely bike or walk, including people with disabilities. MnDOT is anticipated to invest $300 million between 2015-2040, or about 3% of the Current Revenue Scenario (see Table 5-7) in bicycle and accessible pedestrian infrastructure associated with its roads. Although specific projects are not identified, these bicycle and accessible pedestrian highway investments will often be made in conjunction with pavement and bridge projects, or at high priority locations as part of larger mobility projects. These funds will be supplemented by other investments in bicycle and accessible pedestrian infrastructure funded through the Regional Solicitation and by local partners.

Examples of bicycle and accessible pedestrian investments include trails and sidewalks on highway bridges or parallel to the roadway travel lanes, accessible pedestrian signals at signalized intersections, and sidewalk curb ramps that meet or exceed Americans with Disabilities Act (ADA) standards. Federal regulations require the evaluation of need for these kinds of facilities as part of federal aid highway projects and construction.

Regional Mobility Improvements: Traffic Management Technologies

Traffic management technologies smooth the effects of congestion, help improve air quality, and reduce the number of incidents throughout the highway system. These technologies are often called Active Traffic Management (ATM), Intelligent Transportation Systems (ITS), or roadway system management investments. Benefits of traffic management technologies include increases in average person throughput, improvements in overall capacity and travel time reliability, as well as decreases in primary and secondary crashes and overall travel time. Examples of traffic management technologies include traveler information systems, incident response programs, dynamic signing and re-routing, speed harmonization, ramp meters with HOV bypass lanes, traffic signals, operations, and coordination – including advanced walk signal, countdown timers, and queue warning. On freeways, full ATM implementation can be more effective when done in conjunction with other corridor-wide improvements such as the construction of a new or extended MnPASS lane. In some cases, however, more limited ATM strategies can be

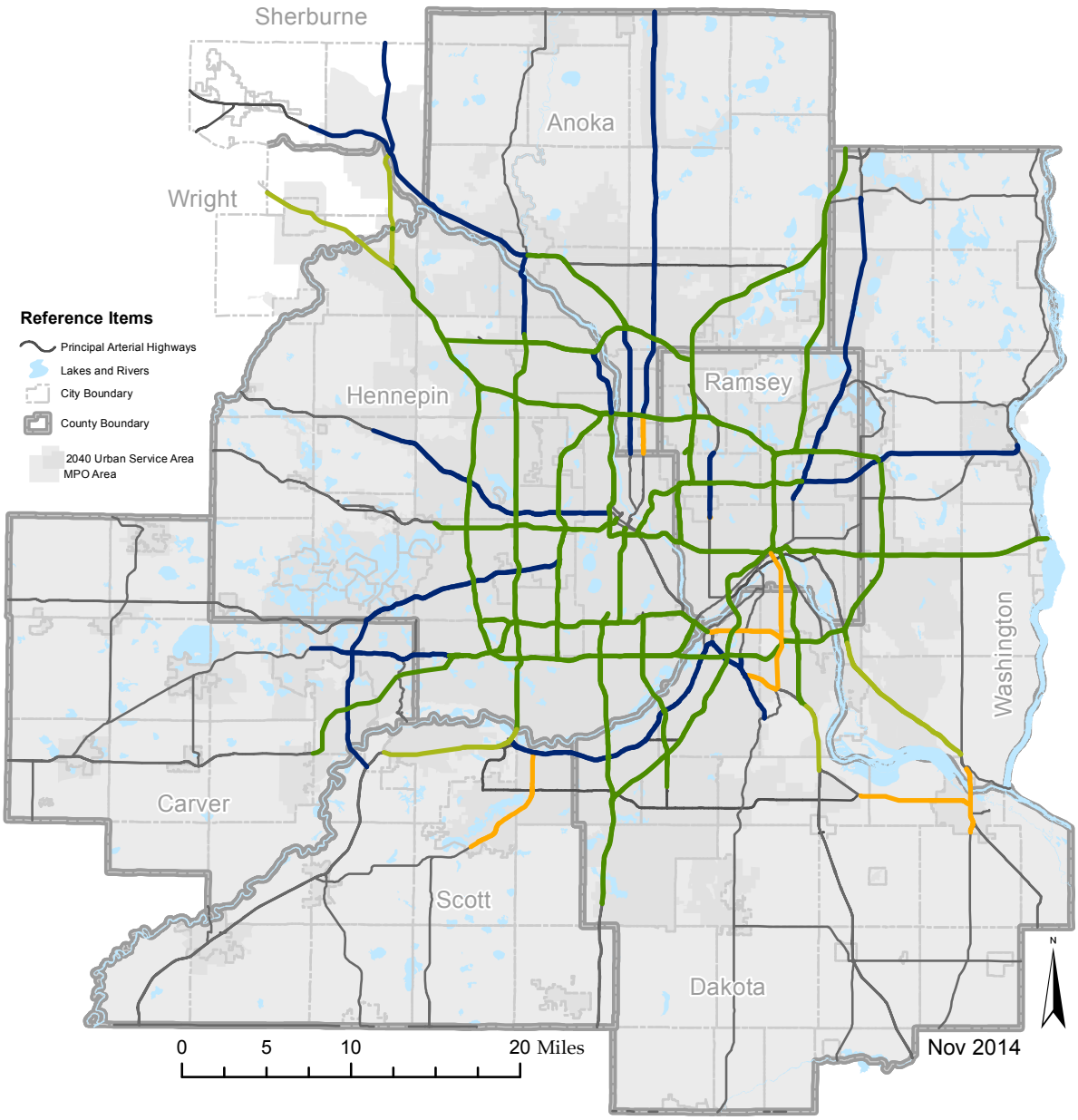
implemented in an effective manner, on a case-by-case basis to improve freeway and non-freeway highways.

The existing and planned elements of MnDOT's traffic management technology system are illustrated in Figure 5-4. Table 5-7 shows that in the Current Revenue Scenario, MnDOT anticipates investing $40 million to $60 million ($4 million to $6 million per year for 10 years) in traffic management technologies. These funds will be supplemented by other transportation system management investments funded through the Regional Solicitation, by local governments, and by private businesses as businesses continue to improve consumer technologies showing real time traffic and routing recommendations.

To improve and advance the broader implementation of traffic management technologies, the Metropolitan Council will convene MnDOT and other regional transportation partners to continue exploring the feasibility of developing a regional arterial traffic management center to complement MnDOT's freeway regional traffic management center (RTMC) (Work Program, Arterial Traffic Management Center).

Figure 5-4: Traffic Management Technology System

MnDOT Traffic Management Technology System



Regional Mobility Improvements: Spot Mobility Improvements

Spot mobility projects identified through MnDOT's Congestion Management and Safety Plan (CMSP) improve traffic flow by providing bottleneck relief, improving geometric design, and addressing safety hazards. These lower-cost/high-return-on-investment projects are generally less than one mile long, are coordinated with other funded projects such as repaving, and can be implemented on shorter timeframes as compared to traditional highway capacity projects. In some instances, these types of improvements require use of flexible design principles to maximize the use of available pavement and right-of-way.

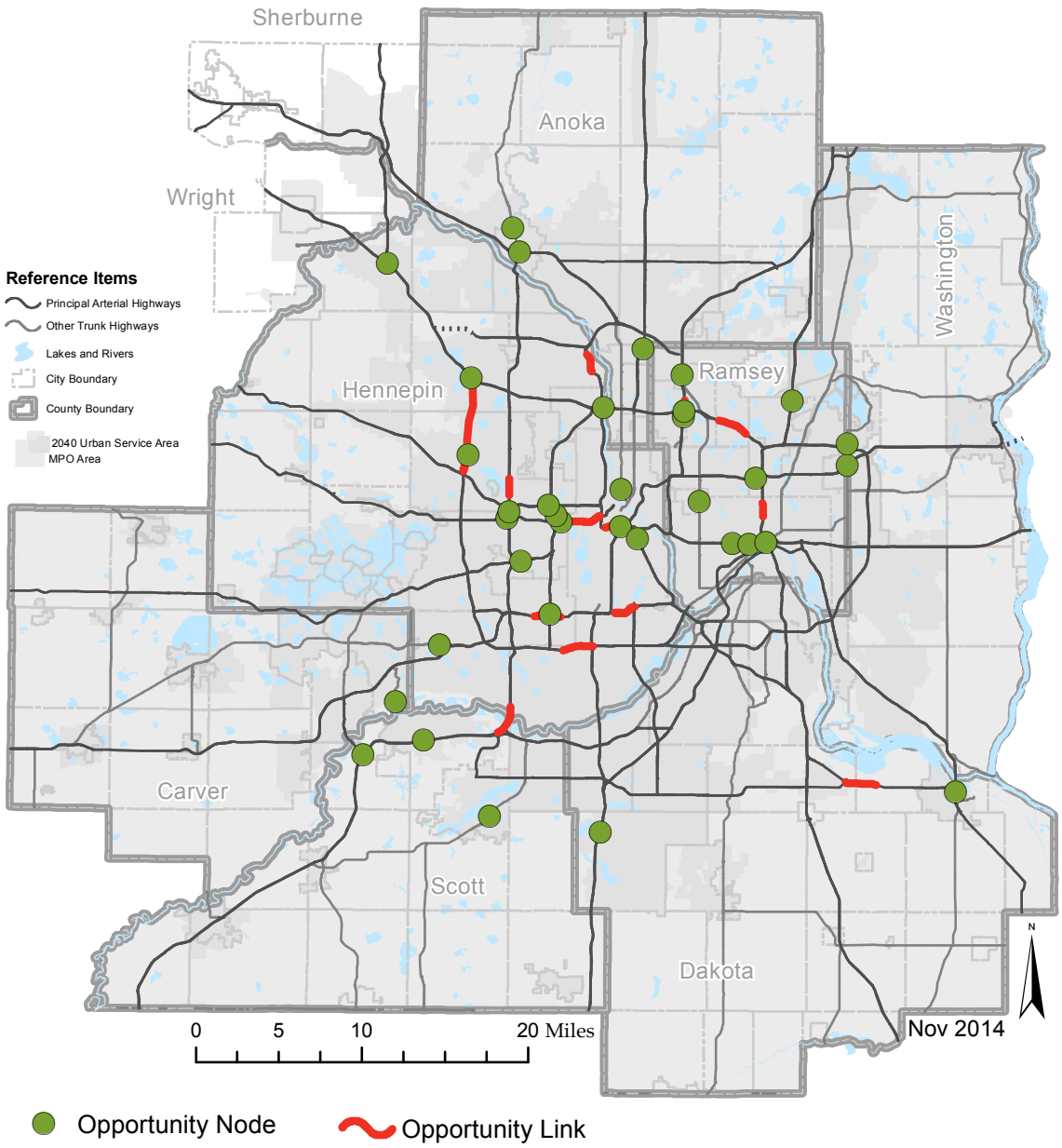
MnDOT has worked with other regional highway partners over the past several years to identify CMSP opportunity areas. The *2030 Transportation Policy Plan* (adopted November 2010) discussed and listed examples of what were then called lower-cost/high benefit improvements. MnDOT has implemented with great success some lower-cost/high-return-on-investment projects such as the widening of State Highway 100 at Excelsior Boulevard and the addition of a third lane on I-94 between Century and McKnight avenues. In addition, other spot mobility projects have been completed or are under development by MnDOT for implementation. Some of these projects consist of capacity enhancement and short auxiliary lane additions while others focus on providing transit advantages or improving roadway system management.

In 2013, MnDOT published the results of the latest CMSP process identifying over 50 areas with opportunity to address congestion and safety problems using lower-cost/high-return-on-investment spot mobility improvements. The list published in *CMSP III* (2013) represents only a snapshot of candidate spot mobility improvements; the process identified an additional 350 problem locations. While the 50 areas illustrated in Figure 5-5 identify potential areas of opportunity, and some of the projects have been implemented, MnDOT needs to complete additional work before most of these potential solutions can become programmed improvements. Improvements to the 50 areas were estimated to cost over $200 million, which is more than the $75 million to $125 million identified in Table 5-7 for spot mobility investments, so not all of these 50 areas will be improved under the Current Revenue Scenario ($7.5 million to $12.5 million per year for 10 years).

A number of CMSP-related questions have been raised during the process to update the *2040 Transportation Policy Plan* that deserves further study and discussion. In addition to continuing to address and further develop many of the CMSP opportunity areas identified in this plan, MnDOT and the Council will continue to work with regional highway partners to update the CMSP at least every four years and prior to updates to MnSHIP and the Transportation Policy Plan (Work Program Congestion Management and Safety Plan).

Figure 5-5: Spot Mobility Improvement Opportunity Areas Identified in CMSP III (MnDOT, 2013)

Spot Mobility Improvement Opportunity Areas



Regional Mobility Improvements: MnPASS System

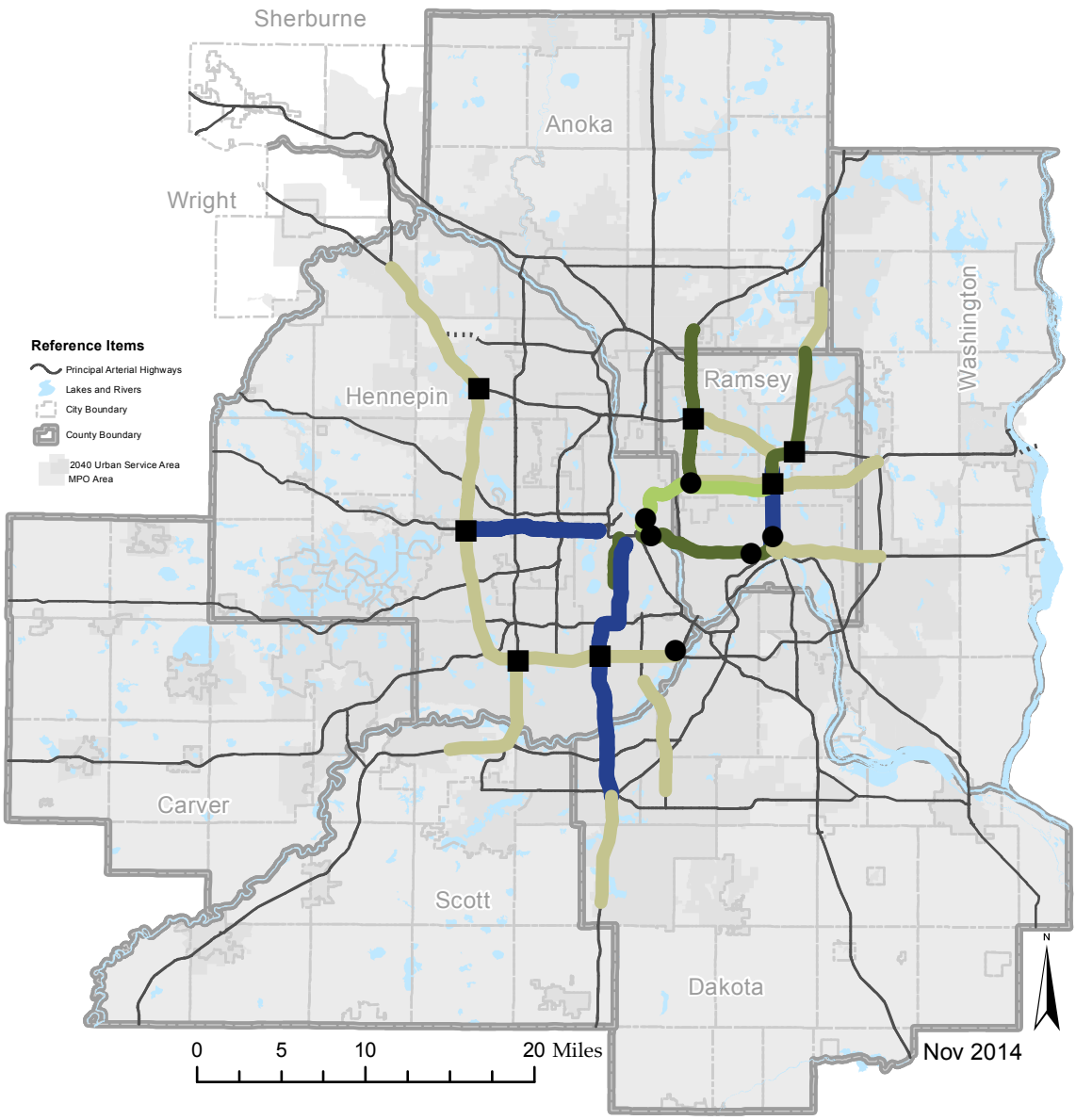
Priced managed lanes provide a reliable, congestion-free travel option during rush hours for people who ride transit or in carpools, and other motorists who are willing to pay. In the Twin Cities, we call this system MnPASS. Single-occupant vehicles and small trucks can buy their way into the managed lanes during rush hour times as long as the target travel conditions are maintained in the lane. Any vehicle can use the MnPASS lanes during non-rush hour times. A system of MnPASS lanes can improve highway efficiency and effectiveness by moving more people through congested highway corridors during rush hour periods. The MnPASS system offers commuters and small trucks a choice for improved travel time. The choice and reliability offered by MnPASS also supports transit riders and other kinds of ridesharing, especially commuters using longer-distance express bus service and park-and-ride facilities. New or extended MnPASS lanes also improve the flow of traffic in adjacent general purpose lanes.

The Metropolitan Highway System Investment Study (MHSIS) and MnPASS 2 studies were completed just prior to adoption of the *2030 Transportation Policy Plan* in November 2010. The *2030 Transportation Policy Plan* documented the tiered priority for MnPASS investments. The MnPASS System Vision shown on Figure 5-6 and Table 5-3 is based on the 2010 MnPASS 2 Study, although the tiers have been adjusted since 2010 to reflect the present status of MnPASS project implementation and the funding available under the Current Revenue Scenario.

The MnPASS System Vision shown in Figure 5-6 is estimated to cost $1.8 to $2.4 billion (2014 dollars) which is beyond the funding available in the Current Revenue Scenario. To promote cost-effectiveness and allow for building more of the MnPASS system, this estimate assumes most MnPASS projects will be built in conjunction with major pavement and bridge reconstruction or rehabilitation projects, and with little or no new right-of-way. In some cases, MnPASS projects may require use of flexible design principles to maximize the use of available pavement and right-of-way.

Figure 5-6: MnPASS System Vision

MnPass System Vision



MnPASS

- Existing / Under Construction
- Tier 1 MnPASS Expansion
- Tier 2 MnPASS Expansion
- Tier 3 MnPASS Expansion*

- Direct Connection
- Through Movement

** The I-94 east corridor is in the MnPASS system vision contingent on resolving highway right-of-way issues through further study, including the Gateway transitway Draft Environmental Impact Statement.*

Three MnPASS corridors, I-394, I-35W south of downtown Minneapolis, and I-35E north of downtown Saint Paul, are operating or under construction. Between 2015 and 2024, MnDOT will complete two new MnPASS lanes and extend two existing MnPASS lanes. These projects are shown as Tier 1 MnPASS investments in Table 5-3, and the summarized costs are shown in Table 5-7. Because of increasing highway operations and rebuilding needs, limited available revenues, and rising cost of construction, MnDOT does not anticipate being able to construct additional MnPASS lanes after 2024 under the Current Revenue Scenario.

The four projects scheduled for construction prior to 2024 are:

- **I-35W south of downtown Minneapolis:** MnDOT will complete the southbound I-35W MnPASS south of downtown Minneapolis to 46th Street in conjunction with major pavement and bridge reconstruction projects.
- **I-35W north of Minneapolis:** MnDOT intends to align preservation efforts with MnPASS implementation on I-35W north of Minneapolis. A corridor study for I-35W North MnPASS completed in 2013 recommended pursuing significant capital cost savings by integrating MnPASS lane construction with major bridge and pavement asset management projects in the corridor. The study recommended constructing the I-35W North MnPASS lanes in phases, starting with the lanes between State Highway 36 in Roseville and U.S. Highway 10 in Arden Hills and Blaine. This first phase is included in the Current Revenue Scenario.
- **I-94 between downtown Minneapolis and Saint Paul:** MnDOT is working to complete a corridor study for the I-94 MnPASS lane between Minneapolis and Saint Paul and has indicated the project should be included in the Current Revenue Scenario. If the I-94 MnPASS Study shows the project cannot be implemented before 2024, MnDOT will work to restore transit advantages between downtown Minneapolis and downtown Saint Paul until MnPASS is constructed in the corridor. The bus-only shoulder lanes between State Highway 280 and downtown Minneapolis were removed as an emergency traffic relief measure in 2007 following collapse of the I-35W bridge.
- **I-35E north of Saint Paul:** MnDOT is currently in the environmental/pre-design process for extending MnPASS lanes on I-35E north between Little Canada Road and Ramsey County Road J.

Table 5-3: MnPASS System Investment Priorities for Current Revenue Scenario

Tier	Route	From (or at)	To	Description	Estimated Cost* (year of expenditure dollars)	Investment Scenario
0	I-394	I-494	I-94 near downtown Minneapolis	MnPASS lanes	Complete	Complete
0	I-35W	I-35W/E south split	South of downtown Minneapolis	MnPASS lanes	Complete	Complete
0	I-35E	I-94	Little Canada Road	MnPASS lanes	Under construction	Under construction
1	I-35W	Downtown Minneapolis	46th Street	Complete southbound MnPASS lane in conjunction with pavement reconstruction and I-35W/Lake Street transit station	Cost in highway asset management	Current Revenue Scenario, 2015-2018
1	I-35E	Little Canada Road	Ramsey County J	Construct MnPASS lanes	$16 million	Current Revenue Scenario, 2015-2018
1	I-35W	MN 36/280	US 10	Construct MnPASS lanes	Approx. $100 million	Current Revenue Scenario, 2019-2024
1	I-94	Downtown Minneapolis	Downtown Saint Paul	Construct MnPASS lanes including direct connections to and from both downtowns	Approx. $100 million	Current Revenue Scenario, 2019-2024

*Cost estimates include MnPASS, and may or may not include other pavement, bridge, or roadside infrastructure improvements related to MnPASS implementation and anticipated to be completed at the same time.

MnDOT will continue to develop all tiers of the MnPASS system in close coordination with all related public and private transit service and support facility planners and providers, including cities, counties, Metro Transit, suburban transit providers, Metro Mobility, and Transit Link.

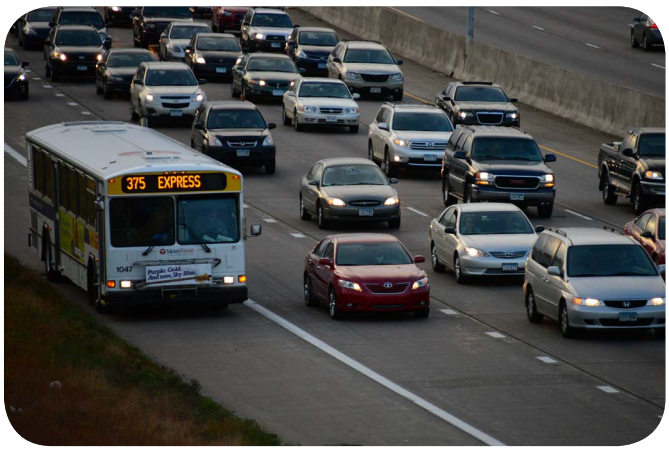
Although Tier 2 and 3 MnPASS lanes are not funded under the Current Revenue Scenario, there are many ongoing studies of MnPASS in the Tier 2 and 3 corridors. MnDOT has started to develop a study to add an eastbound MnPASS lane on State Highway 36 between I-35W and I-35E. MnDOT is also participating in the Gateway Corridor Transitway study for I-94 east of downtown Saint Paul. The I-94 east corridor is in the MnPASS system vision but implementation of both the I-94 MnPASS lane and the METRO Gold Line (Gateway BRT) will require resolving right-of-way issues through further study, including the Gateway Transitway Draft Environmental Impact Statement. MnDOT and Dakota County completed a managed lane study in 2014 for State Highway 77 south of I-494. The study recommended adding a MnPASS lane to northbound State Highway 77 between 138th Street in Apple Valley and Old Shakopee Road in Bloomington, The study acknowledged that the benefits of a MnPASS lane on State Highway 77 cannot be fully achieved without improvements to ease congestion for westbound I-494 between State Highway 77 and I-35W.

For corridors where MnPASS lanes are planned, other corridor investments will be designed so as not to preclude a future MnPASS investment. Recent examples include the eastbound auxiliary lane on Interstate 494 in Edina, Bloomington, and Richfield, the northbound auxiliary lane on Interstate 35W between the 4th Avenue interchange and Johnson Street, planned general purpose lane additions on Interstate 94 between Lexington Avenue and Rice Street, and planned general purpose and auxiliary lanes on Interstate 494 between Interstate 394 and Interstates 94/694.

MnDOT and the Council will also continue to work together to further refine the MnPASS system vision. In the process to update the *2040 Transportation Policy Plan*, a number of MnPASS-related questions have been raised that deserve further study and discussion, including the relationship between new or extended MnPASS lanes and transit service and support facilities (Work Program MnPASS System Plan Update).

Regional Mobility Improvements: Highway Strategic Capacity Enhancements

While past practice emphasized highway capacity expansion as a common response to growing traffic congestion, this plan advances the direction from the *2030 Transportation Policy Plan* adopted in November 2010 by continuing to acknowledge that limited funding is available to operate, maintain, rebuild, and enhance all of the transportation system, including highways, and emphasizing that any capacity enhancements must be carefully developed, considered, and prioritized for funding. However, in some cases, strategic capacity enhancements other than traffic management technologies, spot mobility improvements, new or extended MnPASS lanes, or capacity improvements to other modes may be needed on the highway system to improve travel conditions for people and freight. Strategic capacity enhancements must be affordable, place priority on existing problems, be developed and built using the lower-cost/high-return-on-investment approach, and be prioritized for funding based on their ability to advance the *Thrive MSP 2040* outcomes and Transportation Policy Plan goals and objectives. In addition general-purpose-lane capacity enhancements should be considered only if the project maximizes use of existing pavement and right-of-way; and MnPASS has been evaluated and found not to be feasible.



On freeways, strategic capacity enhancements may include bus-only shoulder lanes, truck climbing lanes, unpriced dynamic shoulder lanes, auxiliary lanes, improvements to existing interchanges to alleviate bottlenecks like freeway-to-freeway system interchanges (such as I-35W/494 in Bloomington or I-94/494/694 in Oakdale/Woodbury), frontage roads or improvements to the local arterial system that allow traffic to use an off freeway route. This plan supports consideration of permanent general-purpose lanes on freeways for the purpose of correcting lane continuity in areas with high levels of existing congestion; this plan does not support adding permanent general-purpose capacity elsewhere on the freeway system. For highway corridors with transit advantages or where MnPASS lanes are planned, strategic capacity enhancements will not eliminate existing transit advantages, will not preclude future implementation of MnPASS lanes and will lead toward future transit advantages or MnPASS investment.

This plan also supports cost-effective strategic capacity enhancements on non-freeway principal arterial highways. Special emphasis should be placed on improvements that integrate preservation, safety, multimodal enhancements and modernization, including:

- Truck climbing lanes
- Lane continuity within the urban service area
- Traffic management technology implementation such as fiber optic cable to allow traffic signal interconnection and coordination
- Transit advantages
- Increasing roadway and intersection capacity by building alternative intersection designs, replacing an intersection with an interchange, or reducing the number of access points to the road through frontage roads or improvements to the local arterial system

For interchange proposals on any principal arterial, freeway or non-freeway, the evaluation process and criteria are identified in Appendix F. The main purpose of the interchange proposal assessment will be to identify safe and cost-effective projects that can be supported by the Council and MnDOT for local and regional funding. Completion of this assessment and explicit support from MnDOT will continue to be necessary to obtain funding through the Regional Solicitation process for non-freeway state trunk highway improvements.

Many local agencies and other transportation stakeholders have expressed a desire, conducted studies and pursued state and federal funding to convert some non-freeway principal arterial intersections to interchanges to increase safety and mobility. Freeways with grade-separated interchanges carry traffic faster and, in most cases, are safer than non-freeway principal arterials with at-grade intersections and traffic signals.

Many regional partners are continuing to implement non-freeway principal arterial improvements identified a decade ago in the interregional corridor studies, such as the efforts of Dakota County along U.S. Highway 52, most recently at County Road 86, or the efforts of MnDOT and Scott County to implement several intersection conversions along U.S. Highway 169 in Scott County, such as County Road 69, with the intent of improving safety and capacity in these corridors. The Shakopee Mdewakanton Sioux tribe is also working with MnDOT and Scott County and fully funding strategic capacity enhancements to U.S. Highway 169 to support the tribe's economic development. However, the inter-regional corridor studies preceded the region's attempts to identify lower cost /high-return-on-investment improvements so few of the improvements identified through these studies have been included in the Current or Increased Revenue Scenarios of this plan. Future work in these corridors will need to reassess the approach and design to assure that projects are affordable, focused on existing problems, and provide a high-return-on-investment.

As a work program item for the next update of the *2040 Transportation Policy Plan*, the Council and MnDOT will work with regional highway partners to analyze key intersections on the non-freeway principal arterial system within the urban service area to identify and prioritize specific intersection conversion projects (Work Program Principal Arterial Intersection Conversion Study). Although several highway corridors such as State Highway 36, U.S. Highway 10, U.S. Highway 169 and U.S. Highway 212 have recently been studied, the improvements being identified through these efforts are not included in the Current or Increased Revenue Scenarios, and should be prioritized for future funding through the Intersection Conversion Study.

A-minor arterials are also important in carrying regional and subregional trips in a safe and efficient manner, and play a critical role in supplementing the capacity of the principal arterial system. They support access to regional job concentrations, educational institutions, and industrial and manufacturing centers for motorists and people riding transit, biking, and walking. This plan supports cost-effective strategic capacity enhancements to A-minor arterials such as traffic signal interconnection and coordination, turn lanes, and building new A-minor arterials where needed within the urban service area to provide critical regional, multimodal highway connectivity. A-minor arterial enhancements can also often be identified through city or county comprehensive plan updates, which are reviewed for consistency with regional plans and policies by the Council.

Between 2015 and 2024, MnDOT will only have revenue to complete a limited number of strategic capacity enhancements. These projects are illustrated in Figure 5-7 and listed in Table 5-4 and Appendices B and C.

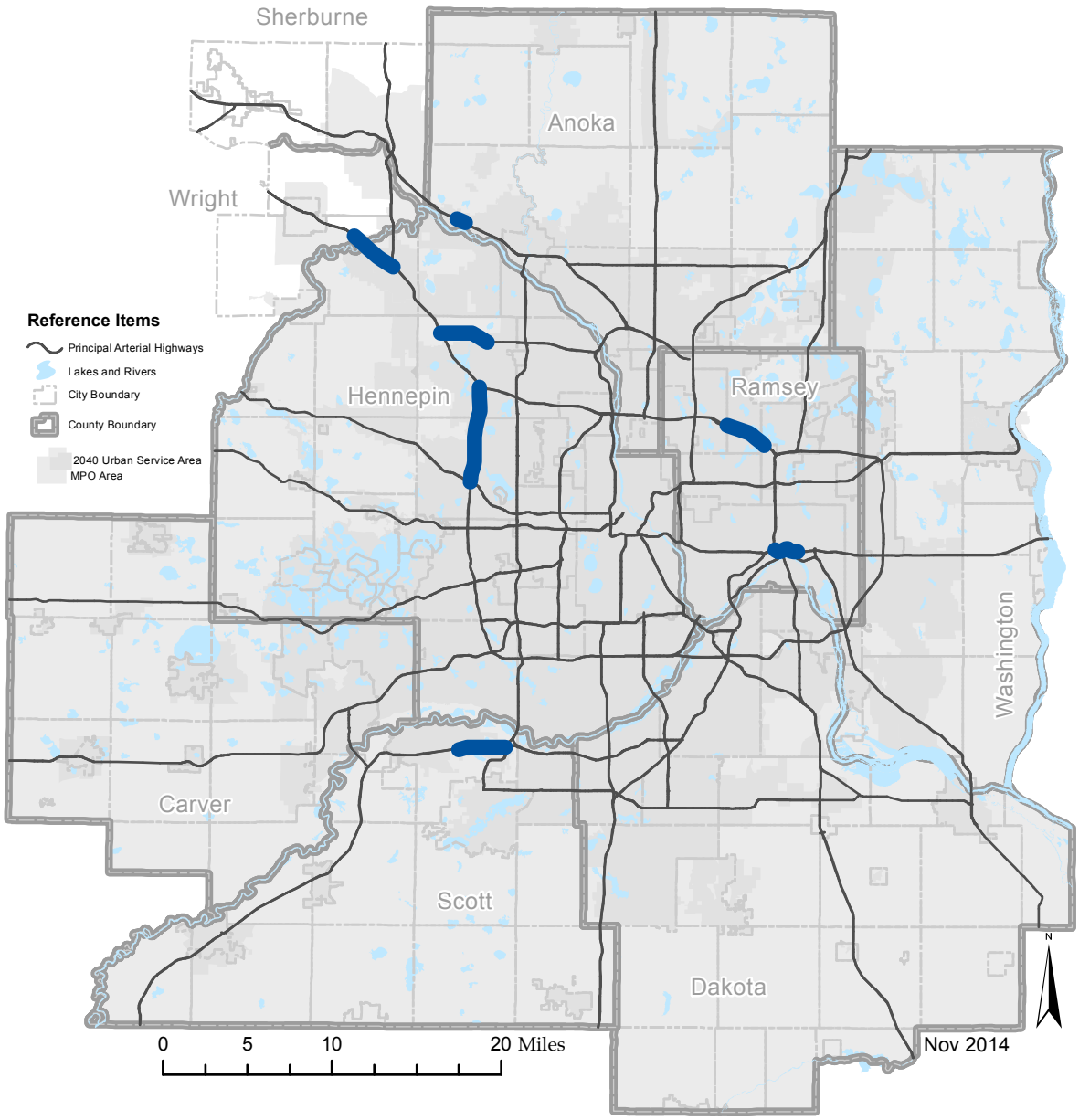
The funded strategic capacity projects are primarily receiving revenue through special funding programs such as the state's Corridor Investment Management Strategy (CIMS) and Corridors of Commerce programs, and funding provided by the Shakopee Mdewakanton Sioux for U.S. Highway 169. Because of increasing operations and rebuilding needs, limited available revenues, and rising cost of construction, MnDOT does not anticipate being able to make additional strategic capacity investments after 2024.

Table 5-4: Highway Strategic Capacity Enhancements 2015-18

Route	From (or at)	To	Description	Estimated Cost (year of expenditure dollars)
I-494	North of I-394	I-94/694	Construct one additional lane in each direction in conjunction with pavement and bridge rehabilitation	$86million ($36 million strategic capacity, $50 million preservation)
TH 610	I-94	Hennepin County 81	Complete the four-lane freeway and connection with I-94	$131 million (an additional $50 million for right-of-way in Program Support)
I-694	Lexington Avenue	Rice Street	Construct one additional lane in each direction	$42 million ($32 million strategic capacity, $30 million preservation)
I-94	MN 241 in Saint Michael	MN 101 in Rogers	Extend westbound ramp, add westbound lane through MN 101 interchange, and add eastbound lane between the interchanges	$46M
I-94	East 7th Street exit in Saint Paul	Mounds Boulevard in Saint Paul	Eastbound auxiliary lane, emergency pull-off areas, noise wall, and related roadside infrastructure	$3 million
US 10	Armstrong Boulevard in Ramsey		New interchange and rail grade separation	$34.4 million total (MnDOT - $10 million)
TH 169	Scott County 18/Canterbury Road	Scott County 21	Construct additional southbound lane in Shakopee	$1.5 million total (MnDOT – Future operations, maintenance, and rebuilding only)

Figure 5-7: Highway Strategic Capacity Enhancements 2015-18

Highway Strategic Capacity Enhancements



Regional Mobility Improvements: Freeway Interchanges

Highway access to jobs, education, and industry is critical to the livability and prosperity of the region. But additional freeway access must be provided in a way that preserves or enhances the safety and capacity of the system. As mentioned in the previous section, proposals for new or modified interchanges on the principal arterial system must be reviewed by MnDOT and the Council and meet the criteria in Appendix F. Further review is required by the Federal Highway Administration (FHWA) for interchange proposals on the Interstate system. In addition to solving highway capacity or safety deficiencies, new interchanges should be consistent with regional development plans and regionally approved local comprehensive plans (Wright and Sherburne County and Houlton, Wisconsin local comprehensive plans do not need to be regionally approved). New interchanges should also support development that enhances the region's economic competitiveness. See Thrive MSP 2040 and "Land Use and Local Planning" for more discussion of land use planning for housing, jobs, education, and industry within the seven-county region.

Between 2015 and 2024, MnDOT will contribute to the regional highway access investments projects listed in Table 5-5 in Appendices B and C. These projects are funded through the state's regular construction and Transportation Economic Development (TED) programs. Because of increasing highway operations, maintenance, and rebuilding needs, limited available revenues, and rising cost of construction, MnDOT does not anticipate being able to contribute to regional highway access investments after 2024.

Table 5-5: Freeway Interchange Investments 2015-2018

Route	From (or at)	To	Description	Estimated Cost (reported in year of expenditure dollars)	Investment Scenario
I-94	5th/7th Street in Minneapolis		Reconstructed interchange to close 5th Street ramp and replace it with one at 7th Street	$9.7 million total (MnDOT - $6.79 million)	Current Revenue Scenario; 2015-2018
US 212	Shady Oak Road in Eden Prairie		Reconstructed interchange	$7M	Current Revenue Scenario; 2015-2018
TH 100	36th Street in Saint Louis Park	Barry Street	Reconstruct mainline including interchanges at CR 5, MN 7, and 36th Street	Cost in asset management	Current Revenue Scenario; 2015-2018

Increased Revenue Scenario Investments

The investments identified in the Current Revenue Scenario are able to be funded and are the region's highest highway investment priorities, but do not represent the highway investments needed to help achieve the outcomes, goals, and objectives in *Thrive MSP 2040* and this Transportation Policy Plan. The Increased Revenue Scenario identifies a higher level of spending for highway investments that will come closer to advancing the outcomes, goals, and objectives of *Thrive MSP 2040*, this Transportation Policy Plan, and the *Minnesota State Highway Investment Plan 2014-2033*.

Building on work completed in 2012 for the Governor's Transportation Finance Advisory Committee (TFAC) and supplemented with additional information from MnDOT, this plan calls for significant additional state highway investments for the 2015 to 2040 timeframe, summarized by investment category in Table 5-7.

The Increased Revenue Scenario for the metropolitan area's state highway system totals $8 billion to 10 billion (constant dollars), which does not include funding needed for additional, high priority transit, local transportation, aviation, or non-highway freight transportation improvements. The total includes the anticipated public costs – operations, maintenance, and capital – only for the state highway system in the metropolitan area.

While the intent in developing this Increased Revenue Scenario was to identify a practical scenario for the 2015 to 2040 timeframe, an additional $8 billion to 10 billion of increased revenue for highways is a very aggressive scenario. For example, when policymakers were discussing different options for raising revenue for the needs identified through the TFAC process, the $4 billion to $6.5 billion in needs identified for the metropolitan area's state highway system required the equivalent of more than a 40-cent rise in the gas tax over a 20-year period. The TFAC analysis did not include the additional state highway funding needs for system operations and maintenance, now included in this *2040 Transportation Policy Plan*.

Table 5-7 shows how the $8 billion to $10 billion in increased revenues might be allocated among the 10 investment categories. An important message in this table is the level of funding increase needed compared to the Current Revenue Scenario investment categories. Based on the best information available, funding for state highway should increase as noted:

1. Operations and maintenance should increase on the order of 50% (+$1 billion)
2. Funds to rebuild and replace highway assets should increase about 35% (+$2 to $ 2.5 billion)
3. Highway safety, bicycle, and accessible pedestrian investments should increase 75% and 100%, respectively (+$0.4 billion and +$0.3 billion)
4. Regional mobility investments should increase in the range of $4 to $5 billion, a very significant increase over the spending in the Current Revenue Scenario.

The text that follows identifies potential investments between 2015 and 2040 under an Increased Revenue Scenario for each of the 10 highway investment categories defined in the Current Revenue Scenario discussion. The lists of projects under the Increased Revenue Scenario are illustrative and may not identify the region's highest priorities for investment. As discussed throughout the Current Revenue Scenario, the Metropolitan Council, MnDOT, and other regional highway partners will continue to develop state highway projects and identify priorities as part of the on-going transportation planning process. See Chapter 11 Work Program for discussion of select activities to be completed prior to the next update of the Transportation Policy Plan or the Unified Planning Work Program for discussion of all annual transportation planning activities performed by the Metropolitan Council. This plan concludes by identifying additional highway investments that are beyond the Increased Revenue Scenario and time period of this plan that may be needed as the region continues to grow and develop.

Operate and Maintain Highway Assets

The MnDOT Highway Systems Operation Plan 2012-2015 (HSOP) identifies a shortfall in current state highway operations and maintenance spending. The HSOP showed that both traditional and risk-based cost estimates of current operations and maintenance needs exceed the budget anticipated. The Increased Revenue Scenario includes an additional $1 billion in MnDOT operations and maintenance spending (see Table 5-7), which would account for both unmet needs on the existing highway system and additional needs created under this scenario due to improvements like new or additional traffic management technologies, MnPASS, and strategic capacity enhancements.

Program Support

Resources are also needed to support the delivery of quality highway projects. Under the Increased Revenue Scenario, approximately $700 million would be allocated to the metropolitan area for meeting additional project delivery priorities (see Table 5-7). This does not include internal MnDOT resources necessary for program delivery.

Rebuild and Replace Highway Assets

Based on work done for the Transportation Finance Advisory Committee, an Increased Revenue Scenario would yield approximately $2 to 2.5 billion for additional pavement, bridge, and roadside infrastructure investments in the metropolitan area (see Table 5-7). This level of new investment would help maintain conditions for both principal arterials and state owned A-minor arterials which are not part of the National Highway System, like State Highway 47/University Avenue, State Highway 65/Central Avenue, State Highway 51/Snelling Avenue, State Highway 13 and State Highway 5. Many of these state roads serve as important transit routes, including the proposed arterial bus rapid transit network.

Highway Safety Improvements

Under the Increased Revenue Scenario, it is estimated that approximately $300 million (about 3% of the Increased Revenue Scenario) would be allocated to the greater Twin Cities region for meeting specific highway safety priorities. See Table 5-7.

Highway Bicycle and Accessible Pedestrian Improvements

Under the Increased Revenue Scenario, it is estimated that approximately $300 million (about 3% of the Increased Revenue Scenario) would be allocated to the greater Twin Cities region for meeting additional highway bicycle and accessible pedestrian priorities. See Table 5-7.

Regional Mobility Improvements

Regional mobility improvements consist of several types of the 10 investment categories including: (6) traffic management technologies, (7) spot mobility improvements, (8) the MnPASS system, (9) highway strategic capacity enhancements, and (10) highway access to jobs, education, and industry. Potential regional mobility improvements are expected to increase by $4 to $5 billion, but the breakdown by each of these six categories has not yet been determined, as indicated in Table 5-7.

Regional Mobility Improvements: Traffic Management Technologies and Spot Mobility Improvements

The need for traffic management technology and spot mobility improvements on the principal and A-minor arterials greatly exceed the level of investment anticipated under the Current Revenue Scenario. A portion of the $4 billion to $5 billion in additional regional mobility funding would be allocated to meeting additional active traffic management and intelligent transportation system priorities. Some of these priorities are illustrated in Figure 5-4 and Figure 5-5.

Regional Mobility Improvements: MnPASS Investments with Increased Revenues

The Increased Revenue Scenario includes funding for the Tier 2 and Tier 3 MnPASS projects, listed in Table 5-6, and would result in completing the MnPASS system vision. Consistent with the findings from the MnPASS 2 Study completed by MnDOT in 2010 and the Metropolitan Council's Metropolitan Highway System Investment Study, Tier 2 MnPASS projects should be completed before Tier 3 MnPASS projects unless subsequent corridor studies provide a basis for reprioritizing. While a portion of the I-35W North MnPASS would be completed under the Current Revenue Scenario, consistent with recommendations from the I-35W North corridor study, the Tier 2 projects shown below would be completed under an Increased Revenue Scenario. Refer to the Current Revenue Scenario and Figure 5-6 for more discussion of MnPASS.

Table 5-6: MnPASS System Investment Priorities Under Increased Revenue Scenario

Tier	Route	From (or at)	To	Description	Estimated Cost for MnPASS
2	I-35W	Downtown Minneapolis	MN 36/280	Construct MnPASS lanes	$160-180 million
2	TH 36	I-35W	I-35E	Construct eastbound MnPASS lane	$35-60 million
2	I-35W	US 10	95th Avenue in Blaine	Construct MnPASS lanes	To be developed
3	TH 36	I-35W	I-35E	Construct westbound MnPASS lane	To be developed
3	TH 36	I-35E	I-694	Construct MnPASS lanes	To be developed
3	TH 77	138th Street in Apple Valley	Old Shakopee Road in Bloomington	Construct MnPASS lanes	$41 million
3	US 169	Scott County 17 in Shakopee	I-494	Construct MnPASS lanes	$80-$115 million
3	I-35E	Ramsey County J	Anoka County 14	Construct MnPASS lanes	To be developed
3	I-35	Crystal Lake Road/ Southcross Drive in Lakeville	Dakota County 70	Construct MnPASS lanes	To be developed
3	I-94	MN 101 in Rogers	I-494/694	Construct MnPASS lanes with southbound direct connection to I-494	$70 to $95 million
3	I- 94	Downtown Saint Paul	I-694/494 in Woodbury	Construct MnPASS lanes	To be developed
3	I-494	I-94/694	I-394	Construct MnPASS lanes	To be developed
3	I-494	I-394	US 212	Construct MnPASS lanes	$70 to $150 million
3	I-494	US 212	MN 5/MSP Airport	Construct MnPASS lanes	$150 to $185 million
3	I-694	I-35W	I-35E	Construct MnPASS lanes	To be developed

Regional Mobility Improvements: Strategic Capacity Enhancements with Increased Revenues

Several types of strategic regional highway capacity enhancements are needed throughout the region. These include improvements to freeway-to-freeway system interchanges, existing interchanges, and existing at-grade intersections with traffic signals on multilane highways. Regional transportation partners have identified many potential strategic capacity enhancements, including improvements to the I-35W/I-494 interchange in Bloomington and to the I-94/494/694 interchange in Oakdale/Woodbury. Many of these efforts are high priorities and are not included in the Current Revenue Scenario due to anticipated funding limits.

In many rural parts of the metro region, trucks are a significant percentage of total traffic flow, carrying agricultural products and natural resources from Greater Minnesota into the metropolitan area on roads where the number of automobiles does not justify MnPASS improvements. Improvements to highways in these outer portions of the metro area which would primarily benefit freight and residents of Greater Minnesota should be considered for funding from sources that would otherwise be designated for use outside the Twin Cities metro area, such as the Greater Minnesota portion of the Corridors of Commerce program funded by the legislature in recent years. This plan does not currently include those funds in the "anticipated revenue" for the metro region so if MnDOT determines these funds should be spent on a project located within the metro region that benefits Greater Minnesota, both the project and this additional funding would need to be amended into this plan in order to maintain the plan's fiscal balance between expenditures and revenues.

Although Appendix F has been part of the region's long range plan for decades, after adoption of the *2030 Transportation Policy Plan* in 2010, MnDOT and the Council implemented a more formal interchange review process. Conversion of the intersection at U.S. Highway 169 at 101st Avenue in Brooklyn Park to an interchange has been found consistent with the qualifying criteria in Appendix F, although funding has not been identified. As part of the work program following adoption of the *2040 Transportation Policy Plan*, MnDOT and the Council will undertake a Principal Arterial Intersection Conversion Study to identify and prioritize key at-grade intersections that should be improved to strategically enhance the capacity of the principal and A-minor arterial system.

Regional Mobility Improvements: Highway Access Investments with Increased Revenues

Regional transportation partners have identified many potential regional highway access investments, either new interchanges or modifications to existing interchanges on controlled access freeways. Some of these efforts are high priorities and are not included in the Current Revenue Scenario due to anticipated funding limits. Other proposals have been brought forward by local partners to support the economic development they hope to achieve in their communities.

The new or modified interchanges listed below have been found consistent with the qualifying criteria found in Appendix F of the Transportation Policy Plan, although funding has not yet been identified. This list is not intended to be exhaustive nor does it indicate the region's priorities for investment.

1. U.S. Highway 52 at Dakota County 42 (Rosemount)
2. I-494 at Bush Lake Road (Bloomington)
3. I-94/MN 610 at Hennepin County 610/Maple Grove Parkway (Maple Grove)
4. I-494 at Argenta Trail (Mendota Heights, Sunfish Lake, Inver Grove Heights, Eagan)
5. I-94 at Brockton Avenue (Dayton, Rogers)
6. U.S. Highway 212 at Carver County 140 (Chaska)

Two other interchanges, I-94 at Wright County 22 (Saint Michael) and the modification and collector distributor road at I-94 at Wright County 19 (Albertville), are not subject to approval via Appendix F since they are beyond the seven county region. However, they are noted under this Increased Revenue Scenario since Interstate access requests for those locations have been approved by FHWA.

Highway Investment Summary

The projects identified in the Current Revenue Scenario are illustrated in Figure E-8 and listed in Appendices B, C, and E. These investments are for the region's state highway system only, which are Interstates, U.S., and state trunk highways owned and operated by MnDOT.

Several counties and cities also own a small part of the principal arterial system, and own and operate a majority of the A-minor arterial system. Highway investments made by the counties and cities on their systems are not shown in this section since they are identified through the local comprehensive and capital improvement planning processes, and are largely funded by state and local taxes as shown in Chapter 4 Regional Transportation Finance. All of the major state and local highway projects identified to date in the metropolitan planning area – consisting of the seven-county region plus the contiguous, urbanized areas of Wright and Sherburne counties, and Houlton, Wisconsin -- are listed in Appendices B, C, and E.

Projects in the first four years of the plan are identified with some certainty and MnDOT is actively developing them. Projects identified in years 2019-2024 are likely to advance, but continue to need significant development and may substantively change as they are developed. Specific projects have not been identified beyond 2024. Over the timeframe of this plan, MnDOT anticipates investing $11 billion (year-of-expenditure dollars) in the metropolitan area's state highway system.

MnDOT is largely able to meet its highway asset rebuilding and replacement needs, but has high priority, unmet needs for all other investment categories, including operations and maintenance, specific highway safety improvements, and regional mobility. Operations and maintenance, program support, and reconstruction and replacement activities are estimated to make up between 76% to 94% of the Current Revenue Scenario. Safety, bicycle, and pedestrian investments are estimated to make up 5% to 7% of the Current Revenue Scenario.

Between 2015 and 2024 in the Current Revenue Scenario, MnDOT will also invest approximately $721 million (6% of the Current Revenue Scenario) in regional mobility improvements. These include traffic management technology, spot mobility improvement, the MnPASS system, highway strategic capacity enhancements, and regional highway access investments, known as "regional mobility improvements."

MnDOT will continue to improve and expand traffic management technologies throughout the metropolitan area and deliver spot mobility improvements identified through its Congestion Management and Safety Plan. It will also continue to expand the MnPASS system of priced managed lanes. And in response to special funding like the state's Corridor Investment Management Strategy (CIMS), Transportation Economic Development (TED), and Corridors of Commerce programs, MnDOT will complete or contribute to several strategic capacity enhancements and regional highway access projects. However, it should be noted that these special funding programs should not be seen as dedicated funding

sources that will be perpetuated in the future, so no funding amounts beyond those already awarded or appropriated are included in the revenue assumptions for the Current Revenue scenario.

As shown in Table 5-7, these projects make up over 30% of the regional mobility funding available to the metropolitan area separate from Regional Solicitation funding. Because of operation, maintenance, and rebuilding needs in 2025 through 2040, limited available revenues, state trunk highway bond repayment responsibilities, and the rising cost of construction, MnDOT does not anticipate making regional mobility improvement investments in the region after 2024. Performance outcomes based on these investments are summarized in "System Performance Measurement and Monitoring."

If new revenues become available, MnDOT would continue to invest in operations and maintenance in the metropolitan area. This would include addressing a backlog of priority projects, as well as operating and maintaining new highway facilities, such as new or improved traffic management technologies and an expanded MnPASS system. MnDOT would also develop and deliver additional safety, bicycle, accessible pedestrian, and regional mobility improvements, such as the MnPASS, strategic capacity, and regional highway access projects discussed. These projects would help the region work toward the outcomes identified in *Thrive MSP 2040* and the goals and objectives identified in this plan. As shown in Table 5-7, the investments under the Increased Revenue Scenario are estimated to cost $8 billion to 10 billion (constant dollars).

Table 5-7: Highway Investment Summary 2015 to 2040 (MnDOT Spending Only)*

Investment Category	Current Revenue Scenario** (reported in year-of-expenditure dollars)				Increased Revenue Scenario
	2015-2024 (10 years)	2025-2034 (10 years)	2035-2040 (6 years)	2015-2040 (26 years)	2015-2040 (26 years)
Operate and Maintain Highway Assets	$0.6 billion	$0.8 billion	$0.6 billion	$2.0 billion	+ $1 billion
Program Support	$0.4 billion	$0.3 billion	$0.2 billion	$0.9 billion	+ $0.7 billion
Rebuild and Replace Highway Assets (Pavement, Bridge, and Roadside Infrastructure)	$1.8 billion	$3.0 billion	$2.1 billion	$6.9 billion	+ $2 to 2.5 billion
Specific Highway Safety Improvements	$100 million	$200 million	$100 million	$0.4 billion	+ $300 million
Highway Bicycle and Accessible Pedestrian Improvements	$100 million	$100 million	$100 million	$300 million	+ $300 million
Regional Mobility Improvements	Approx. $720 M	$0	$0	Approx. $700 million	+ $4 to 5 billion
ATM	$40-60 M	$0	$0	$40-60 M	To be developed
Spot Mobility	$75-125 M	$0	$0	$75-125 M	To be developed
MnPASS***	$275-325 M	$0	$0	$275-325 M	To be developed
Strategic Capacity***	$225-275 M	$0	$0	$225-275 M	To be developed
Highway Access***	$15-25 M	$0	$0	$15-25 M	To be developed
TOTAL*	$3.7 billion (10 years)	$4.4 billion (10 years)	$3.1 billion (6 years)	$11 billion (26 years)	+ $8 to 10 billion (26 years)

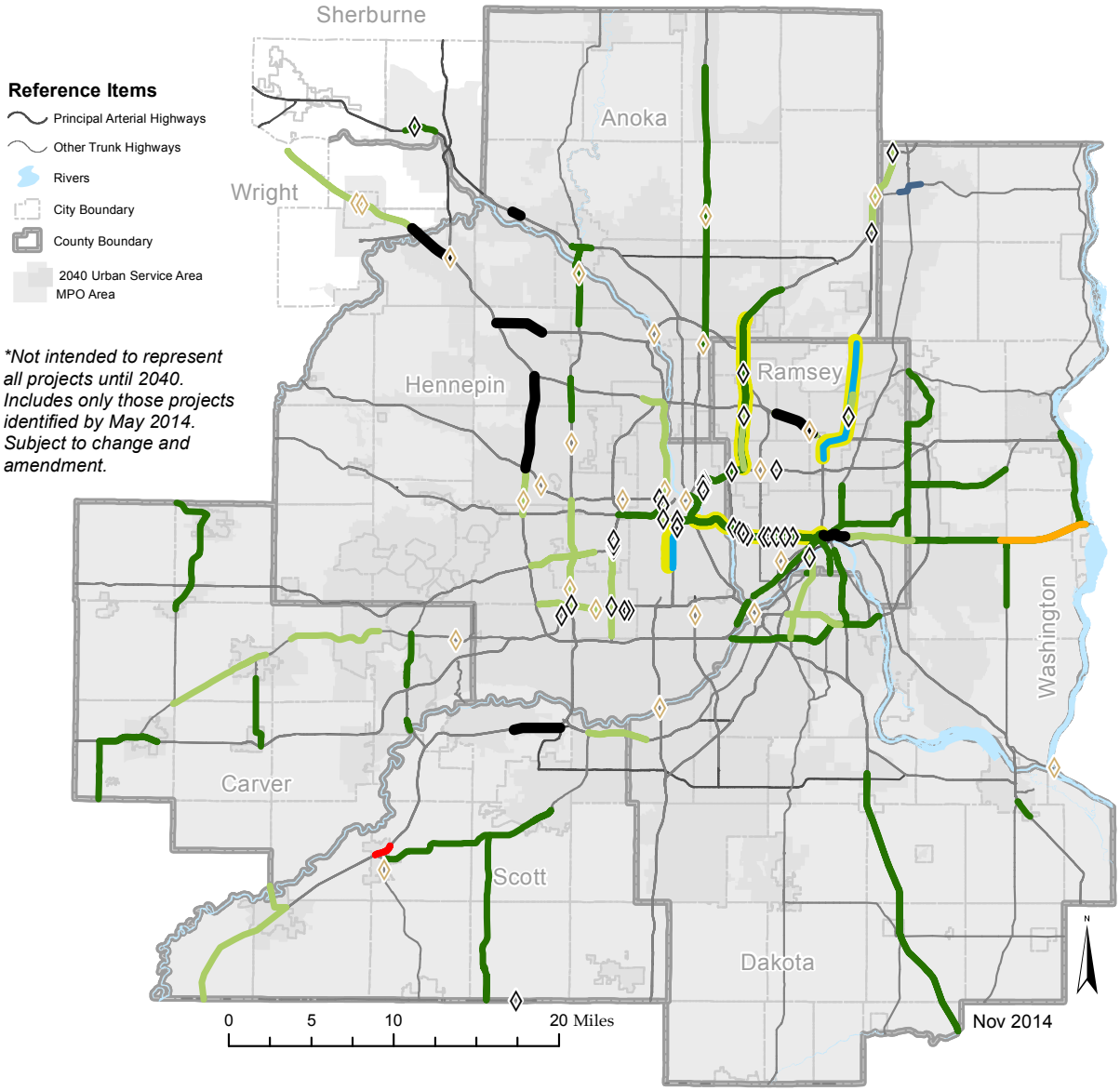
*Local transportation investments are identified in local capital improvement programs and local comprehensive plans per Minnesota Statutes 473.146.

**Current Revenue Scenario investments do not include $1.3 billion in federal funding for improvements to the non-freeway principal and A-minor arterial system to be identified by the Transportation Advisory Board through the Regional Solicitation. Investments funded through the Regional Solicitation must be consistent with *Thrive MSP 2040* and the Transportation Policy Plan.

***See lists of specific projects in the text and appendices B, C, and E.

Figure 5-8: Potential Projects Identified To-Date in the Current Revenue Scenario

Identified Projects* in Highway Current Revenue Scenario



- 2015-2018 TIP Bridges
- 2019 - 2024 Bridges
- Strategic Capacity
- Roadside Infrastructure
- Roadside Infrastructure / Safety
- 2015-2018 TIP Pavement
- 2019 - 2024 Pavement Projects
- 2015 - 2018 Pavement / MnPass
- 2015 - 2018 Pavement / Safety
- Tier 1 MnPASS Expansion

Additional Highway Needs beyond Increased Revenue Scenario

There are now, and will continue to be, highway needs in the region that are not addressed under either revenue scenario in this plan. While the region does not support attempts at building general-purpose highway capacity to eliminate congestion, there are other needs that should be recognized. Regional transportation partners have identified many other potential, long-term highway improvement projects, often through the local comprehensive planning and capital improvement planning processes.

When conducting studies of these potential improvements, regional transportation partners must use the population, household, and employment forecasts and corresponding urban and rural land use plans adopted by the Metropolitan Council and local communities so all potential projects can be comparably prioritized for investment. To increase the likelihood of being able to fund these projects, studies should work to develop innovative and affordable projects that address reasonably anticipated needs based on these forecasts and plans.

New River Crossings

Regional transportation partners should continue to work together on two potentially critical future river bridges identified in previous Transportation Policy Plans. MnDOT should continue to work with Carver and Scott counties to monitor the changing needs for, and identify affordable improvements to, the State Highway 41 bridge and its approaches over the Minnesota River. Hennepin and Anoka counties should also continue to work together, and with MnDOT, to monitor the need for and affordable approaches to a new A-minor arterial bridge over the Mississippi River potentially connecting the cities of Dayton and Ramsey. The project partners should work together to preserve right-of-way for bridge improvements if development pressures become imminent.

New principal or A-minor arterials to support expanding urban development

The need for new principal or A-minor arterials to serve growth is well documented in future suburban edge and emerging suburban edge areas where land uses and the arterial grid are not densely developed. As discussed in Appendix D, principal arterials are the most efficient and safe way to accommodate longer and faster regional vehicle trips. The following future principal arterial needs have been identified:

1. **Anoka County** has identified Anoka County 22/Viking Boulevard from Sherburne to Chisago counties as the preferred location for its potential future principal arterial.
2. **Dakota/Scott counties** have identified Scott County 17/State Highway 13 from U.S. Highway 169 to State Highway 19 as the route for its potential future north-south principal arterial, and a future east-west principal arterial along Dakota County 70/Scott County 8 from I-35 to U.S. Highway 169.
3. **Washington County** has identified Washington County 15/Manning Avenue as the route for its potential future north-south principal arterial.

Since principal arterials should end with a connection to another principal arterial, actual endpoints can be finalized in the future. Most of these proposed future principal arterials and their supporting A-minor arterial network will be considered further in future updates of the Transportation Policy Plan when new regional forecasts based on the 2020 census have been developed. Most of these routes are not warranted within the current planning timeframe as the urban service area, consistent with the *2030 Transportation Policy Plan,* is not forecast to expand to require them. However, Scott County 17 and Scott County 42 lie within the urban service area identified by *Thrive MSP 2040*.

As a work program item for the future update of the *2040 Transportation Policy Plan*, the Council, MnDOT, and the counties will work together to assess the need and regional priority for additional principal arterials in the part of the region beyond the urban service area and identify practical approaches for providing, operating, and maintaining them if justified ("Work Program").