CHAPTER 5
HIGHWAY INVESTMENT DIRECTION AND PLAN

The Existing Regional Highway System

Residents and businesses view a safe and efficient regional highway system as an essential part of a transportation system. Highways support and contribute to the variety of travel options that the federal government, the state government, and the region recognize is required for a prosperous metropolitan area. Virtually all people use roads and almost all freight travels on a highway at some point during its trip.

This chapter deals primarily with the highways designated as principal arterials (see Figure 5-1), sometimes called the Metropolitan Highway System. These roads also make up the federally-designated National Highway System (NHS). MnDOT owns and operates the great majority of the principal arterials, while counties and the City of Saint Paul own the remaining six roadways. Principal arterials are generally limited-access highways and freeways such as U.S. Highway 10 (US 10) and Interstate 94 (I-94).

A-minor arterial roadways, which are critical to support and supplement principal arterials, and provide access to jobs, education, and industry, are also addressed by policies in this plan (see Figure 5-2). The A-minor arterials are intended to provide less mobility than the principal arterials but provide more access to other roadways and land uses. The A-minor arterial system is divided into four subclassifications (see Appendix D for definitions and a discussion of highway functional classification). These roadways are also important as first-last mile freight connections between freight-generating businesses and the principal arterial system and provides redundancy to the principal arterials. Examples of A-minor arterials include Trunk Highway 51 (MN 51)/Snelling Avenue in Ramsey County and MN 5 in Carver County. Counties own 70% of A-minor arterials, while MnDOT owns 20% and cities own the remaining 10%.

Together the principal and A-minor arterials make up the Regional Highway System (see Figure 5-2). The Regional Highway System makes up only 2,700 of the region's 17,700 miles (15%), but carries most of the region's motor vehicle traffic (80% of average daily vehicle miles traveled), and 53% of all bus miles traveled (see Table 5-1).

Figure 5-1: Principal Arterial System

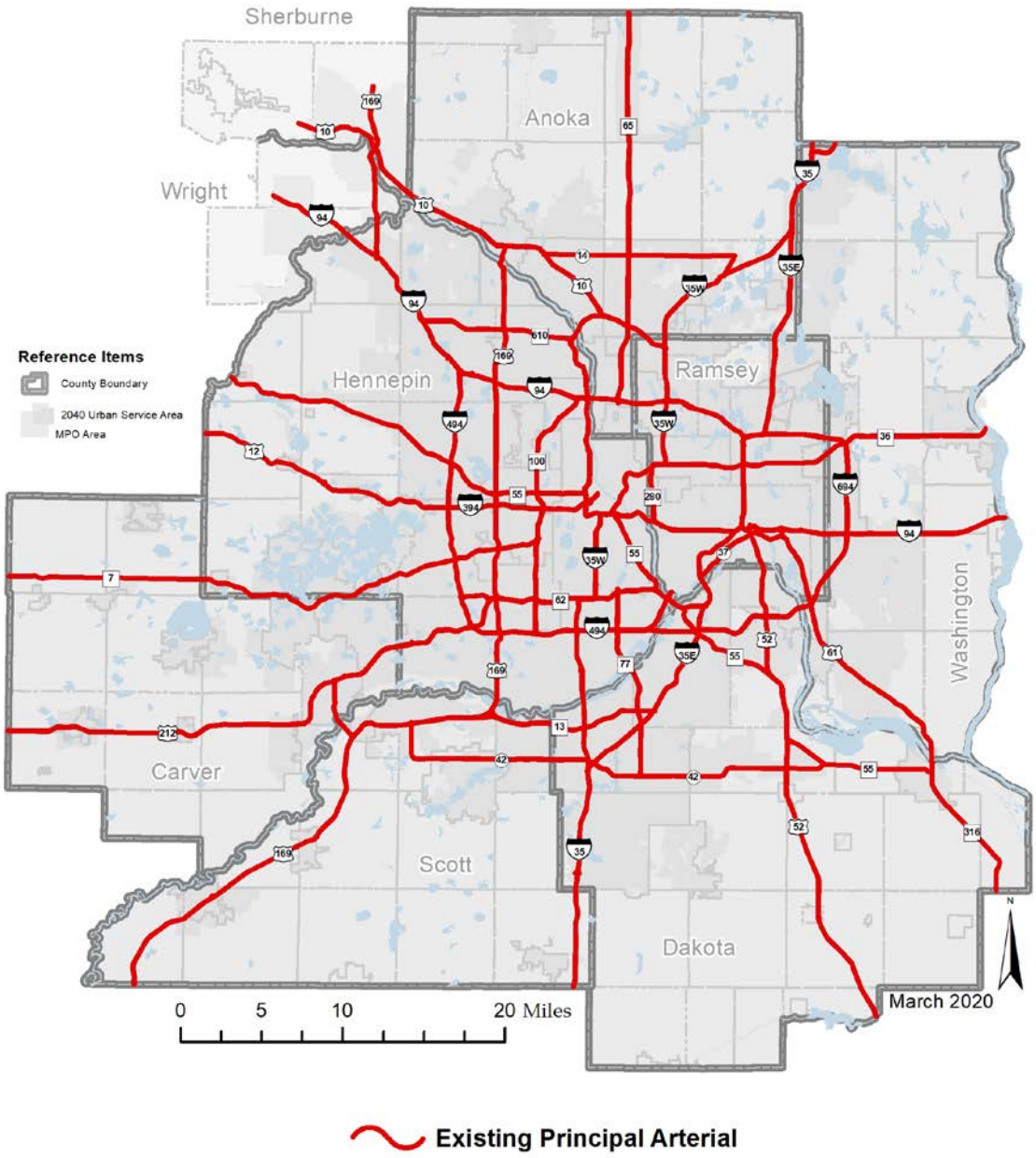
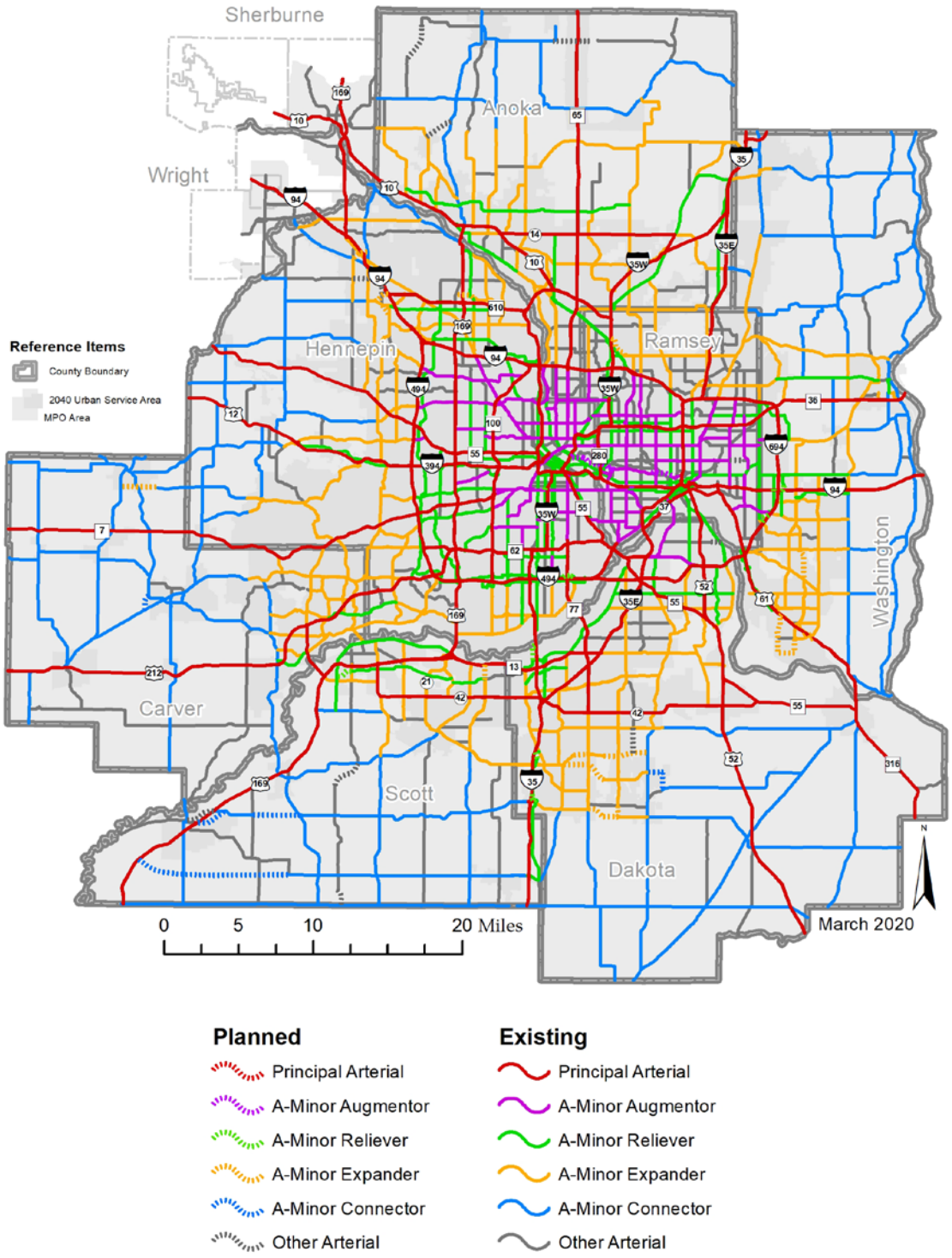


Figure 5-2: Principal and A-Minor Arterial System



Beyond the principal arterials and A-minor arterials, the other minor arterials, collectors, and local streets total approximately 15,000 centerline miles (see Table 5-1). They make up 85% of road mileage in the region and are the responsibility of local governments.

Table 5-1: Usage by Functional Classification

	Total miles	% of total road miles	% of vehicle miles traveled (all)	% of vehicle miles traveled (buses)
Principal Arterial Highways	700	4%	52%	20%
A-Minor Arterial Highways	2,000	11%	28%	33%
Other highways and roads	15,000	85%	19%	47%
Total roads	**17,700**	**100%**	**100%**	**100%**

History of Highway Development

The region's principal arterial system has developed significantly since the 1950s. Over the last two decades, the region's approach to improving the system has changed given the large amount of funding required to operate, maintain, and rebuild the existing system.

As shown in Figure 5-3, in the less densely populated parts of the region, many of the principal arterial highways were constructed before 1960 (generally over 60 years old). In the most densely populated areas, many were built before 1980 (generally over 40 years ago). A few large reconstruction projects have been accomplished in the region and those are reflected in this map. MnDOT has utilized unbonded concrete overlays to achieve most of the benefits of reconstruction at a fraction of the cost. This strategy places a new structural roadway on top of the old roadway. These are not reflected in this map as the old roadway base is retained and the life of this improvement is not expected to meet that of a full reconstruction. Given the general age of the system, despite these large improvements, the region has entered a phase of highway development where many more highways will require significant investments to preserve their existing condition or improve their poor condition (see Table 5-2).

Figure 5-3: Principal Arterials Pavement Construction Era

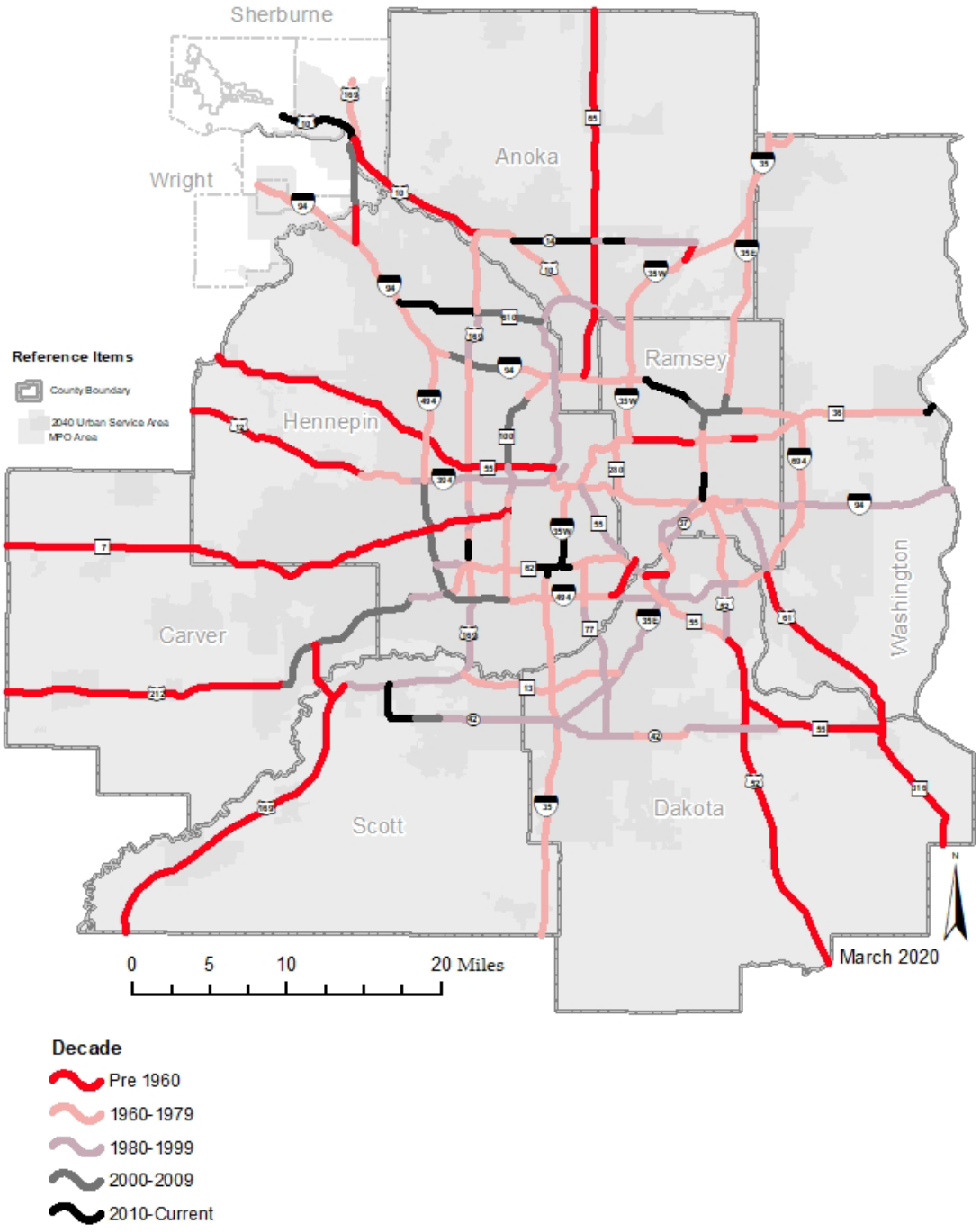


Table 5-2: Principal Arterials Pavement Construction Era

	Pre 1959	1959-1969	1970-1979	1980-1989	1990-1999	2000-2009	2010-2017	Sum
Center-Line Miles Constructed	231	190	66	109	28	52	24	700
Percent	33%	27%	9%	16%	4%	7%	3%	100%

Similarly, many of the region's A-minor arterials have pavement originally constructed from the 1950s to the 1970s (see Table 5-3). This pavement is reaching a comparable point in its lifecycle where significant preservation costs are coming due. Other large parts of the A-minor arterial system were constructed in the 1990s and 2000s as those parts of the region developed and became more densely populated.

Table 5-3: A-Minor Arterials Pavement Construction Era

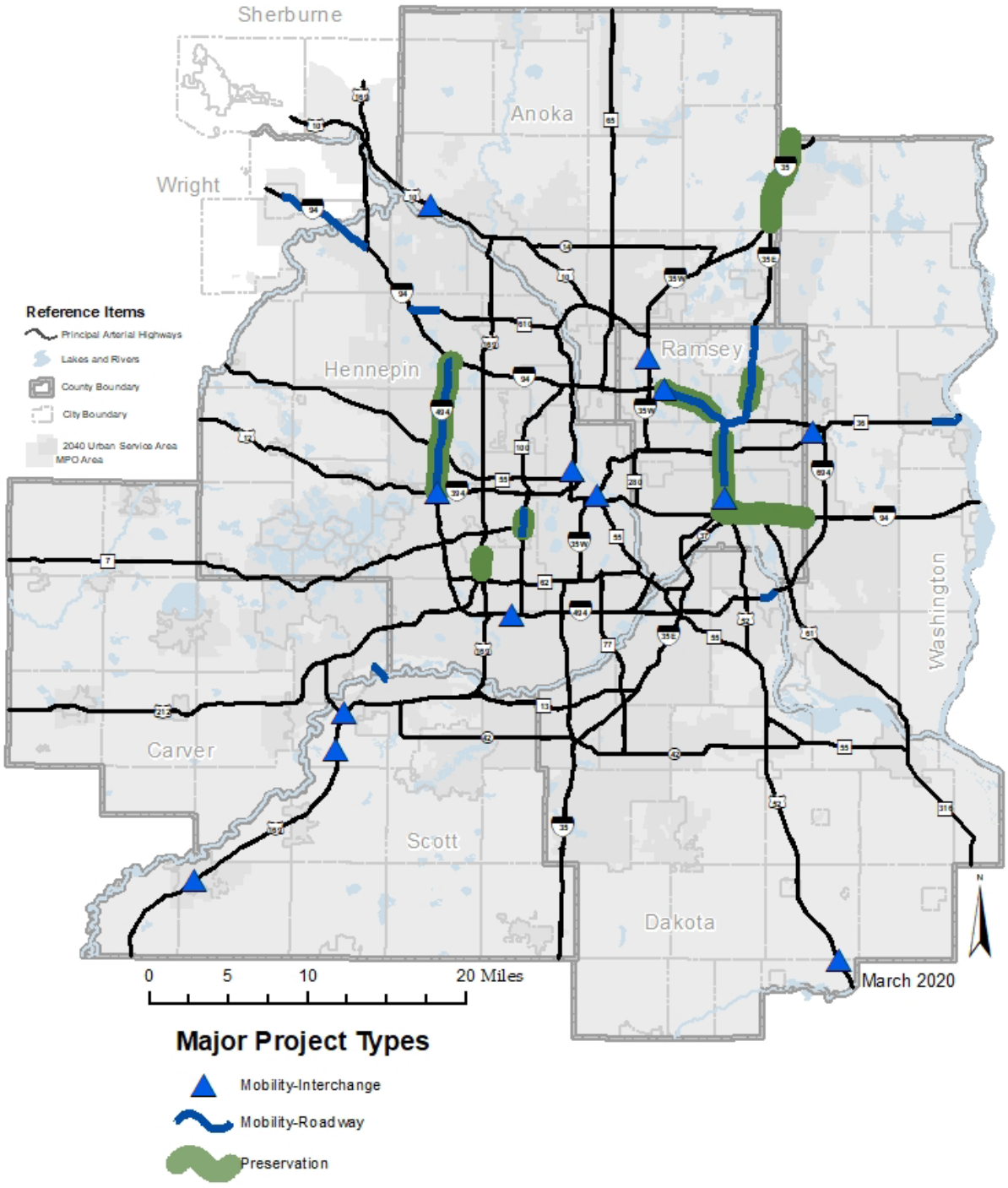
	1930-1939	1940-1949	1950-1959	1960-1969	1970-1979	1980-1989	1990-1999	2000-2009	2010-2017	Sum
Lane-Miles Constructed	180	127	699	959	673	576	767	910	684	5,575
Percent	3%	2%	13%	17%	12%	10%	14%	16%	12%	100%

Highway System Improvements Since 2015

As shown in Figure 5-4 and described below, several major mobility and preservation projects have opened to traffic since the 2040 TPP was initially adopted in January 2015. The consideration of safety improvements is inherent in all projects and projects types. Some of these projects rebuilt and improved an entire corridor (including interchange improvements), while others improved mobility at a single interchange and some only constructed long-term preservation improvements.

- **I-35E Pavement and MnPASS** – MnDOT completed a $98 million construction project on I-35E in the fall of 2015 between Maryland Avenue in Saint Paul and Little Canada Road in Little Canada. This project constructed new pavement on top of the old roadway (i.e., unbonded concrete overlay) and replaced bridges at six crossing points in the corridor. MnDOT used this as an opportunity to add a MnPASS lane in each direction generally throughout the project limits. This project highlights the priority the region places on preserving a mature highway system and strategically addressing mobility when opportunities present themselves. The efficiencies found in combining bridge and pavement preservation work along with mobility improvements led to significant cost savings. MnPASS lanes serve capacity, like traditional general-purpose lanes, but also provide a less congested, more reliable alternative for high-occupancy vehicle travel, such as

Figure 5-4: Major Mobility and Preservation Projects Completed Since 2015



transit and carpooling. In addition, they also provide a less congested more reliable alternative to solo motorists willing to pay during periods of peak congestion. The MnPASS lanes were extended further north on I-35E in 2016 as part of another preservation project.

- **I-494 Pavement and Lane Addition** – In November of 2016, a construction project was completed along I-494 between I-94 and I-394 through Plymouth and Maple Grove. This project cost approximately $86 million and invested in long-term pavement fixes, bridge replacement and repairs, and added a through lane in each direction between MN 55 and I-94/I-694 to extend the six-lane beltway. This project leveraged the preservation investment to cost-effectively invest in congestion mitigation.
- **St. Croix Bridge Construction** – A new bridge crossing the St. Croix River between Oak Park Heights, Minnesota and St. Joseph, Wisconsin opened to traffic on August 2, 2017, replacing the St. Croix Lift Bridge for highway traffic. The new crossing cost approximately $636 million including the bridge and approach work in each state. This investment improves traffic safety, supports interstate commerce, and eases congestion in the St. Croix River Valley, especially in downtown Stillwater. The project also provides an alternate route for travelers when the I-94 bridge between Hudson, Wisconsin and Lakeland, Minnesota (just to the south of the project) is under construction or closed due to an incident. Since the bridge's opening, traffic on MN 36 near the bridge has increased, including a major increase in freight traffic.
- **MN 610 Completion** – In the summer of 2017, an $81 million construction project connected MN 610 from Hennepin County 81 to I-94. This project completed the last long-planned segment of this highway, including an interchange at MN 610 and Maple Grove Parkway and an overpass at I-94 and 105th Avenue. The result of this investment is increased highway capacity, an alternate route during severe congestion or incidents on I-94, support for economic development, and improved movement of freight in the region.
- **I-694 Pavement and Lane Addition** – In November of 2017, MnDOT competed a project along I-694 between US 10 and I-35E that reconstructed the pavement and added a lane in each direction in the cities of Shoreview and Arden Hills to extend the six-lane beltway. This project cost approximately $35 million and is another example of leveraging a long-term pavement fix to achieve cost-effective congestion relief. Earlier projects to reconstruct the interchanges at I-35E and at US 10/MN 51 were planned in order to accommodate this improvement. This corridor previously experienced significant congestion, which negatively impacted freight movement on this major freight corridor for trucks traveling through the Twin Cities.
- **I-94 from MN 101 to MN 241** – A $28 million project in Rogers and St. Michael was completed in the fall of 2015 that added lanes to I-94 from MN 101 to MN 241. This project added capacity to improve traffic flow on an important freight and commuter corridor.
- **MN 100 from 36th Street to I-394** – Between 2014 and 2016 approximately $60 million was invested in a project on MN 100 in St. Louis Park. It replaced bridges carrying Minnetonka Boulevard and MN 7, revised both interchange configurations for improved safety and mobility, added a southbound through lane and reconstructed the aging pavement.

- **MN 101 River Crossing** – In 2016 Carver County completed a $34 million project to construct a bridge that raised what had been MN 101 north of the Minnesota River main channel out of the floodplain, added one lane in each direction and improved its connection to Carver County 61 in Shakopee and Chanhassen. MN 101 here had been turned back to Carver County in 2014 and is now CSAH 101. This segment of roadway had a frequent history of closures during spring flooding, which greatly affected commuters and commerce in the area due to the limited number and capacity of highway crossings of the Minnesota River.
- **US 169 at Nine Mile Creek** – In the fall of 2017 MnDOT completed a project to replace the bridge carrying US 169 over Nine Mile Creek in Edina, Minnetonka and Hopkins with a causeway (i.e., a raised roadway over low or wet ground). This project utilized a full closure of US 169 in order to complete the work in one year and reduce the duration of the impact on the traveling public. This work, along with other safety and preservation improvements along US 169, cost $64 million.
- **I-94 Pavement in Saint Paul** – During 2016 and 2017 MnDOT completed a long-term pavement fix between I-35E and Century Avenue in Saint Paul, Maplewood, Oakdale and Woodbury. This project also included bridge and noise wall work, and a new auxiliary lane along eastbound I-94 from I-35E to Mounds Boulevard. This project cost was $52 million to complete.
- **US 169/MN 41 Interchange and Access Consolidation**– In 2020 Scott County and MnDOT converted a signal at US 169/MN 41 to an interchange, constructed a new interchange at Scott County 14, as well as built out the frontage road system. This project enhanced mobility and safety on this busy freight corridor. The estimated project cost was $73 million to complete.
- I-35 North Metro Split – In 2020 MnDOT completed a project with a long-term pavement fix in Forest Lake, Columbus and Lino Lakes. This project also reconfigured the interchange at MN 8 and expanded the interchange at MN 97. The estimated project cost was $50 million to complete.

Interchanges opened or reconfigured since 2015:

- I-35E at Cayuga Street (Saint Paul)
- I-94 at 7th Street (Minneapolis)
- I-35W at Ramsey County H (Arden Hills and Mounds View)
- US 169 at Scott County 3 (Belle Plaine)
- US 10 at Armstrong Boulevard (City of Ramsey)
- US 52 at Dakota County 86 (north of Cannon Falls)
- I-494 at East Bush Lake Road (Bloomington)
- US 169/MN 41
- US 169/Scott County 14
- MN 36 and Hadley Avenue (North St. Paul and Oakdale)
- MN 212 and Carver County 44 (Chaska)

- I-35 at MN 97 (Columbus)

Spot mobility improvements identified through the Congestion Management Safety Plan (CMSP) process opened since 2015 are listed below.

- I-694/US 10 – two-lane entrance to eastbound I-694 (Arden Hills)
- I-94/3rd Street – two-lane entrance to westbound I-94 (Minneapolis)
- I-394/I-494 – split westbound exit into collector-distributer roadway (Minnetonka)
- MN 51/Larpenteur Avenue – added turn lanes (Falcon Heights)
- MN 100/MN 55 – extended turn lane on each exit (Golden Valley)
- I-35E/Diffley Road – added second left turn lane to southbound exit (Eagan)
- MN 61/MN 55 – added second eastbound left turn lane (Hastings)
- MN 36/MN 120 – extended eastbound left turn lane (North St. Paul)
- I-694/MN 120 – added turn lanes (Maplewood, Mahtomedi, White Bear Lake and Oakdale)
- I-94/I-494/I-694 – added auxiliary lanes southbound 10th St to westbound I-94 and from westbound I-94 to Tamarack Road (Oakdale and Woodbury)
- I-35W/US 10 South Junction – two-lane exit and auxiliary lane along US 10 to Ramsey 96 (Arden Hills)
- I-494, Concord Street through 7th Avenue South – added westbound auxiliary lane (South St. Paul)
- MN 77/Old Shakopee Road – added right turn lane to northbound exit (Bloomington)
- I-494/Rockford Road – added turn lanes as part of reconstruction (Plymouth)

Completed Highway Studies

Substantial regional highway planning has also occurred since 2015. These efforts have broadened the region's understanding of the system and the issues facing it. Many of the studies were regionwide prioritization efforts of a specific highway investment type. The results of many of these efforts are being used to inform the investment decisions in both the Current Revenue Scenario and the Increased Revenue Scenario. Some of these efforts include:

- Metropolitan Council/MnDOT Freeway System Interchange Study
- Metropolitan Council/MnDOT Principal Arterial Intersection Conversion Study
- MnDOT Congestion Management Safety Plan 4
- MnDOT MnPASS System Study 3
- Metropolitan Council Highway Truck Corridors Study
- MnDOT Statewide Freight System and Investment Plan
- Metropolitan Council County Arterial Preservation Study
- MnDOT 20-Year Statewide Multimodal Transportation Plan
- MnDOT 20-Year Minnesota State Highway Investment Plan

Highway Investment Direction

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 demands of a growing region. Anticipated population and job growth is forecast to push highway traffic to even higher levels. With Current Revenue Scenario investments, Table 5-4 shows that daily vehicle trips and miles traveled are both forecast to increase by 17% by 2040 while daily vehicle trips per resident and daily vehicle miles traveled per resident will decrease by 8% and 9% respectively. The difference between population growth (28%) and travel growth (17%) is largely the result of an aging population taking fewer trips per person, people choosing to live in denser parts of the region where they drive less, and using newer tools that affect travel (i.e. telecommuting, online shopping, etc.).

Figure 5-5 illustrates observed 2018 principal arterial freeway congestion and Figure 5-6 illustrates forecasted congestion (one hour per day or more where the traffic volume exceeds the roadway's capacity) on the principal arterial system in 2040. These 2040 results reflect the planned highway and transit investments described in the Current Revenue Scenario. The Work Program in Chapter 14 includes an effort (as part of the Congestion Management Process) to refine the way congestion is presented here so as to provide more nuanced information in the future. Additional investment performance outcomes are summarized in Chapter 13, "Performance Outcomes."

Congestion levels changed in early 2020 with the onset of COVID-19 (coronavirus) outbreak, as travel during the peak period for work, school, and other activities decreased. It is unclear if these changes are short-term or if some of the changes will continue into the long-term. A Work Program item has been added to better understand any changes in travel behavior from COVID-19 and if resulting changes in investments are needed in future Transportation Policy Plans.

Potential changes in technology, particularly in connected and autonomous vehicles create greater uncertainty than in the past regarding future congestion levels. High-level forecasting of various scenarios of connected and autonomous vehicle adoption rates and ownership models (to what extent autonomous vehicles are personally owned) was done as part of the development of this Plan and resulted in the following findings:

1. It is anticipated that the total number of automobiles in the region will decrease with adoption of autonomous vehicles and
2. Increased vehicle miles of travel, primarily from unoccupied vehicles, will influence congestion that is difficult to fully predict. More study of the effects of autonomous vehicles on regional travel demand and congestion is needed and described in the Work Program in Chapter 14.

Table 5-4: Daily Vehicle Trips and Miles Traveled, 2010 and 2040

	2010	2040 Current Revenue Scenario	Change	Percent Change
Population	2,850,000	3,640,000	790,000	28%
Daily Vehicle Trips	6,600,000	7,700,000	1,100,000	17%
Daily Vehicle Trips per Resident	2.3	2.1	-0.2	-8%
Daily Vehicle Miles Traveled	72,900,000	84,990,000	12,090,000	17%
Daily Vehicle Miles Traveled per Resident	25.6	23.3	-2.3	-9%

Figure 5-5: 2018 Congested Principal Arterial Freeways

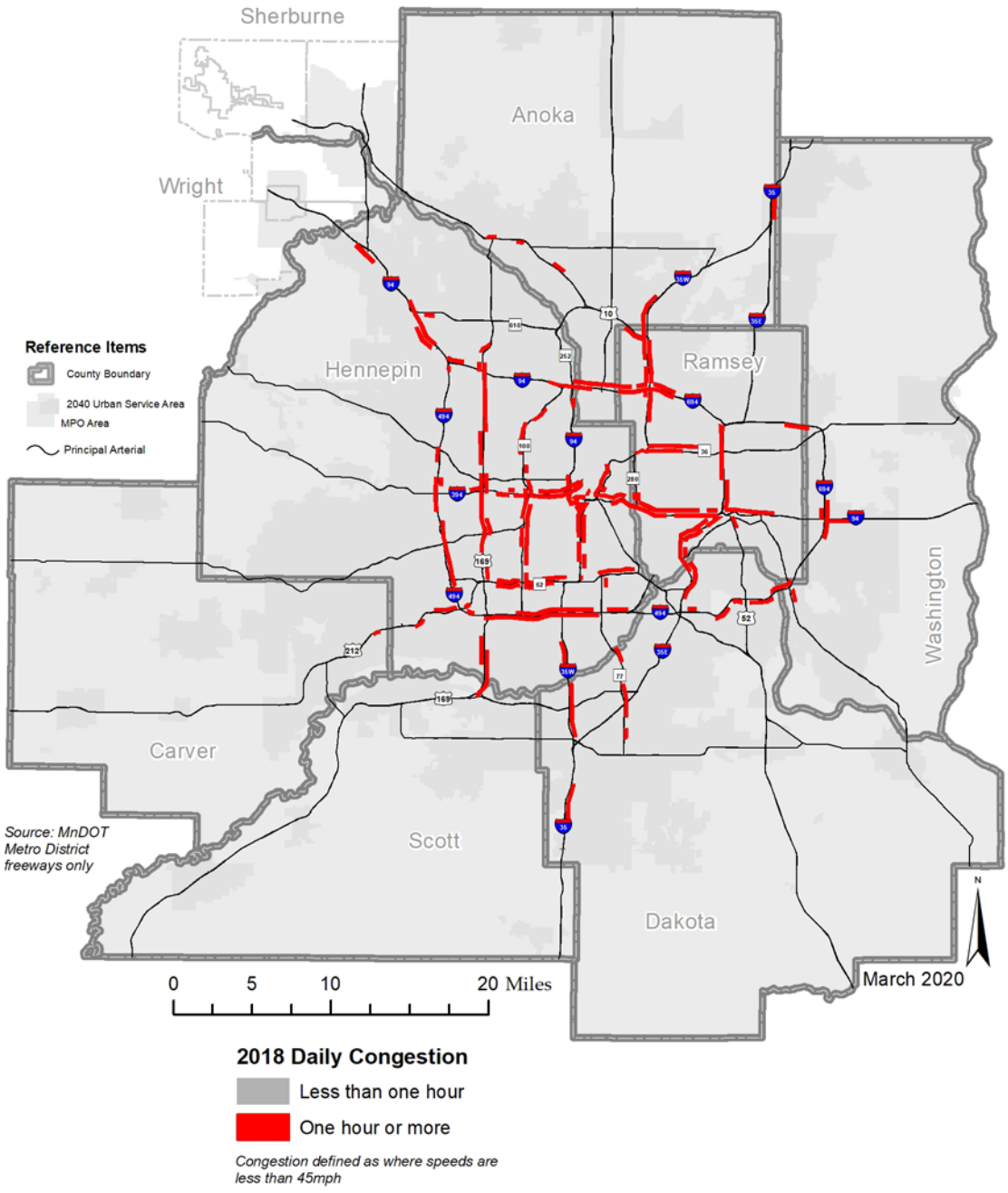
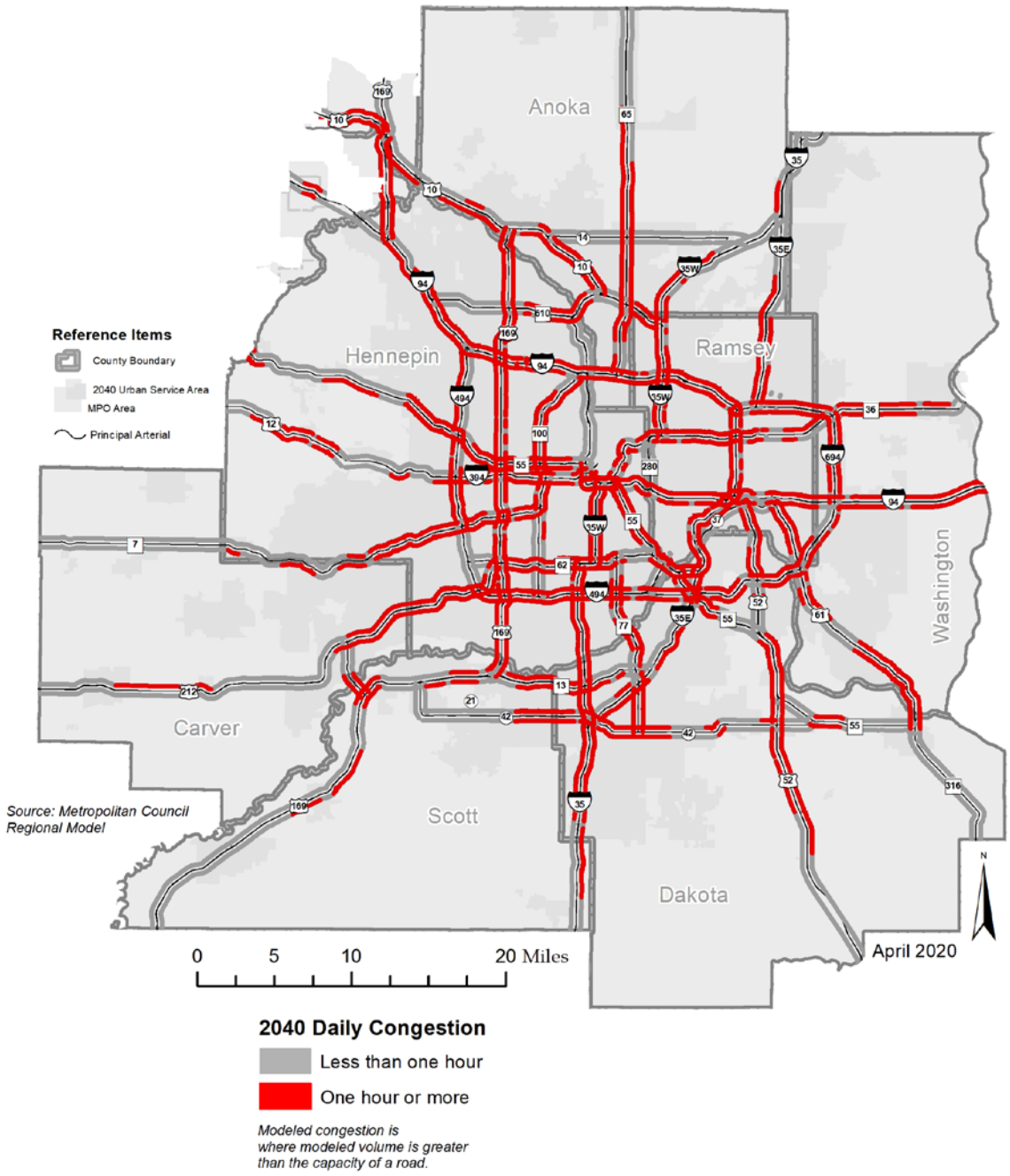


Figure 5-6: 2040 Congested Principal Arterials for Current Revenue Scenario



Highway Investment Philosophy

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

Prioritizing investments is necessary in today's environment of limited fiscal 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" (also often called the "fiscally constrained plan"). The Minnesota Department of Transportation (MnDOT), in cooperation with the Metropolitan Council, identified and estimated the revenues and costs for the state highway operations and maintenance, and capital investments in this plan.

As part of the 2018 update to this plan, the Metropolitan Council also worked with the seven counties to estimate revenue and costs to preserve pavement on the county-owned principal and A-minor arterials through the 2040 horizon year. The urbanized part of Wright and Sherburne Counties, and the principal and A-minor arterials owned by cities within the region where accounted for proportionately according to the collected data. More on the results of this work is described within the Increased Revenue Scenario section of this chapter.

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."

Highway System Investment Prioritization Factors

Table 5-5 summarizes the highway system investment prioritization factors that were ranked highest by policymakers, transportation professionals, and the general public during the extensive 2040 TPP public engagement process in 2015. 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 foundational for the Metropolitan Council and MnDOT in developing the Current Revenue Scenario. All of the factors in Table 5-5 were used to ensure investments in the "Current and Increased Revenue Scenarios" help meet the multiple outcomes, goals, and objectives identified in *Thrive MSP 2040* and this plan.

Table 5-5: Relationship of Regional Highway System Investment Prioritization Factors to TPP Goals and Thrive MSP 2040 Outcomes

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 highway 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.		✓	✓		✓
Improve Regional Highway System Travel Time Reliability	Investments like MnPASS and those made to minor arterial highways seek to provide an affordable and more 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 A-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.		✓	✓	✓	

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
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."	✓	✓		✓	

Highway System Investment Principles

The following highway investment philosophy addresses the Regional Highway System, including the principal arterial and A-minor arterial systems. Given the limited funds available for the transportation system, wise and rigorous investment direction is needed to ascertain and implement the most effective and timely projects. Over the past 15 years, the region and the state have cooperated to revise their highway investment philosophy to address increased usage, reduced transportation purchasing power, and increased needs for both preservation and expansion. The key components of this investment philosophy include the following:

1. The highest priorities for the region are to operate, maintain, and preserve the existing Regional Highway System along with investing in safety improvements.
2. Given the projected population and job growth of the region, mobility projects must also be planned and constructed to ensure that people and freight can efficiently move throughout the region.
3. Since most of the total funds available are being used on preservation of the system, these preservation projects should be used as the catalyst to address other identified safety, mobility, freight, bicycle, and pedestrian needs. Integrating these other needs with preservation projects minimizes cost, reduces inconvenience to the traveling public by coordinating separate needs into one construction project, and addresses multiple policy objectives.
4. Where mobility needs are identified, agencies should first explore lower cost solutions such as traffic management technologies, travel demand management, or increased transit service in the corridor. Next, agencies should explore spot mobility improvements such as turn lanes, alternative intersection designs, auxiliary lanes, frontage roads, or better managing access. If none of these options is sufficient for the level of the problem, then MnPASS lanes or increasing capacity on the adjacent local system should be evaluated. If this does not resolve the problem, then other types of additional capacity should be considered.

5. Investments should be made in lower cost projects that produce high benefits, even if these projects do not completely resolve the existing problem. This approach recognizes the diminishing returns to higher levels of investments. For example, alternative intersection designs are often less expensive than traditional solutions and one way to foster cost savings along with right sizing the investments to the level of the problem. Cost savings can then be used to address other needs on the system, thereby stretching the region's transportation funds further and allowing for greater return on investment and regional balance of investments.
6. Funding should focus on addressing today's problems given the limited funding and the backlog of existing, unresolved transportation needs. Future needs must be anticipated, but projects should be prioritized to address existing problems before problems that are forecasted to occur in 2040 due to growth.
7. The existing infrastructure and right-of-way should be used to the maximum extent possible when projects are designed and implemented. Significant right-of-way purchases for transportation projects are costly and can negatively affect local businesses and residents, and should therefore be minimized.
8. The timing of regional projects should be coordinated with local projects (including utility projects and private sector developments when possible) to combine multiple projects where appropriate and in other cases to avoid having multiple projects along nearby parallel corridors at the same time.

Role of Investment Factors in Regional Studies

The region's highway investment factors and highway investment philosophy are put into practice through the technical criteria used in regional studies. For example:

- The Freeway System Interchange Study used measures of congestion, reliability, crashes, and freight and transit usage to screen locations where at least two freeways meet. At most locations with greater needs, a range of potential solutions were developed. This study documented, at a planning level, the anticipated costs, return periods and overlapping preservation plans in order to inform future investment decisions.
- The Congestion Management Safety Plan (CMSP) 4 Study used safety and mobility performance measures to find small scale, targeted, high return-on-investment improvements that could be made on MnDOT's highway system within the region.
- The MnPASS System Study 3 used several mobility performance measures to develop potential MnPASS corridors. When initial lists where developed, they were reviewed through a lens of transit usage and potential usage.
- The Principal Arterial Intersection Conversion Study used a data-driven approach that considered mobility, safety, and other factors to provide the region with a prioritized list for possible grade separation projects on non-freeway principal arterials.

- The Regional Truck Highway Corridor Study identified highways in the region, which are the most important for freight movement based on truck usage and proximity to freight generating land uses.

The study results are used to help make investment decisions in the following ways:

- Freeway System Interchange Study – Study results are used to select projects for MnDOT as funding becomes available and preservation opportunities present themselves.
- CMSP 4 – Study results are used to select projects for MnDOT's approximately $20 million spot mobility annual set-aside funding, which continues through 2040. Points were also awarded in the Regional Solicitation for projects at CMSP locations identified in the study.
- MnPASS System Study 3 – Study results are used to select projects for MnDOT's $50 million per year set-aside for MnPASS that ends in 2026. The study also helps to identify MnPASS priorities for the Increased Revenue Scenario.
- Principal Arterial Intersection Conversion Study – The Regional Solicitation and MnDOT's Transportation Economic Development Program awarded scoring points depending on the intersection's prioritization level identified in the study (i.e., high, medium or low priority). The study results also inform Strategic Capacity Enhancement priorities for the Increased Revenue Scenario and the Interchange Approval Process in Appendix F.
- Regional Highway Truck Corridor Study – The Regional Solicitation and MnDOT's Transportation Economic Development Program awarded scoring points depending on the prioritization tier of the corridor identified in the study. Projects were also required to be on one of the three tiers in the study to be eligible to pursue 2017 Minnesota Highway Freight Program funds.

Highway Investment Plan

While the investment direction in this plan applies to all of the Regional Highway System, the Highway Investment Plan has in the past focused only on investments on the 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.

This section has been updated to move beyond just MnDOT highway investments. It also includes competitively selected Regional Solicitation highway projects, Highway Safety Improvement Program (HSIP) projects, and Minnesota Highway Freight Program projects. Regionally significant projects on city and county roads are also listed in this Plan and shown on several maps in this chapter. These are primarily A-minor arterial lane expansion projects greater than one mile in length or other projects using federal funds (e.g., Minnesota Highway Freight Program).

Highway Investment Updates Since 2015

Regional Solicitation Process and other Competitive Funds

The Transportation Advisory Board (TAB) to the Metropolitan Council selects projects for federal highway funds through a prioritization process known as the Regional Solicitation. The Regional Solicitation considers the outcomes, goals, and objectives of *Thrive MSP 2040* and this policy plan. Because the Regional Solicitation selects projects only four to five years in advance of construction, long-range projects from such competitive solicitations are not shown in this plan. Other long-range projects are included in Appendices C (Long-Range Highway and Transit Capital Project List) and E (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 processes other than the Regional Solicitation, and are also included in Appendices C and E.

Approximately $1.5 billion in federal highway funding is forecast to be available through the Regional Solicitation for investment on non-freeway principal arterials and A-minor arterials in the seven-county region. Historically, the Regional Solicitation has awarded about 58% of the total funds available to roadway projects (approximately $52 million out of the $90 million available annually or $1.5 billion through 2040). While the Regional Solicitation federal funds are available for expenditure on MnDOT state highways, for simplicity, this plan assumes the Regional Solicitation roadway funds will be spent by local agencies. In recent years, many of the interchange and lane expansion projects funded through the Regional Solicitation have been led by local agencies including projects that improved the state system.

The competitive Highway Safety Improvement Program (HSIP) is administered by MnDOT and the recommended projects are approved by the TAB. There will be approximately $300 million available for HSIP through 2040. The Minnesota Highway Freight Program is a new federal funding source that is also administered by MnDOT and the projects are approved for inclusion into the TIP by the Metropolitan Council. Up to $500 million is available to the region in competitive freight funding through

2040. HSIP is accounted for in under local transportation and the Minnesota Highway Freight Program is accounted for under State Highway although both programs can fund projects in both categories of roadway systems.

Local Investments in Mobility

This Plan acknowledges that a large percentage of MnDOT's funds go toward preservation, and that cities and counties have begun to make significant mobility investments in the state-owned highways. A significant part of the new or expanded county transportation sales and wheelage tax revenues are anticipated to be used on MnDOT's system. Furthermore, many of the strategic capacity projects selected in recent Regional Solicitations were projects that were led by cities or counties but were located on MnDOT's system. 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 documented in the following descriptions of highway investment categories, only MnDOT's spending is shown. Locally-owned parts of the principal and A-minor arterials are largely funded by state and local taxes and reflected in Chapter 4, "Regional Transportation Finance." These projects are identified through the local comprehensive and capital improvement planning processes.

Highway Investment Categories

Another change to this update of the 2040 TPP since 2015 is to reduce the number of highway investment categories. Since there are few highway access projects being constructed throughout the region this investment category was eliminated and the projects grouped with other strategic capacity enhancements. The Highway Investments section is now divided into five primary highway investment categories for the "Current Revenue Scenario" and the "Increased Revenue Scenario."

1. Operations and maintenance
2. Preservation of existing highway assets
3. Safety
4. Regional mobility
    a. Travel Demand Management (TDM)
    b. Traffic management technologies
    c. Spot mobility
    d. MnPASS
    e. Strategic capacity enhancements
5. Multimodal
    a. Freight
    b. Bicycle and pedestrian infrastructure

How program support (i.e., the resources needed to support the delivery of capital projects) and highway access investments are shown in the plan has also changed. Program support activities include planning, technical and project management staff; right-of-way (land) acquisition; consultant services to supplement agency staff and provide special expertise; supplemental agreements to address unanticipated construction related issues; and construction incentives to encourage early completion are included within MnDOT's capital investment categories. In the previous 2040 TPP, program support was shown as a separate investment category, but in this plan, it is distributed across the capital investment categories proportionately. Program support accounts for approximately 13% of these capital costs.

The state highway investments anticipated between 2015 and 2040 under the Current Revenue Scenario are described in this section for each of the five investment categories (operations and maintenance, preservation of existing assets, safety, regional mobility, and multimodal). All of the major state and local highway projects identified to date in the metropolitan transportation planning area are also listed in Appendices C and E.

Relationship to Minnesota State Highway Investment Plan

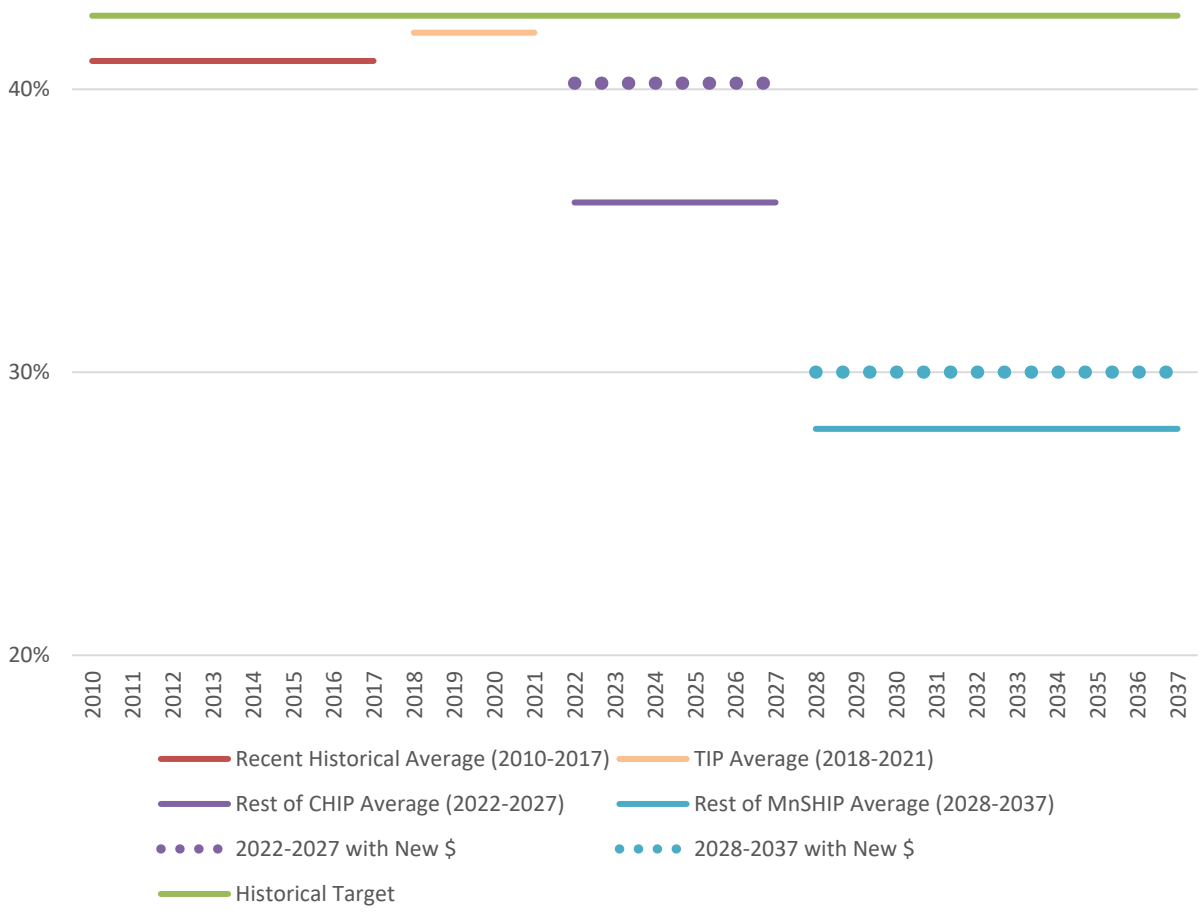
MnDOT projects included in the Current Revenue Scenario were identified consistent with the *Minnesota State Highway Investment Plan 2018-2037* (MnSHIP), published by MnDOT in January 2017. MnSHIP identified expected capital revenues and expenditures for all of the state highway system for the 20-year period. The Metropolitan Council worked closely with MnDOT on the latest MnSHIP.

MnSHIP Includes a Decreasing Percentage of Funds for the Metro Area

Because of the growing emphasis on pavement and bridge preservation, MnSHIP guidance results in a substantial shift of highway resources from the metro area to Greater Minnesota from 2028 to 2037 (see Figure 5-7). The historical share of MnDOT funding provided to the metro area has been in the range of 41% to 43% of the total statewide highway revenues, but will fall to 30% of revenues in the 2028-2040 timeframe. The decline does not start until 2028 given the reallocation of MnDOT resources described in the next section.

This shift is occurring primarily due to two factors: a lack of adequate highway financial resources, and the refocusing of MnDOT's highway investment program to pavement and bridge preservation to meet state and federal performance measures. Greater Minnesota has the vast majority of the state's highway miles and preserving pavement condition throughout the state needs to be a high investment priority. However, the metro area has the majority of the state's congestion, truck freight movements, economic activity, population and employment, and is forecasted to receive the vast majority of the net population growth through 2040, leading to increased travel and growing congestion.

Figure 5-7: Metro Share of MnDOT Investment



Source: MnDOT

Additional Regional Mobility Funding Identified

MnSHIP currently shows that after 2023, no MnDOT funding will be available for mobility projects within the metro area. However, since the adoption of MnSHIP, MnDOT has directed approximately $50 million per year from 2024-2026 ($150 million total) to mobility funding by delaying increases in statewide pavement preservation funding. This short-term, new funding will allow for major mobility projects to continue through 2026, giving time to find longer-term solutions to the state and region's highway funding problems, which will be documented in the next MnSHIP update expected in 2020.

An additional $9 million to $30 million per year of mobility funds were allocated to the metropolitan region starting in 2022 from new state general fund revenues MnDOT received in the 2017 legislative session. These modest increases will primarily allow for a continuation of spot mobility projects and contributions to locally-led mobility projects on MnDOT's system.

Current Revenue Scenario

The projects identified in the Current Revenue Scenario are illustrated in Figure 5-8 and listed in Appendix C and include all of MnDOT projects, as well as federally funded projects on the local system. Projects in the first four years of the plan are identified in the 2020-2023 Transportation Improvement Program (TIP). MnDOT's 10-year Capital Highway Investment Plan (CHIP) additionally identifies projects from 2024-2029. The specific characteristics of projects identified in these later years (2024-2029) are less certain and will be refined as project development progresses.

Table 5-6 summarizes MnDOT revenue and spending for the Current Revenue Scenario, by highway investment 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 approximately $16 billion (reported in year-of-expenditure dollars).

Figure 5-8: Current Revenue Scenario Highway Projects 2020-2029

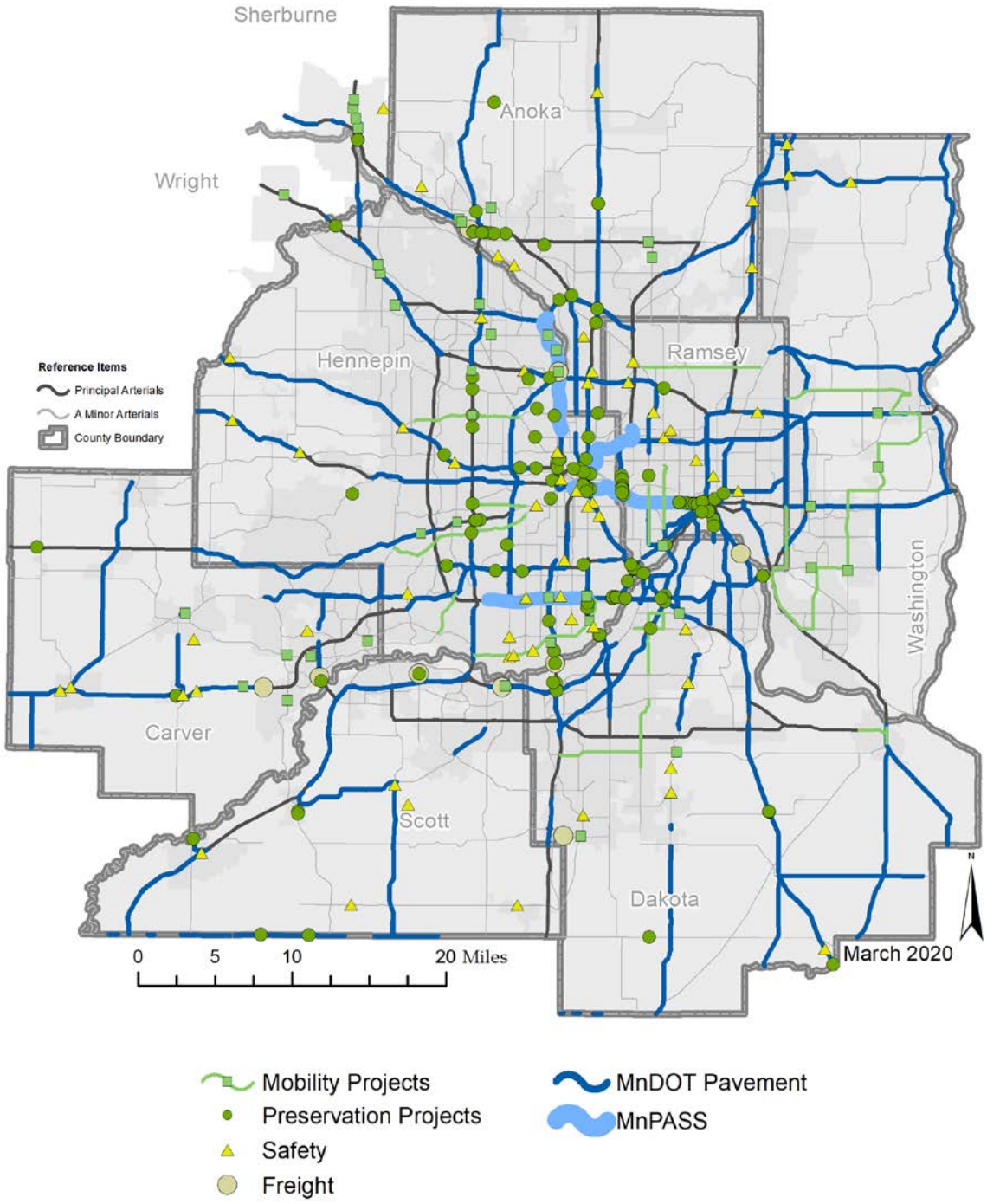


Table 5-6: Current Revenue Scenario Highway Investment Summary 2015 to 2040 (MnDOT Only) year of expenditure dollars – billions**

Investment Category	2015-2017 (3 years)	2018-2027 (10 years)	2028-2037 (10 years)	2038-2040 (3 years)	Total (26 years)	Percent
Operations and Maintenance	$0.3	$1.0	$1.2	$0.4	$2.9	19%
Preservation of Existing Highway Assets	$0.9	$3.5	$3.8	$1.6	$9.8	62%
Safety	$0.0	$0.1	$0.1	$0.0	$0.2	1%
Regional Mobility	$0.4	$1.3	$0.3	$0.1	$2.1	13%
Multimodal	$0.0	$0.2	$0.3	$0.1	$0.7	5%
Total*	$1.6	$6.1	$5.8	$2.3	$15.8	100%

***Local transportation investments are identified in local capital improvement programs. The total here only includes MnDOT investments.**

****Current Revenue Scenario investments do not include $2.2 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.**

Note: Due to rounding, numbers may not add to the totals.

The following pages detail the Current Revenue Scenario investments in the five primary highway investment categories.

Operations and Maintenance

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 and restriping;
- Traffic signal, sign, management system, and lighting maintenance;
- Guardrail and cable median barrier repair;
- Snow and debris removal and 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 highway infrastructure has aged.

As shown in Table 5-6, MnDOT anticipates spending approximately $2.9 billion on state highway operations and maintenance in the Current Revenue Scenario.

Preservation of Existing Highway Assets

A high 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, resurfacing, asset management, or modernization investments. Primary highway asset management activities include:

- Pavement rehabilitation and replacement;
- Bridge rehabilitation and replacement; and
- Roadside infrastructure rehabilitation and replacement.

Long-term pavement fixes should be made whenever possible, since short-term fixes every few years contribute to non-recurring congestion (i.e., not the typical daily congestion but congestion due to construction, weather, crashes, special events, etc.) and frequent disruptions to the traveling public. This impact is most felt on congested corridors. However, shifting towards long-term pavement fixes, such as unbonded overlays, has increased costs and may result in less ability to meet overall pavement performance targets in the short-term as other pavement projects are pushed out to later years. In the long-term, the region would experience cost savings and there would be fewer construction projects on each corridor. For the traveling public, this equates to less frequent roadway closures, less time spent in congested corridors, reduced vehicle miles traveled as drivers do not need to divert to alternate routes, less delay to freight movement, increased safety due to less frequent work zones, and improved reliability for all users of the highway system. MnDOT regularly pursues long term pavement fixes for these reasons, but is greatly constrained in how widespread they can pursue this strategy by funding levels.

Rebuilding and replacement is also needed to preserve components beyond pavement and bridges. These are referred to as roadside infrastructure and include drainage systems, signs, lighting, and traffic signals. Highway preservation efforts also create opportunities to include safety, multimodal, and congestion mitigation improvements in a cost-effective manner.

As shown in Table 5-6, the Minnesota Department of Transportation is anticipated to invest $9.8 billion towards rebuilding and replacing pavement, bridge, and roadside infrastructure between 2015 and 2040. This is approximately two-thirds of the total highway funding anticipated to be available in the Current Revenue Scenario. MnDOT has identified specific pavement and bridge preservation projects for the 2020-2029 timeframe, which are illustrated in Figure 5-9 and listed in Appendix C. Figure 5-9 also includes preservation projects, some on non-MnDOT roads, that have already been selected for funding through the Regional Solicitation (2018-2023).

Figure 5-9: Planned Pavement and Bridge Preservation Projects 2020-2029

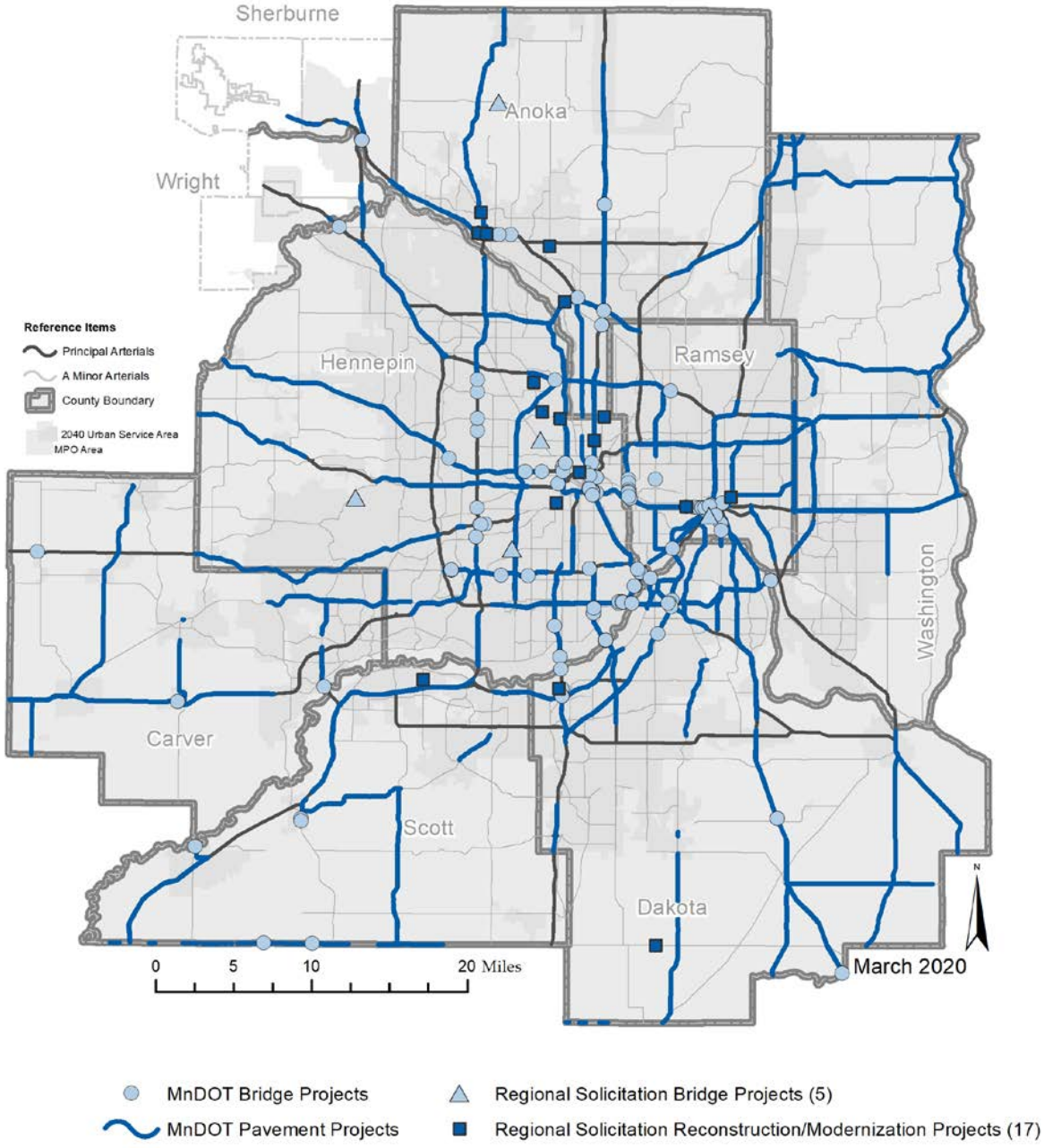
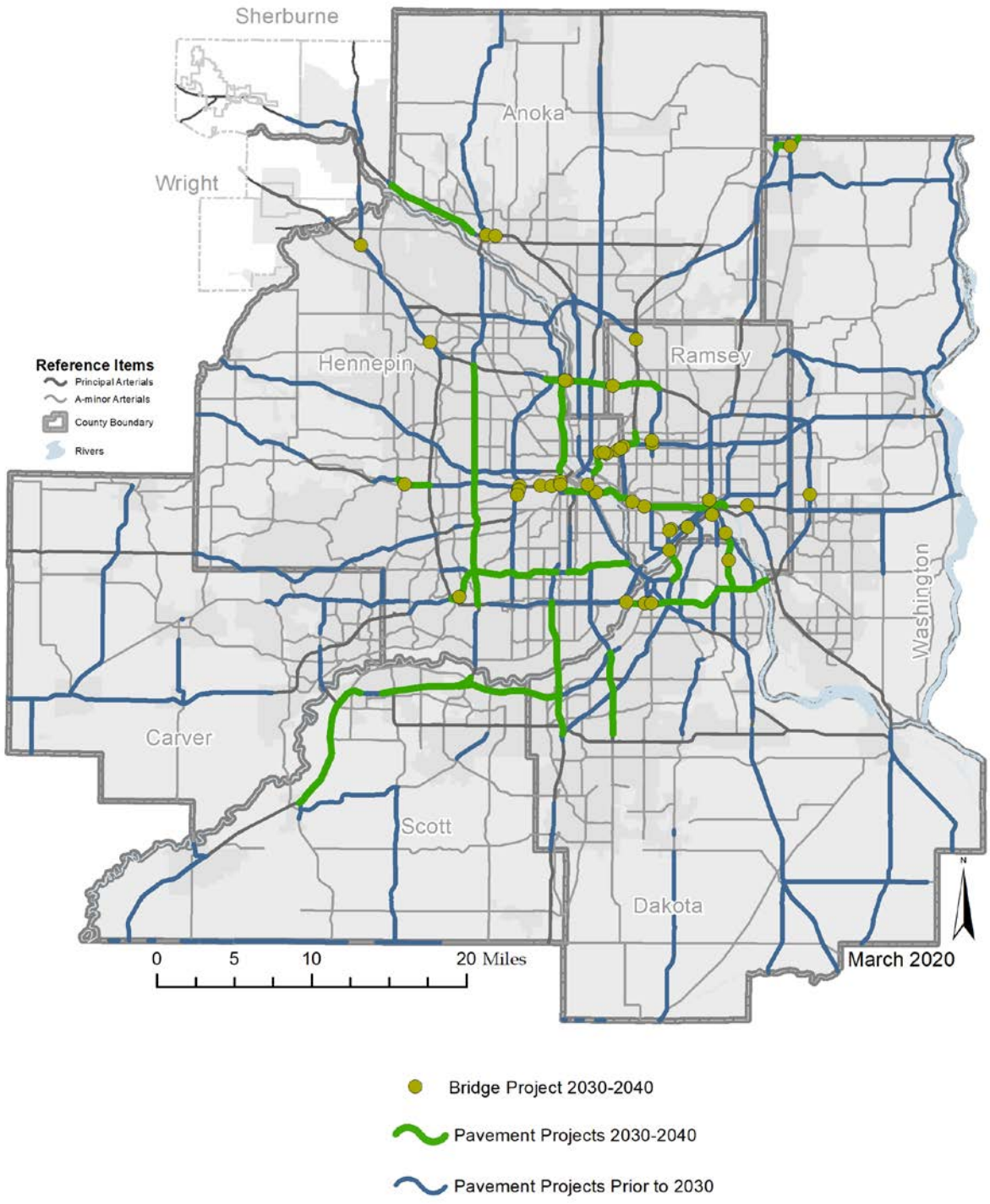


Figure 5-10: MnDOT Planned Pavement and Bridge Preservation Projects 2030-2040



Even with this level of investment, MnDOT anticipates that pavement condition will decline over time. MnDOT's target for percent of miles in poor condition for Interstate and Non-Interstate NHS are less than 2% and less than 4%, respectively. In 2018 metro area pavement conditions were at 1.8% poor for the Interstate system and , 1.5% percent poor for the non-Interstate NHS. In 2027, given the planned investments, MnDOT anticipates pavement conditions to decline to 7.3%, 4.8% and 9.0% poor respectively.

Bridge and pavement preservation projects planned for 2030-2040 are shown in in Figure 5-10. The specific characteristics of potential projects and date of construction are subject to change as further study is undertaken. Due to the age of the system, there will be a higher proportion of bridges needing major repair or replacement between 2030 and 2040 in the metro area relative to the rest of the state. This "bridge bubble" will require careful planning.

In 2018, a study documented the condition and financial needs of the pavements on the locally owned part of the A-minor arterial system. More information is found within the increased revenue scenario at the end of this chapter.

Safety

Highway safety is a high priority for all improvements made to the highway system. All highway projects need to identify and integrate affordable and effective safety improvements. Federal transportation law has consistently emphasized and required states to improve safety. Minnesota has adopted highway safety plans and implemented collaborative interagency strategies for public education, enforcement, improved emergency medical and trauma services, and engineering solutions (the "4E's" of the Toward Zero Deaths, or TZD, initiative) to reduce statewide traffic fatalities.

Despite this progress, there is still a significant amount of safety work to do and limited funding available to do it. In the metropolitan area, specific highway safety investments will include proactive and reactive strategies. Examples of highway safety investments include:

- Adding turn lanes at intersections, especially left turn lanes;
- Lengthening turn lanes at intersections;
- Managing access on non-freeways by constructing frontage roads;
- Constructing reduced conflict intersections (restricting left or through movements off minor street);
- Constructing roundabouts; and
- Installing edge-line rumble strips or cable median barrier.

The Metropolitan Council has adopted, in accordance with federal regulation and consistent with the Safety and Security goal of this Transportation Policy Plan, safety performance measures and specific short-term targets for the metro area. These measures and the most recently adopted targets consist of the following:

Table 5-7: Adopted Safety Performance Measures and Targets

Performance Measures		2020 Targets
Number of	Fatalities	106
	Serious Injuries	738
Rate of Crashes per 100 million Vehicle Miles Traveled	Fatal	0.34
	Serious Injury	2.36
Number of Fatal or Serious Injury Bicycle/Pedestrian Crashes		181

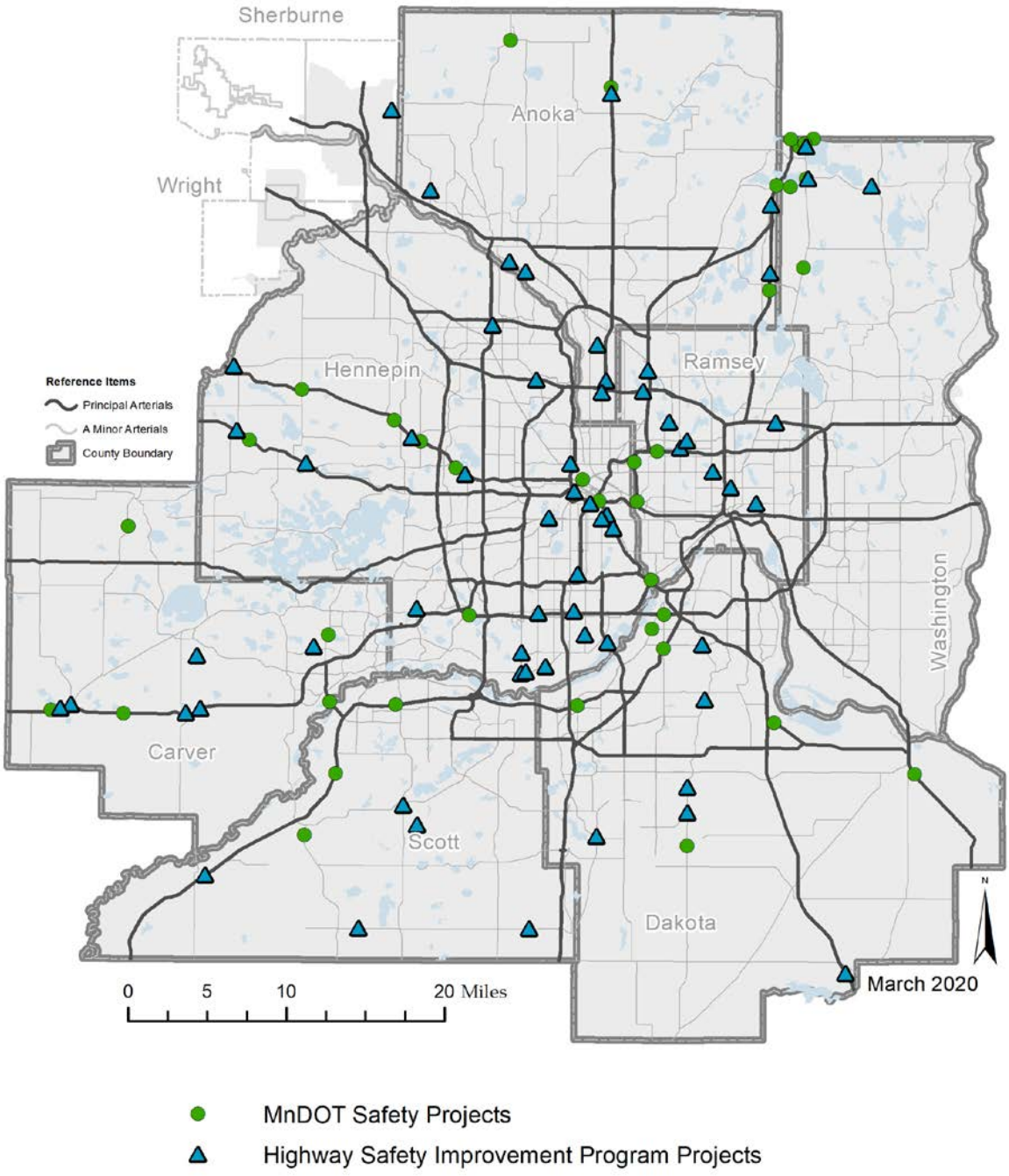
The metro area has a significantly lower rate of fatal and serious injury crashes than the state as a whole. The adopted 2020 fatal and serious injury crash rate targets for the Metropolitan Council are 0.34 per 100 million VMT and 2.36 per 100 million VMT, respectively. This compares with state-wide targets of 0.63 fatal crashes per 100 million VMT and 2.85 serious injuries per 100 million VMT.

MnDOT is anticipated to invest $200 million, or about 1% of the Current Revenue Scenario (see Table 5-6), in specific highway safety investments between 2015-2040. These funds will be supplemented by other safety investments funded through competitive programs like the federal Highway Safety Improvement Program (HSIP) and through safety improvements that are included in pavement and bridge preservation and mobility improvement projects.

HSIP is a core Federal-aid program with the purpose to achieve a significant reduction in traffic fatalities and serious injuries on all public roads, including non-state-owned roads and roads on tribal land. HSIP requires a data-driven, strategic approach to improving highway safety on all public roads with a focus on performance. Most of the projects are roadway improvements, while others include other modes such as the installation of pedestrian countdown timers.

The location of the projects selected for competitive HSIP funding from 2018-2023 are shown in Figure 5-11. Some of these mapped, federally-funded HSIP projects are located on MnDOT's system, while others are on the local system. It should be noted that there are likely many more locally-funded safety projects that are being planned and programmed in the region. Given the importance of safety to the region, the Regional Solicitation criteria for selecting projects includes a measure of crashes reduced by the project. This measure was given the highest weight of all measures in the Roadway Expansion and Roadway Reconstruction/Modernization and Traffic Management Technologies application categories for the 2020 Regional Solicitation. In addition, a new scoring measure was added to the Regional Solicitation and HSIP in 2020 focusing on pedestrian safety elements within larger roadway projects. Figure 5-11 also shows MnDOT's planned stand-alone safety projects.

Figure 5-11: Regionally Selected Safety Projects 2020-2024



Regional Mobility

This plan estimates that the region's population will grow by 28% between 2010 and 2040, which represents almost 800,000 new people using the transportation system, as shown previously in Table 5-4. This increase in people is estimated to result in a 17% increase in vehicle miles traveled.

Currently, MnDOT has approximately $1.3 billion available for regional mobility projects from 2018 until 2027. Starting in 2027, only approximately $30 to $40 million per year will be available through 2040. This minimal level of funding (6% of capital spending) will only continue spot mobility projects and provide some matching funds for city or county led mobility projects on MnDOT's system after 2026. Given the limited funds available for regional mobility investments in the region, the end result will be increased congestion. The level of forecasted 2040 congestion is unacceptable and will negatively affect quality of life and regional prosperity.

Special competitive funding programs like Transportation Economic Development (TED) and Corridors of Commerce programs, which have been funded in recent years through state legislature appropriations, may bring additional mobility funds to the region. However, it should be noted that these special funding programs should not be seen as dedicated funding sources that will be guaranteed in the future. No funding amounts beyond those already awarded or appropriated are included in the revenue assumptions for the Current Revenue Scenario. Given the importance of mobility to our region's economic health, cities and counties may continue the recent trend of partially paying for and/or leading mobility projects on MnDOT's system. However, it is clear that more mobility funds are needed for the region to be successful in the long-term.

The regional mobility investment approach includes five sub-areas that start with the least costly project types and move to more expensive project types.

1. **Travel Demand Management** – The region's first priority to address mobility issues is travel demand management. Travel Demand Management strategies include implementing carpools/vanpools, staggered work hours, telework, compressed work weeks; transit, bicycle and pedestrian investments and land use changes.
2. **Traffic Management Technologies** – The region's next priority to address mobility issues is traffic management technologies (e.g., retiming traffic signals and comprehensive incident response). Past investments in this area have increased the capacity, reliability, and safety of the existing system. Before pursuing larger cost capital projects, an agency should be assured that traffic management technologies have been implemented to the most cost-effective extent possible.
3. **Spot Mobility** – The third priority for mobility investment is to implement low cost spot improvements at specific locations to maximize the return-on-investment. Typically, these are smaller in scope than traditional highway investments with the intent to allow quicker and simpler delivery, and recognize the diminishing returns of many larger projects. The region has in the past and will continue to identify these spot mobility projects through CMSP studies, a region-wide evaluation of MnDOT's system.

4. **MnPASS** – If traffic management or spot mobility projects will not adequately solve the mobility problem, then the fourth priority of mobility investment is MnPASS lanes. These priced lanes manage demand to provide a less congested, more reliable travel option during peak travel periods for transit riders, carpools and those willing to pay. MnPASS can improve highway efficiency and effectiveness by prioritizing person throughput over vehicle throughput and providing long-term travel time reliability that is not possible with general purpose lanes. Although MnPASS lanes are often implemented as additional lanes, conversion of a general purpose lane may be considered as an option in some corridors with a constrained right-of-way.
5. **Strategic Capacity Enhancements** – The fifth priority of mobility investments, strategic capacity enhancements (namely interchanges and general-purpose lanes), are implemented when other previously described investments cannot improve travel conditions for people and freight. These must utilize the existing pavement and right-of-way to the extent possible. A number of criteria and conditions have been adopted to evaluate the appropriateness of implementing strategic capacity projects.

Many of the projects within Regional Mobility are "regionally significant" and must be listed in the TPP prior to being included in the Transportation Improvement Program and prior to being constructed. This region has defined the "regionally significant" roadway projects as any project that adds physical capacity to a principal arterial roadway of any length (e.g., new auxiliary lanes, new MnPASS lanes, new general purpose lanes, and new interchanges) or any project that adds physical capacity to an A-minor arterial of one mile or greater. In general, traffic management technology projects are not regionally significant. See Chapter 11 and Appendix E for more information.

1. Travel Demand Management

Before other types of regional mobility 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 Chapter 12, "Congestion Management Process:"

- Travel demand management (TDM) strategies including implementing carpools/vanpools, staggered work hours, telework, and compressed work weeks.
- Transit, bicycle, and pedestrian investments including new transitways, expanded and enhanced transit service, park-and-rides and enhanced bicycle facilities.
- 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.

Transportation Management Organizations and Competitive TDM in the Regional Solicitation

The Metropolitan Council (Metro Transit) partners with local agencies and Transportation Management Organizations (TMOs) to work on TDM strategies that reduce travel demand during peak periods and in

congested areas. TMOs are public and/or private partnerships in highly congested locations comprising employers, building owners, businesses, and local government interests. Base-level funding for the TMOs has traditionally come from the Regional Solicitation. The region's existing TMOs include:

- **Move Minneapolis** – Primarily serves downtown Minneapolis by promoting travel options for commuters working downtown.
- **I-494 Commuter Services** – Serves the I-494 corridor by promoting travel options to the destinations along the corridor.
- **Move MN** – Serves the City of Saint Paul by promoting travel options to workers, residents, and policymakers in the city.
- **Commute Solutions** – Serves Anoka County by promoting travel options for residents in the county and commuters working in the county.

In addition, the currently-approved Regional Solicitation has a competitive TDM program application category that is open to all agencies (Table 5-8). This funding is aimed at new and innovative ways to reduce congestion through mode shifts away from single occupancy vehicles. An example of a funded project includes Anoka County's last-mile shuttle transit service between the Northstar Commuter Rail Line's Fridley Station and nearby employment sites.

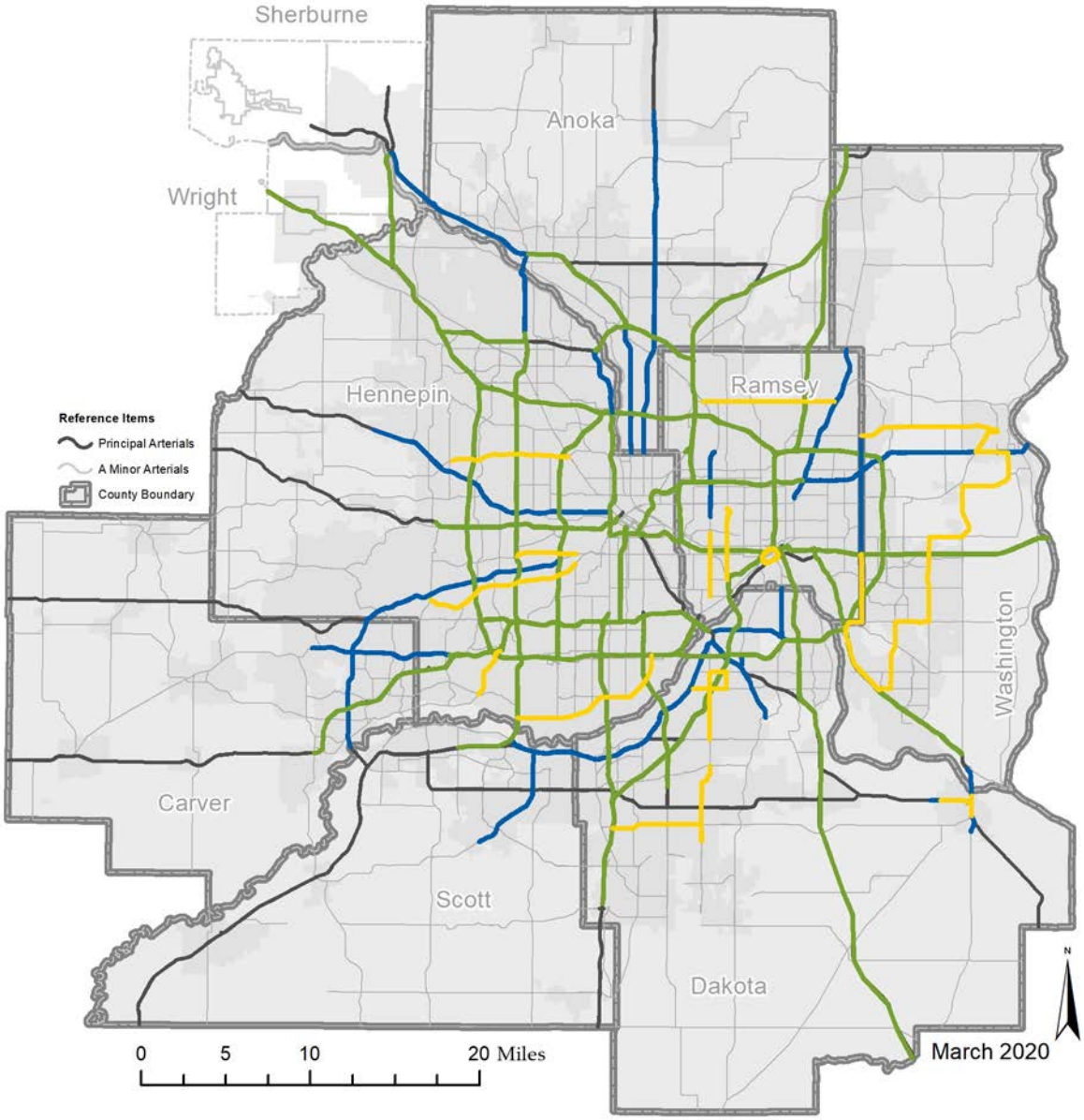
Table 5-8: Competitive TDM projects funded through the Regional Solicitation 2018-2019

Project Description	County	Municipality
Shared Mobility, Community Outreach and Development Program Demonstration in Minneapolis and Saint Paul	Hennepin, Ramsey	Minneapolis, Saint Paul
Nice Ride Densification and Infill Initiative in Minneapolis	Hennepin	Minneapolis
Learn to Ride a Bicycle Program Expansion in Minneapolis and Saint Paul	Hennepin, Ramsey	Minneapolis, Saint Paul
Move MN Colleges as Hubs for TDM Innovation Pilot Program	Ramsey	Saint Paul
Transportation Management Association for Scott and Dakota Counties	Dakota, Scott	Multiple
Multimodal Outreach and Marketing Coordinator for Scott County	Scott	Multiple

2. Regional Mobility: Traffic Management Technologies

Traffic management technologies lessen the effects of congestion, help improve air quality, and reduce the negative effects 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, travel time reduction, improved travel time reliability, as well as a significant decrease in crashes. Examples of traffic management technologies include traveler information systems, incident response programs, dynamic signing and re-routing, ramp meters with high-occupancy vehicle bypass lanes, traffic signals, 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.

Figure 5-12: Traffic Management Technology System



Regional Solicitation Traffic Management Technology Projects (13)

Existing MnDOT Arterial Traffic Management System

Existing MnDOT Freeway Management System

The existing and planned elements of MnDOT's traffic management technology system are illustrated in Figure 5-12, along with selected Regional Solicitation projects from the Traffic Management Technologies application category for 2018-2023. MnDOT was an early adopter of ITS technologies and has a mature system. MnDOT does not anticipate investing in new traffic management technologies beyond awards received in the Regional Solicitation. Instead, all available funds will be used to replace/upgrade existing equipment and to manage the system. Other traffic management technology projects may be funded by local governments and by private businesses.

3. Regional Mobility: Spot Mobility

Spot mobility projects identified through MnDOT's Congestion Management Safety Plan (CMSP) improve traffic flow by providing bottleneck relief 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 pavement preservation, and can be implemented in 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.

In 2018, MnDOT published the results of the latest CMSP (CMSP 4), identifying high priority areas. The list published in *CMSP 4* represents only a subset of candidate locations studied; the process identified an additional 550 problem locations. While there are 61 priority areas illustrated in Figure 5-13, MnDOT needs to complete additional work before most of the potential solutions can become programmed improvements. Improvements to 59 of these 61 areas that are located within MnDOT's Metro District were estimated to cost over $100 million. Metro District has set aside funds specifically for CMSP projects, so all of these 59 areas can be improved under the Current Revenue Scenario.

Starting with the 2020 Regional Solicitation, a new application category was approved called Spot Mobility and Safety. This application category focuses on at-grade intersection or corridor-wide mobility and safety projects. In the 2050 TPP, any selected projects in this application category will be displayed in this section.

Figure 5-13: Spot Mobility Improvement Opportunities (MnDOT)

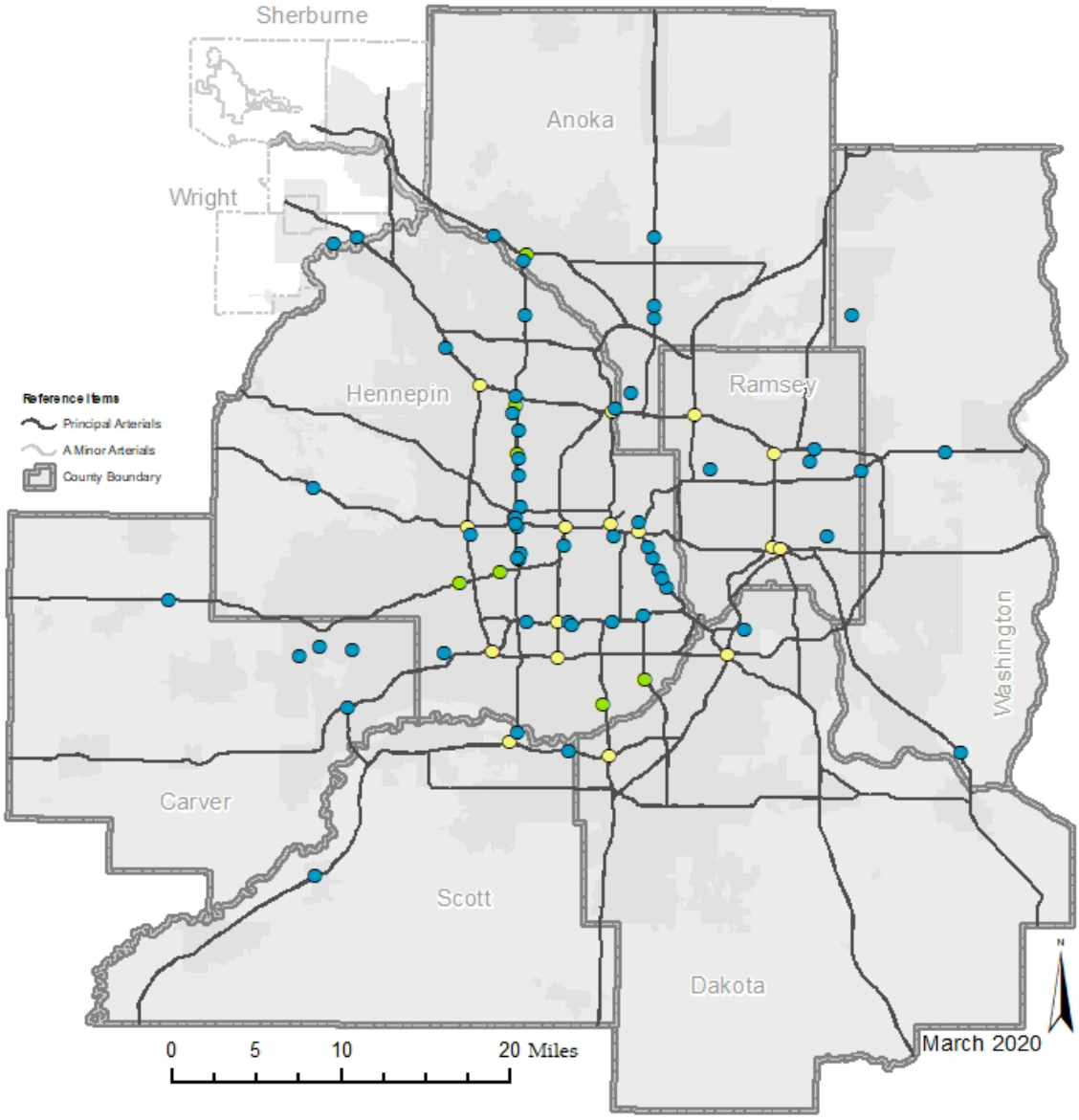


Table 5-9: Programmed CMSP Projects

Location	Description	County	Municipality
MN 7 & Hopkins Crossroad	Add dual left-turn lanes from eastbound to northbound	Hennepin	Multiple
MN 7 & Williston Road	Extend turn lanes, access closures	Hennepin	Minnetonka
US 10 & Ferry Street	Interchange improvements	Anoka	Anoka
MN 77 & Old Shakopee Road	Add right turn lane to northbound exit	Hennepin	Bloomington
I-35W from 106th Street to Old Shakopee Road	Auxiliary lanes	Hennepin	Bloomington
US 169 from 63rd Avenue North to I-94	Auxiliary lanes	Hennepin	Multiple
US 169 & Rockford Road	Access changes	Hennepin	Multiple

The study identified six prioritized problem locations within the urbanized portions of Wright and Sherburne counties, which are in MnDOT District 3. The four in Wright County will be addressed by the Corridors of Commerce project on US 169 in Elk River. MnDOT District 3 is encouraged to develop solutions to the remaining problems and to fund improvements at these identified CMSP locations as well.

The CMSP 4 study utilized a number of criteria to measure proposals against highway system investment prioritization factors described in this plan. These included frequency and severity of crashes, duration of congestion and travel time reliability. The study summarized the benefits of proposals with a benefit-cost ratio that determined final ordering for the study's conclusions. The region also used this list of high priorities as one scoring measure to help allocate competitive funding in the Regional Solicitation.

The Freeway System Interchange Study reported several possible lower cost, quick return-on-investment projects that will be considered under the spot mobility heading. These projects do not include grade-separated solutions, are narrowly targeted, cost less than $10 million, and have return-on-investment periods of less than four years. These projects are mapped in Figure 5-13.

4. Regional Mobility: MnPASS

Priced managed lanes can provide a less congested, more reliable travel option during peak travel times for people who ride transit or are in carpools, and other motorists who are willing to pay a fee. In the Twin Cities, these are called MnPASS Express Lanes. Single-occupant vehicles and small trucks can buy their way into the managed lanes during peak time periods, but variable pricing assures that the target travel conditions are maintained in the lane. Any vehicle can use the MnPASS lanes during non-peak time periods. A system of MnPASS lanes can improve highway efficiency and effectiveness by moving more people through congested highway corridors during peak time periods. The choice and reliability offered by MnPASS also supports transit, 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. According to the 2018 MnPASS Annual Report, MnPASS lanes serve approximately 91,000 people each day, 41,000 on I-394, 31,000 on I-35W and 19,000 on I-35E.

Projects shown as MnPASS in this Plan must still go through the environmental process where they will explore a range of alternatives. A preferred alternative will be selected based on the solution that bests meets the project's stated purpose and need. A Work Program item has been added to Chapter 12 related to this discussion. This effort will include a public conversation about the region's current approach to highway congestion mitigation and building understanding, agreement and refinement as to how the region invests in congestion mitigation. The review will focus on policymaker input but will also include other technical stakeholders and the general public. Context on the issue will be provided through data on existing and future congestion, funding availability, and the trade-offs of pursuing different approaches moving forward. As part of the discussion, technology solutions, spot improvements, strategic capacity investments and the trade-offs between MnPASS and other lane expansion will be discussed. The results of this pubic discussion will refine or change the regional highway investment direction for inclusion in the 2050 TPP.

The I-35W corridor south of downtown Minneapolis and I-35W North MnPASS project from Ramsey County Road C in Roseville to north of Lexington Avenue in Blaine are currently under construction and are shown as existing in Figure 5-14.

Four MnPASS expansion corridors are included in the Current Revenue Scenario as Tier 1 priority corridors, shown in Figure 5-14 and Table 5-10. Adequate funds are either available now or are anticipated to be made available from existing funding sources to allow construction. The first Tier 1 priority corridor is the addition of MnPASS lanes on I-94 between downtown Minneapolis and downtown Saint Paul. As of the date of this publication, $100 million has been allocated to the project. This corridor is also scheduled for major preservation work. The current *Rethinking I-94 Study* will evaluate mobility options along I-94 from MN 55 (Hiawatha Avenue) to Marion Street, although developed solutions may extend beyond these limits. Alternatives beyond MnPASS are still being considered.

Three MnPASS corridors are partially funded and are shown as both Tier I as part of the Current Revenue Scenario and Tier II as part of the Increased Revenue Scenario. Special funding from the Corridors of Commerce program was provided for the first two projects.

- MN 252/I-94 from MN 610 to Dowling Avenue;
- I-494 from US 169 to MN 5; and
- I-35W from Ramsey County Road C to downtown Minneapolis

With these planned investments through 2026, MnPASS will move beyond a few isolated corridors to take the form of a regional system providing travel time and reliability benefits to transit, high occupancy vehicles and those willing to pay a fee.

The MnPASS System Study 3 evaluated corridors across the region beyond the Tier 1 corridors. A further discussion of this study and its outcomes are presented in the Increased Revenue Scenario. Finally, the Study also identified MnPASS supporting investments that may be necessary to continue to assure a less congested, more reliable trip. These projects are detailed in the Increased Revenue Scenario, under Strategic Capacity Enhancements.

Figure 5-14: MnPASS System under Current Revenue Scenario

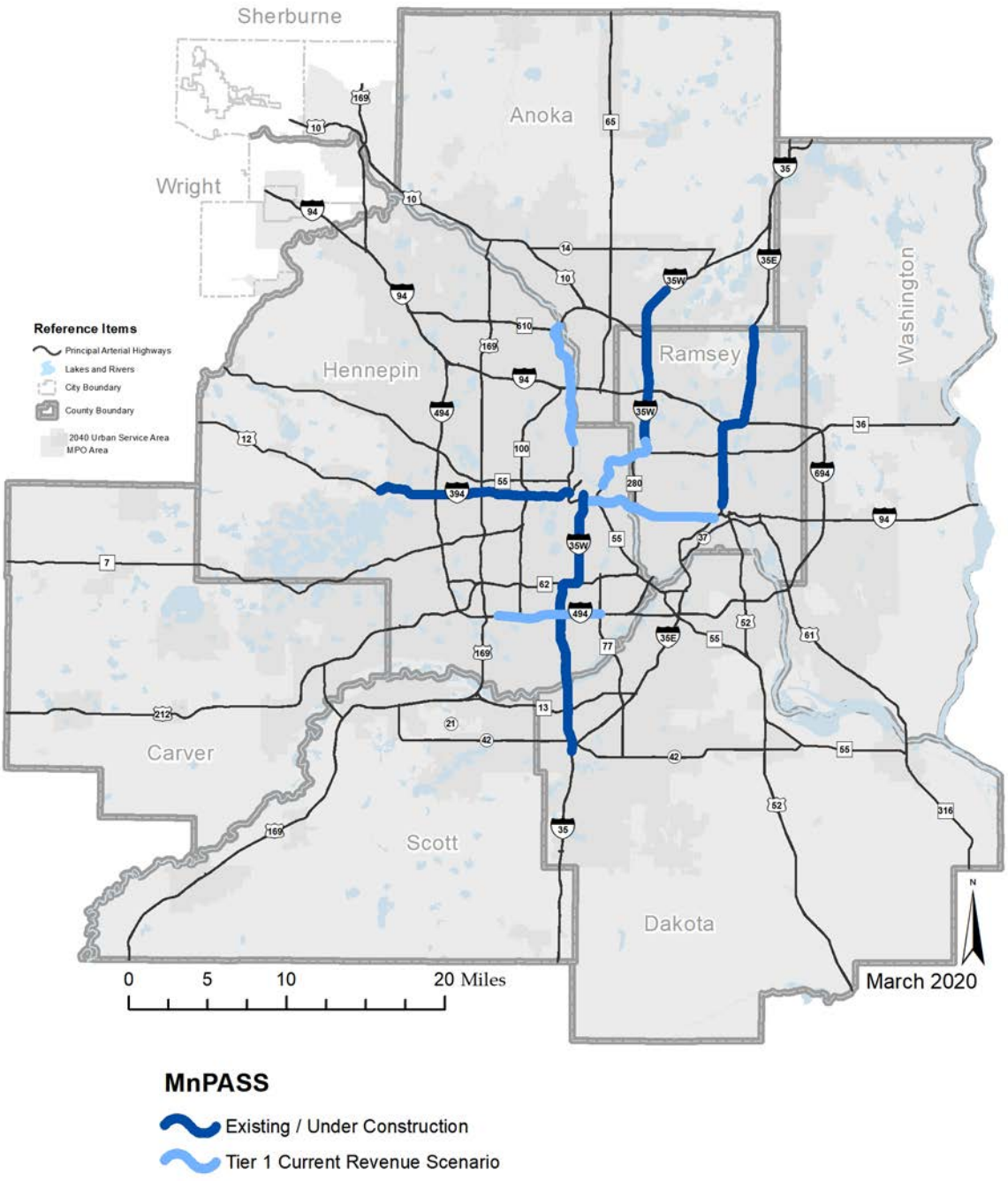


Table 5-10: Status of MnPASS Corridors

ROUTE	From	TO	Description	Status
I-394	I-494	I-94 near downtown Minneapolis	HOV Conversion	Complete
I-35W	I-35W/I-35E south split	46th Street	HOV Conversion and Extensions	Complete
I-35E	I-94	Ramsey County J	Added MnPASS Lanes	Complete
I-35W	Downtown Minneapolis (26th St)	46th Street	Complete Southbound MnPASS lane in conjunction with construction of I-35W/ Lake Street Transit Station	Under construction; project opening 2021
I-35W	Ramsey County C	Lexington Avenue	Construct MnPASS lanes	Under construction; project opening 2021

TIER I PRIORITY

Route	From	To	Description	Status
I-94	Downtown Minneapolis	Downtown Saint Paul	Design under study between MN 55 and MN 61	Environmental document in process
I-35W	Ramsey County C	Downtown Minneapolis	Construct MnPASS, with southbound being the priority	Environmental document in process
I-494	West of East Bush Lake Road	East of MN 77/Cedar Avenue	Construct MnPASS and other improvements	Environmental document in process

Route	From	To	Description	Status
MN 252/I-94	I-94 I-694	MN 610 Dowling Ave	Construct MN 252 MnPASS lanes in conjunction with freeway conversion Provide new I-94 MnPASS lanes between I-694 and Dowling Ave	Environmental document in process

5. Regional Mobility: Strategic Capacity Enhancements

In some cases, traffic management technologies, spot improvements, or MnPASS lanes do not sufficiently resolve the specific highway deficiencies necessary to improve travel conditions for people and freight. The region has designated these other improvements that might be needed as strategic capacity enhancements. These types of improvements are described below and those to be implemented with current revenue investments are identified. The region has established a number of criteria or conditions that these improvements must meet to be consistent with the adopted highway investment philosophy. Specific strategic capacity enhancements projects must place priority on existing problems; maximize use of existing pavement and right-of-way; 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. For highway corridors with transit advantages or where MnPASS lanes are planned, strategic capacity enhancements cannot eliminate existing transit advantages and will not preclude future implementation of MnPASS lanes. Where appropriate, these investments should build toward future transit advantages or MnPASS implementation.

Examples of strategic capacity enhancements on freeways include:

- Freeway system-to-system interchange improvements
- New service interchanges (see Appendix F)
- New or expanded ramp movements on existing service interchanges (see Appendix F)
- Other service interchange improvements
- Auxiliary lanes over one mile (less than one mile would be considered in CMSP)
- Bus only shoulders
- Truck climbing lanes
- New general-purpose lanes
- Improvements to general purpose lanes adjacent to a MnPASS lane that are needed to reduce operational deficiencies on the MnPASS lane

Examples of strategic capacity enhancements on non-freeway principal arterials include:

- New service interchanges or freeway conversions (see discussion of Principal Arterial Intersection Conversion Study in the Increased Revenue Scenario and Appendix F)

- High-performing CMSP projects that are too large to fit into the CMSP mold due to project cost, project elements, or length
- New general-purpose lanes

For proposals of new service interchanges (i.e., interchanges which connect a freeway to an arterial as opposed to connecting to another freeway) or new ramps for service interchanges, the evaluation process and criteria for initial approval are identified in Appendix F. The main purpose of the interchange approval process is to identify safe and efficient projects that can be supported by the Metropolitan Council and MnDOT for local and regional funding. Completion of this assessment and explicit support from MnDOT is currently a qualifying requirement for principal arterial interchange improvements to pursue funding through the Regional Solicitation and several other competitive MnDOT funding programs.

A-minor arterials are also important in carrying regional and sub-regional trips in a safe and efficient manner, and play a critical role in supplementing the capacity and network 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 building new A-minor arterials where needed within the urban service area to provide critical regional, multimodal highway connectivity. A-minor arterial enhancements can often be identified through city or county comprehensive plan updates, which are reviewed for consistency with regional plans and policies by the Metropolitan Council.

The region will only have revenue to complete a limited number of strategic capacity enhancements as illustrated in Figure 5-15, and listed in Table 5-11 and Appendix C. Programmed projects include several interchanges or lane expansions partially funded through the Regional Solicitation. There are also additional locally-funded expansion projects that are programmed.

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 2026. However, special funding programs, such as the state's Corridors of Commerce program, may fund future strategic capacity enhancements.

Figure 5-15: Strategic Capacity Enhancements 2020-2025

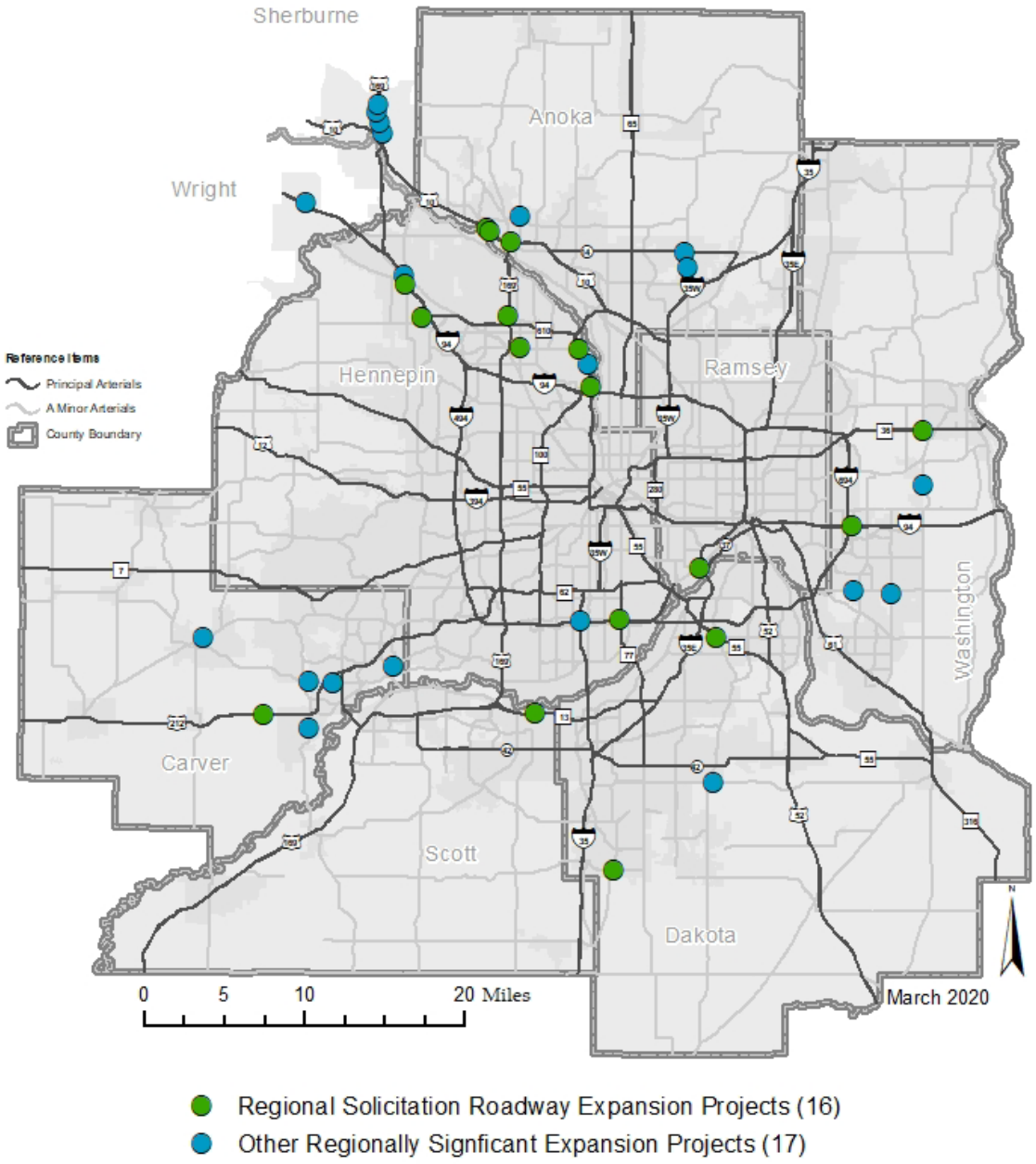


Table 5-11: Highway Strategic Capacity Enhancements 2020-2025*

Road	Location	Project Description
MN 36	Manning Avenue	Interchange
I-94	Dayton Parkway (Brockton Lane)	Interchange
I-94	Dayton Parkway (Brockton Lane) to MN 101	New Lanes
77th St	MN 77	Underpass
US 169	101st Avenue North	Interchange
US 10	Fairoak Avenue	Underpass
US 10	Thurston Avenue	Interchange
Dakota CR 26	MN 3 to MN 55	2 to 4 Lanes
Dakota CR 70	Kenrick Avenue to CR 23	2 to 4 Lanes
Dakota CR 46	MN 3 to MN 52	2 to 4 Lanes
MN 212	Carver CR 11 to CR 36	2 to 4 Lanes
Carver CR 10	Clover Ridge Drive to CR 11	2 to 4 Lanes
Carver CR 10	MN 41 to US 212	2 to 4 Lanes
Carver CR 11	US 212 to 6th Street	2 to 4 Lanes
MN 5	TH 284 to Main Street	2 to 4 Lanes
MN 101	Flying Cloud Drive to Pioneer Trail	2 to 4 Lanes and Realignment
MN 13	Dakota Avenue	Interchange
Scott CR 27	Scott CR 21 to Scott CR 44	2 to 4 Lanes
US 169	US 10 to 198th Avenue North	Four Interchanges
I-94	MN 241 to Wright CR 19	4 to 6 Lanes and Interchange Improvements
I-494	I-35W	Directional Ramp
MN 252	73rd Ave N to 85th Ave N	Three Interchanges (66th, Brookdale Dr, and 85th Ave)
US 10	MN 47/US 169	Interchange reconstruction and auxiliary lanes to and from the east
West Broadway Ave	85th Avenue to 93rd Avenue	2 to 4 Lanes
Hennepin CR 610	Hennepin CR 30 (97th Avenue) to MN 610	New roadway and additional interchange ramps at I-94
Lexington Parkway	Shepard Road to MN 5	New roadway connection
Helmo/ Bielenberg Bridge Over I-94	Helmo Avenue to Bielenberg Drive	New Overpass over I-94
Anoka CR 7 (7th Avenue)	Bunker Lake Boulevard to Anoka CR 20 (157th Avenue)	2 to 4 Lanes
Anoka CR 17 (Lexington Avenue)	I-35W to Anoka CR 14 (Main Street)	4 to 6 Lanes

Anoka CR 14 (Main Street)	Harpers Street to Anoka CR 17 (Lexington)	2 to 4 Lanes
Washington CR 18 (Bailey Road)	Woodlane Drive to Washington CR 13 (Radio Drive)	2 to 4 Lanes
Washington CR 19 (Woodbury Drive)	Dale Road Washington CR 18 (Bailey Road)	2 to 4 Lanes
Washington CR 15 (Manning Ave)	Washington CR 10 (10th Street) to Washington CR 14 (40th Street)	2 to 4 Lanes
Dakota CR 46 (160th St)	MN 3 to MN 52	2 to 4 Lanes

***The timing of some Carver County projects may extend beyond 2025.**

Multimodal

Multimodal: Freight

MnDOT is responsible for allocating approximately $20 million per year that the State of Minnesota receives from federal funding sources through the National Highway Freight Program. These are new funds that became available starting in 2016 with the signing of the FAST Act. MnDOT completed a solicitation for 2019-2022. The solicitation utilized a number of criteria to measure proposals against highway system investment prioritization factors described in this Plan. These included crash rate reduction, sustained crash location, presence in a safety plan, Heavy Commercial Annual Average Daily Traffic, cost-effectiveness, truck travel time reliability, removing a barrier or avoiding future load restrictions on oversize/overweight routes, upgrading of a roadway to 10-ton standards and daily truck load equivalents entering and exiting a facility or facilities.

In this latest funding cycle, almost $80 million was awarded to projects within the region, which was 80% of the statewide total. Based purely on the highest performing projects submitted, 96% of the funds would have been allocated to the region. However, MnDOT implemented a policy that mandated a minimum of 20% of total funds must be awarded to either the metro area or Greater Minnesota in order to ensure geographic balance of projects throughout the state. This indicates that there are many worthwhile projects in the metro area that could positively affect freight movements. Freight projects selected in the metro area are displayed in Figure 5-16 and Table 5-12 and were selected out of one of three primary application categories: Freight Safety, Freight Congestion/Freight Efficiency Improvement, and First-Last Mile Connections. Being located on one of the regionally defined Truck Highway Corridors was a qualifying requirement for projects within the metro area to pursue the funds. More discussion about this Metropolitan Council-led study that produced these Truck Highway Corridors is in the Freight Investment Direction.

Figure 5-16: National Highway Freight Program Projects, 2021-2025

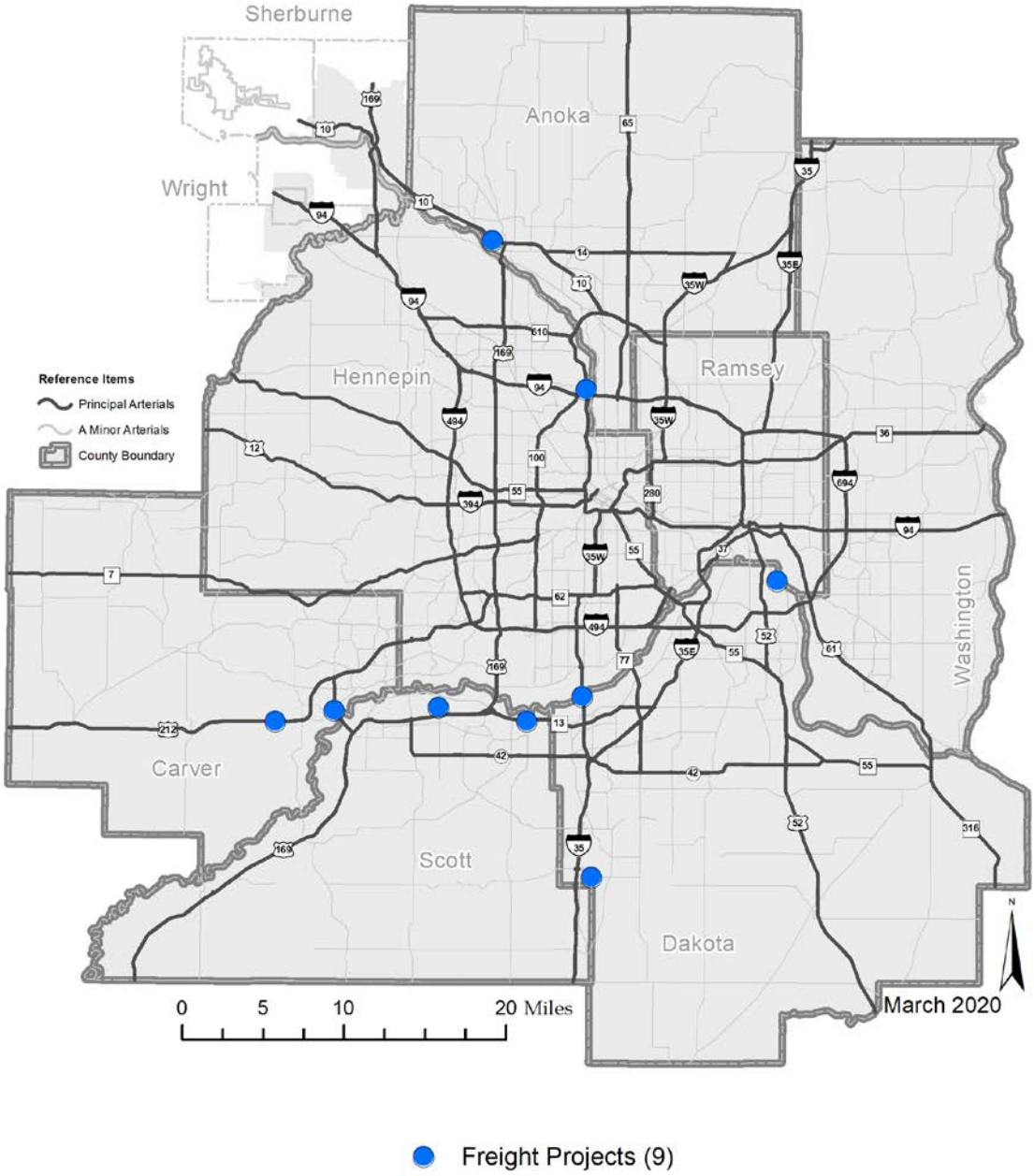


Table 5-12: National Highway Freight Program Projects, 2021-2025

Project	County Location	Grant Amount
I-35W Bridge over MN River	Hennepin/Dakota	$19,500,000
Dakota County 70 Expansion	Dakota	$7,000,000
Concord Street Improvements	Dakota	$7,560,000
Scott County 83 Reconstruction	Scott	$594,000
US 212 Freight Bottleneck Improvements	Carver	$15,000,000
MN 10/US 169 Safety and Mobility Improvements	Anoka	$20,000,000
MN 13 Port Access and Mobility Project	Scott	$15,000,000
MN 252 Interchange at 66th Avenue North	Hennepin	$10,00,000
Downtown Chaska MN 41 Improvements	Carver	$4,000,000

Multimodal: Bicycle and Pedestrian Infrastructure

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 approximately $120 million between 2015 and 2040, or approximately 1% of the Current Revenue Scenario (see Table 5-6) 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. Some of these Regional Solicitation projects are stand-alone multiuse trail, on-street bicycle lanes, sidewalks, or Safe Routes to School infrastructure grants. However, an additional 2% to 4% of the total budget for Regional Solicitation funded roadway projects historically goes toward bicycle and pedestrian project elements. Multimodal roadway projects are prioritized in the currently-approved Regional Solicitation scoring and in fact, nearly all of the roadway projects funded in recent funding cycles included either a trail, sidewalk, or improved intersection crossing.

Examples of bicycle and accessible pedestrian investments include:

- Trails and sidewalks on highway bridges or along the roadway travel lanes.
- Grade-separated trail crossings of major barriers.
- Accessible pedestrian signals at signalized intersections.
- Sidewalk curb ramps that meet or exceed Americans with Disabilities Act (ADA) standards.

Federal regulations require the evaluation of needs for these kinds of facilities as part of federal aid highway projects and construction. Beyond ADA compliance on the projects themselves, agencies with

50 employees or greater also should be working toward completing their Americans with Disabilities Act Transition Plan for the public right-of-way. In the near future, this step will be required for all types of projects to be included in the TIP.

Increased Revenue Scenario

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 all of the highway investments needed to help achieve the outcomes, goals, and objectives in *Thrive MSP 2040* and this Transportation Policy Plan and Minnesota's Statewide Multimodal Transportation Plan [link here]. The Increased Revenue Scenario identifies a higher level of spending for highway investments that will come closer to advancing the outcomes, goals, and objectives

Building on work completed in MnDOT's Minnesota State Highway Investment Plan, this plan calls for significant additional state highway investments through the 2040 timeframe, summarized by investment category in Table 5-13. The Increased Revenue Scenario for the metropolitan area's state highway system totals $9 billion to $11 billion (constant dollars). The total includes the anticipated public costs – operations, maintenance, and capital – only for the state highway system in the metropolitan area.

Table 5-13 shows how the $9 billion to $11 billion in increased revenues might be allocated among the 5 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 highways should increase as noted:

Operations and maintenance should increase on the order of 15-35% (+$500 million to $1 billion)

Funds to rebuild and replace highway assets should increase at least 35% (+$3.4 billion to $4.7 billion)

Specific Safety projects should increase 200% (+$400 million)

Regional mobility investments should increase on the order of $4.5 billion, a very significant increase over the spending in the Current Revenue Scenario of $2.1 billion

Multimodal (Bicycle and pedestrian, and freight investments) should increase 35-50% (+$200 million $400 million)

Table 5-13: 2015-2040 Increased Revenue Scenario for MnDOT (year of expenditure dollars)

Investment Category	Current Revenue Scenario	Increased Revenue Scenario	
Operations and Maintenance	$2.9B	$500M-1B	+15-35%
Preservation of Existing Highway Assets	$9.8B	$3.4-4.7B	+35-50%
Safety	$200M	$400M	+200%
Regional Mobility	$2.1B	$4.5B	+200%
Multimodal	$700M	$200M-400M	+35-50%
Total	$15.8B	$9-11B	+60-70%

If a funding level less than the $9 billion to $11 billion is provided to the region, then the new revenues funds should be focused first on three primary areas before being used to better meet other identified needs in all investment areas:

- Regional Mobility – Identified in MnSHIP as the largest unfunded investment need at $4.5 billion. In addition, funds allocated to mobility in the Current Revenue Scenario will be reduced in 2027. New revenues should be used on the mobility priorities identified in this chapter.
- Safety – Identified in the TPP as one of the region's highest priorities and incorporated into all investment categories, this category represents stand alone, targeted safety improvements. MnSHIP identifies an unfunded safety need of approximately $400 million between 2018 and 2040.
- Multimodal – Advance planned ADA improvements (e.g., sidewalks, curb ramps, and intersection crossing improvements) to an early year so that MnDOT can be fully ADA-compliant earlier than 2037 as detailed in MnSHIP. This type of investment ties directly back to the Equity and Livability Outcomes in Thrive MSP2040 and the Safety and Security, as well as the Healthy Environment TPP Goals.

The vast majority of the existing funding is going to operations, maintenance, and preservation activities in the Current Revenue Scenario and this level of funding allows the region to largely meet performance targets for asset preservation in the near future. Therefore, new revenues coming to the region should first be allocated to other identified needs before going back to these core functions. All new capital investments will also need to include an additional 15% for program delivery and may require increased operations funds depending on the type of investment.

The text that follows identifies potential investments through the 2040 time-frame under an Increased Revenue Scenario for each of the five 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 14, "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/or 2040 that may be needed as the region continues to grow and develop.

Operations and Maintenance

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 $500 million to $1 billion in MnDOT operations and maintenance spending (see Table 5-13), 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.

Preservation of Existing Highway Assets

The Increased Revenue Scenario would yield approximately $3.4 billion to $4.7 billion for additional pavement, bridge, and roadside infrastructure investments in the metropolitan area (see Table 5-13). This level of new investment would help maintain conditions for both state-owned principal and A-minor arterials.

While not included in Table 5-13, a 2017 Metropolitan Council study evaluated the current condition and financial ability to maintain pavements on the locally owned parts of the region's principal and A-minor arterial system. Pavement management is a complex undertaking that must consider current surface conditions, the varying structure of roads, estimates of future deterioration, a wide range of possible preservation strategies, agency priorities and fiscal constraints. This planning level study found that current conditions generally range from good to fair. Using some basic data and stylized representations of preservation cycles this study estimated that absent inflation this region is positioned to maintain its pavement condition. However, inflation has outpaced the growth in revenues in the past and it is expected to do so in the future. Inflation could lead to a large unmet need of between $800 million and $4 billion between 2018 and 2040. The study documented a number of ways that this gap can be addressed including shifting more resources towards preservation and away from other needs, and continued improvement in preservation practices and technologies. Additional revenue will also need to be considered. The region is anticipated to grow by 800,000 people by 2040 and it is important that local transportation needs are considered.

Safety

Under the Increased Revenue Scenario, it is estimated that approximately $400 million would be allocated to the Twin Cities region for meeting specific highway safety priorities (see Table 5-13).

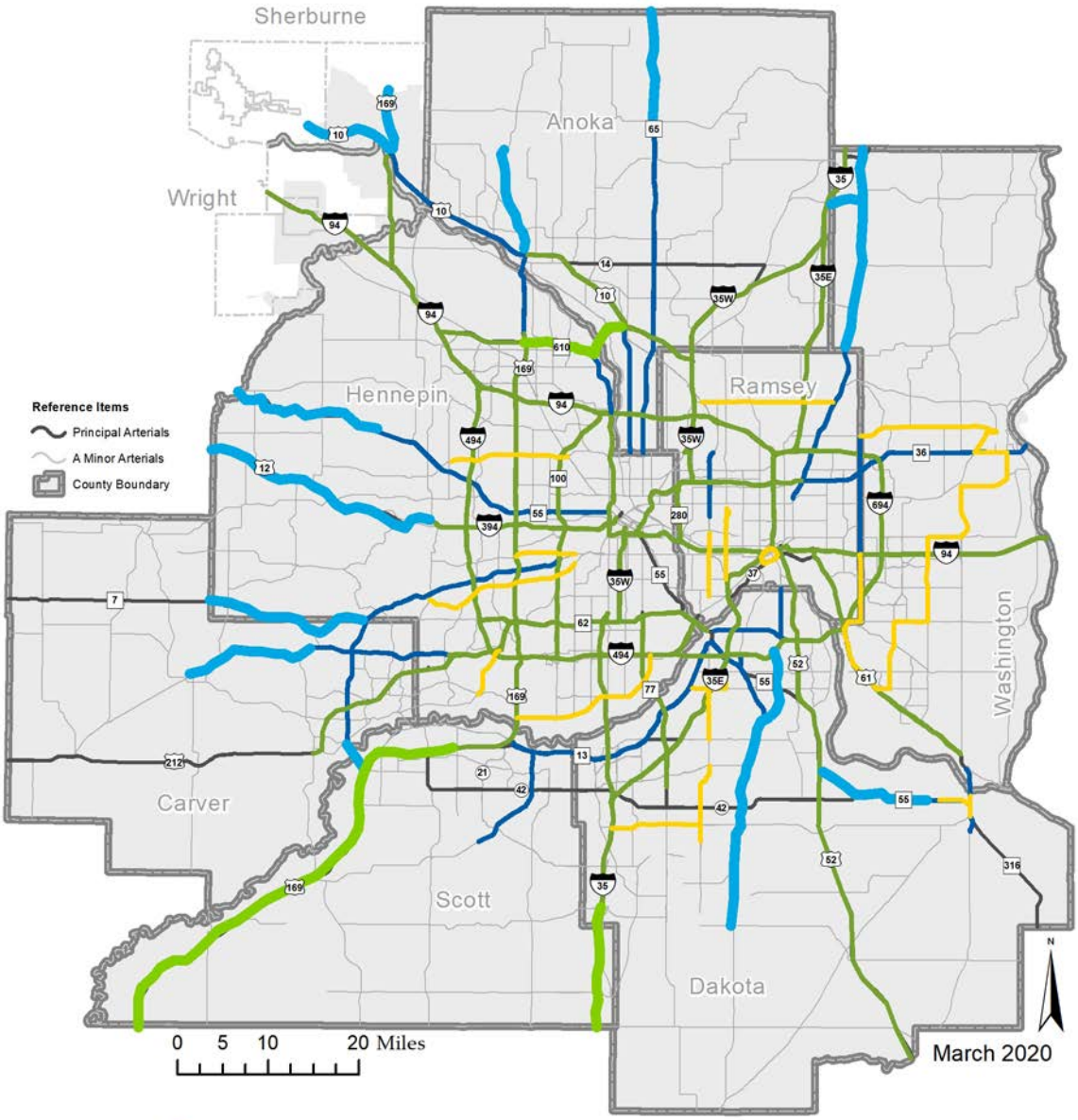
Regional Mobility

Potential regional mobility improvements should increase by $4.5 billion, but the breakdown by each of these six categories has not yet been determined, as indicated in Table 5-13.

Regional Mobility: Traffic Management Technologies

The need for traffic management technology improvements on the principal arterials and A-minor arterials greatly exceed the level of investment anticipated under the Current Revenue Scenario. A portion of the $4.5 billion in additional regional mobility funding would be allocated to meeting additional MnDOT traffic management technology priorities as illustrated in Figure 5-17.

Figure 5-17: Increased Revenue Traffic Management Technologies



Regional Mobility: Spot Mobility

The Current Revenue Scenario includes all projects analyzed in CMSP 4 with a return-on-investment of 10 years or less. As the CMSP study is updated in future years, it is anticipated that additional projects will be generated to add to the Increased Revenue Scenario.

Regional Mobility: MnPASS

The purpose of MnPASS System Study 3 (completed in 2017) was to assist in updating the MnPASS Vision in this plan and prioritize MnPASS corridors. Since the MnPASS System Study 2, many changes have occurred to MnPASS corridors, as well as to other regional highways. The MnPASS System Study 3 was needed to revisit the MnPASS corridor priorities and to determine if conditions on other highway corridors justified the addition of MnPASS lanes.

The MnPASS System Study 3 utilized a number of criteria to measure MnPASS corridors against highway system investment prioritization factors described in this plan. These criteria included proximity to employment centers, severity of congestion, connections to other MnPASS corridors or major destinations, express commuter bus demand and a ratio of 2040 mobility benefits to estimated construction costs.

The Increased Revenue Scenario includes funding for the Tier 2 and Tier 3 MnPASS projects, shown in Figure 5-18 and Table 5-14, and would result in completing the MnPASS system vision. Tier 2 and Tier 3 projects were identified based on the previous plan and the highest performing corridors in the MnPASS System Study 3. Tier 2 MnPASS projects should be completed before Tier 3 MnPASS projects unless corridor studies provide a basis for reprioritizing, partial funding is awarded through a competitive solicitation, other local funds are contributed to the project, or the Tier 3 project can be added at the same time as a major preservation project. In some cases, Tier 2 and 3 corridors overlap where funding has been secured to accomplish at least part of the vision. Further project development will determine what parts of the vision can be accomplished within currently anticipated revenues.

The MnPASS System Vision is estimated to cost at least $1.8 billion to $2.4 billion dollars beyond the funding available in the Current Revenue Scenario. 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 5-18: MnPASS Projects: Increased Revenue Scenario

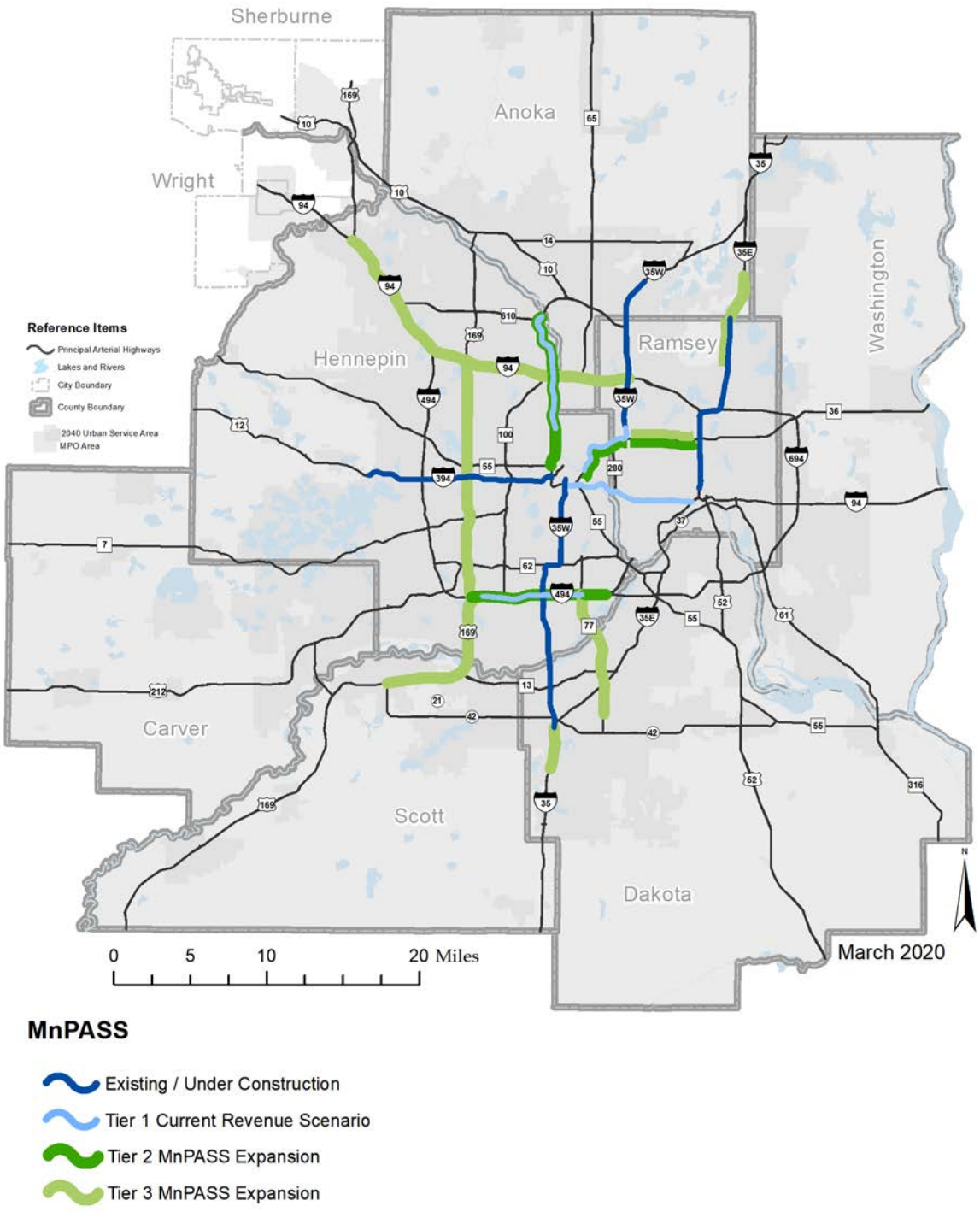


Table 5-14: MnPASS System Investment Priorities Under Increased Revenue Scenario

TIER 2 PRIORITY

Route	From	To	Description	Status
MN 36	I-35W	I-35E	Construct Eastbound MnPASS lane	Corridor study completed in 2018
I-35W	Ramsey County Road C	Mississippi River	Construct MnPASS lanes not completed within Current Revenue Scenario	Environmental document in process
I-494	West Bush Lake Rd	MN 5	Construct MnPASS lanes in remaining sections of project not completed within Current Revenue Scenario	Environmental document in process
MN 252/ I-94	Dowling Ave	4th St	Convert general purpose lanes to MnPASS lanes between Dowling Avenue and 4th Street and add a direct connection to downtown Minneapolis	Environmental document in process

TIER 3 PRIORITY

Route	From	To	Description	Status
MN 36	I-35W	I-35E	Add Westbound Lane Only	Corridor study completed in 2018
MN 77	138th St	I-494	Add Northbound Lane Only	Study has been completed in 2014
US 169	Scott County 17	I-494	Add Lanes	Corridor study completed in 2018
US 169	I-494	I-394	Add Lanes	Corridor study completed in 2018
US 169	I-394	I-694	Add Lanes	
I-35E NB **I-35E SB**	Ramsey County J Anoka County 14	Anoka County 14 Ramsey County 96	Add Extension of Existing MnPASS Lanes	
I-35	Dakota County 50	Crystal Lake Rd	Add Extension of Existing MnPASS Lanes	
I-94	I-494/ I-694	MN 101	Add Lanes	
I-94	I-494/ I-694	MN 252	Add Lanes	
I-694	MN 252	I-35W	Add Lanes	

MnPASS System Impact on the Region

Building out the MnPASS System Vision would have significant benefits for the region's highway and transit systems. The MnPASS System will reduce and better manage congestion in a manner that is more sustainable over the long-term. It will significantly increase person-throughput through congested corridors during peak travel times. The system is also a key to improving travel time reliability for bus transit, small commercial vehicles and other motorists in the metro area who currently experience congested and unreliable travel options. By improving travel times and travel time reliability for bus transit, the MnPASS System will increase bus ridership. It can also increase carpooling by providing

High Occupancy Vehicles this same advantage. Approximately 80% of the people using the current MnPASS lanes are either riding on transit or in carpools. MnPASS is a strategy that will provide a strong long-term return on investment and is especially important given the region's limited mobility investments.

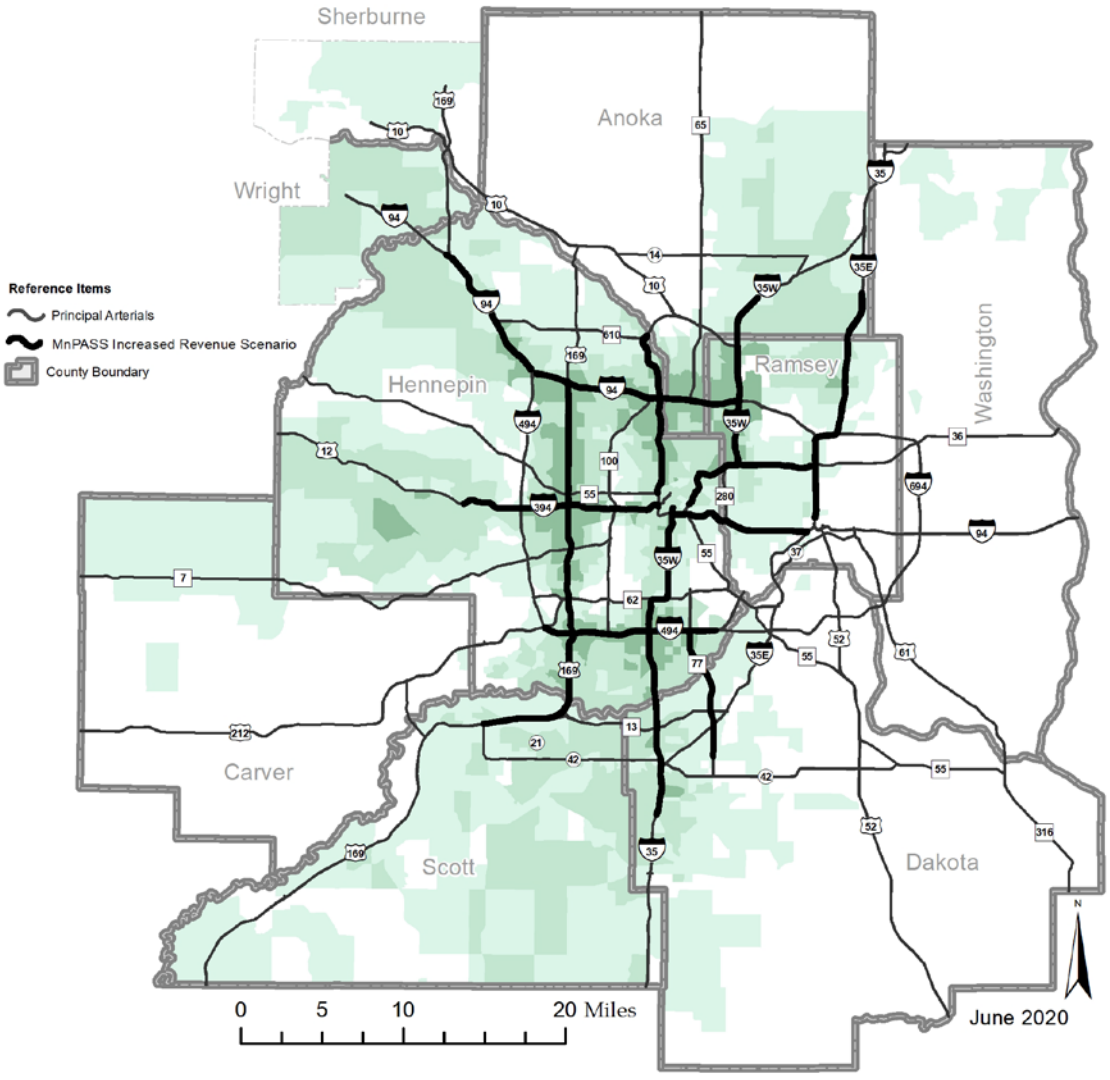
Figure 5-19 shows the percent of forecasted 2040 peak period trips that travel in currently congestion corridors where MnPASS is able to provide a less congested option under the Increased Revenue Scenario. Peak periods are defined as 6 AM to 10 AM and 3 PM to 7PM, and the percent of trips is shown for each Traffic Analysis Zone. A MnPASS option would not provide all of these trips a less congested trip at one time or even on any one day but offer an option when it is most valued to each individual.

Table 5-15 shows the number of 2040 peak period freeway trips on currently congested corridors with and without a less congested option in each of two scenarios. By definition, all 2.6 million trips on congested freeway corridors have no option without MnPASS. In the Increased Revenue Scenario 700,000 trips will be on corridors with the less congested option that MnPASS provides so the number of trips without a MnPASS option is reduced to 1.9 million.

Additionally, trips where MnPASS would provide reliability benefits for only part of what would otherwise be a congested trip were not accounted for here. These trips with partial benefits could be equal or greater than the benefits accounted for here.

If the full system was built out under the increased revenue scenario, commuters would have a MnPASS option on nearly 60% of the currently congested freeways.

Figure 5-19: 2040 Congested Corridor Trips with Less Congested Option, Increase Revenue Scenario



Percent of 2040 congested trips which would have a less congested, more reliable option with Increased Revenue MnPASS System

- > 30 %
- 20 - 30%
- 10 - 20%
- 0 - 10%

Table 5-15: 2040 Peak Period Trips and Congested Lane Miles with More Reliable Options

	Congested Corridor Trips without a MnPASS Option	Congested Corridor Trips with a MnPASS Option	Congested Lane Miles Covered by MnPASS	Percent of Congested Lane Miles covered by MnPASS
Without MnPASS	2.6 million	0	0	0%
Increased Revenue Scenario	1.9 million	700,000	671	58%

In some existing MnPASS corridors, high usage of the MnPASS lanes is making it difficult to maintain a less congested option. The MnPASS System Study 3 identified several operational strategies and infrastructure improvements that can help keep the MnPASS lanes flowing freely. These strategies and improvements are identified at the end of the Strategic Capacity Enhancements discussion in the Increased Revenue Scenario.

Regional Mobility: Strategic Capacity Enhancements

This section includes four primary types of projects: New interchanges, supporting improvements related to improved MnPASS lane operations, freeway system interchange improvements, and regionally significant highway projects partially funded through Carver County's sales tax. The first type of strategic capacity enhancements, new interchanges or overpasses at existing at-grade intersections with traffic signals on multilane highways, was prioritized as part of the Principal Arterial Intersection Conversion Study (2017). Jointly led by the Metropolitan Council and MnDOT, the study initially considered about 300 miles of non-freeway principal arterials with at-grade intersections, considering which intersections might limit the roadway's ability to best serve long-term safety and mobility. A similar prioritization effort has not yet occurred for new interchanges on the existing freeway system since there are so few places in the region where a new freeway interchange is needed. MnDOT and the Metropolitan Council have completed a study of freeway system interchanges, where at least two freeways meet. These locations often represent concentrations and causes of crashes and congestion.

The Principal Arterial Intersection Conversion Study process screened 370 intersections down to 91 intersections for detailed analysis and prioritization. It then prioritized intersections as low-, medium-, or high-priority locations for grade-separation projects or other improvements.

The study utilized a number of criteria to measure proposals against highway system investment prioritization factors described in this plan. These included the critical crash rate index, observed safety deficiencies or concerns, crash frequency, crash severity, need for new infrastructure, Heavy Commercial Average Annual Daily Traffic, connection to a principal or A-minor arterial, support of the

Regional Bicycle Transportation Network, volume-capacity ratios, and support of Express transit routes, local planning and existing land uses.

The results of the study provide high-level guidance for the "right-sizing" of potential projects as follows:

- **23 High-Priority Intersections** – The High-Priority intersections shown in Figure 5-20 often exhibit needs that can justify high-capacity at-grade improvements or grade separations. These intersections (and the corridors they serve) are among the region's candidate locations for strategic capacity expansion under the Increased Revenue Scenario. They should be studied individually or by corridor in more detail to determine right-sized and compatible investments.
- **25 Medium-Priority Intersections** – The Medium-Priority intersections generally do not need grade-separation projects based on current demand. However, additional studies at these locations could show needs for high-capacity at-grade improvements or limited/emerging needs for grade-separation elements (for example, a bridge which may serve only one movement).
- **28 Low-Priority Intersections** – These locations generally do not need major changes or projects based on current demand and any problems can most likely be addressed with at-grade projects under the Spot Mobility project type.

The region and state are used these rankings to help allocate competitive funding through the Regional Solicitation and MnDOT's TED program. It is anticipated that the Principal Arterial Intersection Conversion Study will be updated prior to the 2050 TPP.

The importance of making improvements at these and other intersections is highlighted from the findings documented in the Minnesota 2020-2024 Strategic Highway Safety Plan. The Plan identifies that 47% of the fatal and serious injury crashes across the state from 2014-2018 involved intersections. Mobility improvements that also include safety enhancements for all modes of travel through and across the intersection area can help achieve a reduction in these types of crashes.

Several interchange projects have also successfully completed the interchange approval process and are listed in Appendix F. These projects are primarily led by local partners and the projects will be amended into the plan once they are fully funded. Completing this initial interchange approval does not imply that the project is one of the region's highest priorities (this was the intent of the Principal Arterial Intersection Conversion Study for projects on the non-freeway system), nor does it imply that an interchange is the best solution. Instead, the approval suggests that the location is suitable for an interchange based on consistency with local and regional plans, high-level needs, functional classification of the cross-street, suitable local roadway network/access management, and interchange spacing. This initial, high-level approval is the first of many that are needed in the project development process.

The second list of strategic capacity projects in the increased revenue scenario reflect the growing use of MnPASS lanes. As MnPASS lane use grows, specific locations will begin to reach capacity and become congested. The MnPASS System Study 3 evaluated a variety of strategies to address this issue. The first strategies considered will generally include lower cost and less sensitive options such as pricing algorithm adjustments, access modifications, increased enforcement and lower cost/high benefit improvements such as:

- I-394 eastbound auxiliary lane connection at Louisiana Avenue
- I-394 eastbound exit lane addition at 12th Street into downtown Minneapolis
- I-394 westbound permanent lane addition between downtown Minneapolis and MN 100
- I-394 slip ramp from the collector-distributer road for northbound US 169 traffic merging onto westbound I-394
- I-35W northbound truck climbing lane extension to 98th Street exit

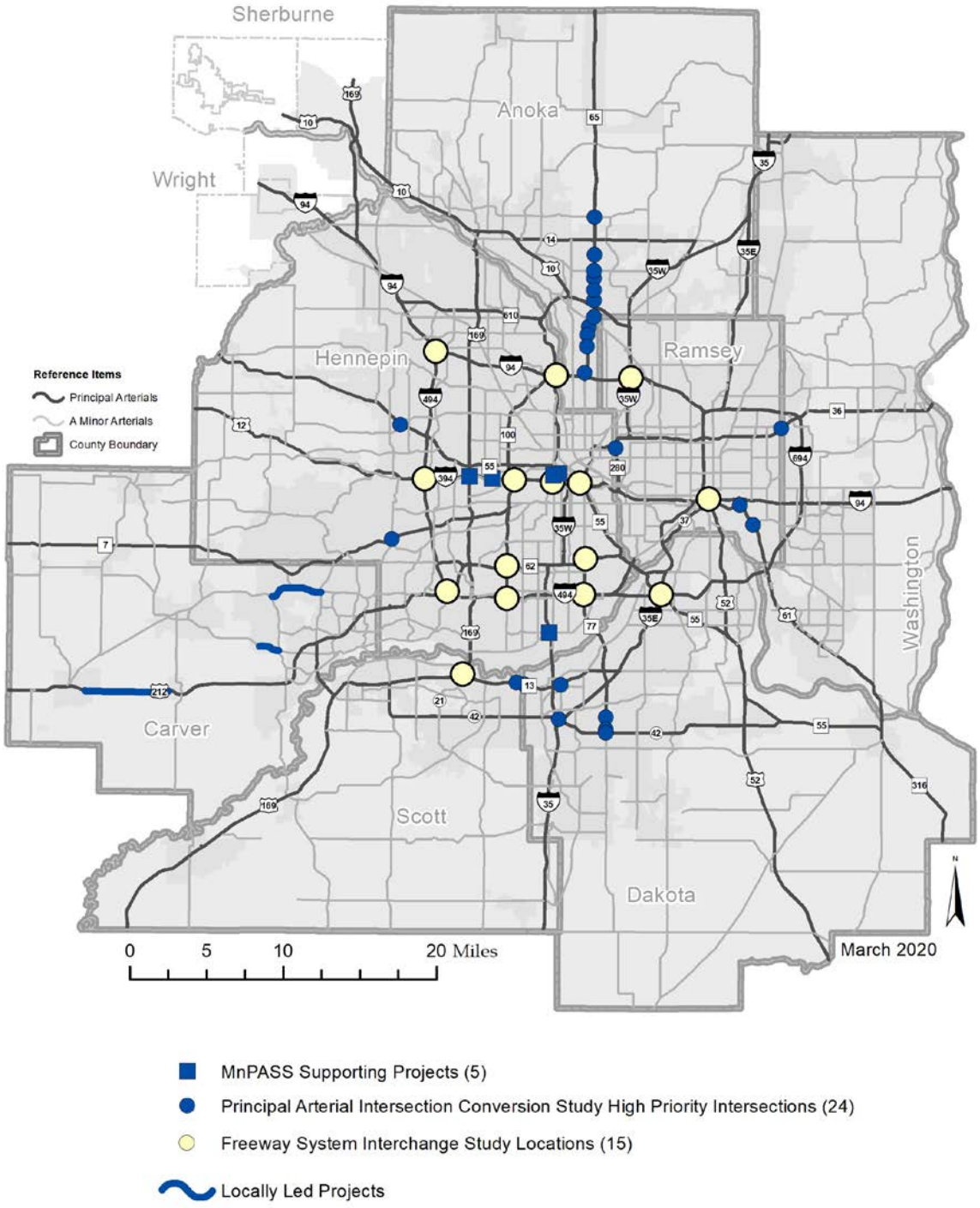
If the above strategies have been exhausted or will be ineffective, strategies such as raising the maximum rate, changing the HOV policy to only allow vehicles with three or more occupants to use the lanes for free, requiring HOV users to have MnPASS accounts and tags, implementing camera-based license plate tolling, or adding MnPASS lanes will need to be considered.

In 2020 the Freeway System Interchange Study reported opportunities to improve some of the greatest concentrations of crashes and congestion on our region's freeways. Improvements range widely in terms of scale and often multiple solutions are proposed at individual locations. Improvement types include auxiliary lanes, directional ramps, other bridge movements, two-lane entrances and exits, collector-distribution road modifications and other creative solutions. This study reported, at a planning level, estimated costs and return period for proposed improvements. Each of these proposals will require additional study and consideration before becoming a programmed project. Additionally, MnDOT does not have a dedicated funding source for these improvements; however, preservation projects will be monitored for implementation opportunities.

The last type of Strategic Capacity Enhancement projects included are partially funded projects by local partners. As these are not fully funded they cannot be part of the Current Revenue Scenario. At this time, only Carver County has documented projects in this category, generally projects where a local share has been committed; however, future competitive funding awards will be necessary to deliver these projects. Carver County has identified several projects that are either expansion projects on the principal arterial system or that are expansion projects on the A-minor arterial system of greater than one mile. It is anticipated that other counties will identify specific highway projects to be funded by their sales tax revenue in the coming years and that they will be added to next update of this plan.

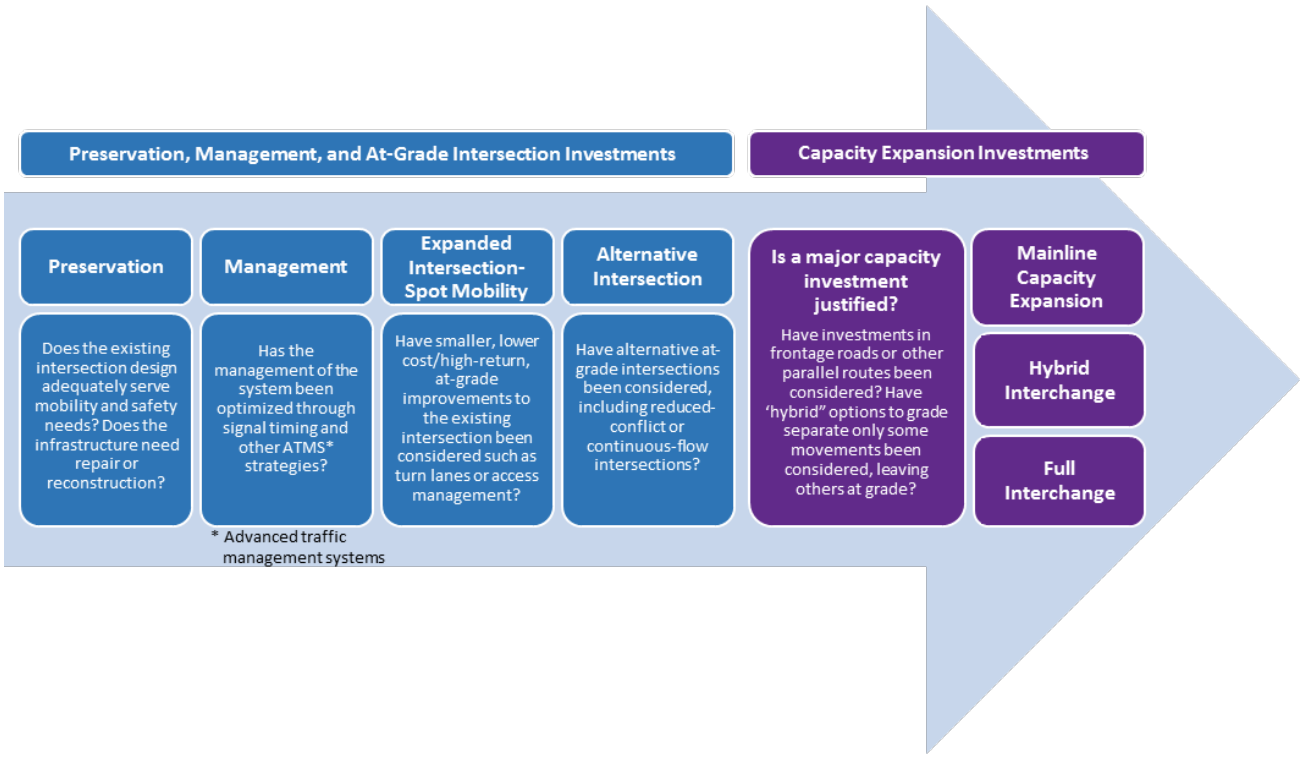
- MN 212 roadway expansion (4-lane expressway from Cologne to Norwood Young America)
- MN 5 roadway expansion (4-lane divided urban from MN 41 in Chanhassen to Victoria Drive in Victoria)
- Carver 10 roadway expansion (4-lane from Carver 11 to Carver 43)

Figure 5-20: Strategic Capacity Enhancements for the Increased Revenue Scenario



Consistent with the TPP, the 2017 Principal Arterial Intersection Conversion Study also encouraged planning to ensure the "right-sizing" of project investments, recommending that intersection improvements consider a progression of investment decisions along with technical data and context at the intersection and throughout the corridor (see Figure 5-21). This progression should shift from at-grade lower-cost designs to designs that propose to substantially increase capacity, where supported.

Figure 5-21: Progression of Intersection Investments



On some corridors, there are general purpose lane expansion needs due to congestion. MnPASS is not a viable alternative in some corridors for several potential reasons, including a lack of transit which limits the benefits of a MnPASS lane. Also, if the existing roadway is not a freeway, a MnPASS lane is not possible without full freeway conversion. In addition, 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 TPP in order to maintain the plan's fiscal balance between expenditures and revenues.

Multimodal

Under the Increased Revenue Scenario, it is estimated that approximately $200 million to $400 million would be allocated to the region for meeting additional freight, bicycle, and pedestrian priorities.

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. Regional transportation partners have identified many 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 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:

- **Anoka County** has identified Anoka County 22/Viking Boulevard from Sherburne to Chisago counties as the preferred location for its potential future east-west principal arterial.
- **Scott County** has identified Scott County 17/MN 13 from US 169 to MN 19 as the route for its potential future north-south principal arterial. In addition, Scott County 78 from US 169 to

Scott County 17 is another future principal arterial connection that is being actively planned for upgrade.

- **Dakota County** undertook a Principal Arterial Study in 2017-2018 to evaluate its system for future principal arterial designation. The study recommended several segments be further considered in the next several years for principal arterial designation, including Dakota County 63 between MN 55 and I-494, which includes a new, planned interchange at I-494 and Argenta Trail, the southerly extension of the existing principal arterial designation of Dakota County 23 from Dakota County 42 to Dakota County 70, and Dakota County 70 from I-35 east to Dakota County 23.

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 in future updates of the Transportation Policy Plan when new regional forecasts based on the 2020 census have been developed.