MEETING OF THE TAC PLANNING COMMITTEE

Thursday | February 13, 2020
Room LLA | 1:00 PM
Metropolitan Council, 390 Robert Street North, Saint Paul, MN 55101

AGENDA

I. CALL TO ORDER

II. APPROVAL OF AGENDA

III. APPROVAL OF MINUTES

January 9, 2020, meeting of the TAC Planning Committee

IV. INFORMATION

1. Transportation Policy Plan (TPP) Review of Investment Chapters
    a. Highway
    b. Transit
    c. Bicycle and Pedestrian
    d. Freight
    e. Aviation (no changes)
2. Climate Change Mitigation Tools Related to Land Use and Transportation (Mauricio Leon, Community Development Division)
3. Discussion of Transportation Safety Work Group Membership

V. OTHER BUSINESS

VI. ADJOURNMENT

* Additional materials included for items on published agenda

Please notify the Council at 651-602-1000 or 651-291-0904 (TTY) if you require special accommodations to attend this meeting. Upon request, the Council will provide reasonable accommodations to persons with disabilities.

Full Packet

Minutes of the
REGULAR MEETING OF THE TAC PLANNING COMMITTEE

Thursday, January 9, 2019
Metropolitan Council Chambers, 390 Robert Street North, Saint Paul

Committee Members Present: Nathan Abney, Holly Anderson, Dave Burns, Charlie Cochrane, Paul Czech, Bill Dermody, Jack Forslund, Jason Gottfried, Anne Kane, Elaine Koutsoukos, Michael Larson, Jan Lucke, Steve Mahowald, Paul Mogush, Mehjabeen Rahman, Angie Stenson

CALL TO ORDER

A quorum being present, Committee Chair Lucke called the regular meeting of the TAC Planning Committee to order.

APPROVAL OF AGENDA AND MINUTES

The agenda was adopted. The December 2019 minutes were approved without correction.

INFORMATION ITEMS

1. **Review of Transportation Policy Plan (TPP) Overview and Chapter 1**

   Amy Vennewitz presented this item. At the December meeting, she outlined the schedule for the next TPP update, which will lengthen the current plan by a year. Changes will focus on what has changed since the 2018 plan adoption. A main area of focus is identifying issues and topics that need additional study in preparation for the 2050 plan update in 2024.

   https://metrocouncil.org/Council-Meetings/Committees/Transportation-Advisory-Board-TAB/TAB-Technical-Advisory-Committee/TAC-Planning-Committee/2020/TAC-Planning-01-09-20/TPPOverview-Presentation.aspx

   Committee member discussion included the following points for consideration:

   - How to address gaps between jurisdictions that affect pedestrian travel
   - Congestion can create problems with reliability and accessibility, but it's not always a problem in central cities where there is a lot of activity. Congestion should be part of a larger picture and provide a clearer description of how congestion affects prosperity and why it's a problem. Addressing congestion can conflict with other goals such as reducing vehicle miles traveled.
   - For the majority of the region, the highway system is well-developed, as described on slide 6, but acknowledge that in the outer parts of the region, the system is still developing.
   - Improving vehicle technology with electrification is important for reducing emissions, but don't understand the need for significant behavior change in reducing vehicle trips to become a reality.
   - Land use can be used to leverage transit investments as well, not just the other way around as stated in the TPP (leverage transportation investments to guide land use). A transit system can't be efficient with supportive land use patterns, while in other situations without transit (such as the Gold Line) the needed planning and investments may not happen to create supportive land uses. This goal depends on the situation and could be tweaked.
   - "Mobility" seems to be used in more of a highway context here; it can be used to mean different things for transit, biking, and walking. The meaning depends on the context. This is something to discuss more for the larger 2050 update.

2. **Review of TPP Work Program**

   Amy Vennewitz presented this item with the draft updated chapter.

https://metrocouncil.org/Council-Meetings/Committees/Transportation-Advisory-Board-TAB/TAB-Technical-Advisory-Committee/TAC-Planning-Committee/2020/TAC-Planning-01-09-20/DRAFT-Updated-Work-Program.aspx

Vennewitz asked for thoughts on work that should be done related to connected and autonomous vehicles. Committee discussion included the point that we should be ahead of technology and restate our values and what we hope the technology will do rather than just responding to the technology. White Bear Lake will be hosting a demonstration autonomous vehicle project to connect with a senior center in the community. With regards to the Downtown Transit Capacity and Transit Advantages Analysis in the work program, there is energy behind downtown transit in St. Paul, which hosted a NACTO charette recently, and the city may increase work on downtown planning and transit. Metro Transit is working with Minneapolis on how the speed and reliability of transit service is improved in its downtown, where some corridors have over half the people moved on 4% of vehicles by using transit. In relation to some of the pedestrian work, Dakota County is looking at pedestrian safety in school areas, and MnDOT is hiring a planner with an ADA focus, so the work program relates to some of the work other partners are doing in this area.

3. **Public Comments Received on the Draft Public Transit and Human Services Coordinated Plan**

   Heidi Schallberg presented this item.

   https://metrocouncil.org/Council-Meetings/Committees/Transportation-Advisory-Board-TAB/TAB-Technical-Advisory-Committee/TAC-Planning-Committee/2020/TAC-Planning-01-09-20/Comments-Memo-TC-01272020.aspx

OTHER BUSINESS

None

ADJOURNMENT

After business was completed, the meeting adjourned.

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 sustainable 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. 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

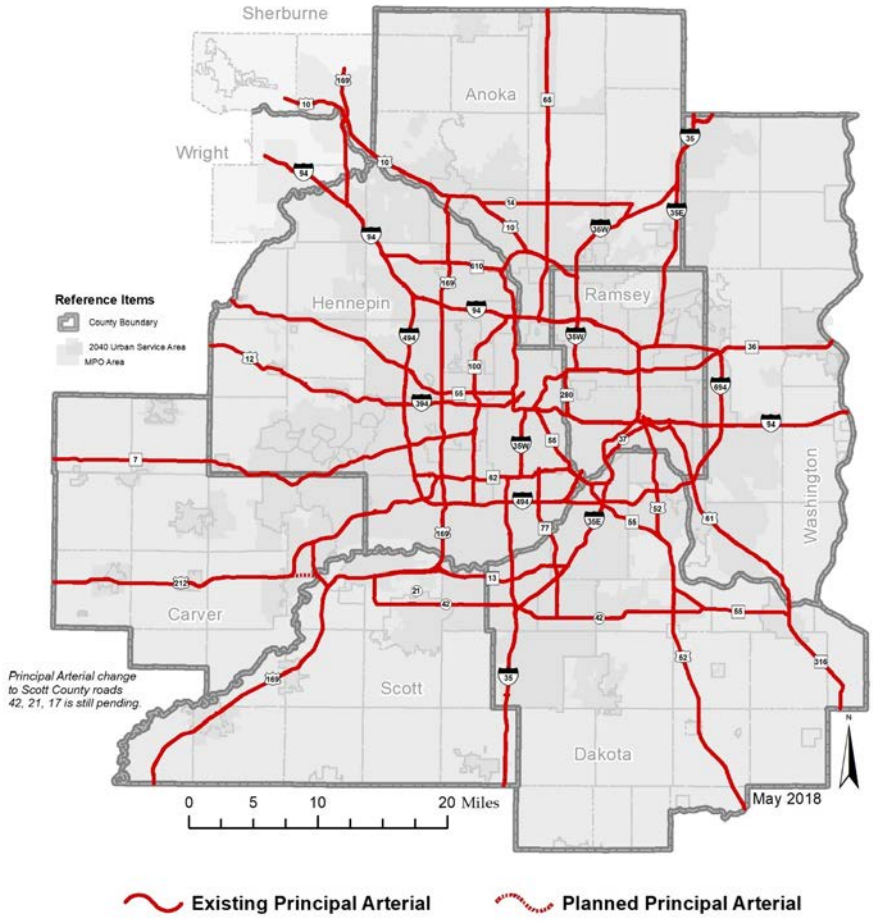

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Figure 5-2: Principal and A-Minor Arterial System

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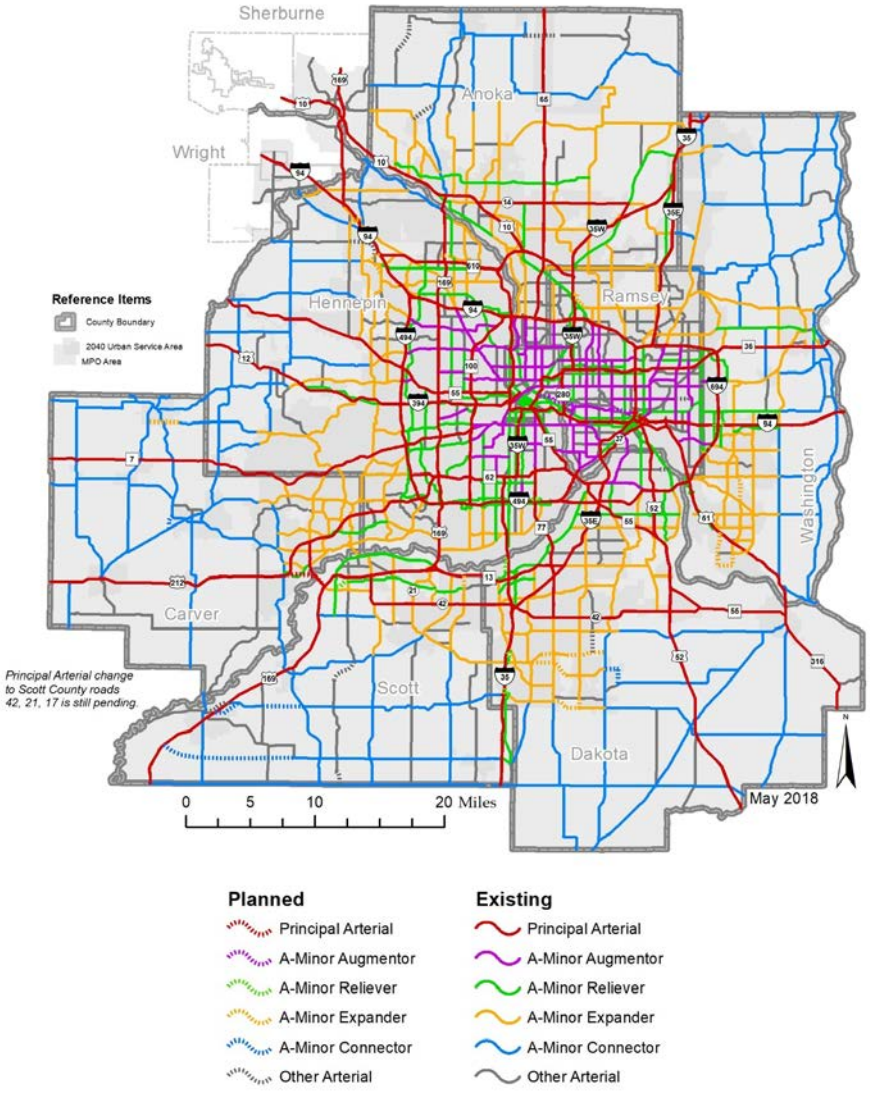

Beyond the principal arterials and A-minor arterials, the other minor arterials, collectors, and local streets total approximately 15,000 centerline miles (see Table 5-1). They make up 85% of road mileage in the region and are the responsibility of local governments.

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 and is now a well-developed and managed system. 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

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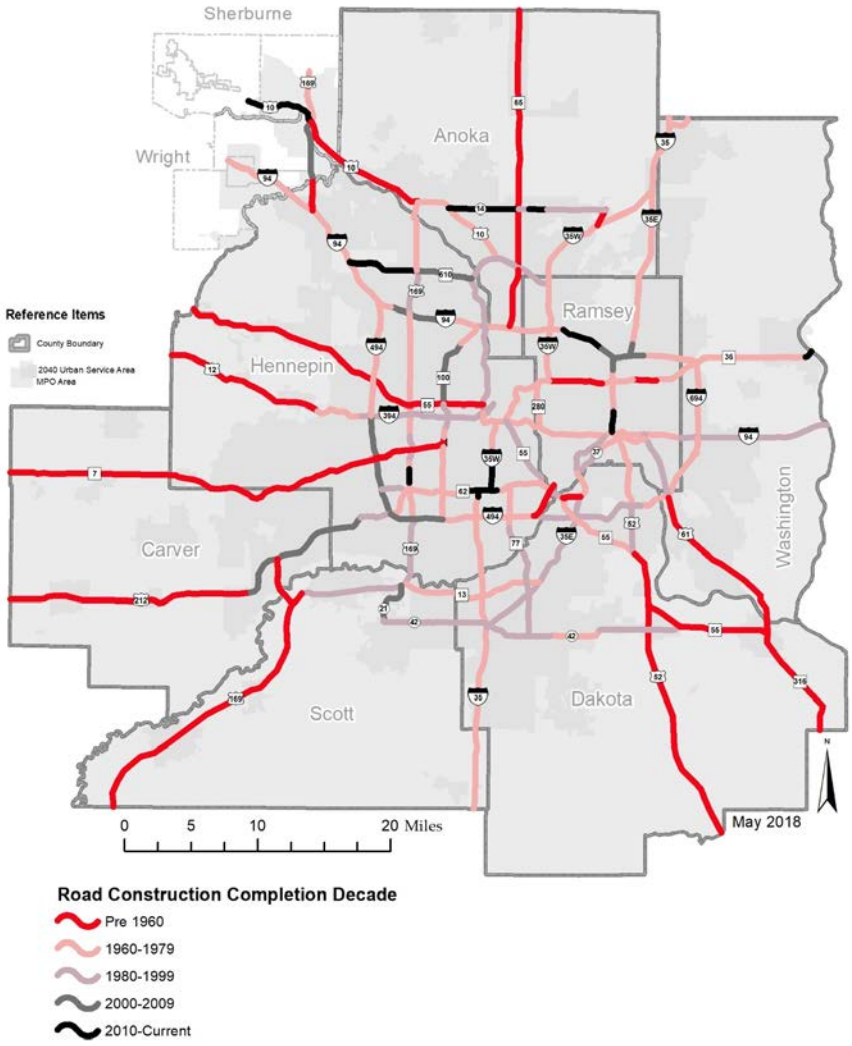

Table 5-2: Principal Arterials Pavement Construction Era

	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 January 2015. The consideration of safety improvements is inherent in all projects and projects types to varying degrees. Some of these projects rebuilt and otherwise improved an entire corridor (including interchange improvements), while others improved mobility at a single interchange and some generally 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 ~~congestion-free~~ alternative for high-occupancy vehicle travel, such as

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

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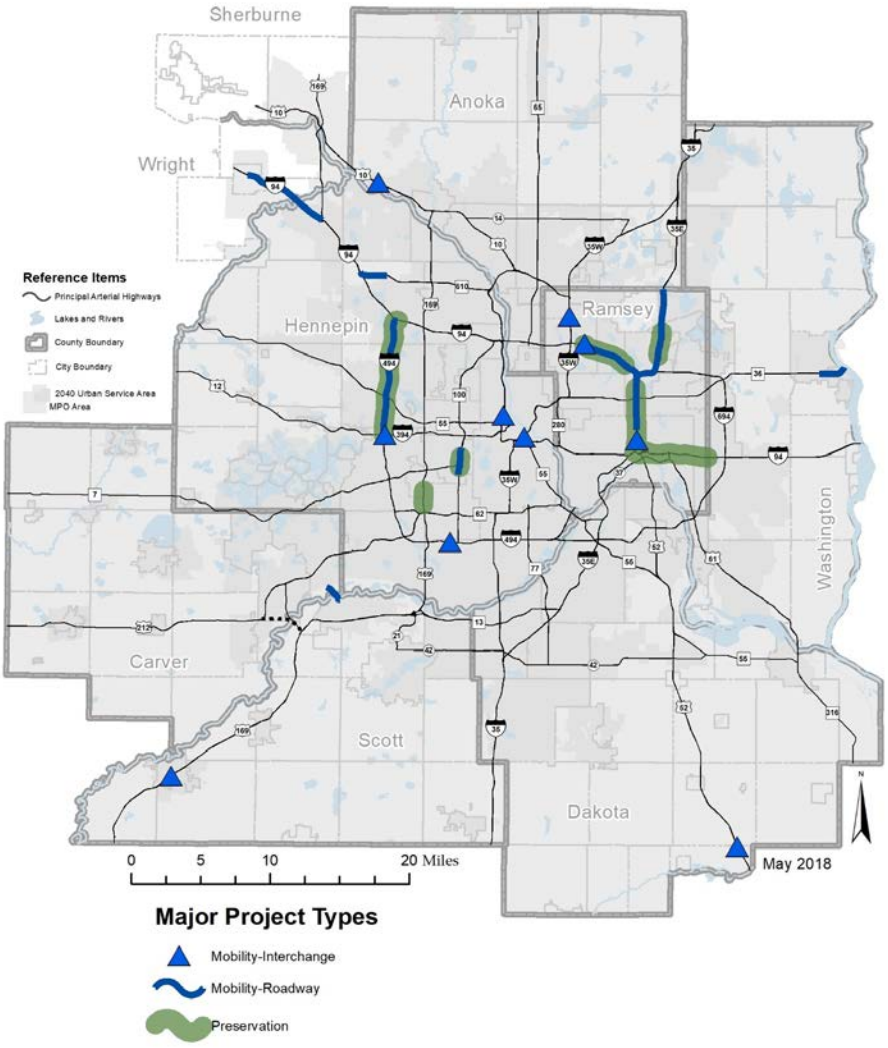

transit and carpooling. In addition, they also provide an ~~congestion-free~~ alternative to solo motorists willing to pay during periods of peak congestion. The MnPASS lanes were extended further north on I-35E in 2016 as part of another preservation project.

- **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 approximately 30%, 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 $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 $73 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)

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. 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

Commented [PS7]: Update with new model results

denser parts of the region where they drive less, and using newer tools that affect travel (i.e. telecommuting, online shopping, etc.).

~~Since the 2015 plan the numbers reported here reflect a different anticipated outcome in 2040. Population forecasts for 2040 are similar however daily vehicle trips were anticipated to increase by 2.1 million and are now forecast to grow by only 1.1 million over the same time horizon. Daily vehicle miles traveled were anticipated to increase by 16.5 million but updated work estimates this increase at only 12.2 million. These changes in expectations for 2040 result from a number of factors. The region's new activity-based model better reflects the aging population and the fewer trips and miles that older people travel. More recent data shows that younger people are often choosing to live in denser parts of the region where they travel by car less often and we are all using new tools more often that affect travel.~~

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."

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~~ 2015 and 2040

	~~2010~~2015	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	85,120,000	12,220,000	17%
Daily Vehicle Miles Traveled per Resident	25.6	23.4	-2.2	-9%

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Figure 5-5: ~~2016~~ 2018 Congested Principal Arterial Freeways

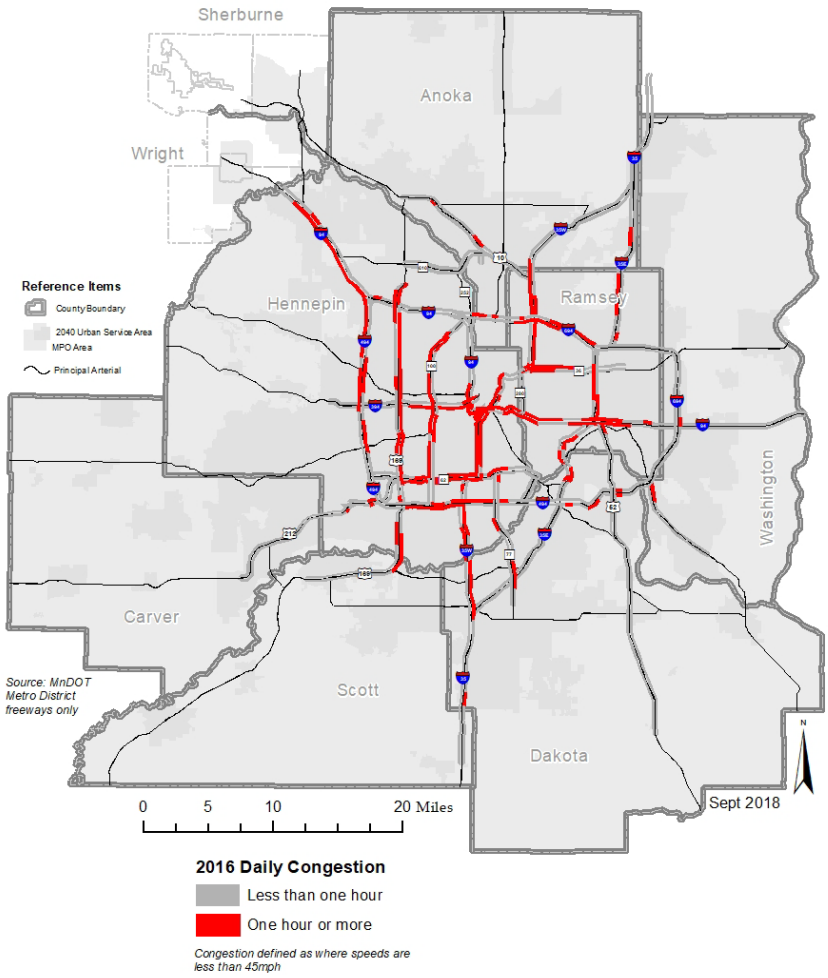

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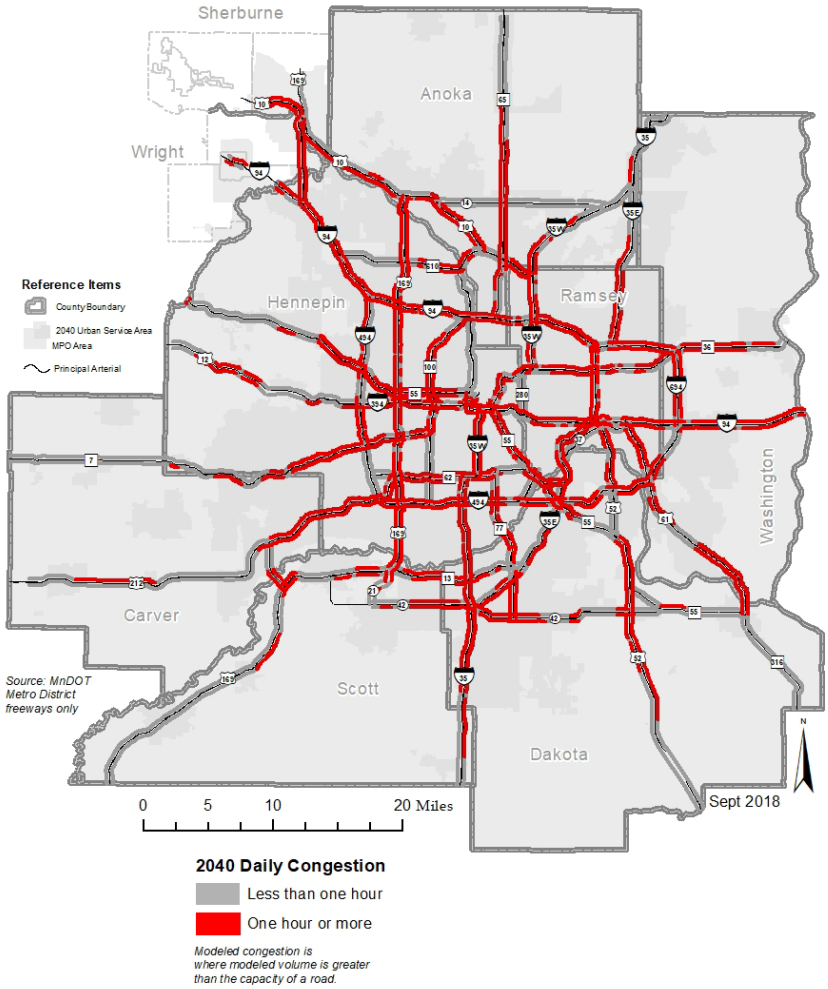
Figure 5-6: 2040 Congested Principal Arterials for Current Revenue Scenario



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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 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 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 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. Traffic management technologies
    b. Spot mobility
    c. MnPASS
    d. 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

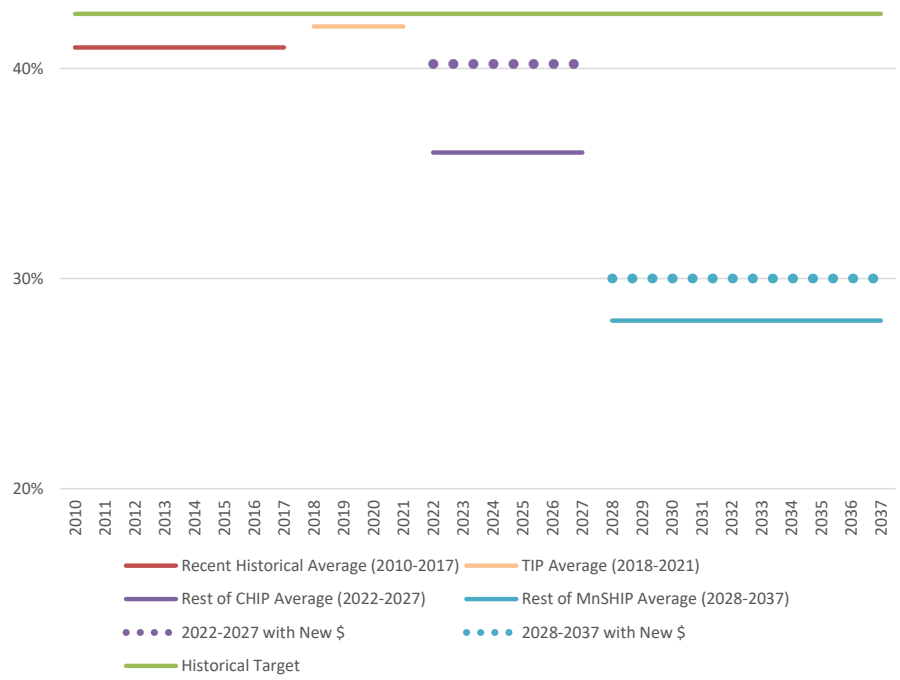
MnDOT projects included in the Current Revenue Scenario were identified consistent with the *Minnesota State Highway Investment Plan 2018-2037* (MnSHIP), published by MnDOT in January 2017. MnSHIP identified expected capital revenues and expenditures for all of the state highway system for the 20-year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

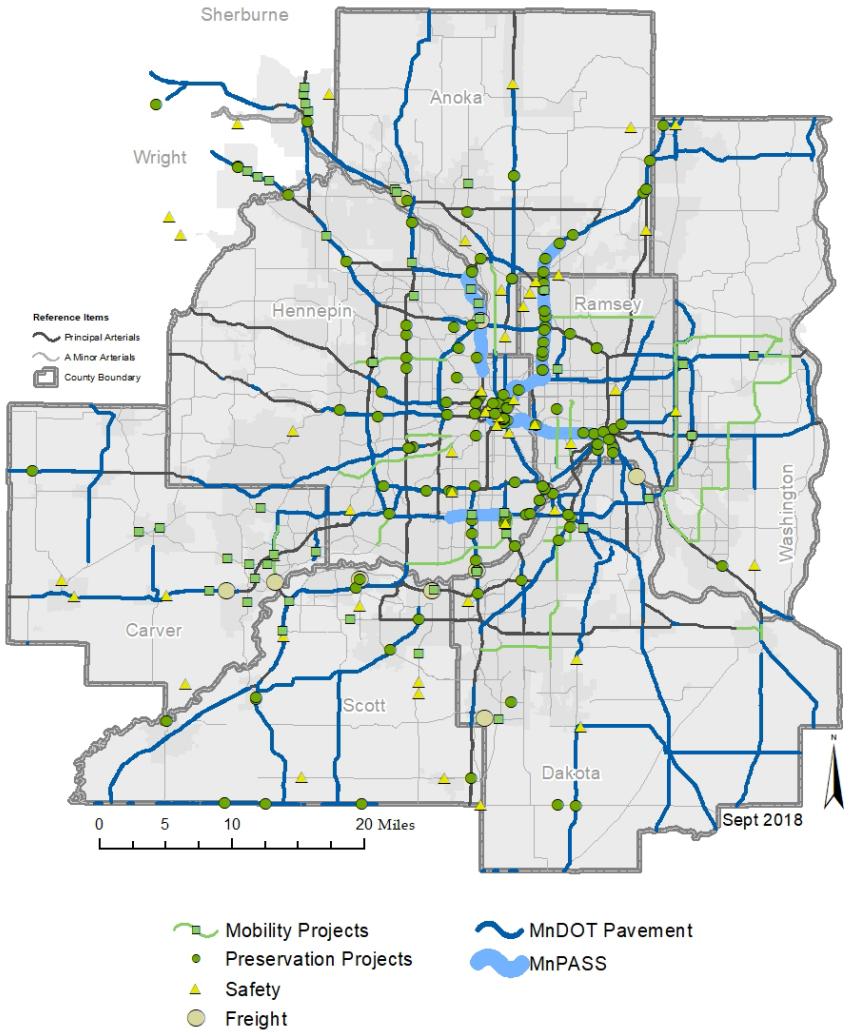
An additional $9 million to $30 million per year of mobility funds were allocated to the metropolitan region starting in 2022 from new state general fund revenues MnDOT received in the 2017 legislative session. These modest increases will primarily allow for a continuation of spot mobility projects and 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 ~~2018~~2021~~2027~~ ~~2030~~2029



Commented [FT11]: Update per project update elsewhere

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 ~~2018~~2020-~~2027~~2029

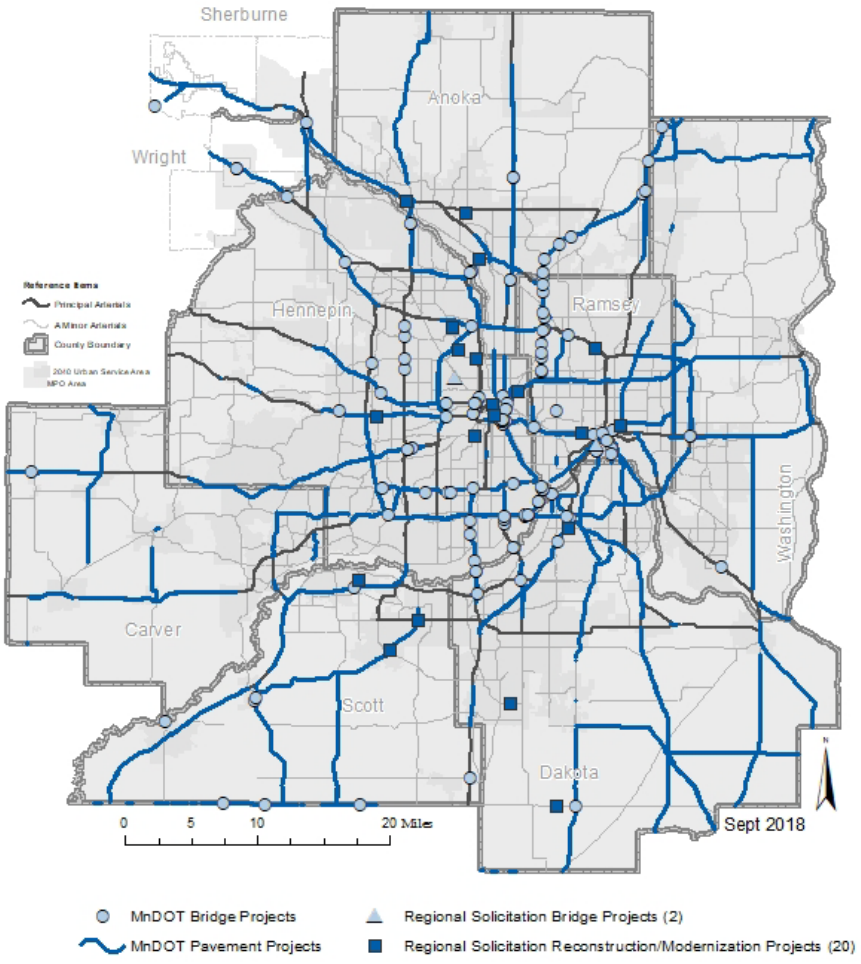


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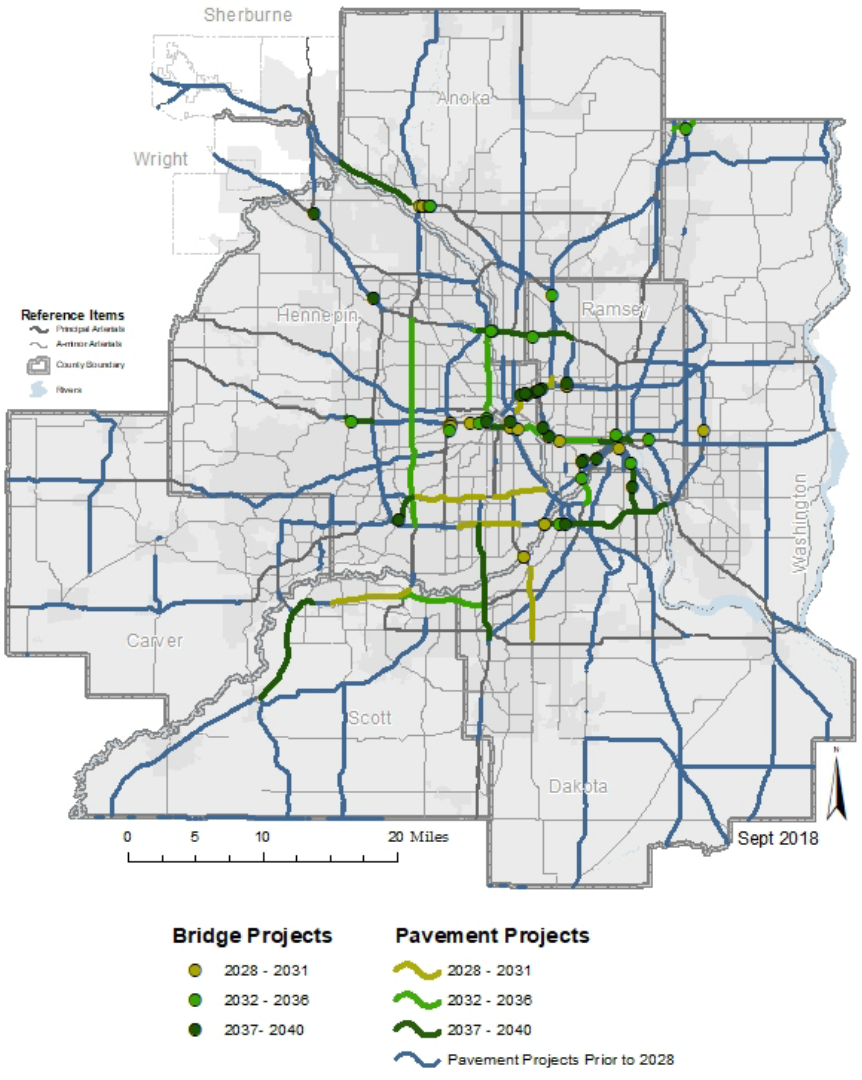
Figure 5-10: MnDOT Planned Pavement and Bridge Preservation Projects ~~2028~~2030-2040



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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 ~~and Non-NHS~~ are less than 2% and~~,~~ less than 4%~~, and less than 10%~~ respectively. In 2018~~6~~ metro area pavement conditions ~~was~~ were at 1.8% poor for the Interstate system and ~~2.3%~~, 1.5~~6~~% percent poor for the non-Interstate NHS. ~~and 8.3% in poor condition respectively.~~ 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

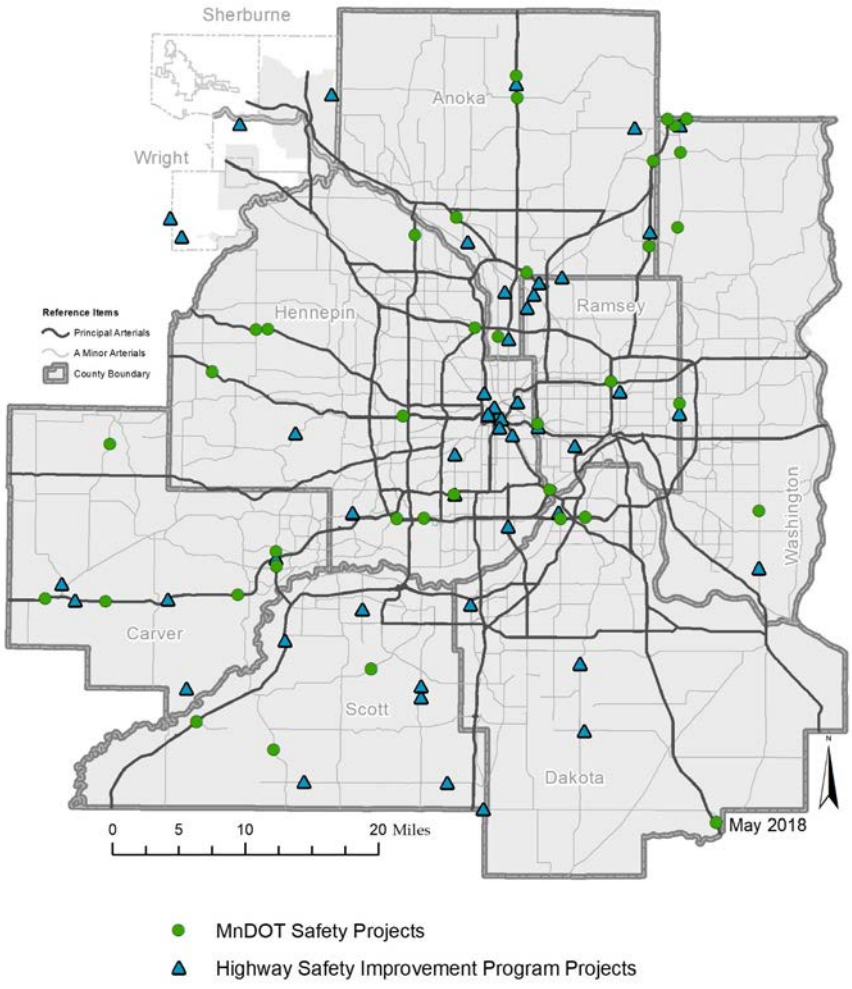
The metro area has a significantly lower rate of fatal and serious injury crashes than the state as a whole. The ~~proposed 2018~~adopted~~-~~2020 fatal and serious injury crash rate targets for the Metropolitan Council are 0.3~~41~~ per 100 million VMT and 2.3~~65~~ per 100 million VMT, respectively. This compares with state-wide targets of 0.6~~32~~ fatal crashes per 100 million VMT and 2.85~~3.19~~ 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 ~~2018~~2020-~~2022~~2024



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Also, the triangle on the MN River in Carver Co was withdrawn recently.

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Regional Mobility

This plan estimates that the region's population will grow by 28% between ~~2010~~ 2015and 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.

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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 four sub-areas that start with the least costly project types and move to more expensive project types.

1. **Traffic Management Technologies** – The region's first 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.
2. **Spot Mobility** – The second 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.
3. **MnPASS** – If traffic management or spot mobility projects will not adequately solve the mobility problem, then the third priority of mobility investment is MnPASS lanes. These priced lanes manage demand to provide a ~~congestion free~~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.

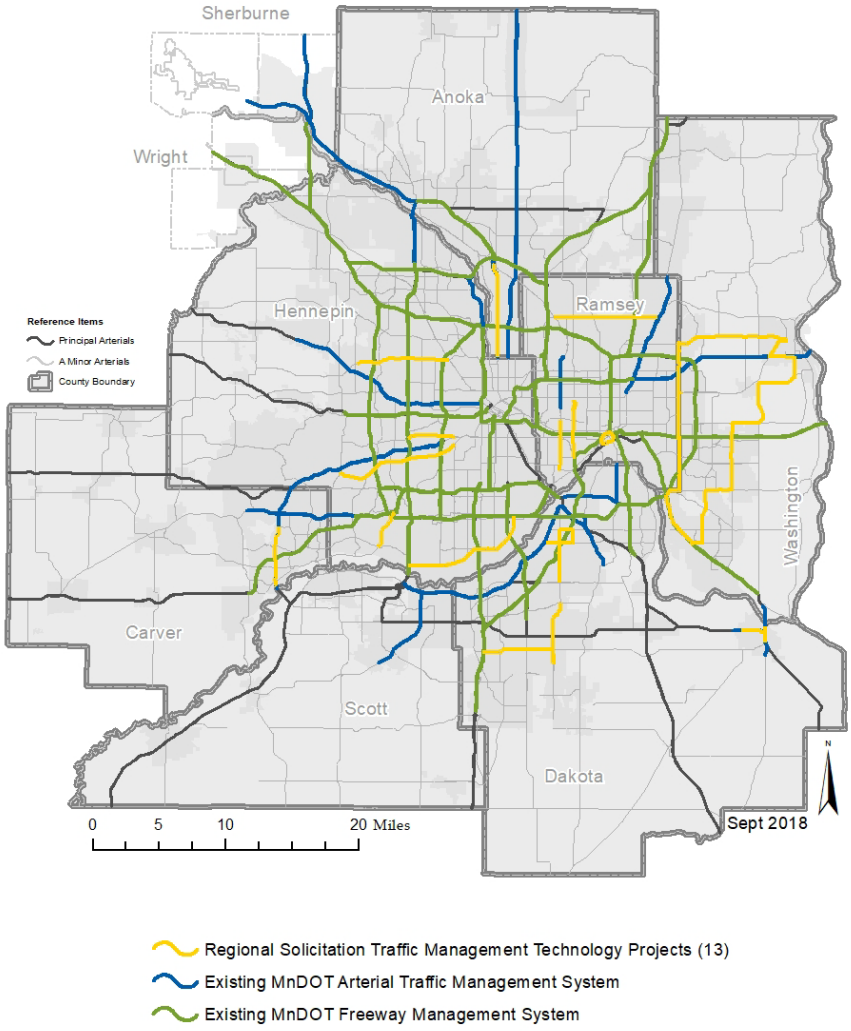
4. **Strategic Capacity Enhancements** – The fourth priority of mobility investments, strategic capacity enhancements (namely interchanges and general-purpose lanes), are implemented when other previously described investments cannot improve travel conditions for people and freight. These must utilize 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. 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



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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.

2. 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.

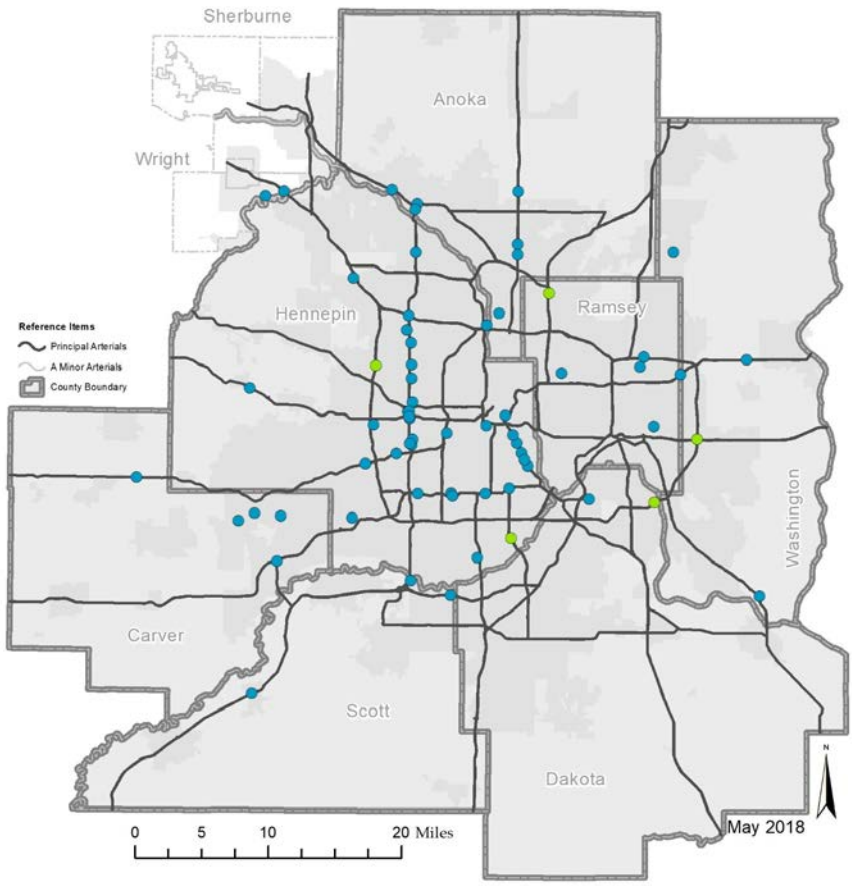
~~MnDOT has worked with other regional highway partners over the past several years to identify CMSP opportunity areas. The 2040 Transportation Policy Plan (adopted January 2015) included 50 locations with opportunities to address congestion and safety problems using lower-cost/high-return-on-investment spot mobility improvements. MnDOT has implemented with great success some lower-cost/high-return-on-investment projects such as the widening of MN 100 at MN 7 and Minnetonka Boulevard, and the addition of a third lane on I-94 between Century and McKnight avenues. More recent investments include an additional lane on westbound I-494 from I-35W to MN 100, extended turn lanes on the exit ramps from MN 100 to MN 55 and an added left turn lane from eastbound MN 55 onto US 61. In addition, other spot mobility projects have been completed or are under development by MnDOT for implementation, including the five projects shown in Figure 5-13 and Table 5-8. Some of these projects consist of capacity enhancement and short auxiliary lane additions, while others focus on providing transit advantages or improving roadway system management.~~

In 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-grad 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 ~~y Areas Identified in CMSP 4~~ (MnDOT~~, 2018~~)

Commented [PS20]: Remove green, add Freeway System Interchange projects <= $10m & <= 4 year return period



- Congestion Management Safety Plan Locations (61)
- Congestion Management Safety Plan Programmed Projects (5)

~~Table 5-8: Programmed CMSP Projects~~

~~Location~~	~~Description~~	~~County~~	~~Municipality~~
~~I-94/I-494/I-694~~	~~Auxiliary lane southbound from 10th St North to westbound I-94 and from westbound I-94 to Tamarack Rd~~	~~Washington~~	~~Multiple~~
~~I-35W & US 10 South Junction~~	~~Add 2-lane exit and auxiliary along US 10 to Ramsey County 96~~	~~Ramsey~~	~~Multiple~~
~~I-494 from Hardman Avenue through 7th Avenue~~	~~Add one-mile westbound lane~~	~~Dakota~~	~~South St. Paul~~
~~MN 77 & Old Shakopee Road~~	~~Add right turn lane to northbound exit~~	~~Hennepin~~	~~Bloomington~~
~~I-494 & Rockford Road~~	~~Add turn lanes to exit ramps~~	~~Hennepin~~	~~Plymouth~~

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, ~~and are estimated, at a planning level, to~~ cost less than $10 million, and have return-on-investment periods of less than four years. These projects are mapped in Figure 5-13.

3. Regional Mobility: MnPASS

Priced managed lanes can provide a less congested, more reliable ~~reliable, congestion-free~~ 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 5-9. 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 ~~for the MnPASS lane~~ along I-94 from MN 55 (~~Olson~~ Hiawatha Avenue~~Memorial Highway~~) to ~~MN 61~~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. ~~Parts of the MnPASS vision on~~

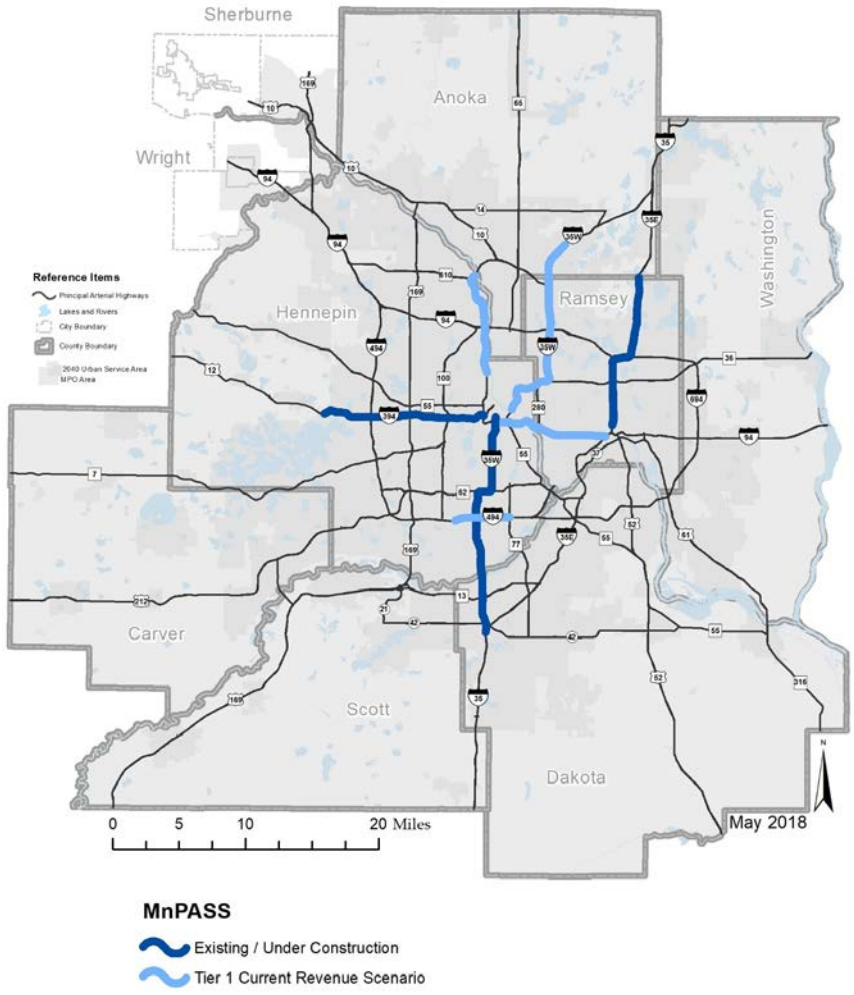
- MN 252/I-94 from MN 610 to Dowling Avenue~~,~~;
- I-494 from US 169 to MN 5; and

- I-35W from Ramsey County Road C to downtown Minneapolis ~~are funded in this plan and so these corridors are shown as both Tier I as part of the Current Revenue Scenario and Tier II as part of the Increased Revenue Scenario.~~

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 congest~~ion~~ed, more~~-free~~ reliable trip. These projects are detailed in the Increased Revenue Scenario, under Strategic Capacity Enhancements.

Figure 5-14: MnPASS System under Current Revenue Scenario



Commented [PS21]: Show I-35W North MnPaSS as existing/under construction

Commented [FT22R21]: Update limits of 494 to match text

Table 5-9: 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-35W~~	~~Ramsey County C~~	~~Lexington Avenue~~	~~Construct MnPASS lanes~~	~~Contract letting 2018~~
I-94	Downtown Minneapolis	Downtown Saint Paul	Design under study between MN 55 and MN 61	Environmental document in process~~Construction starting in 2022~~
I-35W	Ramsey County C	Mississippi River	Construct MnPASS, with southbound being the priority	Environmental document in process~~Corridor study starting in 2018~~

Route	From	To	Description	Status
I-494	West of East Bush Lake Road	East of MN 77/Cedar Avenue	Construct MnPASS and other improvements	~~Corridor study~~Environmental document in process ~~completed in 2017~~
MN 252/I-94	I-94 I-694	MN 610 Dowling Ave	Construct MN 252 MnPASS lanes in conjunction with freeway conversion Construct new I-94 MnPASS lanes between I-694 and Dowling Ave	~~Corridor study ongoing in 2018~~Environmental document in process

4. 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. ~~In addition, general purpose lane capacity enhancements should be considered only if MnPASS has been evaluated and found not to be feasible.~~ 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 5-10 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 ~~2018~~2020~~10~~-2025

Commented [PS23]: Add Scott, Dakota, Carver, and Anoka projects, plus new Reg Sol projects.

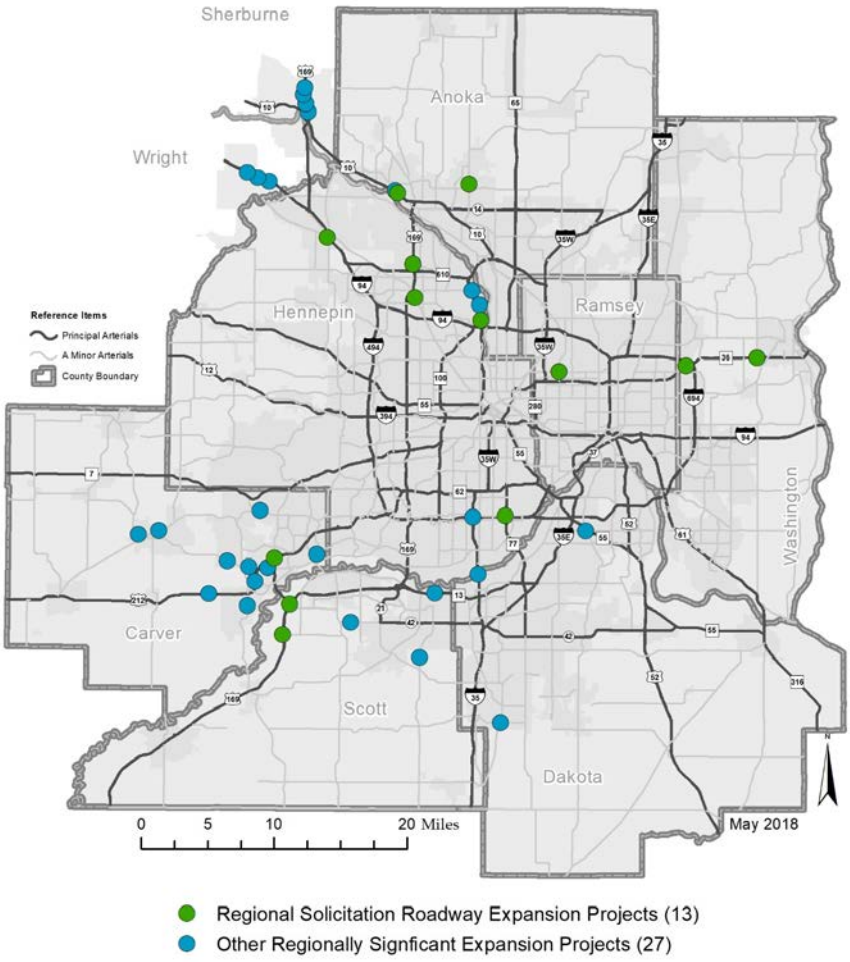


Table 5-10: Highway Strategic Capacity Enhancements ~~2018~~2020-2025*

Road	Location	Project Description
~~Anoka CR 78~~	~~139th Lane NW to CR 18~~	~~2 to 4 Lanes~~
~~Hennepin CR 81~~	~~71st Avenue to 83rd Avenue~~	~~4 to 6 Lanes~~
~~I-35W~~	~~Cliff Road to Mississippi River~~	~~Extend Northbound Truck Climbing Lane~~
~~MN 36~~	~~Hadley Avenue~~	~~Interchange~~
~~MN 41~~	~~US 212 to Carver CR 14~~	~~2 to 4 Lanes~~
~~US 169~~	~~MN 41/Scott CR 78~~	~~Interchange~~
MN 36	Manning Avenue	Interchange
~~MN 51~~	~~Ramsey CR B2 through Lyndia Av~~	~~3rd Lane Northbound Only~~
~~US 169~~	~~Scott CR 14~~	~~Interchange~~
I-94	Dayton Parkway (Brockton Lane)	Interchange
I-94	Dayton Parkway (Brockton Lane) to MN ~~610~~101	~~Auxiliary~~ New Lanes
~~MN 252~~	~~66th Avenue~~	~~Interchange~~
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 ~~50~~23	2 to 4 Lanes
~~MN 212~~	~~Carver CR 44~~	~~Interchange~~
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 10~~	~~Carver CR 11 to CR 43~~	~~2 to 4 Lanes~~
Carver CR 11	US 212 to 6th Street	2 to 4 Lanes
~~Carver CR 18~~	~~MN 41 to Bavaria Road~~	~~New 2-lane Arterial~~
~~Waconia Bypass~~	~~MN 5 to Carver CR 10~~	~~New 2-lane Arterial~~
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 42~~	~~Scott CR 17 to Scott CR 83~~	~~2 to 4 Lanes~~
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

Commented [PS24]: Move to Increased Rev Scenario

I-494	I-35W	Directional Ramp
MN 252	73rd Ave N to 85th Ave N	~~Two~~ 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 5-11 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, ~~2018~~2021-~~2022~~2025

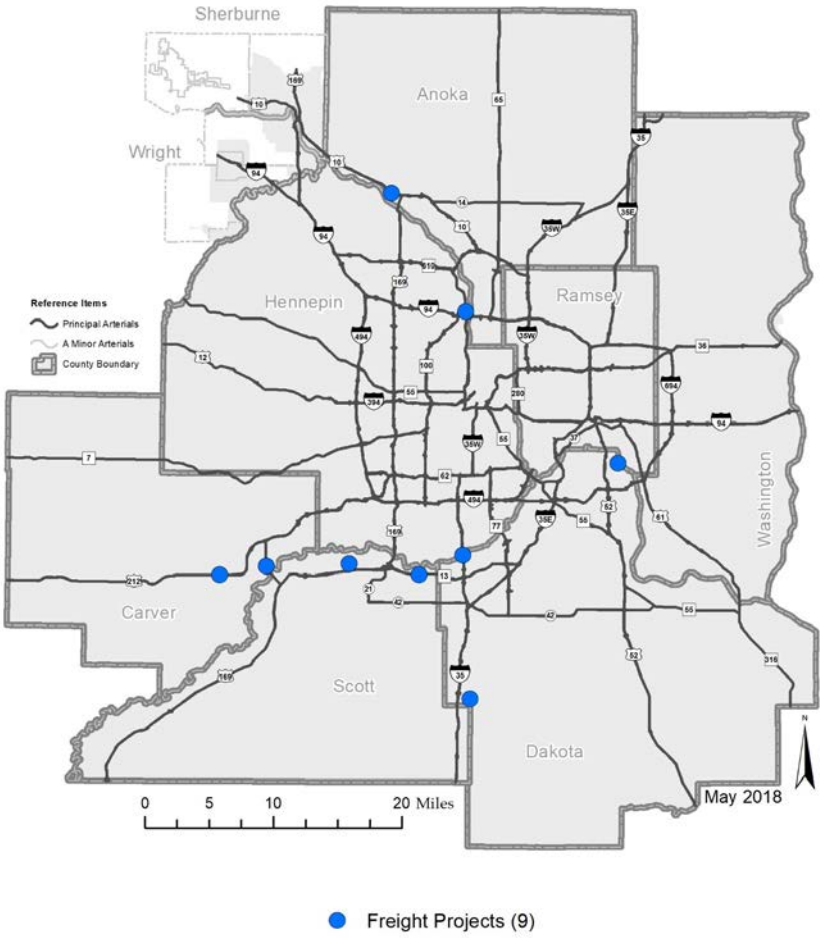


Table 5-11: Federal Highway Freight Program Projects, ~~2018~~2021-~~2022~~2025

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.

Multimodal: Travel Demand Management

In addition to the four 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.
- **Transit for Livable Communities and St. Paul Smart Trips** – 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 5-12). 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 5-12: 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
St. Paul Smart Trips 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

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).

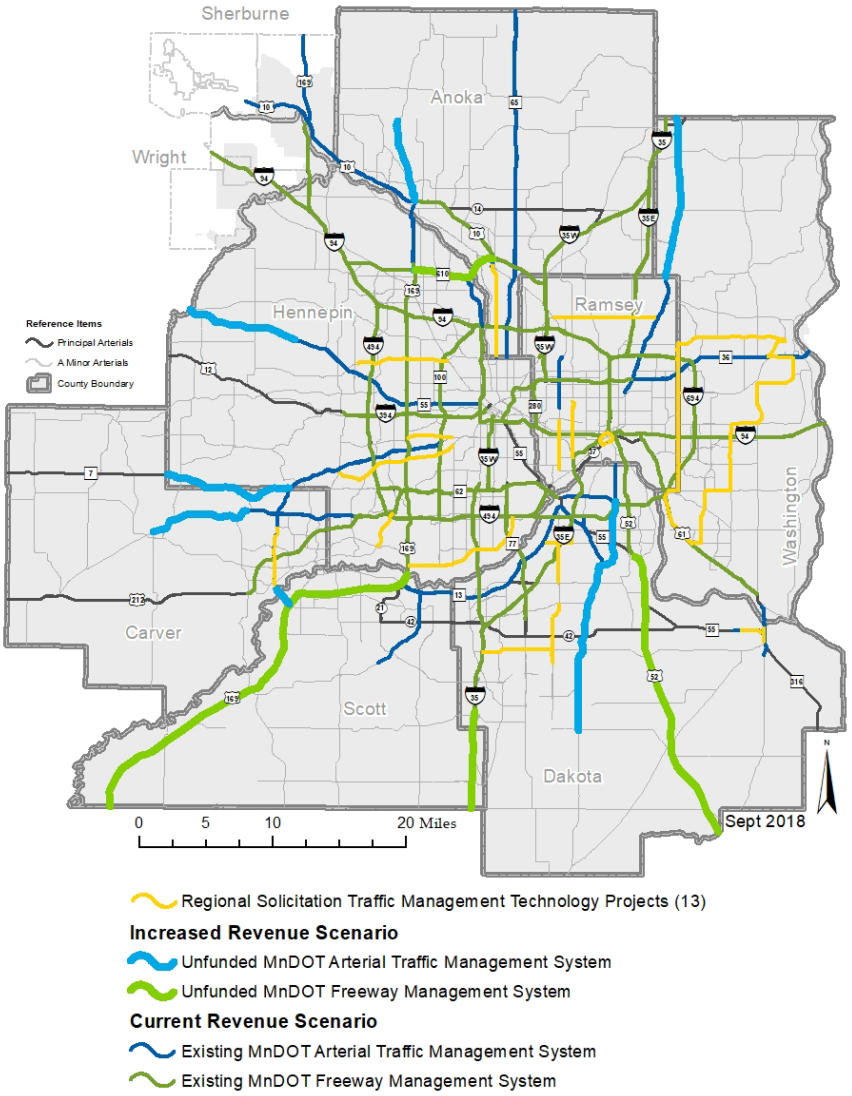
Regional Mobility

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



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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

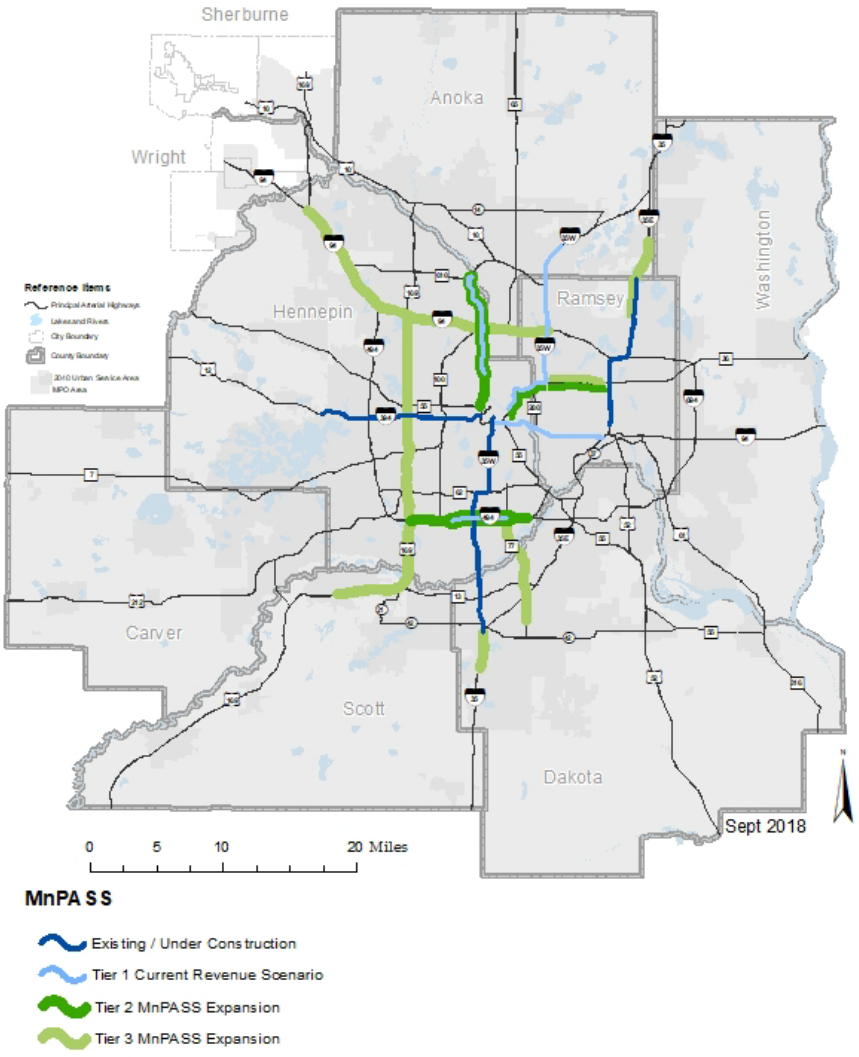
The purpose of MnPASS System Study 3 (completed in 2017) was to assist in updating the MnPASS Vision in this plan and prioritize MnPASS corridors. Since the MnPASS System Study 2, many changes have occurred to MnPASS corridors, as well as to other regional highways. The MnPASS System Study 3 was needed 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



Commented [PS26]: Show I-35W North as existing/under construction

Commented [FT27R26]: Update limits of 494 Tier I to reflect text

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 to be completed in 2018
I-35W	Ramsey County Road C	Mississippi River	Construct MnPASS lanes not completed within Current Revenue Scenario	Corridor study starting in 2018
I-494	West Bush Lake Rd	MN 5	Construct MnPASS lanes in remaining sections of project not completed within Current Revenue Scenario	Corridor study completed in 2017
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	Corridor study ongoing in 2018

TIER 3 PRIORITY

Route	From	To	Description	Status
MN 36	I-35W	I-35E	Add Westbound Lane Only	Corridor study to be completed in 2018
MN 77	138th St	I-494	Add Northbound Lane Only	Study has been completed
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 general-purpose lanes. 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 and 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 ~~congestion free~~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 ~~congestion free~~less congested option would not provide all of these trips a ~~congestion free~~less congested trip at one time or even on any one day but allow a pricing algorithm and driver preferences to interact to provide that benefit precisely 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~~congestion free~~ option in each of two scenarios. By definition, all 2.6 million trips on congested freeway corridors have no ~~congestion-free~~ option without MnPASS. In the Increased Revenue Scenario 700,000 trips will be on corridors with the less congested ~~congestion free~~ option that MnPASS provides so the number of trips without ~~an entirely congestion free~~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 ~~congestion-free~~ MnPASS option on nearly 60% of the currently congested freeways.

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

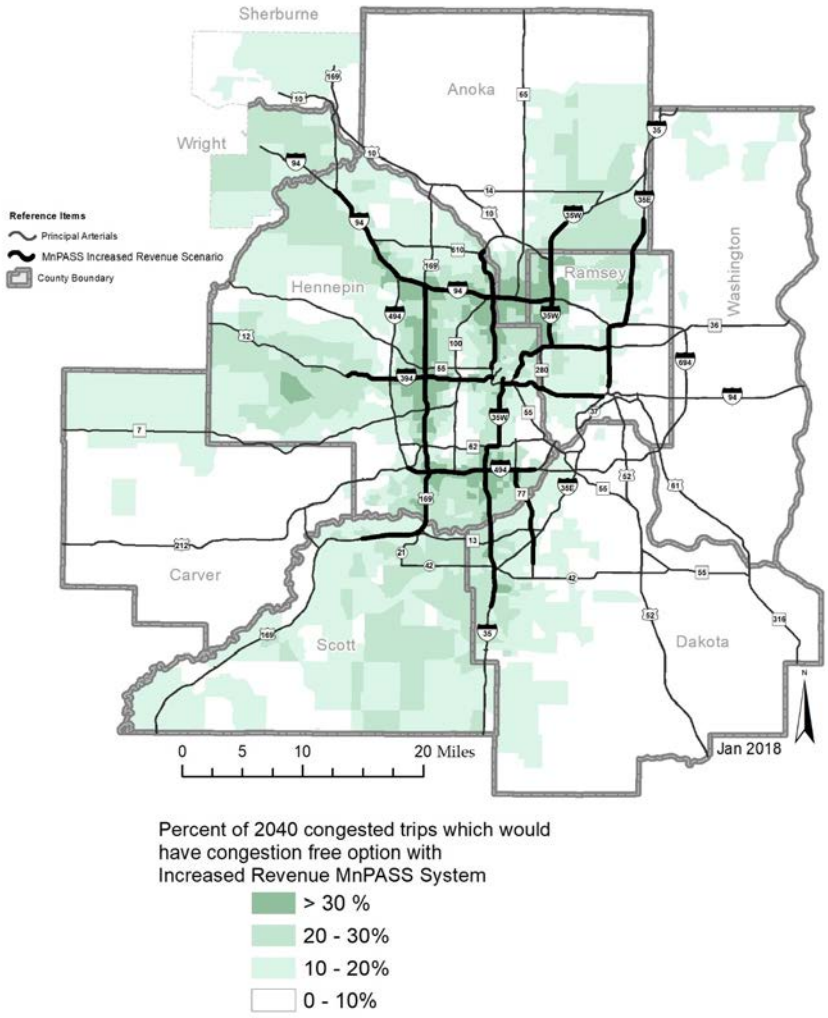


Table 5-15: 2040 Peak Period Trips and Congested Lane Miles with Congestion-Free Options

	Congested Corridor Trips without a ~~Congestion-Free~~MnPASS Option	Congested Corridor Trips with a ~~n Entirely Congestion-Free~~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 ~~congestion-free~~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 three 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.

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

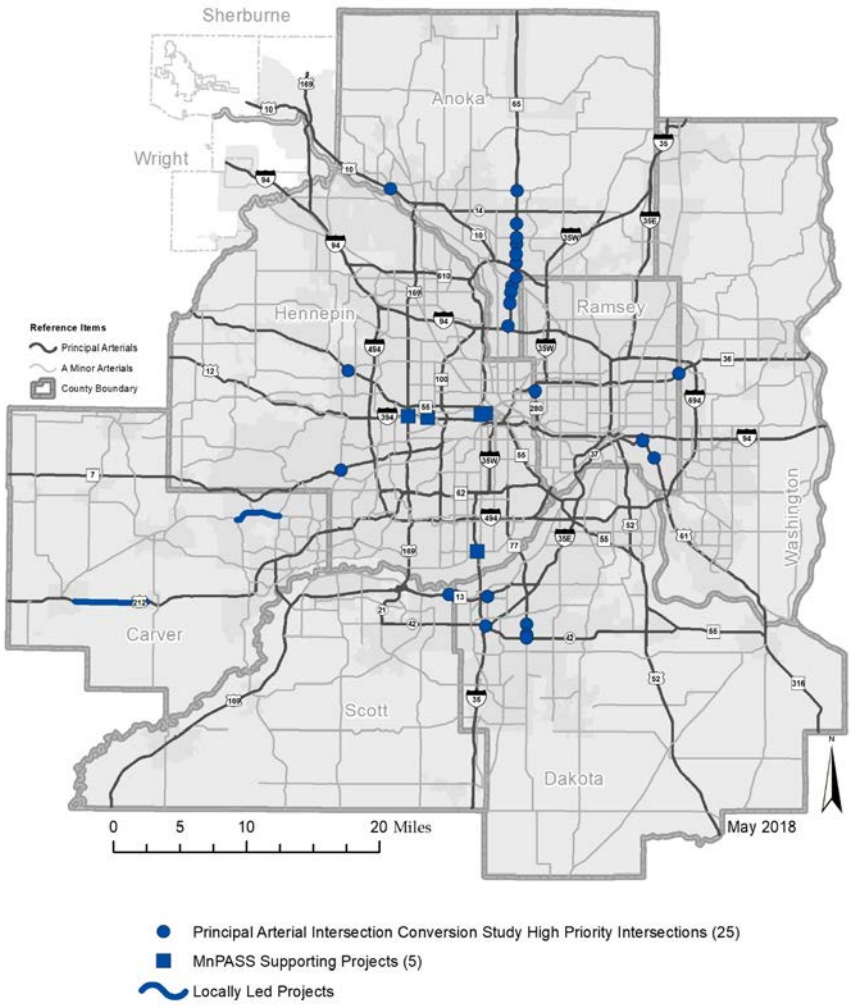
If the above strategies have been exhausted or will be ineffective, strategies such as raising the maximum rate, changing the HOV policy to only allow vehicles with three or more occupants to use the lanes for free, requiring HOV users to have MnPASS accounts and tags, implementing camera-based license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

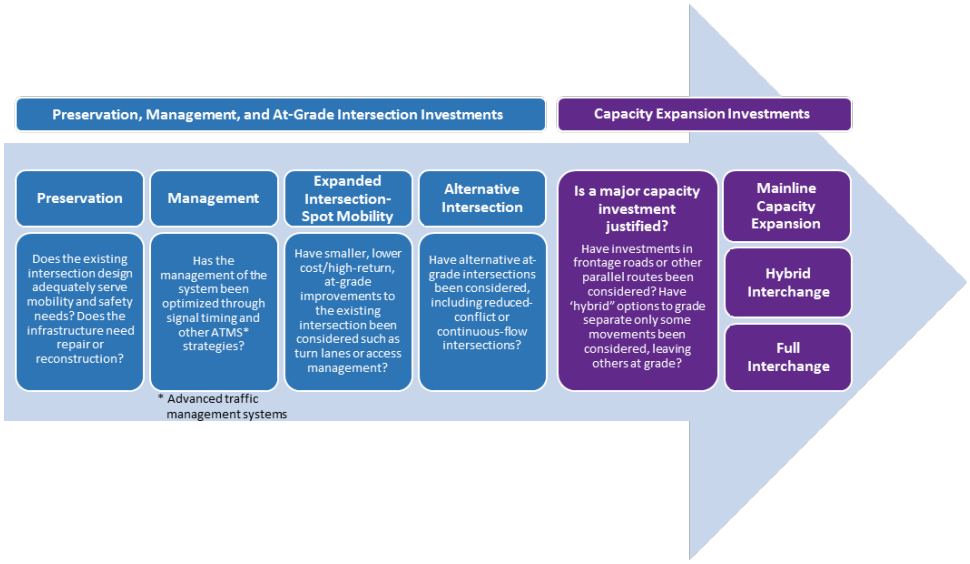


Commented [PS28]: Remove TH 10/Thurston, update map with new PAs in Scott co, remove Hadley and TH 36

Commented [FT29R28]: Add FSIS not in Spot Mobility Figure 5-13, add Carver 10 (moved from Current Revenue)

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. ~~The study also recommended several routes be considered in the long-term for principal arterial designation. These potential routes include segments of Dakota County 70, MN 50/MN 61, Dakota County 23, Dakota County 86, MN 3, and/or MN 149.~~
- ~~**Washington County** has identified Washington County 15/Manning Avenue as the route for its potential future north-south principal arterial.~~

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

CHAPTER 6
TRANSIT INVESTMENT DIRECTION AND PLAN

Residents and businesses view a strong public transit system as an essential part of a transportation system that will serve a prosperous, livable, equitable region. The federal government, state government, and the region have all acknowledged that a sustainable future must include a variety of options for travel within urban areas. Transit service and facilities must be located where they will bring a strong return on the investment. Park-and-ride facilities are best located in suburban and developing areas, while high-frequency bus service is best located in urban neighborhoods. In order to be good stewards of public investments, the region must invest in transit strategically with solutions that broadly strive toward this plan's regional goals and objectives, and integrate with land use and other regional systems. In this way, transit benefits the entire region, including places with no or limited service.

The region's transit investment plan plays a role in realizing all of the goals of the *Transportation Policy Plan*. However, the transit investment plan also plays roles in addressing the specific performance-based objectives. The objectives provide the foundation for investment factors that are used to set transit investments priorities. Table 6-1 helps link to parts of the transit investment plan that summarize investments or guide investment decision-making.

Table 6-1: Linking Transit Investment Direction and Plan to Goals and Objectives

Goal	Objectives Guiding Investments	How are these objectives reflected in the plan?
Transportation System Stewardship	A. Efficiently preserve and maintain the regional transportation system in a state of good repair. B. Operate the regional transportation system to efficiently and cost-effectively move people and freight.	This plan fully funds the existing transit system and has tools to ensure that it is managed to be efficient and cost-effective. Investments in expansion and modernization will also consider cost-effectiveness as an investment factor to get the most out of new project.
Safety and Security	A. Reduce fatal and serious injury crashes and improve safety and security for all modes of passenger travel and freight transport. B. Reduce the transportation system's vulnerability to natural and man-made incidents and threats.	Safety and security are essential elements of the transit system. Their consideration should be integrated with all investments. Specific investments opportunities are also discussed in the plan.
Access to Destinations	A. Increase the availability of multimodal travel options, especially in congested highway corridors.	Providing access is a fundamental role of the transit system. This plan has multiple considerations for increasing ridership and the availability of transit throughout the investment

	B. Increase travel time reliability and predictability for travel on highway and transit systems. D. Increase transit ridership and the share of trips taken using transit, bicycling and walking. E. Improve multimodal travel options for people of all ages and abilities to connect to jobs and other opportunities, particularly for historically under-represented populations.	factors. There are a number of investment discussions that would improve reliability for transit, including transitways, transit advantages, and technology. Equity is also an important investment factor to address gaps in access to opportunity that exist in the region.
Competitive Economy	A. Invest in a multimodal transportation system to attract and retain businesses and residents. B. Improve multimodal access to regional job and activity centers identified in *Thrive MSP 2040*.	This plan includes transitway system investments that will make the region a more attractive place to live and do business. The plan also includes an Increased Revenue Scenario that will broaden the investments to include more bus service, allowing transit to serve more parts of the region. Connecting to jobs is an important emphasis on the investment factors.
Healthy and Equitable Communities	A. Reduce transportation-related air emissions. C. Increase the availability and attractiveness of transit, bicycling and walking to encourage healthy communities and active car-free lifestyles.	This plan includes investment factors that consider the impacts on the environment, particularly pollution related to congestion. Additional impacts could be related to land use planning that encourages car-free lifestyles.
Leveraging Transportation Investments to Guide Land Use	A. Focus regional growth in areas that support the full range of multimodal travel. C. Encourage local land use design that integrates highways, streets, transit, walking and bicycling.	This plan is intended to help shape the growth of the region with transit investments as catalysts for livable places. Investment factors help guide transit to areas that are adequately planning for high-density, livable places [*insert link to investment factors*].

The Existing Transit System

The regional transit system consists of different types of services, programs, and related infrastructure that serve a variety of roles.

Types of Services

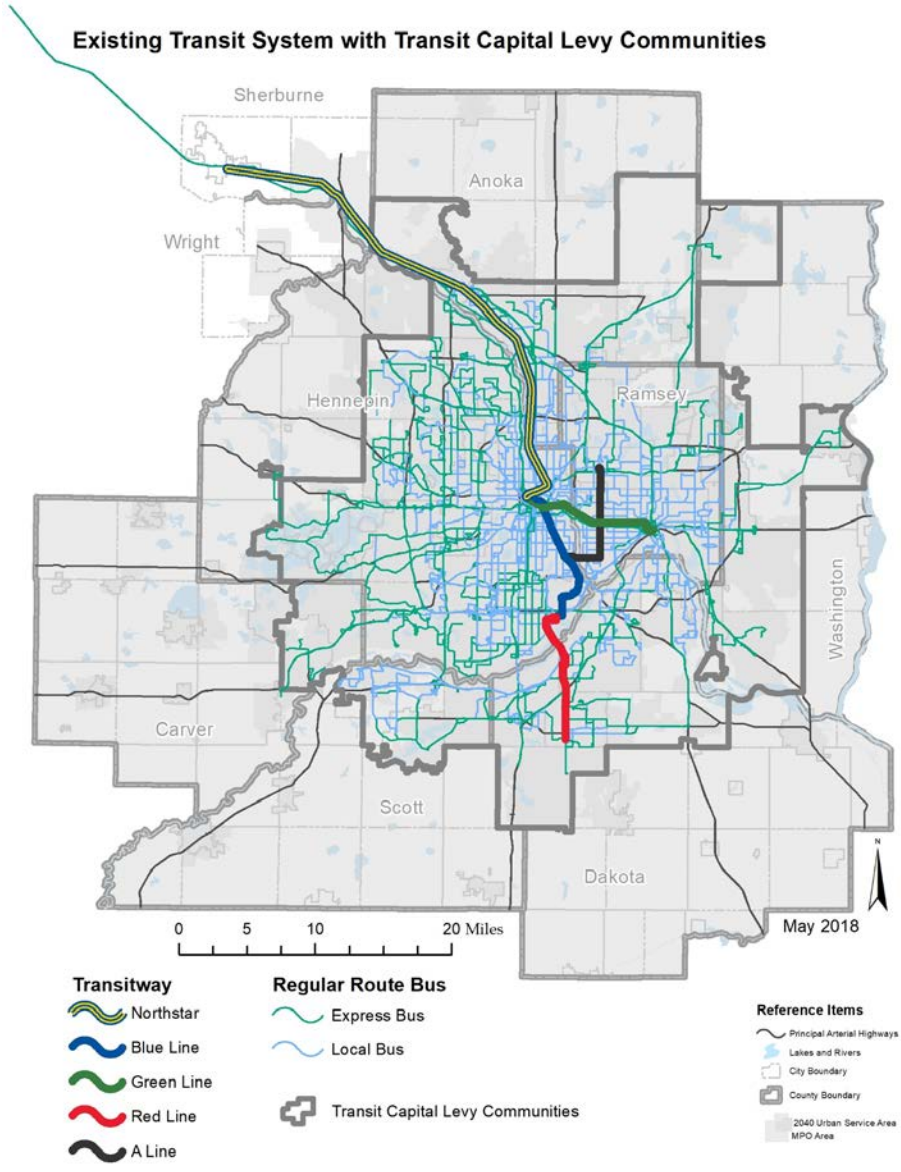
Six types of public transit service currently operate in the Twin Cities area:

- Regular-route bus service is provided on a fixed, published schedule along specific routes, with riders getting on and off at designated bus stops. Regular-route service is provided using a variety of bus types that operate local service and express service. Some providers also operate a deviated fixed route, or flex service. The 12 bus routes in the high-frequency network (figure 6-4 in the Bus and Support System Investment Plan shows existing and potential high-frequency routes) carried about 27% of the region's riders in 2018.
- Light rail transit (LRT) service is provided by electrically powered trains operating at high frequencies in primarily an exclusive right-of-way. Light rail uses specially designed transit stations and amenities. The region's two light rail lines carried about 29% of the region's riders in 2018
- Bus rapid transit (BRT) service is provided at high frequencies with unique buses and specially designed facilities and amenities similar to light rail.
- Commuter rail lines operate on traditional railroad track powered by diesel trains with limited stops. Commuter rail typically serves morning and evening commuters.
- Dial-a-ride is a shared-ride service that that allows customers to schedule pickup times. There are two types of dial-a-ride service in the region: general public dial-a-ride and Metro Mobility service mandated by state and federal law.
- Public vanpools are made up of five to fifteen people, including a volunteer driver, commuting to and from work destinations throughout the region on a regular basis in a subsidized van. Vanpools typically serve origins and destinations not served by regular-route bus service.

Currently 211 regular bus routes operate in the region: 115 local and 96 express. In service are also two light rail lines (Blue Line and Green Line), three BRT lines (the A Line, the C Line and Red Line), and one commuter rail line (Northstar). These services are shown in Figure 6-1.

Figure 6-1: Existing Transit System by Service Type

Commented [HC1]: Will be updated to 2020 data and add C Line.



Transit Service Providers

A number of providers operate transit service in the region. The size, geographic service area, and service types of these providers vary, but the Metropolitan Council works with each provider to ensure the transit system is integrated and cohesive in addressing the region's needs. Providers include:

- Metropolitan Council
  - Metro Transit is the largest transit provider in the region and operates most of the region's regular-route bus service, and all light rail and commuter rail lines.
  - Metropolitan Transportation Services manages a variety of contracted services including regular-route bus, Metro Mobility Americans with Disabilities Act (ADA) service, Transit Link general public dial-a-ride, and the Metro Vanpool service.
- Suburban transit providers operate regular route and, in some cases, dial-a-ride service for 12 suburban communities. These providers are: Minnesota Valley Transit Authority, SouthWest Transit, and the cities of Maple Grove and Plymouth.
- University of Minnesota provides regular-route bus service and ADA service around and between the Minneapolis and Saint Paul campuses.
- There are transit services in the Twin Cities urbanized portions of Wright and Sherburne counties. Tri-CAP currently provides weekday dial-a-ride and deviated rural-route service within the City of Elk River and Trailblazer provider similar services within St. Michael and Albertville. More information on these services can be found in MnDOT's Annual Transit Report.
- Small transit services or individual routes are occasionally operated by other local communities as unique or demonstration services.

Transit Service Areas

Regular-route service is primarily provided by the Metropolitan Council and the suburban transit providers within the Transit Capital Levy Communities, the communities within the seven-county region where a property tax is levied to pay for transit capital needs. The Transit Capital Levy Communities are established in state law but have changed in response to the growing region, most recently with the additions of Lakeville, Forest Lake, Columbus, and Maple Plain.

The ADA requires complementary service for certified riders who want to travel where regular-route transit service is available but are unable to use the regular-route system due to a disability. The state has established additional service areas beyond that through law.

Dial-a-ride service is provided for the general public in areas of Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, and Washington counties where demand cannot be served on regular-route transit. Dial-a-ride service is also available in the contiguous urbanized portions of Sherburne and Wright counties.

Transit Capital and Infrastructure

There are currently two multimodal hubs in the transit network. The Union Depot in downtown Saint Paul serves as a multimodal hub that connects local bus service, light rail transit, intercity bus services, Amtrak passenger rail, and potential future transitways. In 2014, a second regional multimodal hub opened in downtown Minneapolis at Target Field Station, where two light rail lines serve and additional lines will come together in the future to meet the downtown Northstar commuter rail station and other services.

The regional transit system requires an average of about 1,300 regular-route buses, 91 light rail vehicles, 18 commuter rail passenger cars, 6 commuter rail locomotives, and 780 dial-a-ride buses to operate.

In 2018, the region had 104 park-and-rides with nearly 33,700 spaces served by bus and rail transit. The region also has 26 transit centers with facilities that improve waiting conditions and the transfer experience between buses and trains. With the opening of the C Line, the region has 92 transit stations serving existing light rail, BRT and commuter rail lines.

Facilities have been built to give transit advantages over general traffic including:

- 336 miles of bus-only shoulders
- 6 miles of bus-only lanes on city streets
- 98 highway ramp meter bypasses
- 71 miles of managed lanes
- 7 miles of exclusive busways

The region is also supported by a substantial system of transit support facilities, both public and private, that includes bus garages, maintenance buildings, rail support facilities, and operations centers.

Providing an Advantage for Transit – Bus Lane Pilot Projects

Metro Transit has partnered with local roadway authorities to improve speed and reliability along high ridership corridors served by one or more urban local bus routes. The region is exploring an expanded network of bus-only lanes or other transit advantages that can provide consistent travel times in congested areas and can make transit a more attractive option for the region's traveling public.

In many instances, bus lane concepts are being tested through a short-duration pilot project. This allows for the region to measure changes to route performance, observe impacts to traffic, and gather public feedback. If the initial results are promising, the region can incorporate any lessons learned into the final design and expand the concept to additional corridors as it becomes a more proven concept.

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Figure 6-2: Existing Transit Infrastructure

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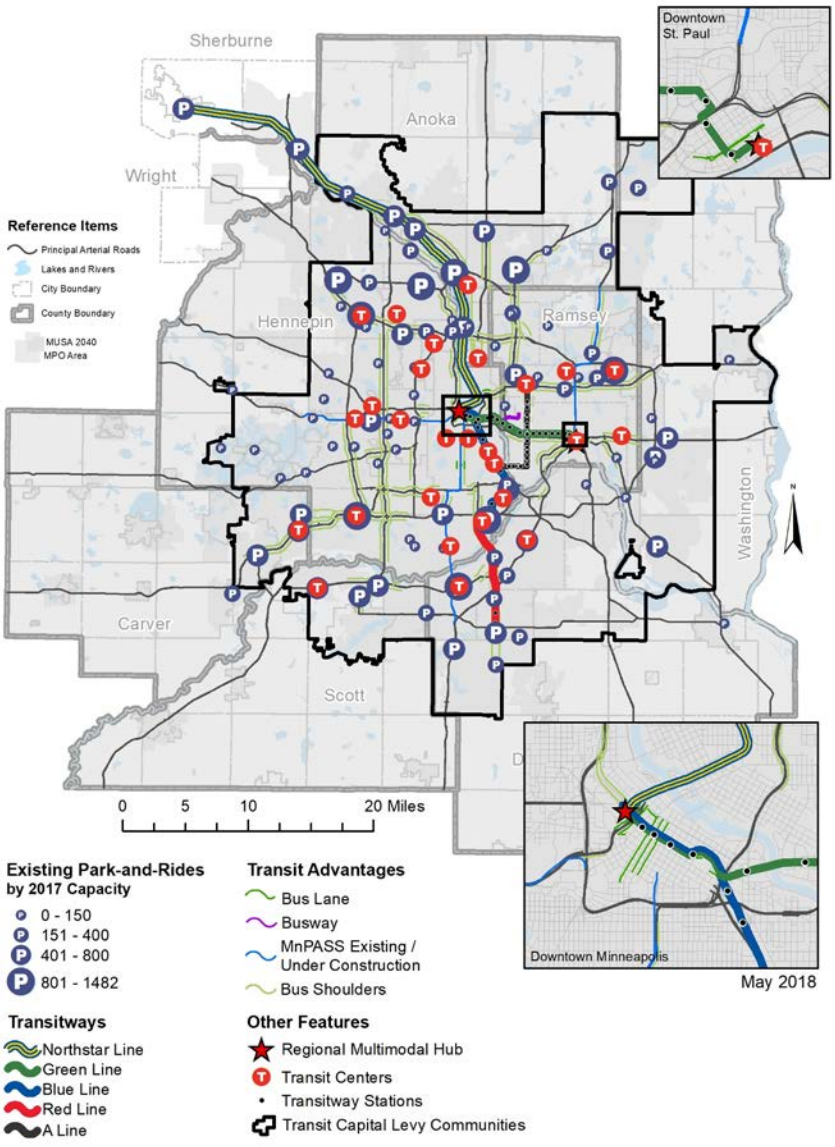


Transit System Improvements since 2015

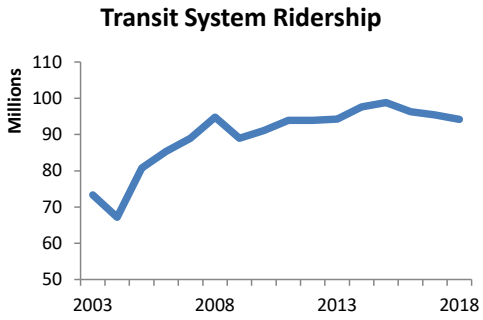
The region has made significant progress in building transit capacity for future growth in the region ~~since the TPP was published in 2015~~in the past five years. The bus system has expanded to new markets, particularly the reach of express service and park-and-rides, and continues to grow service in the strongest markets. New and improved transitways have opened and several additional transitways are in development. Examples include:

- The region's first two arterial bus rapid transit METRO lines, the A Line and the C Line, opened in 2016 and 2019, respectively.~~,~~ The A Line provides improved~~ing~~ connections from the METRO Blue Line and METRO Green Line to additional neighborhoods in St. Paul, Minneapolis, and Roseville. Ridership in the corridor is up ~~about~~ over 30~~3~~% since A Line opened. The C Line provides improved service in the neighborhoods between downtown Minneapolis and Brooklyn Center Transit Center and early indications are that ridership growth is similar to A Line.
- Metro Transit introduced a fleet of eight electric buses as part of the METRO C Line opening in 2019.
- Metro Transit set a new single-day record of nearly 370,000 rides, bolstered by the recent additions of the METRO A Line, METRO Green Line, and METRO Red Line.
- A new online bus rapid transit station opened to replace an existing offline station on the METRO Red Line, improving service speed and reliability and increasing ridership.
- The Mall of America Transit Station, one of the busiest transit hubs in the region, was renovated to provide a better customer experience, better transit operations, and an improved exterior aesthetic.
- Several new park-and-ride facilities opened throughout the metro area, creating transit capacity for future growth of the region.
- Several transit providers have explored the use of emerging technology in transit operations and customer interfaces. For example, ~~A~~a new mobile app was introduced by Metro Transit that includes trip planning features and a new mobile ticketing platform and SouthWest Transit began providing an on-demand, mobile app-based transit service known as SouthWest Prime.~~,~~
- Metro Transit has installed 135 new bus shelters and enhanced 78 existing bus shelters by adding lighting, heaters, or pedestrian improvements focused in areas of concentrated poverty where more than half of residents are people of color.
- Progress continued on the development of the METRO Green Line and Blue Line extensions, the METRO Orange Line, the METRO Gold Line, Rush Line dedicated BRT, Riverview modern streetcar, and several arterial bus rapid transit corridors. ~~The Rush Line corridor study resulted in the local selection of a preferred alternative, which has been added to the Current Revenue Scenario of this plan.~~
- The high frequency service network expanded with the introduction of service improvements to routes 2 and 11. Ridership on both routes increased by over 15% after being introduced to

the high frequency network. Additional expansion of the high frequency network is being currently being explored.

The result of these improvements has been increased use and demand for transit services. Since 2003, the year before the first light rail opened in 2004 (METRO Blue Line), the region has seen:

- Transit rides increase by ~~over~~ nearly 30%
- Park-and-ride users increase by nearly 70%
- ~~Five~~ Six operating transitways, like light rail, commuter rail, and bus rapid transit, now account for more than one out of every ~~four~~ three transit rides



Passenger Travel beyond the Region

Each mode of transportation best serves a specific trip distance, providing its own unique characteristics and values for interstate and international mobility. The vast majority of intercity passenger movements occur by automobile, especially on the National Highway System roads maintained by MnDOT and other states. The Twin Cities region is also served by Amtrak passenger rail service and a number of intercity bus companies and airlines.

Long-distance passenger rail service provides connections to Portland, Seattle, and Chicago and places in-between on Amtrak's Empire Builder. Trains arrive and depart once a day in each direction. In 2014, Amtrak relocated its platform and services to the newly renovated Union Depot in downtown Saint Paul. Target Field Station along the BNSF tracks in downtown Minneapolis currently serves the Northstar commuter rail, but could also be utilized by intercity passenger trains in the future. Both Target Field Station and the Union Depot renovation have been constructed in the last 10 years as multi-modal stations.

MnDOT has primary responsibility for planning intercity passenger rail in Minnesota; the Metropolitan Council participates on advisory committees to assure that any new or upgraded rail service is consistent with other regional plans. Consistent with the Minnesota State Rail Plan, MnDOT is currently studying potential new higher-speed (90 miles per hour or greater) rail services to link the Twin Cities with Chicago, and the Twin Cities with Duluth. MnDOT is also studying the feasibility of an additional Amtrak trip to and from Chicago to serve increasing demand for passenger travel to eastern Wisconsin and Chicago. For information on these studies, see the MnDOT passenger rail webpage.

Intercity bus service provides ground transport connections between destinations in the upper Midwest and the Twin Cities, including service to Minneapolis-Saint Paul International Airport as well as intermodal stations in downtown Minneapolis and Saint Paul Union Depot. Recent upgrades to attract passengers include Wi-Fi on buses, in addition to express bus services with travel times that are more competitive with the private automobile. Intercity bus service in Minnesota is operated by private

service providers such as Megabus, Greyhound, Jefferson Lines, and Land-to-Air Express. Some of these services also offer connections within the Twin Cities region, often taking advantage of existing transit facilities like park-and-ride lots. The Metropolitan Council has no direct role in planning or providing these intercity bus services. MnDOT does work with these operators and MnDOT's Intercity Bus program provides some subsidies to support bus service in Greater Minnesota.

See Chapter 9, "The Aviation Investment Direction and Plan," for air travel beyond the region.

Travel Demand Management

The Metropolitan Council partners with cities and Transportation Management Organizations (TMOs) to work on travel demand management (TDM) that reduces ~~travel demand~~vehicle miles traveled during peak periods and in congested areas. Transit plays an important role in travel demand management, particularly by providing more transportation system capacity in congested areas of the region or to destinations with congested access. The region's existing TMOs include:

- Move Minneapolis primarily serves downtown Minneapolis by promoting travel options for commuters working downtown.
- Commuter Services serves the I-494 corridor by promoting travel options to the destinations along the corridor.
- Transit for Livable Communities and Saint Paul Smart Trips serve 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.

The TMOs and transit providers provide services that encourage the use of a variety of modes of public transit. In addition, every two years the Regional Solicitation provides a funding opportunity for new or expanded travel demand management projects. TDM funding helped Metro Transit develop a mobile app for mobile fare payment and transit information and transit providers are making progress in developing relationships with other complementary mobility services, such as bike share and car share. TDM funding has also supported projects like transportation management staff at various agencies, outreach and engagement and technology solutions for encouraging mode shift away from single-occupant vehicles, and educational campaigns about travel choices. The TDM funding in the Regional Solicitation is somewhat unique in that it has typically supported a variety of non-profit efforts in additional to governments.

Transit Investment Direction Overview

The following are brief descriptions of the different sections of the transit investment plan.

Transit Planning Basics – An important part of understanding the transit investment plan includes understanding the many factors that influence the design of the transit system. Local development patterns and demographics – factors external to transit providers – as well as route and network design decisions made by transit providers are important factors in of the success of a transit system. Certain factors are used to establish Transit Market Areas, a regional transit planning tool designed to match

transit demand to the types and levels of service provided. Regional Transitway Guidelines help guide the planning and implementation of transitways. Local governments and transit providers need to work together to best align these factors in order to maximize the success of the transit system and its potential integration with communities.

Bus and Support System Investment Plan – The bus system will continue to be the workhorse of the regional transit system by providing the majority of transit trips, providing essential connections to transitways, and providing options throughout the entire region. The bus and support system plan includes the following elements to address current and future needs:

- Tools to manage the transit system to be cost-effective within available resources
- Alternatives that can be provided where regular-route service is not available or accessible for those with a disability
- Opportunities for expansion and improvement of bus service, and a process for identifying priorities from that vision
- Opportunities for expansion and improvement of transit facilities that better support a good customer experience and system operations
- Other elements of the transit system that support its effective, safe, secure, and reliable operation

These elements, and the processes and plans that support them, are described in more detail in Bus and Support System Investment Plan. The plan does not identify specific investments in the bus and support system. Rather, the plan identifies general investment categories and investment strategies.

Transitway System Investment Plan – The region will also need to build, operate, and maintain a system of transitways that will improve service in high-demand corridors and connect more areas of the region with frequent, reliable transit service. Equally as important, transitways provide the permanence and attraction to developers, residents, and businesses that will help shape the high-density, mixed-use, livable development patterns that are growing in demand and that are the focus of many *Thrive MSP 2040* outcomes. Land use planning and implementation by local governments will also help shape investments in transitway corridors. The first priority will be to operate and maintain the existing transitway system. Expansion of the transitway system will be guided by investment factors that will assist the region in setting priorities for investment that have the greatest return for the region. The transitway system includes a number of options to match appropriate investments with needs throughout the region. These elements, and the processes and plans that support them, are described in Transitway System Investment Plan. The plan identifies specific project investments in the transitway system.

Investment Summary – The transit investment plan includes a financial summary that illustrates the level of investments planned across the elements in the plan within two revenue scenarios:

- A Current Revenue Scenario that identifies planned investments within reasonably expected revenue assumptions

- An Increased Revenue Scenario that identifies an investment strategy that would build out and expand the transit system

Transit Planning Basics

The transit system is a network of routes, facilities, and services that need to be well designed and managed to best achieve regional goals, including good stewardship of public resources. This is especially true in a fiscally constrained situation, where available funding only allows for implementing and operating the highest priority projects in the plan.

A number of demographic and urban design factors exist that are generally outside the control of transit providers and that help shape the design and determine the potential success of transit investments. Demographic factors are, for the most part, outside the direct control of any agency or government body, though they can be affected by agency actions over time. Urban design factors are generally managed by the land use planning efforts and development controls of local governments. A successful transit system requires the cooperation of transit agencies and local governments within their respective roles.

In addition to demographic and urban design factors, a number of transit route and network design factors guide the design of transit service and ultimately influence the overall success of the transit network. Transit providers shape these factors in the design of the transit system to manage it relative to land use.

Demographic Factors

Demographic factors are outside the direct control of transit providers but play a significant role in the design of transit service. While these factors are out of the direct control of transit providers, the impact of transit investment can indirectly influence these factors by providing access to opportunity. These factors include:

- Auto-ownership or the number of cars available in households
- Demographics such as household income, number of children, age, disability, and marital status
- Job status and unemployment rate

Demographic factors also include areas of concentrated poverty and areas of concentrated poverty where at least 50% of the residents are people of color, which are a special feature in *Thrive MSP 2040*. More information on these is discussed under Transit Market Areas. Working with local partners, transit providers can help shape a vision, through policy and planning, for transit corridors and corresponding demographic factors that will support increased transit use.

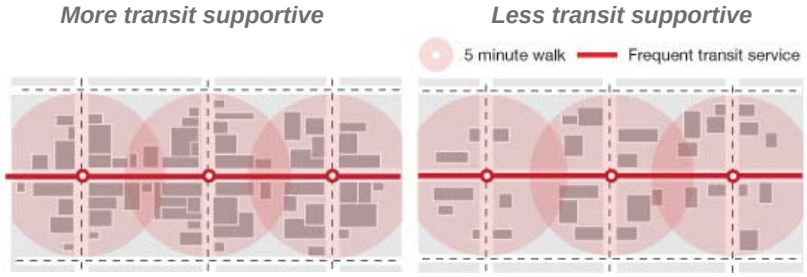
Urban Design Factors

Urban design factors that fall within the control of local governments, such as land use, planning, and infrastructure design, also influence the design and potential success of transit services. Local

governments and transit agencies need to work together to best match transit service with local land use and maximize the opportunities for the success of the transit system. For communities that desire more transit service, local governments can choose to plan for transit-supportive land use, but the changes will likely take place over time. In a number of suburban communities, these changes are happening, like with station-area planning along light rail and bus rapid transit corridors. The following factors are the primary components of effective local transit service. Express and commuter services are discussed separately.

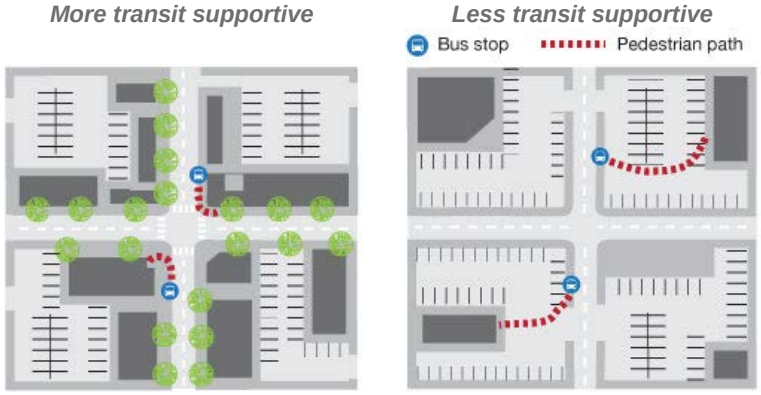
Encourage population and activity density

Density supports transit because there are more people and activities within walking distance of nodes. Additionally, people living in dense areas are more likely to use transit because more frequent and reliable transit options can be provided to be more competitive with driving.



Design for a pedestrian-friendly environment

All transit users are pedestrians for at least some portion of the beginning and end of their trip. A pedestrian-friendly environment encourages transit use by providing a comfortable walking environment and minimizing the walking distance from the transit stop to front doors.



Encourage a mixed-use land use pattern

Transit is most effective when it serves a variety of trip purposes and destinations. Mixed-use development patterns encourage travel patterns with many origins and destinations throughout the day, making transit more effective and easier to provide for a variety of purposes.

More transit supportive *Less transit supportive*

Develop an interconnected street network that maximizes pedestrian and bicycle access and allows for simple route design

An interconnected street network minimizes barriers and maximizes the area that is accessible within a short walk or bike to a transit stop, allowing each stop to serve more people. In addition, it supports the design of simple, direct routes that are efficient and easy to understand.

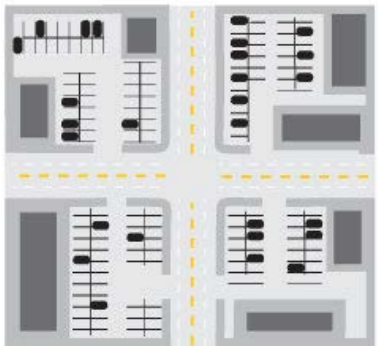
More transit supportive *Less transit supportive*

Support travel options that encourage or complement using transit

Transit is more effective in areas where the cost of driving and parking are greater, or at least comparable to the cost of using transit, and alternatives like car-sharing, bicycling, and walking are available and convenient.

More transit supportive

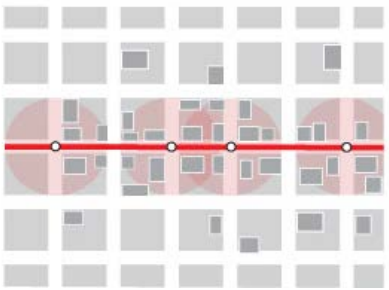
Less transit supportive



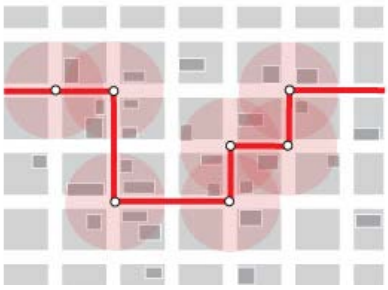
Plan for linear growth in nodes along corridors

A linear pattern of development along corridors is easier to serve with transit. Transit routes that are linear and consistent are most effective to provide and easier for customers to understand. This also requires coordination across community boundaries.

More transit supportive



Less transit supportive



The factors listed above describe the general relationship between local land use decisions and transit planning. More detail on these factors and the considerations for local communities on land use planning around transit is available in Chapter 3, “Land Use and Local Planning.”

Transit Route and Network Design Factors

The quality and design of transit service is an important part of the success of transit. Regional transit providers must weigh the potential benefits of transit investments against the costs, in order to best manage the system to be cost-effective and efficient. This applies to times when the transit system is stable, when the transit system is expanding, and when the transit system is facing cuts. There are also different factors for the design of local transit service and express and commuter transit service.

Local route and network design

The most important factors that transit providers look for when designing local transit routes and networks are:

Serve a variety of trip purposes and destinations

Transit will generate higher ridership and more balanced passenger loads if it is designed to serve a number of different trip purposes along the route and throughout the day.

Design routes with strong anchors at both ends

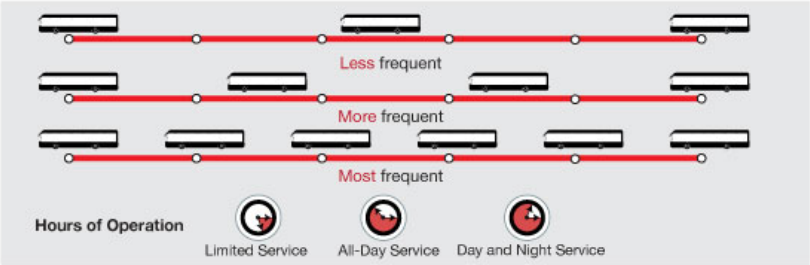
Transit is more efficient with balanced passenger loads in each direction. Important destinations at each end help to distribute demand evenly and limit overcrowding of vehicles and over-supply of service.

Balanced demand

Unbalanced demand

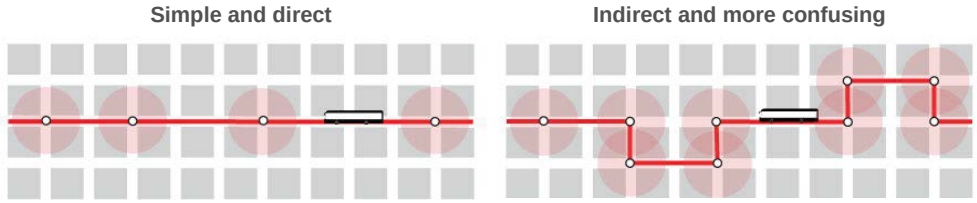
Match level of service to demand

Transit will be more effective if the type and level of service provided is appropriate to the demand for transit. This allows providers to get the most out of high-demand areas while still serving lower-demand areas.



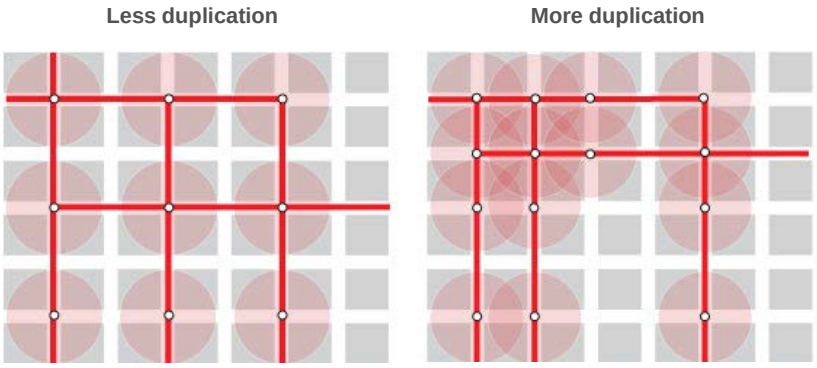
Design simple, direct routes

Transit service is more efficient and reliable to provide and easier for customers to understand when routes are designed in simple, linear patterns without complicated paths.



Avoid duplication of service

Routes should be spaced far enough apart so that they do not compete with one another for riders at the expense of service coverage in other areas.



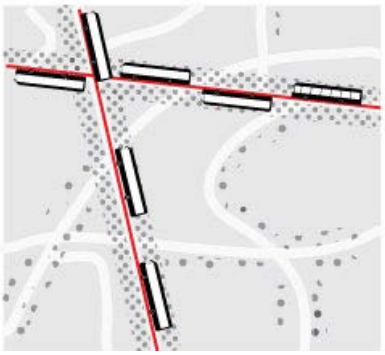
Provide useful customer information and comfortable amenities

Transit ridership grows and the user experience is better when customers can easily understand the system and are comfortable while waiting at or leaving a stop and riding on a bus or train.

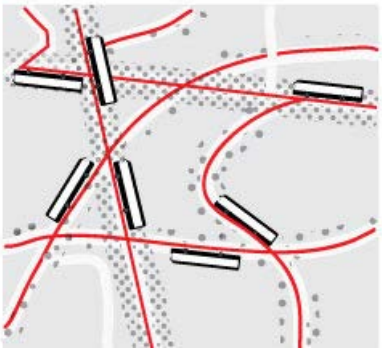
Balance frequency and coverage

An effective transit network finds a balance between providing fast, frequent routes that offer more convenience and providing coverage to more area but with infrequent, less-convenient service.

More frequent, less coverage



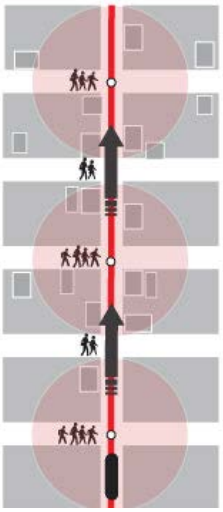
Less frequent, more coverage



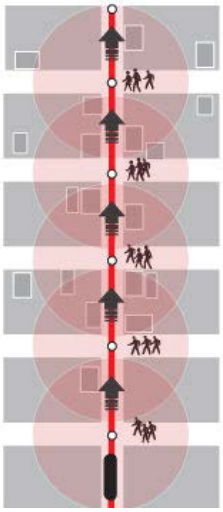
Balance walking distance and travel speed

Routes with more stops provide shorter walks to transit but at slower and sometimes less reliable travel speeds. A transit network needs to balance between providing fast service with fewer stops and slower service with many stops.

Faster service, less access



More access, slower service



Commuter and Express Route Design

The factors that guide the design of express routes are somewhat different from those covered in the above section for local routes. Express routes are focused on providing fast, reliable trips into major

regional centers. The most important factors for express service success are high-density origins and destinations at both ends of the route (such as at a park-and-ride and downtown) and demand management that balances parking supply and cost with the demand for parking and access for transit. The level and location of congestion can also be a substantial factor in the success of express bus services.

Transit Market Areas

Market Areas Overview

An important underlying element to the transit investment plan is the definition of Transit Market Areas. Transit Market Areas are defined by the demographic and urban design factors that are associated with successful transit service. There are five Transit Market Areas (see figure 6-3) as well as some unique Market Area features. The Transit Market Areas are generally associated with community designations in *Thrive MSP 2040* (see Land Use and Local Planning for more details) as follows:

- **Transit Market Areas I and II** are mostly Urban Center communities where urban form and density are most supportive of transit. These areas also have the largest concentrations of transit-dependent residents in the region. Transit service in these areas focuses on providing a dense network of local routes with high levels of service to accommodate a wide variety of trip purposes. Market Area II will typically have a similar route structure to Market Area I, but lower levels of service, as demand warrants.
- **Transit Market Area III** is primarily Urban along with portions of the Suburban, Suburban Edge, and Emerging Suburban Edge and is generally characterized by overall lower density and less transit-supportive urban form along with some pockets of denser development. The primary emphasis of transit service in this area is express and commuter service with some suburban local routes and dial-a-ride service providing basic access.
- **Transit Market Area IV** is primarily Suburban Edge and Emerging Suburban Edge along with portions of Suburban, and is generally characterized by consistently low-density development and an urban form that does not support frequent local transit service. Transit service in Market Area IV is primarily peak-period express and commuter service oriented to park-and-ride facilities that can effectively capture the lower density transit demand. Local trips are provided by general public dial-a-ride services.
- **Transit Market Area V** is generally all forms of Rural and Agricultural but does include the unique freestanding town centers of Stillwater, Waconia, Forest Lake, and Hastings; Market Area V is generally characterized by low-density development or undeveloped land not well suited for regular-route transit service outside of limited peak-period express and commuter service.

Unique Market Areas

The Emerging Market overlays are unique areas of Transit Market Areas II and III where significant pockets of higher density exist but surrounding conditions still limit the success of local transit. These

areas should be a focus for future development that will connect them with areas of higher transit intensity, specifically looking at extensions of existing routes or connections.

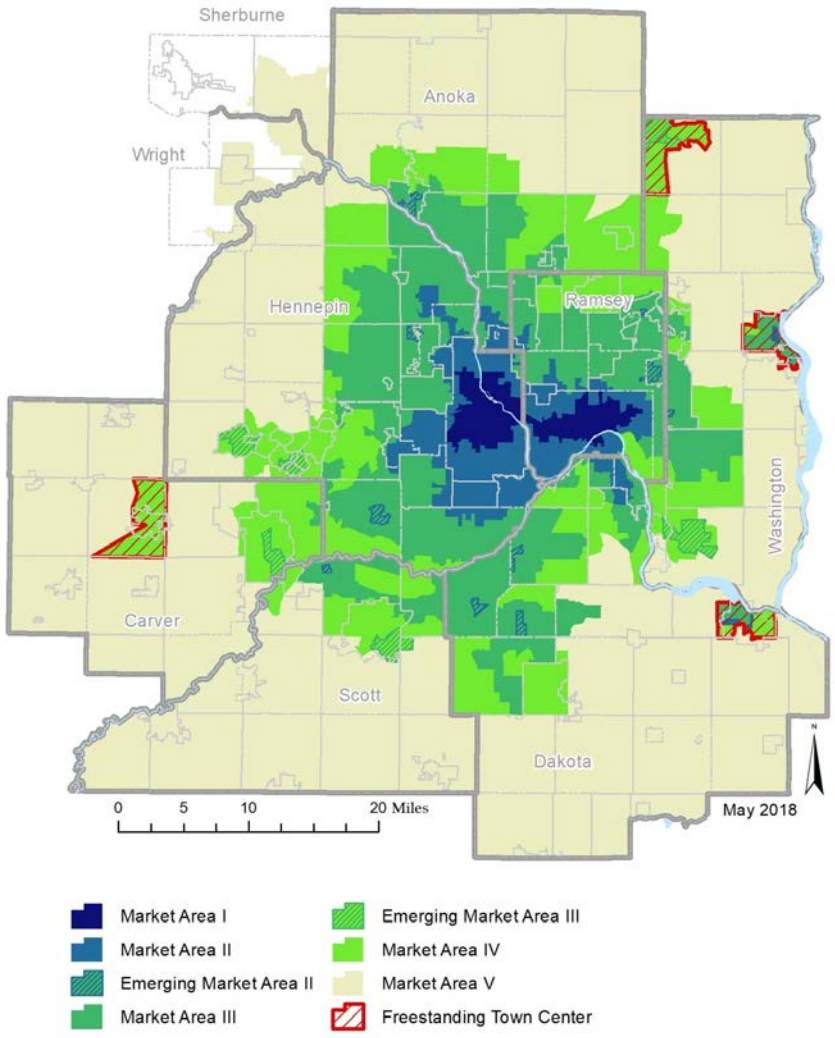
Freestanding Town Centers are unique areas that grew independently of Minneapolis and Saint Paul and act as suburbs but are still separated from the urban and suburban areas by rural land. These areas typically have small downtowns of their own but also export many workers to other regional centers. Local transit services that connect to the region would not be as effective serving these areas given their location in the region, despite their relatively concentrated nature. However, these areas may still have express service demand and possible demand for small circulator services.

The Metropolitan Council and regional transit providers will also coordinate their efforts with MnDOT and transit services that connect beyond the seven-county metropolitan region. The Transit Market Areas do not address the feasibility of these kinds of services, which are coordinated on a case-by-case basis.

Two additional areas of emphasis in *Thrive MSP 2040* are important for consideration in transit service design, the special features of Areas of Concentrated Poverty, Areas of Concentrated Poverty where at least 50% of residents are people of color, and Job Concentrations. Residents of Areas of Concentrated Poverty must overcome a legacy of private disinvestment to access the opportunity of the region. In transit, this often means considering higher levels of service, better amenities, or unique service types focused on providing better access to jobs or education. These areas are also highly correlated with limited household access to a private vehicle. Job Concentrations have good potential to be served with transit because of their density and level of activity. Many of these concentrations will need to adapt and continue adding density and diversifying land uses to be truly transit-oriented. This will need to be coordinated with continued investments in transit access to these areas as well as better transit facilities.

The Transit Market Areas are shown in Figure 6-3 and described in more detail in Appendix G. Transit Market Areas are primarily used to design the regional bus system, but some guidance on their application to transitways is discussed in the Regional Transitway Guidelines.

Figure 6-3: Transit Market Areas



Regular-Route System Design

For the regular-route bus system, the guidelines on transit service design in Appendix G: Regional Transit Design Guidelines and Performance Standards cover a number of topics including:

Regional Transit Design Guidelines and Performance Standards Topics

- Transit Market Areas and Service Options – the service types that are appropriate for the different Transit Market Areas
- Network Design and Access
    - Stop Spacing – the distance between bus stops on a route
    - Route Spacing – the distance between bus routes
- Service Levels
    - Service Span – the number of hours/day and days/week a transit service operates
    - Service Frequency – the average time between transit trips on a route
- Facility Siting and Design
    - Customer Facility Features – features at customer facilities that improve the customer experience
- Performance Standards
    - Productivity – passengers per in-service hour
    - Cost Effectiveness – the subsidy required to operate a route, per passenger

The application of these design guidelines impacts the cost and productivity of transit service. More detail on how these are used in transit investment decisions is discussed in Bus and Support System Investment Plan. The Metropolitan Council is also conducting a Work Program item that explores the performance trade-offs in different transit system investment philosophies. The Bus Service Allocation Study will explore how investing more in coverage or productivity affect the outcome of the transit system and metrics associated with it, such as the plan's objectives of growing ridership, providing more access to transit, or supporting equity.

In addition to these guidelines regarding the design of transit service, there are two performance standards that are used to evaluate *individual transit* routes once they are in operation. These performance standards are Subsidy per Passenger and Passengers per In-Service Hour. Performance standards are discussed in more detail in Appendix G. A state statute requires the Metropolitan Council to document route performance standards for farebox recovery ratio, which will be updated in a Work Program item on the Comprehensive Transit Financial Report. ~~Additional refinements to performance standards will also be explored through this effort in collaboration with regional transit providers.~~

These measures may differ from those developed to inform the *Transportation Policy Plan* on the performance of the *overall transit system*, which are discussed in the Performance Outcomes chapter.

Transitway Design

For transitways, the region has developed the Regional Transitway Guidelines (2012). These guidelines assist in the development of transitways in planning, design, or operation and establish technical best practices for nine transitway elements. These elements are:

Regional Transitway Guidelines Topics	
• Service Operations • Station Spacing and Siting • Station and Support Facility Design • Runningway • Vehicles	• Fare-Collection Systems • Technology and Customer Information • Identity and Branding • Project Development, Leadership, and Oversight

The guidelines are not intended to be design standards or specifications. Rather, they establish consistent, general practices that ensure transitways are developed in a consistent and equitable manner as the region's transit network continues to grow and expand. The guidelines are intended to be flexible enough so that each transitway can boast its unique characteristics and opportunities and planners can address its unique challenges. The guidelines are also intended to be a living document, evolving over time as the region's experience with transitways continues to grow. The full details on the Regional Transitway Guidelines are available from the Metropolitan Council.

The guidelines will be updated on an as needed basis to address outstanding issues, including the addition of dedicated bus rapid transit and updated best practices.

Transit Asset Management and Safety Performance Targets

Transit asset management, a best practice and a requirement under federal law, is a business model that prioritizes funding based on the conditions of transit assets. Transit providers are required to assess, track, and report on their assets to FTA, and develop targets for asset management to ensure a state of good repair. Transit providers will also develop transit asset management plans that document the implementation actions for asset management within their transit system. While transit asset management is a requirement of transit providers, it must be coordinated with a region's Metropolitan Planning Organization (MPO), or in this region, the Metropolitan Council. Two asset management plans, one developed by the Metro Transit and the other a group plan featuring the region's suburban transit providers, were submitted and adopted by the Council in 2019. Both plans outlined and established the four federally required performance measure targets for transit asset management, which are::

- Rolling stock (buses and train used for serving customers): The percentage of revenue vehicles (by type) that exceed the useful life benchmark.
- Equipment (vehicles used in a support role): The percentage of non-revenue service vehicles (by type) that exceed the useful life benchmark.

- Facilities: The percentage of facilities (by group) that are rated less than 3.0 on the Transit Economic Requirements Model (TERM) Scale.
- Infrastructure: The percentage of rail track segments (by mode) that have performance restrictions. Track segments are measures to the nearest 0.01 of a mile.

Transit asset management plans detail the specific strategies that transit providers will use to meet or exceed their transit asset management targets. These plans prioritize asset management through its Transportation System Stewardship goal, objectives, and strategies. Transit funding, particularly FTA formula funds and regional transit capital, is prioritized for asset management first, with fleet replacement being the region's number one transit capital funding priority for the existing system. The region also has a Fleet Management Procedure that documents vehicle replacement expectations based on, among other things, useful life and mileage expectations. These procedures will likely be referenced or updated in transit asset management plans. The region also has a funding category for transit modernization within the Regional Solicitation, which allows the region alternative to using federal flexible funding solely for transit expansion during times when modernization and maintenance are more pressing needs. There are more details on these strategies later in this chapter.

Transit safety performance monitoring and target setting is also a requirement under federal law. The National Public Transportation Safety Plan outlines the performance measures and other expectations for the nation's public transit providers. Safety performance targets will be developed by transit providers, in coordination with the Metropolitan Council as the MPO, and be adopted by the Metropolitan Council no later than January of 2021 in accordance with federal law. The four FTA-required performance measures and targets for transit system are:

- Fatalities: total number of reportable fatalities and rate per total vehicle revenue miles, by mode.
- Injuries: total number of reportable injuries and rate per total vehicle revenue miles by mode.
- Safety events: total number of reportable safety events reported to NTD and rate per total vehicle revenue miles by mode.
- System reliability: mean distance between major mechanical failures by mode.

Transit Modernization and Expansion in the Regional Solicitation

This transit investment plan discusses two unique funding opportunities to improve the transit system in the Current Revenue Scenario: modernization and expansion. These categories of funding coincide with two of the Transit application categories for federal flexible funding through the Regional Solicitation. The needs in these categories will likely evolve over time and the Regional Solicitation allows for regular reviews of the focus and criteria used to rank project submittals. For the 2020 Regional Solicitation, two new transit funding concepts were developed. An arterial bus rapid transit (BRT) project funding category was created to fund a larger share of a single arterial BRT project and provide more certainty for planning the arterial BRT system (see Transitway System Investment Plan for more details). A new market guarantee was also established to ensure that at least one Transit Expansion or Modernization project is funded that serves areas outside of Transit Market Area 1 and 2

for at least one end of the project. Both of these concepts will be evaluated after the 2020 Regional Solicitation for consideration in future solicitations. There are likely projects that address both expansion and modernization and, in some instances, there may be a gray area between the categories. The following is a general description of the need basis for transit modernization and expansion projects.

Modernization

The focus of transit modernization is to improve the transit system to better suit current needs and current transit riders. The focus of transit modernization will generally be to make transit more attractive to existing transit riders with the intent of retaining transit riders. Modernization improvements may also attract new riders, although this is not the explicit purpose. This could include investments that offer faster, more reliable travel times or investments that improve the overall customer experience. Other opportunities for modernization should be explored through preservation and maintenance investments that could improve efficiency, effectiveness, or environmental impact. Modernization projects will usually involve a capital investment, but can also include impacts to operating investments. Some modernization investments may even reduce operating costs, such as energy efficiency improvements.

Examples of modernization projects include:

- Improved boarding areas and comfort amenities, like heat, light, and safety or security equipment, at existing customer facilities.
- Customer information improvements at existing customer facilities.
- Transit advantages or technology that improves reliability and the customer experience, such as bus shoulders, transit-only lanes, or transit signal priority.
- Energy efficiency improvements at a bus garage.
- Improved fare collection systems.

Expansion

The focus of transit expansion is to improve the transit system to attract new transit riders or invest in future transit needs. The focus of transit expansion will generally be to add capacity, services, or facilities that grow (or facilitate the growth of) transit system use. Expansion projects will generally include a mix of capital and operating investments, since new facilities and service generally require additional ongoing costs.

Examples of expansion projects include:

- Operating or providing vehicles for new transit routes.
- New customer facilities, like new transit stations or centers, that are not replacing existing ones.
- Added park-and-ride capacity at an existing facility.

Bus and Support System Investment Plan

Bus and support system investments include all elements of the transit system that are not specific to transitways, including: regular-route bus service, Metro Mobility, Transit Link and other dial-a-ride programs, vanpool, customer and support facilities, and other support systems. The transit system is operated efficiently and cost-effectively today because of the management tools already in place in the region. The primary role of the transit system is serving people, measured in ridership. The different investment opportunities in the transit system are aimed at serving people, whether through maintaining a route already on the streets, adding service to serve new customers, improving the attractiveness of transit to the user and making it a mode of choice, or making it more efficient to serve people better.

This section of the plan discusses the types of transit services that will be provided in the region and how they are managed, the facilities and amenities that support these services, and the potential for a better transit system for the people of the region. Investments in the regular-route bus system are guided by the Transit Market Areas and Regional Transit Design Guidelines discussed above. The specific details about how transitways fit into this system are discussed in Transitway System Investment Plan.

Transit System Management

Management of the transit system is an essential part of transit investment and stewardship of the system. A well-managed transit system ensures that public resources for transit are used as efficiently and cost-effectively as possible to meet the needs of transit customers while also considering the impacts and benefits to low-income populations and populations of color. The following are general descriptions of how the region will manage the transit system effectively by coordinating the efforts of multiple regional transit providers.

Route Performance Analysis

Transit providers should review their transit service annually using the performance standards outlined in Appendix G to ensure that their transit services are being provided to an efficient and cost-effective standard consistent with rest of the region.

Additionally, the Metropolitan Council will prepare an annual Regional Route Performance Analysis that reports the performance of each route as compared to the performance standards defined in this plan. Routes that do not meet the performance standards should be reviewed for adjustment or possible elimination. The annual Regional Route Performance Analysis can be found on the Metropolitan Council's website: https://metrocouncil.org/Transportation/Planning-2/Transit-Plans,-Studies-Reports/Transit-Transitways/RegionalRoutePerformanceAnalysis.aspx?source=child.

Coordination among Transit Services

Coordination among the regional transit providers is essential to ensure that the transit system functions seamlessly and offers user-friendly rider experience. Coordination efforts include identifying opportunities for timed-transfers, providing locations for transfers between dial-a-ride services and

regular routes, and connecting services offered by different providers. The Metropolitan Council will promote coordination of transit services through the regional transit policies and procedures, which outline procedures for fleet management, procurement, and facilities ownership and management. This includes coordination with services that connect to areas outside the seven-county region, when necessary. The Metropolitan Council will also encourage and facilitate communication and coordination among transit providers to ensure well-coordinated schedules.

Transit Fare Structure

Regional transit fare policy will be designed to achieve a variety of goals. Fares should be simple and easy to understand to improve customer service and fare compliance. They should reflect the costs of providing service while mitigating the negative impacts to low-income and transit-reliant riders. The most recent fare increase occurred in October 2017, the first increase since 2008. The Transit Assistance Program (see sidebar) was created in 2017 to help make transit more affordable for low-income riders.

Fare policy should take a common regional approach to provide seamless travel for riders among providers and modes. It should promote ridership growth while maintaining or increasing the revenue recovery rate. New fare technology, including new fare media, off-board fare collection, and mobile apps, will play an important role in transit fare policy and service delivery. Improvements in fare collection technology should ensure regional compatibility while supporting the need to modernize the fare system.

Transit Assistance Program

Regional efforts to mitigate negative impacts of fare increases include Metro Transit's Transit Assistance Program (TAP). The TAP provides qualified, low-income transit riders a discounted, $1 fare for a full year. Riders that qualify for TAP access discounted fares with a TAP card. Low-income riders can apply to TAP individually or through one of several organizations that have partnered with Metro Transit for the program. Since inception, the TAP program has supported over 2.1 million rides for low-income transit riders.

Competitively Procured Services

Contracting the operation of transit services can be an appropriate and cost-effective way to meet new service demand, demonstrate new routes or service types, provide efficiencies on certain routes, properly align service expertise with providers, or maintain service in response to fiscal pressures. Decisions about which routes should be contracted to a private provider will be based on service demand and funding levels.

Service contracts should be structured in a manner that promotes healthy competition. Metro Transit will continue to be the primary provider of regular-route transit services in its service area. The Metropolitan Council will review the amount of contracted service every two years. Twenty percent of regular-route bus service, measured in National Transit Database revenue hours, is the target for private contract operations.

Vehicle Fleet

The bus is the most basic element of the transit system. Buses should be comfortable, clean, and designed to meet customer needs. The region utilizes a variety of bus types to match the appropriate vehicle to the service it is providing. The existing bus fleet is over 1,800 vehicles, including dial-a-ride buses. These vehicles need to be maintained and replaced when they are past their useful life, which varies by bus type. Fleet replacement is the top capital investment priority for maintaining the existing transit system. Vehicles are also equipped with various types of equipment that allow them to better serve customers and provide more efficient operations. Innovation in equipment and general vehicle design is ongoing, and regional transit providers will explore modern features as appropriate. The region will work to maintain a bus fleet that is integrated and not overly specialized to specific services, routes, or corridors. Bus rapid transit services may have sub-fleets, but these should also be integrated across corridors. This will allow for more flexibility in operations and reduce the total number of buses and spare buses required, which saves the region money and reduces demand on support facilities. The regional Fleet Management Procedure outlines standards and is available on the Metropolitan Council's website.

For vehicle propulsion technology, the region has made substantial strides to incorporate hybrid electric buses into the vehicle fleet. Many of the early hybrid buses are now coming to the end of their useful life and must be replaced. Electric vehicles are an emerging technology that could offer additional environmental benefits for the region as the technology becomes more proven. A small number of electric buses ~~will be~~were introduced into the fleet ~~in the next four years~~ with the opening of the METRO C Line in 2019 and the region ~~should~~ will monitor their performance as input to a larger initiative to explore broader-scale integration of electric buses. Additional electric vehicles will be considered as performance monitoring on the C Line is ongoing. However, capital funding is also a substantial constraint to expansion of the electric vehicle fleet.

Transit Provider Operating Policies

The Metropolitan Council will coordinate regional policies and procedures that apply to all transit providers, and will provide for a high-quality, seamless, and coordinated regional transit system while respecting the local autonomy of individual providers. These policies and procedures will ensure that transit resources are distributed equitably and transparently and facilitate an efficient system. A list of the key operating policies for transit providers is included in Table 6-2. Copies of any of these materials are available are available through the Metropolitan Council or directly from transit providers.

Table 6-2: Transit Provider Operating Policies

Policy	Description
Regional Route Performance Analysis	All regional transit providers will submit route performance information to the Metropolitan Council every year for review and inclusion in the Regional Route Performance Analysis.

Policy	Description
Transit Fare Structure	All regional transit providers will adhere to the regional fare structure and prices established by the Metropolitan Council unless otherwise exceptions are specifically justified and granted.
Fleet Management Procedures	The Metropolitan Council's fleet management procedure guides fleet decisions, including vehicle type and configuration, acquisition, use, maintenance, replacement schedule, ancillary equipment, and disposal. The policy also reflects fleet modernization, including alternative fuels such as low-sulfur diesel, bio-diesel and ethanol, and alternative vehicles such as hybrid electric. All regional providers will adhere to the procedures and policies for regional transit vehicles.
Facilities Ownership Procedures	The facilities ownership procedure establishes the requirements for owning and maintaining a regional transit facility. All public regional transit facilities will be available for use by any regional transit provider.
Procurement Procedures	All regional transit providers will follow procurement procedures that are consistent with state and federal laws and guidance, when appropriate.
Regional Service Improvement Plan	All regional transit providers should submit proposals for service improvement to the Metropolitan Council in order to be considered for non-state regional expansion funding for transit in an Increased Revenue Scenario.
State Transit Funding Allocation Policy and Procedures	The region will distribute state transit revenues using procedures that allocate resources to state and federal mandated transit services and the region's priorities, including the preservation of existing transit services and documented expansion priorities.
Title VI Policy	Title VI of the Civil Rights Act of 1964 requires considerations of discrimination through public investments for transit providers.

Alternatives to the Regular-Route Transit Network

While the regular-route transit system is planned to meet the needs of the majority of transit users, some customers can be more effectively served through demand-responsive alternatives. This is typically the case for those living in areas that cannot be cost-effectively served with the regular-route transit network and for people whose disabilities prevent them from being able to use the regular-route transit system. Because these services complement the regular-route transit system, they continually adapt to the service levels provided on the rest of the system.

Metro Mobility

Metro Mobility meets the requirements of the Americans with Disabilities Act (ADA) by providing transit service to people with disabilities certified as not able to use the regular-route transit system. Under the ADA, the region is required to provide complementary paratransit service within 3/4 of a mile of all local regular-route transit service during the same times that the service operates. Minnesota state law also requires the service to be provided in areas beyond the requirements of the ADA.

Metro Mobility continues to experience intense pressure for growth as demand for ADA service increases with the aging population of the seven-county metro area and other demographic changes. Prior to 2019, Metro Mobility saw an average annual growth in ridership of 7%. Ridership growth in 2019 was modest at 2%. However, the cost of the service has outpaced ridership growth in recent years because of driver shortages and the need to significantly increase driver wages. Additionally, the Federal Transit Administration has defined more stringent service quality expectations, lowering productivity and resulting in higher costs per trip. ~~In recent years, Metro Mobility has seen an average annual growth in ridership of 7%.~~

Each new ride requires a subsidy (at $28.68 per passenger in 2018), unlike regular-route bus service, which becomes more cost effective with additional demand. Because Metro Mobility is an essential service for the people it serves and is required under federal and state law to complement the regular-route system, the substantial growth of this program is considered as an investment in the operation and maintenance of the existing transit system, rather than transit system expansion.

In response to the financial pressure of growth in demand, the 2017 Legislature established a Metro Mobility Task Force. The Task Force studied new options for service delivery that would improve service and help the region meet the growing demand in a cost-effective way. The Task Force report recommends that the Metropolitan Council pilot new services that incorporate ~~shared and premium use of Taxis,~~ on-demand, lower-subsidy services such as transportation network companies (e.g. Uber and Lyft)~~, and Special Transportation Services~~. These new services would be customer-selected and offered in addition to the existing service model. Metro Mobility has used taxis for the past 15 years for a limited number of trips. However, the Task Force concluded that adding subsidized t~~T~~ransportation n~~N~~etwork c~~C~~ompanies or other on-demand service would provide a wider range of ~~and promoting these services better could result in better~~ options for customers, acknowledging a wide range of abilities and the need for more flexible service options. A pilot on-demand service is expected to launch in 2020. The Council will analyze whether the option shifts some customers to~~, some new demand being absorbed by these services,~~ ~~a~~these lower subsidy per trip services~~,~~ and reduce~~d~~ capital investment needed for~~in~~ Metro Mobility vehicles.

Transit Link and Other Dial-a-Ride Programs

Dial-a-ride service provides a public transit option for travel that is not served by the regular-route transit network. The Metropolitan Council contracts with local governments and private companies to provide county-based general public dial-a-ride service, known as Transit Link. Although Transit Link is available to the general public, typical users are the elderly, people who do not own a car, people too

young to drive, and persons with disabilities traveling outside the Metro Mobility service area. Some suburban transit providers also provide citywide dial-a-ride services with non-regional funds in place of regular-route service that would not be effective. Growth or reduction in these services will be addressed as a consideration of the overall transit system and as demand warrants. The expansion of the regular-route bus system may result in reduced demand for Transit Link, as more people will have access to regular-route service. However, the expansion of Suburban Edge and Emerging Suburban Edge communities at low densities may increase the demand for this type of service.

In Wright and Sherburne counties, dial-a-ride and deviated routes are the primary transit services beyond access to the Northstar Commuter rail line. Services are available to the public on weekdays. The services are funded with local resources and state and federal transit resources from MnDOT.

Metro Vanpool

Commuter vanpools are made up of five or more people, including a volunteer driver, commuting to and from work at destinations throughout the region on a regular basis. The Metro Vanpool program provides financial assistance for vans serving locations or times not well served by the regular-route transit network.

Emerging Shared Mobility Technology

Recent advances in shared mobility technology provide new alternatives and complements to the regular route transit network. Shared mobility services such as ridesharing services and microtransit have been defined by their ability to leverage smart phone technology (though they are not needed to access service), providing on-demand service, and being dynamically routed to efficiently serve demand in real time. On-demand shared mobility services have the potential to more effectively serve low-density, auto-oriented areas that have proven difficult to serve with fixed-route service. SouthWest Transit's SouthWest Prime, ~~a service operated by SouthWest Transit~~Plymouth Metrolink Dial-a-Ride, Maple Grove My Ride, and MVTA Connect~~,~~ are all services that provide~~s~~ on-demand~~, door-to-door,~~ transit service that can be accessed through an app on a smart phone~~, Internet browser, or phone call~~. A significant difference from traditional dial-a-ride programs is that rides do not have to be scheduled in advance. On-demand shared mobility services could complement existing transit in the region by serving as a first-and-last mile connection from transit hubs to low-density or isolated destinations or replacing low performing fixed-route services and flex-route services. These Council and transit providers will continue to monitor and evaluate these emerging service types for potential applications and expansion moving forward. In addition, the Council will explore a Work Program effort to better define the role for shared mobility and microtransit in helping provide access to transit and achieve the broader regional transportation goals and objectives in this plan. Given the dynamic nature of emerging technologies, the Work Program item is purposefully open-ended in scope.

An emerging area of focus in this area is the development of mobility hubs. These are places where travelers can easily access and connect among multiple transportation options (including public transit, shared mobility, and other modes). A Work Program effort will develop planning guidance for the different land use and transportation contexts where mobility hubs are being explored.

Regular-Route Service Expansion Opportunities

The regular-route bus system includes bus service that operates on a fixed route, stopping at designated bus stops and following a consistent schedule. There are a number of different service types within the regular-route bus system designed to serve the different Transit Markets Areas. The different service types reflect the general trade-off between frequency of stops and speed of service, along with matching level of service to anticipated demand. Express service has fewer stops and faster speeds while local service stops more frequently but travels slower. Together, the mix of regular-route services makes up a network that allows people to transfer between services and access many destinations beyond a single line. More information about specific route types can be found in Appendix G.

The regular-route bus system will need to expand to meet growing demand and improve access to destinations, especially for those who rely on transit. Since expansion of the regular-route bus system will typically respond to development patterns and is more flexible than large investments in facilities or transitways, the needs of the system can change more frequently, especially in emerging markets. However, the expansion of the bus system will also provide valuable connections to the transitway system across all route types and extend its reach to broader areas. This will not only support bus system expansion to new customers but also ensure the success of transitway investments. As a result, the region will need to support transit investment and expansion across the entire region, inclusive of different service types. The following are general descriptions of the types of improvement opportunities for service expansion.

Local Routes

Local routes play a number of different roles and make up the basic structure of the regular-route bus system. These routes operate primarily on city streets in both the urban core and suburban areas and stop frequently, typically every one-to-two blocks. Local routes provide people with the highest level of access but often come with the trade-off of potentially slower, less reliable trips.

Core Local Routes – These routes generally serve urban areas along dense corridors. They comprise the basic framework of the all-day bus network, providing people with essential connections to major activity centers and transitways. Expansion of core local routes will concentrate on providing more frequent and a longer span of service on existing routes to meet growing customer demand along these corridors.

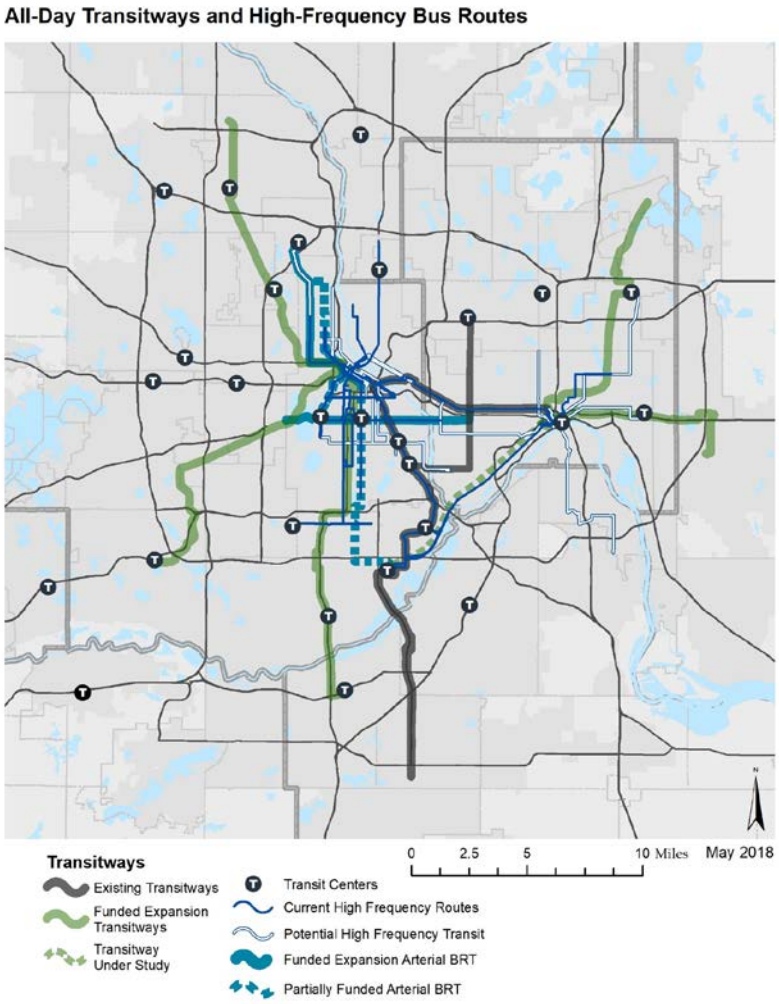
High-Frequency Transit Routes – These are generally the highest-demand routes in the system. These routes serve a significant portion of the total ridership across the transit network (56% of the region's riders in 2018, including METRO Blue Line and Green Line). High-frequency routes receive the highest level of all-day service – at least 15-minute frequency from 6 am – 7 pm on weekdays and 9 am – 6 pm on Saturdays. These routes often have highly visible customer facilities at major stops. Existing and proposed high-frequency transit service is shown in Figure 6-4, including planned METRO lines and arterial bus rapid transit lines. The Land Use and Local Planning section of this plan specifies the intensity and level of activity needed to support this level of investment. Local governments are

encouraged to identify potential high-frequency corridors in cooperation with regional transit providers for consideration. A local example is the ~~Primary Transit Network identified in the City of Minneapolis' Access Minneapolis transportation action plan~~work Minneapolis has undertaken in their Transportation Action Plan, which identifies Transit Priority Projects in the city.

Commented [HC4]: Forthcoming in early 2020 but not yet public.

Figure 6-4: Existing and Potential High-Frequency Bus Routes and Transitways

Commented [HC5]: To be updated: (add C Line, remove Route 19, update Gold Line and Riverview, review transit centers, review ABRT funding status)



Supporting Local Routes – These routes serve urban areas on crosstown corridors that typically do not connect to a major regional center, such as one of the downtowns. They are designed to complete the grid of urban bus routes and facilitate connections to core local routes and transitways. Expansion

of supporting local routes will focus on adding new routes to fill in the grid and provide better service coverage to moderately dense areas of the region. Frequency and span on existing routes will also be improved to better serve customer needs. With more intense development along these corridors, some supporting local routes may be reclassified as core local routes to reflect a more transit-supportive development pattern.

Suburban Local Routes – These routes provide access to the transit network across large portions of the lower-density portions of the transit service area, mostly in Transit Market Areas II and III. These routes tend to operate with less frequent trips and fewer hours of service. Suburban local bus service will be expanded in areas where there are coverage gaps or existing frequency or span of service do not meet expected demand. Improvements will focus on expanding suburb-to-suburb service and connections to major transfer points. Improvements will reduce the need for customers to transfer downtown to get to their destination, and improve access to jobs and other destinations outside of the urban core.

Commuter and Express

Commuter and express routes are designed primarily to bring people from urban and suburban residential areas to jobs in the region's major employment areas. These routes generally operate to serve the most common work start and end times. Future demand for commuter and express service, and associated demand for park-and-ride facilities, can be determined using a number of methods. The region has a model for estimating future park-and-ride demand, which is discussed in more detail under Park-and-Ride Facilities.

As commuter and express routes generally travel longer distances over the region's highway network, they will be expanded, in coordination with transit advantages, to provide a congestion-free alternative in congested highway corridors, as demand warrants. Existing routes may be improved to add reverse-commute service to connect urban residents with suburban jobs and to provide mid-day service to provide commuters the flexibility to return home if needed. An important part of express bus service is the presence of a transit advantage to bypass highway congestion. For additional details, go to the Transit Advantages discussion. Express bus services can also be coordinated with highway bus rapid transit transitway services and facilities. A map of 2040 express bus service corridors and the park-and-ride system are shown in Figure 6-5 under Park-and-Ride Facilities.

Service Expansion Priorities and the Regional Service Improvement Plan

To improve short- and medium-range planning efforts and prioritize transit service growth, regional transit providers should evaluate their service improvement plans every two years and prepare or update them regularly, as needed. The plans can take a variety of forms, ranging from a lengthy list of service improvement concepts to a set of focused changes to meet near-term needs. Ideally, the plans will identify priorities for service expansion in each provider's service area for at least the next two to four years. Providers should also consult with local governments, businesses, the public, historically underrepresented groups, and other stakeholders in their service area to get a variety of the inputs into

regional transit service planning. Providers are also encouraged to explore new service delivery models and markets, as funding allows, and share feedback and best practices with all providers in the region.

Metro Transit is currently working on a major planning effort called Network Next, which will develop a vision for their 2040 bus network. Network Next is discussed in more detail in the Work Program, which is anticipated to be completed in 2021, and the implications of this vision will be addressed in the next update of the *Transportation Policy Plan*.

The Regional Service Improvement Plan is a documentation of transit needs that is an input to funding prioritization should additional funding be made available for bus service (the Increased Revenue Scenario). With the recently adopted State Transit Funding Allocation Policy and forthcoming procedures, transit providers now receive state funding through block grants to allocate to services within their service area. Because this policy affects existing and increased state revenues, the Regional Service Improvement Plan would not impact how state funds are prioritized, even in the Increased Revenue Scenario. Providers will be asked to submit their projects to the Metropolitan Council for consideration in the Regional Service Improvement Plan, which will evaluate them against regional planning goals and objectives. Each submittal should include a project description, resources needed for implementation, projected year of implementation, project readiness including capital facility coordination, and data for a technical evaluation.

The Regional Service Improvement Plan will evaluate proposed service improvements based on a number of factors. Specific technical measures will be determined based on data availability and methodologies developed in coordination with all regional transit providers. Table 6-3 includes the minimum factors and example measures that will be the basis of the Regional Service Improvement Plan technical evaluation and descriptions of the considerations for measuring these factors. Additional factors may be determined collectively by regional transit providers, as specific details are determined for each update of the Regional Service Improvement Plan.

Table 6-3: Regional Service Improvement Plan Technical Investment Factors

Technical Factors	Description and Example Measures
Cost-Effectiveness	Cost-effectiveness for transit service is typically measured relative to ridership. This region has standards for “subsidy per passenger,” but other measures will also be considered.
Access to Destinations and People Served	Transit access provides opportunities for people to ride and for transit to be productive. This region has standards for “passengers per in-service hour.” Additional measures could consider access to job concentrations as methodologies become more understood.
Equity	The transit system plays an important role in providing access and opportunity to a number of disadvantaged groups, including people with disabilities, people of color, and low-income populations. This includes a large portion of the region’s transit-dependent population. Measures will

Technical Factors	Description and Example Measures
	document the extent to which disadvantaged groups are affected by potential improvements.
Peak-Period Transportation Benefits	The transit system provides additional capacity to the transportation system when it is most needed, during peak travel times. This benefits the region by shifting trips and miles traveled from driving alone to riding transit; this can reduce traffic congestion. Both of these can also positively impact air quality and contributions to climate change.

The Regional Service Improvement Plan will provide a technical evaluation of submittals for service expansion. Additional factors and tools may need to be considered by policymakers when considering how increased revenues should be prioritized for service expansion, including regional balance and community support. The Regional Service Improvement Plan will be updated as new data becomes available or as needs have substantially shifted, to adapt to the changing demands for bus service. For example, the plan may be updated when new regional transitway investments are identified in the TPP and feeder routes need to be evaluated, or prior to the next major update of the TPP.

Transit Facilities Expansion and Modernization Opportunities

Transit facilities compose the built environment of the transit system. Customer facilities are the places where transit customers access transit vehicles, ranging from bus stops to large and complex multimodal transit hubs. Support facilities include the necessary “behind the scenes” infrastructure that supports transit providers and their operations, such as bus garages, communications control centers, and bus layover facilities. Transit advantages are roadway improvements that improve person throughput by reducing the factors that hinder efficient transit operation, such as bus shoulders or transit-only lanes, transit signal priority, or curb bump-outs.

The network of transit facilities must be strategically improved and expanded to serve the region’s growing transit system. Improvements to transit facilities will improve the customer experience and maximize the efficiency of transit investments.

Customer Facility Expansion and Modernization

Customer facilities – bus stops, transit centers, transit stations, multimodal hubs, and park-and-ride facilities – are essential to provide convenient and attractive access to transit service. Such facilities support the regular-route bus and rail system and provide transfer points for the dial-a-ride system. Customer facilities are most successful when they are well-integrated with the surrounding environment. Every customer facility should provide ADA accessibility, safety, comfort, and information for customers to feel secure in using the transit system. Customer facilities also serve as an important point of transfer between transit services, including bus-to-rail transfers. Detailed guidelines for customer facility amenities can be found in Appendix G.

Bus Stops

Bus stops are established locations for customers to get on and off the bus and are the most frequently used transit customer facility. They are essential for providing access to transit for the vast majority of customers. There is a greater density of bus stops in Market Areas I and II, where development density and urban design are best suited for walk-up access to transit. Transit providers work with local communities to provide pedestrian connections and signage at each stop. Features that modernize the bus stop - such as concrete improvements for accessibility, enhanced transit information, shelters, or electrical connections to support heat and light in shelters - improve the customer experience.

Transit Centers

Transit centers are locations where two or more transit routes connect to provide comfortable and convenient locations for customers to connect to other routes and services in the system. They typically have multiple bus stops and bus service is timed for easy transfers. Buses also frequently layover at transit centers.

Transit centers are typically located at major activity centers or transitway stations, and may be located at a park-and-ride. Transit centers in Market Areas I and II typically serve transit customers who walk up to begin the transit trip or transfer from another route. In Market Areas II, III and IV transit centers anchor local transit routes by creating places outside of the downtowns where routes come together to offer customers more route choices. Transit centers in Market Areas III and IV typically have associated park-and-ride facilities that serve express routes and connecting local routes. Transit centers provide customers with shelter, transit information, and other features to enhance the transit customer experience. Transit centers may need to be modernized to meet customers' needs for accessibility, safety, and comfort, and new transit centers may need to be added or improved as transit services expand throughout the region. Some transit providers in the region have named these facilities "transit stations," but they are classified as transit centers for technical planning purposes.

Transit Stations

Transit stations are customer facilities associated with transitways. They provide the public access to light rail, commuter rail and bus rapid transit services. New transit stations are typically developed as transitways are constructed, but can also be added incrementally before or after a full transitway is in operation. As the transitway system matures, transit agencies modernize transit stations through refurbishments and upgrades for service reliability, safety, and customer comfort. More information regarding transit station investment can be found in the Transitway System Investment Plan.

Regional Multimodal Hubs

In addition to transit stations, there are two regional multimodal hubs in the system that connect light rail and commuter rail transit to a number of other existing and planned services. The Union Depot in downtown Saint Paul is served by the Green Line, local and express bus service, Amtrak passenger rail service, and a number of intercity bus services. Target Field Station in downtown Minneapolis is served by the Green Line and Blue Line light rail, Northstar commuter rail, and other bus services that connect

in downtown Minneapolis. More information regarding planned transitway connections to these hubs can be found in “Transitway System Investment Plan.”

Customer Facility Features

Regional transit providers offer a range of features at customer facilities to improve the customer experience. Customer facility features may include pedestrian connections and accessibility, customer information in static and real-time signage, shelters, shelter lighting or heaters, trash and recycling receptacles, seating, security cameras, bicycle parking and storage, fare payment and vending machines, landscaping, and public art.

Customer facility features create a more comfortable, accessible and attractive waiting environment for transit customers, as well as enhanced customer safety. Customer facilities can also benefit the surrounding neighborhood by making transit a more attractive travel option for nearby people and businesses, and by contributing to the overall character of the streetscape.

More specific policy and guidance for facility features rests with the region’s transit providers. For example, Metro Transit has a policy on the prioritization and placement of shelters. Some cities have regulations on the placement of benches. These are also discussed in more detail in Appendix G.

Investing in customer facilities means time passes more easily for transit customers

Customer facilities at transit stops have a proven positive influence on the customer experience, according to research from the University of Minnesota.

The wisdom in the old saying “time flies when you’re having fun” means that transit customers perceive wait times differently based on the features provided. At transit stops with no features - such as benches, shelters, and real-time transit information – the research found that transit customers perceived waiting times to be at least twice the actual wait. Facilities with features significantly reduce perceived waiting times. A 5-minute wait feels like only 3.2 minutes for transit customers with access to shelters.

The full findings of the research from the University of Minnesota are reported in “Perceptions of Waiting Time at Transit Stops and Stations.”

Park-and-Ride Facilities

Park-and-ride facilities are surface lots and structured ramps predominantly located outside of the Urban Center that are served by express bus, bus rapid transit, or rail. Park-and-rides are important tools for creating locations with the customer density required to provide cost-effective transit service from suburban and rural areas.

The 2030 Park-and-Ride Plan (2010) documented the anticipated demand by regional travel corridors and provided recommendations for future park-and-ride facilities. The plan included methodologies for determining facility need and integration with the transit system, analyzing market areas, and considering site selection and facility design. The plan also included a park-and-ride demand forecast model for estimating future need based on a number of factors that contribute to park-and-ride use.

This model has been updated to reflect *Thrive MSP 2040* forecasts, but also takes into account these factors affecting park-and-ride demand:

- Socioeconomic forecasts
- Commute patterns from Census data
- Transit rider characteristics from a variety of survey data sources
- Downtown job growth and the overall distribution of jobs in the region
- Parking costs
- Level of transit service, both during peak periods and in the midday
- Travel time to downtown Minneapolis or Saint Paul
- Travel time from user origins to potential park-and-ride facilities
- Available capacity at potential facilities

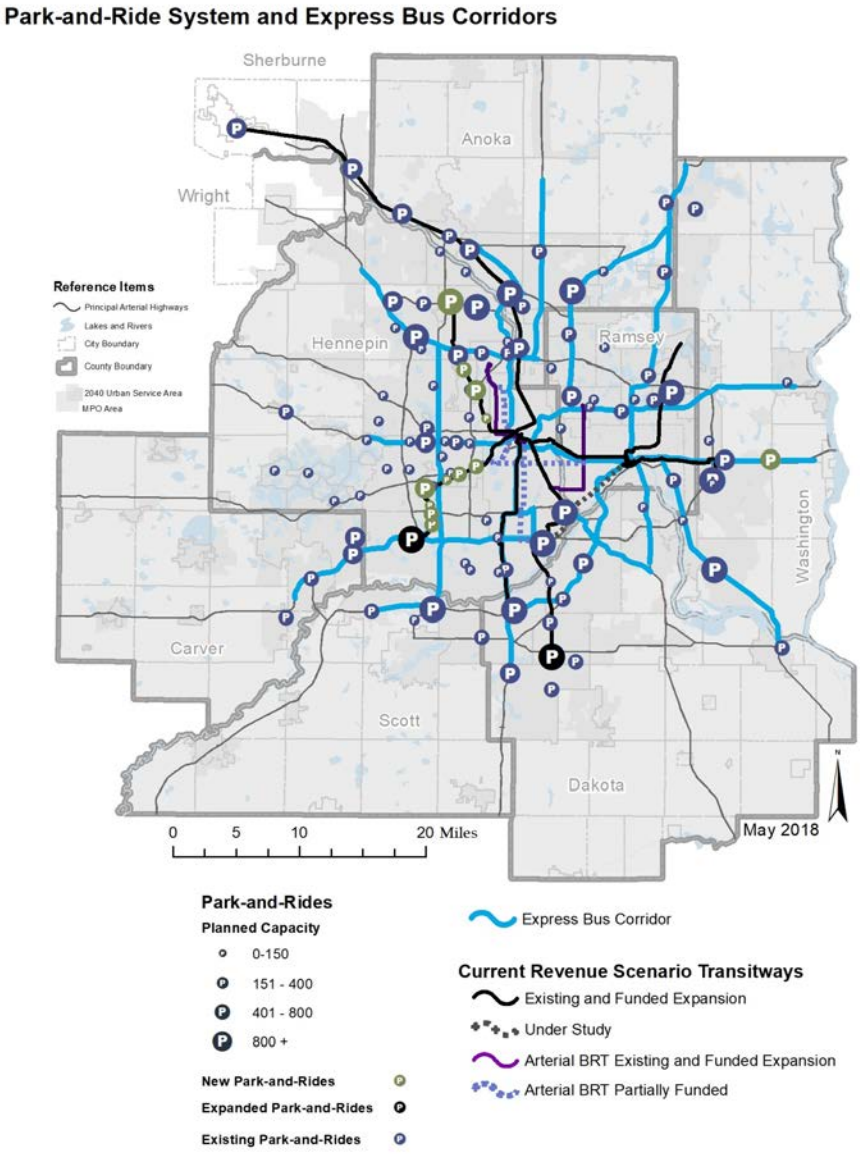
The model is available for the seven-county region and may be used by all regional transit providers to estimate future park-and-ride needs and planning efforts, including project submittals through the regional solicitation. The data in the 2030 Park-and-Ride Plan is largely out-of-date and regional transit providers will need to discuss whether an updated plan is needed. Regardless, the updated park-and-ride demand model will be used and other guidance, tools, or data in the 2030 Park-and-Ride Plan will be updated and made available on the Metropolitan Council's website in the future.

Park-and-rides are optimally located in a congested travel corridor, upstream of major traffic congestion, with service to major regional destinations. Facility design takes into account the cost of construction and land acquisition; site access for vehicles, pedestrians, and cyclists; site visibility; future expansion potential; community and land use compatibility; environmental constraints; and opportunities for joint-use ventures and transit-oriented development. The region is shifting away from providing small facilities to concentrate on fewer, larger facilities with more frequent service. Larger regional facilities serving multiple cities increase the attractiveness of the service to all residents of the region. Transit providers will continue to coordinate with local communities in planning and designing park-and-rides to integrate park-and-rides into local development patterns. Transit-oriented development and joint-use ventures associated with park-and-ride locations may become more prevalent over time as the region's transitway system and land use development matures.

Expansion of the park-and-ride system has been a focus since the late-1990s, with usage growing annually by as much as 20%. The previously developed 2030 park-and-ride need has been largely built, with nearly 35,000 spaces in the system. While opportunities still exist to expand park-and-ride capacity in certain locations, the system is not expected to expand as dramatically and quickly as past decades. The system currently operates at around 50-60% of capacity and can accommodate much of the demand expected through 2040. The park-and-ride system and express bus corridors are shown in Figure 6-5.

Figure 6-5: Park-and-Ride System and Express Bus Corridors

Commented [HC6]: To be updated with most recent data.



Support Facility Expansion and Modernization

The regional transit system must have sufficient facilities to support efficient and cost-effective transit services. For buses, these support facilities include garages and bus maintenance facilities, bus layover facilities at route terminal points, and dispatching and control centers. For rail, these support facilities include operations and maintenance facilities, train storage facilities, layover facilities, and logistics facilities such as control centers. In addition, system-wide support facilities are needed for the maintenance of customer facilities, transit police force, employee training, customer service centers, and administration. As the transit system expands, and the types of services available and the number of riders increases, support facility capacity must increase as well.

Bus Support Facilities

As the bus fleet expands to meet anticipated ridership growth, bus garages, bus layovers and vehicle storage will need to be increased. This will be accomplished by expanding existing facilities and constructing new facilities. Maximum use of existing garage facilities should be made but over-crowded bus garages lose operating efficiency, making it more difficult to provide the quality of transit service expected in the region. Bus garage expansion should precede fleet expansion. Currently, Metro Transit uses five bus garages to provide for daily maintenance and storage of vehicles, with an additional facility serving needs for more intensive vehicle repair. Other regional transit providers have support facilities as well, either through direct ownership or through agreements with private operators. These facilities support bus rapid transit vehicles as well as regular-route vehicles. Existing garage facilities in the region are aging and the need to maintain or replace them will emerge as an issue that will need to be addressed in the coming decades. Their use and effective life can be maximized with maintenance and modernization efforts, including investments that result in operating efficiencies. The emergence of electric buses as a potential regional fleet investment would also require substantial planning and investment in charging stations and maintenance equipment and parts at bus support facilities.

Bus layover facilities provide a physical space for transit vehicles to stage, an opportunity for route recovery time, and driver break rooms and restrooms. Bus layover facilities are typically located at the terminus of transit routes and may be co-located with customer facilities. These facilities enable the system to operate cost-effectively and on time. Given projected growth and existing capacity of existing layover facilities, additional layover facilities will be needed in both downtowns, the University of Minnesota, and some suburban locations.

Rail Support Facilities

Rail support facilities presently include two light rail transit operations and maintenance facilities, a rail operations support facility, and the Northstar commuter rail maintenance facility. Additional transitway rail service will generate need for additional operations and maintenance facilities. Options to improve or expand existing facilities as well as construct new facilities will be evaluated based upon the planned transitway network, corridor-specific planning efforts, and system-wide facilities planning.

System-wide Support Facilities

Transit control centers are an essential communications, safety, security, and service link for regional transit service. Control centers monitor schedule adherence and coordinate the daily activities of buses, trains, Metro Mobility and dial-a-ride services, service vehicles, training vehicles, and other mobile units. They also dispatch vehicles to respond to on-street incidents and to support transit police. As the bus and rail system expand, the transit control centers will also need to expand.

Facilities that headquarter maintenance crews are needed to keep customer facilities clean and in good condition. As ridership grows, customer facility maintenance capacity must expand to meet the maintenance needs of more heavily used existing facilities and of new facilities.

Transit police support facilities are composed of a central headquarters and small local substations. Administrative offices are also part of the support facilities that contribute to a well-functioning transit system. These system-wide support facilities must have the capacity to support the transit system as it grows.

Other Transit System Improvements

Expansion of Transit Advantages

Transit advantages are roadway improvements that improve person throughput by reducing the factors that hinder efficient and attractive transit service. These advantages include but are not limited to bus-only shoulders and lanes, high-occupancy vehicle lanes and MnPASS, ramp-meter bypasses, traffic signal queue jumps, transit signal priority, and curb extensions.

Growing roadway congestion will make it increasingly more difficult for buses to move around the region. Right-of-way that provides a fast travel alternative for rail and bus transit should be pursued when transit volumes justify. Transit advantages benefit transit operations and can work to relieve congestion for both transit and drivers in general purpose lanes alike. Current efforts to implement bus rapid transit in the region, along freeways as well as higher density urban arterial roads, provide faster, more reliable travel times, reduced waiting time for service, and attractive transit amenities and options for commuters who currently drive.

On state highways, transit advantages can include bus-only shoulders, dedicated bus lanes, MnPASS lanes, ramp meter bypasses, and transit stations adjacent to or on roadways (see Figure 6-6). Opportunities for further implementation of bus-only shoulders are limited as the system is nearly built out. MnPASS lanes are highway lanes that are shared by transit, high-occupant vehicles, and single-occupant vehicles (SOVs) that opt to pay a fee to use the lane. SOV usage is controlled by varying the fee price based on real-time traffic conditions. Prices are set to maintain a consistent flow of traffic. MnPASS lanes, like those in the I-394, I-35W, and I-35E corridors, provide a significant transit advantage by offering a congestion-free alternative for transit riders. This strategy can dramatically increase the overall number of people that can travel through a corridor in a given amount of time. The development of the region's MnPASS system is discussed in Chapter 5, "Highway Investment Direction and Plan."

On local streets and signalized highways, improvements include dedicated bus lanes, dynamic parking lanes, traffic signals that are coordinated with transit service and/or provide transit priority (e.g. transit signal priority), curb extensions that allow buses to avoid pulling into and out of travel lanes, and queue jump lanes, among others. These improvements all work to provide faster trips for customers, improve the attractiveness of transit, and significantly increase the people capacity of local streets.

While some express and local transit corridors are currently well supported by transit advantages, there are a number of locations that need improvements to maintain or improve transit travel times and reliability. In addition, opportunities to coordinate with planned road improvements, or to adequately serve planned community development projects through enhanced transit service, provide high returns on capital transit infrastructure investment. Corridors with high levels of congestion and high existing and potential transit ridership should be prioritized for new transit advantages. The timing of these projects will be dependent on opportunities associated with roadway projects, where coordination is essential to project delivery, but may also be coordinated with transitway projects. A number of bus lanes are being piloted in the City of Minneapolis in coordination with Metro Transit and a broader vision may be considered once the concept is more thoroughly developed and tested. ~~Chapter 14, "~~The Work Program~~,"~~ includes a reference to work being done through Metro Transit's Network Next ~~study~~ to programmatically explore where local transit routes are experiencing speed or reliability issues, and whether these issues could be addressed with transit advantages on local streets.

Figure 6-6: 2040 Bus Shoulders and MnPASS

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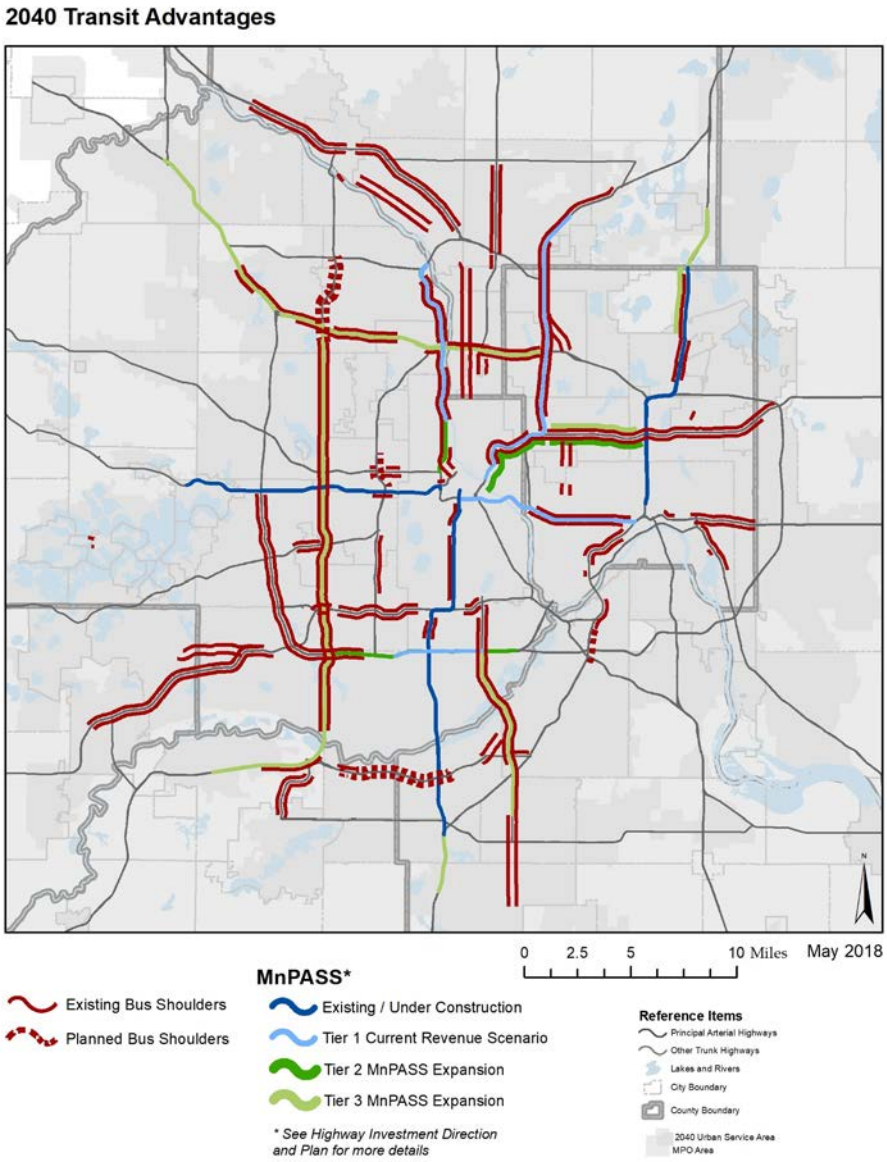


Marketing Transit

Marketing transit can significantly increase awareness of service and lead to higher ridership. The Metropolitan Council and regional transit providers will increase the value, benefits, and usage of transit services through a variety of advertising and promotional programs. Additionally, the Metropolitan Council will pursue opportunities for partnerships with other transit-supportive services including bicycle- and car-sharing services. Annual transit marketing plans will be developed by the Metropolitan Council based on input from stakeholders.

Transit providers will also form partnerships on travel demand management strategies including working with Transportation Management Organizations to broaden the awareness of transit to more businesses and employees. More information on this relationship can be found under the Existing Transit System and in the TPP's discussions of strategies and Chapter 5, "The Highway Investment Direction and Plan." In addition, every two years the Regional Solicitation provides a funding opportunity for new or expanded travel demand management projects.

Safety and Security

Working with transit providers and communities, the Metropolitan Council will continue to strive to provide a safe and secure environment for customers and employees on vehicles and at transit facilities. The Metro Transit Police Department is an important component of this effort. Through a variety of means, the Transit Police enhance security, increase ridership, and preserve the quality of regional transit infrastructure. These include fare enforcement, welfare checks, regular patrols and rides on transit vehicles, partnerships with other law enforcement agencies and community organizations, and innovative programs such as community service officers. It is important to note that not everyone has the same experience using the region's transportation system; analyses of enforcement data show that people of color experience disproportionate traffic stops or enforcement on transit. People of color are also disproportionately represented among the region's transit riders. The Council will strive to ensure that Metro Transit Police Department actions do not create or perpetuate racial inequities. The Metro Transit Police Department will also work to remain current with evolving industry standards, best practices, and community expectations.

Transit infrastructure is another important component of safety and security. These investments include cameras and emergency telephones on transit vehicles and at stations, and improved lighting at transit stops and stations, among others. An important component of safety and security is good design of facilities, including the consideration of Crime Prevention through Environmental Design principles. Safety is a shared responsibility and everyone needs to know what is expected of them. Consequently, the Metropolitan Council will continue to invest in employee awareness and public education campaigns to improve transit safety.

In addition to promoting safety and security during regular transit operations, the Metropolitan Council and Metro Transit also have an important role in regional disaster preparedness. The Metropolitan Council maintains an emergency management plan to coordinate between Metro Transit and the various regional and state public safety agencies in the event of an emergency situation.

Recent federal legislation gave authority and responsibility to the USDOT for safety oversight and rulemaking related to all modes. FTA has been publishing rules along these lines, focusing mostly on rail transit, but also requiring performance measures and targets for transit safety. Every transit provider in the region takes the safety of their employees, customers, and the public seriously and has procedures for ensuring safety. At Metro Transit:

- Each mode has its own System Safety Program Plan that describes how safety is integrated into the operation. Further, all modes have an accident investigation, reporting, and corrective action planning process.
- All modes of transit have an operations emergency management plan that describes the overarching responsibilities and public safety partners. These are updated annually for bus and light rail.
- All major capital projects undergo a safety certification process to ensure that the new service is safe for passenger operations. Similarly, significant changes to the operating system are subject to the same rigorous verification.

Current Revenue Scenario Bus and Support System Investments

The bus system is the largest and most important part of the transit system because it serves all parts of the region. Bus and support system investments are limited by reasonably expected resources, and opportunities to invest are dependent on these constraints. The following summarizes the components of the system that are assumed to be funded in the plan's Current Revenue Scenario. The first priority for investing in the region's bus and support system is continuing to operate and maintain the existing system.

Operate and Maintain the Existing Bus and Support System

- Operating and managing the bus network and routes consistent with Regional Transit Design Guidelines and Performance Standards
- Operating Metro Mobility, including anticipated growth needed to meet demand
- Operating the Transit Link dial-a-ride service and providing Metro Vanpool subsidies
- Operating and maintaining the support systems for the transit system, such as shelter and public facility maintenance and customer information
- Maintaining and replacing vehicles
- Maintaining or replacing existing capital facilities and other equipment to support operations and a positive customer experience, including a modest expansion of bus stop amenities

Beyond ongoing operations and maintenance, opportunities for expansion and modernization of the transit system are limited and available primarily through competitive grant programs. This includes projects funded through the Regional Solicitation, which distributes federal flexible funds, such as surface transportation block grants, within the metropolitan area, or other federal, state, and local programs. The opportunities include:

Expand and Modernize the Bus and Support System

- Expansion of transit capital vehicles or facilities (including park-and-rides) to serve new markets or provide an improved experience for existing customers, such as enhancements to customer information signage, retrofits to existing transit stations, and placement of additional customer waiting shelters and bike amenities
- Start-up operating funding for limited expansion of transit service for demonstration purposes, including exploring innovative service models and new technologies
- Modernization of transit facilities or systems to improve the customer experience, provide more efficient or more environmentally friendly transit operations, or improve the operating capabilities of regional transit providers

The opportunities for bus operating and capital expansion will be prioritized based on an evaluation through the Regional Service Improvement Plan, the Regional Solicitation, or other more specific plans that focus on short-term regional transit needs. Regional Solicitation projects will be incorporated into regional planning through the Transportation Improvement Program, developed annually.

Increased Revenue Scenario Bus and Support System Investments

The region will need additional resources to realize the vision for the transit system in this plan that goes beyond the limited opportunities in the Current Revenue Scenario.

Additional resources would allow the region to expand existing services and add new service to parts of the region. Expansion and modernization of transit facilities will enhance the transit customer's experience on multiple levels. Access to a bus stop or customer facility might be improved through a better pedestrian connection, provision of secure bike storage, or a more conveniently located park-and-ride. A transit user's wait for the bus would be improved with shelters at more bus stops and more amenities at customer facilities such as heaters, lights, and transit information. These customer facilities would be in clean, good condition because investments in maintenance support facilities would be commensurate with customer facility expansions and improvements. Once on the bus, a transit customer's ride might be more reliable or comfortable because the vehicle has been cleaned and maintained at an updated bus garage that operates at its optimal capacity. Better access to customer support, from police to transit information, would be made possible under this scenario because of investments made in support facilities.

Expand and Modernize the Bus and Support System – Increased Revenue Scenario

- An average of at least 1% annual growth in the regular-route bus service over 25 years (at least 25% growth in total), with near-term improvements guided by the Regional Service Improvement Plan, that includes:
    - Improved local service frequencies and hours of service to attract new riders to the system and improve access and reliability for existing riders, including an expansion of high-frequency arterial routes
    - Expanded coverage of local service with an emphasis on connections between high-density residential neighborhoods, regional job concentrations, and transitways
    - Expanded commuter and express service to new markets and improved service in markets that are overcapacity
- Expanded fleet needed to expand service
- Enhanced maintenance including additional snow removal at transit customer facilities and improvements including better lighting, more customer information, rehabbed aging facilities (e.g. Sun Ray Transit Center), more and better shelters, improved multimodal connections, enhanced pedestrian connections to bus stops, and energy-efficient improvements
- Expanded or modernized transit support facilities including additional garages for increased system capacity, additional layover capacity in major regional centers, light rail support facility upgrades, bus rapid transit garage capacity, and other improvements
- Exploration of emerging trends in transit service such as microtransit, electric buses, and fare collection strategies and technologies

Like the Current Revenue Scenario, the opportunities for bus operating and capital expansion under the Increased Revenue Scenario will be prioritized based on an evaluation through the Regional Service Improvement Plan or other more specific plans that focus on short-term regional transit needs.

Transitway System Investment Plan

A network of transitways is and will be a significant element of the regional transit system, both in terms of use and investment. Transitway investments are permanent and long-range. They require diligent planning to best serve the existing developed region and help guide future development in the region. This permanence also plays a strong role in the ability of transitways to focus future growth and act as a catalyst for development in the region.

The region will develop a network of transitways that considers a variety of modes including: bus rapid transit in multiple forms, light rail, and commuter rail. The region is currently examining modern streetcar as a regional transitway mode (see discussion near the end of this chapter). Each mode has unique characteristics that are cost-effectively matched to an appropriate purpose and need. Transitways are also supported by the regular-route bus service described in the previous section. It is important for the region to consider and include connecting services in transitway planning and investment scenarios.

Transitway Modes

The following are general descriptions of transitway modes in the region. More detailed project descriptions and statuses are available under the Current and Increases Revenue Scenario discussions.

Bus Rapid Transit

Bus rapid transit (BRT) is a transitway mode that uses buses while incorporating many of the premium characteristics of rail. BRT is more flexible than rail in fitting the unique opportunities and limitations of a corridor. BRT has a number of attributes that, as a whole, distinguish it from other bus services in the region.

- Service operations: BRT typically operates at service frequencies of 15 minutes or better for most of the day in both directions, and can be complemented with other services such as local or express routes.
- Running way: BRT can operate in a dedicated busway, bus lanes, MnPASS lanes, dynamic shoulder lanes, dynamic parking lanes, bus-only shoulders, or mixed traffic, depending on the characteristics of the corridor. BRT typically includes various transit advantages such as queue jump lanes and curb extensions to provide faster travel.
- Technology: BRT can include transit signal priority to allow buses to move more quickly and reliably through traffic signals. Customer information displays and other technology are often provided to improve the customer experience.
- Identity/brand: BRT is often uniquely branded to help distinguish it from other bus services.
- Stations: BRT stations are uniquely branded with more amenities and generally spaced further apart than a standard bus stop to provide faster travel.

- Vehicles: BRT vehicles can range from typical 40-foot transit buses to specialized vehicles with a unique look, low floors and additional doors for quicker boarding, and other customer amenities.
- Fare collection: BRT typically utilizes off-board or other unique fare collection methods that allow for quicker customer boarding.

BRT facilities are often scalable to demand and can be added or expanded, as needed, over time. For example, an express corridor could add a MnPASS lane or other transit advantage, and then add stations and park-and-rides as demand increases. Because of this, BRT is better suited to adapt to unique corridor conditions than rail. The region is planning for three types of BRT that are matched to the conditions of the corridors: dedicated bus rapid transit, highway bus rapid transit, and arterial bus rapid transit.

Since BRT is intended to be flexible, corridors may be implemented in a way that is a combination of BRT types. Dedicated BRT projects are typically more substantial investments and will likely fit into the New Starts category of federal funding. Highway BRT and arterial BRT projects will typically fit into the Small Starts category of federal funding and may be explored in a phased approach. In many cases, elements of these projects can be implemented prior to the complete bus rapid transit investment (for example, limited stop bus service or enhanced bus shelters). ~~Dedicated BRT and highway~~ In 2019, it was decided that all BRT lines will be considered part of the METRO system with color designations for dedicated and highway BRT lines and letter designations for arterial BRT lines, as long as the service and facilities meet certain minimum characteristics.

Dedicated Bus Rapid Transit

Dedicated BRT is often considered the most similar to light rail in the characteristics of how it operates and level of investment. Dedicated BRT uses special roadways or lanes of roadways dedicated to the exclusive use of buses. Projects are generally similar to light rail in project length, with stations also spaced about a mile apart. Dedicated BRT has more flexibility than light rail because the dedicated guideway and stations can be shared with other services, such as express or local bus. Buses are also more flexible than light rail to operate on existing facilities through small areas where space is limited to build a dedicated guideway. Dedicated BRT has requirements for right-of-way and infrastructure similar to light rail, except for the train and associated propulsion and track systems. A local example of dedicated BRT infrastructure is the University of Minnesota busway, which connects the University's campuses with frequent bus service. The future METRO Gold Line and Rush Line are the first dedicated BRT transitways to be included in the plan.

Highway Bus Rapid Transit

Highway BRT provides frequent, all-day service to regional centers that are near highways and spaced further apart throughout the region than neighborhood or local centers, making them difficult to connect with local bus service. Highway BRT generally operates on limited access roadways where buses can use bus-only shoulders, MnPASS lanes, ramp meter bypasses, and priced dynamic shoulder lanes as transit advantages. Stations are spaced about one to two miles apart. Highway BRT service is often

complemented with express bus service that uses the same facilities and is coordinated with local bus connections. Other highway BRT characteristics would be similar to dedicated BRT and light rail, such as service frequencies, fare collection, technology, and customer information. The METRO Red Line is the only existing highway BRT line operating in the system. The second line, the METRO Orange Line on I-35W South, is also included as an expansion project in the plan's Current Revenue Scenario.

Arterial Bus Rapid Transit

Arterial BRT is an all-day, frequent service that is faster and provides a better customer experience in corridors with strong existing local bus service. These corridors are all in highly developed areas of the region where available right-of-way limits the ability to implement facilities for light rail or dedicated BRT. Arterial BRT can attract a high number of new transit riders and improve the experience for a high number of existing riders. Arterial BRT generally operates in mixed-traffic on local streets with stations spaced about ½ mile apart, depending on corridor specifics, and incorporates transit advantages such as transit signal priority or queue jump lanes. Arterial BRT can be complemented with local bus service that stops more frequently. Typical amenities include improved stations and customer information, unique vehicles and branding, and fare collection that allows for faster boarding. The first arterial BRT line in the region, the METRO A Line, opened along Snelling Avenue in 2016~~. Construction began on~~and a second line, the METRO C Line, opened on Penn Avenue in 2019~~.~~ ~~and station planning on t~~The planned D Line, on Chicago/Fremont Avenues, ~~was completed in 2018~~is anticipated to start station construction in 2021. Station planning for the B Line on~~,~~ Lake Street and Marshall Avenue is expected to ~~begin in 2018~~wrap-up in 2020 and similar efforts for the E Line on Hennepin Avenue are expected to begin in ~~2019~~2020. Metro Transit is evaluating the long-range vision for arterial BRT as part of Network Next, which is described in more detail in the Work Program.

Light Rail Transit

Light rail transit is an all-day, frequent service that connects dense employment and population centers with each other. It operates on tracks primarily in an exclusive running way. Vehicles are typically powered by overhead electrical wires. Stations are typically spaced about ½ to one mile apart. Typical light rail lines in this region can extend 10 to 15 miles out from the urban core and primarily serve the most densely developed areas of the region. Longer lines would generally be cost-prohibitive and better served by connecting local or express service. Light rail service operates in both directions at a high frequency. All light rail lines will be considered part of the METRO system and given color designations for customer information purposes. The initial segments of the METRO Blue Line and Green Line are operating, with extensions in development.

Modern Streetcars

Modern streetcar is an all-day, frequent service that operates in urban areas with high transit demand. Modern streetcars typically operate in mixed traffic, similar to a local bus route, but may also operate in an exclusive runningway. They typically stop every few blocks (spacing may vary up to 1/4-1/2 mile) and operate at shorter distances than light rail, with an emphasis on high-frequency service with high accessibility. Typical modern streetcar lines to date are shorter and travel more slowly than light rail.

However, modern streetcars may attract new transit riders similar to light rail and may offer some travel time advantages over local buses, such as faster boarding, faster fare collection, and intersection signal priority – similar to the transportation benefits BRT can offer. Modern streetcar service is particularly suitable for high-density, mixed-use areas with short average passenger trip lengths, areas where improved transit will benefit a high number of existing riders, and as an attraction for new or infrequent transit users like shoppers or visitors. Modern streetcars also have demonstrated promise for supporting high-density, mixed-use, walkable development in urban cores where people can live without a car and become regular and frequent transit users. Despite their differences, there are many similarities between modern streetcar and light rail and the two modes may share characteristics of each other, depending on the purpose of the project and implementation decisions made by lead agencies. The Riverview Modern Streetcar is the first project of this type assumed in the Current Revenue Scenario.

A number of other recent ~~and~~ or ongoing studies are considering modern streetcars for further planning or implementation (e.g. Nicollet-Central, West Broadway~~, Riverview~~). ~~but no existing modern streetcars exist in the region and no specific projects are assumed in the Current Revenue Scenario of this plan. As project recommendations come forward that would introduce this mode to the region, they will be considered on an as needed basis.~~ The Metropolitan Council is continuing to collaborate with local units of government and regional transit planning partners to determine the role of modern streetcars in the regional transit system as the first potential applications of the mode are discussed.

Commuter Rail

Commuter rail is an express transit service that primarily connects downtown employment centers to distant population centers. Commuter rail typically operates on existing freight railroad tracks to reduce infrastructure costs. Commuter rail vehicles may use diesel multiple unit vehicles or conventional diesel locomotives pulling passenger coaches. In many cases, commuter rail operates on tracks that also carry intercity passenger rail traffic operated by Amtrak or other passenger rail services, potentially sharing common stations. Lines are typically 20 or more miles in length, with stations spaced much further apart than light rail or BRT, typically about five miles apart. This spacing results in faster travel times that are competitive with auto travel. Station areas are primarily oriented to park-and-ride uses or dense housing and mixed-use development. Commuter rail services operate at 20- to 30-minute frequencies during peak periods, with limited or no midday or reverse-direction service. The Northstar Line is the only existing commuter rail line in the transitway system and is not considered part of the METRO system of all-day, frequent transitway service.

Regional Transitway Guidelines

More detailed descriptions of the characteristics of each mode are available in the Regional Transitway Guidelines (2012). The image in Figure 6-7 is an excerpt from the Regional Transitway Guidelines and it illustrates the basic characteristics of each mode. The only modes not included in this discussion are dedicated BRT and modern streetcars, modes that have not been implemented in this region yet. The Regional Transitway Guidelines will be updated on an ongoing basis as additional information or

insights are available, new modes are incorporated into the regional transit system, or if the parameters for the guidelines change.

Other Modes

No other modes are currently being explored for transitway development in the region. However, if other modes are being explored through further detailed studies, like local corridor planning studies, their inclusion in the plan would require an amendment.

Figure 6-7: Excerpt of "Minimum Elements" from the Regional Transitway Guidelines

Regional Transitway Guidelines

Table 10-1 – Minimum Elements from Transitway Guidelines[3]

	Arterial BRT	Highway BRT[4]	LRT	Commuter Rail
Service Operations	*WEEKDAY* Combined frequency for Arterial BRT and local service should be 10-min. peak period, 15-min. midday/evening, 30- to 60-min. early/late *WEEKEND* 15-min. day/evening, 30- to 60-min. early/late	*WEEKDAY* Combined frequency for station-to-station and express services should be 10-min. peak period and 15-min. midday *WEEKEND* Frequency based on demand	*WEEKDAY* 10-min. peak period, 15-min. midday/evening, 30- to 60-min. early/late *WEEKEND* 15-min. day/evening, 30- to 60-min. early/late	*WEEKDAY* 30-min. peak period Off-peak frequency as needed At least 5 trips each peak period
Stations	Transitway stations justified by proven, documented demand that: • Achieve a functional, cost-effective outcome that balances aesthetics with funding availability • Are attractive and informative environment for passengers at stations that is consistent with local community context, transitway identity, and passenger waiting times • Achieve functional integration with the surrounding land uses, which may include forming a nucleus for transit-oriented development at stations • Balance travel time, access and station demand relative to travel markets at the time of implementation • Promote a safe and secure environment by designing all elements to enhance passive security by maintaining visibility to and within the station and station area • Implement an interdisciplinary approach to station and facility design that incorporates advancements in technology			
Runningway	Full-sized mixed-traffic lanes (10-12 feet) that provide transit with travel-time advantages under congested roadway conditions	Full-sized (12 feet) managed lanes or bus-shoulder lanes that provide transit with travel-time advantages under congested roadway conditions	Adequate, exclusive trackage for safe and reliable operation	Adequate trackage (or trackage rights) for safe and reliable operation
Vehicles	Sleek, modern, premium-styled buses appropriately sized and configured to service characteristics		Compatible with existing rail and infrastructure systems	
Fare Collection	Modern and proven fare collection systems that integrate well within the regional system and fit the needs of the region and transitway			
Technology	Automatic vehicle location (AVL) on all vehicles and automatic passenger counters (APC) on all LRT, Commuter Rail, and BRT station-to-station vehicles Real-time schedule information at all high-volume stations and real-time parking availability at major park-and-ride facilities			
	Proven communications link compatible and coordinated with regional transit control center		Compatible with existing rail systems technology and control centers	
Identity and Branding	TBD	Color line names for station-to-station services Unique system name Consistent signage and branding using regional transit system color scheme Unique vehicle designs distinguished from local bus		Unique line name that does not conflict with color lines or LRT/Highway BRT system name

Transitway Development Process

Corridor Planning and Development

The development of the transitway system and individual corridors warrants substantial study prior to investment decisions. This process is essential for gathering public input and being good stewards of public money. The following is a typical process for the development of a transitway:

1. **System Planning and Feasibility** – The Metropolitan Council will lead or collaborate on region-wide studies of transitways, in coordination with MnDOT, local governments (counties and cities) and transit providers, to guide decision-making at the regional level. Corridor feasibility studies led by local governments or transit providers should also coordinate with regional system planning.
2. **Corridor Planning and Alternatives Analysis** – Corridors should undergo an analysis of alternative transitway modes or alignments through early planning work that narrows the list of alternatives down to a local recommendation for the "Preferred Alternative." The locally preferred alternative is the alternative ultimately included in the *Transportation Policy Plan*, a requirement for federal, state, or regional funding.
3. **Environmental Review** – Every project will undergo an environmental review, consistent with state and federal law, depending on the size and nature of a project. The environmental review will disclose potential environmental impacts of a project and identify ways to avoid or minimize them.
4. **Design and Engineering** – The design and engineering of a project will build upon preliminary work in previous steps through to full project design and engineering. This step includes work described as "project development" and "engineering" under the federal New Starts program, but also includes pre-project development work that may be required to transition a project after environmental and planning work.
5. **Construction** – The capital elements of a project will be built, tested and readied for operations. This phase also includes the expansion of vehicle fleets and other systems needed to operate the transitway.
6. **Operation** – A project begins operating during the testing phases but "revenue service" begins when it opens to the public to serve customers.

For rail projects, these steps generally occur as a complete project where all elements are planned, designed, built, and opened for operation on the same timeline. For BRT projects, these processes can occur in phases with different elements of the project; a park-and-ride for instance, being planned, designed, built, and opened before other elements.

Throughout all of these steps, public and stakeholder participation will be an essential aspect of project work. The Metropolitan Council and its regional partners in transitway development, including local governments, will work together to ensure that each transitway project is developed to integrate into the transportation system and the community context, and to consider the concerns of affected communities.

County governments have led the way on the early stages of many transitways, often funding and leading corridor studies. Cities and transit providers are also engaging in corridors studies. It is important that the Metropolitan Council, counties, cities, regional transit providers, MnDOT, and other stakeholders work together to develop these major investments in a collaborative way. Many of the details of project implementation and best practices are described in the Regional Transitway Guidelines. However, best practices will continue to evolve and project-specific issues will continue to arise in projects of this scale. Collaboration will be a key component of project development.

Transitways are major regional projects that require the coordination of many potential elements that are not directly addressed in this chapter. Table 6-4 includes references to other areas of the plan and other considerations that will be used in transitway development.

Table 6-4: Transitway Development Coordination References

Bus System Service and Facilities	Other elements of this plan describe how bus improvements are planned and how facilities support the development of transitways, such as park-and-rides.
Transit Advantages and Highways	The discussion of transit advantages can often be coordinated with transitway improvements, particularly with BRT transitways.
Pedestrian and Bicycle Plans	The plan has a substantial discussion on the regional bicycle system. Elements of a good pedestrian experience are also discussed in Chapter 3, “Land Use and Local Planning.”
Land Use and Local Planning	Local governments play a significant role in planning local transportation and land use that connects to transitways. More discussion is available in Chapter 3, “Land Use and Local Planning” and through local comprehensive plans.
Regional Transitway Guidelines (available on Metropolitan Council website)	The Regional Transitway Guidelines have a lot of information on best practices and standards for transitway design and integration into the transportation system.

Setting Regional Transitway Priorities

Transitways are some of the largest single transportation investments that the region is planning through 2040. The significance of these projects and the number of corridors under study will require the region to prioritize transitway investments to ensure the efficient development of a successful, regionally balanced system. *Thrive MSP 2040* and the *Transportation Policy Plan* have established new accountability considerations that are intended to guide the development of the region and investments in infrastructure. *Thrive MSP 2040*’s outcomes and the *Transportation Policy Plan*’s goals and objectives are important policy statements that will establish a clearer understanding of the results that transitway investments are intended to achieve.

The ability of the region to compete for federal New Starts and Small Starts funding will also depend on advancing competitive projects. The region will need to be aggressive but strategic about which projects are submitted to compete for federal funding. The region will also need to be strategic about funding projects with higher levels of state or local funding if they may not compete well for federal funding.

Transitway projects already undergo a substantial analysis at the corridor level to determine the appropriate mode and alignment. Counties, cities, and transit providers are leading efforts to determine the right fit for each corridor. The information developed during these analyses by lead agencies to recommend a locally preferred alternative for inclusion in the plan should provide a common understanding for determining how a project advances the region toward its desired results. The region's desired results can also inform each corridor analysis to help determine the best result for the region, while allowing for flexibility to fit with local needs.

Setting regional transitway priorities is a dynamic process as projects come forward for inclusion in the *Transportation Policy Plan*. The process is a collaborative effort of policymakers that includes funding and operating agencies, such as counties and transit providers, with involvement from cities and other stakeholders through the region's advisory committees. The process starts with gathering the appropriate technical information and allowing policymakers to be strategic in deciding how a project moves forward and how it is reflected in the *Transportation Policy Plan*.

Providing the Technical Information

The basic technical information for a proposed transitway project will provide a common understanding for regional decision-making. Through corridor analyses, this region has substantial experience evaluating transitway alternatives with technical measures to determine the right investment for a corridor. This plan identifies technical investment factors that will be considered when evaluating corridors for the region to prioritize. The technical investment factors are included in Table 6-5. Projects should provide information that addresses the technical investment factors, using suggested measures as guides.

Table 6-5: Technical Investment Factors for Setting Regional Transitway Priorities

Technical Investment Factors	Suggested Measures
Ridership (Current and forecast year)	• Average weekday project boardings • New weekday system linked trips on transit
Access to Jobs and Activity	• Increase in job accessibility on the transit system • Number of regional job concentrations or local centers served
Cost-Effectiveness	• Annualized capital and operating cost per annual boarding or per new annual system linked trip on transit

Technical Investment Factors	Suggested Measures
Existing Land Use	• Total population, employment, and student enrollment within ½-mile of proposed stations • Intersection density and walkability near stations • Number and relative share of affordable housing units within ½ mile of proposed stations and community housing performance scores
Future Land use and Development	• Land use plans supportive of transitway densities, as described in "Land Use and Local Planning" • Qualitative assessment of regulatory, infrastructure, and financing tools supportive of transit-oriented development • Strength of development market • Plans, policies and land use controls to create and preserve a mix of housing affordability (see Housing Policy Plan)
Equity	• Average weekday project boardings by transit-dependent households • Income and affordable housing access • Opportunity access for low-income population and people of color
Environment	• Water supply –local policies supporting sustainable water management • Air quality – emissions reduction

This list of technical factors was developed by the Metropolitan Council, in collaboration with regional partners, to strongly align with the federal Capital Investment Grants program evaluations and with factors that measure the region's desired results stated in *Thrive MSP 2040* and the 2040 *Transportation Policy Plan*. The technical information will inform decision-making by policymakers that will consider the technical information and policy factors.

Considering Policy Factors

With the technical information available, policymakers will then need to consider other factors that are more qualitative and less technical. This will require a strong collaboration that includes the funding partners and the Metropolitan Council, with involvement from cities and other stakeholders through the region's advisory committees. All seven counties in the region administer a sales tax for transportation with identified investment priorities, some including substantial funding for transit. These priorities will be a significant input into the policy discussion about transitway priorities. The county-administered sales taxes are currently the most substantial non-federal funding source for transitways. The policy investment factors and important considerations for this analysis are included in Table 6-6.

Table 6-6: Policy Investment Factors for Setting Regional Transitway Priorities

Policy Investment Factors	Possible Considerations
Regional Balance	• Investment levels across the region (geographic and per capita considerations) • Investment levels that promote prosperity at the community's stage and level of development
Funding Viability	• Viability for revenues being considered • Timing of spending expectations and revenues available • Identified sources for operating funding
Community Commitment	• Local government support (Resolutions of support) • Local land use and development commitments • Public support
Risk Assessment and Technical Readiness	• Potential risks through project implementation • Stage of technical readiness, project development

Transitway corridors should take these technical and policy investment factors into consideration during corridor studies, including feasibility studies and alternative analyses. The technical and policy factors will guide the region in determining how a project fits into the timing and funding options in the Current Revenue Scenario of the plan.

The investment factors highlight the importance of land use and local government development support. Transitway investments are intended to help shape development patterns, but development patterns will also help shape transit investments. In order for transitways to realize their full potential for expected development, local governments will need to provide the vision and planning for land use and local investments. The Metropolitan Council and transitway funding partners are committed to expanding the transitway system; local partners will need to show commitment to transit-supportive land use and local improvements, like bicycle and pedestrian infrastructure, in return. More information on how local governments can do this is available in Chapter 3, "Land Use and Local Planning."

Transitways will not be included in the Current Revenue Scenario until a locally preferred alternative is recommended from a local process. If a number of transitways make this recommendation simultaneously, a multi-transitway analysis may need to be conducted to consider several projects at once. This may also be explored through a regional Program of Projects approach to funding multiple projects at once and accelerating some projects. Until specific measures and methodologies can be defined through the work program item, transitway projects that come forward will be evaluated on a case-by-case basis. This process is not intended to add steps to the transitway adoption process, but rather to add clarity to the decision-making process moving forward. The process will be integral to decision-making under an Increased Revenue Scenario, where transitway investment has the potential to be accelerated across multiple corridors.

Current Revenue Scenario Transitway System Investments

The region has many corridors under for transitway investment potential. Transitway investments are limited by reasonably expected current revenues and projects must be prioritized within these constraints. The Current Revenue Scenario includes the list of projects that have a locally preferred alternative with approved local resolutions of support and an identified reasonable funding plan (based on projections for existing revenues or past experience securing revenues for similar projects). The capital funding for transitway expansion other than arterial bus rapid transit is generally assumed to be:

- 50% or less federal Capital Investment Grants (e.g. New Starts or Small Starts),
- 50% or more county sales and use tax revenues and/or other local revenues.

Operating funding for transitway expansion is generally assumed to be funded by fare revenue, county sales tax, and state general funds. State general obligation bonds are no longer assumed for future projects unless they have been specifically identified in law.

As a result, arterial bus rapid transit projects are funded primarily based on Regional Solicitation project awards and associated local match funds, state general obligation bonds identified in law, and any coordinated preservation efforts like bus replacements or roadway projects.

Existing Transitways in Operation

The first priority for investing in the region's transitway system is continuing to operate and maintain the existing transitways. Existing transitways are shown on Figure 6-8 - Map of Existing Transitways and Current Revenue Scenario Expansion Transitways.

- METRO Blue Line (Hiawatha Light Rail Transit)
- Northstar Commuter Rail
- METRO Red Line (Cedar Avenue Highway Bus Rapid Transit)
- METRO Green Line (Central Corridor Light Rail Transit)
- METRO A Line (Snelling Avenue Arterial Bus Rapid Transit)
- METRO C Line (Penn Avenue Arterial Bus Rapid Transit)

Beyond ongoing operations and maintenance, these corridors may require modernization or modest expansion improvements that address operational issues, unmet demand, or other unique challenges. This may include additional stations that will be identified in the project list (Appendix C) and Transportation Improvement Program (TIP), which is updated annually.

Transitway Expansion Assumed to be Funded in the Current Revenue Scenario

The second priority for investing in the region's transitway system is the expansion of the system in corridors that provide the strongest contributions to meeting *Thrive MSP 2040* outcomes and regional goals and objectives in this plan. The funded projects have a locally preferred alternative (if seeking federal New Starts or Small Starts funding) and an accepted funding plan. These projects are advancing through project development phases, such as final environmental clearances, design and engineering, or construction, with a tentative opening date planned.

The projects assumed to be funded are also furthest along in implementing land use strategies around transitways that further support the region's desired results. Local governments should be conducting or implementing station-area planning for these corridors as they continue to move through the transitway development process. Land use strategies are discussed in more detail in Chapter 3, "Land Use and Local Planning."

The transitway corridors below have a locally preferred alternative and are funded within the current revenue assumptions of the plan. They are shown on Figure 6-8 - Map of Existing Transitways and Current Revenue Scenario Expansion Transitways.

- ~~METRO Red Line (Cedar Avenue Highway Bus Rapid Transit) Stage Two: all improvements planned to be complete by 2021~~
- METRO Orange Line (I-35W South Highway Bus Rapid Transit): under construction with some elements already completed, planned to open around 2021
- METRO Green Line Extension (Southwest Light Rail Transit): in engineering with heavy construction anticipated to begin in 2018, planned to open around 2023
- METRO Blue Line Extension (Bottineau Light Rail Transit): in engineering, heavy construction and planned opening year to be determined (assumed prior to 2030 for air quality modeling)
- METRO Gold Line (Gateway Dedicated Bus Rapid Transit): in project development, planned to open around 2024
- Rush Line Dedicated Bus Rapid Transit: in pre-project development, planned to open around 2026
- Riverview Modern Streetcar: in pre-project development, planned to open around 2032
- METRO D Line (Chicago/Fremont Arterial Bus Rapid Transit): in engineering, planned to open in 2022
- ~~C Line (Penn Avenue Arterial Bus Rapid Transit): in engineering, planned to open in 2019~~

~~**METRO Red Line (Cedar Avenue Highway Bus Rapid Transit)** Stage Two The first stage of this project opened in mid-2013. An Implementation Plan Update (2015) identified future stages for investment in improvements to the corridor. A number of these investments have recently been completed or are funded for near-term implementation. These include an online, median station at Cedar Grove Station, improvements at the Mall of America Station, an expansion of the park-and-ride at Apply Valley Transit Station, and improvements to bicycle and pedestrian access to the corridor. Stage Two also includes station-area planning along the corridor and studies for improvements in the northern Dakota County segment of the corridor. Future METRO Red Line stages beyond Stage Two are currently included in the Increased Revenue Scenario.~~

METRO Orange Line (I-35W South Highway BRT) This project will connect Minneapolis, Richfield, Bloomington, and Burnsville primarily along I-35W. The locally preferred alternative of highway BRT on I-35W was refined in 2014 with the adoption of the Orange Line Project Plan Update, which incorporates and updates previous planning projects completed in the corridor between 2005 and 2010. The Orange Line began early construction activities in 2017, ~~and anticipates~~received a federal Small

Starts funding agreement and started full construction in ~~2018~~2019, ~~toward full construction in 2019~~ and is planned to open~~ing~~ in 2021.

METRO Green Line Extension (Southwest Light Rail Transit) This 14.5-mile extension of the METRO Green Line will connect Eden Prairie, Minnetonka, Hopkins, St. Louis Park, and Minneapolis and the existing Green Line communities. The project's locally preferred alternative was adopted as the Kenilworth-Opus-Golden Triangle (3A) light rail alignment in May 2010. During the project development phase, the terminus was revised to SouthWest Station, eliminating the Mitchell Road Station from the project. The project ~~anticipates~~ start~~ed~~ ~~ing heavy~~ construction ~~and receiving a full funding grant agreement~~ in 2019 and anticipates receiving a full funding grant agreement in 2020.

METRO Blue Line Extension (Bottineau Light Rail Transit) This 13.5-mile extension of the METRO Blue Line will connect Brooklyn Park, Crystal, Robbinsdale, Golden Valley, and north Minneapolis with the existing Blue Line communities. The project's locally preferred alternative was adopted as the West Broadway– Burlington Northern Santa Fe Corridor – Olson Memorial Highway (B-C-D1) light rail alignment in May 2013. The project is in engineering and anticipates ~~receiving a full funding grant agreement in 2019~~requesting a full-funding grant agreement when this phase is complete.

METRO Gold Line (Gateway Dedicated BRT) This project will connect Saint Paul, Maplewood, Landfall, Oakdale, and Woodbury. This project's locally preferred alternative was adopted as dedicated BRT generally on the Hudson Road – Hudson Boulevard (A-B-C-D3) alignment that crosses to the south side of I-94 at approximately Bielenberg Drive terminating along Guider Drive between Queens Drive and Woodlane Drive~~at Woodbury Theater~~. Advanced station-area land use planning, environmental work, and early engineering is ongoing. The project was also approved for entry into the FTA New Starts project development phase in January 2018 and anticipates entering the engineering phase in 2020.

Rush Line Dedicated BRT This project will connect Saint Paul, Maplewood, Vadnais Heights, Gem Lake, and White Bear Lake. The project's locally preferred alternative is dedicated BRT generally from Union Depot along Phalen Boulevard, Ramsey County Regional Railroad Authority property (adjacent to Bruce Vento Trail) to I-694, and Highway 61 terminating in downtown White Bear Lake. Work is ongoing on station-area planning, environmental review, and early engineering in preparation for eventual request into the FTA New Starts project development phase.

Riverview Modern Streetcar This corridor connects Saint Paul with the Minneapolis-Saint Paul International Airport and the Mall of America and South Loop district in Bloomington. This project's locally preferred alternative was approved as a modern streetcar alignment in a mix of dedicated and shared-use guideway from Union Depot to the Mall of America generally along West 7th Street and crossing the river at Highway 5. The project would use existing Green Line light rail tracks in downtown Saint Paul and existing Blue Line light rail tracks starting just north of Fort Snelling Station. The project will be conducting the environmental review phase and early engineering work in the next few years. The project anticipates entering the federal Capital Investment Grants (New Starts) Project Development phase in 2023, working toward a planned opening date of 2031.

METRO D Line (Chicago/Fremont Arterial BRT) This 18-mile project will connect Minneapolis, Brooklyn Center, Richfield, and Bloomington. The project is arterial BRT generally along Fremont Avenue in north Minneapolis and Chicago Avenue in south Minneapolis terminating at the Brooklyn Center Transit Center and Mall of America, providing frequent transit service along the entire corridor. The project is finalizing engineering plans and is expected to being station construction in 2021 with a planned opening in 2022.

~~**C Line (Penn Avenue Arterial BRT)** This project will connect Minneapolis and Brooklyn Center. The project is arterial BRT generally along Glenwood and Penn Avenues terminating at Brooklyn Center Transit Center. Temporary stations will serve the line along Olson Memorial Highway starting in 2019 until the Blue Line extension is complete, after which the line will move to Glenwood Avenue concurrent with the Blue Line extension opening.~~

Federal Funding Assumptions for Transit Expansion

The Twin Cities region is in the midst of an aggressive build-out of the transitway system that will help shape the future of the region. To date, the region has been successful in advancing projects that have received substantial funding from the federal government's highly competitive Capital Investment Grants program that includes New Starts and Small Starts grants. The region has been awarded over $1 billion in federal funding for all three projects that have requested FTA funding. This Plan's list of projects is no different, assuming ~~between~~ around $~~200 $250~~300 million per year in federally competitive capital expansion funds for at least the next decade~~, and potentially beyond~~.

~~Five~~ Six of the ~~six~~ seven funded expansion projects (all except D~~C~~ Line) assume 45-50% of the capital cost of the project will come from federal Capital Investment Grant funding. The region will continue to plan for and prepare federally competitive projects and explore opportunities for multi-project commitments from the federal government.

There is risk in these assumptions, as the Plan assumes approximately 10% of the federal budget for Capital Investment Grants (under current budget amounts) for ten years. Should federal funding not materialize for any given project, the region will need to work cooperatively to determine a viable funding path forward that considers the *Thrive MSP 2040* outcomes of Stewardship, Prosperity, Equity, Livability, and Sustainability. The discussion of Setting Regional Transitway Priorities will assist with this potential situation.

~~Potential Current Revenue Scenario Projects~~ Partially Funded Arterial Bus Rapid Transit

The following arterial BRT project(s) are not included in the fiscally constrained plan but elements of the project (e.g. limited-stop bus service) have been prioritized for funding ~~by local partners or implementing agencies. Funding for these projects has either been identified by a local partner or partially secured through other processes (such as~~through the Regional Solicitation~~)~~.

~~The following project(s) are not included in the fiscally constrained plan but have been prioritized for funding by local partners or implementing agencies.~~ They are shown on Figure 6-8 - Map of Existing Transitways and Current Revenue Scenario Expansion Transitways.

~~Locally Prioritized Project Under Study:~~

- ~~Riverview Corridor~~

~~Partially Funded Arterial BRT:~~

- ~~D Line (Chicago-Emerson-Fremont)~~
- METRO B Line (Lake Street/Marshall Avenue Arterial Bus Rapid Transit)~~:~~ in station-planning phase anticipated to be finalized in late 2020
- METRO E Line (Hennepin Avenue/France Avenue Arterial Bus Rapid Transit)~~:~~ in station-planning phase anticipated to be finalized in 2021

~~Riverview Corridor~~ ~~This corridor connects Saint Paul with the Minneapolis-Saint Paul International Airport and the Mall of America and South Loop district in Bloomington. A draft locally preferred alternative was identified in late 2017 recommending modern streetcar in a dedicated and shared-use guideway from Union Depot to the Mall of America generally along West 7th Street and crossing the river at Highway 5. It would use existing Green Line light rail tracks in downtown Saint Paul and existing Blue Line light rail tracks starting just north of Fort Snelling Station. The corridor is in the process of advancing this recommendation through the appropriate local processes. The Riverview Corridor has been prioritized for funding by Ramsey and Hennepin counties and would be included in the plan through a future update or amendment.~~

~~Arterial Bus Rapid Transit~~ Arterial bus rapid transit is a transitway mode intended to improve the customer experience and attractiveness of some of the most heavily used existing bus routes in the transit system. ~~The first line, the A Line, opened in 2016, and the second line, the C Line, began construction in 2018.~~ There are three funded arterial BRT lines in the plan (two are open and one in engineering), ~~P~~but progress has been made on several other arterial BRT corridors~~ beyond the two funded lines in this Plan~~. Additional investment in the arterial BRT system can happen incrementally until full funding is secured for each project. Several projects have identified funding for certain elements of a future arterial BRT and these elements could provide improvements to the existing bus service in the corridor, regardless of when funding for the full BRT project is secured. The current projects with partial funding for arterial BRT improvements include~~ Chicago-Emerson-Fremont,~~ Lake Street/Marshall Avenue~~,~~ and Hennepin Avenue/France Avenue.~~ Of these lines, Chicago-Emerson-Fremont line is the highest priority for implementation and the Metropolitan Council is aggressively seeking funding for the remaining capital costs.~~

Examples of incremental investments building toward arterial BRT include:

- Enhanced customer waiting facilities and customer information technology
- Faster, limited stop bus service
- More reliable bus service with transit signal priority and transit advantages

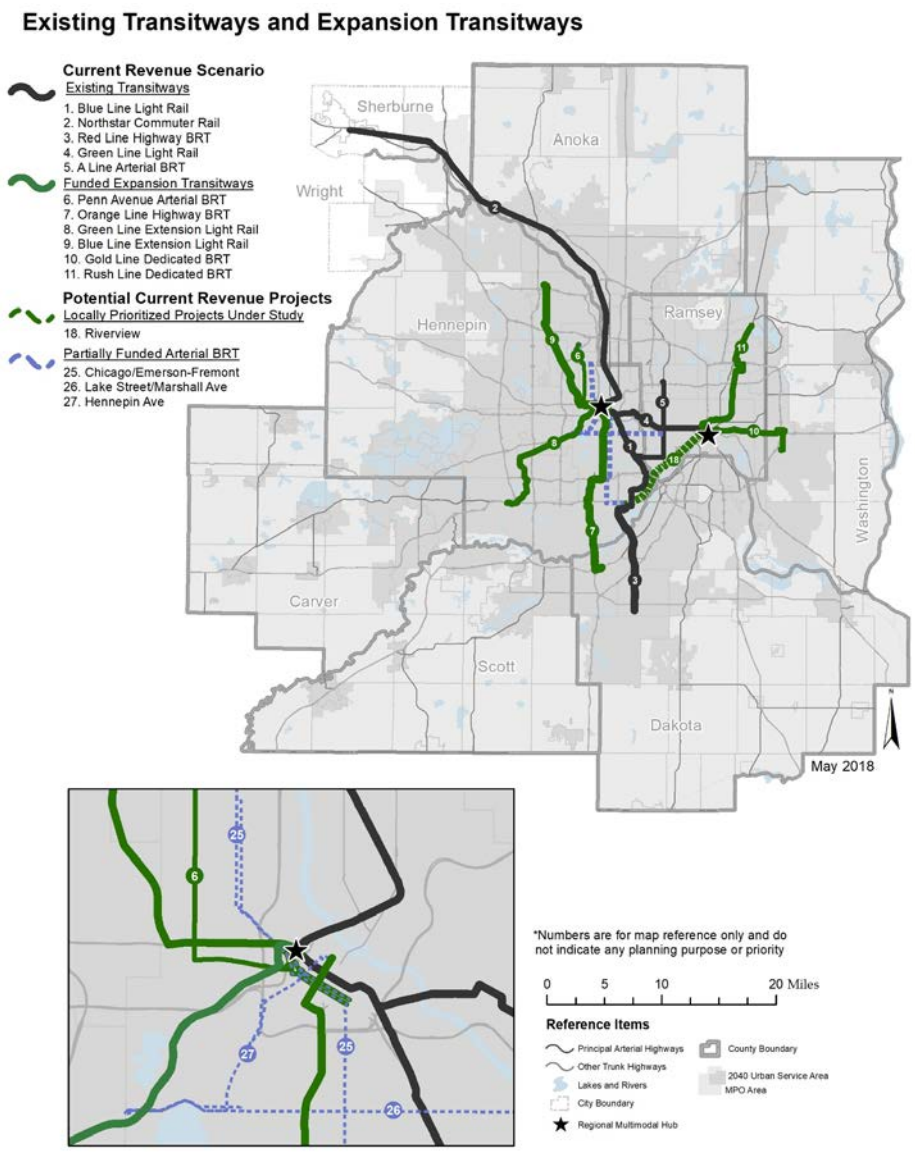
- New larger buses for improved circulation and boarding

This plan acknowledges the incremental build out of some of these elements for the corridors in planning. A number of these improvements are funded through the Regional Solicitation (see Project List, Appendix C). As funding is identified for the implementation of the full set of arterial BRT improvements for a corridor, the plan will be amended.

Figure 6-8: Map of Existing Transitways and Current Revenue Scenario Expansion Transitways

Commented [HC8]: To be updated once ready.

C Line to existing
Riverview to funded
D Line to funded
E Line full corridor plan



Increased Revenue Scenario Transitway System Investments

In order to complete the region's vision of a transitway system and do it on an accelerated timeline, the region will need additional funding for transitways. Increased funding will allow the region to:

- Accelerate the build-out of the transitways included in the Current Revenue Scenario
- Afford additional transitways that have recommended locally preferred alternatives, are under study, or needing to be studied for mode and alignment by other partners
- Implement a system of arterial BRT projects on heavily used existing transit routes

Increased funding will allow the region to invest in a system of transitways that keeps the region competitive in providing an attractive economy and connected, livable communities. The corridors listed in this section will need to go through the technical and policy investment factor prioritization identified previously. Because implementation of these corridors is likely not available under current revenues until after 2024, any prioritization efforts will need to consider the long-term implications of prioritization as well as the near-term possibilities should increased revenues become available.

Local governments along these corridors should be working on land use studies and planning that would maximize the potential of transitways while recognizing that they are still in the planning phases. These projects still provide an opportunity to adapt the transportation decisions with the land use visions of local communities.

Under the Increased Revenue Scenario, the transitway corridors listed below could reasonably be implemented by 2040. These corridors are in various stages of development and will need to be prioritized for funding if it becomes available. The Metropolitan Council will continue to work with the appropriate partners in the planning of these potential transitway investments and with local governments working on land use planning. The complete transitway vision is shown on Figure 6-9.

Projects with Study Recommendations in Advanced Stages of Development:

- METRO Red Line future stages
- Nicollet-Central Modern Streetcar

Projects with Study Recommendations:

- Midtown Rail
- Red Rock Bus Rapid Transit
- West Broadway Modern Streetcar
- Highway 169 Bus Rapid Transit
- METRO Orange Line Extension

Projects under Study or to be Studied:

- Highway 36
- I-35W North
- I-394/Highway 55
- Robert Street
- North Central
- ~~METRO Orange Line Extension~~
- I-94 West

Additional Arterial BRT projects:

- American Boulevard
- Central Avenue NE
- East 7th Street
- Nicollet Avenue
- Robert Street

- West Broadway Avenue

Projects with Study Recommendations but Incomplete Funding Plan

METRO Red Line Future Stages (Cedar Avenue Highway BRT) – The first stage of this project opened in mid-2013 and improvements in the second stage ~~are~~ were largely completed ~~or funded in the Current Revenue Scenario~~by 2020. An Implementation Plan Update (2015) has identified additional future stages that will add stations, park-and-ride capacity, and service to the line, including an extension to a number of planned stations in Lakeville. The priorities in the near-term are infill stations at Palomino Drive and Cliff Road, with each station undergoing some level of planning recently or in the near future. Extension of the line further south will be dependent on performance of the existing line and potential performance of the extensions. Future stages would also address bicycle and pedestrian improvements and station area planning.

Nicollet-Central Modern Streetcar – This project would connect neighborhoods in downtown, northeast, and south Minneapolis. The corridor study was completed in 2013 and the locally preferred alternative recommendation is modern streetcar primarily along Nicollet Avenue, Nicollet Mall and Hennepin/1st Avenues – The project is currently in the environmental review phase and the City of Minneapolis is expected to begin engineering in 2019. The City of Minneapolis has an identified local funding source to continue to advance this project beyond environmental work and has prioritized this corridor for advancement.

Commented [HC9]: Pending update in coordination with City of Minneapolis.

Midtown Rail – This project would connect the existing METRO Blue Line Lake Street Station and planned METRO Green Line West Lake Station with neighborhoods in south Minneapolis. The transit study was completed in 2012 with a locally preferred alternative recommendation of rail in the Midtown Greenway combined with arterial BRT on Lake Street. Funding has not yet materialized for further development of the rail project, though Metro Transit secured partial funding for bus improvements on Lake Street and will ~~begin~~ complete bus ~~improvement~~ station planning efforts in ~~2018~~2020.

Red Rock Highway Bus Rapid Transit – This project would connect Saint Paul to Newport, Saint Paul Park, Cottage Grove, and Hastings. An implementation plan was completed in 2016 that refined a long-term vision of highway BRT recommendations in the Highway 61 corridor. Initial stages include improved express bus service and all-day bus service introduction with ongoing monitoring of its performance.

West Broadway Modern Streetcar – This project would connect the Minneapolis neighborhoods along West Broadway to downtown Minneapolis and Robbinsdale. The corridor study was completed in 2017 with a recommendation of modern streetcar to North Memorial along with additional improvements to bus service in the corridor. Funding has not yet materialized for further development of the project.

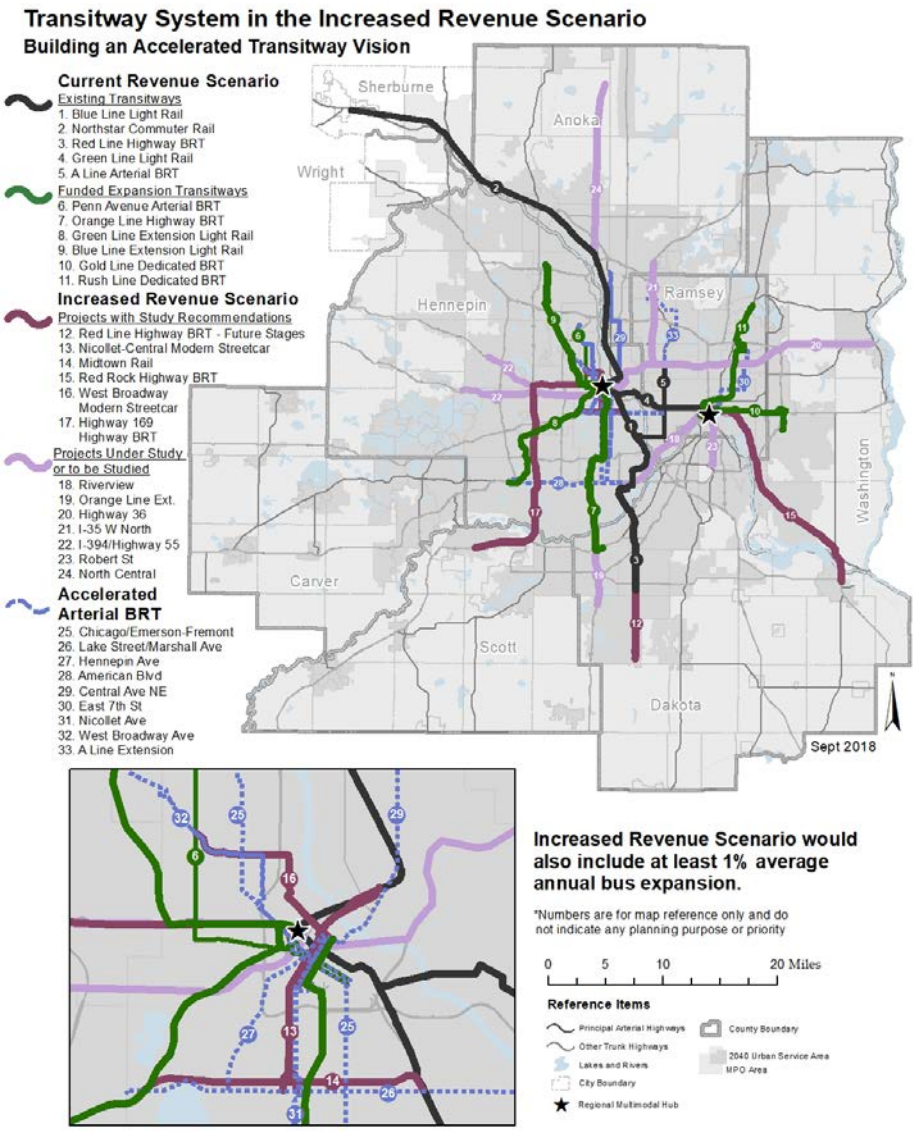
Highway 169 Highway Bus Rapid Transit – This project would connect communities in northern Scott County to cities along Highway 169 in Hennepin County and along ~~either~~ Highway 55 ~~or I-394~~ into downtown Minneapolis. The Highway 169 Mobility Study evaluated options for improving transit and reducing congestion on Highway 169 in the southwest metro, with a focus on highway bus rapid transit, MnPASS, and spot mobility improvements. The study narrowed the BRT alternatives to service

between Shakopee and downtown Minneapolis along 1) Highway 169/I-394 ~~between Shakopee and downtown Minneapolis~~, or 2) Highway 169/Highway 55 ~~between Shakopee and downtown Minneapolis~~, with Highway 55 being the recommended improvement based on the technical information and stakeholder input.~~.~~ In addition to the study of BRT, potential interim service improvements were identified, and highway improvements could provide improved transit advantages in the corridor for existing and planned transit.

METRO Orange Line Extension – The first stage of the METRO Orange Line is expected to bring BRT service to Burnsville on I-35W. The Metro Orange Line Extension Study (2017) defined the key components of a potential future extension of Orange Line service south further to Burnsville Center. The study is identified preferred station locations, route alignments, runningway operations and operating technologies needed for an extension. The study was completed in 2019.

Figure 6-9: Map of Transitway System in an Increased Revenue Scenario – Building an Accelerated Transitway Vision

Commented [HC10]: Map to be updated to reflect changes to transitway statuses:
- Add I-94 West to "Projects under Study"
- Move Orange Line Extension to "Projects with Study Recommendations"
- Move Riverview and Chicago-Fremont to Funded
- Move Penn ABRT to Existing



Arterial Bus Rapid Transit in the Increased Revenue Scenario

The proposed system of arterial bus rapid transit lines was first developed in 2012 through the Arterial Transitway Corridor Study. The first arterial BRT line opened in 2016 and the second ~~began construction in 2018~~in 2019. Several other corridors have identified funding for pieces of the full arterial BRT project. The remaining corridors are included in the Increased Revenue Scenario. If additional revenues were made available, the build out of the arterial BRT system would be accelerated. A list of these corridors is included in the Increased Revenue Scenario overview and in figure 6-9.

As full funding for these lines is identified~~, either partial or full,~~ they will be amended into the TPP. In the meantime, progress may continue on any of these corridors through more detailed station-planning activities or other implementation planning in coordination with local partners. In 2020, the Regional Solicitation was approved to add an arterial BRT funding category to allocate as much as $25 million to one arterial BRT project. The first project to receive funding will be approved in late 2020. ~~Metro Transit's Network Next will also examine the future of arterial BRT corridors in the region, building on experience from planning, designing, constructing, and operating the lines that have progressed. The study will update previously studied corridors and evaluate potential new corridors for implementation.~~

Arterial BRT in Network Next

Metro Transit completed a system study of arterial BRT in 2012 that concluded with recommendations for arterial BRT in 12 corridors originally identified in the 2030 Transportation Policy Plan. Implementation of these corridors began with the METRO A Line in 2016 and the METRO C Line in 2019. Three additional corridors—the METRO D Line, B Line, and E Line—are currently being advanced through planning and engineering. As five of the original 12 corridors have been implemented or advanced, conditions in other corridors have changed, and interest in study of additional corridors has grown. In 2019, Metro Transit initiated a plan to identify the next phase of arterial BRT corridors for implementation and consideration in the TPP. This plan, called Network Next, will chart a vision for the Metro Transit bus network of 2040, and will identify arterial BRT corridors for implementation along with improvements to the local and express bus network. The Network Next plan is anticipated to be adopted in 2021 and more information can be found in the Work Program.

Additional Projects Under Study or to be Studied

The following projects have been identified as showing potential for transitway investments as a result of transit system studies.

~~**METRO Orange Line Extension** – The first stage of the METRO Orange Line is expected to bring BRT service to Burnsville on I-35W. The Metro Orange Line Extension Study (2017) is defining defined the key components of a potential future extension of Orange Line service south further into to Burnsville Center and to Lakeville. The study is identifying identified preferred station locations, route alignments, runningway operations and operating technologies needed for an extension. The study is expected to bewas completed in 2019.~~

I-35W North – This corridor links downtown Minneapolis with communities along I-35W north of downtown to Blaine. The corridor was studied in the I-35W North Managed Lanes Corridor Study completed in 2013. The study focused primarily on the highway MnPASS vision, but also included an analysis of highway BRT to the 95th Avenue Park-and-Ride in Blaine that could potentially be coordinated with the MnPASS vision. The MnPASS design work on the corridor is ongoing and the expected construction of MnPASS lanes in this corridor will not preclude the potential for future highway BRT.

Robert Street – This corridor completed a transit study in 2015 that narrowed down the potential projects to arterial BRT and streetcar on Robert Street from downtown Saint Paul to West Saint Paul. A recommendation for a locally preferred alternative did not emerge from the study but is expected to be ~~reanalyzed~~ revisited by Dakota County in collaboration with other local government stakeholders in the corridor. In addition, Robert Street will be evaluated along with other arterial BRT corridors as part of Metro Transit's Network Next effort. ~~after local governments completed their Comprehensive Plan updates by the end of 2018.~~

Highway 36 ~~and~~, I-394/Highway 55, I-94 West ~~through~~ from the Highway Transitway Corridor Study – The Highway Transitway Corridor Study was a regional analysis of potential highway BRT investments in nine corridors throughout the region. These investments have the potential to be coordinated with highway improvements that might include MnPASS, bus-only shoulders, or other transit advantages. The analysis indicated the strongest potential for highway BRT improvements in the Highway 36, Highway 169, I-94 West, and I-394/Highway 55 corridors. Highway 169 has been studied in more detail ~~and I-94 was dismissed because of a lack of local support. The remaining corridors were acknowledged as potential projects but have yet to undergo more detailed study.~~and the result of the Highway 169 work has garnered increased interest in the Highway 55 corridor, although a formal study has not yet emerged. Highway 36 is being studied for transit improvements through an effort jointly led by Washington and Ramsey counties with recommendations expected in late 2020 or early 2021. I-94 West is being further evaluated through a partnership between Metro Transit and MnDOT as part of the Highway 252/I-94 highway project environmental review phase.

Transit Investment Plan Financial Summary

The previous sections of this chapter described in detail the expected investments under the current and Increased Revenue Scenarios for both the bus and support system and transitway system investments. This section summarizes the two scenarios by providing a brief, high-level financial summary of all of the planned transit investments.

Current Revenue Scenario Financial Summary

Table 6-7 is a financial summary of the Current Revenue Scenario for both the bus and support system and transitway system investments.

Table 6-7: Current Revenue Scenario Summary of Funded Investments (Year of Expenditure Dollars)

Commented [HC11]: Totals need to be updated to match Finance Chapter (due in March).

	2018 Annual	Total 2015-2040 (26 years)
Revenues	**$ 1.277 B**	**$ 34.8 B**
Bus and Support System Investments		
Operating	$ 479 M	$ 17.8 B
Capital	$ 65 M	$ 3.6 B
Total Bus and Support System	**$ 544 M**	**$ 21.4 B**
Regional Solicitation for Transit	**$ 24 M**	**$ 750 M**
Transitway System Investments		
Operating	$ 93 M	$ 5.3 B
Capital	$ 566 M	$ 5.6 B
Transitway Projects Capital Detail:		(Included in "Capital" above)
- Projects Completed 2015-2020	-	$ 50 M
- Chicago-Fremont Arterial BRT	-	$ 75 M
- METRO Orange Line Highway BRT	-	$ 1510 M
- METRO Green Line Light Rail Extension	-	$ 1.912 B[1]
- METRO Blue Line Light Rail Extension	-	$ 1.534 B
- METRO Gold Line Dedicated BRT	-	$ 46120 M
- Rush Line Dedicated BRT	-	$ 480 M
~~- Penn Ave Arterial BRT~~ - Riverview Modern Streetcar		$ 2.066 B~~$ 35 M~~
Locally Designated to Future Projects	-	$ 1.8 B

[1] Pre-2015 expenditures for the METRO Green Line Extension are not included in this figure. As of June 2018, the total project cost is estimated at $2.003 B.

Total Transitway System	**$ 659 M**	**$ 12.7 B**
Total Investments – All Categories	**$ 1.227 B**	**$ 34.8 B**

The following are the major financial conclusions of the Current Revenue Scenario.

- The region is able to operate and maintain the existing bus and support system.
- No expansion of bus service is available beyond the growing demand for Metro Mobility.
- There is limited capital expansion and modernization of the bus and support system facilities through preservation efforts and through the Regional Solicitation.
- The region is able to operate, maintain, and improve the existing transitways that include METRO Blue Line, METRO Green Line, METRO Red Line, METRO A Line, METRO C Line, and Northstar.
- By 2030, funded transitway expansion will include building and operating ~~five additional METRO lines, including the region's first~~two light rail line extensions, the region's second highway BRT, the region's first two dedicated BRTs, and building at least one additional arterial BRT line. ~~Three~~ Two additional ~~new~~ arterial BRT projects have partial funding identified in the plan but are not fully funded. The region's first modern streetcar line is anticipated to open after 2030.
- ~~The region also expects additional transitway expansion projects to be identified in future amendments or updates to the Plan, based on available resources.~~

Increased Revenue Scenario Financial Summary

The Increased Revenue Scenario is based on both analyzing the need to build out and expand the bus and support system and transitway system, and considering what might be an attainable level of new revenue for transit in the region. In 2012, the Governor's Transportation Finance Advisory Committee (TFAC) looked at this issue in detail and concluded that building a competitive regional economy would require approximately $4.2 billion to $5.7 billion in new metropolitan area transit revenue over a 20-year period.

The key goals of the TFAC plan continue to be carried forward in the region's vision for transit expansion. The Increased Revenue Scenario in this plan continues to basically use the TFAC level of financial need as a starting point, but also includes consideration of changes in revenues, such as the new county sales tax, and project development work that has occurred since the TFAC analysis.

For the bus and support system, the region has a vision of expanding service by at least 1% per year or about a 25% increase in service from 2015-2040. This service increase would include new routes and facilities and increased frequency of service and improved facilities on existing routes. It would include growing service to better serve the current population and job base and also meet the needs of the growing population and job base within the region. From 2015 – 2040, growing the bus system by 1% annually could require an additional $1.8 billion - $2.2 billion.

Transitways in the Increased Revenue Scenario represent a vision of corridors throughout the region that could be explored with additional revenues. Because the details of each corridor are not known

until a corridor planning process has been completed, the revenue needs for this scenario are not complete. However, as corridor planning processes progress, the details in the TPP can be updated to illustrate a more comprehensive revenue vision. There are currently a number of potential projects in the Increased Revenue Scenario that have completed corridor planning processes but are not able to be funded with current revenues.

CHAPTER 7

BICYCLE AND PEDESTRIAN INVESTMENT DIRECTION

Overview

Bicycling and walking have become increasingly important in the Twin Cities for commuting to work or school, running personal errands, and traveling to entertainment and activity venues. Bicycling and walking also support healthier communities. The potential for further expanding bicycling and walking in the region for transportation purposes is significant.

According to data from the U.S. Census Longitudinal Employer Household Dynamics, approximately 20% of all employees who work in one of the major employment clusters in the Twin Cities live less than three miles from their workplace. About 20% of all bicycle trips in the region are less than one mile long and nearly 45% are less than three miles in length, according to the Metropolitan Council's 2010 Travel Behavior Inventory. So the proximity of the region's residents to their places of employment aligns well with residents' tendencies to travel by bike or walk for shorter trips.

Walking accounts for a higher percentage of all trips region wide (6.5%), than either biking (2%) or transit (3%) and is imperative to the start and end of trips by any mode. The high levels of importance of walking and biking in connecting to the regional transit system should also be noted; there are many more residents who live within three miles of transit service (compared to proximity to where they work) who could take advantage of improved opportunities to combine transit with walking or biking.

Improvements to facilitate and encourage these connections (like bike lockers and storage facilities at transit stations or new local bikeway and sidewalk connections) will go a long way to expanding the reach of the transit system and in creating new opportunities for people to walk and bike for transportation. As a more comprehensive regional bicycle system and pedestrian facilities continue to develop over time (including better options for bicyclists and pedestrians to get across or around physical barriers like rivers, rail corridors, freeways, and multi-lane arterial roadways), walking and biking trips may continue to increase in volume and distance.

The regional trail system and other off-street, multi-use trails have played increasingly important roles in walking and bicycling for transportation, particularly in the urban and suburban areas of the region. According to Metropolitan Council estimates, there were over 13 million visits to the 360 miles of regional trail in 2016, which represents an 80% increase over the previous 10 years. Past studies by Three Rivers Park District have shown that commuter use has grown as much as 7% per year on some of its urban trails.

Commented [SH1]: To be updated

This demand for on- and off-street bikeway facilities offers a significant opportunity for a modal shift that would help to reduce congestion, improve air quality, improve personal health, and is an attractive and marketable component for making the Twin Cities a desirable place to live. It is important to acknowledge that recreational bicycling is also growing and, combined with increasing bicycle trips for

transportation, there is a corresponding need for developing more protected or separated bikeways to serve a broader range of demographic groups, levels of experience, and physical abilities around the region than more traditional bicycling infrastructure can provide. In addition, bicycling for recreation and transportation provides local economic benefits around the metro area.

Within and near congested activity centers, biking and walking can be effective transportation options because they accommodate shorter-distance trips and require less space and less costly infrastructure compared to other transportation modes. Because walking is fundamentally tied to the end points of any trip (no matter the mode of travel) and pedestrian planning is integral to transportation planning for other modes, there are multiple references and detailed descriptions of pedestrian facility planning, design, and funding in other sections of this Transportation Policy Plan. Pedestrian planning issues are addressed as they relate to state highway funding in the Highway Investment Direction and Plan, connecting to the regional transit system in Transit Investment Direction and Plan, and to land use planning and urban design best practices in Land Use and Local Planning.

Minnesota Walks, a statewide framework created by a partnership with MnDOT and the Minnesota Department of Health, provides a vision and strategies for making walking and rolling in all communities in the state safe, convenient, and desirable. This framework emphasizes strategies that can be implemented at all levels – state, regional, and local. The Metropolitan Council will work with its transportation partners to identify potential implementation of regional strategies to get more people walking and to improve accessibility, safety, and connections.

The longer range of bicycle trips (and the facilities they rely on) often requires that they cross between cities or counties. More than half of the region's bicycle trips (approximately 55% according to the Metropolitan Council's 2010 Travel Behavior Inventory) are greater than three miles in length. The Metropolitan Council and its transportation partners will plan for these longer bicycle trips, along with the shorter trips within communities, to maximize the potential impact of choosing bicycling over driving alone for transportation.

Existing Regional Bicycle and Pedestrian Facilities

Description of Facilities

Walking and bicycling are essential modes within the regional transportation system and have numerous benefits at local, regional, and global levels. These modes allow people to make daily trips without adding to roadway congestion and vehicle-related air pollution, including carbon and greenhouse gas emissions that contribute to climate change. They make it possible to connect with bus and rail transit and allow people to choose active lifestyles by incorporating exercise into their daily routines. In addition, walking and biking can reduce a household's transportation costs, while also providing global benefits by helping to reduce our dependence on non-renewable energy sources.

Walking and biking trips tend to be relatively short in the region, averaging about one-quarter to one-half mile for walking, and between one and three miles for bicycling; however, more than half of the region's trips by bicycle (about 55% according to the Metropolitan Council's 2010 Travel Behavior

Inventory) are greater than three miles in length. Regional transportation planning must account for these longer bicycle trips to maximize the potential benefits of increasing bicycling as a travel mode choice compared to driving alone.

Except for a few state trails in the metro area, the region's bicycle and pedestrian facilities consist of regional trails (designated in the Metropolitan Council's Regional Parks Policy Plan), local on-street bikeways, off-road multi-use trails, and sidewalks for which local agencies have primary responsibility for planning, development, and maintenance.

The Metropolitan Council assists in planning for the development of bikeways and multi-use trails for biking and walking, and provides some direct funds for regional trails. The Metropolitan Council's current roles with respect to biking and walking facilities include:

- Planning for local and regional networks that strives to ensure continuity and connectivity between jurisdictions
- Assisting in coordinated planning to determine solutions for regional barriers to biking and walking
- Providing guidance for biking and walking facilities to support other regional initiatives, such as transit investments, Livable Communities investments, and equity
- Providing guidance to local comprehensive plans to ensure biking and walking are key factors in land use and transportation planning.

Pedestrian Facilities

Pedestrian facilities, like sidewalks and curb ramps, are often constructed or improved in conjunction with public roadway projects implemented by the state and local governments. They can also be planned in partnership with cities and constructed as part of private developments to provide connections throughout a community. Sidewalks with curb ramps are commonly thought of as the backbone of the pedestrian infrastructure network; in more rural areas, paved shoulders may be used by pedestrians. Street crossing treatments are just as critical for safe travel for pedestrians. Street crossing facilities can include a wide range of treatments, from differing types of marked crosswalks, advance stop lines, accessible pedestrian signals for people with vision impairments, curb extensions to reduce crossing distances, pedestrian crossing islands, and other signal treatments. Shared use trails also serve trips made by pedestrians.

Overall pedestrian safety and connectivity are vital components of regional multimodal transportation planning. As the operator of the largest transit system within the region, the Metropolitan Council has a specific interest in pedestrian infrastructure to ensure safe and convenient pedestrian connections to transit stops and stations, including adequate waiting areas for transit users and full accommodations for the disabled or visually impaired. In addition, the Metropolitan Council encourages transit-oriented design in all transitway corridors or near bus transit centers (including transit stations and park-and-ride facilities). Transit-oriented design includes the appropriate spacing and orientation of buildings to facilitate efficient pedestrian movement.

Accessibility for People with Disabilities

Usable pathways are particularly important to people with disabilities, and the Americans with Disabilities Act (ADA) of 1990 requires all government entities that provide transportation services and/or infrastructure to ensure that people with disabilities can use the transportation system in an accessible and safe manner. The federal government has recently put greater emphasis on ensuring compliance with the ADA, and federal law requires that all government agencies with 50 or more employees develop an ADA Transition Plan that details the steps to making the community accessible for all. Public agencies with fewer than 50 employees must still conduct a self-evaluation of facilities, programs, and services to identify any that must be modified to meet ADA requirements. For the 2020 Regional Solicitation, applicants must have a completed self-evaluation or ADA transition plan that covers the public right of way for transportation to be eligible to apply. Because existing sidewalks can potentially be barriers for people with disabilities due to slope, width, or other elements, they should be included in self-evaluations or transition plans. In the Twin Cities region, one in every 11 residents has a disability. As people age, disabilities become more common, so the region will likely have significantly more people with disabilities as the percent of residents who are 65 or older increases. Disabilities are also more common among some people of color. About one in every six residents who are American Indian have a disability, and about one in every eight black residents have a disability. Ensuring the region is accessible for people with disabilities is an equity issue in many different ways.

Bicycle Facilities

In regard to bicycling, the Twin Cities region is fortunate to have a well-developed system of on-street or adjacent-street bicycle facilities in the core and suburban cities and widespread networks of off-road trails throughout much of the region. Over time, the Twin Cities region has supported and funded bicycle-friendly infrastructure more successfully than most other U.S. cities of similar size. The state and region have made investments that mirror this traditionally high level of support. This strong support is evidenced by the extensive networks of off-road trails, including the regional trail system that has been developed over more than a century to provide multi-use connections between regional parks and other major activity nodes. Many of these trails parallel the region's rivers and creeks or make use of abandoned rail lines.

Existing bikeways take on several characteristics in the region. On-road bicycle facilities have been developed in various forms. There are collector and arterial streets with bike lanes, roads with advisory bike lanes, roads with shared road markings (i.e., "sharrows"), and bicycle boulevards, as well as many designated bike routes that have either striped shoulders or are low-volume roads but without pavement markings. Typical bicycle transportation routes may include several or all of these types of bikeway facilities. In addition, several protected bikeways have been constructed in Minneapolis and Saint Paul and more are planned. These bike-only facilities within street corridors have some vertical separation from traffic lanes and are intended to provide a more comfortable user experience, similar to a trail, to serve a broad range of ages and abilities.

Bicycle, Pedestrian Trends since 2015

Data Collection

Pedestrian and bicycle data collection efforts by cities and counites have continued and are expanding, in accordance to new guidance on how to conduct these counts. The Federal Highway Administration (FHWA) updated its Traffic Monitoring Guide to include standard guidance for counting pedestrians and bicyclists. Since 2014, MnDOT's Bicycle and Pedestrian Counting Initiative further expanded the work within the state to institutionalize this data collection. MnDOT developed a Bicycle and Pedestrian Data Collection Manual to supplement the FHWA Traffic Monitoring Guide. Other elements in MnDOT's initiative have included annual training programs for local government staff on how to conduct counts; the installation of permanent monitoring stations throughout the state, including the Twin Cities region; and the development of a MnDOT district-based portable counting equipment loan program to support MnDOT districts and local governments in conducting bicycle and pedestrian counts. In 2018, MnDOT convened the Minnesota Bicycle and Pedestrian Data Taskforce, which is a group of state, regional, and local partner agency stakeholders working to coordinate data collection, sharing, and analysis. In 2019, MnDOT developed a Strategic Plan for Counting People Walking and Bicycling for their Pedestrian and Bicyclist Data Program. The plan developed goals, strategies, and actions for MnDOT's statewide program to further institutionalize this data collection.

Just like vehicle count data, bicycle and pedestrian count data can be used in many ways. Having reliable data on traffic volumes and patterns for people traveling by walking or rolling or by bicycling is important for informing planning and engineering done at all levels, whether state, regional, or local. Analysis of the data can be used to further traffic safety, physical activity and health, economic development, and environmental goals. The Council will work with regional partners to identify needs for a regional count program for use in regional pedestrian and bicycle planning.

The two largest cities in the region, Minneapolis and Saint Paul, have been conducting regular bicycle and pedestrian counts for several years. In Minneapolis, the city counts bicyclists at 30 benchmark locations and pedestrians at 23 benchmark locations each year. Minneapolis also has over 380 additional locations where it counts bicyclists and pedestrians on a three-to-four year rotation. In Saint Paul, the city counts bicyclists at 30 benchmark locations and pedestrians at 25 benchmark locations each year. Collecting this data at consistent benchmark sites allows the cities to measure trends in bicycling and walking over time. For example, in its 2018 Bicyclist and Pedestrian Count Report, the City of Minneapolis shows that from 2007 to 2017, bicyclists have increased 53% and pedestrians have increased 21% at the annual benchmark locations.

Cities may use count data to help measure changes with installing bicycle or pedestrian facilities. The City of Saint Paul collected bicycle counts before and after bike lanes were installed at locations throughout the city to be able to measure changes in bicycle traffic. The City of Minneapolis has used its data to analyze the average percentage of bicyclists riding on sidewalks compared to bicycle facilities. MnDOT's Bicycle and Pedestrian Data Collection Manual includes other case studies of how data has been used in local communities in the state to guide decisions, such as installing mid-block pedestrian crossings.

As with any data, caution is needed in how it is used. The national Pedestrian and Bicycle Information Center notes that "Low counts should not be used as a justification for not providing facilities or safety improvements at certain locations or along a corridor. People on foot or bike may need to access a destination, but roadway conditions could be so intimidating that few people attempt the trip."

Regional Bicycle System Inventory

The Regional Bicycle System Inventory was compiled in 2016 with the help of counties and their member cities in combining available local bike plan data into unified county datasets. The Metropolitan Council then assembled a unified regional dataset that included most cities with existing bike plans. ~~The data include, at a minimum, existing and planned, on-street and off-street bikeways. Some cities and counties provided more detailed data regarding bicycle facility type, which eventually will be incorporated at the regional level in collaboration with Metro GIS.~~ The purpose of the inventory dataset is to assist local planning agencies when developing or updating local bike plans or in reviewing regional and adjacent city plans. As more cities and counties develop bicycle plans and continue to construct more bicycle facilities, there is a need to update this inventory on a regular basis. To that end, a Regional Bicycle System Inventory Update has been added to the TPP Work Program in Chapter 14. This inventory will be updated to include agencies with newly adopted bicycle plans and to expand the list of facility type attributes that are reflected locally. In addition, a process will be developed for coordinating regular system inventory updates, preferably on an annual basis at the end of construction cycles.

~~The Metropolitan Council will rely on regular bicycle facility updates from the counties to keep the regional bicycle system inventory current; ideally, annual updates compiled at the end of every construction cycle are preferred.~~

Table 7-1 shows the regional bicycle system mileage totals for all local, state, and regional facilities compiled in the 2016 bikeways inventory.

Table 7-1. Regional Bicycle System Mileage Summary

Bikeway Status	On-street	Off-street	Undefined	Total
Existing	1,878	2,030	--	3,908
Planned	1,032	820	1,013	2,865
Total	2,910	2,850	1,013	6,773

Bicycle and Electric Scooter Sharing Technologies

Nice Ride Minnesota is a non-profit organization that has been operating a public bike-sharing system in the Twin Cities since 2010. The system was designed to complement the transit system and to provide convenient and affordable transportation by enabling short bicycle connections between activity centers. Beginning operations with about 700 bikes and 65 fixed parking module stations, the system

grew to more than 1,800 bikes at 200 stations by 2017. In 2016 the system served more than 430,000 shared bicycle trips during the traditional April through November biking season.

Transition to a Dockless Bicycle System

As has been recently implemented in cities such as Seattle, San Francisco and Aurora, Colorado, Nice Ride Minnesota has proposed transitioning to a “dockless” bicycle sharing model. The proposal would gradually phase out the fixed-bicycle share stations, and replace them with new dockless bicycles that can be locked and parked anywhere and accessed via smart phone apps. These new bikes and sharing system are proposed to be managed by a private partner to increase the convenience, cost and accessibility to many more potential bicyclists. The expectation is that the number of shared bicycles in circulation could increase by more than five times, to 10,000 bikes or more in a just a few years. Aside from the increased convenience and affordability the new system would offer, there may also be challenges due to the vast number of bikes and limited designated bike parking areas in the core and surrounding cities. In order to manage these possible unintended impacts, local land use regulations will need to address this new bicycle sharing technology.

The Advent of Electric Scooters

In early 2018, the emerging technology of e-scooters debuted on Minneapolis and Saint Paul streets. Similar to a dockless bicycle sharing system, e-scooters are owned and managed by private vendors and activated with personal on-line accounts via smart phones. Scooter share is in the very early stages of what might become a viable urban mobility option, but at least one study noted a very high early adoption rate and the potential to attract a greater percentage of women (who are nearly matching the early adoption rates by men) compared to traditional, station-based bike sharing systems. In addition, there have been higher rates of acceptance among lower-income groups pointing to potential support in meeting the Healthy and Equitable Communities Goal. This emerging technology will be monitored to determine what next steps may be needed if the early high adoption rates are sustained.

Protected Bikeways

Protected bikeways are on-street or off-road bicycle facilities that are physically separated from lanes of moving traffic. Also known as “separated bike lanes” or “cycle tracks” for on or adjacent-street applications, protected bikeways are typically designed to be separated from general traffic lanes with vertical elements such as plastic or concrete bollards, or an elevated curb. These urban street treatments are intended to make bicycling as safe as possible for the widest range of cyclist age and ability.

The planning, programming and construction of protected bikeways is an emerging trend in the core cities of Minneapolis and Saint Paul, and other cities and counties are beginning to follow suit. Minneapolis adopted a Protected Bikeways Plan in 2015 that called for the construction of more than 30 miles of new, on-street protected bikeways by 2020. As of late 2017 about 13 miles of on-street protected bikeways had been constructed and opened for daily use within Minneapolis. The City of St Paul completed the first leg of its downtown Capital City Bikeway in 2017; the city’s bike plan calls for

this network to be expanded to four miles to ultimately create a full downtown protected loop with connections to incoming state and regional trails. Other local agencies such as the cities of Edina and Hopkins and Hennepin and Ramsey counties, have adopted bicycle plans that include some form of an enhanced bicycle network (including on-street, protected bikeways) and/or policies for "complete streets" road design and active transportation principles.

Growth in Purchase and Use of E-Bicycles

E-bicycles, or electric bikes, are an emerging trend in the Twin Cities bicycle market and are beginning to be seen on local streets and trails with some regularity. While not as universally popular as in China (where 9 out of 10 e-bikes in use around the world reside), nor as big of an expansion "boom" market as the Netherlands has experienced (up to 20% of all bike sales in recent years), there is an expectation in the U.S. that it is only a matter of time before e-bikes catch on as a highly-regarded option for commuting, off-road adventure cycling or bicycle touring. Already popular among retiring baby boomers who just want an occasional power assist in the pedaling stroke to climb hills or navigate more efficiently alongside vehicles, the newest trends in e-bike design features are targeted for the daily commutes of younger generations. While up-front cost remains relatively high ($1,600 to $4,000 and up) the operational costs compared to those of typical auto ownership are low enough that e-bikes tend to pay for themselves within their useful lives. As average prices decline over time, the clean energy benefits of e-bikes will attract the carbon-footprint consciences of millennials and younger generations. In addition, as advancing smart vehicle technologies are incorporated into e-bike designs and options, bicycling via e-bike can be made safer (thru advance obstacle or oncoming vehicle warnings) and more convenient (from options like a "no sweat mode" that can apply power assist in response to a cyclist's heart rate). All of these factors point to growing numbers of cyclists who may opt for e-bikes over conventional bicycles.

What e-bikes will ultimately mean for regional and local bicycle planning remains to be seen, but there are a few potential changes, regarding who and how one bikes in the future, that can be surmised:

- Upper age limits for healthful biking will be extended
- Average commute or bicycle trip distance will increase due to higher average speeds with less energy expended
- More demand for on-street bicycle facilities may result due to higher levels of confidence and safety from more people having the means to maintain bike speeds closer to average vehicle speeds
- Daily bicycle routes become more direct, especially in hilly areas, now that most anyone can ride with ease over long, steep hills
- Greater need to manage/enforce speed limits of off-road trails and/or need to legislate greater separation of bikes and pedestrians

Winter Cycling is an Essential Transportation Need

As one of the coldest metro areas in North America, the Twin Cities has been referred to as the "nerve center" of winter biking in the United States. While detailed statistics have not yet been compiled for the region, there are other notable indications that winter cycling is alive and thriving in the Twin Cities. Spurred by the local innovation of the fat tire bike circa 2005, and subsequent locally developed, winter-specific bicycle gear, parts and cold-weather apparel, a vital urban cycling culture has emerged. This was most evident from Minneapolis and Saint Paul's selection to host the 4th Annual International Winter Cycling Congress held in February 2016. This event drew more than 300 city planners, engineers, and bicycle advocates and enthusiasts from around the world including nations such as Finland, Sweden, and the Netherlands. In addition, local events have been springing up in recent years that celebrate the thrill of winter cycling, such as the Winter Bike Expo, Fatbike Frozen 40, and Fat Tire Loppet, which draw several hundred winter biking enthusiasts from casual riders to everyday commuters and hard-core competitors. Aside from the growth in popularity of "fat bikes" for recreation and transportation, more common road and mountain bikes continue to be adapted for winter use, at lower cost and by those who rely on bicycles for transportation throughout the year. With increasing numbers of winter cyclists who continue to rely on well-maintained bicycle facilities for transportation throughout the year, it is imperative for all road authorities to provide timely snow and ice removal along the most depended on winter bikeways.

Pedestrian and Bicycle Safety

Pedestrians and bicyclists are the most vulnerable travelers on our transportation networks. Increases in the number of people walking and bicycling can help improve safety by creating greater visibility and driver awareness. Research has shown that as more people bike and walk, crash rates for these modes tend to decline.

Crash Statistics

Within the seven-county core of the Twin Cities region, an average of 22 pedestrians and 3 bicyclists died each year, based on traffic crash data from 2014-2018. According to crash data from the Minnesota Department of Public Safety for 2014 through 2018, there were 1,324 traffic fatalities in Minnesota; 25%, or 333, of these happened in the Twin Cities region. Of these 333 people who died in traffic crashes in the metro, 112 were pedestrians and 17 were bicyclists. While 25% of the overall traffic fatalities in the state happen in the Twin Cities region, the region's share of crashes looks much different for pedestrians and bicyclists because of its more urbanized area. Although the region has 25% of the state's overall traffic fatalities, we have 55% of the state's pedestrian fatalities and 49% of the state's bicyclist fatalities.

While walking trips are 6% of all trips made within the region, pedestrian fatalities are a disproportionately larger percentage of the region's traffic deaths with 34% of all traffic fatalities from 2014-2018. The numbers are not as disproportionate for bicyclists, but they still are 5% of all Twin Cities traffic fatalities, compared to making 2% of all trips. Future additional analysis of crash data would provide more information about the nature of these crashes and safety issues within the region.

The Council plans to develop a Regional Pedestrian Safety Action Plan to analyze pedestrian crashes and identify countermeasures and programmatic recommendations to improve pedestrian safety. During the development of the Minnesota Strategic Highway Safety Plan for 2020-2024, data analysis showed a trend of increasing pedestrian crashes, and this is an emerging focus area priority for the state.

Other analyses of pedestrian crash data have shown that people of color are overrepresented in pedestrian fatalities or crashes. The Dangerous by Design 2019 report from Smart Growth America found that in Minnesota, people who identify as indigenous (Native American) or black or African-American have higher percentages of pedestrian deaths when compared to their proportion of the state's population. Within the Twin Cities region, the 2017 City of Minneapolis Pedestrian Crash Study found that there are more pedestrian crashes (regardless of crash severity) per capita in areas of the city where the majority of residents are people of color with lower incomes.

For crashes with less severity, perceived underreporting is a challenge with pedestrian and bicycle crashes. Many police departments may not file reports for crashes where an injury is not apparent. For the information made available on the city's web site, the City of Saint Paul Police Department began tracking basic data for pedestrian and bicycle crashes based on calls to the department instead of only on crash reports. The Minneapolis Pedestrian Crash Study compared police reports of pedestrian injury crashes with hospital records and found an overall trend of underreported pedestrian injuries; however, the degree of underreporting is difficult to determine.

Pedestrian Safety

Pedestrians are the most vulnerable travelers on our transportation network and they include different groups of people with various trip types: children walking to school, people with different disabilities requiring a range of mobility devices (e.g., wheelchairs, power chairs, walkers, canes or guide dogs), or senior citizens with limited mobility options. Planning for safe accommodations throughout the year should be routine. Reliable and timely winter maintenance for pedestrian networks is critical to ensure people can continue to meet their daily travel needs.

Analyzing crash data can help determine the best approaches to improving pedestrian safety. The 2017 Minneapolis Pedestrian Crash Study analyzed pedestrian crash data for a 10-year period to determine trends and contributing factors for these crashes. This study found that the majority of pedestrian crashes in the city are at intersections, and two thirds are at signalized intersections. Within the city, 80% of pedestrian crashes happened on just 10% of the streets; when looking just at crashes that were fatal or resulted in serious injuries for pedestrians, 75% of those crashes happened on just 5% of the city's streets.

Transit is another factor in the city's pedestrian crashes. The data analysis found that over half of the city's pedestrian crashes happened within 100 feet of a bus stop. While only 8% of the street mileage in Minneapolis carries high-frequency transit routes, those streets had 63% of the city's pedestrian crashes. As travel speeds increase, so do the risks for death or severe injuries in a crash. The city's study showed that most pedestrian crashes happen on streets with a 30 mile per hour speed limit;

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unsurprisingly, the crash severity increased on streets with higher speed limits. A 2017 National Transportation Safety Board study, *Reducing Speeding-Related Crashes Involving Passenger Vehicles,* cites a European Transport Safety Council study that showed 5% of pedestrians struck by a vehicle traveling at 20 miles per hour (mph) are killed; however, "this likelihood increases to 45% at 30 mph, and 85% at 40 mph." In Minnesota, the minimum speed limit on streets in urban districts is 30 mph. With a vehicle traveling at this speed, only about 5 out of 10 pedestrians survive being hit in a crash. In 2019, the Minnesota Legislature passed a law that allows cities, but not counties or the state, to change speed limits for city-owned streets, based on safety, engineering and traffic analysis. Minneapolis and Saint Paul are collaborating to determine the most appropriate speed limits on their city-owned streets and anticipate lowering speed limits. Speed limits on county and state streets remain set by the state.

Failure of drivers to yield to pedestrians is a common contributing factor in pedestrian crashes. A MnDOT and Local Road Research Board project with the City of Saint Paul that was completed in 2019 evaluated driver yielding rates and speed compliance on arterial and collector roads within the city. The project included low-cost engineering treatments, enforcement, education, and social norming over the two-year study period to increase driver compliance with pedestrian crosswalk laws. Baseline study data revealed drivers yielded to pedestrians 31.5% of the time at unsignalized intersections, and multiple threat passing (drivers passing other drivers who are stopped for pedestrians) happened at one in 10 staged crossings. Results from the study showed an increase in drivers yielding to pedestrians, with a high of 78% during the final phase. This study program could be used by other cities in the state. A follow up study is planned for pedestrian engineering and enforcement at signalized intersections and is expected to begin later in 2020.

Tools like Pedsafe (https://safety.fhwa.dot.gov/ped_bike/tools_solve/) can help select appropriate infrastructure treatments for people on foot or using mobility devices. In addition to walkways, the Federal Highway Administration has identified four proven pedestrian-related safety countermeasures (https://safety.fhwa.dot.gov/ped_bike/). These include street medians and pedestrian crossing islands in urban and suburban locations, road diets, leading pedestrian intervals, and pedestrian hybrid beacons. Road diets typically convert a four-lane undivided roadway to three lanes with two through lanes and a center turn lane; this reduces the number of lanes pedestrians need to cross. Leading pedestrian intervals give pedestrians a walk signal a few seconds before the vehicle signal turns green, allowing time for pedestrians to be further into the crosswalk and more visible to drivers who need to yield. Pedestrian hybrid beacons have two red lights above one yellow light that are activated by a pedestrian using a push button. Once activated, drivers see a sequence of yellow and red lights signaling they should stop to allow pedestrians to cross. Conducting a road safety audit with a pedestrian focus is another good way to help agencies identify safety issues and potential solutions.

Safe Routes to School

Many state and local partners, including MnDOT and the Minnesota Department of Health (MDH), have continued working over the past 15 years to develop and fund programs that support youth walking and biking to school on routes that are safe, comfortable, and convenient. Comprehensive Safe Routes to

School programs address multiple areas, including engineering, education, encouragement, enforcement, equity, and evaluation. In 2020, MnDOT is working to update its five-year strategic plan for Safe Routes to School in the state. Safe Routes to School infrastructure funding became available through the Regional Solicitation in 2013 with changes in the federal funding programs. Other funding for planning and implementation is available through MnDOT as well as MDH's Statewide Health Improvement Partnership.

Eliminating Traffic Deaths and Serious Injuries

Minnesota's Toward Zero Deaths traffic safety program has been working to use an interdisciplinary approach to reducing fatal and serious injury crashes in the state since 2003. This work has most commonly been organized at the county and state levels. Cities across the country have also increasingly been adopting Vision Zero policies and developing plans to eliminate deaths and serious injuries from traffic crashes. In 2019, Minneapolis adopted a Vision Zero Action Plan to work toward its vision of eliminating traffic deaths and serious injuries on city streets by 2027. While this work focuses on all traffic deaths and serious injuries, not just from crashes involving pedestrians and bicyclists, this comprehensive approach is important for the most vulnerable travelers in our system.

Regional Bicycle Transportation Network

The Regional Bicycle Transportation Network (RBTN) was established in 2014 as the official regional bikeway network that sets the region's priority vision for planning and investment. The network was based on a Regional Bicycle System Study analysis and prioritization of potential corridors based on factors such as bicycle trip demand, network connectivity, social equity, population and employment density, and connections to transit. Further details on the study completed in 2014 can be found on the Metropolitan Council's website.

The purpose of the RBTN is shaped by the following goals:

- Establish an integrated and seamless network of on-street bikeways and off-road trails;
- Provide the vision for a "backbone" arterial network to accommodate daily bicycle trips by connecting regional destinations and local bicycle networks
- Encourage cities, counties, parks agencies, and the state to plan and implement future bikeways in support of the network vision.

In support of these overall goals, cities and counties are encouraged to plan and implement the RBTN and its connections to local bikeway networks through local bicycle, transportation and/or comprehensive plans.

Guiding Principles

A set of guiding principles for defining the Regional Bicycle Transportation Network was developed during the Regional Bicycle System Study to identify a regional bikeways network that would:

- **Overcome physical barriers and eliminate critical system gaps**. Specifically addressing gaps and barriers in the regional system will improve convenience and continuity for bicyclists.
- **Facilitate safe and continuous trips to regional destinations**. Developing and upgrading bicycle facilities along the RBTN will improve the convenience and safety of bicycling along these facilities.
- **Function as arteries to connect regional destinations and the transit system year-round**. Designating alignments within RBTN corridors and implementing bikeways on the RBTN will provide the needed connections to regional destinations and the regional transit system.
- **Accommodate a broad range of cyclist abilities and preferences to attract a wide variety of users**. Bicyclists have varying levels of comfort to ride based on facility type (on-street facility vs. off-road trail), roadway characteristics, and personal levels of experience and ability. In some urban, high demand corridors it may be appropriate to develop both an on-street facility and an off-road trail to accommodate the full range of cyclist preferences.
- **Integrate and/or supplement existing and planned infrastructure**. When developing the RBTN, existing and planned infrastructure should be used when possible to reduce the need to purchase new right-of-way and to minimize the growing financial burden of preserving and maintaining existing facilities.
- **Provide improved opportunities to increase the share of trips made by bicycle**. Implementing a complete RBTN that provides convenient connections to key regional destinations and the regional transit system will increase the likelihood of choosing bicycling for transportation over other travel modes.
- **Connect to local, state, and national bikeway networks**. Connecting to other established bicycle networks will expand the reach and effectiveness of the regional network.
- **Consider opportunities to enhance economic development**. New bicycling investments can be an effective tool for creating local economic development opportunities and to foster the Twin Cities' image as a highly livable region with many bike-friendly destinations.
- **Be equitably distributed throughout the region**. Social equity and regional geographic balance were emphasized in identifying the RBTN. By focusing on population and employment concentrations, the network will be able to attract the greatest number of riders. By also applying the Metropolitan Council's identified Areas of Concentrated Poverty (where at least 50% of the residents are people of color), the network will offer equitable access to bicycling and the economic opportunities and health benefits afforded by bicycle infrastructure.
- **Follow spacing guidelines that reflect established development and transportation patterns**. The RBTN corridors were developed in a way that applied spacing concepts based on urban and suburban development patterns and plans. The resulting network is denser and has greater accessibility compared to regional bikeway corridors found in other metropolitan regions.

- **Consider priorities reflected in adopted plans**. The RBTN was developed to reflect local bicycle plans and policies that inform regional priorities.

In addition to developing the initial RBTN, these guiding principles are used in reviewing potential RBTN map revisions proposed by local agencies since the last TPP update.

Description of Corridors and Alignments

As shown in Figure 7-1 below, and as a basic primer to the RBTN concept first introduced in 2014 Transportation Policy Plan update, the RBTN consists of a series of corridors and general alignments. The corridors are established where there is existing or potentially high bicycle trip demand between regional destinations and activity centers and also connecting to moderate-to-higher density local neighborhoods or commercial areas. Corridors reflect where alignments have not yet been identified; the presence of corridors allow for local planning processes to determine the most appropriate alignment that follows the orientation of the corridor and combines on-street bikeways with off-road trails, where appropriate.

Alignments are defined where there are existing or planned bikeways, or in the absence of these, a consensus of which road or roadways would most efficiently meet the regional corridor's intent. When alignments are identified within an existing corridor, the original corridor will dissolve and be replaced by the alignment on the RBTN map. Corridors and alignments are classified as Tier 1 or Tier 2 priorities, with Tier 1 representing the region's highest priorities for bikeway planning and investment. Tier 1 corridors and alignments are planned in locations where they can attract the most riders and where they can most effectively enhance mode choice in favor of biking, walking, and transit over driving alone. High rates of bicycle travel demand, as well as current and planned population and employment densities, were heavily weighted in the Regional Bicycle System Study used to develop the RBTN.

Regional Bicycle Transportation Network Implementation Status

As the RBTN has been the established regional network since 2014, it is appropriate to continue monitoring progress on its implementation. Table 7-2 shows the estimated centerline miles of existing and planned RBTN alignments/corridors and their corresponding percentages of total RBTN centerline miles.

Table 7-2. RBTN Implementation Status*

RBTN Facility Status	On-Street	Off-Street	Undefined	Total	% of Total
Existing Bikeways (Alignments)	140	454	55	650	44.7%
Planned Bikeways					
RBTN Alignments	40	260	91	390	48.6%
RBTN Corridors	NA	NA	413	413	51.4%
Total Planned Bikeways	40	260	504	803	55.3%

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RBTN Facility Status	On-Street	Off-Street	Undefined	Total	% of Total
Total RBTN centerline miles	180	714	559	1453	100%

*** Table values are Council estimated RBTN centerline miles.**

Regional Bicycle Transportation Network Revisions since the Previous Plan Update

Since the last TPP update, multiple changes have been incorporated into the RBTN. Agencies submitted change requests leading up to the 2020 Regional Solicitation consistent with these administrative change categories:

1. Alignment designations within existing RBTN corridors
2. Minor corridor or alignment extensions up to one-half mile long that provide missing connections to RBTN alignments, regional trails, or regional destinations
3. Minor alignment shifts to within one-quarter mile of the initial alignment in core cities or to within one-half mile of initial alignment outside core cities and that continue to serve the destinations served by the initial alignment.

In addition to changes under these administrative categories, the Transportation Advisory Board accepted a proposed major bikeway alignment along the planned Gold Line transitway in Washington and Ramsey Counties. That bikeway, to be constructed in conjunction with the Gold Line BRT project, will serve bicyclists between Woodbury 494 Station and downtown Saint Paul and has been added to the RBTN as a Tier 1 alignment.

~~First, there were dedicated alignments within existing corridors which are defined as administrative adjustments in this plan and do not require a plan update or amendment. More substantive changes that are proposed in this update include corridor centerline adjustments, corridor or alignment extensions or deletions, and new corridors or alignments. The proposed adjustments and additions are the result of direct meetings or communications with counties and cities, as well as changes proposed by local agencies and approved by the Transportation Advisory Board for the 2016 regional solicitation of federal transportation funds.~~

Figure 7-1 shows the updated RBTN as revised since the 2018 TPP update.

Figure 7-1. Regional Bicycle Transportation Network

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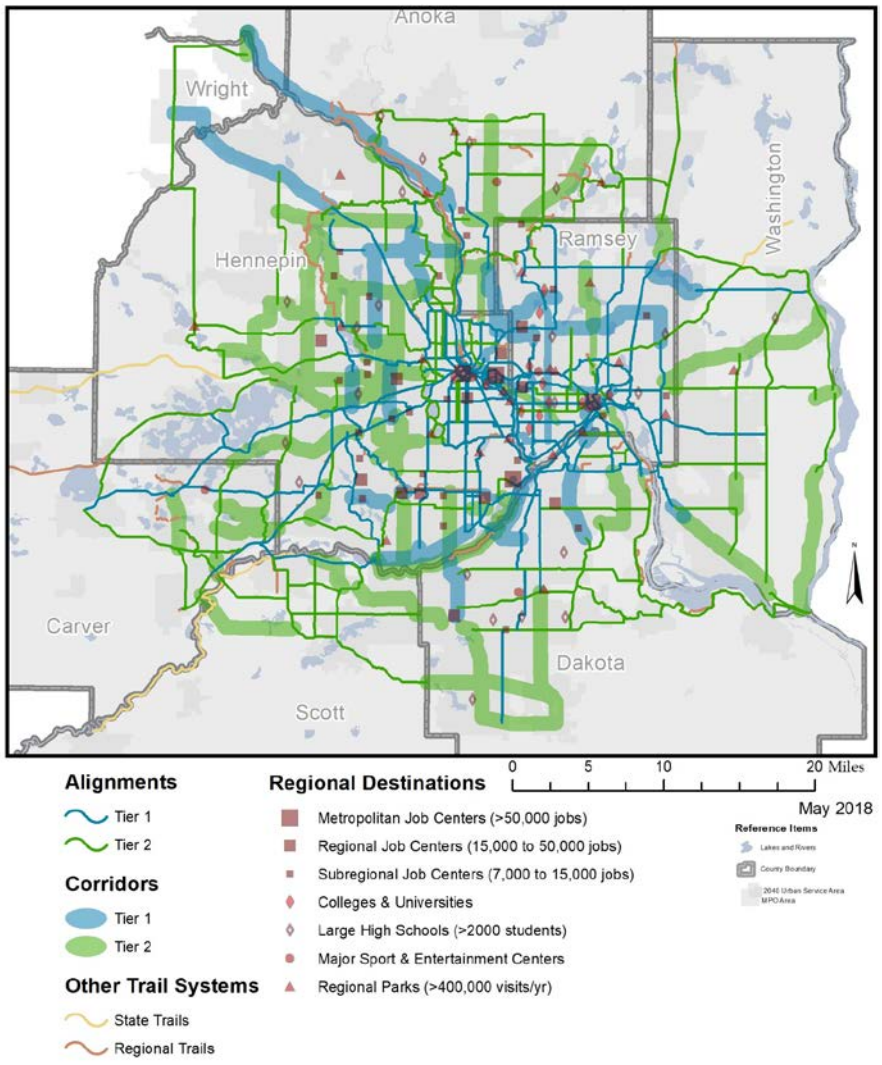


For a zoomable view of the RBTN, please see the online map version via this link: (INSERT DIRECT LINK TO RBTN ONLINE INTERACTIVE MAP)

Updating the Regional Bicycle Transportation Network

The Council is developing a process that will allow for more significant updates to RBTN corridors or alignments to occur every two years. This new process will allow for potential changes to be evaluated in time to recommend decisions to the TAB and the Council ahead the release of each Regional Solicitation.

In terms of the more specific process of reviewing agency requests for modifications or additions to the RBTN, such requests have been evaluated using the mostly qualitative regional bikeway guiding principles described earlier. Reviews have also looked conceptually at how new alignments would alter the existing spacing and route directness of RBTN corridors and alignments. As the RBTN expands to serve regional growth, formal~~ized~~ measures for evaluating corridor spacing and route directness are needed to improve regional network planning (e.g., identifying where gaps exist) and to supplement the review process for RBTN additions. Also related, the previous TPP update describes a range of appropriate bikeway facility types for the RBTN, but agency comments have noted that the TPP stops short of offering guidance on where in the region, or along which types of roadway, specific treatment types may be preferred.

In an effort to address these RBTN system planning needs, a new study, the RBTN Bikeway Facility Guidelines and Measures Study, is included in the Chapter 14 Work Program.

Regional Bicycle Transportation Network and Regional Trails

Many regional trails have been identified as important alignments within the RBTN. Existing and planned regional trails, as well as general regional trail search corridors, are identified in the Regional Parks Policy Plan and are designed as multi-use facilities to serve both recreation and transportation trips. Regional trail alignments are identified by the regional park implementing agencies through the development of trail-specific master plans; these master plans must be consistent with the Regional Parks Plan to be approved by the Metropolitan Council. Regional trails are required to provide connections between components of the Regional Parks System and are primarily multi-use recreational trails, although many trails also serve and support bicycle transportation.

Regional trails were an important input in the original RBTN and while there is significant overlap between the two networks, there are also some distinct differences. For example, the RBTN is planned to facilitate bicycling for transportation which include commute trips to work and school, shopping trips, trips to entertainment venues and trips to visit family/friends, while regional trails are planned and designed primarily for recreation. Consistent with the RBTN's focus on transportation is its emphasis on connecting regional destinations by integrating on-street bikeways and off-road trails to create the most direct route that values trip efficiency over route aesthetics. For regional trails the planning philosophy is more focused on connecting regional parks and trails mainly through the development of off-road facilities that are planned to maximize scenic value rather than route efficiency.

Recreational bicycling, although not the focus of the Transportation Policy Plan, is significant to the region in that it represents an important entry point for many cyclists to become familiar with the

regional transportation and trail systems. Ultimately, many recreational cyclists will become users of these systems for commuting and other transportation purposes.

Regional trails that are not included in the RBTN may provide a transportation function at a local level, just as there are many trails and on-street bikeways within the RBTN that also serve recreational needs in urban and suburban areas. In practice, the RBTN, regional trails, and all local trail and bikeway networks should complement each other to serve the overall bicycle transportation and recreation needs of the region. An integrated system of regional trails and the RBTN requires a collaborative approach to regional trail and bicycle transportation planning by the Council and its agency partners. Council staff are working to define opportunities for increased collaboration involving bicycle transportation and parks agency planners in order to achieve a more coordinated planning process and integrated regional system overall.

Critical Bicycle Transportation Links

There are several physical barriers to bicycle transportation that disrupt the connectivity of regional and local bikeway networks and act as major obstacles for residents trying to access key destinations. The links overcoming these barriers are defined as critical bicycle transportation links.

Critical bicycle transportation links serve to accomplish any of the following:

- Close a gap in the Regional Bicycle Transportation Network or connect a local bikeway to a major regional destination.
- Improve continuity and connections between jurisdictions (on or off the regional network).
- Improve or remove a physical barrier (on or off the regional network).

Closing a Gap in the Regional Bicycle Transportation Network

Gaps in the RBTN can be addressed by:

- Providing a missing link between existing or improved segments of the Regional Bicycle Transportation Network.
- Improving bikeability within an RBTN corridor to better serve all bicycling skill and experience levels within the corridor (for example, providing a safer, more protected on-street facility; improving traffic signals, signage, and pavement markings at busy intersections; or adding a bike route parallel to a highway or arterial roadway along a lower-volume neighborhood collector or local street).
- Providing a short (up to one mile) but critical link connecting a local bikeway to the Regional Bicycle Transportation Network, a major regional destination, a major transit-oriented development, or to a high-volume, multimodal transit station.

Improving Continuity and Connections between Jurisdictions

There are many cases around the region where an existing bikeway may stop at one city's border and not carry through to an adjacent city or county. Creating more consistent, continuous and connected

bikeways will improve access between local and regional bicycle networks, as well as the convenience and overall experience of bicycling.

Removing or Circumventing a Physical Barrier

Physical barriers to biking can be natural or man-made and include major rail corridors, rivers and streams, freeways or expressways. In 2017, the Metropolitan Council conducted a Regional Bicycle Barriers Study to begin addressing the need for bikeway improvements across the region's physical barriers. This study is described in more detail below. Projects that remove or provide more bikeable options around or across physical barriers (for example, providing grade-separated crossings where appropriate) can arise in a number of ways. Planning work may underscore the need for a local bikeway to improve options through a major barrier.

Additionally, major roadway infrastructure projects can provide opportunities to create bicycle connections across one or several barriers, particularly in instances where there is not a usable parallel alternative within a reasonable biking distance. For roadway bridges crossing the region's major rivers, see the major river barrier crossings assessment below.

By their nature, projects to remove physical barriers can prove particularly costly and the potential to enhance such connections may be opportunity driven with respect to major highway, bridge, and transitway projects. Given the significant expense of building connections like bridges or underpasses and their anticipated long life, it is important to consider the inclusion of bicycle infrastructure in all projects that improve options to cross or get around these physical barriers, even if the full potential of the bicycle connection is not evident at the time of construction.

Addressing the Region's Physical Bicycle Barriers

In beginning to address the region's physical bicycle barriers, particularly as they relate to the definition of critical bicycle transportation links, Metropolitan Council staff performed a general review of the region's major river crossings and conducted a Regional Bicycle Barriers Study to address the other regional physical barriers to bicycling. The region's primary rivers (Mississippi, Minnesota and Saint Croix Rivers) were not analyzed in the Regional Bicycle Barriers Study because of the large differences in approach and scale that would be required for these major rivers compared to the other smaller and less challenging barriers that were evaluated through the study. Also, there are many different and non-bicycle related factors that are the primary drivers for developing new bridge crossing projects. That said, this plan recognizes the major rivers as the longest and most challenging physical barriers to bicycling in the region.

Major River Barrier Crossings Assessment

The Metropolitan Council conducted a high-level assessment of the existing roadway bridges and existing or planned stand-alone bikeway bridges crossing the region's primary rivers. The Twin Cities has three primary rivers that run throughout the region that represent major barriers to all transportation modes. These include the Mississippi, Minnesota, and Saint Croix rivers which serve as the boundary lines between cities, counties, and in the case of the Saint Croix, the Wisconsin/Minnesota state line.

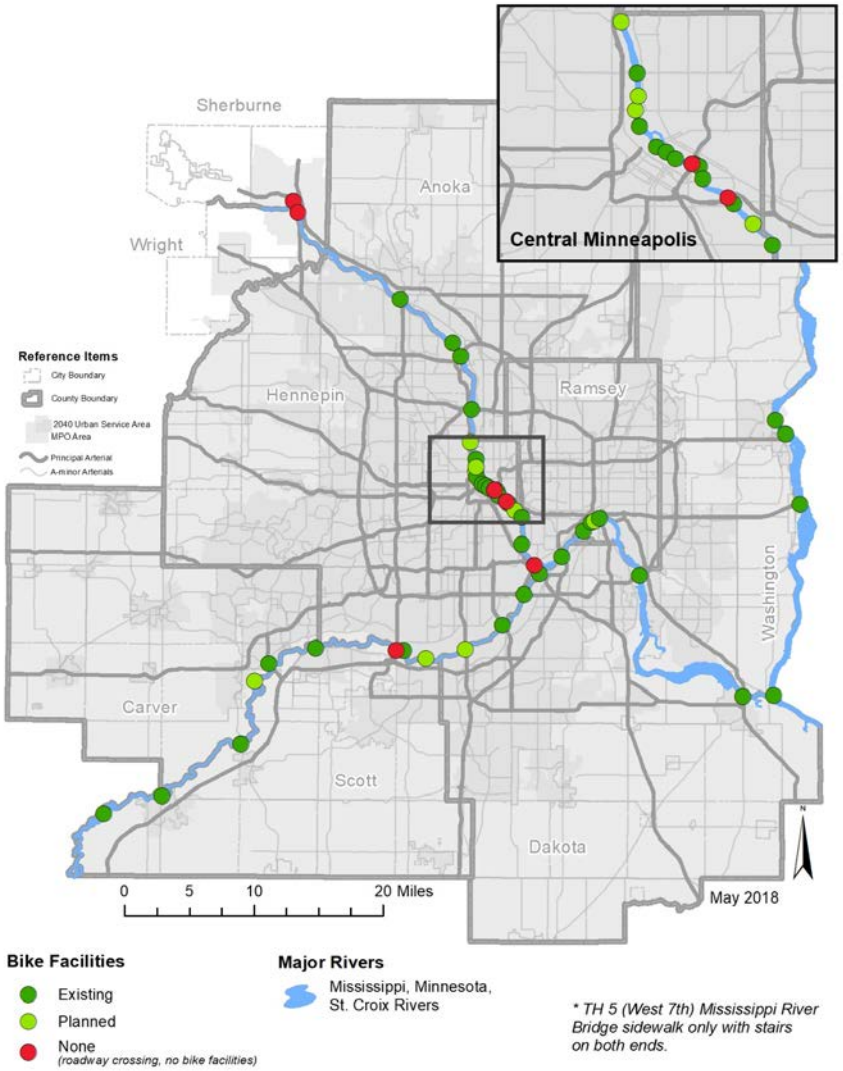
There are currently 38 roadway bridges and five independent stand-alone bicycle/pedestrian bridges that cross these major river barriers. As shown in Table 7-3, of the 38 roadway bridges, 28 have existing bikeways, four have planned bikeways, and six have none existing or planned bicycle facilities.

In addition to five existing stand-alone bicycle bridges, there are four stand-alone or rail bridge-adjacent bicycle crossings planned in Minneapolis and the City of Carver. Figure 7-2 shows the locations of all major river roadway crossings, and all existing and planned independent bikeway crossings of the major rivers.

Table 7-3. Major River Crossings by Bridge Type

Bridge Type	Existing Bikeway	Planned Bikeway	None existing or planned	Total
Road bridges	28	4	6	38
Rail bridges	0	3	0	3
Stand alone bike-pedestrian bridges	5	1	0	6
Total	33	8	6	47

Figure 7-2. Major River Bicycle Barrier Crossings



Because of high construction costs, long implementation timeframes, typically long distances between bridge crossings, and a much shorter range of bicycle trips compared to vehicle trips (average of under 3 miles, regionally) all of these crossings shown in Figure 7-2 are designated as major river bicycle

barrier crossings and projects that improve these crossings are considered a regional priority with respect to bicycling and walking modes. Guidelines for applying this new regional designation are discussed in the “Investment Direction” section provided later in this chapter.

Regional Bicycle Barriers Study

In 2017, the Metropolitan Council conducted a Regional Bicycle Barriers Study to analyze the need for bikeway improvements across the region’s physical barriers. The study defined physical barriers to include secondary rivers and streams, rail line corridors, and freeways and expressways. Freeways are highways with full access control, meaning motorists do not encounter any cross-road intersections. Expressways, for this study, were defined to include the region’s non-freeway principal arterials that comprise of at least four lanes and are divided by a median. These highways differ from freeways in that they do have cross-road intersections with traffic signals and some partial stop sign-controlled intersections with right-turn-in and right-turn-out-only access. Some high-volume, higher-speed minor arterials were also included as “expressways” based on input from the study’s technical advisory work group. Regional bicycle barriers, based on the definitions developed through this study, are shown in Figure 7-3.

Figure 7-3. Regional Bicycle Barriers

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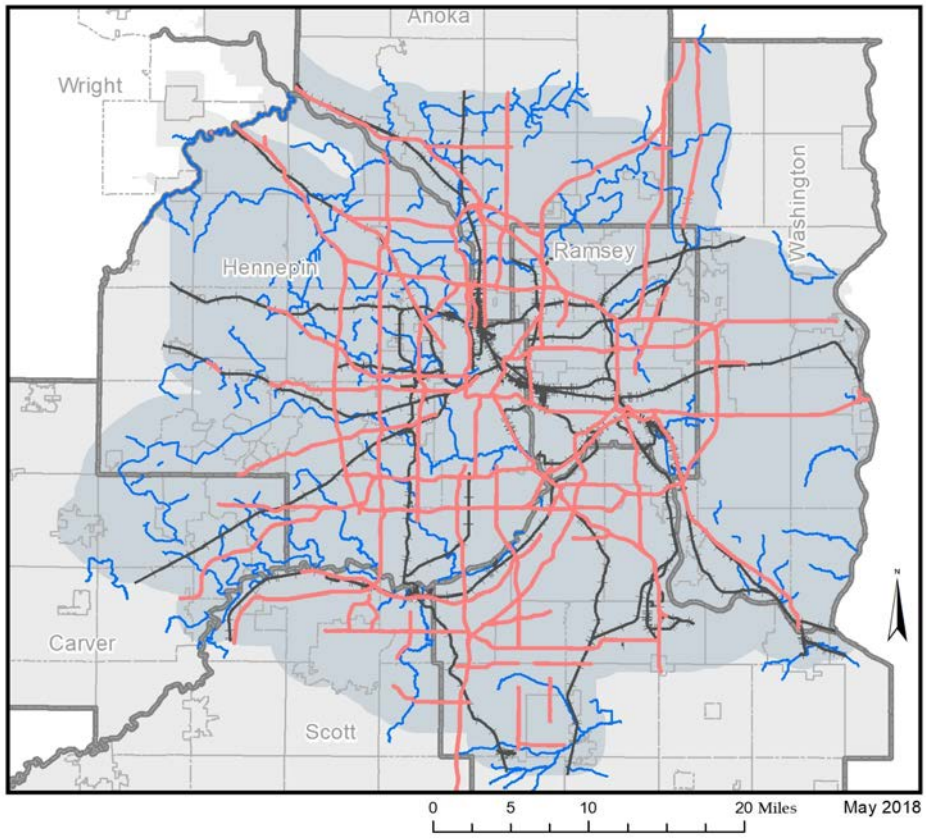


In addition to defining regional bicycle barriers, the study analyzed a series of potential barrier crossing improvement locations based on four analysis factors that included safety and existing conditions,

bicycle trip demand, local and regional bike network connectivity, and social equity. The actual points to include in the study's analysis of potential future crossings were determined with assistance from a technical advisory work group of bike transportation professionals and advocates, and from public input received through an interactive, on-line map questionnaire. The study included bicycle barrier crossing locations already identified in local plans, points within or on RBTN corridors or alignments, and additional points based on the spacing criteria shown in Table 8-4. Points on local networks and regional facilities were considered equally in the analysis. Preferred spacing distances between bikeable crossings were determined by the study's technical work group and ranged from a ½-mile between crossings in urban centers to two miles between crossings in the region's rural areas.

Table 8-4. Bicycle Barrier Crossing Spacing Criteria

Thrive Planning Area	Preferred Maximum Spacing	Example Cities
Urban Center	½-mile	Minneapolis, St Paul, Richfield, Hopkins, South St Paul
Urban	¾-mile	Golden Valley, Roseville, Maplewood, Crystal, Edina
Suburban, Suburban Edge, Emerging Suburban Edge	1 mile	Blaine, Woodbury, Maple Grove, Eagan, Lakeville
Diversified Rural, Rural Residential, Agricultural	2 miles	Grant, Afton, Ham Lake, Lake Elmo, Independence

Ultimately, the study determined a series of bicycle barrier crossing improvement areas along the identified regional bicycle barriers (see ~~the sub-regional example in~~ Figures 7-4 and 7-5 in the Investment Direction section). These improvement areas are shown as circles with diameters that represent the barrier segments where future crossings could be developed. The area circle diameters vary by aggregated Thrive community designation group and correspond to the preferred barrier crossing spacing distances also described in Table 8-4.

The intent of the study was to inform and guide regional investments in bicycle infrastructure through the Regional Solicitation of federal transportation funds and other state and local programs that fund projects in the region. Since the TPP 2018 update, a Technical Addendum to the Regional Bicycle Barriers Study was conducted to update the analysis of ~~the full regional set of~~ regional bicycle barrier crossing points and resulting ~~bike~~bicycle barrier crossing improvement areas; the update was conducted ~~will be revisited~~ to ensure local planned crossings and existing conditions ~~are~~ were best reflected within the initial analysis factors developed for the study. The final results of the analysis update are incorporated in the regional bicycle barrier crossing improvement area maps described in more detail in the Investment Direction section and shown in Figures 7-4 and 7-5.

~~It is the Metropolitan Council's intention that these adjustments will be reviewed by a regional group of peer bicycle planning professionals and discussed with the Technical Advisory Committee and its subcommittees prior to its use in future regional solicitations.~~

Find more information on the detailed analysis process for the Regional Bicycle Barriers Study and Technical Addendum Update at ~~metrocouncil.org.~~ (INSERT DIRECT LINK TO RBBS & TECH ADDENDUM WEB PAGE).

Implementing the Regional Bicycle Transportation Network

Local Planning for Regional Bicycle Transportation Network Corridors and Alignments

The broad RBTN corridors shown in Figure 7-1 (one-mile wide in suburban/rural areas, one half-mile wide in the core cities) are intended to allow flexibility among local government agencies to tailor specific alignments for bikeway facilities through the local planning process. When specific alignments are designated through the local planning process, the regional corridor will be replaced on the RBTN map with the preferred alignment. These new alignment designations are periodically added to the RBTN map as an administrative task and will not require a TPP amendment.

In planning for specific RBTN alignments and developing bikeway improvement projects, agencies should consider all the guiding principles for regional bicycle corridors described previously but with special attention to the following subset of principles that are most effectively planned at the local level:

- **Overcome physical barriers and eliminate critical system gaps**. More attention and planning will be needed at the local level to identify existing gaps in the Regional Bicycle Transportation Network and opportunities to eliminate or divert from physical barriers. The Metropolitan Council will assist locals in planning for this critical element in developing the RBTN.
- **Facilitate safe and continuous trips to regional destinations**. Planning for the development of bicycle facilities along the RBTN, as well as for connections between the RBTN and local bikeway systems, should be coordinated with Metropolitan Council staff.
- **Accommodate a broad range of cyclist abilities and preferences to attract a wide variety of users**. Local roadway conditions and geometry, along with the available off-road trails network will largely determine what alignments and facility treatments may be feasible within an established regional bicycle corridor. Local agencies should try to accommodate cyclists of all ages and for the full range in abilities from novice to avid cyclist by providing a range of off-street and on-street bicycle facilities. In some urban, high demand corridors, it may be desirable to provide both an on-street bike facility (like a bike lane) and a parallel off-road trail. In most corridors with space for only an on-road facility, a buffered or protected bike lane may be the optimal solution to attract the widest range of cyclists.

- **Integrate and/or supplement existing and planned infrastructure**. Wherever possible, it is desirable to construct bicycle facilities along existing roadways or implement trails on corridors with minimal requirements for new land acquisition. This is important to ensure that limited dollars for bicycle infrastructure can be efficiently invested to complete the regional network in a shorter timeframe.
- **Consider opportunities to enhance economic development**. When planning specific alignments within the regional bicycle corridors, local transportation professionals should work closely with their economic development and land use planners to identify opportunities for the bikeway project to enhance and/or serve as a catalyst to community development programs and projects. Connecting residential neighborhoods with shopping, entertainment, and work centers should be a major consideration when developing bicycle facility improvement projects.

Placement of Regional Bicycle Transportation Network Alignments on Roadways

When identifying roadways and highway corridors appropriate for implementing specific alignments for regional bikeways, it is imperative that transportation agencies coordinate and collaborate in their planning activities. This will help to ensure that trade-offs between opportunities for implementing a bikeway and the physical constraints of the roadway corridor are fully considered. To that purpose, for major corridor studies and projects, meetings and other opportunities for engaging the public will be critical to inform the project development process.

The provision of safe and comfortable bicycle facilities in the roadway corridor should be the goal in order to achieve continuity for regional bicycle corridors and to facilitate direct access to corridor destinations. Planning for cyclist bikeability and convenience across a range of experience levels and abilities is an important focus for any major roadway project. Other competing priorities, including safety for all users and mobility for all transportation modes, will also need to be considered. This balancing of priorities is especially needed on A-minor arterials in urban areas.

Some highways serve as the only practical and effective crossing over a major barrier (such as, rivers, freeways, multi-lane highways, and railroad corridors). In these cases, safe bicycle and pedestrian accommodations should be provided on the highway segment that crosses over (or under) the barrier. On some highways with high traffic volumes, an intensive mix of trucks and buses, and limited right-of-way to provide designated bicycle facilities, it may be appropriate to route the facility away from the highway when a nearby, parallel local street is available. This condition occurs more frequently on A-minor arterials in highly-developed, urban corridors than on A-minors in less developed, suburban or rural corridors; however, this will not always be the case and each corridor should be planned to address its unique issues and needs from both a local and regional perspective. As an alternative to locating regional bikeways along major highways, regional transportation partners could work together to plan and build new, continuous bicycle facilities that cross barriers via the local street system; with their lower traffic volumes and slower speeds, local streets can be improved to accommodate a broader range of cyclist abilities.

Facility Types that Meet Regional Bicycle Corridor Functionality

There is a range of bicycle facility treatments, both off road and on street, which may be applied in different parts of the region to accomplish the function of regional bicycle corridors and to maximize their attractiveness to potential bicyclists. Local planners will need to consider their community's local corridor context (for example, urban, suburban, rural) to determine the feasibility of an off-road trail facility, or to identify which on street bikeway type would be most appropriate for the specific corridor at hand.

In addition to off-road trails, the following list of on-street bicycle facility types provides a few suggested examples for implementing the Regional Bicycle Transportation Network and are listed in descending order of complexity:

- **Protected bikeways (sometimes known as "cycle tracks")**: Protected bikeways are on-road or off-road facilities that are physically separated from lanes of moving traffic. They can be designed as on- or off-road facilities and are often times separated from general traffic lanes with a vertical element such as a bollard or an elevated curb. There are one-way and two-way cycle track designs and in areas where on-street parking is allowed, they can be placed between the parking lane and sidewalk. Protected bikeways were initially developed in densely developed urban locations like commercial downtown districts in large cities, but have recently expanded to outside of downtowns and in suburban locations.
- **Buffered bicycle lanes**: Buffered bike lanes are conventional lanes that are combined with a buffer space designated with pavement markings that separate vehicle traffic from bike lane traffic. This treatment type may be appropriate for urban and suburban areas on streets with high traffic volumes, high speeds, and or high volumes of trucks or buses. Buffered bike lanes may also be appropriate along medium-to-high volume roads with lower speeds to provide greater separation and comfort for all cyclists.
- **Conventional bicycle lanes**: Bike lanes can facilitate a safer and more comfortable trip for cyclists by providing a dedicated space for on-street bicycle travel. These facilities are most often placed on the right-hand sides of the street (so they flow with traffic) between the general traffic lane and the curb or parking lane and are designated through pavement striping and markings and/or signage. These facilities are one of the more common treatment types in urban areas and are also suitable in suburban areas along medium or high-volume streets.
- **Bicycle Boulevards**: In urban and some suburban areas, bicycle boulevards may be an appropriate treatment to improve a designated regional bicycle corridor. Bike boulevards are low volume, lower speed roads that are designed to give cyclists priority over motorized vehicles. These facilities typically apply relatively low-cost treatments, such as signs and pavement markings, along with traffic speed and/or traffic volume management devices such as speed "bumps" or traffic "islands" at intersections. Bicycle boulevards can be especially effective in providing a more bicycle-friendly alternative to a parallel running, high volume, arterial street or highway.

- **Wide paved shoulders**: On some roadways, especially in the rural areas of the region, this may be the most feasible treatment. To make these facilities more prominent to cyclists and motorists, “Bike Route” or “Share the Road” signs and/or pavement markings may be added appropriately along the route.

Pedestrian and Bicycle Planning Resources

The following resources represent a set of practical guidelines and design concepts for state and local transportation agencies engaged in the planning, design and implementation of pedestrian and bicycle infrastructure. These resources include a range of urban, suburban, small town and rural planning perspectives and may be useful in identifying specific design treatments for individual communities.

- Minnesota’s Best Practices for Pedestrian/Bicycle Safety, MnDOT
- NACTO Urban Bikeway Design Guide, Second Edition, National Association of City Transportation Officials
- Bikeway Facility Design Manual, MnDOT
- Guide for the Development of Bicycle Facilities, American Association of State Highway and Transportation Officials (AASHTO)
- Separated Bike Lane Planning and Design Guide, Federal Highway Administration (FHWA)
- Essentials of Bike Parking, Association of Pedestrian and Bicycle Professionals
- Small Town and Rural Multimodal Networks, FHWA
- Pursuing Equity in Pedestrian and Bicycle Planning, FHWA
- Accessible Shared Streets: Notable Practices and Considerations for Accommodating Pedestrians with Vision Disabilities, FHWA
- Designing Walkable Urban Thoroughfares: A Context Sensitive Approach, Institute of Transportation Engineers (ITE)

The national Pedestrian and Bicycle Information Center (http://www.pedbikeinfo.org/) provides a Design Resource Index that helps locate information for different pedestrian and bicycle design treatments in these and other design manuals.

Investment Direction

Potential Funding Sources

Federal Funding Sources

With the 2015 federal legislation Fixing America’s Surface Transportation (FAST) Act, two federal transportation funding programs available to the region changed. The Surface Transportation Program is now the Surface Transportation Block Grant (STBG) Program. The previous Transportation Alternatives Program, which was a core source of funding for bicycle and pedestrian facilities in the region, is now the Surface Transportation Block Grant Set-aside Program. Bicycle and pedestrian facilities remain eligible for funding under the federal STBG Program and the region has a history of

funding larger bicycle facility projects using STBG funds. Congestion Mitigation Air Quality (CMAQ) funds are also eligible for bicycle and pedestrian projects that can demonstrate an air quality benefit, though the region has not traditionally used CMAQ funds for these purposes.

In the Twin Cities region, the Transportation Advisory Board (TAB) is responsible for allocating federal transportation funds available to the region through a biennial Regional Solicitation. As described in the Chapter 4, "Transportation Finance," the solicitation was evaluated and revised to ensure it is consistent with the outcomes and principles of Thrive MSP 2040, the Transportation Policy Plan, and the requirements of the FAST Act. The solicitation process allocates federal funds through three modal categories: roadways (including multimodal elements), transit and travel demand management projects, and bicycle and pedestrian facilities. Within the bicycle and pedestrian facilities category, there are three main project types: multiuse trails and bicycle facilities, pedestrian facilities, and Safe Routes to School infrastructure projects. Each solicitation will determine the amount of federal funds allocated within each modal category; however, it is assumed that at a minimum, the full amount of available STBG set-aside program funds will be allocated to bicycle and pedestrian facilities.

State and Local Funding Sources

MnDOT uses state highway funds to improve the trunk highway system with facilities for bicyclists and pedestrians. These investments are often made as part of larger highway pavement and bridge projects and may include trails and sidewalks parallel to the roadway or as part of a reconstructed bridge structure, as well as bike lanes in some urban corridors or wide paved shoulders in rural areas. See Chapter 5, "Highway Investment Direction and Plan," for more on anticipated future highway funding levels for bicycle and pedestrian improvements on the trunk highway system.

Regional trails identified by the Metropolitan Council in its Regional Parks Policy Plan are eligible for funding through the Metropolitan Council's regional parks capital improvement program (CIP). The parks CIP is funded with state bonds, Metropolitan Council bonds and Parks and Trails Legacy Fund appropriations. The state's Parks and Trails Legacy Fund represents a dedicated funding source for outdoor recreation, to be used for parks and trails of state or regional significance. Regionally significant trails in the metro area are those defined in the Regional Parks Policy Plan. The Metropolitan Council disburses state funds to partially finance the costs of operating and maintaining the regional parks system. Regional park implementing agencies also use their local funds for constructing, maintaining, and operating regional trails.

City, county, and park agency funds have been integral to supporting the development, maintenance, and preservation of local multi-use trail and bikeway systems. These funds typically derive from local property taxes for trail system improvements and from property assessments in the case of city street improvements. Like MnDOT, counties and cities may also use their roadway state aid revenues from the state gas tax to invest in bicycle and pedestrian facilities as part of roadway and bridge reconstruction projects on county and municipal state aid roads.

Regional Funding Needs

The local funds identified above make up the bulk of revenue supporting bicycle and pedestrian networks and will continue to be critical to the provision of pedestrian and bicycle infrastructure so that these local investments can effectively complement and round out the regional system. However, as a result of diminishing tax revenues and the increasing costs of ongoing maintenance (including winter snow removal to accommodate year-round use), preservation, and rehabilitation needs for bicycle and pedestrian facilities, there is a large shortfall of dollars available to fund existing system needs. Current revenues are also inadequate to fund new infrastructure needs including the vision for the Regional Bicycle Transportation Network and the local bikeways systems needed to supplement the regional network.

The Metropolitan Council recognizes that, as with other modes, there are significantly more needs for bicycle and pedestrian infrastructure than there are available funds. As shown in Table 8-5, between 2011 and 2018 there were more than $120 million in stand-alone bicycle, pedestrian and safe routes to school projects funded with federal transportation funds through the Regional Solicitation directed by the Transportation Advisory Board. However, only about 36% of total project requests were funded over the four, 2-year cycles during this period. On average, about 15.3% of the total regional funds available were allocated to bicycle and pedestrian funding categories per two-year regional solicitation cycle. This does not include, however, funds that were allocated to roadway and bridge projects that included bicycle and pedestrian facilities.

Table 7-5. Regional Solicitation Project Funding Summary, 2011 – ~~2016~~2018

Commented [ES5]: Updated w/2018 Reg. Solicit. values; 2016 values corrected to reflect final (not preliminary) figures.

Year	Funded (in $M)	Funds Requested (in $M)	% of Requests Funded	Total Fed. $$ to Region ($M)	% of Total to Bike/Ped
2011	$ 26.23	$ 74.95	35.0%	$ 177.89	14.7%
2014	$ 27.70	$ 63.33	43.7%	$ 189.50	14.6%
2016	$ ~~36~~35.22	$ ~~86.43~~85.48	41.~~9~~2%	$ ~~221.17~~223.00	~~16.4~~15.8%
2018	$31.20	$110.40	28.3%	$194.30	16.1%
Total	$ ~~90.15~~120.35	$ ~~224.70~~334.16	~~40.1~~36.0%	$ ~~588.56~~784.69	15.3%

As a result of a general shortage of funds to meet bicycle and pedestrian facility needs, any new state transportation funding package should include additional funding for bicycle and pedestrian infrastructure, on local and regional transportation networks.

Regional Solicitation

The Metropolitan Council, through its Transportation Advisory Board's Regional Solicitation process, makes specific categories of federal transportation funds available to local governments on a

competitive basis Local governments may apply for stand-alone bicycle and/or pedestrian facilities, or these facilities may be included as part of related roadway projects.

The Transportation Advisory Board solicits applications for federal funding for these improvements through three project categories: roadways including multimodal elements, transit and travel demand management projects, and bicycle and pedestrian facilities. Bicycle and pedestrian projects are generally funded from the Surface Transportation Block Grant Set-aside Program, but Surface Transportation Block Grants, or the Congestion Mitigation and Air Quality program funds can also be applied to bicycle and pedestrian projects.

The sections that follow list and describe the basis for the region's priorities for investment in bicycle and pedestrian infrastructure through the Regional Solicitation for federal transportation funds. Additional funding for bicycle and accessible pedestrian highway infrastructure through MnDOT is described in TPP Chapter 5, Highway Investment Direction and Plan.

Regional Bicycle Transportation Network

Projects proposed to enhance existing or complete new segments or connections of the RBTN will be given priority for federal transportation funding, provided that operations and maintenance commitments are made by the project applicant for the entire segment of proposed bikeway and any adjoining segments within the applicant's jurisdiction. The network is subdivided into two tiers for regional planning and investment prioritization:

- **Tier 1 RBTN Corridors and Alignments** (as previously shown in Figure 7-1) should be given the highest priority for transportation funding; these are the corridors and alignments determined through the Regional Bicycle System Study (2014) to provide the highest transportation function by connecting the most regional activity centers through the developed urban and suburban areas of the region.
- **Tier 2 RBTN Corridors and Alignments** (also shown in Figure 7-1) should be given the second highest priority for transportation investment. These corridors and alignments provide transportation connectivity to outlying regional destinations within and beyond the urban/suburban areas and serve to connect Tier 1 regional bicycle transportation corridors and alignments.

~~Major River Bicycle Barrier Crossings and Regional Barrier Crossing Improvement Areas~~

~~This new priority designation and new information should be considered as potential added criteria for the Regional Solicitation for federal transportation funds; and also considered for inclusion in local and state programs that fund transportation projects in the region.~~

Major River Bicycle Barrier Crossings

The previous TPP Update established this new regional designation for Major River Bicycle Barrier Crossings ~~and~~which has since been incorporated in the scoring criteria for the Regional Solicitation for

federal transportation funds. Because roadway and stand-alone bicycle/pedestrian bridges crossing the Mississippi, Minnesota and Saint Croix Rivers are relatively infrequent outside of the Minneapolis and Saint Paul downtowns and the University of Minnesota campus, and thereby provide limited access and great inconvenience for the much shorter bicycle trips compared to vehicles, all of the region's existing roadway bridges and existing or planned bicycle/pedestrian bridges are designated as Major River Bicycle Barrier Crossings. Projects to improve these designated major river crossings for bicycle users should also be considered for inclusion in local and state programs that fund transportation projects in the region.

Projects that add new or upgrade existing bicycle facilities on roadway bridges crossing the region's major rivers are considered to receive additional points in the Regional Solicitation. Projects applying for regional funds in the "Multi-Use Trails and Bicycle Facilities" category that construct new, or upgrade existing, stand-alone bicycle-pedestrian bridges crossing these major rivers, are also considered to receive a high priority for federal transportation funds within this category.

Regional Bicycle Barrier Crossing Improvement Areas

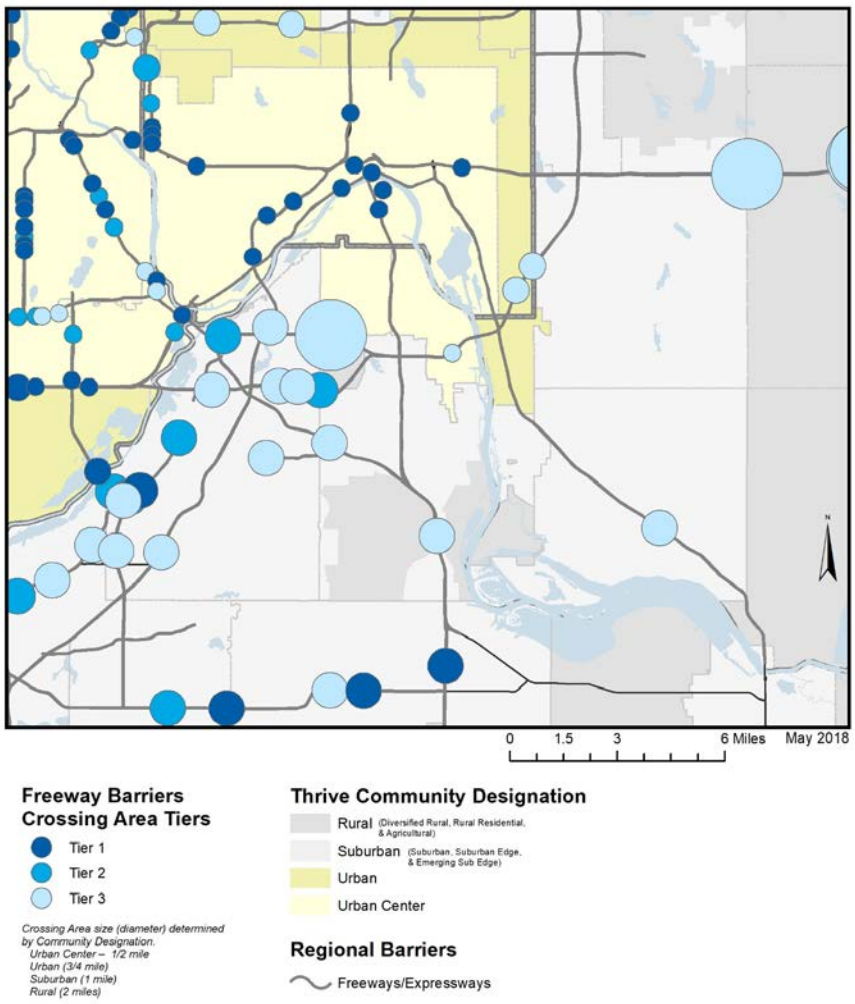
A set of regional bicycle barriers was determined through the Regional Bicycle Barriers Study as shown previously in Figure 7-3. These are the major physical barriers to bicycling that include freeways/expressways, rail corridors, and secondary rivers and streams. The study identified, and a subsequent study Technical Addendum updated, the series of tiered regional barrier crossing improvement areas shown as circles ~~in the sub-regional example shown~~ in Figures 7-4 and 7-5. The circle diameters in ~~this example~~these maps represent the prioritized barrier segments where future crossings may be developed; ~~and vary in length by aggregated Thrive community designation group. These improvement area circle diameters (i.e., barrier segments)~~they correspond to the preferred barrier crossing spacing distances previously shown in Table 7-4 ~~(under "Regional Bicycle Barriers Study")~~and vary in length by aggregated Thrive community designation group. An on-line, interactive version of these maps can be found here: (INSERT DIRECT LINK TO ON-LINE REGIONAL BICYCLE BARRIER CROSSING IMPROVEMENT AREA MAPS)

~~The full regional set of barrier crossing improvement areas will be revisited to ensure local planned crossings and existing conditions are best reflected within the initial analysis factors developed for the study. It is the Metropolitan Council's intention that these adjustments will be reviewed by a regional group of peer bicycle planning professionals and discussed with the Technical Advisory Committee and its subcommittees prior to the 2020 regional solicitation.~~

~~**Figure 7-4: Example of regional barrier crossing improvement areas for freeway/expressway barrier type.**~~**To be replaced with updated regional maps, reformatted from Figures 4 & 5 in Technical Addendum Update to RBBS completed in 2019.**

(Insert New) Figure 7-4: Regional Bicycle Barrier Crossing Improvement Areas: Freeways and Expressways

(Insert New) Figure 7-5: Regional Bicycle Barrier Crossing Improvement Areas: Railroads and Streams



~~Assuming these adjustments are implemented and acceptable to the region in time for the 2020 Regional Solicitation, the~~ The following information and guidelines ~~would apply~~have been incorporated in the 2020 Regional Solicitation:

- The bicycle barrier crossing improvement area circle diameters ~~(Figure 7-4)~~in Figures 7-4 and 7-5 represent barrier segments along which future barrier crossing improvement projects may receive additional points in the regional solicitation.

- Roadway and bridge ~~expansion~~ projects that add new or upgrade existing bicycle facilities on bridges or tunnels crossing these designated barrier segments, or that add or upgrade surface street level bicycle crossings of the barrier segments, should be considered to receive additional points in the regional scoring process for federal transportation funding.
- Projects applying for regional funds in the "Multi-Use Trails and Bicycle Facilities" category that construct new, or upgrade existing stand-alone bicycle-pedestrian bridges and tunnels crossing the designated barrier segments, or add a new bicycle facility or bike-specific safety improvement at an existing roadway crossing of a designated barrier segment, should be considered to receive a high priority for federal transportation funds within this category.

More information on the detailed analysis process for the Regional Bicycle Barriers Study and Technical Addendum Update can be found at (INSERT DIRECT LINK TO RBBS & TECH ADDENDUM WEB PAGE).~~metrocouncil.org~~.

Other Key Investment Factors for Pedestrian and Bicycle Projects

Opportunities for Pedestrian Improvements

Regional funding priority will be geared toward stand-alone pedestrian projects that are connected to transit service or regional job concentrations. These include:

- Along existing or potential high-frequency arterial bus routes in the urban core and suburban communities.
- Transit-oriented developments around existing or programmed transitway stations.
- Existing transit stations, transit centers, or frequent-service park-and-ride locations that are within a reasonable walking distance to residential development or activity centers, or metropolitan job concentrations like the downtowns and the University of Minnesota.
- Projects that are included as part of a community's Americans with Disabilities Act (ADA) transition plan and/or demonstrations of best practices in design for use by people of all ages and levels of mobility.
- Metropolitan, regional, and sub-regional job concentrations defined in Thrive MSP 2040.

Safety

Regional evaluation criteria will favor infrastructure projects that significantly improve safety for bicyclists and pedestrians while maintaining or enhancing the ease of bicycling or walking. Funding can also be provided to projects that do not improve network connectivity but significantly improve the safety of bicycling or walking (including users of all ages and levels of mobility) or that address an identified safety problem. An example of this type of project would be improvements to intersections that receive a high level of bicycle and/or pedestrian traffic but which were not originally designed with bicycle/pedestrian safety in mind.

Cost Effectiveness

Bicycle and pedestrian projects should be cost-effective to construct and to maintain. When determining the right solution for a safety or connectivity problem, local agencies should first consider methods that use existing right-of-way and infrastructure to improve the desirability of biking or walking before considering the construction of entirely new facilities that would require new right-of-way and/or increase operations and maintenance costs.

Continuity and Connections between Jurisdictions

Regional evaluation criteria should favor projects that improve continuity and/or connections between jurisdictions. This would include extending a specific bikeway facility treatment across jurisdictions to improve consistency and inherent bikeability and convenience for all cyclists. Creating more consistent, continuous and connected bikeways improves access between local and regional bicycle networks, as well as improving the overall bicycling experience.

Multimodal Projects

Roadway projects submitted for federal funding should include features that benefit all users of the transportation system including pedestrians and bicyclists (including users of all ages and levels of mobility) in addition to vehicular modes. Regional evaluation criteria should favor roadway projects that meet the needs of pedestrians and bicyclists with an emphasis on safety and barrier removal. In addition, evaluation criteria for stand-alone bicycle and pedestrian improvements should favor projects that support compact mixed-use transit-oriented development within employment centers and those that provide direct connections to high-service transit facilities.

Bicycle Connections to Transit

Regional evaluation criteria should favor local bicycle projects that connect to an existing or planned regional transitway or a bus transit stop or station location. These potential connections should be emphasized in the project development process in order that local opportunities to facilitate multimodal trips via bicycles and transit can be maximized.

Reconstruction of Existing Facilities

In addition to building new facilities for bicyclists and pedestrians, local jurisdictions are encouraged to apply for Regional Solicitation funds for reconstructing existing facilities where the project would improve the bikeway or pedestrian path to a quality level superior to that of the existing facility and where facilities have been properly maintained. Projects considered for federal funding should also have an approved plan for maintenance or a maintenance agreement to ensure that the facility remains in good repair and is passable.

CHAPTER 8
FREIGHT INVESTMENT DIRECTION

Overview

The movement of freight plays a critical role in supporting the region's economic competitiveness and quality of life, that allows the region to stand out as an important business and transportation hub. With a safe, efficient, reliable, and robust freight transportation system, the region's residents have access to the goods and materials they need to live and work. Without an effectively operational freight transportation system, businesses would not be able to distribute their goods to customers or receive shipments needed to manufacture products.

The growth of the Twin Cities region over the past 150 years has been tied to its function as a major shipping center. While the region does not carry a major share of through-moving freight on the national scale when compared to major shipping ports like Los Angeles, or rail hubs like Chicago, the Twin Cities region is the primary freight hub for Minnesota and the upper Midwest. The metro region is the major distribution center for goods produced and consumed in Minnesota, Wisconsin, North and South Dakota and eastern Montana.

As a freight hub, the Twin Cities region is at the center of many of the mobility and access issues affecting the freight transportation system in Minnesota. Because of this broad reach, the Metropolitan Council does not plan for freight within the region alone, but works closely with the Minnesota Department of Transportation (MnDOT) and other partners to ensure that the regional freight system continues to support a thriving and sustainable economy for the region and the entire state.

The Twin Cities region is fortunate to be served by five modes of freight transportation, each with its own role in moving goods into, out of, through and within the region. These modes include:

- **Trucks** carry freight on roadways, including long-haul trucks traveling through the region, to riverports and rail yards, direct truck service to distribution facilities and freight-generating industries such as manufacturers and processing plants, as well as deliveries to businesses and consumer households.
- **Railroads** move a variety of commodities, especially heavy bulk goods and containerized freight. The region's rail lines provide important local and regional connections that serve national markets and international trade through east and west coast ports.
- **Barges** provide water transportation over the inland river system and offer lower cost higher-volume shipping options than other modes, which is a particular advantage for transporting bulk freight over long distances. A number of key industries rely on the affordability provided by barge freight transportation.
- **Air** freight services allow regional companies to ship low-weight, high-value and time-sensitive goods to cities in the U.S. and around the world.

- **Pipelines** provide a less obvious, yet important mode for relatively safe and efficient transport of large quantities of fuel products. The metropolitan area has an extensive pipeline network to convey crude oil, refined oil and natural gas for consumption by the transportation, residential heating and manufacturing economic sectors.

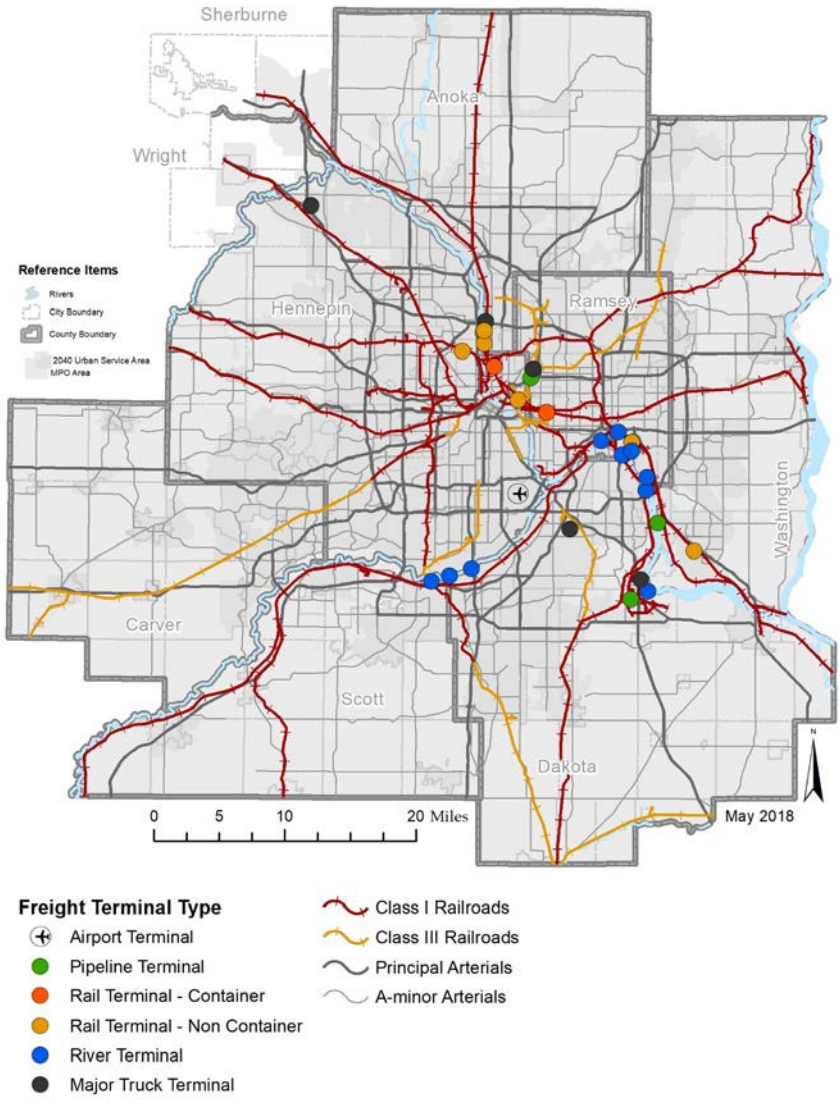
Other chapters of this long-range plan explain future public investments in infrastructure to support two of the five freight modes: highways and aviation. In addition, the 2016 Transportation System Performance Evaluation contains a more detailed discussion about freight movement in the region, as does "The Story of Freight in the Twin Cities."

Although the region's highways and airports are publicly owned, many freight-related improvements are the responsibility of private owners and operators of transportation modes and freight terminal facilities. Freight railroads are privately owned and each individual railroad makes its own plans for future infrastructure investments. The federal Army Corps of Engineers maintains and operates the Mississippi River Waterway system, including the Minnesota and St. Croix Rivers, and is responsible for maintaining and updating locks and dams, and for maintaining waterways through extensive channel dredging operations. The pipeline system is owned by private companies and is managed and regulated by the US Departments of Transportation and Energy through the Pipeline and Hazardous Materials Safety Administration and the Federal Energy Regulatory Commission, respectively.

Existing Metropolitan Freight System

A safe, efficient, high-capacity freight transportation system is essential to the economic well-being of the region and the state. Producers and consumers of freight rely on an effective and efficient transportation system to prosper. Although regional transportation planning primarily focuses on facilities for personal travel within the region, the region's freight system is inseparable from goods movement nationally and internationally. Like passengers, freight moves by multiple modes. Private entities own and operate many of these modes and freight terminal facilities. Public freight-related improvements are limited to those components of the transportation system operated and maintained by the public sector, such as highways and connecting roadways, navigable rivers, riverport terminals and airports. The overall metropolitan freight system is shown in Figure 8-1.

Figure 8-1: Metropolitan Freight System



The existing metropolitan freight system includes the following five modes of freight transportation.

Trucks on Highways

Within this region, freight continues to move primarily by truck and highways continue to be a critical element of the freight transportation system and the region's economic sustainability. Primary arterials (including interstate freeways) minor arterials (mostly consisting of county highways) and city streets support the movement of goods through and within the metropolitan region. Principal arterials also provide important connections to the other major economic centers of the state such as Duluth, Rochester, and St. Cloud. Interstate 94 provides an important freight link, connecting the Twin Cities to other metro areas in the Upper Midwest. The heaviest Minnesota-connected truck activity is along the I-94/I-90 corridor between Chicago and the Twin Cities. Other high-volume truck corridors include I-94 west to Fargo, North Dakota and I-35 between Duluth, Des Moines, Iowa and other locations to the south. The region's minor arterials are also important in providing "first and last mile" connections to freight-dependent businesses and industries.

Highway operations and maintenance are critical, especially snow removal to assure timely, all-weather, freight delivery. Rebuilding and replacing both bridges and pavement is very important for freight movement. Bridges having weight restrictions due to "poor "conditions can greatly affect trucks by adding a significant amount of time and fuel costs detouring to alternate crossings. The Minnesota Manufacturer's Perspective Studies identified deficiencies in pavement quality as a concern. Poor pavement can cause significant damage to cargo (such as precision instruments and high tech machinery) in addition to causing significant damage to trucks.

Barges on Waterways

Portions of the Mississippi and Minnesota rivers in the region are navigable by barge via channels and locks maintained by the U.S. Army Corps of Engineers. Barges carry bulk commodities such as grain, minerals, fertilizer, and aggregate to domestic and international markets. There are two major river ports in the Twin Cities metro region, the Port of Saint Paul on the Mississippi River and the Ports of Savage on the Minnesota River. In addition, there are multiple private barge terminals in Burnsville and between Saint Paul and Hastings on the Mississippi River. The St Anthony Falls Lock and Dam and the Minneapolis Upper Harbor were closed in 2015. Freight is hauled by barge more than 1,800 miles downriver from the Twin Cities to the Port of New Orleans where it is loaded onto ocean-going ships for export to global markets. Also, sand for fracture mining of natural gas and oil is being shipped by barge down the Mississippi and up the Ohio River to river terminals closer to Pennsylvania oil and gas fields. In 2015 the region had roughly 30 active freight terminals that collectively handled more than 9.2 million tons of barge-hauled freight.

Railroads

Early in the 20th century, rail system tracks were constructed to connect between a few large cities and mostly located outside of urban areas. With steady overall population and employment growth through the first half of the 20th century and then escalating in the 1960s and 70s, came the development and growth of suburban and rural communities along the rail corridors. Railroads then grew their systems to serve the growing communities along their lines. The railroad industry has continuously grown since

the 1980s, and rail lines continue to be an increasingly important component of the region's freight system, especially for bulk commodities and containers.

Today, four Class I railroads operate more than 500 miles of track in the metro region: the Burlington Northern Santa Fe, Canadian National, Canadian Pacific and Union Pacific railways. Class I railroads connect the region to major national markets and also carry a large amount of cross-country freight that moves through the region.

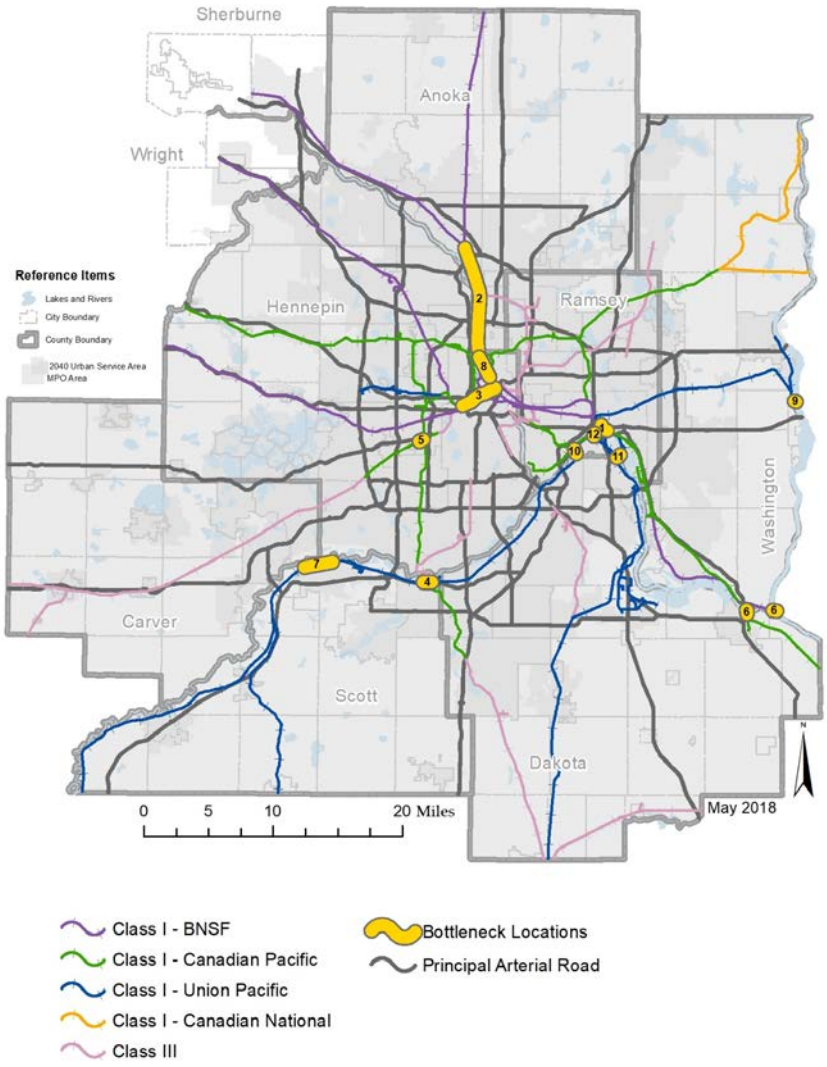
Four Class III (short line) railroads (Minnesota Prairie Line, Progressive Rail, Twin Cities & Western, and Minnesota Commercial Railroad) operate about 160 miles of track within the region. Class III lines carry out local freight transfers, generally within 100 miles of the core cities.

Since about 2010 an increasing number of trains traversing the region have been shipping sand from Wisconsin to be used in the fracture mining of oil in North Dakota, and shipping oil from North Dakota to Chicago and eastern U.S. destinations; however, the number of oil trains has dropped off some since new pipelines began transporting oil out of North Dakota in 2016. Oil trains are primarily using BNSF and Canadian Pacific rail lines, while sand utilizes these and other rail lines.

Rail traffic also includes intermodal container-based shipping which has substantially increased the efficiency of goods movement since the 1980s as containers can be moved between modes without the need to repack goods. Also, through partnerships with trucking carriers, railroads have created multimodal delivery networks that further the efficiencies of time-saving intermodal transfers. About 20 independently operated truck-rail transload/warehouse centers also support the intermodal distribution of freight in the metro area.

The region's two primary container intermodal terminals, the Canadian Pacific Shoreham Yard in northeast Minneapolis and the Burlington Northern Santa Fe Midway Hub in Saint Paul, are operating near capacity. The BNSF has acquired land in Washington County which could be used for potential expansion of their Twin Cities intermodal or specialized rail yard operations. Congestion occurs on several segments of the regional rail system as evidenced by the 12 rail bottlenecks in the region identified in MnDOT's *Statewide Freight and Passenger Rail Plan* and shown in lists in Figure 8-2.

Figure 8-2: Metro Rail System Bottlenecks



Metro Rail System Bottleneck Locations (as shown in Figure 8-2):

1. Hoffman Junction
2. Coon Creek Junction/3rd Mainline (BNSF)
3. Minneapolis Junction
4. Savage MN River bridge (TC&W)
5. St. Louis Park Interchange (CP)
6. Prescott, WI St. Croix River bridge (BNSF)
7. Shakopee track re-alignment (UP)
8. University Interlocking
9. Hudson, WI St. Croix River Bridge (UP)
10. Mendota Heights Mississippi River bridge (UP)
11. Pigs Eye Mississippi River Bridge (UP)
12. Robert Street Mississippi River Bridge (UP)

Hoffman Junction east of Union Depot is the most congested bottleneck in the metro area. That junction, where the mainline tracks of three major Class I railroads intersect, handles as much as 5% of the nation's freight rail operations during seasonal peaks (about 10,000 rail cars per day).

Air Freight

High-value, low-weight and time-sensitive goods are shipped via the air freight system, especially when moving over long distances. High-tech and biomedical companies in the region rely heavily on air freight service to make timely shipments of medical supplies to hospitals throughout the nation.

Minneapolis-St. Paul International Airport (MSP) handles air freight, not only for the Twin Cities metro area, but for most of Minnesota and adjacent areas in Wisconsin and North and South Dakota. Major air freight carriers include Federal Express, UPS and DHL, as well as commercial airlines. As the headquarters for the former Northwest Airways, MSP became a major regional hub in the 1960s, and today remains a significant passenger hub for Delta Airlines, which merged with Northwest Airlines in 2009, offering direct flights to many worldwide destinations. This has made it possible for the region to continue taking advantage of "belly freight" opportunities for shipping freight in the baggage compartments of passenger aircraft.

Goods shipped via passenger aircraft represent less than 20% of overall air freight tonnage moving through MSP; more than 80% is shipped through the three international air freight carriers.

Pipelines

Pipelines represent a major infrastructure network developed to efficiently transport fuel products to and within the Twin Cities metro area. While not readily apparent as a transportation mode (as all pipelines are buried underground), they significantly reduce the volume of trucks that would otherwise be required to haul fuel on the region's highways. Although not absent of some risks, pipelines are a relatively safe mode of transport as they are not exposed to the risks inherent in other surface modes with respect to intermodal transfers of flammable substances and the potential for on-the-ground, physical conflicts. Major pipelines in the region lead to the region's two petroleum refineries located in Saint Paul Park and Rosemount, and to the Magellan pipeline terminal in Roseville.

Freight Challenges and Opportunities

While the overview of this plan discusses general challenges and opportunities for transportation within the region, there are some challenges unique to the freight system.

Freight Capacity and Congestion

Economic and population growth in the metropolitan area continues to increase the amount of freight movement in the region. Deregulation of motor carriers and railroads have also added to the total amount of freight through increased competition and lowered shipping costs. Together, these forces will continue to increase the size of and need for an efficient freight transportation system.

All goods movement relies on a high-capacity freight transportation system. Freight shippers, carriers, and other users have expressed concern that the freight system is not adding capacity to meet growing freight needs in the region. Some freight modes are already hampered by an existing lack of capacity. In particular, truck movement in the region is impacted by recurring highway congestion, in addition to that caused by incidents such as weather and crashes. Trucks also contribute to peak hour congestion on regional highways, just by the nature of their size and slower acceleration capabilities. Freight motor carriers have taken steps to avoid driving in peak-congestion periods when possible, but the growing duration and extent of congested highways and local roads reduces the efficiency and competitiveness of the region's freight system.

Over the last decade, growth in fracture mining of the Bakken oil field in North Dakota and Montana has increased traffic on the east-west rail mainlines through the northern part of the country. In recent years, construction of new pipelines has reduced the need to transport oil by train, alleviating some of the rail congestion experienced between 2010 and 2016. Insufficient capacity of terminal facilities, restrictive or outdated bridges, limited track capacity, and a lack of options for alternative routes and interchanges have also contributed to rail congestion.

Connectivity

Freight connectivity is another issue in the region. Some major freight truck and intermodal terminals within the region have poor connections to major highways. Although the metropolitan highway system is designed for loads of 10-tons per axle, some of the rural areas within the seven-county region have an underdeveloped 10-ton road network. These roads are important for freight connections from farms and other businesses in rural areas in the region.

Exacerbating the connectivity issue is the steady growth of large semi trucks for expanded parcel and local delivery networks. Many minor arterials and collector streets in the urbanized area were designed for smaller delivery trucks, and newer traffic control strategies like roundabouts and curb bump-outs are not always designed with consideration for the turning radius needs of these larger trucks.

Freight Safety

Increased concern over safety affects the freight system. Trucking is a regulated industry with strict operating rules that improve safety for freight movement and motorists, but continued enforcement and

inspection of vehicles, a state responsibility, is critical to ensuring safe roads, bridges, and highways. Trucking companies develop and implement driver training and apply performance measures to monitor safety and compliance with regulations.

For railroads, safety is also a primary consideration. While the rail freight industry enjoys lower accident and fatality rates than the truck industry, rail accidents are high-profile events with serious liability concerns for the railroad and safety concerns for the public and railroad employees. Highly volatile Bakken crude oil moving in unit trains through the region has increased the possible risks in the last 8 to 10 years.

To improve rail safety, the Federal Railroad Administration has developed a National Rail Safety Action Plan. The plan identifies a number of possible actions for the nation's freight and passenger railroads to improve safety, including the implementation of grade-crossing improvements, application of in-vehicle safety devices, and strengthening railcars used in transporting hazardous materials. New technologies and careful routing will allow railroads to identify potential risk factors and make routing decisions that maximize rail safety.

Finally, adequate right-of-way adjacent to rail tracks is an important safety feature to provide a clear space in the event of a derailment or material spill. Encroachment on rail property by adjacent properties or other interests increases the risk of accident and injury.

Freight Security

Security is a major concern in freight transportation. Security includes the protection of goods and commodities as well as safeguards against potential threats of terrorism. Nationwide, initiatives to improve freight security have included electronic tracking of shipments, sealed freight containers, vehicle-tracking technologies, and inspection of vehicles at security-sensitive facilities and destinations.

Rail trespassing is a safety concern as well as a security concern. Rail bridges and corridors can be attractive (though illegal) shortcuts for pedestrians and cyclists, with sometimes fatal results. Nationally, over 500 people die each year in railroad trespassing-related incidents. In Minnesota, more people die from pedestrian/rail accidents than from vehicular/rail accidents. Unlike the policies in 48 other states, state and local law enforcement statutes in Minnesota do not support railroad policing of their own property to address this problem. Rail is also the mode of choice for many hazardous materials, including dangerous chemicals and nuclear material, and rail trespassers pose a security threat to these shipments.

Automated Trucks

The development of automated truck technology is moving very quickly as the size of the trucking industry makes it a lucrative target. Although there is much uncertainty as to when technical and regulatory hurdles will be overcome for any self-driving vehicles, widespread usage of self-driving trucks may occur even sooner than for automobiles. Logistics companies will quickly turn over their fleets to self-driving trucks if and when it becomes profitable to do so, whereas widespread use of

autonomous cars will depend on decisions of individual drivers who will factor in emotional, cultural, and personal financial considerations.

Self-driving trucks would have some advantages for the freight industry, as they could help reduce current and growing shortages of truck drivers and also their ability to remain in service for longer periods, rather than having to stop for federally-mandated, driver rest breaks. This may allow for freight to be delivered more efficiently, as well as make better use of the capital invested in trucks. Even before fully autonomous vehicles are available, the trucking industry is already making use of advanced technologies to improve safety; these applications include collision avoidance, speed governors, automatic vehicle location and automatic braking . Automated lane steering may be added within a few years. Another possible advantage of automated trucks is increasing the utilization of highways through auto-vehicle platooning that could improve operational capacity of some urban highway corridors.

It is likely that the first use of self-driving trucks will be on long haul trips through rural areas, especially on interstate freeways and other highways with lower traffic volumes and more controlled environments than city streets (for example, expressways with limited access points and few conflicts with non-motorized modes).

As experimental driverless truck platoons are being deployed and wider implementation of semi- and fully autonomous trucks is within reach, there are concerns from organized labor within the trucking industry regarding likely impacts to employment. Today there is a growing shortage of truck operators for long haul shipping, and a rapid deployment of the technology would create the short-term benefit of reducing, or even eliminating the shortage. There may always be a need for manned trucks to haul goods in dense urban areas where interactions and conflicts with other modes and users are great, and the current technology used in demonstration projects requires an operator in the lead truck of a multi-unit “road train.” In the longer term, however, many drivers could be displaced by automated technology. A potentially significant challenge in the adoption of automated trucks may be how to implement the technology at an acceptable pace that remains in balance with the current and projected supply of truck operators.

E-Commerce and Urban Freight Logistics

E-commerce, or the option of making consumer purchases through the internet, has been available since the mid-1990s, but has increased in recent years in overall volume and number of individuals participating. The global e-commerce market is projected to grow as much as 20% per year through 2025. This ongoing trend is affecting the efficiency of freight movements in urban areas due to the public’s high and continually growing demand for overnight or expedited home deliveries that minimize opportunities to receive, consolidate, and distribute parcels in fully-loaded trucks and delivery vehicles. This has often times resulted in increased traffic congestion in densely developed areas, and safety issues to other users like pedestrians and bicyclists, due to reduced sight lines for operators of large trucks navigating on streets designed for smaller vehicles. However, despite these impacts, the private market has begun to adapt with some innovative developments, including:

- Corporations purchasing fleets of small courier vans to provide “last mile” parcel deliveries from regional warehouses;
- Shipping to lockbox locations or parcel acceptance centers at neutral retail sites designated for customer pick-ups;
- Utilizing other transportation modes to deliver parcels locally, such as personal automobiles, cargo bicycles, and parcel porters.

Local governments can also adopt various operations, logistics, or technology strategies to improve urban freight mobility and reduce impacts to residents and businesses. These can include curbside management policies to designate and enforce freight loading zones, institutional policies such as encouraging or requiring deliveries during off-peak hours, newer applications of intelligent transportation systems, and policies to encourage or incentivize the use of green technologies. More detailed information is available in the “Primer for Improved Urban Freight Mobility and Delivery Operations, Logistics, and Technology Strategies,” USDOT, Federal Highway Administration, 2018.

Freight Terminals and Adjacent Land Use

The metro region has a variety of freight terminals located on rivers, in industrial centers with access to the freeway system, in proximity to railroad main lines, and at Minneapolis Saint Paul International Airport. Trucking terminals can be located in a wide variety of locations, as long as they have roadway connections, and are often specifically located in industrial areas to be near potential shippers and away from housing and other incompatible land uses. However, terminals for rail and barge freight modes are limited to locations which are adjacent to a navigable river or a rail line spur.

Over the last few decades there has been increasing competition for land adjacent to the Mississippi River system. Many industrial uses have been redeveloped into residential, non-industrial commercial, or park land as demand for industry adjacent to the river has declined over time. The Mississippi River Critical Area identifies an Urban Diversified district for the purpose of maintaining a diversity of uses, including barge transportation. However, some cities report that there has been pressure from regulators to constrain these historic and important industrial uses. The Metropolitan Council will continue to work with local units of government, the Minnesota Department of Natural Resources and park agencies to balance these various uses so that Mississippi and Minnesota river terminals may continue to handle the bulk commodities most cost-effectively transported by barge.

To address congestion, environmental impacts, and the region’s economic competitiveness, railroads remain a viable alternative for many of our freight transportation needs. One train can take over 400 trucks off the highway system, at one-fifth of the fuel use and one-third of the cost. However, the growth of intermodal rail/truck movement over the past three decades has also increased conflicts between rail intermodal container terminals and nearby residential neighborhoods. Cities and counties will need to continue working with MnDOT and the Metropolitan Council to ensure that adequate road access exists to accommodate trucks between these intermodal rail terminals and the region’s major highways and freeways. The Metropolitan Council will continue to work with cities by supporting best practices in

planning and development that minimize conflicts between these essential freight terminals and residential and commercial land uses.

River and Rail-Accessible Industrial Land

In 2017, the Metropolitan Council conducted an inventory of industrial and manufacturing zoned land throughout the region. As part of that effort, an assessment of rail-accessible and river-accessible industrial land was undertaken. The results of that assessment are shown in Table 8-1. These data will be tracked over time to identify regional trends in the availability of industrial land overall and of rail and river-accessible land for rail and barge-dependent facilities. As a continuation of that effort and to make the database available to public users, a Work Program item has been added in Chapter 14 to develop an on-line, interactive mapping tool to be known as the Industrial Land Atlas. This new tool will help economic development specialists and private sector planners to conveniently assess industrial land options and prioritize sites for future industrial development. In addition, the database and mapping tool may enable local agencies to better understand the region's supply of industrial land and to identify where such parcels may need to be preserved.

Table 8-1. 2016 Metro Industrial Acres by Access Type

Land Status	Acres Vacant	Acres in Use	Total Industrial
River Accessible Acres	17.7%	82.3%	3.5%
	375	1,739	2,113
Rail Accessible Acres	20.0%	80.0%	16.1%
	1,945	7,782	9,726
Other Industrial Acres	28.2%	71.8%	80.4%
	13,702	34,810	48,513
Total Industrial Acres	26.5%	73.5%	100%
	16,022	44,331	60,352

As Table 8-1 indicates, in 2016 there were more than 60,300 acres of industrial land across the seven-county region. Land accessible to the Mississippi River Waterway system makes up only about 3.5 % of all industrial land, and less than 400 acres of river-accessible land are undeveloped. There are more than 2,100 acres of river-accessible land with existing facilities taken into account. By comparison, there is a much greater amount of land that is or could be made rail accessible to a Class III railroad or an already existing Class I spur track (Class I railroads typically have not provided new and direct industrial access from rail mainlines) with more than 9,700 rail-accessible acres across the region. Of that total, nearly 2,000 acres (or 20%) are not in use and available for development. Considering all

industrial land, more than 16,000 acres, or roughly 26%, are potentially available for new development, based on Metropolitan Council parcel and land use data.

Freight Investment Direction

Truck Freight Investment Direction

Fixing America's Surface Transportation Act (FAST Act)

The FAST Act was signed into law by President Obama in late 2015 and was the first transportation bill to provide dedicated freight funding. It includes a $4.5 billion competitive grant program for nationally significant freight and highway projects, plus $6.3 billion in formula-based funds for fiscal years 2016-2020. Minnesota's share of these formula funds will be roughly $20 million per year over the five-year period.

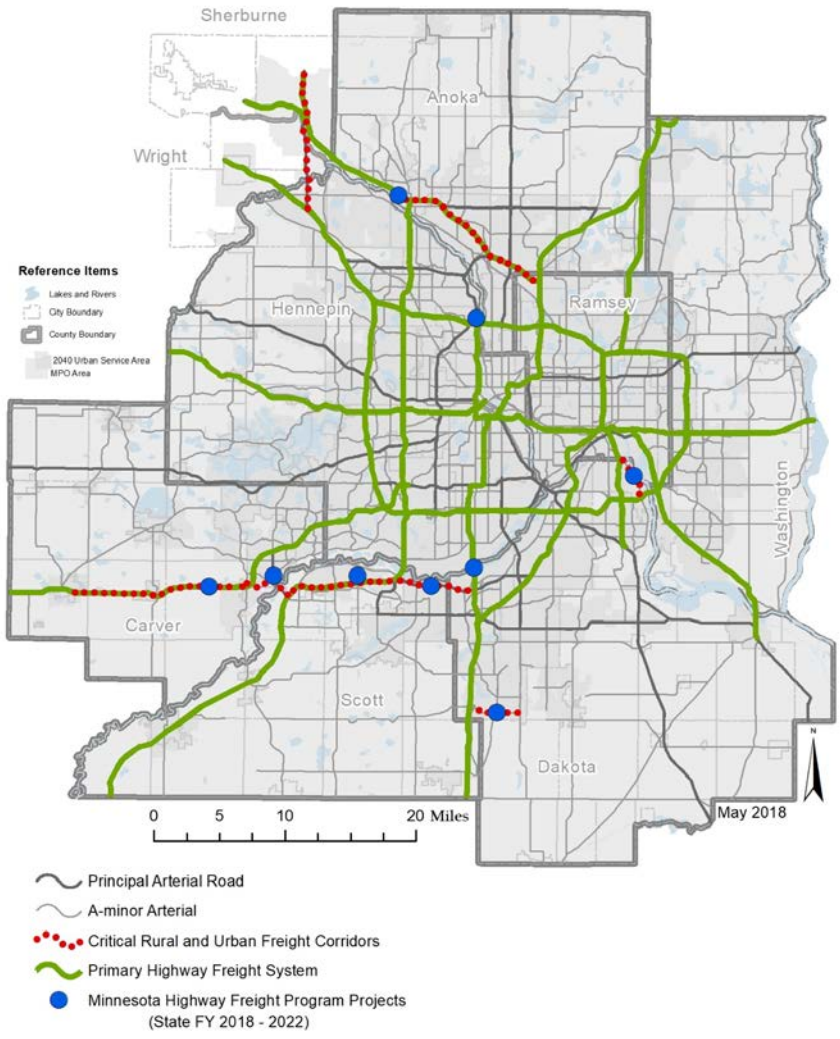
Minnesota's share of this new federal formula funding for freight has been allocated for construction of roadway projects through state fiscal year 2022. Additional information about FAST Act funding for freight projects can be found in the State Freight Investment Plan.

The FAST Act established a new National Highway Freight Network (NHFN) with programmed funds exclusive to improving this network. This NHFN incorporated all interstates not previously included on the Primary Freight Network created under the Moving Ahead for Progress in the 21st Century Act (MAP-21), plus intermodal connectors included on the National Highway System.

Critical Urban and Rural Freight Corridors

In addition to the interim National Highway Freight Network established by the Federal Highway Administration in the new FAST Act, MnDOT and the Metropolitan Council are responsible for identifying additional roadways to this network through the designation of critical urban and critical rural freight corridors. The law established mileage limits for each state when designating these corridors and Minnesota is limited to 75 urban miles and 150 rural miles, statewide. Due to these constraints, a freight investment advisory committee led by MnDOT, in partnership with Metropolitan Council, determined that proceeding with a solicitation of statewide projects for federal freight funds should be done ahead of designating specific corridors. This made it possible for actual demand for highway freight funds to be gauged, and corridors to be designated, in line with areas of greatest need. These corridors, which can be modified in response to changing needs, are identified in MnDOT's recently updated Statewide Freight System Plan as the Minnesota Highway Freight Program. The resulting freight projects selected for funding, and highway connections to the National Highway Freight Network that were also designated through this process as critical urban, and critical rural freight corridors, are shown in Figure 8-3 and Table 8-2 for the metro region. Specific freight project locations and dollar amounts funded through the Federal Highway Freight Program, can be found in Table 5-11 of Chapter 5, "Highway Investment Direction and Plan."

Figure 8-3. National Highway Freight Network in Twin Cities Region



Commented [ES1]: Revise Legend last line to read "Federal Highway Freight Program Projects"

Table 8-2. Critical Urban and Critical Rural Freight Corridors in Twin Cities Region

Critical Urban Freight Corridors

Agency	Highway	From	To	Length (Mi)
Carver County	County Road 61	MN 41	Co. Road 11	2.8
Dakota County	CSAH 70	I-35	Cedar Ave	4.0
MnDOT	MN 156	I-494	Annapolis St E	3.5
MnDOT	MN 13	I-35W	US-169	7.2
MnDOT	US 169	MN 13	MN 41	7.7
MnDOT	MN 41	US Hwy 169	Co. Road 61	2.2
MnDOT	US 10	I-35W near Mounds View Blvd.	0.5 mile west of Thurston Ave	14.2
MnDOT	MN 252	I-694	70th Ave N	0.7
MnDOT	MN 101	I-94 in Rogers	US 10/US 169	6.8
MnDOT	US 169	MN 101/US 10	Sherburne County Rd 33	3.5
Scott County	CSAH 83	4th Ave East	US 169	1.1

Critical Rural Freight Corridors

Agency	Highway	From	To	Length (Mi)
Carver County	County Road 11	County Road 61	US 212	0.2
MnDOT	US 212	County Road 11	Tacoma Ave	4.4
MnDOT	US 212	Tacoma Ave	Carver County Road 34	8.5

Total Mileage Critical Urban and Critical Rural Freight Corridors **66.7 Miles**

Regional Truck Highway Corridors Study

The efficient movement of freight is vital to the economic competitiveness of the Twin Cities metropolitan area, and truck highway corridors comprise a key component of the regional freight transportation system. A Regional Truck Highway Corridors study was completed in 2017 with guidance from a Technical Advisory Group consisting of staff from each of the seven counties, MnDOT, Minneapolis, Saint Paul, the City of Savage and Saint Paul Port Authority, as well as several suburban

city and private transportation industry representatives. The purpose of the study was to identify and prioritize the region's major highway corridors upon which the trucking industry most relies. The study evaluated the metro area's highway corridors across four primary factors: average annual truck volume, truck percentage of overall traffic, proximity to freight-related economic centers, and proximity to regional freight terminals. The principal and minor arterial highways analyzed were assigned to one of three priority tiers, using a data-driven scoring process. Table 8-3 shows the distribution of lane miles among the tiers and across highway functional class and Figure 8-4 is a map of regional truck freight corridors.

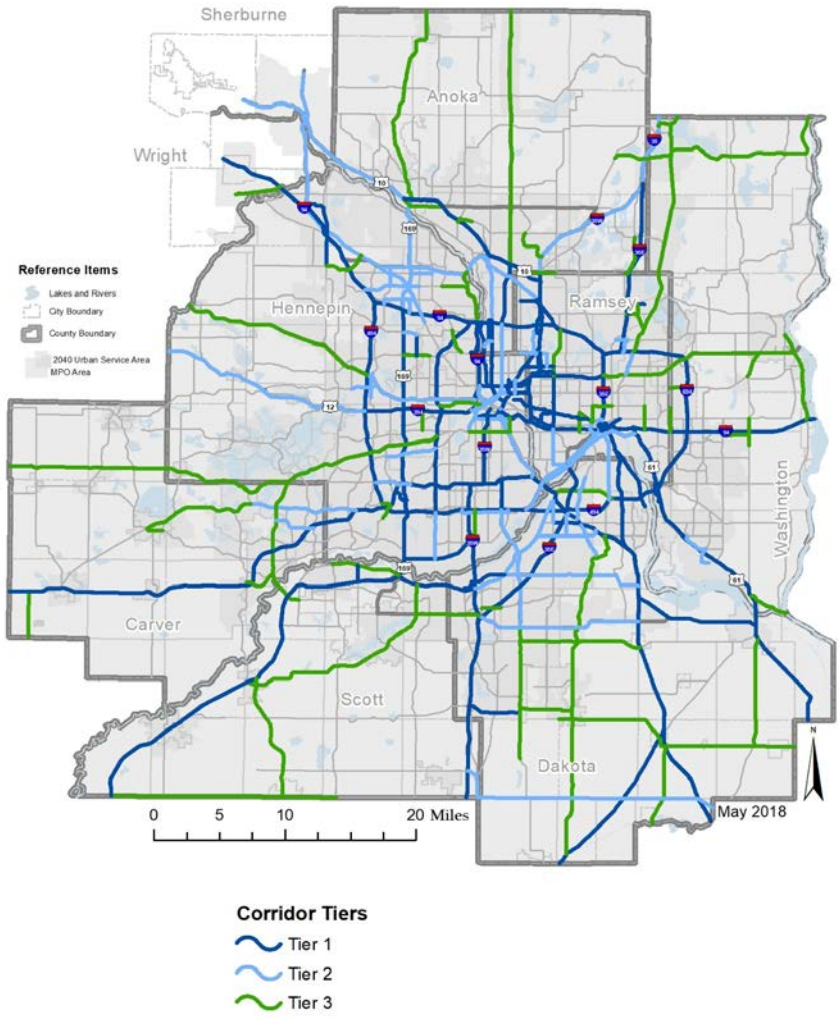
Table 8-3. Centerline Road Miles by Regional Truck Corridor Tier

	Interstate	Principal Arterial	Minor Arterial	Total
Tier One	211	227	108	546
Tier Two	18	111	166	295
Tier Three	0	95	290	385
TOTAL	229	433	564	1226

Nearly all (92%) of the interstate highway miles in the region are designated as Tier 1 truck corridors, which is consistent with their perceived importance to regional trucking overall. For non-interstate highways, there is a fairly equal distribution between principal (43%) and minor (57%) arterials, overall; principal arterials, designated for longer and higher-speed trips through the region, make up about two-thirds of the non-interstate mileage for Tier 1 truck corridors, while minor arterials, more closely associated with the last-mile connections to freight centers, make up two-thirds of the Tier 1/Tier 2 non-interstate truck corridor miles combined.

A follow-up study action from the Regional Truck Highway Corridors Study will be to develop a framework for collecting and reporting truck classification count data on regional truck freight corridors. This will be done in coordination between the Metropolitan Council, MnDOT and county transportation departments with the purpose of monitoring truck volumes and other metrics on these key highways for freight. This effort is outlined as a future study in the "Work Program" chapter.

Figure 8-4. Regional Truck Freight Corridors



Guidelines for Regional Investment

The Metropolitan Council, through its Transportation Advisory Board's regional solicitation process, makes specific categories of federal transportation funds available to MnDOT and local governments

for highway improvement programs on a competitive basis. This regional solicitation of federal funds occurs every two years. Final projects selected for this funding are added to the region's Transportation Improvement Program (TIP) for the next unprogrammed, two-year cycle (typically years 5 and 6 in relation to the current 4-year TIP). Many projects funded through different federal highway programs benefit the movement of freight to the extent that they improve overall highway safety, reduce congestion, or increase operational efficiency through transportation system management. Further specifics about these highway programs and the region's project-specific highway investment plan can be found in Chapter 5, "Highway Investment Direction and Plan."

As an output of the Regional Truck Highway Corridors Study, the Regional Truck Freight Corridors, previously shown in Figure 8-3, provide an additional context for evaluating projects submitted for regional solicitation funds and other state and federal freight funding programs. Regional Truck Freight corridors are designated as regional priorities and ~~should be considered as a possible new~~have been incorporated as an additional scoring criterion through the regional solicitation and other state and state-administered federal freight transportation programs. Proposed projects that address safety, congestion, or system efficiency on segments of a Regional Truck Freight Corridor ~~should be considered for receiving~~ may receive prioritization points in transportation funding programs. During the development of the 2020 Regional Solicitation, several agencies inquired about how changing local conditions that may affect the truck corridors study analysis factors, could be accounted for in future Regional Solicitations. In response, Council staff will develop a process whereby new data relating to the original analysis factors may be applied on a localized, case-by-case basis. An update to the study analysis tool to allow for such local adjustments will be completed in time to be applied in the 2022 Regional Solicitation and available for similar adjustments in subsequent Regional Solicitations.

Other Highway Funding Priorities that Benefit Freight

Chapter 5, "Highway Investment Direction and Plan," of this plan focuses limited financial resources in general funding categories. Investments in all of these areas will benefit truck movements on highways.

Operations and maintenance funding is critical, especially snow removal to ensure safe and timely, all-weather freight delivery. Rebuilding and replacing bridges and pavement is very important for freight movement. Bridges which have weight restrictions caused by their poor condition can greatly affect trucks, which may have to spend a significant amount of time and fuel costs detouring to alternative crossings. Recent freight research Interviews with businesses in western Minnesota through the Minnesota Manufacturer's Perspective Studies identified poor pavement quality as a concern for business operations. Deficient highway pavement can cause significant damage to cargo such as precision instruments and high tech machinery, in addition to damaging trucks.

Regional mobility improvements are also important for trucks. The implementation of traffic management technologies on highways, such as traveler information systems, incidence response programs, traffic signal operations and coordination, queue warning systems, and the dynamic rerouting of trucks along congested corridors, may reduce breakdowns in traffic flow. These in turn will benefit freight by maintaining reliability to meet delivery schedules and improving overall safety for trucks and other vehicles.

Implementing “spot mobility” improvements through MnDOT Congestion Management and Safety Program projects will potentially represent the most cost-effective options to relieve congestion. Some of these improvements, such as on-ramp/off-ramp extensions or collector-distributor lanes between freeway interchanges, can alleviate some of the specific congestion problems trucks can create for other vehicles when accelerating up to the same speed as general traffic.

Implementation of an expanded system of MnPASS lanes, such as those already developed along I-394, I-35W and I-35E, will provide benefits to local and regional freight moved by truck. MnPASS lanes can directly benefit shipments by single-unit commercial vehicles (dual-axle trucks weighing less than 26,000 pounds), vans and autos because those vehicles are allowed to pay to use these lanes otherwise reserved for transit and high-occupancy vehicles. This is especially beneficial to air freight companies such as Federal Express and UPS which transport freight for the biomedical, high-tech and other industries that rely on expedited deliveries of high-value, time-sensitive products.

The development of a MnPASS network may also benefit traditional freight movements by larger trucks because MnPASS lanes can free up capacity and increase traffic flow in adjacent general purpose lanes. By delaying the frequency and reducing the duration of breakdowns in general purpose lanes, the total hours of corridor congestion can be minimized, thereby improving conditions for moving freight.

Future Direction of Freight, Other Modes

Rail Freight

There has been a surge in rail traffic in and through the Twin Cities area in the last decade due to the development of the Bakken oil fields in North Dakota and eastern Montana. The Bakken area initially had very few pipelines but is served by the BNSF and CP Railroads, which enable oil to be shipped through the Twin Cities to Chicago and points east via rail. Westbound shipments to the Bakken area include sand used for hydraulic fracturing of the wells, much of which originates in Wisconsin and southeastern Minnesota and thus must travel through the Twin Cities to North Dakota. New pipeline construction involves a long process of design, permitting, and construction. While completion of some pipeline capacity in the last few years has diminished the number of oil trains, the oilfields are substantial enough to support many years of significant production growth as well as decades of continued production, so some demand for rail transport of oil is expected to continue. The railroads, especially the Burlington Northern Santa Fe, have made, and will continue to make, investments in the system to resolve delays caused by this significant commodity movement. These investments will also be critical to maintaining passenger rail movements to and within the Twin Cities so these delays will not impact Amtrak and Northstar passenger rail performance, as well as maintaining efficient freight rail performance for other goods.

This Bakken crude-by-rail flow has also caused an associated concern for community safety in the region. Bakken crude is a highly volatile material, classified by the U.S. Department of Transportation as a hazardous material requiring specialized testing, handling, and rail equipment regulated by the

Federal Railroad Administration (FRA) and the Pipeline and Hazardous Materials Safety Administration (PHMSA).

This has heightened the need for rail safety measures and inspections, better emergency response training for local fire and police departments, and a renewed emphasis for planning sufficient spatial separation of transportation and industrial corridors from residential and employment concentrations. In 2014 the state legislature funded two additional MnDOT rail inspectors to assure tracks in the state are maintained to safely handle oil trains. MnDOT also completed a study of which oil train rail/highway crossings should be given priority for safety improvements.

The most congested bottleneck in the metro area remains at Hoffman Junction, between Dayton's Bluff and Union Depot in downtown Saint Paul, where three class I railroads operate daily and must cross each other's mainline tracks to deliver freight to several nearby rail yards, while accommodating national freight movements through the Twin Cities. This junction handles up to 120 freight train movements daily (representing about 5% of the nation's freight rail traffic) in addition to two daily Amtrak passenger trains accessing Union Depot. This junction also directly serves the Saint Paul Port Authority terminals. Rail freight tonnage nationwide is forecast to grow about 24% by 2045, and this region could expect to see similar increases in rail freight transport.

In 2013, the Ramsey County Regional Railroad Authority completed the East Metro Rail Capacity Study. That study outlined a 20-year, phased framework for public and private investment in east metro rail corridors to handle the projected growth in freight and passenger rail traffic. In 2018, Ramsey County completed a follow-up study, the East Metro Yards Improvement Project, that focused on the rail lines and yards affected by congestion near Hoffman Junction. The study explored track capacity solutions such as rail-over-rail grade separations and/or additional tracks near rail yard entrances and mainline crossing points in the area.

A continuing trend regarding the region's freight rail system is the increasing competition between freight and passenger demands for rail service within the limited capacity constraints of established freight rail corridors. Future rail planning studies, similar to those done by Ramsey County, will be needed in other rail corridors before potential expansions of passenger rail service are implemented.

As a result of the state's long term vision for enhanced and expanded passenger rail service in corridors shared with freight rail operations, there is a need for long-term partnering between public agencies and the railroads to plan, fund and implement rail system improvements that will achieve public sector goals for passenger rail transportation while maintaining the ability of the private railroads to safely operate existing and future freight rail service.

Considering the potential growth in freight and passenger rail, communities with rail corridors should expect continued and potentially increasing railroad operations. In the event any rail line were to be abandoned, the Metropolitan Council will assist its partners in preserving linear rights-of-way for transportation purposes, if needed. However, about half of the railroad mileage that existed in the metro area in 1990 has since been abandoned and few excess or redundant lines remain in the system, so communities should expect few additional rail line abandonments.

Barges on Waterways

The region's river port terminals are currently concentrated in Saint Paul along both banks of the Mississippi river, and in the cities of Savage and Burnsville on the Minnesota River. Some are private terminals operating on privately owned land, while other terminals operate on public land leased from the Saint Paul Port Authority.

After closure of the Minneapolis Upper Harbor and St. Anthony locks in 2015, Saint Paul and the ports of Savage are the only remaining riverports in the area, making preservation of sufficient riverfront land for barge terminals increasingly important to the region. Saint Paul's port is expected to continue as the single largest barge traffic generator on the Mississippi River north of St. Louis. For the first time in 2013, the port handled more cargo inbound than outbound, reflecting growth and diversification in the commodities being carried by barge. The ports of Savage on the Minnesota River continue to provide an important intermodal operation for exporting agricultural products to other states and international markets, and to transport aggregate to local and regional construction markets.

Maintenance of the entire Mississipi River Waterway system, including dredging of channels and repairing and upgrading of the locks and dams, is dependent on federal funding appropriations to the US Army Corps of Engineers, that are outside of the state's and region's control.

Air Freight

The freight terminal area of Minneapolis-St. Paul International Airport was relocated and rebuilt during the last decade when construction of the new north-south runway displaced the previous freight area. The new area is conveniently accessed off of State Highway 77 at 66th street, and can also be reached via secured access onto the airport property near 34th Avenue and Post Road. The interchange at I-494 and 34th Avenue was rebuilt in 2013. Due to these relatively recent upgrades, there are currently no plans for future major investment in air freight facilities during the next 20 years, although there may be minor improvements for freight resulting from ongoing upgrades to the airfield and passenger facilities.

Pipelines

Maintenance and expansion of pipelines are the responsibility of the private oil and natural gas industries. The US Departments of Transportation and Energy have federal management and regulatory authority over interstate pipelines through the Pipeline and Hazardous Materials Safety Administration and the Federal Energy Regulatory Commission, respectively.

Other Freight Planning Activities

In 2017, MnDOT updated its Minnesota Statewide Freight System Plan (http://www.dot.state.mn.us/planning/freightplan/pdf/mn-statewide-freight-system-plan.pdf) that incorporates the National Highway Freight Network (NHFN) designated in the FAST Act with other Interstate highways within the state which are important to freight movement. The plan describes Minnesota's freight transportation system and its role in the state's economy, current and emerging

industry trends, the performance of the freight transportation system, and current and future issues and needs. The plan also provides a policy framework and strategies to guide future investments in Minnesota's freight system through a Freight Action Agenda for MnDOT and its partners. This "agenda" identifies key steps to advance strategies that will improve the efficiency, safety and reliability of the freight system that includes the newly designated Minnesota Freight Network. The statewide plan works in coordination with the Transportation Policy Plan by providing broad guidance, while allowing for informed decision making at the regional level.

Several other plans have influenced the development of this TPP freight chapter and provide more detail on the future of freight in the region. These include:

The *Minnesota State Freight Investment Plan* (MnDOT, November 2017), can be viewed via this link: https://www.dot.state.mn.us/planning/freightplan/pdf/freightinvestmentplan.pdf

The plan identifies freight investments within Minnesota resulting from new, freight-specific federal funding provided under the Fixing America's Surface Transportation Act of 2015. It was published as an amendment to the Statewide Freight System Plan adopted in 2015. The investment plan's purpose is to coordinate federal, state and local investments on the freight network for the 2018-2027 ten year plan horizon. The plan lists freight projects funded through the Minnesota Highways Freight Program for state fiscal years 2016 through 2022.

The *2015 State Rail Plan* (MnDOT), can be found here: http://www.dot.state.mn.us/planning/railplan/index.html

This rail plan was an update of the 2010 Minnesota Comprehensive Statewide Freight and Passenger Rail Plan) and provided additional guidance for rail initiatives and investments, including a vision for effective utilization of the rail network and its future development. It identified rail issues and bottlenecks in the region.

The *Statewide Multimodal Transportation Plan*, was updated by MnDOT in 2016, and encourages greater accessibility and more efficient movement of goods throughout the Twin Cities metropolitan area and Minnesota. The plan can be viewed here: http://www.dot.state.mn.us/minnesotago/SMTP.html

It aimed to improve freight operations and connections for better access to the transportation system and to define priority networks for all modes based on connectivity and accessibility.

In 2013, MnDOT completed the first-ever Minnesota *Statewide Ports and Waterways Plan* http://www.dot.state.mn.us/ofrw/waterways/pwp.html

The plan includes an overview and history of Minnesota's waterways, industry shipper profiles, and an inventory of facility conditions for metro region ports and locks, as well as for facilities throughout the state's Mississippi River navigable waterway.

The *Twin Cities Metropolitan Region Freight Initiative* http://www.dot.state.mn.us/ofrw/freight/metrofreightstudy.html was completed jointly by MnDOT

and the Metropolitan Council in 2012 and provides more details about freight planning in the region.

CHAPTER 9
AVIATION INVESTMENT DIRECTION AND PLAN

Introduction

Aviation connects the Twin Cities region to the rest of the nation and the world beyond. Although federal law does not require that a region's long-range transportation plan include an aviation element, state law defines aviation as a metropolitan system and requires the Metropolitan Council to prepare an aviation system plan.

Minnesota state law (473.145) directs the Metropolitan Council to prepare a metropolitan development guide that addresses "… the necessity for and location of airports…" More specifically, Minnesota Statutes 473.146, subd. 3.8 requires the Metropolitan Council to adopt a long-range comprehensive transportation policy Plan that includes "a long-range assessment of air transportation trends and factors that may affect airport development in the metropolitan area and policies and strategies that will ensure a comprehensive, coordinated, and timely investigation and evaluation of alternatives for airport development."

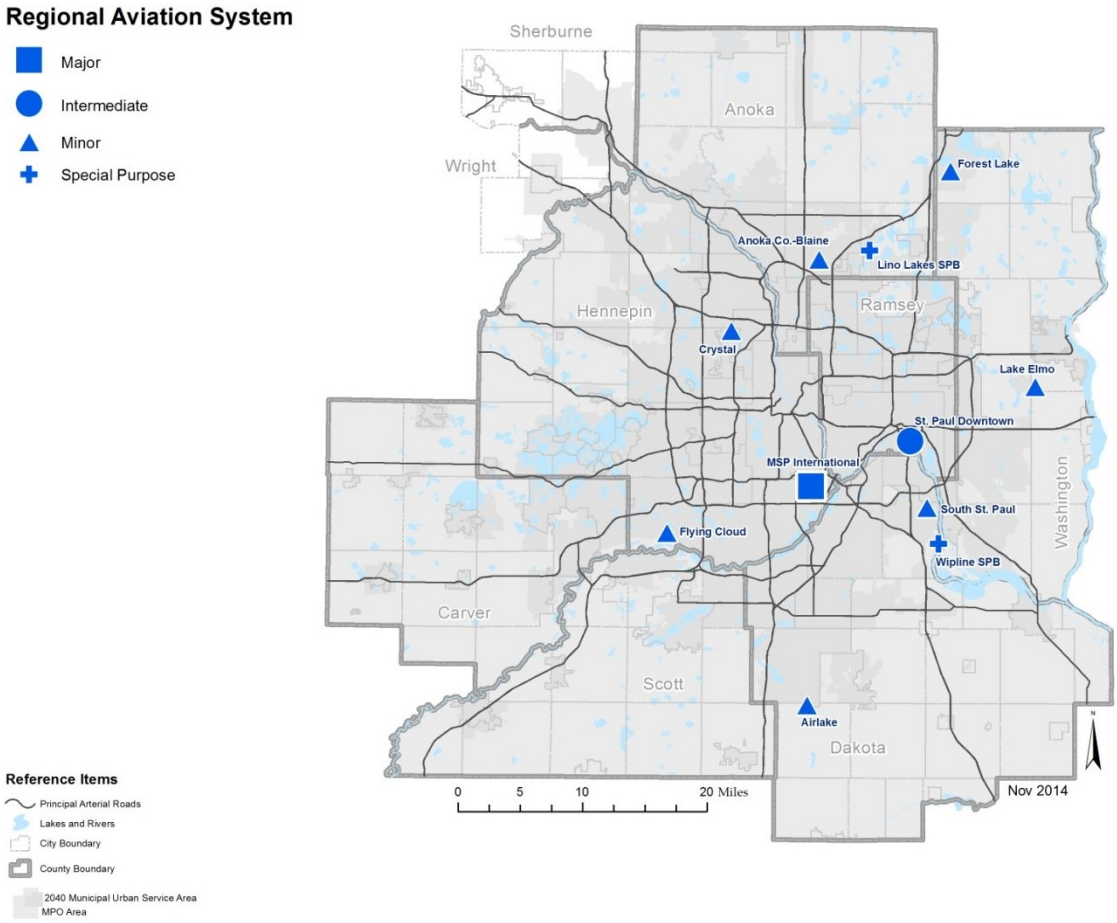
The Twin Cities Regional Aviation System is a well developed aviation system that requires continued protection, maintenance, and enhancements to support the Twin Cities economy and transportation infrastructure. The Twin Cities region is served by one major airport with commercial air service − Minneapolis-St. Paul International Airport − and eight reliever airports for general aviation, business and recreational users. Two seaplane bases are also parts of the system. The airports are classified according to their role within the regional aviation system as a major, intermediate, minor or special purpose facility. Most of the system airports are part of the National Plan of Integrated Airports (NPIAS), which makes them eligible for federal and state funding. However, state funding is not contingent on being in the NPIAS.

MSP International Airport, as a hub serving the Upper Midwest, handled over 37 million passengers, nearly 413,000 aircraft operations and approximately 207,000 metric tons of cargo in 2016. The relievers handled approximately 375,000 aircraft operations in 2016. The regional system of airports serves the metropolitan area well; long-term comprehensive plans for all of the individual airports are updated periodically to detail specific needs for preservation and expansion. These plans need to be consistent with system policies and plans, but they also inform future system planning.

The Existing Aviation System

Air transportation provides a national and global reach for the fast movement of people and time-sensitive freight, offering significant advantages for long-distance travel and transport. It differs from other metro systems since its users are primarily going to, or coming from, destinations outside the metropolitan area, rather than traveling within the region.

Figure 9-1: Regional Aviation System



Because of airports' unique role in interstate commerce, the federal government has significant influence on aviation. Airports are locally owned and sponsored but must meet federal development and operational certification. Air traffic control is a federally operated service provided in federally controlled airspace.

The federal budget impacts the local air-traffic-control tower system. The regional aviation system has both FAA-operated and contracted towers. The federal Air Traffic Control Towers (ATCT) are operated by the FAA and staffed with federal employees, and there are non-federal towers staffed by contract employees working for a management company approved by the FAA. STP, FCM, MIC and MSP are federal towers. Only ANE has a contract tower. In the upcoming years, there will more than likely be continued budget debates about the FAA reauthorization cycle, but bilateral support for the contract tower program was strong and it is anticipated that the program will again be fully funded.

Ground Access to the Aviation System

Accessibility, both by air and ground, is important for air transportation efficiency. Ground access to MSP is provided from State Highways 5 and 77, and I-494, and via two stations on the Blue Line LRT.

The interchange at I-494 and 34th Avenue was rebuilt in 2013 to improve roadway access to Terminal 2. Pedestrian and bicycle access is provided via 34th Avenue to Terminal 2, where bikers and pedestrians can also board free LRT service to access Terminal 1. Overall growth, at both the national and regional level, is expected to continue fueling future travel demand and increase current levels of both commercial airport and urban roadway congestion.

The regional system of reliever airports is geographically spaced throughout the area to conveniently serve urban development, population, and employment patterns and maximize economic benefits. Ground access to the reliever airports in the system is adequate at this time.

Roles and Responsibilities

Aviation roles and responsibilities vary between various levels of government. Federal, state, regional and local units include the Federal Aviation Administration (FAA) of the U.S. Department of Transportation (US DOT), MnDOT's Office of Aeronautics, the Metropolitan Council, Metropolitan Airports Commission (which owns most of the system airports) and other airport owners/operators, such as the Cities of South St. Paul and Forest Lake. The role of the federal government in aviation is especially worth noting, as it is significantly different from the federal role in other transportation modes like transit and highways, where it is primarily the funder of facilities owned and operated by others.

Federal Aviation Administration − a division of US DOT

- Provides design standards for all public airports developed with federal funds
- Prioritizes planning and investments funded under the Airport Improvement Program
- Regulates civil aviation activities within national airspace, including navigation and air traffic control
- Prepares national airports and airspace plans
- Licenses pilots
- Certifies aircraft
- Approves airport plans and environmental mitigation programs.
- Designs and administers regulations on aviation industries including unmanned aircraft systems (UASs).

MnDOT − Office of Aeronautics

- Plans and supports a statewide system of airports and navigational aids
- Registers aircraft and licenses airports and aviation businesses
- Constructs and operates airport system and infrastructure improvements including maintenance of ground-based navigation aids and weather observations systems
- Manages state and federal grants for construction, improvement, maintenance and operations of public airports
- Trains and educates pilots, airport personnel, aviation professionals and the public

- Provides financial resources and technical assistance to local units of government for compliance with state and federal laws/rules and coordination with the Federal Aviation Administration.

Metropolitan Council

- Prepares a guide for the orderly and economic development, private and public, of the Twin Cities area
- Prepares and maintains a regional aviation system plan
- Reviews MAC's airport, environmental and capital plans/programs
- Reviews community plans and public/private projects for compatibility with regional airports and aviation policies
- Provides coordination, funding and technical assistance for planning activities.

Metropolitan Airports Commission

- Promotes aviation
- Owns the major and most reliever airports in metro area
- Operates those airports on a day-to-day basis
- Prepares plans and implements projects for individual airports under its jurisdiction

The Metropolitan Airports Commission was established by the state to operate the region's airports in the 1940s, long before the establishment of the Metropolitan Council in 1967. Minn. Stat. Chapter 473 (https://www.revisor.mn.gov/statutes/?id=473) contain further detail on roles for both Metropolitan Council and Metropolitan Airports Commission.

Other airport owners/operators − South St. Paul owns and operates another reliever airport in the region. South St. Paul is a long-established municipal airport. Forest Lake Airport is not considered an FAA reliever airport, the facility was started as a private airport with turf runway, which has been paved since the last policy plan and is has been a public airport since 1998. Two private special-purpose airports (private seaplane bases) remain in the region.

Airport Classifications, System Role, and Function

All airports are subject to the rules of airspace sovereignty and federal government controls. airports in the metropolitan and state system are part of the National Plan of Integrated Airport Systems, and are classified according to their role and function in the particular system. The only public airport in the region that is not apart of NPAIS is Forest Lake airport. Forest Lake is working on being included in the NPAIS for the next transportation plan update. The role and function of an airport within the overall system is an important policy and technical step in the aviation planning process.

While a region typically has only one or two commercial service airports, a series of reliever airports geographically distributed around the region is needed to provide facilities that relieve demand for smaller planes to use the larger commercial airports. General aviation users are encouraged to use the

reliever airports, and facilities at those airports are intended to attract these users away from Minneapolis-Saint Paul International Airport.

Airports in the Twin Cities Regional Airport System are classified by a number of different methods. Table 9-1 summarizes the roles of the various airports in the region under each system.

- At a national level, many of these airports are classified in the FAA's National Plan of Integrated Airport Systems (NPIAS).
- Minnesota has a state level classification method, applied to all system airports in the state, as defined in Commissioner's Order Number 605, Order Amending the Airport System of the State of Minnesota, December 5, 2012. State plans usually include more airports than the national plan.
- The Metropolitan Council uses a separate system in this Regional Aviation System Plan to reflect metropolitan region airport considerations, and certain state laws reflect this regional classification terminology.

Table 9-1: Airport Classifications

Airport	Federal NPIAS	State	Regional
MSP International	Commercial Service - Primary	Key	Major
Saint Paul Downtown	National - Reliever	Key	Intermediate
Flying Cloud	National - Reliever	Key	Minor
Anoka County-Blaine	Regional - Reliever	Key	Minor
Crystal	Regional - Reliever	Intermediate	Minor
Lake Elmo	Regional - Reliever	Intermediate	Minor
Airlake	Regional - Reliever	Intermediate	Minor
South St. Paul	Regional - Reliever	Intermediate	Minor
Forest Lake	N/A	Intermediate	Minor

Source: Federal Aviation Administration, 2017, Met Council, 2016

Periodic re-evaluation is necessary to see if the system has the right type of airports, in locations providing the right type and level of services in a cost-effective and compatible manner.

The main driver of growth in general aviation, consists of the an expanding very light business jet sector, existing larger-scale corporate business aircraft fleet and increasing fractional ownership. Thus, plans and investments have gone forward at Saint Paul Downtown, Anoka County-Blaine, and Flying Cloud airports that upgrade capabilities for the business users. Continued emphasis on business jet aircraft at these minor/intermediate airports is recognized in the airport's designated role and investment needs.

In 2009 a regional aviation system technical report was completed that included aviation forecasts and a review of all categories, including a peer review of the role and number of reliever airports in this region against similar metropolitan areas. The analysis concluded that no changes are necessary to regional airport classifications or system roles. Table 9-2 summarizes the characteristics of the various airports in the regional system.

Table 9-2: Existing Functional and Operational Characteristics/Classification of Metro Region Airport System Facilities

	Functional Characteristics			Operational Characteristics		Compatibility Area
Facility Classification	**System Role**	**Users Accommodated**	**Air - Service Access Provided**	**Primary Runway Length**	**Instrumentation Capability**	**Compatibility Considerations**
Major Airport						
MSP International	Commercial Air Service Hub	Scheduled Passenger & Cargo, Charter, Air Taxi, Corporate, G.A., Military	International, National, Multi-State, Regional	8,001 - 12,000 ft, Paved	Precision	Airport Compatibility Area requirements for airport system functioning: • Regional Airspace Protection • Airport Airspace land use safety zoning • Land Use Guidelines for Aircraft Noise • Local Infrastructure and Services • Sewer Service • Water Service • Storm Water • Road Access • Police-Fire • Non-Aviation Uses
Intermediate Airport						
Saint Paul Downtown	Business Jet Reliever	Air Charter, Air Taxi, Business Jet , Military, G.A.	Intl., National, Multi-State, Regional	5,001 - 8,000 ft, Paved	Precision	
Minor Airport						
Anoka Co. -Blaine	Business Jet Reliever	Air Taxi, Business Jet	Nat'l./Multi-State	5,000 ft, Paved	Precision	
Flying Cloud	Business Jet Reliever	Air Taxi, Business Jet	Nat'l./Multi-State	5,000 ft, Paved	Precision	
Airlake	G.A. Reliever	Rec./Training/Business	Multi-State/State	4,098 ft, Paved	Precision	
South Saint Paul	G.A. Reliever	Rec./Training/Business	Multi-State/State	4,002 ft, Paved	Non-Precision	
Crystal	G.A. Reliever	Rec./Training/Business	Multi-State/State	3,263 ft, Paved	Non-Precision	
Lake Elmo	G.A. Reliever	Rec./Training/Business	Multi-State/State	2,850 ft, Paved	Non-Precision	
Forest Lake	Recreational/Business	Recreational/Training	State, Regional	2, 700 ft. Paved	Visual	
Special Purpose						
Surfside Seaplane Base	Recreational/ Business	Rec./Training/Per. Bus.	Multi-State/State	6,500 ft Water	Visual	Variable by Facility
Wipline Seaplane Base	Recreational/ Business	Training/Business	Nat'l/Multi-State	8,000 ft Water	Visual	
Hospital Heliports	Emergency Services	Business	State, Regional	Variable	Variable	

***Airport Compatibility Area is defined as a radius area 3 nautical miles and 6 nautical miles off the ends of the existing and planned runways of the nearest system airport; within 3 nautical miles it addresses general land use compatibility issues, and out to 6nm it also addresses sanitary landfills, and wind-generation facilities**

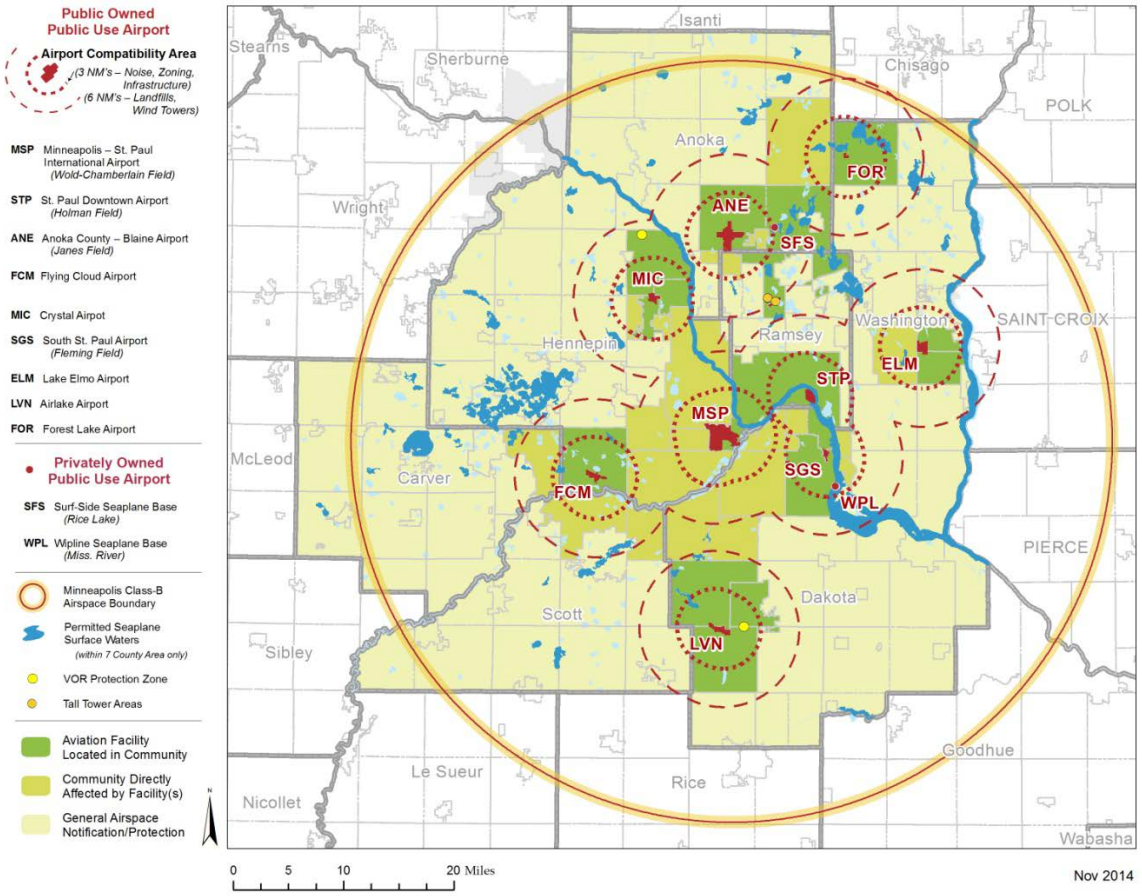
Source: Met Council, 2017.

Airport Service Areas

Accessibility, both by air and ground access to the airport, is important to efficient use of air transportation. While the region has only one major commercial airport, the regional system of minor airports reflects the region's geographic distribution of urban development, population and employment patterns to maximize economic benefits.

Thrive MSP 2040 provides forecasts for when and where growth is likely to occur, including type and density of development. The region is well served by a geographically dispersed pattern of long-established minor airports. Airport service areas have been identified for the major, intermediate and minor system airports, shown in Figure 9-2. These service areas are based upon a 3 nautical mile radius from the airport for noise, zoning and infrastructure land use compatibility. The 6 nautical mile radius is to prohibit new landfills, and wind tower. Based on Thrive forecasts, no new general aviation airports are proposed. Public airports in the collar counties would provide future capacity for growing areas on the edge of the seven-county region.

Figure 9-2: Airport Service Areas



Airport Capacity

Capacity of the regional aviation system is usually determined by several interrelated components: the airspace structure and facilities, airport airside facilities, airport landside facilities and aircraft mix.

Airside Capacity

Airside facilities include runways, taxiways, and aprons for the movement and parking of aircraft. The capacity of an airport's airside facilities usually refers to the number of gates and parking aprons at the major and intermediate airports, and the number of hangar spaces and transient apron/tie-down spaces at the other minor airports. Airside capacity is determined by various factors including prevailing wind, orientation of runways to the winds and to each other if multiple runways, number and type of taxiways, mix of aircraft using the airport, operational characteristics of the based aircraft, and weather conditions. The FAA has established a definition of general airport capacity called the annual service volume (ASV) that takes these variables into account for each particular airport. The ASV for a given airport is the annual level of aircraft operations that can be accommodated with minimal delay. For airports with operations below the ASV, delay is minimal, usually less than four minutes per operation. Delay levels above four minutes can result in rapidly increased congestion, operating costs and increased operational complexities.

In addition, Airport Cooperative Research Program (ACRP) Report 104: Defining and Measuring Aircraft Delay and Airport Capacity Thresholds provides guidance for understanding, selecting, calculating, and reporting measures of delay and capacity. The topics discussed include capacity thresholds. According to this report, the current standard metric for measuring delay at an airport is average delay per operation. Whereas average delay does not tell the whole story, there is general agreement that:

- Average delays below 5 minutes per operation are tolerable
- Average delays greater than 10 minutes are generally not acceptable
- Average delays over 20 minutes indicate the airport is experiencing very significant congestion issues to the point of not being able to operate due to gridlock

As a general rule of thumb, FAA recommends that planning for improvements begin when an airport is projected to reach 60% of ASV; when an airport's operations reach about 80% of ASV project programming and implementation should be initiated. Airside development capacity additions are likely to come from a combination of runway improvements, air-traffic management procedures/equipment and aircraft on-board technology improvements under the FAA NextGen airport capacity program.

Current long-term comprehensive plans for the reliever airports indicate airside capacity in those airports is adequate.

Landside Capacity

While the annual airside capacity at the region's airports is generally adequate, landside issues involve the needs for more hangar building areas and services. .

Landside capacity at most of the system's general aviation airports is defined by the availability of aircraft storage hangars. Hangar storage is necessary because of security concerns, aircraft ownership/operational requirements, and effects of the Minnesota seasons. The most current estimates of existing hangar spaces and percent of capacity utilized are presented in Table 9-3. Existing hangar spaces are generally adequate and with current economic conditions, additional space is available, especially in T-hangars. Future hangar capacity conditions have been improved with development of new building areas at Anoka County-Blaine, Flying Cloud, and South Saint Paul Airports. Provision for additional building area development has been included in the long-term comprehensive plan for Airlake airport, with some possibility of building area redevelopment at Crystal airport. Hangars are usually privately owned and maintained on land leased from the airport operators, so provision of adequate space for hangars is an airport responsibility, while maintenance of the hangars themselves is not an airport responsibility.

Table 9-3: Estimated Utilization of General Aviation Landside Capacity

Airport	Hangar Spaces	Based Aircraft*	Percent of Capacity
MSP International	29	29	66%
Anoka Co. - Blaine	510	389	76%
Crystal	356	164	46%
Flying Cloud	508	361	71%
South Saint Paul	261	261	100%
Forest Lake	22	26	100+%
Saint Paul Downtown	159	82	52%
Airlake	160	139	100+%
Lake Elmo	257	194	69%

Sources: MAC Long Term Comprehensive Plans

Hangar Spaces - Current LTCPs

Based Aircraft – 2016 Based Aircraft (MnDOT registration records)

Note: Based aircraft data excludes military at MSP and Downtown Saint Paul Airport

Maintaining the airport system infrastructure will be a continuing challenge for the region. Impacts and opportunities at individual airports have been assessed in updates of each airport's long-term comprehensive plan through 2050. Growth in flight activity for general aviation is essentially flat as depicted in Table 9-4, but growth is projected to continue for commercial activity through 2040.

Table 9-4: Summary of Regional System Based Aircraft and Forecasted 2040 Activity

Activity	2016	2020	2030	2040	Average Annual Growth
Total G.A. Based Aircraft	1,348	1,412	1,411	1,478	0.4%
Total G.A. Operations	344,745	355,047	367,975	411,670	-0.40%
MSP Enplaned Passengers	18,160,752	19,300,000	23,794,889	30,407,834	2.2%
MSP Aircraft Operations	412,898	427,270	477,762	547,224	1.2%

Sources: MAC, 2016

Total GA Based Aircraft –MnDOT and MAC Records for 2016; HNTB 2015 Reliever Airports Activity Forecasts - Technical Report for forecast years

Total GA Operations – FAA and MAC records for 2016; HNTB 2015 Reliever Airports Activity Forecasts - Technical Report for MIC, LVN, 21D, FCM, ANE forecast years; FAA 2016 TAF for forecast years; MAC forecasts for MSP

MSP Enplaned Passengers – MAC records for 2016; MAC forecasts

MSP Aircraft Operations – FAA records for 2016; MAC forecasts

Long Term Comprehensive Plans

Airport sponsors are required to prepare a 20-year long-term comprehensive plan (LTCP) for each airport in the system. The LTCP is intended to integrate all information pertinent to planning, developing and operating an airport in a manner that reflects its system role and compatibility with its environs. The details on scope and emphasis of a long-term comprehensive airport plan should reflect the airport's system role and the objectives for each plan content category. Full requirements for an LTCP are described in Appendix K.

Plans should be reassessed every five years and updated according to Table 9-5. The reassessment involves reviewing the new forecasts against prior forecasts and actual airport activity, checking the progress of implementation efforts (for example, individual project planning, environmental evaluations, and capital program), and identifying any other issues or changes that may warrant continued monitoring, interim action or establish a need for a plan update. The LTCP does not replace any other planning or reporting requirements of another governmental unit.

If a change to the plan cannot be accommodated during its scheduled update, the LTCP, or parts of it, should be amended. Airlake, Crystal and Lake Elmo Airports long term comprehensive plans have been completed, recently. The other airports are on schedule to be completed with an updated LTCP by 2020. An amendment should be prepared and reviewed by the Metropolitan Council prior to project inclusion in the corresponding year's capital improvement program.

Table 9-5: Update Schedule for Long-Term Comprehensive Plans

Metro Area Public Use Airports	Plan Status	Next Update
Minneapolis-Saint Paul Int'l.	2030 LTCP Approved June 2010	2020
Saint Paul Downtown	2030 LTCP Approved April 2010	2018
Anoka County-Blaine	2030 LTCP Approved April 2010	2018
Flying Cloud	2030 LTCP Approved April 2010	2018
Airlake	2035 LTCP Currently in the review process	2023
Crystal	2035 LTCP Approved September 2017	2022
Lake Elmo	2035 LTCP Approved August 2016	2021
South Saint Paul Municipal	Community CPU Approved 2009	2019
Forest Lake Municipal	Community CPU Approved 2009	2018
Lino Lakes Seaplane Base	Community CPU Approved 2009	2018
Wipline Seaplane Base	Community CPU Approved 2009	2018

Environmental Compatibility

The planning, development and operation of the region's aviation facilities should be conducted to minimize impacts upon the cultural and natural environment, regional systems and airport communities. Airport sponsors should have a surface water management plan, which is consistent with plans of the applicable watershed management organizations and the state wetland regulations. Airport sponsors should also protect groundwater quality, and should identify the location, design and age of individual/group/central sewer systems on-site and all well location sites. The airport sponsors should also provide sanitary sewer to system airports when such service is available. All airports in the system, except Airlake and Lake Elmo, are within the MUSA and currently have sewer service.

In areas around an airport, or other system facilities, land uses should be compatible with the role and function of the facility.

One preventative measure that communities should use in promoting compatible land use is to create an airport zoning ordinance. An airport zoning ordinance protects a community's investment in the airport by limiting structural hazards that could be a hazard to air navigation. An airport zoning ordinance also protects people and property in the vicinity of the airport by acting as a buffer between the airports and other lands uses. MnDOT's Office of Aeronautics is currently reviewing the statutes and rules relating to airport zoning ordinances from a state system perspective to ensure an appropriate balance of public safety and airport compatible development opportunities near and around airports.

As noted in state statutes and in the Appendices, the ability to enact an airport zoning ordinance, an airport sponsor typically invites nearby communities to participate in a Joint Airport Zoning Board (JAZB). These boards work in a collaborative fashion to accommodate both community and airport needs in the zoning process. Further information on JAZB's and the zoning process can be found in Appendix L.

Airport noise programs, and the application of land use compatibility guidelines for aircraft noise, are developed within the context of both local community comprehensive plans and individual airport long-term comprehensive plans (LTCPs). Both the airport and community plans should be structured around an overall scheme of preventive and corrective measures. Appendix L discusses, in greater detail, the current land use measures and status of the noise compatibility program. For additional noise related information, refer to the individual airport LTCP for noise modeling and operational documentation, the Metropolitan Council's Local Planning Handbook for communities and the Builder's Guide for acoustic requirements concerning construction of new single-family detached housing in noise policy areas.

Aviation Investment Plan

For airports in the regional aviation system to meet their facility and service objectives, performance and function, continued investment in system airports will be needed over the 20-year planning period. This section gives an overview of the airport facility, airport issues and planned investments for each regional system airport as found in the long-term comprehensive plans. In addition, it is important to understand the funding process and sources available to airports to implement recommendations and airport capital improvement programs, even though the aviation investments reflected in this plan are not required by federal law to be fiscally constrained.

On an annual basis, the Metropolitan Council reviews the MAC capital improvement plan (CIP) for consistency with regional systems and policy. This review also provides oversight of the improvement program, and the Metropolitan Council approves specific projects that meet dollar thresholds. The review process for the capital improvement plan is defined in Appendix J.

Aviation Funding Sources

Historically, federal, state, and local funding sources all contribute to the support of airports in the Twin Cities Regional Aviation System. Because of changes in both the general aviation and the commercial aviation industries, levels of federal and state funding that historically have been available for airport development are shrinking. Maintaining historic levels of funding is vital to the airports that support the economy of the metropolitan region.

Federal

The FAA operates the Airport Improvement Program, which provides grants to public agencies, and in some cases to private owners and entities, for the planning and development of public-use airports that are included in the National Plan of Integrated Airport System (NPIAS). For MSP International Airport, the grant covers 75% of eligible costs (or 80% for noise program implementation). For all other airports

in the regional system, the grant covers a range of 90% to 95% of eligible costs, based on statutory requirements.

The Airport Improvement Program was established by the Airport and Airway Improvement Act of 1982. Funding for this program is generated from a tax on airline tickets, freight way bills, international departure fees, general aviation fuel, and aviation jet fuel. The FAA uses these funds to provide 95% funding at eligible airports for eligible items under the grant program.

Under the program, funds must be spent on FAA-eligible projects as defined in FAA Order 5100.38, "Airport Improvement Program (AIP) Handbook." In general, the handbook states that:

- An airport must be in the currently approved National Plan of Integrated Airport Systems (NPIAS).
- With the exception of the two Special Purpose Airports and Forest Lake Airport, all of the Twin Cities metro system airports qualify as NPIAS airports and are eligible for AIP funding
- Most public-use airport improvements such as General Aviation terminal buildings, T-hangars, and corporate hangars and other private-use facilities are eligible for 90% federal funding, in certain circumstances

In addition, revenue-producing items typically are not generally eligible for federal funding, and all eligible projects must be depicted on a FAA-approved Airport Layout Plan. Other sources of FAA funding include Facilities and Equipment (F&E) funding for facilities such as air traffic control towers and some runway instrumentation. This funding is separate from the Airport Improvement Program and typically requires no local match. Federal noise funds (Part 150 funds) may also be available for noise mitigation with an 80% federal and a 20% state and/or local share.

In 2001, a non-primary entitlement program was authorized. This program provided up to $150,000 in FAA grant funds each year to general aviation airports that were listed in the NPIAS and were not a primary airport providing airline service for passengers. Under this program, the FAA pays 90-95% of all engineering, inspection, testing, land acquisition, administrative, and construction costs for projects that are eligible. The sponsor or state pays a local 5% match, the state may pay half of the local match, but will neve pay the entire amount. When this program was last renewed, certain revenue-producing items of work, like T-hangars and fuel facilities, could be funded by this program once all safety-related improvements had been completed. This program is not just for safety projects. According to the law, the FAA must determine if the sponsor has made adequate provision for funding the airport's airside needs before a grant can be issued for the construction of an allowable revenue-producing facility.

State

Minnesota's state-funded aeronautics system consists of 135 airports throughout the state. By law, revenues from aviation fuel, aircraft registration, and airline flight property are dedicated to the state airports fund, which is the primary state funding source for aeronautics. Money in the fund is appropriated biennially to MnDOT as part of the transportation budget.

Although the airport sponsor is responsible for project design and construction management, many project-related costs, including consultant services, are eligible for state and/or federal aid as described below.

- **Airport Construction Grant Program**: The State Construction Grant Program funds most capital improvements at state system airports based on a determination that the improvement is a justifiable benefit to the air-traveling public. Airports that are in the NPIAS are eligible for federal funding. Traditionally, state funding participation at NPIAS airports is 80% of eligible costs. State funding at non-NPIAS airports is 90% of eligible costs. Projects that have revenue-generating potential are funded at 80% and 90% at NPIAS and non-NPIAS, respectively. However, these rates do change from year to year, the latest rate changes can be found here: http://www.dot.state.mn.us/aero/airportdevelopment/fundingandgrants.html. This program also funds airport maintenance equipment at a two-third state/ one-third local participation rate.
- **Airport Maintenance and Operation Program**: The State Airport Maintenance and Operation Grant Program provides two-third state reimbursement to the state system airports for their documented, routine maintenance expenses up to a certain ceiling amount that is categorized by airport infrastructure.
- **Hangar Loan Revolving Account Program**: The State Hangar Loan Revolving Account Program provides an 80% interest-free loan to state system airports for building new hangars. The loans are paid back in equal monthly installments over 20 years. Payment receipts, as they become available, are then loaned out again to other airports needing hangars.

Local and Sponsor Funding

Local and sponsor funding is used to make up the balance of the grant-eligible project costs after FAA and MnDOT participation. Sponsor funds are generated by the airport from fuel sales, lease fees, and similar incomes, or from the local governing body. Sources of sponsor funding largely depend upon which of three types an airport is.

- **Municipal Airports** – These airports are owned by counties, cities, or other local municipalities. Sponsor funding includes the sources of revenue from the airport (fuel sales, rents, etc.) as well as any funding external to the airport that the municipality chooses to provide, such as municipal bond revenues and municipal taxes. Municipal airports in the Twin Cities airport system are Forest Lake and South Saint Paul.
- **Private Airports** – These airports can fund projects from their revenue streams (for example, fuel sales, rents). The owners may also be a source of funding, although this typically is more limited. Surfside and Wipline Seaplane Bases are examples of private airports.
- **Metropolitan Airports Commission (MAC)** – Airports owned by the MAC can be funded by revenues generated at any of the MAC-owned airports. This cross-funding helps airports adequately support the system by funding the facilities they need to perform their mission. However, in recent years, MAC philosophy has shifted toward a more self-sufficient system

for the reliever airports. The MAC also has the authority to issue bonds to support the funding of airport projects.

Other Funding

A potential source of funds for airport improvements is from private investors. Private investors may construct needed facilities as part of a lease agreement with the airport that will allow time to amortize their investments. This type of funding is particularly suitable for corporate hangar development and other privately owned projects. These types of projects are not eligible for FAA or state funding. However, this funding source does allow non-municipal sponsors/investors to leverage funding capabilities not available to the airport. This source of funding was recently used for an Fixed Base Operator building at Anoka County Blaine airport.

The combination of these funding sources allow the airports in this mature regional airport system to maintain and, when justified, enhance their facilities to serve their customer's needs and allow them to be as financially self sufficient as possible.

Planned Investments

Minneapolis-St. Paul International Airport

Based on existing conditions and the capacity demands placed on the facility as passenger numbers grow, development activities are needed that focus enhancing the arrival curb, passenger processing facilities, parking and international arrival facilities at Terminal 1, and gate capacity at Terminal 2 to accommodate existing seasonal demand and new carrier entrants at MSP International Airport. In general, the terminal environment at MSP International Airport will also need enhancement in the form of gates, ticket counters, passenger check-in areas, security screening checkpoints, and baggage claim areas.

Environmental analyses associated with the MSP International Airport 2020 improvements were conducted in compliance with both the National Environmental Policy Act (NEPA) and the Minnesota Environmental Policy Act (MEPA). Guidance was provided by the FAA's policies and procedures for considering environmental impacts: FAA Order 5050.4B, "NEPA Implementing Instructions for Airport Actions" and FAA Order 1050.1E, "Environmental Impacts, Policies and Procedures" and MEPA's Minnesota Environmental Review Program.

Preparation of a federal Environmental Assessment and state Environmental Assessment Worksheet began in September 2010 and was concluded in March 2013 with a Finding of No Significant Impact by the FAA and in April 2013 with a Negative Declaration on the need for an EIS by the MAC.

Reliever Airport Investments

In general the development programs at the reliever airports focus on rehabilitation of pavement in aircraft operational areas (runways, taxiways, aprons). Projects vary from year to year, depending on available funding and airport needs. In 2013, pavement rehabilitation was completed at Anoka Blaine

Airport, Airlake Airport and Lake Elmo Airport The following list shows other general projects that are being considered at the reliever airports.

- Obstruction removal
- Land acquisition
- Arrival/departure building
- Perimeter fencing
- Install Automated Weather Observation System
- Runway pavement and taxiway
- Hangar development

Table 9-6 shows the cost of the planned investments at the regional airports. The table is in 2016 dollars and will be updated for current years (2018) costs.

Table 9-6: Planned Investments at Regional Airports Draft UPDATED

Airport	2018-19	2020-2030	2031-2040	2041-2050
MSP International CIP	$392,625,000	$608,047,500	~$50-$100 M annually for MSP	~$50-$100 M annually for MSP

Airport	2018-19	2020 to 2050
Saint Paul Downtown	$4,750,000	Approx. $16,650,000
Anoka County-Blaine	$3,150,000	Approx. $7,250,000
Flying Cloud	$3,300,000	Approx. $ 820,000
Crystal	$5,050,000	Approx. $2,350,000
Lake Elmo	$5,100,000	$Approx $12,500,000
Airlake	$2,550,000	$Approx. $7,850,000
South Saint Paul	$3,813,123	$ 9,000,000 in 2021 and more through 2030.
Forest Lake	$5,869,800	Short-term funding needs likely to shift into out years unless federal funding under NPIAS, approx. $6,300,000

Sources: MAC, 2017

Preliminary 2018-2024 MAC Capital Improvement Program

Individual Airport Investments

Minneapolis-Saint Paul International Airport

Figure 9-2: Minneapolis-Saint Paul International Airport

Airport data

	Existing (2016)	2020	2030	2040
Based Aircraft	19	22	28	32
Operations	412,898	427.270	477,762	547,224
Land Area	3,400 Acres			

Source: MAC, 2016

Airport discussion

The aviation industry is volatile and the MAC needs to be flexible to continue to provide state of the art facilities. Recently, airlines have consolidated, shifted strategies with their aircraft fleet, adopted new security protocols and implemented new technologies for more efficient operations. Monitoring and planning for these changes as well as technology upgrades and variations in growth rates for different aviation activities will be needed.

Downtown Saint Paul Airfield

Figure 9-3: Downtown St. Paul Airfield

Airport data

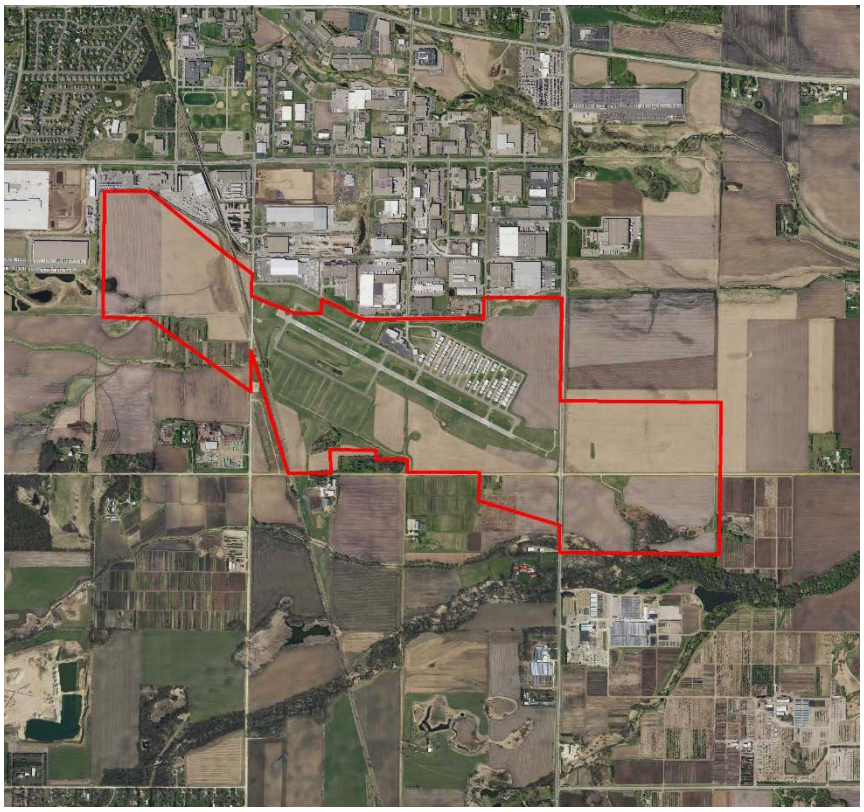
	Existing (2016)	2020	2030	2040
Based Aircraft	82	96	108	145
Operations	54,548	52,105	52,554	53,109
Land Area	576 Acres			

Airport discussion

Downtown Saint Paul Airfield (Holman Field) is located across the river from downtown Saint Paul. Opportunities at this airport revolve around land use compatibility and obstructions. The airport has sufficient capacity for future demand. The airport is used as an alternate for Minneapolis-Saint Paul International Airport, in case of capacity/emergency scenarios at Minneapolis-Saint Paul International Airport. The air traffic control tower located at the airport is an FAA tower.

Airlake Airport

Figure 9-4: Airlake Airport



Airport data

	Existing (2016)	2020	2030	2040
Based Aircraft	139	135	136	134
Operations	38,618	34,811	37,373	39,476
Land Area	595 Acres			

Source: MAC, 2018

Airport discussion

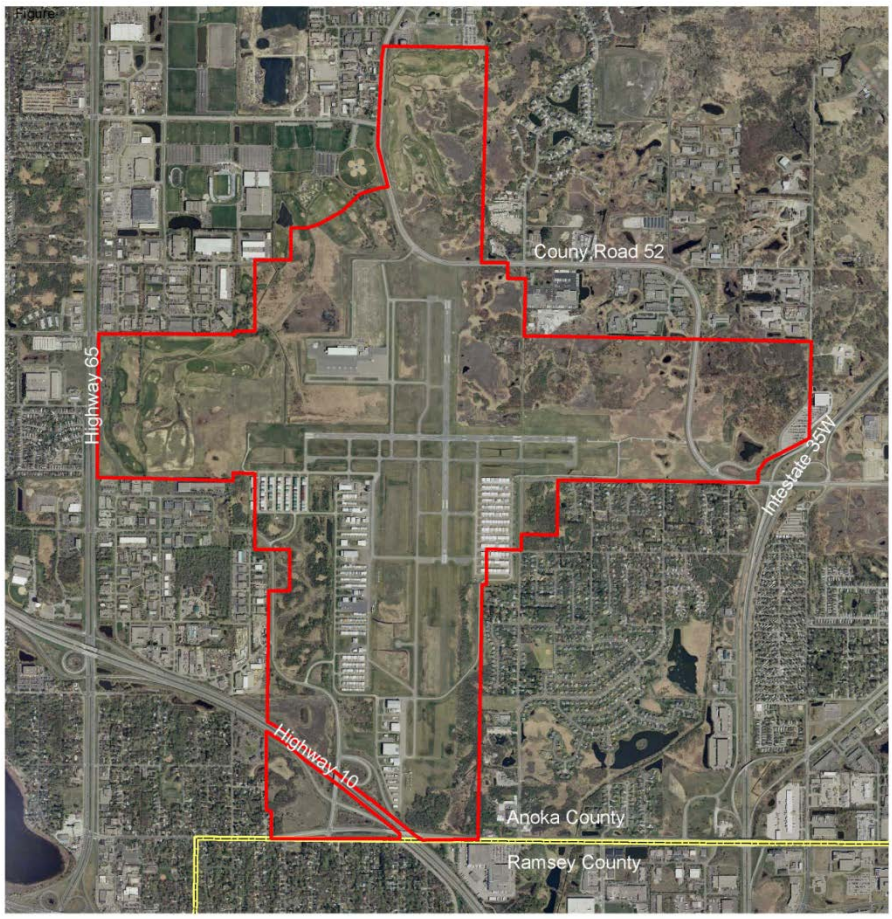
The Metropolitan Council made their system conformance determination for the updated 2035 Airlake Airport LTCP in March of 2018. Airlake Airport is located in Dakota County, approximately 20 miles south of Minneapolis and 16 miles south of Minneapolis-Saint Paul International Airport. The opportunities at this airport include tenant access to municipal systems for sanitary sewer and water. This LTCP focuses on solutions for accommodating business aircraft needs, by maximizing the airfield's operational capabilities, as well as maintaining and improving Runway Protection Zone land use compatibilities. The is no air traffic control tower located at the airport. Airlake airport's primary role is to serve personal, recreational, and some business aviation users in the south part of the metropolitan area.

- A Complimentary Reliever in the Metropolitan Airports Commission (MAC) system;
- An Intermediate Airport per Minnesota Department of Transportation/Office of Aeronautics (MnDOT); and
- A Minor Airport per the Metropolitan Council Regional Aviation System Plan.

The aircraft mainly anticipated to use Airlake Airport – and that which it is designed for – will continue to be a family of small, propeller-driven airplanes with fewer than 10 passenger seats used primarily for pesnoal, recreational, and flight training purposes up to mid-size corporate jets used primarily for business purposes. The proposed plan does not contemplate upgrading the role of Airlake Airport to accommodate a larger aircraft family or scheduled passenger or cargo flights.

Anoka County-Blaine Airport

Figure 9-5: Anoka County – Blaine Airport



Airport data

	Existing (2016)	2020	2030	2040
Based Aircraft	389	403	393	399
Operations	80,845	84,192	84,576	93,615
Land Area	1,860 Acres			

Source: MAC, 2014

Airport discussion:

Anoka County- Blaine Airport is located in the southern part of Anoka County and the city of Blaine, approximately 12 miles from downtown Minneapolis and 12 miles from downtown Saint Paul. The air traffic control tower located at the airport is a contract tower and future funding for these towers is not guaranteed. Other opportunities at Anoka-Blaine airport include non-aeronautical land uses.

Crystal Airport

Figure 9-6: Crystal Airport

Airport data

	Existing (2016)	2020	2030	2040
Based Aircraft	164	180	171	171
Operations	36,967	39,707	38,845	41,640
Land Area	436 Acres			

Source: MAC, 2014

Airport discussion:

The Metropolitan Airports Commission finalized the updated Crystal Airport LTCP in 2017. Crystal Airport is located in Hennepin County, approximately seven miles northwest of downtown Minneapolis.

The opportunities at this airport include the right sizing of airport facilities and on-going removal of off airport obstructions. The air traffic control tower located at the airport is an FAA tower and currently funding for these towers has been provided. Crystal Airport's primary role is to serve personal, recreational, and some business aviation users in the northwest metropolitan area, including the cities of Crystal, Brooklyn Park, Brooklyn Center, and Minneapolis. The airport's classification will continue to be that of:

- A Complimentary Reliever in the Metropolitan Airports Commission (MAC) system;
- An Intermediate Airport per Minnesota Department of Transportation/Office of Aeronautics (MnDOT); and
- A Minor Airport per the Metropolitan Council Regional Aviation System Plan.

The aircraft mainly anticipated to use Crystal Airport – and that which it is designed for – will continue to be a family of small, propeller-driven airplanes with fewer than 10 passenger seats. The proposed plan does not contemplate upgrading the role of Crystal Airport to accommodate a larger aircraft family or scheduled passenger or cargo flights. Nor does the plan contemplate downgrading the role of Crystal Airport.

Flying Cloud Airport

Figure 9-7: Flying Cloud Airport

Airport data

	Existing (2016)	2020	2030	2040
Based Aircraft	361	360	364	393
Operations	84,038	81,156	86,068	101,042
Land Area	860 Acres			

Source: MAC, 2014

Airport discussion:

Flying Cloud Airport is located approximately 14 miles from downtown Minneapolis. The airport is considered by the MAC to be a primary reliever airport for MSP International Airport and the primary runway extension was constructed in 2008. The air traffic control tower located at the airport is an FAA tower.. Other opportunities at Flying Cloud Airport include development of non aeronautical land uses to procure additional revenue.

Forest Lake Airport

Figure 9-8: Forest Lake Airport

Airport data

	Existing (2012)*	2020	2025	2030
Based Aircraft	26	26	26	26
Operations	8,000	8,000	8,000	8,000
Land Area	330 Acres	330	330	330

***No Data**

Airport discussion

Forest Lake Airport is located in northern Washington County. Built as a private airport, it is now owned by the City of Forest Lake. Although this airport was added to the regional system in 2010, it will require

significant investment to fully function as a reliever airport. The airport is not currently in the National Plan of Integrated Airport System, but is continuing to work toward inclusion. Recently, the airport landing strip has been paved. Since the airport has a a paved runway, this is the start of the process for the Forest Lake Airport to be included in the NPIASs. This would be a great opportunity for the airport and also serve the flying public in the region as well. The opportunities at Forest Lake airport include obstruction removal, perimeter fencing, and provision of both airside and landside improvements. As adjacent land is developed, compatibility of land uses must be carefully monitored.

Lake Elmo Airport

Figure 9-9: Lake Elmo Airport

Airport data

	Existing (2016)	2020	2030	2040
Based Aircraft	194	218	211	205
Operations	27,275	24,539	25,615	27,664
Land Area	640 Acres	640	640	640

Source: MAC, 2016

Airport discussion

The Metropolitan Airport Commission finalized the Lake Elmo Airport LTCP in 2016. As the city of Lake Elmo continues to grow, there may be land use compatibility issues off the runway end at Lake Elmo Airport. The Long Term Comprehensive Plan update for the Airport, which was completed in 2016, addresses the issue of extending or relocating the primary runway. Lake Elmo Airport's primary role is not expected to change throughout the foreseeable planning period. The classification of the airport will continue to be that of a

- Reliever in the MAC system,
- Intermediate Airport per Minnesota Department of Transportation – Aeronautics (MnDOT) criteria,
- Minor Airport in the regional system.

The existing runways at Lake Elmo Airport are short in comparison to the other MAC owned Reliever Airports. Both the primary and crosswind runways at Lake Elmo Airport are the shortest in the system.

Based on the aviation activity forecasts, the future critical design aircraft for Lake Elmo Airport will continue to be represented by the family of propeller-driven aircraft with fewer than 10 passenger seats. The City and MAC have been working together with each other and MnDOT, to coordinate with regards to planning and land use compatibility issues around the airport. The MAC is currently in the environmental review process for the improvements at the airport.

South St. Paul Airport

Figure 9-10: South St. Paul Airport

Airport data

	Existing (2014)	2020	2025	2030
Based Aircraft	274	298	323	351
Operations	64,800	71,520	77,520	84,240
Land Area	270 Acres	270	270	270

Source: South St. Paul Airport LTCP, 2014

Airport discussion

South St. Paul Airport is located in South St. Paul/Inver Grove Heights approximately seven miles south of downtown Saint Paul. The airport is owned and operated by the City of South St. Paul. There is no

air traffic control tower and the airport is designated a minor airport in the regional aviation system. The opportunities at South St. Paul include obstruction removal, runway length, landside development and land use compatibility. The Long Term Comp Plan was completed in 2014. The LTCP analyzed runway length, airspace obstructions, obstruction removal, and conduct a financial feasibility analysis for capital improvement projects in the future. The LTCP also developed a strategic business plan for growth opportunities in the future. The airside analysis showed that there were physical constraints for extending the runway, however, the use of stopways to provide additional takeoff distance for aircraft was possible. The preferred alternative that was selected in the LTCP, is to construct a 300 foot stopway on one end of the runway, and a 120 foot stopway on the other end of the runway. This alternative satisfied the runway length issues at the airport.

An Emerging Issue: Unmanned Aircraft Systems (UAS)

Unmanned aircraft systems (UASs) are starting to emerge as a new technology for farmers, commercial operators and the general public. An unmanned aircraft system, sometimes called a drone, is an aircraft without a human pilot onboard; instead, the UAS is controlled by an operator on the ground. The FAA has produced rules and regulations for UAS flying in and around airports and disaster areas. The most recent FAA regulations include pilot/aircraft and location requirements. The rules can be found here: https://www.faa.gov/uas/getting_started/

The existing regulations prohibit the general public from operating UASs within 5 miles of an airport without prior notification to the airport and air traffic control Unmanned aerial vehicle regulations and legislation by both the state and federal authorities will be updated in the near future.

Minnesota Department of Aeronautics has further information about how UASs should be registered and operated. MnDOT has more information.

It is important that operators register their aircraft and follow all operational rules. Operators should check their local community for additional guidance and rules. Many communities are adopting rules for UAS operations.

This technology will be moving quickly, and the Metropolitan Council will follow the development of regulations for a better understanding how these regulations will affect citizens, communities and the region.