CONGESTION MANAGEMENT PROCESS

POLICY AND PROCEDURES HANDBOOK

METROPOLITAN COUNCIL

August 2020

The Council's mission is to foster efficient and economic growth for a prosperous metropolitan region

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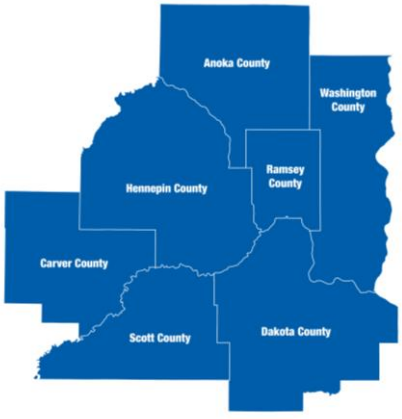

The Metropolitan Council and its 17-member board, appointed by the Governor, guides the strategic growth of the seven-county Twin Cities area. It plans the regional transportation system, and operates the bus and rail network; treats wastewater, plans for the water supply, and monitors water quality; funds redevelopment, models transit-oriented development and guides land use; plans for and funds regional parks; and identifies housing priorities, and provides affordable housing for low- and moderate-income households.

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1. Introduction

Metropolitan Planning Organizations (MPOs) in Transportation Management Areas[1] (TMAs) are required by federal law to develop and maintain a congestion management process (CMP). Federal guidance[2] states that the intent of the CMP process is to "address congestion management through a process that provides for safe and effective integrated management and operation of the multimodal transportation system." As the MPO for the Minneapolis-Saint Paul metropolitan area, the Metropolitan Council is responsible for CMP planning and implementation for the seven-county Twin Cities region and the contiguous, urbanized portions of Sherburne and Wright counties. An effective congestion management process benefits the region by addressing several pressing needs:

- Constraints such as highway capital funding levels, available space, and impact on the transportation system limit the number of new, large-scale projects being planned and constructed.
- Transportation safety is becoming an increasingly visible planning and operational consideration.
- Transit, bicycling, walking, and other non-single occupant vehicle modes are becoming a more prominent focus of transportation system investment and use.
- Development of processes that support the transportation performance philosophy and requirements of Moving Ahead for Progress in the 21st Century (MAP-21), the federal transportation funding and authorization act.

This CMP Policy and Procedures Handbook addresses the following requirements:

- Establishes a Congestion Management Process for the Minneapolis-Saint Paul metropolitan area, which consists of Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, and Washington counties, and the contiguous urbanized parts of Wright and Sherburne counties.
- Addresses federal requirements set forth in MAP-21 and the federal Fixing America's Surface Transportation (FAST) acts.

The Metropolitan Council CMP Policy and Procedures Handbook is considered a "living" document and will be updated as needed to reflect decisions made by the CMP Advisory Committee and other key stakeholders.

The Congestion Management Process

The Congestion Management Process is a system of strategies facilitated by MPOs to improve the transportation system's performance and reliability by reducing the adverse impacts of congestion. An effective CMP leads to congestion management projects and programs that ultimately improve travel conditions. It is a systematic and regionally agreed-upon process that includes:

- The development of congestion management objectives;
- Establishment of multimodal performance measures;

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[1] A metropolitan area with population exceeding 200,000 is referred to as a Transportation Management Area (TMA). It is a requirement that a Congestion Management Process be developed for all TMAs.

[2] Source: 23 CFR 450.322, which establishes the requirements for the Congestion Management Process in TMAs.

- A data collection process and system used to monitor and define the extent and duration of congestion and identify their underlying causes;
- Identification of regional CMP strategies;
- Identification of an implementation schedule and possible funding sources for strategies; and
- A regular evaluation of the effectiveness of implemented strategies.

The CMP is an on-going process that is constantly adjusting to fulfill the goals and needs of the region. It is an integral part of the region's overall planning process, and as such serves to guide the transportation investments and strategies the Council and its partners choose for the region.

Causes of Congestion

The process of congestion management begins by understanding its causes. A national study presented by FHWA[3] on the sources of congestion identified six major causes of congestion:

- **Geometric Bottlenecks**—points where the roadway narrows or regular traffic demands cause traffic to back up; these are the largest source of congestion and typically cause a roadway to operate below its adopted level of service standards. The study found that bottlenecks cause forty percent of congestion.
- **Incidents—**crashes, stalled vehicles, debris on the road; these incidents cause about one quarter of congestion problems. Incidents are the next greatest cause of congestion producing twenty-five percent.
- **Work zones—**for heavy construction and regular maintenance activities such as filling potholes. Work zones are the cause of ten percent of congestion.
- **Weather—**weather events like rain, snow, fog and high winds cause slowdowns but also create additional traffic incidents like crashes. Weather produces fifteen percent of congestion.
- **Poor signal timing**—the inefficient operation of traffic signals or green/red lights where the time allocated for traffic does not match the vehicle volume on the road; poor signal timings are a source of congestion on major and minor streets. Poor signal timing is the cause of five percent of congestion.
- **Special events—**cause "spikes" in traffic volumes and changes in traffic patterns; these irregularities either cause delay on days, times, or locations where there usually is none or add to regular congestion problems. Special events produce five percent of congestion.

As shown in Figure 1, bottlenecks are the largest cause of congestion nationally, followed by traffic incidents and bad weather. These national data are widely used in CMP updates due to the lack of comprehensive local studies on the causes of congestion. The data suggest that local causes are likely to be similar, with bottlenecks and traffic incidents typically being the top two causes of congestion. Strategies and improvements can address or mitigate all these causes of congestion, even though some situations cannot be controlled directly, like bad weather and special events.

[3] Incorporating Travel-Time Reliability into the Congestion Management Process: A Primer, p. 14

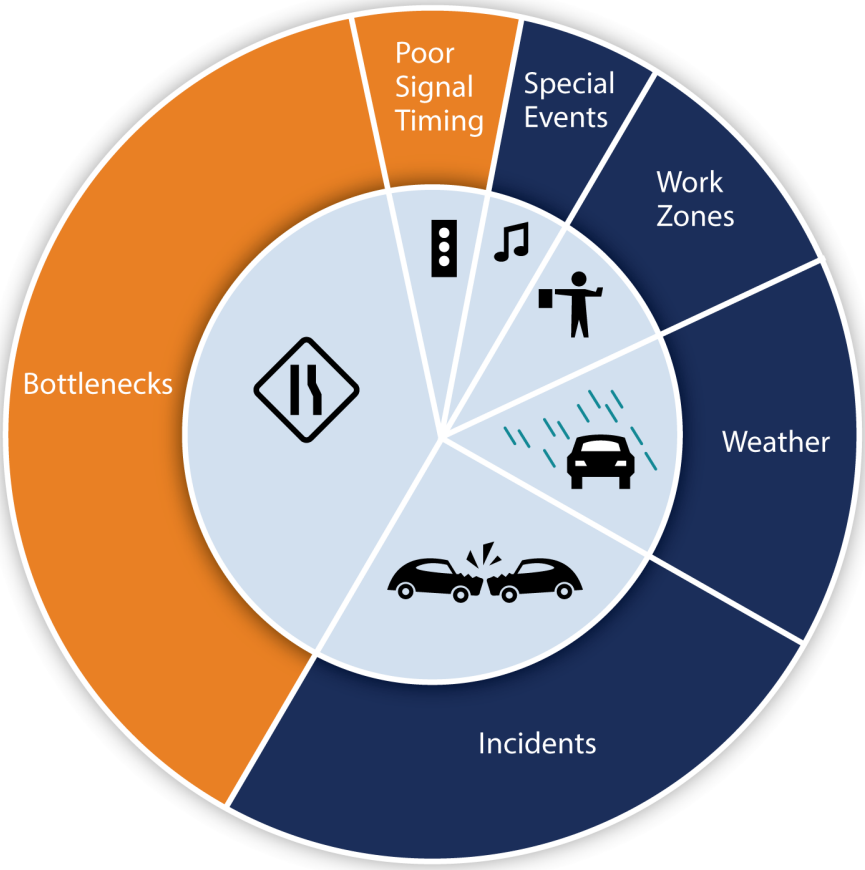

Figure 1: Causes of Congestion

Federal Requirements

The federal government began requiring systematic congestion management from state departments of transportation (DOTs) and MPOs in 1991 with passage of the Intermodal Surface Transportation Efficiency Act (ISTEA). The congestion management policy was retained and refined in each subsequent federal transportation law. Starting in 2012, the U.S. government took important steps toward helping state DOTs and MPOs take a more streamlined, performance-based, multimodal approach to addressing congestion management and the needs of the national transportation system. MAP-21, signed into law on July 6, 2012, initiated the process of identifying complementary national, state, and local goals for the federal-aid highway program (Table 1). These goals and corresponding policy direction were retained and advanced through the next major federal transportation law, Fixing America's Surface Transportation Act (FAST Act). Signed into law on December 4, 2015, the FAST Act directed and funded transportation programs through September 2020. Together, these laws establish the federal requirements for a congestion management process.

Table 1: National goals of the federal-aid highway program

Goal	Description
Safety	To achieve a significant reduction in traffic fatalities and serious injuries on

	all public roads.
Infrastructure condition	To maintain the highway system's assets in good repair
Congestion reduction	To achieve a significant reduction in congestion on the National Highway System
System reliability	To improve the efficiency of the surface transportation system
Freight movement and economic vitality	To improve the National Highway Freight Network, strengthen the ability of rural communities to access national and international trade markets, and support regional economic development
Environmental sustainability	To enhance the performance of the transportation system while protecting and enhancing the natural environment
Reduced project delivery delays	To reduce project costs, promote jobs and the economy, and expedite the movement of people and goods by accelerating project completion by eliminating delays in the project development and delivery process, including reducing regulatory burdens and improving agencies' work practices

Federal Guidance

The federal government also developed guidance to aid MPOs in developing a CMP. This guidance is presented in two documents of the Federal Highway Administration:

- The Congestion Management Process: A Guidebook (2011)
- Incorporating Travel-Time Reliability into the Congestion Management Process: A Primer (2015)

Congestion Management Process: A Guidebook

Congestion Management Process: A Guidebook provides MPOs with a concise description of the CMP components and includes practical examples of how to implement a successful process based on the experiences of MPOs across the country. The guidebook includes an in-depth explanation of the Federal Eight-Step Congestion Management Process, which establishes the key elements of an ongoing congestion management process:

1. **Develop Regional Objectives** - Objectives should be identified to assist in accomplishing the congestion management goals.
2. **Define Regional CMP Network** – The CMP must be defined in both geographic scope and system elements to be analyzed.
3. **Develop Multi-Modal Performance Measures** – The CMP must define the measures by which it will monitor and measure congestion on a regional and local scale.
4. **Collect Data/Monitor System Performance** – There must be a plan with regards to collecting data and evaluate the defined performance measures.
5. **Analyze Congestion Problems and Needs** – The CMP must define how congestion issues will be analyzed, presented and anticipated.
6. **Identify and Assess Strategies** – There must be a toolbox for selecting congestion mitigation strategies and evaluating potential benefits and congested locations.
7. **Program and Implement Strategies** – There must a plan for implementing the CMP as part of the regional transportation planning process.

8. **Evaluate Strategy Effectiveness** – The strategies must be regularly monitored to gauge the effectiveness.

Incorporating Travel-Time Reliability into the Congestion Management Process: A Primer

The document *Incorporating Travel-Time Reliability into the Congestion Management Process: A Primer* provides guidance on integrating travel-time reliability into the CMP to address nonrecurring congestion. This guidance aids MPOs in improving System Reliability, one of the national goals that requires performance measurement under MAP-21 and the FAST Act.

Travel-time reliability is defined as the consistency and dependability in travel times that are measured day to day and across different times of the day. Travel-time reliability addresses congestion caused by nonrecurring traffic events. Nonrecurring events include:

- Traffic crashes
- Road work zones
- Bad weather
- Special events

Regional Guidance

Policy and Procedures Handbook Overview

This handbook outlines the policies and procedures that the Metropolitan Council will implement to satisfy the federal requirements for the CMP. The Metropolitan Council is also in the process of developing a dashboard that will provide specific information about performance monitoring of the Council's CMP network.

This *Policy and Procedures Handbook* follows the organization of the federal eight-step Congestion Management Process. The chapters in this handbook are summarized below.

Chapter 1: Introduction – Defines the CMP in terms of purpose and federal requirements and provides an overview of the causes of congestion and the Policy and Procedures Handbook.

Chapter 2: CMP Overview – Summarizes past CMP activities in the Twin Cities metropolitan area, provides best practices and sample strategies, and recommends next steps for the needs assessment of the region's existing CMP process.

Chapter 3: Regional CMP Goals and Objectives – Describes the CMP goals and objectives and how they are developed.

Chapter 4: Regional CMP Network – Describes the multimodal CMP network.

Chapter 5: Multimodal Performance Measures – Documents the multimodal CMP performance measures.

Figure 2: The Federal Eight-Step Congestion Management Process

Chapter 6: Program for Data Collection and Monitoring System Performance – Documents the framework for ongoing CMP data collection and acquisition, data sharing, and CMP strategy performance evaluation and reporting.

Chapter 7: Congestion Problems and Needs Analysis – Describes the approach used to identify and evaluate congestion problems and needs. Includes a description of the CMP annual update process.

Chapter 8: CMP Strategy Identification and Assessment – Presents the Congestion Management Strategies Toolbox for evaluating congested locations in the CMP network.

Chapter 9: CMP Strategy Programming, Implementation, and Evaluation Framework – Documents the CMP strategy programming, implementation and evaluation framework

Policy and Procedures Handbook Methodology Compendium

The *Policy and Procedures Handbook Methodology Compendium* is an important extension to the Policy and Procedures Handbook. This Handbook includes:

- The methodologies to develop the performance measures
- The procedure to develop the volume-to-capacity ratio calculation
- The methodology to develop the trip type evaluation from StreetLight data[4]
- The procedure to develop the crash evaluation
- The Congestion Management Strategies matrix

CMP Corridor Study Area Report

The Corridor Study Area Report documents the identification of congested locations to be subjected to in-depth analysis and the strategies to be considered for future implementation within those study areas. Specifically, the Corridor Study Area Report will include the following:

- Identified congested locations within the regional transportation system, and the specific corridor study areas that have been selected for further analysis as part of the CMP.
- Documentation of corridor conditions that affect travel within the corridor, causing congestion.
- The recommended CMP strategies for each of the study areas identified for further analyses. This includes preliminary recommendations for projects and programs.

2. Metropolitan Council CMP Overview

The Metropolitan Council, in partnership with the region's transportation authorities and local governments, maintains a collaborative, systematic, and data-driven Congestion Management Process. This process has helped create, and continues to support, one of the nation's most effective multimodal transportation systems. Nonetheless, the highway system offers opportunities to increase the benefits of the region's CMP. In collaboration with the FHWA and its regional partners, the Metropolitan Council is committed to developing and maintaining a CMP that effectively identifies and articulates the region's

[4] The Handbook will be updated to include this information at a later date.

congestion objectives and needs, establishes and implements congestion mitigation strategies, and measures and communicates the effectiveness of its strategies.

This chapter summarizes the history of the Metropolitan Council CMP from 1991 to 2018, identifying ongoing CMP activities and recent supporting studies, and details the federal guidance on opportunities to improve the CMP planning and implementation process. The chapter concludes by presenting a set of best practices for the Twin Cities region.

Background

Beginning in the 1990s, the Metropolitan Council and MnDOT partnered with the region's road and transit authorities to develop a congestion management process for the Twin Cities metropolitan area. This process has helped distinguish Minnesota as a national leader in managing the freeway system through solutions such as bus-only shoulders, ramp metering, and MnPASS High Occupancy Toll Lanes.

The Council sought to communicate the CMP in the region's long-range metropolitan transportation plan, the *Transportation Policy Plan* (TPP). The 2030 TPP (adopted November 2010) addressed CMP elements throughout the plan. The 2040 TPP (adopted January 2015) framed its discussion of congestion management activities and goals within the context of the federally identified, eight-step congestion management process. The 2040 TPP update (adopted October 2018) advances the CMP policy direction and shifts to provide an overview of the region's CMP including recent supporting studies and ongoing strategies. It emphasizes that detailed documentation for the CMP will be presented separately as a stand-alone document in the future. The present CMP *Policy and Procedures Handbook* addresses the development of such an independent CMP document.

Supplementing this policy direction, MnDOT and the Council have reported on congestion monitoring, management strategies, and effectiveness in several ways summarized below. Data from these reports will continue to support the system monitoring and evaluation component of the CMP.

- *Transportation System Performance Evaluation* (formerly *Transportation System Audit*) – Since 1996 and pursuant to state law, the Metropolitan Council has produced this report approximately every four years as part of updating the *Transportation Policy Plan*.
- *Metropolitan Freeway System Congestion Report* – Beginning in 1993, MnDOT began its annual publication of this report. The congestion report identifies segments of the region's freeway system that experience recurring congestion, summarizing the duration (number of hours per day) and extent (location of congested segments of the system). The results of this study (2017) are shown in Figure 1.
- *Annual Regional Park-and-Ride System Report* – Beginning in 1999, the Metropolitan Council began annual publication of the regional park-and-ride system report. The report identifies the locations, use, and changes in use of park-and-ride facilities throughout the region.
- Previous versions of the CMP lacked an effective congestion measure off the freeway network. More recently the Metropolitan Council and MnDOT have used a "Big Data" approach to assess congestion on the non-freeway arterial system. This is a recent development and both agencies are in the process of developing congestion reporting for this system.

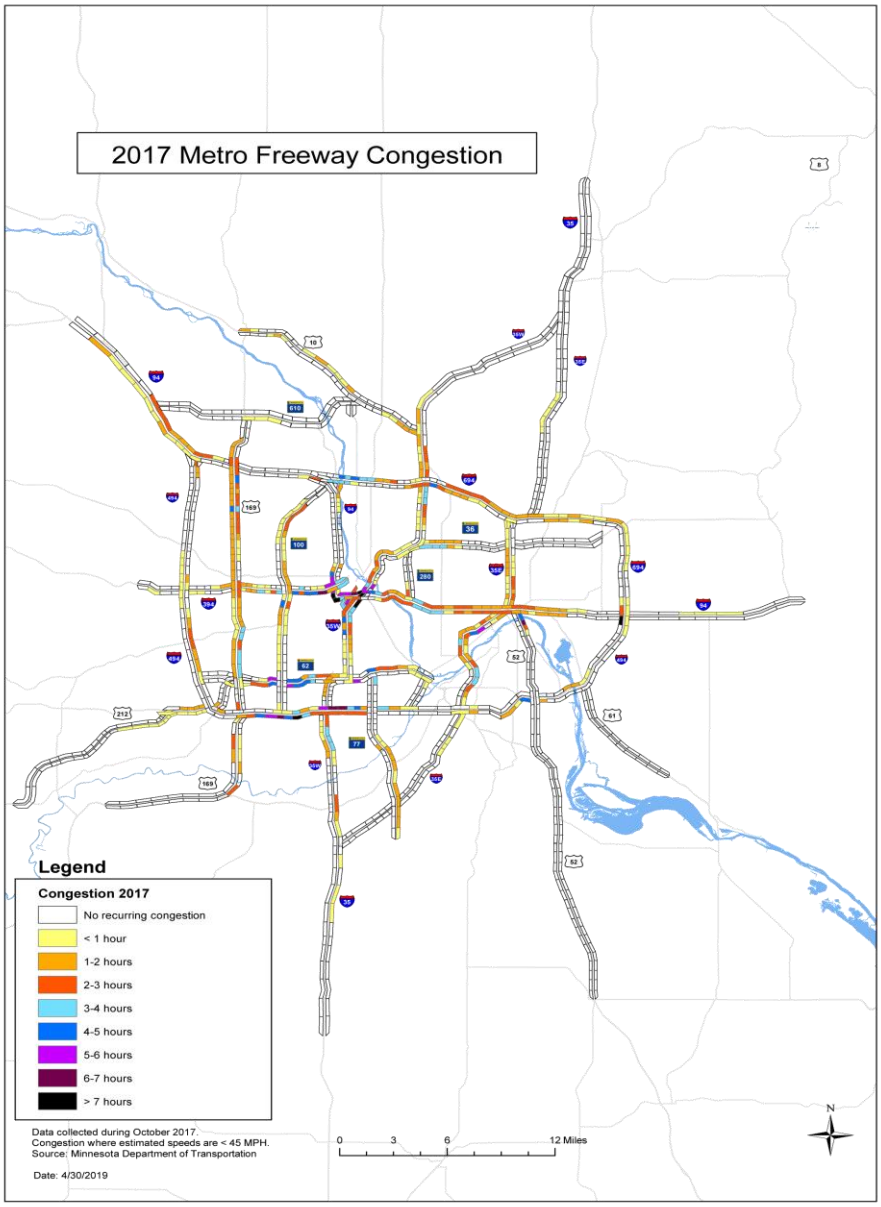

Figure 3: Recurring Freeway Congestion Identified in the 2017 Metropolitan Freeway System Congestion Report

Other CMP Activities

In addition to the policy and monitoring activities described above, the Metropolitan Council has implemented additional efforts to enhance the region's CMP. These actions are based on guidance from the FHWA, as well as the Council's commitment to improving its CMP planning and implementation.

CMP Peer Exchange

As part of the Council's 2016 review of its Transportation Management Area Planning Certification, the U.S. Department of Transportation proposed a work plan to assist the Metropolitan Council in improving the Congestion Management Process. The work plan included a peer exchange, which was hosted by

the FHWA and the Metropolitan Council in May 2017. This peer exchange included CMP experts from MPOs representing St. Louis, Portland, Salt Lake City, and Wilmington, Delaware. This peer exchange provided examples of best practices from across the country and provided better understanding of how other MPOs approach CMP planning and implementation. The May 2017 peer exchange is summarized in the "Peer Exchange" section below.

CMP Advisory Committee

The Metropolitan Council established a Congestion Management Process Advisory Committee in 2017, comprised of technical experts and other stakeholders representing the entire metropolitan planning area. The purpose of the CMP Advisory Committee is to assist the Metropolitan Council in developing CMP objectives, processes. and strategies that represent the goals and priorities of the region.

The CMP Advisory Committee is instrumental in developing the region's CMP Plan and regular plan updates and serves as the body that guides the region's Congestion Management Process long-term. The committee will meet at least quarterly to direct the CMP and facilitate implementation and monitoring of CMP strategies.

CMP-Related Studies and Ongoing Strategies

The following studies and strategies are examples of the region's cooperative, systematic, and data-driven approach to assessing the region's transportation needs and developing strategies that support system-wide congestion mitigation.

Thrive MSP 2040

Thrive MSP 2040 (adopted May 2014) and the Council's previous metropolitan development guides establish a 30-year vision for the region's land uses. These guides have provided policy direction to aid in congestion management. They address issues that transcend any one neighborhood, city, or county, as the region works together to build and maintain a thriving metropolitan region. *Thrive MSP 2040* and previous guides establish policy direction for the TPP, including the land use policies that are more detailed in the TPP.

Regional Solicitation for Federal Funding

Every two years, the Regional Solicitation process allocates federal funding to locally initiated projects to help meet regional transportation needs. The Council works with the Transportation Advisory Board (TAB) to review projects and prioritize them for funding, using an objective, data-driven, transparent process. Congestion mitigation has been a key project scoring criterion in the Regional Solicitation.

MnDOT Team Transit

Since 1991, MnDOT, the Metropolitan Council, the region's transit providers, and local counties and cities have worked together to identify and fund transit advantages on the state highway system. Transit advantages include bus shoulders, high-occupancy vehicle (HOV) lanes, park-and-ride lots, and HOV metered ramp bypass lanes. Partners identify needs for transit advantages through quarterly meetings, and MnDOT works to integrate them into MnDOT construction projects when feasible and practical. Funding for the program is provided through an annual target set by MnDOT.

2030 Transit Master Study

Completed in August 2008, the region updated its vision for a system of high capacity transitways in the region. The study evaluated and ranked for implementation more than 20 potential rail and bus corridors. The study built on the *2020 Transit Master Plan* and *2030 Transportation Policy Plan* and continued emphasizing transit as an important mobility alternative to driving in highway congestion.

MnPASS System Study Phase 3

Completed in 2017, the MnPASS[5] System Study Phase 3 is the most recent version of a study that establishes the region's MnPASS system vision and prioritized list of corridors for MnPASS lane implementation. The MnPASS study considered person-throughput, travel-time reliability, vehicle speed, vehicle-miles traveled (VMT), and benefit/cost results of potential MnPASS lane construction as it prioritized corridors for MnPASS lane implementation. The MnPASS study supports the region's CMP efforts by identifying travel demand management strategies, offering alternatives to congestion during peak travel periods, and incorporating greater reliability into the regional transportation network. The first MnPASS study was completed in 2005. The results of the MnPASS System Study Phase 3 are shown in Figure 2.

[5] The MnPASS system describes a series of high-occupancy toll lanes in the Metropolitan Region. The MnPASS system is one of the travel demand management strategies implemented as part of the region's CMP

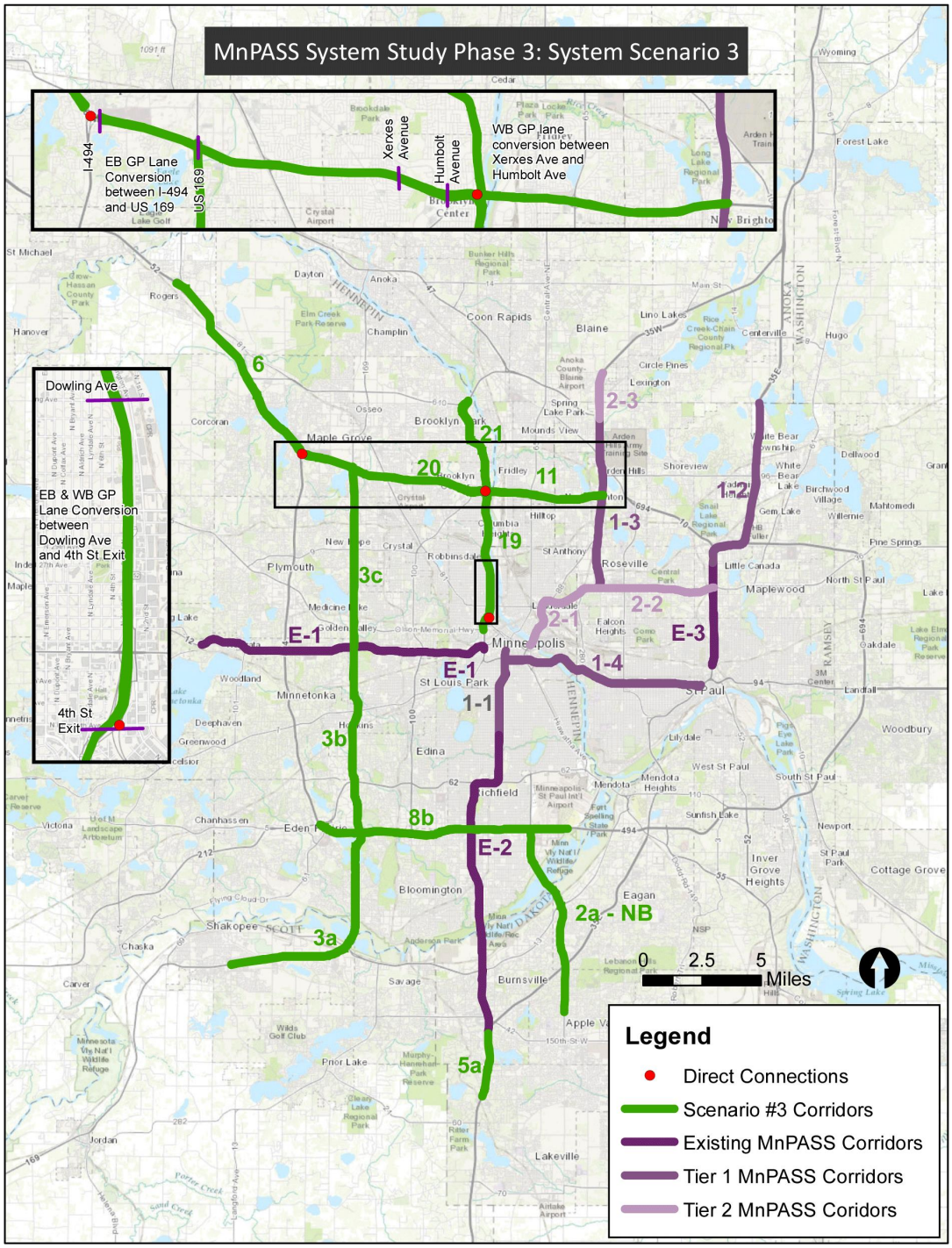

Figure 4: MnPASS Corridor Prioritization Resulting from the 2017 MnPASS System Study Phase 3

Congestion Management and Safety Plan 4

Since 2007, MnDOT has developed and regularly updated its Congestion Management and Safety Plan (CMSP). The CMSP identifies specific congestion issues on the freeway, and later arterial network, developed a toolbox of lower cost strategies to address the issues, and documents results from before and after studies of specific sites to evaluate and communicate effectiveness.

Completed in 2018, the Congestion Management and Safety Plan 4 (CMSP 4) is the most recent iteration of the plan guiding MnDOT's funding program that identifies and prioritizes projects addressing capacity-related congestion and safety concerns on the region's Interstate and state highway system. The plan and program emphasize highway construction projects that are typically lower in cost and smaller in scope than traditional highway capacity expansion investments, and can be delivered quickly, simply, and with less disruption to traffic in the project area. The fourth iteration of the CMSP, CMSP 4, improves on past iterations by including travel time reliability as a key performance measure for evaluating projects.

2030 Park-and-Ride Plan

Adopted in May 2010, the 2030 Park-and-Ride Plan established a detailed guide for selecting, prioritizing, and implementing park-and-ride facilities along transit routes. The siting and prioritization criteria emphasize siting park-and-ride facilities along congested highways.

Transportation Demand Management (TDM) Evaluation and Implementation Study

Completed in August 2010, the Council published the TDM Evaluation and Implementation Study. Developed in partnership with local TDM providers, the study outlined a clear process for selecting, funding, and implementing TDM strategies. It also outlined a process for structing and evaluating TDM programs in the region. The TDM Study's recommendations improve the structure of the region's TDM program and focus on Metro Transit's TDM outreach efforts beyond local transportation management organization (TMO) service areas while emphasizing:

- Funding for TDM activities and projects with the greatest impact
- Need for a clear and transparent funding allocation process for TDM Congestion Mitigation Air Quality (CMAQ) funds
- Need for conducting regular and consistent evaluation of the impact of TDM strategies implemented by all TDM providers in the region

Principal Arterial Intersection Conversion Study

Completed in 2017, the Council and MnDOT facilitated the Principal Arterial Intersection Conversion Study that examined over 370 intersections on the region's non-freeway principal arterial system to identify the region's highest priority intersections for potential grade-separation projects. Of the 91 at-grade intersections advanced into the study's second phase, 34 were identified as high-priority for potential improvements based on screening-level criteria that can justify high-capacity at-grade improvements or grade-separation. The results of this study directly support the CMP by providing a region-wide analysis of magnitude of the mobility problems at key intersections and begin to assess corridor-level issues. The results of the Principal Arterial Intersection Conversion Study are shown in Figure 3.

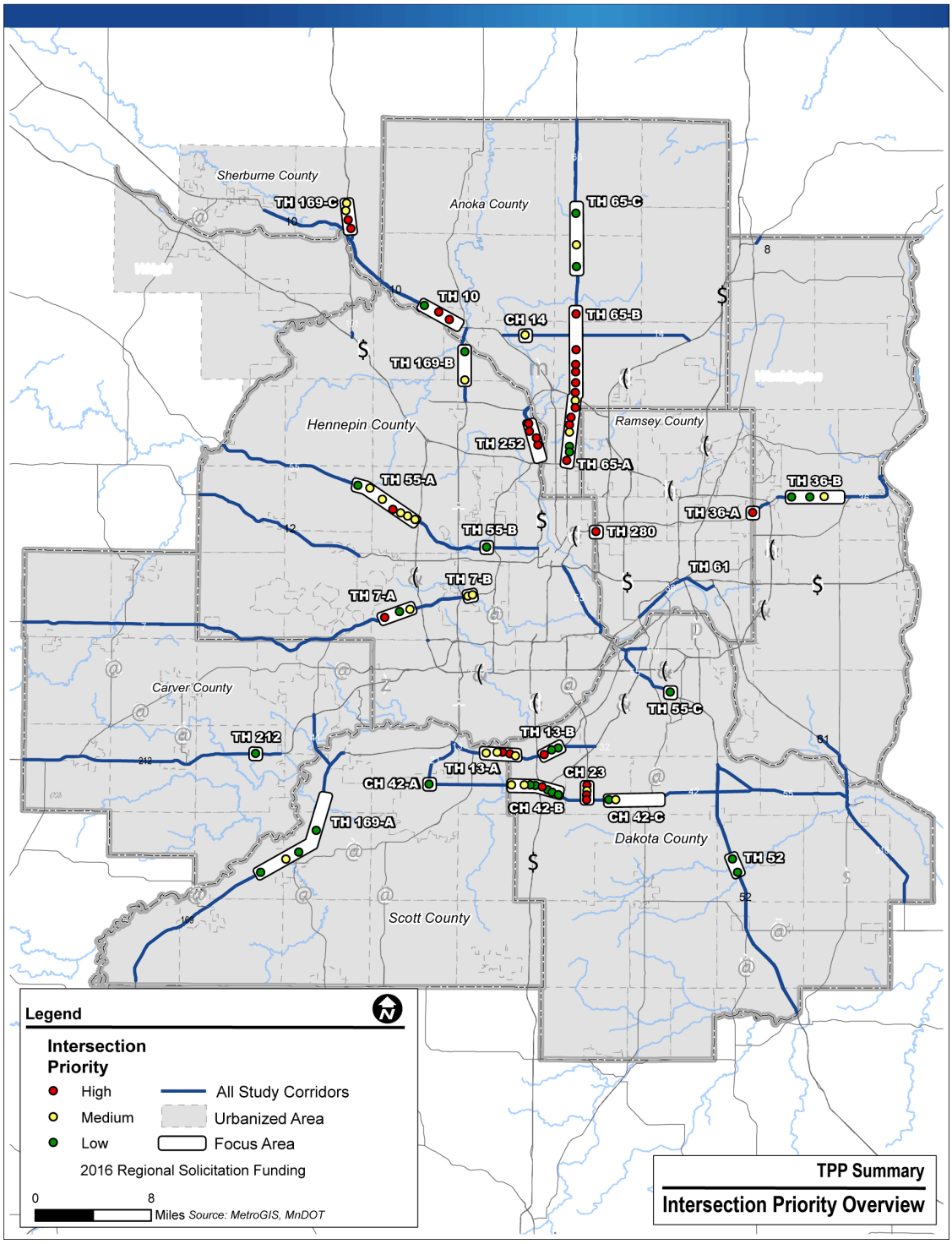

Figure 5: Results of the Principal Arterial Intersection Conversion Study

Freeway System Interchange Prioritization Study
Starting in summer 2018, MnDOT and the Council began facilitating a process to identify the region's prioritized list of freeway-to-freeway interchanges for improvement. The study will identify and apply evaluation criteria region-wide to identify the most feasible and efficient system interchange investments yielding congestion and safety benefits.

Travel Behavior Inventory
The Travel Behavior Inventory is a program of travel behavior research and transportation model improvement. The program includes a biennial regional household travel survey, which enables monitoring of person-based performance measures, including mode share. Future improvements to the travel behavior inventory and regional model will be targeted to improve the ability to forecast key CMP performance measures.

A-Minor Arterial System Evaluation Study
The 2012 study evaluated and demonstrated how the A-minor arterial system supplements the principal arterial system throughout the region. The study showed how the region's local policy to prioritize minor arterials and assign them to one of four types of A minors (Augmenter, Connector, Expander, and Reliever) has resulted in federally funded congestion- and safety-related improvements responsive to established policy, funding priorities, physical context, and daily multimodal use.

Arterial Bus Rapid Transit (BRT) Study
In 2011-2012, Metro Transit studied 11 urban corridors with high-ridership bus routes that connect major destinations for implementation of enhanced bus service. Many of these routes were first identified as needing high-capacity transit in the 2030 Transit Master Study discussed previously. Bus Rapid Transit in these corridors would improve travel speed, increase reliability, enhance the ride and create faster connections. This requires eliminating delays: reducing boarding time, the time buses wait at traffic lights, and time spent in traffic congestion. To date, Metro Transit has implemented two arterial BRT routes (A and C Lines) and three more are in project development (D Line, E Line, and B Line). Metro Transit anticipates updating the Arterial BRT System plan along with its Network Next effort in 2019-2020.

Highway Transitway Corridor Study
In 2013-2014, Metropolitan Council studied eight highway corridors with existing, relatively high peak-hour commuter transit demand, to evaluate potential for highway BRT in these corridors. Many of these corridors were first identified as needing high-capacity transit in the 2030 Transit Master Study, discussed previously, Highway BRT is anticipated to function in a similar way to the METRO Red Line (Cedar Avenue, opened in 2013) and Orange Line (I-35W South, scheduled to open in 2021). Highway BRT operates all day at frequent intervals and provides enhanced passenger facilities and amenities. BRT bypasses congested traffic by using bus shoulders and MnPASS lanes. The corridors analyzed were chosen because of their potential ability to connect regional destinations with high-speed transit service that uses already existing or planned highway facilities.

Federal Guidance to Metropolitan Council
Between August 2016 and January 2017, the Federal Highway Administration and the Federal Transit Administration conducted a certification review of the transportation planning process for the Minneapolis-Saint Paul Traffic Management Area. Both agencies conduct this kind of review every four years for urbanized areas with population over 200,000.

The Certification Review presented several recommendations to improve the CMP so that it complies with 23 CFR 450.322[6] and the eight-step federal process. Specific recommendations from the Certification Review include:

- Increase analysis to consider non-freeway principal arterials and minor arterial roadways.
- Use SMART (Specific, Measurable, Agreed Upon, Realistic, Time-Bound) objectives and the inclusion of acceptable level of performance for the region.
- Incorporate greater public transparency of CMP implementation at both system-wide and project levels.
- Document the steps to consider, select and dismiss CMP strategies based upon identification and analysis of strategy options, particularly on non-freeway arterials.
- Evaluate previously implemented congestion management strategies and their corresponding impacts.
- Integrate the CMP into the project selection process.
- Evaluate mobility or congestion relief projects against the range of strategies to determine the best benefit/cost strategy for implementation.
- Fully develop the improvement process using facility-level data to clearly define the operational problems and the expected performance benefits of the potential solutions.

Best Practices

The study team has identified best practices that support a routine, cooperative, and comprehensive CMP planning and implementation process. These best practices draw from FHWA guidance, the Council's experience, the May 2017 Peer Exchange, and insight gleaned from the consultant team's work in CMP planning throughout the nation.

Peer Exchange

The Metropolitan Council and the FHWA hosted a peer exchange event in May 2017. The event welcomed CMP experts from MPOs in St. Louis, Portland, Salt Lake City, and Wilmington (Delaware). The peer exchange identified representative best practices from across the country and gave Metropolitan Council staff the opportunity to better understand how other regions are approaching the CMP planning and implementation process. Specifically, the peer exchange addressed the following topics:

- Performance measures used by peer regions to both identify congested corridors and measure whether the implemented projects led to congestion improvement
- Investment strategies that peer regions have used to help mitigate congestion on key corridors, and the process through which the strategies were developed
- Data collection processes and potential sources for key datasets
- Methods for prioritizing projects with congestion management strategies for funding

Overarching conclusions from the peer exchange are that there are several ways in which a region may successfully implement a CMP, and that a CMP should be tailored to the region and developed with input from regional stakeholders. The peer exchange also introduced examples of visualization

[6] 23 CFR 450.322 establishes the requirements for the Congestion Management Process in TMAs.

techniques that graphically depict congestion in a manner that is easily digested and understood by policymakers and the public.

Sample Best Practices

The CMP plan update team identified a set of sample best practices that support a routine, cooperative, and comprehensive CMP planning and implementation process. The sample best practices are presented below. Applicability to the Metropolitan Council CMP Plan is summarized under each best practice.

Focus on short-term, low-cost strategies, programs, and projects

One of the benefits of an effective CMP is a more effective allocation of limited transportation funding among operations and capital projects and programs. By identifying all congestion issues in the region, the CMP can help identify opportunities to engage in short-term, low-cost projects that deliver significant congestion benefits.

> ***Applicability to the Metropolitan Council CMP Update: Medium*** *– The Metropolitan Council, MnDOT, and various local stakeholders have implemented this kind of investment direction for the freeway system. Consistent with the federal Certification Review findings, the region has an opportunity to implement a similar project identification and programming process on non-freeway facilities throughout the region.*

Include performance measures that address multimodal availability

In addition to addressing general traffic, it is valuable to include performance measures that report on the effectiveness of multimodal transportation options within congested highway corridors, particularly transit. These multimodal transportation options support the CMP by providing alternatives to driving in congestion.

> ***Applicability to the Metropolitan Council CMP: High*** *– The Metropolitan Council, Metro Transit, and MnDOT have been working toward identifying and communicating multimodal performance benefits in congested corridors. The Council, Metro Transit, and MnDOT have an opportunity to work with all transit and local transportation authorities to better evaluate and articulate where these strategies have been effective in providing alternatives to congestion and identifying locations where multimodal travel options should be expanded.*

Use screening measures, with additional performance measures for identifying congested locations

Some regions have found it beneficial to use one congestion screening measure to identify potentially congested corridors and apply additional performance measures to only those congested corridors. This approach allows agencies to focus scarce resources on areas that will benefit most from more in-depth analysis, while providing coverage for the entire system.

> ***Applicability to the Metropolitan Council CMP: High*** *– The Metropolitan Council and MnDOT have implemented this kind of screening process for the freeway system. Consistent with the federal certification review findings, the region has an opportunity to implement a similar process on non-freeway facilities throughout the region.*

Identify strategies that address nonrecurring congestion

Congestion due to non-recurring disruptions such as traffic incidents, weather, work zones, and special events accounts for an average of 55 percent of total delay. Designated alternate routes and traffic incident management are effective strategies that can reduce nonrecurring congestion.

Applicability to the Metropolitan Council CMP: Medium *– MnDOT and local road authorities have identified and implemented strategies to address non-recurring congestion. The CMP Plan update process should acknowledge and document these strategies and their effectiveness and explore if they should be implemented in other locations throughout the region.*

Integrate the CMP into Transportation Policy Plan Development

A well-functioning CMP informs the region's metropolitan transportation plan. For example, the TPP may identify congested corridors that need transportation improvements, but traditional roadway capacity improvements are not financially feasible. The CMP can then identify feasible strategies that may be funded in the short-term or included in future TPP updates. During the TPP update, investment policy could be refined to fund a larger number of Congestion Management Process-identified improvements.

Applicability to the Metropolitan Council CMP: Medium *– The Metropolitan Council and MnDOT have implemented this kind of process for the freeway system. Consistent with the federal Certification Review findings, the region has an opportunity to implement a similar process on non-freeway facilities throughout the region.*

Include non-freeway principal and minor arterials in the CMP Network

Inclusion of more than just the National Highway System in the CMP network allows monitoring of facilities that fall within the "sweet-spot", that is, facilities where congestion can be viably addressed without adding lanes, yielding system-wide congestion benefits. Improvements on arterial and collector roadways may have a higher level of feasibility, thus improving systemwide performance and potentially reducing travel demand on freeways and principal arterials.

Applicability to the Metropolitan Council CMP: High *– The Metropolitan Council and MnDOT have focused congestion monitoring and reporting efforts on the freeway system and have begun efforts focused on the non-freeway system. This CMP Plan update offers opportunities for the region to address FHWA's guidance to increase analysis of non-freeway roadways and perform a comprehensive analysis based in an inclusive and flexible CMP network.*

Use the CMP to address applicable MAP-21/FAST Act performance reporting requirements

Metropolitan planning organizations are required to monitor and regularly report on specific, federally required performance measures. Several of the required performance measures are related to congestion, such as those included in the measure areas of safety, system performance, freight movement, and traffic congestion. Including these federal requirements in the list of CMP performance measures establishes an efficient and meaningful monitoring and reporting process. Additionally, the Congestion Management Process strategies can directly address deficiencies relative to these performance measures.

Applicability to the Metropolitan Council CMP: High *– The Metropolitan Council and MnDOT have included federally required performance measures in previous CMP efforts. It is strongly recommended that the CMP retain and advance congestion-related performance measurement required under MAP-21 and the FAST Act.*

Establish a set of CMP Principles in addition to CMP Objectives

In addition to CMP objectives, some regions establish a set of CMP principles that articulate the region's congestion management policy and priorities. Principles are policy statements of priority and are different from objectives that should be specifically measured and monitored over time.

Applicability to the Metropolitan Council CMP: Low *– The vision, outcomes, and goals articulated in Thrive MSP 2040 and the 2040 TPP provide clear policy direction for the region's CMP.*

Conclusion

The CMP Policy and Procedures Handbook outlines the region's approach to congestion management, presenting a process that follows federal CMP requirements and guidance, incorporates national best practices, and advances the congestion management priorities of the Twin Cities region. While carrying forward the policy direction of the TPP, the 2019 CMP update is intentional in responding to the findings of the 2017 federal Certification Review. Specifically, the 2019 CMP update:

- Expands analysis to give equal consideration to freeway and non-freeway facilities within the CMP network.
- Incorporates SMART (Specific, Measurable, Agreed Upon, Realistic, Time-Bound) performance objectives, and performance targets.
- Documents the collaborative, stakeholder-driven process used to select and dismiss CMP strategies based upon identification and analysis of strategy options.
- Evaluates mobility or congestion relief projects against the range of strategies to determine the best strategies for implementation.
- Documents the facility-level CMP strategy development process for specific corridor study areas to clearly define the operational problems and the expected performance benefits of potential solutions.
- Presents a systematic update process for annual monitoring and evaluation of the multimodal transportation system.

3. Regional CMP Goals and Objectives

The goals of the Congestion Management Process identify the outcomes the region wants to achieve by implementing a congestion management process and serve as a basis for developing CMP strategies and identifying performance measures.

The CMP Plan goals were developed based on a variety of information, including goals presented in past CMP-related activities, national best practices, and guidance provided by the CMP Advisory Committee[7], regional partners and policymakers. The goals developed for this CMP Plan also reflect the congestion-related policy direction in the *2040 Transportation Policy Plan* and the Council's regional development guide, *Thrive MSP 2040* (adopted May 2014). Chapter 12 of the 2040 TPP (adopted October 2018) identifies the CMP-related goals, objectives, and strategies in *Table 2*.

Table 2: CMP-related goals, objectives and strategies in the 2040 TPP

Goals, Objectives and Strategies
Goal C: Access to Destinations
Objective A: Increase the availability of multimodal travel options, especially in congested highway corridors.
Objective B: Increase travel time reliability and predictability for travel on highway and transit systems.
Objective D: Increase the number and the share of trips taken using transit, bicycling, and walking.
Strategy C5: The Metropolitan Council will work with MnDOT and local governments to implement a system of MnPASS lanes and transit advantages that support fast, reliable alternatives to single-occupant vehicle travel in congested highway corridors and in local corridors.
Strategy C7: Regional transportation partners will manage and optimize the performance of the Principal Arterial system as measured by person throughput.
Strategy C9: The Metropolitan Council will support investments in A-minor arterials that build, manage, or improve the system's ability to supplement the capacity of the Principal Arterial system and support access to the region's job, activity, and industrial and manufacturing concentrations.
Strategy C10: Regional transportation partners will manage access to Principal and A-minor arterials to preserve and enhance their safety and capacity. The Metropolitan Council will work with MnDOT to review interchange requests for the Principal Arterial system. The Metropolitan Council, MnDOT and regional partners will invest in prioritized non-freeway Principal arterial intersections in accordance with the Principal Arterial Intersection Conversion Study.
Strategy C12: Regional transportation partners will invest in an expanded network of transitways that includes but is not limited to bus rapid transit, light rail, and commuter rail. Transitway investments will be prioritized based on factors that measure a project's expected contributions to achieving the outcomes, goals, and objectives identified in Thrive MSP 2040 and the Transportation Policy Plan.
Strategy C15: Regional transportation partners should focus investments on completing Regional Bicycle Transportation Network alignments and their direct connections with local bicycle networks.
Goal D: Competitive Economy
Strategy D5: The Metropolitan Council and MnDOT will work with transportation partners to identify

[7] The Metropolitan Council convenes a Congestion Management Process Advisory Committee comprised of Council/metropolitan planning organization, MnDOT, county, city, and Federal Highway Administration staff with expertise in congestion management on the highway system.

the impacts of highway congestion on freight and identify cost-effective mitigation.

Goals, Objectives, Performance Measures, and Performance Benchmarks

The CMP Advisory Committee agreed on three CMP goals, which establish the region's broad vision and policy direction for congestion management. Each goal is supported by CMP objectives, which refine the goal's policy priorities into more specific areas of emphasis. Finally, the CMP objectives are made specific, measurable, and time-bound by their corresponding performance benchmarks and performance measure. By establishing a link between CMP goals, objectives, performance measures and performance benchmarks, the region maintains a performance-based planning process that allows it to evaluate what progress has been made toward the CMP outcomes. The CMP goals, objectives, performance measures, and performance benchmarks are summarized below. CMP performance measures and performance benchmarks, their definitions and methodologies, and their relationship to CMP goals and objectives, are discussed further in Chapter 5: CMP Performance Measures.

Several topic areas also include key performance indicators. These are performance areas that the region wants to monitor and report on regularly, but without establishing a performance benchmark.

Goals

Goal 1: Increase Access to Destinations

Increase the reliability, affordability, and efficiency of the multimodal transportation system to support the prosperity of people and businesses by connecting them to destinations throughout the region and beyond.

Goal 2: Support a Competitive Economy

Provide a regional transportation system that supports the economic competitiveness, vitality, and prosperity of the region and state.

Goal 3: Promote Safety and Security

Promote a regional transportation system that is safe and secure for all users.

Objectives

The objectives for the Metropolitan Council CMP are organized into six major topic areas:

- Safety
- Travel Time Reliability
- Goods Movement
- Roadway Capacity
- Public Transit
- Travel Demand Management

Safety

- **Manage Annual Number of Fatalities**: Manage annual number of fatalities for a total of 65 or fewer by 2030
- **Manage Annual Number of Serious Injuries**: Manage annual number of serious injuries for a total of 425 or fewer by 2030
- *Other Key Performance Indicators*:
  - Rate of Fatalities per 100 million Vehicle Miles Traveled (VMT)
  - Rate of Serious Injuries per 100 million VMT
  - Number of Non-Motorized Fatalities and Non-Motorized Serious Injuries

Travel Time Reliability

- **Manage Travel Time Reliability**: Continue to maintain the percentage of reliable person-miles traveled on the NHS system at or above 60% through 2030
- **Limit Annual Hours of Peak-Hour Excessive Delay**: Limit the annual hours of peak-hour excessive delay per capita to 9.5 or fewer by 2030
- **Manage Delay Associated with Traffic Incidents**: Manage person-hours of total delay by managing the average clearance time for traffic incidents for a total of 30 minutes or less by 2030
- **Manage Peak Period Congestion**: Manage the percentage of directional miles on the instrumented system experiencing recurring congestion during the peak periods for a total of 35 percent or less by 2030
- **Manage Recurring Congestion**: Manage the daily hours of recurring congestion on the principal arterial freeway system for a total of 1,400 or less by 2030
- **Maintain a Signal Retiming Program**: Maintain a program of evaluating 20 percent of the region's traffic signals for retiming every year on congested segments of Roadway Groups 3 and 4[8]
- *Other Key Performance Indicators*:
  - Percent of Congested Roadway Centerline Miles with MnPASS
  - Person-Hours of Delay on Transit

Goods Movement

- **Maintain Truck Travel Time Reliability**: Maintain truck travel time reliability index on the interstate system at 2.5 or less by 2030
- **Manage Over-Capacity Roadway Miles on Truck Routes**: Manage over-capacity roadway miles on major truck routes by X percent by 2030[9]
- **Manage Freight Bottlenecks**: Maintain a program of evaluating X freight bottlenecks every X years[10]

Roadway Capacity

- **Limit Congested Roadway Miles**: Limit miles of the instrumented system[11] experiencing more than 2 hours of congestion per day to 80 or less by 2030

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[8] CMP Roadway Groups are defined in Chapter 4: Regional CMP Network on page 3

[9] The performance benchmark for this measure will be established in future updates to the CMP.

[10] The performance benchmark for this measure will be established in future updates to the CMP.

- *Other Key Performance Indicators*:
  - Average Daily Number of People in MnPASS Lanes
  - Number of Registered Carpools and Vanpools

Public Transit

- **Other Key Performance Indicators:**
  - Passenger Miles Traveled
  - Transit Revenue Miles

TDM Performance Measures

- ***Key Performance Indicators*:**
  - Modal share: The Percent of Non-Single Occupancy Vehicle Travel

[11] MnDOT maintains a system of in-pavement traffic recorders on a large portion of the Interstate and principal arterial system in the metropolitan area. This system provides the data MnDOT needs to produce their Annual Congestion Report. The instrumented system is the only source that can be used to monitor the duration of congestion at this time.

4. Regional CMP Network

Defining the Congestion Management Process (CMP) network involves identifying two parts of the transportation system that will frame the congestion evaluation and implementation process:

- Geographic area of application
- Multimodal transportation network

This chapter identifies the geographic area of application and the multimodal transportation network for the Metropolitan Council CMP.

The Metropolitan Council's CMP activities have historically focused on the region's freeway system. The freeway system is operated and managed by the MnDOT Regional Transportation Management Center (RTMC), using a range of intelligent transportation system devices to frequently and regularly collect and analyze traffic data. MnDOT's freeway data collection system allows it and others to analyze and report details of freeway system performance as a part of the CMP. At the request of regional transportation authorities and local stakeholders, this CMP Plan expands the extent of the CMP network to better manage congestion throughout the region's roadway system.

Geographic Area of Application

The geographic area of application for the Minneapolis-Saint Paul metropolitan area CMP encompasses the roadway system where congestion management policies and strategies apply. The geographic area consists of the seven-county metropolitan area (Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, and Washington counties) and the contiguous urbanized parts of Wright and Sherburne

counties. A map of the CMP Plan geographic area of application is shown in Figure 4.

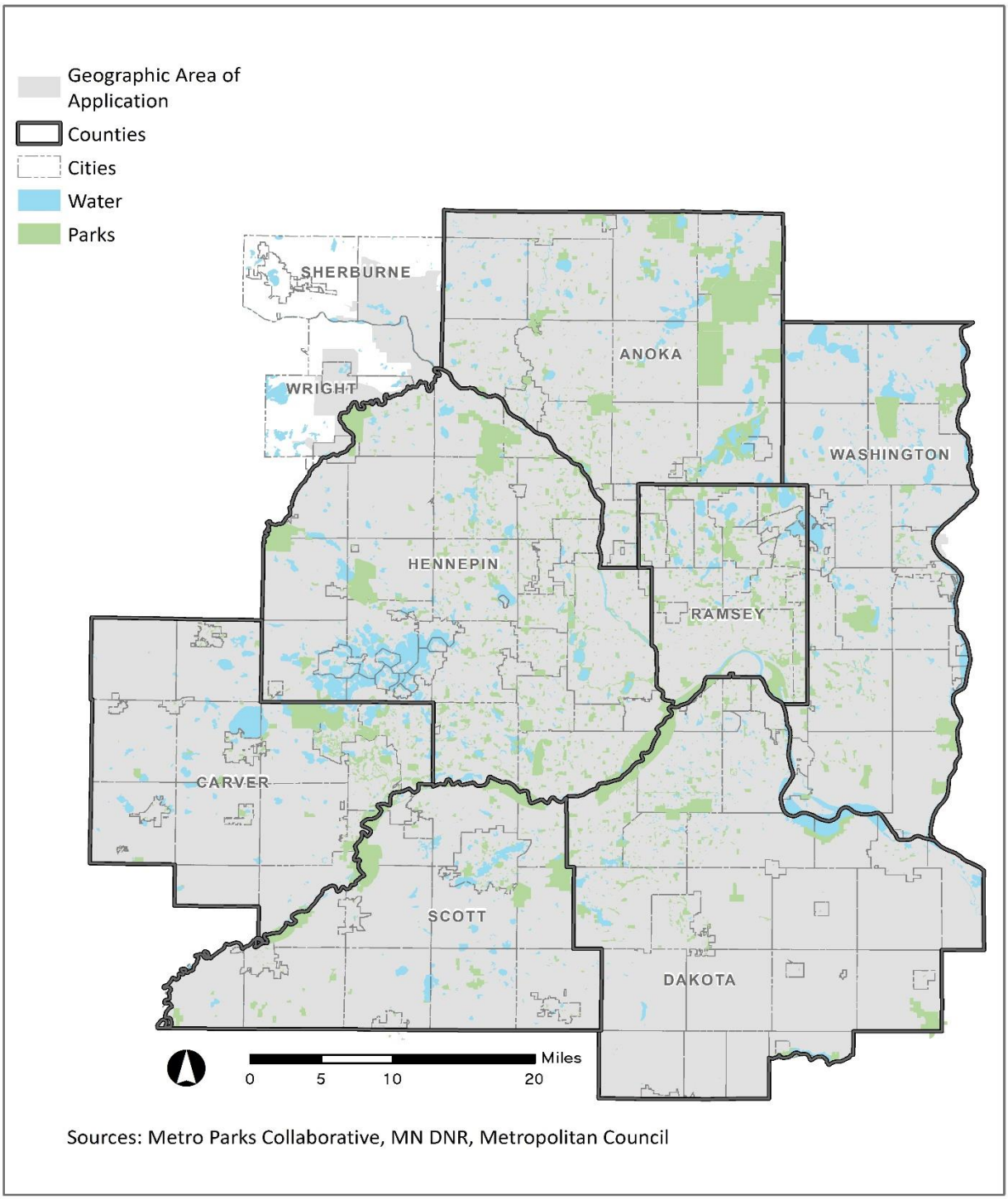


Figure 5: Metropolitan Council CMP Plan Geographic Area of Application

Multimodal Transportation Network

The Metropolitan Council CMP consists of a transportation network that includes roadways and multimodal facilities. In addition to evaluating congestion on the roadway network within the geographic

area of application, the CMP will evaluate transit, bicycle, pedestrian and trail, and freight movement networks to measure the degree to which travelers are able to choose an alternative mode of travel to single-occupancy vehicles.

CMP Roadway Network

The Metropolitan Council CMP roadway network includes five groups of roadways that are described in Table 3 and illustrated in Figure 5. Generally, the groups differentiate functional classification and roadway type.

Table 3: Regional CMP Network

Roadway Group	Description
Group 1: NHS Interstate	National Highway System (NHS) facilities that are included in the Interstate System
Group 2: NHS Non-Interstate Freeway	NHS facilities that are not included in the Interstate System but are freeways
Group 3: NHS Other Principal Arterials	NHS facilities that are neither Interstate nor freeway facilities
Group 4: A-Minor and Wright/Sherburne Minor Arterials	A-minor Arterials[12] within the seven-county area, and Minor Arterials within the contiguous urbanized parts of Wright and Sherburne counties
Group 5: Corridors of Concern	Other functionally classified roadways with congestion problems recognized by the Metropolitan Council. There are no roadways classified as Group 5 as of June 2020.

[12] "A-Minor" is a Roadway designation developed by and used only within the seven metropolitan counties to identify the most important minor arterials in the region. Further information can be found in Appendix A – Glossary of the 2040 TPP.

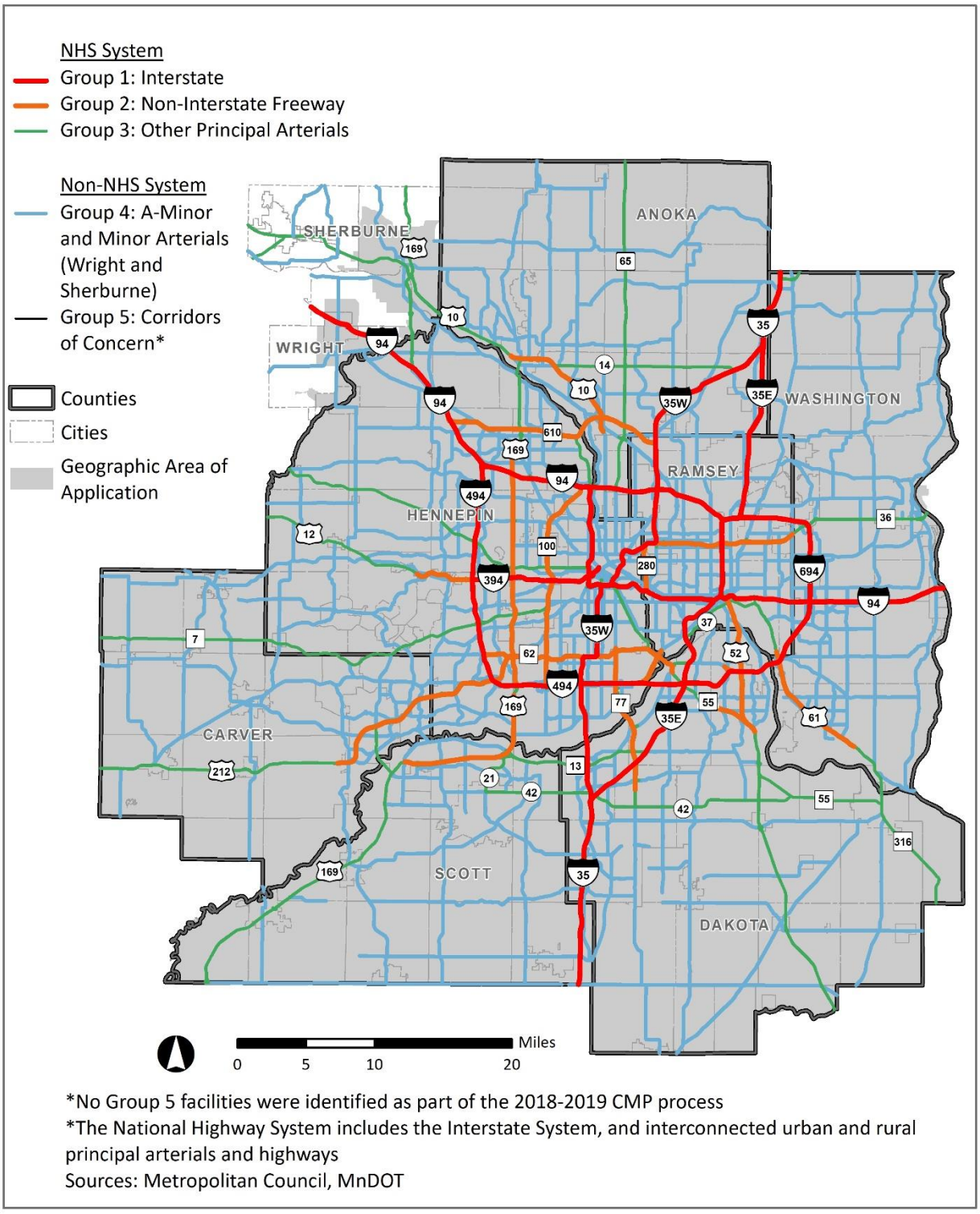


Figure 5: Metropolitan Council CMP Roadway Network

Defining the regional CMP roadway network using a grouping system yields several benefits. It establishes a clear and flexible framework for identifying and managing congestion:

- **Supports state and federally required transportation system performance measurement and reporting**. State and federal transportation law requires the Metropolitan Council to regularly report transportation system performance in the metropolitan area. Federal law requires reporting statistics for the NHS routes; the first three groups of the CMP network include the region's NHS routes, supporting efficient analysis and reporting.
- **Focuses attention on regional congestion priorities**. Regional policy has focused congestion management and investment within the 7-county area on the principal and A-minor arterial system. Based on the 2010 Census, the metropolitan transportation planning boundary expanded to include the contiguous urbanized parts of Wright and Sherburne counties. At the same time, local officials were showing significant interest in actively managing congestion on other parts of the highway network. While all minor arterials, collectors and local roads are not automatically included in the Regional CMP network, roadways with these federal functional classifications may be included in Group 5 of the CMP network after regionally significant congestion is acknowledged through CMP planning.

CMP Multimodal Network

Consistent with federal guidelines, the Metropolitan Council CMP includes a multimodal transportation network. In addition to evaluating and managing congestion on the highway network, the CMP may evaluate freight traveling on highways, transit, and other components of the regional multimodal network. Such an evaluation seeks to identify the degree to which transportation modes other than the single-occupancy vehicle provide practical transportation alternatives that may alleviate highway congestion. Aspects of the regional multimodal network evaluated by the Metropolitan Council CMP include regional transit (Figure 6), as well as MnPASS lanes and freight corridors (Figure 7). The freight corridors shown in Figure 7 were identified in the Regional Truck Highway Corridors Study.

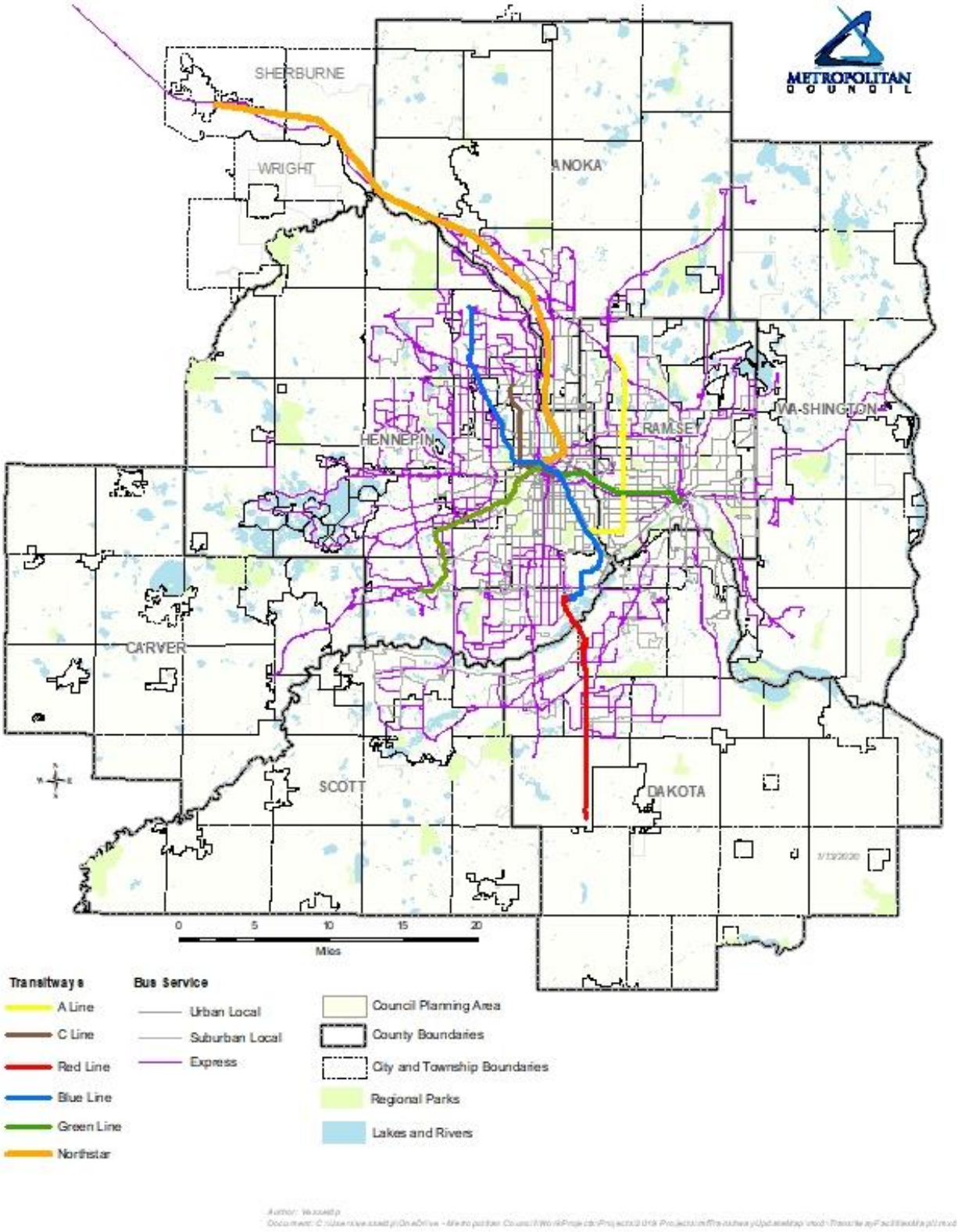


Figure 6: Minneapolis-Saint Paul Metropolitan Area Transit Routes

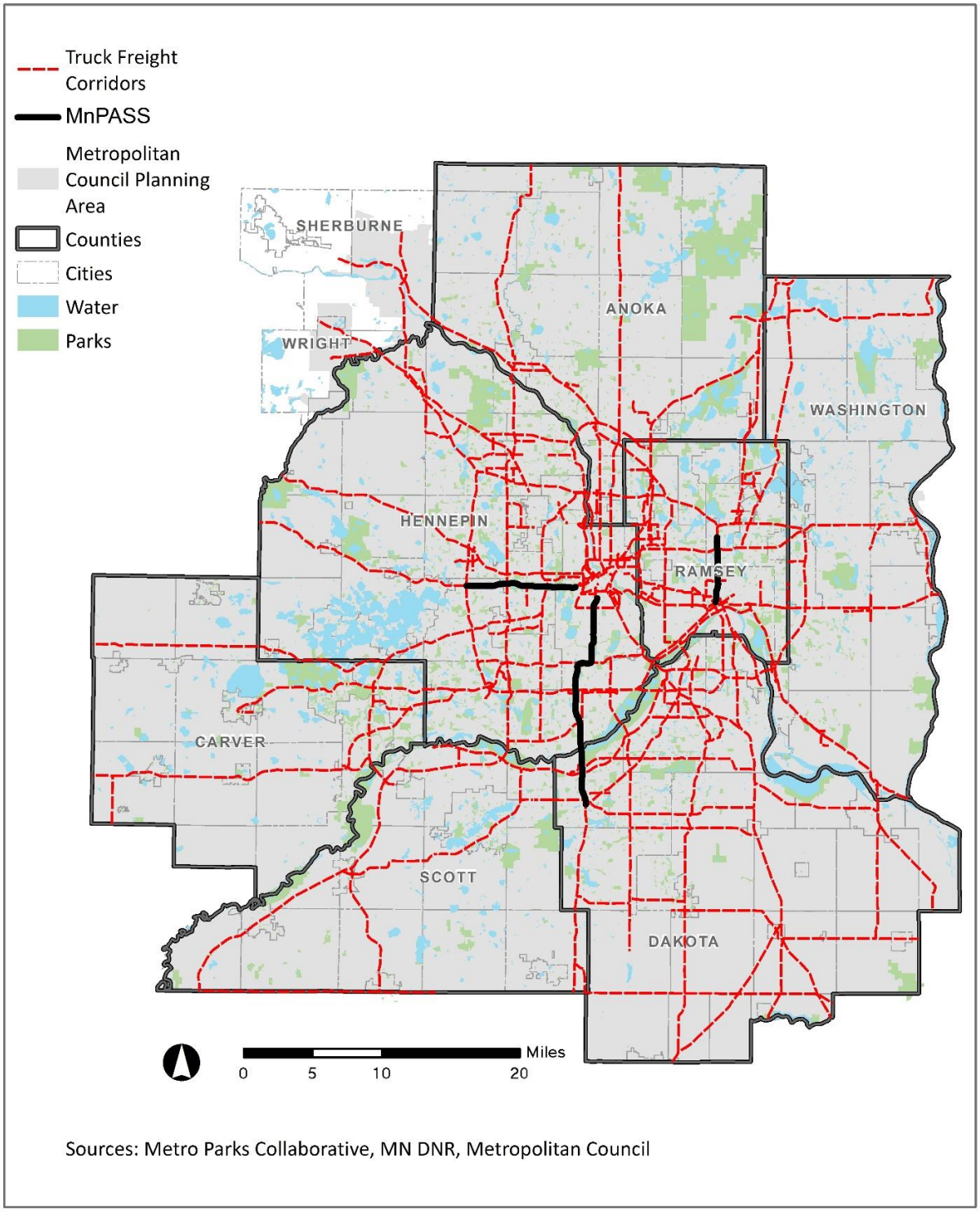


Figure 7: Minneapolis-Saint Paul Metropolitan Area Truck Freight Corridors and MnPASS Lanes

5. CMP Performance Measures

Performance measures are tools to monitor and evaluate the effectiveness of the Congestion Management Process (CMP) on the region's transportation network. They help identify congested conditions at both system-wide and local scales, track progress toward meeting regional CMP objectives, and gauge the effectiveness of congestion mitigation strategies, programs, and projects. Finally, CMP performance measures are important for communicating system conditions to policymakers and the public.

As identified by FHWA, a set of effective performance measures:

- Includes quantifiable data that are simple to present and interpret and have professional credibility
- Describes existing conditions and can be used to identify problems and to predict changes
- Can be calculated easily and with existing field data, uses techniques available for estimating the measure, and achieves consistent results
- Applies to multiple modes and is meaningful at varying scales and settings

Background

Chapter 12 of the 2040 TPP (adopted October 2018) highlights the need to develop and formalize a set of CMP performance measures that meet federal requirements, reflect local priorities, and incorporate a "SMART" approach to performance-based planning. Specifically, the 2040 TPP emphasizes the need for a set of performance measures that can:

- Track progress towards meeting regional congestion-related objectives
- Identify specific corridors that require additional data collection and analytical efforts
- Assess congestion mitigation strategies, programs, and projects
- Better communicate system performance using visualization techniques that are understandable to policy makers, the public, and the Metropolitan Council's partner agencies

While the Metropolitan Council has historically tracked various performance measures that are related to system congestion, these have not been reported in a single document and needed reevaluation to confirm their alignment with current regional policy. In the development of the CMP, the CMP Advisory Committee reexamined the performance measures currently in use, vetted them for relevance to the region's congestion management priorities, and developed several new measures to better reflect the CMP's desired outcomes. Additionally, this document consolidates the set of Metropolitan Council CMP performance measures in a single location.

Performance Measures

The CMP performance measures were selected to measure existing conditions and help evaluate the effectiveness of congestion management strategies for the CMP network. The performance measures can be characterized as falling into two general categories:

- **Performance measures that align with federally required performance measures** – These CMP performance measures align with the congestion-related measures required under the (MAP-21 and FAST Acts. These measures have federally established reporting schedules.
- **Other performance measures that relate directly to the regional CMP goals** – These measures relate to the CMP goals and have reporting frequencies that are established by Metropolitan Council.

As discussed in Chapter 3: Regional CMP Goals and Objectives, the CMP performance measures serve to establish CMP objectives that are specific, measurable, and time bound. Each CMP performance measure corresponds to a specific CMP objective, and as such, may be assigned to one of the six major topic areas presented in Chapter 3: Regional CMP Goals and Objectives:

- Safety
- Travel Time Reliability
- Goods Movement
- Roadway Capacity
- Public Transit
- Travel Demand Management

Some of the major topic areas also include key performance indicators (shown in italics). These are performance areas that the region wants to monitor without establishing a performance benchmark. Detailed descriptions of the performance measures and key performance indicators, by topic area, are presented in Table 4.

Table 4: Metropolitan Council CMP Performance Measures and Indicators[13, 14]

Item #	Performance Measures *Other Key Performance Indicators*	Description	Federal Requirement?
Safety			
1	**Annual number of fatalities**	**The number of fatalities from motor vehicle crashes. This is measured by the number of fatalities and not the number of crashes involving fatalities**	**Yes**
2	**Annual number of serious injuries**	**The number of incapacitating injuries from motor vehicle crashes. This is measured by the number of people experiencing incapacitating injuries and not the number of crashes involving incapacitating injuries**	**Yes**
3	*Rate of fatalities per 100 million Vehicle Miles Traveled (VMT)*	*The ratio of total number of fatalities to the number of vehicle miles traveled (in 100 Million VMT) in a calendar year*	*Yes*
4	*Rate of serious injuries per 100 million VMT*	*The ratio of total number of serious injuries to the number of vehicle miles traveled (in 100 Million VMT) in a calendar year*	*Yes*
5	*Number of non-motorized fatalities and non-motorized serious injuries*	*The number of pedestrian or bicycle fatalities and incapacitating injuries from crashes involving motor vehicles*	*Yes*
Travel Time Reliability			
6	**Percent of reliable person-miles traveled on the Interstate and non-Interstate National Highway System (NHS)**	**Percent of Person-Miles Traveled on the Interstate System That Are Reliable (the Interstate Travel Time Reliability measure). Percent of Person-Miles Traveled on the Non-Interstate NHS That Are Reliable (the Non-Interstate NHS Travel Time Reliability measure).**	**Yes**
	Annual hours of peak-hour excessive delay per capita	Annual hours of peak-hour excessive delay per capita	Yes
8	Average Clearance Time	The average time that it takes to completely	No

[13] **Bold text** designates a performance measure where the region has established a CMP performance benchmark (Table 2). *Italicized text* designates a performance indicator for which the region has not established a CMP performance benchmark.
[14] Methods for developing performance measure data are described in the Travel Trends Report Performance Measures Methodology Supplement.

Item #	Performance Measures *Other Key Performance Indicators*	Description	Federal Requirement?
		clear a traffic incident from the roadway	
9	**Percentage of directional miles on the instrumented system experiencing recurring congestion during the peak periods**	**Percentage of directional miles experiencing recurring congestion during the AM and PM peak periods**	**No**
10	**Daily hours of recurring congestion on the principal arterial freeway system**	**Daily hours of recurring congestion on the principal arterial freeway system facilities. AM plus PM hours of recurring congestion are reported in the Regional Transportation Management Center (RTMC) Congestion Report**	**No**
11	**Number of signalized intersections evaluated for retiming every year**	**The number of signalized intersections evaluated every year through the program**	**No**
12	*Percent of congested roadway centerline miles with MnPASS*	*Percentage of congested roadway miles on the CMP network that have MnPASS high-occupancy toll lanes. For this measure, congested roadways are those defined as having a Volume-to-Capacity Ratio greater than 1.00*	*No*
13	*Person-hours of delay on transit*	*Amount of delay transit passengers experience as compared to the shortest scheduled travel time*	*No*
Goods Movement			
14	**Truck Travel Time Reliability Index**	**This measure uses the Truck Travel Time Reliability Index**	**Yes**
15	**Over-capacity roadway miles on major truck routes**	**Percentage of over-capacity roadway miles on major truck routes. Major truck route is defined in the Transportation Policy Plan as the National Highway Freight Network established in the FAST Act plus the locally designated Critical Urban and Rural Freight Corridors.**	**No**

Item #	Performance Measures *Other Key Performance Indicators*	Description	Federal Requirement?
16	**Number of freight bottlenecks evaluated every X years**	**The number of freight bottlenecks evaluated every X years through the program[15]**	**No**
Roadway Capacity			
17	**Miles of the instrumented system experiencing more than 2 hours of congestion per day**	**The aggregate number of instrumented system miles experiencing more than 2 hours of congestion per day. This is defined within the Management Center (RTMC) Congestion Report, where AM plus PM miles of the instrumented system experiencing more than 2 hours of congestion are designated as "Severe"**	**No**
18	*Average daily number of people in MnPASS lanes*	*The average annual daily number of MnPASS Lane users*	*No*
19	*Number of registered carpools and vanpools*	*The total annual number of carpools and vanpools registered through Metro Transit Ridematch*	*No*
Public Transit			
20	*Passenger Miles Traveled*	*The number of miles passengers travel using fixed route transit in the CMP area*	*No*
21	*Transit Revenue Miles*	*The total number of revenue miles from fixed route transit routes that operate in the CMP area. Transit Revenue Miles represent the total mileage traveled by vehicles in scheduled or unscheduled revenue-producing services*	*No*
TDM Performance Measures			
22	*Modal share: the percent of non-single occupancy vehicle travel*	*Percentage of non-single occupancy vehicle travel in the CMP area*	*Yes*

[15] The methodology for this measure, and its performance benchmark, will be developed in future updates to the CMP.

Performance Benchmarks

The Metropolitan Council CMP supports an objectives-driven, outcomes-based approach to metropolitan transportation planning by linking the region's CMP goals and objectives to its performance measures and performance benchmarks. The performance benchmarks enable the region to evaluate whether progress has been made toward the desired outcomes of the CMP. The CMP performance benchmarks were developed to be "SMART," with objectives that are specific, measurable, agreed-upon, realistic and time-bound. Table 2 on page 24 presents the CMP performance benchmarks, as well as their relationship to the CMP goals, objectives and performance measures.

6. Data Collection and System Performance Monitoring Program

The ability to monitor system performance is one aspect of the congestion management process that supports effective investment decisions for transportation improvements. By tracking system performance, local and regional transportation authorities can evaluate the effectiveness of implemented congestion mitigation strategies and determine whether operational or policy adjustments are needed to improve these approaches in the future. There are several other aspects of the transportation system that should also be monitored to optimize investments, such as safety, physical condition, environmental quality, economic development, quality of life, and customer satisfaction.

The Final Rule[16] on Metropolitan Transportation Planning from the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) identifies the requirement for "a coordinated program for data collection and system performance monitoring to define the extent and duration of congestion, to contribute in determining the causes of congestion, and evaluate the efficiency and effectiveness of implemented actions." In addition, it also indicates that "to the extent possible, this data collection program should be coordinated with existing data sources and coordinated with operations managers in the metropolitan area."

As a result, the system performance monitoring program for the Twin Cities region develops a congestion monitoring and reporting framework that relies heavily on data already collected or planned to be collected in the Twin Cities region. The performance monitoring program coordinates data collection and monitoring activities for the CMP performance measures and other key performance indicators. The CMP data collection and monitoring activities are described in the following pages.

The purpose of this chapter is to identify the data collection and monitoring activities, which informs the specific management and operations strategies outlined in chapter 9 of this document. The process for determining the causes of congestion and effectiveness of implemented actions are also described in chapter 9.

Data Collection and Performance Monitoring

Data collection and monitoring activities are conducted for each of the CMP performance measures and other key performance indicators, which are grouped into the major topic areas presented in Chapter 3: safety, travel time reliability, goods movement, roadway capacity, public transit and travel demand management. Table 5 below presents data collection details for each performance measure and performance indicator.

[16] 23 CFR 450.322 (d) 3 and Congestion Management Process: A Guidebook (2011), p. 26

Table 5: Performance Measures and Data Collection Details

	Performance Measure *Other Key Performance Indicator*	Existing Reporting Requirement	Responsible Agency for Data Collection	Responsible Agency for Data Analysis	Frequency of Evaluation
Safety					
1	**Annual number of fatalities**	**FAST Act Reporting Requirement**	**Minn. Dept. of Public Safety (MnDPS)**	**MnDOT, Metropolitan Council**	**Annually**
2	**Annual number of serious injuries**	**FAST Act Reporting Requirement**	**MnDPS**	**MnDOT, Metropolitan Council**	**Annually**
3	*Rate of fatalities per 100 million Vehicle Miles Traveled (VMT)*	*FAST Act Reporting Requirement*	*MnDPS*	*MnDOT, Metropolitan Council*	*Annually*
4	*Rate of serious injuries per 100 million VMT*	*FAST Act Reporting Requirement*	*MnDPS*	*MnDOT, Metropolitan Council*	*Annually*
5	*Number of non-motorized fatalities and non-motorized serious injuries*	*FAST Act Reporting Requirement*	*MnDPS*	*MnDOT, Metropolitan Council*	*Annually*

#	Performance Measure *Other Key Performance Indicator*	Existing Reporting Stream	Responsible Agency for Data Collection	Responsible Agency for Data Analysis	Frequency of Evaluation
Travel Time Reliability					
6	Percent of reliable person-miles traveled on the Interstate and non-Interstate National Highway System (NHS)	FAST Act Reporting Requirement	FHWA	MnDOT, Metropolitan Council	Every two years
7	Annual hours of peak hour excessive delay per capita	FAST Act Reporting Requirement	FHWA	MnDOT, Metropolitan Council	Every two years
8	Average Clearance Time	Metropolitan Council CMP Dashboard	MnDPS	MnDOT, Metropolitan Council	Annually
9	Percentage of directional miles on the instrumented system experiencing recurring congestion during the peak periods	Regional Transportation Management Center (RTMC) Congestion Report	MnDOT, Metropolitan Council	MnDOT, Metropolitan Council	Annually
10	Daily hours of recurring congestion on the principal arterial freeway system	Regional Transportation Management Center (RTMC) Congestion Report	MnDOT	MnDOT	Annually
11	Number of signalized intersections evaluated for retiming every year	Metropolitan Council CMP Dashboard	MnDOT, Counties, Cities	Metropolitan Council	To be developed
12	*Percent of congested roadway centerline miles with MnPASS*	*Metropolitan Council CMP Dashboard*	*MnDOT, Metropolitan Council*	*Metropolitan Council*	*To be developed*
13	*Person-hours of delay on transit*	*Metropolitan Council CMP Dashboard*	*Metropolitan Council*	*Metropolitan Council*	*To be developed*
Goods Movement					
14	Truck Travel Time Reliability Index	FAST Act Reporting Requirement	FHWA	MnDOT, Metropolitan Council	Every two years
15	Over-capacity roadway miles on major truck routes	Metropolitan Council CMP Dashboard	Metropolitan Council	Metropolitan Council	To be developed
16	Number of freight	Metropolitan Council	MnDOT,	Metropolitan	To be

#	Performance Measure *Other Key Performance Indicator*	Existing Reporting Stream	Responsible Agency for Data Collection	Responsible Agency for Data Analysis	Frequency of Evaluation
	bottlenecks evaluated every X years[17]	**CMP Dashboard**	**Counties, Cities**	**Council**	**developed**
Roadway Capacity					
17	**Miles of the instrumented system experiencing more than 2 hours of congestion per day**	**Regional Transportation Management Center (RTMC) Congestion Report**	**MnDOT**	**MnDOT**	**Annually**
18	*Average daily number of people in MnPASS lanes*	*MnPASS Quarterly Report*	*MnDOT*	*MnDOT*	*Annually*
19	*Number of registered carpools and vanpools*	*Metropolitan Council CMP Dashboard*	*Metropolitan Council*	*Metropolitan Council*	*Annually*
Public Transit					
20	*Passenger Miles Traveled*	*Metropolitan Council CMP Dashboard*	*Metropolitan Council*	*Metropolitan Council*	*Annually*
21	*Transit Revenue Miles*	*Metropolitan Council CMP Dashboard*	*Metropolitan Council*	*Metropolitan Council*	*To be developed*
Travel Demand Management					
22	*Modal share: the percent of non-single occupancy vehicle travel*	*FAST Act Reporting Requirement*	*US Census Bureau - American Community Survey*	*Metropolitan Council*	*Every two years*

[17] The methodology for this measure will be developed in future updates to the CMP.

7. Congestion Problems and Needs Analysis

In addition to the system-wide performance monitoring activities described in Chapter 6, another purpose of the CMP is to facilitate development and implementation of congestion mitigation projects. Developing the CMP involves selecting congested-corridor study areas that will undergo detailed evaluation for identifying potential projects and/or programs to address their specific needs. The process follows three phases:

- Identification of corridor study areas
- CMP strategy screening
- Project identification and implementation

The three phases are described below and summarized in Figure 8, below.

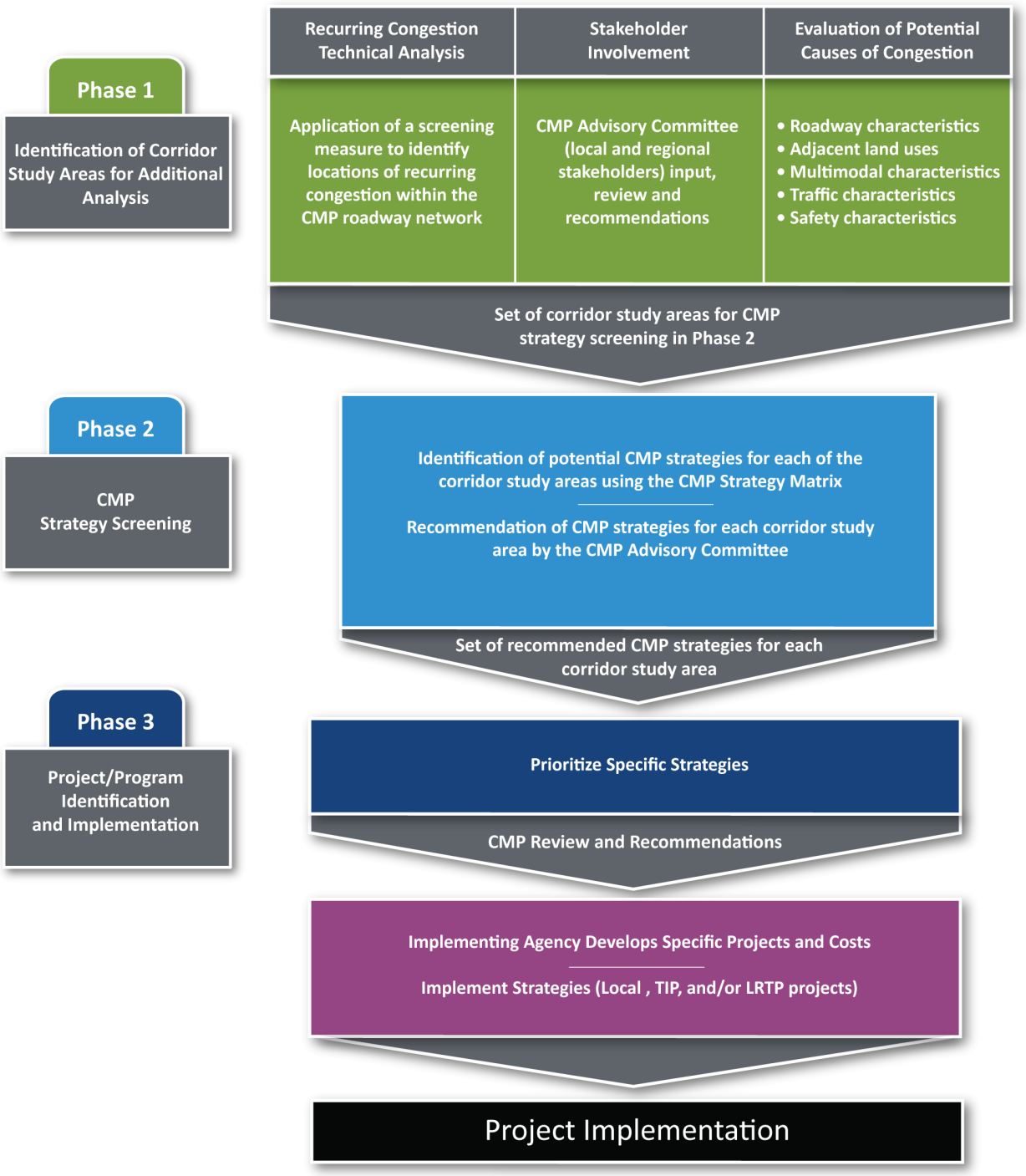


Figure 8: CMP Evaluation Process Update Process

Phase 1: Identification of Corridor Study Areas

The Metropolitan Council will lead monitoring efforts to review the degree of congestion throughout the CMP network. This process, described below, identifies the level of recurring congestion present throughout the CMP network. The integration of the evaluation of congested corridors based on

reliability and nonrecurring congestion will rely on future work based on observed travel time data. Corridor study areas selected in this phase then undergo further evaluation to identify the specific causes of congestion for each.

Phase 2: CMP Strategy Screening

Once a set of corridor study areas has been selected, the CMP Advisory Committee analyzes the study areas and identifies potential congestion management strategies for each. Chapter 8 provides a Congestion Management Strategies Toolbox to help with the strategy identification.

Phase 3: Project Identification and Implementation

The congestion management strategies that are identified as potentially applicable to the selected Corridor study areas are then evaluated in greater detail by the lead implementing agency. During this phase, the lead agency performs additional analysis of potential projects to identify specific improvements, implementation issues, and costs. Programs, such as demand-reducing programs, or policy changes are evaluated to identify recommended action items. The lead agency then selects projects or programs to be implemented.

Corridor Study Area Selection and Congestion Needs Identification Process

During the Phase 1 of project identification, the CMP Advisory Committee selects a set of corridor study areas from the CMP network for additional analysis using a two-step process. This approach, which is suggested by FHWA[18], involves application of a congestion screening measure which is supplemented later by additional congestion evaluation techniques. The process is summarized below.

Step 1: Screen the CMP Network for Congestion

The Metropolitan Council screens the entire CMP roadway network to identify locations of congestion. The specific screening methodology applied, along with the screening results, is described in the Transportation Trends report. This step yields a list of congested network locations.

The screening methodology used in the 2019 CMP update is documented in the Policy and Procedures Handbook Methodology Compendium Section B.

Step 2: Conduct Additional Analysis and Select Corridor Study Areas

The CMP Advisory Committee evaluates the list of congested locations within the CMP roadway network based on how recent previous analyses were done, timeline for recent or programmed improvements, lead agency support (whether agency with corridor jurisdiction is cooperative in conducting the analysis and identification of potential congestion management strategies), and geographic balance throughout the region; these selection criteria may be modified over time. The CMP Advisory Committee also reviews the locations to identify potential causes of congestion including:

- Roadway characteristics: Purpose and functional classification; number and type of lanes; roadway and lane width; speed limit; access/intersection spacing and type; presence and connectivity of frontage roads
- Adjacent land uses and land use patterns
- Multimodal characteristics: Presence and condition of other transportation facilities such as railroads, trails, and sidewalks; span, frequency, and stop locations for bus service

[18] Congestion Management Process: A Guidebook (2011), p. 24

- Safety characteristics: Number and severity of crashes (fatal, serious injury, other); types of crashes (head on, rear-end, sideswipe opposing, sideswipe same direction, right angle)
- Traffic characteristics: Daily volumes; peak period traffic characteristics; trip classification (local or regional circulation and access)

The methodology for the trip classification analysis used for the 2019 CMP update can be found in the Policy and Procedures Handbook Methodology, Compendium Section D. The methodology for the crash data analysis used for the 2019 CMP update can be found in the Policy and Procedures Handbook Methodology Compendium Section C.

Connection to the System Performance and Monitoring

To effectively reduce congestion, the Metropolitan Council follows an annual process for system performance monitoring and reporting. A central component of this process is identifying and evaluating congested CMP network locations by the CMP Advisory Committee.

8. CMP Strategy Identification and Assessment

This chapter summarizes the Congestion Management Process (CMP) strategy selection and assessment process. Following the identification of corridor study areas (discussed in Chapter 7), the CMP Advisory Committee identifies potential CMP strategies for development as projects and programs by the lead implementing agency.

The Congestion Management Strategies Toolbox described below identifies potential congestion management strategies. The Congestion Management Strategies Toolbox is applied in a workshop setting using the Congestion Management Strategies Matrix (Congestion Management Plan Methodology Compendium; Section E) to help collaborative review of the corridor study areas. The strategy identification and assessment workshop need to include planners and engineers with expertise in each corridor study area from the road authority, local governments where the study area is located, Metropolitan Council, and any other interested parties. Information on the relationship between strategies and performance measures can be found in the “Strategies to Performance Matrix” in the Congestion Management Process Methodology Compendium; information on the recommended applications of specific strategies by facility, geographic area, time of day, and other factors can be found in the Congestion Management Process Plan Application Matrices Compendium.

The Congestion Management Strategies Toolbox should be revisited periodically to assure that CMP strategies are reflective of new technologies, services, and opportunities within the transportation system. For example, the emergence of autonomous and connected vehicle technology is expected to have important impacts on the nation’s transportation system over the coming decades and may impact the strategic framework for congestion management.

Congestion Management Strategies

The Congestion Management Strategies Toolbox helps planners, engineers, and decisionmakers effectively identify and apply these congestion management strategies. The strategies can be grouped into the broad categories of Demand Management Strategies and Operational Management Strategies, as presented in Figure 11.

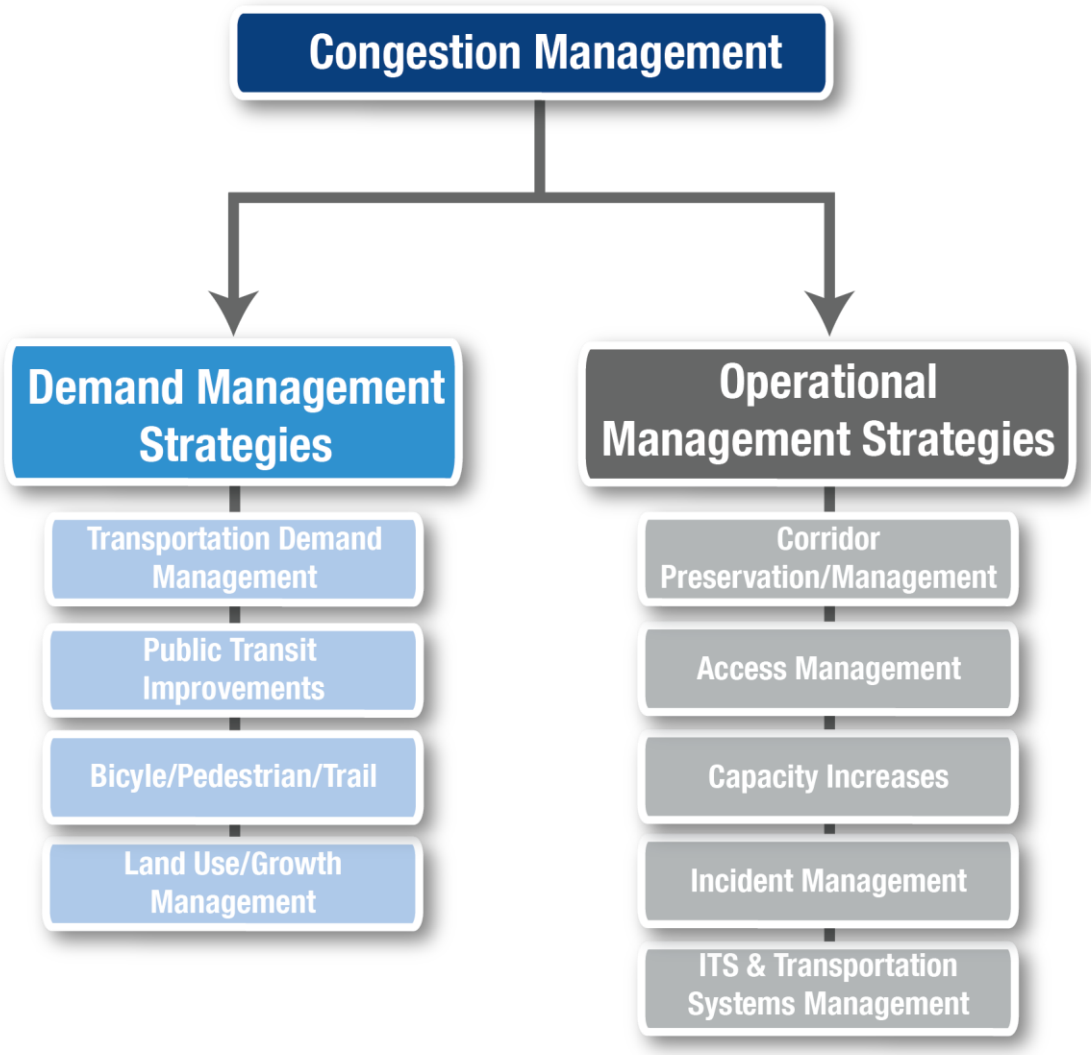


Figure 11: Congestion Management Strategies

Congestion Management Strategies Toolbox

The CMP uses a strategy toolbox with multiple categories to help develop congestion mitigation strategies for selected corridor study areas. Following an approach used by other MPOs and promoted by FHWA[19], the toolbox of strategies is organized to encourage consideration of demand management and operational strategies before adding traditional roadway capacity. The Toolbox is summarized in Figure12.

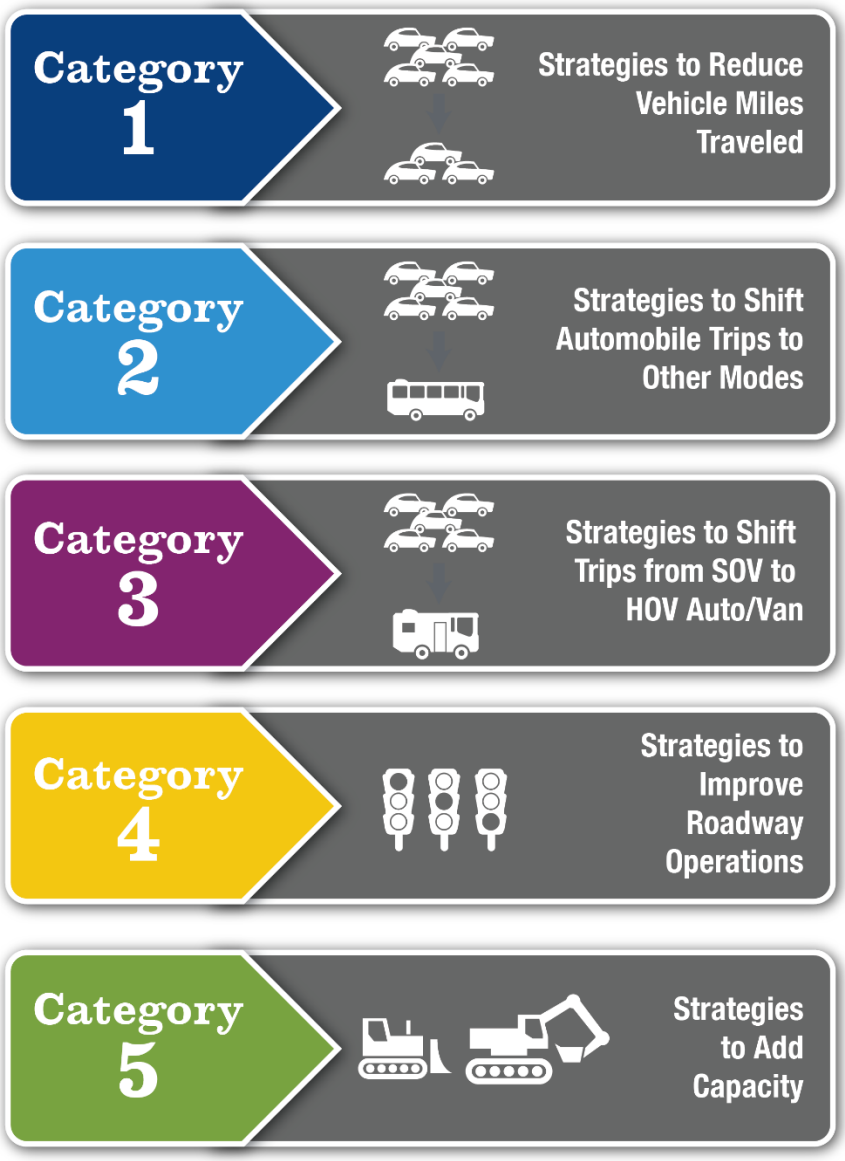
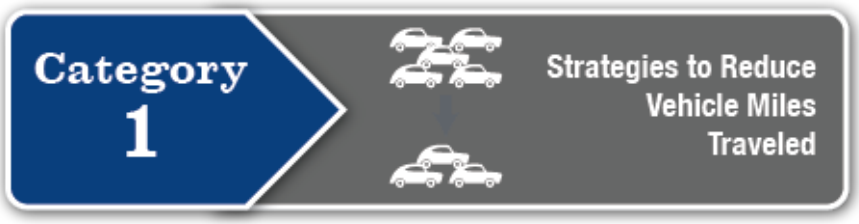


Figure 12: Congestion Management Toolbox

[19] 23 CFR 405.320 (c) 4 and Congestion Management Process: A Guidebook (2011), p. 32.

This congestion management approach is consistent with the Council's Transportation Policy Plan, FHWA congestion management process guidance, and industry trends to consider all available solutions before adding traditional roadway capacity. The CMP toolbox of strategies is discussed in the remainder of this section.



Category 1: Strategies to Reduce Vehicle Miles Traveled

Travel Demand Management Strategies

These strategies are used to reduce the use of single occupant motor vehicles, as the overall objective of TDM is to reduce the miles traveled by automobile. The following TDM strategies are available for consideration in the toolbox to potentially reduce travel in the peak hours. Strategies include:

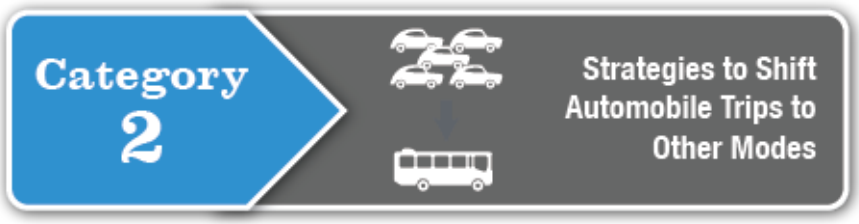
- **1.01 Congestion Pricing (MnPASS):** Congestion pricing can be implemented statically or dynamically. Static congestion pricing requires that tolls are higher during traditional peak periods. Dynamic congestion pricing allows toll rates to vary depending upon actual traffic conditions. The more congested the road, the higher the cost to travel on the road. Dynamic congestion pricing works best when coupled with real-time information on the availability of other routes.
- **1.02 Alternative Work Hours:** There are three main variations: staggered hours, flextime, and compressed work weeks. Staggered hours require employees in different work groups to start at different times to spread out their arrival/departure times. Flextime allows employees to arrive and leave outside of the traditional commute period. Compressed work weeks involve reducing the number of days per week worked while increasing the number of hours worked per day.
- **1.03 Telecommuting:** Telecommuting policies allow employees to work at home or from a regional telecommute center instead of going into the office. Telecommunicating policies may be practiced all the time or only one or more days per week.
- **1.04 Guaranteed Ride Home Programs:** These programs provide a safety net to those people who carpool or use transit to work so that they can get to their destination if unexpected work demands or an emergency arises.
- **1.05 Alternative-Mode Marketing and Education:** Providing education on alternative modes of transportation can be an effective way of increasing demand for alternative modes. This strategy can include mapping websites that compute directions and travel times for multiple modes of travel.
- **1.06 Safe Routes to Schools Program:** This federally funded program provides 100 percent funding to communities to invest in pedestrian and bicycle infrastructure surrounding schools.
- **1.07 Preferential or Free Parking for High Occupancy Vehicles (HOVs):** This program provides an incentive for employees to carpool with preferred, free-of-charge parking for HOVs.
- **1.08 Event Transportation Management Plans**: Cities develop multimodal transportation management plans to identify and communicate transportation options to participants.

Land Use/Growth Management Strategies

The strategies in this category include policies and regulations that would decrease the total number of existing auto trips and trip lengths while promoting transit and nonmotorized transportation options. These strategies include the following:

- **1.09 Negotiated Demand Management Agreements:** As a condition of development approval, local governments require the private sector to contribute to traffic mitigation agreements. The agreements typically set a traffic reduction goal (often expressed as a minimum level of ridesharing participation or a stipulated reduction in the number of automobile trips).
- **1.10 Trip Reduction Ordinance:** These ordinances use a locality's regulatory authority to limit trip generation from a development. They spread the burden of reducing trip generation among existing and future developments better than negotiated demand management agreements.
- **1.11 Infill Developments:** This strategy takes advantage of infrastructure that already exists, rather than building new infrastructure on the fringes of the urban area. Infill development can increase the development density of an area to a level that supports more travel by alternative modes and less auto dependence.
- **1.12 Transit Oriented Developments:** This strategy clusters housing units and/or businesses near transit stops or stations in walkable communities. By providing convenient access to alternative modes, auto dependence can be reduced.
- **1.13 Design Guidelines for Pedestrian-Oriented Development:** Maximum block lengths, building setback restrictions, and streetscape enhancements are examples of design guidelines that can be codified in zoning ordinances to encourage pedestrian activity and less auto dependence.
- **1.14 Mixed-Use Development:** This strategy allows many trips to be made without automobiles. People can walk to restaurants and services rather than use their vehicles.
- **1.15 Long-Range Comprehensive Land Use Planning:** This strategy supports cities, counties, and the region in identifying and planning for population, household, and employment changes and their impacts on land use, transportation, other infrastructure, and natural resources.[20]

[20] Minn. Stat. 473.851 requires all communities in the 7-county metropolitan area to prepare comprehensive plans that are consistent with the metropolitan development guide (Thrive MSP 2040) and related system plans, including the Transportation Policy Plan.



Category 2: Strategies to Shift Automobile Trips to Other Modes

Public Transit Strategies

Two types of strategies, capital improvements and operating improvements, are used to enhance the attractiveness of public transit services to shift existing auto trips to transit. Transit capital improvements generally modernize the transit systems and improve their efficiency; operating improvements make transit more accessible and attractive. The following strategies are included in the toolbox for consideration:

- **2.01 Transit Capacity Expansion:** This strategy adds new vehicles to expand transit services.
- **2.02 Increasing Bus Route Coverage and/or Frequencies:** This strategy provides better accessibility to transit to a greater share of the population. Increasing frequency makes transit more attractive to use.
- **2.03 Implementing Regional Transitways:** Bus rapid transit (BRT), light rail transit (LRT), and commuter rail best serves dense urban centers where travelers can walk to their destinations. Transitways from suburban areas can sometimes be enhanced by providing park-and-ride lots.
- **2.04 Providing Real-Time Information on Transit Routes:** Providing real-time information on transit progress either at bus stops, terminals, transit stations and/or personal wireless devices makes intermodal travel more attractive.
- **2.05 Reducing Transit Fares:** This strategy encourages additional transit use, to the extent that high fares are a real barrier to transit. However, due to the direct financial impact on the transit system operating budgets, reductions in selected fare categories may be a more feasible strategy to implement.
- **2.06 Provide Transit Advantages:** Transit advantages on the street and highway system support reliable transit service. Strategies include exclusive right-of-way, bus-only lanes, bus-only shoulders, and bus bypass ramps.
- **2.07 Provide Transit Signal Priority:** Transit signal priority can move high-frequency buses through congested intersections and create more reliable transit travel times.
- **2.08 Encourage Off-board Fare Collection**: To yield more reliable transit travel times, encourage off-board fare collection at the busiest transit boarding locations.

Freight Transportation Strategies

- **2.09 Monitor Shifting Freight Numbers:** The continued monitoring of local freight volumes and the location of major freight generators allows transportation authorities to respond to freight congestion with appropriate policies and projects.

Non-Motorized Transportation Strategies

Non-motorized strategies include bicycle, pedestrian, and trail facility improvements that encourage non-motorized modes of transportation instead of single-occupant vehicle trips. The following strategies are included:

- **2.10 New Sidewalk Connections:** Increasing sidewalk continuity and connectivity encourages pedestrian traffic for short trips.
- **2.11 Enhanced Pedestrian Crossings:** Transit benefits from high-quality and connected pedestrian infrastructure. Visibly marked crosswalks can make the pedestrian street crossing experience more pleasant and noticeable, which could increase transit service ridership.
- **2.12 Designated Bicycle Facilities on Local Streets:** Enhancing the visibility of bicycle facilities can increase the perception of safety. In many cases, bicycle lanes can be added to existing roadways through restriping.
- **2.13 Improved Bicycle Facilities at Transit Stations and Other Trip Destinations:** Bicycle racks and bicycle lockers at transit stations and other trip destinations increase security. Additional amenities such as locker rooms with showers at workplaces provide further incentives for using bicycles.
- **2.14 Improved Safety of Existing Bicycle and Pedestrian Facilities:** Maintaining lighting, signage, striping, traffic control devices, and pavement quality and installing curb cuts, curb extensions, median refuges, and raised crosswalks can increase bicycle and pedestrian safety.
- **2.15 Exclusive Non-Motorized ROW:** Abandoned rail rights-of-way and existing parkland can be used for medium- to long-distance bicycle trails, improving safety and reducing travel times.
- **2.16 Complete Streets:** Design and operate the entire right-of-way for the most vulnerable users. Safe access for all users including pedestrians, bicyclists, motorists, and transit may lead to fewer crashes and lower levels of delay systemwide.
- **2.17 Preservation Projects with Multimodal Improvements**: This strategy includes scoping pavement, bridge, and infrastructure preservation projects to identify the needs of all applicable travel modes when developing and constructing to address each mode's needs and incorporate multiple congestion management strategies into a single project.
- **2.18 Park-and-Ride Lots:** These lots can be used in conjunction with HOV/HOT lanes, express bus services, and transitways. They are particularly helpful when coupled with other commute alternatives such as carpool/vanpool programs, transit, and/or HOV/HOT lanes. The lots may be publicly owned or a public-private partnership.

Category 3: Strategies to Shift Trips from SOV to HOV Auto/Van

Making it easier, more efficient, or more cost effective to travel via high-occupancy vehicle can manage congestion that results from low-vehicle occupancy.

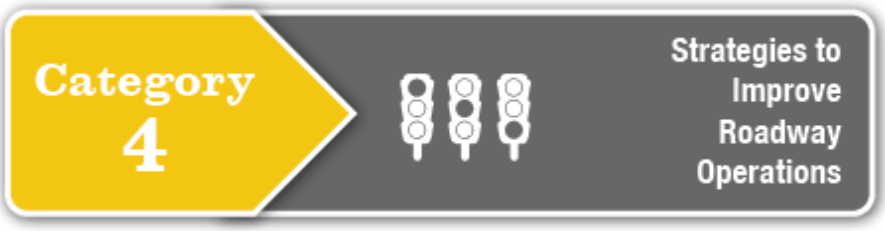
Travel Demand Management Strategies

The following TDM strategies are recommended to encourage high-occupancy vehicle (HOV) use on the existing system:

- **3.01 Ridesharing (Carpools & Vanpools):** In ridesharing programs, participants are matched with potential candidates for sharing rides. This typically is arranged/encouraged through

employers or transportation management agencies that provide ride-matching services. These programs are more effective if combined with HOV lanes, parking management, guaranteed ride home policies, and employer-based incentive programs.

- **3.02 Employer-Landlord Parking Agreements:** Employers can negotiate leases so that they pay only for parking spaces used by employees. In turn, employers can pass along parking savings by purchasing transit passes or reimbursing non-driving employees with the cash equivalent of a parking space
- **3.03 Parking Management:** This strategy reduces the availability of free parking to encourage other modes of transportation. Options include reducing the minimum number of parking spaces required per development, increasing the share of parking spaces for HOVs, introducing or raising parking fees, providing cash-out options for employees not using subsidized parking spaces, and expanding parking at transit stations or park- and-ride lots



Category 4: Strategies to Improve Roadway Operations

Streamlining roadway operations can manage congestion.

Strategies Using Intelligent Transportation Systems (ITS)

The strategies in ITS use new and emerging technologies to manage existing congestion while improving safety and environmental impacts. Typically, these systems consist of many components, including sensors, electronic signs, cameras, controls, and communication technologies. ITS strategies are sets of components working together to provide information and allow greater control of the operation of the transportation system. The following strategies are included in the toolbox.

- **4.01 Dynamic Messaging:** Dynamic messaging uses changeable message signs to warn motorists of downstream queues; it provides travel time estimates, alternate route information, and information on special events, weather, or accidents.
- **4.02 Advanced Traveler Information Systems (ATIS):** ATIS provide an extensive amount of data to travelers, such as real-time speed estimates on the Web or over wireless devices and transit vehicle schedule progress. It also provides information on alternative route options.
- **4.03 Integrated Corridor Management (ICM):** This strategy, built on an ITS platform, coordinates the individual network operations with parallel facilities, creating an interconnected system. A coordinated effort between networks along a corridor can effectively manage the total capacity in a way that will result in reduced congestion.
- **4.04 Automated and Connected Vehicles:** Automated vehicles could have a profound impact on congestion mitigation by optimizing “platooning” (a group of vehicles traveling very closely together safely at high speed) and the capacity of the street network. This strategy recommends being proactive with policy on automated and connected vehicles.
- **4.05 Advanced Traffic Management System (ATMS):** This strategy uses real-time information to improve traffic flow. A few methods that could be utilized to improve traffic flow based on ATMS information are rerouting of traffic, dynamic messaging, or signal timing adjustments.

- **4.06 Traffic Signal Coordination:** Signals can be pre-timed and isolated from other signals, pre-timed and synchronized with other signals, actuated by events (such as the arrival of a vehicle, pedestrian, bus, or emergency vehicle), set to adopt one of several pre- defined phasing plans based on current traffic conditions, or set to calculate an optimal phasing plan based on current conditions.

Transportation Systems Management Strategies

Transportation Systems Management (TSM) strategies identify operational improvements to enhance the capacity of existing infrastructure and right-of-way. These strategies typically are used together with ITS technologies to better manage and operate existing transportation facilities. The following strategies are included in the toolbox.

All Streets and Highways

- **4.07 Bottleneck Relief:** This strategy corrects short, isolated, and temporary lane reductions, and other physical limitations that form a capacity constraint and results in a traffic bottleneck.
- **4.08 Changeable Lane Assignment/Dynamic Lane Control:** This policy encourages creative lane distribution to increase capacity and improve traffic flow. This strategy includes reversible flow lanes and movable median barriers, which add capacity during peak periods.
- **4.09 Vehicle Use Limitations and Restrictions:** This strategy includes all-day or selected time-of-day restrictions of vehicles, typically trucks, to increase roadway capacity.
- **4.10 Improved Signage:** Improving signage to clearly communicate location and direction information can improve traffic flow.
- **4.11 Geometric Improvements for Transit:** This strategy includes providing for transit stop locations that do not affect the flow of traffic, improve sight lines, and improve merging and diverging of buses and cars.
- **4.12 Intermodal Enhancements:** Coordinating travel modes makes movement from one mode to the other easier. These enhancements typically include modifying transit schedules to reduce layover time or increase the opportunity for transfers, creation of multimodal facilities, informational kiosks, and improved amenities at transfer locations. These improvements can improve the freight and pedestrian experience.
- **4.13 Goods Movement Management**: This strategy restricts delivery or pickup of goods in certain areas or during certain times to reduce congestion.
- **4.14 Towing Improvements:** Implementing a zero-tolerance policy for towing vehicles on metro freeways and in construction zones on non-freeway arterials will reduce turbulence and lead to more reliable thoroughfares.
- **4.15 Shared Mobility:** Shared mobility (Uber, Lyft, shared bicycles and scooter) implementation can create a more balanced and cost-effective transit network where the lowest ridership demand areas are served by transportation network companies (TNCs) in lieu of on-demand dial-a-ride. This strategy highlights the potential to partner with private TNCs, such as Uber, Lyft, or Via Transportation, in creating policies and services for shared mobility.

Freeways

- **4.16 Ramp Metering:** This strategy reinforces ramp metering to reduce the congestion impact from merging vehicles.
- **4.17 Freeway Auxiliary Lanes that are shorter than one mile:** This strategy recommends adding auxiliary lanes to help drivers merge into freeway traffic more efficiently, increasing safety and lessening congestion impacts.

- **4.18 Ramp Modifications:** This strategy reinforces ramp modifications to reduce the congestion impact from merging or diverging traffic
- **4.19 Interchange Removal:** This strategy supports the removal of urban interchanges when feasible and when the removal would support other congestion mitigation efforts, such as reducing turbulence and maintenance costs

Non-Freeways

- **4.20 Signal Timing**: This strategy involves adjusting the signal timing through the corridor to reflect current volumes, travel patterns, and to relieve congestion.
- **4.21 Parking Restrictions**: This strategy is used to convert parking lanes to travel lanes during peak periods. Parking signs can be used to notify vehicles to not park in certain areas during peak periods to add capacity to the roadway.
- **4.22 One-Way Conversions**: Converting streets from two-way to one-way at strategic locations can increase traffic flow, offer improved signal timing, and accommodate odd-spaced signals. Additionally, one-way conversions can simplify crossings for pedestrians, who must look for traffic in only one direction.
- **4.23 Network Management**: This strategy encourages the use of alternative, uncongested intersections to reduce congestion at key intersections and improve safety.
- **4.24 Superstreet Corridors**: This strategy uses superstreet corridors to improve suburban and ex-urban mobility by delivering two-way progression, reducing intersection size, and improving bus travel time and reliability.
- **4.25 Alternative Intersection Design**: This strategy encourages nontraditional solutions, such as" superstreet" and non-freeway interchange types like single-loop interchanges, quadrant roads, "High T" intersections, and elevated left turns.

Incident Management Strategies

Incident management strategies identify ways to ensure that corridors maintain capacity during incidents. Incidents can significantly affect the travel lanes and consequently the capacity and the congestion of a corridor.

- **4.26 Snow Removal**: This strategy involves ensuring that snow is cleared from priority roadways and corridors during and soon after a snow event. Ensuring that snow removal is done consistently and efficiently will allow roadways to maintain capacity during a snow event.
- **4.27 Pavement and Bridge De-Icing**: This strategy involves making sure there is a proper procedure in place to de-ice bridges and roadways during cold weather events. Snow or ice on roadways or bridges have potential to cause significant delay and crashes.
- **4.28 Incident Detection and Management Systems:** This strategy addresses primarily non-recurring congestion, typically includes video monitoring and dispatch systems, and may also include roving service-patrol vehicles.

Access Management Strategies

- **4.29 Dynamic Access Changes:** This strategy involves closing interchanges, intersections, or restricting movements at interchanges and intersections in real-time to address congestion.
- **4.30 Access Management Policies:** This strategy includes adoption of policies to regulate driveways and limit curb cuts and/or policies that require continuity of pedestrian, bicycle, and trail facilities.

Integrated Construction Strategies
An integrated construction approach reduces inconvenience to the traveling public by coordinating separate needs.

- **4.31 Coordinated Preservation Projects**: This strategy includes analyzing the locations of programmed transportation projects and avoiding simultaneous construction on parallel corridors that serve as alternate routes.

CMP Safety Mitigation
- **4.32 CMP Safety Mitigation**: The CMP process includes safety issues in identifying congested corridors by using crash data produced by MnDOT. This system produces reports by crash type or cause, which can later be used to identify safety issues on the major roadway network for both congested and uncongested roadways. Reducing the number of crashes that occur on major roadways can reduce nonrecurring congestion. While the delay incurred resulting from crashes cannot be determined easily, it is a significant contribution of delay on major roadways.

Category 5: Strategies to Add Capacity
Adding capacity to the network is the final strategy to manage congestion.

Corridor Preservation Strategies
Creating connected and well-maintained corridors will enable constant, easy, and unimpeded movement.

- **5.01 Corridor Preservation:** This strategy includes implementing, where applicable, land acquisition techniques such as full title purchases of future rights-of-way and purchase of easements to plan proactively in anticipation of future roadway capacity demands.

Capacity Expansion Strategies
Adding lanes can be considered when other demand and operational management strategies cannot improve travel conditions for people and freight.

- **5.02 Turn Lanes:** This strategy is used to optimize the flow of traffic for making left or right turns, usually using only concrete islands or pavement markings. Turn lanes increase capacity and improve operations by reducing queue distances and delays for both the through and turning movements.
- **5.03 Reallocation of Current Right-of-Way Space:** Restriping to adjust the width, number, or directionality of lanes can add capacity in the direction or movement that is experiencing congestion.
- **5.04 Intersection Improvements:** Intersections can be widened and lanes restriped to increase intersection capacity and safety. This may include widened shoulders. Intersection geometry

can be changed from a standard intersection to a continuous flow intersection, roundabout, reduced-conflict intersection, three-quarter intersection with J-turns or partial interchanges.

- **5.05 High Occupancy Vehicle Lanes:** Adding new HOV lanes increases corridor capacity while, at the same time, providing an incentive for single-occupant drivers to shift to ridesharing. In the Twin Cities, MnDOT has converted HOV lanes into MnPASS high-occupancy toll (HOT) lanes where single-occupant vehicles pay tolls to use the facility while transit and vehicles with two or more occupants use the facility for free.
- **5.06 Managed Lanes:** FHWA defines managed lanes as highway facilities or a set of lanes in which operational strategies are implemented and managed in real time to respond to changing conditions. Examples of managed lanes may include high-occupancy toll (HOT) lanes with tolls that vary based on demand, exclusive bus-only lanes, truck-only lanes, HOV and clean air and/or energy-efficient vehicle lanes, and HOV lanes that could be changed into HOT lanes in response to changing levels of traffic and roadway conditions.
- **5.07 Interchange Configuration Modifications:** Examples include hybrid interchanges and partial cloverleaf interchange modifications.
- **5.08 Additional General-Purpose Lanes:** This strategy involves increasing the capacity of congested roadways through additional general-purpose travel lanes, including freeway auxiliary lanes that are longer than one-mile and converting signalized four-lane arterials to six-lane arterials.
- **5.09 Increase the Capacity of the System Through New Roadway Facilities.** Examples include local roads parallel to freeways, collector-distributor roads at freeway interchanges, and frontage roads.

9. CMP Strategy Framework for Programming, Implementation, and Evaluation

The congestion management strategies identified by the CMP Advisory Committee as having the greatest potential benefit are shared with the lead implementing agency for further development as specific projects. The lead implementing agency evaluates the potential congestion management projects and programs in detail to identify costs, anticipated benefits, funding, and the implementation schedule. This strategy programming and implementation framework helps communicate when, where, how, and by whom CMP investments are made.

Programming and Implementation Framework

The CMP framework provides guidance and transparency for the process by which CMP recommendations are developed into projects and implemented. This framework consists of four components:

- **CMP Strategy Recommendations** – The CMP Advisory Committee recommends potential congestion management strategies.
- **Project Development** – The lead implementing agency considers the potential congestion management strategies and develops them into specific projects and/or programs.
- **Project Prioritization and Selection Processes** – Lead implementing agency proposes projects for funding through agency programs or competitive programs like the Regional Solicitation, the regional prioritization and selection process that reflects TPP policy direction.
- **Project Programming and Implementation** – For projects selected through the Regional Solicitation, or other federally funded competitive grant programs, the region reports the results of its project selection efforts in updates to the Transportation Improvement Program (TIP). Local agencies identify locally funded projects in their capital improvement plans and programs.

The text below describes the four components in more detail.

CMP Strategy Recommendations

The first component of the CMP strategy compiles and communicates the recommendations developed by the CMP Advisory Committee. The recommendations are shared with potential lead implementing agencies, stakeholders, and others involved in the project development process. The CMP Strategy, Matrix summarized in Table 6 presents an example format for documenting and communicating the CMP recommendations.

Table 6: The CMP Strategy Matrix

Identified By	Strategy	Effectiveness	Time Frame	Responsibility
Committee or subcommittee recommending the strategy	Description of the recommended strategy, including the project(s) or program(s) through which the strategy will be implemented	Indication of the expected effectiveness of the strategy, expressed as High, Medium, or Low	Indication of the time required to develop and implement the strategy, expressed as Short, Medium, or Long	Government entity responsible for implementing the strategy
"	Strategy 1	"	"	"
"	Strategy 2	"	"	"
"	Strategy 3	"	"	"

The implementation time frame is defined as:

- Short-term: Five years or less to develop and implement the strategy
- Mid-term: Six to 10 years to develop and implement the strategy
- Long-term: Longer than 10 years to develop and implement the strategy

Project Development

The next step in CMP strategy programming and implementation is further development of one or more specific projects by the lead implementing agency. The lead agency develops the specific project scope, capital and operating costs, and implementation plan and schedule, including potential funding sources.

Project Prioritization and Selection Processes

As specific projects are identified, lead agencies can pursue funding. Funding sources may include programs funded and administered by the lead implementing agency, and competitive grant programs such as the Regional Solicitation administered by the Transportation Advisory Board (TAB) to the Metropolitan Council.

The Regional Solicitation reflects the transportation investment direction established in the Transportation Policy Plan. Every two years, the TAB updates the Regional Solicitation project scoring criteria to better incorporate TPP policy direction and address regional needs. For example, the update to the 2020 Regional Solicitation put more transparent emphasis on projects coming from regional system studies, including:

- Integrating the results of regional prioritization efforts into the project scoring, including:
  - Principal Arterial Intersection Conversion Study
  - Congestion Management and Safety Plan IV

    - Highway Truck Corridor Study
- Increasing the maximum federal award for Travel Demand Management (TDM) projects to enhance the potential benefit of these investments.
- Evaluating projects using Streetlight InSight's speed data to measure congestion levels on the principal arterial and A-minor arterial networks.

The region will continue to improve this transparency and Metropolitan Council staff will continue to work with the TAB and its subcommittees to include or refine criteria that clearly identify and prioritize projects that incorporate effective CMP strategies.

In addition to the Regional Solicitation, it is important that MnDOT and other local partners examine the project selection and competitive grant programs that they administer to clearly incorporate congestion management criteria. Other competitive grant programs in the metropolitan area include Transportation Alternatives (in areas that are not eligible to compete as part of the Regional Solicitation), Safe Routes to School Solicitation (in areas that are not eligible to compete as part of the Regional Solicitation), Highway Safety Improvement Program, the Transportation Economic Development (TED) program, and the Minnesota Highway Freight Program.

Project Programming and Implementation

The region reports the results of project selection and programming efforts in updates to its federal Transportation Improvement Program (TIP). Representing the region's short-range project programming, the TIP communicates the anticipated implementation schedules for all federally funded transportation projects in the region, and all MnDOT projects, including projects that do not include federal funding. Projects in the TIP must be consistent with the 2040 TPP, and any project that adds one mile or more of highway capacity must be identified explicitly in the TPP. Supplementing the TIP and 2040 TPP, local agencies identify locally funded projects in their capital improvement plans and programs.

390 Robert Street North
Saint Paul, MN 55101-1805

651.602.1000
TTY 651.291.0904
public.info@metc.state.mn.us
metrocouncil.org

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youtube.com/MetropolitanCouncil