DVRPC WHITE PAPER

The State of the Practice:

A Study of DVRPC's Peer Metropolitan Planning Organizations' Congestion Management Processes

December 2024

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Executive Summary

The Congestion Management Process (CMP) is a federal requirement to identify, assess, and mitigate congestion, with a focus on improving mobility, reliability, accessibility, and connectivity. This white paper evaluates the current state-of-the-practice and emerging trends for CMPs based on interviews with ten peer Metropolitan Planning Organizations (MPOs) from around the country. The aim is to learn from peer practices and identify opportunities to streamline and reprioritize CMP tasks and enhance DVRPC's approaches to project planning, development, and evaluation. The report starts with an introduction that provides relevant background to this study. It is then organized into six primary sections related to topics that were discussed in the interviews and many of the principal components of the CMP.

- Approaches to Congestion Management
- Identify, Assess, and Prioritize Congested Locations
- Develop Strategies and Tie Them to Specific Locations
- Interface with Project Development
- Evaluate Before-After Performance and Strategy Effectiveness
- Monitor Congestion and Report Results

A final section, Conclusion: What's Next for the CMP, reflects the evolving role of the CMP and suggests pathways for strengthening the region's congestion management practices. It emphasizes the need for MPOs to improve integration between the CMP and other regional products, such as the Long-Range Plan (Plan), Transportation Improvement Program (TIP), and Unified Planning Work Program (UPWP). It also synthesizes the key findings from this study and provides a set of actionable recommendations to guide DVRPC's next CMP update by strengthening the Commission's approach to congestion management, better aligning with federal requirements, and more fully addressing current and future challenges in the Greater Philadelphia region. An initial consideration is to prioritize from the different transportation goals that underlie the CMP analysis to better focus this wide-ranging program. Additional recommendations include enhancements to the CMP's framework and analysis, project development, and communication and engagement.

CMP Framework and Analysis

1. Streamline the identification of congested locations and increase the priority range.
2. Tailor strategies to the conditions of specific congested locations.
3. Prioritize low-cost congestion management strategies.
4. Use and integrate large datasets.
5. Make before-and-after performance evaluation the expectation.

Project Development

6. Develop project sponsor CMP evaluation forms.
7. Engage in more and earlier involvement in project development.
8. Operationalize the requirement to consider alternatives to SOV-capacity adding first.
9. Increase emphasis on developing and monitoring supplemental commitments for SOV capacity-adding projects.

Communication and Engagement

10. Focus the CMP's objectives.
11. Clearly communicate CMP findings and recommendations.
12. Collaborate more within DVRPC for CMP updates.
13. Support continual process improvements by participating in megaregional and national conversations related to advancing CMP practices.

Introduction

As the federally designated Metropolitan Planning Organization (MPO) for Greater Philadelphia, the Delaware Valley Regional Planning Commission (DVRPC) is tasked with updating its Congestion Management Process (CMP) every four years in coordination with the region's Long-Range Plan (Plan). The CMP uses a variety of traffic data to identify and monitor the most congested roadways in Greater Philadelphia. It then uses this information along with other analyses to recommend operational, travel demand, and multimodal strategies that improve the flow of people and goods, minimize costs, and promote transportation project consistency with the Plan. The CMP evaluates the effectiveness of implemented strategies to improve mobility, reliability, accessibility, connectivity, and enhance safety across the region and uses the results to inform strategy recommendations.

The CMP is a requirement under federal regulations (23 CFR Parts 450.322 and 500.109) for Urban Areas (UAs) with populations greater than 200,000, which are known as Transportation Management Areas (TMAs). These regulations specify that the CMP be implemented as a continuous, comprehensive, and collaborative metropolitan planning process. Regulations require that alternatives to building new Single-Occupant Vehicle (SOV) road capacity be explored first. Where additional capacity is deemed necessary, multimodal supplemental strategies must be developed to obtain the most long-term value from the investment.

As part of the *Moving Ahead for Progress in the 21st Century Act* (MAP-21), the *Fixing America's Surface Transportation Act* (FAST Act), and continuing with the new *Infrastructure Investment and Jobs Act* (IIJA), national transportation performance management (TPM) measures have been adopted by the Federal Highway Administration (FHWA) effective May 20, 2017. The intent is to have Departments of Transportation (DOTs), MPOs, and other planning partners better align proposed project improvements through performance-based planning and programming. The CMP integrates the national performance management reliability and traffic congestion measures, known as PM3 measures, to assist in identifying and prioritizing congested locations and for developing strategies to improve mobility and reliability.

DVRPC uses a series of CMP Objective Measures to tie the CMP analysis to Plan goals and to where congestion is occurring in the region. The current CMP Objective Measures include increasing mobility and reliability, integrating modes and providing transit accessibility, modernizing and maintaining the transportation network, achieving Vision Zero, providing for goods movement, maintaining and enhancing the transportation security and emergency preparedness, and supporting other Plan goals, such as investing in mixed-use centers, offering shorter commute options, and prioritizing investments in less sensitive environmental areas. The CMP is developed with significant input and guidance from the CMP advisory committee to meet needs across the region.

In preparation for the next four-year CMP update, DVRPC conducted a series of interviews with peer MPOs to help staff assess the current state of the practice in congestion management processes. Given the expanding topics MPOs cover and the increasing requirements from the federal government, it is important to explore areas for further improvement and potential connections between programs and opportunities to build off these connections. This effort aims to ultimately address these questions: How can Greater Philadelphia's CMP be streamlined, reprioritized, and strengthened as a tool for data-informed project

identification, planning, development, decision making, and evaluation that helps to achieve the vision and goals in the region's long-range plan? How can it be used to more effectively interface with other DVRPC programs and planning partner projects, and to inform regional policy?

This white paper summarizes the findings from this research and is intended to inform the next CMP update. This white paper does not cover all aspects of the CMP—instead, it focuses primarily on the identification and assessment of congested locations, tying congestion mitigation strategies to locations, project development, SOV capacity-adding projects alongside supplemental strategies, evaluation of strategy effectiveness, and monitoring and reporting congestion.

Peer Identification

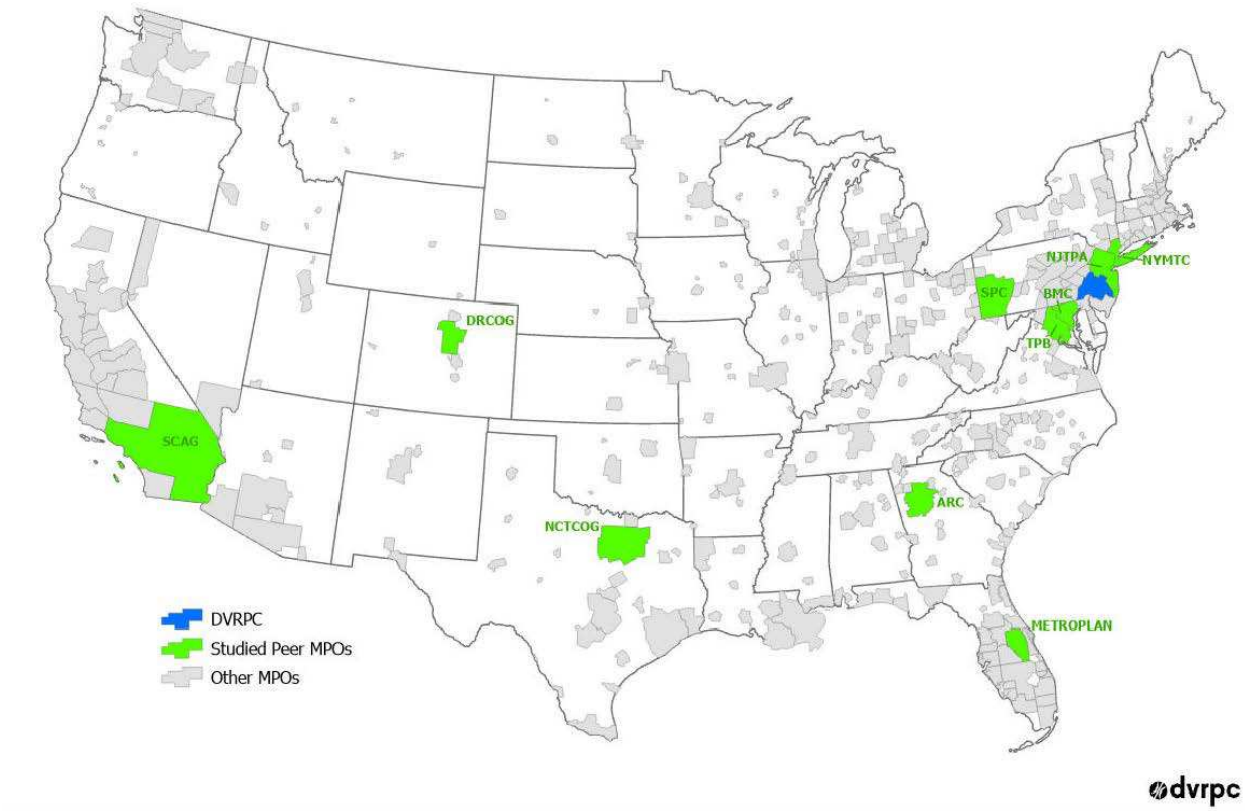
To identify peer MPOs located in the United States, DVRPC staff conducted desktop research to evaluate over 400 MPOs, continuing the efforts of *The State of the Practice: A Study of DVRPC's Peer Metropolitan Planning Organization's Long-Range Plans* White Paper (DVRPC Publication #23109). Staff evaluated the MPOs primarily based on a review of current peer CMPs, as well as quantitative factors related to their regions and CMP, including data pertaining to population, population density, 10-year population growth, geographic area, demographics, socioeconomics, and the CMP completion year.

Staff also did a qualitative assessment of each MPO's staffing levels, governance model, CMP approach, and potential to address topics of interest. Topics of interest include the MPO's approach to SOV capacity-adding projects, use of federal performance measures, method to identify congested locations, strategy recommendations for congestion mitigation, consideration of induced demand, integration between the CMP and other MPO plans and programs, communication of the CMP, application of emerging technologies, safety and security features, focus on accessibility, connectivity, livability, the environment and reducing pollution, addressing poverty and expanding access to economic opportunity, and finally multimodal transportation and land-use planning. Appendix A contains more information about this evaluation.

Ten peer MPOs emerged from this quantitative and qualitative evaluation. Figure 1 maps all national MPOs and highlights the jurisdictions of the peers selected, including DVRPC. All ten accepted an invitation to participate in the CMP state-of-the-practice study. The selected MPOs are:

- Atlanta Regional Commission (ARC)
- Baltimore Metropolitan Council (BMC)
- Denver Regional Council of Governments (DRCOG)
- MetroPlan Orlando (MetroPlan)
- National Capital Region Transportation Planning Board (TPB) of the Metropolitan Washington Council of Governments
- New York Metropolitan Transportation Council (NYMTC)
- North Central Texas Council of Governments (NCTCOG)
- North Jersey Transportation Planning Authority (NJTPA)
- Southern California Association of Governments (SCAG)
- Southwestern Pennsylvania Commission (SPC)

Figure 1: Peer MPOs Studied



Source: DVRPC, USDOT, and U.S. Census Bureau, 2024.

Research Methods

One-on-one interviews were the primary method for gathering information from peer MPOs. Before the scheduled interviews, DVRPC staff conducted research on the selected peers through CMP review. This review provided initial insights and suggested lines of questioning beyond the original topics of interest. Based on this review, each MPO was asked approximately four to seven CMP-specific questions, in reference to their CMP studies, findings, and other standout information. Additionally, each MPO was asked a standardized list of questions, shown in Appendix B. DVRPC staff conducted interviews of two to three staff from each of the 10 peer MPOs in August 2024. Peer MPO staff were sent a list of interview questions via email at least one day ahead of each interview to give some time to prepare their responses. Interviews were conducted via Zoom and lasted approximately 90 minutes each. All ten peers were given an opportunity to review and comment on a draft of this report. Participants from each peer MPO are recognized and appreciated for their generous contributions to this research in Appendix C. Appendix D lists peer resources used in the review.

The unique context for planning varies significantly across MPO regions due to a host of factors, including population size, land use, and socioeconomics, and each MPO has grown and evolved to meet different local needs. While this makes true apples-to-apples comparisons difficult, there is still much that can be learned from peer approaches to the CMP.

Documentation

The results of this study are summarized in six sections:

- **Approach to Congestion Management** considers the role that peer MPO structure and governance play in organizing and approaching CMP efforts. This section documents what the peers described as some of the biggest recent successes and examines CMP adoption timeline, staffing, and descriptive or prescriptive focus.
- **Identify and Assess Congested Locations** describes how peers identify, prioritize, and assess congested locations, evaluate the causes of congestion, and prioritize congested locations.
- **Develop Strategies and Tie Them to Specific Locations** discusses how strategies are identified and linked to locations that align with each area's vision, goals, and needs.
- **Interface with Project Development** includes analyses of a range of strategies early in the scoping and conceptual development phases, with roadway capacity-adding only as a last resort. Where capacity-adding is deemed appropriate, supplemental strategies must be developed to get the most long-term value from the investment.
- **Evaluate Before-After Performance and Strategy Effectiveness** assesses how MPOs measure the results of implemented strategies, including the use of performance metrics to monitor congestion before and after project implementation.
- **Monitor Congestion and Report Results** examines how MPOs collect congestion-related information and effectively communicate and make it available to planning partners and the public.

The conclusion compiles the study's key findings and assesses the role of the CMP today and moving ahead into the future.

Approach to Congestion Management

The peer MPO interviews revealed significant variance in MPO structure and approach to the CMP. A region's governance model has a large impact on MPO structure and the differing approaches to CMP processes, including updates, strategy development, and project implementation. Table 1 summarizes relevant information regarding peer MPOs' CMP approaches to congestion management, including coordination with the Plan, Transportation System Management and Operations (TSMO) and Intelligent Transportation Systems (ITS) integration, number of staff, collaboration with consultants, state legislation impacts, and descriptive versus prescriptive approach. Ultimately, the CMP is an intricate analysis, and this study highlights the range of processes, structures, and approaches to the CMP. This section begins with each peer's biggest recent CMP success(es).

Table 1: Summary of Approaches to Congestion Management

	ARC	BMC	DRCOG	DVRPC	METROPLAN	NCTCOG	NJTPA	NYMTC	SCAG	SPC	TPB
CMP Updated as Separate Document from the Plan	●		●	●	●	●	●	●	●	●	●
CMP Updated on the Same Timeline as the Plan			●		●	●	●	●	●	●	●
CMP Integration with Traffic Operations			●		●	●		●		●	●
1-2 Full-Time Equivalent CMP Staff	●	●	●	●	●	●	●	●	●	●	●
Consultant Assistance for CMP Development		●			●		●	●			
State Legislation directs CMP Development			●						●		
Descriptive CMP	●	●	●	●	●	●	●	●	●		●
Prescriptive CMP				●		●	●	●		●	

Source: DVRPC, 2024.

The Biggest Successes from Peer MPOs

At the start of each interview, DVRPC staff asked peer MPOs: *What do you consider to be some of the biggest successes within your regional CMP over the last several years?* The variety of answers provided by peer MPOs serves as a broad introduction to capture the importance of the CMP and its many applications, as well as introduce the unique strengths and highlights of each peer MPO and their CMP.

- **ARC** has integrated big data into its 'Key Network' that prioritizes 362 regional corridors using congestion, safety, Title VI populations, air quality, and volume data. This effort is operationalized through an interactive Transportation Dashboard, which links congestion to project planning and helps advance regional performance goals.
- **BMC** uses their online CMP tool and congestion reporting to identify congested locations and share information with their planning partners. From a policy perspective, BMC works with local governments to identify high-level regional CMP priorities, such as cross-jurisdictional transit and TSMO corridors, to include in the "priority letter" that each jurisdiction submits to the state annually. The priority letters are

used by the state DOT to develop the statewide consolidated transportation plan, and the regional coordination is received positively by the state.

- **DRCOG** has moved away from defining CMP projects and using a "strong arm" approach, which minimized collaboration with local governments and struggled to identify the best strategies. Instead DRCOG has shifted toward a descriptive approach, now defending and justifying CMP projects through a "three A's" ethos—avoid, adapt, and alleviate. Avoiding focuses on mode shift and improving traveler information services; adapting on implementing travel demand management and multimodal strategies; and alleviating on targeting operational improvements, where capacity-adding is a last resort.
- **MetroPlan** uses the CMP to help identify solutions to improve reliability on the regional network, to inform prioritization criteria for the long-range plan, and to define goals related to federal performance measures using data-driven analysis and evidence-based decision making. The CMP evaluation also provides insight into the funding policy for allocation of organizational TMA funds.
- **NCTCOG** made corridor specific congestion information more readily available to planning partners to identify deficiencies and select projects. Related efforts include transitioning to a GIS-based system that helps automate the use of performance measures to score corridors and measure the effectiveness of implemented strategies, streamlining the CMP process. Internal peer review from other departments and outside agencies has helped NCTCOG refine and improve CMP development.
- **NJTPA** undertakes a place-based analysis, centered around connectivity, accessibility, and mobility, which has given their CMP an effective approach focused on access to opportunity. Additionally, NJTPA's online library, PRIME, catalogs recommendations from all completed transportation studies.
- **NYMTC** uses member agency status reports to target specific areas for mobility or project feasibility studies, which has been a success, alongside increased coordination between the CMP, TIP, and Plan.
- **SCAG** has developed a transportation demand management (TDM) toolbox of interactive and explorable strategies that provides a magnitude of benefits from different strategies, such as reductions in vehicle miles traveled (VMT), and contains real world examples of implemented strategies in the region. Additionally, SCAG has studied congestion pricing and brings a regional perspective for road pricing on express lane networks and supporting consistency between counties.
- **SPC** intertwines the CMP with TSMO, ITS, and safety operations work. This has created a holistic, low-cost approach to CMP projects. A switch to probe data visualization in GIS has made the identification of congested corridors easier and increasingly interactive.
- **TPB** highlighted their Commuter Connections program, which includes TDM strategies such as carpooling, ridematching services, and transit information. TPB also noted the Metropolitan Area Transportation Operations Coordination (MATOC) program plays an important role in coordination and communicating incident management information, and other operational strategies. TPB takes a systems approach to collecting, storing, and analyzing traffic data to track bottlenecks over time and collaborates with implementation agencies that ensure location-based projects align with CMP goals.

CMP Update Cycle

Most peer MPO CMPs are updated at the same time as the long-range plan, and then either adopted with the Plan or separately. According to federal regulations, an MPO must update its Plan every four years in areas considered to be air quality non-attainment and maintenance areas. CMPs generally follow this four-year timeline.

- **TPB** updates the CMP and the Plan together so that their goals are aligned, and as a bonus this streamlines their performance metrics.
- **NJTPA and MetroPlan** integrate the CMP with the Plan update to reflect regional priorities and inform choices for decision makers as part of the Plan development process. Both include the CMP as an appendix to the Plan.

Alternatively, some CMPs are developed at different timelines from the Plan. For example, DVRPC completes their CMP prior to the next update cycle of the Plan's financial plan. Regardless of the update timeline, one consistent intent of the CMP across peers is for it to inform the Plan with the most current information and to support regional priorities.

MPO Staffing and Consultants

DVRPC staff asked: *How many employees work on the CMP?* Generally, across all ten peer MPOs the consensus was one to two full-time equivalent staff working on the CMP, although dedicated staff often contribute to other projects. The number of full-time staff working on each peer CMPs is largely dependent on the CMP and Plan update cycles. Most of the peers noted that staff from long-range plan, travel demand modeling, GIS, and traffic operations departments contribute to specific CMP tasks.

ARC's multi-disciplinary CMP requires teamwork from a range of commission departments.

SCAG is unique in that the organization does not have any full-time CMP staff. Instead, staff from other planning sections, including the Plan, TIP, Freight, and two employees working specifically on congestion pricing and priced lanes, all work together to develop the CMP.

Some MPOs indicated they use consultants to help update their CMP. Consultants are generally hired for assistance with data collection, analysis, automation, documentation, and assistance with visualization. Consultants bring specialized knowledge and expertise in specific areas but may be limited in their understanding of specific regional issues and internal MPO processes.

Organizational Structure

MPOs integrate their CMP department with different planning sections to gain synergies. Most MPOs intertwine some combination of the Plan, travel demand modeling, traffic operations, and TDM within their CMP. The interviews revealed more TSMO and ITS project development in the CMP when the CMP and traffic operations are housed in the same group.

DRCOG locates their CMP within the Mobility and Analytics department, which includes the Travel Demand Modeling, Air Quality, and Traffic Operations sections.

NCTCOG, **MetroPlan**, and **SPC** all include Traffic Operations within their CMP section. MetroPlan uses staff within their TSMO department to develop CMP updates. The CMP focuses on planning to minimize recurring and non-recurring congestion with a particular focus on lower-cost solutions (primarily TSMO-related) to improve reliability.

DVRPC places the CMP within the same division as the Plan and TIP so that it can both inform the Plan's development and support its implementation, especially by helping to translate the Plan's goals into

projects that can be brought into the TIP. This also provides an in-depth analysis of the region's transportation network, which can inform project identification.

State and Other Legislation

State and other legislation can impact approaches to CMP development and implementation.

SCAG must follow California's Environmental Quality Act (CEQA), which shifts the focus of roadway improvement alternative analysis metrics from changes in level-of-service to changes in vehicle miles traveled (VMT). This puts less emphasis on reducing delay and more on reducing vehicle trip frequency and length and provides California MPOs the opportunity to develop more multimodal strategies to manage congestion[1]. The California Air Resources Board sets regional targets to reduce certain pollutants, which further emphasize multimodal strategies[2]. Local investments and decision-making both guide and constrain the Plan, with 31 percent of SCAG's overall transportation funding coming from federal and state sources. In response, SCAG focuses on regional efforts, such as rideshare and express lanes, which SCAG indicates is an effective way to share responsibilities between the region and counties.

DRCOG has approval responsibilities in the National Environmental Policy Act (NEPA) process thanks to legislation in Colorado that enables more opportunities for the CMP to be involved in project development. Additionally, DRCOG has prioritized investment in multimodal transportation options as an approach to minimize congestion, improve air quality, and meet the requirements of Colorado's State Bill 260 of 2021.

Descriptive versus Prescriptive

Some MPOs indicated they take a more descriptive approach—providing data or information—to the CMP rather than prescriptive—providing project recommendations or strategies. Ultimately, each MPO's CMP falls within a spectrum between descriptive and prescriptive, with pros and cons for each approach.

DRCOG indicated that a descriptive approach helps to "defend or justify" a project, not "define" a project, and the CMP acts as an information provider. DRCOG previously used the travel demand model to define and program projects based on locations where there was both existing and anticipated congestion, however, local jurisdictions requested a more inclusive and collaborative process, which has led to a more descriptive approach.

BMC partners with local jurisdictions and provides them with congestion information through data requests, web-based tools, quarterly reports, and other products.

NCTCOG takes a more descriptive approach using location-based performance measures, along with a TSMO and ITS GIS asset inventory, to help identify quick and low-cost operational improvements at specific locations. In addition, they have aligned strategy development separately for the Plan, Corridor and NEPA studies, and the TIP to develop travel demand reduction and operational congestion mitigation strategies.

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[1] CA Senate Bill 743, 2013, https://lci.ca.gov/ceqa/sb-743/

[2] CA Senate Bill 375, 2008, https://www.ca-ilg.org/post/basics-sb-375

TPB identifies congested locations, tracks studies that have been done, and when and who last implemented TSMO and ITS, TDM, and multimodal strategies.

ARC presents data and methodologies, and lets the viewers interpret the congestion story, while at the same time the commission helps to facilitate TSMO and ITS, TDM, and multimodal strategies.

NYMTC indicated the CMP has some influence on major project targeting, but it is not a fully formed process. The Metropolitan Transportation Authority has an enormous planning process, and the state and city DOTs also do their own planning. NYMTC is considering how the CMP could potentially shift more toward a “plan” rather than a “process.” For example, the CMP could provide more of a vision for the future of congestion management that incorporates actionable steps for increasing accessibility and mobility through a multimodal and land-use shift.

Identify, Assess, and Prioritize Congested Locations

Table 2 summarizes how peer MPOs' identify and assess congested locations, the performance measures used in the analysis, the types of tools used to identify congested locations, and the scale(s) at which MPOs analyze congested locations (corridor facility, corridor area, intersection, regional, or bus route). It further summarizes whether the causes of congestion are analyzed, which peers prioritize congested locations, if they use assessments to score TIP and Plan projects, and finally if they have developed data automation techniques to streamline assessment efforts.

Table 2: Identifying, Assessing, and Prioritizing Congested Locations

	ARC	BMC	DRCOG	DVRPC	METROPLAN	NCTCOG	NJTPA	NYMTC	SCAG	SPC	TPB
Performance Measures											
Archived Travel Times (PTI, TTI, speed, delay)	●	●	●	●	●	●	●	●	●	●	●
Traffic Volumes (AADT or VMT)	●	●	●	●	●	●	●	●	●	●	●
Duration	●	●	●				●	●		●	●
Travel Demand Model (V/C or D/C)	●	●	●	●		●	●	●	●		●
PM3 at Facility Level (LOTTR or TTTR)		●		●	●	●	●	●			
Freight (truck volumes)	●		●	●	●	●	●	●			●
Safety (crashes, KSI)	●		●	●	●	●	●	●			
Modal Accessibility (such as park-and-ride and parallel rail)				●	●	●	●				
Roadway Infrastructure (such as frontage road percent)						●					
Job Accessibility					●		●				●
Ped/Bike Level of Stress	●				●						
Health and Environment (PM, NOx, VOC, AQI)	●				●						
Community Analytics	●			●			●				
Real-Time Data Platform											
RITIS PDA or AVAIL Tools	●	●		●	●		●	●		●	●
StreetLight					●		●				
Replica							●				
Analysis Scale											
Roadway Corridor Facility	●	●	●	●	●	●	●	●	●	●	●
Intersection	●	●		●		●		●		●	
Roadway Corridor Area				●							
Region (County, MPO)	●	●	●	●	●	●	●	●	●	●	●
Bus Route Facility				●		●					●
Other											
Causes of Congestion	●	●	●	●	●	●					●
Prioritization of Congested Locations	●	●	●	●	●	●					●
Data Automation	●			●		●					

Source: DVRPC, 2024.

Performance and Other Measures Used to Identify and Assess Congestion

MPOs use a combination of one or more traffic-related performance measures to measure congestion and prioritize congested locations. Performance measures include archived travel time data—travel time index (TTI), planning time index (PTI), delay, and speeds—travel demand model volume-to-capacity (V/C) ratio, traffic volumes, and other metrics such as safety and freight. All the peers report using archived travel time data and volumes to measure performance. Eight of the peers use volume-to-capacity data from the travel demand model, and seven peers use freight metrics, such as truck volumes.

NCTCOG, **NJTPA**, and **NYMTC** incorporate Transportation Performance Management (TPM) PM3 reliability measures into their CMPs at the corridor facility level. PM3 reliability measures used in peer CMP analysis include level of travel time reliability (LOTTR) and truck travel time reliability (TTTR) on the National Highway System (NHS). Some peer MPOs mentioned they do not use the PM3 measures at the facility level, since their performance measures are more granular and ingrained with their CMP approach and process.

DRCOG measures congestion on principal arterials and above in four ways: duration, intensity, reliability, and magnitude. Duration refers to the length of time a driver experiences congestion, whether it is just during the peak period or throughout the day. Intensity refers to the severity of congestion. For example, a high TTI indicates that observed travel times are significantly higher than free flow travel times. Reliability refers to the variability of travel, or inconsistent travel times. For instance, a high PTI, measured at the 95th percentile, indicates unreliable travel times due to non-recurring congestion, such as crashes, disabled vehicles, short-term construction, weather delays, and other events. DRCOG uses PTI to measure reliability on freeways and crash events on all other roadways. Magnitude refers to higher traffic volumes and congestion, where higher volume roadways impact more road users.

ARC uses different types and sources of data to identify and assess congested locations. Project level data includes volumes, VMT, vehicle hours travel, and air pollution. Model data includes traffic outputs from the Activity-Based and VISUM Network Models such as V/C and air quality outputs from EPA's Community-LINE Source Model, which accounts for shifts in traffic volumes, speeds, and fleet mix. Observed data includes real-time and archived operations RITIS probe data, including speeds, travel times, crash, and other safety data. RITIS data is the cornerstone of ARC's congestion analysis, particularly for capturing travel time and reliability metrics by corridor and visualizing trends over time. Reference data includes policy and network overlays including ARC's Regional Thoroughfare Network (RTN), the Atlanta Strategic Truck Route Master Plan (ASTRoMap), and the NHS. ARC is also developing a regionwide bicycle model to assess comfort levels for cyclists throughout the Atlanta region, which may provide future integration into CMP performance evaluation.

MetroPlan uses delay, commute travel times, reliability (separate for interstates and arterials), freight reliability, safety (the number of fatal crashes), bike and pedestrian levels of stress, connectivity to transit, fiber availability, state's air quality data, and other related factors to identify and analyze congested locations. They also use GIS to identify congestion hot spots at the corridor level.

ARC, **BMC**, **TPB**, **NJTPA**, and **SPC** identify and prioritize congested locations using the RITIS Probe Data Analytics (PDA) tools, such as the Bottleneck Ranking Tool. BMC's uses the tool to examine travel speeds and times, duration, and cost of delay metrics to understand the impact and cause of bottlenecked corridors.

TPB finds the Bottleneck Ranking Tool useful but recognizes that it does not fully address congestion's multi-dimensional elements. SPC would like to automate the identification and assessment of congested locations.

NYMTC utilizes archived travel time data and the AVAIL tool (similar to the RITIS PDA suite) to assess congestion using the PM3 LOTTR and TTTR measures. The regional travel demand model assesses anticipated congestion using a demand-to-capacity (D/C) ratio. NYMTC's CMP has a strong focus on the duration of congestion, and they assess congestion not only at the corridor facility level but also the county level, since high-density urban areas like Manhattan are not readily or fairly comparable to the other counties in NYMTC's region. Given the importance of freight to the region's economy, NYMTC's CMP places a heavy focus on truck (freight) traffic. Other measures, such as safety, are emphasized more in other programs, like Complete Streets.

NCTCOG develops corridor fact sheets that highlight corridor performance by identifying deficiencies and inventorying availability of operational, ITS, and traffic incident management assets. Performance is grouped into four categories: performance measures, roadway infrastructure, modal options, and operations. This analysis helps to prioritize corridors for congestion mitigation and to determine appropriate strategies.

NJTPA uses a place-based analysis approach to identify congested locations and needs. They assess travel patterns to and from urban areas in New York City, within urban areas of North Jersey, and between and within suburban areas. TTI, PM3 performance measures, transit metrics, job and modal accessibility, and bicycle and pedestrian safety issue areas all go into analysis of congestion and reliability.

Several MPOs provide a storyline, equating different commute destinations with their associated travel times to help simplify traffic congestion and mobility challenges.

NJTPA focuses on multimodal accessibility as part of their place-based approach and has developed a set of personas to demonstrate the transportation challenges that everyday individuals face when traveling about the North Jersey region. The authority sees accessibility as the fundamental purpose of the CMP to the point where they have considered calling it an accessibility management plan.

DRCOG provides examples comparing travel times before-and-after the Covid-19 pandemic.

Causes of Congestion

Most of the peer MPOs indicate that it is challenging to identify causes of congestion. Congestion can be caused by operational issues, crashes, disabled vehicles, adverse weather, construction, insufficient capacity, or other reasons.

MetroPlan focuses on nonrecurring congestion on several key interstates, such as I-4, due to their proximity to high-demand vacation destinations. Tourists who are unfamiliar with traveling in the area are susceptible to higher crash rates, which can increase congestion and contribute to more travel variability in these corridors. More people are moving further outside the metropolitan area due to higher housing costs leading to sprawling development patterns and increased congestion across the region. There are few exits off the interstate and no major alternatives, which compounds these issues.

TPB uses travel time data to analyze if roads with significant bus travel (six or more buses an hour in the AM or PM peaks) experience more congestion than other remaining roads to help identify causes of congestion.

Findings show that these roads experience more congestion, except for interstates, which experience by far the most congestion in the region. TPB has found some shortcomings with travel time data on low-speed roads—such as the ones analyzed—so findings are not conclusive. However, this analysis helps to identify strategies such as adding dedicated bus lanes or enforcing bans on parking in bus lanes.

BMC uses their bottleneck evaluation reports to assess the causes of congestion.

NJTPA notes that a limitation to using this data is the difficulty of identifying causes of congestion across dispersed locations and different place types.

Prioritizing Congested Locations

About half of the MPOs prioritize congested locations based on performance and other measures—while recognizing that they must also consider broader community goals beyond simply managing congestion.

ARC, **TPB**, and **BMC** use the RITIS PDA Bottleneck Ranking tool as part of their congested location prioritization. ARC combines these metrics with congestion, safety, air quality, traffic volume, Title VI populations access to opportunity, and other network data together within their Key Network to better analyze multiple CMP objectives in one system to prioritize congested locations. Computer scripting and programming allows ARC to work with big data as part of an automated CMP analysis process. TPB evaluated a section of roadway along I-95 (Exit 61) that contains a major bottleneck, and the information has been used to help inform program work in the area. BMC uses GIS overlays such as community analytics and safety data to help prioritize congestion locations.

DRCOG scores each of their four performance measures—duration, intensity, reliability and magnitude—separately ranging from one to five, which are summed to obtain a possible maximum score of 20 for each road segment. The scores are associated with an A-F letter grade, and grades D or F are identified as congested and allowed for new capacity if capacity-adding is analyzed as an appropriate strategy. They use the congestion scores, along with the high anticipated V/C ratios from the travel demand model outputs, to prioritize congested locations.

NCTCOG uses a table-based methodology to score 25 corridors for congestion issues based on Excel Spreadsheet decision trees, which are currently being migrated to GIS databases. Some of the key measures used in this analysis include performance measures such as TTI, LOTTR, crash rates, availability of arterial capacity, percent of frontage road and parallel freeways, parallel bus routes and light and commuter rail facilities, nearby park and rides, bus trip density, shoulder availability, ITS coverage, truck lane restrictions, and percent of HOV and managed lanes.

MetroPlan has a data-driven prioritization process that uses evidence-based decision making to inform and prioritize projects. CMP performance measures help to prioritize project types and advance congestion mitigation projects as regional priorities in the Plan.

NJTPA does not rank list congested locations to indicate one area is more “important” than another. Instead, they use place types to link each location’s needs using a matrix of strategies and other factors.

Develop Strategies and Tie Them to Specific Locations

Peer MPOs diverge in their approaches to identifying strategies to manage congestion and tying them to unique locations. MPO CMPs apply strategies at different scales—regional, place-based, or site-specific. All MPOs focus on operational (TSMO and ITS), TDM, and multimodal strategies including transit, bicycle and walking, but some MPOs focus on some strategies more than others depending on their organization structure, policy directives, and other-related factors. Some MPO CMPs identify strategies through various lenses including safety and increasing access to economic opportunities to provide a more comprehensive process of strategy selection, while other CMPs focused on other emerging strategies such as pricing and micromobility. A descriptive CMP approach develops a generalized list of strategies and leaves it up to project sponsors to determine which recommendation(s) to pursue. A prescriptive CMP approach prioritizes and ties strategies to regional priorities or specific to the conditions at each congested location. Table 3 shows a summary of peer MPO strategy approaches and focus areas.

Table 3: Summary of CMP Strategies and Tying Strategies to Locations

	ARC	BMC	DRCOG	DVRPC	METROPLAN	NCTCOG	NJTPA	NYMTC	SCAG	SPC	TPB
Strategy Scale											
Regional	●	●	●		●	●		●	●		●
Place-Based				●			●	●			
Site Specific				●		●	●		●	●	●
Strategy Focus Areas											
Operational and TDM	●	●	●	●	●	●	●	●	●	●	●
Bus Signal Priority and Bus Rapid Transit			●		●		●		●	●	●
CAV Studies	●			●	●	●			●		●
Corridor Study/Plan Database Library				●			●				
Address Poverty and Improve Economic Opportunity		●		●			●				●
Induced Demand	●		●	●	●	●	●	●	●		
Micromobility	●		●	●	●	●	●	●	●		●
Mobility-as-a-Service								●			
Pedestrian and Bicycle	●	●	●	●	●	●	●	●	●	●	●
Pricing	●	●	●			●		●	●		●
Ridesharing								●	●		●
Safety	●			●	●		●			●	●

Source: DVRPC, 2024.

Regional Approach

The regional scale aligns with high-level priorities set in the Plan or MPO board guidance and is generally applied by MPOs using a descriptive CMP approach. Regional approaches can tie strategies to congested locations using data-driven CMP strategy toolboxes, toolkits, checklists, and guides listing strategies that are cross-referenced with benefits, costs, ease of implementation, performance measures, and timelines. The limitation to this approach is that specific locations are complex and have multiple needs that cannot be fully addressed using a top-down, data-driven process. They can also be strategies that cross jurisdictional boundaries and involve collaboration and resource sharing between agencies, such as ridesharing. Other MPOs categorize strategies by strategy type, including but not limited to TSMO, ITS, TDM, multimodal including transit, pedestrian and bicycle, and Single Occupant Vehicle (SOV) capacity-adding as a last resort. Either way, it can be challenging to determine the best congestion management approaches for a specific location out of a generalized list.

DRCOG categorizes strategies into the "Three A's Ethos"—Avoid, Adapt, and Alleviate—which align with the goals in their Plan.

NCTCOG's strategies include a three-tiered approach, with capacity-adding as a last resort: (1) identify quick to implement, low-cost strategies and solutions to better operate the transportation system; (2) more evenly distribute congestion across multiple road types and transit, including shifting short trips from vehicle to bicycle or pedestrian trips; and (3) increase accessibility by giving people multiple travel options.

TPB's Board is focused on regional strategies consistent with their long-term commitments to transit, Commuter Connections, and MATOC programs. Regional strategies have been impactful for TPB, and they defer to implementing agencies and their planning partners to prescribe strategies for specific locations. For example, HOT lanes have taken on an added importance over HOV lanes since they are now used as a strategy to obtain transit subsidies. They have developed strategy matrices tied to general locations across their region, which provide a qualitative view of how applicable certain strategies may be. They have recently expanded the number of pedestrian, bike sharing, and growth management strategies.

SCAG focuses on ridesharing and express lanes as regional strategies. SCAG's interactive and explorable TDM toolbox of strategies is used to help planning partners prioritize projects, as it indicates the magnitude of VMT reduction for a given strategy. With this, SCAG is also focused on multimodal integration strategies that decrease VMT and is less focused on strategies that reduce vehicle delay.

BMC has developed a CMP strategy guide that correlates strategies to specific CMP objectives. The project submittal forms for the TIP and Plan include a question about which, if any, CMP strategies are included in the project.

NYMTC's CMP has limited influence on how strategies are tied to congested locations, as state and city DOTs typically do their own planning and decision-making. These agencies often ask NYMTC how chosen strategies can be effectively implemented. NYMTC has developed a CMP checklist of strategies that is particularly helpful to smaller counties that traditionally do not have large enough planning staff to make these decisions without MPO input.

MetroPlan's CMP strategies are networkwide and align with regional goals and measures across the entire planning area. General categories of strategies in the CMP include TDM, TSMO and ITS, data collection, safety, and arterial and freeway management. These general strategies are further refined into location-based strategies in the Plan and TIP as part of the project planning process.

Place-Based Approach

Place-based approaches are built off corridor plans and often consider surrounding land use, demographics and socioeconomics, and apply context sensitive solutions. Place-based analyses can help identify locations with special needs and can increase access to economic opportunities. For example, areas with high SOV-usage near rail transit indicate opportunities for first- and last-mile, transit signal priority (TSP), managed lanes, and bus enhancement strategies to shift modes from vehicles to public transit. Place-based analysis may highlight land-use mismatches between major jobs and home locations that result in longer commuting trips. This strategy scale is generally applied by MPOs using a mix of prescriptive and descriptive approaches.

NJTPA emphasizes place-based and accessibility strategies categorized separately by urban and rural location, availability of transit, and a host of other factors. NJTPA has developed a series of one-page strategy profiles that includes information on need addressed by the strategy and specific tactic or applications of the strategy, and they then focus on action as opposed to just a strategy description. NJTPA will use the Replica software platform for the next CMP update along with other data sources to provide further insight into identifying the appropriate place-based strategies, such as the potential of a mobility as-a-service (MAAS) strategy.

NYMTC sees major potential for MaaS in specific parts of their region, particularly in eastern Long Island where low frequency bus routes are being replaced with on demand service. The NY 511 program, which was once a hotline for traffic information, is becoming a MaaS application. It can indicate options to avoid congestion and direct travelers to the best mode to get to their destination.

Site-Specific Approaches

Site-specific approaches use facility studies, modeling, and stakeholder comments to tailor recommendations specific to each location based on analysis or on-the-ground knowledge. This strategy scale is generally applied by MPOs using a prescriptive CMP approach. A limitation of this approach is that it is time consuming and difficult to collect, verify, and regularly update this level of granular information across a large region.

NCTCOG uses corridor fact sheets to help determine appropriate strategies for specific locations. In addition, this process allows coordination with partner agencies to determine appropriate implementation agencies for project development. This allows NCTCOG to provide constructive feedback about project locations and strategies, while avoiding SOV capacity-addition. It provides a clear communication feedback loop between NCTCOG, TxDOT, and other planning partners. TIP staff track changes in scope and strategies to ensure major CMP supplemental strategies are not removed without consequence.

SPC conducted a "Congestion Strategy Survey" with planning partners to obtain suggested strategies to mitigate congestion along specific congested corridors. SPC considered these suggestions in their strategy matrix, based on whether congestion data supported the strategy. The strategy matrix is composed of benefit and suitability rankings. Benefits are ranked in three categories from low to high, and suitability is

ranked in four categories from easy to hard accounting for environmental, financial, right-of-way, and manpower factors. The highest benefit and most suitable strategies are considered to be the most appropriate for the location. SPC indicated the evaluations are included for each CMP corridor and are helpful for targeting strategies, but have limitations, such as unknown costs and physical constraints, that goes with generalizing strategies to specific locations.

TPB undertakes scenario planning to provide insights into which strategies are likely to be successful at specific locations. These exercises have verified that operational strategies show moderate success and TDM strategies have much more success in managing congestion. Scenario planning has led to dedicated bus lanes, pedestrian-focused improvements, bike sharing, and growth management becoming priority strategies. TPB has also undertaken special studies to examine the appropriateness of specific strategies. For example, they identified priority bus routes and examined which ones experienced more congestion to help identify appropriate strategies.

SCAG's Corridor System Management Plans (CSMPs) and project microsimulations led by the state DOT have been innovative tools to help identify and implement operational strategies for specific corridors. However, SCAG is not doing these plans now due to the state DOT shifting from a focus on decreasing delay to one on reducing VMT, which inherently encourages multimodal strategies.

NJTPA's PRIME database provides a library of studies, plans, and programs and recommendations contained in them including strategies to manage congestion at specific locations and these can be mapped and overlaid with project locations. DVRPC's Planning Innovation Team is building its own unique version of the PRIME database.

Strategy Focus Areas

All the MPOs utilize the operational, TDM, and multimodal strategies outlined in CMP guidance. Of interest are other strategies included in peer MPO CMPs. The review identified other strategy focus areas based on technology, safety, micromobility, pricing, and consideration for how induced demand affects strategy recommendations.

NCTCOG, **MetroPlan**, **DRCOG**, and **SPC** all indicate that technology and TSMO and ITS strategies are crucial to their CMP and congestion management. NCTCOG tracks and maps TSMO and ITS infrastructure assets to identify gaps in infrastructure and recommend appropriate strategies. They collaborate closely with TxDOT, which provides updated ITS data each year. DRCOG has a strong TSMO and ITS focus in the NEPA process that stems from their traffic signal coordination and synchronization program, which occurs across multi-jurisdictional and signal ownership corridors. SPC is also focused on highlighting the benefits of low-cost strategies, such as traffic signal retiming, employer rideshare incentives, and park-and-ride lots, each of which can have significant impacts on reducing congestion. SPC noted that some of these strategies are listed in PennDOT's *Regional Operations Program* (ROP), which prioritizes funding for TSMO and ITS improvements such as CCTV cameras and fiber infrastructure at specific locations.

NYMTC indicated a desire to improve on their own TSMO strategy efforts by coordinating more closely with TSMO working groups to target specific strategies for location-based improvements. They defined TSMO as making transportation improvements without building new, expensive infrastructure, and consider this to be the future direction of the CMP.

MetroPlan indicated how reliability has become a major focus through stakeholder discussions, so strategies such as Integrated Corridor Management (ICM), and work zone and incident management are at the forefront. Making drivers aware of incidents before and during their travel are key strategies, along with variable message signs (VMS), Florida 511, and CAV information. They have increased deployment of fiber optic cable networks to support data transmission between connected and automated vehicles (CAV) due to requests from local transit authorities. This data exchange enables route optimization and congestion avoidance. MetroPlan has also focused on TDM strategies to reduce SOV trips and is establishing a TDM plan to help with this effort.

SCAG has had success using ITS strategies by increasing collaboration between their CMP working group and the association's ITS group to work on regional strategies and projects such as Rideshare 511, express lanes, and bus signal priority. SCAG highlighted how ITS strategies have been particularly influential in prioritizing transit, in alignment with their multimodal shift in focus. SCAG's dedicated transit line study validated ITS strategies with transit.

Other MPO's besides SCAG focus on transit signal priority and dedicated bus lane strategies.

TPB implemented Transit Signal Priority (TSP) at intersections along VA-7 (Leesburg Pike) and at other locations in the region using a Transportation Investments Generating Economic Recovery (TIGER) grant for Bus Transit Priority in 2015 and 2016.

MetroPlan has found queue jumping, where traffic signals provide preference to buses to get a head start at intersections, and bus rapid transit (BRT) in Orlando as effective strategies to improve reliability.

NJTPA uses measures such as TTI and bus on-time performance (OTP) to identify locations for bus priority treatments.

DRCOG noted that TSP has been a successful strategy. DRCOG has helped to facilitate meetings with the transit agencies and the DOT to mediate efficient coordination and justification for these kinds of projects.

TPB, **DRCOG**, **ARC**, and **BMC** have started to investigate or develop strategies for connected and automated vehicles (CAVs). However, they are hesitant to emphasize CAV strategies at this point, because their future is highly uncertain. They do note that analysis and reporting on CAVs gives hope that with the correct policy support these vehicles can help mitigate congestion.

Some peer MPOs were more heavily focused on safety strategies in their CMP.

MetroPlan analyzed aggressive driving and intersections crashes, and vulnerable road user pedestrian and bicycle crashes.

NJTPA mapped out pedestrian and bicycle crashes with fatalities and serious injuries to identify along with transit facilities to identify first- and last-mile challenges in accessing transit.

SPC and other MPOs aim to promote slower travel to increase safety benefits in a central business district or other designated urban place types. In these cases, congestion mitigation is not a priority.

Micromobility is a newer strategy, with less studied impacts. Peer MPOs anticipate that micromobility can potentially provide significant benefits in reducing VMT and SOV usage. For example, DRCOG indicates that micromobility use in greater Denver has tripled since 2019.

ARC's e-bike program strategy has already led to some small mode shifts. While the program is currently small, ARC believes expanding it can create a larger mode shift.

SPC indicated they are trying to assess in more detail how emerging technologies and pedestrian and bike infrastructure, including Pittsburgh's bikeshare system (POGOH), can be enhanced in the region.

TPB has become increasingly interested in the potential benefits of micromobility, and discussing these strategies within their Commuter Connections program. In particular, micromobility can help areas underserved by transit and provide new options for zero car households.

NJTPA sees the potential of micromobility in the case of first- and last-mile travel, based on Transportation Research Board (TRB) studies and publications.

NYMTC is closely considering which micromobility modes should be allowed in bike lanes, as they look to optimize safety, efficiency, mobility, and more. NYCDOT has indicated that electric scooters or bikes, as well as pedal-less bikes can be used in bike lanes, contrary to New York state law. This is indicative of the confusing, uncharted territory surrounding the implementation of micromobility projects.

SCAG is trying to collect more information on micromobility, however, a widespread ban on electric scooters creates limitations on its application.

Pricing strategies have been helpful in combating congestion and can continue to do so in the future. However, neither Pennsylvania nor New Jersey has state-enabling legislation in place to support pricing strategies in the Greater Philadelphia region.

NYMTC indicates that congestion pricing is a hot topic right now due to plans for implementing a program to charge drivers a toll to enter the Congestion Relief Zone (Manhattan south of 60th Street) during peak hours[3]. Alternative analyses from the travel demand model suggests that pricing could help alleviate congestion, raise funding, and create environmental benefits.

SCAG has found tolled express lanes are an effective way to address congestion in their region.

A focus area for the CMP is how to assess proposed capacity-adding projects while considering the effects of induced demand. Induced demand is the concept that increased automobile travel occurs when roadways are expanded, and this additional travel goes beyond what would otherwise be anticipated through natural growth. Latent demand is a related concept that is a measure of how much driving demand is currently unfulfilled within existing road capacity. Peer MPOs have addressed induced demand in different ways.

[3] Congestion pricing came online around lower and mid-town Manhattan on January 5, 2025.

SCAG must anticipate induced demand risks and remarked that it is a major topic in the region, since the state enacted requirements to reduce VMT. SCAG's approach now is to manage demand through accurate pricing, aiming to reduce traffic on congested roadways and encourage alternative travel options.

NYMTC expressed concern that the CMP can be too car-centric, which leads to some solutions that no longer fix problems. Engineering solutions only work for so long, because they cause induced demand, which only creates more issues. Non-car solutions to mobility are becoming crucial, and states and the FHWA should focus more on that in the CMP.

ARC indicated that induced demand generally makes problems worse up or downstream or alters land uses. ARC's CMP approach has been to better quantify induced demand by using big data to tell a story using before-and-after performance evaluations and help inform strategy development.

Some peer MPO's have focused on needs analysis and addressing poverty and improving economic opportunities.

NJTPA hopes to gain new insights on targeting congestion relief for low-income, disadvantaged, and underserved or underinvested populations by examining congestion data, alongside socioeconomic and origin-destination data.

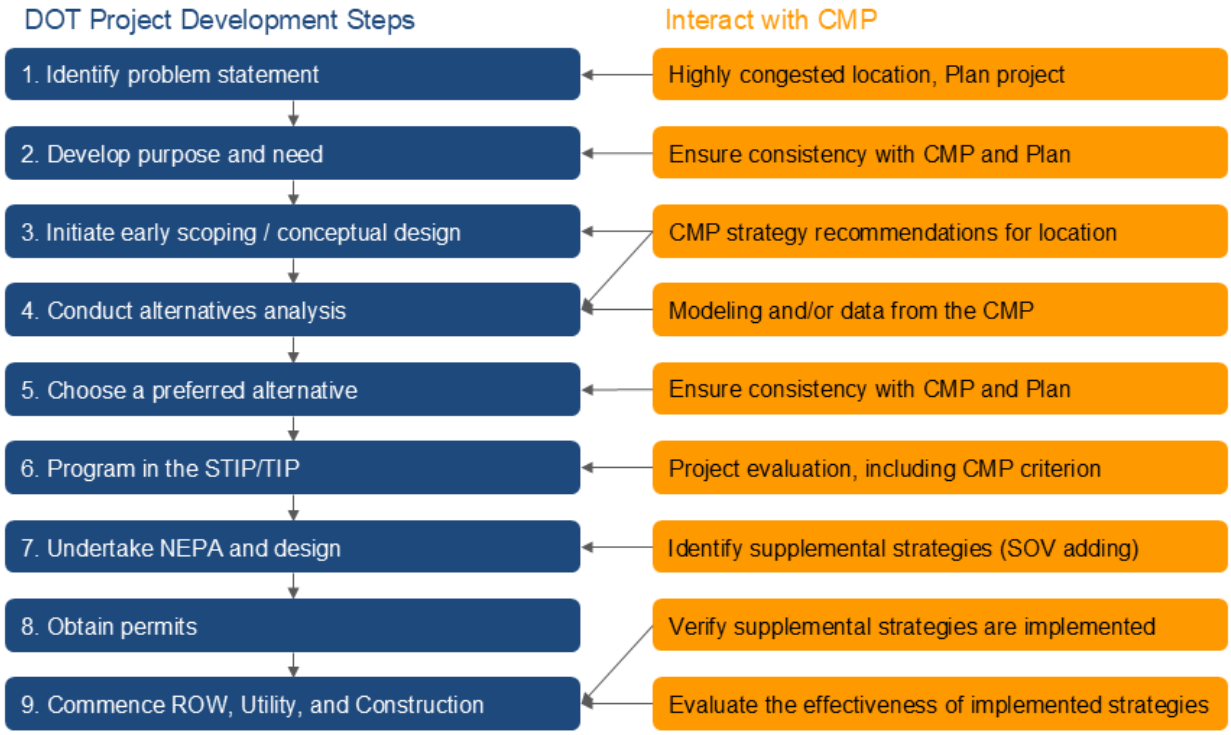
DVRPC uses a set of congested corridor areas and census data to perform community analytics and develops congestion mitigation strategies based on assessed needs.

SCAG indicates there is a strong focus in their long-range plan to address poverty and improving economic opportunity through a community analytics process, which is used in project prioritization and strategy development.

Interface with Project Development

Project development consists of many phases where the scope emerges through increasing levels of study and scrutiny. The CMP can play a role in nearly every step along the way (see Figure 2). The CMP identifies major congested locations that can be used for problem statement intake. CMP strategy recommendations can inform early scoping, concept development, preliminary design, and alternatives analysis (see steps 3-5 in Figure 2). If non-SOV strategies cannot alleviate congestion enough in a project area as shown through the alternatives analysis, and capacity-adding is deemed appropriate, the CMP requires the development of supplemental strategies and commitments that are agreed on by project sponsors to get the most long-term value from the investment. Supplemental strategies can include TSMO and ITS, TDM, public transit, and other multimodal improvements. For large projects, public outreach will also shape project development, particularly in the phases for scoping and conceptual design, alternatives analysis, and choosing a preferred alternative. Since there are many more proposed congestion mitigation projects than there are funds available, projects need to be weighed against regional priorities and funding constraints. Using the CMP in project evaluation can help to select the appropriate alternative to add to the Plan or TIP.

Figure 2: Project Development Interfaces with the CMP



Source: DVRPC, 2025.

Peer MPOs contrast in their approach to project development. Some MPOs, such as TPB and NCTCOG, require alternatives to capacity-adding upfront in project planning as part of the Plan and TIP project selection process. Other MPOs, such as DRCOG, are involved more upfront in project development through the NEPA process to develop alternative strategies. Yet other MPOs have established procedures and checklists to engage project sponsors and planning partners in alternatives analysis, such as NJTPA and DVRPC. Table 4 summarizes peer MPO CMP involvement in project development.

Table 4: Summary of CMP and Project Development

	ARC	BMC	DRCOG	DVRPC	METROPLAN	NCTCOG	NJTPA	NYMTC	SCAG	SPC	TPB
Plan/TIP Project Submission SOV Capacity-Adding Forms or Other Verification		●				●	●	●	●		●
SOV Capacity-Adding Procedures and/or Checklist		●		●		●	●			●	●
State Justification Forms						●					
CMP consideration in Plan/TIP Project Evaluation Criteria	●		●	●	●	●	●	●		●	
Plan SOV Capacity-Adding Appropriate Areas				●							
NEPA Study Involvement			●			●					
Travel Demand Model	●		●	●	●	●		●			
Design Standard Inputs			●								
State Interchange Approval Process			●								
State Legislation Impacts			●			●			●		

Source: DVRPC, 2024.

CMP Consistency Tools

CMP consistency tools include submission forms, SOV-capacity-adding procedures or checklists, and other ways for project sponsors to prove projects meet CMP regulations around capacity adding.

TPB engages with stakeholders through a technical input solicitation process for capacity-adding projects proposed for the TIP and the Plan. Project sponsors are required to complete application forms that identify projects that will incorporate major SOV capacity-adding elements. As part of this process, project sponsors must document the various CMP strategies and alternative methods considered in place of capacity-addition. The TPB Board has become increasingly involved as discussions over these improvements have become more complex and have led to, for example, discussions on separated bike and pedestrian facilities, and a marked shift toward active travel. Project sponsors in the TPB region often have substantial resources, with large and sophisticated staff and a heavy reliance on the District of Columbia, Maryland, and Virginia Departments of Transportation (DDOT, MDOT, and VDOT), to help complete the standard documentation.

NCTCOG requires a "CMP Implementation Form" to be completed by project sponsors of Plan, TIP, and corridor projects. This form indicates any corridor deficiencies and specific deficiency-correcting CMP congestion mitigation TDM, and TSMO and ITS strategies, showing capacity-adding is a last resort. For a project to proceed, NCTCOG verifies that candidate projects meet CMP requirements. As necessary, NCTCOG may perform their own SOV analysis to help determine potentially appropriate strategies when capacity-adding is proposed, including using travel demand model output volumes or other volumes to perform V/C analysis and determine if capacity-adding is justified. A comprehensive evaluation is performed using alternative roadways, modal options, system demand, and reliability scoring factors. If the evaluation score does not meet requirements, then the project is not compliant with the CMP. When this happens,

NCTCOG works with the project sponsors to obtain CMP compliance before the project can advance. In addition, TxDOT has established a unique framework where they require all project sponsors of capacity-adding studies to complete a "CMP Disclosure Statement" form in coordination with MPOs in the state. This process is intended to ensure the consideration and deployment of CMP strategies in project development.

BMC has project sponsors complete a project development form and identify CMP strategies for proposed projects, and strategies are selected and implemented by local or state agencies. BMC staff works with the regional CMP Committee to identify high-level regional CMP priorities that each jurisdiction can include in its annual priority letter to MDOT.

NYMTC indicates that major capacity-adding is rare in the region primarily due to the limitations of an already-existing, dense roadway infrastructure and built environment. NYMTC's operating procedures for consideration of SOV capacity-adding is one-lane mile or more, so small projects are not considered capacity-adding. The federal regulations do not set these definitions, so they are instead set by each MPO. NYMTC asks project sponsors to show that capacity-adding is needed through their own scoping or feasibility studies, as these studies often show that expansion is not cost effective. NYMTC also expressed concern that capacity-adding project and supplemental strategy discussions are not necessarily ingrained within project development and enforcement of CMP regulations is lacking.

NJTPA has procedures for project development in place and uses a template checklist to document which alternative and supplemental strategies should be considered. NJTPA works to engage with planning partners on projects as early as possible to ensure alignment with the CMP and Plan goals, and its PRIME online library database helps in these efforts.

SCAG requires eligible projects to complete a CMP assessment before funding selection and programming in the Federal Transportation Improvement Program.

SPC remarked that while it is important to "check all the boxes" before considering the implementation of SOV capacity-adding strategies, the definition of capacity-adding is unclear. Nevertheless, capacity-adding as a last resort strategy has helped to inspire and establish a bus rapid transit (BRT) project between Oakland, PA, and Pittsburgh, PA, providing more frequent transit service, including transit signal pre-emption. This project removed on-street parking from a roadway at some specific locations, which added capacity while increasing the efficiency of both BRT operations and general traffic. SPC does not see this as SOV-capacity-adding, because it supports an effective multimodal project. Other connector and local road capacity-adding projects have occurred in the Pittsburgh region in response to development and were deemed appropriate to help alleviate congestion on other nearby local roads.

DVRPC limits SOV-capacity-adding projects to a set of congested corridor areas designated as appropriate for roadway expansion. These corridors are designated in consultation with regional planning partners.

Project Evaluation and Prioritization

Some peers use the CMP to assess projects for adding to the Plan or TIP.

NJTPA uses the CMP to inform project selection and CMP measures for project prioritization.

SPC overlays their CMP congested locations with proposed Plan and TIP candidates to help prioritize projects for selection.

ARC uses a Key Decision Point (KDP) process to prioritize transportation projects in the TIP and Plan. The CMP helps evaluate project specifics, such as location, congestion types, and more. This process allows for the integration of different project evaluation criteria and for individual projects to be compared more fairly. ARC's travel demand model provides inputs in the KDP process but the model is used less than in the past for prioritizing critically congested corridors and project assessment.

DRCOG prioritizes anticipated high congestion locations identified in the travel demand model in project development. Capacity-adding projects outside of a congested location in the model do not score well. DRCOG addresses low-scoring project concerns with planning partners and the relevant stakeholders.

DRCOG and **MetroPlan** use the CMP more to defend or justify projects rather than in defining Plan or TIP projects. They use their CMP performance measures as part of their Plan and TIP project evaluation criteria.

NYMTC uses LOTTR and the Plan forecast year travel demand model D/C ratio in project evaluation and prioritization.

State Legislation

For some peer MPOs, state legislation emphasizes more focus on travel demand reduction and TSMO and ITS strategies to manage congestion, which influences how projects are developed in their regions.

SCAG is directed by California Senate Bill 375 of 2008 to reduce air pollution and California Senate Bill 743 of 2013 to shift roadway improvement alternative analysis metrics from level of service to VMT. This puts less emphasis on reducing delay and more on reducing trips and trip lengths by using TDM, transit, pricing, and other multimodal strategies to manage congestion. The California state government has pushed back on new managed lanes projects because they are seen as SOV-capacity adding in the region. As a result, funding programs sponsored by the state require the examination of alternatives to capacity-adding.

DRCOG has some approval responsibilities in the NEPA process as part of state legislation and participates with NEPA study teams on strategy development for proposed capacity-adding projects. DRCOG reminds stakeholder groups that strategies must align with CMP regulations, Plan principles and goals, air quality conformity, and the travel demand model's anticipated high congestion locations. They review NEPA documents to ensure mentions of DRCOG are consistent with the CMP. As part of alternatives analysis, DRCOG participates in discussions and helps to prioritize design element improvements in project development, such as transit, pedestrian, and bicycle strategies. In addition, Colorado state legislation requires that new interchanges and major improvements to existing interchanges must align with TDM plans or they will not be approved. There is a considerable stakeholder involvement in TDM programs by agencies such as transportation management agencies (TMAs) and traffic signal operations (in local governments).

Evaluate Before-and-After Performance and Strategy Effectiveness

Before-and-after performance evaluations analyze the effectiveness of traffic management strategies by comparing data prior to and following specific changes or interventions. Some peers perform before-after evaluations on a routine basis for specific types of projects, while others perform evaluations when they are requested by planning partners. As needed refers to MPOs that are trying to meet the regulations and inform strategy decision-making for the next similar project but haven't been requested to do so by other partners. Table 5 summarizes how peer MPOs vary in the extent they conduct before-and-after performance evaluations. Peers highlighted how there are often limitations in understanding the effectiveness of strategies due to external factors such as the economy or land use changes. Also, it was expressed that land-use changes and other factors that may come across as external influences, do not occur in a vacuum—and are often induced by capacity adding projects. NJTPA noted it is difficult to know the true impact of implemented strategies without experimental controls.

Table 5: Summary of CMP Before-and-After Performance Evaluations and Strategy Effectiveness

	ARC	BMC	DRCOG	DVRPC	METROPLAN	NYMTC	NJTPA	NYMTC	SCAG	SPC	TPB
Routine Basis			●		●						
As Needed				●							
As Requested	●	●	●		●	●	●	●	●	●	●

Source: DVRPC, 2024.

DRCOG is required to conduct evaluations for both traffic signal coordination and re-synchronizing intersection projects under Colorado state requirements. Other types of projects, such as priced lanes, are evaluated based on request.

MetroPlan performs evaluations for planning partner projects and strategies on an as requested basis. For more routine operational improvements, such as signal retiming, evaluations are performed on a routine basis one-year after project completion, as extraneous factors such as the economy and land use changes can skew the results if performed later and make it more difficult to isolate the true effects of a strategy. MetroPlan has found value in strategy evaluation by comparing performance in one county or city, against another to help understand why a strategy succeeds in one area, but not another.

BMC conducts before-and-after evaluations on an as requested basis, focusing efforts on planning partner priority projects and strategies. MDOT performs their own in-house before-and-after evaluations as part of their mobility reporting process.

ARC has not found a good way to assess the effectiveness of strategies for TSMO and ITS improvements, since each location is unique and not easily comparable to other locations.

TPB noted that external factors like the economy can impact congestion more than a transportation project.

SPC is working with its stakeholders to improve before-and-after evaluation. The commission aims to make evaluations a regional expectation by increasing both their frequency and application.

SCAG is also working to enhance before and after analysis and plans to use third-party real-time data and the StreetLight platform to help conduct these evaluations.

NJTPA uses before-and-after evaluations to inform TPM target-setting and to prioritize congestion mitigation strategies. Archived real-time data can help with examining instantaneous changes in performance due to new projects or programs, however, the authority believes that many factors impact congestion trends. NJTPA expresses that while some strategies may deliver temporary reductions in congestion, changes in induced demand and land-uses can present challenges in longer-term performance outcomes.

NYMTC attempts to identify and compare performance measures across its boroughs and counties but does not monitor or evaluate the before-and-after performance of congestion management projects. Instead, individual projects are measured as part of CMAQ eligibility to prove congestion reductions, or a lack thereof. Echoing the sentiment of other peer MPOs however, while before-and-after evaluation is important, isolating the effects of specific congestion management improvements is difficult considering external forces.

Monitor Congestion and Report Results

Peer MPOs vary on how frequently they provide CMP performance updates and make information available to the public and communicate with them. Table 6 summarizes how peers monitor congestion, report performance, and share information with the public. GIS mapping and dashboards are a form of CMP reporting that is becoming increasingly useful, and a growing trend across MPOs.

Table 6: Summary of Monitoring Congestion and Reporting Results

	ARC	BMC	DRCOG	DVRPC	METROPLAN	NCTCOG	NJTPA	NYMTC	SCAG	SPC	TPB
Quarterly Report		●									●
Annual Report			●		●						
Biennial Report					●						●
GIS Web Application	●	●		●	●	●				●	
Local Data Requests		●		●							

Source: DVRPC, 2024.

BMC produces quarterly congestion analysis reports that identify the region's top 10 bottlenecks, and yearly performance is shared using a web GIS analysis tool aimed at helping local jurisdictions to obtain information. These GIS web maps are interactive, experience-based tools which allow users to explore CMP data for their own interpretation and analysis.

DRCOG creates an annual congestion report that includes existing and anticipated congested corridors, VMT trends, and information on shifts in travel behavior due to the Covid-19 pandemic. DRCOG revisits its CMP objectives each year as part of the annual report update, while setting out their CMP approach in internal documents.

TPB publishes both quarterly and biennial technical reports. The quarterly report analyzes regional trends and the top 10 bottlenecks in the region using the RITIS PDA platform. The biennial report is a much more detailed report on the state of congestion and includes regional congestion trends, top bottlenecks, congestion trends along 18 major corridors, and transit facility congestion.

SPC updates a "GIS Web Application" tool that shows major roadway congested corridor facilities and associated archived travel time, which is updated on a continual basis. The tool uses GIS to map congested corridors by county, while each corridor links to strategies sorted by applicability to the selected corridor. SPC's probe data analysis uses the RITIS PDA platform to feed their GIS tool, which includes a tutorial to help users navigate and find relevant information.

ARC makes CMP information available on an online GIS dashboard tool to report performance using mobility and other CMP measures, and track regional bottlenecks, speeds, and transit congestion.

NJTPA and **NYMTC** align the CMP analysis and report with the Plan update, each are presented as separate documents. NYMTC calls their updates a status report.

MetroPlan's "Tracking the Trends" transportation dashboard maps performance measures by corridor, along with transit ridership, roadway usage, and reliability, and other CMP measures. These data are also manipulated to create graphs and tables with further congestion insights, including asset conditions and safety, or accessibility and connectivity measures, respectively. MetroPlan also produces a biennial congestion management scorecard that provides a snapshot in time of system performance with respect to measures that impact congestion, such as crashes and VMT, and those that measure congestion, such as reliability and delay, and describes progress toward the targets for each measure. Additionally, MetroPlan aims to develop a congestion management update memo annually to provide a state-of-the-system summary for CMP performance measures.

Conclusion: What's Next for the CMP?

MPO CMP development continues to evolve, with better data and tools to support the identification, assessment and causes of congested locations, tying congestion mitigation strategies to specific locations, project development, conducting before-and-after performance evaluations to assess strategy effectiveness, and monitoring congestion and reporting trends. The primary goal of this *CMP State-of-the-Practice* white paper is to uncover opportunities to streamline, reprioritize, and strengthen DVRPC's CMP and its activities, give it a larger role in project development, support the identification of supplemental strategies, and improve its communication. The peer interviews provided valuable insights to all of this and more to incorporate into future DVRPC CMPs.

This research identified a range of potential areas to strengthen DVRPC's highly regarded CMP in future update cycles. The ability to incorporate the following practices, many of which are already done by the commission to some degree, will need to be balanced with staff resources, federal and state requirements, DVRPC Board direction, and other regional priorities. These recommendations are organized based on the CMP framework and analysis, project development, and communication and engagement components.

CMP Framework and Analysis

1. **Streamline the identification of congested locations and increase the priority range**. Focus analysis on the four components of congestion: intensity, reliability, magnitude, and duration to identify bottlenecked interchanges, intersections, and corridor facilities. These metrics can utilize PM3 measures like LOTTR, PHED, and TTTR and other travel time measures such as PTI and TTI to further align the CMP and TPM. DVRPC currently has three levels of congested corridors: priority, congested, and emerging. Having a wider range helps with prioritization in the region's project evaluation criteria and could be used to help identify strategy recommendations for specific facilities. If using components of congestion, consider a ranking system of 1 to 5 for each metric that can be combined into a congestion score that is used in prioritization. Or similarly, standard deviations like those in DVRPC's Title VI Compliance Tool that indicate congestion is well above average, above average, average, below average, or well below average. Finally, consider setting a minimum threshold for congestion levels that a facility would need to be above to support the case that SOV-capacity addition is necessary.

2. **Tailor strategies to the conditions specific to congested locations.** Consider moving away from large, congested corridor areas to develop strategies and to the most congested specific bottleneck or facility locations. Prioritize strategies based on identified needs at individual congested locations; considering potential strategy benefits, timeframes and costs; alignment with regional CMP goals; and performance measures. While SPC has a general strategy matrix, they rank each strategy on a high-medium-low and "not applicable" scale based on their benefits and suitability for each of the region's corridor facilities, helping to match strategies and locations. NJTPA's place-based approach alongside their strategy profile sheets has helped target accessibility improvements at specific locations which also translates to a more access to opportunity focus that aims to better connect the entire region. DVRPC can build on how CMP Objective Measures and Plan goals are used to identify strategies. Two options for doing this are: (1) develop CMP strategy profiles that focus on place-based strategies from a needs and accessibility perspective; or (2) develop strategy matrices that target strategies tied to different performance

measures, roadway functional classes, and underlying land uses. There are several recently developed internal datasets that can inform strategy recommendations, which can be weighted relative to each other through a pairwise comparison or utilizing other approaches:

a. Tools such as the Regional Truck Route Network, Regional Transit Screening Platform, Regional High-Injury Network, Development Intensity Zones (DIZ) transect, and updated Plan and Freight Centers.

b. Local priorities. Project sponsor CMP evaluation forms are one way for local jurisdictions, and state DOTs to prioritize their congested locations and match them with strategy recommendations.

c. Before-and-after performance evaluations and causes of congestion.

d. Strategy recommendations from DVRPC corridor studies or other agency studies can be used to identify the right strategy for the right location. DVRPC's current work on developing a tool like NJTPA's PRIME database, which stores and categorizes past study recommendations, could also inform CMP strategy recommendations.

e. Track what has already been implemented along a corridor and remove those strategies from the recommendations.

3. **Prioritize low-cost congestion management strategies**. Quick and easy to implement, low-cost but high-impact strategies have become a priority across many of the MPOs interviewed. These strategies, particularly focus on TSMO and ITS, and lead to more efficient and effective CMP project implementation and evaluation. Location-based TSMO and ITS strategies, such as traffic signal retiming, truck restrictions, rideshare incentives, or park-and-rides, can be easily tracked and evaluated before-and-after implementation. Interactive coordination between the CMP, and TSMO and ITS working groups increases the feasibility of low-cost project development. These can be prioritized in strategy identification (see #2 in this list) by expanding consideration of benefits to cost.

4. **Use and integrate large datasets.** Several MPOs draw from large datasets, including archived travel time data, traffic volumes, operations management data, and origin-destination (O/D) data to improve the effectiveness of transportation needs analyses and congestion management strategies as well as better understand the locations, causes, and severity of congestion. These datasets can support before-after project evaluation. Incorporating large datasets has helped MPOs promote a systematic process for analyzing congestion across multiple CMP objectives. GIS-based web mapping and dashboards consolidate big data into one easily navigable format. For example, ARC's Key Network addresses congested locations while bringing in other data, such as safety, access to economic opportunity, air quality, and freight. DVRPC incorporates many of these large datasets already, but including more traffic events and O/D data can contribute to the congestion needs analysis.

5. **Make before-and-after performance evaluations the expectation.** Once a project has been implemented, before-and-after project evaluation can improve MPO and stakeholder understanding of project effectiveness, as well as its limitations. MPOs must work with the DOTs and other planning partners to make this an operational process. Results should be stored in a database that can inform strategy recommendations. Consider how different project types, like signal retiming, should be evaluated on unique timelines based upon various factors. This process can improve PM3 target-setting as well as inform future strategy recommendations based on the impacts in similar place types (see #2 in

this list). Use of large datasets can expedite these analyses. It is important to recognize and acknowledge the limitations of before-and-after evaluations due to many factors that can impact congestion, such as changes to the macroeconomy. Roadway enhancements may lead to land use changes that can reduce congestion mitigation effectiveness, which shows these projects have economic and other benefits. While it is hard to know what the root causes are without controls, one option is to identify similar facilities by functional class and comparable land uses as control variables.

Project Development

6. **Develop project sponsor CMP evaluation forms.** Several peer MPOs utilize formal documentation processes between project sponsors, local counties or jurisdictions, and state DOTs to ensure CMP projects (especially SOV-capacity adding) align with CMP federal regulations, CMP and Plan goals and objectives, and the TIP. Examples such as NCTCOG's CMP evaluation forms and TPB's technical input solicitation forms represent good practices in developing alternative strategies to manage congestion with capacity-adding as a last resort. Build on the coordination between the CMP and the long-range plan and TIP to develop CMP project evaluation forms for proposed SOV capacity-adding projects and require project sponsors to complete checklists of non-SOV capacity adding strategies analyzed separately and combined to confirm that SOV capacity-adding is appropriate[4]. It may be possible to incorporate CMP identified congested locations and needs into the project intake forms used to identify candidates for the TIP and Plan update cycle. DVRPC can help project sponsors complete the evaluation forms. Examples such as BMC's "priority letter" include county and other local jurisdiction identified projects along with high-level regional CMP priorities to help develop the statewide transportation plan.

7. **Engage more and earlier involvement in project development**. Early involvement in project development during the scoping, conceptual design, or study stage is consistent with CMP regulations and provides opportunities to consider non-SOV-capacity-adding strategies first to manage congestion. For example, DRCOG participates in NEPA study teams and reminds partners that projects need to align with CMP regulations, Plan principles and goals, travel demand model outputs, and any appropriate design elements. The CMP could also play a larger role in identifying projects, as well as creating a list of operational improvements to include in the Plan's capital vision for transportation infrastructure.

8. **Operationalize the requirement to consider alternatives to SOV-capacity adding first.** Regulatory requirements mandate that an MPO should first explore alternatives to building new SOV roadway capacity, including TSMO and ITS, TDM, and multimodal containing rail, bus, pedestrian, and bicycle strategies. There is room for improvement for how MPOs and stakeholders verify that alternatives are fully considered. Doing so requires building relationships with the state DOT project managers and ensuring DVRPC staff are included at the outset of the project development projects.

9. **Increase emphasis on developing and monitoring supplemental commitments for SOV capacity-adding projects**. Ensure the MPO region gets the most benefit, particularly when adding capacity as a last-resort solution. This, in turn, will help to identify the right strategies for the right locations in future projects, as monitoring and reporting helps MPOs to better understand strategy effectiveness by project and

[4] DVRPC's *CMP Procedures Manual* (Publication #21010) has a project development checklist that can be used as a starting point.

location types. Document processes between MPOs and stakeholders to provide clarity on how supplemental strategies are added and evaluated alongside capacity expansion.

Communication and Engagement

10. **Focus the CMP's objectives**. While there are any number of goals that can be used, having a shorter, more focused list can help to better communicate what the CMP is and does and limit the scope creep that often occurs in the process. This discussion may be included in the long-range plan's visioning dialogue with stakeholders and the public. Some ideas based on goals identified by peers include:

    - Promote Smart Growth development.
    - Provide more travel options and flexibility, and reduce reliance on car ownership to reduce costs.
    - Reduce VMT and related air pollution, along with wear and tear on roads, and the need for new high-cost investments.
    - More efficiently move people and goods to increase productivity, improve reliability, and free time up for other activities.
    - Enhance safety and help to achieve a Vision Zero goal of no deaths or serious injuries on the region's transportation network.
    - Overcome the greatest barriers to mobility.
    - Support regional and cross-jurisdictional efforts that cross municipal, county, and state boundaries, such as transit and TSMO corridors, express lanes, bus rapid transit, and rideshare programs.

11. **Clearly communicate CMP findings and recommendations**. Build on communicating CMP key findings and recommendations to regional stakeholders, including local counties and jurisdictions, transit agencies, TMAs, stakeholders, and the interested public. This includes simplifying and improving user interfaces of interactive dashboards, GIS web maps, strategy recommendations, and data presentations. Examples include ARC's interactive transportation dashboard. A good starting point is a simple, clear, and concise story about what the CMP is and does, how it is used, and what are its key findings and recommendations. This type of messaging is a requirement for inclusion in the region's long-range plan.

12. **Collaborate more within DVRPC for CMP updates.** Use an all-hands on deck approach to obtain contributions from DVRPC program areas, including Operations, TDM, Travel Trends and Forecasting, Freight and Clean Transportation, Capital Programs, Long-Range Planning, and Mobility Analysis and Design. This can increase familiarity with the CMP and buy-in on its development from downstream users.

13. **Support continual process improvements by participating in megaregional and national endeavors to advance CMP practices.** This includes the Association of Metropolitan Planning Organization's Core Products Interest Group, NJDOT's State Transportation Innovation Council, and other efforts.

The CMP helps to translate the Plan's vision and goals into consistent, implementable projects that can advance into the TIP, and functions as a medium-term planning process that contributes to strengthening the connection between the Plan and TIP. These are an ambitious set of recommendations that if conducted can significantly elevate the role of the CMP in project development and turn it into a general transportation planning platform of considerable use to other DVRPC program areas and planning partners alike.

Appendix A: Peer Selection Process

The U.S. Department of Transportation (USDOT) lists 402 MPOs in the country, along with the area and population covered by their jurisdictions in 2020. There are 54 MPOs with at least one million people in their jurisdiction. DVRPC's region ranks eighth in the nation by population and 29th by area, making it one of the largest MPOs in the country. The region covered by an MPO is known as the metropolitan planning area (MPA). Few statistics on MPAs are readily accessible, and their boundaries are complex and updated regularly based on census counts.

When creating a list of peers for this study, staff developed two indexes, to compare MPO jurisdictions both quantitatively and qualitatively. In the interest of similarity to DVRPC, only the 54 MPOs with at least one million people in their jurisdiction were considered across the quantitative and qualitative indexes. Given the difficulty of obtaining precise statistics on MPAs, staff combined data on MPAs, Metropolitan Statistical Areas (MSAs), and census data on counties and cities in MPO regions to create a quantitative index of MPO similarity (see Table C-1). This index was based on a set of factors used to determine peer status, along with a system for allocating points for MPO similarity, out of a maximum of 10 points.

For each criterion, an MPO could be allocated either one point or no points. One point was awarded for CMP's completed from 2019 to 2024, as CMP recency was important to consider. One point was awarded to multi-state MPOs and MPOs located in the Northeastern U.S. and mid-Atlantic, geographically relevant to DVRPC. For all other criteria, the data collected was divided into four quartiles. Quartile four always consisted of 14 MPOs (for consistency), while the other three quartiles consisted of 13 MPOs each. Quartile one, marked in dark red, made up the lowest values, ascending from light red, to light blue, to dark blue, made up of the highest values, for any given criteria. MPOs received 1 point toward their overall score when they were positioned within seven ranked spaces above or below DVRPC's own relative position. In cases where two or more given values were equal, in the seventh position from DVRPC, they were all awarded one point. These criteria included the 2020 population, population density, area in square miles, the ratio of the major city's population compared to the total MPO area population, 10-year MSA population growth from 2010 to 2020, the total number of employees in the MPO area, and the MPO area's employee density.

Table A-1: MPO Quantitative Scoring Index

MPO	2020 Population	Population Density (sq. mi.)	Area (sq. mi.)	City/ MPO%	MSA Growth 2010 to 2020	Total # of Employees	Employee Density (sq. mi.)	Update Year > 2019	Multi-State	North-East U.S.	Index
DVRPC	5,893,466	1,546.4	3,811	27.2%	4.7%	3,059,699	802.9	Y	Y	Y	10
Alamo Area	2,374,046	874.7	2,714	60.4%	19.4%	1,497,252	551.7	Y			2
ACOG	1,313,136	627.1	2,094	51.9%	13.8%	651,556	311.2				0
ARC	5,585,284	1,227.5	4,550	8.9%	15.6%	3,804,923	836.2	Y			4
BMC	2,816,948	1,173.7	2,400	20.8%	4.9%	1,470,019	612.5	Y		Y	5

MPO	2020 Population	Population Density (sq. mi.)	Area (sq. mi.)	City/ MPO%	MSA Growth 2010 to 2020	Total # of Employees	Employee Density (sq. mi.)	Update Year > 2019	Multi-State	North-East U.S.	Index
Boston Region MPO	3,353,990	2,430.4	1,380	20.1%	8.5%	2,000,000	1,449.3	Y		Y	5
BMPO	1,944,346	1,587.2	1,225	9.4%	10.3%	962,000	785.3	Y			2
CAMPO - Austin, TX	2,332,432	439.5	5,307	41.2%	33.0%	1,189,528	224.1	Y			1
CAMPO - Raleigh, NC	1,357,017	846.0	1,604	34.5%	25.1%	1,040,972	649.0				2
CRTPO	1,523,089	977.0	1,559	57.4%	51.3%	1,119,800	718.3	Y			2
CMAP	8,602,637	2,081.5	4,133	31.9%	1.7%	4,533,162	1,096.8				6
DRCOG	3,305,020	916.8	3,605	21.6%	16.5%	1,715,577	475.9	Y			5
EWCOG	2,600,697	567.1	4,586	11.6%	0.3%	1,696,805	370.0	Y	Y		3
Fresno COG	1,009,236	167.8	6,016	53.7%	8.4%	398,100	66.2	Y			1
GBNRTC	1,166,902	740.4	1,576	23.9%	2.8%	696,286	441.8	Y			3
HRTPO	1,705,382	638.0	2,673	26.9%	7.7%	1,027,006	384.2	Y			2
Plan Hillsborough	1,459,745	1,313.9	1,111	26.4%	14.1%	830,800	747.8	Y			3
H-GAC	7,092,124	837.7	8,466	32.5%	19.8%	3,500,000	413.4	Y			5
Indianapolis MPO	1,778,930	1,172.7	1,517	49.9%	20.2%	1,380,000	909.7				2
KIPDA	1,136,612	798.7	1,423	34.0%	0.1%	758,153	532.8		Y		2
MAG	4,704,697	441.4	10,659	34.2%	15.6%	2,500,000	234.5	Y			4
Memphis Urban Area MPO	1,146,882	758.0	1,513	55.2%	1.6%	621,209	410.6	Y	Y		3
MetroPlan Orlando	2,289,419	800.8	2,859	13.4%	25.3%	1,080,000	377.8	Y			2
Metropolitan Council	3,231,474	1,088.0	2,970	13.3%	12.5%	1,581,000	532.3	Y			3
MTC	7,765,693	1,037.5	7,485	13.0%	9.5%	4,005,000	535.1	Y			4

MPO	2020 Population	Population Density (sq. mi.)	Area (sq. mi.)	City/ MPO%	MSA Growth 2010 to 2020	Total # of Employees	Employee Density (sq. mi.)	Update Year > 2019	Multi-State	North-East U.S.	Index
Miami-Dade MPO	2,691,209	1,332.3	2,020	16.4%	10.3%	1,300,000	643.6	Y			2
MARC	2,080,228	540.9	3,846	24.4%	7.7%	1,080,157	280.9	Y	Y		4
MORPC	1,658,731	1,465.3	1,132	54.6%	16.5%	1,265,000	1,117.5	Y			2
GNRC	1,822,846	461.4	3,951	37.8%	25.1%	1,308,221	331.1	Y			2
NYMTC	13,165,064	4,829.4	2,726	66.9%	6.6%	7,090,003	2,600.9	Y		Y	6
NCTCOG	7,698,817	814.9	9,448	16.9%	19.9%	5,712,063	604.6	Y			3
North Florida MPO	1,576,159	587.9	2,681	60.2%	19.3%	640,426	238.9	Y			1
NJTPA	7,025,148	1,593.0	4,410	4.4%	6.6%	2,717,335	616.2	Y		Y	7
NOACA	2,082,043	1,038.4	2,005	17.9%	0.5%	1,100,000	548.6				1
Oahu MPO	1,014,651	1,655.2	613	34.6%	6.6%	604,221	985.7	Y			3
OKI	2,070,892	790.7	2,619	14.9%	5.9%	1,053,174	402.1	Y	Y		3
Palm Beach MPO	1,490,994	753.0	1,980	7.9%	10.3%	721,000	364.1	Y			1
PAG	1,043,433	113.5	9,195	52.0%	6.4%	550,000	59.8				1
Oregon Metro	1,685,021	3,310.5	509	38.7%	12.9%	985,260	1,935.7	Y			1
Puerto Rico MPO	3,285,874	967.3	3,397	9.8%	-16.0%	1,053,165	310.0	Y			3
PSRC	4,294,365	672.7	6,384	17.2%	16.8%	2,003,675	313.9	Y			2
RPC	1,352,289	1,017.5	1,329	28.4%	8.9%	677,779	510.0	Y			3
RTC	2,265,823	280.1	8,089	28.3%	16.1%	1,048,792	129.7	Y			2
PlanRVA	1,075,133	518.4	2,074	21.1%	4.5%	598,275	288.5				2
Rio Grande Valley MPO	1,355,260	419.3	3,232	10.5%	12.4%	400,000	123.8	Y			2

MPO	2020 Population	Population Density (sq. mi.)	Area (sq. mi.)	City/ MPO%	MSA Growth 2010 to 2020	Total # of Employees	Employee Density (sq. mi.)	Update Year > 2019	Multi-State	North-East U.S.	Index
SACOG	2,537,783	410.0	6,189	20.7%	11.6%	1,060,751	171.4	Y			1
SANDAG	3,298,495	774.3	4,260	42.0%	6.6%	1,338,161	314.1	Y			3
SEMCOG	4,829,680	1,048.1	4,608	13.2%	2.2%	2,700,000	585.9				4
SEWRPC	2,047,922	759.3	2,697	28.2%	1.2%	1,275,000	472.7	Y			3
SCAG	18,823,705	487.0	38,649	20.7%	2.9%	8,976,000	232.2	Y			3
SPC - Pittsburgh, PA	2,576,206	362.3	7,110	11.8%	0.6%	1,600,000	225.0	Y		Y	2
SPC - Providence, RI	1,097,186	919.7	1,193	35.3%	4.7%	495,441	415.3	Y		Y	4
TPB	5,732,469	1,612.5	3,555	12.0%	14.4%	3,169,200	891.5	Y	Y	Y	7
WFRC	1,802,700	1,014.5	1,777	11.1%	11.9%	1,200,000	675.3	Y			2

MPOs invited and who participated in the study are listed in red font.
MPOs included in the 2022 DVRPC Long-Range Plan State of the Practice White Paper are listed in italics.
Source: DVRPC, 2024.

After completing the quantitative analysis, DVRPC staff decided a qualitative analysis should be conducted as well, to examine the contents of peer MPO's CMPs as a factor for potential inclusion in the study. While DVRPC congestion management staff attempted to be as consistent as possible in qualitatively assessing peer MPOs, these choices are still subjective. According to other interpretations, peer MPO's CMPs may have ranked lower or higher than presented in this study. Nonetheless, this qualitative consideration evaluated the extent to which peer MPOs address topics of interest for DVRPC within their respective CMPs. DVRPC considered how peer MPOs addressed capacity-adding, incorporated federal performance measures, identified and prioritized congested locations and strategies, addressed induced demand, integrated the CMP with other MPO products, communicated with stakeholders, and advocated for multimodal transportation systems. This *CMP State of the Practice White Paper* aims to address these factors, so MPOs that DVRPC felt addressed these considerations particularly well were given priority in their selection for participation in the study. Together, the quantitative and qualitative analyses explain how DVRPC staff chose the peer MPOs participating in this study.

Appendix B: Interview Questions

DVRPC staff developed a standardized list of questions to be asked during each MPO interview conducted in August 2024, alongside CMP-specific questions that varied depending on the topics of interest drawn from each MPO's CMP and other related documents, including the Plan. In the interest of being concise, the CMP-specific questions, varying by MPO, are not listed, but are discussed throughout this report. This means each interview had consistent questions, asked of every MPO, and questions that differed in each interview. The standardized list of questions is located below.

Introductory Questions

- What do you consider some of the biggest successes within your regional CMP over the last several years?
- How is the CMP being incorporated into the development of the Long-Range Plan, the project selection process for the TIP, and in other MPO plans and programs?
- How many staff work on the CMP?

Congestion Management Strategies

- How are CMP strategies tied to specific congested facilities?
- How are the PM3 measures used to identify the appropriate strategies for managing congestion?
- How does the CMP evaluate the effectiveness of implemented strategies, such as "variable speed limits, CCTV cameras, coordinated signals, and others?"
- How are these findings used to inform further strategy recommendations?

SOV Capacity-Adding and Supplemental Strategies

- How does the CMP determine when and where SOV capacity-adding is the appropriate last-resort solution?
- How does the CMP develop supplemental strategies, multimodal and otherwise, to reduce congestion as part of major roadway SOV capacity-adding projects?
- For these SOV capacity-adding projects, what coordination occurs with DOTs, the FHWA, and others, in terms of scope and design?

Other

- How does the CMP incorporate: (a) safety and security (b) accessibility, connectivity, and livability (c) environment and community?
- How does the CMP account for advanced, emerging technologies, including micromobility, mobility-as-a-service, automated, connected, and electric vehicles, managed lanes, congestion pricing, and others?
- How is the CMP effectively communicated to key regional partners, including member governments, DOTs, TMAs, transit agencies, private companies, and the public?
- How are the causes of congestion identified and used throughout the CMP?

- How does the CMP address the concept of “induced demand,” where roadways undergo capacity expansion to meet higher demand and reduce congestion, but traffic volumes rise thereafter, meaning congestion returns to similar levels?
- How does the CMP simplify and/or automate the data collection and analysis process?
- How does the CMP address the coordination between transportation and land-use planning?
- Is there anything else you would like to add regarding your CMP that we haven’t already discussed?

Appendix C: List of Peer MPO Staff Interviewed

DVRPC extends its deepest gratitude to the many staff at its peer MPOs throughout the country who generously shared their time, expertise, and experiences with the project team for this study. Those participants and their titles are listed in Table C-1 below.

Table C-1: List of MPOs and Staff Interviewed in this Study

MPO	Staff Interviewed
Atlanta Regional Council (ARC)	• Kyung-Hwa Kim, Performance Analysis and Monitoring Manager • Nasim Rezvanpour, Senior Transportation Planner
Baltimore Metropolitan Council (BMC)	• Eileen Singleton: Principal Transportation Engineer • Victor Henry: Senior Transportation Planner • Ed Stylc: Transportation Analyst
Denver Regional Council of Governments (DRCOG)	• Steve Cook: Transportation Modelling and Operations Director • Max Monk: Assistant Planner
MetroPlan Orlando	• Eric Hill, Director of Transportation Systems Management and Operations • Lara Bouck, Manager of Project Development
New York Metropolitan Transportation Council (NYMTC)	• Gerry Bogacz: Assistant Director • John Simpson: Mobility Coordinator
North Central Texas Council of Governments (NCTCOG)	• Natalie Bettger: Senior Program Manager • Eric Quintana: Senior Transportation Planner
North Jersey Transportation Planning Authority (NJTPA)	• Brian Fineman: Director, Systems Planning, Data, and Forecasting • Eugene McGuinness: Principal Planner, Performance-Based Analytics
Southern California Association of Governments (SCAG)	• Philip Law: Manager, Mobility Planning and Goods Movement • Courtney Aguirre: Planning Supervisor, Multimodal Integration Business Unit • Priscilla Freduah-Agyemang: Senior Regional Planner
Southwestern Pennsylvania Commission (SPC)	• Evan Schoss: Manager of Operations and Safety • Zach Hollingshad: Operations and Safety Planner
National Capital Regional Transportation Planning Board (TPB) of the Metropolitan Washington Council of Governments	• Andrew Meese: Program Director, Systems Performance Planning

Source: DVRPC, 2024.

Appendix D: Links to Peer MPOs' Relevant CMP Resources

DVRPC is incredibly grateful for the hard work of the peer MPOs included in this study, and the relevant CMP resources they have created. These resources, including CMP documents, reports, web pages, web maps, dashboards, and more, were useful in guiding both peer interviews and the contents of this study itself. For ease of access, and accurate representation, these resources are linked in Table D-1 below.

Table D-1: List of Peer MPOs' Relevant CMP Resources

MPO	Relevant CMP Resources
Atlanta Regional Council (ARC)	• CMP Web Page • CMP Dashboard • CMP: Tracking the Progress Dashboard • Regional Thoroughfare Network Identification and Classification Report
Baltimore Metropolitan Council (BMC)	• CMP Web Page • Quarterly Congestion Analysis Reports Database • CMP Analysis Tool • Recommended CMP Objectives • Development of A Strategy for a CMP for the Baltimore Region – Defining the CMP Network • Baltimore Regional CMP: Proposed Performance Metrics and Data Collection and Management Plan • Baltimore Regional CMP: Development of a Process to Analyze Areas of Congestion and Associated Mobility Issues • Baltimore Regional CMP: Develop a Process to Evaluate Strategy Effectiveness • Baltimore Regional CMP: Congestion Management Strategy Guide • Planning Dashboards Web Page • Maryland Priority Letter Map Web Page
Denver Regional Council of Governments (DRCOG)	• CMP Web Page • 2023 Annual Report on Roadway Traffic Congestion in the Denver Region • Congestion Mitigation Toolkit • NEPA Manual • Regional Transportation Operations and Technology Strategic Plan
Delaware Valley Regional Planning	• CMP Web Page • 2023 CMP Report

MPO	Relevant CMP Resources
Commission (DVRPC)	• CMP Procedures • The State of the Practice: A Study of DVRPC's Peer MPOs' Plans
MetroPlan Orlando	• 2045 Metropolitan Transportation Plan - Managing Mobility: A CMP • 2045 Metropolitan Transportation Plan - Managing Mobility: Systems Performance Report • Maps and Tools Web Page • Existing Conditions Review: TSMO Master Plan
New York Metropolitan Transportation Council (NYMTC)	• CMP Web Page • 2021 CMP Status Report • CMP Procedures • Jerome Avenue Transportation Study - Status Report Example
North Central Texas Council of Governments (NCTCOG)	• CMP Web Page • 2021 CMP Update • CMP Project Forms and Documentation Process • Example TxDOT CMP Project Disclosure Statement • CMP Project Implementation Form Instructions
North Jersey Transportation Planning Authority (NJTPA)	• CMP Web Page • Plan 2050: The NJTPA CMP • Accessibility and Mobility Strategy Synthesis: Strategy Identification and Prioritization • Accessibility and Mobility Strategy Synthesis Summary Report • Accessibility and Mobility Strategy Synthesis: Needs Assessment • Accessibility and Mobility Strategy Synthesis: Objectives and Performance Measures • Accessibility and Mobility Strategy Synthesis Strategy Profiles • Accessibility and Mobility Strategy Synthesis Web Page • Assessment of System Connectivity

MPO	Relevant CMP Resources
Southern California Association of Governments (SCAG)	• Transportation System: CMP Technical Report • TDM Strategic Plan and Final Report - Appendix G TDM Toolbox • Mobility Go Zone and Pricing Feasibility Study • SCAG Region Value Pricing - Regional Express Lane Network: Concept of Operations • SB 375 • Transportation Impacts (SB 743) • Dedicated Transit Lines Study
Southwestern Pennsylvania Commission (SPC)	• CMP Web Page • CMP GIS Web App • CMP Introduction • CMP Strategies • CMP Performance Measures • CMP Glossary • CMP RITIS Data Analysis • CMP Strategy Survey • 2022 CMAQ Performance Plan
National Capital Regional Transportation Planning Board (TPB) of the Metropolitan Washington Council of Governments	• CMP Web Page • CMP Technical Report's Web Page • Congestion Dashboard • Congestion Report 4th Quarter 2022 • System Performance Web Page • Technical Inputs Solicitation • MATOC Web Page

Source: DVRPC, 2024.

The State of the Practice:

A Study of DVRPC's Peer Metropolitan Planning Organizations' Congestion Management Processes

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Geographic Area Covered: The nine-county Delaware Valley Regional Planning Commission (DVRPC) region, as well as the planning jurisdictions of the Atlanta Regional Commission (ARC), Baltimore Metropolitan Council (BMC), Denver Regional Council of Governments (DRCOG), MetroPlan Orlando, National Capital Region Transportation Planning Board (TPB), New York Metropolitan Council (NYMTC), North Central Texas Council of Governments (NCTCOG), North Jersey Transportation Planning Authority (NJTPA), Southern California Association of Governments (SCAG), and Southwestern Pennsylvania Commission (SPC).

Key Words: Congestion, congestion management, congested locations, data, evaluation, induced demand, monitoring, performance, pricing, project development, strategies, state-of-the-practice, reporting, transportation, transportation performance management, traffic.

Abstract: This white paper documents interviews conducted with ten peer Metropolitan Planning Organizations (MPOs) to identify the state of the practice within the Congestion Management Process' (CMPs). These interviews revealed six primary focus areas that cover a range of congestion management activities: approaches to congestion management; identify, assess, and prioritize congested locations; develop strategies and tie them to specific locations, project development; evaluating before-after performance and strategy effectiveness; and monitoring congestion and reporting results. The conclusion compiles this study's key recommendations, which are intended to inform the next update to the region's CMP. These recommendations are streamline data collection, identification, and assessment of congested locations, develop innovative processes for identifying strategies and tailoring them to specific locations, operationalize the requirement to consider alternatives to SOV-capacity-adding, emphasize developing and monitoring supplemental strategies, conduct more performance evaluations, and build on collaborating and communicating with planning partners and internally.

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DVRPC's vision for the Greater Philadelphia Region is a prosperous, innovative, equitable, resilient, and sustainable region that increases mobility choices by investing in a safe and modern transportation system; that protects and preserves our natural resources while creating healthy communities; and that fosters greater opportunities for all.

DVRPC's mission is to achieve this vision by convening the widest array of partners to inform and facilitate data-driven decision-making. We are engaged across the region, and strive to be leaders and innovators, exploring new ideas and creating best practices.

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