CONGESTION MANAGEMENT PROCESS

TECH MEMO 4

Strategies and Toolbox

COMPILED BY:

OLSSON

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Association of Central Oklahoma Governments
4205 N. Lincoln Blvd. | Oklahoma City, OK 73105 | 405.234.2264 | acogok.org

ASSOCIATION OF CENTRAL OKLAHOMA GOVERNMENTS

Mark W. Sweeney, AICP ..... Executive Director

John M. Sharp ..... Deputy Director

TRANSPORTATION PLANNING SERVICES

Jennifer Sebesta ..... TPS Division Manager

Eric Pollard ..... Air Quality & Clean Cities Manager

Gwen Gordon ..... TPS Administrative Assistant

Association of Central Oklahoma Governments
4205 North Lincoln Blvd
Oklahoma City, OK 73105
Telephone: (405) 234-2264
www.acogok.org

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Contents

1. Congestion Strategy Framework

Introduction

Effectively managing congestion requires a clear framework that connects data-driven analysis with coordinated, multimodal solutions. As travel patterns evolve and the region continues to grow, the Congestion Management Process (CMP) provides a structured approach for identifying the most appropriate strategies to address congestion across diverse contexts. This framework emphasizes making the best use of the existing transportation system by leveraging operations, technology, transit, and active transportation improvements, while ensuring that any future capacity projects are grounded in demonstrated need and aligned with regional and federal goals. By organizing strategies into cohesive categories and illustrating how they work together, the CMP helps guide agencies toward investments that improve mobility, enhance safety, strengthen reliability, and support an accessible multimodal network.

Purpose of Identifying Multimodal Strategies

Managing congestion effectively calls for coordinated multimodal strategies to enhance mobility, reliability, and safety. The updated CMP focuses on operational efficiency and optimizing the system with multimodal investment, prioritizing these approaches over expanding roadways. This aligns with national standards, federal requirements, and the region's goals for sustainability, economic growth, and equitable access.

Strategy Interconnections

The congestion management strategies in this CMP were developed to support both the regional priorities outlined in Encompass 2045 and the federally required framework for managing congestion in Transportation Management Areas. Encompass 2045 emphasizes a transportation system that is safe, efficient, equitable, and multimodal. The CMP directly advances these priorities by focusing first on strategies to optimize the existing network, such as traffic operations, transit enhancements, travel demand management, and bicycle and pedestrian improvements before considering roadway capacity expansion. This ensures regional investments support the goals of improving mobility, expanding travel options, reducing crashes, and promoting healthier, more connected communities.

These strategies also meet the federal expectations established in 23 CFR 450.320, which require MPOs to apply a systematic, performance-based approach to identifying and addressing congestion. The CMP incorporates federal performance measures related to safety, reliability, freight movement, and environmental outcomes, and uses data-driven analysis to pinpoint congested locations and select appropriate strategies. By linking CMP findings to both the Metropolitan Transportation Plan and the Transportation Improvement Program (TIP), the region ensures federally funded projects, especially those adding capacity, are consistent with the CMP and include consideration of multimodal or operational solutions.

Together, this alignment strengthens the region's ability to manage congestion cost-effectively while advancing long-term regional goals. The CMP becomes not only a federal requirement, but a practical tool for guiding investment decisions, improving system performance, and supporting the broader vision of Encompass 2045 and future plans.

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2. Strategy Identification Process

Introduction

The process for identifying strategies took place through review of peer agencies, Federal strategies, and Encompass 2045 strategies. Additionally, stakeholders were engaged and challenged to review the existing strategies from the 2016 CMP and provide feedback related to strategy feasibility within their respective jurisdictions. Ensuring the congestion management toolbox aligns with existing policy, as well as real-time feasibility within member jurisdictions is key in this process.

Existing Strategies - Review

As part of the Congestion Management Process (CMP) update, stakeholder agencies were asked to review the previous regional congestion management toolbox and provide both a numerical effectiveness score, between 1 and 5 with 5 indicating high support for the strategy. Qualitative comments were also encouraged for each strategy. Feedback was received from Edmond, Norman, Oklahoma City, ODOT, and Noble. Overall, the strategies with the strongest support were those providing practical, lower-cost operational improvements that can be implemented in the near-term and yield consistent, measurable benefits. Stakeholders emphasized strategies addressing signal coordination, access management, traffic operations, and targeted roadway improvements are most effective across a variety of roadway types.

Participants expressed mixed views on strategies relying on behavioral change or widespread public participation, such as ridesharing, telecommuting programs, or carsharing. While these strategies were recognized as potentially beneficial, their effectiveness was considered highly dependent on user adoption rates and the presence of supporting programs (e.g., Guaranteed Ride Home). Feedback on strategies, particularly HOV lanes, major transit expansion, and carsharing—are effective in higher-density corridors with significant demand. Jurisdictions with suburban or rural roadway networks noted these strategies provide limited congestion relief, compared to operational improvements.

Stakeholders also noted short-term treatments such as shoulder running, or interim lane expansions can help manage congestion temporarily but do not fully address long-term capacity needs. Meanwhile, high-capacity transit received philosophical support, but scored lower due to concerns about feasibility, cost, and current ridership demand.

Overall, stakeholder comments on the previous strategies reflect a preference for scalable, cost-effective, and data-driven strategies to improve traffic flow and safety without requiring major capital investment or large-scale cultural shifts. These priorities help guide the refinement of the updated CMP toolbox, presented in the next chapter, and align future strategy selection with both regional conditions and local agency needs. Table 2-1 summarizes stakeholder feedback on the previous strategies.

Table 2-1 Stakeholder Feedback on Previous Strategies

Strategy Category	General Support Level	Key Themes from Feedback	Applicability Notes
Traffic Incident Management	High (5)	High support. Alleviates congestion and improves safety.	Applicable on all roadway types.
Transit Rights-of-Way	High (5)	Increased travel time reliability; Reduced VMT; Stimulation of mixed use and high density land uses adjacent to corridor	Arterials and highways; scalable region-wide.
Signal Coordination & ITS	High (4–5)	Provides immediate flow benefits; strong value across jurisdictions.	Arterials and highways; scalable region-wide.
Access Management	High (4–5)	Highly effective for improving safety and reducing delays.	Best on arterials and suburban corridors.
Intersection Improvements	High (4–5)	Cost-effective congestion reduction at bottlenecks.	Applicable on all roadway types.
Minor Widening / Operational Improvements	High (4–5)	Affordable and impactful short-term improvements.	Applicable on highways and arterials; short-term.
Telecommuting & Flex Schedules	High (4-5)	Reduces peak demand but depends on employer uptake.	Effective across all facility types.
Transit Improvements / High-Capacity Transit	High (4–5)	Strong conceptual support.	Works in dense corridors with strong demand.
Ridesharing / Vanpooling	Medium (3–4)	Useful but participation varies; dependent on incentives.	Better for regional commuter corridors.
Carsharing	Medium (3)	Minimal impact in low-density areas; low adoption expected.	Most applicable in dense urban districts.
HOV Lanes	Low-Medium (2–3)	Only effective in very congested, high-volume corridors.	Limited to major freeway corridors.
Alternative Mode Events	Medium (3)	Helpful for awareness but limited congestion relief.	Best as supplemental TDM programming.
Shoulder Running / Interim Capacity	Medium (3)	Useful short-term fix but not a long-term congestion solution.	Highway corridors with physical constraints.

Identifying Strategies

A main element of this updated CMP is to recommend solutions for managing congestion and meeting regional goals. Federal guidance suggests strategies align with regional objectives, fit local needs, support other goals, and consider collaboration for assigning implementation responsibilities. CMP goals and actions help guide the selection of suitable strategies for specific congestion problems.

Agencies need to understand both current system operations and anticipated future needs or issues. Congestion management strategies may differ based on the following scenarios.

1. The specific congestion issue or dimension that needs to be addressed,

2. The objectives to be accomplished by the deployed strategy,
3. Whether the strategy is to be implemented on a new or an existing facility,
4. The availability of right-of-way,
5. The current operational characteristics, and
6. Environmental and societal concerns.

The recommended strategies presented in the next chapter align with the previous Encompass 2045 goals and the proposed CMP objectives. The strategies are feasible, actionable, and achievable through active collaboration among sponsoring and administering partners. In summary, this chapter establishes a framework for identifying and assessing the existing congestion management strategies. Insights from best practices, the previous ACOG CMP, and stakeholder feedback have informed the recommended toolbox strategies.

3. Updated Congestion Management Toolbox

The recommended congestion management strategies include a range of projects, actions, programs, and policies designed to mitigate traffic congestion within the ACOG transportation network. This chapter introduces a tailored toolbox with different approaches aimed at addressing regional congestion issues, bottlenecks, and mobility requirements as identified through comprehensive data analysis.

ACOG's existing metropolitan transportation plan (Encompass 2045) and existing CMP prioritize demand management strategies to reduce or eliminate travel. Federal policy requires cost-effective congestion management approaches before considering expensive options that increase single-occupant vehicle capacity.

In accordance with 23 CFR 450.320 (c) 4[1], the following list of six congestion management strategy types has been developed for the ACOG MPO TMA, in concert with the Encompass 2045 and CMP guiding principles.

1. Travel demand management (TDM) strategies to eliminate or reduce the need to make trips by motor vehicle.

2. Strategies for integrating transportation and land use to promote mixed-use and transit-oriented development, increasing density and lowering reliance on motor vehicles.

3. Technology solutions through the use of transportation systems management and operations (TSM&O) and intelligent transportation systems (ITS) to maximize the efficiency of the existing infrastructure.

4. Public transit enhancements and projects make transit a more attractive and competitive mode of transportation in the ACOG MPO TMA region.

5. Bicycle and pedestrian improvements to enhance the reach of the public transportation system and encourage trips by nodes other than single occupancy vehicles.

6. Improvements to roadways to include access consolidation and control, complete streets policies, restriping, and finally the addition of lanes or construction of new facilities where no other solutions can minimize or alleviate congestion effectively.

Each strategy type is detailed below. Table 3-1 outlines the congestion management toolbox, grouping strategies by category. Some are regional or system-wide, while others target specific corridors or projects. For each, potential congestion reduction, recommended analysis methods, and estimated costs (low, medium, high) are noted, along with implementation timeframes. The toolbox highlights companion strategies to optimize results when used together. The congestion management toolbox also includes alignment with Encompass 2045 project selection criteria. This ensures projects are aligned with the MTP and TIP processes, while simultaneously working towards congestion management.

[1] eCFR :: 23 CFR 450.320 -- Development of programmatic mitigation plans.

Six Congestion Management Strategy Types

1. TRAVEL DEMAND MANAGEMENT

Seven different Travel Demand Management (TDM) strategies are identified including:

1. Alternative work schedules,
2. Telecommuting,
3. Ridesharing,
4. Alternative mode events,
5. Employer incentive programs,
6. Carsharing, and
7. Pricing strategies.

These strategies generally have low to moderate costs and offer advantages like cutting down peak travel times and reducing the number of single-occupancy vehicle miles traveled (VMT). This can lead to several environmental benefits, such as better air quality and lower greenhouse gas emissions. While assessing the effectiveness of these methods regionally is challenging, they often yield better results in targeted areas like districts, business parks, or specific subareas. TDM strategies can also be successfully coordinated with public transit options, park-and-ride facilities, and land use, cycling, and pedestrian initiatives.

2. TRANSPORTATION AND LAND USE COHESION

Transportation and land use cohesion strategies are designed to optimize management of properties surrounding and connected to significant transportation infrastructure. These approaches involve revising planning and zoning regulations to promote development to align with the characteristics and requirements of the related transportation networks.

Previous strategies are:

1. Encouraging infill development and densification,
2. Promoting mixed-use development, and
3. Creating guidelines to promote transit-oriented development.

Implementing land use policies effectively can cut down on single-occupant vehicle trips, since people living or working nearby have shorter distances to reach commercial areas and activity centers. These land use policies are also dependent upon the development and implementation of pedestrian infrastructure strategies that enhance a traveler's ability to navigate an environment by walking (i.e. sidewalks, mid-block crossings, safe crossing infrastructure, etc.).

Generally, developing these strategies is affordable for the agency or jurisdiction, with costs remaining low to moderate. While policy creation can happen quickly, achieving full integration between land use and transportation takes longer because it depends on ongoing development and redevelopment. Working with private companies, public transit providers, and planners for biking and walking routes helps improve coordination between land use and transportation. Most of these land use approaches are not expensive and typically require new ordinances or economic incentives to motivate developers to get involved.

3. TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS (TSM&O) AND INTELLIGENT TRANSPORTATION SYSTEMS (ITS)

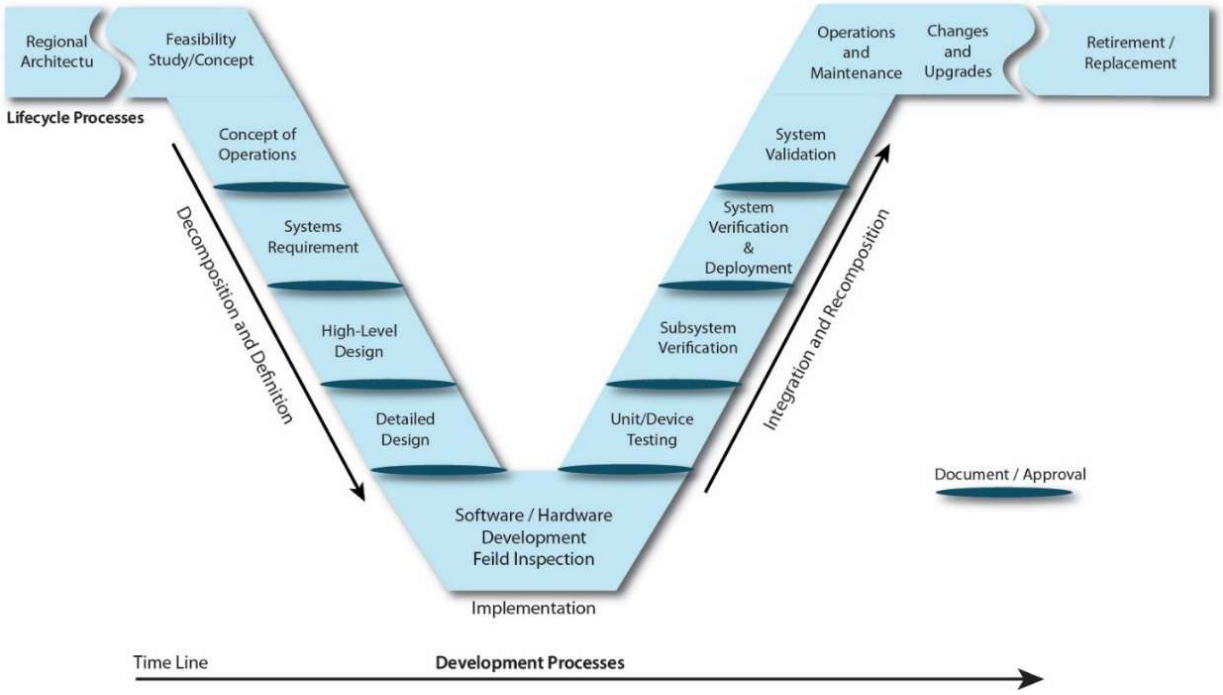
Transportation system management and operations (TSM&O) and intelligent transportation systems (ITS) use modern technologies to improve how well current transportation infrastructure works. These strategies aim to get the most use out of the existing network without building extra lanes or expanding physical capacity.

Fourteen TSM&O/ITS strategies have been identified for the ACOG MPO TMA. These strategies rely heavily on coordinating with related initiatives to maximize effectiveness. An integrated network of ITS and TSM&O approaches significantly aids regional congestion reduction.

Examples of the strategies recommended for ACOG and the TMA include enhanced traffic enforcement, developing work zone management principles, enhancing the parking management program, speed harmonization, ramp metering, managed lanes, intersection enhancements for bicycles and pedestrians, formalizing a traffic incident management program and various communications and traffic monitoring improvements.

The costs associated with these improvements are generally considered low to moderate. Regional implementation of ITS infrastructure requires adherence to specific requirements in order to qualify for federal funding. When ITS deployments incorporate new technologies or involve multiple jurisdictions or agencies, a systems engineering process is mandated. While this procedure may extend the project timeline, it plays a crucial role in ensuring that the deployed technology aligns with the community's needs. A diagram of the systems engineering process is shown in Figure 3-1.

Figure 3-1 Systems Engineering "V" Diagram



Source: Systems Engineering for Intelligent Transportation Systems, FHWA, 2025

4. TRANSIT

The Central Oklahoma region is served by three major transit systems, the Central Oklahoma Transportation and Parking Authority (COPTA) operates transit service under the name EMBARK and provides service to Oklahoma City and Norman. Additionally, the City of Edmond is served by the transit service known as CityLink. Most of these transit routes operate with 30-minute frequency during peak hours (below the level to support spontaneous transit usage). Increasing the share of person trips taken on public transportation would lessen the number of vehicle trips and reduce congestion.

ACOG, in partnership with the regional transit providers has developed a Long Range Transit Plan (LRTP) for the central Oklahoma region. The LRTP's vision statement is to: Develop an intentional plan for a cohesive network of transit services that supports growth, promotes economic mobility, enhances quality of life, and facilitates opportunity across Central Oklahoma. This planning effort, referred to as Connect Central Oklahoma, has identified the following four goals for the investment strategies developed with in the plan:

- Provide communities with meaningful access to transit
- Create a compelling, reliable rider experience
- Offer competitive service options
- Utilize resources effectively

The tools within the CMP toolbox align with the proposed investment vision from the LRTP, leveraging strategies to support existing and future high capacity transit solutions and regional connectivity through seven public transportation strategies:

1. Expanding enhanced and express bus service,
2. Expanding Bus Rapid Transit (BRT),
3. Developing intersection queue jumps to improve transit travel times,
4. Providing enhanced amenities on vehicles or stops,
5. Increasing bus route coverage or frequency,
6. Developing new fixed guideway travel ways,
7. Implementing dedicated transit rights-of-way,
8. Establish strategic partnerships,
9. Invest in transit-oriented development and mobility hubs, and
10. Increase reliable funding for long-term transit investments and sustainable operations.

Transit strategies vary in cost, with new transit routes and dedicated right-of-way generally being more expensive than boosting service frequency or improving bus stops. While grants often cover capital expenses, securing operational funding for expanded services can be challenging. These strategies help increase transit ridership, reduce vehicle miles traveled, and improve air quality. They are also effective when combined with bicycle, pedestrian, and land use initiatives that encourage less car use.

5. BICYCLE AND PEDESTRIAN

The bicycle and pedestrian network serves as an important extension of the primary public transportation system. This strategic approach explores methods to increase bicycle usage and promote walking trips. Three principal strategies have been identified: constructing new sidewalks and bicycle lanes on local streets, developing regional design guidelines that support bicycle- and pedestrian-friendly development, and expanding bicycle sharing programs. These initiatives are generally associated with low to moderate costs.

Bicycle and pedestrian policies are most effective when integrated with complementary measures, such as the adoption of complete streets policies, land use and transportation coordination strategies that support densification, and enhanced safety measures including improved enforcement.

The implementation of bicycle and pedestrian strategies offers significant benefits by reducing reliance on automobile travel, which consequently decreases vehicle miles traveled (VMT) and enhances regional air quality and congestion. The associated costs for these strategies typically remain low to moderate.

6. ROADWAY IMPROVEMENTS

Federal policy requires cost-effective congestion management strategies are considered before expanding single-occupant vehicle capacity. However, adding lanes or new facilities may

sometimes be necessary. Roadway network improvements should be paired with supporting companion strategies.

Eight roadway improvement strategies for the ACOG MPO TMA region aim to enhance operations, address bottlenecks on current facilities, and support other transportation modes where appropriate. Strategies are listed below.

1. Improved signage,
2. Access management improvements,
3. Turn restrictions at key intersections,
4. Adopting local complete streets policies,
5. Geometric design improvements to intersections and interchanges,
6. Adding capacity through restriping activities or widening (if appropriate),
7. Addition of acceleration or deceleration lanes, and
8. The development of new arterials or expressways.

The cost of roadway improvements varies depending on the strategy's type and complexity. These improvements usually target specific problem areas instead of entire corridors or regions. To achieve the greatest benefit, it's best to combine roadway enhancements with related strategies. For instance, when considering road widening or intersection upgrades, planners should also think about future transit needs and set aside space for possible bus service expansions. The following symbols to the right show the estimated strategy cost identified in the toolbox.

Symbol	Meaning
$	Low Cost
$+	Low to Moderate Cost
$$	Moderate Cost
$$+	Moderate to High Cost
$$$	High Cost

Table 3-1 Congestion Management Toolbox

1. Travel Demand Management							
Project/Program	Congestion Impacts	Roadway Type	Cost	Timeframe	Companion Strategies	Data Sources/ Analysis Tools	Encompass 2045 Connection[2]
Alternative Work Schedules: Continue/expand existing programs to work with employers and employees to leave home and arrive at work location outside traditional peak demand periods.	-Reduced peak period VMT -Improved travel time	N/A	$	Existing	-Telecommuting -Ridesharing -Park & Ride Lots	-Traffic Counts -Participant Surveys	C10, C20, C22 [Performance | Economic Strength | Safety and Security | System Preservation]
Telecommuting: Continue/expand existing programs to work with employers and employees to allow for remote work, work-from-home, and other telecommuting options.	-Reduced peak period VMT -Reduced overall VMT -Reduced overall VHT -Reduced parking demand	N/A	$	Existing	-Alternative Work Schedules -Ridesharing -Park & Ride Lots	-Traffic Counts -Participant Surveys	C10, C20, C22, C14 [Economic Strength | Equity and Options | Performance | System Preservation]
Alternative Mode Events: Continue/expand existing programs to develop additional events that promote non-SOV work trips (e.g. Bike to Work Day, Carpool Day, Vanpool Day, etc.)	-Reduced peak period VMT -Reduced overall VMT -Reduced overall VHT -Reduced parking demand -Increased demand for walking, biking and transit	N/A	$	Existing	-Ridesharing -Managed Lanes -Park & Ride Lots -Transit Programs	-Participant Surveys -Boarding and Alighting Data	C10, C12, C14, C18 [Economic Strength | Equity and Options | Performance | System Preservation]

[2] Encompass 2045 Project Selection Criteria

Project/Program	Congestion Impacts	Roadway Type	Cost	Timeframe	Companion Strategies	Data Sources/ Analysis Tools	Encompass 2045 Connection[3]
Ridesharing: Continue/expand existing programs to work with users to register and regularly utilize carpooling and vanpooling. Ridesharing programs are most effective when coupled with a guaranteed ride home program to allow for commuters who may have emergencies to know that they can respond immediately should their plans or ride partners' plans change.	-Reduced peak period VMT -Reduced peak period SOV trips -Reduced parking demand -Increased use of alternative modes	Freeway & Arterial	$	Existing	-Alternative Work Schedules -Telecommuting -Guaranteed Ride Home Programs -Managed Lanes	-Traffic Counts -User Logs -Participant Surveys	C10, C20, C22, C3 [Economic Strength | Equity and Options | Performance | System Preservation]
Carsharing: Continue/expand existing programs to deploy carsharing stations in the ACOG region. Currently, Enterprise Carshare, Zipcar, and TimeCar are operating in the ACOG region at limited locations.	-Reduced parking demand -Increased demand for walking, biking and transit	Arterial	$	Existing	-Ridesharing -Managed Lanes -Park & Ride Lots	-Traffic Counts -User Logs -Participant Surveys	C10, C15, C18, C12 [Economic Strength | Equity and Options | Performance | System Preservation]
Employer Incentive Programs: Marketing and reward program partnerships between transit operators and employers to encourage existing staff's use of transit through subsidies of transit fares provided to employees.	-Increased transit ridership -Reduced VMT -Enhanced travel time reliability	N/A	$	Short Term (1-5 years)	-Alternative Work Schedules -Alternative Mode Events	-Boarding and Alighting Data	C10, C17, C18, C12 [Economic Strength | Equity and Options | Performance | Connectivity]
Pricing Strategies: Consider the use of peak period and/or congestion pricing on the turnpike system in the ACOG region to assist in demand reduction on the network. Consider toll price reductions or free trips for HOV vehicles.	-Reduced peak period VMT -Reduced travel time for turnpike users	Freeway	$$	Existing	-Managed Lanes -Ridesharing	-Toll Revenue -Traffic Counts on Tollway	C20, C22, C3, C1 [Performance]

[3] Encompass 2045 Project Selection Criteria

2. Transportation and Land Use Cohesion							
Project/Program	Congestion Impacts	Roadway Type	Cost	Timeframe	Companion Strategies	Data Sources/Analysis Tools	Encompass 2045 Connection
Design Guidelines for Transit-Oriented Development (TOD): Land use and development guidelines that encourage clustering housing units, employment and service centers around transit stations in walkable areas.	-Reduced VMT	Arterial	$	Short Term (1-5 years)	-Design guidelines for bicycle/pedestrian friendly development	-Site Impact Analysis -Land Use Changes Over Time	C2, C12, C15, C17 [Economic Strength | Performance | Connectivity | System Preservation]
Infill and Densification: Focus new development in the footprint of existing infrastructure rather than building new infrastructure in greenfield locations.	-Reduced VMT -Increased use of alternative modes	N/A	$$	Short Term (1-5 years)	-Improved Transit Stations/Stops -Enhanced Transit Amenities -Bike Sharing Programs -Carsharing	-Travel Demand Model -Site Impact Analysis	C12, C13, C2, C14 [Economic Strength | Performance | Connectivity | System Preservation]
Mixed-use Development: Comingling of residential, commercial and other service land uses in order to reduce the need for people to use vehicles to access goods and services.	-Reduced VMT -Increased use of alternative modes	N/A	$$	Short Term (1-5 years)	-Improved Transit Stations/Stops -Enhanced Transit Amenities -Bike Sharing Programs -Carsharing	-Travel Demand Model -Site Impact Analysis	C2, C12, C10 [Economic Strength | Performance | Connectivity | System Preservation]

3. Transportation Systems Management and Operations (TSM&O) and Intelligent Transportation Systems (ITS)							
Project/Program	Congestion Impacts	Roadway Type	Cost	Timeframe	Companion Strategies	Data Sources/Analysis Tools	Encompass 2045 Connection
Partnership with Private Commercial Traffic/Travel Applications: Identify and partner with commercial truck GPS/electronic logbook developers (Garmin, Rand McNally, Waze, etc.) to ensure accurate truck routing/alternate routing during road work/congestion/incident times.	-Increased travel time reliability -Reduction in work zone related incidents -Reduced delay due to incidents	Freeway & Arterial	$	Short Term (1-5 years)	-Traffic Incident Management (TIM) Program -Regional Traffic Management Center (TMC) -Enhanced Enforcement	-Inventory of Partnerships	C19, C20, C21, C22 [Performance | Economic Strength | Safety and Security]
Enhanced Enforcement: Targeted deployment of enforcement personnel in areas that are prone to congestion and incidents.	-Increased travel time reliability	Freeway & Arterial	$	Short Term (1-5 years)	-Speed Harmonization -Work Zone Management -Service Patrols -Regional Traffic Management Center (TMC) -Traffic Incident Management (TIM) Program	-Crash Data	C19, C20, C21, C22 [Performance | Economic Strength | Safety and Security]
Work Zone Management: ITS, Smart Work Zones and enforcement supported work zones for projects located on heavily traveled and/or incident prone roadways.	-Increased travel time reliability -Reduced VHT -Reduction in work zone related incidents	Freeway & Arterial	$	Short Term (1-5 years)	-Traffic Incident Management (TIM) Program -Enhanced Enforcement	-Crash Data -TOPS-BC	C19, C20, C21, C22 [Performance | Economic Strength | Safety and Security]

Project/Program	Congestion Impacts	Roadway Type	Cost	Timeframe	Companion Strategies	Data Sources/Analysis Tools	Encompass 2045 Connection
Communications Networks and Roadway Monitoring Coverage: Communications and monitoring infrastructure (fiber, wireless, cameras speed detectors, etc.) required to support operational activities. Communications networks allow remote monitoring and surveillance of the CMP network and provide date for real time management of the transportation system. Information may also be provided to the media and public to assist in TDM and incident routing.	-Increased operational capability to monitor and respond to incidents on the network and provide traveler information	Freeway & Arterial	$+	Short Term (1-5 years)	-Regional Traffic Management Center (TMC) -Traffic Signal Coordination and Modernization -Traffic Incident Management (TIM) Program -Transit Programs	-Network Monitoring Inventory (data)	C19, C20, C21, C22 [Performance | Economic Strength | Safety and Security]
Regional Traffic Management Center (TMC): Consider enhancing the existing control center for monitoring, communication and control of the CMP network. TMC's facilitate situational awareness, communication among owner agencies, response partners, execution of responses and coordination.	-Reduction in incident response time -Reduced delay due to incidents -Increased travel time reliability	Freeway & Arterial	$+	Medium Term (6-10 years)	-Traffic Incident Management (TIM) Program -Communications Networks and Roadway Monitoring Coverage -Enhanced Enforcement -Traffic Signal Coordination and Modernization -Managed Lanes	-Incident Duration -Incident Response Time -Incident Reduction -TOPS-BC -Miles of Network Covered by ITS Devices	C19, C20, C21, C22 [Performance | Economic Strength | Safety and Security]
Traffic Signal Coordination and Modernization: Enhance signal detection and controller ability to respond to changes in traffic flow either in real time or by developing new signal timing plans. May also include transit signal priority to enhance transit system reliability and travel times.	-Reduced VHT -Reduced intersection delay -Increased travel time reliability -Improved travel time	Arterial	$$	Medium Term (6-10 years)	-Traffic Incident Management (TIM) Program -Communications Networks and Roadway Monitoring Coverage -Enhanced Enforcement -Traffic Signal Coordination and Modernization -Managed Lanes	-Incident Duration -Incident Response Time -Incident Reduction -TOPS-BC -Miles of Network Covered by ITS Devices	C19, C20, C21, C22 [Performance | Economic Strength]

Project/Program	Congestion Impacts	Roadway Type	Cost	Timeframe	Companion Strategies	Data Sources/Analysis Tools	Encompass 2045 Connection
Parking Management Program: Examination and revisions to parking policies, prices and lot/garage locations to encourage efficient use of parking resources in high parking demand areas. May include mobile applications, electronic payment, wayfinding and other signage.	-Reduced VMT -Reduced CBD congestion -Reduced event-based parking congestion	Arterial	$	Short Term (1-5 years)	-Traffic Incident Management (TIM) Program -Enhanced Enforcement	-Crash Data -TOPS-BC	C19, C20, C21, C22 [Performance | Economic Strength | Safety and Security]
Speed Harmonization: Variable speed limits on segments of the network that approach areas of recurring congestion, bottlenecks, incidents, special events, and other conditions that affect traffic flow.	-Reduced VHT -Reduction in traffic incidents	Freeway	$+	Short Term (1-5 years)	-Regional Traffic Management Center (TMC) -Traffic Incident Management Program -Enhanced Enforcement -Communications Networks and Roadway Monitoring Coverage	-NMPRDS -Crash Data -TOPS-BC -Simulation Models	C19, C20, C21, C22 [Economic Strength | Performance |Safety and Security]

4. Transit

Project/Program	Congestion Impacts	Roadway Type	Cost	Timeframe	Companion Strategies	Data Sources/Analysis Tools	Encompass 2045 Connection
Improved Transit Stations/Stops: Includes improvements in real-time scheduling, location of vehicles, arrival time, alternate routes and modes. Also included addition of bicycle and pedestrian infrastructure and amenities (bike lockers, bike racks, etc.) and connection to existing networks.	-Increased Transit Ridership -Reduced VMT -Increased travel time reliability -Increased use of alternative modes	Arterial	$+	Medium Term (6-10 years)	-New Sidewalks and Designated Bicycle Lanes on Local Streets -Bike Sharing Programs	-Bicycle Rack Locker Usage Information -Boarding and Alighting Data	C17, C18, C11, C15 [Economic Strength | Equity and Options | Performance | Connectivity]
Express Bus Service Expansion: Additional high speed, limited stop operations between two commuter points.	-Improved travel time -Reduced VMT -Enhanced travel time reliability	Freeway	$+	Short Term (1-5 years)	-Traffic Signal Coordination and Modernization -Regional Traffic Management Center (TMC) -Communications Networks and Roadway Monitoring Coverage	-Network Monitoring Inventory (data) -Boarding/Alighting Data -Mode Split -Transit Elasticity Model	C17, C20, C22, C1 [Economic Strength | Equity and Options | Performance | Connectivity]
Transit Intersection Queue Jump Lanes and Signal Priority: Addition of travel lanes at signalized intersections that allow buses to proceed before other vehicles (May require additional ROW).	-Improved travel time -Reduced VMT -Enhanced travel time reliability	Arterial	$+	Short Term (1-5 years)	-Traffic Signal Coordination and Modernization -Regional Traffic Management Center (TMC) -Communications Networks and Roadway Monitoring Coverage	-Network Monitoring Inventory (data) -Boarding/Alighting Data -Mode Split -TOPS-BC	C17, C19, C20, C22 [Economic Strength | Equity and Options | Performance | Connectivity]
Enhanced Transit Amenities: Transit vehicle transit shelter upgrades and replacements to provide users with a better rider experience to encourage more transit use.	-Increased transit ridership -Reduced VMT -Enhanced travel time reliability	Arterial	$$+	Short Term (1-5 years)	-New Sidewalks and Designated Bicycle Lanes on Local Streets -Bike Sharing Programs	-Boarding/Alighting Data	C17, C11, C18, C10 [Economic Strength | Equity and Options | Performance | Connectivity]

Project/Program	Congestion Impacts	Roadway Type	Cost	Timeframe	Companion Strategies	Data Sources/Analysis Tools	Encompass 2045 Connection
Increasing Bus Route Coverage or Frequencies: Examine route structure for opportunities to enhance transit frequencies on primary transit corridors and/or expand transit service to areas that do not have transit coverage but are suitable for transit operation. May require investment in new buses (capital cost).	-Increased transit ridership -Reduced VMT -Enhanced travel time reliability	Arterial	$$+	Short Term (1-5 years)	-Regional Traffic Management Center (TMC) -Traffic Signal Coordination and Modernization	-Free Flow Factor -Boarding/Alighting Data -Travel Demand Model -Simulation Models -Transit Elasticity Model	C10, C17, C12, C18 [Economic Strength | Equity and Options | Performance | Connectivity]
New/Expanded Fixed Guideway Transit Travel ways: Exclusive Street travel ways (e.g. bus rapid transit) devoted to increasing the person-capacity of a travel corridor.	-Increased travel time reliability -Reduced VMT -Increased person throughput -Stimulation of mixed-use and high-density land uses adjacent to corridor	Arterial	$$+	Medium Term (6-10 years)	-Regional Traffic Management Center (TMC) -Traffic Signal Coordination and Modernization	-Boarding/Alighting Data -Travel Demand Model -Simulation Models -TOPS-BC -Transit Elasticity Model	C17, C15, C12, C10 [Economic Strength | Equity and Options | Performance | Connectivity]
Dedicated Transit Rights-of-Way: Reservation of travel lanes for transit operation. This may include bus-on-shoulder (BOS) operation during peak periods to enhance travel corridor throughput.	-Increased travel time reliability -Reduced VMT -Increased person throughput -Stimulation of mixed use and high density land uses adjacent to corridor	Arterial	$$+	Medium Term (6-10 years)	-Regional Traffic Management Center (TMC) -Traffic Signal Coordination and Modernization	-Boarding/Alighting Data -Travel Demand Model -Simulation Models -TOPS-BC -Transit Elasticity Model	C17, C20, C22, C15 [Economic Strength | Equity and Options | Performance | Connectivity]
Establish Strategic Partnerships: Collaborate with public agencies, private sector, non-profits to accelerate infrastructure, strengthen workforce, and expand access.	-Increased Transit Ridership -Reduced VMT -Enhanced travel time reliability	Arterial	$	Short Term (1-5 years)	-Regional Traffic Management Center (TMC) -Communications Networks and Roadway Monitoring Coverage	-Boarding/Alighting Data -Travel Demand Model -Simulation Models -TOPS-BC -Transit Elasticity Model	C17, C20, C22, C15 [Economic Strength | Equity and Options | Performance | Connectivity]
Investment in Transit Oriented Development (TOD) and Mobility Hubs: Strategic investment to create seamless, intuitive and attractive transit experiences.	-Reduced VMT -Increased person throughput -Stimulation of mixed use and high density land uses adjacent to corridor	Arterial	$$+	Medium Term (6-10 years)	-New Sidewalks and Designated Bicycle Lanes on Local Streets -Bike Sharing Programs	-Bicycle Rack Locker Usage Information -Boarding and Alighting Data	C17, C11, C18, C10 [Economic Strength | Equity and Options | Performance | Connectivity]

Increase Reliable Funding: Leverage local taxes, developer contributions, federal grants, and private investment to fuel long-term transit investments and sustainable operations.	-Increased Transit Ridership -Reduced VMT -Enhanced travel time reliability	Arterial/Free way	$	Short Term (5-10 years)	Regional Traffic Management Center (TMC) -Communications Networks and Roadway Monitoring Coverage	-Boarding/Alighting Data -Travel Demand Model -Simulation Models -TOPS-BC -Transit Elasticity Model	C17, C20, C22, C15 [Economic Strength | Equity and Options | Performance | Connectivity]

5. Bicycle and Pedestrian

Project/Program	**Congestion Impacts**	Roadway Type	Cost	Timeframe	Companion Strategies	Data Sources/Analysis Tools	Encompass 2045 Connection
Design Guidelines for Bicycle/Pedestrian Friendly Development: Regional land use guidelines to specify maximum block lengths, building setback restrictions, streetscape examples and circulation patterns that can be easily codified into local land use ordinances to encourage alternative mode use.	-Increased mobility -Increased use of alternative modes -Increased bicycle/pedestrian safety	Arterial	$	Short Term (1-5 years)	-Design Guidelines for Transit Oriented Development (TOD) -Adoption of Local Complete Streets Policies	-Network Monitoring Inventory (data)	C6, C7, C18, C12, C14 [Economic Strength | Equity and Options | Connectivity]
Bike Sharing Programs: Expand the coverage of the Spokies system to encourage additional use of bicycle transportation.	-Increased mobility -Increased use of alternative modes -Increased bicycle/pedestrian safety	Arterial	$	Short Term (1-5 years)	-Improved Transit Stations/Stops -Enhanced Transit Amenities -Alternative Mode Events	-Network Monitoring Inventory (data)	C10, C15, C18, C12 [Economic Strength | Equity and Options| Performance | Connectivity]
New Sidewalks and Designated Bicycle Lanes on Local Streets: Enhance the visibility of bicycle and pedestrian infrastructure to increase the perception of safety. Restriping and potential use of cycle tracks and other enhanced bicycle ways should be considered in order to make bicycle travel more attractive to users.	-Increased mobility -Increased use of alternative modes -Increased bicycle/pedestrian safety	Arterial	$+	Short Term (1-5 years)	-Improved Transit Stations/Stops -Enhanced Transit Amenities -Alternative Mode Events	-Network Monitoring Inventory (data)	C6, C7, C18, C11, C12 [Economic Strength | Equity and Options | Performance | Connectivity]

6. Roadway Improvements							
Project/Program	**Congestion Impacts**	Roadway Type	Cost	Timeframe	Companion Strategies	Data Sources/Analysis Tools	Encompass 2045 Connection
Development of Access Management Policies: Planning and design principles that identify and restrict the access of adjacent parcels to a major thoroughfare to maximize traffic safety and mobility.	-Reduction of traffic incidents -Improved travel times -Decreased delay	Arterial	$	Short Term (1-5 years)	-Design Guidelines for Bicycle/Pedestrian Friendly Development -Design Guidelines for Transit Oriented Development	-Crash Data -NMPRDS -Travel Demand Model	C5, C8, C22, C16 [Economic Strength | Performance System Preservation]
Adoption of Local Complete Streets Policies: Planning and design principles that encourage the development of a roadway network that accommodates all users.	-Increased bicycle/pedestrian safety -Increased use of alternative modes	Arterial	$	Short Term (1-5 years)	-Design Guidelines for Bicycle/Pedestrian Friendly Development -Design Guidelines for Transit Oriented Development	-Crash Data -Travel Demand Model	C12, C18, C10, C15 [Economic Strength | Performance | System Preservation]
Roadway Signage Improvements: Enhancing wayfinding through the region with enhanced signage that complements the decision-making ability of the roadway user.	-Reduced delay due to indecision -Reduction in erratic lane changes and potential for crashes	Freeway & Arterial	$	Short Term (1-5 years)	-Acceleration/Deceleration Lanes -Enhanced Enforcement	-Network Monitoring Inventory (data) -Crash Data	C8, C16, C20 [Performance | System Preservation]
Increasing Lanes without Widening: Restriping existing facilities to take advantage of excess width in the highway cross-section.	-Increased throughput through additional capacity -Reduced congestion due to removal of bottlenecks	Arterial	$+	Medium Term (6-10 years)	-Intersection and Interchange Improvements	-Travel Demand Model -NPMRDS	C22, C20, C16 [Economic Strength | Performance | System Preservation]
Acceleration/Deceleration Lanes: Allowing vehicles (especially large vehicles) extra room to reach the proper speed prior to entering or exiting a high speed facility.	-Reduction of traffic incidents -Reduced vehicle delay due to slow moving vehicles in through lanes	Freeway	$+	Medium Term (6-10 years)	-Roadway Signage Improvements	-Travel Demand Model	C5, C8, C22, C20 [Performance | System Preservation]
Intersection and Interchange Improvements: Redesign of existing intersections and interchanges to allow for easier movement through the reduction of conflicts or the addition of through lanes.	-Increased throughput via additional vehicle capacity -Reduced congestion due to removal of bottlenecks	Freeway & Arterial	$+	Medium Term (6-10 years)	-Increasing Lanes without Widening -Roadway Signage Improvements	-Travel Demand Model -Simulation Models -NMPRDS -Intersection Capacity Analysis Tools	C5, C8, C22, C20, C16 [Economic Strength | Performance | System Preservation]

Project/Program	**Congestion Impacts**	Roadway Type	Cost	Timeframe	Companion Strategies	Data Sources/Analysis Tools	Encompass 2045 Connection
Increasing Lanes with Roadway Widening: Strategic expansion of roadway capacity by the addition of through lanes.	-Increased throughput via additional vehicle capacity -Reduced congestion due to removal of bottlenecks	Freeway & Arterial	$$+	Medium Term (6-10 years)	-Traffic Signal Coordination and Modernization -Increasing Lanes Without Widening -Roadway Signage Improvements	-Travel Demand Model -Simulation Models -NPMRDS	C22, C20, C3, C16 [Economic Strength | Performance | System Preservation]
New Arterials or Expressways: Addition of new major traffic moving routes to the regional transportation network.	-Increased throughput via additional vehicle capacity -Reduction in congestion due to removal of bottlenecks	Freeway & Arterial	$$$	Long Term (10+ years)	-Traffic Signal Coordination and Modernization -Increasing Lanes Without Widening -Roadway Signage Improvements	-Travel Demand Model -Simulation Models -NPMRDS	C1, C3, C22, C20 [Economic Strength | Performance | System Preservation]

4. How to Use the Toolbox

The toolbox is designed to assist ACOG, ODOT, and other project sponsors in identifying effective strategies for addressing congestion within the CMP network. It supports the selection of a suitable strategy or combination of strategies to benefit the specific location under evaluation. When a strategy demonstrates potential, it can be further analyzed using the regional travel demand model or additional analysis tools recommended in the toolbox.

For larger projects, especially those with high-cost and involve capacity expansion, the toolbox should be used to identify alternative strategies for integration throughout the project development process. While CMP strategies typically do not yield significant capacity increases akin to conventional expansion efforts, incorporating demand management and operational strategies within capacity improvement projects may lengthen the facility's period of effectiveness before further capacity enhancements are required.

The toolbox also serves to inform project selection methodologies and metrics for Encompass 2045 and the ACOG MPO TMA Transportation Improvement Program (TIP). Placing greater emphasis on alternative transportation modes during future project selection strengthens the planning process and lays a robust groundwork for successful CMP implementation.

As technology and industry practices evolve, ACOG will continue to periodically review the toolbox. Regular updates to the strategies and methods are part of this ongoing process.

Evaluating Strategies

ACOG, ODOT, and local partners have access to various analysis tools to assess how congestion management strategies may reduce congestion. These tools help evaluate the effectiveness of proposed projects, identify impacts of different strategies (such as transportation demand management, land use coordination, TSM&O, and ITS), and screen options in ACOG's congestion management process. Below is a summary of each tool.

REGIONAL TRAVEL DEMAND MODEL

ACOG's traditional four-step Regional Travel Demand Model is currently being updated and may be used in the future to support a variety of analytical needs such as preparation of various system and subarea analyses, including the Long-range Transportation Plan, transit projects, some ITS deployments, and other technical analyses.

Regional travel demand model outputs (VMT, VHT, and other measures) can be used to illustrate the location, duration, and extent of congestion for the region at baseline conditions. The travel demand model can then be used to forecast conditions for the future network including programmed TIP projects. A review of the forecast conditions allows ACOG and its partners to identify locations for the application of CMP toolbox strategies. Regional travel demand model outputs can also be used to assess the impact of alternative strategies, such as the targeting of densified development to specific areas or corridors and the addition of capacity or a new roadway to the existing network.

Travel demand model outputs can be used as inputs into the Tool for Operations Benefit/Cost (TOPS-BC), and/or other tools to calculate a variety of performance measures, to evaluate the impacts of many of the types of the toolbox strategies and to help allocate benefits to subregions. Data outputs can include changes in travel times, speed, mode share or a reduction in trips.

SIMULATION MODELS

Micro- and meso-scale simulation models assess travel impacts for multimodal and roadway projects. Meso-simulation offers more detailed subarea analysis than regional models, but less specificity than microsimulation, producing fluid-like traffic flow data such as speed and density

without tracking individual vehicles. Microsimulation evaluates intersections, road segments, and strategies, reporting speed, flow, density, and delay, but is limited to small areas like corridors or specific projects. Simulation models effectively analyze traffic congestion buildup, dissipation, and duration, providing outputs to calculate measures such as vehicle/person miles or hours traveled, travel time, queue length, throughput, delay, emissions, and fuel consumption. Results help value individual or combined strategies.

TOOL FOR OPERATIONS BENEFIT COST ANALYSIS (TOPS-BC)

TOPS-BC is one of several benefit/cost evaluation tools designed for assessing transportation systems management and operations (TSM&O) strategies. As a spreadsheet-based application, it's relatively simple to use and accessible to a broad audience. TOPS-BC enables users to quickly analyze TSM&O projects even with limited data, offering approximate benefit/cost analyses. The tool sources data from the USDOT's national benefit and cost databases, letting users incorporate national findings into local decision-making. Additionally, USDOT provides the ITS Benefits, Costs and Lessons Learned database, which helps professionals evaluate the value and expense of ITS implementations. Both the TOPS-BC spreadsheet and its user guide can be downloaded from FHWA's Planning for Operations website.

Given these features, TOPS-BC is recommended as a core component of the congestion management toolbox for ACOG and its planning partners. It offers users:

- The ability to investigate the expected range of impacts associated with previous deployments and analyze many TSM&O strategies
- A screening mechanism to help identify tools and methodologies for conducting a benefit-cost analysis based on analysis needs
- A framework and cost data to estimate the life-cycle costs of various TSM&O strategies
- A framework and suggested impact values for conducting simple sketch planning level benefit-cost analysis for TSM&O strategies.

VEHICLE EMISSIONS MODELING SOFTWARE

The U.S. Environmental Protection Agency (EPA) created spreadsheet models to analyze the travel and emissions effects of Transportation Demand Management (TDM) strategies for various contexts. Their MOBILE6 emission factor model, last updated in 2004, estimated emissions from a range of vehicles. In 2010, EPA replaced the MOBILE series with the Motor Vehicle Emission Simulator (MOVES), now the standard tool for vehicular emissions estimates. The most recent update of this simulator is MOVES5[4]. This is the U.S. EPA's latest official Motor Vehicle Emission Simulator, designed to estimate emissions from cars, trucks, and other vehicles under a wide range of scenarios. It can be used to determine the emissions impacts of TDM strategies by modeling how changes in travel behavior, such as reduced vehicle miles traveled (VMT) or shifts to alternative modes, affect regional or project-level emissions, supporting both planning and regulatory analyses.

TRANSPORTATION DEMAND MANAGEMENT (TDM) EVALUATION MODELS

Vehicle emissions models are frequently paired with the Regional Travel Model for major regional programs, or with other tools such as the Center for Urban Transportation Research's TRIMMS tool or the TDM Effectiveness Evaluation Model for less significant strategies. These models help estimate how many commuters might change their travel methods or behaviors by participating in a program, and calculate related shifts in vehicle activity, such as reductions in vehicle miles traveled (VMT). These data are then applied to emissions models to determine the decrease in emissions from these commuter programs. Further details can be found in the EPA's publication, Commuter Programs: Quantifying and Using Their Emission Benefits in SIPs and Conformity.

[4] Latest Version of MOtor Vehicle Emission Simulator (MOVES) | US EPA

INTERSECTION CAPACITY ANALYSIS TOOLS

Intersection capacity analysis tools can be used to identify performance issues at specific intersections or corridors. Throughput, signal timing, and turning movements can be examined to develop and/or evaluate potential solutions to intersection or corridor focused issues. These tools can be used to develop new signal timing plans or to evaluate geometric changes.

TRANSIT ELASTICITY MODELS

One quantitative approach to forecasting transit demand is the application of transit elasticity modeling. Elasticity measures the sensitivity of demand in relation to a specific variable. Various analytical tools are employed to estimate potential changes in demand. For short-term planning horizons involving a single variable change, elasticity models are generally effective and widely utilized in transit planning. However, for longer-term forecasts that consider multiple variables, more advanced modeling techniques may be required.

Within the transit industry, common rules of thumb suggest that the elasticity of transit ridership with respect to service hours is approximately 1.5; thus, a 10 percent increase in service hours is expected to result in a 15 percent rise in ridership. Additionally, non-commute trips typically display greater price sensitivity than commute trips. Elasticities for off-peak transit travel are generally 1.5 to 2 times higher than those observed during peak periods, as peak-period travel is predominantly comprised of commute trips.

5. Implementing CMP Strategies

This report outlines how CMP strategies were developed and how projects are programmed and implemented throughout the planning process. It explains the integration of CMP strategies into components like the Metropolitan Transportation Plan (MTP), Transportation Improvement Program (TIP), and Regional ITS Architecture, and details the CMP analysis process for different transportation investments.

Integration with the Metropolitan Transportation Planning Process

The CMP is intended to work in concert with Encompass 2045 and the future MTP update, which is underway. CMP strategies help shape project identification and prioritization in the MTP. The MTP provides long-term guidance for which CMP strategies should advance into programming and implementation. Specifics of the relationship to the general planning process are described below.

RELATIONSHIP TO ENCOMPASS 2045 AND FUTURE UPDATES

CMP strategies reinforce the goals of Encompass 2045, including performance, safety, equity, connectivity, economic strength, healthy communities, and system preservation. The CMP provides a shorter-term, tactical approach for achieving these long-range goals by ensuring that system management and operations improvements are considered early in project scoping.

The MTP serves as a comprehensive multimodal strategy that outlines regionally significant projects and programs to be funded by local, state, federal, and private sources. Projects aligned with the MTP may advance toward implementation through inclusion in the region's Transportation Improvement Program (TIP), proceeding through development stages, such as environmental review, preliminary engineering, right-of-way acquisition, and actual construction or deployment. The CMP is a critical component of long-range planning, closely linked to the MTP in several respects:

- The vision statement and goals articulated in the MTP establish the foundation for crafting congestion management objectives and performance metrics within the CMP.
- The CMP offers data on regional congestion, assisting ACOG in pinpointing corridors or segments that require further analysis through corridor studies.
- The CMP Toolbox provides an evaluative framework for transportation projects and programs aimed at maintaining or reducing recurring and non-recurring congestion. Recommended analytical tools assess how various mitigation strategies contribute to the achievement of regional objectives.
- The CMP establishes procedures for programming and implementing cost-effective congestion mitigation strategies, integrating them into the MTP evaluation and programming process and subsequently into the TIP. While the CMP does not directly allocate funding, it presents strategies that can be executed independently or as components of broader initiatives and scheduled for future MTPs and TIPs.
- After implementation, the CMP supports ongoing system monitoring, enabling assessment of overall system performance and evaluation of the effectiveness of applied congestion management strategies.

Relationship to Regional ITS Architecture

The ITS Architecture within the ACOG MPO TMA provides an institutional and operational framework for the integration of systems across agency boundaries. ACOG and ODOT have developed status reports to guide the implementation of ITS strategy and project deployment. CMP strategies, particularly TSM&O and ITS, must be consistent with the regional ITS architecture. This ensures interoperability and appropriate deployment of technologies such as:

- Cameras
- Traffic detection systems
- Dynamic message signs
- Traffic management centers
- Incident response tools

The CMP also relates to this Regional Intelligent Transportation System (ITS) Architecture in the following ways:

- The Regional ITS Architecture and ITS Status Reports provide an important resource for identifying sources of data in the region to support monitoring and reporting of congestion using CMP performance measures.
- The Regional ITS Architecture can identify technology-related solutions to some of the needs and deficiencies identified in the CMP. The Architecture's framework, including stakeholder and service packages involved, can provide a strategy for smooth deployment and integration of ITS related projects to address congestion.
- All ITS strategies implemented from the CMP Toolbox should be consistent with the Regional ITS Architecture. The Regional ITS Architecture and the CMP Toolbox should be reviewed for consistency and reconciled as necessary when updated.
- The integration of Regional ITS Architecture to different planning products can be defined as a separate process.

Incorporation into TIP and Project Prioritization

The TIP is a four-year plan listing top-priority MTP projects for the ACOG region, identifying federal, state, and local funding sources. Updated every two years, it includes a project selection process for STP-UZA funds, with ACOG staff and the ACOG MPO Technical Committee scoring and prioritizing projects using criteria approved by the ITPC. CMP strategies should be integrated throughout the TIP development and project selection process. The CMP relates to the TIP in the following ways:

- Providing system performance information for use by ACOG in evaluating projects nominated for inclusion in the TIP.
- Providing system performance information for project sponsors, which may influence their project applications for the TIP.
- The CMP Toolbox identifies alternative congestion management strategies that can be used to advance transportation projects through the selection process.
- The CMP Toolbox identifies potential analysis tools for evaluating project effectiveness in terms of their contribution to a reduction in congestion levels in the region.
- The current Surface Transportation Program Urbanized Area funding (STP-UZA) project evaluation criteria for the ACOG region includes components that relate to CMP performance measures, objectives and goals.

The STP-UZA evaluation criteria and selection process should strengthen the TIP's connection to the CMP by sharing more operational details about the ACOG transportation network. The next section suggests ways to update TIP procedures. The CMP gives ACOG and its partners useful data on congestion and solutions in the region.

Existing STP-UZA Criteria

The existing criteria used by ACOG staff and the ACOG MPO Technical Committee to evaluate and select STP-UZA projects in the ACOG region include several measures
that are linked to the Congestion Management Process. These five out of seven total criteria are listed below.

- Average Daily Traffic (ADT)
- Volume-to Capacity Ratio
- Accident Severity Rate
- Air Quality
- CMP Congestion Corridor

6. Analysis of CMP Strategies

This section explains how the CMP helps evaluate strategies for reducing congestion by using established objectives and performance measures. Projects suggested for both the CMP network and especially the CMP Focus Network should be analyzed to determine their ability to enhance travel within the ACOG transportation system. The CMP assessment process can be either quantitative or qualitative, measuring how effectively different strategies ease travel demand and congestion.

- At minimum, proposed CMP network projects should undergo a qualitative analysis to determine how congestion mitigation strategies reduce travel demand and congestion. These strategies should be considered before expanding capacity. Where applicable, conduct quantitative analysis with the tools listed in Section 4.

- Future MTP and TIP project evaluations may strengthen connections to the CMP. Project sponsors could report qualitatively on strategy benefits and provide quantitative data on congestion relief, trip reliability, and alignment with CMP goals.

Qualitative Strategy Analysis

The CMP analysis assesses how projects affect congestion based on CMP goals and performance measures. This helps ACOG determine if an investment will meet the congestion management objectives for the ACOG MPO TMA.

Qualitative assessments help compare projects based on:

- Alignment with CMP objectives
- Ability to improve mobility
- Cost and ease of implementation
- Environmental considerations
- Multimodal impacts
- Community support and context

Quantitative Strategy Analysis

Quantitative tools evaluate measurable impacts and include:

- Travel Demand Model outputs
- Simulation models
- Tool for Operations Benefit–Cost (TOPS-BC)
- Emissions modeling
- Transit elasticity models
- Intersection capacity analysis models

Recommended Enhancements to the Planning Process

The following recommendations will strengthen integration of the CMP with other transportation planning processes.

- Adding CMP strategy results to TIP project pages
- Scoring ODOT projects with CMP metrics
- Documenting congestion benefits for federally funded projects
- Improving tracking of implemented strategies
- Updating CMP screening regularly