CMP Toolbox

The CMP Toolbox includes Strategies/Projects, Congestion and Mobility Benefits, and Costs and Impacts. The toolbox is divided into the eight categories, as listed below.

- Highway Strategies
- Transit Strategies
- Bicycle and Pedestrian Strategies
- Travel Demand Management Strategies
- Intelligent Transportation Systems and Transportation Supply Management Strategies
- Access Management Strategies
- Land Use Strategies
- Parking Strategies
- Regulatory Strategies

CMP Toolbox – Highway Strategies

Strategies/Projects	Congestion and Mobility Benefits	Costs and Impacts
1a. Increasing Number of Lanes without Highway Widening	• Increase capacity	• Construction and engineering
Takes advantage of excess width in the highway cross section used for break-down lanes or median		• Maintenance
1b. Geometric Design Improvements	• Increase mobility	• Costs vary by type of design
Includes widening to provide shoulders, additional turn lanes at intersections, improved sign lines, and auxiliary lanes to improve merging and diverging	• Decrease congestion by improving bottlenecks • Increase traffic flow and improve safety	
1c. High Occupancy Vehicle (HOV) Lanes	• Decrease congestion by reducing VMT	• HOV, separate ROW costs
Increases corridor capacity while at the same time provides an incentive for single-occupied drivers to shift to rideshares Most effective as part of a comprehensive effort to encourage HOVs, including publicity, outreach, park-and-ride lots, and rideshare matching services	• Increase vehicle occupancy • Decrease regional trips • Improve travel times • Increase transit use and improve bus travel times	• HOV, barrier separated costs • HOV, contra flow costs • Annual operations and enforcement • Can create environmental and community impacts
1d. Super Street Arterials	• Increase capacity	• Construction and engineering substantial for grade separation
Involves converting existing major arterials with existing major arterials with signalized intersections into "super streets" that feature grade-separated intersections	• Improve mobility	• Maintenance varies based on area
1e. Highway Widening by Adding Lanes	• Increase capacity	• Costs vary by type of highway constructed
Adds new highway lanes; traditional way to deal with congestion	• Improve mobility	• Can create environmental and community impacts

CMP Toolbox – Transit Strategies

Strategies/Projects	Congestion and Mobility Benefits	Costs and Impacts
2a. Reducing Transit Fares	• Decrease daily VMT	• Loss in revenue per rider
Encourages additional transit use	• Decrease congestion • Increase ridership	• Capital costs per passenger trip • Operating costs per passenger trip • Operating subsidies needed to replace lost fare revenue • Alternative financial arrangements need to be negotiated with donor agencies
2b. Increasing Employer Incentive Programs	• Increase transit ridership	• Cost of incentives to employers to offer employee benefits for transit use.
Encourages additional transit use	• Decrease travel time • Decrease daily VMT	
2c. Increasing Bus Route Coverage or frequencies	• Increase transit ridership	• Capital costs per passenger trip
Provides better transit accessibility to a greater share of the population	• Decrease travel time • Decrease daily VMT	• Operating costs per trip • New bus purchases likely
Increased frequency makes transit more attractive to use		
2d. Implementing Park-and-Ride Lots	• Decrease congestion by increasing vehicle occupancy rate	• Structure costs for transit stations
Encourages HOV use for longer distance commute trips	• Increase mobility and transit efficiency	
2e. Implementing Rail Transit	• Decrease daily VMT	• Capital costs per passenger
Serves dense urban centers where travelers can walk to their destinations		• New systems require large up-front capital outlays and ongoing sources of operating subsidies, in addition to funds that may be obtained from federal sources, under increasingly tight competition
Can be enhanced from suburban areas by providing park-and-ride lots		
2f. Vehicle Replacement/Upgrade	• Decrease daily VMT	• Capital costs
Furthers the benefits of increased transit use	• Decrease congestion • Increase ridership	• Addition of clean fuel bus fleets may be incorporated as part of regular vehicle replacement programs

CMP Toolbox – Transit Strategies (cont'd)

Strategies/Projects	Congestion and Mobility Benefits	Costs and Impacts
2g. Intelligent Bus Stops Ranges from kiosks, which show the static bus schedule to real-time information, indicating the location of buses, and the arrival time of the next bus	• Decrease daily VMT • Decrease congestion • Increase ridership	• Capital costs per passenger
2h. Personalized Rapid Transit Includes fully automated vehicles capable of operation without human drivers over a reserved guideway Vehicles are available on-demand, direct origin to destination service for an individual or a small group - typically 1 to 6 passengers	• Decrease daily VMT • Decrease congestion	• Capital costs • New systems require large up-front capital outlays and ongoing sources of operating subsidies, in addition to funds that may be obtained from federal sources, under increasingly tight competition

CMP Toolbox – Pedestrian and Bicycle Strategies

Strategies/Projects	Congestion and Mobility Benefits	Costs and Impacts
3a. New Sidewalks and Designated Bicycle Lanes on Local Streets	• Increase mobility and access	• Design and construction costs for paving, striping, signals, and signing
Enhances the visibility of bicycle and pedestrian facilities increases the perception of safety	• Increase non-motorized mode shares • Separate slow-moving bicycles from motorized vehicles • Decrease incidents	• ROW costs if widening needed • Bicycle lanes may require improvements to roadway shoulders to ensure acceptable pavement quality
3b. Improved Bicycle Facilities at Transit Stations and Other Trip Destinations	• Increase bicycle mode share	• Capital and maintenance costs for bicycle racks and lockers, locker rooms
Increases safety with the addition of bicycle racks and bike lockers at transit stations and other trip destinations Additional amenities such as locker rooms with showers at workplaces provide further incentives for using bicycles	• Decrease motorized vehicle congestion on access routes	
3c. Design Guidelines for Pedestrian-Oriented Development	• Increase pedestrian mode share	• Capital costs largely borne by private sector; developer incentives may be needed
Encourages pedestrian activity through the use of design guidelines (i.e. maximum block lengths, building setback restrictions, and streetscape enhancements	• Discourage motor vehicle use for short trips • Decrease VMT • Decrease emissions	• Public sector may be responsible for some capital and/or maintenance costs associated with right-of-way improvements • Ordinance development and enforcement costs
3d. Improved Safety of Existing Bicycle and Pedestrian Facilities	• Increase non-motorized mode share	• Capital costs of sidewalk improvements and additional traffic control devices
Increases safety by maintaining lighting, signage, striping, traffic control devices, pavement quality; installing curb cuts and extensions, median refuges, and raised crosswalks	• Decrease incidents • Increase monitoring and maintenance costs	
3e. Exclusive Non-Motorized Rights-of-Way	• Increase mobility	
Use abandoned rail rights-of-way and existing parkland for medium- to long-distance bike trails, improving safety and reducing travel times	• Increase non-motorized modes • Decrease congestion on nearby roads • Separate slow-moving bicycles from motorized vehicles • Decrease incidents	• Right of way costs • Construction and engineering costs • Maintenance costs

CMP Toolbox – Transportation Demand Management Strategies

Strategies/Projects	Congestion and Mobility Benefits	Costs and Impacts
4a. Alternative Work Hours	• Decrease peak-period VMT	• No capital costs
Allows workers to arrive and leave work outside of the traditional commute period. It can be on a scheduled basis or a true flex-time arrangement	• Improve travel time among participants	• Agency costs for outreach and publicity • Employer costs associated with accommodating alternative work schedules
4b. Telecommuting	• Decrease VMT	• First-year implementation costs for private-sector (per employee for equipment)
Allows employees to work at home or in a regional telecommute center instead of going into the office. They might do this all the time, or only one or more days per week	• Decrease SOV trips	• Second-year costs tend to decline
4c. Pricing	• Decrease peak period VMT	• First-year implementation costs for public -sector
Involves pricing facilities to encourage off-peak or HOV travel, and includes time-variable road, and cordon (area) tolls, high occupancy/ toll (HOT) lanes and vehicle-use fees	• Decrease SOV trips	
4d. Ridesharing	• Decrease work VMT	• Savings per carpool and vanpool riders
Typically arranged/encouraged through employers or transportation management agencies (TMA), which provide ride-matching services	• Decrease SOV trips	• Costs per year per free parking space provided • Administrative costs
4e. Emergency Ride Home Programs	• Decrease work VMT	• Requires administrative support from employers
Provides a guaranteed ride home at no cost to the employee in the event an employee or a member of their immediate family becomes ill or injured, requiring the employee to leave work	• Decrease SOV trips	• Potential to be costly

CMP Toolbox – Transportation Demand Management Strategies (cont'd)

Strategies/Projects	Congestion and Mobility Benefits	Costs and Impacts
4f. Vanpool Sponsorship Program	• Decrease work VMT	• No capital costs
Enhancing the appeal of vanpooling, the Vanpool Sponsorship Program offers financial incentives for vanpooling in areas where public transportation is not readily available or feasible.	• Decrease SOV trips	• Agency costs for outreach and publicity
4g. Employer Trip Reduction (ETR) Plans	• Decrease work VMT	• Although not mandated by the CAAA, employers with over 100 employees at any single worksite, in areas of severe or extreme non-attainment with the CAAA, file plans for each site with state agencies
ETR plans may demonstrate how employers would decrease their employee contribution to single-occupancy vehicle use during peak-commuting periods Programs may include employee ridesharing, transit subsidies of mass transit fares, and telecommuting	• Decrease SOV trips	• Agency costs for preparation of ETR
5k. Collaborative Technologies	• Decrease work VMT	• Requires administrative support from employers
Includes communication, conferencing, and collaborative management tools Communication – e-mail, instant messaging, and VoIP. Conferencing – webinars, web conferencing, and HD video conferencing Collaborative – shared electronic calendars, project management, knowledge management systems, prediction markets, and desktop sharing services such as concurrent versions system (CVS) Encourages telecommuting Provides novel methods for social interaction and entertainment opportunities that can significantly alter activity-travel behaviors	• Decrease SOV trips	• Potential to be costly

CMP Toolbox – Intelligent Transportation Systems and Transportation System Management Strategies

Strategies/Projects	Congestion and Mobility Benefits	Costs and Impacts
5a. Traffic Signal Coordination	• Improve travel time	• O&M costs per signal
Improves traffic flow and reduces emissions by minimizing stops on arterial streets.	• Decrease the number of stops • Decrease VMT, VHD and PHT by vehicle miles per day, depending on program	• Signalized intersections per mile costs variable
5b. Targeted and Sustained Enforcement of Traffic Regulations	• Improve travel time	• Increased labor costs per officer
Improves traffic flow by reducing violations that cause delays.	• Decrease the number of stops	
5c. Reversible Traffic Lanes	• Increase peak direction capacity	• Barrier separated costs per mile
Appropriate where traffic flow is highly directional	• Decrease peak travel times • Improve mobility	• Operation costs per mile • Maintenance costs variable
5d. Freeway Incident Detection and Management Systems	• Decrease accident delay	• Capital costs variable and substantial
Alleviates non-recurring congestion Typically include video monitoring and dispatch systems	• Decrease travel time • Decrease VHT and PHT	• Annual operating and maintenance costs
5e. Ramp Metering	• Decrease travel time	• O&M costs
Allows freeways to operate at their optimal flow rates, thereby speeding travel and reducing collisions	• Decrease accidents • Improve traffic flow on major facilities	• High costs associated with enhancements to centralized control system • Capital costs
5f. Highway Information Systems	• Decrease travel times and delay	• Design and implementation costs variable
Provides travelers with real-time information that can be used to make trip and route choice decisions	• Some peak-period travel shift	• Operating and maintenance costs variable
5g. Advanced Traveler Information Systems	• Decrease travel times and delay	• Design and implementation costs variable
Provides an extensive amount of data to travelers, such as real time speed estimates on the web or over wireless devices	• Some peak-period travel and mode shift	• Operating and maintenance costs variable

CMP Toolbox – Intelligent Transportation Systems and Transportation System Management Strategies (cont'd)

Strategies/Projects	Congestion and Mobility Benefits	Costs and Impacts
5h. Traffic Surveillance and Control Systems	• Decrease travel times and delay	• Design and implementation costs variable
Monitors volume and flow of traffic by a system of sensors, and further analyzes traffic conditions to flag developing problems, and implement adjustments to traffic signal timing sequences, in order to optimize traffic flow estimating traffic parameters in real-time	• Some peak-period travel and mode shift	• Installation of video surveillance cameras may be less expensive than magnetic loop detectors, which require disruption and digging of the road surface
Currently, the dominant technology traffic surveillance is that of magnetic loop detectors, which are buried underneath roadways and count automobiles passing over them		
Video monitoring systems for traffic surveillance may provide vehicle classifications, travel times, lane changes, rapid accelerations or decelerations, and length queues at urban intersections, in addition to vehicle counts and speeds		
5i. Elimination of Bottlenecks	• Decrease travel time	• Design and implementation costs variable
Involves widening of selected highway segments to alleviate bottlenecks, which frequently occur at intersections, bridge crossings with narrow lanes, and entrance ramps with high traffic volumes	• Decrease accidents • Improve traffic flow on major facilities	• Operating and maintenance costs variable
5j. Geographic Positioning Systems and Personal Travel Assistants	• Decrease travel time	• Considerably high, but expected to decrease
Provides accurate location coordinates, and is expected to include miniaturization; increased accuracy; and supplementary location technologies to cover GPS-denied areas (inside buildings, or downtown streets) in the future	• Decrease accidents • Improve traffic flow on major facilities	
5k. Smart Cards and RFID	• Decrease travel time	• Considerably high, but expected to decrease
Provides contact-less technology for entering transit system	• Decrease accidents • Improve traffic flow on major facilities	

CMP Toolbox – Access Management Strategies

Strategies/Projects	Congestion and Mobility Benefits	Costs and Impacts
6a. Left Turn Restrictions; Curb Cut and Driveway Restrictions	• Increase capacity, efficiency on arterials	• Implementation and maintenance costs vary; range from new signage and striping to more costly permanent median barriers and curbs
Limits turning vehicles, which can impede traffic flow and are more likely to be involved in crashes	• Improve mobility on facility • Improve travel times and decrease delay for through traffic • Decrease incidents	
6b. Turn Lanes and New or Relocated Driveways and Exit Ramps	• Increase capacity, efficiency	• Additional right-of way costs
In some situations, increasing or modifying access to a property can be more beneficial than reducing access	• Improve mobility and safety on facility • Improve travel times and decreased delay for all traffic	• Design, construction, and maintenance costs
6c. Interchange Modifications	• Increase capacity, efficiency	• Design and construction costs
Decreases weaving sections on a freeway	• Improve mobility on facility • Improve travel times and decreased delay for through traffic • Decrease incidents due to fewer conflict points	
6d. Minimum Intersection/Interchange Spacing	• Increase capacity, efficiency	• Part of design costs for new facilities and reconstruction projects
Decreases number of conflict points and merging areas, which in turn decreases incidents and delays	• Improve mobility on facility • Improve travel times and decrease delay for through traffic • Decrease incidents	

CMP Toolbox – Access Management Strategies (cont'd)

Strategies/Projects	Congestion and Mobility Benefits	Costs and Impacts
6e. Frontage Roads and Collector-Distributor Roads	• Increase capacity, efficiency	• Additional right-of way costs
Directs local traffic to major intersections on both super arterials and freeways (frontage roads) Separate exiting, merging, and weaving traffic from through traffic at closely-spaced interchanges (collector-distributor)	• Improve mobility on facility • Improve travel times and decreased delay for through traffic • Decrease incidents due to fewer conflict points	• Design, construction, and maintenance costs
6f. Roadway Restrictions	• Increase capacity, efficiency on arterials	• Implementation and maintenance costs vary
Closes access during rush hours (AM and PM peak hours) and aids in the increase of safety levels through the prevention of accidents at problem intersections This measure may be effective along mainline segments of a highway, which operate at poor service levels	• Improve mobility on facility • Improve travel times and decrease delay for through traffic • Decrease incidents	
6g. Access Control to Available Development Sites	• Increase capacity, efficiency on arterials	• Implementation and maintenance costs vary
Coordination of access points to available development sites allows for less interference in traffic flow during construction and/or operation of new developments	• Improve mobility on facility • Improve travel times and decrease delay for through traffic • Decrease incidents	

CMP Toolbox – Land Use Strategies

Strategies/Projects	Congestion and Mobility Benefits	Costs and Impacts
7a. Mixed-Use Development	• Increase walk trips	• Public costs to set up and monitor appropriate ordinances
Allows many trips to be made without automobiles People can walk to restaurants and services rather than use their vehicles	• Decrease SOV trips • Decrease in VMT • Decrease vehicle hours of travel	• Economic incentives used to encourage developer buy-in
7b. Infill and Densification	• Decrease SOV	• Public costs to set up and monitor appropriate ordinances
Takes advantage of infrastructure that already exists, rather than building new infrastructure on the fringes of the urban area	• Increase transit, walk, and bicycle • Doubling density decreases VMT per household • Medium/high vehicle trip reductions	• Economic incentives used to encourage developer buy-in
7c. Transit-Oriented Development	• Decrease SOV share	• Public costs to set up and monitor appropriate ordinances
Clusters housing units and/or businesses near transit stations in walkable communities	• Shift carpool to transit • Increase transit trips • Decrease VMT • Decrease in vehicle trips	• Economic incentives used to encourage developer buy-in

CMP Toolbox – Parking Strategies

Strategies/Projects	Congestion and Mobility Benefits	Costs and Impacts
8a. On-Street Parking and Standing Restrictions	• Increase peak-period capacity	• Design, construction, and maintenance costs for signage and striping • Rigid enforcement of parking restrictions
Enforcement of existing regulations can substantially improve traffic flow in urban areas Peak-period parking prohibitions can free up extra general purpose travel lanes or special bus or HOV "diamond" lanes	• Decrease travel time and congestion on arterials • Increase HOV and bus mode shares	
8b. Employer/Landlord Parking Agreements	• Decrease work VMT	• Economic incentives used to encourage employer and landlord buy-in
Employers can negotiate leases so that they pay only for the number of spaces used by employees	• Increase non-auto mode shares	
8c. Preferential or Free Parking for HOVs	• Decrease work VMT	• Relatively low costs, primarily for the private sector, include signing, striping, and administrative costs
Provides an incentive for workers to carpool	• Increase vehicle occupancy	
8d. Location-Specific Parking Ordinances	• Decrease VMT	• Economic incentives used to encourage developer buy-in
Encourages transit oriented and mixed-use development Parking requirements can be adjusted for factors such as availability of transit, a mix of land uses, or pedestrian-oriented development that may reduce the need for on-site parking	• Increase transit and nonmotorized mode shares	
8e. Park and Ride Lots	• Increase transit use and ridesharing	• Land acquisition, construction and maintenance are necessary for park-and-ride lots.
Park-and-Ride lots provide parking in areas that are convenient to other modes of transportation, and are commonly located adjacent to train stations, bus lines, or HOV lane facilities	• Decrease VMT	

CMP Toolbox – Regulatory Strategies

Strategies/Projects	Congestion and Mobility Benefits	Costs and Impacts
8a. Trip Reduction Ordinance Draws commuters to use other ways to travel to work besides driving alone	• Improve air quality • Decrease traffic congestion • Minimize energy consumption	• Requires employers to promote commute alternatives
9b. Congestion Pricing Controls peak-period use of transportation facilities by charging more for peak-period use than for off-peak	• Decrease VMT • Increase transit and nonmotorized mode shares	• Implementation and maintenance costs vary
9c. Auto Restriction Zones (Pedestrian Malls) Allows for a more equitable community, where all residents have an equal access to services within the area Provides commercial access for pedestrians and non-car users The most common form of an auto-restriction zone (pedestrian zones) in large cities is the pedestrian mall. Pedestrian malls generally consist of a storefront-lined street that is closed off to most automobile traffic. Emergency vehicles would have access at all times, while delivery vehicles may be restricted to limited delivery hours or entrances on adjacent back streets.	• Increase capacity • Decrease travel times • Increase safety • Improve bicycle and pedestrian-friendly roadways	• Design, construction, and maintenance costs
9d. Truck Restrictions Aims to separate trucks from passenger vehicles and pedestrians Prohibits trucks from traveling on certain roadways, and may call for weight restrictions on certain bridges	• Increase capacity • Decrease travel times • Increase safety • Improve bicycle and pedestrian-friendly roadways	• Implementation and maintenance costs vary

CMP Toolbox – Regulatory Strategies (cont'd)

Strategies/Projects	Congestion and Mobility Benefits	Costs and Impacts
9e. Arterial Access Management Involves the application of local and state planning, and regulatory tools in efforts to preserve and/or enhance the transportation functions of roadways Includes land use ordinances and techniques, corridor preservation, transportation improvements, and techniques in finance	• Increase capacity • Decrease travel times • Increase safety • Improve bicycle and pedestrian-friendly roadways	• Requires government legislation • Implementation and maintenance costs vary