



## Congestion Management Task Force Transportation Management and Operations Compendium of Strategies

### Introduction

Following are strategies identified in the northeastern Illinois transportation planning process to improve transportation management and operations or to reduce congestion. The sources of the strategies are keyed as follows:

- **CMP:** Congestion Management Process, Congestion Mitigation Handbook (CATS, 1998).
- **RTP-06:** Capital Element Update to the 2030 Regional Transportation Plan (CATS, 2006)
- **RTP-07:** 2007 Update to the 2030 Regional Transportation Plan (draft, CMAP, 2007)
- **TMO:** Draft Transportation Management and Operations Specific Plan (draft CMAP, 2007)

### Travel Demand Management (“Telecommuting”):

- **Ridesharing Programs.** Ridesharing (carpooling and vanpooling) can reduce congestion by reducing the number of vehicle trips, in turn leading to reductions in VMT. (CMP, TMO)
  - **Internet Service.** Improve internet information and ride-matching services. (TMO)
  - **Wireless Service.** Provide real-time wireless ridematching on the fly. (TMO)
- **Car Sharing Programs.** Car sharing reduces VMT by reducing vehicle ownership; cars are available when needed, but discretionary trips may be more likely made by transit or non-motorized modes. (CMP, TMO)

- **Alternative Work Arrangements.** Alternative work arrangements reduce VMT by providing work sites closer to homes, or by spreading traffic to non-peak periods. (CMP)
- **Transit and Rideshare Incentives.** Economic incentives for transit and ridesharing can reduce the costs of these modes, encourage their use, and thus reduce VMT. (CMP)
  - **Tax Incentives.** Provide business tax incentives to provide program and support for employees. (TMO)
  - **Pay-as-you-go Insurance.** Develop pay-as-you go insurance to provide incentive. (TMO)
  - **Zoning.** Encourage ridesharing and transit through zoning codes and development ordinances. Give municipalities incentives and abilities through zoning enabling legislation. (TMO)
  - **Demand-responsive transit.** Develop demand-responsive transit services. (TMO)
  - **Transit – workplace shuttles.** Provide shuttles between transit services and employment sites. (TMO)
  - **Transit-workplace sidewalks.** Provide sidewalks between rail transit stations and employment within ½ mile. (TMO)
- **Parking Management.** Parking management manages the cost of parking, reduces its availability, provides information regarding availability, so as to reduce travel demand and reduce excess VMT searching for parking spaces. (CMP)
  - **Preferred Parking.** Provide incentives for preferred parking for carpools and vanpools. (TMO)
  - **HOV Park-n-Ride.** Provide expressway Park’n’Ride lots to encourage ridesharing, particularly accompanied by HOV priority facilities. (TMO)
  - **Internet Information.** Post information about parking availability on the internet. (TMO)
- **Guaranteed Ride Home Programs.** Guaranteed ride home programs reduce VMT through increased transit use by assuring transit users a way home should they need to travel when transit is not available. (CMP, TMO)

### Transportation System Management (“Technology”)

- **Traffic signal improvements.** Traffic signal improvements improve traffic flow and/or provide priority or preemption capabilities. Traffic signals need to be optimized for traffic flow at various sites, intersections, and corridors while maintaining local access. Traffic signals are coordinated to provide smoother

flow to move vehicle platoons more efficiently and reduce crashes as recurring traffic conditions or incident response needs warrant. Priority is sometimes given to transit or other vehicles, allowing longer green times to accommodate transit schedules. Preemption is given to emergency vehicle needs or to clear railroad grade crossings. (CMP)

- **Controller Uniformity.** Develop uniformity within traffic signal controllers to allow for integration. (TMO)
- **Integration.** Extensively integrate traffic signals on a sub regional and/or corridor basis to ease and reduce traffic congestion. (TMO)
- **Geometric improvements.** Geometric improvements are “physical improvements that may involve adjustment to the number or arrangement of travel lanes at intersections or on limited segments of a roadway.” Intersection improvements include restriping, channelization, adding turn lanes, installing traffic islands, modifying the intersection angle, and changing corner radii (increasing or decreasing). Segment improvements may include expressway auxiliary lanes, passing lanes, truck climbing lanes, bus turnout lanes, widened shoulders, one-way couplets, medians, and reversible lanes. Geometric improvements generally smooth traffic flow and/or reduce crashes. (CMP)
  - **Intersection Improvements.** Provide priority to the improvement of intersections. (TMO)
  - **Improve Throughput.** Investigate more innovative design for intersections to increase vehicle throughput. (TMO)
  - **Improved Expressway Access.** The RTP supports introducing or modifying interchanges between arterials and major highways to provide safer and more efficient access to the expressway system. These improvements should be fully coordinated with the plans and policies of adjacent and affected jurisdictions. The RTP supports introducing or modifying interchanges between major highways to manage congestion or facilitate moving large volumes of regional traffic more efficiently. (RTP-07)
  - **Arterial Improvement Strategies (RTP-06)**
    - Discourage access permits for individual driveways and entrances in favor of providing consolidated entrances or frontage roads.
    - Provide tight intersection designs with minimum curb-to-curb cross sections to reduce signal cycle lengths.
    - Dual left turn bays should be avoided.<sup>1</sup>

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<sup>1</sup> Some exceptions may apply. However, other accommodations of heavy left turning vehicle volumes should be ruled out before using dual lefts, since dual lefts may increase signal cycle lengths and intersection delay.

- Narrower lanes should be used when appropriate to promote shared-use (by bicycles and pedestrians).
  - Roundabouts should be employed as an alternative to conventional intersections where appropriate.
  - Limit introduction of new traffic signals.
  - Provide transit accommodation and priority.
  - Provide safe and comfortable accommodation for pedestrian and bicycle travel.
  - To the extent feasible, a grid system of streets should be maintained to provide land access and provide alternative arterial routes.
  - Provide transit accommodation and priority.
- **Time of day restrictions.** Time of day restrictions move travel demand to off peak periods or, in the case of parking restrictions, increase peak-period travel capacity. (CMP)
- **Ramp metering.** Ramp meters are used to assure that merging traffic does not exceed the merge area or weave area's capacity to absorb that traffic at a point. Ramp meters spread out the entering vehicles. Ramp meters are also used to control overall flow to assure that downstream traffic flow is maintained. Ramp metering can reduce crash rates. (CMP, TMO)
  - Improve ramp meter algorithms to reduce crashes and smooth traffic flow in weave and merge areas. (TMO)
- **Reversible Expressway Lanes.** Create more reversible expressway lanes to balance traffic flows. (TMO)
- **Commercial Vehicle Improvements.** Geometric, sign and signal improvements focused on commercial vehicle traffic can smooth traffic flow and reduce crashes. (CMP)
  - **Truck-specific treatments and truck-only facilities.** Promote truck-specific treatments aimed at improving safety and efficiency of commercial goods movement during project development. Study the feasibility of truck-only corridors to facilitate commercial goods movement where appropriate. (RTP-06, TMO)
  - **Correct Truck Bottlenecks.** Correct severe bottlenecks in locations that impede freight mobility and cause inefficient routing. This includes mitigating inefficiencies caused by vehicle weight restrictions and viaduct clearance limitations in locations requiring truck access. (RTP-06)
    - **Auxiliary Lanes.** Provide auxiliary lanes for vehicles to bypass heavy truck movements. (TMO)

- **Intermodal Connectors.** Promote continued improvement of “intermodal connector” facilities. (RTP-06)
  - **Freeway Access.** Provide direct truck-only access between intermodal freight facilities and freeways. (TMO)
- **Context-sensitive Freight Operations Improvements.** Promote context-sensitive geometric improvements to improve truck turning movements such as recessed stop bars and right-aligning left turn lanes. (RTP-06)
- **Miscellaneous Truck Operations Improvements.** Provide “freight-friendly” installations such as truck-only electronic toll collection, pre-clearance and credentialing, information and advisory systems, and truck storage lanes that improve operations safety. (RTP-07)
- **CREATE Corridors.** This comprehensive plan will improve the efficiency and safety of rail operations in the region by providing additional rail capacity, upgrading technologies and removing key rail/rail and rail/highway conflicts. (RTP-06)
- **Construction Management.** Enhanced construction management reduces the duration and scope of delay resulting from project construction. (CMP)
  - **Truck Priority.** Establish highway system truck priorities during capital construction and reconstruction projects. (RTP-06)
  - **Coordination.** Develop a state and local agency system for coordinating expressway and roadway construction projects to avoid clustering of projects in one area. (TMO)
  - **Lane Rental.** Charge contractors a fee for each day each lane is out of service, so that there is an incentive to minimize disruption and delay. (TMO)
- **Railroad Grade Separations.** Grade separations can be introduced to overcome conflicts between and among passenger and freight rail operations as well as between rail and highway facilities. New grade separations at key locations will reduce travel time for both rail and highway traffic and improve safety for pedestrians, cyclists, rail and highway travelers. (RTP-07)
  - **Rail-to-rail separations.** Where heavy conflicts occur between commuter services and crossing freight services, provide rail-to-rail grade separations. (RTP-06, TMO)
  - **Highway-rail grade separations.** Reduce rail/highway grade crossings conflicts by providing grade separations and at-grade safety improvements. (RTP-06)

- **CREATE Highway-Rail Grade Separations.** 25 high-priority grade separations to reduce conflicts between rail and highway traffic (RTP-06).
- **Rail Yard Improvements.** Rail yards may be relocated and/or consolidated to reduce operational conflicts. This includes necessary track relocation as well as additional and reconfigured crossovers. Rail yards may also be expanded and modernized to permit storage of additional trains and requisite maintenance facilities. (RTP-07)
- **Freight Rail Coordination.** Coordinate freight rail operations with commuter rail service and infrastructure projects. This includes providing additional capacity on new or restored rail sections to permit additional train movement with modernized train control systems that permit bi-directional operation. (RTP-06)
- **Safety Improvements.** Improve traffic flow by reducing crashes. Crashes and other incidents are a major cause of delay. (RTP-07)
  - **Improve highway-rail crossing safety.** Improving highway-rail crossing safety. Such improvements may include grade separations to eliminate conflicts, improved sight distances, improved crossing control devices and operations (including coordination with highway traffic control devices upstream and downstream). (RTP-07)
  - **Improve intersection safety.** Increase intersection safety by such strategies as improved signal conspicuity and enforcement, including expanded red-light running cameras; improved sign visibility through better retro-reflectivity or illumination; improved sight distances at intersection approaches; improved access management near intersections; and improved designs. (RTP-07)
  - **Improve safety of large truck operations.** Focus on truck crash sites and unsafe operators. Provide real-time congestion information to truck operators to warn of impending backups. Encourage trucks' use of freeways and tollways. Provide separated truckways. (RTP-07)
  - **Reduce roadway departures and reduce their effects.** Improve highway signs and markings; apply forgiving roadway design concepts on high-speed highways; and maintain low vehicle operating speeds in urban and suburban environments. (RTP-07)
  - **Improve safety of vulnerable users.** Focus on high crash locations for motorcyclists, bicyclists, and pedestrians. Reduce crashes resulting from errors by other drivers. Reduce excessive motorcycle speeds; consider special needs of motorcycles in highway design; and pursue motorcycle helmet laws. Strategies to improve bicycle and pedestrian safety include

the provision of sidewalks, bike lanes, and wide paved shoulders; maintaining low vehicle speeds on urban and suburban streets and arterials; develop off-system trails. (RTP-07)

- **Safe Routes to School.** “Safe Routes to School” programs make walking or biking to school a safe and valued activity for children. Provide safer roadway crossings, sidewalks, traffic calming, and bicycle lanes and paths. (RTP-07)
- **Safety for Seniors and People with Disabilities.** Traffic and transit operations should accommodate the travel needs of seniors and people with disabilities. (RTP-07)
- **Control Excessive Speeds.** Speeds in areas where pedestrian and bicycle travel is common should be maintained at rates safe for non-motorized travel. (RTP-06)
- **Provide Sidewalks and Buffers from Moving Traffic.** Provide sidewalks in developed areas and areas expected to be developed by the highway facility’s design year. Sidewalks should be separated from moving traffic by a buffer consisting of a landscaped parkway or a street furniture area. On-street parking can be used to provide an additional pedestrian safety buffer. (RTP-06)
- **Landscaped Medians.** Landscaped medians with pedestrian crossings should be provided on multi-lane roads. The safety of such crossings can be improved even more with advance stop bars. (RTP-06)
- **Minimize Crossing Distances.** Pedestrian exposure to fast-moving traffic should be reduced by minimizing the crossing distance at intersections. This can be accomplished through minimizing curve radii, providing pedestrian refuge islands between turning and through lanes, providing pedestrian median refuges, and/or curb bump-outs. If a safe intersection crossing cannot be provided, grade-separated or mid-block/median protected crossing treatments should be provided. (RTP-06)
- **Appropriate Signal Timing.** Signals should be timed appropriately for pedestrian and bicycle crossings, and should consider the needs of elderly and disabled pedestrians. Innovations such as pedestrian count-down signals and leading pedestrian intervals should be implemented where appropriate. Protected/permitted left turns should be controlled or prohibited where such turns are presenting a hazard to pedestrian crossings;

rather, protected left turn phases are preferred. In addition, well-designed experiments to accommodate pedestrians and traffic flow safely with innovative signals, beacons, and signal timing are encouraged.

- **Illumination.** Appropriate illumination of pedestrian crossings for night-time travel is recommended.
- **Bicycle Facilities.** Bicycle travel should be accommodated with bicycle facilities. An appropriate bicycle facility type should be provided based on adjacent land use, then highway speed and access controlled appropriate through design for that facility.

### Encourage High-Occupancy Vehicle Use (“Transit”)

- **HOV Priority Systems.** High-Occupancy Vehicle priorities reduce delay for vehicles with multiple occupants, so they encourage carpooling and vanpooling, thereby increasing person throughput for a given capacity and reducing VMT. (CMP)
  - **HOV Lanes.** Develop a regional system of HOV lanes. (TMO)
  - **HOV Queue Bypass.** Implement queue bypass for HOV’s at ramp meters. (TMO)
  - **HOT Facilities.** Allow SOV’s on HOV facilities, subject to special tolls.
- **HOV Support Services.** HOV support services include preferential parking, park-and-ride facilities, and other services to make carpooling easier, thus reducing VMT and increasing person throughput. (CMP)

### Public Transit Capital Improvements (“Transit”)

- **Exclusive Right-of-way Facilities.** Exclusive right-of-way facilities reduce conflicts between public transit and other transportation system users. Examples include rail facilities, busways, bus bypasses of signal queues, or bus lanes on roadways. (CMP)
  - **Bus Queue Bypass.** Allow buses to bypass traffic stop signals when behind schedule on arterial roadway. (TMO)
- **Fleet Improvements.** Fleet improvements include modernized vehicles for quicker passenger loading and unloading, improved communications equipment, improved maintenance profiles, and faster fare collection, all to improve system efficiency and effectiveness. (CMP)
- **Transit support facilities.** Transit support facilities, such as new or modernized yards or maintenance facilities, can improve efficiency. Other support facilities, like shelters and park-and-ride lots, make transit use more convenient and comfortable, thus encouraging transit use and reducing VMT. (CMP)

- **Park-n-Ride.** Additional park'n'ride facilities to encourage increased transit use. (RTP-06)
- **Operations-oriented Facility Improvements.** Short rail extensions and additional sidings intended to improve the efficiency of existing rail operations. (RTP-06)
- **Bus-Oriented Engineering Enhancements.** Provide bus stop placements that are highly visible to potential users and enable convenient drop-offs, pickups, and re-entry into traffic.
- **Freeway Access.** Provide direct ramps between transit stations and freeways. (TMO)
- **Bus Rapid Transit.** Bus rapid transit provides bus operations with technical and infrastructure improvements to improve service. Enhancements may include specialized vehicles, flexible service, flexible route structure, efficient advance fare collection, level boarding, limited stops, and intelligent transportation systems integration. ITS integration may include automatic vehicle location (AVL) combined with traffic management systems, transit signal priority (TSP), signal coordination, and transit supportive services (information systems: web site, maps, real-time information system, on-board announcements). BRT superstops can facilitate advance fare collection, faster boarding, and more comfortable waiting areas, and perhaps enhanced real-time service information. (RTP-06, TMO)
  - **Central Area Bus Rapid Transit.** Connects rail stations with major attractions and business district (Carroll Ave separated out below within Ogden Ave Transitway). (RTP-06)
  - **DuPage J Line Bus Rapid Transit.** Connects Schaumburg, Naperville, Oak Brook, and intermediate communities. (RTP-06)
  - **Cermak Road Bus Rapid Transit.** Provides service on corridor from Cicero through North Riverside Oak Brook. (RTP-06)
  - **Golf Road Bus Rapid Transit.** Provides service on corridor from Evanston through Schaumburg to Elgin. (RTP-06)
  - **Ogden Ave Transitway.**
    - **Carroll Ave Busway.** Provides service from Ogilvie Transportation Center to Navy Pier and surrounding destinations. (RTP-06)
    - **Remainder of Ogden Transitway.** Provides service to corridor from Ogilvie Transportation Center to North Riverside. (RTP-06)
- **Pace Arterial Rapid Transit Network (PARTNER).** The PARTNER Program will operate on arterial street in mixed traffic with short sections of bus-only lanes and queue bypass lanes where necessary to help buses get through

congested road sections, with branded modular station that will include specially designed bus pole, information kiosk (including system map, schedules and real-time information display), shelter, benches. Service will feature low floor buses, corridor-based, simple route structure that provide regional connectivity, and ITS enhancements. Planned ITS enhancements include automatic vehicle location system combined with dynamic traffic management, transit signal coordination and transit signal priority, and transit supportive information services, such as a web site, maps, real-time information system, and on-board station announcer. (RTP-06)

- **CTA Neighborhood Express Bus Services.** Express bus services have been initiated with “skip-stop” service on several routes. The services link regional destinations in and near Chicago. Potential enhancements would reduce travel times and improve customer service. (RTP-06)
- **Pace Express Bus Services.** Pace express services would function either as extensions of the PARTNER program along less dense corridors, providing higher speed access to regional destinations with few stops, or would operate as point-to-point services when there is sufficient demand. Such services would use the expressway system and toll facilities, including shoulder riding where appropriate to provide faster more reliable service. (RTP-06)

### Public Transportation Operational Improvements (“Transit”)

- **Transit Service Improvements.** Transit service improvements include route changes, frequency, hours of operation, and schedule coordination. Such improvements can reduce travel times and increase transit ridership, reducing VMT. (CMP)
  - **Additional Service.** Additional service on existing bus and rail routes, particularly oriented toward off-peak and reverse commute travel. (RTP-06)
  - **Additional Coverage.** New bus and paratransit services that provide public transit service to currently unserved areas. (RTP-06)
  - **Limited Stop Service.** Bus routes with limited stops that run longer distances. (RTP-06)
  - **Community Circulators.** Community circulators that allow an alternative to short auto trips. (RTP-06)
  - **Water Transport.** Improved water transport routes to serve passengers and goods. (RTP-06)
  - **Shoulder Riding.** Allow buses to ride on expressway shoulders to bypass traffic congestion to maintain schedules and provide express service. (TMO)

- **Transit Marketing and Information.** Transit marketing and information is the provision of information to the public, along with the use of information to better manage and coordinate transit operations. Such coordination may include schedule, fare, and customer information coordination. Providing and using this information can reduce transit travel times and attract new transit riders. (CMP)
- **Fare Incentives.** Fare incentives can be structured to encourage transit use, reduce the cost of fare collection, and encourage off-peak travel or travel by students or seniors, attracting new riders and reducing VMT. (CMP)
- **Traffic Operations for Transit.** Operations favorable to transit include signal priority for transit, queue bypass, bus stops, and off-street turn-around facilities. Such operations can improve transit travel times and operations efficiencies. (CMP)
  - Traffic signal priority systems for transit vehicles region-wide (RTP-06, TMO)
  - Other intersection operations improvements such as queue bypass and far-side bus stops as appropriate. (RTP-06)
- **Transit Service Coordination.** Encourage transit use by coordinating services:
  - Providing real-time transit service information to travelers. (RTP-07)
  - Enhancing the physical layout of transit stations and transfer links. (RTP-07)
  - Improving and integrating transit schedules and itineraries. (RTP-07)
  - Facilitating fare payment and collection, especially for patrons of multiple operators. (RTP-07)
  - Additional transfer capacity and improved coordination at connection points with high demand. (RTP-06)
- **Private Provision of Transit Service.** Use private providers to provide school bus service, community transit, paratransit, shuttle services, subscription bus service, charter service, limousine/taxi, corporate internal shuttles, interstate coaches, and van services.

### Encourage Use of Non-Motorized Modes (“Telecommuting”)

- **Bike/Ped Infrastructure Improvements.** Infrastructure improvements include facilities for bicyclists and pedestrians to travel along and across transportation facilities and elsewhere. Providing safe and comfortable walking and bicycling infrastructure encourages transit use and reduces VMT. (CMP)
  - **Shared-Use Design.** Implement principles of “shared-use” design in roadway design and implementation (RTP-06)

- **Zoning and Subdivisions.** Encourage zoning and subdivision ordinances to facilitate sidewalks with new development. (TMO)
- **Bike/Ped Support Services.** Bike/Ped Support services, such as bicycle parking, pedestrian signals, benches, and bike route maps, encourage walking and bicycling, encourage transit use, and reduce VMT. (CMP)

### Congestion Pricing (“Tolling”)

- **Road User Fees.** Road user fees are charges for vehicles to use a particular road or enter a designated area. These fees can be targeted by time of day, at points of operations problems, or upstream of bottlenecks or other areas of congestion. Such fees can be used to smooth traffic flow, improve reliability, or reduce VMT. (CMP, TMO)
  - **Freight-oriented Value Pricing.** Value pricing initiatives encourage efficient utilization of highway facilities for freight operations. (RTP-06)
  - **Create Toll Express Lanes.** Create express lanes that bypass expressway bottlenecks and charge a premium toll to finance the construction of these lane (TMO)
- **Parking Fees.** Parking fees can be increased for parkers, perhaps only in peak periods, to discourage driving to or through congested areas, thus reducing congestion and VMT. (CMP)

### Growth Management<sup>i</sup> (N.A.)

- **Compact Development.** Compact development provides for shorter travel distances and encourages transit and non-motorized modes, reducing VMT. (CMP)
- **Redevelopment and Infill.** Redevelopment and infill allow existing infrastructure to be used, often in areas that are amenable to transit and non-motorized transportation. (CMP)
- **The Location-Efficient Mortgage.** Location-efficient mortgages are a financial incentive linking potential transportation cost savings inherent in transit-oriented neighborhoods to improved mortgage financing opportunities and/or terms. This may encourage homeownership in transit-oriented neighborhoods. (CMP)
- **Mixed-Use Development.** Mixed-use developments reduce the distance between origins and destinations, thereby increasing transit and non-motorized trips. (CMP)
- **Jobs-Housing Balance.** A jobs-housing balance approach would, for each subregion, balance the number of jobs and dwelling units by income range, reducing VMT by reducing the need to commute great distances. (CMP)

- **Corridor Land Use and Transportation Coordination.** Corridor focused land use and transportation coordination is a mechanism for local governments to cooperatively plan land development to improve traffic operations (e. g, providing local connectivity to keep local traffic off arterial roads). (CMP)
- **Transit-Supportive Land Use.** The following land-use and design strategies facilitate transit use.
  - Minimize distances between buildings and transit stops. Building setbacks should be minimal. (RTP-06)
  - Provide short walkways connecting buildings and transit stops. (RTP-06)
  - Encourage compact, higher density development centered on the transit service. (RTP-06)
  - Interconnect streets and sidewalks leading to the transit service. Provide direct lines of travel to transit service, without back-tracking. (RTP-06)
  - Require travel demand reduction strategies to be implemented as part of conditional use or planned developments. Promote transit access in development reviews. (RTP-06)
  - Facilitate mixed use developments. (RTP-06)
  - Provide for transit users' needs by creating service-oriented hubs. (RTP-06)
  - Provide transportation centers in appropriate locations. (RTP-06)
  - Require attractive landscaping and street environment. (RTP-06)
  - Provide links with surrounding services and institutions. (RTP-06)
  - Facilitate a mix of housing types. (RTP-06)
  - Create a "sense of place." (RTP-06)

#### Access Management (N.A.)

- **Driveway Management.** Driveway management, including regulations and engineering improvements to reduce the number of driveways for development, share driveways among developments, access from sidestreets or alleys, reduces arterial travel delay and reduces crashes. (CMP)
- **Median Management.** Medians, with strategic placement of median break, control development access and left turn delay. Medians reduce arterial delay and reduce crashes. (CMP)
- **Frontage Roads.** Providing land access with frontage roads instead of arterials may reduce arterial delay and crashes. (CMP)
- **Expressway Entrance Barrier Systems.** Barrier gate systems that can be deployed to prevent access to expressways from individual entrance ramps to divert traffic from already heavily congested travel lanes or to prioritize

expressway travel lanes for evacuation and/or first responder actions following an incident. (TMO)

### Incident Management (“Technology”)

- **Incident Detection/Verification.** Rapid incident detection, by service patrols, travel time inspection, incident reports, and cameras, can reduce the delay and secondary crashes associated with the incident. (CMP)
  - **Service Patrols.** Extend service patrols region-wide. (TMO)
- **Incident Response.** Rapid incident response reduces delay and secondary crashes. Advance planning for incident scenarios with response plans assist in this, with adequate and appropriate response vehicles and personnel. (CMP)
- **Incident Clearance.** Rapid incident clearance reduces delay and secondary crashes. (CMP)
  - **Standards for Police.** Implement standards for crash clearance and traffic stop procedures to reduce secondary incidents and delay. (TMO)
- **Incident Information/Routing.** Incident information can provide guidance to those affected by an incident. Travelers approaching an incident can be guided away from the incident. These strategies can reduce delay and secondary crashes. (CMP)

### Intelligent Transportation Systems (“Technology”)

- **Intelligent Transportation Systems (general) –Traffic Management Centers.** A system of regional traffic management centers that will coordinate communication and operations for the entire freeway, tollway, arterial and rail transit system. Local TMC’s respond to local conditions. (RTP-07, TMO)
- **Intelligent Transportation Systems (general) – Communications System.** regional and multi-state communications system that provides real-time travel condition and emergency management information to transportation agencies, emergency response providers and the general public. This includes a communications infrastructure that will provide electronic links to travelers, emergency responders, transportation/emergency response operations centers, roadside equipment and vehicles. (RTP-07)
- **Advanced Traffic Management Systems.** Advanced traffic management systems, usually focused on a traffic management center, integrates incident management and transportation system management strategies to reduce delay and crashes and improve reliability. (CMP)
  - **Variable Speed Management.** Variable speed management smoothes traffic flow through congestion and incidents, reducing delay and crashes (TMO)

- **Advanced Traveler Information Systems.** Advanced traveler information systems collect, compile, process, and disseminate real time information, pre-trip or en route, about travel times, schedules, incidents, and alternate routes, to enhance travel choice and reduce travel times and improve reliability. (CMP, TMO)
  - **Variable Message Signs.** Provide variable message signs. (TMO)
  - **Radio Services.** Provide radio services, including highway advisory radio. (TMO)
  - **511.** 511 services provide traveler information for trip planning, and can include highway, transit, and rideshare information. Highway information may include incidents, travel times, and road conditions. (TMO)
- **Advanced Public Transportation Systems.** Advanced public transportation systems include a variety of technologies to improve transit system performance and usability. Examples include electronic fare collection and transit vehicle tracking, which can provide user and management information to improve reliability. (CMP)
- **Track and Signal Improvements.** The RTP supports including improved track and signal systems during maintenance and reconstruction projects. Track and signal improvements are critical to efficient train (freight and passenger) operation, allowing for more trains and permitting higher speeds (RTP-07).
- **Commercial Vehicle Operations.** Commercial vehicle operations techniques improve freight operations and efficiency through such systems as weigh-in-motion, credentialing, and navigation. (CMP)
  - Study the ways in which information technology may be used to facilitate freight movement, particularly in regard to container and railcar movement planning and the formation of unit trains to cities within approximately 700 miles (i.e. Midwestern cities). (RTP-06)
  - **Credentialing.** Credential commercial vehicles to manage deliveries by time of day (TMO).
  - **Monitoring.** Monitor rail cars and trucks for improved management. (TMO).
- **Advanced Vehicle Control Systems.** Advanced vehicle control systems provide informational, navigation or control technologies to, for example, prevent operation by impaired drivers, provide routing assistance, and alert operators to maintenance requirements. (CMP)
  - **Vehicle Separation Monitors.** Provide sensors to monitor separation between trucks and other vehicles. (TMO)

## Capacity Expansion (N.A.)

- **Expressway Lanes.** Additional expressway lanes can provide safer operations, less delay, and improved reliability. Auxiliary lanes smooth traffic flow by facilitating conflicting maneuvers away from mainline lanes. Additional expressway through lanes may provide better lane balance. (CMP)
  - **Auxiliary lanes.** Auxiliary lanes are operational improvements that can involve limited lane additions, but do not result in a change in the basic cross-section of the facility. Auxiliary lanes reduce conflicts and crashes by moving weaving sections off of mainline operations (RTP-07).
- **Arterial Lane Additions.** Arterial lane additions may have beneficial effects on safety and travel time if planned properly, so care should be exercised to assure impact on signal cycle lengths and delay as well as multi-modal impacts. (CMP)

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<sup>i</sup> Some of the “growth management” strategies are not strictly management and operations, but are included here for completeness regarding the Congestion Management Process.