

Congestion Management Process – D

2035 Long Range Transportation Plan

A. INTRODUCTION

The Congestion Management Process (CMP) is a tool for documenting and analyzing traffic congestion, and also for recommending and implementing appropriate strategies that can alleviate congestion and improve the performance of the transportation system. This CMP establishes a *consistent and systematic process* for managing congestion by producing information and recommendations on system performance and on alternative strategies for alleviating congestion and enhancing the mobility of persons and goods. This is done with Federal and State guidance for the intended purpose of conforming to Federal air quality standards. Achieving regional air quality improvements are a potential and desired outcome of CMP planning.

The Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 was the first Federal transportation Act to require the establishment of a Congestion Management System in Transportation Management Areas (TMAs), which are urbanized areas with a population over 200,000. The subsequent Transportation Equity Act for the 21st Century (TEA-21), and its successor – SAFETEA-LU – both have maintained the Congestion Management requirements for TMAs.

In TMAs designated as carbon monoxide (CO) or ground-level ozone (O₃) non-attainment areas, the Federal regulation prohibits projects that increase capacity for single-occupant vehicles (SOVs), unless the project emerges from a CMP. At present the EMPO study area is in attainment for CO, and in maintenance for ozone, both of which are considered transportation-related pollutants. The CMP is a required program, although a CMP analysis is not required for individual transportation projects, and the EMPO will be engaged in CMP activities on a regular basis, as discussed in section C of Chapter 3. The US Environmental Protection Agency recently changed the standards for O₃ pollution to a more stringent standard, so the attainment status of counties in our planning area may change in coming years.

Formerly, the CMP was known as the Congestion Management System (CMS), and the CMS was presented as a stand-alone document (*Congestion Management System Report*, July 2004). SAFETEA-LU has changed the name, and has provided for the inclusion of the CMP within the Long Range Transportation Plan. The EMPO is re-tooling the Congestion Management Process, and will implement a new data collection program in year 2007 to better monitor intersections and roadways for delay and operational shortcomings. This data collection program, as well as performance measures and strategies for reducing congestion, are discussed in this appendix.

B. CONGESTION AND ITS MANAGEMENT

Congestion has been defined by the Federal Highway Administration (FHWA) as “The level at which transportation system performance is no longer acceptable due to traffic interference.” The level of acceptable system performance varies by type of transportation facility, geographic location, and/or time of day. In the *National Strategy to Reduce Congestion on America's Transportation Network* (US Dept. of Transportation, 2006), the US DOT states that “Based on current trends, highway congestion is on its way towards becoming a problem in medium-sized

cities within the next ten years, while smaller cities, towns, and the suburban and rural fringe can expect to face similar challenges over the next 10 to 15 years.”

The Transportation Research Board (TRB) has identified two types of congestion, as it relates to travel time and speed. The first and most dominant cause of congestion is recurrent congestion caused by inadequate road capacity. This simply means that there are more vehicles trying to utilize a roadway that it can physically accommodate at a single time. Historically, solutions for this type of congestion have focused on building new roads or adding travel lanes to existing roadway.

The second type of congestion results from random events such as accidents, spillages, vehicle breakdowns, inclement weather, special events or any other factor that cannot be anticipated on a typical day of travel. This type of congestion is called non-recurrent congestion because it is largely unpredictable as to when or where it will occur. It is estimated that more than 60 percent of traffic delay is caused from non-recurrent incidents in an urban area. When they occur during rush hours they cause serious congestion. Incident Management, which is a sequence of pre-planned and integrated activities that applies both human and technological resources to remove incidents as quickly and safely as possible to restore capacity to the highway, is a unique solution to non-recurrent congestion incidents .

A successful congestion management program should address both recurrent and non-recurrent congestion. Both types of congestion can be difficult to mitigate without reducing overall travel demand. For capacity expansion to occur there must be sufficient right-of-way available for acquisition for expansion or funds available to acquire the addition right-of-way needed to build a new road or add travel lanes. Often right-of-way is difficult to acquire and costs can be prohibitive for smaller roadway projects.

Sometimes minimal or temporary relief can be provided through highway performance improvements such as signalization changes, improved roadway signs and pavement markings and other low cost remedies. However, these improvements are often temporary and only serve to prolong the problem without actually fixing anything. Otherwise, meaningful reductions in congestion can only be accomplished with non-capacity expansion strategies, which are discussed in more detail in the following section.

C. CMP REQUIREMENTS

The Evansville MPO will observe these federally required elements for the CMP:

1. Definition of the area of application and a targeted CMP network.
2. The establishment and use of performance measures.
3. Data collection and performance monitoring.
4. Identification and evaluation of congestion management strategies.
5. The identification of implementation responsibilities.
6. The development of an evaluation process for implemented congestion management strategies, in terms of established performance measures.

An explanation of how the EMPO will address these requirements is presented on following pages.

Targeted CMP Network and Data Collection

The Planning Area (see p.1-2) is the area of application for EMPO CMP activities. The EMPO has established 64 locations for collecting CMP traffic counts, and 52 intersections for conducting peak-hour turning movements (see Table D-1 on p.D-4, and Table D-2 on p.D-5). This is the CMP network.

The data collection program will consist of the following:

- 1) Traffic counts will be collected on roadway segments having two-way Annual Average Daily Traffic (AADT) volume of 15,000 vehicles or more, in order to track volume and capacity on the most heavily-travelled roadway segments. Data will be gathered utilizing EMPO counters, INDOT reports, and Kentucky Transportation Cabinet reports. This data will be monitored over time, and will serve to inform the travel time portion of the data collection program. The locations of the traffic counts are shown in Figures D-1 and D-2, on pages D-4 and D-5.
- 2) The EMPO will conduct detailed intersection turning-movement studies along many of the same corridors in which HPMS traffic count data is collected, and at other intersections of local concern. Level-of-service measurements for the individual facilities will be incorporated into the CMP. The locations of the intersection-movement studies are listed in Table D-2 on page D-5.
- 3) Travel time will be calculated for key road corridor segments on a three-year cycle. The road corridors selected for travel time data collection will be derived from traffic count data analysis. A presentation of travel time data will be made in the next update of this plan.

Performance Measures and Monitoring

The use of traffic count data, turning movements, and travel time data will allow the EMPO to estimate level-of-service (LOS) conditions on the associated roadway network. As data is collected and LOS is calculated for road segments on our network, the EMPO will be able to compare current information to older information, to gauge changes in congestion on network facilities. The collection of new CMP data will begin in summer 2009. Tables will be developed showing the calculated LOS for given periods; and the change over time. Those tables will be presented in the next update of this document.

Identification and Evaluation of Congestion Management Strategies

At some point there will be a desire to translate the congestion information obtained from performance monitoring into specific strategies for mitigating congested conditions. Inferring from the demographic data presented in Chapter Four, because of relatively high growth in employment in Vanderburgh County and relatively high growth in population in surrounding counties, *regional* transportation facilities will likely be the most impacted by congested conditions in the future. Regional travel is highly dependent on Single Occupant Vehicles (SOVs), and this is likely to remain the situation for some years to come.

Aside from the traditional "capacity-expanding" types of responses to congestion, there are many innovative Transportation Demand Management (TDM), Transportation System Management (TSM), Land Use, and other strategies which can be utilized at the local level to improve roadway

congestion. Determining which strategies could work best for a given situation may depend somewhat on the cost and time required for implementation. A sampling of congestion management strategies follows, with a cursory evaluation of cost and time required for implementation.

Table D-1: CMP Traffic Count Locations

Primary Street	Count Location - Vanderburgh. Co.	Primary Street	Count Location - Vanderb. Co.
Boeke Rd.	North of SR 66	SR 57	North of Foundation Drive
Burkhardt Rd. Rd.	Wal-Mart - Virginia St.	St. Joseph Ave. Ave.	North of SR 66
Burkhardt Rd. Rd.	Oak Grove Rd. - Morgan Ave.	St. Joseph Ave. Ave.	South of SR 66
Burkhardt Rd. Rd.	Lincoln Ave. - Walnut St.	Stockwell Rd.	North of SR 66
Columbia St.	Main St. - Elsas Ave.	US 41	North of SR 66
Diamond Ave..	Stringtown Rd. - Evans Ave.	US 41	At In-Ky State Line
Diamond Ave..	Hiedelbach Ave. - Lafayette St.	US 41	South of Morgan Ave.
First Ave.	Meyer Ave. - Colorado St.	US 41	St. George Rd.- Petersburg Rd.
First Ave.	Virginia St. - Maryland Ave.	US 41	North of Diamond Ave.
First Ave.	N. Park Dr. - Mill Rd.	Veterans Pkwy	Sycamore St. - Main St.
Fulton Ave.	SR 66 - Meyer Ave.	Walnut St.	West of US 41
Fulton Ave.	Riverside Ave. - Second St.	Washington Ave.	Vann Ave. - Green River Rd.
Green River Rd. Rd.	North of SR 62	Washington Ave.	East of US 41
Green River Rd. Rd.	South of SR 62	Weinbach Ave. Ave.	South of SR 66
Green River Rd. Rd.	North of Morgan Ave.	Weinbach Ave. Ave.	Morgan Ave. - Maxwell Ave.
Green River Rd. Rd.	Washington Ave. - Bellemeade Ave.	Primary Street	Count Location - Warrick Co.
I - 164	North of SR 66	Epworth Rd.	SR 66 - Lincoln Ave.
I - 164	Green River Rd. - US 41	SR 261	North of SR 66
Lincoln Ave.	East of Hebron Ave.	SR 62	East of SR 61
Lincoln Ave.	West of Fielding Rd.	SR 62	West of State St.
Lloyd Expressway	West of US 41	SR 66	West of SR 261
Lloyd Expressway	East of US 41	SR 66	East of SR 261
Lloyd Expressway	West of Vann Ave.	SR 66	Epworth Rd. - Grimm Rd.
Lloyd Expressway	East of Burkhardt Rd.	SR 66	SR 261 - Bell Rd.
Lloyd Expressway	East of Weinbach Ave.	SR 662	West of I-164
Lloyd Expressway	West of Red Bank Rd.	SR 662	East of I-164
Lloyd Expressway	West of St. Joseph Ave.	Primary Street	Count Location - Henderson Co.
Lynch Rd.	Oak Hill - Green River Rd.	Green St.	South of Washington Ave.
Lynch Rd.	East of US 41	Green St.	North of SR 136/Sand Ln.
Morgan Ave.	East of Weinbach Ave.	Green St.	East of Henderson Bypass
Morgan Ave.	East of Green River Rd.	Green St.	North of 12th St.
Morgan Ave.	West of US 41	US 60	N/E of Barret Dr.
Morgan Ave.	East of US 41	US 41	S. of Marywood/N. of US 60
Old Boonville Hwy.	West of Burkhardt Rd. Rd.	US 41	S. of Watson Lane
Oak Hill Rd.	South of Bergdolt Rd.	US 41	S. of CR 812
Riverside Dr.	North of Locust Ave.	US 41A	N. of Collier Rd.

Table D-2: CMP Turning Movement Locations

Reference Street	Cross Street	Reference Street	Cross Street
Bellemeade Ave.	Kentucky Ave.	Morgan Ave.	Stockwell Road
Bellemeade Ave.	St. Mary's Dr.	Morgan Ave.	Weinback Ave.
Boeke Road	Morgan Ave.	Petersburg Rd.	US Highway 41
Burkhardt Road	SR 66	SR 261	Sharon Street
Burkhardt Road	Virginia	SR 57	Oak Hill Road
Columbia Street	First Ave.	SR 57	US Highway 41
Diamond Ave.	Business Hwy 41	SR 57	Kansas
Diamond Ave.	First Ave.	SR 62	Fulton Avenue
Fares Avenue	Columbia Street	SR 62	Red Bank Road
First Ave.	S. of Mill Rd.	SR 66	Stringtown Road
First Ave.	Columbia Street	SR 66	Green River
Fulton Ave.	Franklin Street	SR 66	SR 261
Green River Rd.	Theatre Dr.	St. George Road	US Highway 41
Green River Rd.	Morgan Ave.	St. Joseph Ave.	SR 66
Green River Rd.	Washington St.	Virginia Street	US Highway 41
Kentucky Ave.	Lincoln Ave.	Walnut Street.	Second Street
Lincoln Ave.	Vann Avenue	Washington St.	Weinback Ave.
Lincoln Ave.	Weinback Ave.	WARRICK COUNTY	
Locust Street	Second Street	Old 662	Epworth Road
Lynch Road	Hitch Peters Rd.	Lincoln Ave	SR 261
Lynch Road	Oak Hill Road	SR 62	Gardner Road
Lynch Road	US Highway 41	HENDERSON COUNTY	
Mill Road	St. Joseph Ave.	US 41	Clay St./CR 812
Morgan Ave.	Oak Hill Road	US Hwy 60	Ohio Drive
		Green Street	2nd Street/CR 351

D. CONGESTION MANAGEMENT STRATEGIES

Transportation Demand Management (TDM): The primary purpose of TDM strategies is to reduce the number of vehicles using the road system while providing many mobility options to those who want to travel. TDM strategies are designed to maximize the people-moving capability of the transportation network, and support more efficient use of the existing transportation systems by influencing the time, route, or mode selected for a given trip. To accomplish these types of changes, TDM programs often rely on incentives to make these shifts in behavior attractive and generally work best where land uses are mixed and fairly dense, urban design is integrated with transportation systems, and there are multiple choices for travel. Incentives associated with TDM strategies include preferential parking for persons sharing carpools, vanpools, or transit; transportation allowances for transit; subsidies for transit operators; and guaranteed ride home programs. The following are some TDM alternatives that are, or may be, viable in the Evansville-Henderson area:

Ridesharing

Carpools and vanpools are typically arranged by employers. Ridesharing will reduce SOV trips and Vehicle Miles Traveled (VMT) in the region, and can be especially helpful in corridors with large employment centers. Implementation costs involve parking space and administration, although participants usually realize savings. The timeframe for implementation is usually short-term (1-5 years).

Telecommuting

This allows employees to sometimes work from home or a regional telecommute center, which helps to reduce SOV trips, and most importantly, the amount of traffic during peak travel times. Employer costs tend to decline after initial investments and the timeframe for implementation is usually short-term (1-5 years).

Alternative Work Hour Programs

This allows workers to arrive and leave work outside the traditional commute period. It may be accomplished by Compressed Work Weeks in which employees work a full week in fewer than the typical five days, or a Flexible Work Schedule that shifts work start and end times to off-peak hours of the day. Employer implementation costs vary and the timeframe for implementation is usually short-term (1-5 years).

Public Transit

Transit can be promoted as a TDM strategy when there is a demand for transit service and other TDM strategies are not able to alleviate congestion. Fare reductions (replaced by operational subsidies), increasing route coverage or frequencies, and implementing park and ride lots all have short-to-medium term (0-10 years) implementation timeframes. Costs include capital, operational, and possibly structural outlays.

Non-motorized Improvements

Bicycling and walking are important for travel purposes, especially in mixed land use development areas, and aid in reducing congestion and air pollution. New sidewalks and designated bicycle lanes increase mobility and access. Exclusive non-motorized rights-of-way for medium-to-long distance trails improve safety and reduce travel times for pedestrians and cyclists (and other wheeled non-motorized vehicles). Providing access for pedestrians and cyclists in developments and at transit facilities encourages people to walk and use bicycles. Implementation costs can be part of design and construction costs, but new facility costs for reconstruction can vary widely. The timeframe for implementation of most strategies is short-to-medium term (0-5 years).

Transportation System Management (TSM): The TSM approach to congestion mitigation seeks to identify improvements of an operational nature to enhance the capacity of existing system. Through better management and operation of existing transportation facilities, these techniques are designed to improve traffic flow, air quality, and movement of vehicles and goods, as well as enhance system accessibility and safety.

Intersection and Lane Improvements

Congestion and travel time can be improved by installing traffic control designs and designs for the smooth and safe passage of both pedestrians and vehicles. The devices

and designs used could be signs, turning lanes, auxiliary lanes, traffic islands, traffic channels, and other appropriate geometric designs to help reduce congestion and improve the safety and ease of travel. Implementation costs vary, but are usually moderate to high, and the timeframe for implementation of most strategies is short-to-medium term (0-10 years).

Traffic Signal Improvements

Studies have shown that changes in a signal's physical equipment and timing optimization can help significantly in congestion mitigation. Traffic flow could be improved by equipment updates, timing plan improvements, interconnected signals, traffic signal removal, or traffic signal maintenance as needed. Implementation costs vary and the timeframe for implementation is usually short-term (1-5 years).

Intelligent Transportation (ITS)

ITS technology, such as Advanced Traveler Information Systems, has been a great help in relieving congestion where other solutions have failed. These intelligent transportation systems include computers, communications, and displays. At present, one ITS project is planned for Evansville (see Chapter 3). Implementation costs vary and the timeframe for implementation is usually medium-term (5-10 years).

Incident Detection and Management Systems

To alleviate non-recurring congestion, systems typically include video monitoring, dispatch systems, and sometimes service patrol vehicles. The prompt removal of disabled vehicles from travel lanes reduces travel time and accident delay. Capital costs are variable, as are annual operating maintenance and operational costs. The timeframe for implementation is usually medium-term (5-10 years).

Other Strategies: Aside from TDM and TSM strategies, a variety of other strategies may be used to mitigate congestion. Most of these strategies and techniques are employed to some degree in the Evansville-Henderson area already, but not as part of a coordinated congestion management effort.

Land Use Strategies

Land-use techniques and urban design can be used to mitigate congestion by integrating land-use planning (e.g. zoning), site planning, innovative development styles, and landscaping within a transportation system. Mixed-Use Development, Infill and Densification, Traditional Neighborhood Design, and Transit-Oriented Development all support a reduction of SOV travel and reduction of VMT. Some of these strategies involve public costs in creating ordinances, and all involve economic incentives to encourage developer buy-in. The timeframe for implementation is usually long-term (10+ years).

Access Management

Access management consists of controlling the space and design of driveways and other curb cuts, medians, and median openings, intersections, traffic signals, and freeway interchanges. Appropriate access control can decrease the number of accidents and congestion. To have a successful access management plan, both transportation planners and land use planners have to work cooperatively. The benefits of access management

are fewer conflict points, increased mobility, fewer crashes, increased capacity, and shorter travel times. Implementation costs can be part of design and construction costs, but new signage, striping, and other new facility costs for reconstruction can vary widely. The timeframe for implementation of most strategies is short-to-medium term (0-10 years).

Highways Strategies

The traditional way to deal with congestion has been to widen a highway and add lanes, but this is usually a short-term solution because traffic acts like a gas: it expands to fill the space available. Lanes can be sometimes be added without widening the highway. Geometric design improvements (as described above under Intersection and Lane Improvements), can serve to improve mobility, reduce congestion, and improve safety. Also, the conversion of existing major arterials with signalized intersections into “super streets” that feature grade-separated interchanges, as was done to create Evansville’s Lloyd Expressway, also serve to increase capacity and mobility. Implementation costs can be part of design and construction costs, but new facility costs for reconstruction can vary widely. Also, there is potential for significant environmental and community impacts. The timeframe for implementation of most strategies is short-to-long term (0-10+ years).

Parking Management

Many communities have adopted parking policies to induce transportation mode shifts, increase peak-period capacity, promote access preservation, and improve environmental quality. Parking management strategies include: On-street Parking and Standing Restrictions; Employer/Landlord Parking Agreements; Location-Specific Parking Ordinances; and Preferential/Free Parking for Ride-sharers. Implementation costs vary and the timeframe for implementation of most strategies is usually short-term (1-5 years).

Congestion Factors and Potential Mitigation Actions

The following are examples of TDM, TSM, and other congestion-reduction strategies applied to particular congestion problems:

Single Occupant Vehicle (SOV) Travel

SOV is the predominant mode of travel with the MPO area which is a major cause of congestion and deteriorating air quality.

Action: TDM: Ridesharing (carpooling, vanpooling); transit service; bikeways & walkways;; alternative work-hour programs; telecommuting, parking management.

TSM/Other: Traffic signal improvement; intersection improvement; transit-oriented development; access management; Intelligent Transportation System (ITS).

Traffic Signal Synchronization

Unsynchronized signals contribute to traffic congestion. Driver experiences stops, stop-delays, and longer travel time contributing to increased fuel consumption, congestion, and air pollution.

Action: TSM: Traffic signal improvements.

Access Management

Closely spaced driveways/curb cuts, and driveways too near intersections on arterial streets, hamper traffic movement causing congestion and air pollution.

Action: TSM/Other: Geometric design; traffic signal improvements; intersection improvement; parking management; land-use strategies (e.g. subdivision regulations; urban design).

Intersections Without Right Turn Channelization

Intersections that experience heavy right turn traffic movements without dedicated right turn lanes contribute to congestion during peak hours.

Action: TSM: Geometric design (lane marking); traffic signal improvement; intersection improvements.

School Zones on Major Arterials

The intent of the arterial street system is to emphasize mobility rather than land accessibility within the urban area. Low driving speed limits in school zones on major arterials cause traffic delays and congestion.

Action: TSM: Geometric design; traffic signal improvements; intersection improvements; parking management; access management (designated crosswalks).

Walkways

Walkways that are not properly maintained, that lack ADA accessibility ramps, and that do not properly connect residential and commercial activity centers discourage potential users.

Action: TDM: Sidewalk additions and upgrades; multi-use path additions and upgrades.
TSM/Other: Traffic signal improvements, intersection improvements, urban design improvements, access management.

Bikeways

On street and off street bicycle facilities are valuable as an alternative mode of transportation, and in replacing travel by automobile help to alleviate congestion and enhance air quality.

Action: TDM: Bicycle lanes and routes; multi-use path additions and upgrades; bike parking.
TSM/Other: Urban design improvements (e.g. mixed-use development), access management; traffic signal improvements, intersection improvements.

Transit Service

Enhanced travel and headway times in the urban area can mitigate congestion and improve air quality; Bus bays play an important part in reducing congestion on busy streets.

Action: TDM: Direct transit routes between activity centers and residential areas.
TSM: Bus-priority signals at intersections; geometric design (study to determine feasibility of addition of bus bays).

Identification of Implementation Responsibilities

As discussed in section A, a CMP analysis is not presently required for individual transportation projects in the EMPO study area. This situation makes the undertaking of any congestion management strategies by Local Public Agencies completely voluntary, therefore there can be no implementation responsibilities assigned. But, to create a stronger connection between the CMP and the Long Range Transportation Plan, the EMPO will recommend that future project prioritization criteria include the use of CMP data, where applicable, for a determination of roadway congestion. The EMPO will support local jurisdictions in the evaluation and implementation of congestion management strategies as appropriate.

Development of an Evaluation Process for Implemented Congestion Management Strategies
 The EMPO will work to develop an evaluation process that utilizes established performance measures for implemented congestion management strategies. An evaluation process will be created especially for the selected congestion management strategy. A simple evaluation scheme for the selection of a congestion-reduction strategy, such as non-motorized improvements, might follow a format similar to the one presented in Table D-1 on the following page. This table is the creation of the Victoria Transport Policy Institute, which has also developed similar tables to evaluate the benefits, equity, and application suitability of various congestion-reduction strategies. These may be viewed on the World Wide Web at <http://www.vtpi.org/tm/tm12.htm>

Table D-3: Example Travel Impact Evaluation Summary for CM strategies

Strategy	Travel Impact	Rating	Comments
Construct extensive bikeway network	Reduces total traffic.	1	Indicates whether a strategy reduces overall vehicle travel.
Construct extensive bikeway network	Reduces peak period traffic.	1	Indicates whether a strategy reduces vehicle travel during peak periods.
Construct extensive bikeway network	Shifts peak to off-peak periods.	0	Indicates whether a strategy encourages motorists to shift from peak- to off-peak driving.
Construct extensive bikeway network	Shifts automobile travel to alternative modes.	2	Indicates whether a strategy encourages shifts to alternative modes in general.
Construct extensive bikeway network	Improves access, reduces the need for travel.	1	Indicates whether a strategy improves land use access, and therefore reduces the need to travel.
Construct extensive bikeway network	Increased ridesharing.	0	Indicates whether a strategy encourages ridesharing.
Construct extensive bikeway network	Increased public transit.	1	Indicates whether a strategy encourages public transit use.
Construct extensive bikeway network	Increased cycling.	3	Indicates whether a strategy encourages cycling.
Construct extensive bikeway network	Increased walking.	1	Indicates whether a strategy encourages walking.
Construct extensive bikeway network	Increased Telework.	0	Indicates whether a strategy encourages use of telecommunications to substitute for physical travel.
Construct extensive bikeway network	Reduced freight traffic.	0	Indicates whether a strategy reduces freight travel.

Ratings range from 1 (minimal impact) to 3 (significantly contributes to this impact).