

CHAPTER 8: CONGESTION MANAGEMENT

8.1 Introduction

Federal requirements state that regions with more than 200,000 people, known as Transportation Management Areas (TMAs), must maintain a congestion management plan (CMP) and use it to inform transportation planning and decision-making. These requirements were introduced by the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 and were continued under the successor law, the Transportation Equity Act for the 21st Century (TEA-21). Whereas previous laws referred to this set of activities as a congestion management system (CMS), the most recent surface transportation authorization law, the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), refers to a “congestion management process”, reflecting that the goal of the law is to utilize a process that is an integral component of metropolitan transportation planning. The Regional Congestion Management Plan has been developed to address this federal requirement for the Columbia Area Transportation Study Metropolitan Planning Organization.

8.2 Existing Conditions

Jacobs Carter Burgess was retained by the Central Midlands Council of Governments (CMCOG) to develop a Congestion Management Process/Plan for the Columbia Area. A Congestion Management Process/Plan (CMP) is a process in which a transportation system is periodically monitored for congestion and mitigation strategies are recommended in response to identified deficiencies.

The CMP process is required in accordance with the 23rd Code of Federal Regulations, section 500, in the Federal Register, under the U.S. Department of Transportation. A CMP provides state Department of Transportation and MPOs with a methodical framework for addressing congestion. Federal rules require that a CMP area and network be defined by each MPO. In air quality non-attainment areas, projects that increase capacity for Single Occupancy Vehicles (SOV's) must be derived from a CMP

Aside from the CMP being a federal requirement for a MPO with a population of over 200,000, CMP's helps qualify and/or identify potential projects for inclusion into their regional transportation program. They identify potential improvements based on quantifiable data and they consider congestion in developing transportation

improvements. CMP's establish a baseline condition for future comparison of conditions and allow for project prioritization based on potential congestion mitigation. CMP's can provide solutions beyond merely adding road capacity as mitigation development includes other solutions that may be more effective and cost-efficient. CMP's encourage economic competitiveness and increases the reliability of planning for all modes and all journey purposes. Environmental programs that involve air quality and natural hazard mitigation also benefit from the CMP process.

Approximately 330 centerline miles of key roadways were examined in the Columbia area. The roadways were identified and selected from the Year 2002 CMP corridors, an examination of Year 2005 and 2035 travel demand model volume-to-capacity projections, and CMCOG staff and stakeholder input. These resulting 2008 CMP corridors are shown in Figure ES 1 and in Table ES 1.

From the list of corridors shown in Table ES 1, sub-set corridors were created in order to facilitate a more accurate identification of congested segment locations within the corridors. Approximately 775 directional corridors were created from the corridors in Table ES 1 and they were examined with travel time runs in the AM and PM peak period. Two (2) runs using the standard "floating car" travel time run method was performed for each corridor and each peak period. Most of the sub-set corridors are half a mile in length or greater. Approximately thirty (30) of these directional corridors are between 500 and 1500 feet in length.

8.2.1 Congested Corridors

Based on the Federal Highway Administration (FHWA) Highway Capacity Manual (HCM) 2000-based congestion thresholds evaluated in this study, approximately 4% of the corridors were found to be congested (LOS E and F) and 4% were found to be potentially congested (LOS D) for both the AM and PM peak period (7-9AM, 4-6PM). Approximately 92% of the corridors examined were not congested.

Tables ES 2A and ES 2B summarize the corridors that were identified as congested or potentially congested for the AM Peak Period. Table ES 3A and ES 3B summarize the corridors that were identified as congested or potentially congested for the PM Peak Period. It should be noted that NB, SB, EB, WB indicate the direction of the corridor (i.e. NB = northbound, SB = southbound, etc.).

Figures ES 2 and ES 3 show the congested and potentially congested corridors for the AM and PM peak periods, respectively. It should be noted that the closer spacing for the congestion index lines for the AM peak period compared to the PM peak period was intentionally designed so that the AM and PM peak period could also be combined and overlaid into one map showing the AM results as the inner lines and the PM results in the outer lines.

8.2.2 Potential Intersection Hot Spots

An added value byproduct of travel time runs over a network consisting of approximately 330 centerline miles is that potential intersection hot spot congested locations can be identified. Using average approach delay (for through movements only) at intersections and HCM 2000 delay-LOS thresholds, potential intersection hot spots on the CMP network were identified. The CMP network consists of approximately 1,170 intersections, of which 845 are controlled by a traffic signal.

In the AM peak period, through movement approaches at forty (40) intersections had vehicular delays along the main road that correlated with HCM LOS E or F. In the PM peak period, through movement approaches at forty-one (41) intersections had vehicular delays along the main road that correlated with HCM LOS E or F. The results of the analysis are shown in Tables ES 3 and ES 4 for the AM and PM peak period, respectively. They are also shown in Figure ES 4. It should be noted that this is a planning level analysis that does not adequately substitute for detailed traffic operational studies that are normally performed to identify improvement needs and improvement concepts to alleviate local congestion.

8.3 Future Updates

The following details the suggested program for updating the CMP for the Columbia Area, once every four years:

Field Data Collection

Stage 1: Examine congestion monitoring network versus travel demand model and note additional corridors for consideration.

Stage 2: Perform travel time runs for defined corridors in congestion monitoring network.

Stage 3: Physical roadway conditions along corridors already coded in GIS system are available for re-use. Collect additional roadway characteristics for new corridors.

Stage 4: Consider increasing number of travel time runs per corridor to increase statistical validity of results (3 to 4 runs).

GIS Database

Task 1: Re-use Linear Reference System for existing corridor network (i.e. 660 directional miles). Update Linear Reference System with any new corridors in the monitoring network.

Task 2: Re-use corridor features for existing corridors and collect additional features for new corridors designated for travel time runs.

Task 3: Use current 2008 CMP data to verify and cross-check future data collection efforts.

It is recommended that the LOS E and F corridors be examined after four (4) years, along with any additional corridors identified by CMCOG and 1/2 of the LOS D corridors. In the Year 2016, a major update would be recommended, encompassing all of the corridors.

8.4 Objectives and Strategies

The corridors and intersections identified with congestion were subsequently analyzed for potential mitigation strategies. Various unique characteristics pertaining to each corridor were examined in relation to the potential strategies to reduce congestion. The following list describes the mitigation treatments considered for each corridor and intersection, along with typical improvement strategies, in the order in which they would be considered for application:

1. Level 1) Decrease need for trip making (strategies at regional level versus corridor level)

- Land use policies and regulations to limit growth in areas with limited infrastructure
- Land use policies and regulations to enhance jobs to housing balance along corridors and within sections of the region

2. Level 2) Shift trips from automobiles to other modes

- Public transit capital improvements (exclusive right-of-way, commuter express, circulator, park and ride)
- Public transit operational improvements (service enhancements, queue jumpers, information systems)
- Encourage the use of non-motorized modes (sidewalks, bicycle facilities, transit park and ride)

3. Level 3) Increase HOV use

- Parking management/fee adjustment
- Vanpooling programs
- Ride share matching services

4. Level 4) Enhance operations on existing roadway facilities

- Traffic operations improvements (intersection widening, signal coordination, traffic surveillance and control systems)
- Incident Management (detection and clearing of incidents)
- Access management (medians, signal and driveway spacing, frontage roads, interparcel connections)

5. Level 5) Increase roadway capacity through additional infrastructure Arterial roadway capacity (widening and new roads)