2005

CONGESTION MANAGEMENT SYSTEM PLAN UPDATE

COLUMBUS-PHENIX CITY METROPOLITAN PLANNING ORGANIZATION

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INTRODUCTION

STUDY OBJECTIVES

In Spring 2003, Wilbur Smith Associates were hired to prepare a Congestion Management System (CMS) Plan for the Columbus-Phenix City Metropolitan Organization (CPCMPO); *Figure 1-1* depicts the CPCMPO planning area.

The primary purpose of the Congestion Management System (CMS) Plan is to rate the performance of transportation facilities in the Columbus area and to recommend low-cost, short-term strategies to alleviate congestion. The Columbus-Phenix City MPO Congestion Management System Plan will identify the overall level of congestion in the region, based on congestion and mobility measures, as well as other data sources, and will focus on potential improvement projects in the most congested areas.

As laid down in the previous CMS plan a continuous system monitoring should occur on all "regionally significant" roadway and transit facilities, with data collected continuously to identify the location and extent of congestion on these facilities. This study is an update to the previous CMS plan, which was undertaken by the CPCMPO staff.

STUDY TASKS

Activities undertaken during the development of the Congestion Management System Study are broken down into eight tasks, as follows:

1. Identify New Congested Corridors
2. Define Congestion Mitigation Strategies
3. Development of Congestion Related Performance Measures
4. Data Collection and Monitoring
5. Summary of Findings and Recommendations.

STUDY SCHEDULE

Columbus-Phenix City MPO Congestion Management System Plan Study was conducted in Fall 2004 (September and October months). As a continuous process, this study will be conducted twice a year in Fall and Spring. Currently, the Spring 2005 study is underway and the final report for the year 2005 will be published in early 2006, which will include both the Spring 2005 and Fall 2005 information.

Figure1-1 – Columbus Consolidated Government Study Area

BACKGROUND

Columbus, Georgia was founded in 1828 on the fall line of the Chattahoochee River, along the western-most border of the State of Georgia. Initially a mill town, Columbus was home to many cotton cloth mills that utilized the river to transport goods from Columbus to the Gulf of Mexico. During World War I, Columbus was home to the School of Musketry, which later became Fort Benning. As the industrial age diminished, Columbus started to attract service and technology jobs. Today, Columbus is home to many insurance, bankcard processing, and medical jobs. With a strong local economy, and abundant cultural and entertainment resources Columbus is a desirable place to live, work and raise families.

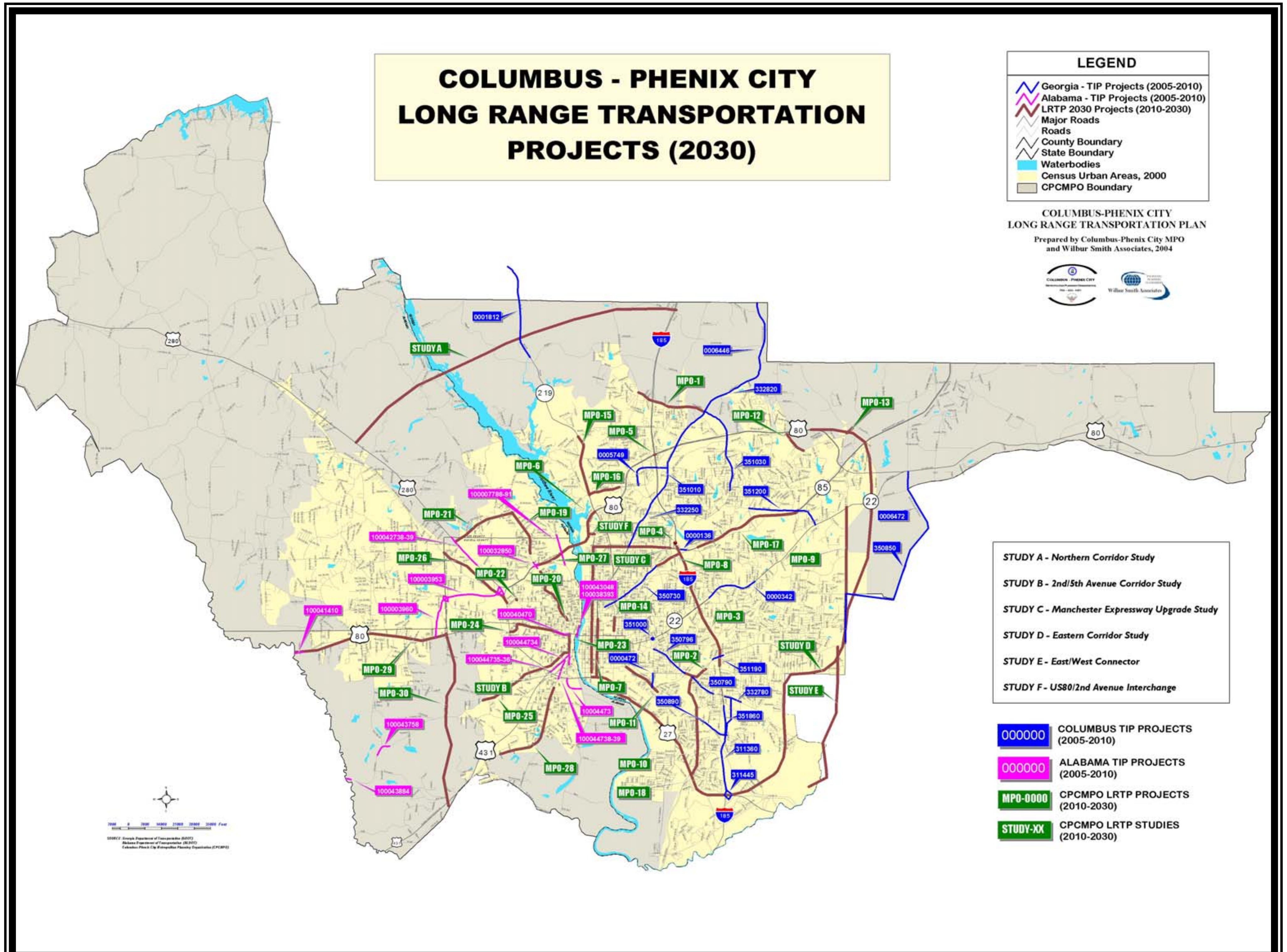
The Columbus-Phenix City Metropolitan Planning Organization (MPO) for the Columbus-Phenix City area is Bi-State organization, where the Georgia MPO participants include: Columbus and Ft. Benning and the Alabama participants include: Phenix City, and Lee and Russell Counties. Annually, the MPO prepares the Unified Work Program (UPWP), which identifies all transportation planning activities agreed upon to be performed by the MPO participants and funded by Federal Grants and State Contracts. The mission of the MPO is to facilitate multi-modal transportation planning and infrastructure improvements in a coordinated, comprehensive and continuous manner for the Columbus- Phenix City Metropolitan Area.

CURRENT IMPROVEMENT PROJECTS

The Columbus-Phenix City Metropolitan Planning Organization maintains a work program developed in accordance with Federal and State planning guidelines. This document, known as the Transportation Improvement Program (TIP), details the use of Federal, State and local dollars on transportation projects in the Metropolitan Planning Organization (MPO) study area. The TIP is a subset of the Long-Range Transportation Plan (LRTP), a planning document that investigates the transportation needs of the Columbus area and develops a plan to address those needs. The development of long-range transportation plan must be accomplished utilizing a comprehensive, cooperative and continuing process.

A Congestion Management System is a decision support tool in the development of the LRTP. The Congestion Management System is especially helpful in identifying transportation deficiencies, transportation needs and priorities related to congestion within the MPO planning boundaries. Figure 1-2 depicts the locations of projects in the Columbus-Phenix City MPO area currently in progress or in the programming process.

Figure1-2 – Long Range Transportation Plan Projects (2030)



CHAPTER 2
CONGESTION MANAGEMENT SYSTEM

OVERALL INTENT

The intent of the Congestion Management System is to protect the region's investment in, and improve the effectiveness of, the existing and future transportation networks. This is achieved by using the Congestion Management System to provide decision-makers with information about transportation system performance and alternative strategies to reduce congestion, and enhance the mobility of persons and goods. Recommendations on strategies considered most appropriate for congested locations in the Area will be developed during later tasks in the Study.

WHAT IS A CONGESTION MANAGEMENT SYSTEM PLAN?

A Congestion Management System is a continuous cycle of transportation planning activities designed to provide decision-makers with better information about transportation system performance and the effectiveness of alternative strategies to deal with congestion. A Congestion Management System may be considered as consisting of four main components:

- Measurement and identification of congestion;
- A matrix of congestion mitigation strategies;
- Monitoring of effectiveness after implementation; and
- An orderly evaluation process.

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) requires that congestion relief be considered in the selection of transportation improvement projects, and that all urbanized areas with populations in excess of 200,000 (termed Transportation Management Areas [TMAs]) develop and implement a Congestion Management System. As shown in *Figure 2-1* the components of Congestion Management System form a continuous cycle of transportation planning activities. By monitoring the effectiveness of congestion mitigation strategies and evaluating their benefits in an orderly, consistent manner, planners and decision-makers can improve their ability, over time, to select the most cost-effective strategies appropriate to their specific local conditions and needs.

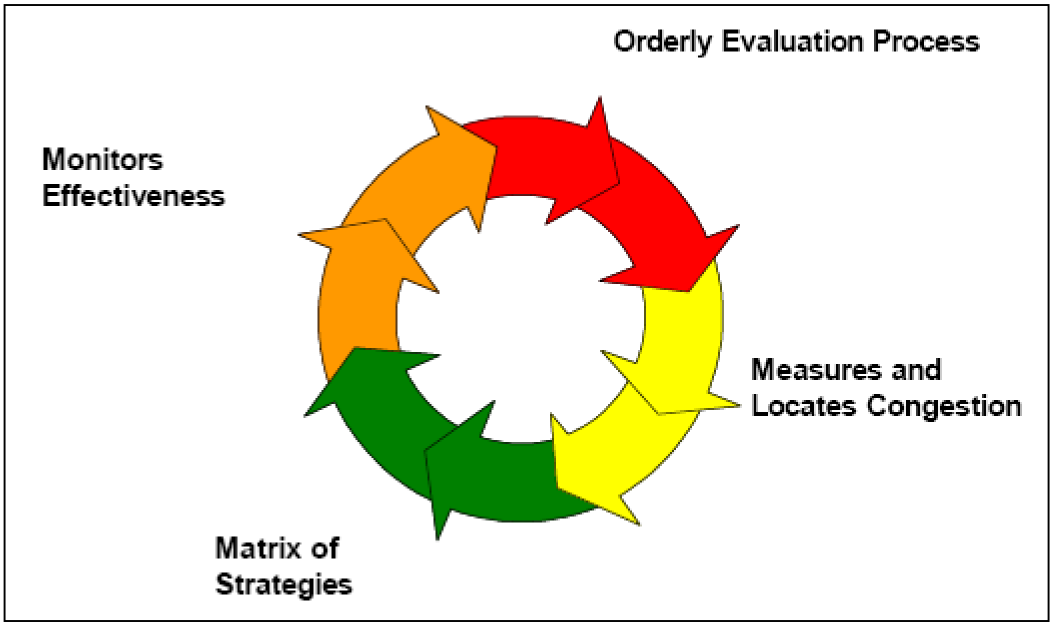


Figure 2-1
Congestion Management System: A Cyclical Process

The Federal Highway Administration has issued guidelines on what constitutes a fully operational Congestion Management System.[1] The guidelines are summarized under the following steps:

- System Monitoring and Identification of Congested Locations;
- Performance Measure Development;
- Identification of Congestion Causes;
- Identification and Ranking of Mitigation Strategies;
- Implementation of Strategies; and
- Monitoring of Effectiveness.

SYSTEM MONITORING

With respect to congestion management planning, system monitoring is an all-inclusive term meant to encompass all the various activities that transportation planners engage in to collect data relevant to transportation system performance. System monitoring should occur on all "regionally significant" roadway and transit facilities, with data collected continuously to identify the location and extent of congestion on these facilities. With respect to roadways, this would include facilities classified as arterial

[1] 23 CFR 500.109(b).

or higher. System monitoring activities typically incorporate one or more of the following:

- *Floating Car Travel Time / Delay Collection:* This method of data collection involves recording the time and position of a vehicle "floating" within the traffic stream at control points along a roadway facility. The speed / time / delay data may be obtained via a tape recorder or stopwatch. However, maximum flexibility in data reduction and presentation can be achieved by using proven Global Positioning System (GPS) technology to simultaneously record and store the time and position of the floating vehicle at intervals of up to 1/10 second. This method of data collection is currently used for Columbus-Phenix City MPO Congestion Management System planning activities.

- *Traffic Count Collection / Analysis:* Traffic count data may be used from statewide, regional or countywide count programs, if available, to monitor roadway system performance. Often, travel time / delay runs will highlight segments along a route, or at an intersection, where traffic counts may need to be collected. These "as-needed" counts are an important component of the system monitoring process.

Time / delay runs and traffic counts serve as integral inputs to the third mechanism to monitor system performance:

- *Regional Travel Demand Model:* The regional travel demand model can serve a twofold purpose with respect to monitoring system performance. First, it provides a method of determining speed and volume values on facilities not directly observed under either of the system monitoring processes described above. Second, it allows for the forecasting of future traffic congestion along broadly defined roadway corridors or activity center areas.

PERFORMANCE MEASURES

Performance measures (and associated threshold values) are used to identify congested conditions at individual locations, or within corridors and activity centers. These adopted measures are the primary means by which congestion information is communicated among transportation professionals and the general public. Therefore, care must be taken in the selection, organization and presentation of these measures so that they are:

- Clearly understood;
- Sensitive to all travel modes;
- Sensitive to time;
- Supported by data that are neither costly nor difficult to collect;
- Supported by data that may be forecast into the future and
- Able to measure the effects of strategies meant to mitigate congestion.

FHWA also suggests that selected performance measures be categorized as follows:

- Those that measure congestion (facility-based measures, such as V/C ratios);
- Those that measure mobility (travel time-based measures);
- Those that measure accessibility (activity-based measures, such as the number of jobs within 35 minutes of a particular facility, or within ½ mile of a transit stop);
- Those that measure system efficiency (measures that provide an overall assessment of system wide performance, such as the number of congested lane-miles, or VMT under congested conditions).

CAUSES OF CONGESTION

The causes of congestion at problem locations and within problem corridors or activity centers are identified. Sometimes the cause of congestion is not readily apparent from the collection and analysis of system performance data. In such cases, field visits to the congested site are necessary to make the determination.

MITIGATION STRATEGIES

Mitigation Strategies are identified through an evaluation process that addresses the identified cause of congestion at a particular location or area, giving the least priority to strategies that add single-occupant vehicle (SOV) capacity. The highest-ranking strategies that address congestion at a particular location are then incorporated within the TIP development process.

MONITORING OF EFFECTIVENESS

Finally, implemented strategies are then monitored for their effectiveness as part of ongoing system monitoring (transportation system performance data collection) activities.

CHAPTER 3
CONGESTION MITIGATION STRATEGIES

INTRODUCTION

A key task in the development of a Congestion Management System is the identification and structuring of congestion mitigation strategies in a fashion that is easily understood by not only technical staff, but also the general public. This chapter provides a focused discussion of those strategies thought most applicable to the congestion problems identified in the Columbus-Phenix City MPO area during the course of this study.

STRATEGY CLASSES

Strategy classes represent broad groupings of individual strategies and improvement measures. The strategies in this discussion have been broken into the following twelve classes, as identified in the Federal Congestion Management System Final Rule[2] for the Congestion Management System:

1. Transportation demand management (TDM) measures
2. Traffic operations improvements
3. Measures to encourage high occupancy vehicle (HOV) use
4. Public transit capital improvements
5. Public transit operational improvements
6. Measures to encourage the use of non-motorized modes
7. Congestion pricing
8. Growth management
9. Access management
10. Incident management
11. Intelligent Transportation Systems (ITS)
12. General purpose capacity expansion

For each strategy class, groups of distinct strategies have been identified, as well as representative measures of effectiveness (MOEs) to assess the pre- or post-implementation effectiveness of a given strategy group. It is important to note that Congestion Management System guidelines do not specify that all possible strategies be analyzed for every location of congestion. Only those that could potentially mitigate congestion at the given location in a reasonable manner should be analyzed.

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[2] 23 CFR 500.109(b)(4)

Strategy classes, groups and representative strategies are summarized in Table 3-1. For each broad class, strategy groups within it are described.

Table 3-1
Congestion Mitigation Strategy Classes and Groups

STRATEGY CLASS	STRATEGY GROUP	REPRESENTATIVE STRATEGIES
1. Transportation Demand Management	A. Ride sharing programs	Ride share matching, Marketing and promotion, Vanpool Operations.
	B. Alternative Work Arrangements	Telecommuting, Flextime or compressed workweeks, Staggered work hours.
	C. Transit/Carpool Incentives	Employer-paid transit passes, Subsidized vanpool service, Carpool/Vanpool parking discounts.
	D. Parking Management	Preferred carpool/vanpool parking, Carpool/Vanpool parking discounts, Increased parking fees.
	E. Guaranteed Ride Home (GRH) Programs	
2. Traffic Operational Improvements	1. Traffic Signal Improvements	Signal retiming, Coordinated systems, Demand responsive systems
	2. Roadway Geometry Improvements	Turn lanes, Channelization, Accel/Decel lanes, Bus turnouts, Lane widening, One-way couplets, Grade separation.
	3. Time-of-Day Restrictions	Turning restrictions, Parking restrictions, Truck restrictions
	4. Ramp Metering	Localized ramp metering, Coordinated ramp metering, Demand responsive metering, HOV bypass metering.
	5. Commercial Vehicle Improvements	Commerical vehicle facilities, Intermodal facilities, Geometric improvements, Truck routes.
	6. Construction Management	Management plans, Detours signing, Advance information

Table 3-1
Congestion Mitigation Strategy Classes and Groups (Cont'd…)

STRATEGY CLASS	STRATEGY GROUP	REPRESENTATIVE STRATEGIES
3. HOV Measures	A. HOV Priority Systems	HOV priority lane, HOV ramp bypass, HOV ramps, Transit signal priority
	B. HOV Support Services	Park-n-Ride facilities, HOV toll savings
4. Transit Capital Improvements	A. Exclusive Right-Of-Way Facilities	Commuter rail rapid transit, Light rail busways, Bus lanes, Bus bypass ramps
	B. Fleet Improvements	Fleet expansion, Vehicle replacement/upgrades, Transit vehicle management systems, Vehicle type changes.
	C. Transit Support Facilities	Park-n-Ride facilities, Transit centers, Improved stations/stop facilities
5. Transit Operational Improvements	A. Transit Service Improvements	Increased frequency, Add stops, Modify operating hours, Express routes, Route modification, Route expansion.
	B. Transit Marketing/Information	Marketing programs, Agency coordination, Transit information systems
	C. Fare Incentives	Fare reductions, Fare packages.
	D. Traffic Operations for Transit	Traffic signal priority, Signal coordination, Bus turnouts, Railroad crossing coordination
6. Non-Motorized Modes	A. Bike/Ped Infrastructure Improvements	Bike lanes, Bike/ped paths, Bike route marking, Sidewalks
	B. Bike/Ped Support Services	Bike rack/lockers, Transit vehicle bike carriers, Employer showers, Bike/ped planning, Bike maps
7. Congestion Pricing	A. Road User Fees	Increased tolls, Time of Day pricing, HOV facility fees.
	B. Parking Fees	Surcharges, Time of Day pricing.

Table 3-1
Congestion Mitigation Strategy Classes and Groups (Cont'd…)

STRATEGY CLASS	STRATEGY GROUP	REPRESENTATIVE STRATEGIES
8. Growth Management	A. Compact Development	Density Standards
	B. Redevelopment/Plan	Site reclamation/reuse, Incentives to develop in areas with existing infrastructure
	C. Mixed Use Development	Zoning regulations
	D. Jobs/Housing Balance	Zoning regulations
	E. Transit-Oriented Development	Density standards, Bicycle/pedestrian access, Design requirements
	F. Corridor Land use & Transportation Cood.	Intergovernmental agreements
G. Access Management	A. Driveway Management	Policies & standards, Sidestreet/alley access, Shared access/common driveways
	B. Median Management	Policies & standards, Establishing medians, Bi-directional turn lanes
	C. Frontage Roads	
H. Incident Management	A. Incident Detection	Emergency traffic patrols, Emergency monitoring, Roadway detectors/surveillance
	B. Incident Response	Emergency vehicle priority, Emergency traffic patrols, Communication systems/protocol
	C. Incident Clearance	Emergency response teams, Service patrols
	D. Incident Inforamtion/Routing	Highway advisory radio, Alternative route planning, Variable message signs.
I. Intelligent Transportation System	A. Advance Traffic Management Systems	Freeway management, Traffic signal control, Emergency management, Electronic toll
	B. Advance Traveler Information Systems	Multi-modal regional traveler information
	C. Advance Public Transportation Systems	Vehicle management systems, Automated vehicle location systems, Electronic fare payment
	D. Commercial Vehicle Control Systems	Weigh-in-motion system, Electronic credential checking

Table 3-1
Congestion Mitigation Strategy Classes and Groups (Cont'd...)

STRATEGY CLASS	STRATEGY GROUP	REPRESENTATIVE STRATEGIES
	E. Advance Vehicle Control Systems	Collision avoidance system, Vehicle guidance system
J. General Purpose Capacity Expansion	A. Expressway Lanes	Add lane to existing facilities, Construct new facilities.
	B. Arterial Lanes	

Source: *Congestion Management System Plan for the Columbus Area Transportation System, 2004, Wilbur Smith Associates.*

Note: Expanded explanation of this Congestion Mitigation Strategy Classes and Groups is provided in Appendix B.

CHAPTER 4
PERFORMANCE MEASURES

INTRODUCTION

Performance measures provide the basis for evaluating transportation system operating conditions and for identifying the location and severity of congestion. Performance measures typically used in a Congestion Management System Plan development are discussed in detail. The Chapter concludes with a discussion of measures appropriate to the current Columbus-Phenix City MPO Congestion Management System Plan.

TYPICAL MOES FOR CONGESTION MANAGEMENT SYSTEM

As noted in the previous chapter, Measures of Effectiveness (MOEs) typically considered in Congestion Management System plans include:

- Travel Time Measures (Vehicle Hours Traveled by Mode, Delay and Speed);
- Volume-to-Capacity Ratios;
- Annual Traffic Counts;
- Intersection Level of Service;
- Percentage of Households and Employment within "X" miles of a Bus Route;
- Percentage of Households and Employment within "X" miles of an Interchange;
- Transit System Measures (Ridership, Reserve Capacity, etc.);
- Vehicle Occupancy; and
- Incident Measures.

Of these MOEs, Travel Time Measures are often used as the primary MOE for use in Congestion Management System Plan development. Volume-to-Capacity Ratios are also often used as a secondary MOE. MOEs are frequently selected based upon consideration of the following factors:

- Availability of data from existing sources;
- Ease of data collection and processing;
- Applicability of those measures in quantifying system performance; and
- Ability of the performance measure to help forecast future system deficiencies.

The following pages go on to describe the various measures used in the development of the current study.

DESCRIPTIONS OF CONGESTION MANAGEMENT SYSTEM PERFORMANCE MEASURES

CONGESTION MEASURES

Volume-to-Capacity (V/C) Ratio [3]

Due to the wide availability of volume and capacity figures, as well as the straightforward nature of the measure, Volume-to-Capacity (V/C) ratios are widely used as general measures of congestion in transportation planning. The Transportation Research Board's (TRB's) Highway Capacity Manual (HCM) has established relationships between V/C ratio and traffic operation, and is a standard guide in the field.

V/C ratios are typically available from regional travel demand models and/or traffic count program, and may be analyzed at the link and corridor levels of analysis.

Travel Time and Travel Speed [4]

Travel time and travel speed are closely related measures that can be used to illustrate the reduction in mobility people experience during congestion. Travel time and speed experienced under congested conditions can be compared to those found in free flow operating conditions to assess the magnitude of congestion. The speed reduction index is an example of using travel time/speed data in this fashion.

The duration of congestion can also be determined by measuring the reduced travel speeds over a period of time. Travel time and speed are relatively easily obtained from model forecast data, and may also be directly observed through "floating car" travel time runs. Some surveillance detectors (occupancy loop or video detection), or signal control detectors can also provide speed data. This data may be summarized at any analysis level desired: link, corridor or region-wide.

[3] Secondary measure selected for the Columbus Area Congestion Management System

[4] Primary measure selected for the Columbus Area Congestion Management System

SYSTEM EFFICIENCY MEASURES

Vehicle Miles Traveled (VMT) / VMT under Congested Conditions

Vehicle miles traveled is defined as the number of miles traveled by a vehicle in each trip and is a direct output of regional travel demand models. VMT can be reported for a link, corridor, major activity center or region wide. VMT is a good indicator of travel demand, as well as air quality emissions. VMT projections readily allow for comparisons between various alternatives of a given scenario, and can also report the frequency of travel between two defined areas. While VMT can report travel by different modes, the measure cannot be used to make comparisons between various modes. As a measure of performance, VMT is best used when:

- Comparing similar links, corridors, and areas;
- Comparing system scenarios in different planning years; and
- Evaluating highway-related project alternatives.

INCIDENT (NON-RECURRING CONGESTION) MEASURES[5]

- Accident Location and Frequency
- Incident-Related Delay
- Incident Duration

Incident measures differ from the other performance measures, which all attempt to measure recurring congestion. An attempt should be made to measure incident congestion, which accounts for much of the congestion experienced in Columbus. Due to the nature of incidents (which include accidents or special events), this information is very difficult to obtain in a systematic way.

CHAPTER 5
DATA COLLECTION

INTRODUCTION

This chapter describes the data collection activities undertaken for the Columbus-Phenix City MPO Congestion Management System study. It covers new data collected by the study team, such as travel time surveys, the use of existing data and other data such as additional traffic counts, obtained from other government agencies. The processing of these data and the generation of Measures of Effectiveness (MOEs) are also described.

TRAVEL TIME SURVEYS

Travel Time Surveys were conducted along arterial routes throughout the Columbus-Phenix City Metropolitan area. Surveyed routes were determined in joint consultation with the Columbus-Phenix City MPO and the consultant. The surveys were conducted between September and November 2004.

Objectives

The purpose of the surveys was to measure travel speed during the peak travel periods, namely the AM peak period (approximately 6:30am to 8:30am), off peak period (10am to 3pm) and the PM peak period (approximately 4:30pm to 6:30pm). Delays caused by traffic signals or other traffic conditions were also recorded.

The travel time surveys were designated to provide MOEs that measure both congestion levels, such as delays and speed reduction ratios, and mobility, such as travel times.

Routes Surveyed

Travel Time Surveys were conducted along a total of 20 routes, as shown in Table 5-1. MPO Staff members identified the critical time of day and conducted surveys in both directions along each route. The 20 routes covered a total of 135 miles of roadway, 9 of which are major arterials in the Columbus-Phenix City Metropolitan area. Individual routes ranged in length from 1.65 miles to 14.45 miles. In total, 270 miles of roadway were surveyed (both directions) during the 8-week period of data collection.

Table 5-1
Columbus Congestion Management System – Data Collection

No.	Road Segement	Beginning Location	Ending Location	Road Length (Miles)
1	2nd Avenue	4th Street	Manchester Expwy.	3.71
2	54th Street – Airport Thruway	River Road	US 27	6.15
3	Buena Vista Road	13th Street	Schatulga Rd	7.11
4	Forest Road	Macon Rd	Schatulga Rd	4.22
5	Lee – Summerville Road	5th Street	US 280	10.91
6	Macon Road	10th Ave	US 80	9.72
7	Manchester Expressway	2nd Ave	Miller Rd	6.86
8	Saint Mary's Road	Buena Vista	Moye Rd	3.54
9	US 280	Veterans Pkwy.	Lee Rd	8.62
10	US 80 – 13th Street	Macon Rd	SR 169	14.45
11	US 80 – J. R. Allen Parkway	US 280	Moon Rd	8.01
12	Veterans Parkway	4th Street	Almond Rd	12.13
13	Victory Drive	Veterans Pkwy	Custer Rd	6.50
14	Warm Springs Road	Veterans Pkwy	County Line Rd	11.42
15	Whitesville Road	54th Street	Williams Rd	3.77
16	Williams Road – Moon Road	Miller Rd	Whitesville Rd	4.71
17	River Road	Veterans Pkwy	Double Churches Rd	4.48
18	Double Churches Rd	River Rd	Fortson Rd	2.98
19	Fort-Benning/Brennan Rd	Torch Hill Rd	Buena Vista Rd	3.30
20	Bradley Park Drive	River Rd	Whitesville Rd	1.65

Source: *CPCMPO*

METHODOLOGY

Travel time and speed data was collected via Global Positioning System (GPS) technology, in conjunction with TS/PP Draft, a transportation planning software which can read the current position and speed of the vehicle. This information is used to record trip logs and generate comparative travel time and delay reports.

The survey vehicles, standard passenger cars, were operated by CPCMPO staff members. During peak data collection weeks, two cars were in operation. The driver used the floating car technique to ensure the vehicle traveled at a speed representative of the typical vehicle for that time of day and specific route travel.

A GPS unit was attached to a computer and set up in the vehicle to record GPS current location and travel speed. Some of the recorded data included:

- GPS location of a predetermined checkpoint along the route, such as a signalized intersection;
- Distance from one segment on the route to the next (segments divided by checkpoints);
- Stopped time at a signalized or sign controlled intersection; and
- Delay along each segment, based on user-specified parameters (segment distance and free flow speed)

A GPS card within the laptop computer used signals from a series of earth-orbiting satellites to continuously monitor the location of the survey vehicle. For each run, a file of GPS data was created with both spatial and temporal information, including the location and time of each of the recorded events.

DATA PROCESSING

GPS data files were processed and imported into Excel® spreadsheets. The predetermined checkpoints along the route were used to divide each route into manageable segments. The number of segments on a particular route varied from 3 (Williams Road) to 21 (Veteran's Parkway).

Based upon the location of each checkpoint, the survey vehicle's progress along each segment was recorded in terms of travel time along each segment, distance between checkpoints, and delay in travel time from previous node (checkpoint) based on user-specified design speed. These readings are just a few of the data collected by the TP/SS Draft software.

At a minimum, three runs per direction were taken along each route during the AM and PM peak periods, while at least one run per direction was taken during the off peak period. From this data, the average speed of travel along each segment and for the whole route was calculated. Travel delay times were also computed from the free flow speed, distance between segments and the average segment travel speed.

CONGESTION CATEGORIES

Each section on the route was assigned one of five congestion categories. The principal criterion used was the percentage of free flow speed observed during the travel time survey. This percentage was calculated as:

$$\text{Percentage of free flow speed (FFS)} = \frac{\text{Observed speed}}{\text{Free-flow speed}}$$

The free-flow speed was taken to be the speed limit on that segment of the route. The levels of congestion were described as follows:

Serious - percent FFS < 40%	OK - percent FFS ≥ 65% and < 80%
Congested - percent FFS ≥ 40% and < 50%	Good - percent FFS ≥ 80%
Marginal - percent FFS ≥ 50% and < 65%	

Other factors

(a) Free-flow speeds for the routes in Muscogee County were determined based on data from the road characteristic database provided by the Georgia Department of Transportation (GDOT). Free-flow speeds were assigned as follows:

26 – 35 mph = 30 mph	46 – 55 mph = 50 mph
36 – 45 mph = 40 mph	56 – 65 mph = 60 mph

(b) Free-flow speeds for routes in Lee and Russell Counties were based on the posted speed limits, using the same speed intervals noted above.

Sample Results

Table 5-2 shows sample results from the travel time surveys. The results of the PM peak period speed runs along Manchester Expressway are shown. The route surveyed begins on the west at 2nd Avenue and runs 6.86 miles to the Miller Road exit. Starting from 2nd Avenue heading eastward:

- the segment is 0.46 miles in length.
- the free-flow speed (Free Flow) is 40 mph.
- free-flow time (FF Time) is 0.70 minutes.

Table 5-2
Manchester Expressway (PM peak period)

				PM Peak Period					
				Eastbound			Westbound		
	Distance (miles)	Free Flow (mph)	FF Time (min)	Speed (mph)	Delay (sec)	Congestion	Speed (mph)	Delay (sec)	Congestion
2nd Ave.									
River Road	0.47	40	0.71	41.60	-1.63	Good	20.17	282.26	Marginal
Veterans Pkwy	0.51	40	0.77	21.00	41.53	Marginal	15.83	158.48	Serious
Woodruff Road	0.62	40	0.93	16.10	82.83	Congested	12.40	48.85	Serious
Armour Road	0.53	40	0.80	16.90	65.20	Congested	28.80	18.55	OK
I-185	0.21	50	0.25	19.30	24.05	Serious	10.40	158.82	Serious
Warm Springs Road	1.02	50	1.22	20.20	108.34	Congested	15.80	70.30	Serious
Miller Road	2.65	50	3.18	20.20	281.48	Congested	42.10	-2.11	Good

The observed speed between 2nd Avenue and River Road is 41.60 mph. The delay is calculated in seconds based on the ratio of distance to observed speed and subtracting it from the free-flow time (converted in seconds). The level of congestion is determined based on the ratio of observed speed to FF speed.

For the segment between 2nd Avenue and River Road, the observed speed of 41.60 mph is 104 percent of the speed limit (40 mph). This section is therefore categorized as "Good". In the eastbound direction, the worst segment is between Armour Road and I-185 ("Serious" level of congestion) and in the westbound direction; the worst segments are between River Road and Woodruff Road and between Armour Road and Warm Springs Road ("Serious" levels of congestion).

Figure 5-1 presents the results of the travel time data collection activities. Detailed calculations by corridor and segment can be found in Appendix A.

TRAFFIC COUNTS

Traffic count data was obtained from Columbus Consolidated Government, GDOT and ALDOT. Figure 5-2 illustrates the free-flow speeds along the survey routes. Figure 5-3 shows the estimated 2004 AADT values at these locations.

The actual level of service or degree of congestion experienced on a particular roadway is dependent upon many more variables than the number of lanes and functional class. These variables include signal timing and coordination, proportion of turning vehicles, frequency of driveways and median cuts, directional distributions and peak-hour factors to mention a few. The impact of these factors is reflected in the average travel speeds measured during the travel time surveys. For this reason, the percent reduction in free flow speed was selected as the primary MOE for the Columbus Congestion Management System study.

VOLUME / CAPACITY RATIOS

Volumes to Capacity (V/C) ratios were calculated for each of the count stations located on the survey routes. Nominal 24-hour capacities were developed from standard roadway ADT capacities, using the Highway Capacity Manual[5] as a guide. These capacities are comparable to those used in many transportation-planning models for urban areas. The two-way capacities that were utilized for this analysis are shown in Tables 5-3 and 5-4. These capacities are a function of the roadway's Functional Classification and number of lanes.

[5] 2000 Highway Capacity Manual, Special Report 209, Transportation Research Board, National Research Council, Washington, DC.

Figure5-1 – Peak Hour Congestion Levels

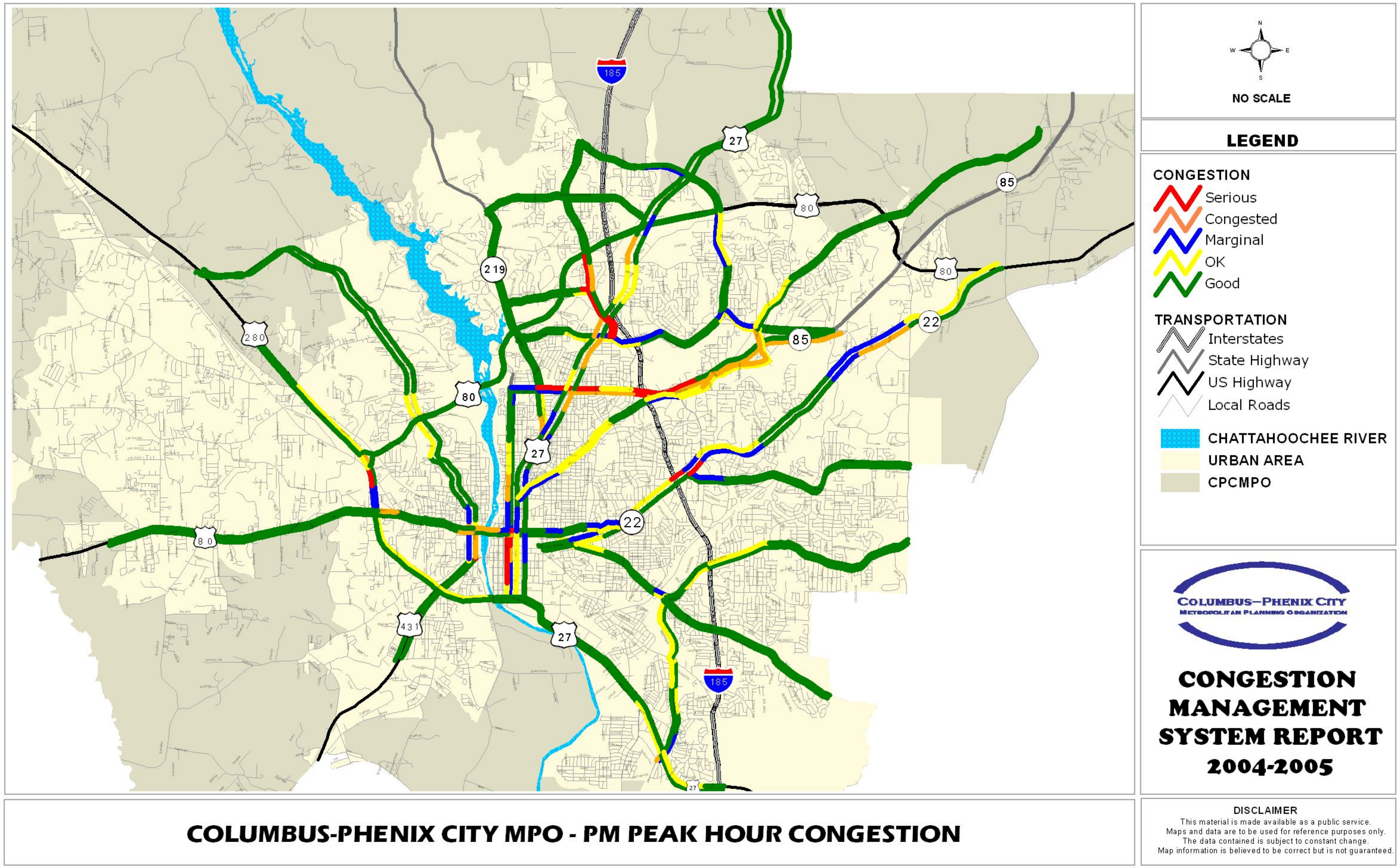


Figure 5-2 – Annual Average Daily Traffic (2004)

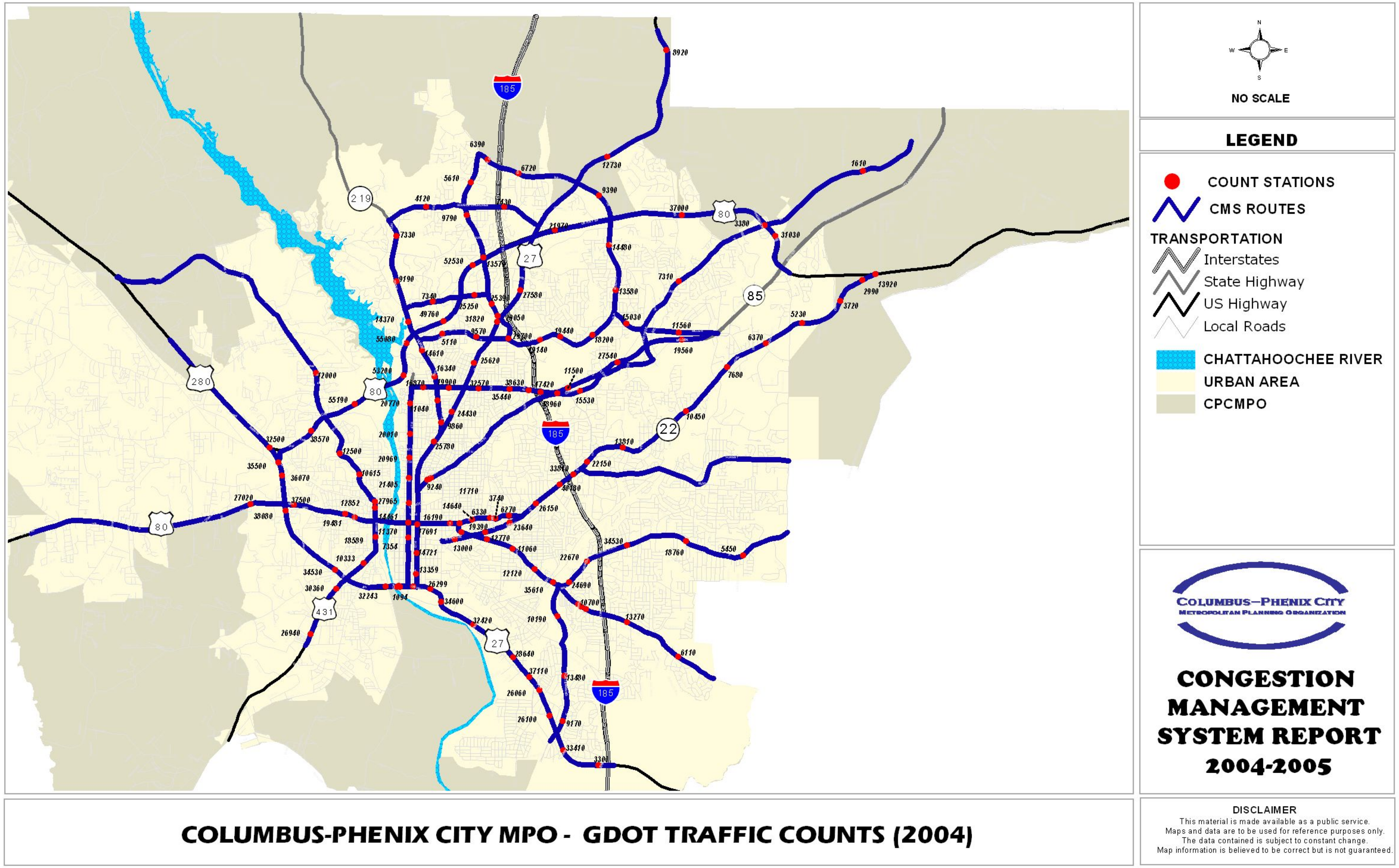


Table 5-3
Multilane Highway Capacities
(Adapted from Table 21-2 of HCM)

FFS	Capacity / lane	4 LD	6 LD
60+ mph	2200	8800	13200
55 mph	2100	8400	12600
50 mph	2000	8000	12000
45 mph	1900	7600	11400

Table 5-4
Divided & Undivided Roadway Capacities
(Adapted from Chapter 20 of HCM)

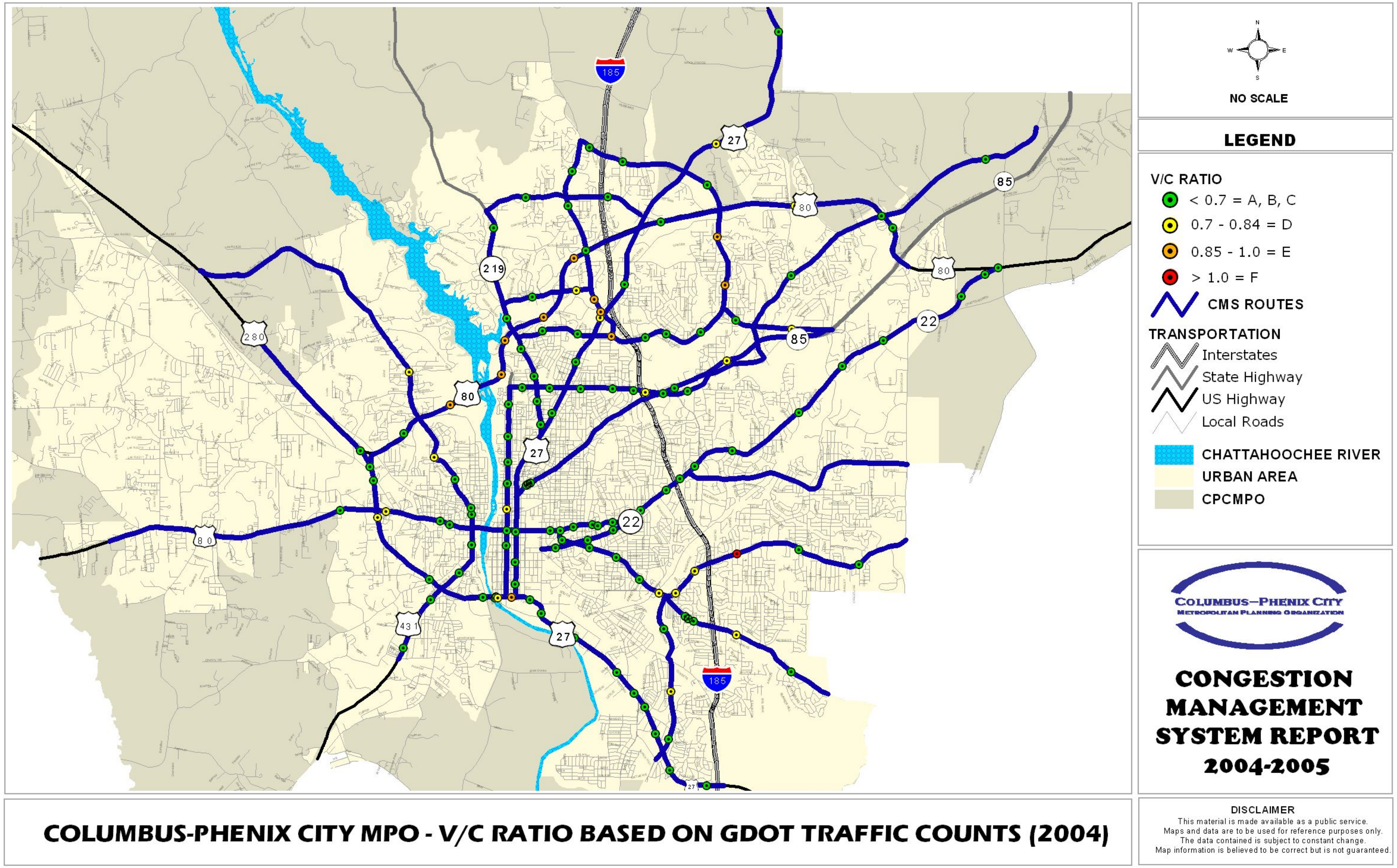
		Undivided roadways				Divided roadways	
FFS	Capacity / lane	2 LU	3 LU	4 LU	5 LU	4 LD	6 LD
30 mph	1200	2200	2400	4300	4800	4800	6000
35 mph	1300	2400	2600	4700	5200	5200	6500
40 mph	1400	2600	2800	5100	5600	5600	7000
45mph	1500	2800	3000	5500	6000	6000	7500
50 mph	1600	3000	3200	5900	6400	6400	8000
55 mph	1700	3200	3400	6300	6800	6800	8500

V/C ratios have been estimated as a secondary MOE to assist in prioritizing improvements at locations found to be congested based on reductions in free flow speeds. Within a group of locations with similar levels of congestion and causes, those with higher V/C ratios should be tackled first.

An additional reason for selecting V/C ratios as a secondary MOE is that it may easily be projected to future years. The traffic volume and corresponding capacities may be run for future year conditions to identify locations with high or rapidly increasing V/C ratios. This information, combined with existing travel time survey results can be used to identify locations where improvements will be required in the future or where more frequent monitoring of congestion is warranted.

V/C estimates, based on the capacities shown in the tables above are shown in Figure 5-4. As noted above, V/C ratios are not necessarily a precise indication of congestion, but it is instructive to review those locations with V/C > 0.7

Figure5-3 – Volume to Capacity Ratio's (2004)



CHAPTER 6
CONGESTED LOCATIONS IN THE MPO STUDY AREA

INTRODUCTION

The Columbus Consolidated Government with its first Congestion Management Study provided an opportunity to develop a routine system evaluation program to collect performance data at structured congestion management planning.

For this assessment, congested corridors in the Columbus-Phenix City area have been identified through different components. It is important to look at congestion based on different sources of data, such as comparing calculated V/C ratios with data obtained from travel time surveys. The components used in determining the highlighted congested corridors were:

- Travel Time Surveys;
- V/C ratios;
- Average Daily Traffic Volume;
- Top 50 Accident Locations; and
- Meeting with Columbus-Phenix City MPO officials.

In this Chapter, the results of the Travel Time Surveys showing congested locations are listed, together with potential causes of congestion. Mitigation strategies and their associated impact on Congestion Management System performance measures are also noted.

OVERVIEW OF THE RESULTS

Travel Time Surveys were conducted during three different time periods (AM, OFF, and PM Peak). Each segment of the roadway was allotted one of five congestion categories. These categories, in order of increasing congestion are:

- Good
- OK
- Marginal
- Congested
- Serious

As discussed in Chapter 5, the congestion levels were developed based on the ratio of observed travel speed to free flow speed. The following figures show congestion categories for each roadway as well as other details, such as the top 50 accident locations. The buffered areas in Figure 6-5 highlight some select corridor segments based on congestion levels as well as isolated locations, which should be the area of focus for relieving congestion.

- Figure 6-1 – Peak Hour Congestion Levels
- Figure 6-2 – Frequency of Accidents at Locations (1999-2004)
- Figure 6-3 – Top 50 Accident Locations (2004)
- Figure 6-4 – Peak Hour Congestion Levels, Accident Locations & V/C Ratios
- Figure 6-5 – Areas of Focus on Selected Routes

As can be seen from Figure 6-1, the overall level of congestion for the Columbus-Phenix Metro Area can be categorized as OK. Majority of the roadways record a 'Good or OK' level of congestion. However, there are roadway segments, which have levels of congestion listed as 'Serious' or 'Congested'. Some of them, for example, Macon Road, can be attributed to the various construction projects taking place on or around it. During the time the Travel Time Surveys were conducted, Macon Road was under construction from Reese Road to its intersection with Beaver Run Road/US 80.

Other areas that were highlighted include Manchester Expressway, from River Road to Miller Road. Some of the delays along Manchester Expressway can be attributed to the spacing between signalized intersections, coupled with the long queues that are formed during peak travel periods. In addition, 2nd Avenue between 8th and 23rd Street, Whitesville Road between Airport Thruway and US 80, Macon Road between Boxwood Blvd and Forest Road, Veterans Parkway between Airport Thruway and US 80 Ramps, Warm Springs Road between Hilton Avenue and Warm Springs Connector, US 280 at the US 80 ramps are segments with either serious or congested locations.

RESULTS BY ROUTE

The remainder of this Chapter provides a summary of the results of Travel Time Surveys along all 20 routes. All the routes were reviewed for level of congestions, number of accident locations and high V/C ratios. Results are summarized, potential causes of congestion are identified and mitigation strategies and their associated impact on Congestion Management System performance measures are noted. This graphical representation show congestions levels for PM peak period.

Figure 6-1 – Peak Hour Congestion Levels

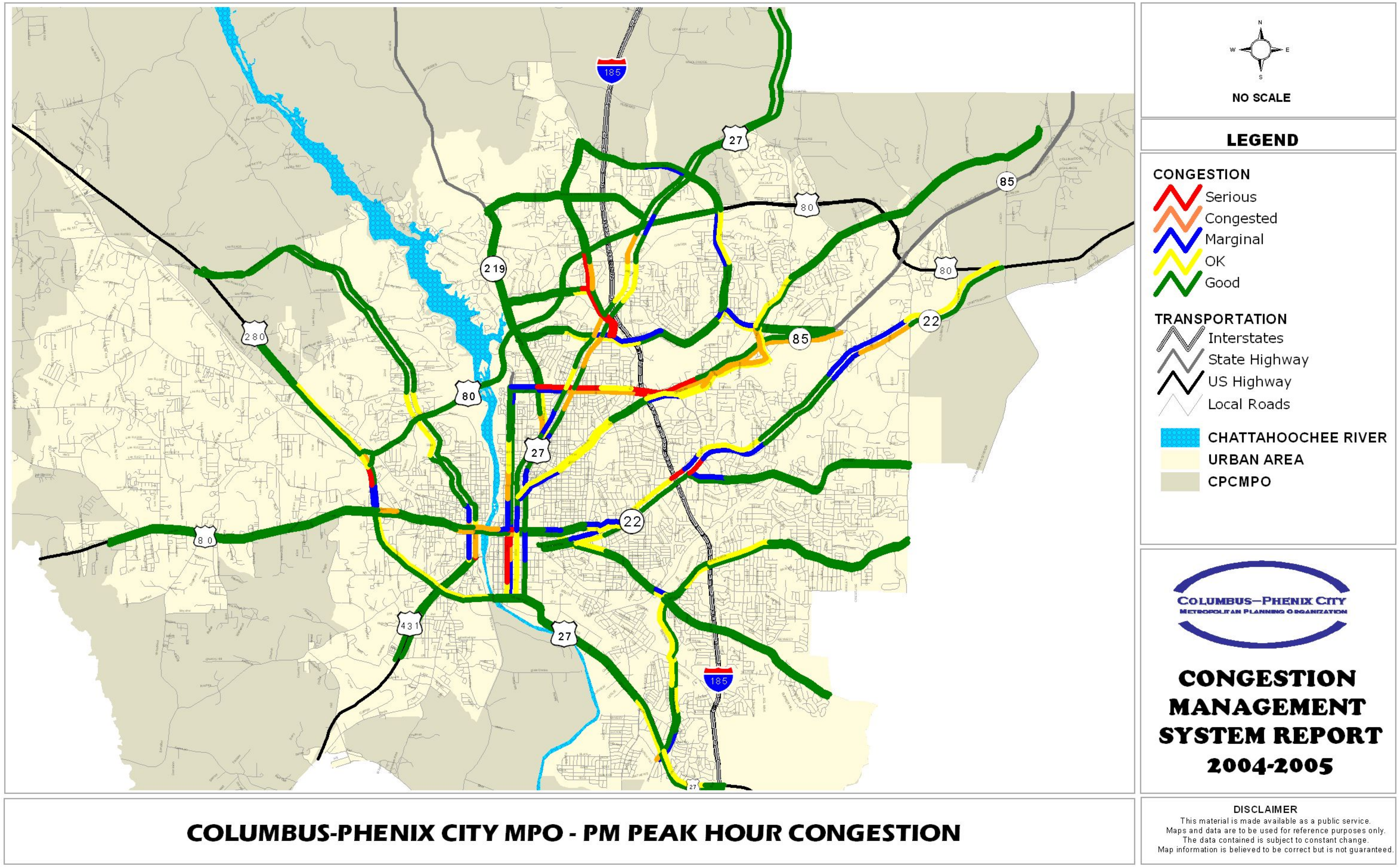


Figure 6-2 – Accident Frequency at Locations in Columbus, Georgia (1999-2004)

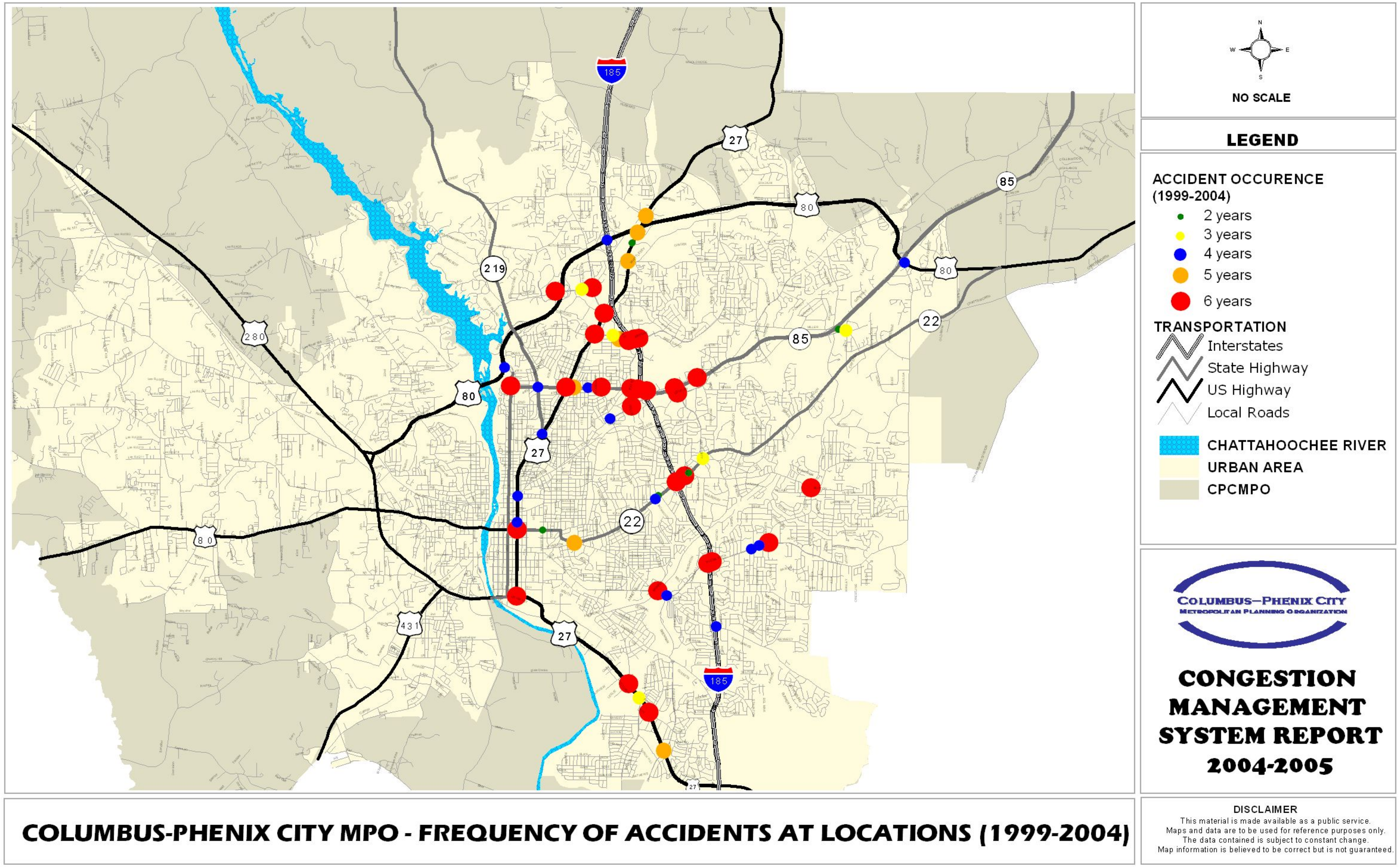


Figure 6-3 – Top 50 Accident Locations in Columbus, Georgia (2004)

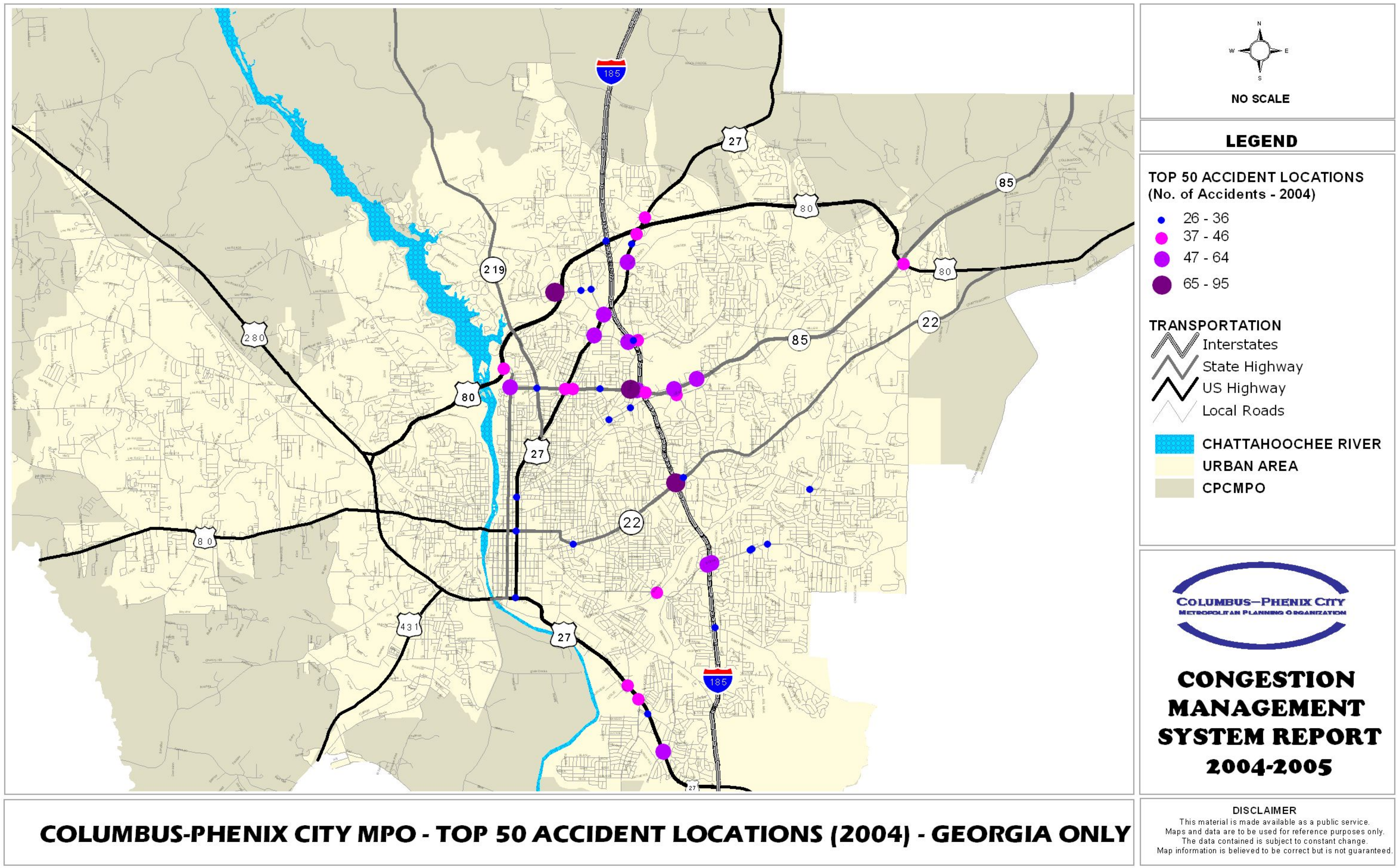


Figure 6-4 – Peak Congestion, Volume to Capacity, and Accident Locations

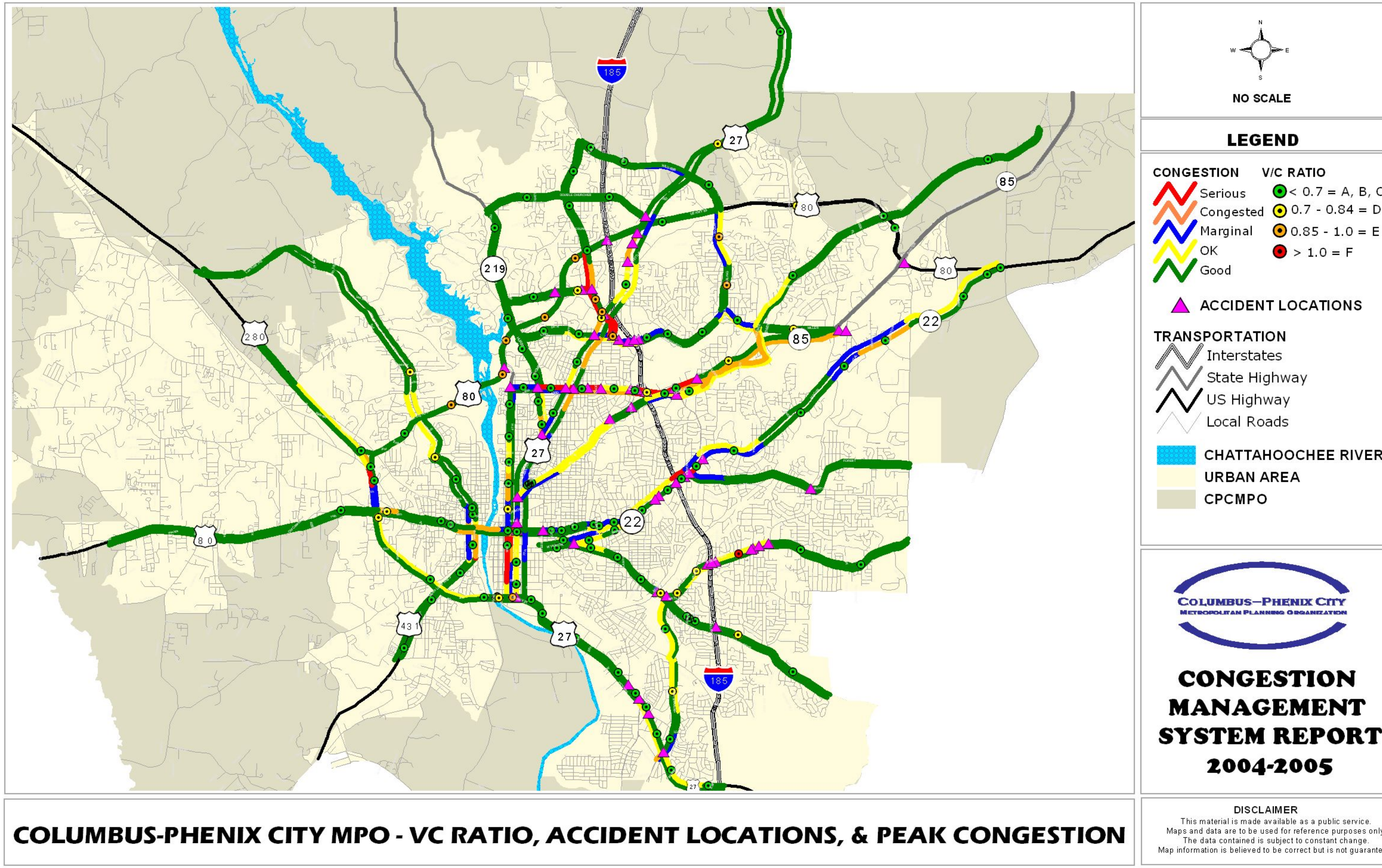
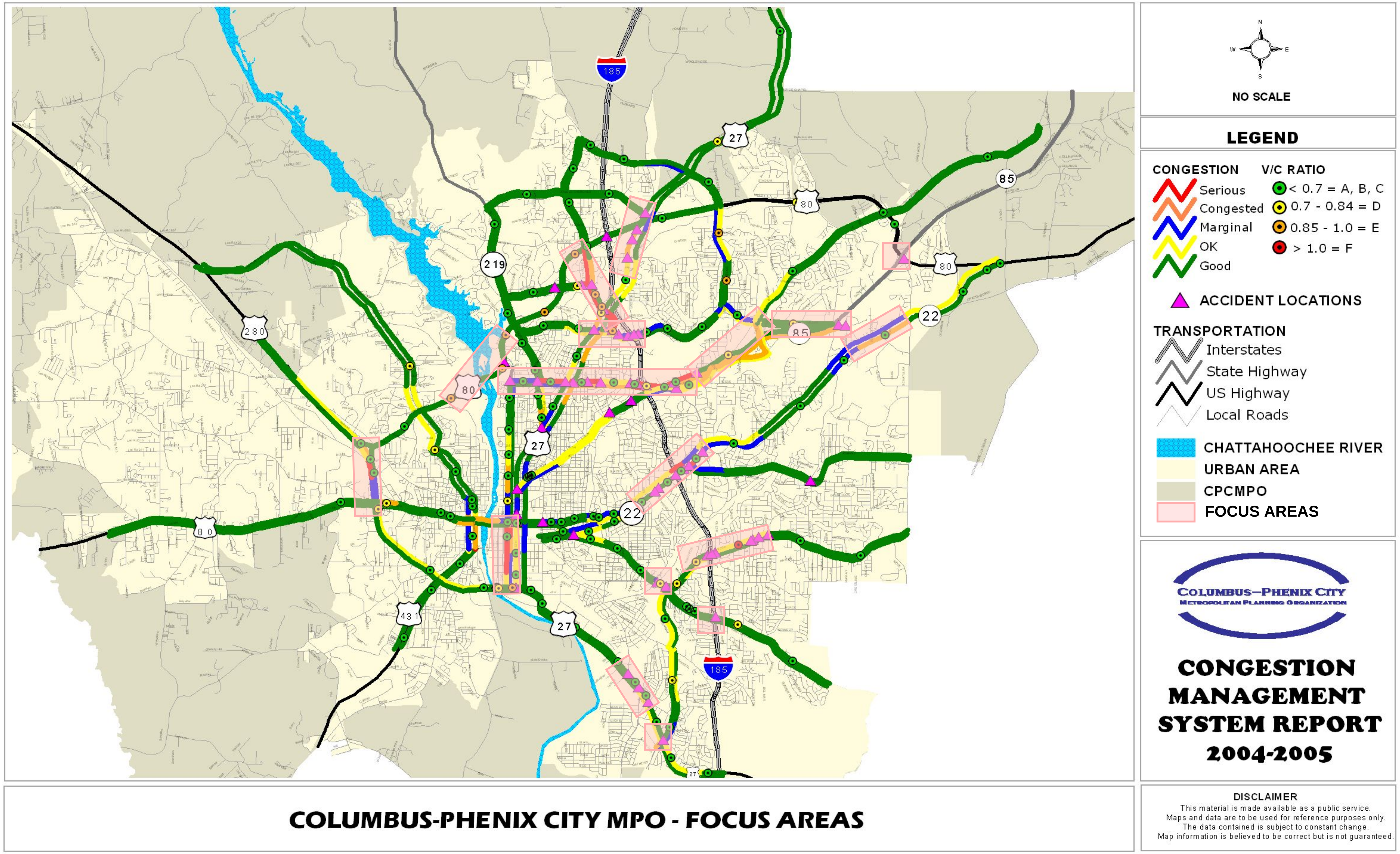
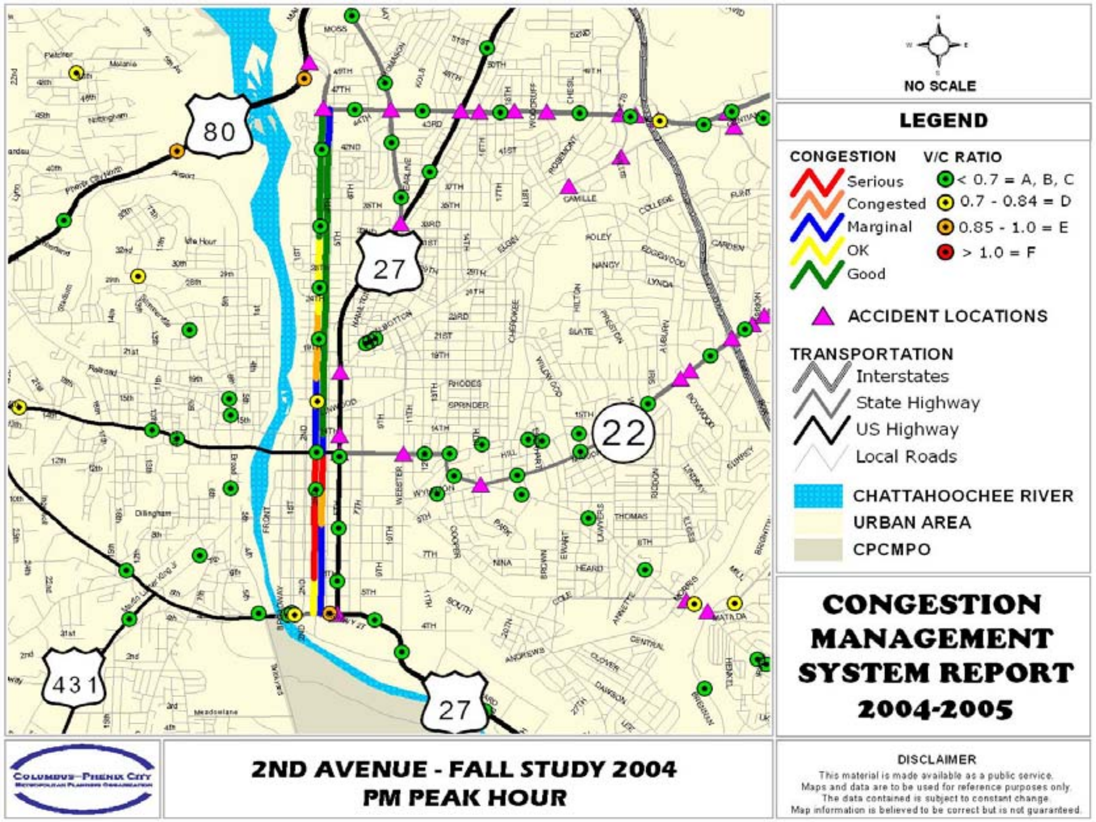


Figure 6-5 – Area of Focus (Peak Hour Congestion Levels)





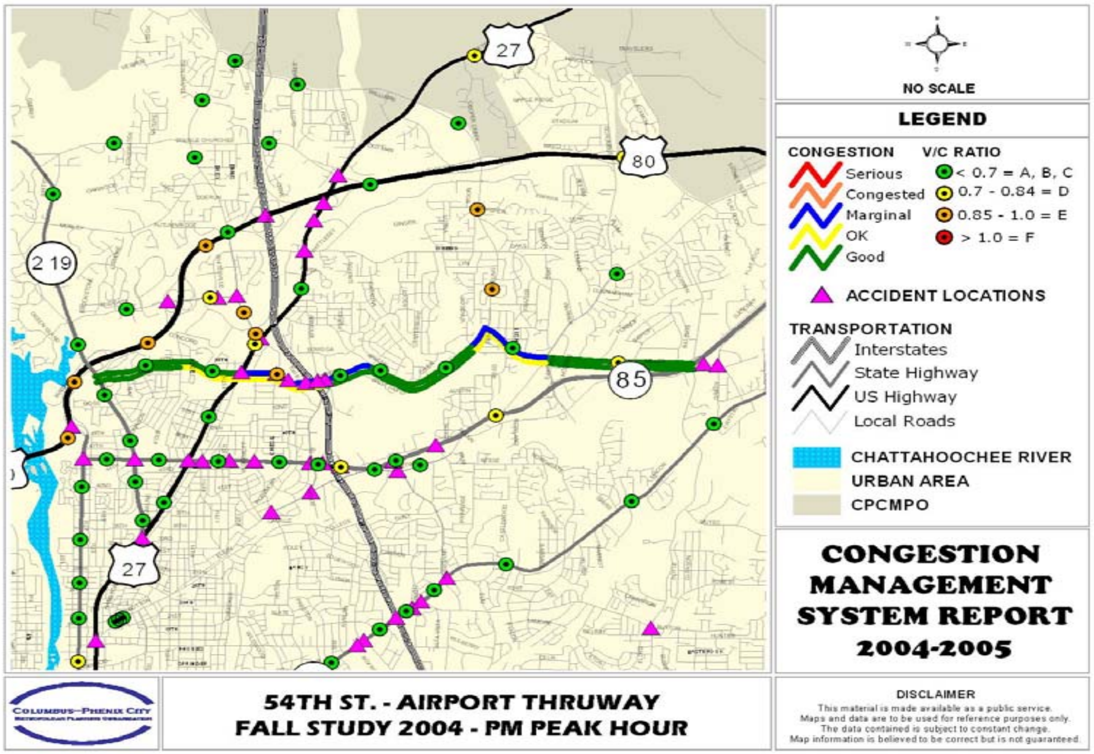
	Distance (Miles)	NB	SB
4th Street			OK
6th Street	0.26	Marginal	Serious
9th Street	0.39	Marginal	Serious
11th Street	0.26	Congested	Serious
13th Street	0.27	Serious	Marginal
14th Street	0.13	Marginal	Marginal
17th Street	0.34	Good	Congested
23rd Street	0.57	Good	OK
28th Street	0.29	Good	OK
32nd Street	0.26	Good	Good
35th Street	0.20	Good	Good
38th Street	0.17	Good	Good
42nd Street	0.31	Good	Good
Manchester Exwy	0.25	Marginal	

Potential Causes for Congestion

- Heavy traffic volume and geometry of the ramp leading to US 80 is root of incidents causing congestion.
- AM and PM Traffic in and out of downtown leading to congestion especially between 8th and 23rd Street.
- Street parking and pedestrian crossings causes travel delay and increases incident risk.
- Inconsistency in the number of lanes (drop from 4 to 2 lanes) along the route causes hindrance in the free-flow of traffic
- Signal Co-ordination improvements are needed in the downtown portion of the route.

Mitigation Strategies and Associated Impact on CMS Performance Measures

	Travel Time	VC Ratio	Arterial/Intersection LOS	Transit System Measures	Incident Management
TDM Measures	▲	▶	▲	▶	▲
Traffic Oper. Imp.	▲	▶	▲	▶	▲
Non-Motorized Modes	▲	▶	▲	▶	▲
Access Management	▲	▶	▲	▶	▲



	Distance (Miles)	EB	WB
River Road			Good
Morris Ave.	0.86	Good	Good
Veterans Pkwy	0.61	OK	Marginal
Armour Road	0.84	OK	Marginal
W. Britt David	0.43	Good	Good
Windsor Dr.	1.32	Good	Marginal
Warm Springs Road	0.74	OK	Good
US 27	1.35	Good	

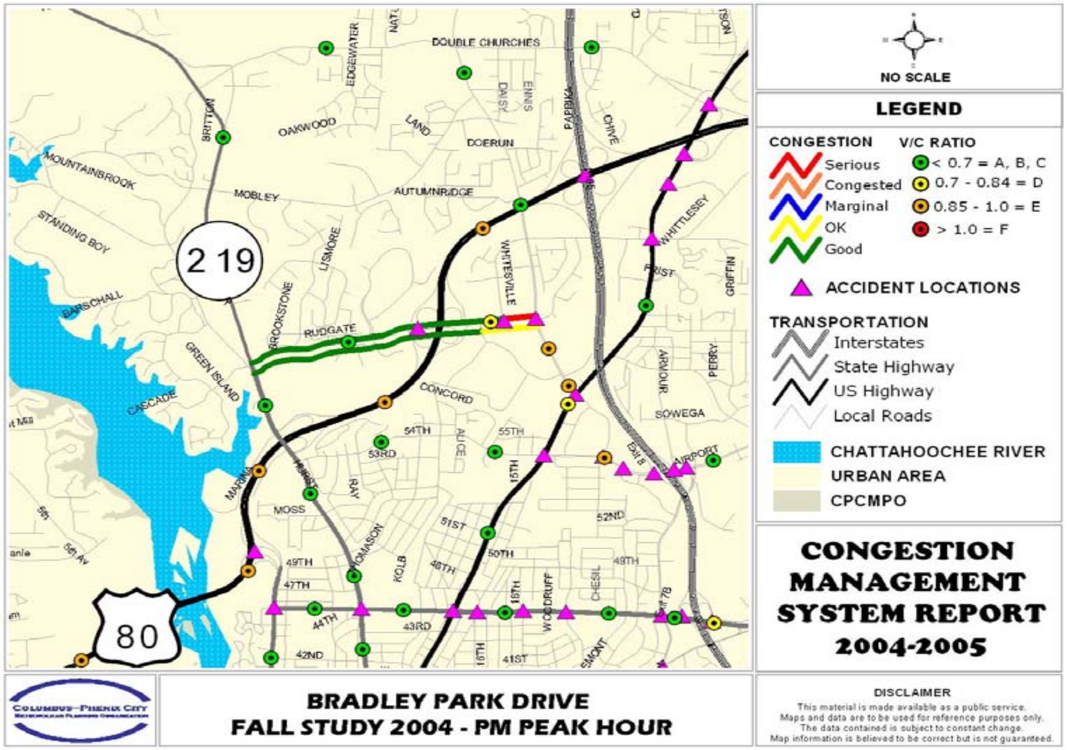
Potential Causes for Congestion

- Heavy traffic volume in the vicinity of Veterans Parkway and I-185.
- Intersection geometry anomalies for example heavy left turn volume onto Veterans Parkway from WB Airport Thruway causes traffic back up along the route.
- High accident location at the intersection of Airport Thruway and I-185 and Airport Thruway and Veterans Parkway.
- With a considerable amount of business located along route there are issues with volume accessing these businesses.

Mitigation Strategies and Associated Impact on CMS Performance Measures

	Travel Time	VC Ratio	Arterial/Intersection LOS	Transit System Measures	Incident Management
TDM Measures	►	►	►	►	►
Traffic Oper. Imp.	▲	▲	▲	►	►
Growth Management	►	►	▲	►	►
Access Management	►	▲	▲	►	▲
Intelligent Transportation	▲	►	▲	►	►

BRADLEY PARK DRIVE



	Distance	EB	WB
River Road			Good
Brookstone Pkwy	0.68	Good	Good
Belfast Ave	0.60	Good	Good
Whittlesey Rd	0.13	OK	Serious
Whitesville Rd	0.18	OK	

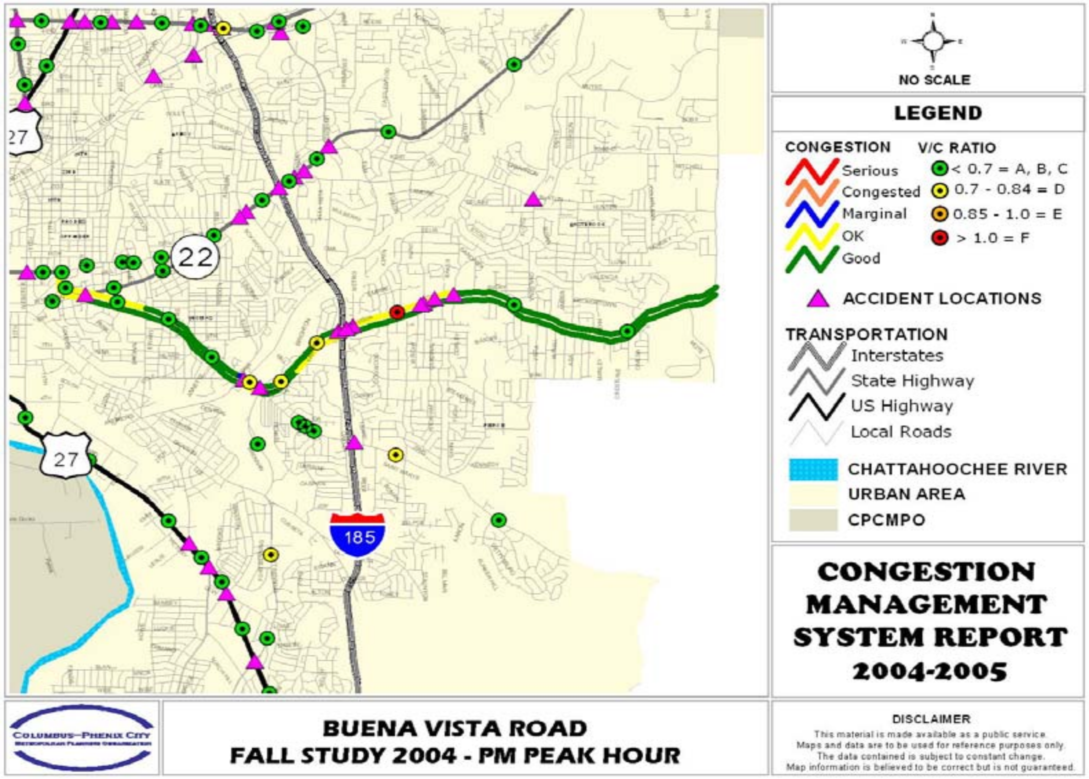
Potential Causes for Congestion

- Heavy traffic volume in the vicinity of Bradley Park Drive and Whitesville Road because of heavy population of commercial shopping outlets and retail establishments.
- High accident location at the intersection of Bradley Park Drive and Whittlesey Road and Bradley Park Drive and Whitesville Road.
- With a considerable amount of business located along route there are issues with volume accessing these businesses.

Mitigation Strategies and Associated Impact on CMS Performance Measures

	Travel Time	VC Ratio	Arterial/Intersection LOS	Transit System Measures	Incident Management
TDM Measures	▶	▶	▶	▶	▶
Traffic Oper. Imp.	▲	▲	▲	▶	▶
Growth Management	▶	▶	▲	▶	▶
Access Management	▶	▲	▲	▶	▲
Intelligent Transportation	▲	▶	▲	▶	▶

BUENA VISTA ROAD



	Distance	EB	WB
13th Street			OK
Wynnton Road	0.42	OK	OK
Brown Ave.	0.56	Good	Good
Andrews Road	1.18	Good	Marginal
Saint Marys Road	0.16	OK	Good
Stream Mill Road	0.46	Good	Good
I-185 (Underpass)	0.55	OK	OK
McBride Dr.	1.12	Good	Good
Schatulga Road	2.67	Good	

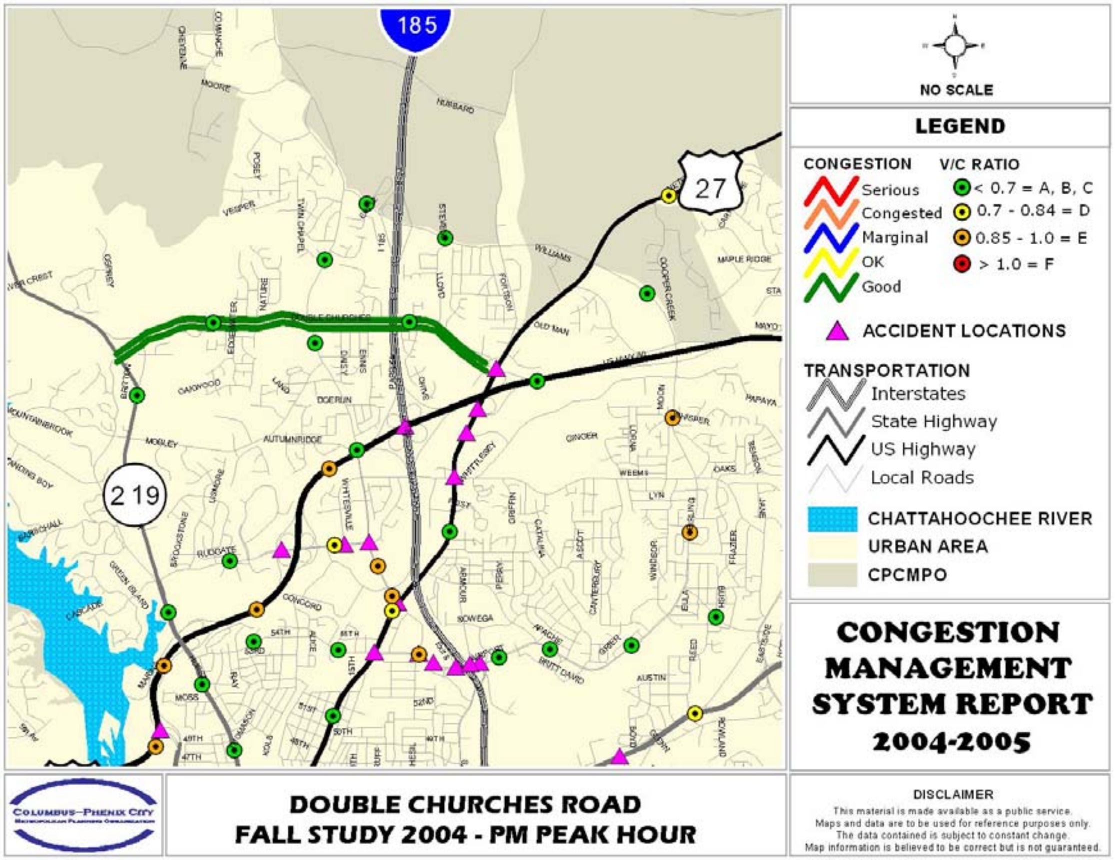
Potential Causes for Congestion

- Two schools along the route add to the traffic causing delays.
- High number of turning vehicles into shopping businesses near I-185.
- Reduced capacity as 4 lanes get converted into 2 lanes.
- Lack of center turn lanes along the 2-lane route.
- One of the top accident locations near I-185
- Volume to Capacity issues along route approaching I-185 from both east and west side.

Mitigation Strategies and Associated Impact on CMS Performance Measures

	Travel Time	VC Ratio	Arterial/Intersection LOS	Transit System Measures	Incident Management
TDM Measures	▶	▶	▶	▶	▶
Traffic Oper. Imp.	▲	▶	▲	▶	▲
Transit Oper. Imp.	▲	▶	▲	▲	▲
Access Management	▲	▶	▲	▶	▲
Capacity Expansion	▲	▲	▲	▶	▶

DOUBLE CHURCHES ROAD



	Distance	EB	WB
River Rd			Good
Britton Dr.	0.23	Good	Good
Edgewater Dr.	0.78	Good	Good
Whitesville Road	0.49	Good	Good
Fortson Rd	1.42	Good	

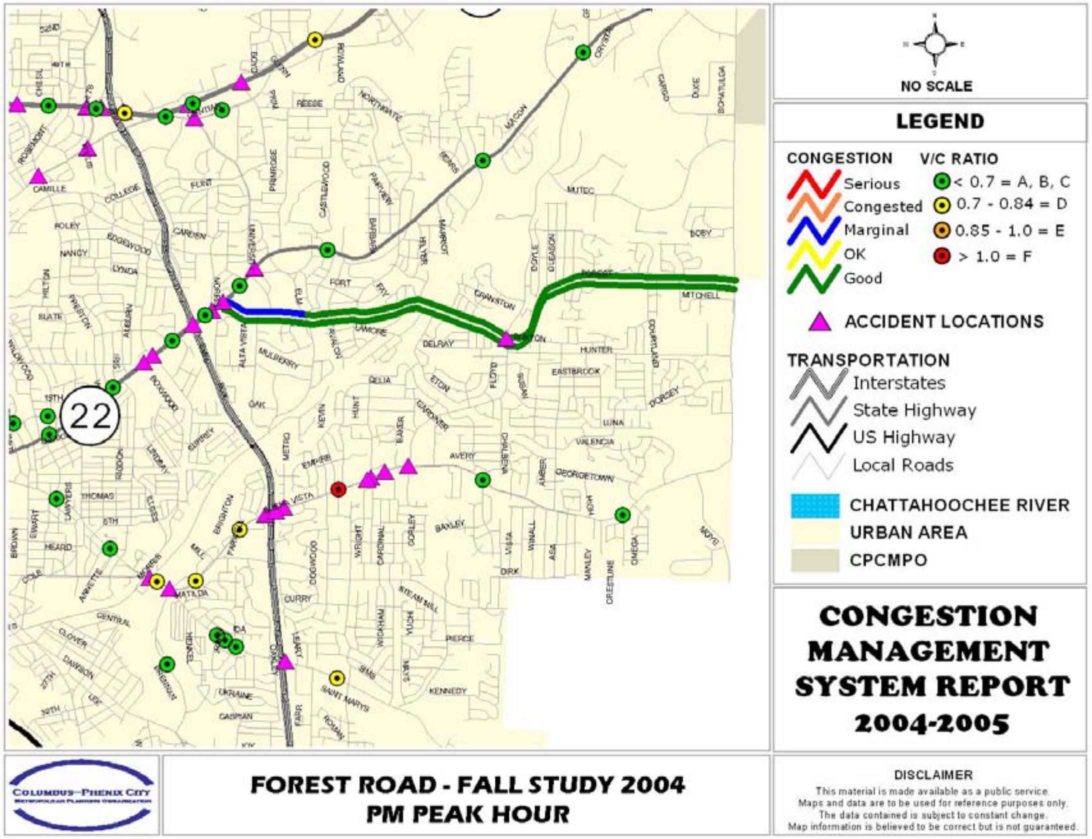
Potential Causes for Congestion

- No congestion along the route.

Mitigation Strategies and Associated Impact on CMS Performance Measures

The route does not have any potential problems for any mitigation strategies to be determined for it.

FOREST ROAD



	Distance	EB	WB
Schatulga Road			Good
Woodruff Farm Rd	1.98	Good	Good
Elm Drive	1.60	Good	Good
Macon Road	0.65	Marginal	

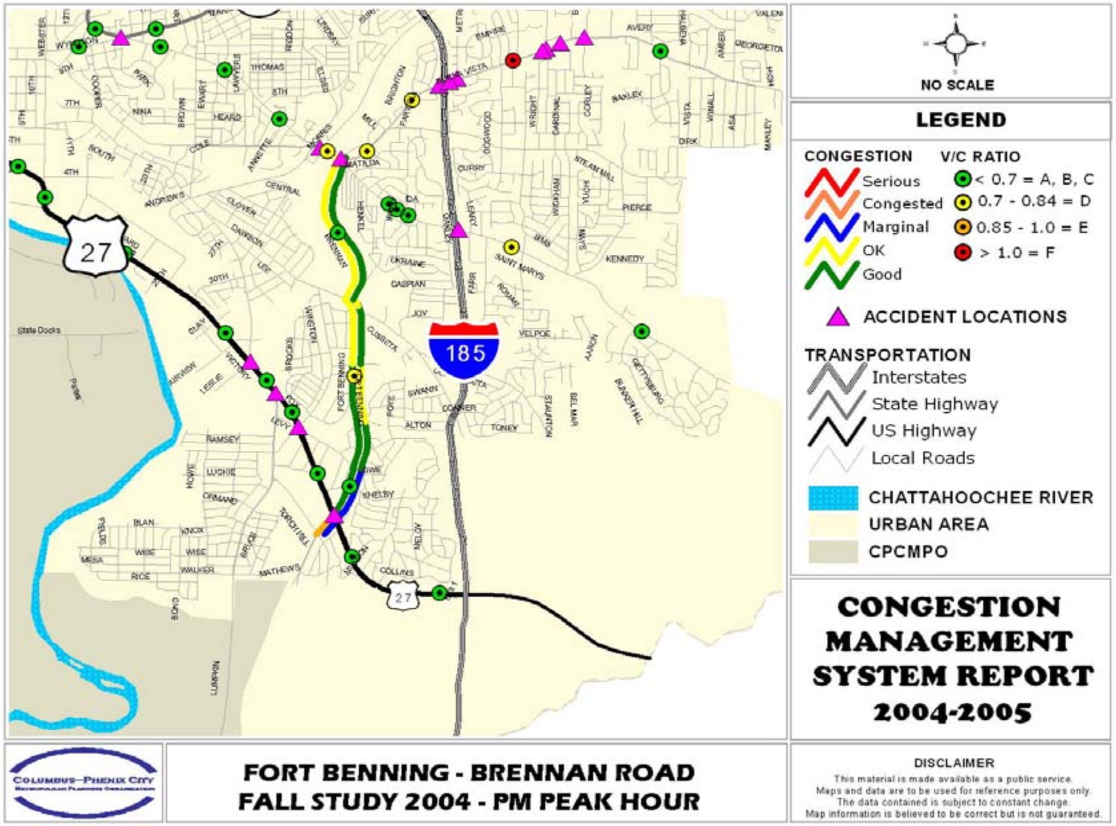
Potential Causes for Congestion

- Two schools along the route add to the traffic causing delays.
- Congestion along the route between Macon Road and Elm Drive
- High number of turning vehicles into adjacent residential streets and houses.
- Reduced capacity as 4 lanes get converted into 2 lanes.
- Lack of left turn lanes along the 2-lane route.
- One of the top accident locations near the intersection

Mitigation Strategies and Associated Impact on CMS Performance Measures

	Travel Time	VC Ratio	Arterial/Intersection LOS	Transit System Measures	Incident Management
TDM Measures	►	►	►	►	►
Traffic Oper. Imp.	▲	►	▲	►	▲
Access Management	▲	►	▲	►	▲
Capacity Expansion	▲	►	▲	►	►

FORT BENNING – BRENNAN ROAD



	Distance	NB	SB
Torch Hill Rd			Marginal
Victory Dr.	0.18	Congested	Marginal
Levy Road	0.40	Good	Good
Ridgeway	0.36	Good	OK
Baker Plaza	0.46	Good	Good
Old Cussetta Rd	0.42	OK	OK
Brennan Rd	0.09	OK	Good
Buena Vista Rd	1.18	OK	

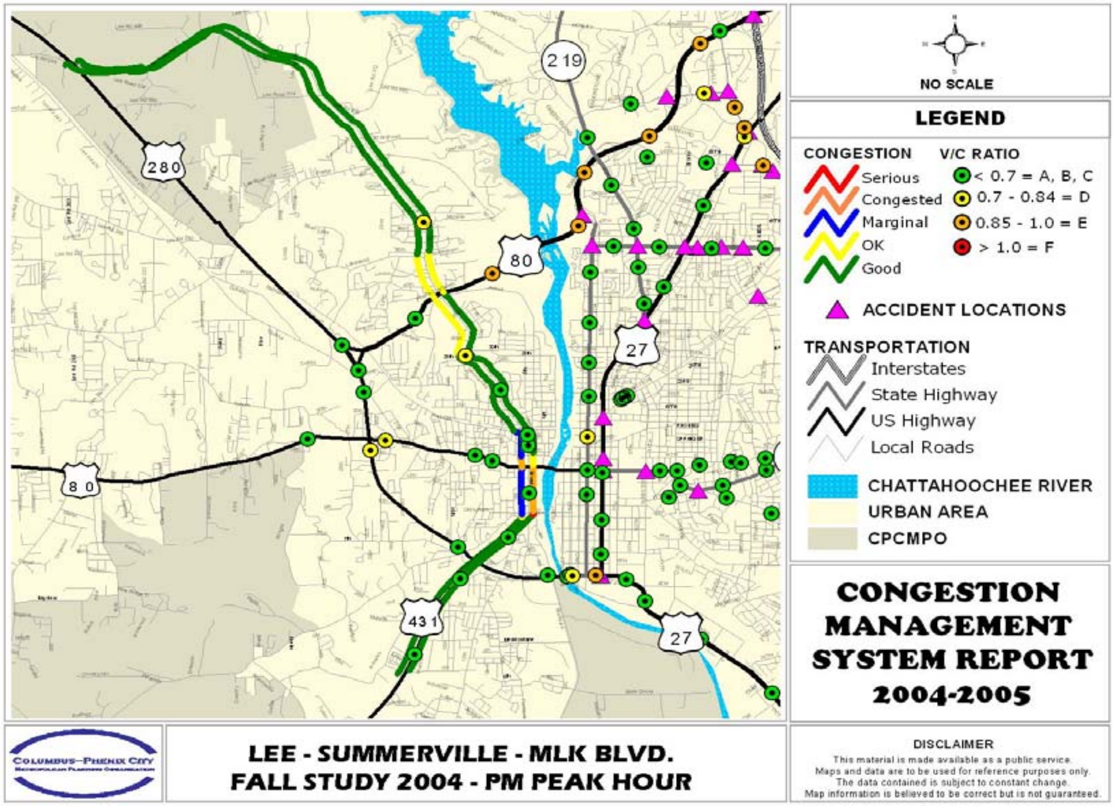
Potential Causes for Congestion

- High number of turning vehicles into adjacent residential streets and houses and commercial properties.
- Reduced capacity as 4 lanes get converted into 2 lanes.
- Lack of center turn lanes along the 2-lane route.
- Volume to Capacity issues along the route on both eastbound and westbound lanes.

Mitigation Strategies and Associated Impact on CMS Performance Measures

	Travel Time	VC Ratio	Arterial/Intersection LOS	Transit System Measures	Incident Management
TDM Measures	▲	▶	▶	▶	▶
Traffic Oper. Imp.	▲	▲	▲	▶	▲
Access Management	▲	▲	▶	▶	▲
Capacity Expansion	▲	▲	▲	▶	▶

LEE-SUMMERVILLE-MLK ROUTE



	Distance	EB	WB
5th Street S			Good
3rd Street S	3.04	Good	Good
US 280	2.99	Good	Good
Broad Street	0.63	Good	OK
Dillingham Street	1.53	Serious	Marginal
13th Street	1.06	Congested	Congested
14th Street	0.12	OK	Marginal
N Railroad Street	0.57	Good	Good
21st Street	0.35	Good	Good
25th Street	0.50	Good	Good
30th Street	0.60	Good	OK
US 80 (Underpass)	0.32	Good	OK
44th Street	0.43	OK	Good
Flecter Drive	0.17	Good	Good
Pierce Road	0.21	Good	Good
Lee Road 318	0.41	Good	Good
US 280	0.31	Good	

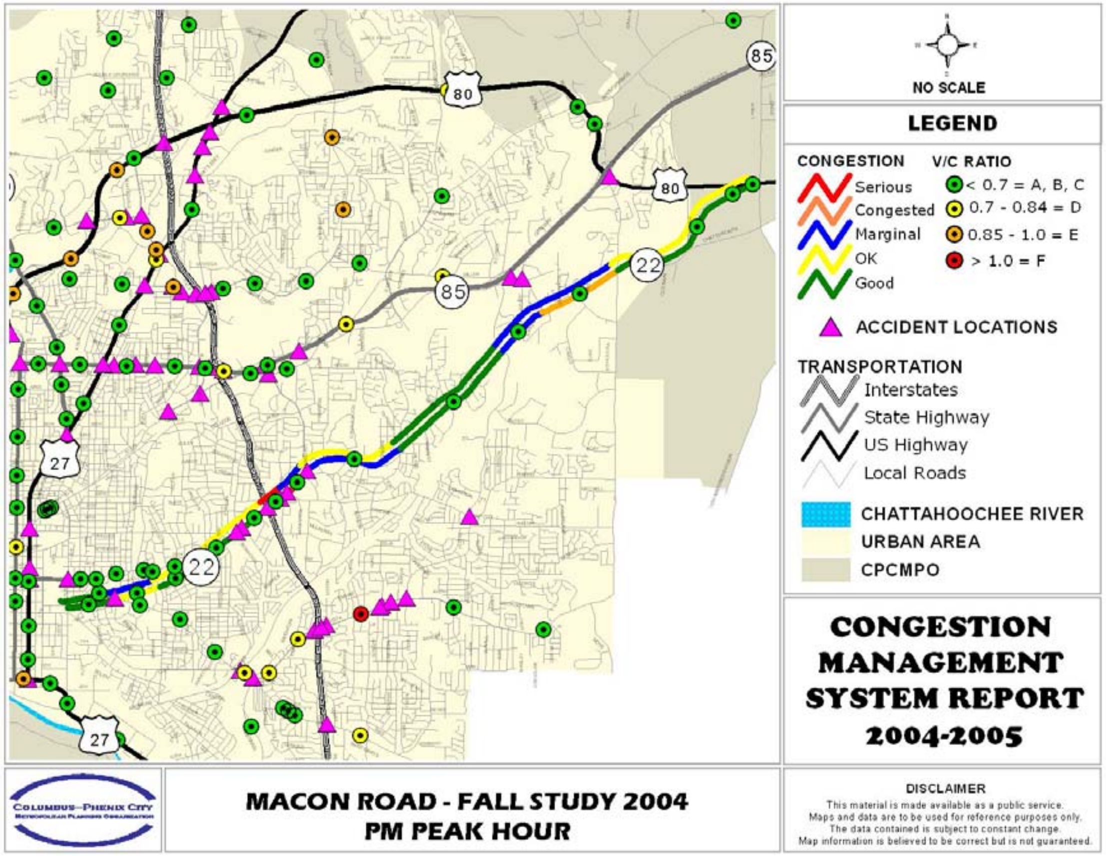
Potential Causes for Congestion

- One school along the route add to the traffic and lack of turn lanes into the school cause travel time delays.
- Reduced capacity as 4 lanes get converted into 2 lanes.
- Lack of center turn lanes along the 2-lane route.
- Poorly planned curb cuts.
- Heavy turning volume onto US80 from Stadium Drive.
- Heavy traffic volume between N Railroad Street and 13th Street.

Mitigation Strategies and Associated Impact on CMS Performance Measures

	Travel Time	VC Ratio	Arterial/Intersection LOS	Transit System Measures	Incident Management
TDM Measures	▲	▶	▲	▶	▶
Traffic Oper. Imp.	▲	▲	▲	▶	▲
Non-Motorized Modes	▲	▲	▶	▶	▲
Growth Management	▲	▲	▲	▶	▶
Access Management	▲	▲	▲	▶	▶
Capacity Expansion	▲	▲	▲	▶	▶

MACON ROAD



	Distance	NB	SB
10th Ave.			Good
Buena Vista Road	1.80	Good	Marginal
Peacock Ave.	1.02	OK	OK
13th street	0.65	Good	OK
I-185 (Underpass)	1.69	Good	Serious
Forest Road	1.25	Good	Marginal
Elm Drive	0.34	Serious	OK
Reese Road	0.28	Marginal	Good
Woodruff Farm Road	1.15	Good	Marginal
Miller Road	0.44	Marginal	Marginal
Flat Rock Road	0.53	Congested	OK
US 80	0.58	Good	

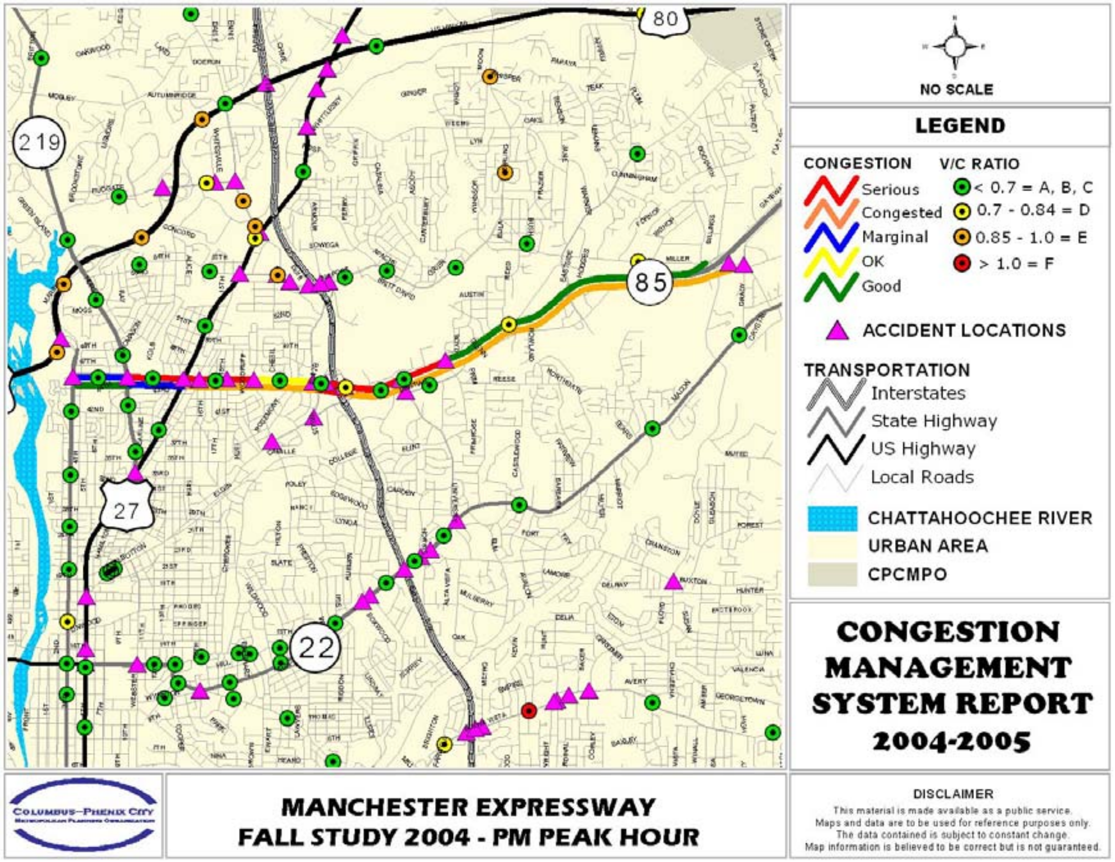
Potential Causes for Congestion

- Heavy traffic volume in the vicinity of I-185 and top accident location again near I-185
- There are some schools located just off the route around I-185. There are some shopping centers in the vicinity as well, which has heavy volume turning in their lots.
- Signal operation and optimization issues along the route causing traffic back-up from Buena Vista Road to I-185
- Congestion along the route from Miller Road to Flat Rock road was due to the on-going construction during Fall 2004. However, this issue has been sorted out after the completion of the construction.

Mitigation Strategies and Associated Impact on CMS Performance Measures

	Travel Time	VC Ratio	Arterial/Intersection LOS	Transit System Measures	Incident Management
TDM Measures	▶	▶	▶	▶	▶
Traffic Oper. Imp.	▲	▲	▲	▶	▶
Growth Management	▶	▶	▲	▶	▶
Access Management	▶	▲	▲	▶	▲
Intelligent Transportation	▲	▶	▲	▶	▶

MANCHESTER EXPRESSWAY



	Distance	EB	WB
2nd Ave.			Marginal
River Road	0.47	Good	Serious
Veterans Pkwy	0.51	Marginal	Serious
Woodruff Road	0.62	Congested	OK
Armour Road	0.53	Congested	Serious
I-185	0.21	Serious	Serious
Warm Springs Road	1.02	Congested	Good
Miller Road	2.65	Congested	

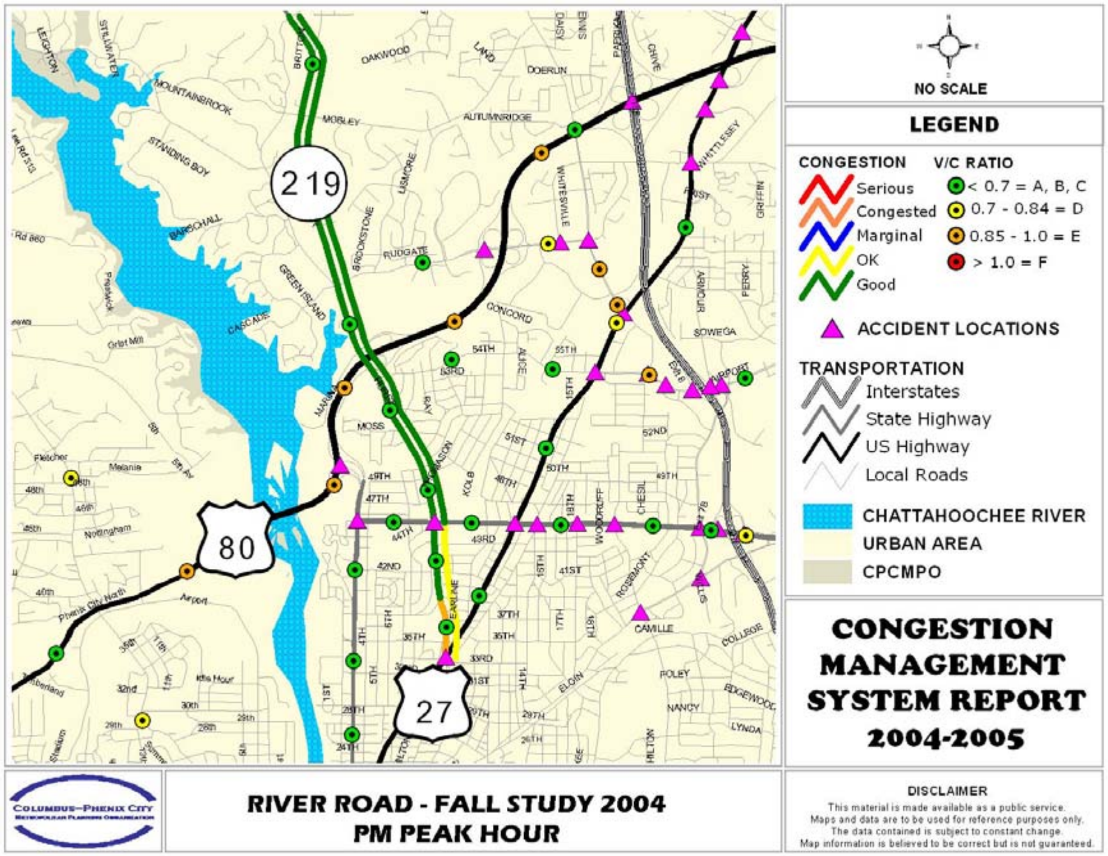
Potential Causes for Congestion

- Heavy traffic volume in the vicinity of I-185.
- 5 of the top 10 accident locations are along Manchester Expressway.
- AM and PM traffic volume magnitude (especially between Veterans Parkway and I-185)
- Heavy turning volumes because of hospitals, medical centers, retail and other commercial establishments along the route.
- Mall traffic – Peachtree Mall is located along the route.
- Columbus Technical College is also located along the route, which add to the AM traffic.

Mitigation Strategies and Associated Impact on CMS Performance Measures

	Travel Time	VC Ratio	Arterial/Intersection LOS	Transit System Measures	Incident Management
Traffic Oper. Imp.	▲	▶	▲	▶	▶
Access Management	▲	▶	▲	▶	▶
Intelligent Transportation	▲	▶	▲	▶	▶

RIVER ROAD



	Distance	NB	SB
Veterans Parkway			Congested
39th Street	0.35	OK	Good
Manchester Expy	0.48	OK	Good
54th Street	0.96	Good	Good
Bradley Park Drive	0.63	Good	Good
Mobley Road	1.09	Good	Good
Double Churches Rd	0.65	Good	

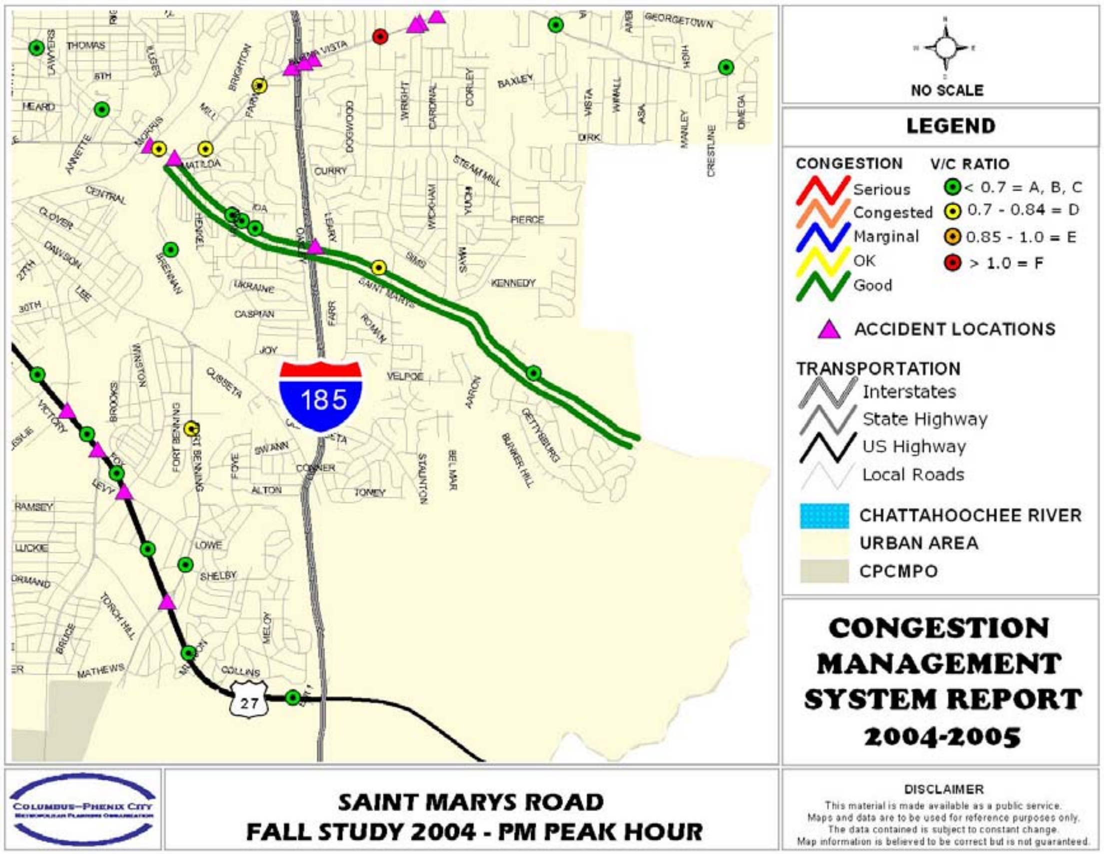
Potential Causes for Congestion

- Heavy traffic volume between Veterans Parkway and Manchester Expressway.
- Accident locations causing incident delays.
- Heavy turning volumes along the route because of retail and other commercial establishments along the route.
- Poorly planned curb cuts.

Mitigation Strategies and Associated Impact on CMS Performance Measures

	Travel Time	VC Ratio	Arterial/Intersection LOS	Transit System Measures	Incident Management
Traffic Oper. Imp.	▲	▶	▲	▶	▶
Access Management	▲	▶	▲	▶	▶
Non-motorized modes	▲	▶	▲	▶	▶

SAINT MARYS ROAD



	Distance	EB	WB
Buena Vista Road			Good
I-185 (Underpass)	1.03	Good	Good
Wickham Drive	0.90	Good	Good
Moye Road (End of Road)	1.60	Good	

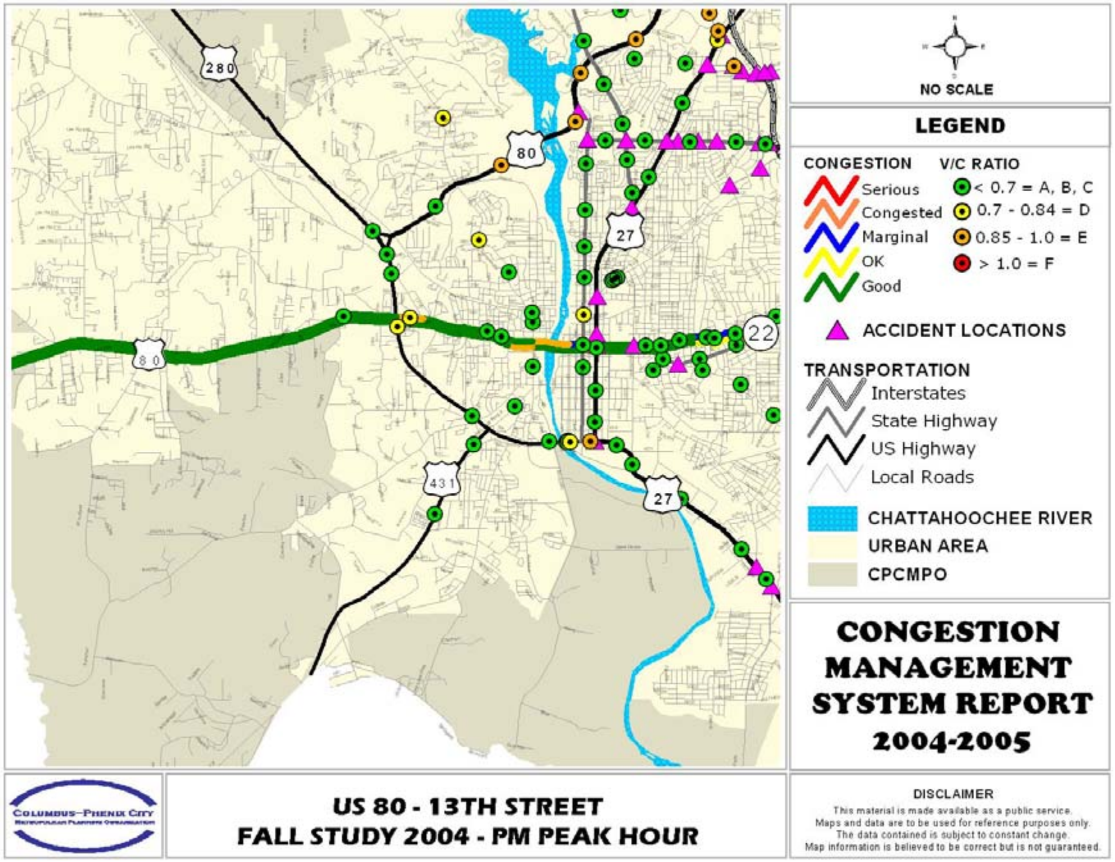
Potential Causes for Congestion

- No congestion along the route, however, there is a transportation improvement project planned along the corridor, which will take care of the capacity issues along the route.

<u>Mitigation Strategies and Associated Impact on CMS Performance Measures</u>

The route does not have any potential problems for any mitigation strategies to be determined for it.

US80 – 13TH STREET



	Distance	EB	WB
Jowers Road			Good
Lee Road 212	3.04	Good	Good
Woodland Drive	2.99	Good	Good
Winston Drive	0.63	Good	Good
36th Ave.	1.53	Good	Good
Auburn Ave.	1.06	Good	Good
US 280 Bypass	0.12	Good	Congested
Opelika Road	0.57	Good	Good
17th Ave.	0.35	Good	Good
10th Ave.	0.50	Good	Good
Broad Street	0.60	Congested	Congested
Broadway	0.32	Good	Marginal
2nd Ave.	0.43	Good	Serious
Veterans Parkway	0.17	Congested	Good
10th Ave.	0.21	Good	Marginal
13th Ave.	0.41	Good	Good
18th Ave.	0.31	Good	Marginal
Macon Road	0.44	OK	

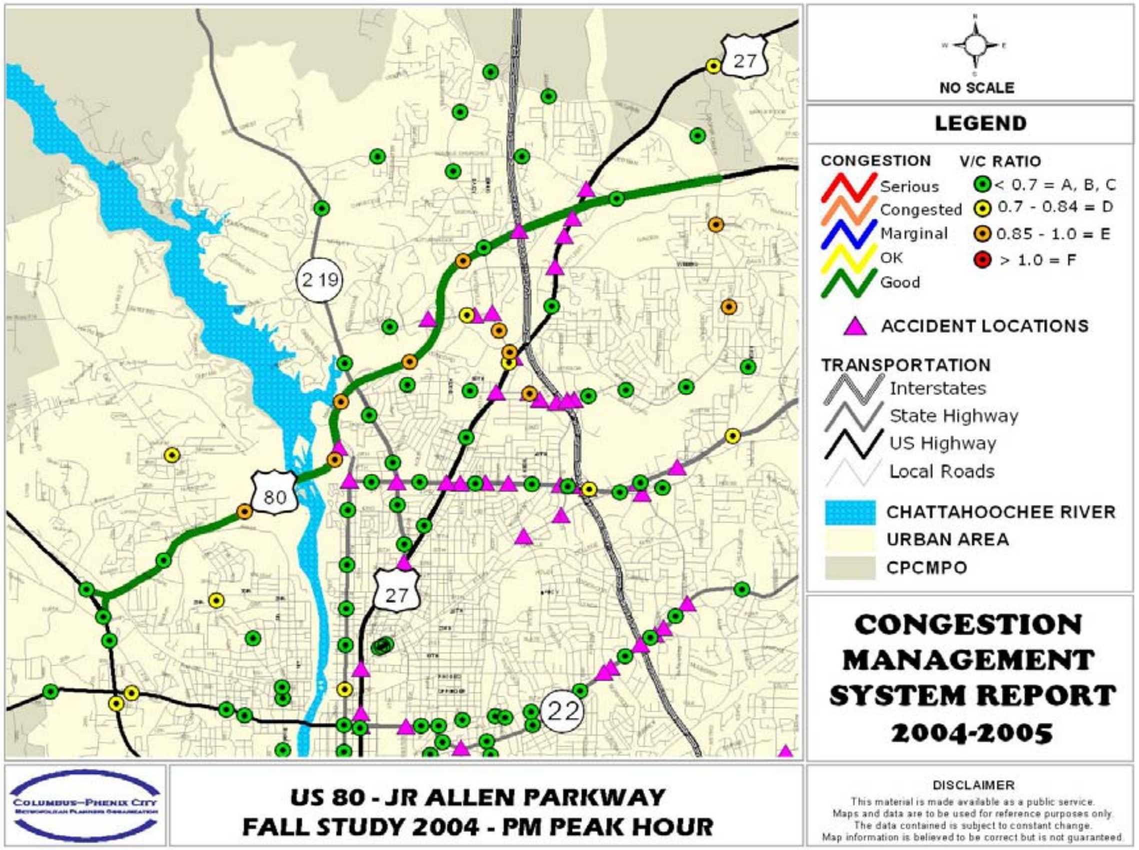
Mitigation Strategies and Associated Impact on CMS Performance Measures

	Travel Time	VC Ratio	Arterial/Intersection LOS	Transit System Measures	Incident Management
TDM Measures	▲	►	▲	►	►
Traffic Oper. Imp.	▲	▲	▲	►	►
Access Management	▲	►	▲	►	▲

Potential Causes for Congestion

- Heavy traffic heading in and out of downtown, with the heaviest concentration between 2nd Avenue in Columbus, Georgia and Broad Street in Phenix City, Alabama.
- Heavy traffic volume at the intersection of US 80 and US 280. There are also issues with volume to capacity as well.
- Heavy turning volumes because of retail and other commercial establishments along the route.

US80 – JR ALLEN PARKWAY



	Distance	NB	SB
US 280			Good
Summerville Road	1.22	Good	Good
2nd Ave. (South)	1.72	Good	Good
2nd Ave. (North)	0.10	Good	Good
River Road	0.39	Good	Good
Bradley Park Drive	1.53	Good	Good
I-185	1.30	Good	Good
Veteran s Pkwy	0.64	Good	Good
Moon Road	1.50	Good	

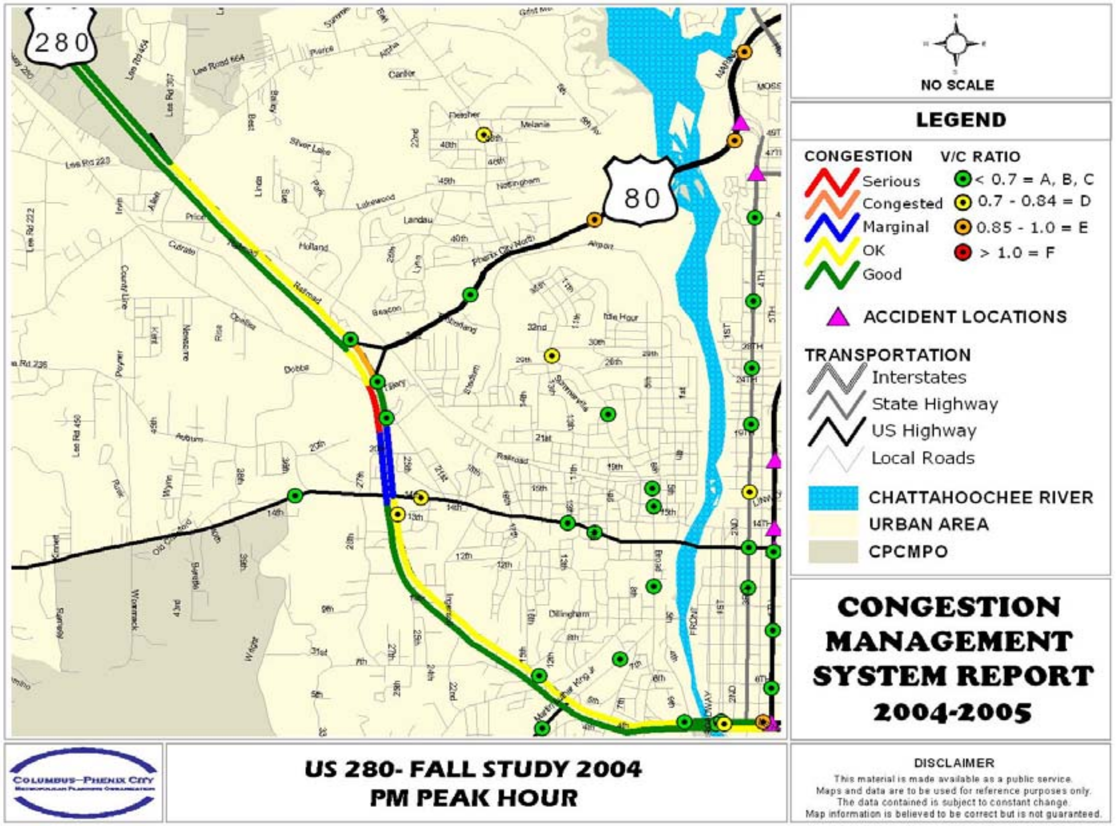
Potential Causes for Congestion

- Volume to capacity issues along the route both in Columbus, GA and Alabama Counties.
- Top accident location along ramps at 2nd avenue intersection leading to incident delays.
- Heavy traffic volume crossing between Georgia and Alabama.

Mitigation Strategies and Associated Impact on CMS Performance Measures

	Travel Time	VC Ratio	Arterial/Intersection LOS	Transit System Measures	Incident Management
TDM Measures	►	▲	►	►	▲
Growth Management	▲	►	▲	►	►
Access Management	▲	▲	▲	►	▲
Intelligent Transportation	▲	►	▲	►	▲

US 280



	Distance	NB	SB
Veterans Parkway			OK
Broad Street	0.30	Good	Good
Brickyard Road	0.53	Good	Good
Crawford Road	2.40	OK	Marginal
Stadium Drive	0.62	Marginal	Serious
US 80 (South)	0.16	Good	OK
US 80 (North)	0.29	Congested	Good
Piecre Road	1.67	OK	Good
Lee Road	2.64	Good	

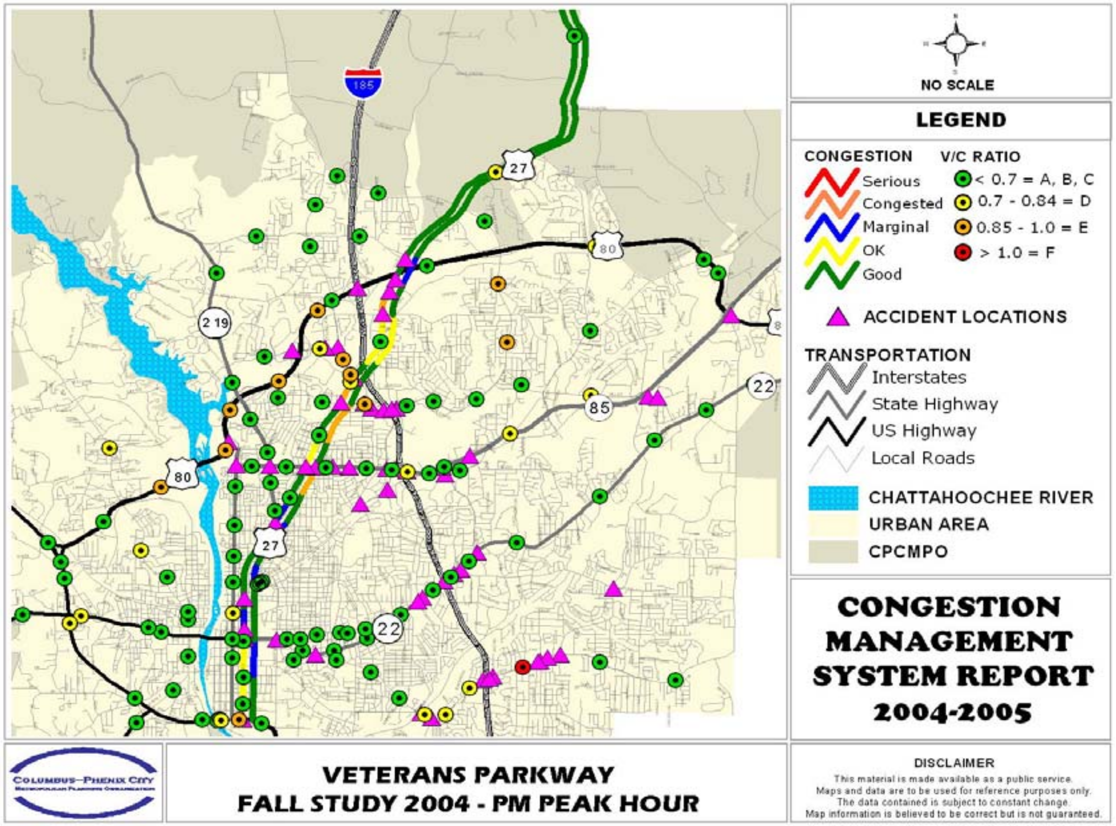
Potential Causes for Congestion

- Heavy traffic volume at the intersection of US 80 and US 280.
- Heavy turning volume onto US80 from US 280.
- Heavy turning volumes because of retail and other commercial establishments along the route.

Mitigation Strategies and Associated Impact on CMS Performance Measures

	Travel Time	VC Ratio	Arterial/Intersection LOS	Transit System Measures	Incident Management
TDM Measures	▲	▶	▲	▶	▶
Traffic Oper. Imp.	▲	▶	▲	▶	▶
Growth Management	▲	▶	▲	▶	▶
Access Management	▲	▶	▲	▶	▶
Intelligent Transportation	▲	▶	▲	▶	▶

VETERANS PARKWAY



Mitigation Strategies and Associated Impact on CMS Performance Measures

	Travel Time	VC Ratio	Arterial/Intersection LOS	Transit System Measures	Incident Management
TDM Measures	▲	▲	▲	▶	▲
Traffic Oper. Imp.	▲	▶	▲	▶	▶
Non-Motorized Modes	▲	▶	▲	▶	▶
Access Management	▲	▲	▲	▶	▲
Intelligent Transportation	▲	▶	▲	▶	▶

	Distance	NB	SB
4th Street			OK
9th Street	0.66	Good	OK
13th Street	0.52	Marginal	Marginal
16th Street	0.27	Good	Good
19th Street	0.65	Good	Good
23rd Street	0.16	Marginal	Good
29th Street	0.35	Good	Good
River Road	0.38	Marginal	Marginal
Neil Drive	0.32	Good	Good
Manchester Expressway	0.63	Congested	OK
50th Street	0.39	Good	Good
Airport Throughway	0.66	Congested	Congested
Whitesville Road	0.46	Good	Good
W Britt David Road	0.25	Good	OK
Whittlesey Road	0.75	OK	Congested
U.S 80 (Eastbound Ramps)	0.55	Good	Good
Double Churches Road	0.32	Marginal	Good
Williams Road	1.09	Good	Good
Hancock Road	1.26	Good	Good
Pierce Chapel Road	0.99	Good	Good
Wooldridge Road	0.61	Good	Good
Almond Road	1.00	Good	

Potential Causes for Congestion

- Heavy peak volumes, especially between 14th and 48th Street.
- 4 of the top 10 accident locations along the route.
- Bottleneck traffic at some major intersections e.g. Airport Thruway.
- One school in the vicinity of Williams Rd.
- Heavy southbound left turn volume onto Adams Farm Drive

VICTORY DRIVE

	Distance	NB	SB
Cussetta Ave.			Good
I-185 (Underpass)	0.73	Good	Good
Fort Benning Blvd	1.46	OK	Marginal
S. Lumpkin Road	1.04	OK	Good
N Lumpkin Road	0.30	OK	Good
10th Ave.	2.15	Good	Good
Veteran Parkway	0.51	OK	OK
Broad Street	0.31	Good	

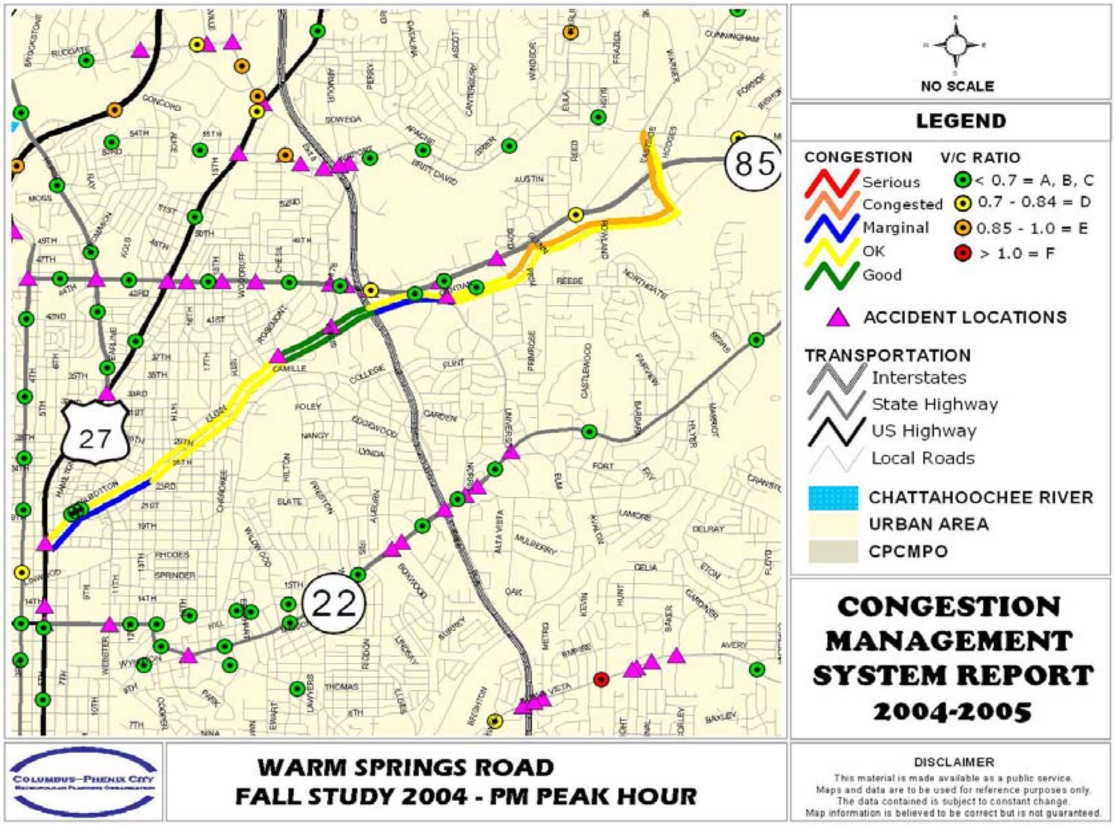
Potential Causes for Congestion

- Heavy peak volumes, especially between N Lumpkin Road and Fort Benning Rd.
- Top accident locations along the route leading to incident delays
- Intersection and Roadway geometry issues.
- Schools in the vicinity add to the traffic woes leading to delays.

Mitigation Strategies and Associated Impact on CMS Performance Measures

	Travel Time	VC Ratio	Arterial/Intersection LOS	Transit System Measures	Incident Management
TDM Measures	▲	▶	▶	▶	▶
Traffic Oper. Imp.	▲	▶	▲	▶	▶
Growth Management	▲	▶	▲	▶	▲
Access Management	▶	▲	▲	▶	▲
Non-Motorized Modes	▲	▶	▲	▶	▶

WARM SPRINGS ROAD



	Distance	NB	SB
Veterans Parkway			OK
12th Ave.	0.78	Congested	OK
17th Ave.	0.69	OK	Marginal
Hilton Ave.	0.61	Marginal	Congested
Armour Road	0.48	Marginal	OK
I-185 (Underpass)	0.27	Marginal	Good
Manchester Expressway	0.78	Marginal	OK
US 27 Alt	1.02	OK	Congested
Miller Road	1.11	OK	

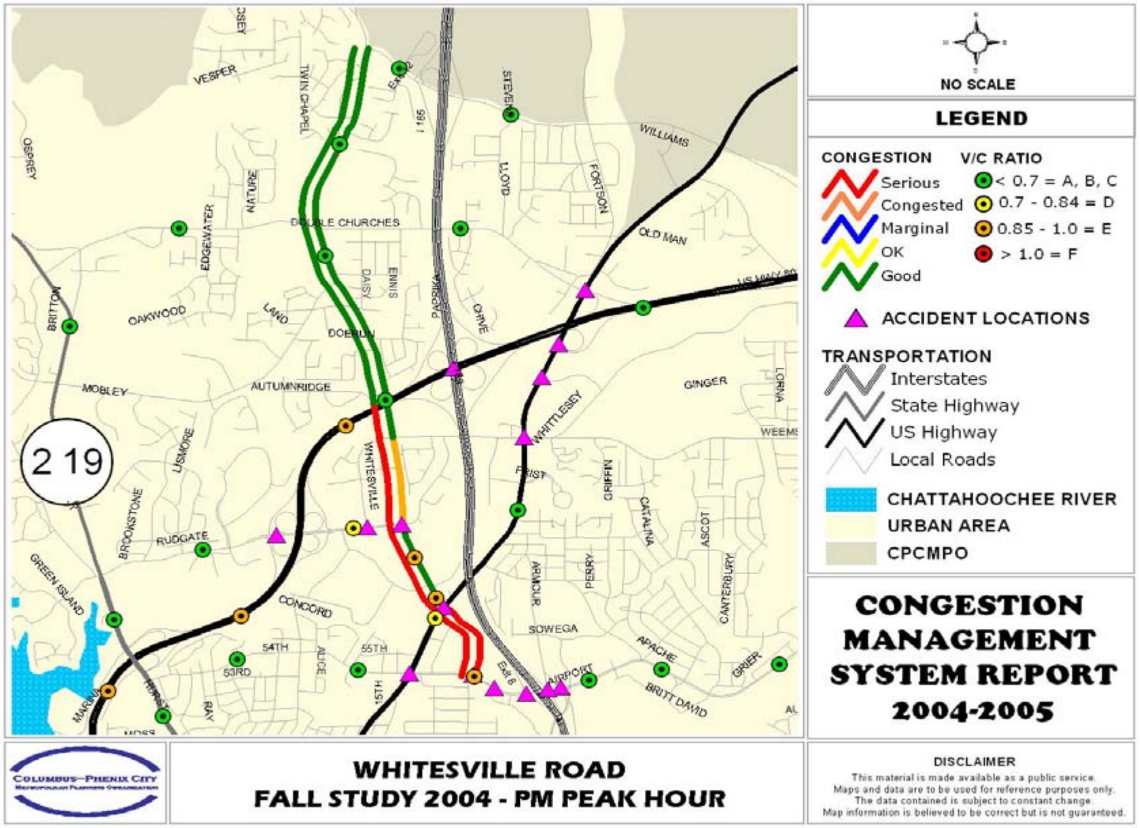
Potential Causes for Congestion

- Heavy traffic heading in and out of CBD, with the heaviest concentration between Hilton Avenue and Warm Springs Connector.
- Roadway geometrics, multiple changes in lane widths from 4 to 2 lanes disrupt traffic flow.
- Lack of Signal Coordination/Optimization
- Lack of turn lanes creates backups as delivery and industrial trucks pull in and out of the businesses.
- Schools in the vicinity add to the traffic causing delays.

Mitigation Strategies and Associated Impact on CMS Performance Measures

	Travel Time	VC Ratio	Arterial/Intersection LOS	Transit System Measures	Incident Management
Traffic Oper. Imp.	▲	▶	▲	▶	▲
Non-Motorized Modes	▲	▲	▶	▶	▶
Access Management	▶	▲	▲	▶	▲
Intelligent Transportation	▲	▶	▲	▶	▶

WHITESVILLE ROAD



	Distance	NB	SB
54th Street			Serious
Veterans Pkwy	0.46	Serious	Serious
Bradley park Dr.	0.51	Good	Serious
Whittlesey Road	0.48	Congested	Serious
US 80	0.22	Good	Good
Willett Drive	1.52	Good	Good
Williams Rd	0.52	Good	

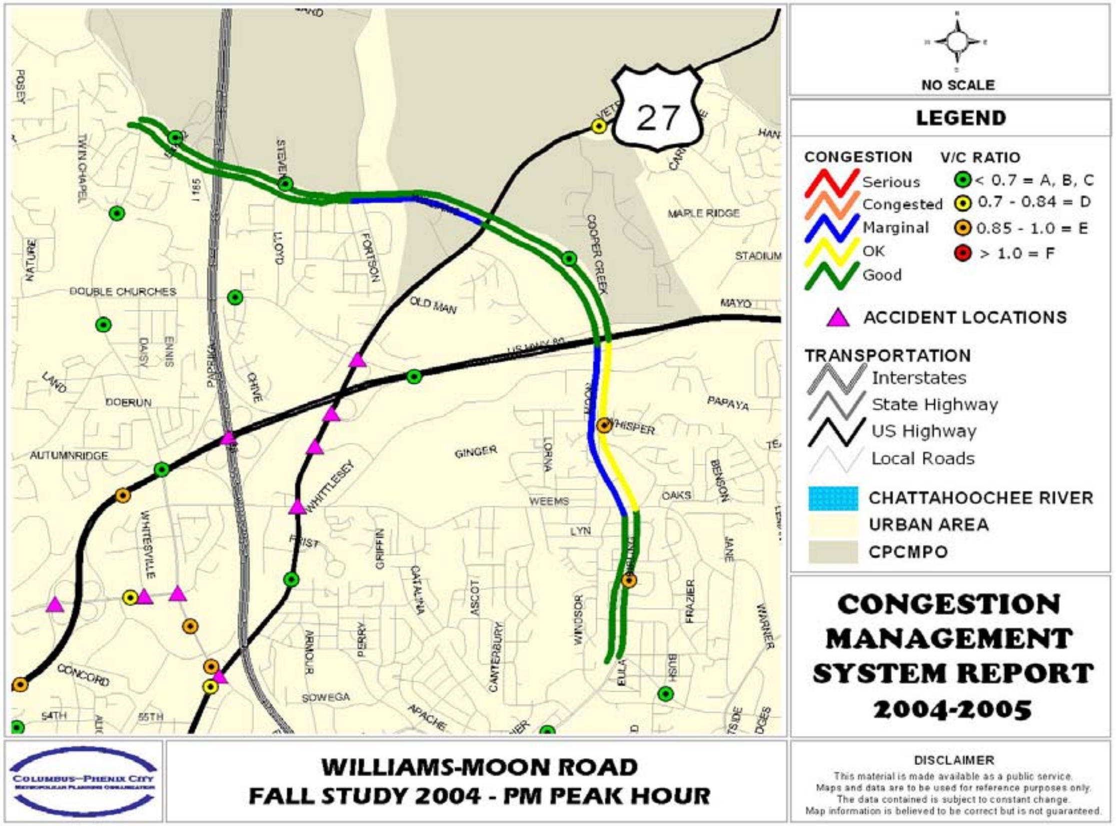
Potential Causes for Congestion

- Heavy peak volumes, especially between Airport Thruway and US 80.
- Top accident locations along the route leading to incident delays.
- Lack of Signal Coordination/Optimization
- Heavy turning volumes because of retail and other commercial establishments along the route.
- Heavy turn volumes to and from Veterans Parkway.

Mitigation Strategies and Associated Impact on CMS Performance Measures

	Travel Time	VC Ratio	Arterial/Intersection LOS	Transit System Measures	Incident Management
TDM Measures	▲	▶	▲	▶	▶
Traffic Oper. Imp.	▲	▲	▲	▶	▶
Non-Motorized Modes	▲	▶	▲	▶	▶
Access Management	▲	▲	▲	▶	▲
Intelligent Transportation	▲	▶	▲	▶	▶

WILLAMS - MOON ROAD



	Distance	NB	SB
Miller Road			Good
Weems Road	0.83	Good	Marginal
US 80	0.97	OK	Good
Veterans Pkwy	0.98	Good	Marginal
Fortson Road	0.72	Good	Good
I-185	0.79	Good	Good
Whitesville Road	0.60	Good	

Potential Causes for Congestion

- Area between I-185 and Fortson Road experiences the most delay during peak hours. Area with heavier concentration of residential development along the road.
- Lack of center turn lanes at strategic locations along this route.
- Lack of bike/pedestrian walkway, especially in the residential areas.
- Heavy stop control delay/heavy truck volumes at Fortson Road.
- Volume to Capacity issues along Moon Road on both eastbound and westbound lanes.

Mitigation Strategies and Associated Impact on CMS Performance Measures

	Travel Time	VC Ratio	Arterial/Intersection LOS	Transit System Measures	Incident Management
Traffic Oper. Imp.	▲	▶	▲	▶	▲
Growth Management	▲	▲	▲	▶	▲
Non-Motorized Modes	▲	▶	▲	▶	▲

CHAPTER 7
SUMMARY OF FINDINGS AND RECOMMENDATIONS

INTRODUCTION

The congestion management system study has categorized the extent of congestion for the individual sections of roadway along 20 routes in the Columbus area. Of the surveyed route miles 6% in the AM peak hours and 10% in the PM peak hours experiences a "congested" or "serious" rating. Table 7-1 below shows distribution of congestion categories for all the 20 routes.

Table 7-1
Distribution of Congestion Miles

	Route Segement by Congestion Category			
	AM Peak		PM Peak	
Congestion Category	Miles	Percentage	Miles	Percentage
Good	186	69%	181	67%
OK	37	14%	35	13%
Marginal	29	11%	28	10%
Congested	9	3%	16	6%
Serious	9	3%	10	4%
Total	270	100%	270	100%

RECOMMENDED STRATEGIES

Recommended strategies to address the congestion found in the Columbus area were identified in Chapter 6. These recommendations, based on local knowledge and engineering judgment, are intended to highlight those strategies considered to be most appropriate to the location and situation were congestion was identified. All recommendations will require further study and evaluation before programming and implementation. The recommended strategies are not intended to limit the scope of further studies. The recommended strategies are summarized in Table 7-2, according to the strategy classes and strategy groups described in Chapter 5

Table 7-2
Summary of Recommended Congestion Mitigation Strategies

	ROUTES	Transportation Demand Management	Traffic Operational Improvements	Transit Operational Improvements	Non-Motorized Modes	Growth Management	Access Management	Intelligent Transportation System	Capacity Expansion
1	2nd Avenue	✔	✔		✔		✔		
2	54th Street – Airport Thruway	✔	✔			✔	✔	✔	
3	Bradley Park Drive	✔	✔			✔	✔	✔	
4	Buena Vista Road	✔	✔	✔			✔		✔
5	Double Churches Rd								
6	Forest Road	✔	✔				✔		✔
7	Fort-Benning/Brennan Rd	✔	✔				✔		✔
8	Lee – Summerville Road	✔	✔		✔	✔	✔		✔
9	Macon Road	✔	✔			✔	✔	✔	
10	Manchester Expressway		✔				✔	✔	
11	River Road		✔		✔		✔		
12	Saint Mary's Road								
13	US 280	✔	✔			✔	✔	✔	
14	US 80 – 13th Street	✔	✔				✔		
15	US 80 – J. R. Allen Parkway	✔				✔	✔	✔	
16	Veterans Parkway	✔	✔		✔		✔	✔	
17	Victory Drive	✔	✔		✔	✔	✔		
18	Warm Springs Road		✔		✔		✔	✔	
19	Whitesville Road	✔	✔		✔		✔	✔	
20	Williams Road – Moon Road	✔			✔	✔			

TRAFFIC OPERATIONAL IMPROVEMENTS

The strategy recommended most frequently is that of traffic operation improvements. This strategy group consists of:

a) traffic signal improvements
b) roadway geometric improvements
c) time-of-day restrictions
d) ramp metering
e) commercial vehicle improvements; and
f) construction management.

This strategy is generally more efficient utilizing a combination of strategies along specific corridors. For example, in the Manchester Expressway corridor, west of I-185, a combination of signal timing / coordination enhancements coupled with geometric improvements could potentially greatly improve both accessibility and mobility.

ACCESS MANAGEMENT

Access management is the second most recommended strategy group. This strategy encompasses such recommendations as shared access and inter-parcel connectivity. Access management techniques strive to preserve the functionality of a facility by controlling movement onto and off a facility to specified locations, and provided local access without reentering the facility.

TRAVEL DEMAND MANAGEMENT

Travel Demand Management (TDM) is another highly recommended group of strategies. TDM generally consist of strategies aimed at moving trip making form the peak hour by offering alternate work schedules, telecommuting options and transit and/or carpooling incentives.

TRANSIT OPERATIONAL IMPROVEMENTS

Transit operational improvements are recommended in the Veterans Parkway and Buena Vista road corridors and would consist of service related improvements and traffic operations for transit services.

NON-MOTORIZED MODE

Bicycle and pedestrian infrastructure improvement were recommended in five corridors and include the addition of sidewalks and/or bicycle lanes as well as signals for bicyclists and pedestrians.

GROWTH MANAGEMENT

Growth management is an appropriate strategy in developing areas. Techniques such as land use and corridor transportation coordination could potential address future congested locations.

INTELLIGENT TRANSPORTATION SYSTEMS

Intelligent Transportation System (ITS) strategies are designed to inform motorist of traffic and travel conditions prior to arriving in congested conditions. The availability of this information could potential result in travel route changes that would avoid congested facilities. Other ITS strategies focus on non-reoccurring congestion such as incident management and incident response.

CAPACITY EXPANSION

Recommendations to consider capacity expansion by the addition of arterial travel lanes were made in the Buena Vista Road and Lee / Summerville Road corridors.