Section 8

CONGESTION MANAGEMENT, SAFETY MANAGEMENT, AND SECURITY ELEMENT

8.0 Introduction

This section focuses upon three program elements to be considered in the planning process: Congestion Management, Safety Management, and Security of the transportation system. These elements serve to increase the mobility of persons and freight that utilize the transportation system and to eliminate or mitigate hazards on the transportation network. TEA-21 legislation required a Congestion Management System be developed for Transportation Management Areas, such as the Huntsville Urbanized Area. SAFETEA-LU updated the requirement for a Congestion Management Process, in contrast to the Congestion Management System. This change intends to address congestion management through a process that provides for effective management and operations, an enhanced linkage to the planning process, and to the environmental review process, based upon cooperatively developed travel demand reduction and operational management strategies as well as capacity increases. Additionally, SAFETEA-LU split two previously conjoined planning factors: safety and security of the transportation system, and added emphasis upon maintenance and operations strategies. Since these factors are clearly integrated within Congestion Management, they are included in this section as well.

8.1 Congestion Management Element

Increasing traffic congestion is one of the greatest challenges facing the Huntsville Urbanized Area. It results in motorist frustration, the loss of productivity, and the deterioration of air quality. Better management of the transportation system will help the region to address these growing problems as limited transportation resources struggle to meet rising travel demands.

The Huntsville Urbanized Area has been designated as a Transportation Management Area by the Federal Highway Administration and the Federal Transit Administration. This designation requires the MPO to develop and maintain a comprehensive congestion management process. As a result, a detailed congestion management analysis has been performed which specifies current and future congestion problems on the network, and identifies various strategies to correct system deficiencies.

The new legislative requirements view the Congestion Management Process (CMP) as more objectives-driven. The CMP also has an emphasis on incorporating management and operations in the project development process, so that short-term improvements may be made to alleviate immediate congestion problems, and long range solutions may also be offered as a more permanent fix.

8.1.1. Management and Operations (M&O)

One of the planning factors identified in the SAFETEA-LU legislation that must be considered in the transportation planning process is to "promote efficient system management and operations". The legislation specifically requires that the metropolitan transportation plan, or long range plan, include not only capital projects, but management and operations strategies as well. These management and operations strategies are highlighted as an important component in mitigating congestion in addition to increasing safety and security.

The Federal Highway Administration recently published: **Management and Operations in the Metropolitan Transportation Plan** (November 2007) and **An Interim Guidebookon the Congestion Management Process in Metropolitan Transportation Planning** (February 2008). These publications define M&O as an integrated approach to optimize the performance of existing and programmed infrastructure through the implementation of multi-modal, intermodal, and often cross-jurisdictional systems, services, and projects. Implementing a planning process with a strong M&O component is best accomplished by a new way of thinking about management and operations in transportation planning – one that is objectives-driven and performance-based such as the CMP. Essentially, the M&O is integrated into the CMP. The CMP actualizes the operations objectives through a systematic approach for developing performance measures, identifying and analyzing problems, collecting data, developing strategies, implementing strategies, and further evaluating how the implemented strategy(ies) impact the transportation network.

M&O strategies are integrated into the long range transportation plan through the CMP. While the CMP focuses on congestion relief, the process itself is systematic in that it involves developing performance measures, identifying operational needs and deficiencies, and developing strategies, including M&O strategies. A discussion of the types of strategies considered in the transportation planning process is found in **Section 8.1.2.3** and in **Appendix C.** Specific projects have been identified to improve the management and operation of the transportation network. These projects are listed in **Section 8.4**, and are classified by the Alabama Department of Transportation as "maintenance and operations" projects.

8.1.2 Steps to an Effective CMP

There are eight steps to an effective CMP. These steps are as follows:

1. Develop Congestion Management Objectives
2. Identify Area of Application
3. Define System or Network of Interest
4. Develop Performance Measures
5. Institute System Performance Monitoring Plan
6. Identify and Evaluate Strategies
7. Implement Selected Strategies and Manage Transportation System
8. Monitor Strategy Effectiveness

Of these eight steps, three provide a critical foundation to the process. These three steps are further discussed below.

8.1.2.1 Develop Congestion Management Objectives

Objectives are specific steps that help to accomplish the goal, and include outcome or output-oriented measures. Objectives should be stated in such a way that performance measures can be derived from the objectives. Congestion management objectives may be related to other, operations-oriented objectives, such as making transit more attractive to commuters or to objectives aligned with regional land use goals.

8.1.2.2 Develop Performance Measures

Performance measures provide metrics that can be used regionally to track systemwide performance, or at a corridor, roadway, or intersection, etc… to identify specific deficiencies within the system. These have been identified and are integrated within the CMP.

8.1.2.3 Identify, Evaluate, Implement and Monitor Strategies

Selected projects and programs are implemented to achieve objectives and to mitigate congestion. Various types of strategies to be considered in the CMP are identified in **Appendix C**. While corridor widening is a viable option, the CMP requires additional strategies to be considered as well. SAFETEA-LU requires that "for transportation management areas classified as nonattainment for ozone or carbon monoxide pursuant to the Clean Air Act, federal funds may not be advanced in such area for any highway project that will result in a significant increase in the carrying capacity for single-occupant vehicles unless the project is addressed through a congestion management process." Furthermore, the CMP must give priority to strategies that reduce congestion and improve the mobility of people, goods, and services without requiring the construction of additional roadway capacity. Capacity adding projects are not prohibited, but the CMP requires the MPO to consider alternative strategies to capacity increases, and that measures be incorporated into the project to make the most efficient use of the new capacity once it has been constructed. At the present time, the Huntsville Urbanized Area is at attainment, but in good faith will consider the additional strategies to mitigate congestion.

In addition to increasing roadway capacity, there are two other major categories of congestion mitigation strategies: Transportation System Management (TSM) and Travel Demand Management (TDM). The TSM approach to congestion management seeks to identify improvements to new and existing facilities that are operational in nature. These techniques are designed to improve traffic flow through better management of existing facilities. The TDM approach to congestion management focuses on user demand and behavior modification strategies to reduce drive-alone and peak-period travel.

The adopted TSM strategies include intersection and signalization improvements on collector and arterial streets to help alleviate traffic congestion. A group of technologies, collectively known as Intelligent Transportation Systems (ITS), is proposed to improve transportation system efficiency and safety. The City of Huntsville has embarked upon a regional effort to develop methods that would enhance the management and operation of the local transportation system in efforts to maximize the level of efficiency and safety through its investment in ITS. Strategies have been identified for the region, and are planned for implementation; however, current efforts are hampered due to lack of federal funds to support the program. The ITS strategies include, but are not limited to, the integrated and coordinated operations of incident management, emergency management, and advanced traffic signal and traveler information. These strategies are discussed in further detail in the Intelligent Transportation Systems (ITS) section of this chapter.

TDM strategies currently underway include the rideshare program which helps to encourage carpooling, vanpooling, and transit usage by offering incentives to the employees of the region's large employers. Additionally, the recent development of bicycle facilities encourages cycling to work.

The implementation of congestion mitigation strategies provides several benefits. The reduction of vehicle travel will mean less traffic congestion on our roadways resulting in reduced travel times, lower vehicle emissions, and improved air quality. Enhanced accessibility, fewer traffic accidents, and greater transportation system reliability will also be achieved through the use of these relatively low-cost strategies. Monitoring the implemented strategies will assure that these benefits continue for users of the transportation system.

The Congestion Management Process for the Huntsville Urbanized Area is presented below.

8.2 Congestion Management Process

The Congestion Management Process (CMP) is a federally required program providing for the comprehensive and continuous study of traffic movement on major corridors at the regional level. Locally, the Huntsville Area Transportation Study's CMP consists of on-going data collection and analysis used to establish trends and to monitor the overall mobility of the transportation system through benchmarking techniques established in the **CMP Procedures and Responsibilities Report**, found in **Appendix C** of this document.

8.2.1 Local CMP Framework

This CMP has been prepared to meet the requirements of federal legislation. The purpose of the CMP is to establish certain characteristics of the local transportation system, so that future data analysis may be performed which would show changes in system efficiency and the quality of the transportation system service experienced by users. All CMP monitoring requirements have been consolidated. The CMP is divided into the following four sections to cover all aspects of the CMP addressed in the federal

requirements:

- State of the System
- CMP Technical Ranking
- Strategy Recommendations
- Strategy Effectiveness Evaluations

The "State of the System" section will assess mobility conditions through established performance measures. The "CMP Technical Ranking" section will list in priority order current and anticipated congested corridors for further study. The "Strategy Recommendations" section provides for further analysis and defines appropriate actions for implementation to solve congestion problems. The "Strategy Effectiveness Evaluations" section will include an evaluation of any implemented strategy recommendations mentioned in previous congestion management documents to determine if the implemented strategy is successful.

The cornerstone of an effective CMP is dependent upon the quality and quantity of data collected for the study area. Specific performance criteria and the parameters of study were established in the **CMP Procedures and Responsibilities Report**, found in **Appendix C**. According to the report, the following elements were selected for study, and have been incorporated into this document:

1. *CMP Transportation Network:*
The CMP Transportation Network consists of all major arterials, minor arterials, major collectors, and major rural collectors that have been modeled per the MPO's **Year 2035 Transportation Plan**. Traffic counts have been taken from the base year network of the transportation model and were used in compiling this report on mobility.

2. *Local Public Transit Systems:*
Both fixed route and demand response public transit services were studied that receive federal funds through the Federal Transit Administration either directly or through the State of Alabama. The City of Huntsville Department of Parking and Public Transit administers a fixed route service - the Huntsville Shuttle. The Shuttle operates thirteen routes within the city limits of Huntsville, and provides service Monday through Friday from 6:00 a.m. until 6:00 p.m. The fixed route system began in 1990 with four routes and a limited schedule, and has since expanded routes and service hours based upon demand for service.

The City of Huntsville also administers a demand response service, known as Handi-Ride. The Handi-Ride service operates Monday through Friday from 6:00 a.m. until 6:00 p.m. Service is limited to pre-qualified individuals that are elderly and/or disabled and cannot access traditional fixed route transit service. Handi-Ride transportation must be scheduled at least 24 hours in advance.

Madison County operates a demand response transportation service as well. Transportation for Rural Areas of Madison County (TRAM) operates Monday through Friday from 7:00 a.m. until 3:00 p.m. This service is limited to individuals residing in rural MadisonCounty; otherwise, there are no other service restrictions. TRAM service must be scheduled at least 24 hours in advance.

Utilizing the data collected for the established CMP network and public transit systems, analyses and assessments were made concerning the state of our local transportation system. The State of the System follows.

8.2.2 State of the System

The following categories of performance measures are being monitored to analyze current mobility conditions and trends in the Huntsville region:

- Congestion Based measures
- System Efficiency Based Measures
- System Mobility Based Measures
- System Accessibility Measures
- Non-Recurring Congestion Measures

These categories have been further broken down into specific performance measures analyzed later in this section.

Statistics are available only for routine vehicular traffic and public transit services on the adopted Congested Management System Network as defined in the **CMP Procedures and Responsibilities Report, Appendix C.**

Data collection for the CMP was performed in accordance with the methods and procedures outlined in the **CMP Procedures and Responsibilities Report**. The most recent traffic count data collected and utilized in this report was collected by all entities and was input into the base year transportation model during its 2009 update. The latest public transit statistics have been compiled from data provided in annually required federal and State reports for the years 2005 through 2008. Data for 2009 has not been validated as of publication time.

8.2.2.1 CMP Objectives

Various objectives for the Huntsville Urbanized Area have been developed, and are based upon the identified performance measures. These objectives and their correlating performance measuresfollow:

1. Congestion-Based Measures: V/C Ratio and Fixed Route Rate of Occupancy

   Reduce the number of segments on the transportation network that have a V/C ratio of 1.0 or higher, so that by 2015 the transportation network exhibit more free flow conditions. This can be accomplished by

implementing various strategies that relate to land use, access management, operational improvements, construction of additional bike and pedestrian facilities, as well as road widening.

Correlate Shuttle Bus ridership with Shuttle Bus capacity so that by 2015 certain routes will not require additional buses to handle overflow passengers.

2. System Efficiency Based Measures: Daily VMT, Daily VMT per Person, Roadways Operating at Congested Conditions (uncongested vs. congested lane miles, congested vs. uncongested VMT)

   Reduce congestion on the transportation network so that users accessing the network may experience overall efficient trips.

3. System Mobility Based Measures: Trip oriented and measures the ease and freedom with which persons can travel from one location to another (Total yearly public transit ridership, average daily passengers on transit services, annual revenue miles, average speed on the transportation network)

   Correlate public transit ridership with bus capacity so that by 2015 certain routes or systems can easily handle the demand for service.

   Routinely increase average speed of all classifications of corridors on the transportation network so that by 2015 enhanced mobility on the overall network can be realized. This may be accomplished through the implementation of short-term and long-term strategies that will either operationally enhance mobility or increase system capacity.

4. System Accessibility Measures: Activity oriented and measures the degree of ease that individuals experience in traveling to employment, shopping, school, and even other modes of transportation.

   Increase carpool activity and the use of alternative modes of transportation besides the vehicle, so that system accessibility may be improved and congestion experienced on the network may be reduced. This may be performed through marketing various modes of transportation and providing more opportunities for network users to try “new” methods of transportation.

   Decrease travel to work time by subarea by implementing short-term congestion relieving strategies as well as planning long-term road widening projects, so that users of the network may access the system during peak times with minimal delay.

5. Non-Recurring Congestion Measures: Traffic Accidents by Intersection

Reduce the number of accidents at high accident prone locations by investigating the need for operational improvements, and correlate the high rate of accidents to congested corridors which will define the potential for delayed trips on the network.

8.2.2.2 System Performance Measures

The statistics presented in this section validates the current state of the regional transportation system, and will assist the region in meeting the above objectives.

1. Congestion Based Measures

Congestion based measures are facility oriented and indicate how much of the road capacity or bus capacity is being used within a corridor. The following indicators of roadway and bus congestion were evaluated:

a. Volume to Capacity Ratios

The Volume to Capacity Ratio (V/C Ratio) is the comparison of traffic volume at a specific location versus the roadway's capacity. Roadway segments experiencing v/c ratios in excess of 1.0 are considered congested. **Section 4, Map 4.4** identifies locations experiencing congestion using this method of measure. Data was obtained from the base year network of the **Year 2035 Transportation Plan**.**Section 4, Map 4.16** displays locations anticipated to experience congestion per the "Future Year Network" data obtained from the Year **2035 Transportation Plan**. These specific roadway segments will be identified and studied further in **Section 8.2.3** and **Section 8.2.4** of this report.

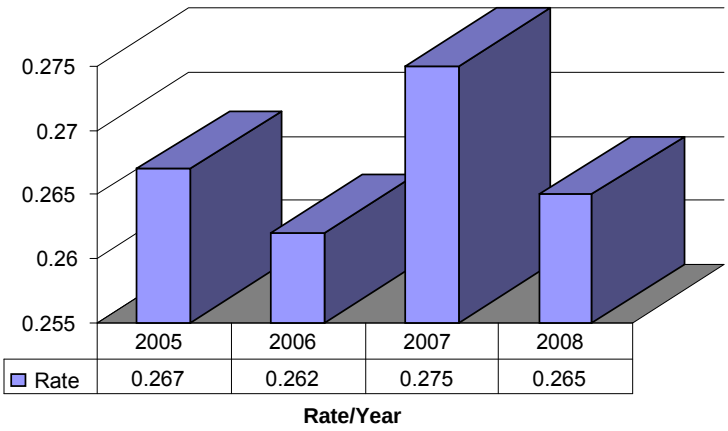
b. Fixed Route Rate of Occupancy

The fixed route rate of occupancy measured here gauges congestion on the Huntsville Shuttle bus system on an average daily basis. According to Huntsville Parking and Public Transit officials, there is not a standard system wide peak time of service for the Huntsville Shuttle; therefore, statistics are displayed on an average daily basis. **Figure 8.1** shows the fixed rate of occupancy for the years 2005 through 2008. In the past, average daily ridership for 2002 was 1,200 passengers, while average daily ridership for 2003 and 2004 stabilized to approximately 1,100 passengers per day. Ridership on the

system increased for 2005-2008, and peaked at 1,617 trips daily during 2007. Trips declined by only 59 trips during 2008. The average system wide rates of occupancy indicate that the fixed transit route is not experiencing congested conditions.

Of all the routes in service, the Southwest Huntsville route tends to have the most ridership, and experiences service at or beyond capacity several times during the day. The primary reason for this was ridership to and from StoneMiddle School. Recent action by the Huntsville City School Board has closed the school beginning with the 2009-2010 school year, and it will be interesting to note what impacts this action will have upon this particular route. More detailed fixed route rate of occupancy data per routemay be available during the next reporting period.

Figure 8.1
Fixed Route Rate of Occupancy
Years 2005-2008



2. System Efficiency Based Measures

System efficiency based measures provide an overall assessment of the transportation system's performance by measuring system demand and the level of congestion in the area. Measures in this category consist of vehicle miles traveled (VMT) and roadways operating at congested conditions. It is important to note that the VMT estimates do not indicate system wide demand, only demand on the CMP network. The following indicators of system efficiency were evaluated:

a. Average Daily Vehicle Miles of Travel (VMT)

The average daily VMT is calculated by multiplying each roadway segment's length by its average daily traffic count, and adding the results from each segment together. The average daily vehicle miles of travel driven on the CMP network totaled 7,291,749 miles for the modeled 2000 base year, and increased by nearly 12% to 8,290,375 for the year 2005 modeled network. This indicates an increase in average daily travel of nearly 1 million miles on the modeled network.

b. Average Daily Vehicle Miles of Travel per Person

The average daily VMT on the CMP network per person was calculated. Countywide, persons traveled an average 25.08 miles per day on the CMP network according to the modeled 2000 base year network. The number of average VMT on the CMP network increased to an average of 26.59 miles per day for the 2005 modeled base year network.

c. Roadways Operating at Congested Conditions

For the purpose of this report, congested roads have been defined as corridors or roadway segments where the average daily traffic count is equal to or greater than the roadway's capacity. For the Huntsville Area MPO, any location with a volume/capacity ratio of 1.0 or higher is considered congested. This section will establish the baseline of vehicle miles traveled on various road classifications operating at congested conditions on the CMP network. This information is displayed on **Figure 8.2. Figure 8.3** shows the total vehicle miles traveled on congested vs. uncongested roadways.

According to **Figure 8.2**, congested vehicle miles traveled are higher on the network's major and minor collectors, followed by major arterials, minor arterials, and interstate highway facilities.

Figure 8.2
Base Year 2005 Congested Vehicle Miles Traveled (VMT) by Roadway Classification

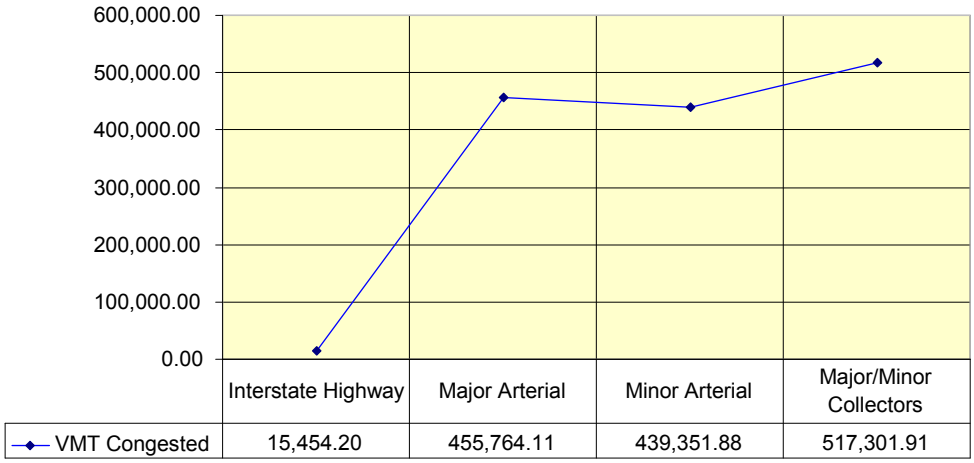
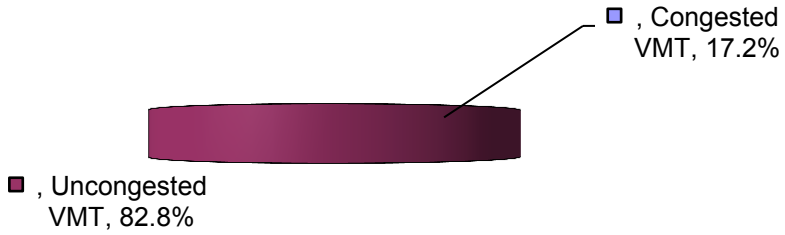


Figure 8.3
Base Year 2005 Congested versus Uncongested Vehicle Miles Traveled (VMT)



An assessment of actual vehicle miles traveled (VMT) congested vs. uncongested was conducted, and results are shown at **Figure 8.3**. Overall, 17.2% of all vehicle miles traveled on the CMP network during this reporting period occurred on congested roadways. A comparison with the modeled 2000 base year data indicates an 11.9% increase in congested vehicle miles traveled on the 2005 modeled base

year network.

3. System Mobility Based Measures

Mobility based measures are trip oriented, and measure the ease and freedom with which persons can travel from one location to another. For the purpose of this report, mobility will be measured for public transit services and on the CMP transportation network.

a. Public Transit Ridership

The previously reported fixed route rate of occupancy indicates a high degree of mobility on the transit system and its capability to accommodate passenger trips. Passenger mobility is not negatively impacted because the calculated rate does not indicate congested conditions on the fixed route system.

To further determine passenger throughput on the transit system, the following indicators have been evaluated:

(1) Total Yearly Ridership

Total yearly ridership for the Huntsville Shuttle fixed route service, and demand response services (Huntsville's Handi-Ride and rural Madison County's TRAM) for the years 2005-2008 are presented below.

Figure 8. 4
Total Ridership Huntsville Shuttle
Years 2005-2008

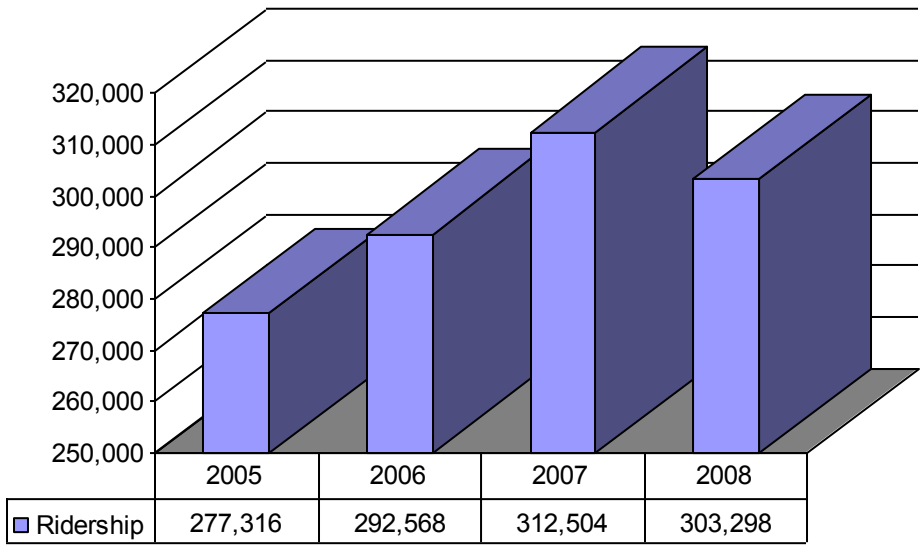


Figure 8.5
Total Ridership Demand Response
Huntsville Handi-Ride: Years 2005-2008

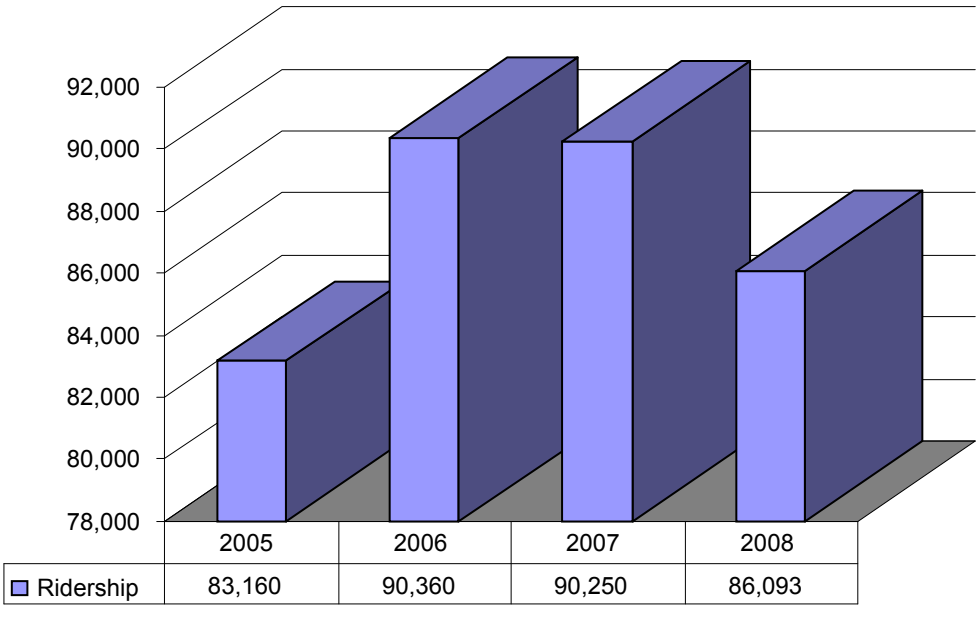
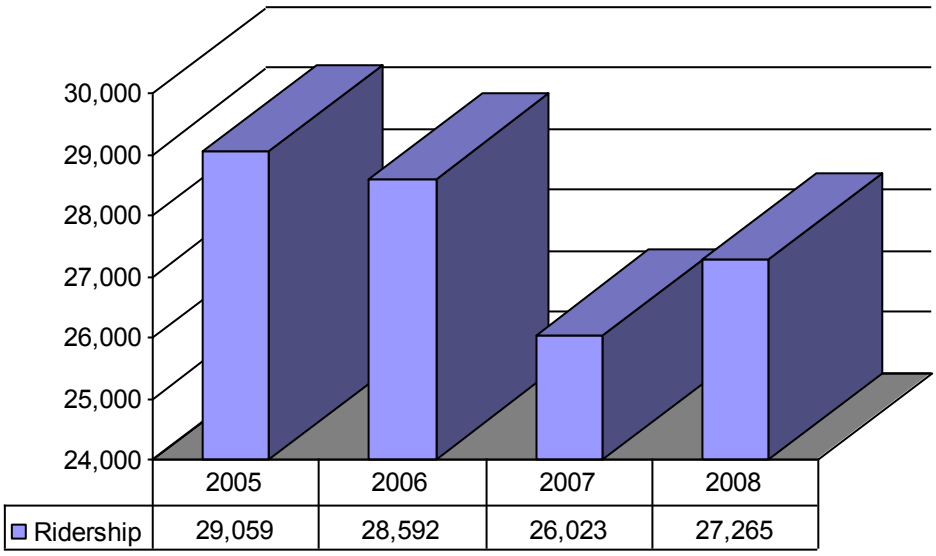


Figure 8.6
Total Ridership Demand Response
Madison County TRAM: Years 2005-2008



While ridership declined by almost 3% in 2008 for Huntsville's fixed route system form 2007's numbers, overall system throughput on the system has increased during the past four years by nearly 8.6%. The City of Huntsville's demand response service, Handi-Ride, has seen a sporadic overall increase in ridership of over 3.5% during the past four years. This sporadic trend in ridership may be due to the following reasons:

- Several human service and social service agencies that historically have depended upon demand response services provided by the City of Huntsville have dropped out of the program and some are now providing transportation services to their own clients. This decrease in demand contributed to a reduction of vehicles, ridership, and revenue miles. This is a continuing trend, as several other human service and social service agencies were not contracted in fiscal year 2006 and beyond.

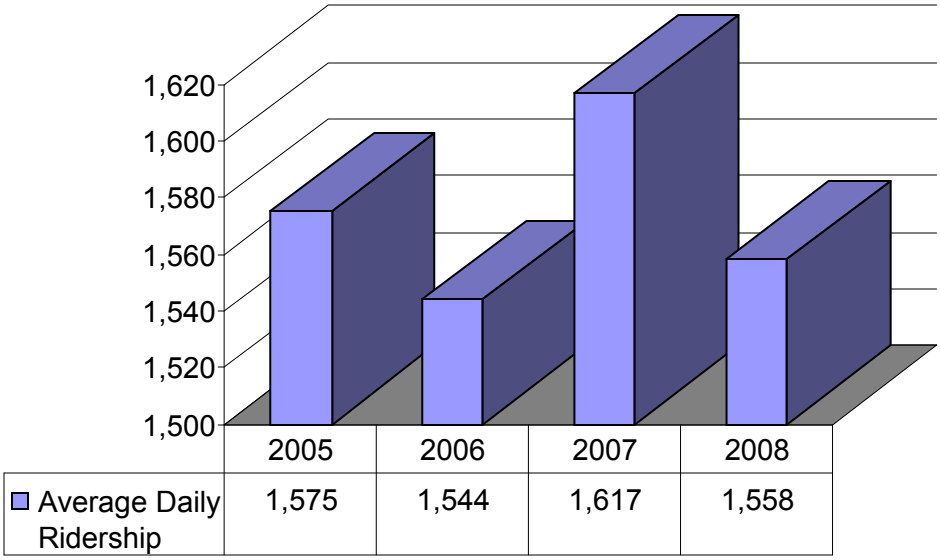
- Additionally, assisted living facilities that have recently been opened in the City of Huntsville also provide transportation for their residents. These trips are of the same nature as those that are typically provided by Handi-Ride (i.e., grocery store, doctor's appointments, drug store, SeniorCenter, etc…).

Demand response trips provided by Madison County's service, TRAM, has decreased during the past four years by over 6%, primarily due to the same reasons.

(2) Average Daily Passengers

Average daily passenger information was collected only for the Huntsville fixed route system. Statistics indicate that a peak average 1,617 passengers rode the Huntsville Shuttle bus per day during 2007. The average number of passengers riding the Shuttle during 2008 was 59 less. While ridership numbers have fluctuated during the past four years, the rate has not been dramatic. These ridership numbers are characteristic of a consistent population that depends on transit for trips to work, school, shopping, and socialization.

Figure 8.7
Average Daily Ridership Huntsville Shuttle
Years 2005-2008

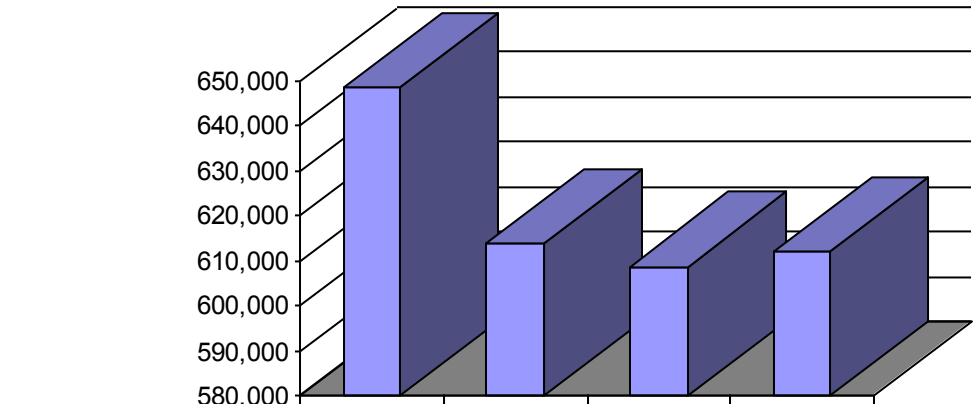


	2005	2006	2007	2008
Average Daily Ridership	1,575	1,544	1,617	1,558

(3) Annual Revenue Miles

Annual revenue mile data was collected on all public transit systems. A discrepancy in the fixed route service is expected since the service days vary from year to year. Additionally, the Shuttle is in service during some holidays and for some special events. The Handi-Ride demand response service's annual revenue miles for the past four years indicate an instability, which may be explained by either persons choosing fixed route service during 2007 (in which Shuttle ridership increased), or a reduction in usage by human service and social service agencies. Madison County's TRAM service reported a decrease in revenue miles, proportional with decreased ridership levels over the past four years.

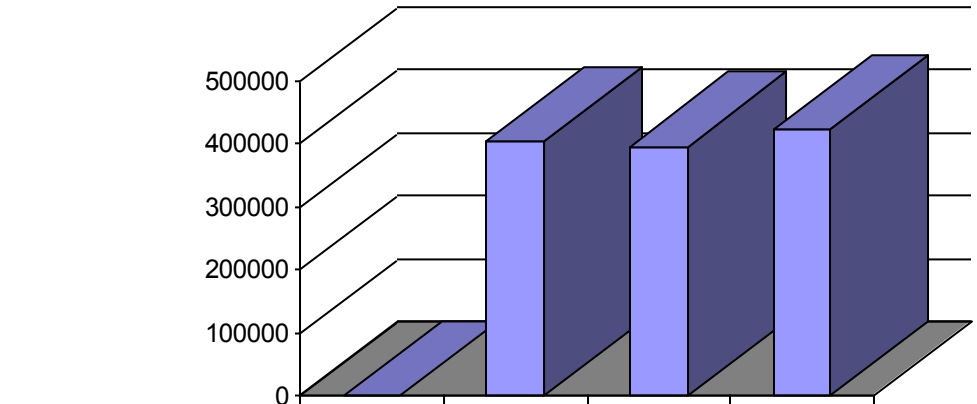
Figure 8.8
Annual Revenue Miles Huntsville Shuttle
Years 2005-2008



	2005	2006	2007	2008
Annual Revenue Miles	648,590	613,880	608,804	612,049

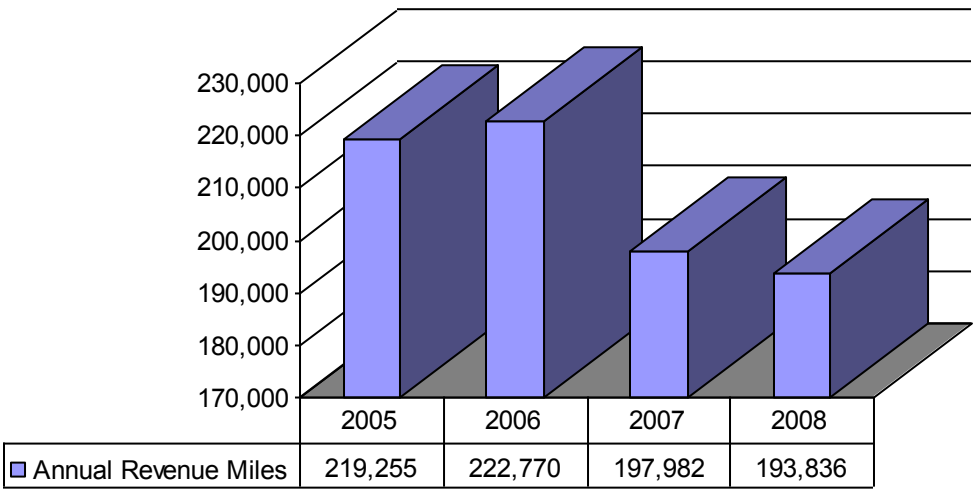
***Annual Revenue Miles for 2005 are not available.**

Figure 8.9
Annual Revenue Miles Handi-Ride
Years 2005-2008



	2005	2006	2007	2008
Annual Revenue Miles	0	403,106	395,958	423,688

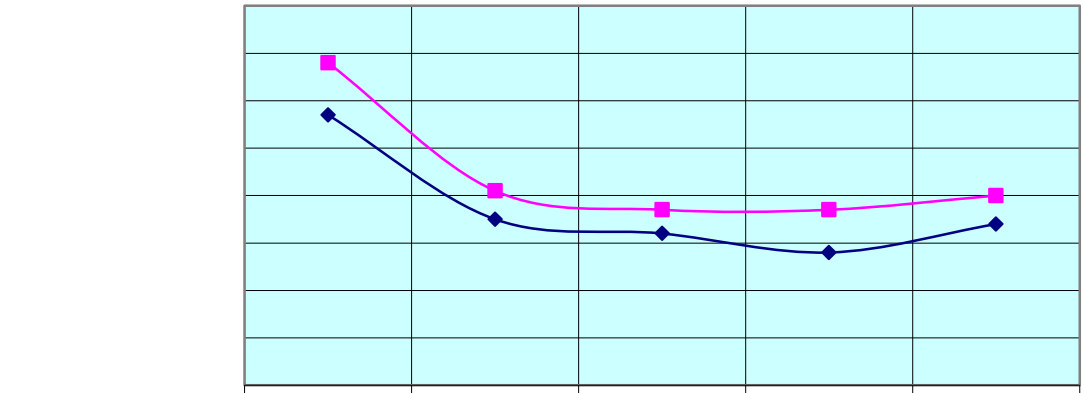
Figure 8.10
Annual Revenue Miles TRAM
Years 2005-2008



b. CMP Transportation Network

Travel time data is the best measure of mobility on transportation networks. Unfortunately, real time travel data is not available for the Huntsville area CMP transportation network. The **Year 2025 Transportation Plan** as well as the **Year 2030 Transportation Plan** and the 2035 update modeled travel time on roads within the MPO study area, which mirrors the CMP transportation network. Higher speeds translate into better mobility across the network. A comparison between the speeds indicated by the **Year 2025 Transportation Plan**, adopted in January 2000, the **Year 2030 Transportation Plan**, adopted during 2005, and the modeled year 2035 transportation network are shown at **Figure 8.11**. Overall, travel speeds have decreased on all classifications of roadways. This decrease in speed indicates more heavily traveled roadways. A decrease in speed of about 10 miles per hour is indicated on freeways and minor arterials, while expressways, major arterials, and major collectors decreased in travel speed by about 5 miles per hour.

Figure 8.11
Comparison of Average Speed on the CMP Network



	Freeway	Expressway	Major Arterials	Minor Arterials	Major Collectors
Base Year 2000	68	41	37	37	40
Base Year 2005	57	35	32	28	34

4. System Accessibility Measures

System accessibility measures are activity oriented, and measure the degree of ease that individuals experience in traveling to employment, shopping, school, and even other modes of transportation. For the purpose of this section, fixed route public transit and the CMP network were evaluated.

a. Public Transit Accessibility

Public transit accessibility is somewhat difficult to measure. There are assurances; however, that transit accessibility goals are met through the triennial **Title VI Report** submitted by the Huntsville Parking and Public Transit Division, and required by the Federal Transit Administration. Such assurances involve passenger opinion surveys, needs-analysis route committees involved in improving and developing new routes, public hearings, and citizen input gathered from these events. Accessibility is furthermore established as the norm through the distribution of specific transit amenities and access of service to a majority of the population fitting the minority population and/or low income profile. System accessibility is measured every three years, and is documented in detail in the

Title VI Report, available for public review in the City of Huntsville's Department of Parking and Public Transit office.

b. CMP Network Accessibility

CMP network accessibility has been measured by referring to transportation related statistics available from the US Census Bureau. Conclusions have been drawn from data presented in the Huntsville Planning Division's "Journey to Work" publications, which measure commuting patterns countywide.The 1990 and 2000 versions of the publication were consulted. The statistics available in these reports are the measure of choice, since most peak-time travel is work-related, and most roadway congestion typically occurs during this time.

Upon evaluating the available statistics, it was determined that overall congestion in the area is not extreme and network accessibility is acceptable. Under free flow conditions, persons can typically commute from one end of the county to the other in about 30 to 40 minutes. **Table 8.1**, which follows, shows some comparisons of Journey to Work Data from 1990 and 2000.

Table 8.1

US Census 2000: Local Journey to Work Statistics

	% Drove Alone		% In Carpools		% Using Public Transit		% Using Other Means		% Walked or Worked at Home		Average Travel Time (Minutes)	
Location	**1990**	**2000**	**1990**	**2000**	**1990**	**2000**	**1990**	**2000**	**1990**	**2000**	**1990**	**2000**
Alabama	79%	83%	15%	12.3%	1%	.5%	1%	.9%	4%	3.4%	N/A	24.8
MadisonCounty	82.4%	83.9%	12.5%	11.3%	.3%	.4%	.8%	.7%	4%	3.6%	21.7	20.9
Huntsville	83.2%	83.8%	11.8%	11.2%	.4%	.5%	.8%	.7%	3.7%	3.9%	20.0	18.0
Madison	90%	87.1%	7.5%	9.9%	.9%	.1%	.6%	.4%	1%	2.6%	19.4	18.2

Data Source: US Census Bureau and City of Huntsville Planning Division

Madison County showed a slight reduction in carpool activity, and a slight increase in persons driving to work alone. Statistics for the City of Huntsville remained relatively unchanged. A slight increase in public transit use was noted, and is equivalent to the State standard. The City of Madison showed a 2.4% increase in carpooling, and a 2.9% decrease in persons driving to work alone. These results indicate that countywide, a 1.5% increase of single occupied vehicles are accessing the transportation network. In the

City of Huntsville, .6% more single occupied vehicles are accessing the transportation network, and in the City of Madison, the number of single occupied vehicles accessing the network decreased by 2.9%.

The mean travel to work time decreased during 2000. Contributing to this improvement is no doubt the construction of Interstate 565, Four Mile Post Extension/Cecil Ashburn Drive, and other regional road widening and construction projects occurring between 1990 and 2000.

A countywide analysis of commuter patterns shows that the number of commuters increased in 2000 by 9.2%, yet commuters experienced a decrease in travel time to work in most subareas. A comparison of total commuters is shown at **Figure 8.12**, and a breakdown of travel time per subarea is displayed at **Table 8.2**. A map of subareas can be found on page 8-22.

Subarea boundaries changed slightly in 2000 based upon the latest census data; however, the boundaries' impact on commuting times per subarea should not be significant nor substantial. Subareas experiencing an increase in land area include Madison, Triana, Gurley, Riverton, East Central, New Market, and Harvest/Monrovia. Subareas experiencing a decrease in land area include Airport, Triana, North, Downtown, and 72 East. Better delineation was made between the Big Cove and East subareas. Even when the Big Cove and East subareas were combined and compared, the area still exhibited a decrease in commuting times. During the past ten years, the Big Cove and East subareas have experienced tremendous growth with the development of the Hampton Cove community. The number of commuters in these combined subareas increased by approximately 127%. The fact that improvements have been made in commuting times in subareas which now have an increased population base is quite impressive. The improvement of these travel times may be the direct result of the construction of the Four Mile Post Extension/Cecil Ashburn Drive which connects the two subareas to the Near South East subarea.

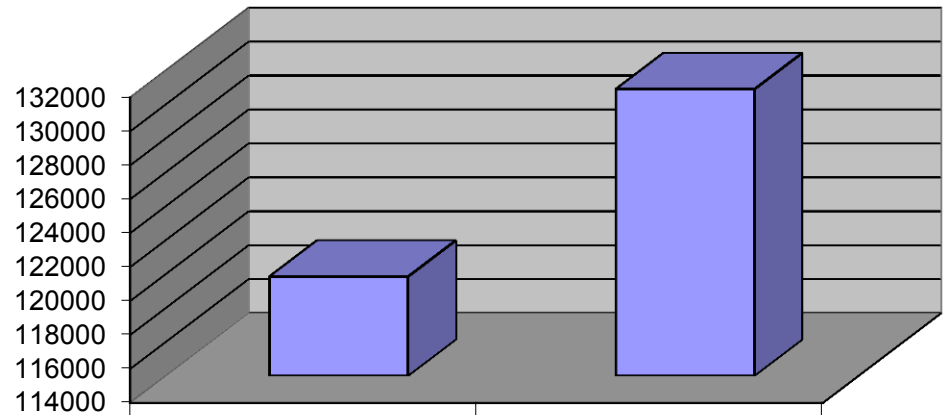
Five subareas show an increase in travel time: Hazel Green, Triana, North West, Toney/Ardmore, and ResearchPark. The North West and ResearchPark subareas show an increase of .2 minutes of travel time – which is very minimal. The remaining three subareas reporting an increase are located near the Madison County limits, in suburban areas. Triana, whose northwest boundary shifted further south and northeast boundary shifted

further north, showed an average 2 minute increase in commuting times.

When comparing the changes in travel time to work, and noting improvements as well as minimal increases in travel time, it is determined that network accessibility during peak hours, (when most congestion occurs) is indeed acceptable.

Figure 8.12

Comparison of Total Commuters 1990 vs. 2000



	Total Commuters 1990	Total Commuters 2000
Total Number of Commuters	119857	130905

Map 8.1: CMP Subareas

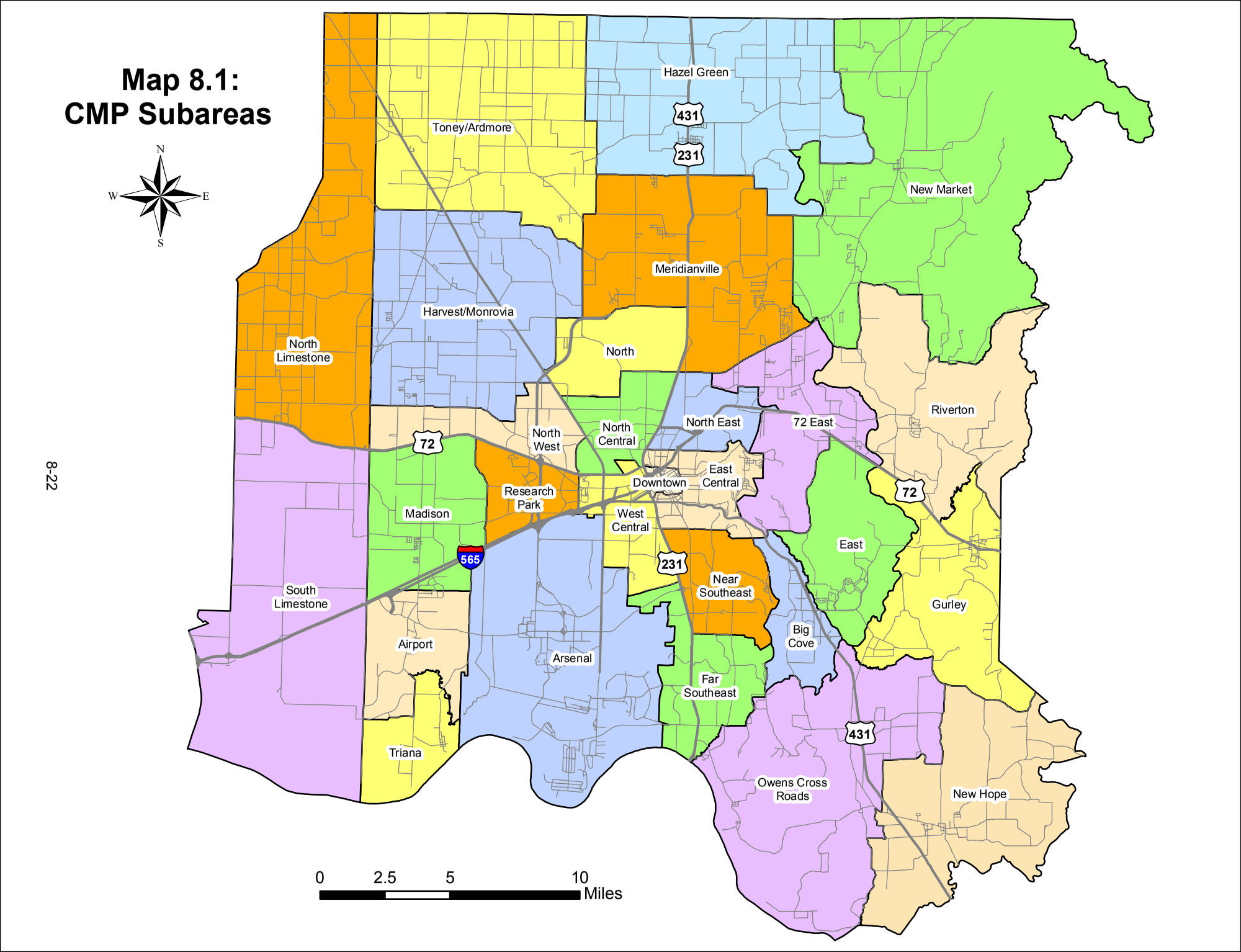


Table 8.2

Comparison of Travel Time to Work per Subarea Place of Residence

Subarea (Place of Residence)	Average Travel Time to Work (Minutes)		Change in Travel Time (Minutes)
	1990	2000	
Airport	19.3	18.4	-.9
Arsenal	12.2	11.4	-.8
Big Cove	26.5	22.5	-4.0
Downtown	15.8	12.2	-3.6
East	24.7	22.7	-2.0
East Central	19.3	16.2	-3.1
Far South East	22.9	20.1	-2.8
Gurley	30.8	27.4	-3.4
Harvest/Monrovia	26.0	23.8	-2.2
Hazel Green	29.6	30.9	+1.3
Madison	19.4	18.2	-1.2
Meridianville	26.4	23.9	-2.5
Near Southeast	19.8	16.9	-2.9
New Hope	32.7	29.3	-3.4
New Market	32.4	31.1	-1.3
North	23.9	21.7	-2.2
North Central	20.2	19.2	-1.0
North East	21.1	18.5	-2.6
North West	16.9	17.1	+.2
Owens Cross Roads	30.6	27.7	-2.9
ResearchPark	17.6	17.8	+.2
Riverton	31.2	27.1	-4.1
Toney/Ardmore	30.6	32.1	+1.5
Triana	20.0	22.0	+2.0
West Central	18.4	17.1	-1.3
72 East	25.5	24.7	-.8
All Subareas	21.7	20.9	-.8

Source: US Census Bureau and City of Huntsville Planning Division

5.Non-Recurring Congestion Measures

The performance measure of choice for quantifying non-recurring congestion is traffic accident statistics within the CMP network. The time of delay, severity of accidents, and the time to clear the accidents may vary widely and are unpredictable; however, the number of traffic accidents at a specific location does give some indication of where traffic flow may be impeded. The top ten intersections with the most traffic accidents have been identified for each studied year, and are displayed at **Table 8.3**. Data was provided by accessing the CARE program, a traffic accident database developed by the University of Alabama and endorsed by the Alabama Department of Transportation. The data provided was from the time period of January 1, 2005 through December 31, 2008. At the time of publication, data for 2009 had not been finalized. High numbers of traffic accidents are oftentimes an indicator of other congestion problems at intersections. Of the intersections comprising the top 10 ten accident locations

during 2004, 2 of these locations have been identified as corridors currently experiencing congested conditions per the latest transportation model. The model also indicates that an additional 2 locations may experience congestion in the future.

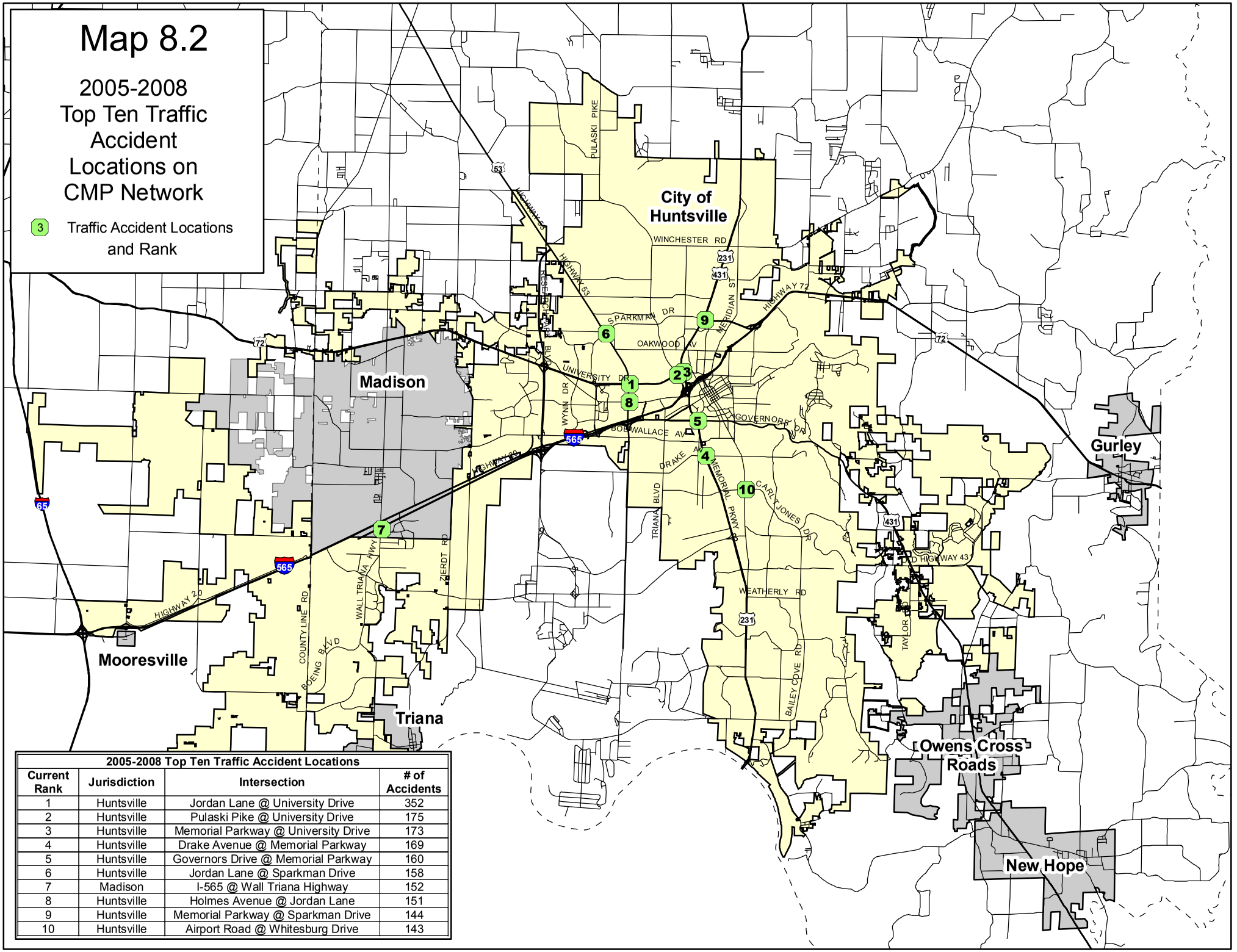
Table 8.3
Top Ten Traffic Accident Locations
January 1, 2005 – December 31, 2008

Current Rank	Jurisdiction	Intersection	# of Accidents
1	Huntsville	University Drive @ Jordan Lane	352
2	Huntsville	Pulaski Pike @ University Drive	175
3	Huntsville	Memorial Parkway @ University Drive	173
4	Huntsville	Memorial Parkway @ Drake Avenue	169
5	Huntsville	Memorial Parkway @ Governors Drive	160
6	Huntsville	Jordan Lane @ Sparkman Drive	158
7	Madison	I-565 @ Wall Triana Highway	152
8	Huntsville	Holmes Avenue @ Jordan Lane	151
9	Huntsville	Memorial Parkway @ Sparkman Drive	144
10	Huntsville	Airport Road @ Whitesburg Drive	143

Map 8.2

2005-2008 Top Ten Traffic Accident Locations on CMP Network

3 Traffic Accident Locations and Rank



2005-2008 Top Ten Traffic Accident Locations			
Current Rank	Jurisdiction	Intersection	# of Accidents
1	Huntsville	Jordan Lane @ University Drive	352
2	Huntsville	Pulaski Pike @ University Drive	175
3	Huntsville	Memorial Parkway @ University Drive	173
4	Huntsville	Drake Avenue @ Memorial Parkway	169
5	Huntsville	Governors Drive @ Memorial Parkway	160
6	Huntsville	Jordan Lane @ Sparkman Drive	158
7	Madison	I-565 @ Wall Triana Highway	152
8	Huntsville	Holmes Avenue @ Jordan Lane	151
9	Huntsville	Memorial Parkway @ Sparkman Drive	144
10	Huntsville	Airport Road @ Whitesburg Drive	143

8.2.3 CMP Technical Ranking

Methods were established in the **Huntsville Area Transportation Study CMP Procedures and Responsibilities Report (Appendix C)** for prioritizing current and anticipated congested corridors. The corridors within the defined CMP transportation network were prioritized based upon the following criteria:

- Extent of current congestion
- Extent of anticipated congestion per the 2035 modeled network
- Current traffic volumes
- Safety
- Multi-modal connectivity
- Prior funding commitments

It is important to note that the model only indicates the locations where average daily traffic volumes may exceed average daily roadway capacity. A consistent method for measuring hourly or peak real-time traffic flow for **all** corridors comprising the CMP network does not currently exist. Therefore, peak hourly flow is not used as a standard of measure, since benchmarks must be established that can be measured consistently from year to year.

Since it is not feasible to identify congestion mitigation strategies for all corridors simultaneously, the top ten corridors were selected. The top ten corridors that have been selected, are presented for congestion mitigation strategy recommendations in **Section 8.2.4** of this report.

The list of the top ten congested corridors follows on the next page:

Table 8.4
CMP Top Ten Corridor Technical Ranking List

Rank	Roadway	Location
1	US 72 East	Maysville Road to Moores Mill Road
2	US 72 West	Hughes Road to Nance Road
	US 72 West	Nance Road to Jeff Road
3	US 231 South	Governors Drive to Bob Wallace
	US 231 South	Bob Wallace to Drake Avenue
	US 231 South	Drake Avenue to Airport Road
4	US 72 West/University Drive	Jeff Road to Providence Main
	US 72 West/University Drive	Providence Main to Enterprise Drive
5	US 231 South	Byrd Spring Road to Weatherly Road
	US 231 South	Weatherly Road to Mountain Gap Road
6	Zierdt Road	Madison Boulevard to Edgewater Drive
7	Old Madison Pike	Voyager Way to Research Park Blvd
	Old Madison Pike	Research Park Blvd to Wynn Drive
8	Jordan Lane	I-565 to Holmes Avenue
	Jordan Lane	Holmes Avenue to University Drive
9	I-565	County Line Road to Wall Triana Hwy
10	I-565	Mooresville Road to Greenbrier Road

8.2.4 Strategy Recommendations

Federal CMP legislation requires the identification and evaluation of strategies to determine the most effective method(s) to alleviate congestion. The legislation further defines the categories of strategies or combination of strategies to be considered. The **CMP Procedures and Responsibilities Report** comprehensively lists each strategy to be considered within screening matrices to assist jurisdictions in selecting appropriate and feasible strategies to correct problematic corridors. The strategies, in order of consideration, are:

- Level One Strategies – Strategies that Eliminate or Reduce Trips
- Level Two Strategies – Strategies that Involve Traffic Operational Improvements
- Level Three Strategies – Strategies that Shift Trips from Single Occupancy Vehicles to Public Transit, Other High Occupancy Vehicles, and Other Modes
- Level Four Strategies – Strategies that Involve Intelligent Transportation Systems
- Level Five Strategies – Strategies that Add Capacity for All Vehicles

Each corridor selected for strategy recommendations has been through a comprehensive screening process. Some solutions may be nontraditional, but may be effective in combating traffic congestion. It is important to remember that the recommendations presented will more than likely require additional study. The following recommendations have been prepared in order to mitigate congested corridors on the CMP Transportation Network.

RANK: 1

CORRIDOR: US 72 East (ARC Corridor V)
BEGIN POINT: Maysville Road
END POINT: Moores Mill Road

FUNCTIONAL CLASSIFICATION: MajorArterial

JURISDICTION: State Controlled Road located in the City of Huntsville

CORRIDOR LENGTH: 1.91 miles

LANE CONFIGURATION: A 4-lane highway divided by a median. This road Is designated as “Corridor V” by the Appalachian Regional Commission.

TRAFFIC CONTROLS: All intersections are under traffic signal control.

SERVICE CHARACTERISTICS:	2005 ADT	2005 V/C RATIO	2005 LOS	2035 ADT	2035 V/C RATIO	2035 LOS
Maysville Road to Moores Mill Road	43000	1.27	F	55092	1.10	F

CURRENT LAND USE/DEVELOPMENT TRENDS: This corridor is primarily highway commercial, and has one high employment center located on US 72 East and another located at the corner of US 72 East and Moores Mill Road. This corridor has a portion of land that is undeveloped on the south side; however, landowners intend on developing the property for a commercial/retail use.

TRANSIT SERVICE: None

CORRIDOR FUNCTION: This corridor is used primarily in AM and PM peak hours by employees traveling into and out of Huntsville from East Madison County as well as counties from the east. The corridor connects directly into Interstate 565, making it a primary artery for traffic to access employment, retail, universities, and healthcare.

OTHER PLANNING DOCUMENTS/STUDIES: This corridor has been identified in Section 4 of this document for improvement to an expressway. This corridor is a portion of project #80, listed in Section 4. Preliminary engineering design is currently underway.

RECOMMENDATIONS: The corridor is presently being designed as an expressway, beginning at the intersection of US 72 East and Maysville Road to Shields Road with a split interchange at Moores Mill Road and an interchange further east at Shields Road. At the present time, the Alabama Department of Transportation has the project scheduled for right of way acquisition to begin in fiscal year 2010, and for construction to begin in fiscal year 2011. It is recommended that this project (shown as project #80:U.S. 72 East/ARC Corridor V from Moores Mill and Shield Road to US 72 East in Section 4), proceed as scheduled. Upgrading this corridor to an expressway will alleviate “stop and go traffic” at the Moores Mill Road intersection.

RANK: 2

CORRIDOR: US 72 West
BEGIN POINT: Hughes Road
END POINT: Jeff Road

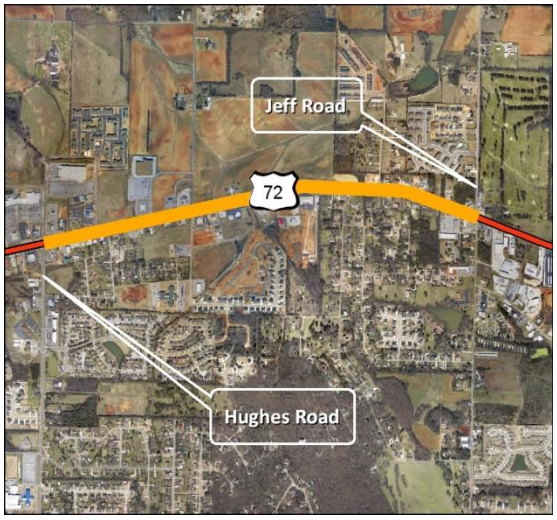
FUNCTIONAL CLASSIFICATION: Major Arterial

JURISDICTION: State Controlled Road located in the City of Huntsville and the City of Madison

CORRIDOR LENGTH: 1.56 miles

LANE CONFIGURATION:Corridor is 4-lane divided with depressed grassymedian averaging 30 feet in width, with separate right and left turning lanes at most signalized intersections.

TRAFFIC CONTROLS:Signals control traffic at three intersections, and three local residential streets west of Jeff Road/Slaughter Road are under stop sign control.



SERVICE CHARACTERISTICS:	2005 ADT	2005 V/C RATIO	2005 LOS	2035 ADT	2035 V/C RATIO	2035 LOS
Hughes Road to Nance Road	45000	1.33	F	68838	1.38	F
Nance Road to Jeff Road	46500	1.37	F	56406	1.13	F

CURRENT LAND USE/DEVELOPMENT TRENDS: The remaining undeveloped frontage along this corridor is expected to become 100% developed by the year 2035 as commercial use. Multi-family residential is likely as the second tier of development to the rear of the commercial tracts.

TRANSIT SERVICE: None

CORRIDOR FUNCTION: This corridor serves as a federal highway and major arterial and with the exception of the I-565 Madison Boulevard corridor, is the only multilane east/west continuous route between Huntsville and Madison and points west. It serves high volumes of commuter traffic to employment centers located in Research Park and Redstone Arsenal, from northwest Madison County and northern Limestone County. This corridor also directly connects the major retail and other commercial properties of both Huntsville and Madison.

OTHER PLANNING DOCUMENTS/STUDIES: This corridor has been identified in Section 4 of this document for improvement. Project #86, listed in Section 4, includes this segment of roadway.The City of Madison is presently constructing intersection improvements at US 72 and Hughes Road utilizing their own funds.

RECOMMENDATIONS: The recommendations for this corridor hinge on a combination of Level 2 and Level 5 strategies. A portion of this project is recommended for improvement, and is part of the larger project listed in Section 4, project #86: U.S. 72/University Drive from Providence Main Boulevard to County Line Road. A multilane divided facility having median control of left turn and cross movement access, in combination with signalization and side street geometric improvements will provide the necessary and additional capacity above that provided by the conventional planned improvements. The City of Madison is constructing intersection improvements at US 72 and Hughes Road, which should provide better mobility at that location. The City of Huntsville is widening Nance Road from US 72 to Capshaw Road, and will need to upgrade the signalization timing during this construction project. It is recommended that the intersection and the corridor be monitored for any further improvements or upgrades that need to be made.

RANK: 3

CORRIDOR: US 231 South (Memorial Parkway)
BEGIN POINT: Governors Drive
END POINT: Airport Road

FUNCTIONAL CLASSIFICATION: Major Arterial

JURISDICTION: State Controlled Road located in the City of Huntsville

CORRIDOR LENGTH: 2.14 miles

LANE CONFIGURATION: 5 continuous lanes are provided in each direction; inner 2 serving as uninterrupted freeway lanes, one uninterrupted continuous transition lane from service road to freeway, and 2 outer lanes along the service road providing access to roadside development and intersecting cross streets at Governors Drive, Bob Wallace, Drake Avenue, and Airport Road.

TRAFFIC CONTROLS:Traffic signals control intersections with service roads at Governors Drive, Bob Wallace Avenue, Drake Avenue, and Airport Road.

SERVICE CHARACTERISTICS:	2005 ADT	2005 V/C RATIO	2005 LOS	2035 ADT	2035 V/C RATIO	2035 LOS
Governors Drive to Bob Wallace	108000	1.44	F	56924	.76	B
Bob Wallace to Drake Avenue	93000	1.24	F	59800	.80	C
Drake Avenue to Airport Road	94000	1.25	F	54770	.73	B

CURRENT LAND USE/DEVELOPMENT TRENDS:Corridor frontage is 100% developed, primarily with two industrial sites occupied by the Huntsville Times and Arora Technologies. A major retail shopping center is located between Bob Wallace and Drake Avenue, and another major retail center is located on Airport Road near US 231 South (Memorial Parkway).

TRANSIT SERVICE: This corridor is served by multiple routes – the Airport Road Route being the main route. Other routes provide limited service to the corridor: The Weatherly Road Route provides service from Bob Wallace to Airport Road, The Airport Road Route provides service to US 231 and Airport Road, and the Red and Blue Routes serve Drake Avenue and Memorial Parkway. All routes run hourly except for the Red and Blue Routes, which run every 30 minutes.

CORRIDOR FUNCTION: This corridor serves as a federal highway and major arterial and thus serves both local and inter-state traffic.Centrally located, it is the most heavily north/south corridor in Huntsville. It connects to the only bridge crossing the Tennessee River between Guntersville, Alabama and I-65 near Decatur, Alabama.

OTHER PLANNING DOCUMENTS/STUDIES: None

RECOMMENDATIONS: A detailed assessment of all strategies was conducted. The parallel service road (not the inner freeway lanes) operate at peak hour Level of Service E or F. Level 4 and Level 2 strategies are recommended. ITS strategies coupled with improvements to signal operation should provide an acceptable level of service at projected traffic volumes. The City of Huntsville Traffic Engineering Division recommends that the intersection of Bob Wallace and Memorial Parkway provide a separate right turn lane from east to south, to help mitigate congestion from the service roads to the Memorial Parkway mainline.Additionally, US 231 south of Airport Road is currently under engineering design to upgrade the road to a freeway. Service roads have been constructed on US 231 from Whitesburg Drive to Weatherly Road, and an overpass was recently constructed to allow more free flow traffic. It is anticipated that once these improvements are made, that traffic along the entire stretch of US 231 will experience more free flow, eliminating stop and go traffic on the main corridor. Future traffic counts assume that the Southern Bypass is constructed; thereby, taking traffic from the portions of US 231 and dispersing it throughout the network.

RANK: 4

CORRIDOR: US 72 West
BEGIN POINT: Jeff Road
END POINT: Enterprise Way

FUNCTIONAL CLASSIFICATION: Major Arterial

JURISDICTION: State Controlled Road located in the City of Huntsville

CORRIDOR LENGTH: 2.16 miles

LANE CONFIGURATION:6-lane divided from Enterprise Drive west for approximately 0.8 miles and 7 lanes undivided until Providence Main. From Providence Main to Jeff Road, the corridorturns into a 4-lane divided corridor. University Driveapproaches to all signalized intersections are provided with left turn lanes, and most are provided with right turn lanes.

TRAFFIC CONTROLS:Most public street intersections along this corridor are under traffic signal control.

SERVICE CHARACTERISTICS:	2005 ADT	2005 V/C RATIO	2005 LOS	2035 ADT	2035 V/C RATIO	2035 LOS
Jeff Road to Providence Main	42000	1.24	F	59848	1.20	F
Providence Main to Enterprise Way	39000	1.15	F	61528	1.23	F

CURRENT LAND USE/DEVELOPMENT TRENDS:With the exception of a small number of parcels, and two existing residential dwellings at the Providence intersection, this corridor is 100% developed – primarily in commercial activities.

TRANSIT SERVICE: The Huntsville Shuttle provides limited service along this corridor. The hourly route serves University Drive; however, the westward extent of service is Enterprise Way/Wayne Road.

CORRIDOR FUNCTION:This corridor serves as a federal highway and major arterial and with the exception of the I-565 Madison Boulevard corridor, is the only multilane east/west continuous route between Huntsville and Madison and points west. It serves high volumes of commuter traffic to employment centers located in Research Park and Redstone Arsenal, from northwest Madison County and northern Limestone County. This corridor also directly connects the major retail and other commercial properties of both Huntsville and Madison. Project #86, shown in Section 4, includes this segment of roadway.

OTHER PLANNING DOCUMENTS/STUDIES: This corridor has been identified for improvement in Section 4 of this document as Project #86: U.S. 72/University Drive from Providence Main to County Line Road.

RECOMMENDATIONS: Current right of way limitations for this segment may make widening a little challenging. Such improvement is indicated in Section 4 of this document, project #86. However, geometric improvements to side street approaches (Level 2 Strategy), coupled with ITS and traffic signal improvements (Level 4 Strategy) will result in significant corridor capacity improvements. City of Huntsville Traffic Engineers recommend improvements on Enterprise Way between US 72 and Moores Farm for signal improvements and left turn restrictions at the shopping center exits. These projects are shown in Section 4 of this document and Section 8.4.1.1 as Maintenance and Operations Projects “B” and “F.”The City of Huntsville has planned roadway improvements at Jeff Road from US 72 to Capshaw Road. Prior to construction, these signals will be retimed to allow for enhanced mobility of vehicles at US 72 and Jeff Road.

RANK: 5

CORRIDOR: US 231 South (Memorial Parkway)
BEGIN POINT: Byrd Springs Road
END POINT: Mountain Gap Road

FUNCTIONAL CLASSIFICATION: Major Arterial

JURISDICTION: State Controlled Road located in the City of Huntsville

CORRIDOR LENGTH: 2.47 miles

LANE CONFIGURATION:6-lane divided, with a 40' depressed grassy median, from Byrd Springs Road to Whitesburg Drive and from south of Weatherly Road to Mountain Gap Road. The corridor provides additional right and left turn lanes at all major signalized intersections. US 231 between Whitesburg Drive and Weatherly Road is being upgraded to allow for free flow traffic via an overpass and service roads.Construction of theservice roads are complete, and the overpass project will be completed soon.

TRAFFIC CONTROLS:Traffic signal controls are evident at each public street intersection.

SERVICE CHARACTERISTICS:	2005 ADT	2005 V/C RATIO	2005 LOS	2035 ADT	2035 V/C RATIO	2035 LOS
Byrd Springs to Weatherly Road	50526	1.01	E	44700	.60	A
Weatherly Road to Mountain Gap Road	50526	1.01	E	44600	.59	A

CURRENT LAND USE/DEVELOPMENT TRENDS: The corridor is completely developed as commercial with the exception of a few parcels of vacant land.

TRANSIT SERVICE: The Weatherly Road Route serves this corridor on an hourly basis.

CORRIDOR FUNCTION: This corridor serves as a federal highway and major arterial and thus serves both local and inter-state traffic. Centrally located, it is the most heavily north/south corridor in Huntsville. It connects to the only bridge crossing the Tennessee River between Guntersville, Alabama and I-65 near Decatur, Alabama.

OTHER PLANNING DOCUMENTS/STUDIES: This corridor has been identified for improvement in Section 4 of this document. Projects #35 and #41, listed in Section 4, includes this segment of roadway.Additionally, the current Transportation Improvement Program includes service road improvements and overpasses on US 231 (Memorial Parkway) at Martin Road, Byrd Springs, and Lily Flagg. Right of way acquisition is underway. Utility relocation and clearing and grubbing is scheduled for fiscal year 2010. The State Department of Transportation has construction scheduled for fiscal years 2014 and 2017. The construction of service roads and an overpass have been completed on US 231 from Whitesburg Drive to Weatherly Road. Additionally, a project to construct service roads and overpasses at Mountain Gap Road and Hobbs Road is identified in Section 4 (project #41 of this document. An access management and intersection improvement project has been identified for a portion of this project, from Hobbs Road to Weatherly Road (project "I").

RECOMMENDATIONS: It is recommended that the construction of grade separation projects (i.e., Strategy 5 – the construction of service roads and associated overpasses) be accelerated for the currently planned locations at Martin Road, Byrd Springs Road, and Lily Flagg. This project is formally listed in this document as project #35: Memorial Parkway (including overpass/interchange) from North of Whitesburg Drive/South of Golf Road @ U.S. 231 North.It is also recommended that funding be pursued to construct the service road and overpass project at Mountain Gap and Hobbs Road. This project is formally listed in Section 4 as project #41: Memorial Parkway (including overpass/interchange) at Mountain Gap/Hobbs Road @ U.S. 431 South. This project will improve traffic flow in the area and will help bring to fruition the goal of unimpeded traffic flow from North Memorial Parkway to Hobbs Island Road, near the Tennessee River.

RANK: 6

CORRIDOR: Zierdt Road
BEGIN POINT: Madison Boulevard
END POINT: Edgewater Drive

FUNCTIONAL CLASSIFICATION: Major Collector

JURISDICTION: City of Madison/City of Huntsville

CORRIDOR LENGTH: 1.06 miles

LANE CONFIGURATION: A 2-lane corridor.

TRAFFIC CONTROLS:The intersection of Zierdt Road and Madison Boulevard is under traffic signal control. All other intersections are under traffic signcontrol.

SERVICE CHARACTERISTICS:	2005 ADT	2005 V/C RATIO	2005 LOS	2035 ADT	2035 V/C RATIO	2035 LOS
Madison Boulevardto Edgewater Drive	20908	1.26	F	30200	1.18	F

CURRENT LAND USE/DEVELOPMENT TRENDS: This corridor is primarily residential on the west side, and borders Redstone Arsenal on the east side. This area has seen tremendous residential growth in the recent past which has increased traffic flow on this corridor.

TRANSIT SERVICE: None

CORRIDOR FUNCTION: This corridor is used heavily in AM and PM peak hours by commuters between the high tech industries and their residences within the City of Huntsville and the City of Madison. Of particular importance is the western entrance gate at Redstone Arsenal at Zierdt Road and Martin Road. This gate serves a majority of employees residing west of Redstone Arsenal. Additionally, the corridor is utilized by residents of the Town of Triana, which lies south on Zierdt Road. As employment growth increases are expected on and around Redstone Arsenal due to BRAC, traffic is expected to increase as well.

OTHER PLANNING DOCUMENTS/STUDIES: The project is identified in Section 4 of this document for improvement. Project #95, listed in Section 4, includes this segment of roadway. Additionally, the project is identified in the current Transportation Improvement Program for improvement. Zierdt Road from Madison Boulevard to south of Martin Road is currently under design. The Transportation Improvement Program has right of way acquisition scheduled for fiscal year 2010. The State Department of Transportation has clearing and grubbing scheduled for fiscal year 2013, and construction scheduled for fiscal year 2014.

RECOMMENDATIONS: It is recommended that engineering design continue for project #95: Zierdt Road from Madison Boulevard to South of Martin Road, and that the project bemoved up in the Transportation Improvement Program as funding is available. This will require close coordination with the State, Federal Highway Administration, and Redstone Arsenal to ensure that the project is not impeded. Additionally, City of Huntsville Traffic Engineering has recommended that Redstone Arsenal have equipment to provide manual operation of the traffic signal at the intersection of Zierdt Road and Martin Road.

RANK: 7

CORRIDOR: Old Madison Pike
BEGIN POINT: Voyager Way
END POINT: Wynn Drive

FUNCTIONAL CLASSIFICATION: Minor Arterial

JURISDICTION: City of Huntsville

CORRIDOR LENGTH: 1.21 miles

LANE CONFIGURATION:The corridor is 4-lanes, divided.

TRAFFIC CONTROLS:The intersections of Wynn Drive, Research Park Boulevard, and Voyager Drive are under traffic signal control. Other side streets are controlled by stop signs.

SERVICE CHARACTERISTICS:	2005 ADT	2005 V/C RATIO	2005 LOS	2035 ADT	2035 V/C RATIO	2035 LOS
Voyager Way to Research Park Boulevard	13700	.43	A	51359	1.61	F
Research Park Boulevard to Wynn Drive	14300	.45	A	35004	1.10	F

CURRENT LAND USE/DEVELOPMENT TRENDS:This corridor includes Research Park, which has seen some major growth in the recent past, and is anticipated to grow and develop even more in the future. Recent development at the intersection of Research Park Boulevard and Old Madison Pike has been of a mixed use nature, with the construction of Bridge Street – a conglomeration of residential, hotel, retail, and office uses.

TRANSIT SERVICE: This corridor is served by the Bridge Street Route.

CORRIDOR FUNCTION:This corridor is used primarily as a connecting route between residents of the City of Madison, the City of Huntsville, and northwestern parts of Madison County who are employed in Research Park. The corridor also serves a major retail center: Bridge Street. The corridor as a whole serves as the only east-west connector from Madison to Huntsville between US 72 and I-565.

OTHER PLANNING DOCUMENTS/STUDIES: None. Old Madison Pike to the west of Voyager Way to Slaughter Road is scheduled in the current Transportation Improvement Program for improvements in fiscal year 2011.

RECOMMENDATIONS: The Base Year network indicates that this corridor is currently not experiencing a tremendous amount of congestion; however, it is anticipated by 2035. At the present time, it is recommended that the corridor be monitored, with the possibility of Level 2 Strategies (specifically traffic signal timing improvements) be performed if needed. It is also recommended that traffic improvements scheduled on Old Madison Pike west of Voyager Way be completed as planned. This will improve traffic flow coming into Research Park from the west. City of Huntsville Traffic Engineering recommends signal system improvements and system optimization for the intersections of Old Madison Pike from Steeplechase to Jan Davis Drive. Additionally, City of Huntsville Traffic Engineering recommends the construction of a joint bike/pedestrian bridge on Old Madison Pike, which crosses Research Park Boulevard. This project will provide an alternate facility for bike/ped traffic. This project is listed in Section 4 and Section 8.4.1.1 of this document as Maintenance and Operations Project “D.”

RANK: 8

CORRIDOR: Jordan Lane
BEGIN POINT: I-565
END POINT: University Drive

FUNCTIONAL CLASSIFICATION: Major Arterial

JURISDICTION: State Controlled Road located in the City of Huntsville

CORRIDOR LENGTH: 1.03 miles

LANE CONFIGURATION:Nominally, a 5 lane undivided with continuous center two way turn lane, with two left turn lanes at University Drive and atboth ramps to I-565. North and south approaches to the I-565 interchangehave a 7 lane undivided section.

TRAFFIC CONTROLS: All major intersections are controlled by traffic signals. Side streets are controlled by stop signs.

SERVICE CHARACTERISTICS:	2005 ADT	2005 V/C RATIO	2005 LOS	2035 ADT	2035 V/C RATIO	2035 LOS
I-565 to Holmes Avenue	27800	.87	C	37314	1.10	F
Holmes Avenue to University Drive	25800	.81	C	38842	1.15	F

CURRENT LAND USE/DEVELOPMENT TRENDS:Uses along this corridor are primarily highway commercial between Holmes Avenue and I-565, with a short section of residential between University Drive and Holmes Avenue. Land is 100% developed.

TRANSIT SERVICE: Transit service is limited, with a route serving the intersection of Jordan Lane and Holmes Avenue and a route serving the intersection of Jordan Lane and University Drive.

CORRIDOR FUNCTION:Corridor use is shared by locals with some traffic utilization by non-locals utilizing Alabama Highway 53 between I-565 and I-65 at Ardmore, Alabama/Tennessee. The corridor provides excellent access from Redstone Arsenal to I-565 and US 72.

OTHER PLANNING DOCUMENTS/STUDIES: None

RECOMMENDATIONS: Level 1 and Level 3 strategies were deemed not applicable. Level 5 strategies are applicable from I-565 to University Drive, as right of way exists to widen this corridor when growth in traffic volumes justify. The current recommendation is to monitor this corridor for any dramatic increase in traffic which would warrant any improvements to be made. Additionally, the City of Huntsville Traffic Engineering has recommended signal coordinating improvements at I-565 and Jordan Lane, and the installation of a GPS time clock as well as a wireless camera system for field to office observation and traffic signal control at the intersection of University Drive and Jordan Lane.

RANK: 9

CORRIDOR: I-565
BEGIN POINT: County Line Road
END POINT: Wall Triana Highway

FUNCTIONAL CLASSIFICATION: Interstate

JURISDICTION: State Controlled Road located in the City of Madison andCity of Huntsville

CORRIDOR LENGTH: 2.17 miles

LANE CONFIGURATION: A 4-lane divided interstate, with an additional laneavailable for exiting or merging traffic.

TRAFFIC CONTROLS:None.

SERVICE CHARACTERISTICS:	2005 ADT	2005 V/C RATIO	2005 LOS	2035 ADT	2035 V/C RATIO	2035 LOS
County Line Road to Wall Triana Highway	44000	.65	A	121100	1.19	F

CURRENT LAND USE/DEVELOPMENT TRENDS: This corridor primarily consists of vacant land, but provides access “off-ramp” to highway commercial and industrial uses. The construction of an interchange at County Line Road and I-565 is planned, which will spur development along this corridor.

TRANSIT SERVICE: None

CORRIDOR FUNCTION:Interstate 565 provides access to Interstate 65 to the west and US Highway 72 at the eastern part of Madison County.

OTHER PLANNING DOCUMENTS/STUDIES: The project is identified in Section 4 of this document for improvement. The project is listed as #24. Additionally, the project is included in the current Transportation Improvement Program for the construction of an interchange at I-565 and County Line Road.

RECOMMENDATIONS: An interchange at I-565 and County Line Road is under engineering design. The project is scheduled for right of way acquisition for fiscal year 2011, with construction planned for fiscal year 2012. It is recommended that this project proceed as scheduled. This project is listed in Section 4, project #24 as: I-565 interchange @ County Line Road.

RANK: 10

CORRIDOR: I-565
BEGIN POINT: Mooresville Road
END POINT: Greenbrier Road

FUNCTIONAL CLASSIFICATION: Interstate

JURISDICTION: State Controlled Road located in the City of Huntsville and Limestone County

CORRIDOR LENGTH: 2.21 miles

LANE CONFIGURATION:A 4-lane divided interstate, with an additional lane available for exiting or merging traffic.

TRAFFIC CONTROLS:None.

SERVICE CHARACTERISTICS:	2005 ADT	2005 V/C RATIO	2005 LOS	2035 ADT	2035 V/C RATIO	2035 LOS
Mooresville Road to Greenbrier Road	44200	.65	A	115994	1.14	F

CURRENT LAND USE/DEVELOPMENT TRENDS:This corridor primarily consists of vacant land, but provides access “off-ramp” to mostly industrial uses. The construction of an interchange at Greenbrier Road and I-565 is planned, which will spur development along this corridor.

TRANSIT SERVICE: None

CORRIDOR FUNCTION:Interstate 565 provides access to Interstate 65 to the west and US Highway 72 at the eastern part of Madison County.

OTHER PLANNING DOCUMENTS/STUDIES: The project is identified in Section 4 of this document for improvement. The project is listed as project #25. Additionally, the project is included in the current Transportation Improvement Program for the construction of an interchange at I-565 and Greenbrier Road.

RECOMMENDATIONS: An interchange at I-565 and Greenbrier Road has been designed. Right of way acquisition is underway. The State Department of Transportation has construction of the corridor for fiscal year 2014. It is recommended that this project proceed as scheduled. This project is listed in Section 4, project #25 as: I-565 interchange @ Greenbrier Road.

8.2.5 Strategy Effectiveness Evaluations

The previous **Congestion Management System Report on Mobility**, submitted in 2006, highlighted an improvement along a segment that has since been completed. This section will indicate the improvement made and will analyze the effectiveness of the improvement. Since base year traffic counts that were input into the year 2035 transportation model were taken *before* the improvement was completed, the staff will depend upon real-time observations in the field to indicate the improvement's success. This method of analysis and measure of system effectiveness will be applied and the improvement evaluated for effectiveness.

Corridor:
Old Madison Pike from Shelton Road to Research Park Boulevard

Background:
The previous transportation model projected future congestion to be extreme, while the base year model indicated a somewhat acceptable level of service with the exception of a stretch of Old Madison Pike from Slaughter Road to Mariner Way. Observations along Old Madison Pike from Shelton Road to Research Park Boulevard, and the completion of a regional mixed-use retail/office/residential center justified the need for taking some immediate steps to ensure traffic flow is not impeded at this location.

Corrective Action Taken:
Federal funds were leveraged to construct a multi-modal transportation center at the Bridge Street development. Additionally, Shuttle bus service became made available along Old Madison Pike and into ResearchPark. Traffic signals were retimed at the location, indicating operational improvements. Ramp improvements were made by the Alabama Department of Transportation at Research Park Boulevard and Old Madison Pike. The widening of Old Madison Pike from Slaughter Road to ThorntonResearchPark has been planned for several years, and the project is under design. Widening the corridor to handle increased future traffic is tentatively scheduled by the State of Alabama for fiscal year 2010. This widening is a necessity based upon the nature of employment locating to the ResearchPark area. Monitoring of this location is continuing.

Evaluation:
Traffic engineers who have studied the corridor indicate that the action taken to provide Shuttle bus service, revamp the ramps a Research Park Boulevard and Old Madison Pike, and retime the traffic signals along the Bridge Street development has assisted in moving traffic effectively along the corridor. The intersections are performing according to their designed purpose. The planned widening project should continue, due to anticipated traffic flow related to growth in employment along the corridor.

Corridor:
US 431/Governors Drive from Memorial Parkway to Monroe Street

Background:
The previous transportation model projected future congestion, while the base year model indicated a "B" level of service. The City of Huntsville has recently completed a 7-lane corridor widening project along US 432 from Monroe Street eastward to Gallatin Street. This corridor widening project affects traffic signal timing to the points east and west of the corridor improvement.

Corrective Action Taken:
While the base year model showed a "B" level of service, actions were taken by City of Huntsville Traffic Engineers. Traffic signals were retimed along the highlighted corridor to complement the widening improvements which occurred further eastward.

Evaluation:
Traffic engineers who have studied the corridor indicate that the action taken to retime the traffic signals along the corridor have improved traffic flow in the area. This corridor will continue to be monitored for future problems. Future strategies to be considered, if congestion becomes imminent, may include further retiming of traffic signals or ITS strategies, as federal funds are available.

8.2.6 Executive Summary

Since the methodology differs in some portions of the **CMP** which establishes benchmarks for the region, overall system trends have not yet been substantiated. At the present time, census data and other performance measures gives some indication that overall mobility on the transportation network is efficient and accessible, with the exception of several trouble spots which are identified in **Section 8.2.3** and addressed in **Section 8.2.4** of this report. Strategy recommendations have been made for the top ten corridors. The previous **CMS Report on Mobility** identified strategy recommendations which have been implemented. According to traffic engineers working in the jurisdiction where the improvements were made, corrections to the corridors were successful. Once additional strategy recommendations are implemented for other corridors, an assessment will be conducted on the effectiveness of the improvement(s). The overall effectiveness of the congestion management process is dependent upon the data collected, performance of the transportation model, and appropriate analysis of selected performance measures. Ongoing data collection, continuous monitoring, and future reports will serve to comprehensively measure network performance and will provide a more multi-dimensional review and assessment of the state of the local transportation system.

8.3 Safety Management Element

The elimination of hazards that may pose problems within the transportation network will improve the safety of the transportation system.The SAFETEA-LU legislation split the safety and security requirements of TEA-21 into two separate and distinct planning factors to be undertaken by States and MPOs. This was done to further emphasize these planning factors. A full discussion of safety initiatives and identified projects is included in this section.

8.3.1 Strategic Highway Safety Plan

23 CFR 450.322(h) requires States to develop a **Strategic Highway Safety Plan** to focus on implementable policies and methods to make travel on State roads safer for motorists. Additionally, the legislation calls for long range statewide and metropolitan transportation plans to include a safety element that incorporates or summarizes the priorities, goals, countermeasures, or projects contained in the Strategic Highway Safety Plan.

While States, and to a lesser degree local MPOs, are tasked with strategic safety planning and implementation, other federal organizations have taken an active role in improving safety on the nation's highways. The United States Department of Transportation (USDOT) and the American Association of State Highway and Transportation Officials (AASHTO) have adopted aggressive goals and an aggressive safety plan to reduce fatalities and injuries from traffic crashes.

The AASHTO **Strategic Highway Safety Plan** contains 22 emphasis areas and 92 separate safety strategies that are intended to save 7,000 – 8,000 lives per year. USDOT and AASHTO requested that highway agencies test various emphasis area strategies. AASHTO further requested each State highway agency adopt a statewide

comprehensive safety plan and serve as a "lead State" in one of the primary emphasis areas. The Alabama Department of Transportation has taken on the lead role in the analysis of roadway departure crashes.

The State of Alabama developed its **Strategic Highway Safety Plan** during 2006 with the assistance of almost 100 individuals from 31 agencies and organizations, including representatives from the Technical Coordinating Committee of the Huntsville Area MPO. The Alabama Strategic Highway Safety Plan emphasizes the following areas: Emergency Medical Services, Older/Restricted Drivers, Safety Legislation, Risky Driving, and Run-Off Road Crashes. Countermeasures for each emphasis area were developed as part of the safety plan. While the countermeasures apply to the entire State, no specific projects are identified. Most of the countermeasures fall outside of the MPOs specialization and area of control and are related to driver behavior. The exceptions are proposed roadway improvements that are related to older or at risk drivers and lane departure crashes. These countermeasures either propose comprehensive improvements to signage, signals, and markings or site specific improvements to address issues at high crash sites. Additionally, other organizations within the MPOs jurisdiction already have several programs in place to meet the goals of the **SHSP**.

8.3.1.1 SHSP Emphasis Areas

A review of the State's SHSP indicates that the local MPO and various agencies and organizations within its jurisdictions, have implemented a variety of strategies to assist the State in meeting its implementation goals. Some strategies are wholly State-driven and can only be enacted at the State level. The five emphasis areas that are the focus of the SHSP are:

1. **Emergency Medical Services (EMS)** – The primary concern of EMSis timely access to emergency medical services in rural areas and expertise of EMTs. The ambulance service that serves the Huntsville Urbanized Area, HEMSI, is an accredited organization.Additionally, rural areas are served by a rescue squad and volunteer fire departments, and other municipal fire and rescue departments have active EMT programs. HEMSI stations, fire stations, and their resources are strategically placed within communities throughout the MPO area. Additionally, Huntsville Fire and Rescue has expertise in extrication of traffic accident victims and are dispatched as first responders to traffic accidents. HEMSI reports that their average response within the City of Huntsville is approximately 6 minutes, 49 seconds. For rural areas, average responsetime is approximately 7 minutes, 39 seconds.

2. **Older/Restricted Drivers** - The two primary goals emphasized are to: 1) Enhance traffic control devices for visibility as well as rumble strips, and 2) Make older drivers aware of their cognitive/mental abilities and ways to either get them off the road or to be more aware of their limitations. This can be done with a combination of education and legislation.

3. **Safety Legislation** – The two primary goals emphasized here are to: 1) Reactivate the State Safety Coordinating Committee, and 2) Enact or strengthen State laws to assist in safety efforts. State laws to be strengthened or enacted are as follows:

- Strengthen the Graduated Drivers License Law
- Strengthen the Booster Seat Law
- Statewide Red Light Camera Law (State law required for locals to operate program)
- Child Restraint Law
- Unattended Children Law
- Aggressive Driving
- Cell Phones (Prohibit use while driving)
- Review Enforcement of Interstates by Municipalities (This is currently done by the City of Huntsville and the City of Madisonon I-565)
- Review Distribution of Funds on Citations Issued (provide a portion of the proceeds of citations to local law enforcement agencies)
- School Bus Occupant Protection
- Primary Seatbelt Law for All Passengers
- ATV (Restrict use of all terrain vehicles by under-aged children)
- Restrict Passengers in Rear of Pick Up Truck
- Max Alcohol Violations (Adopt ordinances that close businesses after three violations)
- Underage Alcohol Violations (Strengthen law)
- Discourage DUI (Color coded vehicle tags for violators)
- Diminished Driving Skills (Require driver testing for older adults)
- Physician Reporting (Require MDs to report certain impairments for license renewal for older adults)
- Drivers License Restrictions (Mandate license restrictions for certain medical conditions)
- Age Related Driving Restrictions (Revise licensing renewal time frame)
- Older/Restricted Driver Designation (Use a universal symbol on vehicles to identify older/restricted drivers)

While these ideas will impact safety on roadways, the implementation and enactment of these strategies may prove difficult due to politics involved.

4. **Risky Driving** – Strategies to mitigate risky driving are: Extensive drug/alcohol education for younger persons and more enforcement for those who drink and drive, occupant protection (safety belts), police traffic services (enforce seat belt non-use, do selective traffic enforcement programs), and youth targeted actions due to unnecessary risk taking based upon inexperience. The City of Huntsville Police Department has implemented various strategies to mitigate risky driving. They conduct extensive drug/alcohol education for younger persons. Additionally, one

of their programs involves deploying roadblocks during holidays or other times when people may have a tendency to consume alcohol and drive. The State Highway Office hasmultiple initiatives that can be or have been acted upon locally, such as child restraint safety checks, and also support for special campaigns like click it or ticket, etc…

5. **Lane Departure Component (Run off Road or ROR)** – 40% of all fatal crashes are caused by vehicles running off of the road. Rural roads comprise 42% of the total run off road crashes. Federal and State roads under the jurisdiction of ALDOT comprise 29% of the run off road crashes. To solve this problem, ALDOT proposes the following actions to deal with these key issues:

   a. Risky Driver Aspect – Work in coordination with the Risky Driver Team to increase the effectiveness of the countermeasures applied by both teams.

   b. CountyROR Crashes – Rural roads are typically narrow, and counties typically don't have necessary funding to correct safety problems. There is a federal source of safety funds through SAFETEA-LU. The Huntsville Area MPO has taken advantage of the funds and have constructed Mooresville Road safety improvements in Limestone County, and replaced stop signs and installed traffic signals at various intersections in Madison County.

   c. Interstate Median Crossover Crashes – Investigate locations where this is a problem.

   d. ROR Crashes on Rural Two-Lane State/Federal Routes – ALDOT addresses this problem already through the hazard elimination safety program.Most recommendations for this category deal with the analysis of crash data generated via computer and if the data is effective enough to identify such crashes with accuracy compared to paper copies.

   e. Two-Lane Rural Head-On Crashes – Most recommendations for this category deal with the analysis of crash data generated via computer and if the data is effective enough to identify such crashes with accuracy compared to paper copies. While ALDOT addresses this problem on rural two-lane State/Federal roads through the hazard elimination safety program, usually these more "local" rural roads do not compete well for hazard elimination funding.

   f. Changes to ALDOT Policies and Procedures – ALDOT has incorporated the roadside clear zone concept into its new designs to the extent that funding allows. However, there may be other areas of

roadway design, construction, maintenance and operation where existing policies could be tweaked to provide additional crash reduction without adding significant cost or time to projects. ALDOT policies can be checked by more recent safety literature/software to determine if any updates are presented that would improve the State's policies. The State may consider the development of a design manual. The Alabama Longitudinal Barrier Installation Manual developed for ALDOT by Auburn University is a good example and could be one chapter of such a manual.

8.3.1.2 SHSP Implementation

Implementation of the SHSP is being conducted at two levels. First, the State Safety Coordinating Committee was reactivated by amending the legislation that created it, and secondly, implementation is being conducted by five large teams of coordinated safety volunteers under the guidance of key leaders serving as an Executive Committee.

8.3.2 Additional State Safety Legislation

In addition to the safety legislation identified in **Section 8.3.1.1**, the State of Alabama Bicycle Safety Act of 1995 also known as the "Brad Hudson Law' enforces the use of bicycle helmets of all operators and passengers who are under 16 years of age to wear approved protective bicycle helmets, and requires that all bicycle passengers who weigh less than 40 pounds or are less than 40 inches in height be seated in separate restraining seats.

8.3.3 Local Traffic Operations Related to Safety

The City of Huntsville Traffic Engineering Department has identified specific safety management projects to be undertaken to enhance safety within the city limits. These projects are in addition to any projects identified in **Section 8.2.4.**These additional projects are discussed in **Section 8.4.**

8.4 Maintenance and Operations Projects Addressing Congestion Management & Safety Management: FY 2010-2015

The Traffic Engineering (TE) Division of the City of Huntsville's Department of Urban Development is charged with the responsibility of maximizing and preserving the functional lifespan of the public street and highway network within the City of Huntsville,and plays a strong advisory rolein the case of private streets, and State & Federal highways. By identifying areas of traffic congestion and high accident rates,TE recommends or implements a number of improvement programs and projects to reduce congestion and improve safety. One of TE's primary missions is to identify and implement Programs (systems and processes) that continually improve and upgrade traffic operations along all street systems. In addition the TE Division serves in an advisory capacity during the planning and conceptual stages of new roads or corridors, and in a controlling capacity regarding the geometric design of Huntsville's street and highway improvement projects.

The projects identified were selected to not only increase capacity at congested intersections, and improve the quality of traffic flow along arterial coordinated signal systems, but also to reduce both the existing collision rate and the potential for future collisions between motor vehicles, pedestrians and bicyclists.The projects are subject to further review by the TE Division, and other projects not yet identified may take precedence over the projects formally listed. The implementation of these projects is under the direction of the TE Division.

These projects were selected for the primary purpose of either congestion management or safety improvements or for both. Bicycle and pedestrian improvement projects are always categorized solely as safety improvements. Given the lack of available federal funds to implement most of these improvements, most of these projects will be categorized as visionary projects. There *may* be opportunities in the future where federal or State funds, earmarks, or grants may be applied for eligible projects, but these funds are subject to availability and certain federal and State requirements – all of which are currently unknown. Currently, one project has received federal earmarks for improvement. The project is "H: Church Street Bridge at Big Spring Park."

8.4.1 Project Selection

These projects target the more costly traffic improvements at severely congested intersections and roadway segments. The projects customarily address a relatively small number of locations that experience one or more daily periods of severe congestion, or are found to have a significantly higher-than-average accident rate history. They are often called "*intersection bottlenecks*", "*weakest links in the chain*", or "*hot spots.*"

Candidates for these projects are most often located along heaviest traveled arterial and collector streets. However, in recent years, a growing number are found at public road intersections and at commercial development along two lane rural roads in newly annexed areas.

In many ofthese two lane cases, one or more of the intersection approaches, or one side of the roadway at these intersections or mid block "hot spots" are under the jurisdiction of Madison County, Limestone County or the City of Madison.

These projects include the construction of new signalized systems at intersections of public roads, or where public roads intersect with major access roads to large scale commercial or industrial development projects. In manyof these cases, due to cost or complexity, geometric improvements often require design and construction by others.

Project construction and signal equipment costs normally range from $50,000 to $500,000 or more depending upon the complexity of the project. Preliminary engineering is either provided in-house by TE staff, by consultants selected by TE under the City of Huntsville's Ordinance 74-401 if less than $7,500, or if more extensive plan development is required, design plans are procured and developed under the oversight of the Engineering Division of Urban Development.

Acquisition of right of way and construction of the larger cost geometric improvements is provided under the oversight of the Engineering Division. For those

projects where both the complexity and construction cost does not exceed the maximum permitted under the city's periodic bid process, construction oversight is provided by TE staff.

8.4.1.1 List of Maintenance & Operations Projects Addressing Congestion Management and Safety Management

Map No. (Page 4-2)	Location	Description	Purpose and Need
A	Four Mile Post Rd @ Whitesburg Dr	Signal & major geometric improvements to Four Mile Post Rd approach	This project will improve traffic flow
B	EnterpriseWay@ University Dr	Reduce island width or eliminate to construct additional Northbound approach lane to University Dr.	This project will improve safety and traffic flow
C	Caldwell Rd @ Hwy 431	Construction of West to North right turn lane and acceleration lane on Hwy 431	This project will improve safety and traffic flow
*D	Old Madison Pike @ Research Park Blvd	Construct joint use pedestrian &bicycle bridge and sidewalk approaches across Research Park Blvd	This project will improve safety
E	Explorer Dr @ Pegasus Rd	New traffic signal installation	This project will improve traffic flow
*F	Enterprise Way: Moores Farm to University Dr	Add signal, left turn restrictions island at shopping center exits, a sidewalk, plus 3rd left turn lane to University Dr	This project will improve safety and traffic flow
G	County Line Rd @ HWY 72	Upgrade displays,phasing and timings and geometric improvements	This project will improve safety and traffic flow
H	Church St Bridge @ Big Spring Park	Construct bridge to improve pedestrian access to Big Spring Park and reduce vehicular/pedestrian conflicts	This project will improve safety and traffic flow
I	US 231	Access management and intersection improvements at US 231 between Hobbs Road and Weatherly Road	This project will improve safety and traffic flow

Note * - Project is *part* of improvement recommended for identified corridors shown in **Table 8.4**.

8.5 Intelligent Transportation Systems (ITS)

Intelligent Transportation Systems (ITS), a collective group of innovative technologies, were developed and have been deployed globally to improve transportation system efficiency, safety, and security. ITS aims to provide travelers with current information on traffic conditions, provide vehicles with safety equipment, and improve the transportation infrastructure by relieving congestion and

enhancing productivity. ITS can assist emergency responders in securing the transportation network during special events as well as time of emergency.

ITS uses a number of technologies including; information processing, communications, and control systems. The anticipated benefits of coordinating and integrating these technologies with the Huntsville area transportation system include improved safety, reduced congestion, improved mobility, improved economic productivity, and a savings in public investment dollars without negatively affecting the environment.

ITS offers an alternative to the traditional measures used for addressing transportation problems and needs. It applies advanced technologies to transportation systems to make them safer, more efficient, and more customer service oriented. The technology includes systems for communicating transportation options, conditions, and schedule information to transportation consumers; smarter vehicles and smarter roads, flexible traffic control, and enhanced fleet management systems. Creative ideas include new ways to disseminate information to travelers and public/private partnerships; linking various public partners by providing real-time information, innovative financing, and techniques, and leveraging non-transportation investments.

8.5.1 USDOT ITS Initiatives

The United States Department of Transportation's (USDOT) Intelligent Transportation Systems (ITS) program has maintained continual efforts of improving transportation safety, relieving congestion, and enhancing productivity. The USDOT recently introduced a new generation of initiatives aimed at enhancing the operation of transportation systems. These initiatives include:

- Integrated Vehicle Based Safety Systems
- Cooperative Intersection Collision Avoidance Systems
- Next Generation 9-1-1
- Mobility Services for All Americans
- Integrated Corridor Management Systems
- Nationwide Surface Transportation Weather Observation System
- Emergency Transportation Operations
- Universal Electronic Freight Manifest
- Vehicle Infrastructure Integration (VII)

8.5.2 Huntsville Urbanized Area ITS Strategic Initiatives

The City of Huntsville, in cooperation with other regional governments and organizations, has identified ITS strategies for its region, and has developed a Strategic Regional ITS Plan. Two important aspects of the Plan are the Concept of Operations and the Regional ITS Architecture.

The Concept of Operations includes, but is not limited to, the integrated and coordinated operations of incident management, emergency management, and advanced traffic signal and traveler information. The development of the Concept of Operations translates the region's identified transportation operations problems into a set of "core"

strategies for developing the Huntsville Regional ITS operations and management program.

The Regional ITS Architecture defines the specific transportation management and incident management components needed to achieve the regional vision of the City. The following components are applicable to the Huntsville area transportation system:

- Traffic Signal Control Systems - Provides for the control and coordination of traffic signals, surveillance and monitoring of traffic, and the monitoring of hardware and software malfunctions.

- Freeway Management Systems - Provides for the following on limited access facilities: surveillance and incident detection, "intelligent" ramp control, information dissemination, incident management, lane use control, and coordination/integration with all appropriate agencies that are affected by freeway management strategies.

- Transit Management System - Provides for the following with respect to public transit operation: transit vehicle tracking, demand-responsive operations, passenger and fare management, vehicle security, vehicle maintenance, and multi-modal coordination. The City of Huntsville Transit has invested in an automatic vehicle locating (AVL) system that has been installed on all of its fleet, which will enhance safety and security of the transit system.

- Regional Multi-Modal Traveler Information System - Provides multi-modal trip planning, route guidance, traveler advisory functions, confirmation and payment services for travelers, special event information, and pre-trip/en-route trip planning assistance, including roadway conditions, traffic information, travel times, and transit information. This information would be available from eitherhome, workplace, hotels, airports, or high-density shopping areas.

- Emergency Management System - Provides for the integration and coordination of appropriate emergency management agencies (county and local police, fire, E-911) with respect to the transportation infrastructure. Detection and response of incidents, as well as real-time traffic information for timely dispatch of personnel, are emphasized. The Huntsville-Madison County Emergency Management Agency, which coordinates all emergency response plans with all jurisdictions represented on the MPO, has identified critical facilities and transportation system elements in its emergency response plans. Additionally, MadisonCounty is designated as a host county for possible nuclear power plant evacuees from adjacent counties. As a result, capabilities of securing the local transportation system are exercised yearly with emergency response organizations county-wide. Implementation of ITS will assist regional emergency response groups in both safety and security of the transportation system.

- Incident Management Program - Provides for the detection and verification of

roadway incidents, appropriate response to incidents, site traffic management, incident clearance, and motorist information.

- Railroad Grade Crossing Warning System - Provides for the implementation of technologies, which increase roadway and rail safety for at-grade crossings throughout the Huntsville area transportation system.

8.5.3 MPO ITS Implementation

The City of Huntsville is continuing its initiative to implement ITS technologies identified in the strategic plan, and integrate them into the transportation system. This is being accomplished by meetings with regional stakeholders, which include law enforcement and other public safety personnel, to discuss implementation strategies for utilizing technology for increasing the safety and security of the transportation system within the MPO jurisdiction. Specific projects have been identified to bring the system to fruition. Additionally, the City should continue to apply for any funding that may be available for the deployment of ITS technologies that complement the ITS strategic plan.

Congestion management and safety management projects have been identified. A systematic approach of integrating these improvements to the transportation system, along with the implementation of ITS technologies and construction of the transportation improvements identified in **Section 4 - Highway Element**, yields a transportation network that will provide more efficient and safe travel in future years.

8.6 Security Element

ITS is a tool that can be used to address congestion, safety, and security on the transportation network. Even though there is a lack of federal funds to fully implement the ITS program, the Huntsville Urbanized area utilizes several tools to promote security on the transportation network.

8.6.1 Local Strategies Implemented to Secure the Transportation Network

1. The City of Huntsville Department of Parking and Public Transit has recentlycompleted installation of extensive hardware and software designed to enhance the effectiveness and efficiency of fixed route and Paratransit services in addition to providing for enhanced customer safety and security. All vehicles are equipped with AVL (automated vehicle location)/GPS transmitters that communicate with dispatchers and transit operations personnel at 30 second intervals providing real time vehicle location and schedule adherence information. The system includes an emergency switch which can be covertly activated by the driver in a situation that requires notification to dispatchers and supervisors without other people on board being aware that an alert has been

sent. All vehicles additionally have mobile data computers (MDC's) for the purpose of communicating operational information that is specific to the type of service being provided by the vehicle. Drivers of Paratransit vehicles update demand response passengers who are being picked up and dropped off so that dispatchers always know who is on board the vehicles. Paratransit scheduling software also recently installed provides dispatchers with ready access to information specific to any customer who is being transported including emergency contact information.

Some public transit vehicles are equipped with video surveillance systems. The City will be updating the existing systems and will retro-fit vehicles that do not yet have surveillance systems using ARRA stimulus grant money that was recently awarded. This work is scheduled to begin in August, 2009. The Central Transfer Station and office building is equipped with video surveillance. Building surveillance is monitored in several locations throughout the building. The adjacent Public Transit office building is also secured by a key card entry system to all employee areas that are not intended to be accessible to the public unannounced.

2. The transportation network is secured during known events for which congestion and safety may be a factor, such as football games, community festival, and other organized events that attracts large volumes of traffic in a concentrated area.

3. Additionally, the metropolitan area is designated as an evacuation area for Browns Ferry Nuclear Power Plant, which requires periodic exercising of regional law enforcement capabilities to move large volumes of traffic along long evacuation routes and in a coordinated fashion.

4. The Huntsville-Madison County Emergency Management Agency (EMA), which coordinates all emergency response plans with all jurisdictions represented on the MPO, has identified critical facilities and transportation system elements in its **Emergency Operations Plan**. Additionally, the **Emergency Operations Plan** and supporting Standing Operating Procedures identify methods for coordinated evacuation into and out of MadisonCounty. These plans are routinely exercised in the field.

5. The Huntsville-Madison County Emergency Management Agency manages the Emergency Operations Center that is manned by local jurisdictions as well as Redstone Arsenal during critical events. The EMA is also part of a regional mutual aid association. The EMA, local response groups, and the mutual aid association frequently exercises the security of the local transportation network, focusing upon non-recurring events, and involving various modes of transportation.

It is through these security initiatives that the transportation system may be made secure for mobilizing emergency responders, improving military mobilization, managing planned

events as well as non-recurring traffic operations, so that ultimately the homeland can be made secure.

8.7 Conclusion

All three elements addressed in this section are interrelated, and also utilize management and operations strategies to ensure the network is effectively and efficiently managed in terms of congestion, safety, and security. It is through the implementation of these management and operations strategies as well as other initiatives identified in the section that improvements to congestion, safety, and security can be made upon the network. Periodic monitoring of the network will be performed to ensure that implemented strategies and projects are effective and that ongoing activities remain successful.