W A M P O

Wichita Area Metropolitan Planning Organization

2011 Congestion Report

December 2011

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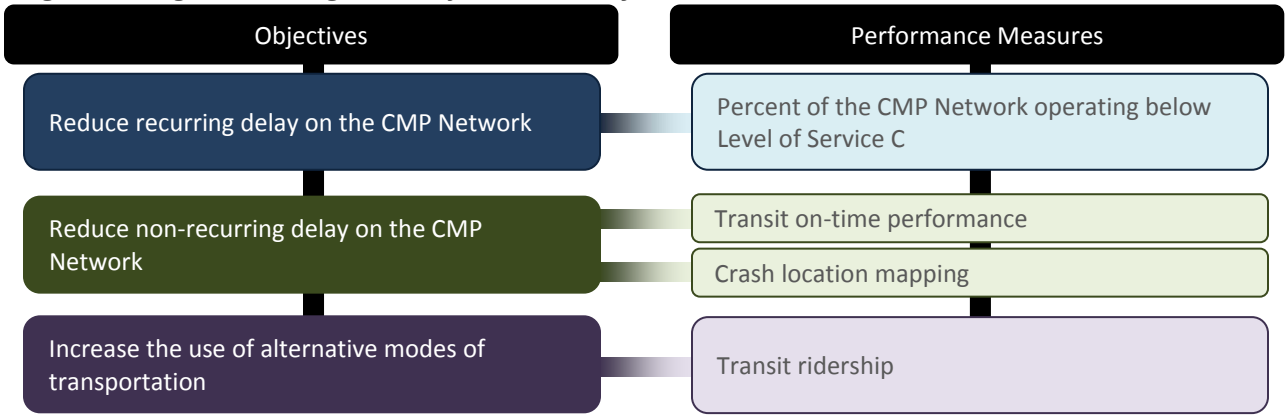
Introduction to the Congestion Report

Traffic congestion causes travel delay, increases air pollution, decreases safety, and hinders regional mobility. WAMPO is undertaking a performance-based planning approach to manage congestion and its adverse effects. This approach provides relevant data into the decision making process. The purpose of the Congestion Report is to inform the decision making process when selecting projects and strategies to manage congestion.

WAMPO has three objectives to manage congestion in the region. These objectives identify what the region plans to accomplish in terms of congestion management. Each objective has at least one performance measure to gauge the success in achieving the objective. The objectives and performance measures are identified in Figure 1.

Figure 1: Congestion Management Objectives and Performance Measures



Level of service information identifies areas where vehicles are experiencing delay; crash location mapping identifies areas where crashes are causing delay; transit on-time performance uses buses as a surrogate of all vehicles and identifies how much irregular delay is occurring; and transit ridership identifies how much the region uses transit service rather than personal vehicles.

The Congestion Report identifies the extent and duration of congestion as identified by each of the four performance measures. This report also identifies specific locations of congestion as well as possible causes of congestion.

WAMPO focuses congestion management on a specific network or roads that have national or regional importance to mobility. This network is a subset of the regional roadway network that serves national and regional importance to economic vitality and regional mobility. The CMP Network includes the roadways that are monitored for congestion. Therefore, this report focuses on the CMP Network.

Objective 1: Reduce recurring delay on the CMP Network

Recurring delay (congestion) is generally defined as the daily travel delay we routinely experience under normal circumstances. This typically happens on weekdays during peak travel times; 7-9am and 4-6pm. Recurring congestion is usually caused by many people traveling at the same time to get to and from work, with the roadway not designed to handle the demand during that particular time.

Percent of the CMP Network operating below Level of Service C

WAMPO uses Level of Service (LOS) as the measure of congestion in the region. When using LOS, each roadway segment is given a letter grade from A – F for a certain time period. When a roadway is functioning well with no congestion issues, it is operating at LOS A or LOS B. When the roadway is operating at LOS C, some minor delays

are experienced. Once the roadway starts operating at or below LOS D, congestion occurs, leading to greater delays and safety risks. WAMPO has deemed that LOS C or higher is acceptable on the roadway network. Once roadways start operating at LOS D or below, WAMPO will identify the area as having a potential congestion issue. WAMPO desires to minimize the amount of roadways operating at or below LOS D.

This LOS analysis focuses on peak hours since the WAMPO region does not typically have sustained congested beyond the peak periods. Peak periods are specific times when roads carry the most traffic. Hourly traffic volume data identified 7-9am and 4-6pm as the peak travel periods for the WAMPO region.

In 2010, WAMPO conducted a travel time study on approximately 250 centerline miles or road during the AM peak period (7-9am) and the PM peak period (4-6pm). The 2010 Travel Time Study covered about half of the CMP Network and focused on those locations known to, or most likely, have congestion. The study provided peak period LOS for arterials and average speed for highways. The average speed on arterials and freeways translates into a LOS for the roadway, as shown in Figure 2.

Figure 2: Level of Service

Level of Service (LOS)	Level of congestion	Highway speed as % of posted speed	Highway speed example at 60 mph posted speed	Arterial Speed as % of posted speed	Arterial speed example at 35 mph posted speed
A	None	> 100%	> 60	> 100%	>35
B	Minimal	95 – 100%	57-60	80 – 100%	28-35
C	Acceptable	90 – 94.9%	54-56	63 – 79.9%	22-27
D	Slightly Congested	75 – 89.9%	46-53	50 – 62.9%	17-21
E	Congested	50 – 74.9%	30-45	37 – 49.9%	13-16
F	Severely Congested	< 50%	< 30	< 37%	<13

Providing an overall view of the amount of congestion occurring in the area is important when developing trend data. Different locations will have congestion, but the amount of overall congestion may change. Figure 3 shows how much of the monitored network experienced congestion in the AM and PM peak periods.

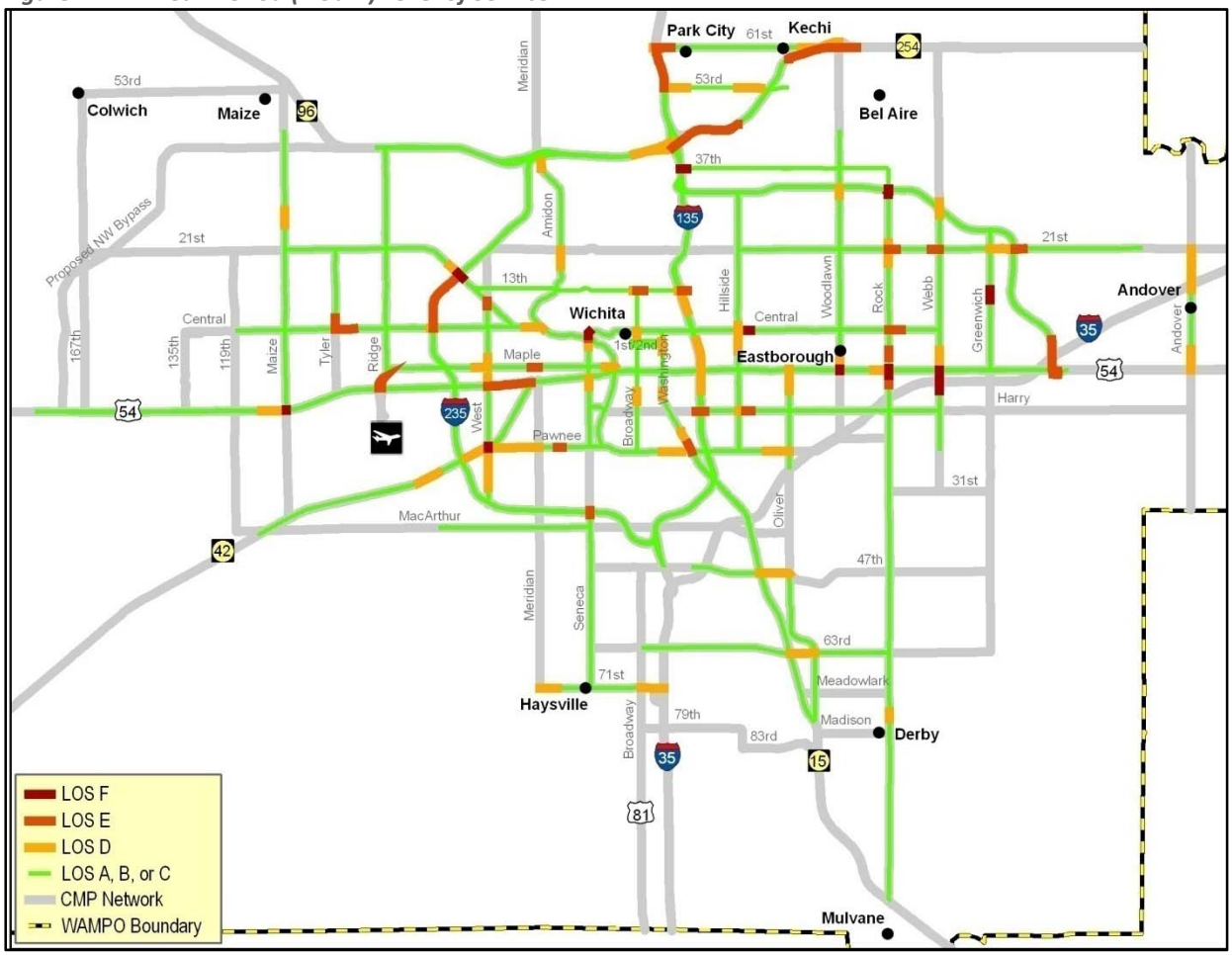
Figure 3: Monitored Network Congestion

	AM Peak Period (7-9am)		PM Peak Period (4-6pm)	
	Miles	% of monitored network	Miles	% of monitored network
Congested	**36.4**	**11%**	**59.7**	**18%**
LOS D	23.1	7.0%	38.2	11.5%
LOS E	11.6	3.5%	16.5	5.0%
LOS F	1.7	0.5%	5.0	1.5%
Uncongested	**295.5**	**89%**	**272.3**	**82%**

Total miles based on GIS network which includes directional lanes of travel (divided), not just center lane miles.

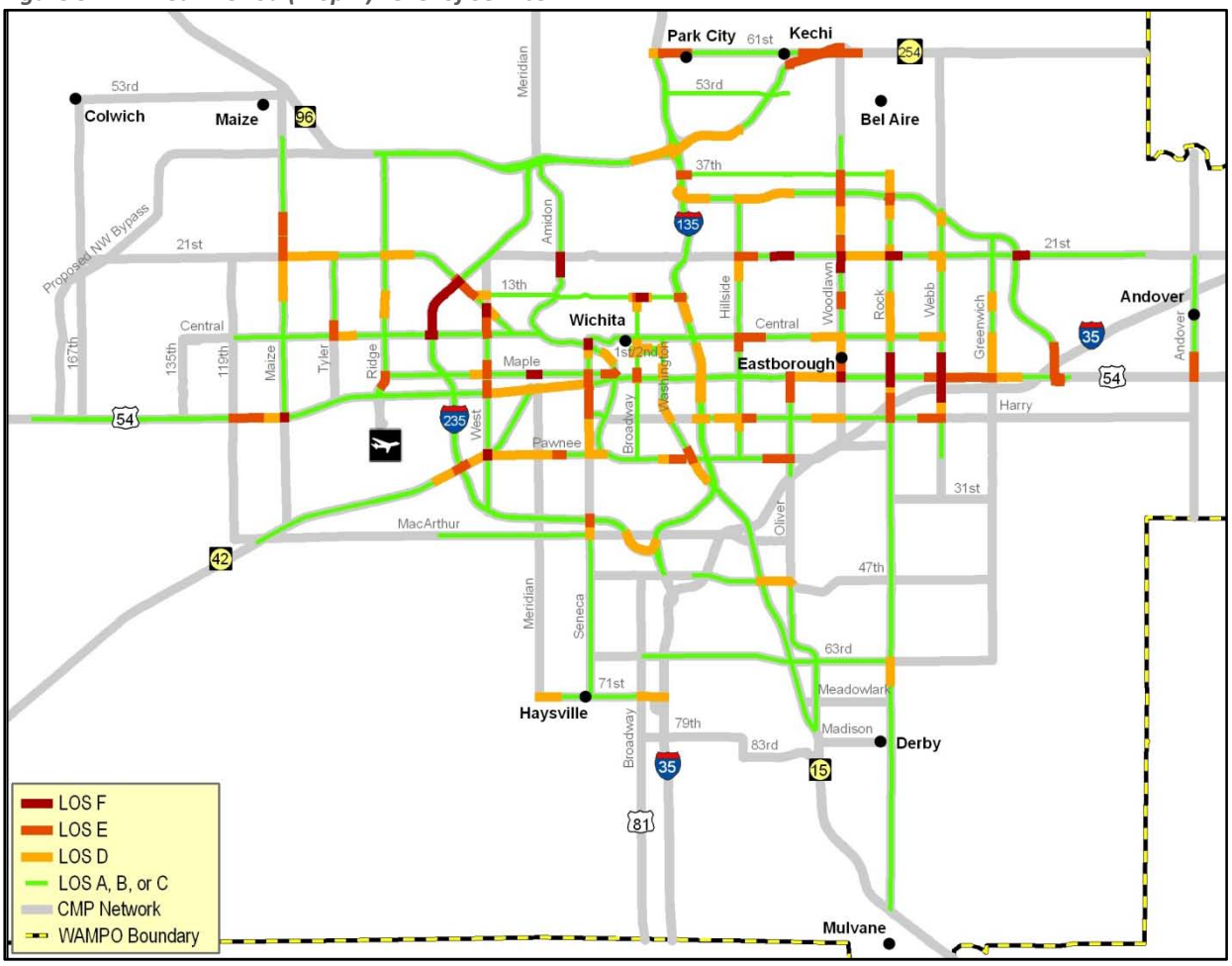
Identifying specific locations of congestion is important when targeting specific improvements. Various locations throughout the region have identified congestion during the AM and PM peak period. Figure 4 shows the location and degree of AM peak period congestion. Figure 5 shows the location and degree of PM peak period congestion.

Figure 4: AM Peak Period (7-9am) Level of Service



Source: WAMPO 2010 Travel Time Study

Figure 5: PM Peak Period (4-6pm) Level of Service

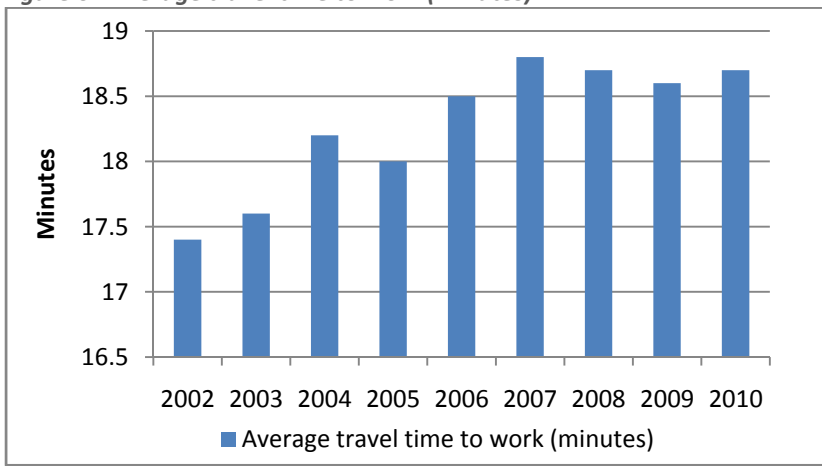


Source: WAMPO 2010 Travel Time Study

After comparing Figure 4 and Figure 5, it is noticeable that the PM peak period had more congestion than the AM peak period. In both the AM and PM peak period, most of the freeways experienced very little congestion except around interchanges (e.g. I-135/I-235/K-254 interchange). Most congestion occurred on the arterials in the region. This type of congestion is typically caused by delay at intersections. Intersection delay will always occur because of the need to allow both directions of travel to pass through the intersection, but the degree of delay can be improved.

Another way the region can identify recurring congestion is by looking at the average travel time to work. This information provides insight into how much congestion is occurring during the AM peak period. Estimates produced by the US Census Bureau for the 2010 American Community Survey show the average commute time to work in the Wichita Area. In 2010, the average commute time to work was 18.7 minutes. Figure 6 shows the average commute time to work data from 2002 – 2010.

Figure 6: Average travel time to work (minutes)

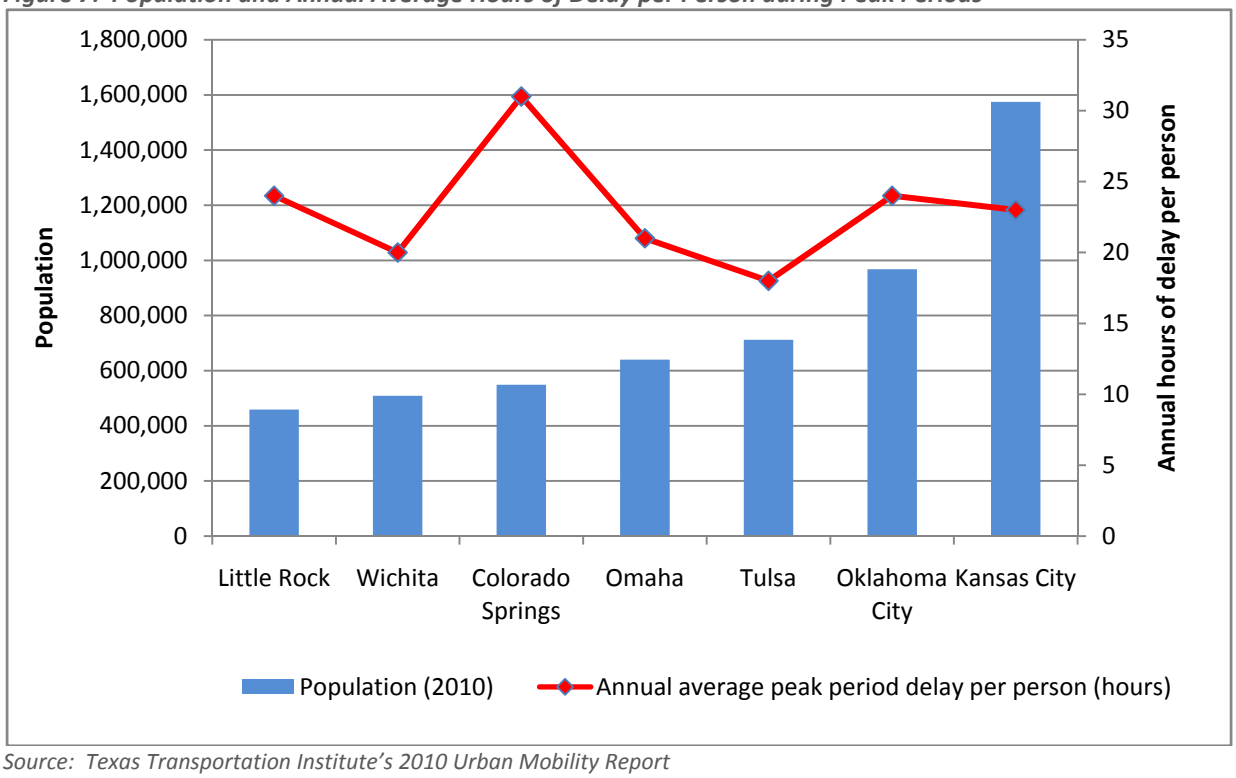


Source: United States Census Bureau American Community Survey 1-Year Estimates for the Wichita, KS Metro Area.

Since 2002, there has been an increase in travel time to work by over one minute. Travel time to work peaked in 2007 at 18.8 minutes. Continued suburbanization and population growth play a major role in this increase. However, travel time to work has been decreasing since 2007, with a slight increase in 2010. This could be from the decline in the economy and improvements to the transportation network.

Showing how the WAMPO region stacks up with other metropolitan areas gives a picture of how the region is doing compared to other areas. The Wichita Area experiences little congestion when compared to Los Angeles or New York, but is much less populated. Figure 7 shows how the Wichita Area compares to similar sized cities or cities in our proximity. The Wichita Area is one of the lowest in annual average peak period delay per person, as shown in Figure 7.

Figure 7: Population and Annual Average Hours of Delay per Person during Peak Periods



Source: Texas Transportation Institute's 2010 Urban Mobility Report

Objective 2: Reduce non-recurring delay on the CMP Network

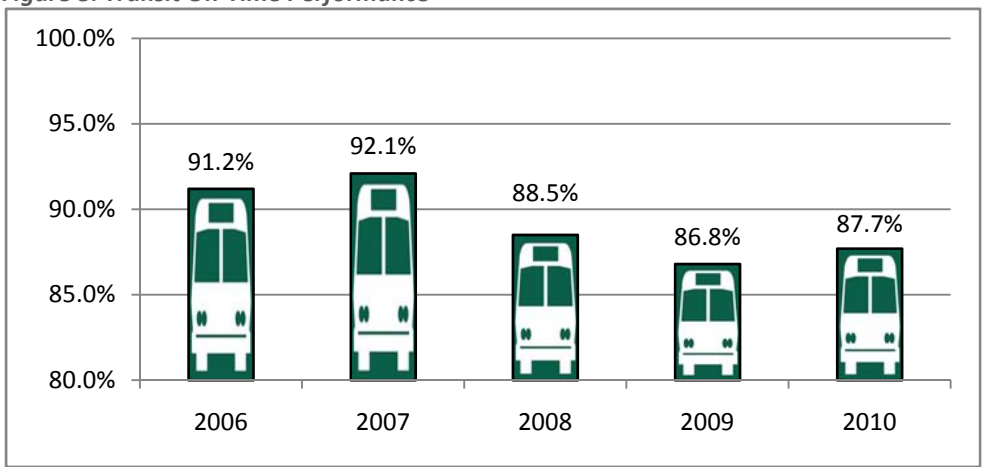
Non-recurring delay (congestion) is travel delay that occurs due to circumstances that do not normally occur on a daily basis. Non-recurring congestion is unusual, unexpected, or unplanned for delay. This can be caused by crashes, weather, special events, debris on the road, construction, roadside distractions, railroads, and other incidents. WAMPO has two performance measures to measure non-recurring delay; transit on-time performance and crash location mapping.

Transit on-time performance

Transit on-time performance measures the percent of Wichita Transit buses that arrive at destinations within three minutes of the scheduled arrival time. Transit on-time performance is an indicator of the reliability of transit services as a viable alternative to automobile travel. Also, transit on-time performance serves as an indicator of the delay experienced by the other vehicles using the roadway network. Since delay information is not readily available for vehicular travel, and delay information is already collected on the on-time performance of buses, the transit on-time performance is used as an indicator of delays other vehicles likely experience.

In 2010, Wichita Transit had an on-time rate of 87.7%. This was an increase of 0.9% from 2009. However, the 2010 on-time rate was below the five year average of 89.3% and below the 2010 target set by Wichita Transit of 91%. Figure 8 shows transit on-time performance from 2006 – 2010.

Figure 8: Transit On-Time Performance

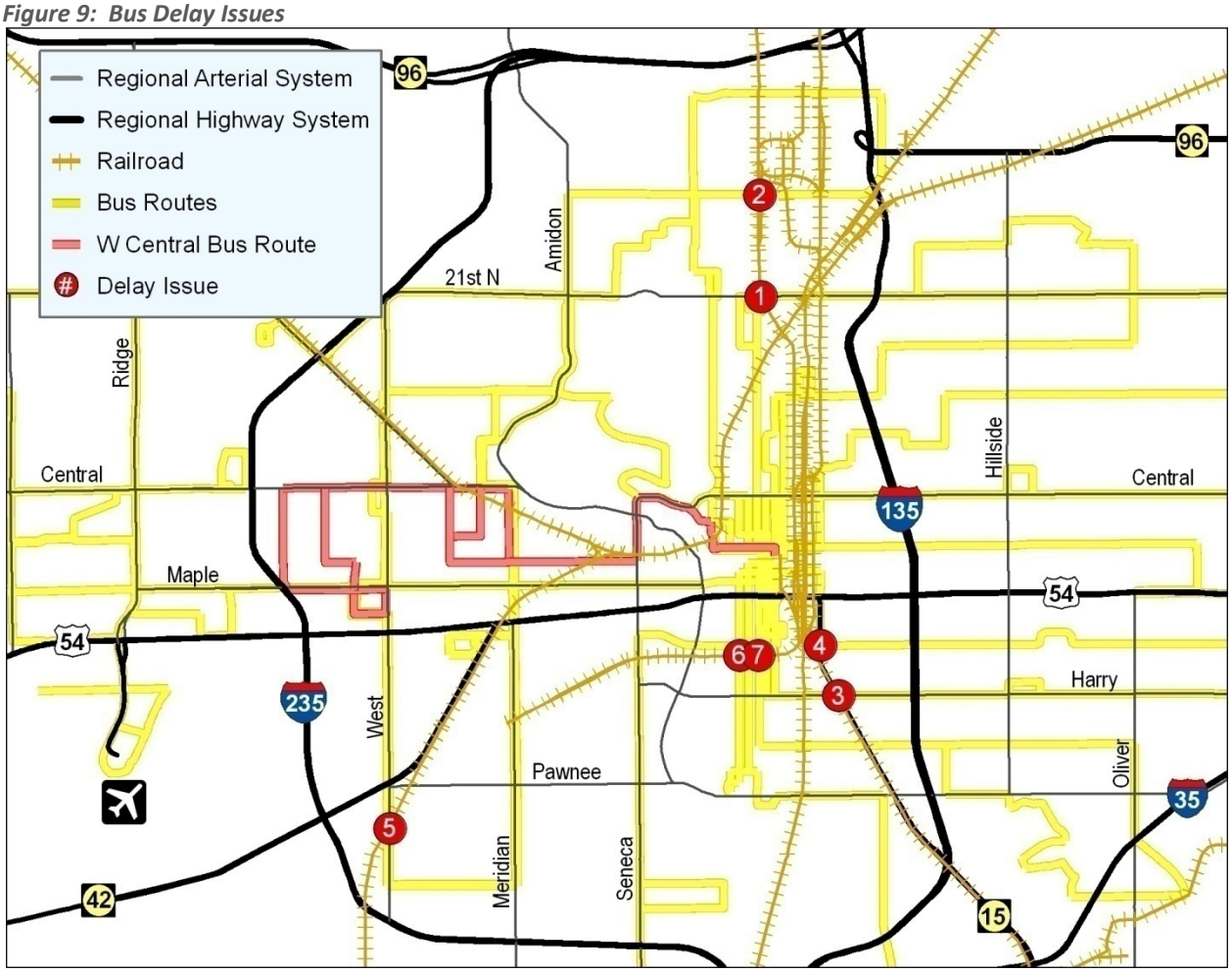


Source: Wichita Transit

Some specific areas and issues were identified by Wichita Transit operations personnel. These issues are shown on the map in Figure 9. The numbered list on the following page corresponds with numbers on the map.

- The North Broadway route experiences delay at 21st St. N. and Broadway due to train traffic.
- The North Waco route experiences delay at 29th St. N. and Broadway due to train traffic, especially during the peak hours.
- The East Harry route experiences delay at K-15 and Harry due mainly to train traffic and partially to issues with crossing K-15.
- The East Lincoln route experiences delay at K-15 and Lincoln due mainly to train traffic and partially to issues with crossing K-15.
- The Meridian route experiences delay at the railroad tracks near Pawnee and West.
- The South Main route experiences delay near Lincoln due to train traffic.
- The South Broadway route experiences delay near Lincoln due to train traffic.
- The West Central route (- symbol on the map) experiences delay three times on one loop two to three times a month. This delay turns a 55 minute loop into an hour and a half because the bus is delayed by trains three separate times

Figure 9: Bus Delay Issues



At-grade railroad crossings are the main cause of delay for buses. Routes crossing K-15, construction, and traffic crashes also regularly cause delays for buses. These types of delay occur at all times of the delay, with no significant increase during peak period.

Crash location mapping

Traffic crashes can be a major cause of congestion on roadways. Congestion can also cause crashes. Mapping crashes provides locations where delay causes traffic crashes and traffic crashes cause delay. Locations with high crash densities most frequently cause delay or identify locations where congestion causes crashes. High crash locations on heavily travelled roadway have the potential to cause the most delay because it affects the greatest number of travelers.

WAMPO has mapped 2009 crash densities for the AM peak hour (7-8am) and the PM peak hour (5-6pm). Provided below in Figure 10 are the AM peak hour and PM peak hour high crash density locations.

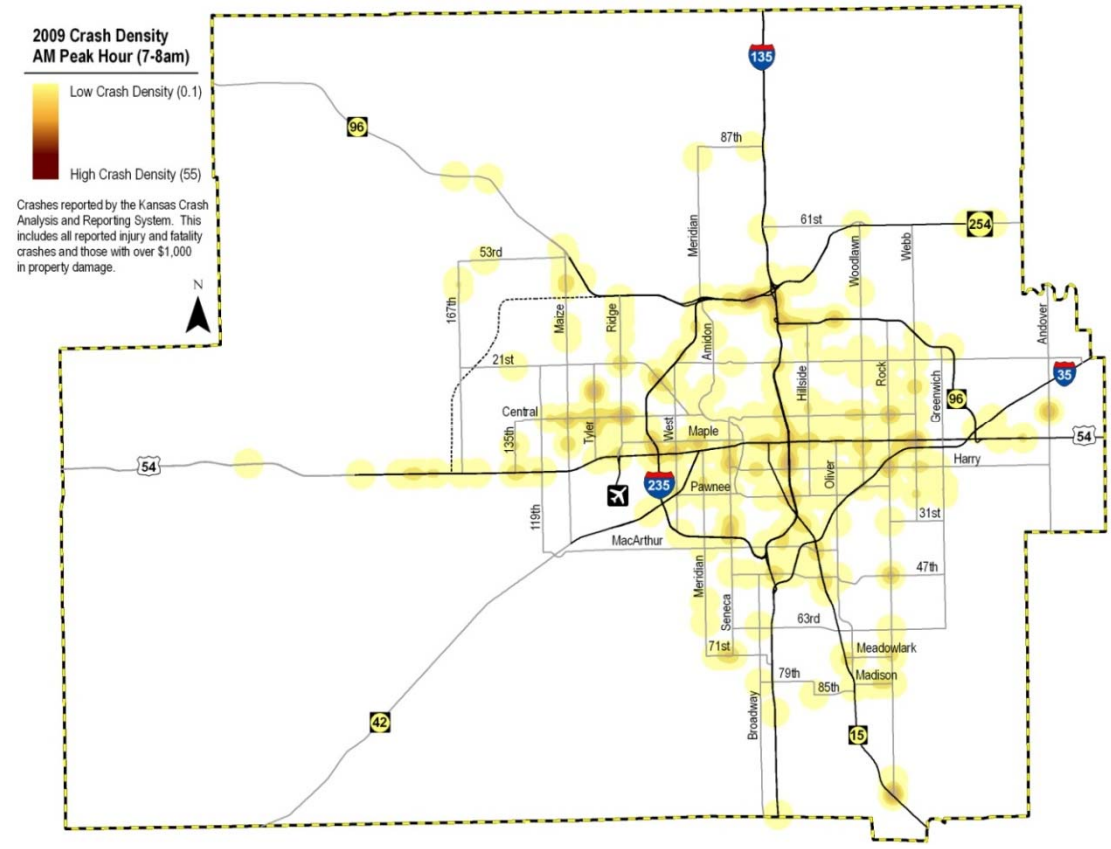
Figure 10: High Crash Density Location

AM Peak Hour (7-8am)	PM Peak Hour (5-6pm)
Highest Crash Densities	Highest Crash Densities
I-235/K-96 west of I-135	US-54 (Kellogg) near CBD and Washington
K-15 and Rock	I-135 south of I-235/K-254
US-54 (Kellogg) and Webb	Central and Ridge
Others High Crash Densities	Others High Crash Densities
I-135 north of Harry	US-54 (Kellogg) and I-235
Central and Ridge	US-54 (Kellogg) and Webb
13th St. N. and Tyler	I-135 and 1st/2nd St. N.
I-135 south of I-235/K-254	K-96 east of I-135
	US-54 (Kellogg) and Seneca

The crash density maps (Figure 11 and Figure 12) show the number of crashes around a specific point in 2009 for the particular peak hour. As shown in the maps, the PM peak hour has much higher crash densities than the AM peak hour. The highest crash densities during the PM peak hour were over twice as high as the highest crash densities during the AM peak hour; 25 crashes for the AM peak hour and 55 for the PM peak hour.

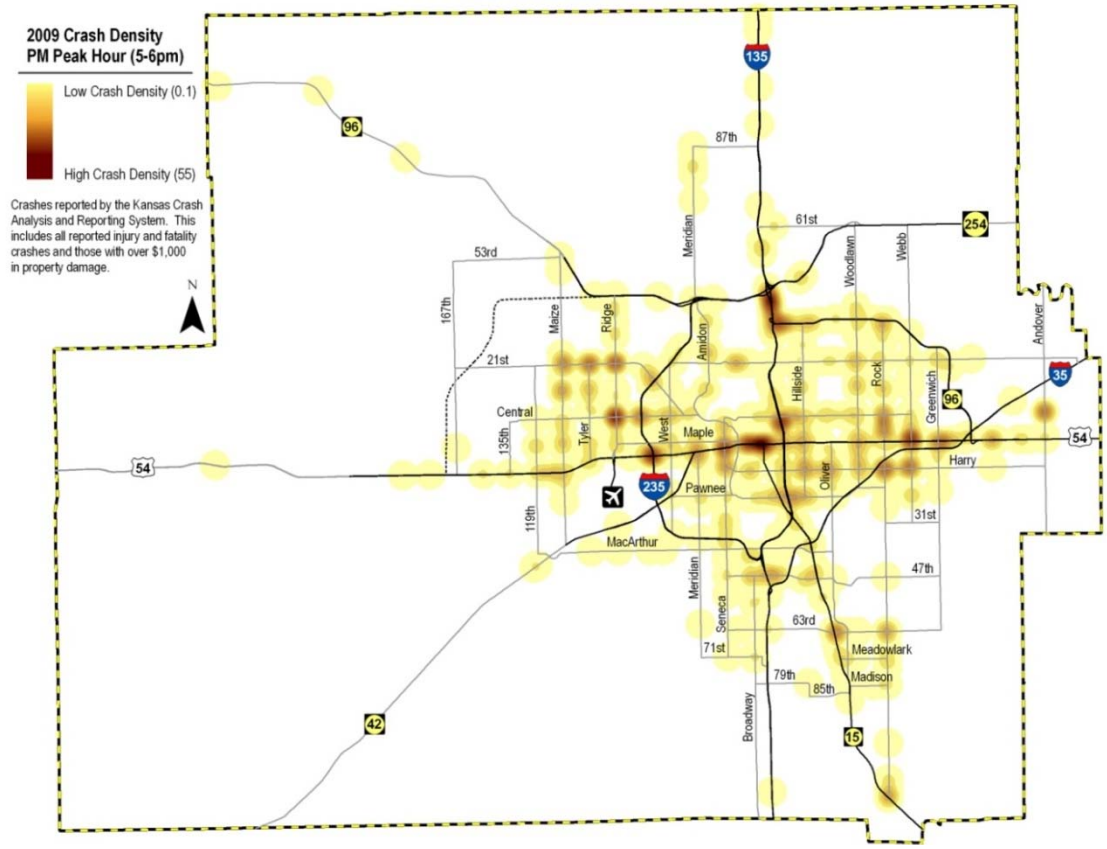
The data provided in this report was provided by the Kansas Crash Analysis and Reporting System (KCARS) and is intended to provide a snapshot of high crash locations in the region. Further crash analysis is necessary to determine specific causes of crashes at high crash locations.

Figure 11: AM Peak Hour Crash Density (2009)



Source: Kansas Crash Analysis and Reporting System

Figure 12: PM Peak Hour Crash Density (2009)



Source: Kansas Crash Analysis and Reporting System

Objective 3: Increase the use of alternative modes of transportation

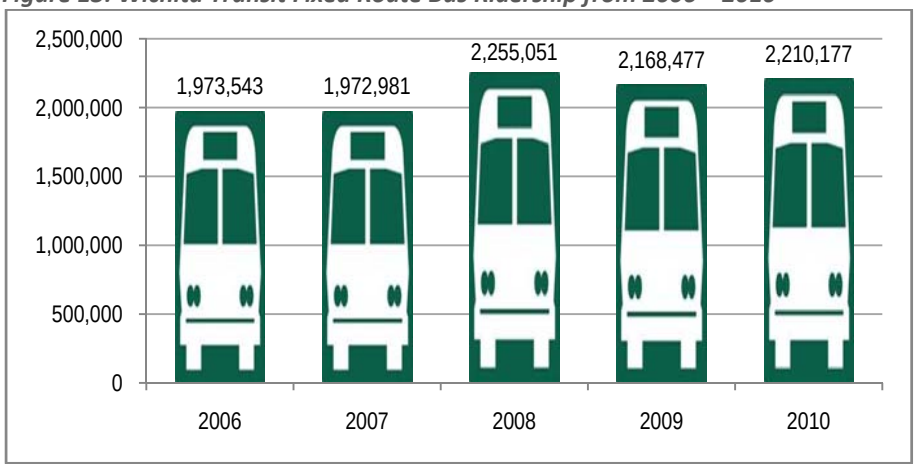
Objective 3 intends to reduce congestion by getting people to use alternative modes of transportation instead of personal vehicles. Many people in the region choose to drive vehicles to get around, which is a major contributor to congestion. Increasing the use of transit can reduce the number of personal vehicles on the road and therefore reduce congestion.

Transit Ridership

Transit ridership measures the number of rides provided by transit and paratransit providers. This includes Wichita Transit's fixed route bus system and the paratransit provider's van service. Measuring transit ridership provides an insight into how many people are not using personal vehicles to travel. People who ride the bus or use paratransit have many different reasons; having no other option, the high cost of gas and vehicle ownership, not wanting to drive through traffic congestion, or many other reasons. For whatever the reason, if people are not traveling in personal vehicles they are not occupying as much space (or no space) on the roadways. This is a benefit to reducing congestion.

In 2010, Wichita Transit provided 2,210,177 rides on the fixed route bus system. This was an increase of 41,700 rides (1.92%) from 2009. This was also 94,131 (4.45%) more rides than the five year average of 2,116,046. Figure 13 shows the fixed route bus ridership from 2006 – 2010.

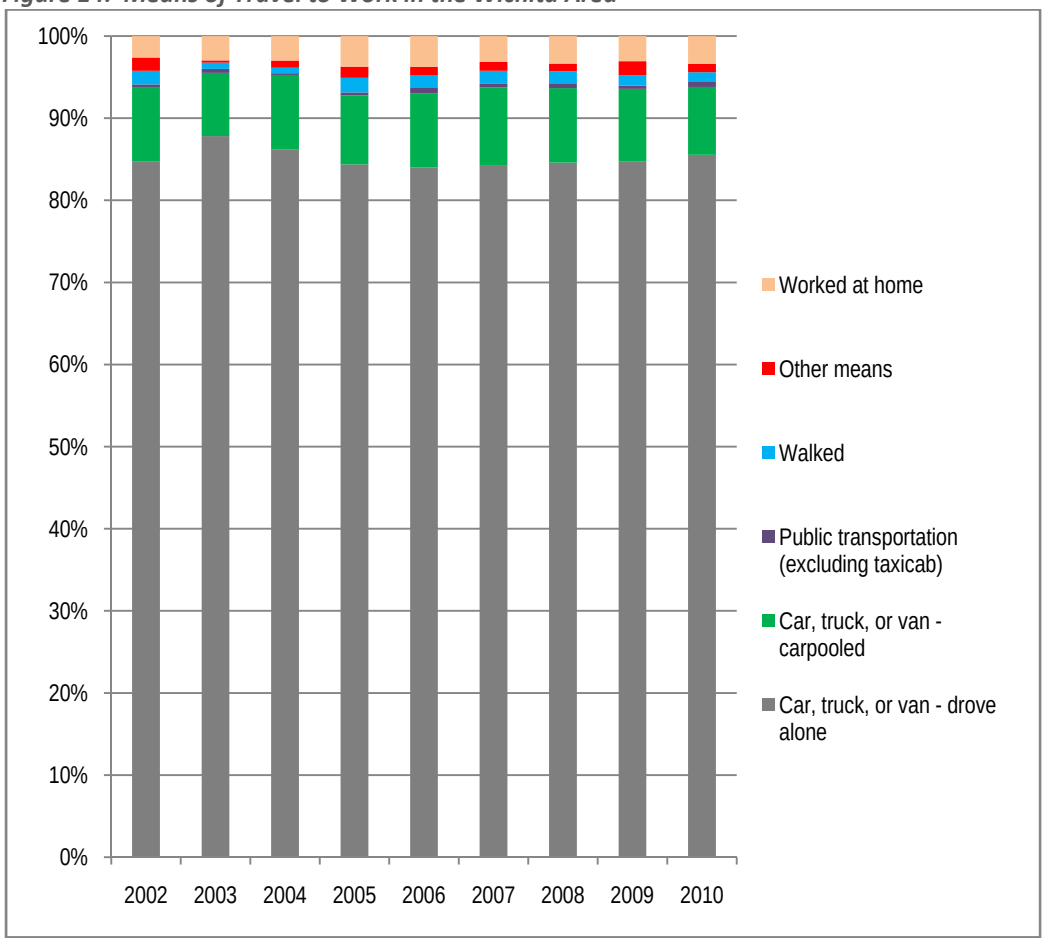
Figure 13: Wichita Transit Fixed Route Bus Ridership from 2006 – 2010



Source: Wichita Transit

Estimates produced by the US Census Bureau for the 2010 American Community Survey shows that in the Wichita Area, there were 289,338 workers 16 years and over. Of them, 1,736 people (0.6%) used public transit to get to work and 247,384 (85.5%) drove alone. Figure 14 shows the breakdown in the means of travel to work in the Wichita Area.

Figure 14: Means of Travel to Work in the Wichita Area



Source: United States Census Bureau American Community Survey 1-Year Estimates for the Wichita, KS Metro Area.

Transit not only includes fixed route bus service, it also includes paratransit service. Paratransit service is typically a dial-a-ride service used to transport people that are unable to drive themselves. These trips usually entail a driver picking up individuals and taking them to and from their destinations, usually with more than one rider on each trip. This reduces the number of single-occupant vehicles on the road.

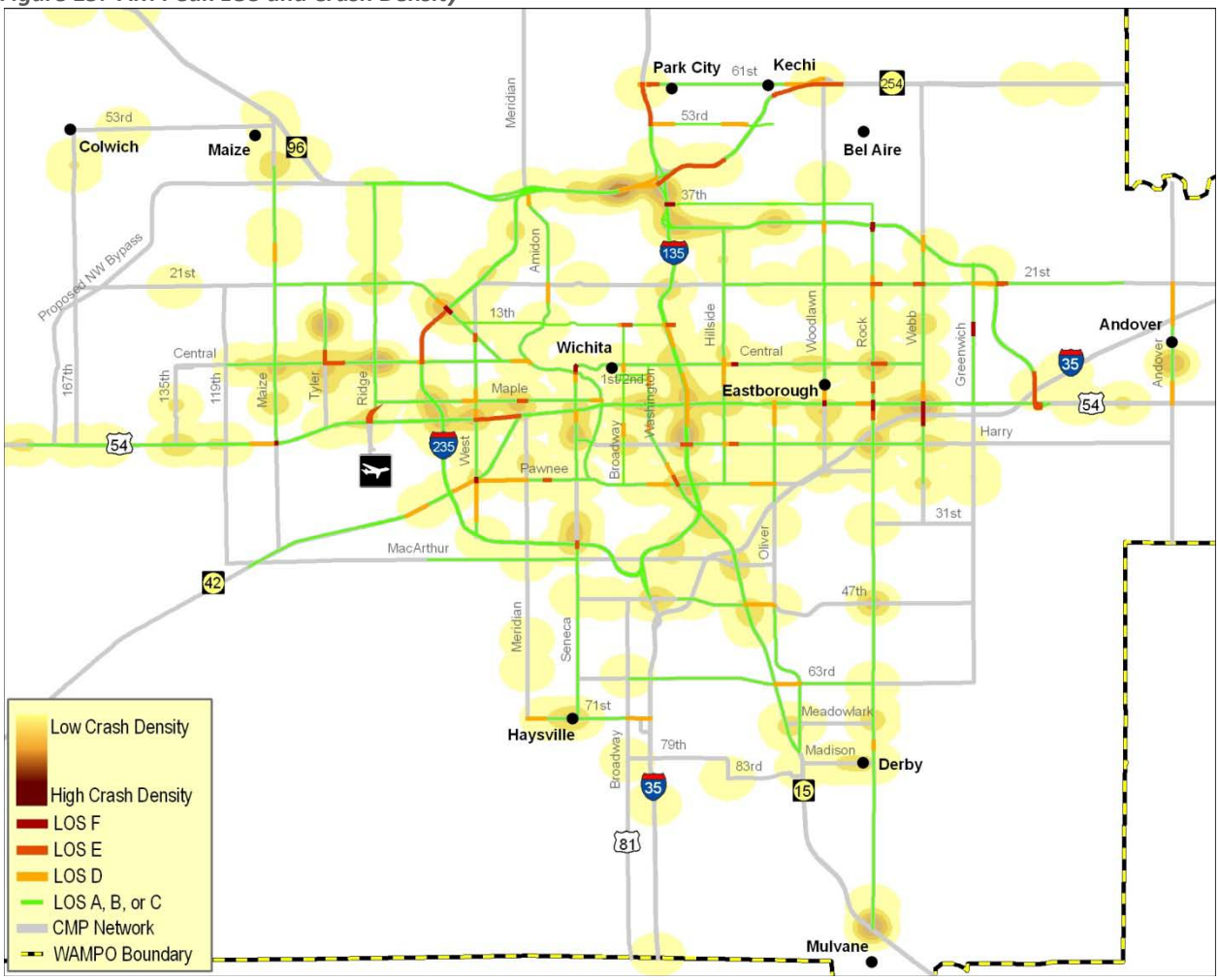
In 2010, paratransit providers gave approximately 733,000 one-way rides. WAMPO was unable to obtain historical data to show trends in paratransit ridership. Future reports will show trend data as it is regularly collected by WAMPO.

Summary

There are various causes of congestion in the region which cause delay at specific locations, leading to overall delay in regional travel. Congestion during the peak periods are the major cause of traveler delay in the region, with more delay occurring during the PM peak period than the AM peak period.

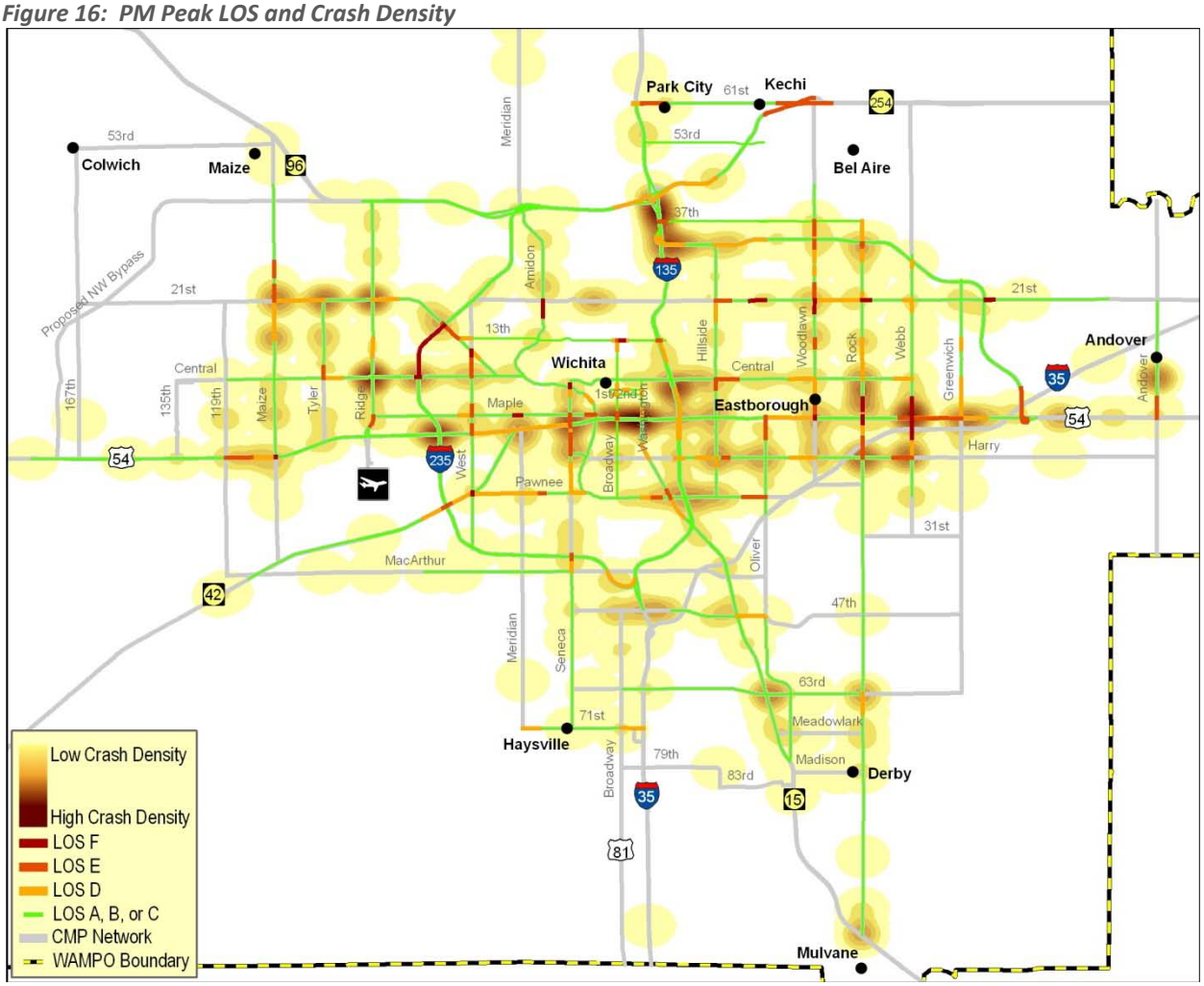
When looking at LOS maps and comparing it to the crash maps, a few issues emerge. Some of the locations operating at a LOS D, E, or F also have high crash densities. These locations are where congestion likely causes crashes, and crashes intensify congestion. Figure 15 shows the AM peak LOS and crash density comparison and Figure 16 shows the PM peak LOS and crash density comparison.

Figure 15: AM Peak LOS and Crash Density



Source: Kansas Crash Analysis and Reporting System and WAMPO 2010 Travel Time Study

Figure 16: PM Peak LOS and Crash Density



Source: Kansas Crash Analysis and Reporting System and WAMPO 2010 Travel Time Study

As the region moves forward with improvements to the transportation system (roadway improvements, signal timing efforts, technology deployments, transit improvements, etc.) the hope is to reduce regional congestion. With the majority of people in the region driving to and from work alone, congestion mitigation strategies aimed at reducing single occupancy vehicles traveling during peak periods will likely have the greatest impact on reducing recurring congestion. Strategies aimed at managing and clearing incidents on the network will likely have a great impact on reducing non-recurring congestion, especially during peak travel periods. Future reports will allow the region to see progress in improving traffic flows and reducing delay, especially at key locations.