

Section 3: Transit Market Analysis

3.1 Introduction

Changes in the City of Manhattan as well as Riley, Pottawatomie and Geary Counties have occurred since the completion of the 2000 *Manhattan Area Transportation Strategy: Connecting 2020* (MATS) and the *Transit Implementation Plan* (TIP) in 2001. Those changes were analyzed to determine if any new conclusions or observations could be made that can contribute to the transit plan update.

The analyses initially compared census data information from 1990 and 2000 to determine market changes and demand. The 2000 Census was not available for either the MATS or the 2001 TIP. Thus reviewing census information is still of value to see if conclusions in 2001 were valid. Beyond analyzing census data, the locations of employees relative to major employers in the study area were reviewed to determine where populations commuted to and from work; thus providing more framework for potential transit needs throughout the study region.

3.2 Demographic Review

Population and employment densities along with other segments of the population are often used as indicators for the need for public transportation. The study area made up of Riley, Pottawatomie and Geary Counties was further segmented at the Census tract level to analyze change over the ten-year period from 1990 to 2000. The following market characteristics, which typically generate public transportation ridership, were reviewed:

- The *Transit Capacity and Quality of Service Manual* considers 1,920 households per square mile to be the minimum acceptable to support fixed-route transit service.
- The *Transit Capacity and Quality of Service Manual* states 2,560 jobs per square mile will contribute to the success of fixed-route transit service.
- Seniors are often a good market for transit because as the population ages, there are more people who no longer drive due to physical constraints.
- The disabled population often requires mobility options that accommodate their unique needs.
- Low income tends to be a good indicator of propensity to ride transit.
- Households with limited access to a vehicle are a key target market for transit services. Limited access to a vehicle may mean that either the household does not own a vehicle at all, or that the number of vehicles owned by the household is not sufficient to meet transportation needs.
- Children between the ages of 10 and 14 who are old enough to travel alone, but not yet old enough to drive can also be a good market for transit services.

Figures 1 through 15 show the demographic and socioeconomic data for these various segments of the study area's population. The figures show data at the census tract group level. There are four levels of data shown on each graphic with the study area averages represented in the level second from the bottom. The data is from the 1990 and 2000 US Census for comparison purposes.

3.2.1 Population and Employment Density

Figure 2 through Figure 5 show employment and population densities in the three-county study area. Looking closely at each of the employment and population maps, the census tracts with the highest population densities directly correlate to those with the highest employment densities. This is equal for both the 1990 and 2000 Census data.

The maps indicate that the cities of Manhattan and Junction City are the most densely populated with densities up to 8,150 persons per square mile in 2000 and employment densities as large as 5,400 persons per square mile in 2000. The 1990 data show lower densities; however, population growth over the ten-year period, the tracts with the densest population, remain relatively consistent. As one moves beyond the city centers, population and employment densities decrease.

The population density of the tract encompassing Fort Riley drops over the ten-year period. In the spring of 1995, headquarters of the 1st Infantry Division were transferred from Fort Riley to Germany. Only a portion of the brigade of the Big Red One remained at the post along with a brigade of the 1st Armored Division and the 937th Engineer Group. This resulted in lower numbers at the Fort in 2000 compared to 1990. In August 2006, the Big Red One again relocated its headquarters to Fort Riley from Germany and the population at the Fort once again returned to numbers more consistent with the 1990 census data.

Figure 2: 1990 Population Density per Square Mile

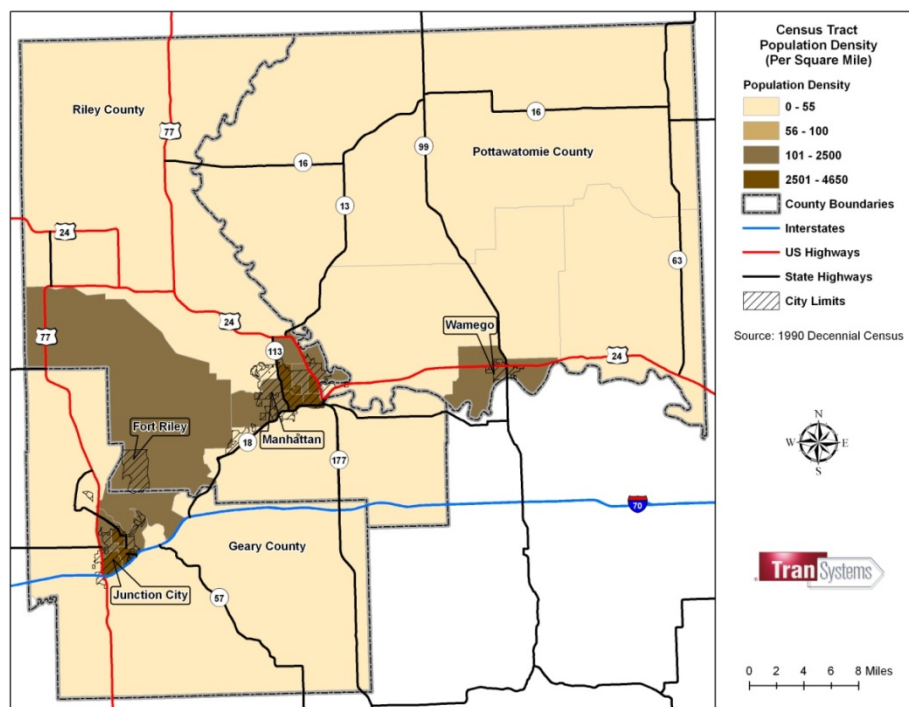


Figure 3: 2000 Population Density Per Square Mile

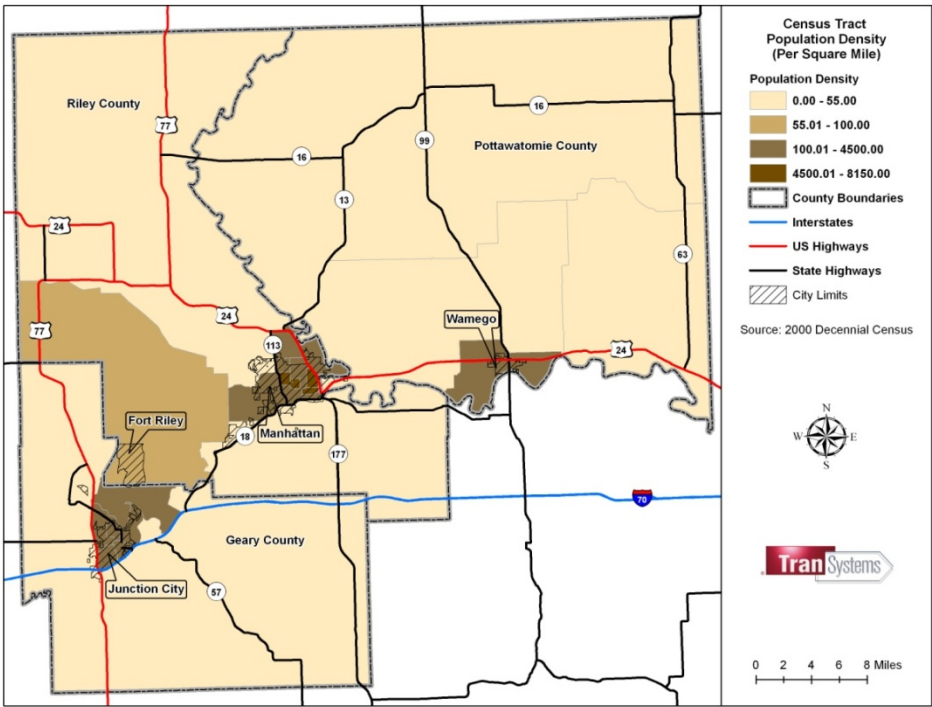


Figure 4: 1990 Employment Density (Jobs per Square Mile)

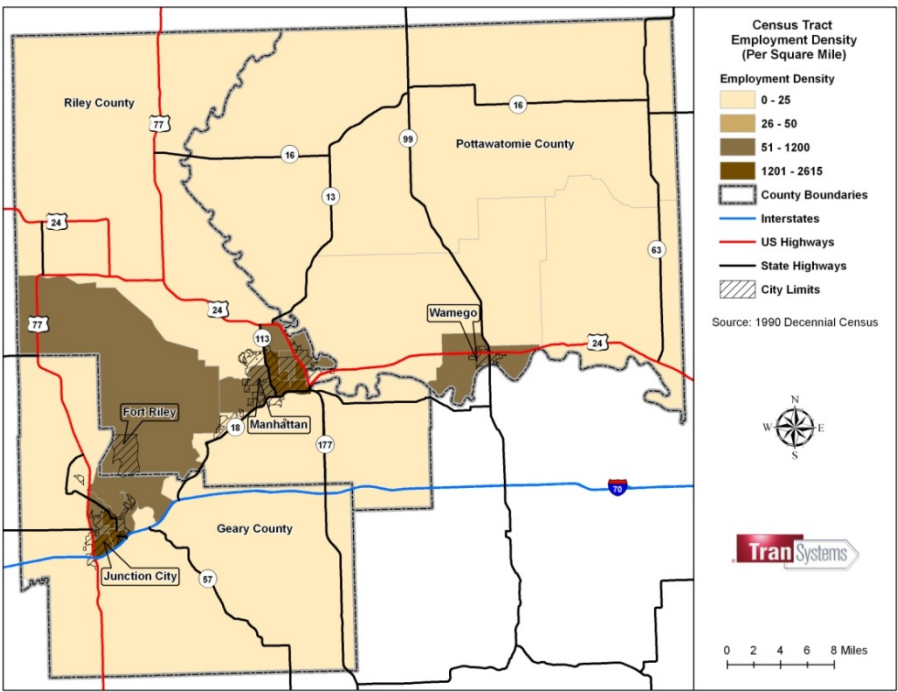
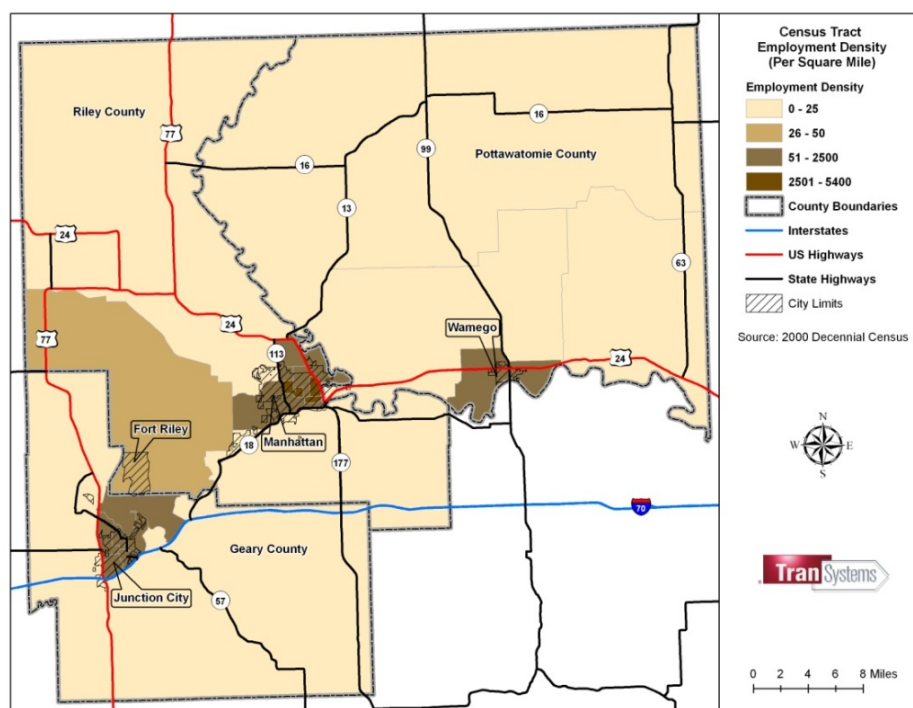


Figure 5: 2000 Employment Density (Jobs per Square Mile)



3.2.1 Families below Poverty Level

Income influences the type of transportation that people are able to use to get to work. People with lower incomes, especially those below the poverty line, are more likely to be in need of public transportation options than people who can afford private transportation. Poverty is defined as an income level for individuals and families below which people are considered to be living in poverty. In 1990, this threshold level was \$13,359 for families of four people and in 2000 it was \$17,604 for families of four.

As shown in Figure 6 and Figure 7, the three-county study area has several areas with very high levels of poverty. In 1990, the average poverty level of the study area is in the 9%-19% range. Poverty levels decline over the ten-year period with the average poverty level dropping to approximately 5.5%-9.5%. There is an exception - the area including Kansas State University reports a poverty level of 69.95% in 1990 and 26.50% in 2000. These numbers could be a bit skewed based on the high concentration of students living in these areas. Poverty status is undefined for people living in college dormitories according to the US Census Bureau. People whose poverty status is undefined are excluded from Census Bureau poverty tabulations. Thus, the total populations in the tracts that encompass K-State have smaller populations than the overall populations in other tracts, making poverty levels appear skewed in comparison to tracts without people whose poverty status is undefined.

Figure 6: 1990 Percent of Families below Poverty Level

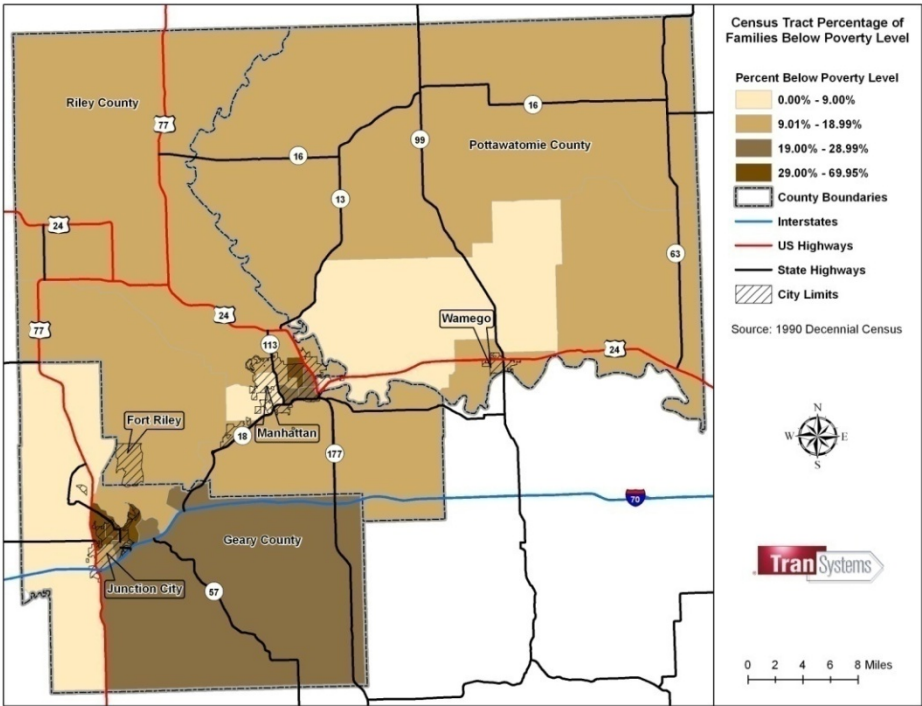
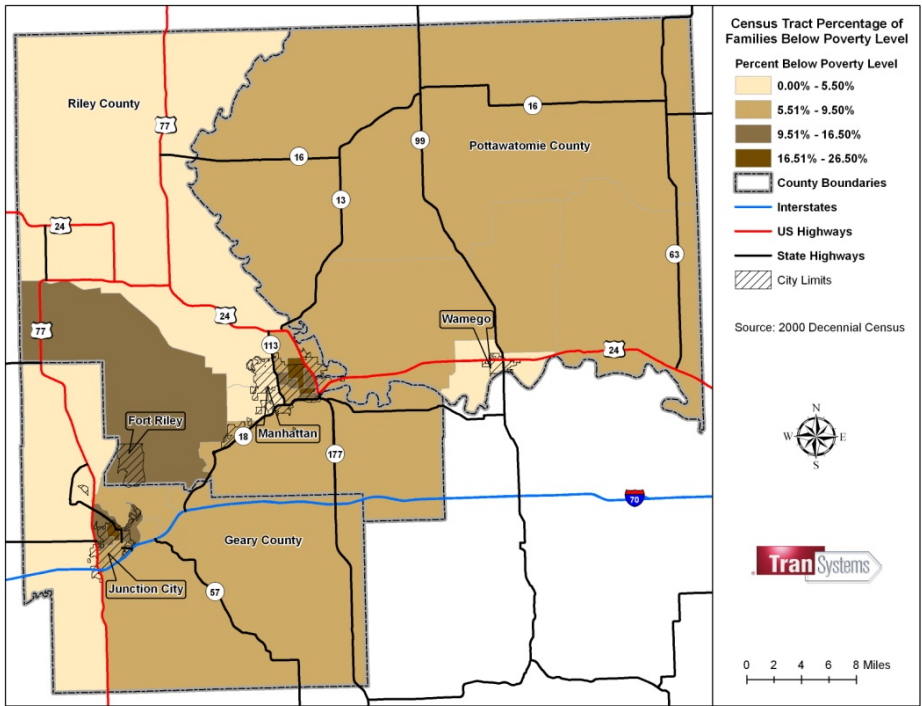


Figure 7: 2000 Percent of Families below Poverty Level



3.2.2 Households without Vehicles

Numbers of cars per household is an important statistic to analyze because it describes transit dependence and in turn, transit demand in the region. Zero-car households are considered to be entirely dependent upon alternate transportation sources. In the study region, the majority of households without vehicles are located near city centers, which equates to the same regions with higher poverty levels. According to the data illustrated on Figure 8 and Figure 9 this holds true in both 1990 and 2000 with the average percentages of households without a vehicle at 4%-8% and 3%-6% respectively. Again, it should be noted that the tracts encompassing Kansas State University could have a high rate of households without vehicles due to the large number of students who do not drive or have access to a vehicle.

3.2.3 Single Parent Households

Single parent households tend to have lower income levels and therefore, have a far greater chance of approaching poverty levels. As previously discussed, those living in poverty have fewer choices in transportation options than those with higher income levels. The study area average of single-parent households was approximately 4%-8% in 1990 and 5%-8% in 2000, as illustrated in Figure 10 and Figure 11. The tract with the highest percentage (15-24% in 2000) of single-parent households is located within the city limits of Junction City. Other tracts that fall above the study area average are typically located in or near the urbanized areas of Manhattan and Wamego.

Figure 8: 1990 Percent of Households without Vehicles

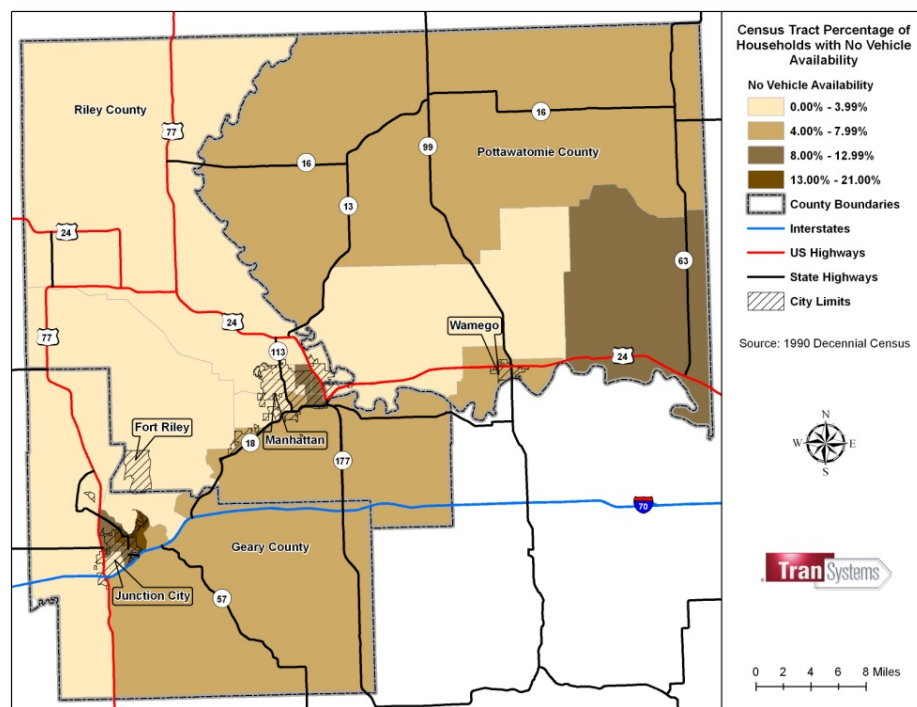


Figure 9: 2000 Percent of Households without Vehicles

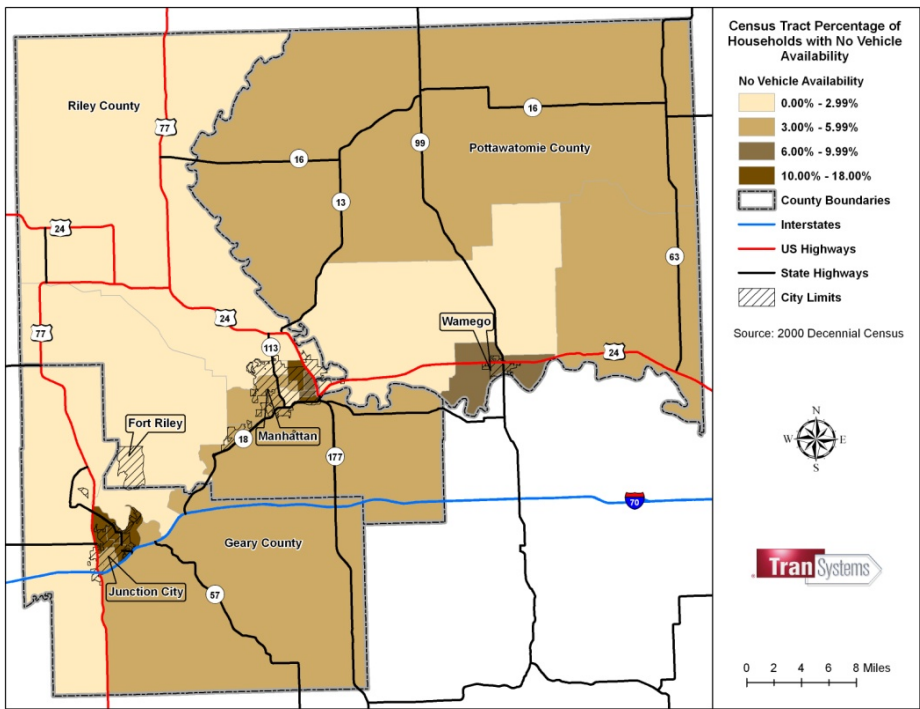


Figure 10: 1990 Single-Parent Households

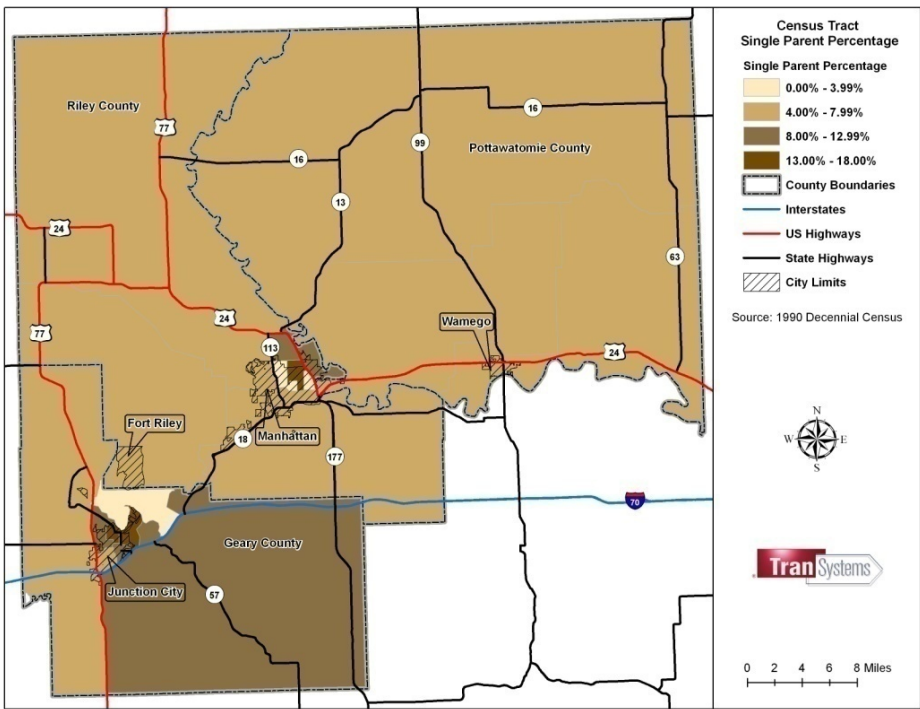
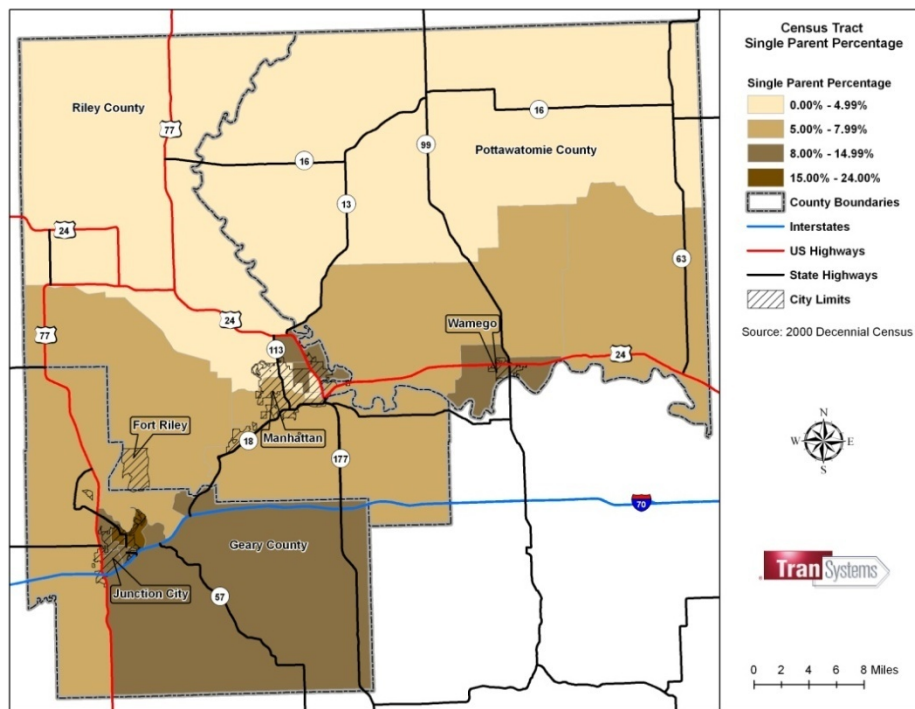


Figure 11: 2000 Single-Parent Households



3.2.4 Older Persons Population

The elderly, defined as people 65 years of age or older, are an important population of transit users due to their often limited mobility. Figure 12 and Figure 13 illustrate that the tracts with the highest percentages of elderly persons are located in the rural areas of the study region. While the average for the study area is 5%-10% in 1990 and 2000, there are tracts near the more densely populated city centers that fall above average. This could potentially increase transit demand as the elderly populations continue to grow; a reflection of the fact that the large baby boomer population in the United States has begun to reach 65 years of age. Currently, the study area has several transit options which provide service to elderly residents.

Figure 12: 1990 Percent of Older Person Populations

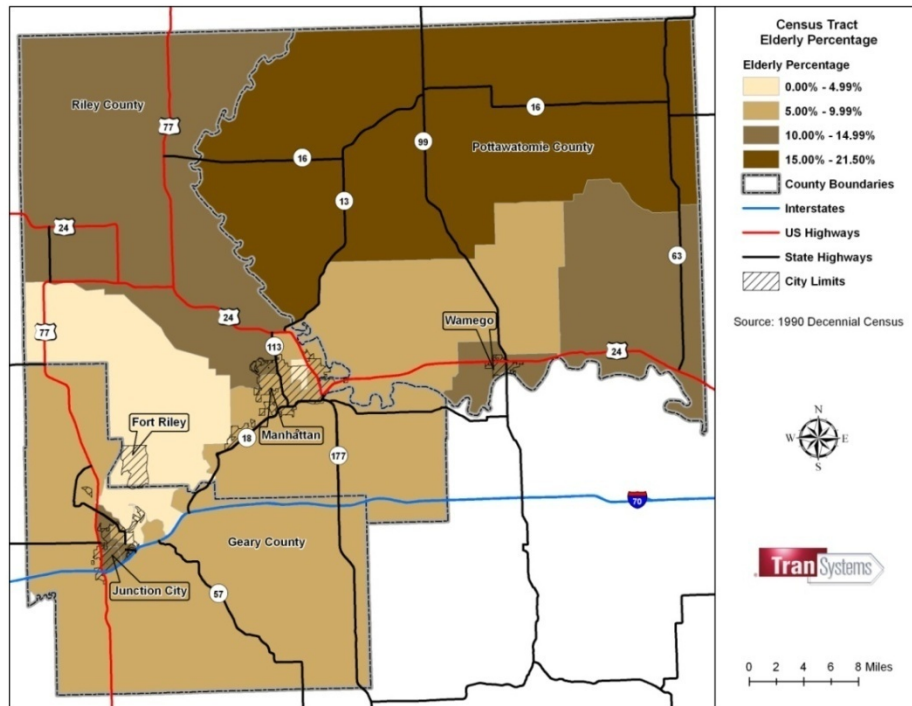
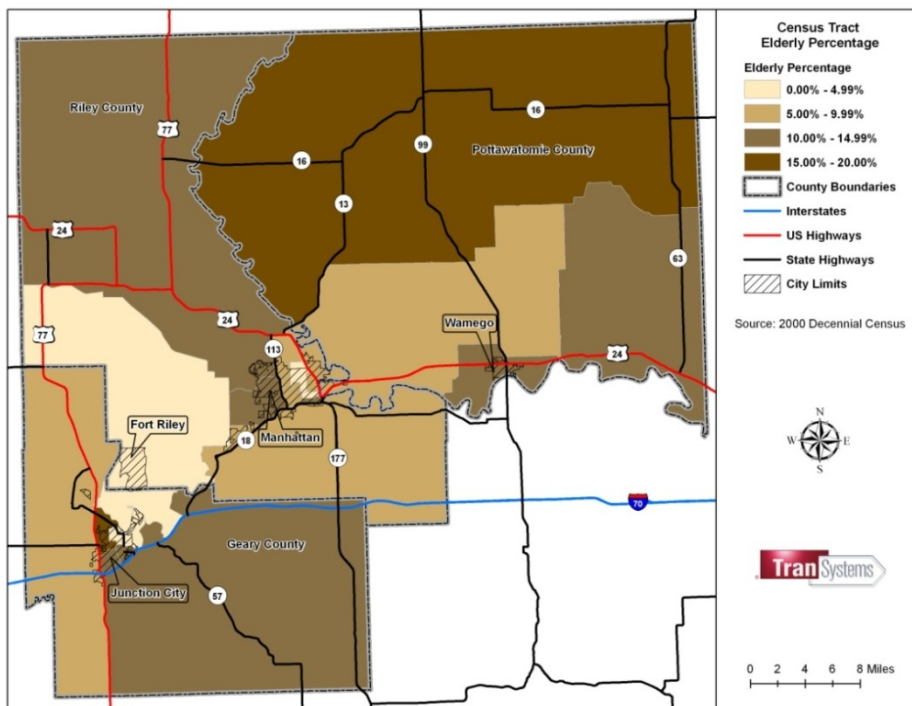


Figure 13: 2000 Percent of Older Person Populations

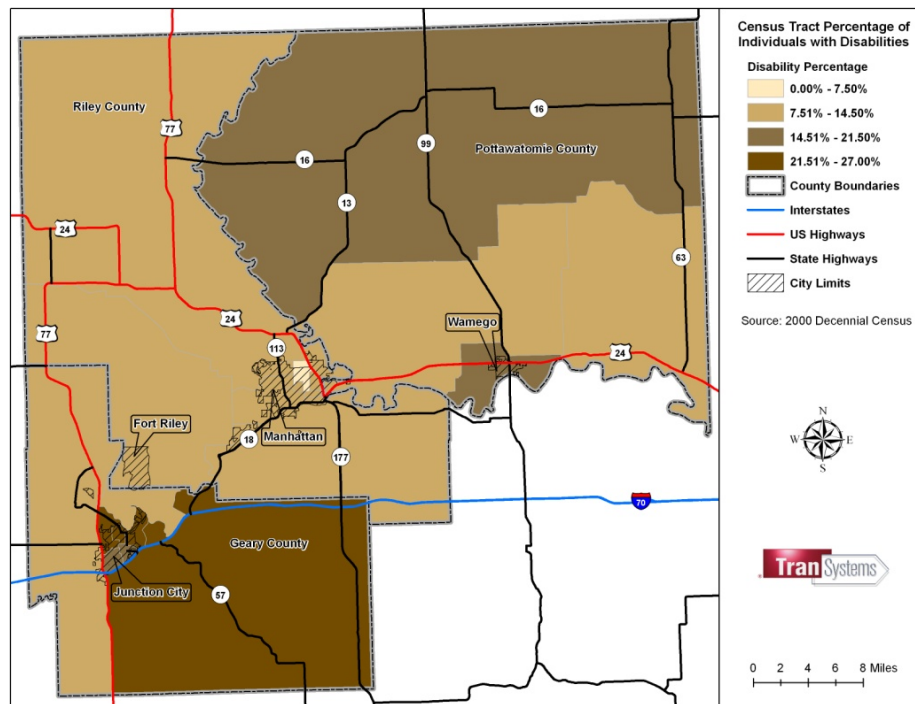


3.2.5 Disabled Population

For disabled persons, a lack of available transportation options that accommodate their disabilities could be a challenge that demands unique transit services. The study area average for persons with disabilities is 7.5%-14.5% of the population. The tract south and west of Junction City has the highest percentage of persons with disabilities; 21.5%-27%.

The 1990 census data tracked disabled populations differently than in 2000 and because of the inconsistencies between the data collection methods, only 2000 numbers are presented in Figure 14 .

Figure 14: 2000 Percent of Individuals with Disabilities



3.2.6 Youth Population

As shown in Figure 15, the youth population, defined as children aged 10 to 14 years, averaged between 4% and 6% in 1990 and 3% and 6.5% in 2000. In one location it does stand out in 2000 – city of Wamego and the surrounding region. Parts of Junction City and Manhattan also have above average populations of youth. Not surprisingly, the census tracts surrounding Kansas State University reflect a very low percentage of population of youth 10 to 14 years of age.

Figure 15: 1990 Percentage of Children Age 10-14

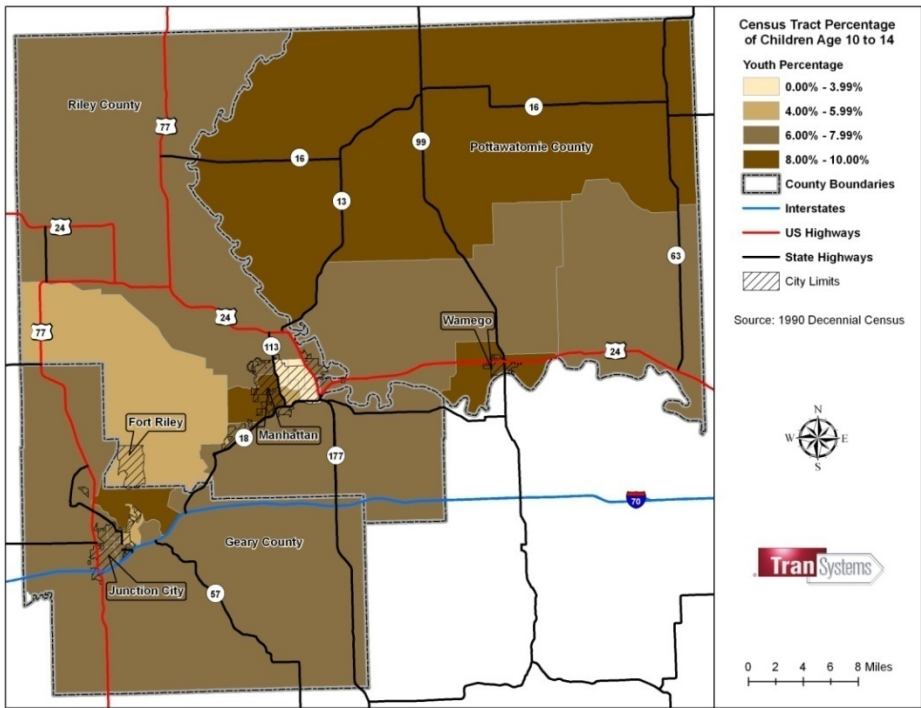
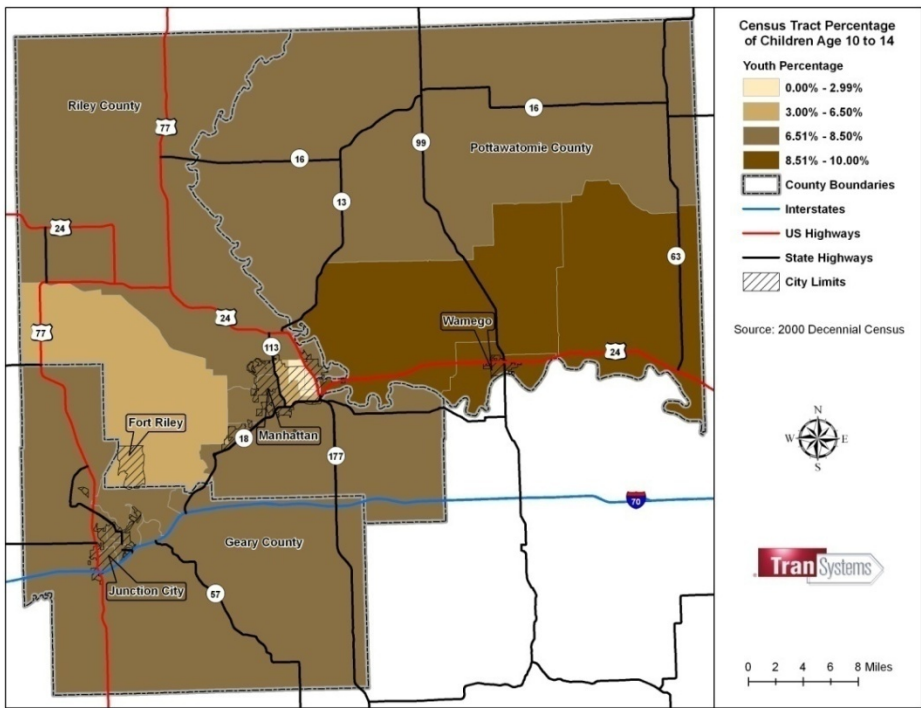


Figure 16: 2000 Percentage of Children Age 10-14



3.3 Major Employers, Social Service Ridership and New Markets

3.3.1 Major Employers in Study Area

Employment is a key factor in transportation and transit discussions because the trip to work is the most frequent and most important trip taken by most people. The cities of Manhattan and Junction City have the highest employment and population densities of the study area. Figure 17 presents employees traveling to Manhattan for employment. The graphic captures nine anonymous employers within Manhattan as well as Kansas State University, the largest employer in the City. The heavy dark blue lines stemming from the center of Manhattan indicate that a large number of employees in Manhattan live close to the city center. The thinner lines represent a fewer number of employees traveling to and from those locations which can be as far as two counties away from the study area. Emphasis in this section is placed on employees traveling to and from jobs in the Manhattan and Riley County area. Information was provided for Geary and Pottawatomie counties, but employee numbers are relatively small compared to the City of Manhattan and therefore were not considered significant enough to demand transit services.

Figure 18 and Figure 19 illustrate the residential locations of Kansas State University staff/faculty and students. The bulk of the residences are located within a two-mile radius of the university. This corresponds to the dense populations discussed in Section 2.2 and confirms the potential demand for fixed route transit service. From a regional perspective there are several areas where there are pockets of residential locations that might create a demand for vanpool services.

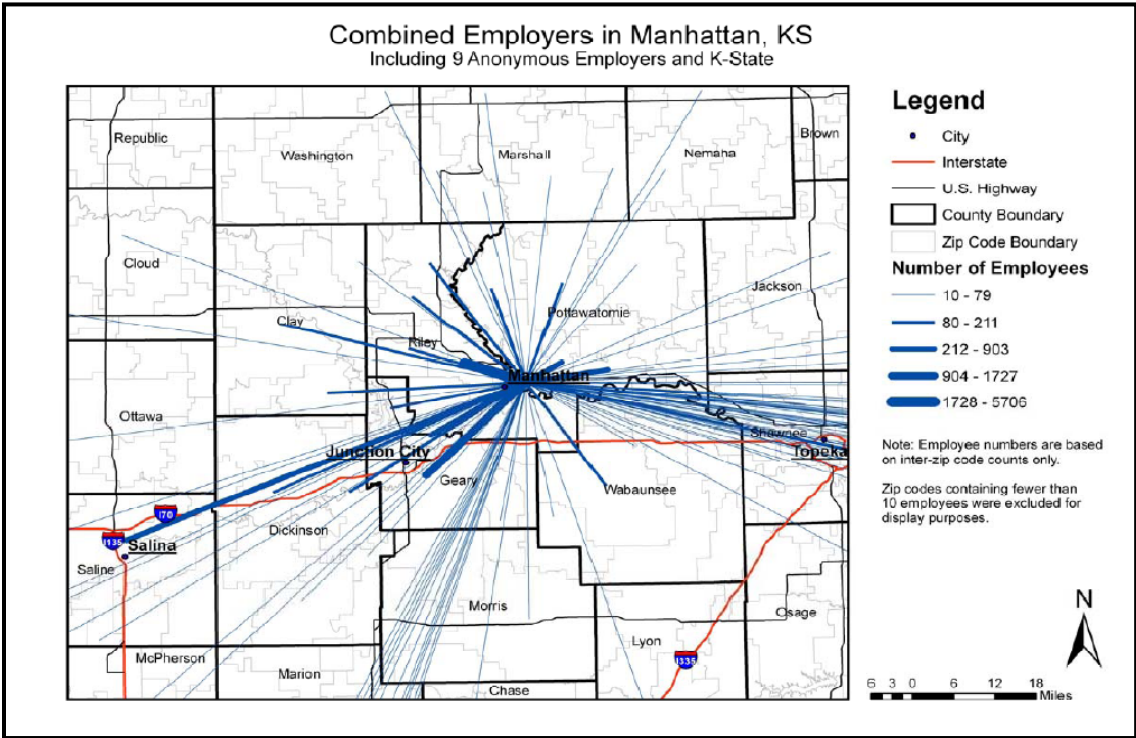
In addition Figure 20 and Figure 21 show major class start and end times for the fall of 2009 at KSU. The figures show the Monday-Wednesday-Friday schedule, with Figure 22 and Figure 23 showing the Tuesday-Thursday schedule. Peak class start times are on the half hour with peak end times at twenty past the hour. An analysis for spring 2010 was also done showing similar results.

Fort Riley is located in Geary County and is one of the largest employers in the study area. Figure 24 and Figure 25 depict residential locations by zip code of both military and civilian employees at the Fort. The darkest areas, located primarily within a twelve-mile radius of the Fort, indicate that a majority of employees commute relatively short distances to work.

Each of these graphics indicates that a majority of employees in the study area live in somewhat close proximity to their places of employment, however, each graphic also illustrates that employees live in counties beyond the study area boundaries. This could create the demand for vanpool transit services that could transport employees to the study area.

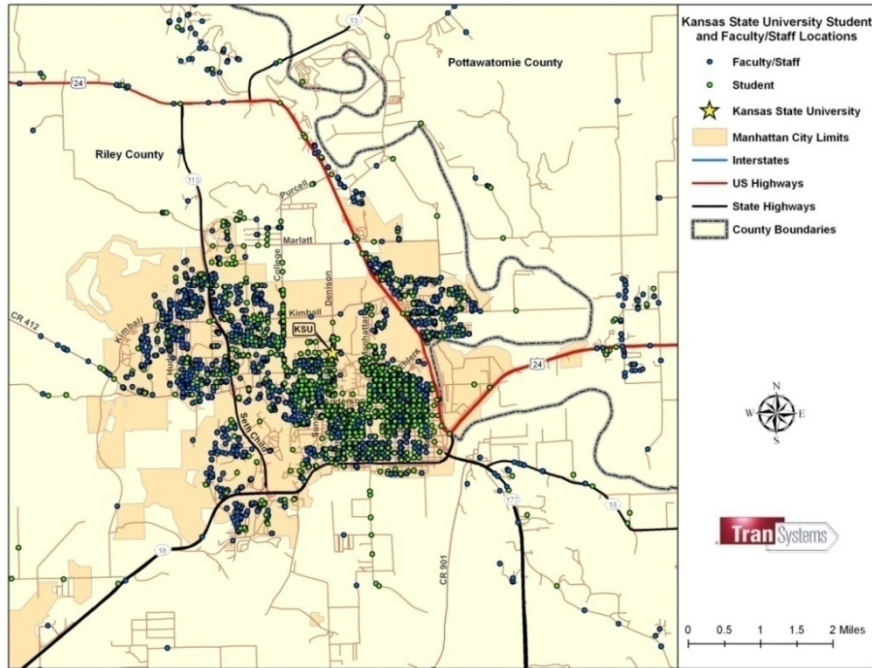
Figure 26 shows locations of important social service agencies and medical facilities in Manhattan. Most agencies are located in the southeast part of the city or in the west.

Figure 17: Commuting Routes of Employees in Manhattan



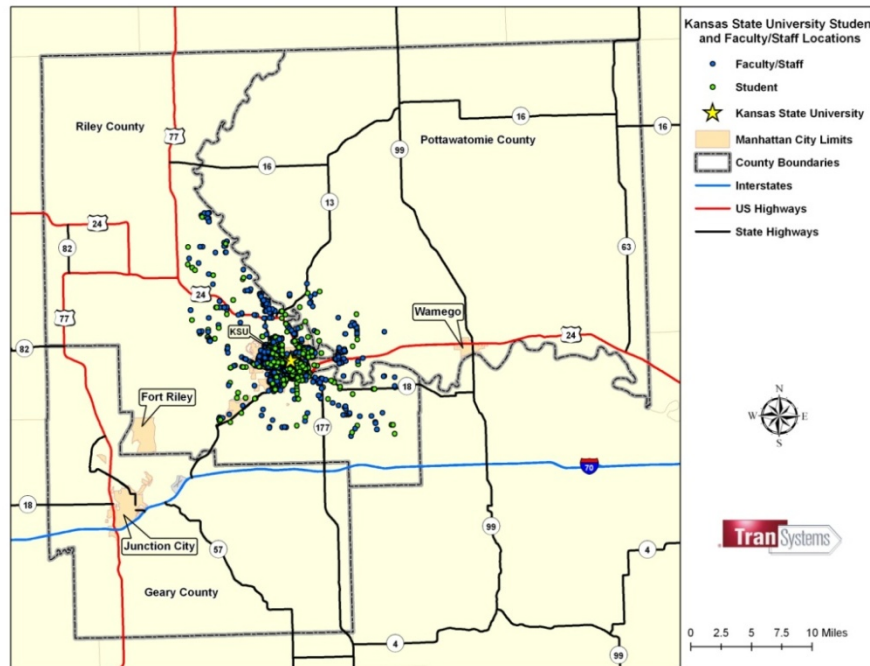
Source: University of Kansas Transportation Research Center

Figure 18: Locations of Kansas State University Student and Faculty Residences – Manhattan Perspective (2009)



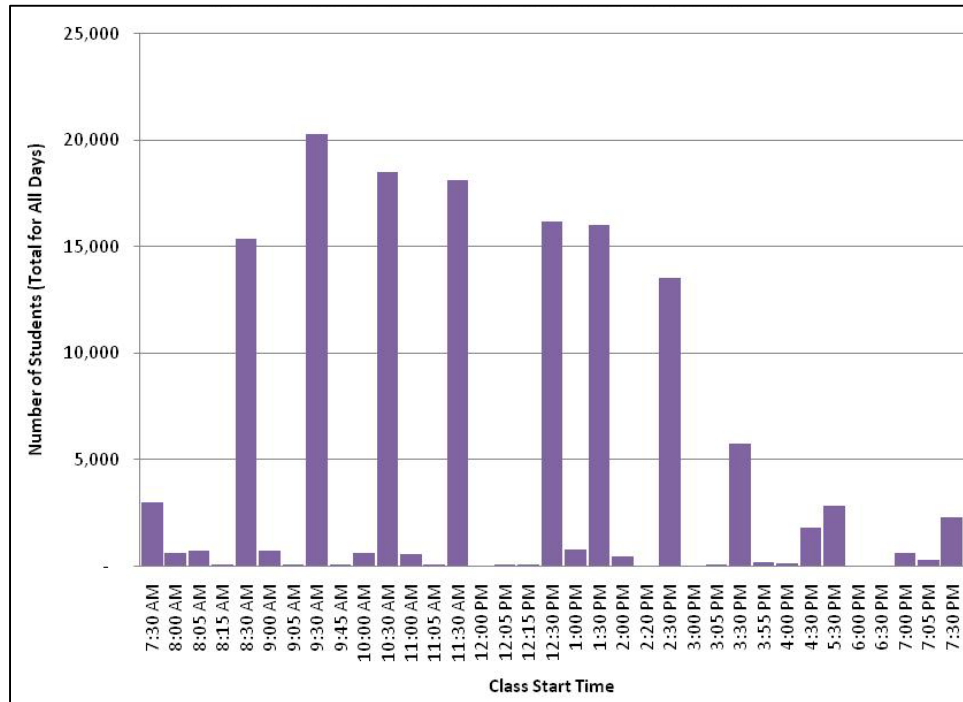
Source: Kansas State University

Figure 19: Locations of Kansas State University Student and Faculty Residences Regional Perspective (2009)



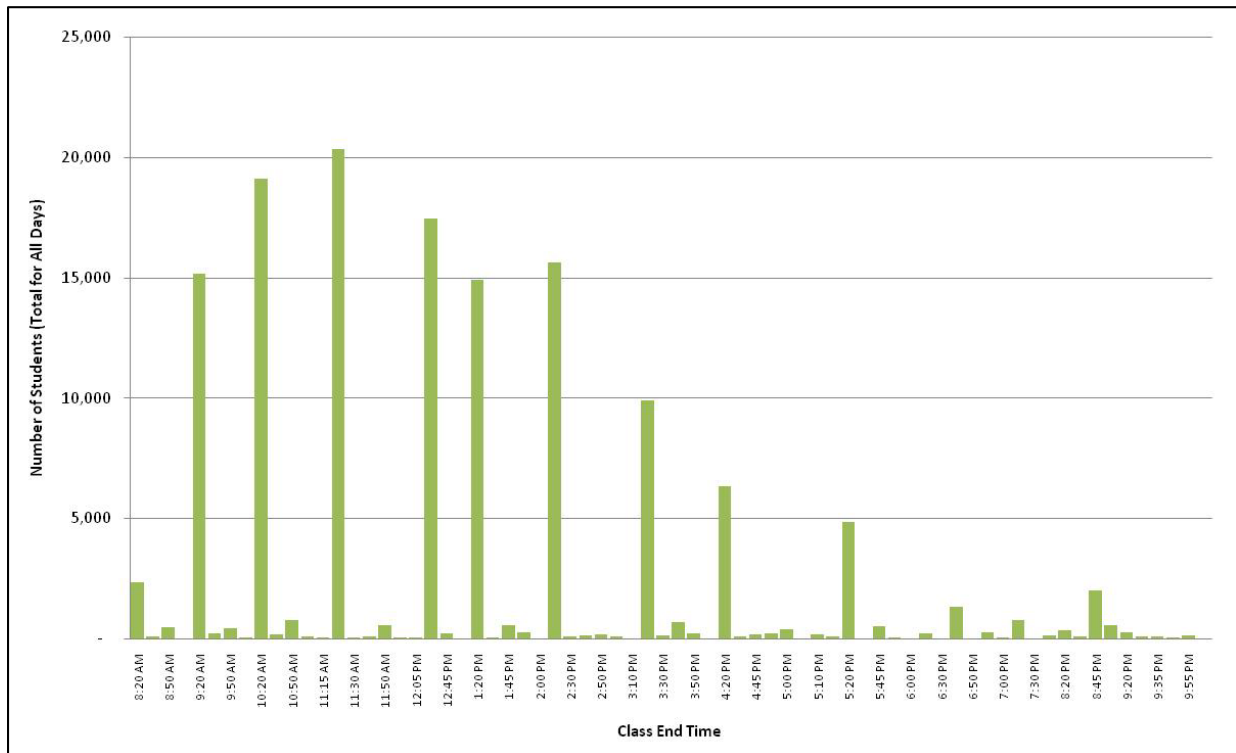
Source: Kansas State University

Figure 20: KSU Class Start Times (Monday-Wednesday-Friday Fall 2009)



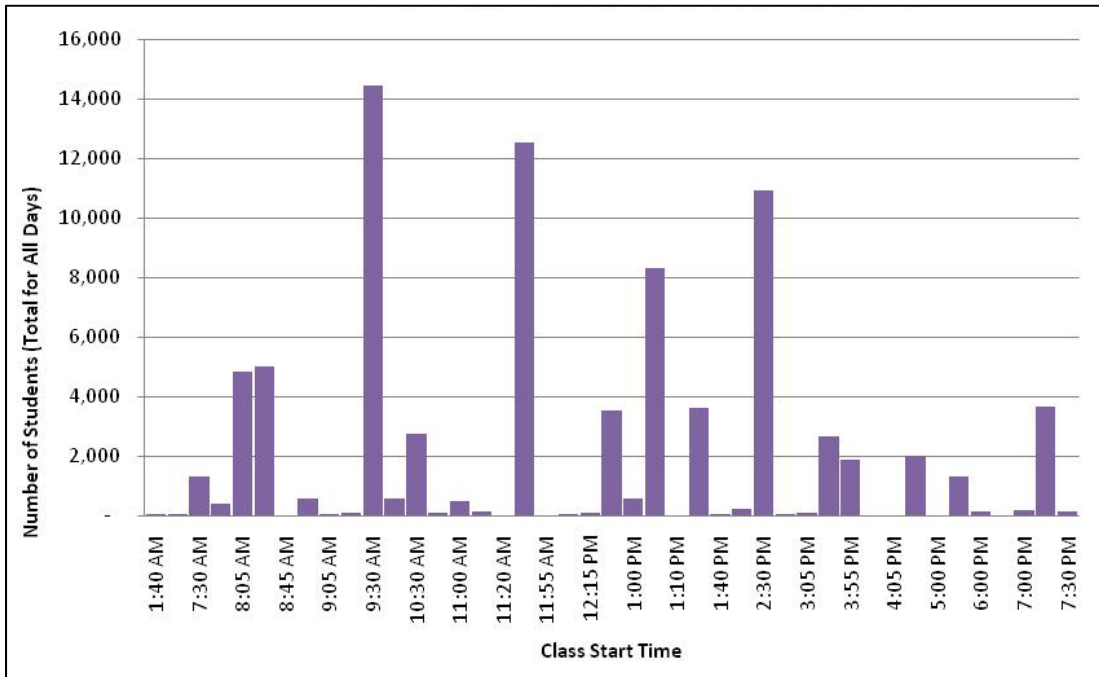
Source: Kansas State University

Figure 21: KSU Class End Times (Monday-Wednesday-Friday Fall 2009)



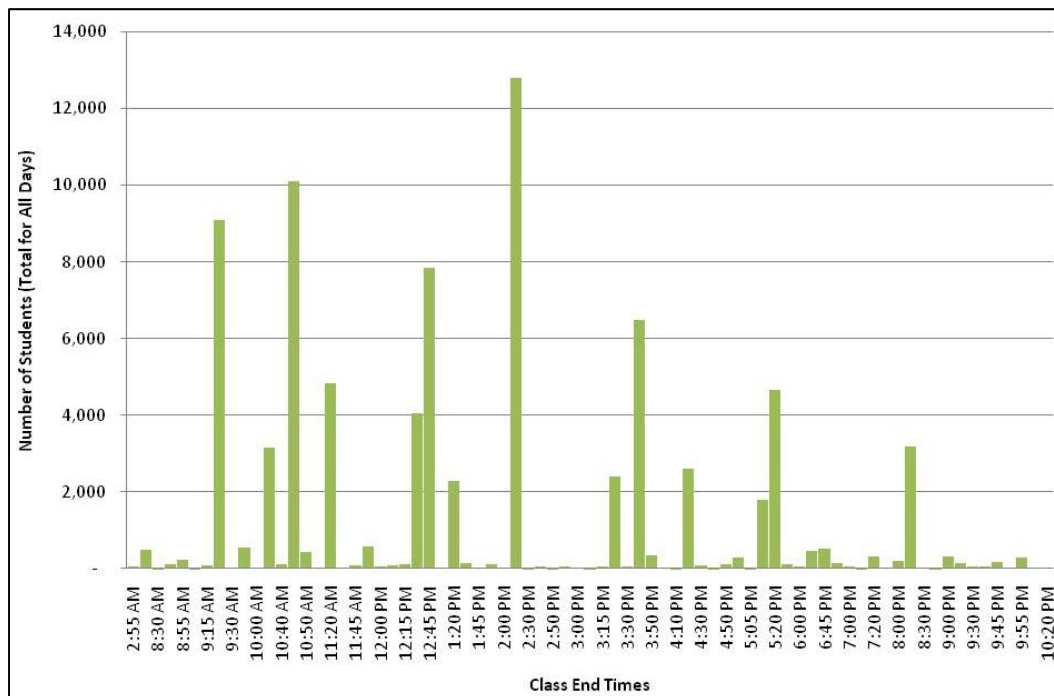
Source: Kansas State University

Figure 22: KSU Class Start Times (Tuesday-Thursday Fall 2009)



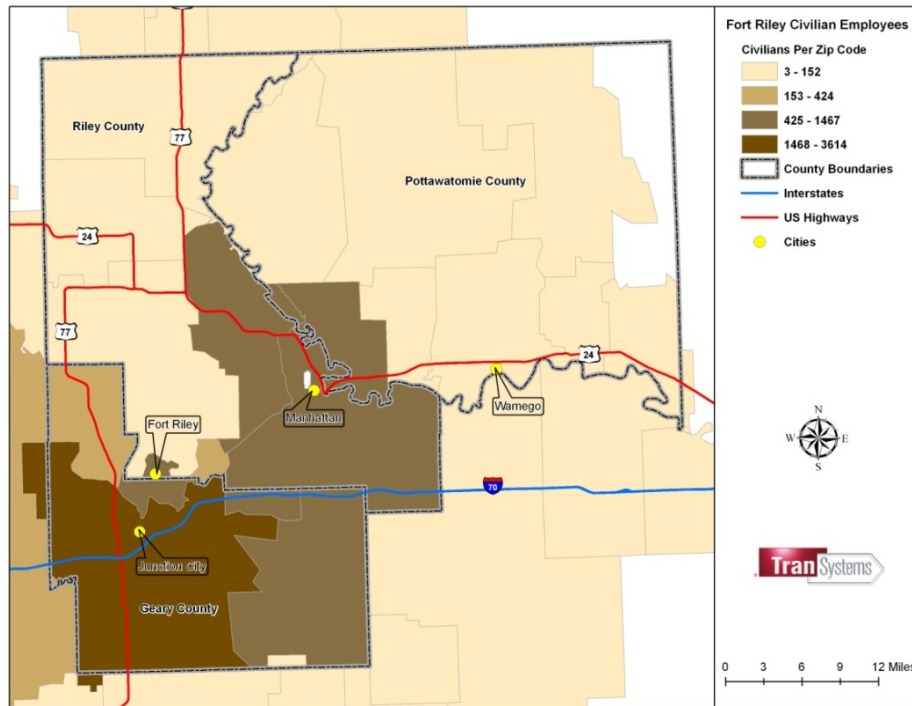
Source: Kansas State University

Figure 23: KSU Class End Times (Tuesday-Thursday Fall 2009)



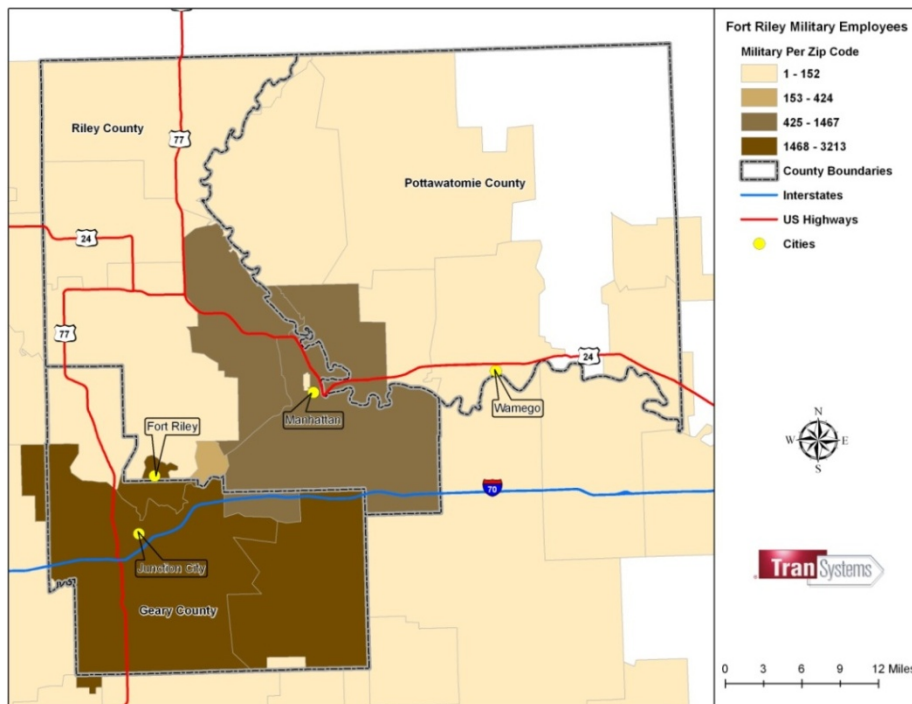
Source: Kansas State University

Figure 24: Proximity of Fort Riley Civilian Employees by Zip Code (2009)

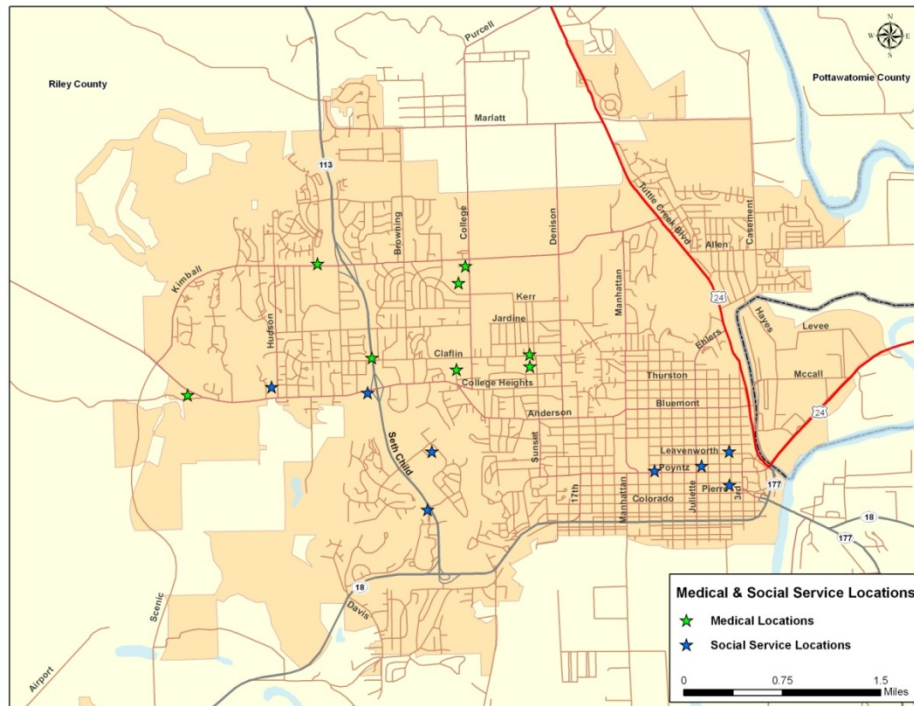


Source: US Army at Fort Riley

Figure 25: Proximity of Fort Riley Military Employees by Zip Code (2009)



Source: US Army at Fort Riley

Figure 26: Locations of Social Service Agencies and Medical Facilities

Source: Flint Hills ATA

3.3.2 New Market Information

This section discusses the potential new markets within the study area that are likely to increase transit demand. Building permit information and land use maps have been analyzed to determine both residential and commercial growth patterns.

Growth in Riley County has occurred primarily northeast of Fort Riley as indicated in Figure 27. This could be in part due to the military families moving into the region. The growth patterns indicated in Figure 28 highlight new residential developments in the northeast, southwest and west areas of Manhattan. These development trends, suggestive of new single-family neighborhoods, could potentially add demand to already existing transit but the demographics of these areas are likely not consistent with those that create more of a demand on transit services.

The commercial district east of Tuttle Creek Boulevard and north of US 24 in the portion of Manhattan located in Pottawatomie County continues to develop, also creating a potential growth in demand for service to that region, especially if these developments are retail or medical uses.

Figure 29: Pottawatomie County Building Permits (2000-2009) Figure 29, which shows the location of growth within Pottawatomie County, illustrates this. The figure also indicates that the City of Wamego along US 24 is also growing.

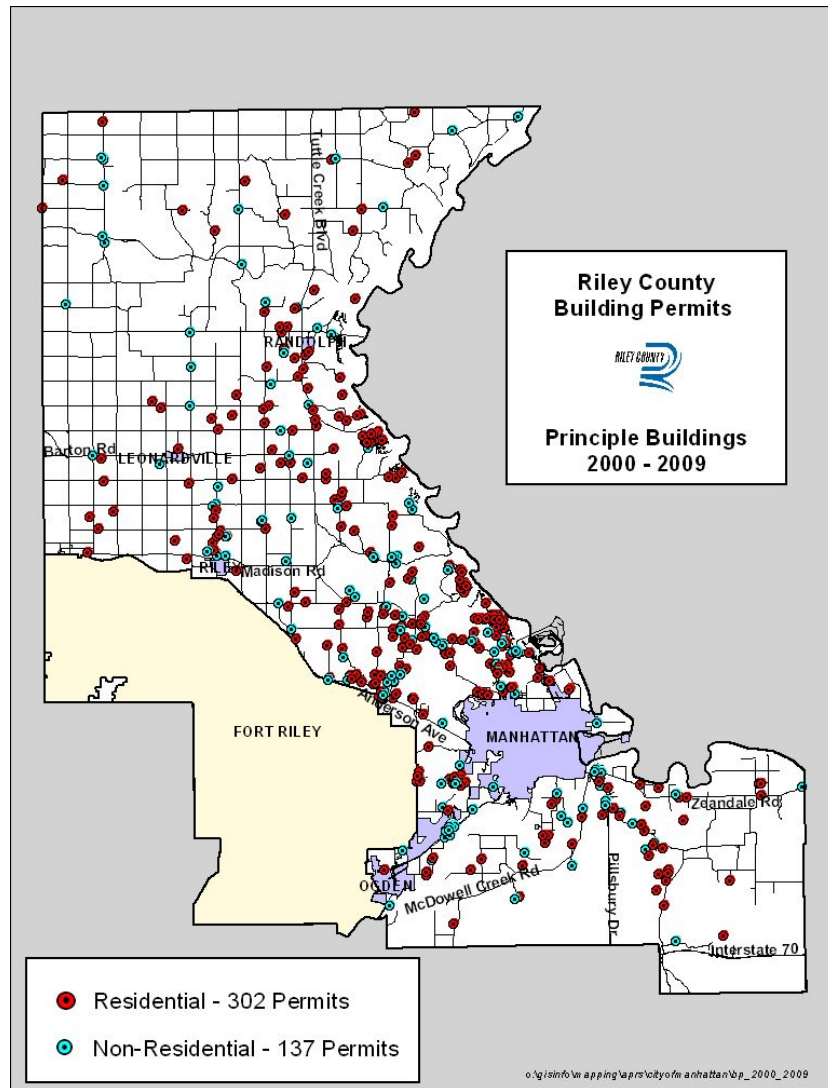
Building permit information was not provided by Geary County for analysis; however Figure 30 represents future land use as outlined in the Flint Hills Regional Growth Plan. Growth patterns identified in this plan are supported by the number of building permits issued in the City of Manhattan as well as Riley and Pottawatomie Counties, and the growth patterns generally illustrate that development is projected to occur within close proximity of I-70 and to the

south of Fort Riley in Geary County. This land use map also shows that growth is anticipated along the US-24 and K-18 corridors.

Stakeholders indicated that the hotel network within Manhattan might be a potential market for transit services. Visitors who arrive to the area via Manhattan Regional Airport are unable to secure cab service or shuttle service to and from hotels within the area, making it difficult to travel throughout the city without the use of a vehicle. Figure 31 illustrates the location of the hotels within the city. Many of the hotels are located in east side of the city near other commercial areas. The figure also shows shopping centers and churches.

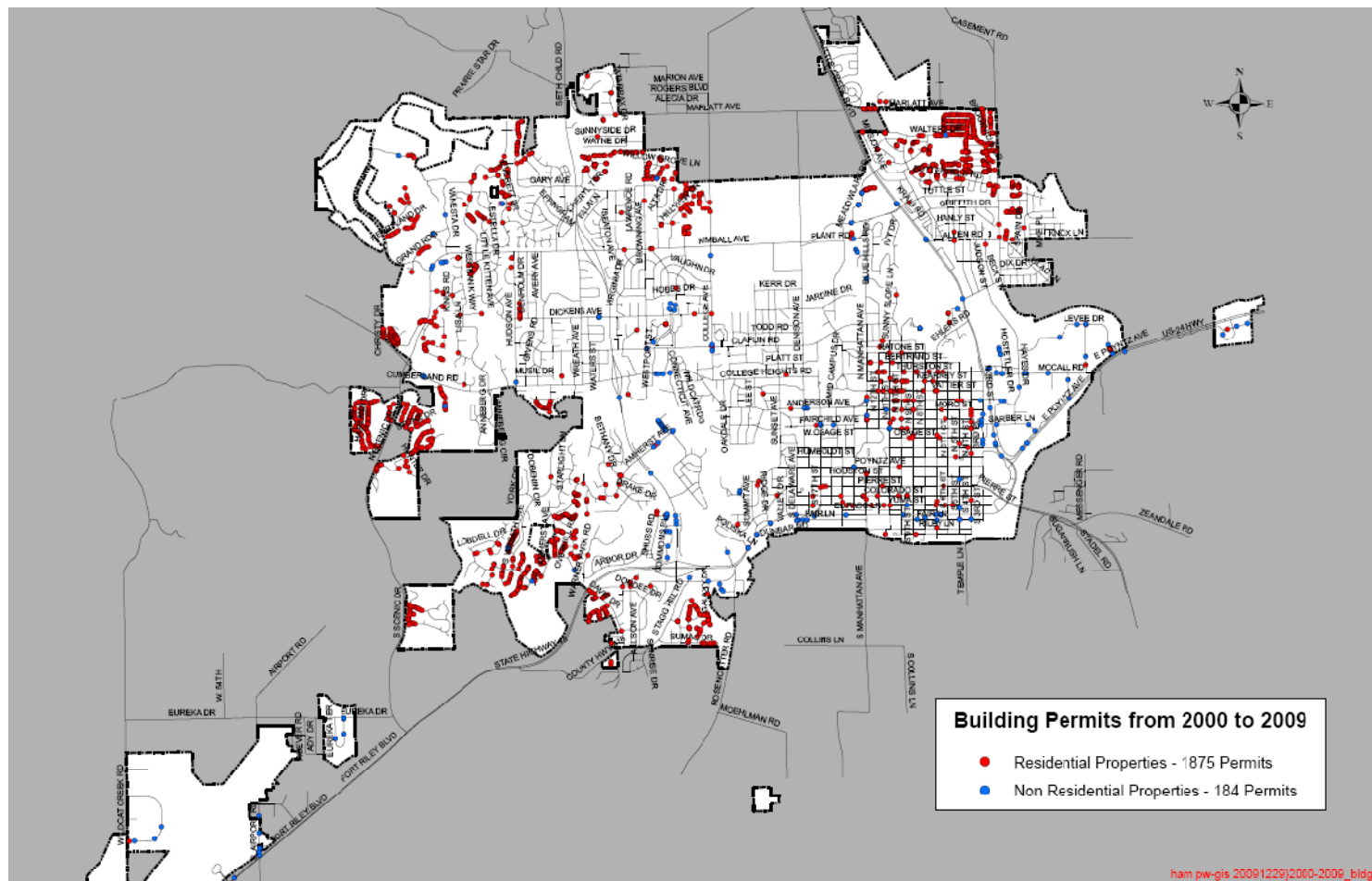
Finally, Section 2.2.2 discussed the impact that poverty has on the ability for people to access private transportation. Figure 32 shows the location of low-income neighborhoods within the City of Manhattan. Residents living in these housing developments are more likely to have a demand for public transportation than residents living in more affluent sections of the city.

Figure 27: Riley County Building Permits



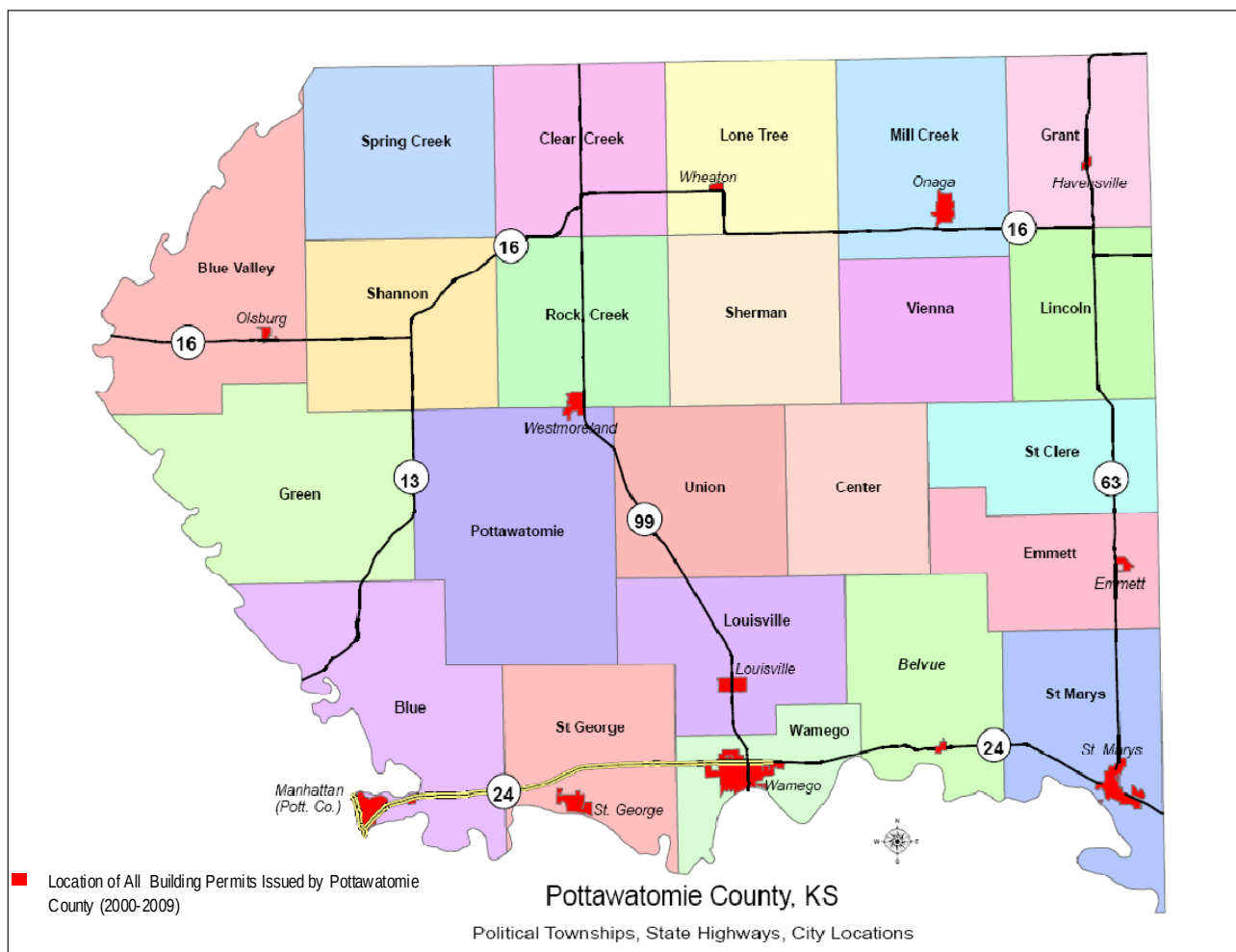
Source: Riley County

Figure 28: City of Manhattan Building Permits



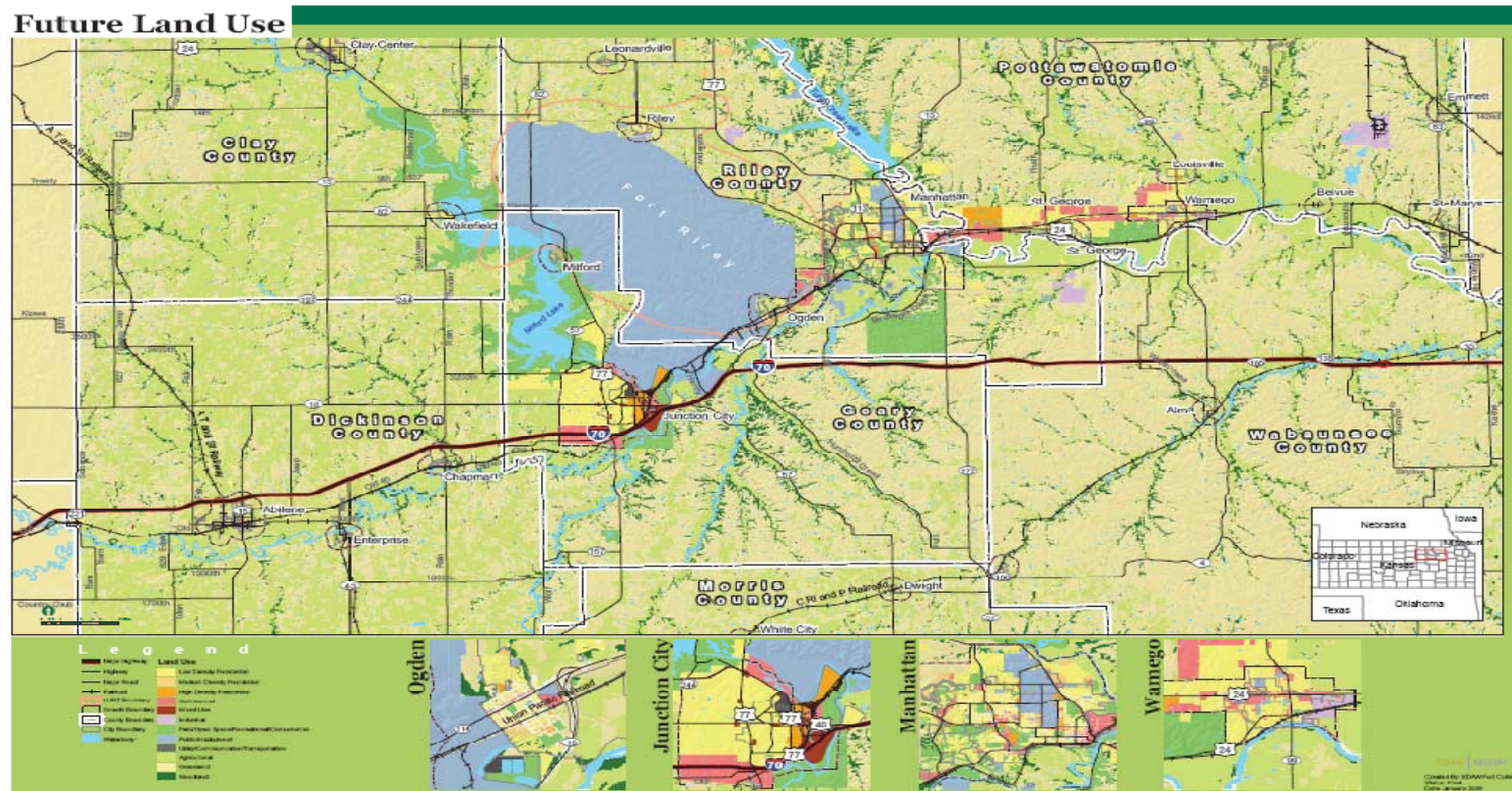
Source: City of Manhattan, Kansas

Figure 29: Pottawatomie County Building Permits (2000-2009)



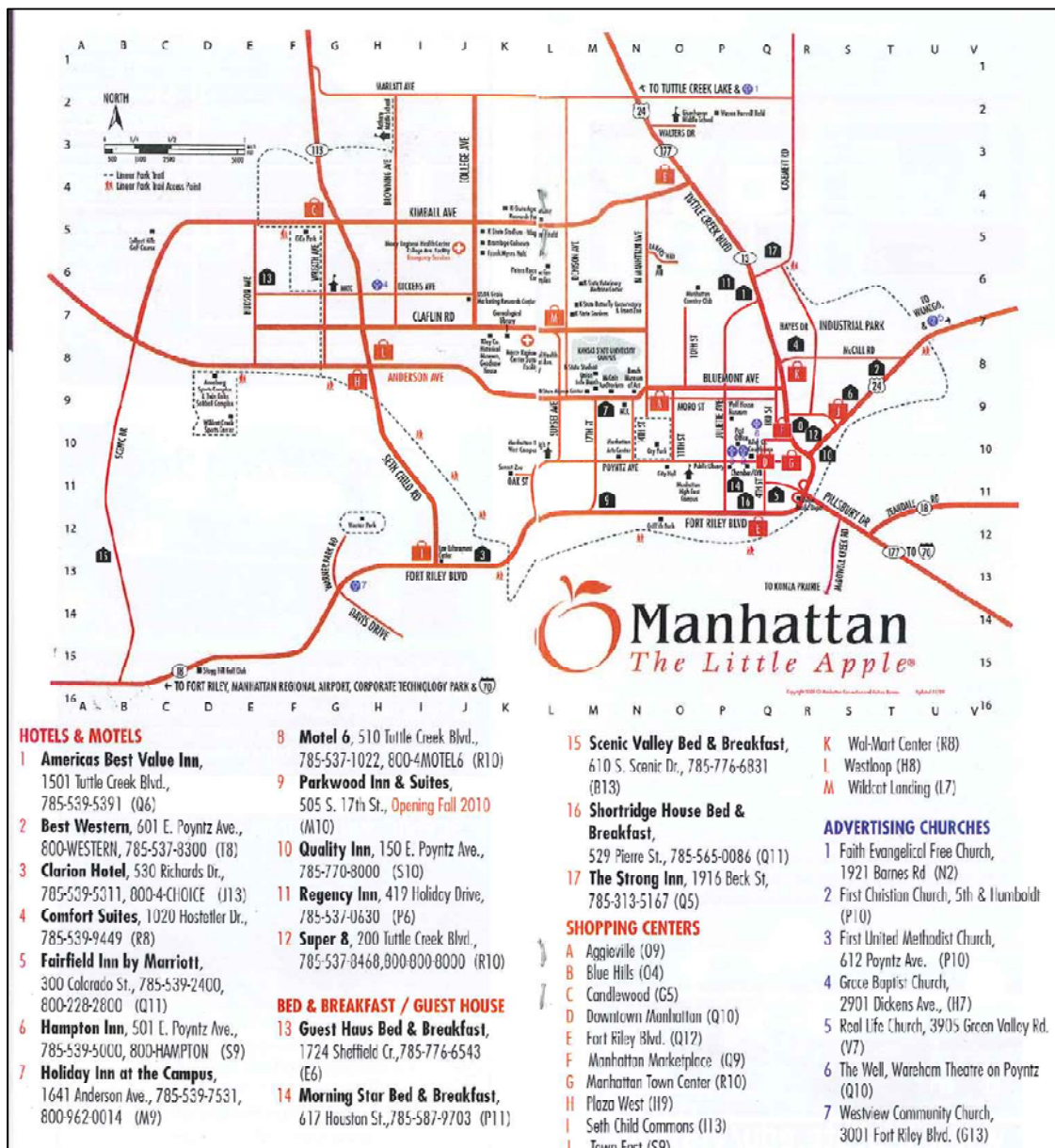
Source: Pottawatomie County

Figure 30: Future Land Use Patterns of Region



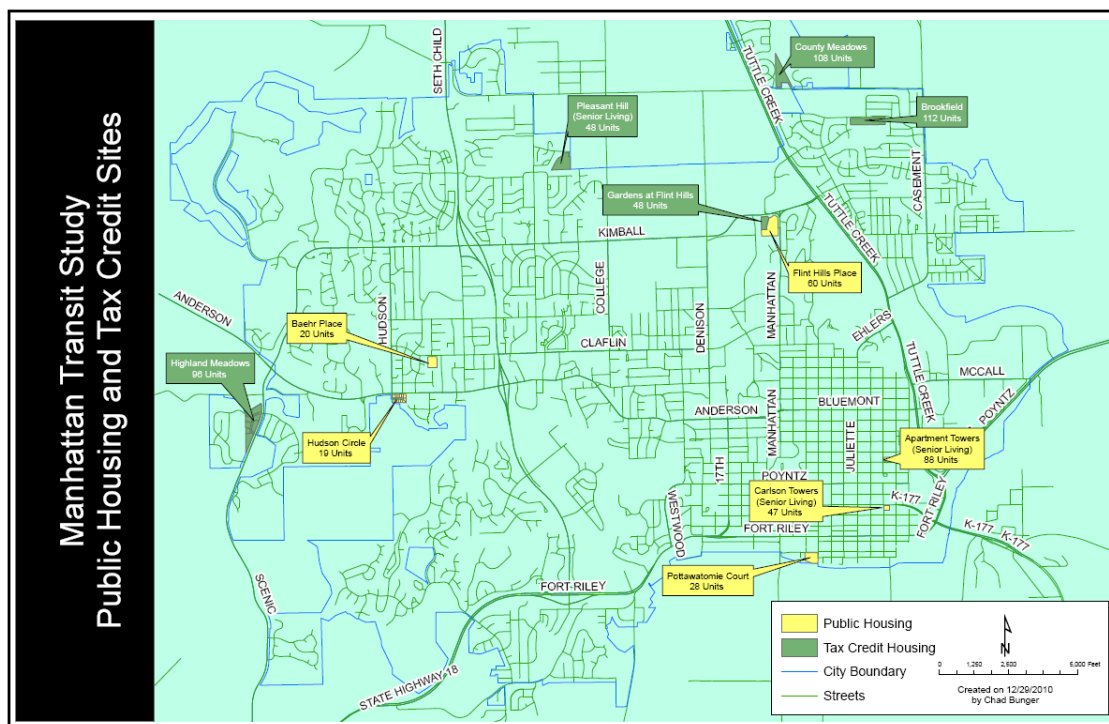
Source: Flint Hills Regional Growth Plan

Figure 31: Location of Manhattan Hotels, Shopping Centers, and Churches



Source: Manhattan Convention and Visitors Bureau

Figure 32: Location of Manhattan Assisted Housing Areas



Source: City of Manhattan, Kansas

3.4 Conclusions

Employment and population density were further analyzed to determine the potential for transit services within the study area. The Transit Potential Analysis is a combination of employment density and population density. It determines what type of transit is appropriate for an area based on those factors. The types of transit are:

- *Demand Response* – Service that operates on flexible routes and schedules. These schedules and routes are dictated by the demand of the patrons and can essentially be scheduled by a simple phone call. This service works in low density population areas and also works well with special populations who have physical and other mobility limitations.
- *Demand Response/Flexible* – Service similar to Demand Response in that routes and schedules are flexible. The main difference is that this service has some structure to both its routes and schedules. This service can work well in areas with low population densities and can be effective where demand is not quite enough for a fixed-route service.
- *Flexible/Fixed Route* – Flexible service is where a bus operates partially on a fixed route, but can deviate from the route to pick up and drop off customers.
- *Fixed Route* – Fixed-route service is what most people know as regular bus service and works well in compact, relatively dense populations.

The city of Manhattan could potentially support a fixed-route service based on the population densities in and around the city center and campus. Commuter service (either a fixed-route or a flexible service using vanpools) to Fort Riley may also be a possible market to consider.

The cities of Wamego and Junction City and the region surrounding Fort Riley could potentially support a flexible/fixed route service based on employment and population densities. Junction City may also support a commuter oriented or community service connecting to Fort Riley. The potential locations of such services would warrant further study that was beyond the scope of this market analysis.

The more rural and less dense parts of the study region would be best served by demand response service. This also includes populations within the more heavily populated city centers that require specialized service due to physical and mobility limitations.

3.4.1 Change in Transit Market Conditions

This study thus confirms and builds upon several outcomes of the 2000 *Manhattan Area Transportation Strategy: Connecting to 2020 (MATS)* and the 2001 *Transit Implementation Plan (TIP)*.

Potential demand for a fixed route bus system lies within the same regions that were identified in the 2000 MATS and the 2001 TIP. These areas mainly include, but not limited to, those adjacent to Kansas State University to the west and southeast of the main campus. The MATS study outlined service to both residential and commercial areas. Growth has picked up in the southwest region of Manhattan (not previously identified as a key demand area), which may indicate an increased demand for transit needs in this area beyond what was outlined in previous studies.

As the population densities continue to increase through natural growth within the study region, areas that could once have been best served by a transit service designed for less dense populations may be better served by a higher demand service such as Flexible/Fixed Route and Fixed-Route service.