

Johnson City Metropolitan Transportation Planning Organization

Elizabethton

Land Use and Transportation Study



March 2011



ACKNOWLEDGEMENTS

Steering Committee

Charles Alley, State Local Planning Office
Glenn Berry, Johnson City MTPO
Fred Edens, Elizabethton City Manager
Jon Hartman, Elizabethton Planning Department
David Ornduff, Elizabethton Planning Department
Jeff Rawls, Johnson City MTPO
Glenn Rosenoff, State Local Planning Office

This study was conducted for the Johnson City Metropolitan Transportation Planning Organization (JCMTPO) which managed and funded the study. The JCMTPO serves as a regional transportation planning and coordination agency for the Johnson City Urbanized Area which includes the City of Elizabethton and the urbanized areas of Carter County, Tennessee.

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1. INTRODUCTION

The earliest inhabitants of the Sycamore Shoals area of the Watauga River knew that the river valley held strategic importance for sustenance, protection, and transport. Add to that the natural beauty of the setting and it is no wonder that Elizabethton has been a desirable center for residence, commerce, worship, recreation, and every other facet of community since being founded in 1799. As the Old Fields clearing grew into a settlement, an outpost, and a community, its residents and leaders made decisions as commonplace as siting a cabin and as monumental as adoption of a popular constitution of government. Growing from a community to a town, a city, and now part of a major urban area, Elizabethton continues to evolve and to manage the effects of the evolution of growth.

1.1 STUDY PURPOSE

The relationship between transportation and land use has become increasingly emphasized in communities around the region as growth has generally outpaced accommodating infrastructure. This study seeks to promote a coordinated approach of these components in a City-wide planning area and provide complementary recommendations for the subregion's transportation with respect to the land use changes that are expected.

The purpose of the Elizabethton Land Use and Transportation Study is to determine and communicate the effects of impending growth areas of the City with respect to the transportation systems that are in place. The study analyzes several transportation deficiency areas and

makes improvement recommendations for those. It is expected that the study will also be used as a basis for future analysis and programming of regional projects within the Elizabethton study area for the next Long-Range Transportation Plan of the Johnson City Metropolitan Transportation Planning Organization (JCMTPO).

1.2 STUDY AREA

As shown in Figure 1, the geographic scope of the study is defined by the current city limits of Elizabethton plus its adopted urban growth boundary. The study area is approximately 10 miles long and 2.25 miles wide and equates to approximately 23.4 square miles (15,000 acres). The urban growth boundary exists as defined by Public Chapter 1101, the Growth Policy Act (1998), and as adopted in the Carter County Growth Plan in 2000.

With respect to the current JCMTPO travel demand model, the study area is generally defined by 22 traffic analysis zones: 125-127, 130-139, 141, 144, 148, 162-165, 170, and 179.

1.3 GUIDING PRINCIPLES

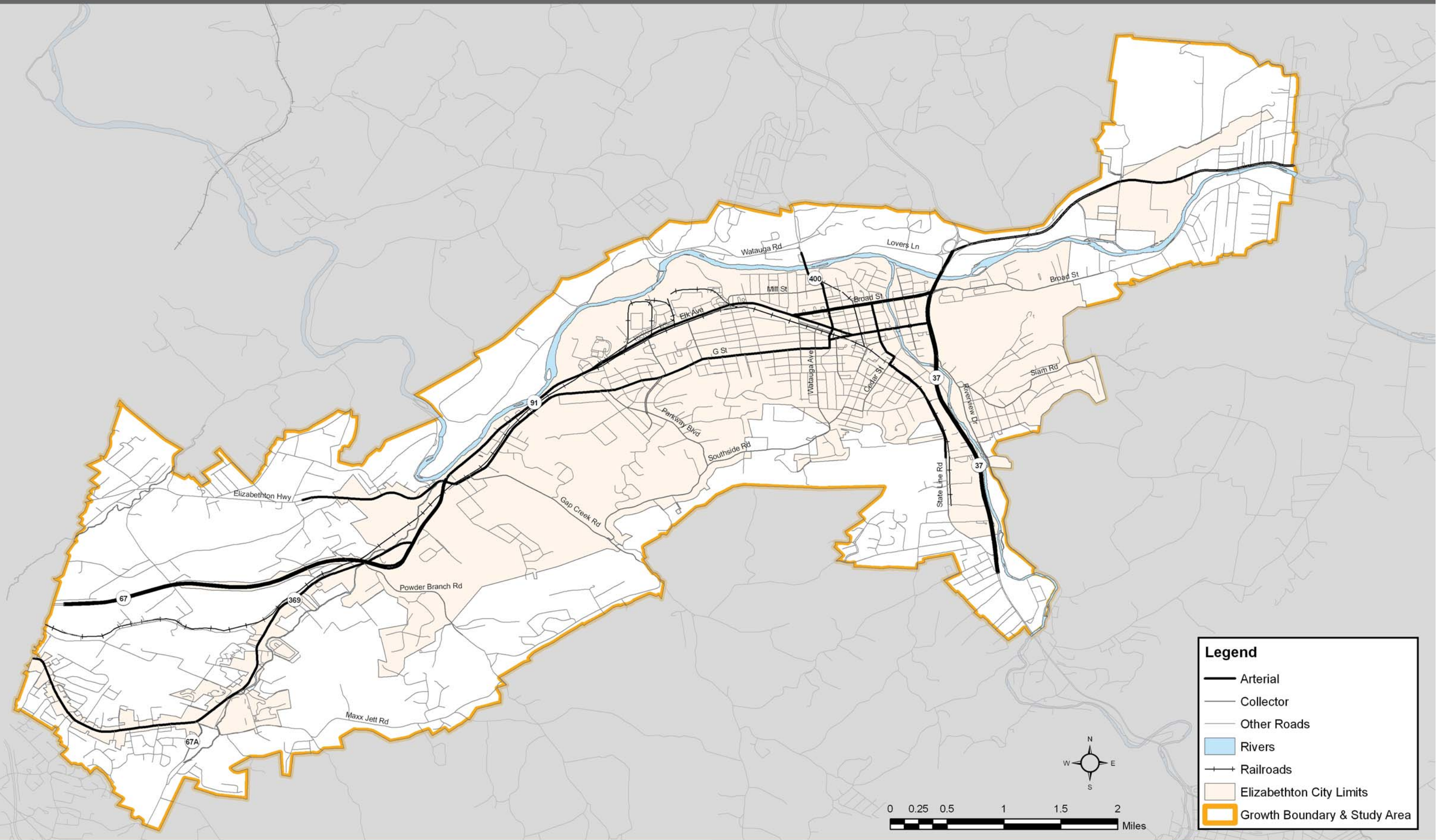
As defined by the study's steering committee, the general objective of the study is to assist in the preservation of Elizabethton's quality of life with respect to its infrastructure and environmental and cultural resources. This objective is met by the study process through adherence to the following community-based guiding principles:

- Foster a balanced growth approach in the context of geography, scale, and supporting infrastructure.
- Coordinate and promote an increased



Elizabethton's strategic and beautiful setting along the Watauga River has contributed to its growth since its founding. Left picture credit: TN State Parks

STUDY AREA



awareness of Elizabethton's development objectives.

- Provide adequate and safe transportation options for all users that enhance community ideals.
- Supply transportation facilities supportive of regional economic growth including industry, small business, and tourism.
- Leverage technology to manage transportation needs in an efficient and cost-effective manner.

The guiding principles complement goals found in previous local, regional, and state transportation plans. They will be used as a catalyst for improvement recommendations as well as a standard against which the relative effectiveness of proposed improvements are measured.

1.4 METHODS

Beginning with an understanding of the recent history of growth and transportation issues within the study area, and ending with the recommendations documented in this study, the planning team has taken a five-step general approach in the completion of this study, consisting of: previous plans and document review, gathering community and stakeholder input, data collection, technical analyses, and study documentation.

1.4.1 Previous Plans and Document Review

The City of Elizabethton has a long history of local planning and, since 1982, has engaged in regional planning as part of the JCMTPO. Much of the background of growth in the area is documented in various studies, reports, and plans. The following documents were reviewed as part of this study:

- Capital Improvements Program
- SR 400 Advance Planning Report
- Community Facilities Plan
- Downtown Enhancement Plan
- Hazard Mitigation Plan
- Historic Zoning Guidelines
- Zoning Code and Map
- Housing Plan
- Transportation Improvement Program
- Regional Long Range Transportation Plan
- Public Transit – Human Services Transportation Plan

- Linear Path/Rail-to-Trail Connection Plan
- Major Thoroughfare Plan
- Park and Recreation Plan
- Population, Economic, and Land Use Plan
- Sidewalk Study
- Subdivision Regulations
- Title VI Compliance Plan
- State Route 91 Improvement Study materials
- State Route 362 planning materials

1.4.2 Gathering Community and Stakeholder Input

Steering Committee

A seven-member steering committee was used throughout the study process to facilitate project administration, develop study guiding principles, and review draft documents. The committee consisted of the following members:

- Charles Alley, State Local Planning Office
- Glenn Berry, Johnson City MTPO
- Fred Edens, Elizabethton City Manager
- Jon Hartman, Elizabethton Planning Department
- David Ornduff, Elizabethton Planning Department
- Jeff Rawls, Johnson City MTPO
- Glenn Rosenoff, State Local Planning Office

Stakeholder Interviews

An early step in acquiring additional planning background and local initiatives was the completion of stakeholder interviews. These interviews were held on August 24 and 25, 2010 at the Elizabethton Public Library. The stakeholders represented in the interview process included interests ranging from public safety (police and fire) to regional economic development (Carter County Tomorrow). A total of 14 local and regional stakeholders were interviewed.

Public Information Meeting

To present some preliminary land use and transportation concepts under consideration for use in the draft study, a public information meeting was held at the Carter County Public Health Department on October 28, 2010. This meeting also gave an opportunity for public input to inform the study process and outcomes.

1.4.3 Data Collection

Data collection centered around demographic and employment data from various sources including the US Census, UT Center for Economic and Business Research (UT CEBR), Tennessee Advisory Commission On Intergovernmental Relations (TACIR), and local and regional planning data and analysis. All parcel-based land use and valuation data was obtained through the Tennessee Comptroller of the Treasury.

Transportation data sources include Tennessee Department of Transportation historic annual traffic counts, travel data compiled for the JCMTPO Long-Range Transportation Plan, and counts and projections made for TDOT's SR 91 study. The Census Transportation Planning Package (CTPP) provided regional travel flow data.

Additional data were compiled by the study team for use in the analyses. These included a basic roadway inventory of roads classified by the City as collector and higher, additional traffic counts, and historic crash data. Observations, particularly of spot improvement locations, were made to verify operational issues noted during steering committee meetings and the stakeholder interview process.

1.4.4 Technical Analyses

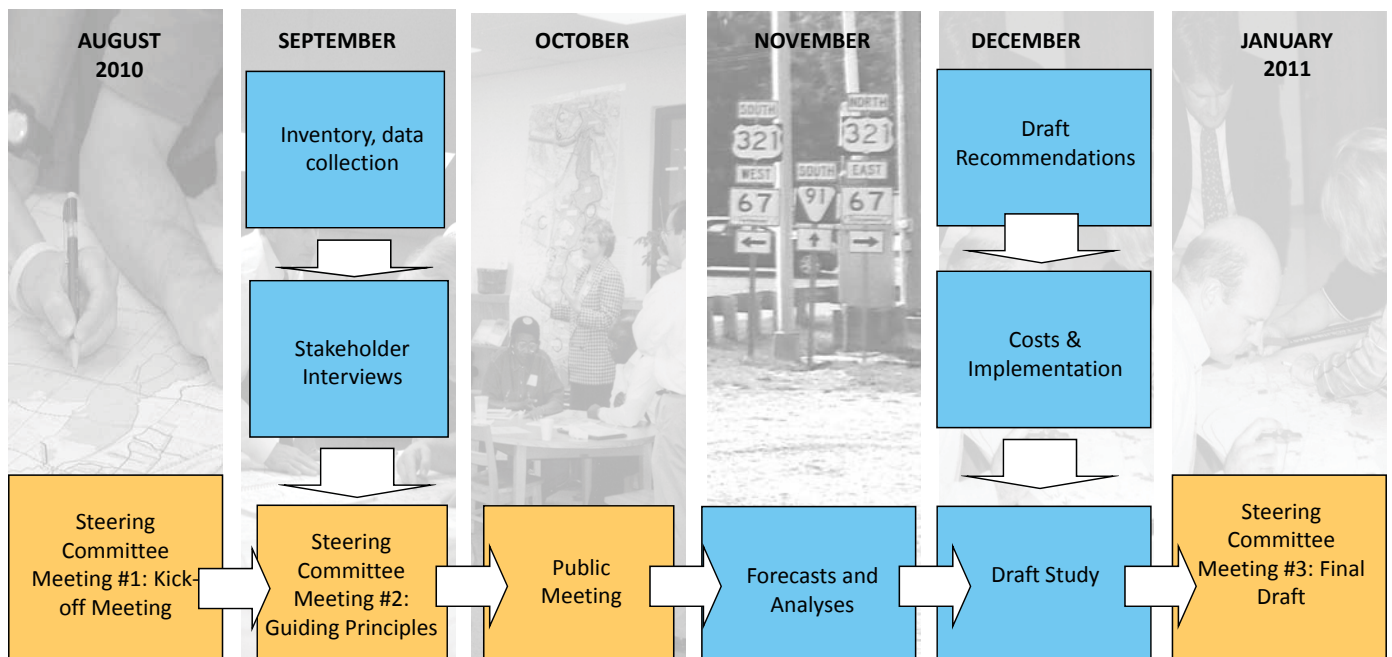
The data gathered during the initial stages of the study were used in technical analyses that helped to quantify land use and travel conditions and forecasts throughout the study area. The intent of the technical analysis was to forecast the 20-year growth conditions of the area, estimate the travel demands stemming from this growth, and determine what impact this growth will have on the transportation infrastructure over the next 20 years.

Land Use Analysis

Understanding the relative amount of land which is currently developed and/or vacant and the likelihood of development in specific areas provides valuable information as to the growth that could occur within the study area over time. This information, gathered from stakeholder input and land use data, was used to help allocate the expected population growth of the area. Additionally, through the analysis of current property value to improvement value, a baseline assessment can be made of underutilized properties, that is, those lands where development or redevelopment is more likely given the current use of the parcel.

Transportation Analysis

To estimate the future trip making needs of the study area, land use assumptions were used to drive an application of the standard four



A six month study process allowed on-going local coordination and adherence to other local planning objectives.

phase planning analysis of trip generation, trip distribution, modal choice, and trip assignment.

TRIP GENERATION provides an estimate of the amount of new traffic produced by future development. ITE's Trip Generation was used to estimate the number of new trips made to and from each general land use area on a daily basis. Growth of traffic from causes external to the study area was also estimated as part of trip generation. General growth rates based on TDOT historical counts were used to estimate growth of travel through the study area. TRIP DISTRIBUTION determines the patterns new traffic will use to arrive at or depart from the future development based on the influences of surrounding land uses or existing traffic patterns. Existing traffic counts and areas of likely future residential and employment growth are used to make these distribution estimates.

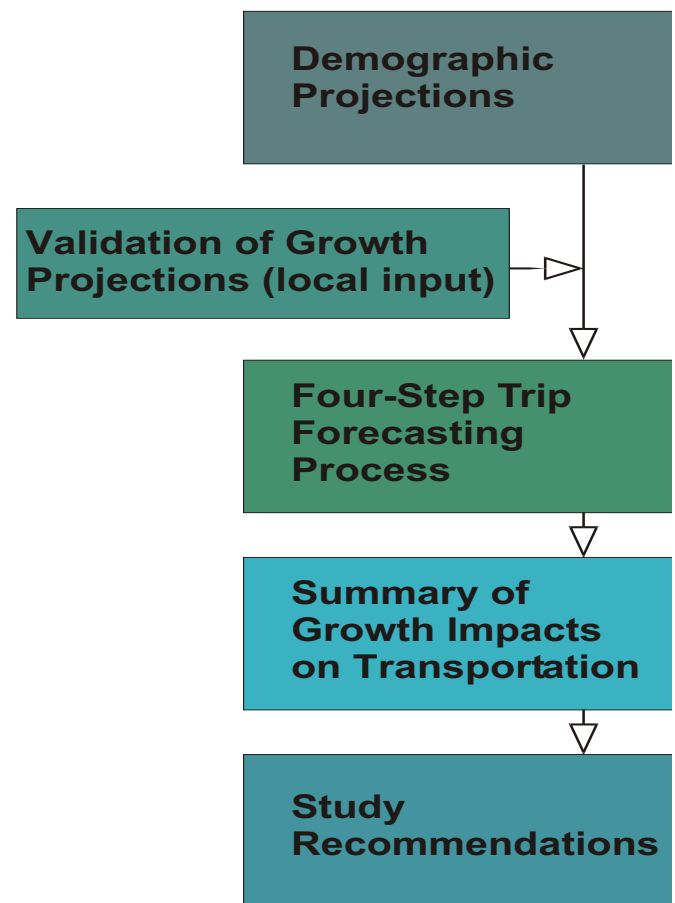
MODAL CHOICE accounts for trips being made within the network by a mode other than private vehicle. Trips made by transit, walking, or bicycling have unique effects on the transportation network and are therefore accounted for differently than auto trips. The low share of trips made by modes other than auto within the study area resulted in the assumption that all trips are made by private auto for this process.

TRIP ASSIGNMENT is the final forecasting step, once the number of trips, their relative origins and destinations, and the travel modes used have been identified. Here, actual traffic volumes are assigned to the existing and proposed roadways based on the three previous planning steps.

The procedure used for this study followed these four steps using a fine-grained network of travel nodes that were based on the forecasted land use conditions and the known volumes of traffic entering the study area at external nodes. An automated trip generation process was developed, and followed by a gravity model-based trip distribution method based on ITE trip generation data. Finally, the travel node origins and destinations were loaded onto a custom-built Corsim travel model to produce the trip assignment using the FHWA-developed procedures built into Corsim. In this way, future traffic projections were made that reflect the likely growth scenario of the Elizabethton study area.

1.4.5 Study Documentation

The results of the previous planning review, community input, data collection, and technical analysis culminate in the findings and recommendations summarized in this document. This document is intended as a general overview of the existing and most likely future land use and transportation scenario based on current growth trends and community desires. The recommendations found in this study vary greatly in degree of cost, effectiveness, and scope of time.



The study process used incorporates general growth projections as well as historic trends into making transportation recommendations.

2. DEMOGRAPHIC & LAND USE CONDITIONS

2.1 DEMOGRAPHICS

The demographic makeup of a place is indicative of both its current and future land use characteristics and resulting transportation needs. Development patterns in the Elizabethton sub-region are defined to a large degree by its existing demographics and workforce. Historic trends in population, socioeconomic characteristics, and employment provide an understanding of the likelihood of additional future growth and land use changes.

2.1.1 Population Trends and Forecasts

The 2009 estimate of Elizabethton's population is 13,757, representing a growth of slightly over 15% over the past 20 years. Much of that population increase was between 1990 and 2000, with more modest growth over the past 10 years. The City currently represents approximately one-quarter of the total population of Carter County, which has also grown by approximately 15% over the past 20 years. This growth rate is below that of the growth of the total state of Tennessee which was over 22% during the same period. Elizabethton's population makes it Tennessee's 41st largest city, having peers such as Athens, Dickson, McMinnville, and Soddy-Daisy. Elizabethton's closest east Tennessee peer is Greeneville which had a 2009 population of 15,336.

Figure 2 shows the population density of the parcels in the study area. As expected, the population is most dense in the core downtown Elizabethton area.

Carter County's population is also notable in the following respects when compared to statewide averages:

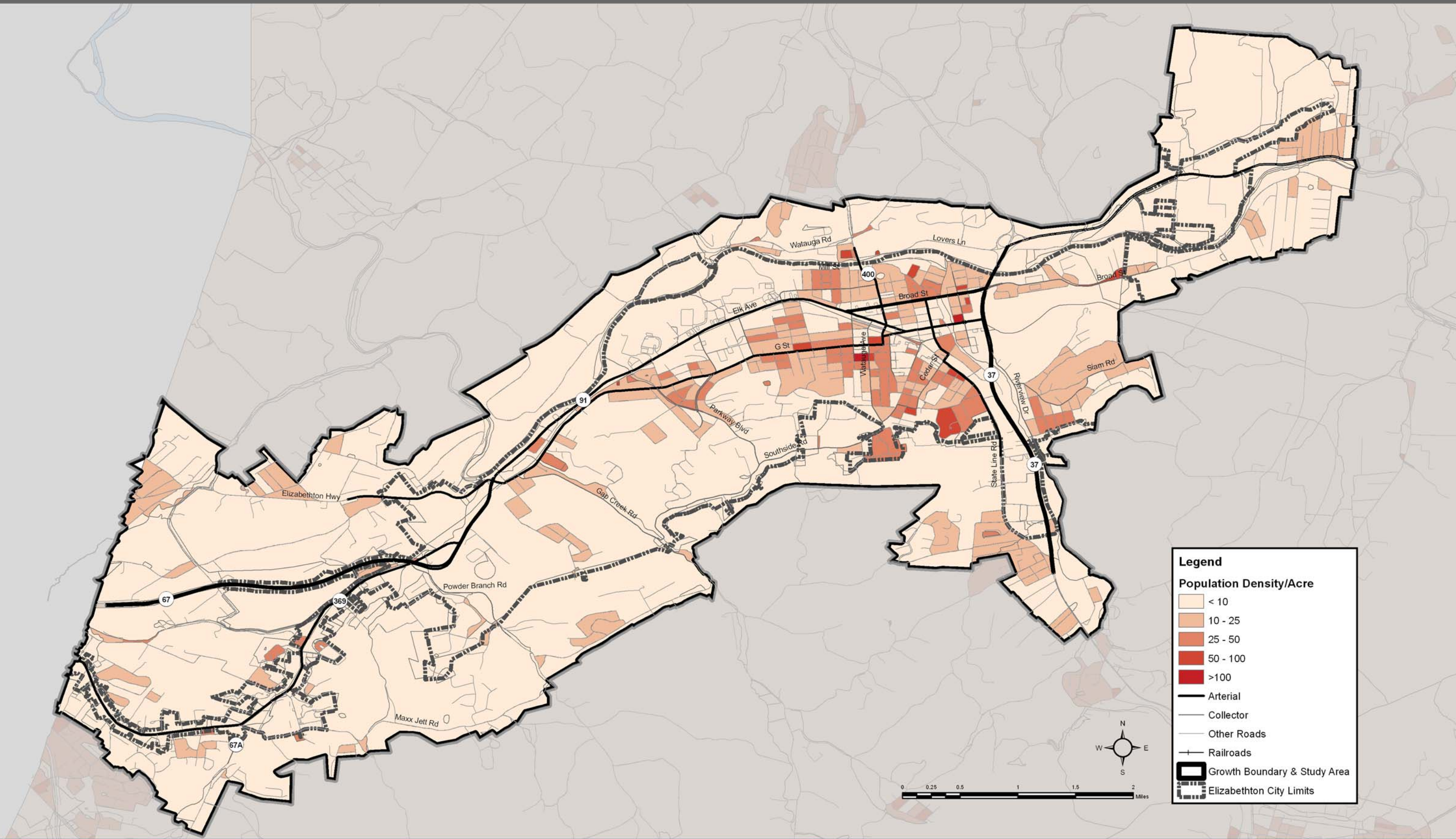
- Higher than average population aged 65 and older (County = 15%, State = 12.4%)
- Lower than average racial diversity (County = 97.5% white, State = 80.2% white)
- Lower than average median household income (County = \$33,874, State = \$43,610)
- Higher than average poverty rate (County = 21.5%, State = 15.5%)

From a transportation standpoint, these statistics indicate the need for transportation alternatives that support the mobility needs of an aging population and those with limited income. Stakeholder input indicated that the Tri-Cities and Elizabethton in particular has been an attractive location for retirees in recent years. This is borne out by the population statistics.

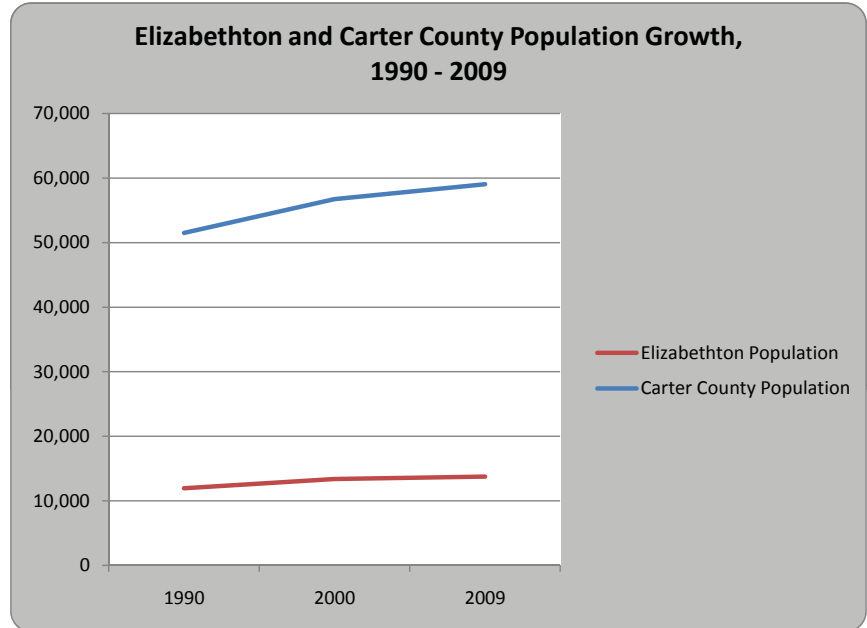


Most higher-density housing is located south of downtown. Multi-family units are not common, though several are either planned or under construction.

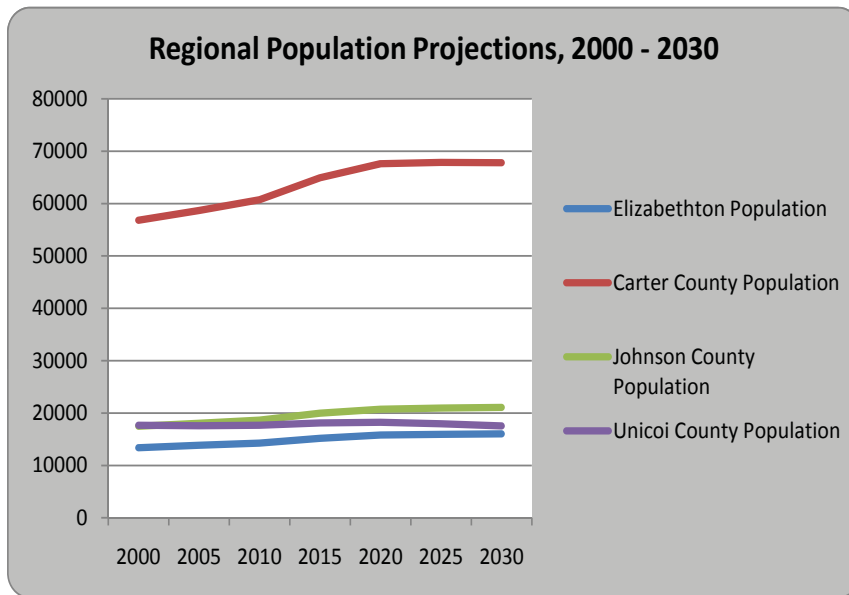
POPULATION DENSITY OF PARCELS



Population growth over the next 20 years is expected to resemble the last 20 years. Modest population growth in counties with commutes affecting Elizabethton will continue to add through traffic volumes on major roadways. Source: Tennessee Advisory Commission on Intergovernmental Relations



20-Year Historic Population			
	1990	2000	2009
Elizabethton	11,931	13,372	13,757
Carter County	51,505	56,742	59,043



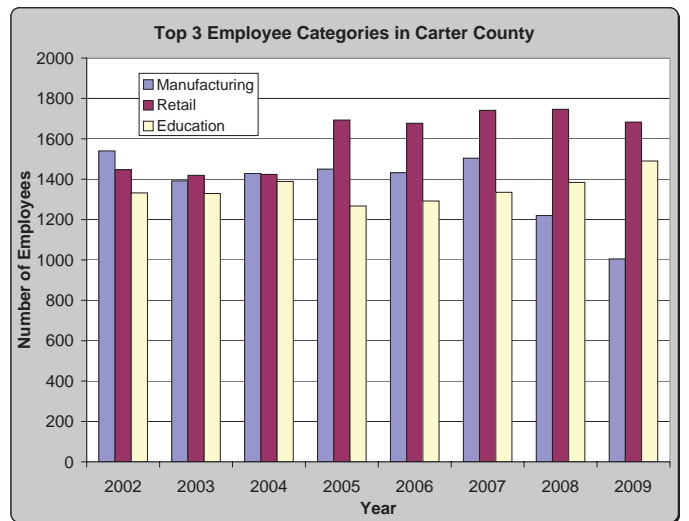
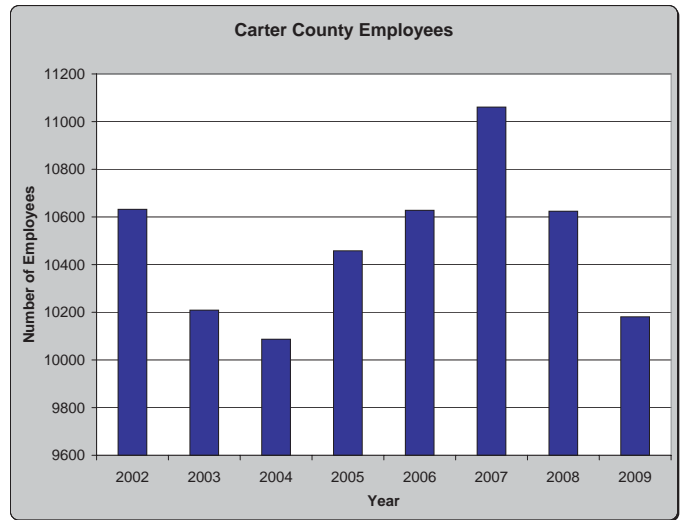
20-Year Population Projections									
	2010	2015	% Change	2020	% Change	2025	% Change	2030	% Change
Elizabethton	14,265	15,185	6.4	15,809	4.1	15,934	0.8	16,037	0.6
Carter Co	60,732	64,940	6.9	67,605	4.1	67,878	0.4	67,816	-0.1
Johnson Co	18,651	19,964	7.0	20,747	3.9	20,951	1.0	21,082	0.6
Unicoi Co	17,663	18,108	2.5	18,252	0.8	17,959	-1.6	17,561	-2.2

2.1.2 Employment Trends

Considering the fluctuations in the job market in recent years, Carter County has enjoyed relatively steady employment. The number of employees within the county has been decreasing modestly over the past three years, but overall employment has remained at 10,000 – 11,000 employees since 2002. The current county unemployment rate is 11% (the statewide average is 10.8%), giving Carter County the 27th lowest rate in the state.

Although the overall number of jobs has remained steady, there has been a shift in the number of jobs within specific industries. For example, since 2002, the number of retail and educational jobs increased by approximately 150 and 250 positions, respectively, while manufacturing saw an overall decrease in employment.

These job shifts have mobility implications as well. As manufacturing employment is replaced by retail jobs, for example, travel characteristics such as peak travel hours, distances traveled, and workplace locations also shift. Travel to retail workplaces is usually characterized by shorter trips made outside of typical peak travel hours, but made to places having higher overall traffic volumes.



In Carter County, slight overall decreases in employment since 2007 have been led by losses in manufacturing jobs. Education jobs have made up some of these losses with retail positions holding steady.

2.2 LAND USE

To establish an understanding of the existing land use patterns in the study area, the most recent existing land use data available were obtained from the City of Elizabethton and are shown in Figure 3. Data from the State of Tennessee Comptroller of the Treasury Division of Property Assessments were also evaluated. Land use areas were identified from the City of Elizabethton GIS data. In total, there are seven different land use categories located within the study area. The primary land use based on acreage is residential, with approximately 51% of the study area falling into this category. Lands classified as agricultural make up the next largest portion of the study area by acreage accounting for roughly 33% of the study area. The next largest classifications of lands are commercial and government, which are each 7% of the acreage, followed by institutional, industrial, and utilities. It should be noted that the available land use data classifies lands largely according by general ownership type and not necessarily strict land use. For example, public housing and the airport are both classified as governmental land uses (as public holdings) and not as residential and industrial, respectively.

2.2.1 Land Use Descriptions

The following is a brief description of the land uses within the study area.

Residential

This classification includes all residential properties both single family and multi-family. Within the study area there are approximately 7,904 acres of land classified as residential. This land use classification represents just over half of the land acreage in the study area.

Agriculture & Farm

Approximately 30% of the study area is comprised of properties classified as agriculture or farm. These classifications represent approximately 4,663 acres of lands that are used for farming or for the raising of

livestock (or those otherwise undeveloped due to terrain or soil conditions). These parcels are generally located east and west of the downtown Elizabethton area.

Commercial

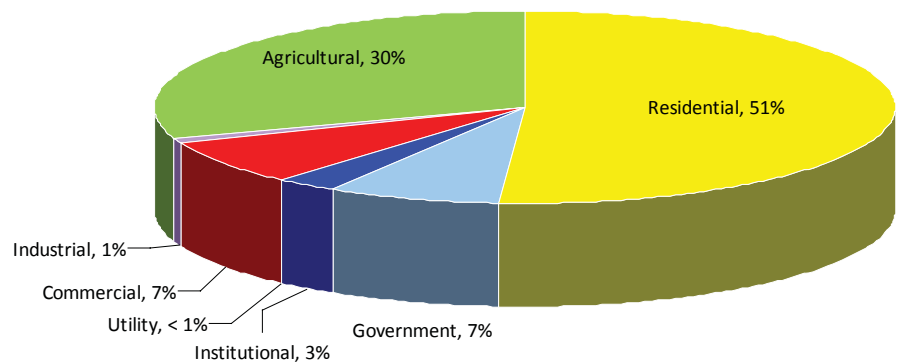
Commercial properties comprise the third largest percentage of land in the study area accounting for 7% of the study area acreage. Commercial properties include uses that provide a range of services, including retail goods, office, financial, restaurants, and auto sales. Existing commercial properties within the study area are most prevalent in the downtown area, around the airport, and along the US 321 corridor.

Industrial

There are 17 parcels within the study area classified as industrial totaling 139 acres. This classification covers a broad spectrum of industry activities. Properties within the study area that are classified industrial are largely light industrial establishments such as wood product businesses and chemical businesses. Properties classified as industrial within the study area are generally located along US 19E and near the airport.

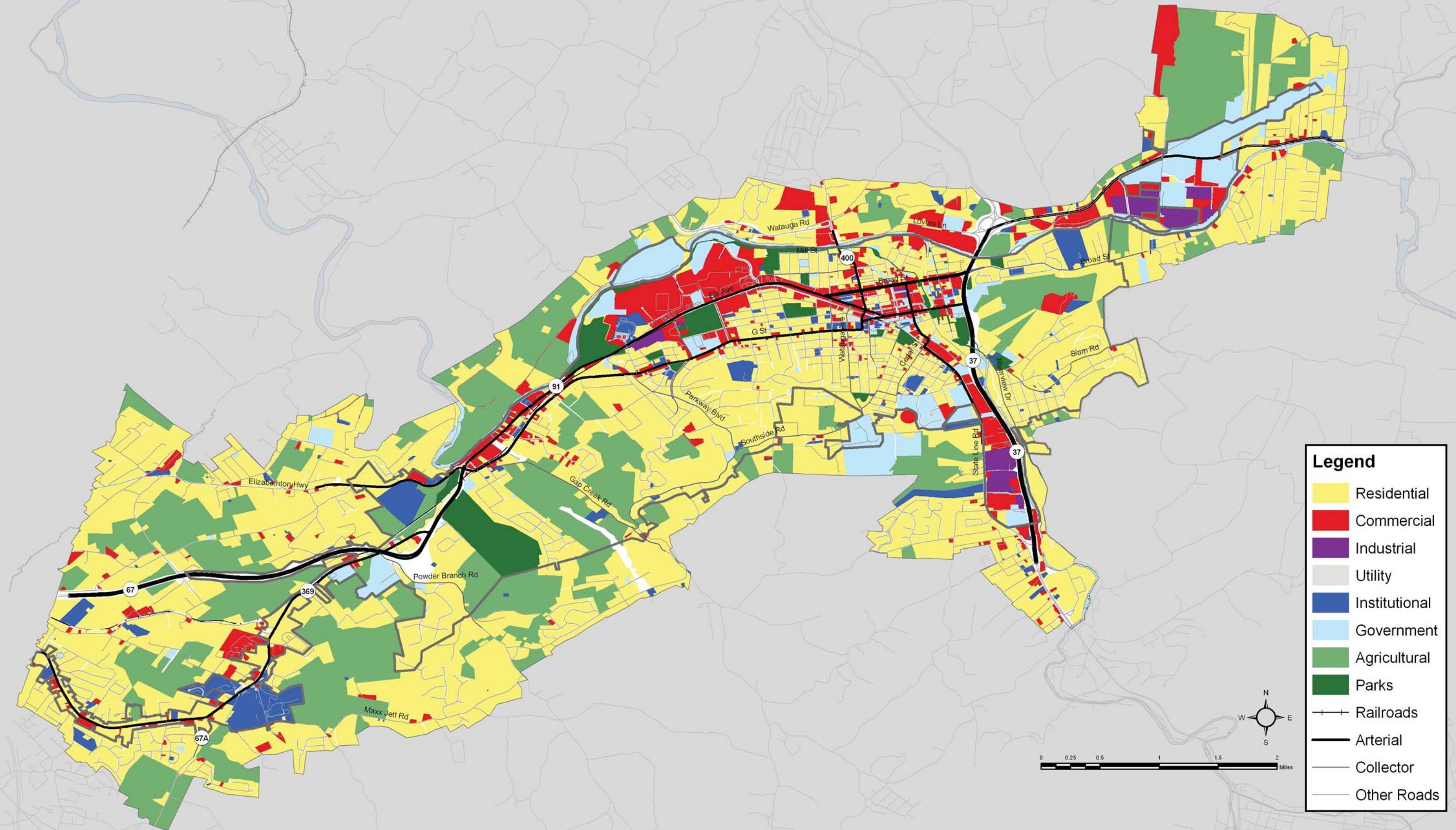
Public Utilities

There are six parcels classified as public utilities within the study area accounting for less than three acres. This property is located throughout the study area and is owned by telephone and gas companies.



Lands classified as residential and agricultural make up over 80% of the identified study area. The amount of retail square footage is significant for a city the size of Elizabethton. The high traffic counts along SR 67/SR 91 have driven retail demand and have contributed significantly to local revenues.

EXISTING LAND USE



Institutional

The City of Elizabethton has classifications for religious and educational/science/charitable land uses. For the purposes of this study, these two land uses are grouped into the institutional land use category. There are a total of 445 acres classified as institutional within the study area. These properties are dispersed throughout the study area, mainly along classified arterial roadways.

Government

The City of Elizabethton classifies public land as having city, county, state, or federal uses. For the purposes of this study, these uses are classified as government. There are approximately 1,140 acres which include public housing, undeveloped land, parks, & government businesses.

2.2.2 Land Use Outlook

Over the next twenty years, approximately 1,770 new residents are expected in Elizabethton. This represents the same 15% growth that occurred over the previous 20 years. Some of this growth

will be infill development and infill redevelopments should be encouraged by the City. However, it is likely that most new population growth will occur at moderate densities in new growth areas. The areas with the most residential growth potential are in the southwest and northeast corners of the study area. These areas are and will continue to be accessed primarily by Milligan Highway, Powder Branch Road, Gap Creek Road, and SR 91 east.

While residential growth is expected in more outer-lying areas of the study area, retail and other commercial development can already be seen and is expected within the already developed core along SR 67/91 from Sycamore Shoals Hospital to downtown. New medical office space is under construction with the potential for more office and retail within the corridor.

A regional desire continues to be industrial, light industrial, manufacturing, and warehouse/distribution employment opportunities. The most readied sites for these land uses are in the

The Demographic-Land Use-Transportation Relationship in Carter County

Carter County has a population which, as a percentage, is less rural than most counties in Tennessee. Approximately 60% of Carter County's population lives in areas classified by the US Census as urban. Carter County is 87th (out of 95 counties) in the total acres of farmland (39,374 acres) and 89th in the average size of farms (76 acres). Carter County includes 82,027 acres of National Forest and 57,534 acres of privately owned forest. This is indicative of the significant topography found within the county whereby most suitable land has historically been settled, developed, and,

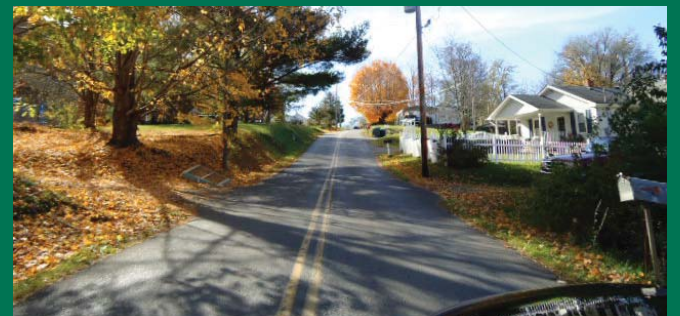


Much of the greenspace of the study area is either dedicated as parkland or has significant topography.

over time, incorporated as urban areas.

The impact on transportation of these population and land use characteristics is the resulting urban settlement and density patterns within the study area and the surrounding region. The county's density of 174 persons per square mile in 2000 made it the 16th most dense county in Tennessee. Consequently, there are few rural roads having excess capacity that serve significant expanses of developable land (most local roads were constructed to serve populated areas, not to access farmlands having relatively small populations).

Data Source: TN Advisory Commission on Intergovernmental Relations (TACIR)



Few classified rural roads in the study area have major excess capacity. However, a scarcity of developable land means that traffic growth will be relatively slow.

northeast portion of the study area along SR 91 and adjacent to the airport. Attracting distribution or other heavily transportation-dependent users will be challenging given the limited east-west connectivity through Elizabethton to I-26. However, more region-oriented industries will find quick access to major regional facilities (US 19E, SR 67/91) attractive. New industrial uses in the Cherokee Industrial area or other locations better suited for commercial, residential, and particularly, riverfront oriented development should not be encouraged.

Based on land use analysis and input received from local stakeholders, the most significant land use changes over the next 20 years were assumed to take place in seven portions of the study area shown in Figure 4. The projected growth characteristics of each area are detailed in the table below.

An analysis of improvement (building) values helped to formulate and verify likely new and re-development areas. Locations where the land is worth more than the improvement can be an indication of where development would be most likely. In Figure 5, those “underdeveloped” areas as shown in red correspond well with the seven growth areas.

Land Values in the Study Area

As noted, undeveloped farmland is not prevalent within Carter County. However, it is valuable. Per acre, Carter County farmland sells for approximately 20% more than other Tennessee land (\$4,041 versus \$3,378). This is the 25th highest average cost out of Tennessee’s 95 counties. Interestingly, the average market value of agricultural products sold from these farms ranks near the lowest (78th) in the state. This may indicate that the small average farm size and the relative scarcity of farmland will continue to make Carter County farms more attractive for development than for continued farming

Data Source: TN Advisory Commission on Intergovernmental Relations (TACIR).



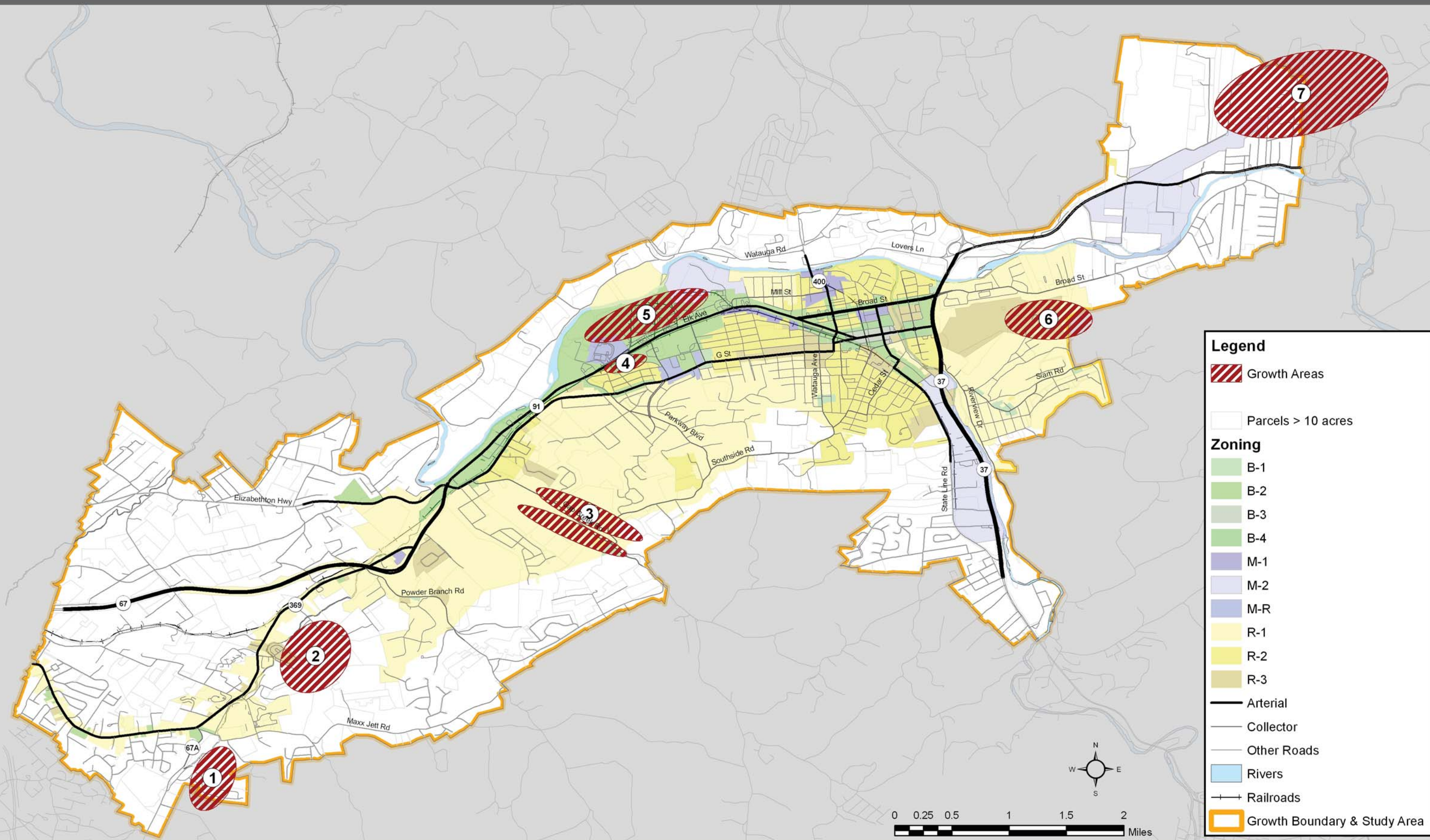
Small average parcel sizes will require amassing, usually at higher costs, making large-scale development that much more expensive.



Commercial properties in varying conditions line SR 67/91, Elizabethton’s primary retail corridor. High volumes of pass-by traffic here have attracted retail, institutional, and now office land uses. As a major revenue source, these uses are encouraged, and corridor management techniques can help make this development more efficient and attractive for future new development and re-uses.

Growth Area (See Fig. 4)	Assumed Land Use Changes (New Development)			
	Attached Dwelling Units	Detached Dwelling Units	Retail Space	Non-Retail Commercial Space
1	0	180	0	0
2	0	170	0	0
3	48	30	72,000 s.f.	0
4	20	0	30,000 s.f.	105,000 s.f.
5	120	0	72,000 s.f.	150,000 s.f.
6	60	0	0	0
7	0	0	0	300,000 s.f.
TOTAL	248	380	174,000 s.f.	555,000 s.f.

NEW GROWTH AREAS



Legend

- Growth Areas
- Parcels > 10 acres

Zoning

- B-1
- B-2
- B-3
- B-4
- M-1
- M-2
- M-R
- R-1
- R-2
- R-3

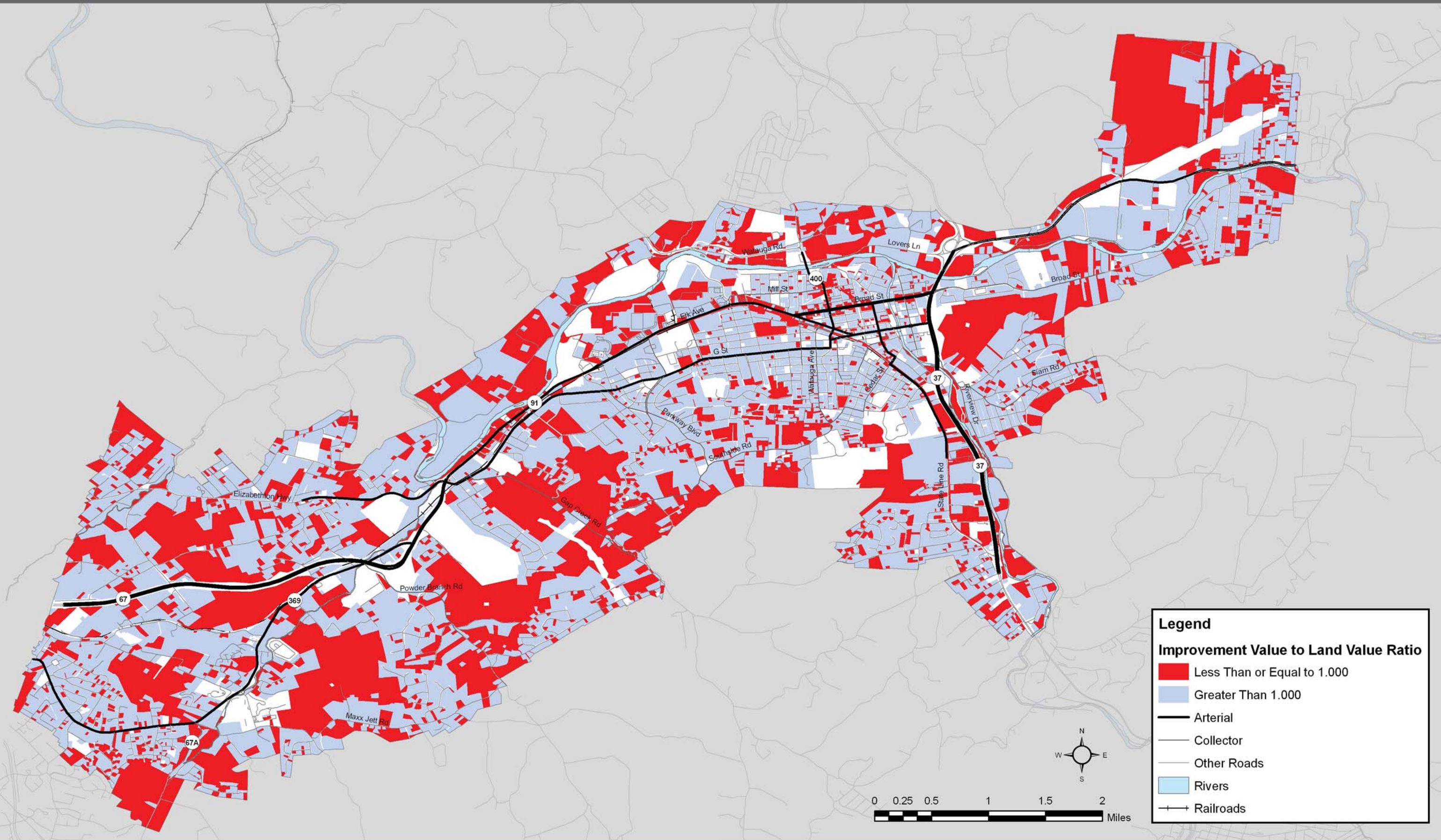
Roads

- Arterial
- Collector
- Other Roads

Other Features

- Rivers
- Railroads
- Growth Boundary & Study Area

IMPROVEMENT VALUE



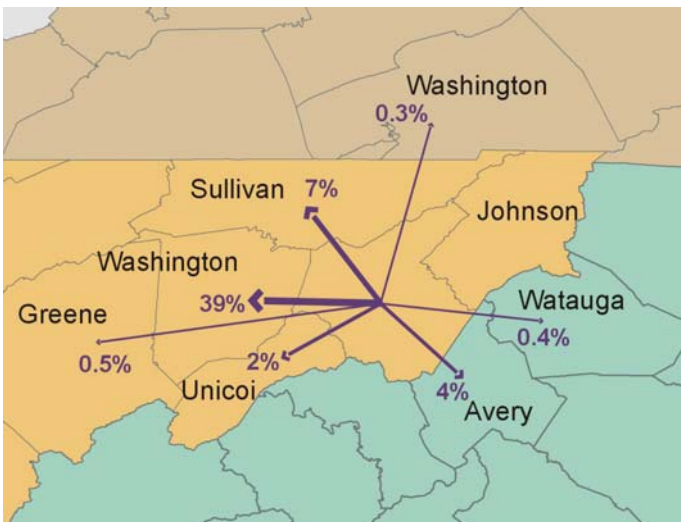
3. TRANSPORTATION CONDITIONS AND OUTLOOK

The mutually dependent characteristics of demographics, land use, and transportation within the study area mean that the existing conditions of each of these at least partially explain the existing conditions of another. The transportation conditions and outlook for Elizabethton can be summarized into analyses of major transportation issues and specific traffic locations. The major flows are the “big picture” items such as the condition of east-west movement and how the likely pattern of development will impact future travel in the city. The specific locations are defined by smaller, individual needs that can make a significant improvement for everyday users at these locations.

The travel conditions within the study area are organized into the categories of commuting patterns and major flows, major corridors, special locations, and non-motorized travel.

3.1 COMMUTING PATTERNS AND MAJOR FLOWS

Analysis of transportation conditions logically begin with an understanding of the City’s employment commuting patterns. US Census data shows that just over 25,000 people who are employed live in Carter County. Approximately 44% of these workers remain in Carter County



County-to-County commutes made by Carter County residents (Census Transportation Planning Package 2000).

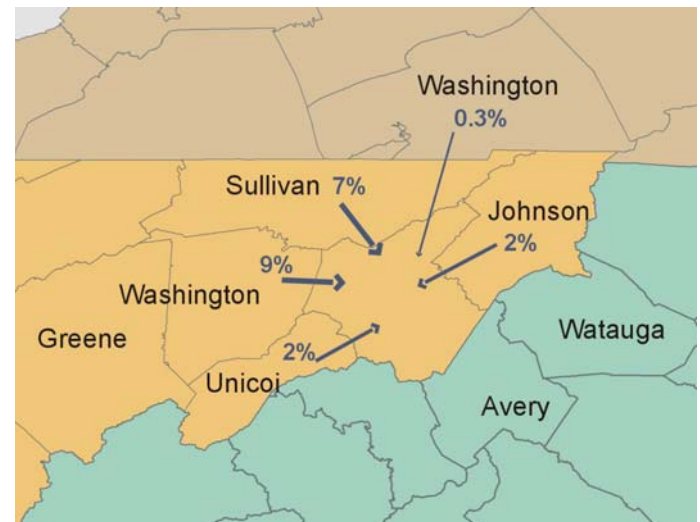
for work. The next highest ten destinations for employment account for 54% of the Carter County workforce.

Also of importance is the commuting of workers living outside of Carter County into the county for their jobs. The census shows that just under 14,000 employees work in Carter County. 78% of these employees reside in Carter County, 19% come from other counties which represent the next five highest origins of Carter County employees.

This information reveals that commuting outside of Carter County is primarily oriented to and from counties to the west and north of Carter (Washington, Sullivan, Unicoi). These origin/destination pairs rely on US 321 and, ultimately, its connection to I-26 as the primary commuting corridor in the region. Add to this the land uses previously mentioned that make US 321 the primary commercial corridor, and it can be seen that the role of US 321 as both a mobility route and an access route is quite complex.

3.2 MAJOR CORRIDORS

In addition to US 321, several other roadways within the study area have been identified as significant. The following roads, classified by the City as collectors and arterials have been inventoried and summarized in Table 3.1.



County-to-County commutes made to Carter County by residents of other counties (Census Transportation Planning Package 2000).

Table 3.1 Summary of major roadways within the study area.

Road	From	To	No. Lanes	Width	Speed Limit	Class
Broad St	US 19E	Overstone Dr	2	22	25	Collector
Broad St (US 321, SR 67)	Elk Ave	US 19E	5	60	35	Arterial
Carter Blvd	Parkway Blvd	G St	2	46	25	Collector
Cedar St	Florence St	Southside Rd	2	20	25	Collector
Elizabethton Hwy (SR 91)	US 321	Study Limit	2	23	35	Arterial
Elk Ave	Broad St	US 19E	3	47	35	Arterial
Elk Ave (US 321, SR 67, SR 91)	G St	Mill St	5	60	35	Arterial
Elk Ave (US 321, SR 67, SR 91)	Mill St	Broad St	4	54	35	Arterial
F St	Lynn Ave	Elk Ave	2	27	25	Arterial
Florence St	State Line Rd	Cedar St	2	20	25	Collector
G St	Elk Ave	Carter Blvd	2	21	25	Arterial
G St	Carter Blvd	Lynn Ave	3	32	25	Arterial
Gap Creek Rd (SR 362)	G St	Study Limit	2	21	25	Collector
Hattie Ave	Sycamore St	K St	2	36	25	Collector
Holston Ave	F St	K St	2	24	25	Collector
Hudson Dr	G St	Elk Ave	2	29	25	Collector
Johnson Ave	Sycamore St	State Line Rd	2	26	25	Arterial
Johnson Ave	State Line Rd	Florence St	2	20	25	Collector
Lynn Ave	G St	F St	2	24	35	Arterial
Lynn Ave	Elk Ave	Watauga Rd	5	60	35	Arterial
Main St	A St	5th St	2	27	25	Collector
Mill St	Elk Ave	Lynn Ave	2	28	25	Collector
Milligan Hwy	US 321	Study Limit	2	25	35	Arterial
Okolona Rd (SR 359)	Milligan Hwy	Study Limit	2	21	35	Collector
Parkway Blvd	G St	Southside Rd	2	23	25	Collector
Powder Branch Rd	Milligan Hwy	Study Limit	2	28	25	Collector
Riverview Dr	Siam Rd	End	2	18	25	Collector
Roan St	Elk Ave	I St	2	32	25	Collector
Siam Rd	US 19E	Study Limit	2	19	25	Collector
Southside Rd	Cedar St	Gap Creek Rd	2	20	25	Collector
SR 91	US 19E	Study Limit	5	60	35	Arterial
State Line Rd	Johnson Ave	US 19E	2	21	25	Arterial
Sycamore St	Broad St	Johnson Ave	2	32	25	Arterial
US 19E	Study Limit	State Line Rd	4	48	55	Arterial
US 19E	State Line Rd	Watauga River	4	48	35	Arterial
US 19E	Watauga River	Study Limit	4	48	55	Arterial
US 321	Elizabethton Hwy	Study Limit	4	72	65	Arterial
Watauga Ave	Elk Ave	Cedar St	2	24	25	Collector

3.2.1 Cross-Section

Following the standard functional classification hierarchy, most roads within the study area currently have cross-sections and cross-sectional elements appropriate for their function. Examples of this are:

- Features of US 321 west of G Street suitable for higher-speed travel (central median, wide shoulders, etc)
- Provision of on-street parking on E Street within the CBD.
- Limited-width streets with sidewalks in established neighborhoods south of downtown.
- Some use of turn lanes in suburban commercial settings in the US 321 corridor.

As more communities begin planning for improved mobility, the concept of complete streets has become widely accepted. The concept centers around the fact that streets should provide adequate service for all types of users and not be limited to a single mode of travel. In addition to adequate travel lanes for vehicular capacity, other cross-sectional components of complete streets include:

- Non-motorized travel accommodations (sidewalks, bike lanes, etc.)
- On-street parking
- Pullouts/loading zones
- Intersection turn lanes
- Colored and/or textured pavements
- Traffic calming infrastructure
- Facilities accommodating large vehicles (trucks, buses)
- Efficient traffic control

A successful complete streets approach does not require all streets to have all of these or other cross-sectional elements. However, working towards a network of complete streets in Elizabethton does mean that various road user types will be considered in the planning, design, and maintenance process.

3.2.2 Existing Traffic

Overall, traffic volumes within the study area have followed state and national trends and have been characterized by very modest increases or decreases over the past five years.

Table 3.2 provides TDOT's annual traffic counts within the study area for the current (2009) traffic volumes along with overall growth or decreases in these volumes over the past five years. The most heavily traveled roadways experienced little growth over the past five years.

Figure 6 illustrates the traffic volumes in the study area based on TDOT's existing 2009 traffic volume counts. This data was analyzed to determine the Level of Service

(LOS) of the roadways. LOS is a concept used to describe how well an intersection or roadway operates. A description of each LOS is listed in the following table. LOS A is the best and LOS F is the worst. LOS D is typically considered as the minimum acceptable LOS for a signalized intersection in an urbanized area. The ADT thresholds used for the analysis are shown in Table 3.3 and the results are illustrated in Figure 7.

Level of Service	Description
A	Operations with very low delay. This occurs when progression is extremely favorable. Most vehicles do not stop at all.
B	Operations with stable flows. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.
C	Operations with stable flow. Occurs with fair progression and/or longer cycle lengths. The number of vehicles stopping is significant, although many still pass through the intersection without stopping.
D	Approaching unstable flow. The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop.
E	Unstable flow. This is considered to be the limit for acceptable delay. These high delays generally indicate poor progression, long cycle lengths, and high V/C ratios.
F	Unacceptable delay. This condition often occurs with oversaturation or with high V/C ratios. Poor progression and long cycle lengths may also cause such delay levels.

In addition, turning movement counts were obtained from TDOT for signalized intersections in the study area. Figure 8 shows the counts along with the resulting LOS for each intersection.

Table 3.2 2009 TDOT Traffic Counts and Historic Five Year Change

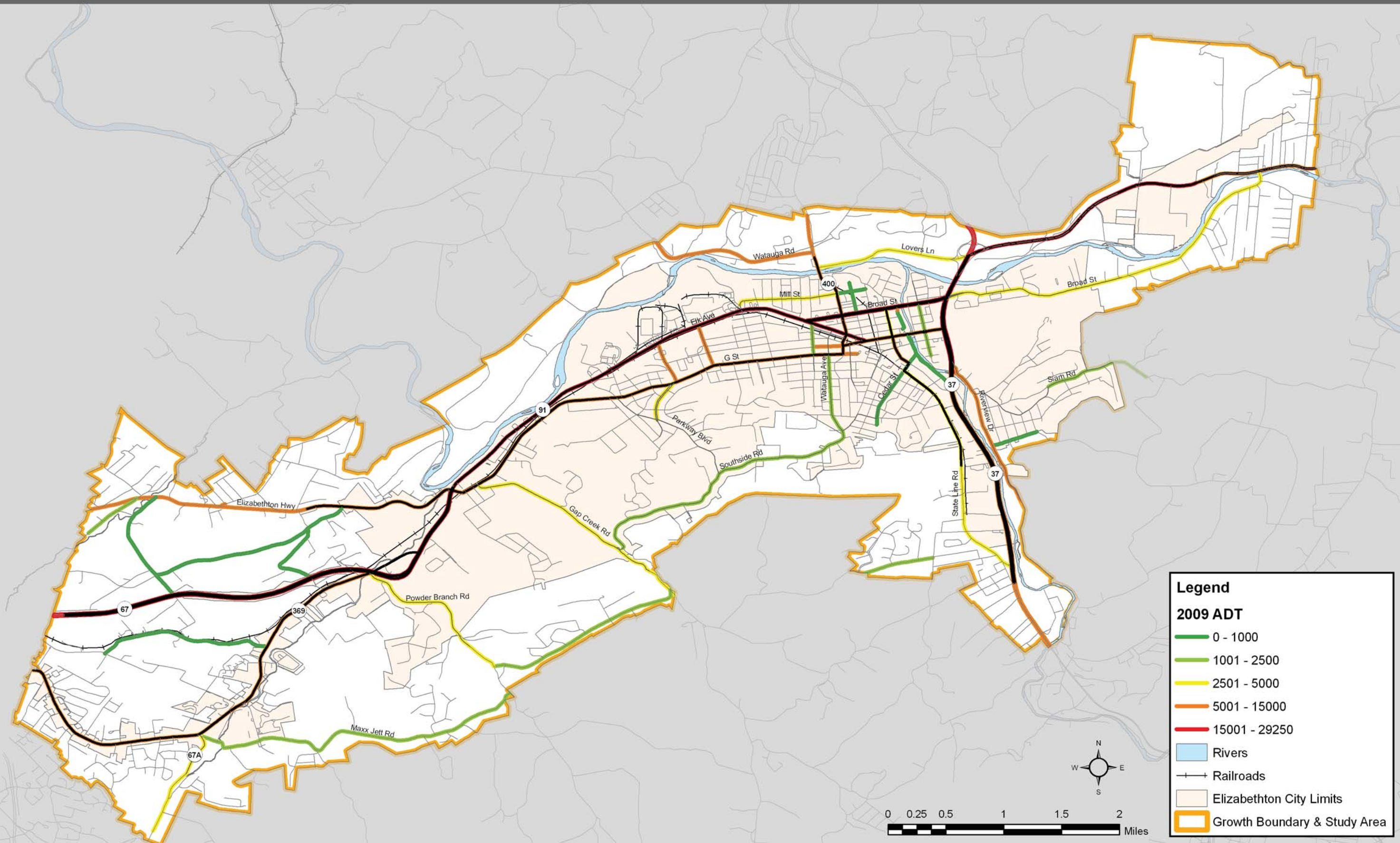
Road	2009 ADT	5-Year Traffic Change
Hudson Dr.	5,397	+9%
Lovers Lane	3,239	+9%
SR 359 (E of SR 67 A)	8,291	+4%
SR 91	15,670	+2%
Carter Blvd.	2,972	+2%
SR 359 (W of SR 67 A)	9,753	+1%
W. G. St. (Near Sylvan Hill Rd)	8,989	+1%
Elk Ave. (Between Holston and Academy)	5,712	+1%
Roan St.	1,882	+1%
US 321 (Near Parkway Blvd.)	24,794	0%
US 321 (W of SR 359)	22,667	0%
SR 91 (S of SR 321)	18,686	0%
W. G. St. (Near F St.)	11,225	0%
Mill St.	3,328	0%
Southside Road	1,477	0%
W. G. St. (Between Gap Creek Rd. and SR 321)	10,941	-1%
Bemberg Rd.	7,456	-1%
Riverview Dr.	6,662	-1%
S. Sycamore St.	6,351	-1%
Old State HWY 91	4,551	-1%
SR 67 A	3,280	-1%
Watauga Ave.	1,752	-1%
US 321 (Near Holly Lane)	28,255	-2%
US 321 (Near Lynn Ave.)	24,979	-2%
SR 91 (N of SR 321)	19,336	-2%
Gap Creek Road	4,313	-2%
Siam Rd.	1,386	-2%
Johnson Ave.	639	-2%
Main St.	2,000	-5%

Table 3.3 Average Daily Traffic (ADT) Thresholds for Level of Service (LOS)

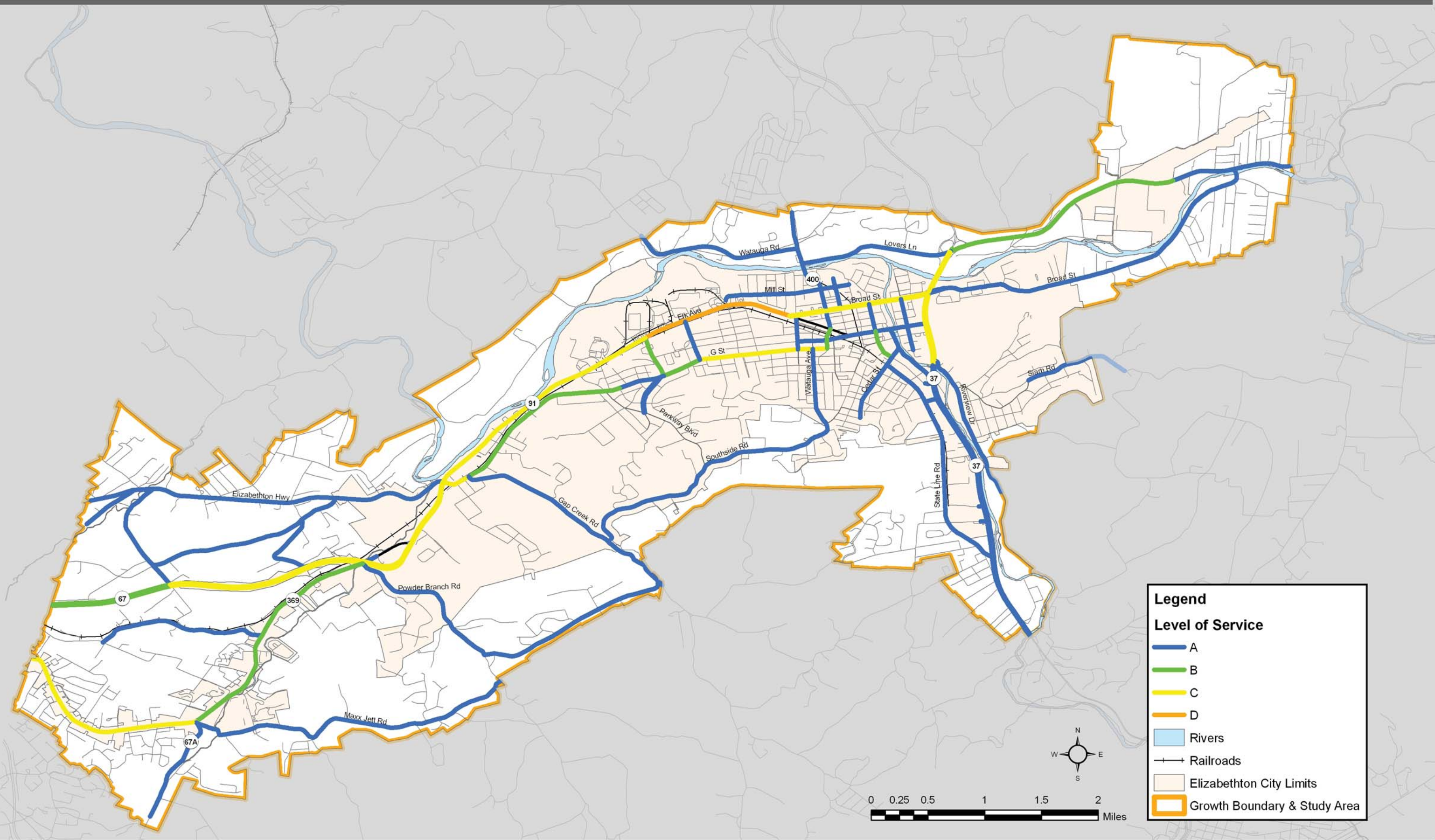
Road Type	ADT Thresholds for Given Level of Service				
	A	B	C	D	E
2-LANE					
TYPE I URBAN	6,500	9,400	13,800	16,150	18,700
TYPE II URBAN	5,100	7,400	9,100	14,600	16,300
TYPE I RURAL	7,900	10,000	14,900	18,000	23,400
TYPE II RURAL	6,500	9,100	11,600	15,700	18,700
3-LANE					
TYPE I	8,200	11,600	14,500	17,200	23,300
TYPE II	6,400	9,200	11,300	15,300	17,100
4-LANE					
URBAN (ALL)	10,700	17,500	2,600	32,700	34,500
RURAL (DIVIDED)	15,200	24,800	35,400	45,500	50,500
5-LANE					
URBAN (ALL)	13,400	20,200	27,300	34,400	37,500
RURAL	15,200	22,200	32,000	42,300	51,600

Current and projected LOS was based on mainline traffic volumes. Type I roads describe routes used for longer distance, higher speed travel. Type II roads are generally used for more local access trips. Source: RPM - derived from data of Maryland, Alabama, Florida, and Arizona DOTs.

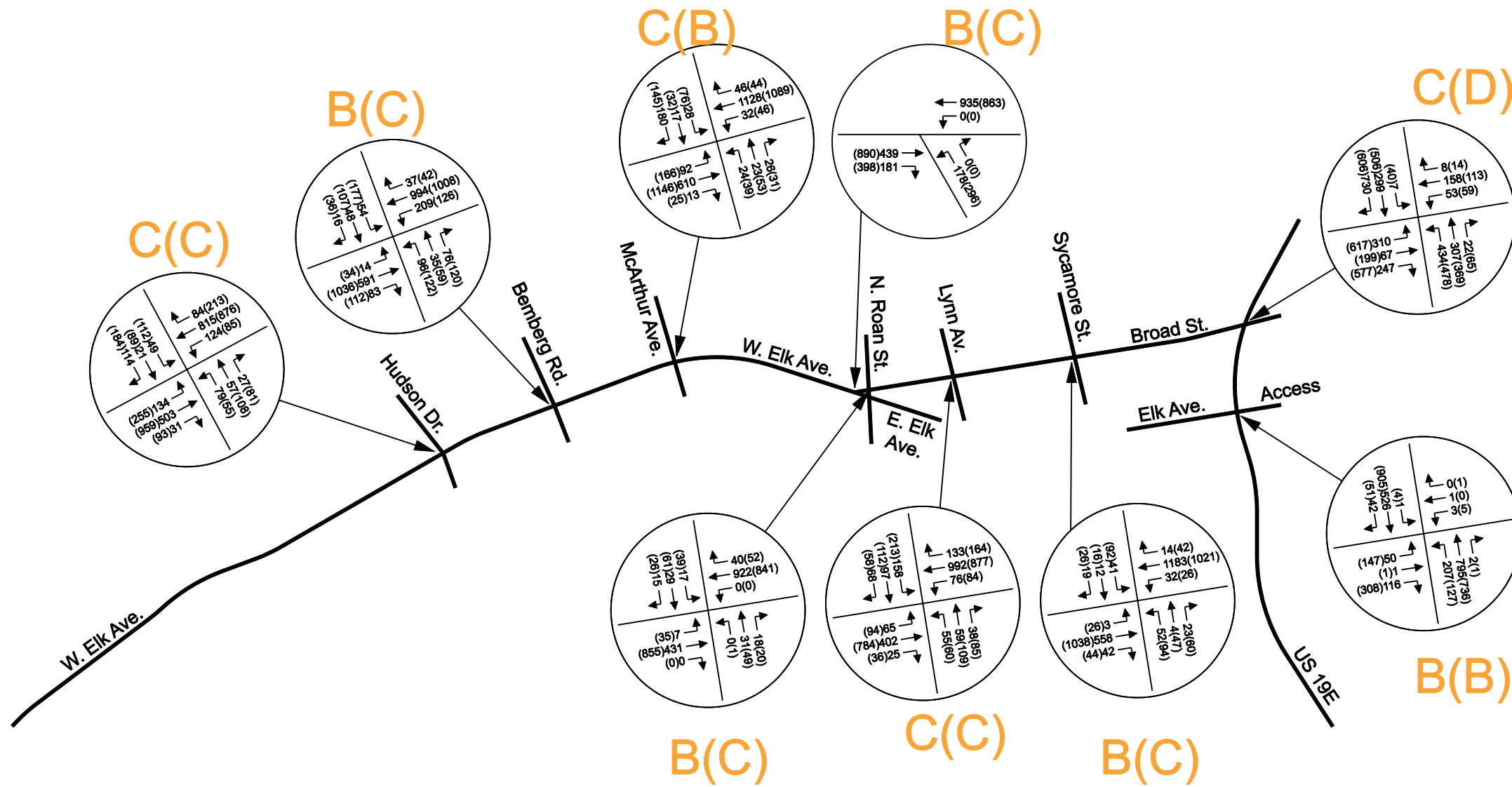
2009 AVERAGE DAILY TRAFFIC VOLUMES (ADT)



LEVEL OF SERVICE 2009



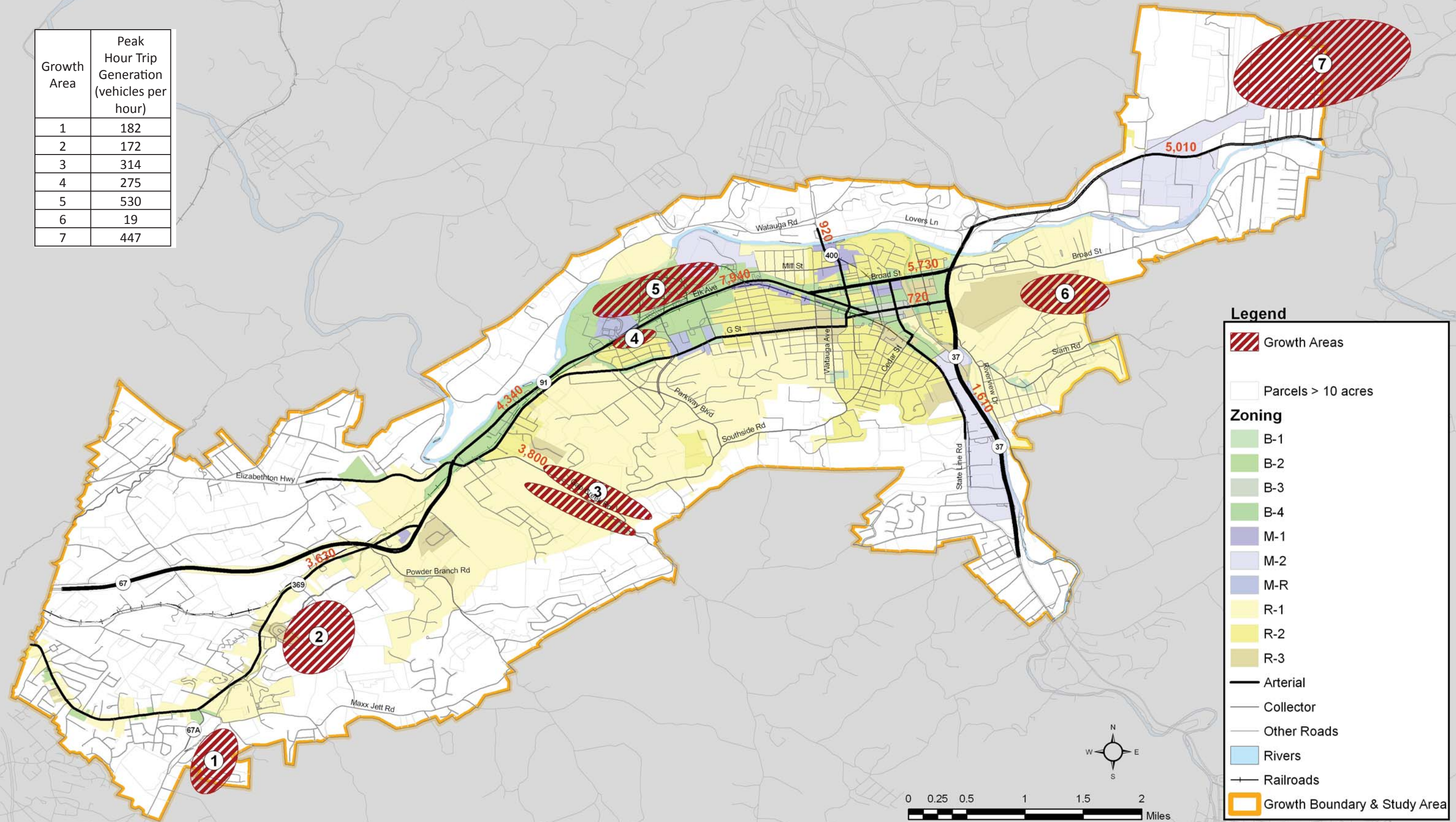
INTERSECTION TRAFFIC VOLUMES AND ANALYSIS



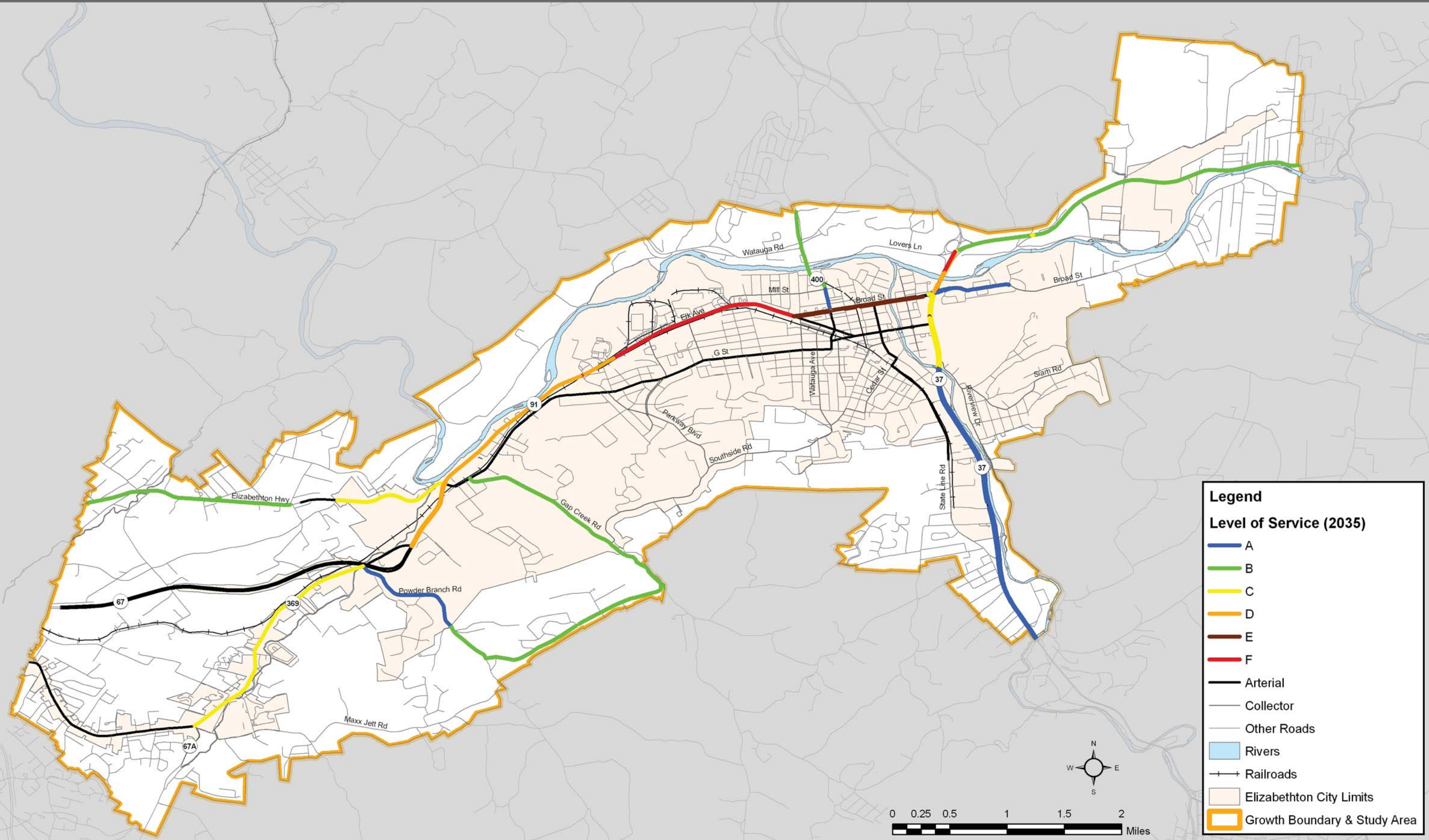
XXX - AM Peak Hour
 Traffic Volumes
 (XXX) - PM Peak Hour
 Traffic Volumes
 A(A) - AM(PM)

DAILY TRAFFIC VOLUMES FROM NEW GROWTH

Growth Area	Peak Hour Trip Generation (vehicles per hour)
1	182
2	172
3	314
4	275
5	530
6	19
7	447



LEVEL OF SERVICE 2035



Legend

Level of Service (2035)

- A (Blue line)
- B (Green line)
- C (Yellow line)
- D (Orange line)
- E (Brown line)
- F (Red line)

Arterial (Thick black line)

Collector (Thin black line)

Other Roads (Grey line)

Rivers (Blue shaded area)

Railroads (Black line with cross-ticks)

Elizabethton City Limits (Light orange shaded area)

Growth Boundary & Study Area (White area with orange outline)

3.2.4 Future Projects

Transportation planning within the study area has been most comprehensively accomplished through the JCMTPO's Long-Range Transportation Plan (LRTP). Projects in the LRTP move forward through the implementation process based on a number of factors. Some of the planned projects in the latest (2005) LRTP have been completed, others may remain years from construction. Planned projects in the region vary widely with regard to implementation status. These projects will have a positive impact on mobility. However, analysis shows that other improvements should be considered over the next 25 years as well.

Status	Road	Project
Substantially Complete	Lynn Avenue	Widen to 5-lanes from Elk Ave to cross Watauga River on new bridge
	SR 91	Traffic signal interconnect and optimization
"Committed" in LRTP	Gap Creek Road (SR 362)	Reconstruction and widening between US 321 and Hampton Gap Creek Rd
	Elizabethton Connector (SR 91 extension)	Widening or construction of new east-west route as alternate to US 321
"Proposed" in LRTP	SR 91 at Ben Allen Road	Signalize intersection (2015)
	West G Street	Widen to 3 lanes from Hudson St to SR 362 (2030)

3.2.5 Access

Access management is the intentional regulation of all access to a public roadway. The principles of access management can be applied at a scale ranging from consideration of a single driveway placement to a comprehensive system-wide access management program. The Access Management Manual states that "an effective access management program can reduce crashes as much as 50%, increase roadway capacity by 23% to 45%, and reduce travel time and delay as much as 40% to 60%."¹

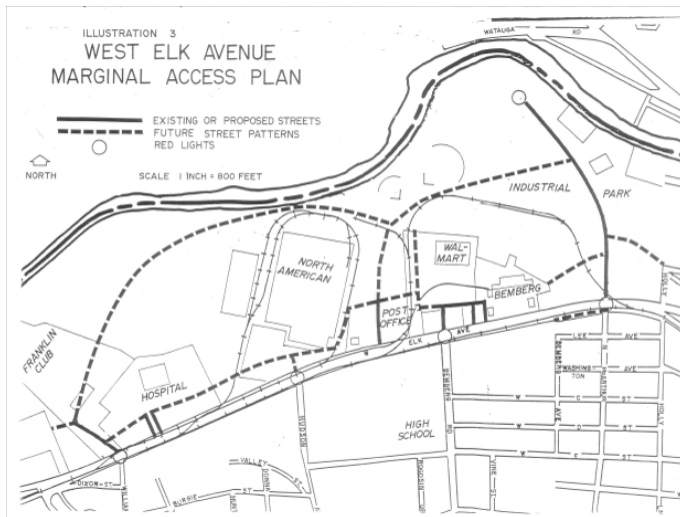
In Elizabethton, as in most cities, certain standards exist which prohibit the construction of very closely spaced access points. Special attention has also been given to the access needs along US 321. Also, TDOT has designated and designed certain highways (US 321 west and US 19E north of Elizabethton) as controlled access to prohibit new at-grade intersections.

Generally, few other roadways outside of those mentioned have certain needs for access management. However, as growth occurs, more demand for access will be placed on roads that may be desirable to remain mobility-oriented. For this reason, some level of access management should be considered on roads like US 19E south, SR 91 east of Elizabethton, and also on the south side of Elk Avenue.

¹ Access Management Manual. Transportation Research Board.2003.

Summary of Current Access Management Needs

Corridor Segment	Recommended Access Strategy	Consideration
SR 91, east of US 19E US 19E, south of Broad St	Allow new public street access in coordination with TDOT access spacing requirements (minimum 1,320 ft spacing recommended). Minimize new driveway allowances through the use of shared driveways and cross-access requirements. New development should obtain access through an intersecting side street wherever possible.	
US 321 (SR 67/91), west of SR 359	Maintain full access control. New access should only be allowed by means of grade-separated interchange.	
US 321 (SR 67/91), Mill St to Williams Ave	Aggressive reduction of private driveways through implementation of full frontage road system on north side of US 321.	Develop specific plan to regulate number and configuration of driveways to implement as parcel redevelopments occur.
US 321 (SR 67/91), Elk Ave to Mill St	Facilitate efficient access through construction of two-way left turn lane.	Exiting 80' ROW should be confirmed with survey.
Broad St, US 19E to Elk Ave	Expand use of rear access to commercial properties having frontage on Broad St. (develop alleyway in between Broad and Cottage or look for rear access from Cottage). Minimize new driveway allowances (and reduce number of existing driveways) through the use of shared driveways and cross-access requirements.	Develop specific plan to regulate number and configuration of driveways to implement as parcel redevelopments occur.



Access along Elk Avenue was addressed and a plan created in the 1987 Major Thoroughfare Plan. West of Hudson Drive, adherence to the plan has resulted in the construction of Over Mountain Drive and the desirable access configuration that exists today.



Average access spacing = 1350'
(on north side of US 321)

120'

Reductions in the number of access points east of Hudson Drive is desirable in order to lengthen the average spacing here. An adopted, specific plan will be needed to capitalize on redevelopment occurrences by which access changes can be made.

3.2.6 Safety

The crash experience along the US 321 (SR 67/91) corridor is significant, but this highway carries a high volume of traffic daily. As would be expected, clusters of crashes exist at intersections. Of note is the lower crash density west of Williams Avenue, where fewer access points exist, compared to the eastern (more developed) portions of the corridor. The high number of crashes just west of Hudson Drive indicates that there may be a need for advance intersection warning signage. Eastbound motorists at this location have driven a long distance at relatively high speed, and may not be expecting the congestion that occurs at the Hudson Drive intersection.



Warning signage already on US 321 helps drivers to be aware of changing road conditions. Under SAFETEA-LU legislation, funding for safety has become more readily available for high-crash locations.

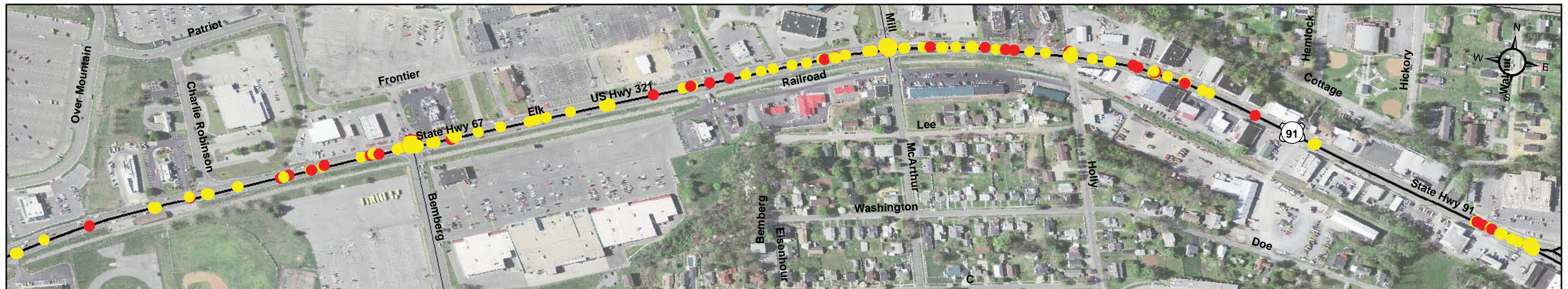
Safety of G Street

Of interest locally is the crash experience of West G Street. Over the course of three years, from SR 362 to East E Street, G Street has had 80 crashes. Eight of these crashes resulted in severe injuries (none were fatal). The number of crashes, while high, when considered along with the amount of traffic on G Street, gives a crash rate of 2.02 crashes per million vehicle miles. In comparison, the statewide average for an urban three lane road is 2.63 crashes per million vehicle miles. Therefore, as a whole, the crash experience of G Street is less severe than similar roads across the state.

Location on G Street	Total Crashes
260 feet northeast of US 362	1
Horizontal Curve NE of US 362	1
Intersection of City St.	3
Intersection of Jena Beth Dr.	3
Intersection of Legacy Dr.	4
Intersection of Bonnie Kate Blvd.	3
Intersection of Ward St.	5
Intersection of Rosedale Dr.	1
210 feet north of Rosedale Dr.	1
210 feet east of Sylvan Hill Rd.	1
Intersection of Division St.	3
Intersection of Williams Ave.	1
Intersection of Carter Blvd.	3
Intersection of Bemberg Rd.	5
Intersection of Ferguson Ave.	3
Intersection of Roan St.	5
Intersection of Watauga Ave.	10
Intersection of Lynn St.	5
Intersection of Holston Ave.	9
Intersection of Doe St.	3
Intersection of Sycamore St./Elk Ave.	7
Intersection of E. E St.	3
Entire segment (3.4 miles)	80

Source: TDOT





Legend

US 321 Crashes (2006-2008)

- Injury
- Property Damage Only

Three Year crash locations along US 321 (SR 67/91)

3.3 SPECIAL LOCATIONS

Although limited in scale, traffic operations at specific locations can play a major part in the overall quality of mobility for system users. Several specific locations have been included for study due to acute traffic needs.

3.3.1 Westside Elementary

Located on Burgie Street west of downtown, Westside Elementary is a traditional neighborhood school on four acres and surrounded on all sides by residential land uses. A traffic plan exists for Westside Elementary that basically provides a structured use of the two main entrances/exits of the school. However, due to a lack of driveways and parking areas on school property, the perimeter streets around the school are used for drop-off, pick-up, and queuing and the large number of private vehicles transporting children creates congestion on these local streets. To facilitate arrival and dismissal traffic, the following recommendations are made:

- **Partner with neighbors.** One block away is a parking lot for West Side Christian Church, which is unused during typical school hours. Despite the school's advisement not to park at the church and walk, off-site parking and walking with children has many benefits. A school partnership with the church for parking in exchange for improved pedestrian facilities, use of school facilities, etc, is a classic example of shared parking strategies used in many cities.



- **Open earlier.** Much of the observed morning queue was parents in their cars with students, waiting for school to open. Opening at 7:15 instead of 7:30 might decrease dwell time for traffic.
- **Encourage alternative modes.** Educating parents on available transportation options like busing and walking can decrease use of private vehicles.
- **Construct additional parking.** Additional parking could be provided along the eastern end of the school property (approximately 30 spaces) for short-term arrival and dismissal use. However, this construction would have the most impact on the already limited school site.



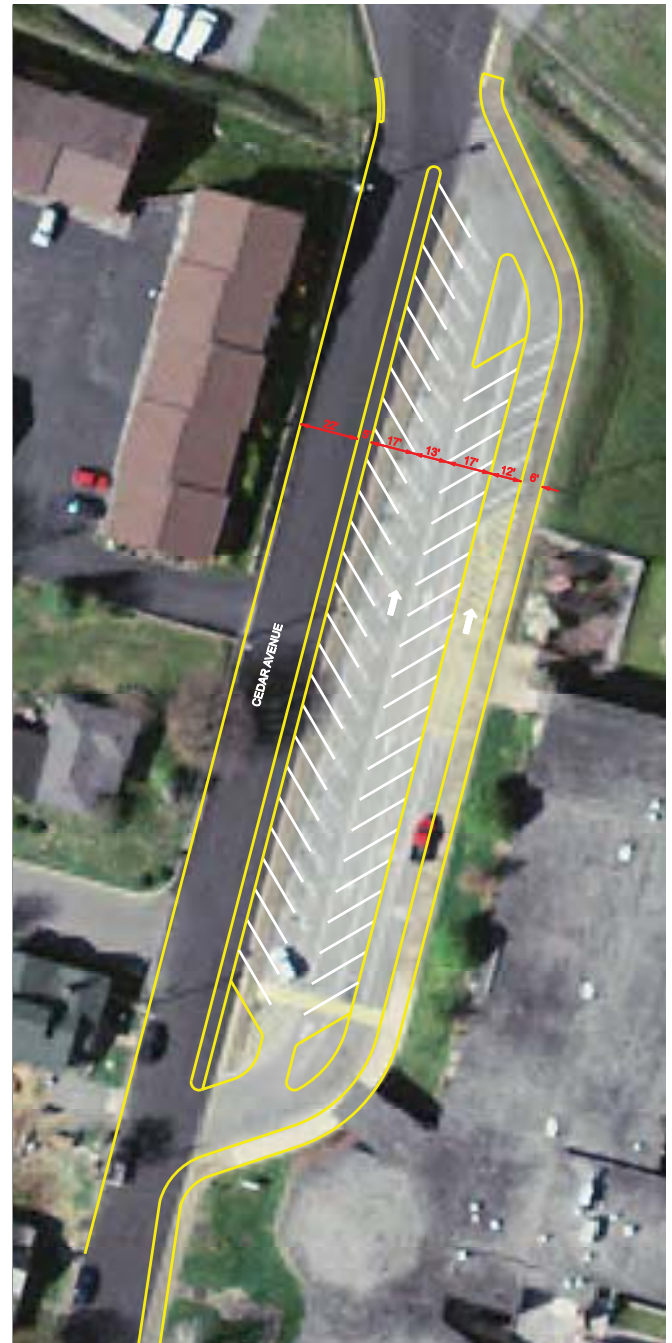
Queues at Westside Elementary school are relatively brief. Morning congestion occurs due to driving parents waiting with children for the school to open. Limited-hours traffic control and designated arrival/dismissal locations have been used to manage high numbers of private vehicles in a traditional neighborhood school setting.



Additional parking as shown could be constructed on the east end of Westside Elementary. However, this would only result in approximately 30 spaces which would only be used during the short arrival and dismissal periods. A preferable alternative is a shared parking agreement with the church located one block south. Federal 'Safe Routes to School' funding could be sought for sidewalk enhancements and programs that might be needed to facilitate the children's walk to school from the existing parking lot.

3.3.2 Harold McCormick Elementary

Harold McCormick is on Cedar Avenue just south of downtown and has more opportunity for off-street arrival and dismissal operation due to larger parking areas and driveways. Drop-off and pick-up takes place on a combination parking lot/driveway located just east of and parallel to Cedar Avenue. However, the configuration of this lot results in drop-off and pick-up occurring along a short segment of sidewalk directly in front of the school door, resulting in queues that extend off of school property and onto Cedar Avenue. A re-configuration of Cedar Avenue and the school lot would facilitate better traffic operation while maintaining needed parking.



Modified use of the existing driveway/parking lot could manage arrival and dismissal queues at McCormick Elementary. Pull-through parking on the east side of the driveway would spread loading out along the length of the driveway.

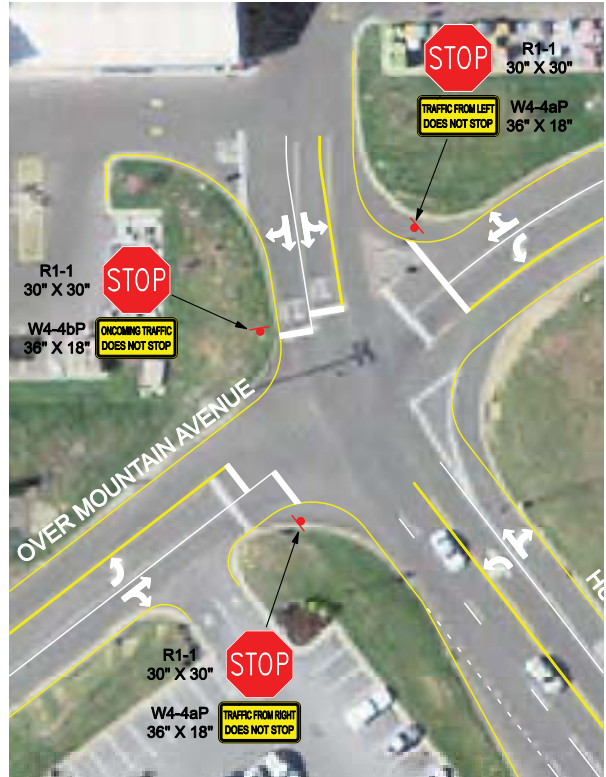
3.3.3 Hudson Drive and Over Mountain Drive

This intersection is the main entrance for Wal-Mart and several restaurant properties fronting Elk Avenue. Proper operation allows northbound traffic (coming from Elk Avenue) to proceed without stopping through the intersection. The other three intersection approaches have a stop condition. Uncertainty by drivers as to the correct traffic priority leads to inefficiency and unnecessary delay at this intersection. Several improvement options exist, ranging from signing and marking changes to complete reconstruction.

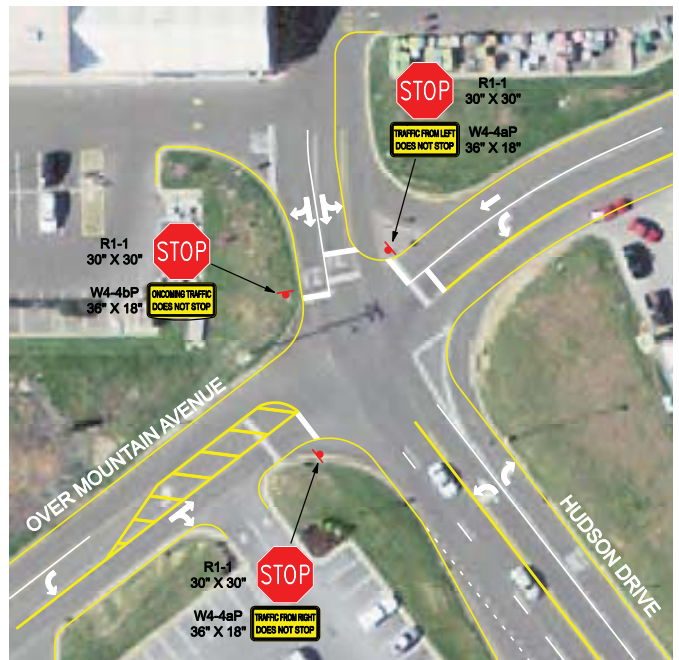
Reconstruction as a roundabout removes movement priority confusion by making all legs yield-controlled.



Restriping and signing to clarify movement priorities is the simplest solution.



Only allowing southbound (exiting) traffic forces entering traffic to turn left or right.



3.4 NON-MOTORIZED TRAVEL

Communities across the state of Tennessee and across the nation are planning and implementing more facilities for non-motorized users than ever before. Both on- and off-street, bicycle and pedestrian accommodations are becoming more common, and in many cases are requirements of using federal transportation funds.

3.4.1 Bicycle and Pedestrian Facilities

Figure 11 illustrates the current and proposed non-motorized accommodations within the study area. There are currently 37.5 miles of sidewalk, no on-street bicycle facilities, and approximately 2.5 miles of separate shared use path. The Sycamore Trail and Linear Path combine to make approximately 3.25 miles of walking/bicycle path. Through the public input process in Elizabethton, facilities for non-motorized travel were generally considered more to be recreational amenities than needed transportation infrastructure. However, input and data also indicated a sizable population of elderly persons and households having limited access to a personal vehicle. The relatively compact land area of Elizabethton (limited by natural features) and the combined demographics point to a relatively strong need for non-motorized mobility options. Construction of the Rail to Trail corridor between Johnson City and Elizabethton is a golden opportunity for enhanced recreation and mobility along the congested Elk Avenue corridor and beyond.

3.4.2 Transit

As with bicycle and pedestrian accommodations, service by public transit is limited within the study area. A service of the First Tennessee Human Resources Agency, NetTrans provides paratransit service as well as regular fixed route service on the Carter County Connection (The C). The C route makes six stops in Elizabethton from 7:00 AM to 6:00 PM on 2-3 hour headways and terminates at the Johnson City Transit terminal.

For many of the same reasons as the need for improved non-motorized facilities, more comprehensive transit service is desirable, though existing population and employment densities make providing efficient service a challenge.

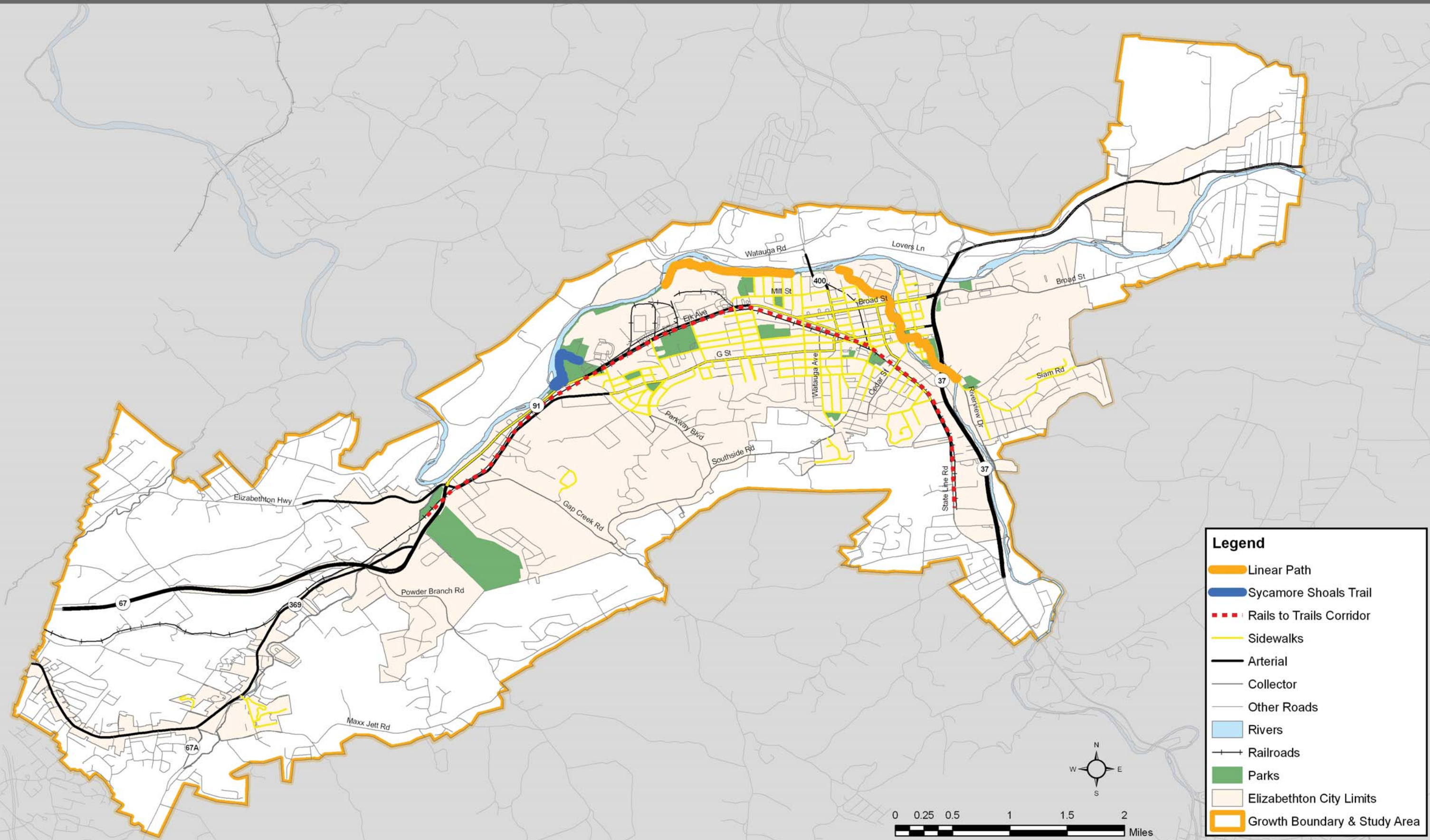


The location of major traffic flows in downtown make connections to the Linear Path from neighborhoods south of G St possible via Cedar, Hattie, and/or Johnson.



Primary objectives for non-motorized travel should include: (1) taking advantage of large parcels and undeveloped or redeveloping lands along the river to extend the Linear Path (orange), (2) finding a connection between the Rails to Trails corridor and Sycamore Shoals (blue), and (3) planning for connections between the Rails to Trails corridor and the extended Linear Path (red).

NON-MOTORIZED FACILITIES



4. RECOMMENDATIONS

Analysis of the existing and projected land use and transportation conditions and needs within the Elizabethton study area have resulted in the formulation of 19 specific and area-wide project recommendations which are located on Figure 12. Some of the recommendations already exist on local and regional transportation plans, others are being introduced by this study.

The project recommendations presented here are based on conceptual, planning-level analysis and have not been investigated through detailed engineering to determine cultural, environmental, right-of-way, or other construction-related impacts. Some of these recommendations will require additional specific study to further define their feasibility and/or effectiveness. Cost estimates do not include costs for right-of-way acquisition, damages, easements, or utility relocations.

4.1 SHORT-TERM RECOMMENDATIONS

S-1 Signalize the Intersection of SR 91 and Ben Allen Road

As listed in the regional LRTP, signalization of this intersection should be completed as traffic volumes warrant. This project is included in the current JCMTPO TIP.

S-2 Construction of a Two-Way Left Turn Lane on Elk Avenue

Between Holly Lane and Broad Street, a center turn lane will allow safer turning movements and additional through capacity for US 321 traffic. The curb-to-curb width of this segment is 54 feet*, meaning the turn lane can be added just by restriping the roadway and removing the limited on-street parking/shoulders (11' outside through lanes, 10' inside through lanes, and 12' center turn lane). Local data indicate that 80 feet of right-of-way exists at this segment. (*A short segment at Holly Ln measured 50' and would require some minor widening.)

S-3 Extension of Over Mountain Drive

Connection of this frontage road between Williams Avenue and Hudson Drive

will allow east-west movement and short trips between adjacent lands without affecting Elk Avenue. This connection will help facilitate a future frontage road network extending from Williams Avenue to Mill Street.

S-4 Reconfigure Lanes at the Intersection of Elk Avenue and Hudson Drive

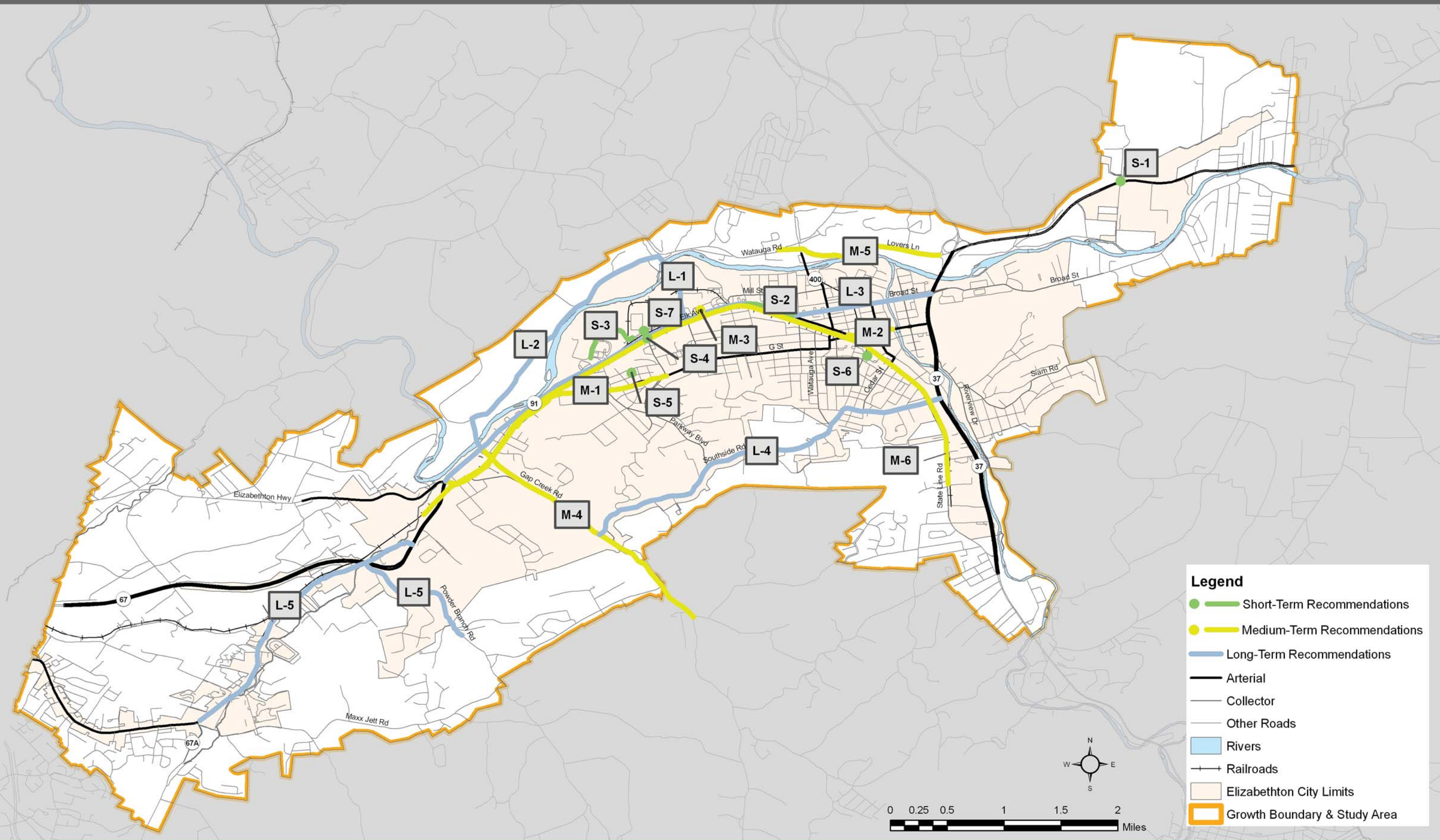
Restriping the northbound approach of this intersection to include a dedicated left turn lane (and a shared through/right turn lane) will allow concurrent northbound and southbound left turns. This will prevent the need for the existing inefficient split-phase signal operation.

SHORT-TERM RECOMMENDATIONS

Project ID	Roadway	Limits	Improvement	Cost (\$1,000s)	Time-frame
S-1	SR 91	Intersection with Ben Allen Rd	Signalize intersection	\$300*	Short-Term
S-2	Elk Avenue	Holly Ln to Broad St	Construction of two-way left turn lane	\$23	Short-Term
S-3	Over Mountain Drive	Current end to Williams Ave	Extend frontage road around hospital	\$563	Short-Term
S-4	Hudson Drive	Intersection with Elk Ave	Restripe approach to allow concurrent left turns	\$125	Short-Term
S-5	Westside Elementary		Circulation enhancement	\$51	Short-Term
S-6	McCormick Elementary		Circulation enhancement	\$145	Short-Term
S-7	Hudson Drive	Intersection with Over Mountain Dr	Reconfigure intersection	\$5-\$60	Short-Term

*Cost as provided in previous planning documents.

RECOMMENDED IMPROVEMENTS

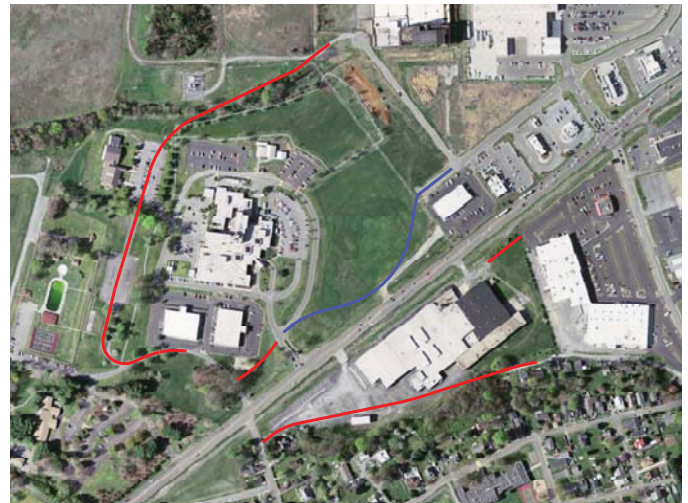




Project S-2. The existing four lane segment of Elk Avenue west of Broad Street is characterized by stand alone businesses on individual parcels. On-street parking exists on both sides of the road here, though most businesses have off-street parking on their property. The road is 54 feet wide from curb to curb. Removal of the on-street parking would provide enough width for a center two-way left turn lane. The turn lane allows left turns to be made without blocking one of the through lanes. It also allows left turns to be made out of businesses more easily. The inside through lanes would be narrowed to 10' (common in established urban areas), the outside through lanes should be 11', and the center turn lane 12' wide.



Project S-5. Mitigation of congestion at Westside Elementary means providing more off-street parking. Off-street parking can be provided on-site, but this would require forgoing other needs of the school site (in this case, a playground). A better solution is to provide off-site parking through a shared parking agreement with a nearby church (one block away). Safe Routes to School Grants could be sought for needed pedestrian infrastructure to facilitate this short walk to school.



Project S-3. Extending Over Mountain Drive to the west is important as an access management strategy and as a matter of convenience for hospital workers and visitors. A similar opportunity for cross-access exists south of Elk Avenue as part of ongoing redevelopment. All opportunities for cross- and shared-access arrangements should be explored, particularly in the US 321 (SR 67/91) corridor.

S-5 Improve Circulation at Westside Elementary

The preferred option is a no-build alternative which allows for the shared use of church parking during arrival and dismissal hours. Safe Routes to School funding could be a way to implement sidewalk and programming enhancements that might be needed for this walk-friendly option. An alternative is the construction of approximately 30 additional parking spaces on the east end of the property which would provide some short-term parking.

S-6 Improve Circulation at McCormick Elementary

Minor reconstruction and restriping of Cedar Avenue and the adjacent school pick-up/drop-off area would allow for additional parking as well as a more efficient driveway for arrival and dismissal operations.

S-7 Reconfiguration of the Intersection of Hudson Drive and Over Mountain Drive

Several options exist for this intersection from simple restriping to reconstruction as a roundabout. The simplest option includes restriping the intersection and installing signs that clearly communicate the movement priority for north-bound (entering) traffic.



Project S-7. Several options, from simple restriping to complete intersection reconstruction exist to mitigate inefficient operations at the intersection of Hudson Drive and Over Mountain Drive.

4.2 MID-TERM RECOMMENDATIONS

M-1 Widen G Street to Three-Lanes

Adding a center turn lane from Hudson Drive to SR 362 will enhance the safety and capacity of G Street and is in keeping with the road's classification as an arterial street. This project is already listed in the regional LRTP.

M-2 Elk Avenue Downtown Streetscape Enhancements

The three through lanes plus on-street parking result in higher speed traffic and excess capacity down Elizabethton's main street. Returning the street to two-way traffic should be the focus of a future downtown circulation study.

M-3 Access Management Retrofits on Elk Avenue

As Elizabethton's primary mobility and commercial arterial, access is essential but must be efficient. A plan to remove some current access points and re-configure and connect others should be implemented in conjunction with redevelopment along the corridor. A central median in place of the existing two-way left turn lane as a component of access management will allow a more aesthetic entry into the city.

M-4 Reconstruction of SR 362 from SR 361 to US 321

This TDOT project is currently in the right-of-way acquisition phase and has final design nearly complete. The result will be an improved two to three-lane highway into Elizabethton from the south. New growth will be expected and appropriate access management techniques should be used.

M-5 Extension of SR 91

As growth east of Elizabethton continues, the improvement of Lovers Lane to accommodate the extension of the SR 91 designation will grow in importance. The state route designation should generally follow the existing Lovers Lane alignment, but will require re-alignment on its western end to intersect SR 400.

M-6 Complete Rail-to-Trail and Linear Path

A golden opportunity to expand non-motorized travel options in the region, the Rail-to-Trail will extend the length of the City on unused rail line. Connections between this and the existing Linear Path should be explored. The extension of the Linear Path along the Watauga River should also be planned.

MED-TERM RECOMMENDATIONS

Project ID	Roadway	Limits	Improvement	Cost (\$1,000s)	Time-frame
M-1	G Street	SR 362 to Hudson Rd	Widen to three lanes	\$5,700*	Mid-Term
M-2	Elk Avenue	Elm St to Riverside Dr	Streetscape improvements	Future study	Mid-Term
M-3	Elk Avenue	Williams Dr to McArthur Ave	Access management retrofits	\$844	Mid-Term
M-4	SR 362	Elk Ave to SR 361	Reconstruction of SR 362	\$37,700*	Mid-Term
M-5	SR 91 Ext (Lovers Lane)	SR 91 to SR 400	Improvement of two-lane highway	\$37,400*	Mid-Term
M-6	Rails to Trails and Linear Path Connections		Multi-use path construction	\$2,922	Mid-Term
M-7	Citywide		Wayfinding signage	Future Study	Mid-Term

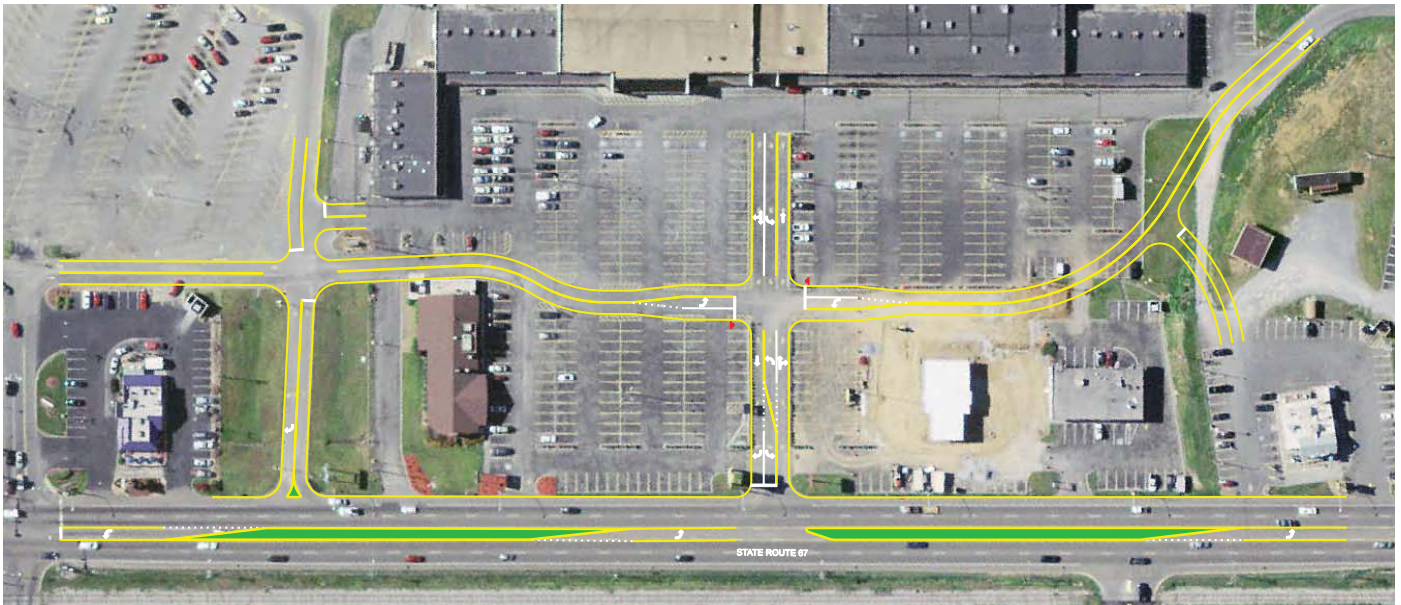
*Cost as provided in previous planning documents.

M-7 Establish Wayfinding Program

The tourism industry of Carter County and the region would benefit from a consolidated effort to direct traffic to key destinations through signage.



Project M-1. As an arterial of the City, G Street should provide an adequate level of service. Road features should enhance G Street's transition from rural to suburban to urban.



Project M-3. Ultimately, the extension of Over Mountain Drive to Mill Street would provide local access between complementary land uses along the Elk Avenue retail corridor. Inherent in this plan is the removal of most individual parcel accesses directly to Elk Avenue. Implementation of this plan will take a coordinated effort between City planning and the development community to work towards improved access. Most likely, these changes will require an adopted corridor plan, implementation as redevelopment occurs, and potential public/private partnerships.



Project M-2. Elizabethton's Downtown Enhancement Plan provides guidance on returning Elk Avenue to two-way traffic. Bike lanes should also be considered downtown. A downtown circulation study would validate the Enhancement Plan findings with technical analysis.



Project M-5. SR 91 east drops its state route designation and narrows to a two lane roadway at SR 37. Its alignment continues as Lovers Lane along the river to SR 400..



Project M-6. Construction of the Rails to Trails corridor on inactive rail between Johnson City and Elizabethton can be a banner project for regional non-motorized transportation in Tennessee. Implications of quality non-motorized accommodations can be as far-reaching as attraction of new industry due to enhanced quality of life.



Project M-7. An overall wayfinding schedule of signs should supplement typical route signing to enhance tourism in the region. Commercial areas, as well as historic, cultural, and natural resources should be signed.

4.3 LONG-TERM RECOMMENDATIONS

L-1 Sycamore Shoals Road Improvements – Phase 1

Beginning on State Route 400, crossing the Watauga River on a new bridge, and intersecting Elk Avenue at Bemberg Road, this improvement would provide a new westerly roadway and an alternative access to commercial areas along Elk Avenue. This improvement would be most effective concurrently with or after the extension of SR 91 (project M-5).

L-2 SR 362 Extension and Sycamore Shoals Road Improvements – Phase 2

Extending SR 362 from its proposed end at US 321 to cross the Watauga River and intersect Sycamore Shoals Road would provide a more complete east-west mobility alternative. Sycamore Shoals Road should be improved from this proposed SR 362 bridge to the proposed Bemberg Road bridge (part of project L-2).

L-3 East-West Capacity of US 321 Corridor

A potential alternative to projects L-1 and L-2 is to add capacity to US 321. The traffic projections approach 45,000 vehicles per day over the next 25 years, presenting a need for an additional through lane in each direction.



Congestion on Broad Street, on the US 321 corridor. At least one objective of projects M-5, L-1, L-2, L-3, and L-4 is to alleviate growing congestion here.

LONG-TERM RECOMMENDATIONS

Project ID	Roadway	Limits	Improvement	Cost (\$1,000s)	Time-frame
L-1	Sycamore Shoals Road	SR 400 to Bemberg Rd	Improvement of two-lane highway, new bridge construction, and new three-lane road construction	\$15,600	Long-Term
L-2	SR 362	Elk Ave to Sycamore Shoals Rd	Extension of SR 362 including new bridge	Future Study of Alternatives	Long-Term
L-3	US 321	US 19E to Williams Dr	Capacity Improvement	Future Study of Alternatives	Long-Term
L-4	Southside Road	US 19E to SR 362	Improvement of two-lane highway	\$6,440	Long-Term
L-5	Milligan Highway and Powder Branch Road	All	Safety enhancements (shoulders, signing, etc)	\$1,100 per mile	Long-Term

L-4 Improve Southside Road

An east-west alternative to US 321 to the south is Southside Road. With the coming improvements to SR 362, having a connection between US 19E and SR 362 south of Elizabethton would be beneficial. The connection exists now in Southside Road, but will need improvements and a short segment of new construction to intersect directly with US 19E on its eastern end.

L-5 Milligan Highway and Powder Branch Road Safety Enhancements

With significant growth expected in the southwestern portion of the study area, these two primary access roads should be upgraded. Standard width lanes, shoulders, and turn lanes at key intersections should be constructed as needed as part of redevelopment within the area.



Project L-4. Southside Road serves a mixture of institutional and (primarily) low density residential land uses. With improvement, it could be another east-west alternative route.



Project L-1. As evidenced by the current TDOT investigation of US 321 (SR 67/91) improvements, the east-west flow through Elizabethton is the City's primary long-range need. Several new construction corridors north of the Watauga River were removed from further consideration by TDOT. This study proposes moderate reconstruction of portions of the existing Sycamore Shoals Road as well as a new road and bridge to extend from Bemberg Road (through the old WalMart site). This would provide improved access into the retail area and provide improved commercial and riverfront redevelopment opportunities. (Blue line shows a second alternative, though this route transverses areas identified by TDOT as having environmental areas of concern.)

4.4 MEETING LOCAL GUIDING PRINCIPLES

The community-based guiding principles developed at the outset of this study have helped to shape the study process as well as its recommendations for future action. The overall study objective was to develop strategies that will assist in the preservation of Elizabethton’s quality of life. These recommendations have been developed to that end, and at the same time provide major growth opportunities for the City and its metropolitan sub-region.

The most major findings of this effort and its resulting recommendations can be summarized in a few broad areas of emphasis and some specific courses of action for each. These items will give City and regional leaders a short-term concrete path of action to move forward with the implementation process.

Broad Emphasis Areas	Specific Actions
Initiate Long-Range Planning for US 321 (SR 67/91) Corridor Needs	<ul style="list-style-type: none"> • Initiate before and after study of travel time and delay as part of signal coordination project currently underway. • Request study of specific turn lane needs as add-on to signal coordination project • Continue discussions with TDOT on added capacity to existing route or north-of-river improvements listed in this study • Undertake specific access management plan that will structure access requirements for redeveloping properties • Plan to refine regional TAZ structure to better capture origins and destinations of this corridor
Leverage Density, Age, and Income Statistics for Non-Motorized Travel Improvements	<ul style="list-style-type: none"> • Plan to purchase rail ROW from Johnson City to initiate Rails to Trails corridor • Complete sub-regional bicycle and pedestrian plan to prioritize needs and expenditures • Seek funding for Rails to Trails corridor construction (enhancement grants, NHS, etc) • Amend current sidewalk study to determine ADA needs and compliance schedule
Set Standards for Developer-Required Improvements	<ul style="list-style-type: none"> • Establish “road fund” or some other way to collect developer impact fees to add shoulders, sidewalks, etc. • Establish standard traffic impact study requirements and procedures by which impacts must be mitigated through infrastructure improvements
Miscellaneous	<ul style="list-style-type: none"> • Seek TDOT permission to restripe Elk Avenue to add two-way left turn lane • Initiate school-area recommendations through school board (apply for Safe Routes to School funding for Westside Elementary) • Initiate Hudson and Over Mountain improvements with business owner coordination • Develop crash statistics for high-crash location for federal/TDOT safety funding • Perform detailed downtown traffic circulation study • Update master plan for US 321 (SR 67/91) retail corridor development

City and regional leaders can begin to move towards implementation in short order. In some cases, time is of the essence in taking advantage of current opportunities.

Project ID	Location	Project	Foster a balanced growth approach in the context of geography, scale, and supporting infrastructure.	Coordinate and promote an increased awareness of Elizabethton's development objectives.	Provide adequate and safe transportation options for all users that enhance community ideals.	Supply transportation facilities supportive of regional economic growth including industry, small business, and tourism.	Leverage technology to manage transportation needs in an efficient and cost-effective manner.
S-1	SR 91 and Ben Allen Rd	Signalize intersection	●	◐	◐	◐	◐
S-2	Elk Avenue	Construction of two-way left turn lane	◐	●	◐	●	○
S-3	Over Mountain Dr	Extend frontage road around hospital	●	●	○	◐	○
S-4	Hudson Dr	Restripe intersection to allow concurrent left turns	◐	◐	◐	◐	◐
S-5	Westside Elementary	Circulation enhancement	○	○	◐	○	○
S-6	McCormick Elementary	Circulation enhancement	○	○	◐	○	○
S-7	Hudson Dr	Reconfigure intersection w/ Over Mountain Dr	○	●	○	◐	○
M-1	G Street	Widen to three lanes	◐	○	◐	○	○
M-2	Elk Avenue	Downtown streetscape improvements	○	○	●	●	○
M-3	Elk Avenue	Access management retrofits	●	●	○	◐	○
M-4	SR 362	Reconstruction of SR 362	●	○	◐	●	○
M-5	Lovers Lane	Improvement of two-lane highway	●	○	◐	◐	○
M-6	Rail-to-Trail / Linear Path Construction		◐	●	●	◐	○
M-7	Wayfinding signage		○	◐	○	●	●
L-1	Sycamore Shoals Rd	New bridge and Bemberg Rd connection	●	◐	◐	◐	○
L-2	SR 362	Extension of SR 362 including new bridge	●	◐	◐	◐	○
L-3	US 321	Capacity Improvement	●	◐	◐	◐	●
L-4	Southside Road	Improvement of two-lane highway	◐	○	◐	○	○
L-5	Milligan Hwy / Powder Branch Rd	Safety enhancements (shoulders, signing, etc)	●	●	◐	○	●

Recommended projects demonstrate the general guiding principles to varying degrees: fully (black circle), partially (half black circle), or to lesser degrees (open circle).

5. TITLE VI REVIEW

Specific civil rights considerations in transportation planning revolve around Title VI of the Civil Rights Act and Environmental Justice (E.O.12898 Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations). TDOT's policy is to ensure compliance with 42. U.S.C. 2000 "No person in the United States shall, on the grounds of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under a program or activity receiving federal financial assistance from the Department of Transportation." E.O. 12898 requires each agency (including the US DOT) to "make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations". US DOT issued its Order on Environmental Justice (DOT Order 5610.2) in response to clarify Title VI responsibilities. Adverse impacts related to transportation projects include:

- Air, noise, and water pollution, and soil contamination;
- Destruction or disruption of man-made or natural resources;
- Destruction or diminution or aesthetic values;
- Destruction or disruption of community cohesion or a community's economic vitality;
- Destruction or disruption of the availability of public and private facilities and services;
- Vibration;
- Adverse employment effects;
- Displacement of persons, businesses, farms, or non-profit organizations;
- Increased traffic congestion, isolation, exclusion, or separation of minority or low-income individuals within a given community from the broader community; and
- The denial of, reduction in, or significant delay in the receipt of, benefits of DOT programs, policies, or activities.

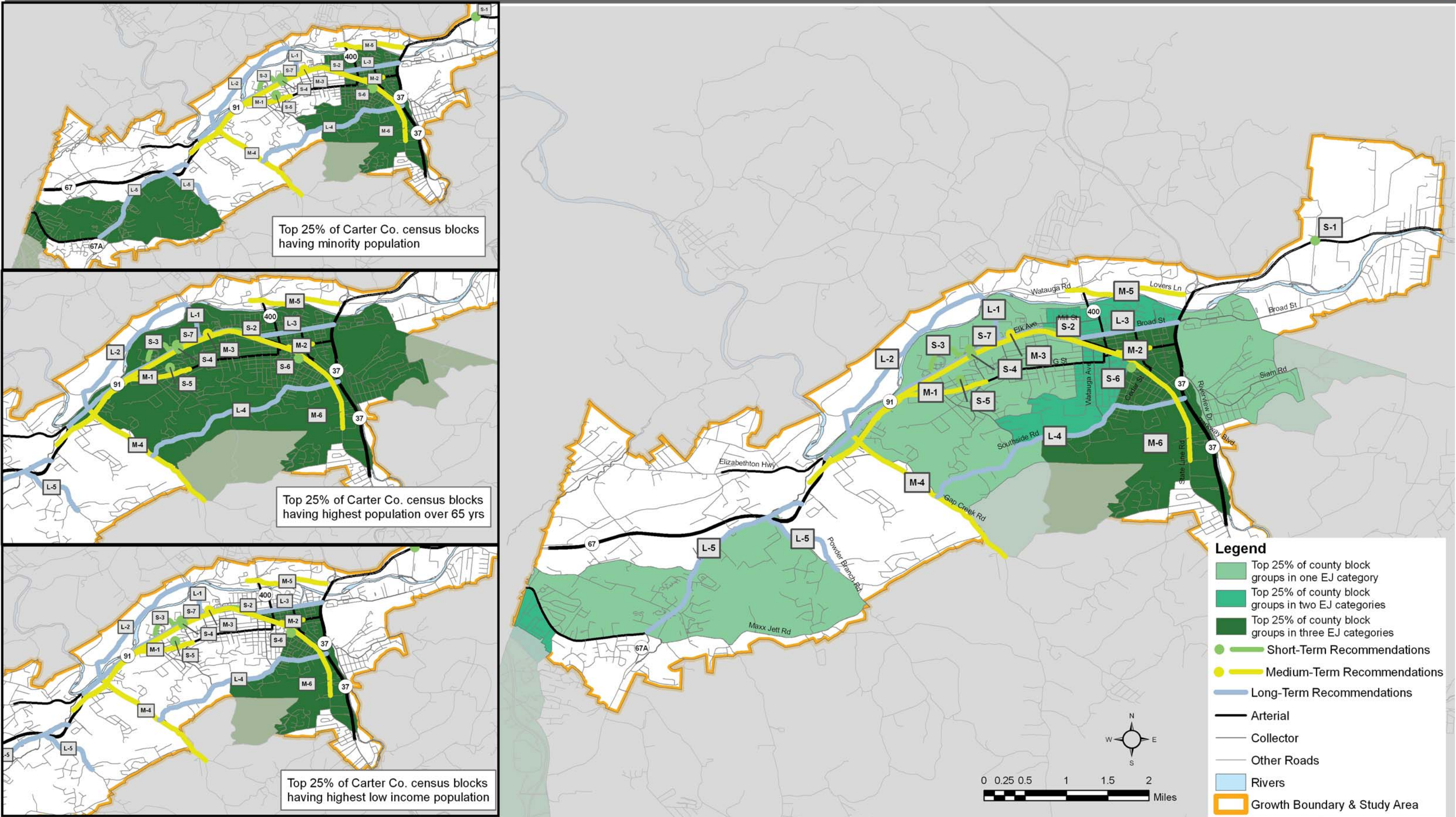
MPOs are required to consider three fundamental environmental justice principles:

1. To avoid, minimize, or mitigate disproportionately high and adverse human health or environmental effects, including social and economic effects, on minority populations and low-income populations.
2. To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process.
3. To prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority populations and low-income persons.

As shown in Figure 13, many of the recommendations in the Elizabethton Land Use and Transportation Study are located within areas identified as requiring additional consideration within the environmental justice framework. A few of the projects (S-6, M-2, M-6, L-3, and L-4) will impact areas having high populations of elderly, minority, and low-income persons. However, impacts may not result in a burden, but rather a benefit within sensitive areas. This is often the case with bicycle & pedestrian projects, signal projects, wayfinding projects, and other projects not introducing right-of-way requirements, noise creation, or other disruption.

Careful consideration of these impacts as well as appropriate outreach to populations within these sensitive areas should be undertaken as these recommended projects progress.

ENVIRONMENTAL JUSTICE AREAS





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