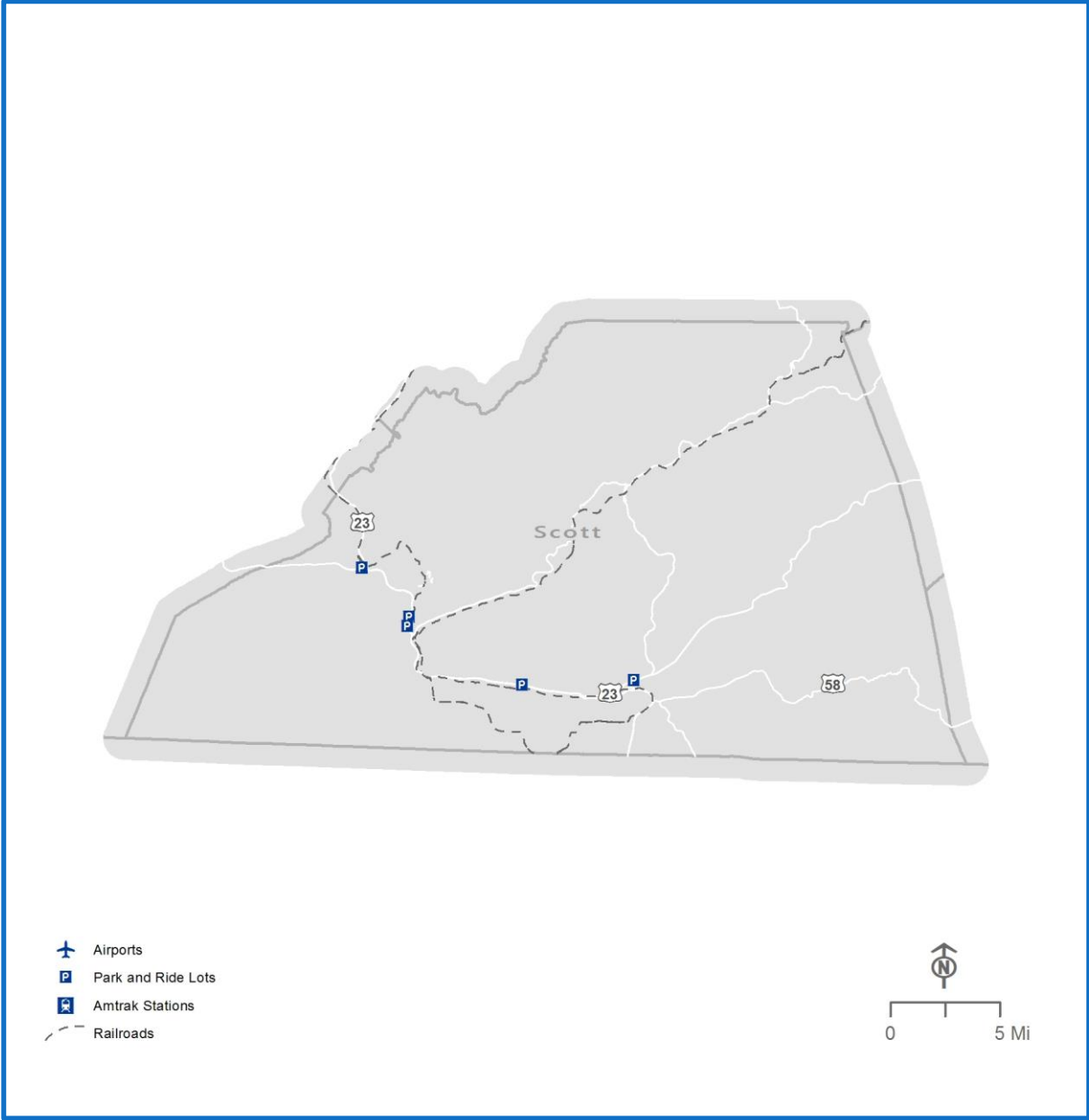


# VMTP 2025 Needs Assessment

## Regional Needs Profile



### Kingsport Region

December 2015

# 1. NEEDS ASSESSMENT PURPOSE

The VMTP 2025 Needs Assessment framework is based on two principal objectives underlying transportation policy to enhance economic competitiveness. Based on the VTrans2040 Vision and policy directives from the Governor’s office, the VMTP 2025 Needs Assessment is based on two principal objectives of transportation policy with the aim of enhancing economic competitiveness. These are 1) to attract and retain the 21<sup>st</sup> century workforce, and 2) to support goods movement for Virginia businesses.

This document is one portion of the overall Needs Assessment for regional Networks that deals with the Needs Assessment for the Kingsport Region. There is a separate document entitled “VMTP 2025 Needs Assessment: Regional Networks Introduction,” that provides an overall introduction into the background and methodology of the Needs Assessments. In this document, details are provided on the 2025 Needs development process, as well as the economic factors shaping regional Transportation Needs. This introductory document provides a foundation for the regional needs described here. The focus of this Transportation Needs Assessment is to identify the Transportation Needs that are part of the Kingsport Regional Network, and that would support regional industries and workforces.

## Defining Transportation Needs

Transportation Needs, as considered in the 2025 Needs Assessment, are defined as the gap between the transportation system in place currently that serves the current industries in a region, and the future transportation system needed to serve the desired future economy in the region. The gap between the transportation needs and economic conditions is the basis for the findings in this report. The following sections outline the Kingsport Region Regional Economic Profile, regional Transportation Profile, and regional Transportation Needs profiles.

## Defining a Regional Network

This portion of the VMTP 2025 Needs Assessment is for a Regional Network. For the purposes of the VMTP Needs Assessment, the final determination of Regional Networks will be developed as part of the outreach process in working with each region. The gap between the transportation needs and economic conditions is the basis for the findings in this report. The following sections outline the Hampton Roads regional Economic Profile, regional Transportation Profile, and regional Transportation Needs profiles.

In the Kingsport Region, the Needs Analysis area is Scott County.

## 2. Economic Profile

### A. Introduction

The trends analysis conducted as part of the VTrans2040 Vision Plan showed strong indications that future economic success for both states and regions will hinge on attracting and retaining increasingly scarce talented workers, particularly from among the well-educated Millennials. In addition, future goods movements will be critical to supporting Virginia's current and emerging businesses. A key part of understanding emerging transportation needs statewide is understanding the current and future economic conditions in different parts of the state. The Needs Assessment therefore focuses on understanding the major economic dynamics of each region and using that understanding to shape transportation needs.

The Study Team used available data from state and national sources, as well as input from the Kingsport Region stakeholders to identify an overall current economic profile for the region. The components of the current economic profiles layers together demographic and economic characteristics of the region. The Regional Profile incorporates the following baseline data for each region:

- Demographic Characteristics
- Top Industries by Employment, Output and Location Quotient
- Workforce Characteristics
- Top Employers
- Activity Centers, characteristics and travel markets (as defined by existing centers of employment as modified by input from stakeholders in each region)

### B. Demographics

At a regional level, research regarding basic demographics was analyzed as a foundation for understanding regional economic dynamics. The economic and demographic data analyzed in this report support insights regarding which workforce and/or key age groups are currently present in the region. This information is important to inform potential types of investments to attract and retain the desired workforce.

#### Statewide Demographics

According to the Woods and & Poole *2014 State Profile*, the current population in the state of Virginia is 8,185,867. By the year 2025, the Commonwealth of Virginia's population is projected to increase by between 1 million and 1.5 million people. Statewide per-capita incomes are expected to rise 21%, from \$44,765 to \$54,226.

*Table 1: Statewide Population Projections.*

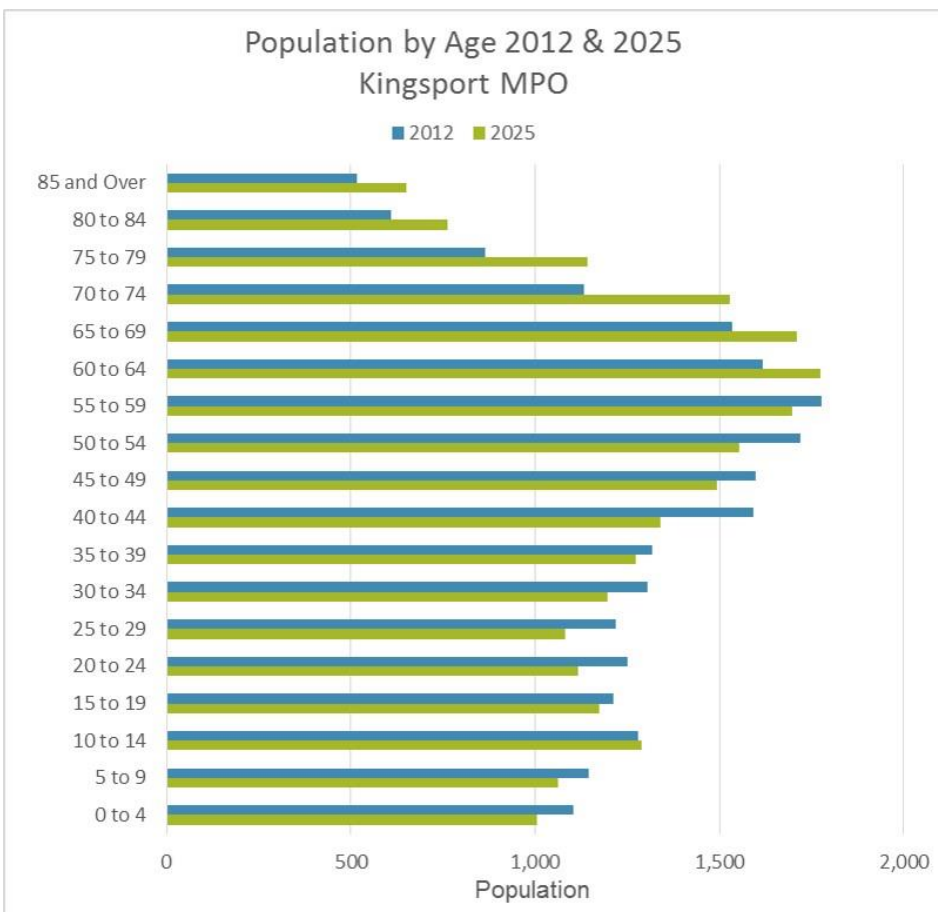
Geography	Current Population (2012)	Weldon Cooper Projection (2025)	Woods & Poole Projection (2025)	% Change (2012 – 2025)
Virginia	8,185,867	9,203,977	9,740,553	12%
Kingsport Region	22,781	22,843	-	< 1%

Sources: Weldon Cooper Center for Public Service, Demographic Research Group, Intercensal Estimates for Virginia, Counties and Cities: 2010-2012, and Woods and Poole Economics, Incorporated, 2014 State Profile District of Columbia, Maryland, and Virginia. Washington DC

## Regional Demographics

As evident in Table 2, population growth is projected for the Kingsport Region. Projections estimate 100 new residents in the region by the year 2025.

According to the Woods and & Poole 2014 State Profile, per-capita income for the region is expected to rise 20% (slightly less than the state average of 21%) from \$29,182 to \$35,014. Population growth is also projected to be accompanied by a demographic shift, with a higher percentage of the population over the age of 60.



*Figure 1: Population of Region 2000 in the years 2012 and Projected for the year 2025.*

Source: Weldon Cooper Center for Public Service, Demographic Research Group, Intercensal Estimates for Virginia, Counties and Cities: 2010-2012

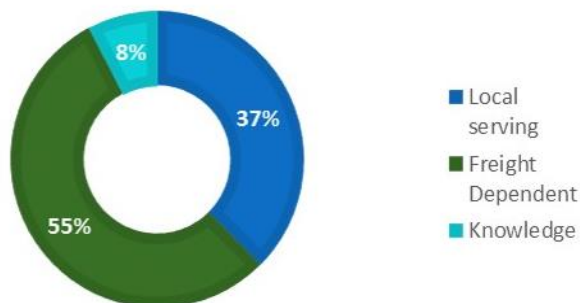
## C. Current Industry Strengths

The following economic measures were used to analyze the strength and characteristics of the current regional economy in the Kingsport Region.

### Economic Sectors

The 20 industry sectors, as defined by The North American Industry Classification System (NAICS), have been grouped into three clusters – or broader economic groupings – based on the characteristics that support each industry’s growth. These economic clusters are defined as local economic sectors, knowledge-based economic sectors, and freight-based economic sectors. Each economic cluster has different characteristics in terms of land use, commuting patterns, and other aspects of regional accessibility that are essential to attracting and retaining these businesses and their workforce. These different characteristics and each region’s mix of economic clusters combine to create unique needs, opportunities and constraints related to transportation and accessibility. For example, a region with greater economic emphasis on manufacturing or warehousing will have a greater focus on freight intermodal needs than a region with stronger knowledge-type service industries such as financial services, where passenger intermodal needs would be a greater concern.

In addition to the unique characteristics of each cluster, there are also underlying principles with respect to land use density that relate to the different economic sectors and also to the suitability of different transportation modes. These relationships work differently in different regions, and will be applied in context for all 15 of the regional networks. When considering the output of all industries present in the Kingsport Region, Figure 3 provides a summary of the predominance of each economic cluster, as analyzed by a methodology developed by the Study Team and used in all regional analyses throughout the state.



*Figure 2. Top Sectors by Output (2012)*  
 Source: IHS Global Insight, 2012.

The freight dependent cluster is clearly the strongest in this region. Freight-dependent services make up 55% of the economic output in the Kingsport Region. This suggests that the Kingsport region is highly dependent on goods movement to support economic activity, which also corresponds with some of the top industries in the region, including manufacturing and agriculture. Conversely, the knowledge and local serving clusters account for 8% and 37% of economic output, respectively. Each economic sector has different transportation characteristics and needs, as will be discussed below. The local services

economic cluster, for example, is typically characterized by different peak commute times; customer traffic; trip-chaining destinations; and truck deliveries.

## Top Industries by Output

Real Estate is the strongest industry by output in the Kingsport Region when measured by economic output and the manufacturing industry is the second largest industry. This may reflect a shift in the traditional manufacturing based economy and highlight the recent increase in land development. Wholesale trade, agriculture, and utilities round out the top five industries in the region with the greatest economic output. (Refer to Table 2).

*Table 2: Current Industries by Output.*

Top Industries	NAICS Code	% of Output
Real Estate	44-45	20%
Manufacturing	31-33	14%
Wholesale Trade	42	13%
Agriculture	11	12%
Utilities	22	8%

*Source: IHS Global Insight, 2012.*

## Top Industries by Employment

In the Kingsport Region, the top industries by employment include agriculture, public administration, health care and social assistance, manufacturing, and retail trade. (Refer to Table 6). Manufacturing and agriculture were also included in the top five industries by output. More localized services such as public administration, health care and social assistance and retail trade are typically employment intensive industries, which may be a reason why these industries are in the top five by employment, but not by output.

*Table 3: Current Top Industries by Employment.*

Top Industries	NAICS Sector Code	% of Workforce
Agriculture	11	22%
Public Administration	92	21%
Health Care and Social Assistance	62	12%
Manufacturing	31-33	12%
Retail Trade	44-45	11%

*Source: IHS Global Insight, 2012.*

Many of the top employers in the region are manufacturing based and freight dependent industries. This corresponds appropriately with the top industries by output, employment and with the regional economic profile of Scott County.

*Table 4: Current Top Employers.*

Employers	Employees
Joy Technologies Inc.	100 - 299
KVAT	100 – 299
Tempur – Pedic	100 – 299
VFP Inc.	100 - 299

*Source: IHS Global Insight, 2012.*

## Top Industries by Location Quotient

Location quotient (LQ) is an economic measure, expressed as a ratio, which compares a region to a larger reference region according to some characteristic or asset. It is often used to quantify how concentrated a particular industry, cluster, occupation, or demographic group is in a region, as compared to the nation, and can reveal what makes a particular region unique in comparison to the national average.

Location quotients for 20 different industry categories were calculated for the Kingsport Region. The industries expressed in Table 7 have the highest LQ scores in the region. The score for mining, for example, can be inferred to mean that these services are more than six times more concentrated in the region than in the entire nation, on average.

*Table 5: Current Top Industries by Location Quotient.*

Top Industries	NAICS Sector Code	Location Quotient
Mining	21	6.08
Agriculture	11	3.80
Public Administration	92	1.34
Other Services	81	1.10
Health Care and Social Assistance	62	1.05

*Source: IHS Global Insight, 2012.*

## D. Activity Center Analysis

An important part of the Needs Assessment at the regional level has been the identification and evaluation of economic activity centers. For the purposes of this analysis, activity centers are defined as areas of regional importance that have a high density of economic and social activity. Activity centers were first defined in draft form using employment location patterns. A GIS-based spatial analysis was conducted to determine which areas have the greatest relative density of jobs. Activity centers were revised, refined, or amended after discussing economic conditions with regional stakeholders. Centers such as this were instead affirmed by stakeholders who had a knowledge of the regional significance of the activity there, and then mapped accordingly. The activity centers are a tool in the development of each regional profile and do not have standing in the statewide planning and programming process such as Urban Development Areas; therefore the activity center definitions have no significance other than as a reference tool within the economic profiles. Figure 2 below shows activity centers as blue circles.

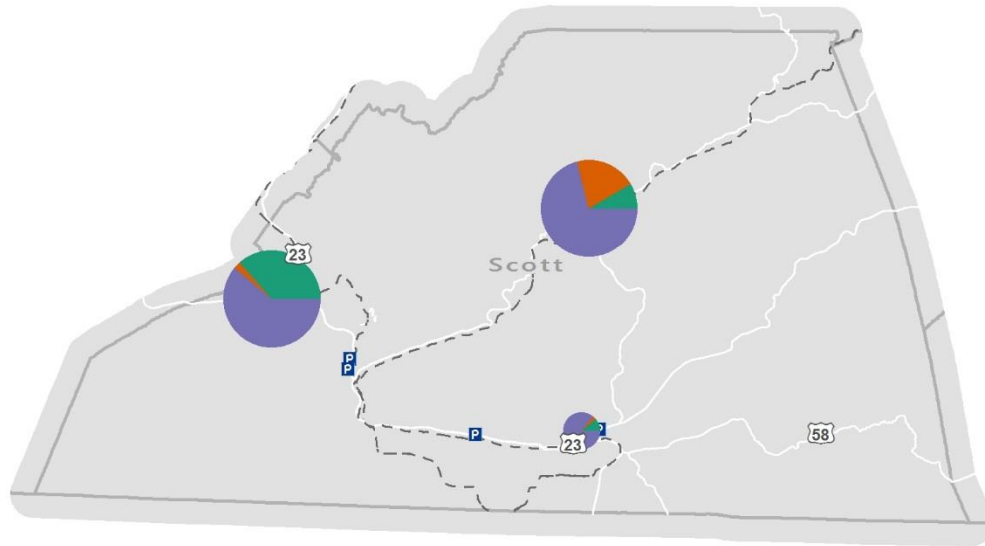
## Kingsport Activity Centers



*Figure 3: Map of Activity Centers based on Job Density and Stakeholder Input*

Once activity centers were identified, the next step was to analyze the type and scale of economic activity that took place in those locations. Based on the categorization of jobs by NAICS code into the three economic clusters of local, freight, and knowledge economies, analysts developed charts that represented the breakdown of employment by industry sector in each activity center, and scaled those charts based on the number of jobs in each center relative to the other centers in the region. Figure 3 below shows the mapping of each activity center broken down by industry sector, and scaled by relative number of jobs.





*Figure 4: Activity Center Employment by Industry Sector.*  
Source: IHS Global Insight, 2012.

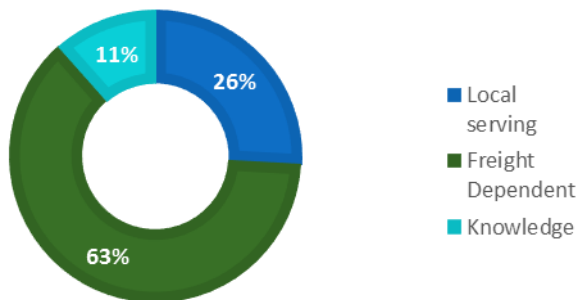
## E. Forecasted 2025 Industry and Employment Strengths

Through a series of work sessions with the Kingsport stakeholders, the Study Team used economic forecasts for 2025 and got input from stakeholders to determine the future desired economic profiles for each region. 2025 economic forecasts for employment by industry from third party data sources were the primary source for the future economic profiles. However, the intent of this process was not to presuppose Kingsport’s economic future, but to allow input from stakeholders to affirm or modify these basic economic forecasts according to regional desires.

The future economic profiles were used as the basis for determining future transportation needs to support the future economic vision in the Kingsport Region. The basic economic datasets that were compiled include:

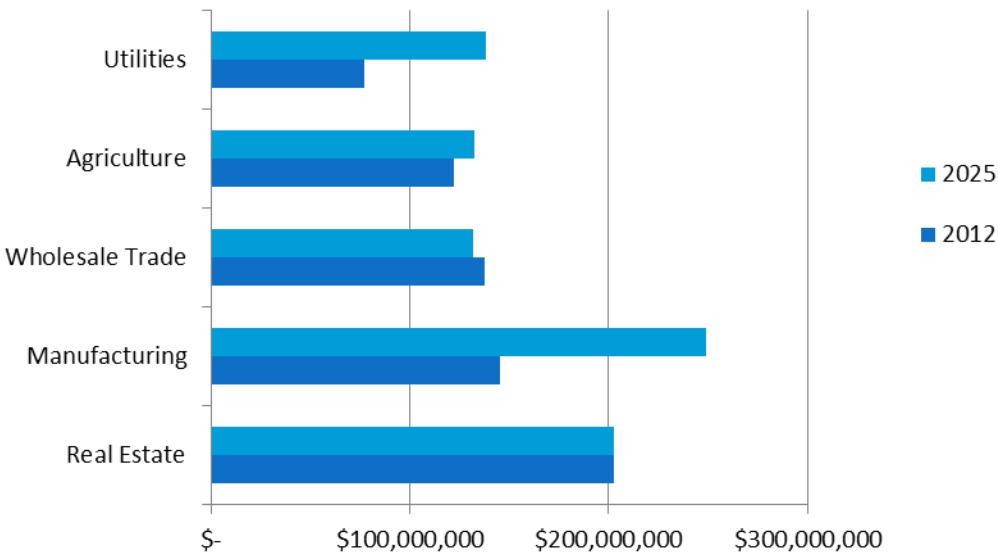
- Current Top Industries by Workforce, Output and Location Quotient
- Future Growth Industries
- Activity Center profiles
- Top Employers and Locations
- Economic Development Priorities

Substantial growth is forecasted for the Kingsport Region by 2025. According to statewide and national datasets used, the public administration and information industries will see the highest percentage growth. Combined, they are expected to produce almost \$120 million more in 2025 than was produced in 2012.



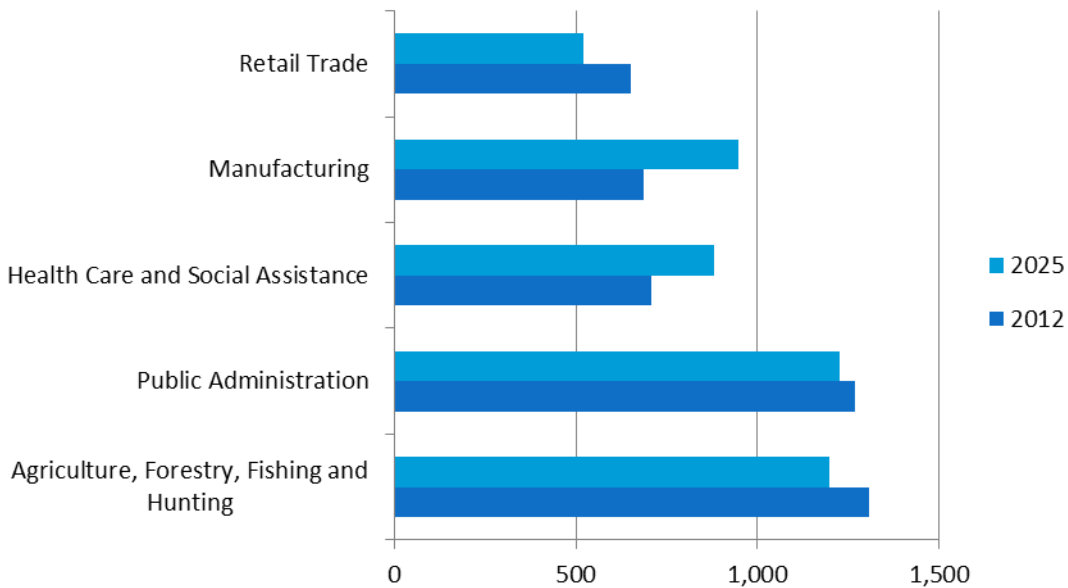
*Figure 5: 2025 Industry Sectors by Output.*  
 Source: IHS Global Insight, 2012.

Freight-dependent sectors will continue to dominate economic sector, making up 63% of the economic output in the Kingsport Region in 2025. The knowledge sector is also anticipated to grow from 8% of output to 11% of output. Local serving sectors is anticipated to reduce its share of the regional economy, from 37% in 2012 to 26% in 2025.



**Figure 6: Top Industries by Output**  
 Source: IHS Global Insight, 2012.

The top industries by output in the Kingsport Region are anticipated to either stagnate or grow between 2012 and 2025. The only exception is wholesale trade, which will decrease slightly in output by 2025. In all industries combined, economic output in the Kingsport Region is expected to increase by nearly \$330 million by 2025. (Refer to Figure 5).



**Figure 7: Top Industries by Employment.**  
 Source: IHS Global Insight, 2012.

The future state of employment in the current industries with the highest employment in the region varies. Industries such as health care and social assistance and manufacturing will continue to grow. However, retail trade, public administration, and agriculture is expected to decline slightly from the

present number of workers. The industries with the greatest percentage of employment growth are real estate, construction, information, wholesale trade, and professional services.

*Table 6: Top Industries by Employment.*

Top Industries	NAICS Sector Code	% Change in Employment (2012-2025)
Real Estate	53	171%
Construction	23	129%
Information	51	52%
Wholesale Trade	42	42%
Professional Services	54	39%

Source: IHS Global Insight, 2012.

## 3. TRANSPORTATION PROFILE

### A. Introduction

The following section describes the transportation and accessibility measures that were developed to capture the workforce needs and the freight needs at a regional scale. This set of measures reflects regional transportation characteristics in the Kingsport Region such as typical commute times and overall travel reliability. The following categories of performance metrics that were used to create a regional transportation profile for the Kingsport Region:

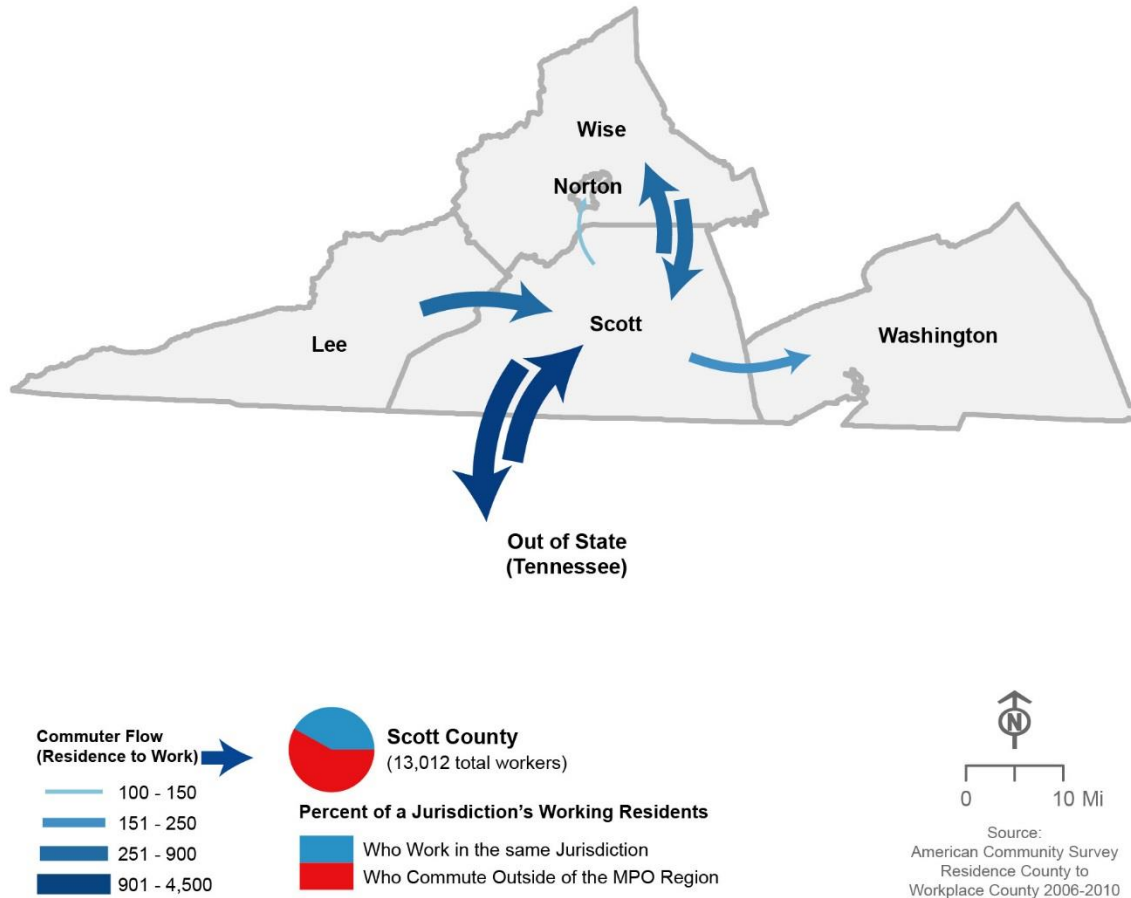
- Commuting Patterns
- Accessibility to Employment
- Roadway Measures
- Freight Measures

### B. Commuting Patterns

#### Regional Commuting Patterns

Commuting patterns in the Kingsport Region show that there is a large amount of commutes from Virginia to Tennessee and vice versa. As represented in Figure 7, about two thirds of workers in the Kingsport Region travel across the state line. This is, in part, due to the fact that the City of Kingsport is located in Tennessee, which attracts workers from the surrounding area and generates significant economic activity.

## Commuter Origin/Destination Flow



*Figure 8: Regional Commuting Patterns.*  
Source: Census Commuting Data, 2006-2010

## Activity Center Commuting Patterns

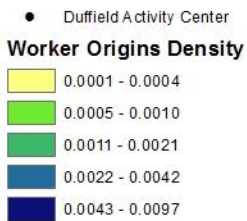
Equally important to the formation of a regional transportation profile for the Kingsport Region was the analysis of commuting patterns between activity centers. Figures 8 through 10 below provide insights into the commuting patterns for three of the activity centers in the Kingsport Region. Block groups are symbolized on a color scale from dark blue to yellow, with the darker shades representing the block groups with the largest number of commuters to the activity center analyzed within that map.

The data source used to analyze the origin of workers in activity centers was the LEHD Origin-Destination Employment Statistics (LODES) data from the United States Census Bureau. The data file provided the Census Block of the home and work locations for all persons working in the state of Virginia in 2011 based on Unemployment Insurance earnings data and Quarterly Census of Employment and

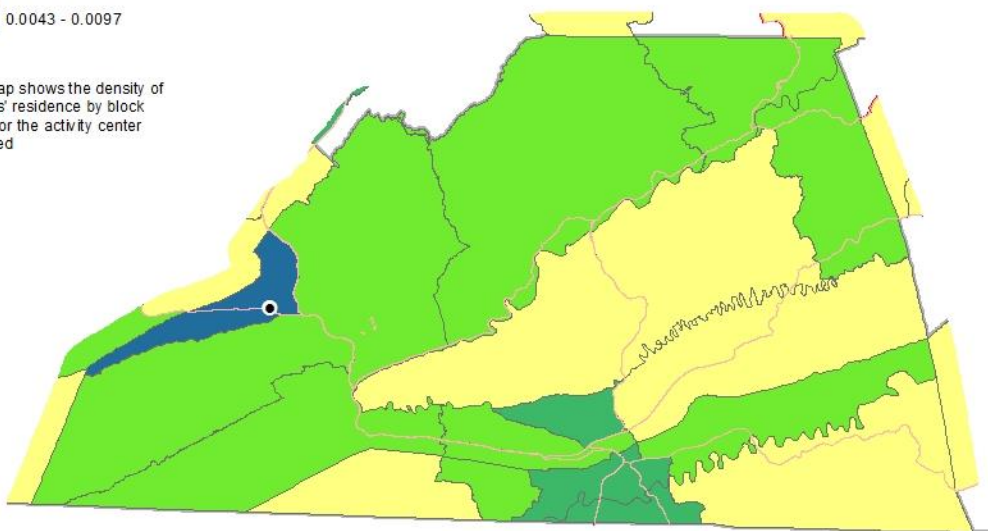
Wages (QCEW) data. The LODES data is not perfectly accurate as job and home locations can be misreported through the original data sources. In addition, the Census Bureau uses noise infusion and synthetic data methods to ensure confidentiality in the publically released data. For these reasons, the data have been aggregated and reported at the Census Block Group level in the following analysis.

As shown on the map, Duffield sees a significant number of commuters from the surrounding area, especially the block groups in the western parts of the region. (Refer to Figure 8).

### Duffield Worker Origins



This map shows the density of workers' residence by block group for the activity center identified



*Figure 9: Commuting Patterns to Duffield Activity Center.*

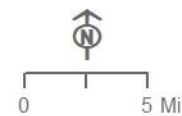
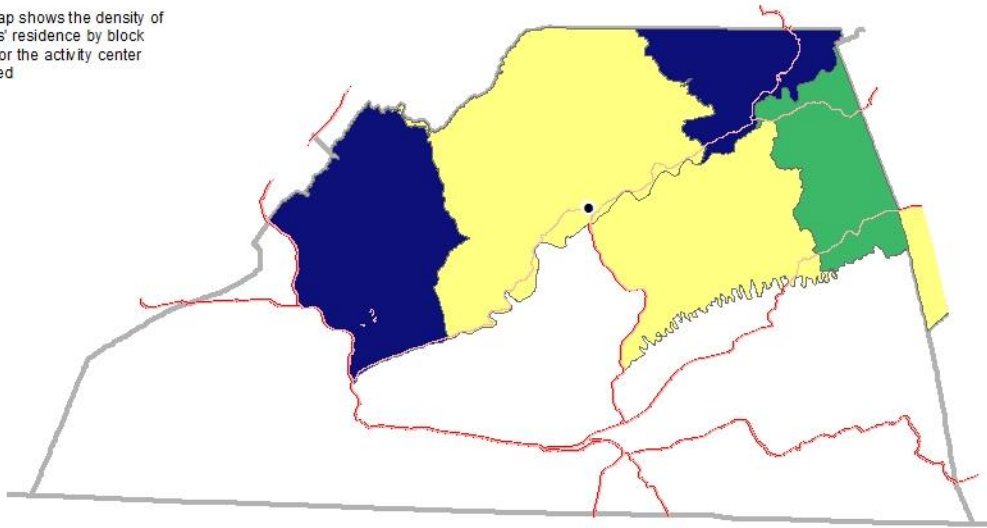
Source: US Census, LEHD Origin-Destination Employment Statistics (LODES), 2011

Commutes to the Fort Blackmore activity center are limited to block groups in the northern part of the Kingsport Region. (Refer to Figure 9). Commutes are not originating from the southern parts of the region bordering Tennessee.

## Fort Blackmore Worker Origins

- Fort Blackmore Activity Center
- Worker Origins Density**
- 0.00003 - 0.00004
  - 0.00005 - 0.00006
  - 0.00007 - 0.00018

This map shows the density of workers' residence by block group for the activity center identified



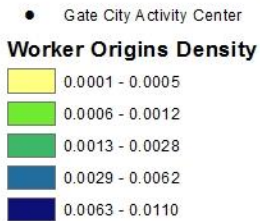
*Figure 10: Commuting Patterns to Fort Blackmore Activity Center.*

Source: US Census, LEHD Origin-Destination Employment Statistics (LODES), 2011

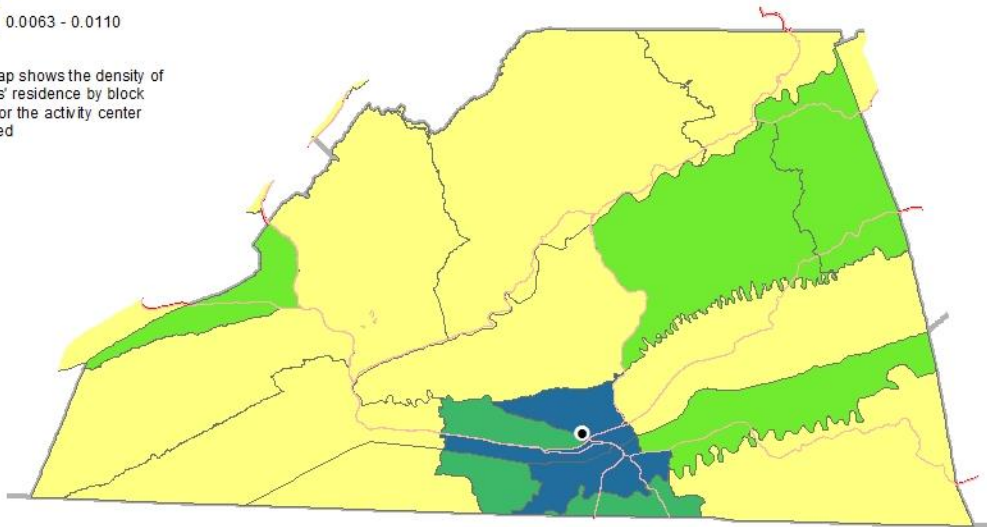
The Gate City activity center is a significant destination for workers in the Kingsport region. Commutes originate from all block groups in the Kingsport Region, but most of the trips originate from block groups in and around Gate City. (Refer to Figure 10).



## Gate City Worker Origins



This map shows the density of workers' residence by block group for the activity center identified



*Figure 11: Commuting Patterns to Gate City Activity Center.*

Source: US Census, LEHD Origin-Destination Employment Statistics (LODES), 2011

## Mode Choice

In the Kingsport Region, the majority of commuters drive alone to work, accounting for 84% of commutes. Carpooling is the second most prevalent option, accounting for 11% of commutes. Public transit use for commute trips is nonexistent, as there is not a fixed transit service in the area. Transit use is limited to demand response, typically for medical and recreational trips. (Refer to Figure 11).

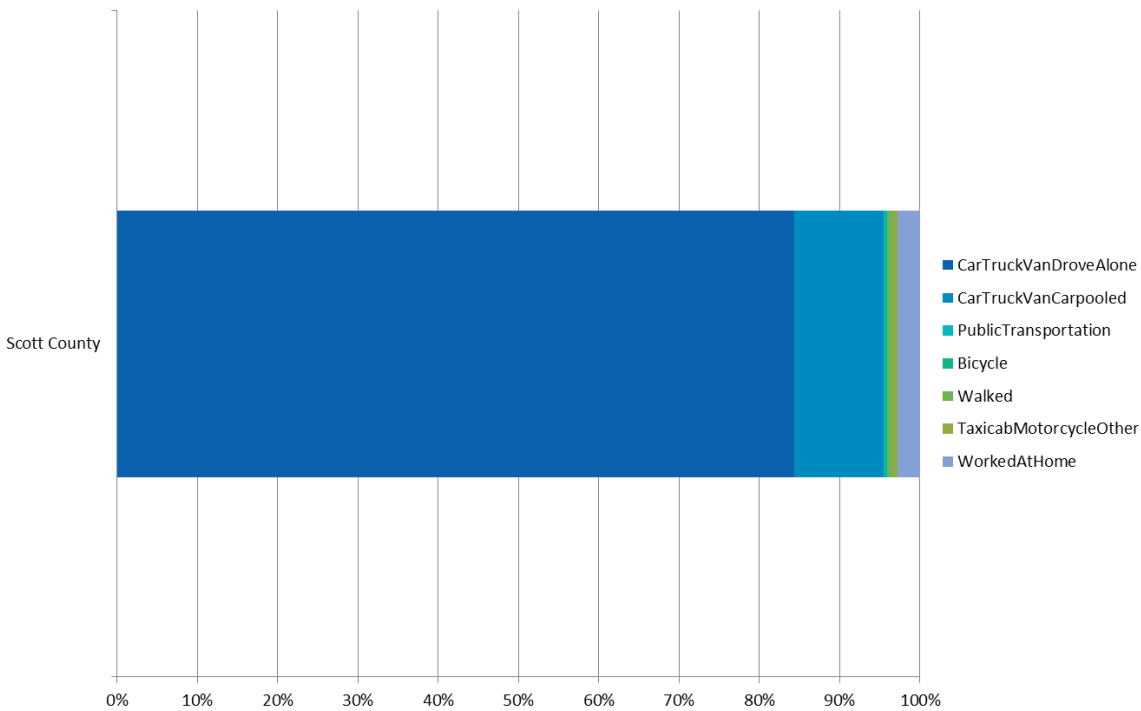


Figure 12: Mode Share Split by Jurisdiction.

Source: ACS 2013 5-Year Estimates

## Average Commute Times

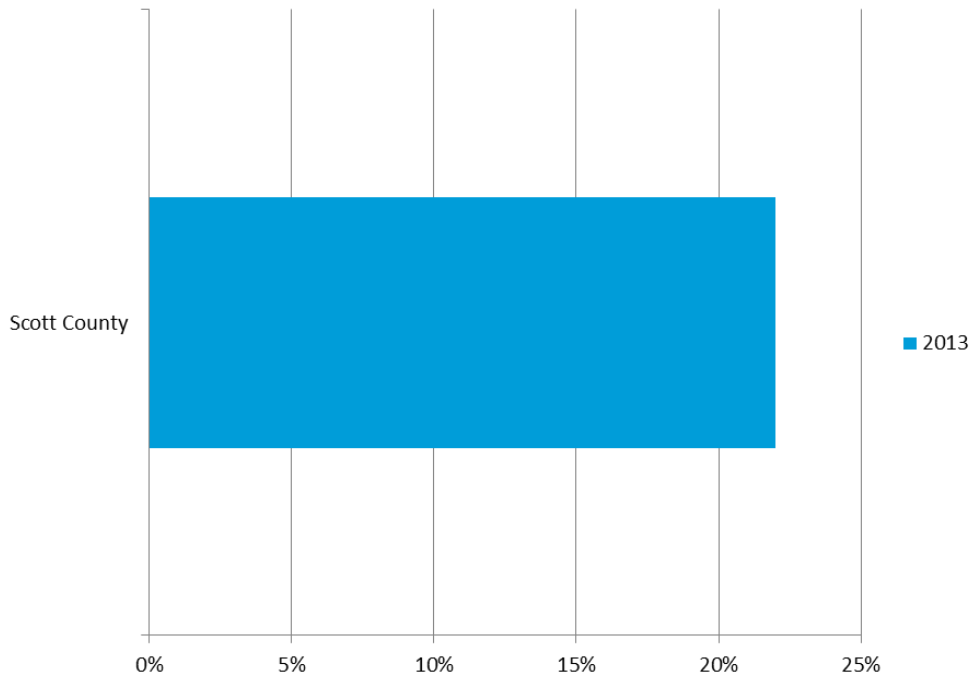
In the Kingsport Region, average commute time is 30.6 minutes in Scott County. (Refer to Table 7). This is partially due to the fact that the City of Kingsport is located in Tennessee, which encourages longer driving distances to reach the urban center.

Table 7: Mean Commute Time by Jurisdiction.

Jurisdiction	Mean Commute Time (Minutes)
Scott County	30.6

Source: ACS 2013 5-Year Estimates

As a result, commutes of over 45 minutes make up almost a quarter of the commutes in the Kingsport Region. (Refer to Figure 12).



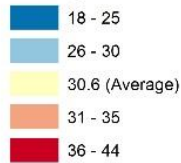
*Figure 13: Percent of Commutes Long than 45 Minutes.*  
 Source: ACS 2013 5-Year Estimates

Figure 13 provides a closer look at where longer commutes originate. In the Kingsport Region, the shortest commutes originate in the block groups directly adjacent to the Tennessee border. The average commute time increases the further the block group is located from the Tennessee border.

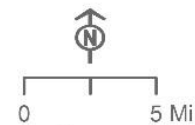
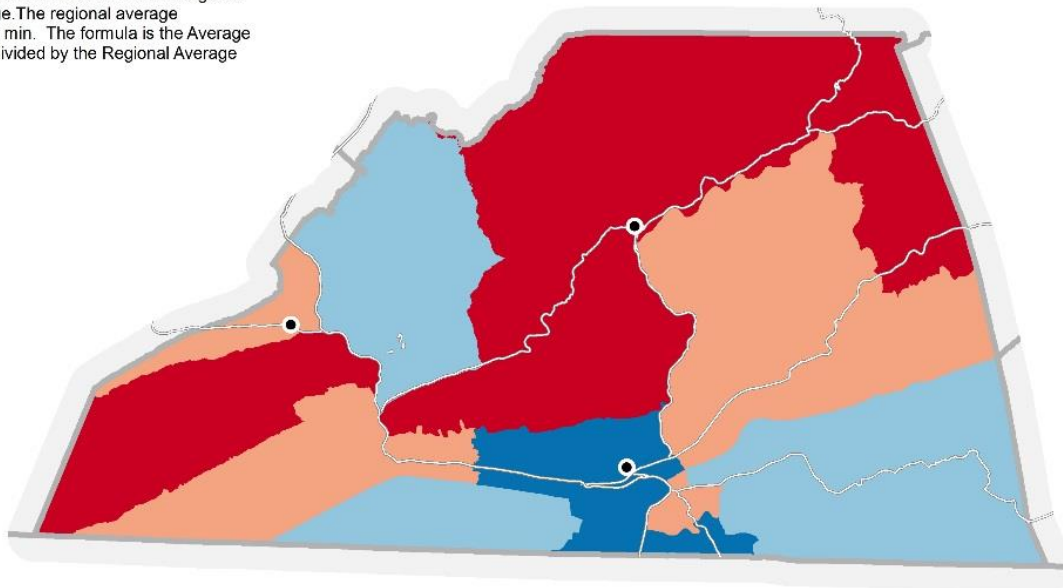
## Commute Time

● Activity Centers

### Average Commute Time (Minutes)



This map shows the Areas with average commute time above or below regional average. The regional average is 30.6 min. The formula is the Average Time divided by the Regional Average



Source:  
American Community Survey  
2009-2013 5 Year Estimate,  
Table B08303

*Figure 14: Kingsport Region Commute Times.*

Source: ACS 2013 5-Year Estimates

## C. Accessibility to Employment

As part of the transportation conditions assessment, a set of accessibility performance measures and attributes were employed to address the workforce and freight needs at the regional scale. This set of performance measures/attributes reflects regional characteristics such as commute times and the availability of multimodal transportation between activity centers.

## Auto Accessibility

Auto Accessibility in the Kingsport Region is driven by two main factors: distance from activity centers, and distance from major arterial roadways. Accessibility for auto travel is measured as the number of jobs that can be reached within a 45 minute drive. The areas with the highest level of auto accessibility are along the Tennessee border near the Gate City activity center, near the convergence of US Routes 23, 58, and 421. However, auto accessibility is low for most areas of the region, especially in the northern and eastern areas of the region. The accessibility to jobs is weighted by the population affected to provide further insight into the relative degree of access to employment for residents among areas of the region. (Refer to Figure 14).

### Auto Accessibility

- Activity Centers

#### Population-Weighted Auto Accessibility



Total number of jobs reachable in a 45 minute drive time for each Census Block Group multiplied by population in the CBG

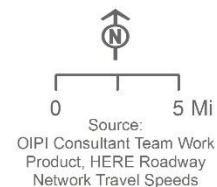
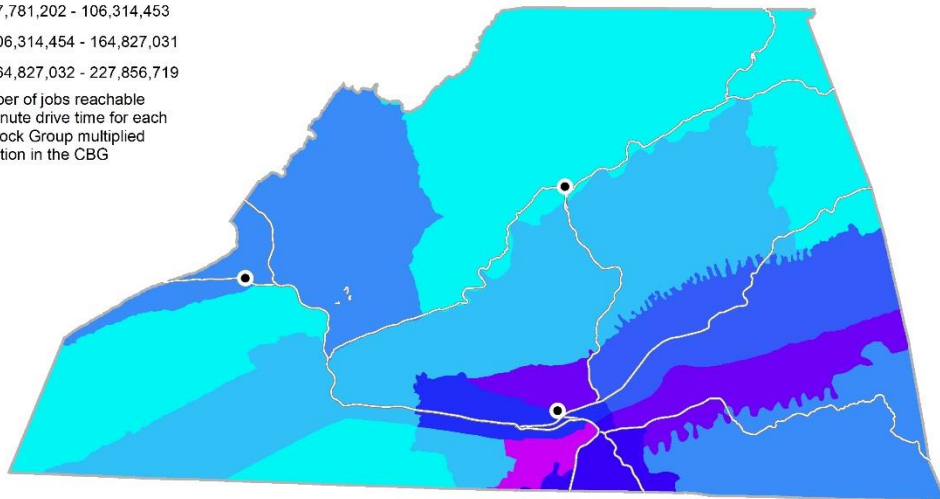


Figure 15: Auto Accessibility

## Transit Accessibility

While Kingsport, Tennessee does have fixed-route transit service, it does not extend into the Virginia portion of the region. This is reflected not only in the low (fixed route) transit accessibility scores for the region, but also limits the jobs accessible by transit in Tennessee. Due to the lack of inter-city transit options in the region (other than demand response services), commuters using transit are restricted in their ability to reach regional jobs. (Refer to Figure 15).

### Transit Accessibility

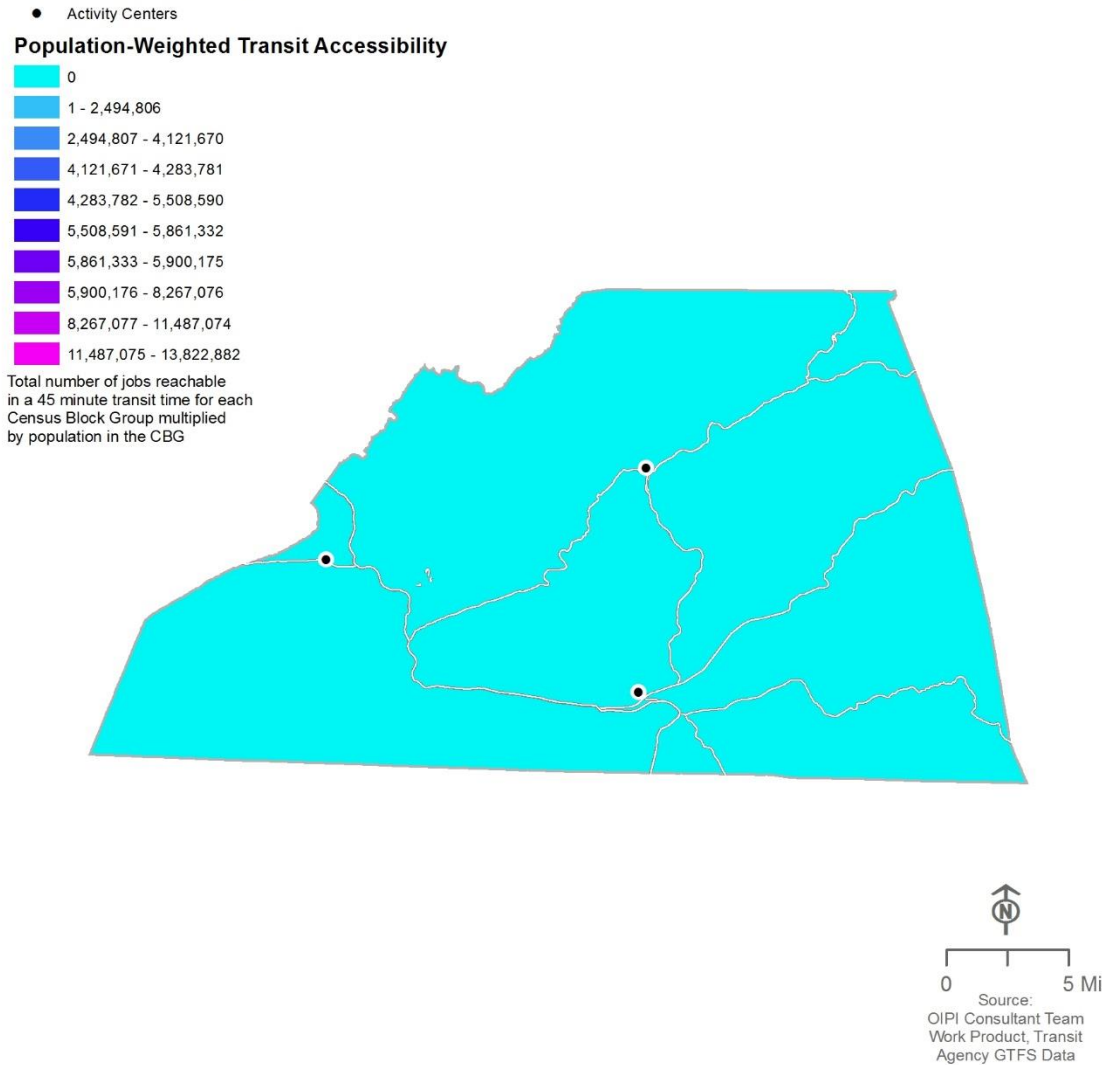


Figure 16: Transit Accessibility

## Walk Accessibility

Walk Accessibility in the area is largely determined by the mix of land use and density of development surrounding the origin of each trip. Gate City and towns and village areas in the Kingsport Region scored the highest, as was expected, with the highest scoring areas located within the Gate City activity center. (Refer to Figure 16).

### Walk Accessibility

- Activity Centers

#### Population-Weighted Walk Accessibility



Total number of jobs reachable in a 45 minute walk time for each Census Block Group multiplied by population in the CBG

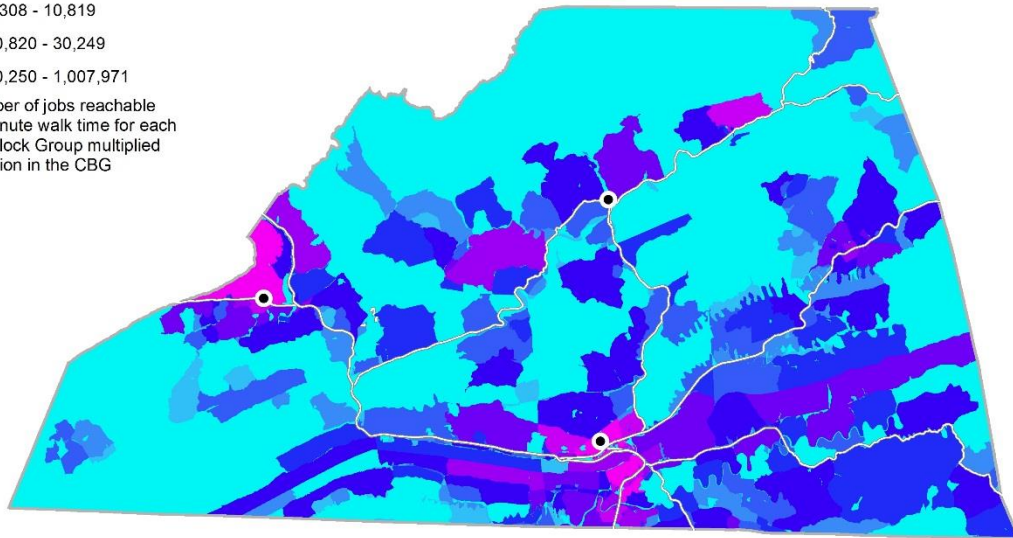


Figure 17: Walk Accessibility

## Freight Accessibility

In addition to railways, US Route 23 and 58 are the major corridors for freight movement throughout the region. Accessibility of freight origins to these roadways is dependent primarily on the proximity of the origin to highway access ramps. Most activity centers in the region do not have immediate access to an interstate. The exception to this is Gate City, which has the highest interstate accessibility in the region. (Refer to Figure 17).

### Access to Interstate or Principal Arterial Ramps

- Activity Centers

#### Blockgroup to Interstate or Principal Arterial Ramps

Drive Time (Minutes)

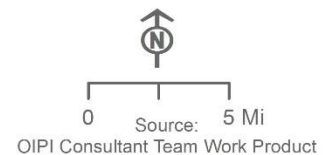
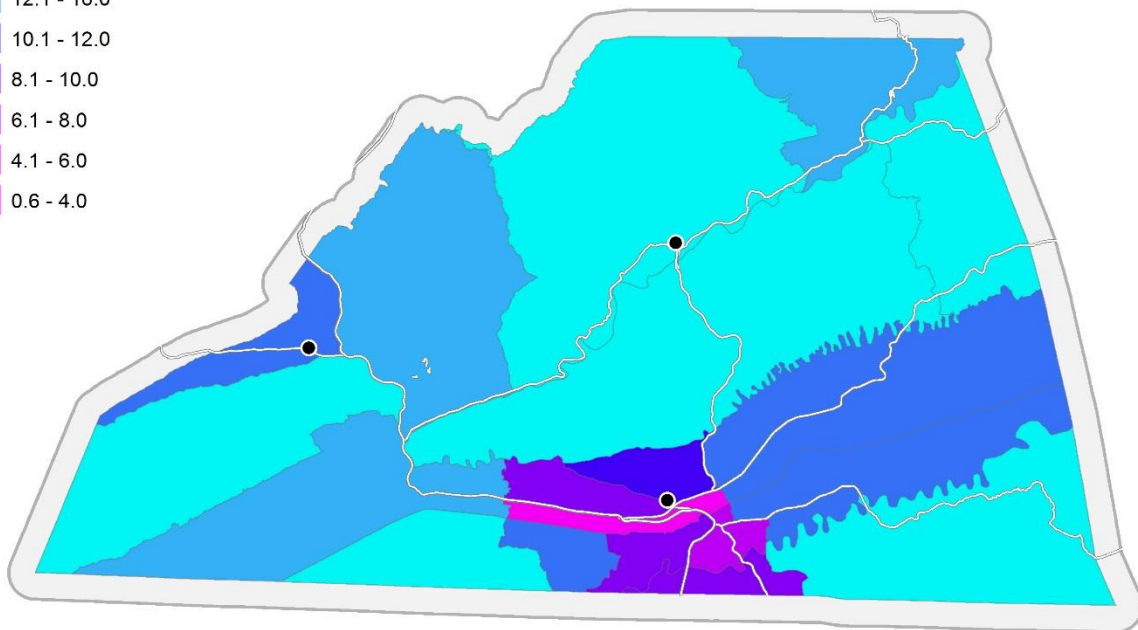


Figure 18: Access to Interstate and Principal Arterial Ramps



The location of warehouses and distribution centers is another important factor in the level of freight accessibility for the region. The eastern areas of the Kingsport Region are most accessible to warehouse and distribution centers. However, even in the most accessible areas of the region, the nearest warehouse and/or distribution center is a 43 minute drive. In some areas of the region, the drive time to the nearest warehouse and/or distribution centers is 82 minutes. (Refer to Figure 18).

### Access to Warehouse and Distribution Centers

- Activity Centers

#### Blockgroup to Warehouse and Distribution Centers

Drive Time (Minutes)

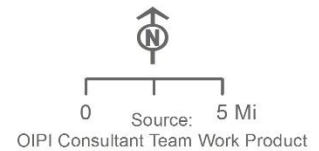
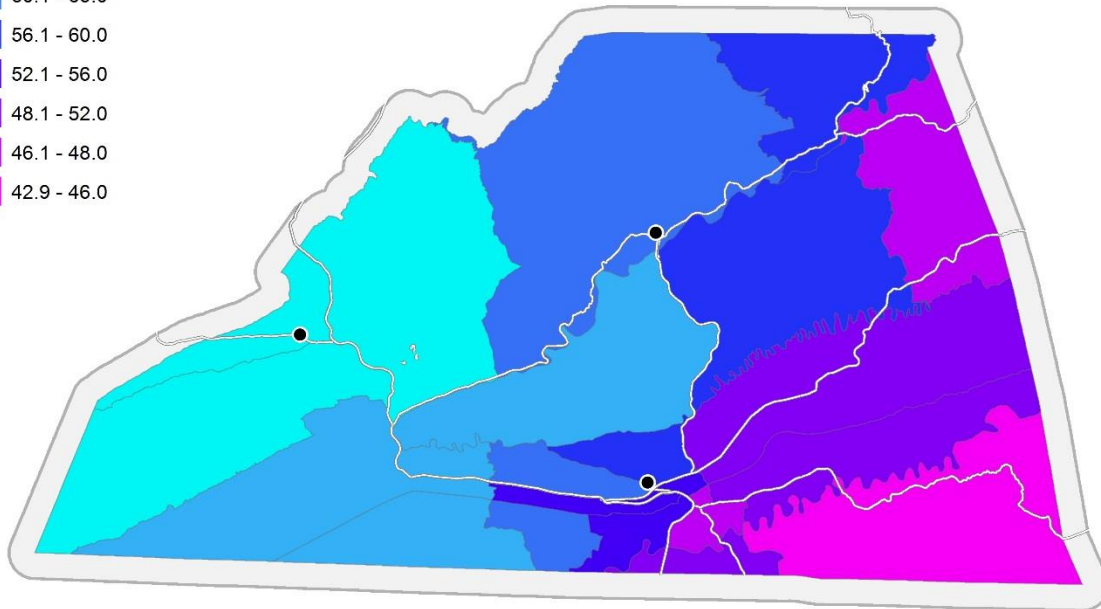
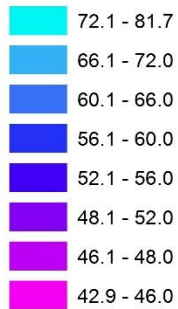


Figure 19: Access to Warehouses & Distribution Centers

Norfolk Southern operates freight rail lines that pass through Scott County. Clinchfield Railroad rail lines run through the region as well, and are operated by CSX. Roanoke-Blacksburg Regional Airport is the closest major airport to the Kingsport Region in Virginia that handles large quantities of freight. It is over a five-hour drive to Roanoke-Blacksburg Regional Airport from the Kingsport Region. (Refer to Figure 19).

### Access to Major Air Cargo Airports

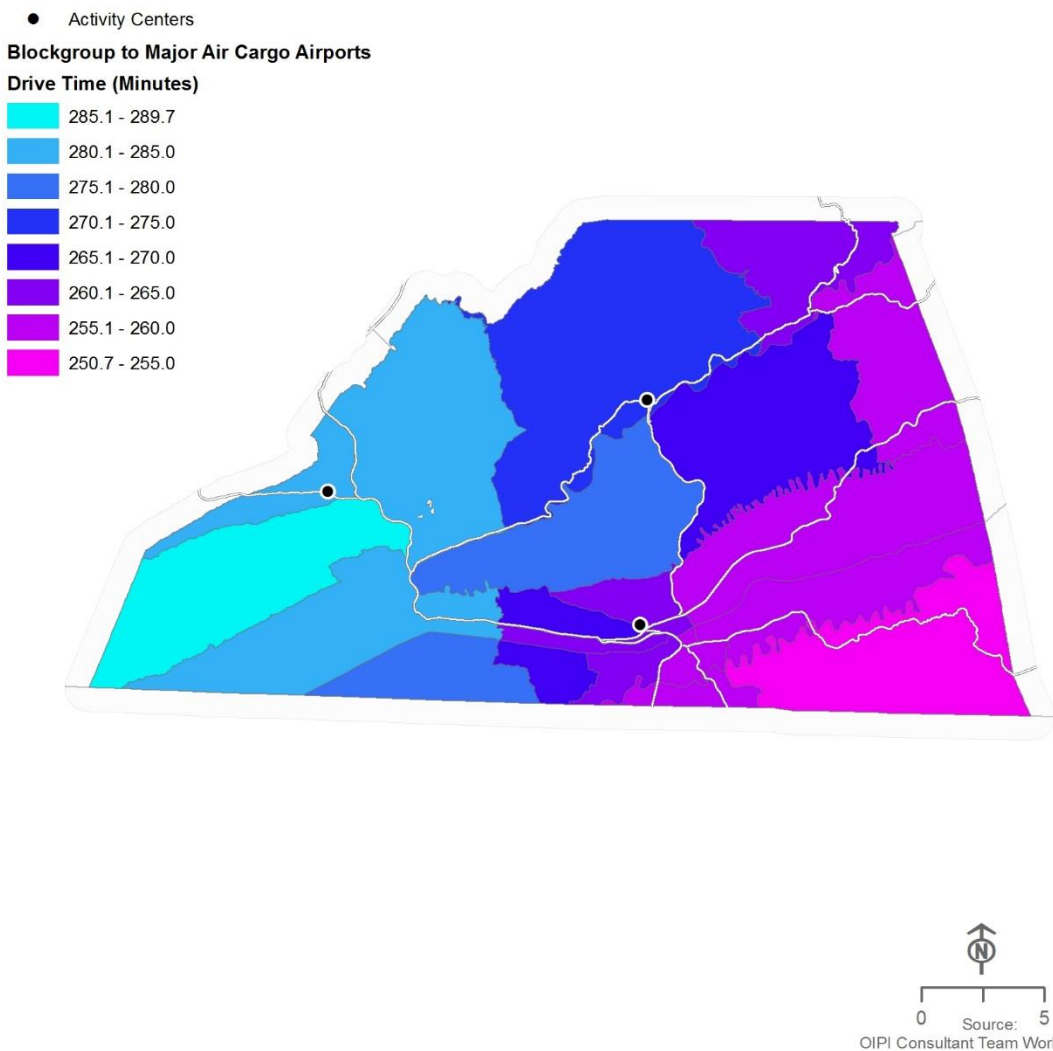


Figure 20: Access to Freight Airports

## D. Roadway Measures

This assessment identified the transportation conditions in Kingsport Region based on a series of quantitative roadway measures. The findings in this section reflect corridor-level measures that are critical to access and mobility for people and freight.

## Travel Time Reliability

Travel Time Reliability measures the frequency by which trips along a specified corridor are significantly delayed. The Reliability Index, as shown in Figure 18 below, is defined as the ratio of the median speed to the 90th percentile speed during the weekday AM peak period. Data for US Route 23 and US Route 58 were available for analysis in the Kingsport Region, as they are the major arterial roadways with heavy commuter traffic. Overall, scores on the travel time reliability index indicated high travel time reliability for both corridors. The reliability index scores are higher in several locations along US Route 58 near both the eastern and western borders, as well as near the Gate City activity center. These areas represent lower levels of travel time reliability. There are, however, no areas of significant concern along either corridor. (Refer to Figure 20).

### Highway Conditions: PM Peak - Reliability Index

- Activity Centers
- PM Peak - Reliability Index**
- 1.0 - 1.1
  - 1.2 - 1.3
  - 1.4 - 1.8



Figure 21: Travel Time Reliability

Note: the Reliability Index is based on a statewide scale which may skew the scores for the Kingsport Region based on the travel time reliability in other regions throughout the state.

## Percent of Time Congested

Congestion is an important determinant of roadway level of service. The percentage of time congested was calculated for evening peak times from 2013 to 2014 for US Route 23 and US Route 58. According to the analysis, neither US Route 23 nor US Route 58 have major congestion problems in the Kingsport Region. All roadways analyzed are congested less than 5% of the time. (Refer to Figure 21).

### Highway Conditions: PM Peak - Percent Time Congested

- Activity Centers
- PM Peak - Percent Time Congested**
- 0% - 0.8%
  - 0.9% - 4.8%
  - 4.9% - 25%

PM peak percent time congested. A percentage of the time that a typical vehicle spent in significantly congested conditions in 2014. Significant congestion is defined as operating at speeds below 50% of the free-flow speed. The free-flow speed is measured as the 85th percentile over night speed.

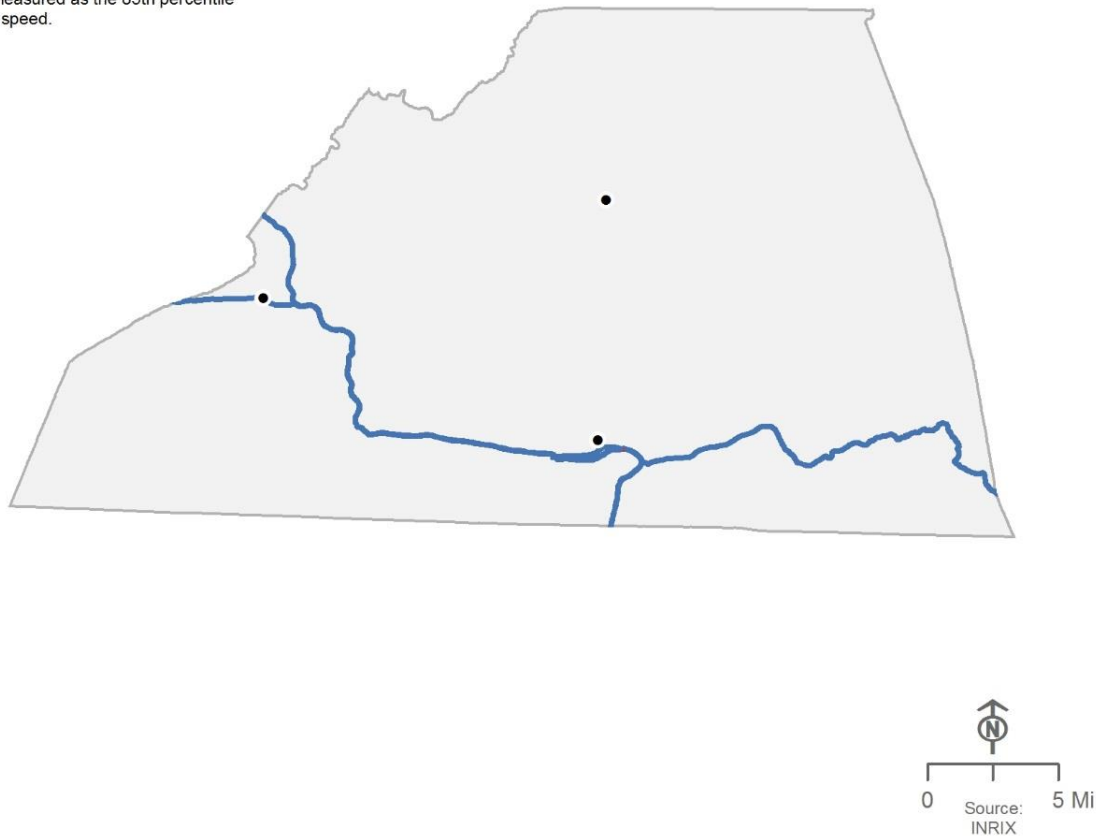


Figure 22: Percent of Time Congested

## Travel Time Delay

Figure 22 displays the total hours of delay per vehicle experienced during the evening peak period on Tuesdays-Thursdays in 2014. A traveler is considered as experiencing delay when travel speeds fall below the posted speed limit.

### Highway Conditions:AM Peak Delay Hours

- Activity Centers
- AM Peak Delay Hours**
- 0 - 25
  - 26 - 55

This map displays the total number of hours of delay per vehicle experienced during the weekday, AM Peak Period during the study year. Delay is measured as the difference between free flow times and AM peak travel times.

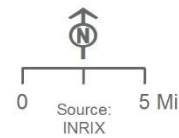
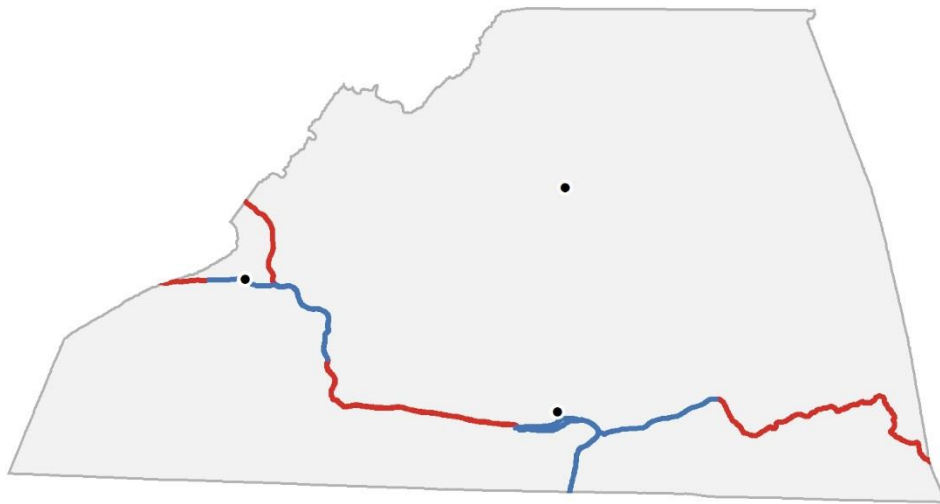


Figure 23: Travel Time Delay

## Median Speeds

Figure 23 displays the ratio of pm peak hour vehicle speeds and the speed limit. Speeds greater than 1.0 indicate travel at speeds higher than the speed limit. However, most of US Route 58 east of the Gate City activity center operates at an average speed between 41 – 50 mph. during the evening peak period. West of the Gate City activity center US Route 23/58 operates at a median speed between 51 – 60 mph. (Refer to Figure 22).

### Highway Conditions: PM Peak Median Speed

- Activity Centers
- Ratio of Median Speed and Speed Limit**
- 0.00 - 0.50
  - 0.51 - 0.85
  - 0.86 - 1.00
  - >1

This map displays the ratio of pm peak hour vehicle speeds and the speed limit. Speeds greater than 1.0 indicate travel at speeds higher than the speed limit.

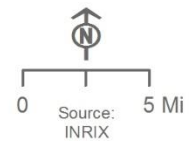
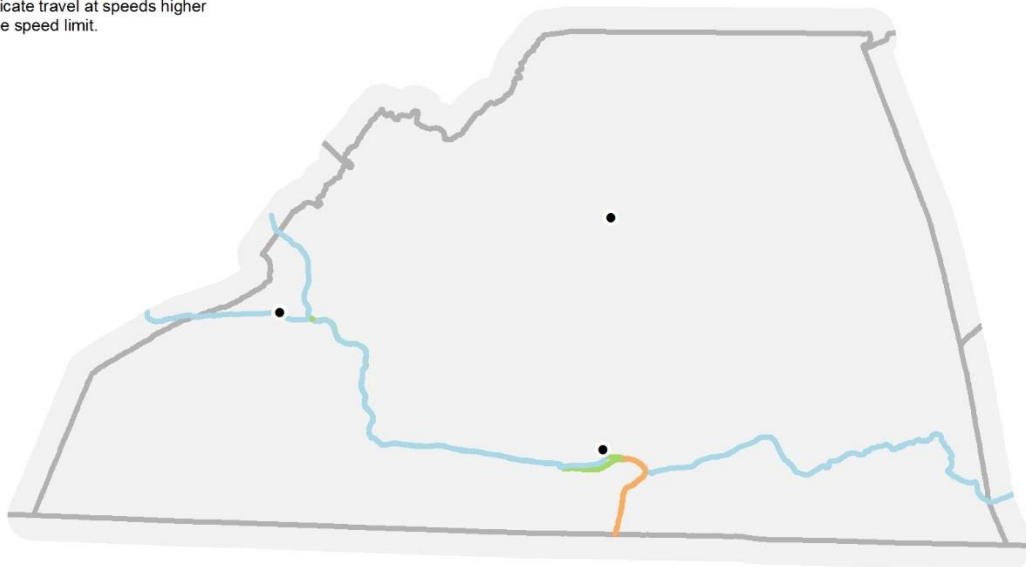


Figure 24: Median Speeds

## D. Regional & Local Commodity Flows

Although not strictly an intra-regional issue, an understanding of commodity flows is one important piece of identifying and characterizing how transportation systems support regional businesses. Freight flows within, out of, and to the Hampton Roads Region support local businesses by moving goods to market and allowing business to access key material inputs. The measures below discuss modal dependence of freight commodities, as well as the top commodities in the region by monetary value, geographic destination, and tonnage.

### Modal Dependence

The ability of goods and services to flow between industries and customers is the foundation of a functioning economy. Freight delivery is essential to enable input commodities to reach production locations, deliver intermediate goods, and also to deliver finished products to customers. Industry output (sales) in this context can be considered to be “dependent on freight,” since transportation is used to move products between buyers and suppliers.

This section assesses the relative reliance of different industries on modes, quantified in terms of dollars of freight-dependent industry output. In the Kingsport Region, an average of 89% of the dollar value of all goods that are moved through the region are moved by truck. Other modes is the second most important mode, carrying around 10% of the total dollar value of goods. The Kingsport Region does not utilize pipeline, air or water freight modes and has minimal rail dependence. (Refer to Figure 23).

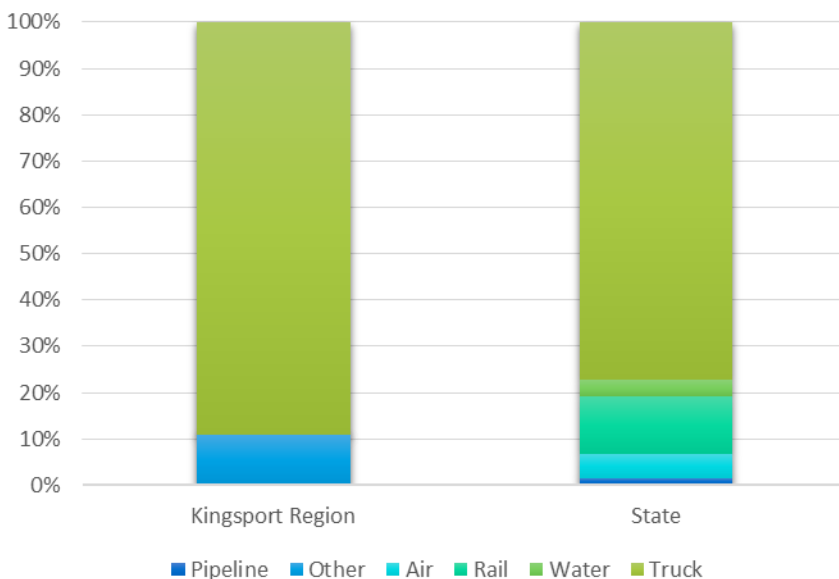


Figure 25: Comparison of Freight Modal Dependence

Location quotients are used to compare the prominence of freight modes between the Kingsport Region, and the state as a whole. The Kingsport Region relies on trucks for freight movement 1.15 times more than the state does as a whole. Rail and air transportation for goods is more common for the state

on average than it is for Kingsport Region. This reflects the greater density of freight rail lines in other portions of the state. It also reflects the relatively large distance – over a five hour drive – to Richmond International Airport from the Kingsport Region. (Refer to Figure 24).

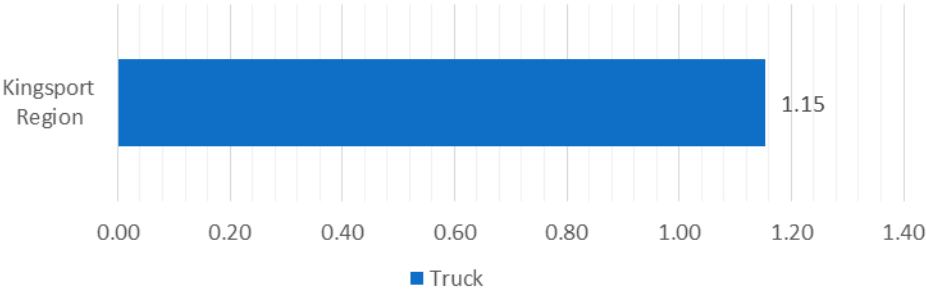


Figure 26: Location Quotient by Mode of Freight Travel

### Top Commodities

While to prior section addressed freight modal dependence on the basis of industry output, this section describes commodities shipped into and out of the region, as measured in terms of the dollar value and tonnage of each commodity group. Secondary Traffic (i.e. freight that is made up of goods being transferred between warehouses or retail centers) accounts for the highest total dollar value of freight imported to the Kingsport Region. Petroleum or coal products are the highest total value export from and second highest value import to the Kingsport Region. Overall, the Kingsport Region imported \$307 million worth of goods and exported \$472.7 million of goods, resulting in about \$165 million dollars of net exports in 2012. (Refer to Figures 26 and 27).



**Inbound Commodities, by Value (\$M)**

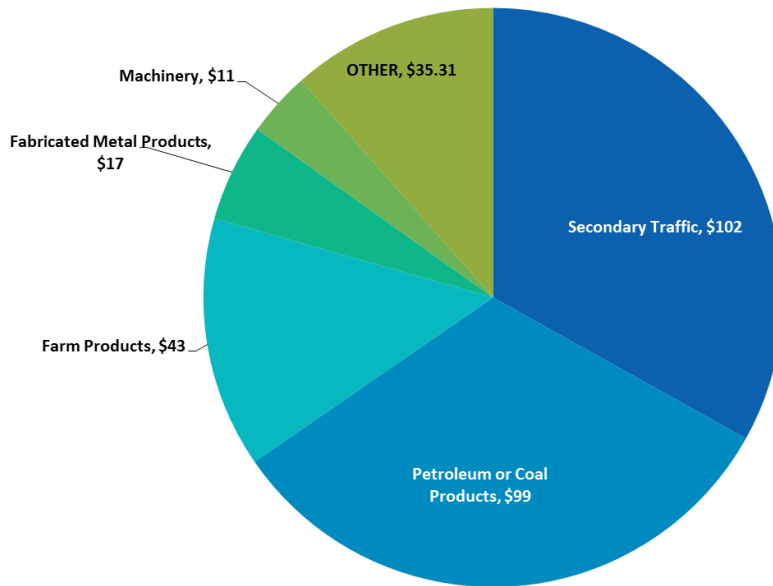


Figure 27: Top Freight Values by Commodities.

**Outbound Commodities, by Value (\$M)**

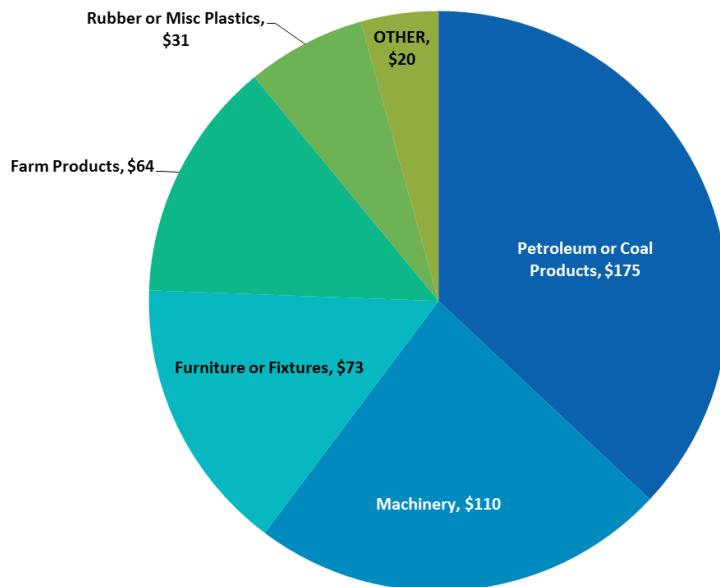
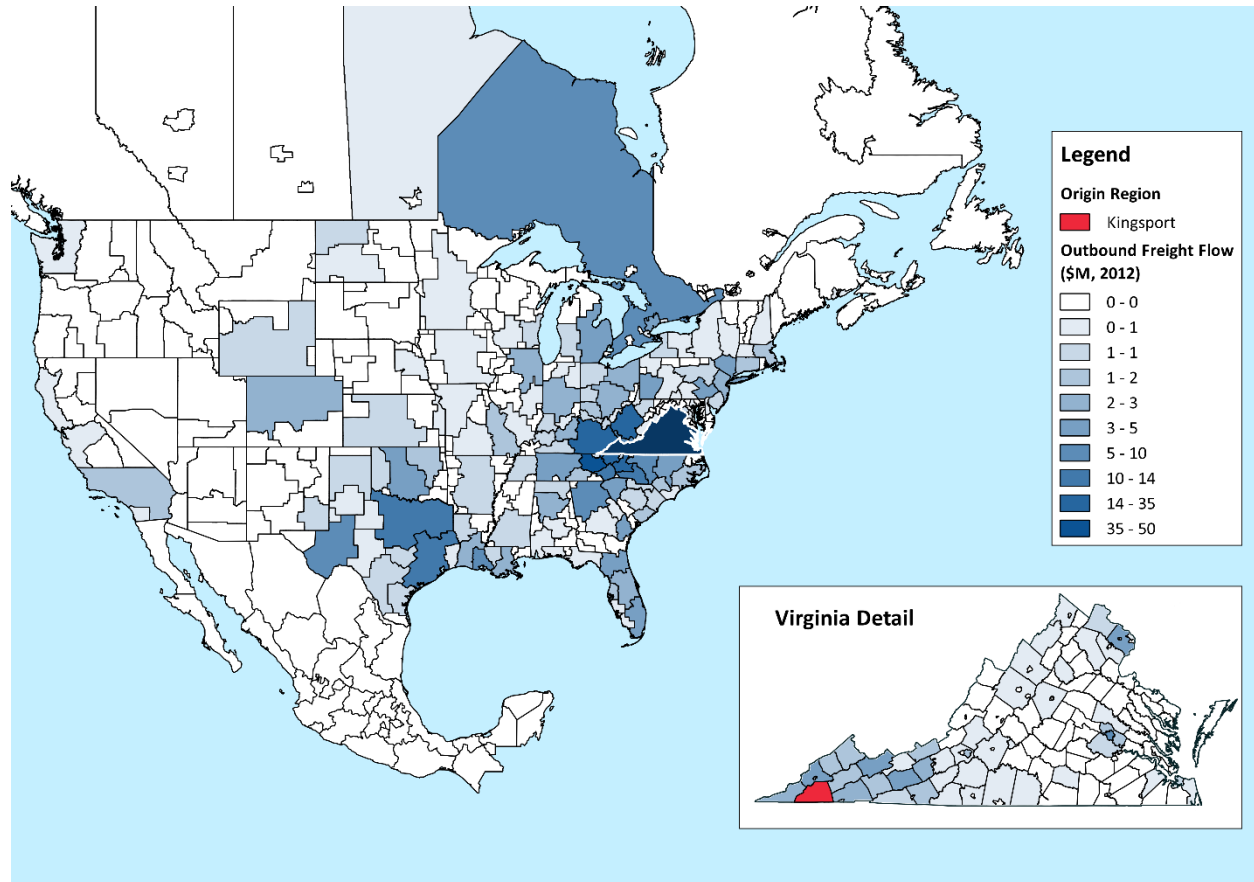


Figure 28: Top Freight Values by Commodities.

The Southeast region, as defined by the Bureau of Economic analysis, is the most important destination for freight from the Kingsport Region, in terms of both value and tonnage. In 2012, almost \$270 million of freight was exported to the Southeast Region from the Kingsport Region. The Southwest region is the second highest destination for freight in terms of both value and tonnage. (Refer to Figure 28).



*Figure 29: Top Freight Values by Region.*

The next figures present information on top commodities moved to and from the region, based on their tonnage. Considering freight movements both in terms of value and in terms of tonnage provide distinct perspectives for transportation planning. Value most directly relates to economic activity, while tonnage can serve as one indicator of likely wear and tear imposed on the transportation network by freight movement. When freight movements were analyzed by weight, petroleum and coal products was the highest amount of total tonnage for both imports and exports. The second highest tonnage for export and import were nonmetallic minerals and secondary traffic respectively. (Refer to Figures 29 and 30).

**Inbound Commodities, by Weight (000s of tons)**

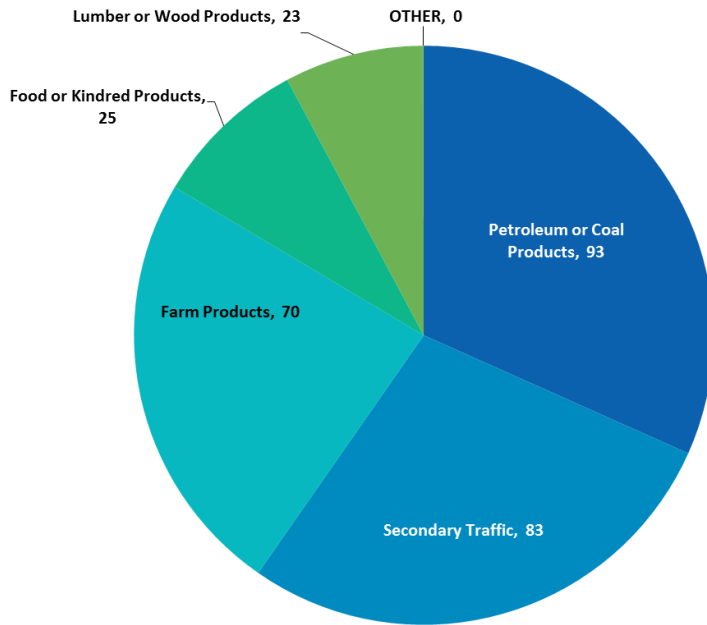


Figure 30: Top Commodities by Weight – Inbound.

**Outbound Commodities, by Weight (000s of tons)**

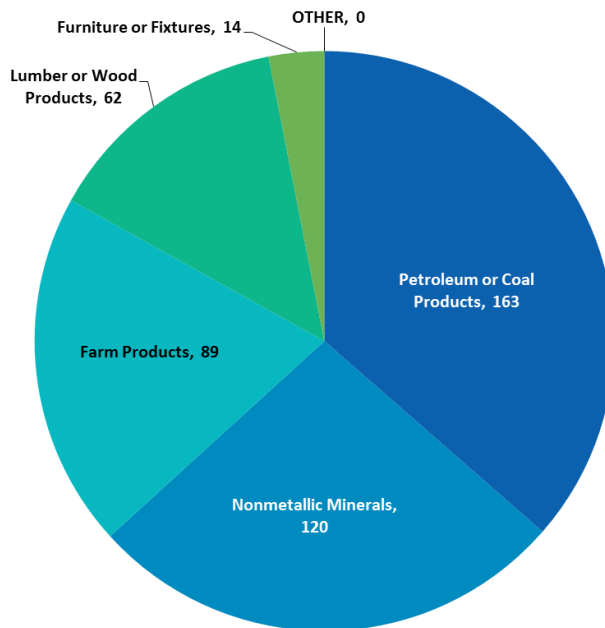


Figure 31: Top Commodities by Weight - Outbound.

## 4. NEEDS PROFILE

### A. Introduction

Based on the overall approach to the VMTP Needs Assessment, Transportation Needs will be identified as deficiencies or gaps in the transportation conditions that are most critical to each region's key future industries, with an emphasis on attracting and retaining the future workforce and supporting Virginia businesses' goods movement needs. The key economic and transportation conditions have been identified in the Economic and Transportation profiles above. Economic and transportation linkages are discussed at length in the Regional Network Needs Assessment Introduction.

The Needs Assessment relates current transportation conditions and deficiencies to key future industries and economic profiles. The Needs Assessment, however, does not propose specific projects to address the Transportation Needs in each region, since this should be done by MPOs, localities and other nominating entities when they put forward projects for potential funding programs, including those subject to HB2 screening. Instead, the VMTP Transportation Needs Assessment is intended to identify a set of regional transportation needs in order to be able to compare proposed projects to those needs. The Needs Assessment also uses a spatial analysis for the region to provide observations about specific corridors, travel markets, and activity centers in addition to the regional profiles that will provide more detail regarding specific areas within the region around which some of the transportation needs are focused.

Needs have been identified based on both stakeholder input and on the analysis of economic and transportation conditions. In the first round of Regional Forums, held in May, 2015, the transportation and economic conditions were presented to groups of regional stakeholders. Following this, a discussion was held with the stakeholders to connect the transportation conditions to desired economic futures and begin identifying potential Needs.

These Needs were categorized into a series of five very broad types of capacity Needs:

1. Corridor Reliability/Congestion
2. Network Connectivity
3. Transportation Demand management
4. Modal Choice
5. Walkable/Bikeable Places

Non-capacity needs (i.e. Safety, Operations and State of Good Repair Needs) were also recorded when they were identified from stakeholder input, although these were not the focus of the Regional Networks Needs Assessments. The potential Needs identified in the first Forum were analyzed by the OIPI teams against the economic and transportation data that was assembled for each region and, where data was found to support the proposed needs, these Needs were included and documented. In addition, the Study Team analyzed all the overall assembled data for each region in order to identify additional Needs not identified in the Forum, to assemble a more complete picture of potential Transportation Needs in each region, with a particular focus on attracting and retaining the 21<sup>st</sup> century workforce needed for each region's 2025 economy.

## B. Economic and Transportation Needs Correlation

The Study Team conducted a number of research efforts aimed at identifying key correlations between industries and their transportation needs, as described further in the introductory document, [VMTP 2025 Needs Assessment: Regional Networks Introduction](#). These included national research of industry trends in workforce needs and goods movement needs and a national survey of site selection professionals conducted by the Southeastern Institute of Research. Based on the findings of this research, the following table outlines the key correlations between three broad industry sectors (Local, Knowledge and Freight sectors) and their general transportation needs. It should be noted that the table does not reflect that these industry sectors always have these and only these transportation needs. Individual industry types and individual business needs for transportation will vary and the table only represents where there were apparent correlations between industry sectors and basic categories of transportation needs.

*Table 8: Economic and Transportation Correlation. Source: Summary correlations based on national research and survey of national Industry Site Selection Professionals conducted by OIPI Consultant Team.*

<b>Economic and Transportation Correlation Table</b>			
	<b>Local Sector</b>	<b>Knowledge Sector</b>	<b>Freight Sector</b>
<b>Highway Access</b>	HIGH	HIGH	HIGH
<b>Passenger Reliability</b>	MED	HIGH	MED
<b>Bottleneck Relief</b>	MED	HIGH	HIGH
<b>Freight Reliability</b>	MED	MED	HIGH
<b>Freight Accessibility</b>	MED	LOW	HIGH
<b>Network Connectivity</b>	HIGH	HIGH	MED
<b>Transportation Demand Management</b>	LOW	MED	MED
<b>Modal Choice</b>	HIGH	HIGH	MED
<b>Transit Access</b>	MED	HIGH	MED
<b>Active Transportation Options</b>	MED	MED	LOW
<b>Walkable Places</b>	MED	HIGH	LOW

The above table of correlations was used to identify potential categories of transportation needs in the region by linking prominent regional economic sectors with anticipated Needs and comparing these to the general transportation conditions that currently exist, as described below.

## C. General Regional Needs

As discussed in the Economic Profile above, when the 2025 Future Economic Profile was estimated for the Kingsport Region, it showed that over 66% of the economy will be made up of freight dependent industries. The knowledge based sector is anticipated to grow by 3%, from 8% to 11%. Conversely, the local serving sector will shrink to 26% of regional output.

The forecasted growth in the knowledge economic sector for this region brings the potential for additional transportation needs. The economic and transportation correlations for the knowledge industry sector particularly point to improving freight access, network connectivity, and modal choice. The local economic sector also has important correlations with transit accessibility to support workforce access to these kinds of jobs. Therefore, transportation needs in the region should include expanding transit access, both within the region’s economic activity centers, and between the centers. Fixed route transit is limited to the Tennessee portion of the region. However, the expansion of knowledge-based and local-based sectors would benefit from both additional fixed route transit in the region and additional demand-response rural transit to provide better workforce access. Further support for the knowledge sector would also come from additional walkable places and modal options for walking and biking in the region.

The above represent general transportation needs for the region based on an analysis of its economic sectors and projected growth. More specific needs from a more detailed spatial analysis of the economic and transportation conditions in the region are described below.

## D. Spatial Analysis of Regional Network Needs

### Summary of Needs

Potential Needs were also developed by analyzing the economic and transportation data in the region from a spatial standpoint. This analysis included the potential Needs identified by stakeholders in the first Regional Forums, as well as new Needs that emerged from the spatial analysis of the data. These needs were categorized into a series of very broad types of capacity needs as described above. The spatial analysis of needs consists of a map of needs, a table of identified needs, and a findings of needs that summarizes the economic and transportation findings to support each identified need. Each of these is summarized below.

To assist with the understanding of the map and table of needs described below and the relationship of these needs to the Corridors of Statewide Significance and the Urban Development areas, please refer to the following legend of icons.

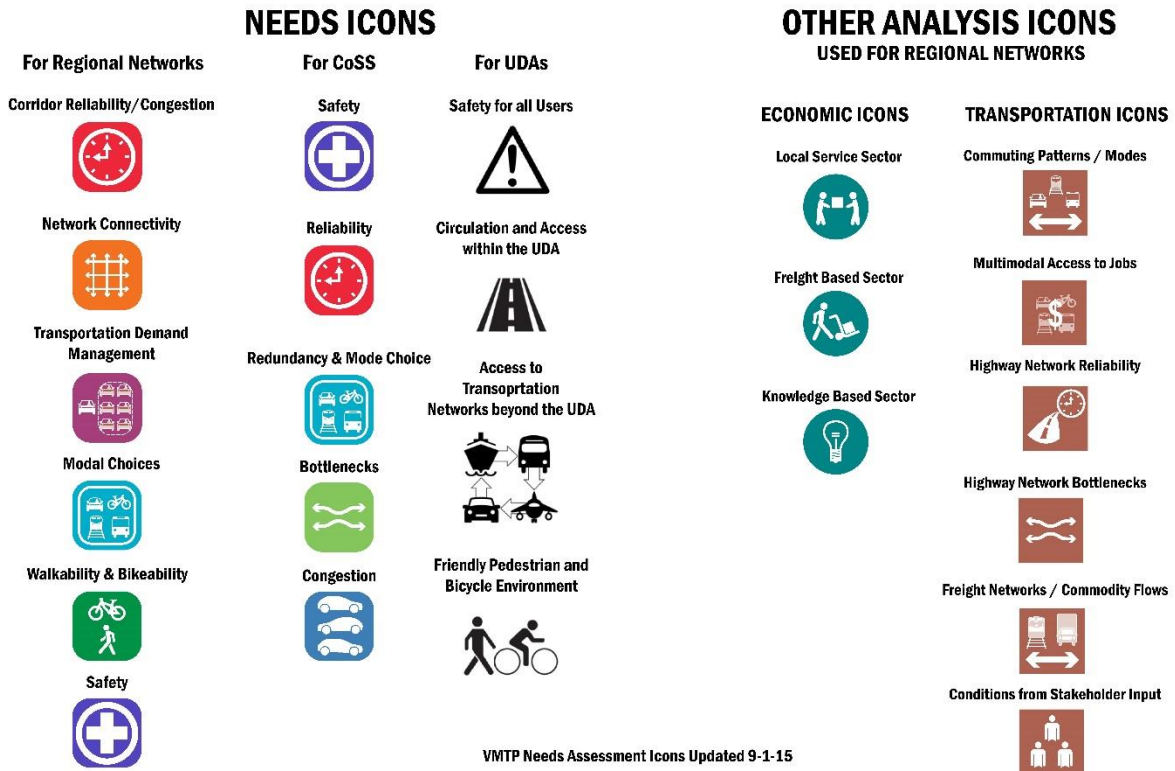


Figure 32. VMTP Needs Icons

## Map of Needs

The map below summarizes the regional transportation needs according to activity centers and corridors. The needs are summarized and color coded by general category. Each of the needs is also numbered and keyed to the finding of needs table.

## Findings of Needs

The table below lists each of the identified transportation needs in the region, and describes the basis for each need in terms of economic and transportation findings and data. The analysis of regional network transportation needs for the region was compiled into a table that identifies the following findings of need:

1. Category of Need
2. General Description of Need
3. Economic findings to support need
4. Transportation findings to support need

The findings to support the determination of need generally came from the statewide datasets of economic and transportation conditions summarized above. However, in cases where the statewide

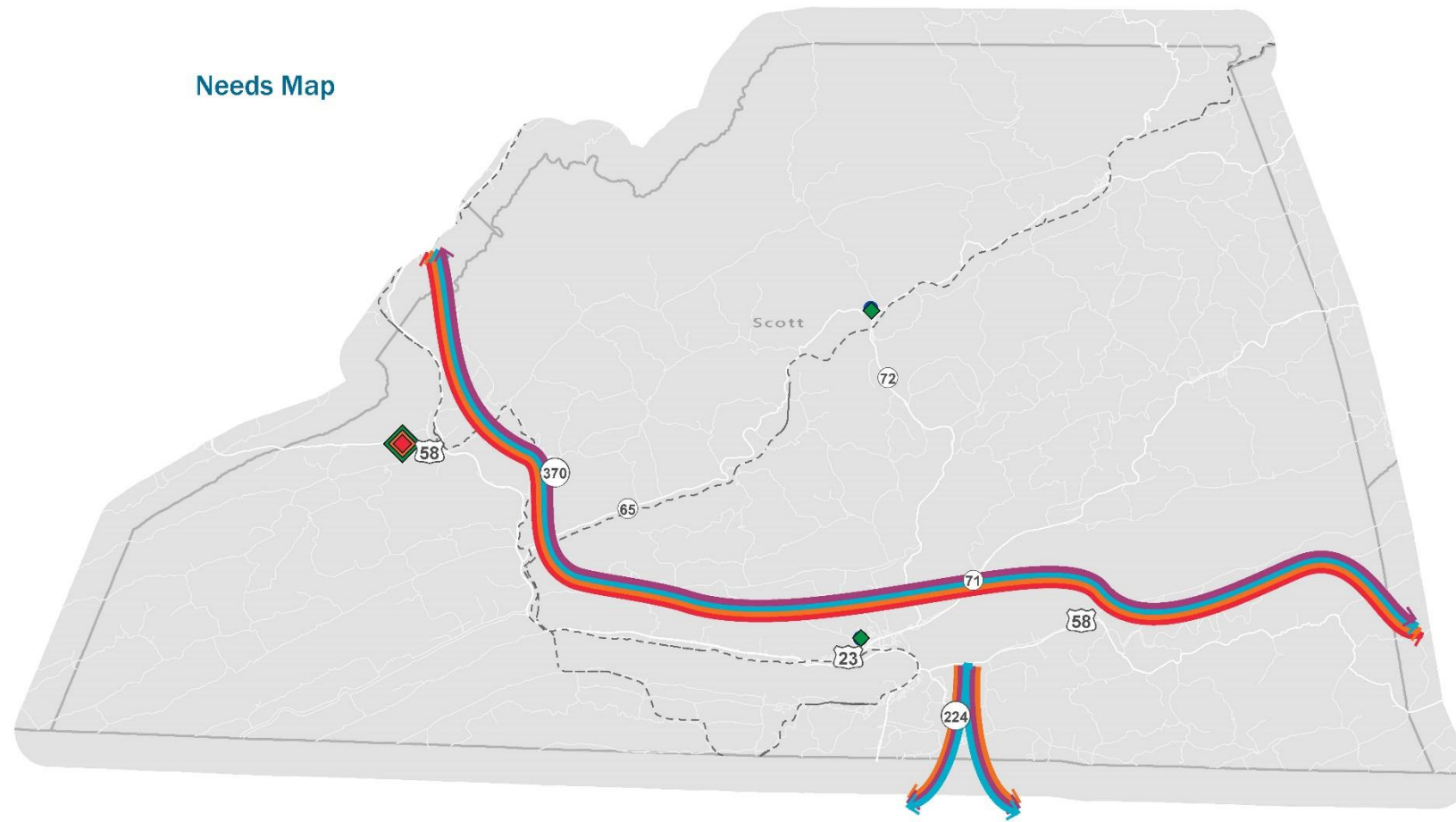
data is not of a fine enough grain or level of detail to accurately determine a need, it was supplemented by locally obtained data from studies or plans. It is important to note that local plans and studies were not used to identify proposed projects as needs, but only for supporting data to make an objective determination of need.



Figure 33: Summary Needs Map

## Kingsport Region Needs Summary

Needs Map



### Needs Table

<b>A. US 58/23 Corridor Reliability</b>	<p> The US 58 and 23 serve as major thru-corridors in the region. These corridors handle significant freight and commuter traffic, serving multiple activity centers. There are currently limited alternative choices to driving single occupancy vehicles on these corridors. Redundancy in choice and network connections are needed.</p>
<b>B. Network Connectivity and Mode Choice to Kingsport</b>	<p> The most significant commuter movement in the region is across the state line, including both in-flow and out-flow from Scott County. With high volumes, access management issues, and various bottlenecks, passenger reliability is key to the economic vitality of the region.</p>
<b>C. Duffield Freight Connectivity</b>	<p> The Duffield activity center has the highest concentration of freight related industries and employment. Freight access is key to the economic vitality of this activity center.</p>
<b>D. Walkable/Bikeable Places</b>	<p> The Kingsport region is largely autocentric and is generally underserved by alternative modes of transportation. A lack of active transportation infrastructure creates safety concerns and reinforces reliance on vehicular travel.</p>

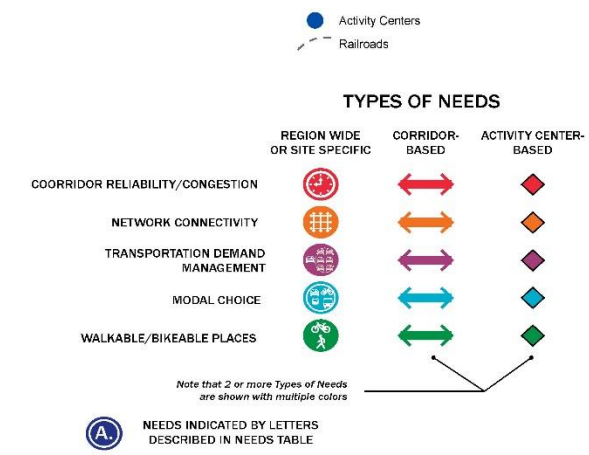








Table 9: Findings of Needs

A. US 58/23 Corridor Reliability	
NEED	 <p>The US 58 and 23 serve as major thru-corridors in the region. These corridors handle significant freight and commuter traffic, serving multiple activity centers. There are currently limited alternative choices to driving single occupancy vehicles on these corridors. Redundancy in choice and network connections are needed.</p>
ECONOMIC	 <p>These corridor serves the major activity centers of Duffield, Fort Blackmore and Gate City. These centers include local serving, knowledge based and freight dependent industries. As a result, peak traffic times include significant commuter traffic. Increased transit and TDM services can help provide multimodal options for commuters and increase reliability for all users.</p>
TRANSPORT.	 <p>There are few congestion and delay issues in Danville. However, there are a few bottlenecks, including near the Gate City activity center where US 58 and 23 merge, and near the Duffield activity centers where these roads separate. Creating redundancy in the network through transit, TDM and increased network connectivity will increase reliability for all users.</p>
B. Network Connectivity and Mode Choice to Kingsport	
NEED	 <p>The most significant commuter movement in the region is across the state line, including both in-flow and out-flow from Scott County. With high volumes, access management issues, and various bottlenecks, passenger reliability is key to the economic vitality of the region.</p>
ECONOMIC	 <p>The urban core of the region is Kingsport, Tennessee. Connectivity across the state line is vital for the businesses and activity centers in Scott County to thrive and grow.</p>
TRANSPORT.	 <p>Commuter origin/destination data and job accessibility mapping shows the highest commuter flows across the state line. The few network bottlenecks in the region are located along the major corridors connecting Virginia and Tennessee. Local input also suggests that the rural on-demand transit services are heavily oriented to bringing Scott County residents to the medical facilities and shopping opportunities in Kingsport.</p>

## C. Duffield Freight Connectivity

NEED



The Duffield activity center has the highest concentration of freight related industries and employment. Freight access is key to the economic vitality of this activity center.

ECONOMIC



Duffield activity center already includes significant freight oriented business. Local input indicates that two additional freight related businesses will be locating in Duffield by 2025.

TRANSPORT.



Despite having some of the highest percentage of freight related industries, freight accessibility measures show that Duffield has is one of the least freight accessible areas in the region.

## D. Walkable/Bikeable Places

NEED



The Kingsport region is largely autocentric and is generally underserved by alternative modes of transportation. A lack of active transportation infrastructure creates safety concerns and reinforces reliance on vehicular travel.

ECONOMIC



The Gate City, Fort Blackmore and Duffield activity centers includes schools, libraries, and multiple shops, markets and restaurants.

TRANSPORT.



The major issues in these areas of the region are modal conflicts, safety concerns and congestion. Providing dedicated infrastructure for all users can alleviate these issues.