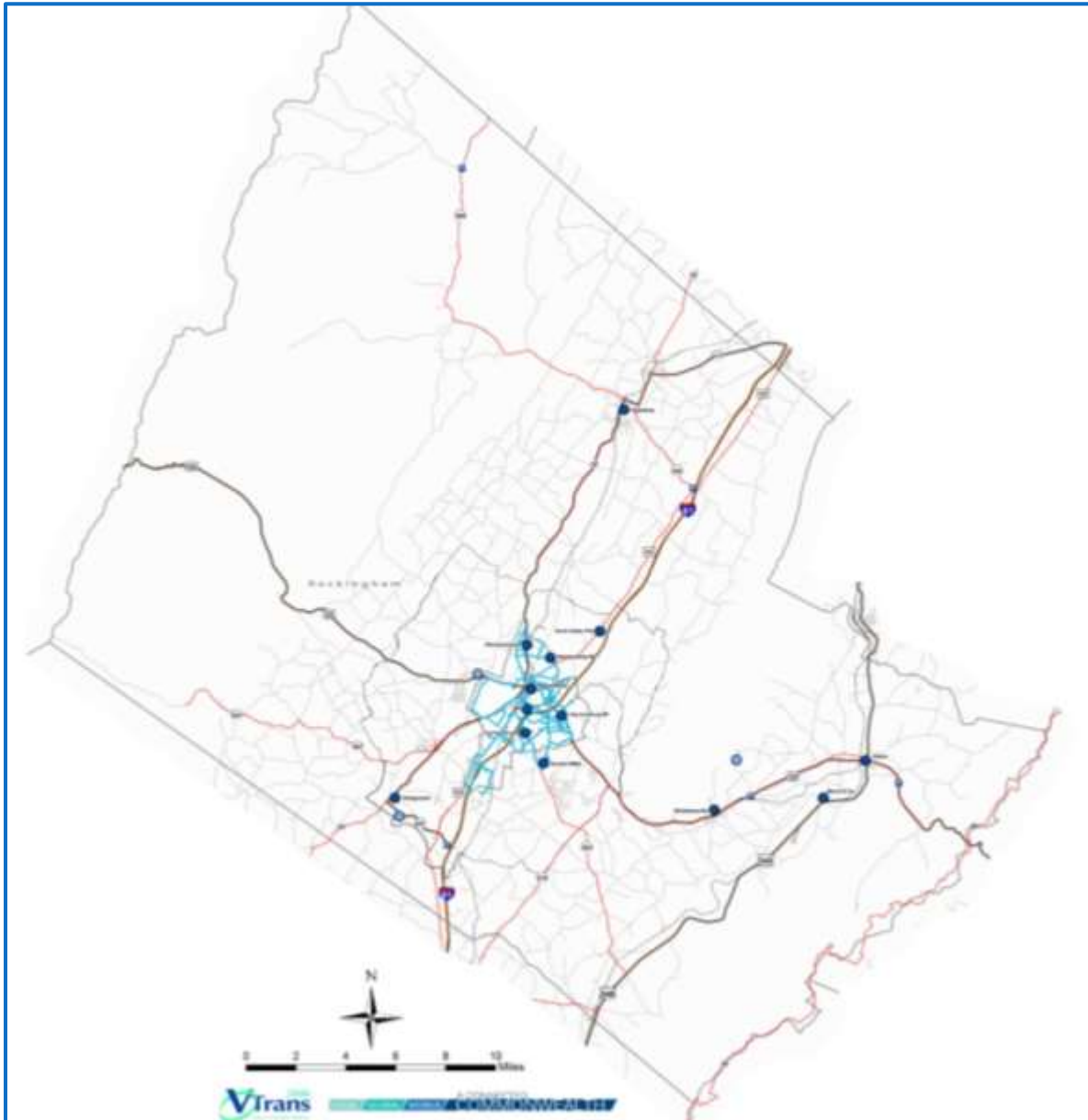


VMTP 2025 Needs Assessment

Regional Needs Profile



Harrisonburg-Rockingham Region

December 2015

1. NEEDS ASSESSMENT PURPOSE

The VMTP 2025 Needs Assessment is an essential element of the overall VTrans2040 Statewide Transportation Plan for Virginia. Based on the VTrans 2040 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 21st 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 Harrisonburg-Rockingham (HR) 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 HR 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 HR regional Economic Profile, regional Transportation Profile, and regional Transportation Needs.

Defining a Regional Network

This portion of the Needs Assessment deals with a Regional Network. For the purposes of the VMTP Needs Assessment, the final determination of each Regional Network has been developed as part of the outreach process in working with each region. Additional information about how the regional Networks were defined is referenced in the introductory document, “[VMTP 2025 Needs Assessment: Regional Networks Introduction](#).”

The HR Region is defined as the City of Harrisonburg and Rockingham County. However economic generators, economic attractors and commuting corridors located outside of but adjacent to this region that influence the economy or travel market of the HR Region were considered in the development of the Regional Needs Profile. These include:

- **Economic Generators:** Page County (VA), Shenandoah County (VA), Charlottesville-Albemarle Region (VA), Pendleton County (WV), and Hardy County (WV)
- **Economic Attractors:** Page County (KVK Precision Specialists), Shenandoah County (New Market Poultry, Bowman Andros), and Charlottesville-Albemarle Region
- **Regional Commuting Corridors:** US 33 (From US 220 in Franklin, WV to US 29 in Ruckersville, VA), US 340 (From Waynesboro to Luray), US 11 (From Winchester to Staunton), US 42 within Rockingham, SR 259 (From I-81 near Broadway to US 48 in Baker WV)

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 analyzing 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 HR Region stakeholders to identify an overall current economic profile for the region. The components of the current economic profiles layer 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 Weldon Cooper Center, 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, to 1.5 million. Statewide per-capita incomes are expected to rise 21 percent from 44,765 to 54,226.

Table 1: Statewide Population Projections

Current Population – 2012	Weldon Cooper 2025 Projection	Woods & Poole 2025 Projection
8,185,867	9,203,977	9,740,553

Source: 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.

Regional Demographics

The HR Region is forecasted to experience steady population growth over the next decade. The county as a whole may experience an increase in population by almost 12 percent by 2025 (**Table 2**) whereas the City of Harrisonburg is projected to have an increase in population by over 20 percent.

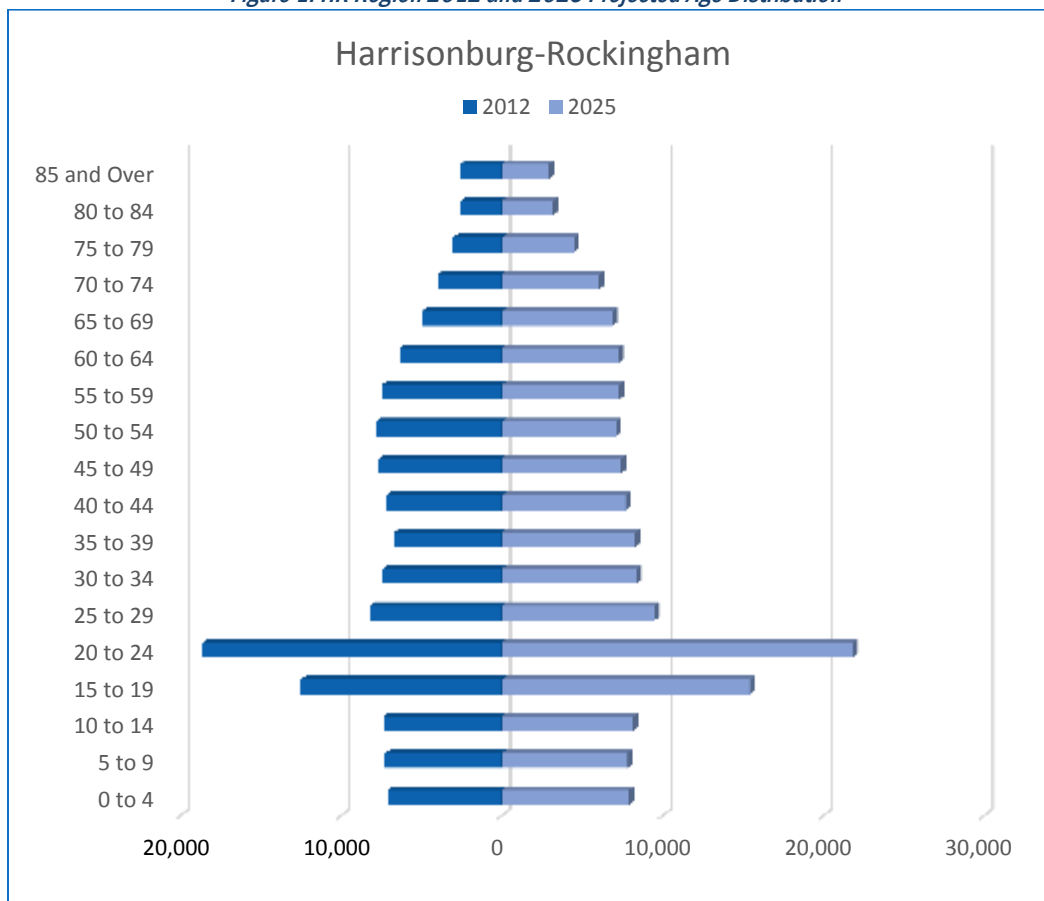
Table 2: HR Region County and City Population Projections

Jurisdiction	2012	2025	% Change (2012-2025)
Rockingham County	77,391	86,656	12.0%
City of Harrisonburg	50,981	61,279	20.2%

Source: US Census Bureau. Weldon Cooper Center for Public Service, Demographics Research Group; Intercensal Estimates for Virginia, Counties, and Cities: 2010-2012, Charlottesville, Virginia, January 27, 2014, www.coopercenter.org; Accessed between January-August, 2014.

Figure 1 illustrates the age distribution for the HR Region in 2012 and the projected age distribution for 2025. The age distribution for this region has a high proportion of college age cohorts, most likely due to the number of higher educational institutions in the region. Population growth is projected to not be accompanied by a demographic shift compared to 2012.

Figure 1: HR Region 2012 and 2025 Projected Age Distribution



Source: Woods & Poole Economics, Incorporated. 2014 State Profile District of Columbia, Maryland, and Virginia. Washington DC. 2014. <http://www.woodsandpoole.com>. Accessed June 18, 2014.

C. Current Industry Strengths

Economic drivers in the HR Region are predominantly centered on freight-dependent industries. These include agriculture, forestry, fishing and hunting; manufacturing; wholesale trade; transportation and warehousing; mining, quarrying, and oil and gas extraction; utilities; and construction. However, James Madison University, a knowledge-based industry, is a major employer in the region. The following economic measures were used to analyze the strength and characteristics of the current regional economy in the HR Region.

Top Industries by Output

Manufacturing is the strongest industry by economic output (**Table 3**). The Retail Trade industry is the second strongest with 15 percent of the region’s output.

Table 3: HR Region Current Industries by Output, 2012

Top 5 Industries	Output (\$M)	% of Output
Manufacturing	\$3,747	26%
Retail Trade	\$2,112	15%
Wholesale Trade	\$1,903	13%
Public Administration	\$1,154	8%
Health Care	\$721	5%

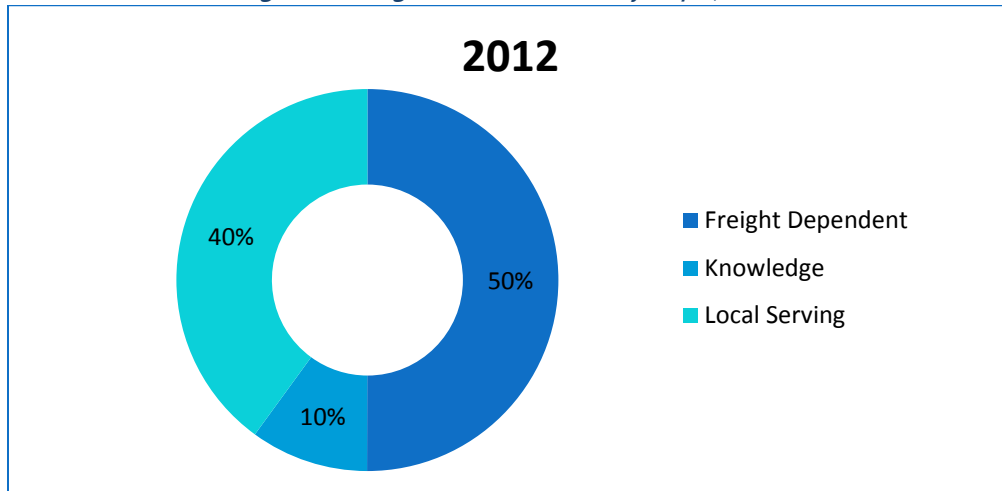
Source: IHS Global Insight Business Market Insights (BMI) Data & Forecasts, 2012.

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. **Figure 2** illustrates the summary of each economic cluster in the HR Region. In 2012, the freight dependent industries were the predominant economic sector by output in the region at 50 percent. Each economic sector has different transportation characteristics and needs. The Freight Dependent economic cluster, for example, is typically characterized by shift hours, truck origins and destinations, and access to rail, highways, ports and airports.

Figure 2: HR Region Economic Sectors by Output, 2012



Source: IHS Global Insight Business Market Insights (BMI) Data & Forecasts, 2012.

Top Industries by Employment

In the HR Region, the top industries by employment are Public Administration, Manufacturing, Accommodation/Food Service, Retail Trade, and Health Care (**Table 4**).

Table 4: HR Region Top Industries by Employment, 2012

Top 5 Industries	Number of Jobs	% of Workforce
Public Administration	11,562	17%
Manufacturing	10,737	16%
Accommodation/Food Service	7,628	12%
Retail Trade	6,891	10%
Health Care	6,795	10%

Source: IHS Global Insight Business Market Insights (BMI) Data & Forecasts, 2012.

Table 5 lists the current top employers in the HR Region. James Madison University is the largest employer in the region followed closely by Sentara RMH Medical Center and Rockingham Public Schools. These local serving and knowledge-based industry employers serve many workers that rely on the local transportation system.

Table 5: HR Region Current Top Employers

Employers	Employees
James Madison University	2,652
Sentara RMH Medical Center	2,123
Rockingham Public Schools	2,000
Cargill, Inc.	1,283
RR Donnelley	1,100

Source: 2012 InfoUSA data, supplemented with 2014 HR MPO data.

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. The HR Region’s employment in Educational Services is more than triple the national average (**Table 6**). The HR Region is home to many diverse options for higher education and technical training including James Madison University (JMU), Eastern Mennonite University (EMU), Bridgewater College, Blue Ridge Community College, and Massanutten Technical Center.

Table 6: HR Region Current Top Industries by Location Quotient, 2012

Top Industries	Location Quotient
Educational Services	3.22
Corporate Management	1.62
Accommodation/Food Service	1.51
Real Estate	1.44
Transportation/Warehousing	1.39

Source: IHS Global Insight Business Market Insights (BMI) Data & Forecasts, 2012.

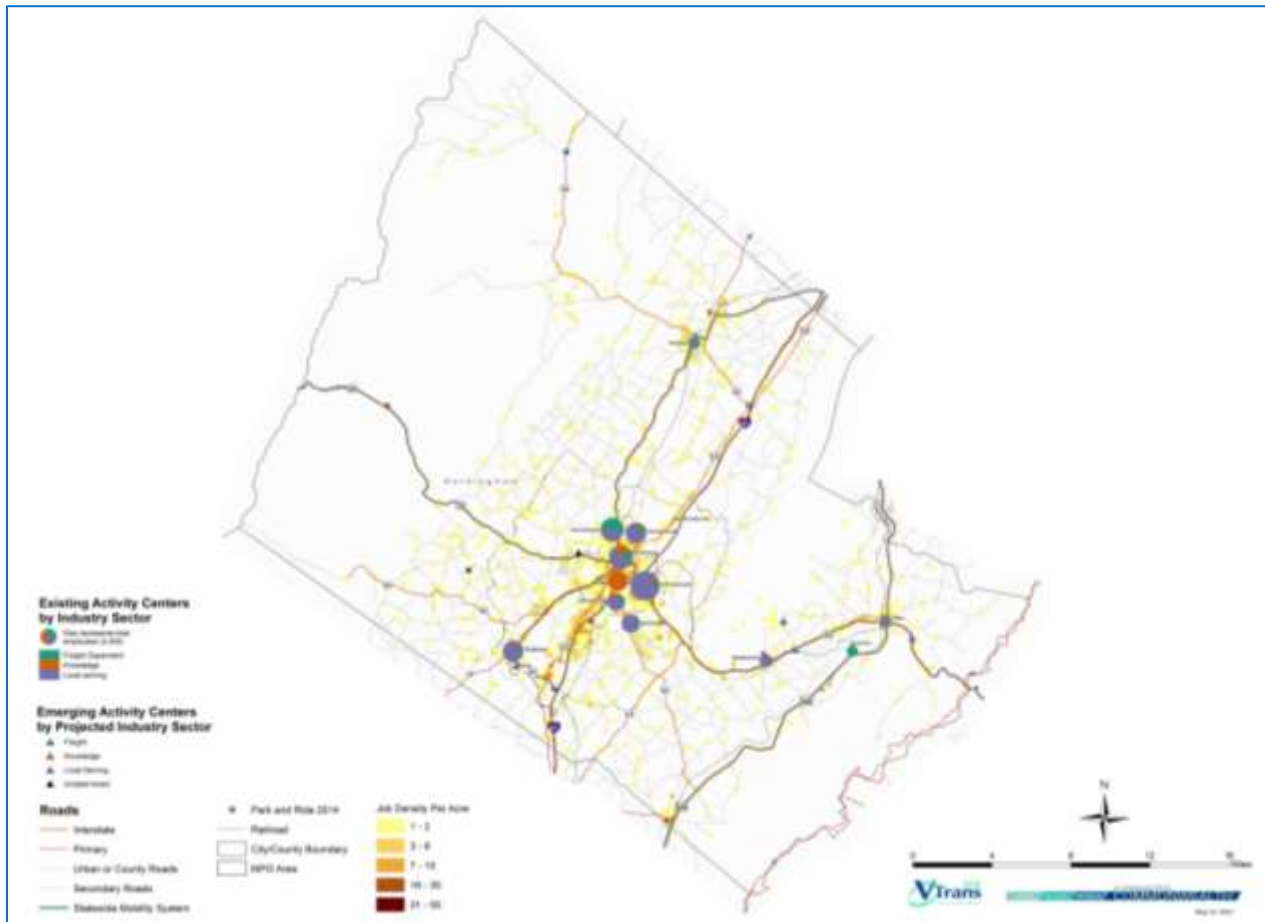
D. Activity Center Analysis

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, drawn with a 1-mile-radius, were then developed for these areas. The Activity Centers were then revised, refined, or amended after discussing economic conditions with regional stakeholders. **Figure 3** below shows the job density per acre in a color range from yellow to dark brown.

Once the 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 Serving, Freight Dependent, and Knowledge-Based 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**).

Regional stakeholders also identified locations where emerging activity centers are projected to develop over the next ten years and provided feedback on which economic cluster is anticipated. These are depicted on the **Figure 3** as triangles.

Figure 3: HR Region Existing and Emerging Activity Center Employment by Industry Sector



Source: InfoUSA data, Regional Stakeholder Input

E. Forecasted 2025 Industry Strengths

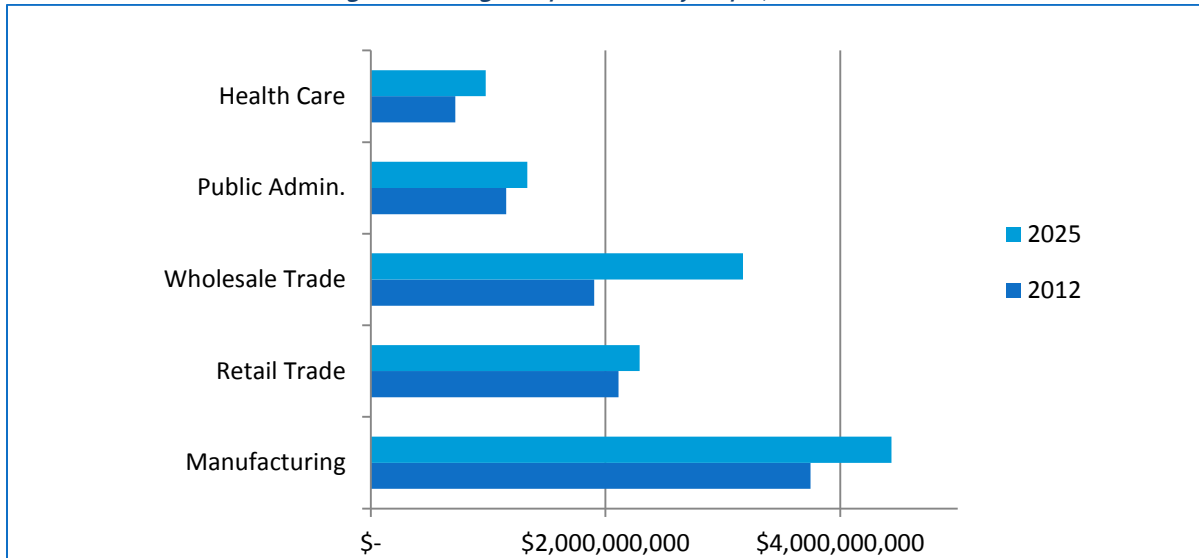
Through a series of work sessions with the HR Region stakeholders, OIPI consultants used economic forecasts for 2025 and got input from stakeholders to determine the future desired economic profiles for each region. 2025 economic forecasts for employment by industry from third party data sources were the primary source for the future economic profiles. However, the intent of this process was not to presuppose the HR Region’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 HR 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

Figure 4 compares the top five industries by economic output in 2012 with forecasted growth by 2025. Three of the five top industries by output are within the local-serving industry sectors, the other two being freight-dependent. Manufacturing is expected to continue to dominate the region’s output during the coming decade. Wholesale trade is expected to increase by almost 30 percent. Though none of the major output generators are listed as the top five fast-growth employment sectors, they play a critical role in the region’s current and future economic productivity.

Figure 4: HR Region Top Industries by Output, 2012 and 2025

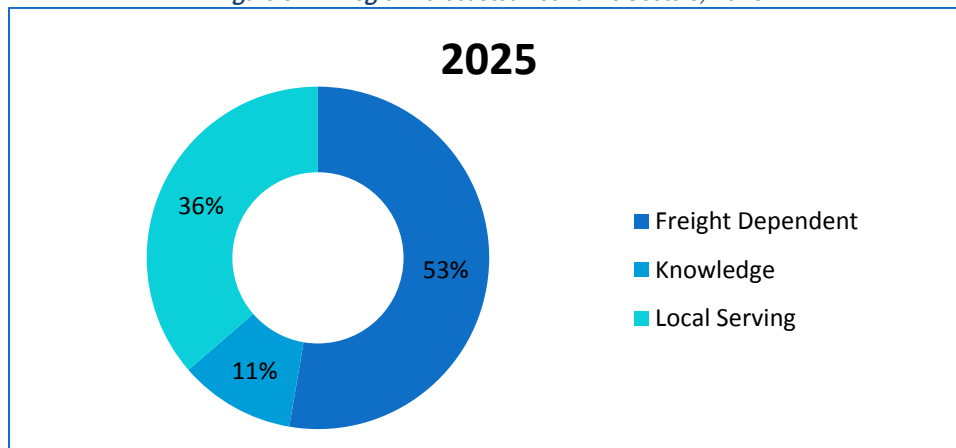


Source: IHS Global Insight Business Market Insights (BMI) Data & Forecasts, 2012.

Forecasted Economic Sectors

Figure 5 illustrates the summary of the forecasted economic clusters in the HR Region for 2025. Freight Dependent industries will still be the predominant economic sector by output in the region at 53 percent.

Figure 5: HR Region Forecasted Economic Sectors, 2025



Source: IHS Global Insight Business Market Insights (BMI) Data & Forecasts, 2012.

Forecasted Industries by Employment

Forecasted top industries by employment for the region are listed in **Table 7**. Health Care, a local serving industry, is expected to be the dominant industry with approximately 18 percent of the workforce followed by the freight dependent Mining/Extraction industry at 14 percent of the workforce.

Table 7: HR Region Forecasted Top Industries by Employment, 2025

Top 5 Industries	Number of Jobs	% of Workforce
Health Care	13,244	18%
Mining/Extraction	10,447	14%
Accommodation/Food Service	8,291	11%
Information	7,449	10%
Construction	5,343	7%

Source: IHS Global Insight Business Market Insights (BMI) Data & Forecasts, 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 HR 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 HR Region:

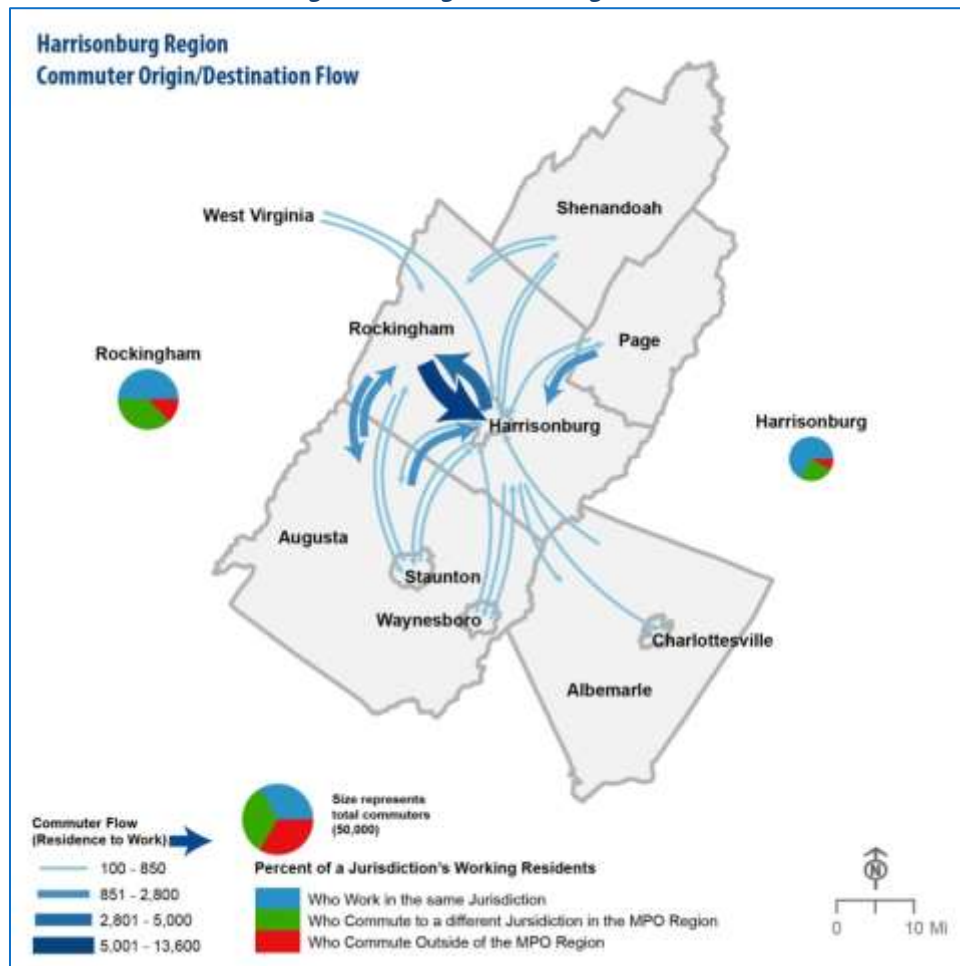
- Commuting Patterns
- Accessibility to Employment
- Roadway Measures
- Freight Measures

B. Commuting Patterns

Regional Commuting Patterns

Figure 6 illustrates the commuting patterns within and among the HR Region localities between 2009 and 2013. The pie charts indicate that the vast majority of the region’s working residents either work within the same jurisdiction that they live or commute to a different jurisdiction within the MPO region. A significant portion of Rockingham County residents commute within the County or to the City of Harrisonburg – and likewise for City of Harrisonburg residents. For those commuting outside of the region, the majority are going either to or from Augusta County or Page County.

Figure 6: HR Region Commuting Patterns



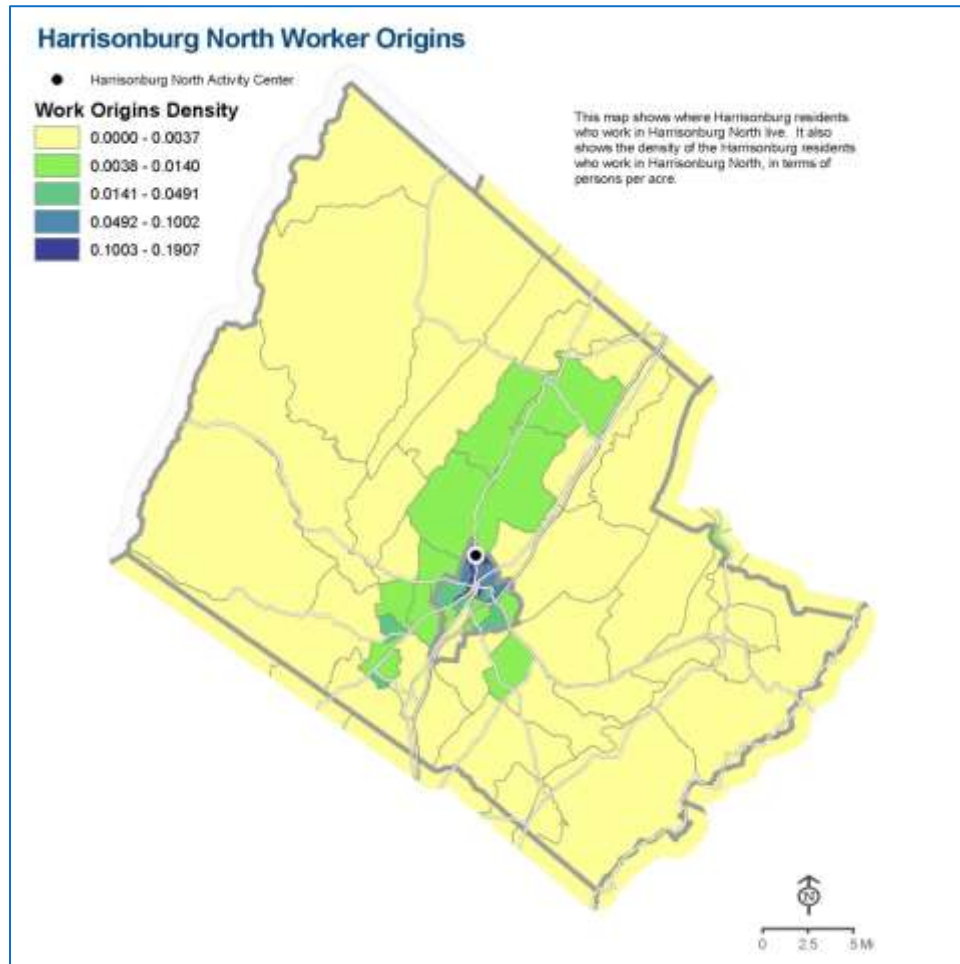
Source: American Community Survey: Residence County to Workplace County Flows for the United States and Puerto Rico Sorted by Residence Geography: 2006-2010.

Activity Center Commuting Patterns

Equally important to the formation of a regional transportation profile for the HR Region was the analysis of commuting patterns between Activity Centers. **Figures 7, 8 and 9** below provide insights into the commuting patterns for three of the Activity Centers in the HR Region. Block groups are symbolized on a color scale from light beige to dark blue, with the darker shades representing the block groups with the largest number of commuters to the Activity Center analyzed within that map.

As shown on **Figure 7**, northern Harrisonburg receives commuters mostly from within the City and along the VA 42 corridor.

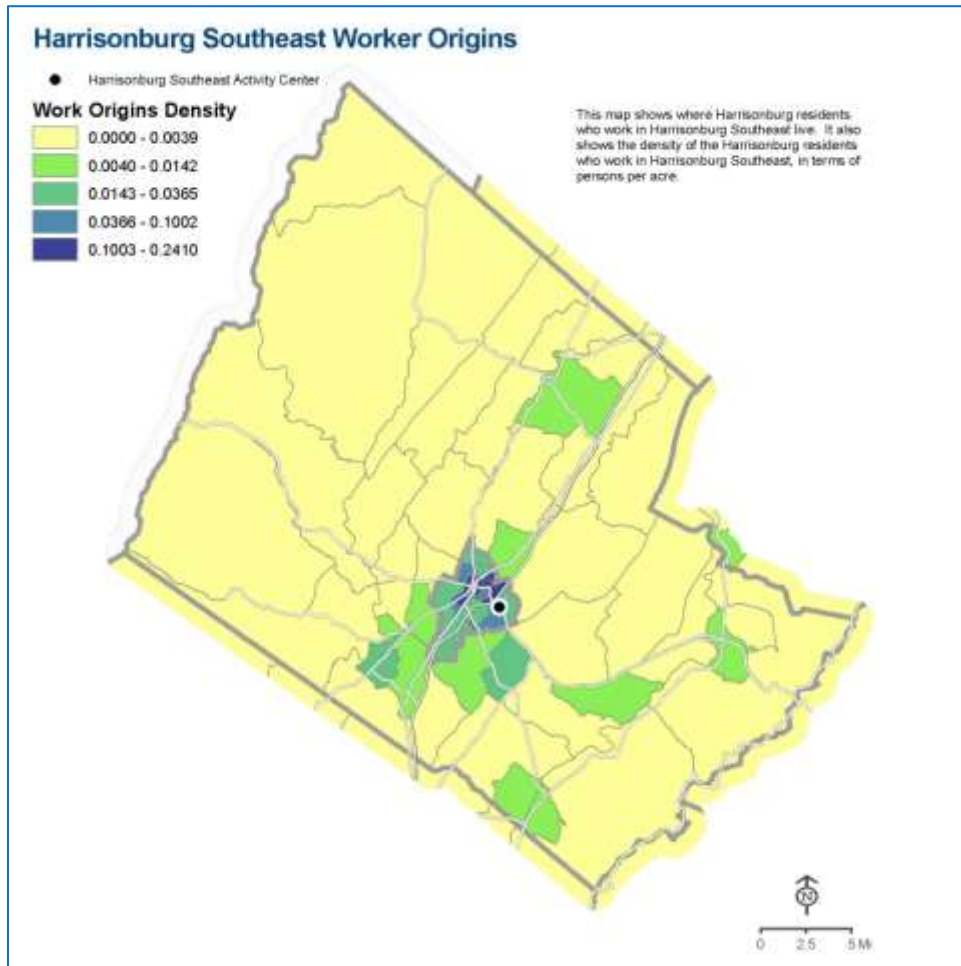
Figure 7: Commuting Patterns to Harrisonburg North Activity Center



Source: Longitudinal Employer-Household Dynamics (LEHD) program which uses Unemployment Insurance earnings data and the Quarterly Census of Employment and Wages (QCEW) data to create statistics on employment, earnings, and job flows at detailed levels of geography and industry and partially synthetic data on workers' residential patterns, <http://lehd.ces.census.gov/>.

The Harrisonburg Southeast activity center receives most of its commuters from the surrounding area but some come from various areas around the region (**Figure 8**).

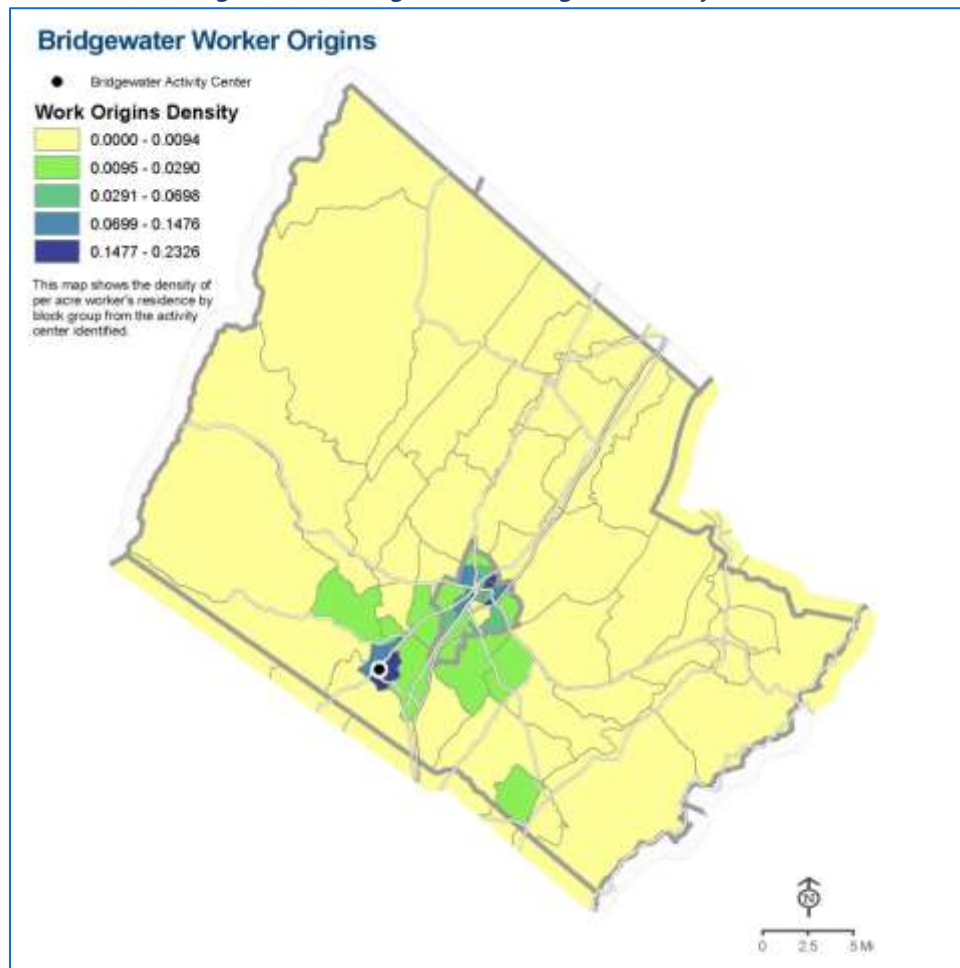
Figure 8: Commuting Patterns to Harrisonburg Southeast Activity Center



Source: LEHD, <http://lehd.ces.census.gov/>.

Figure 9 shows that a majority of commuters to the Bridgewater activity center originate from the City of Harrisonburg or areas adjacent to it.

Figure 9: Commuting Patterns to Bridgewater Activity Center

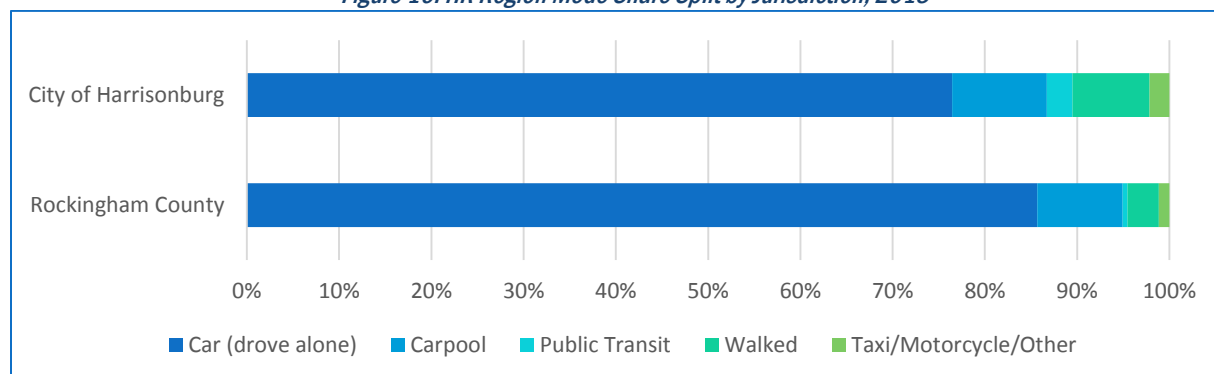


Source: LEHD, <http://lehd.ces.census.gov/>.

Mode Choice

In the HR Region, the majority of commuters drive alone to work. While there is some variation between jurisdictions, cars are used between 74 and 81 percent of the time. For all jurisdictions, carpooling is the second most popular option, accounting for 8 to 10 percent of the mode share. Walking is the highest in the City of Harrisonburg at 8 percent (**Figure 10**).

Figure 10: HR Region Mode Share Split by Jurisdiction, 2013



Source: US Census Bureau, 2009-2013 American Community Survey 5-Year Estimates.

Average Commute Times

The average commute time in the HR Region ranges from 15 to 22 minutes among the three jurisdictions (**Table 7**).

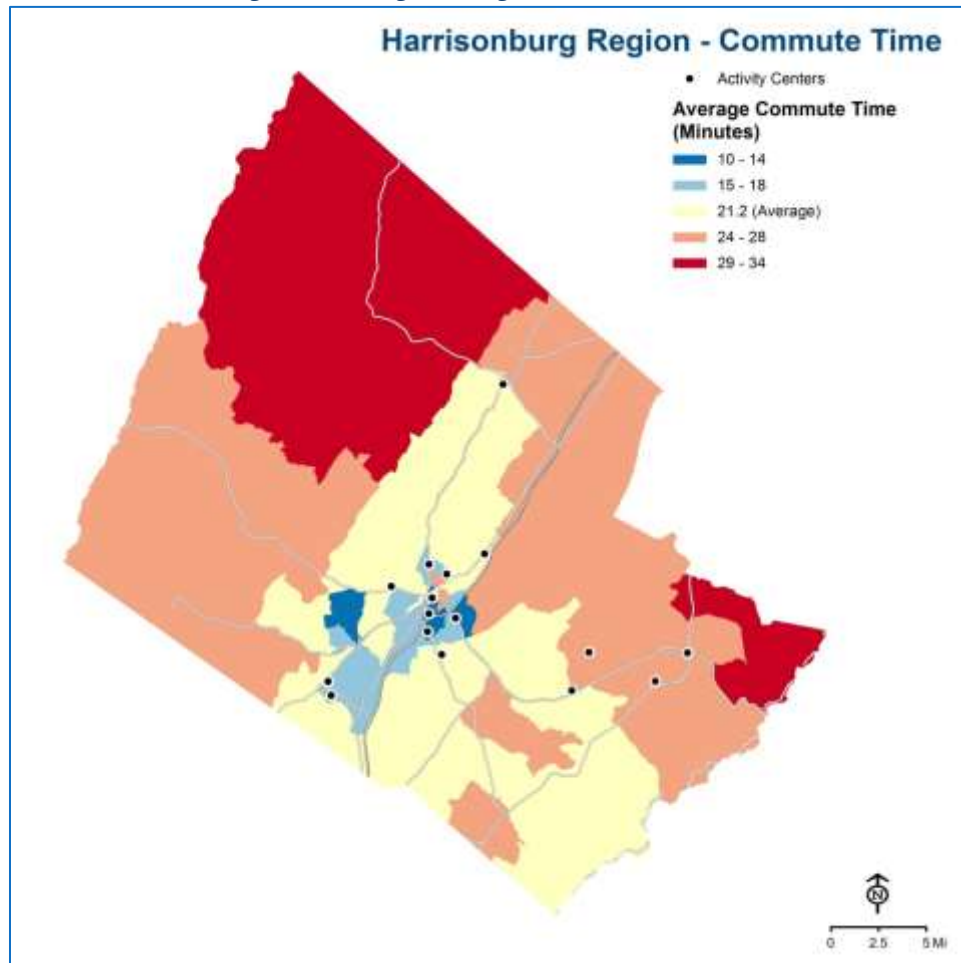
Table 8: HR Region Mean Commute Time, 2013

Jurisdiction	Mean Commute Time (Minutes)
City of Harrisonburg	15.7
Rockingham County	22.1

Source: US Census Bureau, 2009-2013 American Community Survey 5-Year Estimates.

Figure 11 provides a closer look at where longer commutes originate. In the areas within and south of the City of Harrisonburg, commute times are below average for the region as a whole. Block Groups in rural areas of Rockingham County have commute times that are above the regional average of 21.2 minutes, as these areas have fewer jobs in close proximity, and less access to transportation networks than more developed areas.

Figure 11: HR Region Average Commute Times, 2013



Source: US Census Bureau, American Community Survey 2013, 5-Year Estimates.

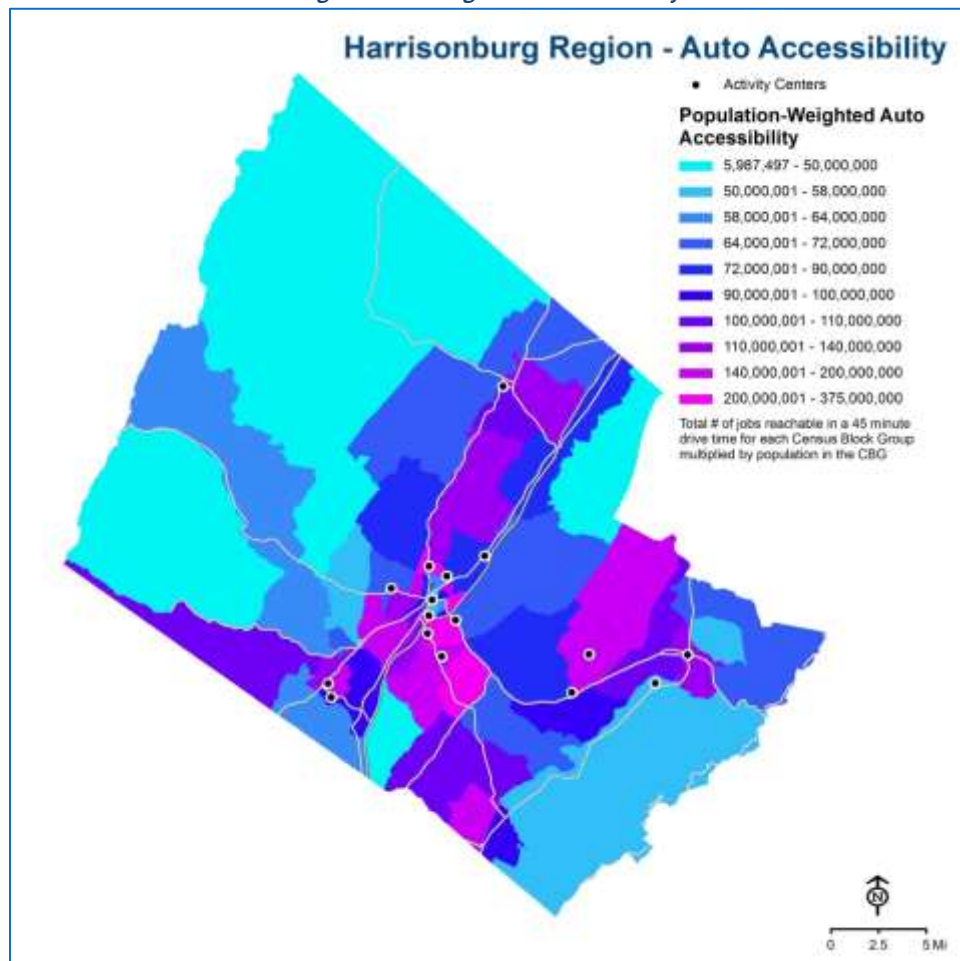
C. Accessibility to Employment

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 general 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 HR 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. Closer jobs and higher density census block groups are weighted more than jobs further away and less dense census block groups. The areas with the highest level of auto accessibility exist within the City of Harrisonburg (Figure 12). Even the most rural areas of the region are within a 45 minute drive of jobs.

Figure 12: HR Region Auto Accessibility

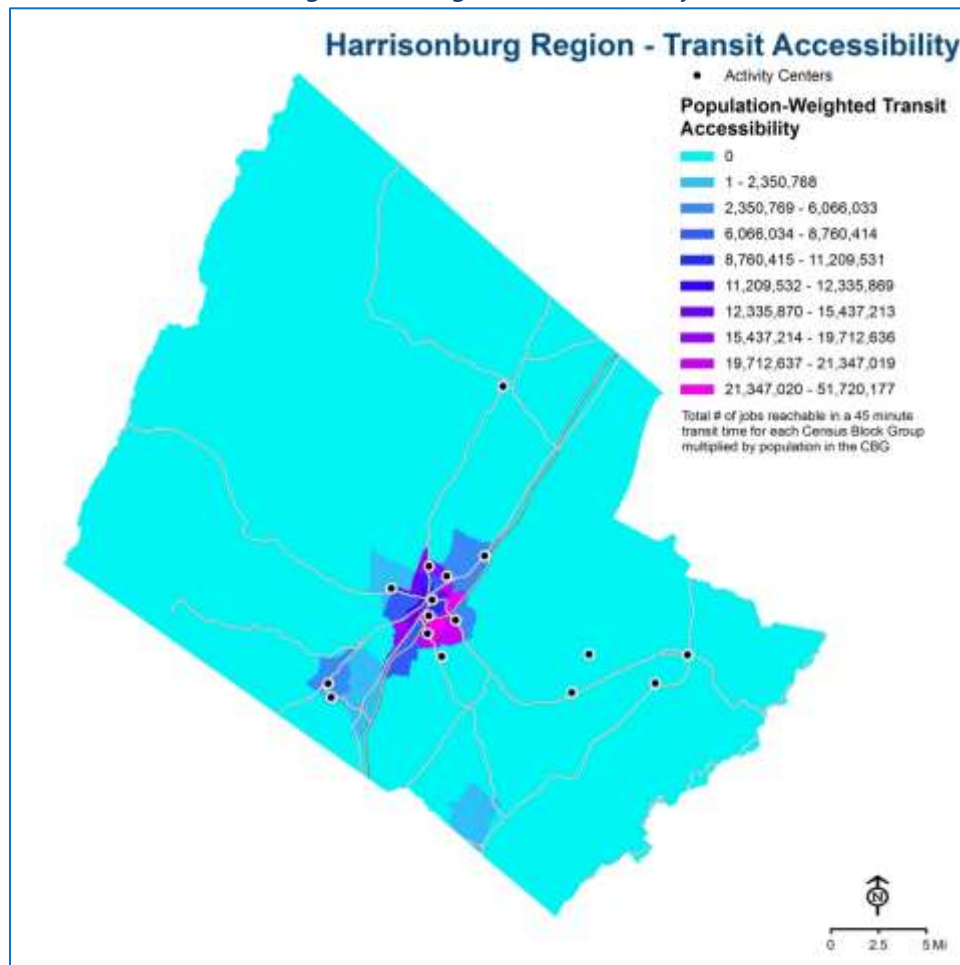


Source: GIS Network analysis of the distance-weighted employment accessible from each census block group along a Navteq roadway network using roadway speeds developed from FHWA HERE data. InfoUSA Business Data, 2012 was used to calculate employment locations.

Transit Accessibility

Figure 13 illustrates the total number of jobs reachable in a 45 minute transit time for each census block group multiplied by population within that census block group. The fixed-route transit options in the HR Region are limited to within the City of Harrisonburg. This is reflected not only in the low (fixed route) transit accessibility scores for large parts of the region, but also the low number of jobs accessible from the high scoring areas. 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.

Figure 13: HR Region Transit Accessibility

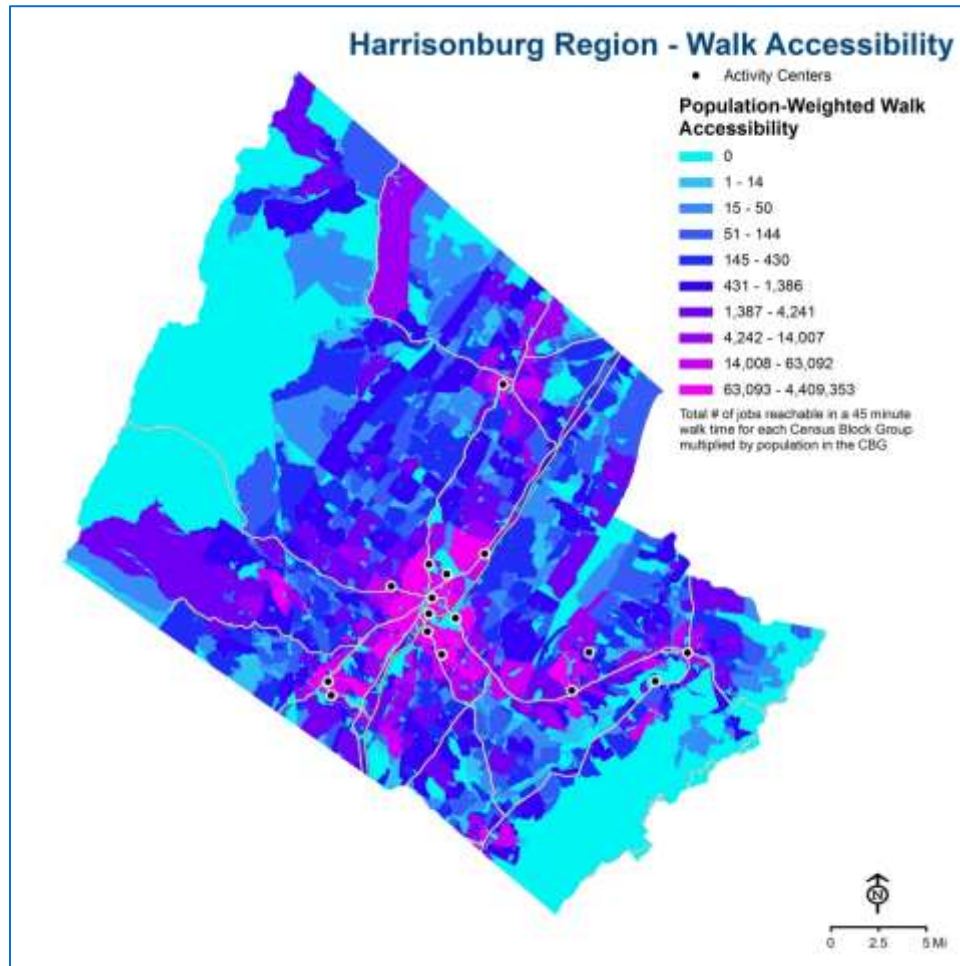


Source: GIS Network analysis of the distance-weighted employment accessible from each census block group along a Navteq roadway network using General Transit Feed Specification (GTFS) transit data and including walk time to and from stations. InfoUSA Business Data, 2012 was used to calculate employment locations.

Walk Accessibility

Figure 14 reveals a regional pattern of mixed use development in communities where residents live within walking distance of thousands of jobs and/or the services represented by those jobs. The areas within and surrounding the City of Harrisonburg scored the highest, as was expected. The high variability within even the highest scoring areas reflects the significance of land use and job density in determining walk accessibility.

Figure 14: HR Region Walk Accessibility

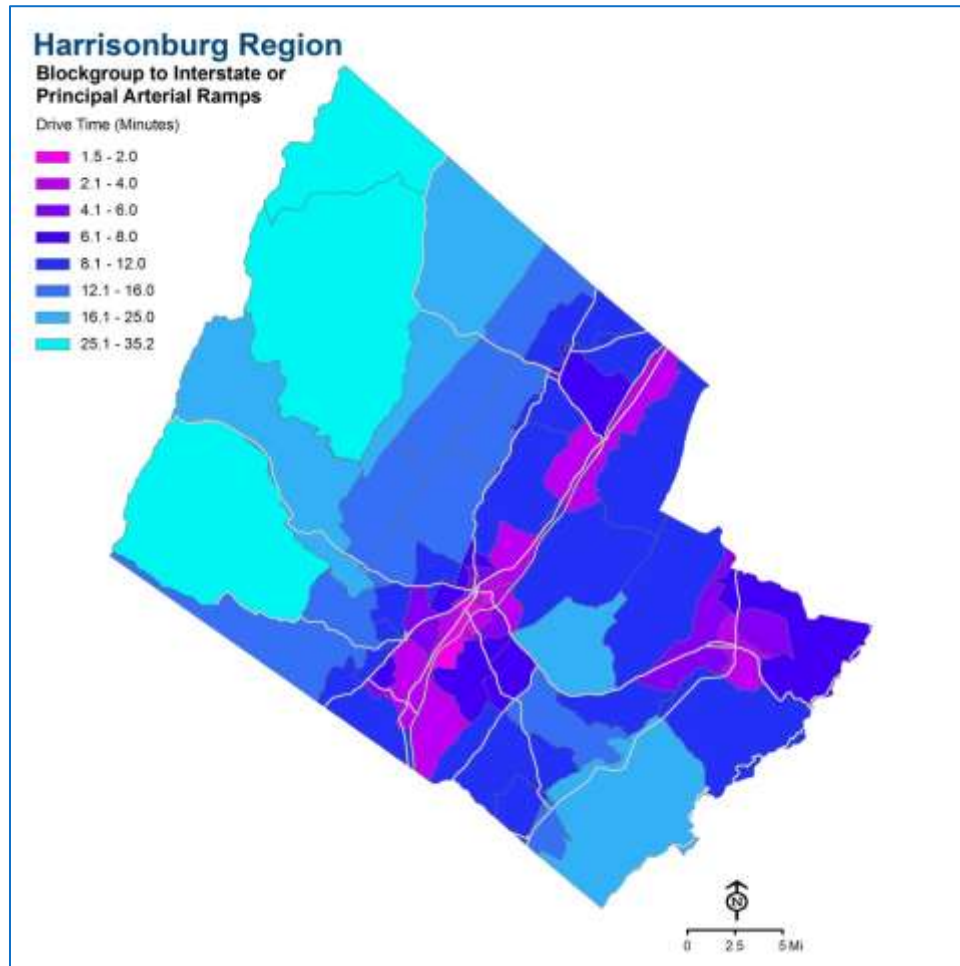


Source: GIS Network analysis of the distance-weighted employment accessible from each census block group along a Navteq roadway network using roadway characteristic data to interpolate walkability. InfoUSA was used to calculate employment locations.

Freight Accessibility

In addition to railways, I-81 is the major corridor for freight movement throughout the region. Accessibility of freight origins to this interstate is dependent primarily on the proximity of the origin to highway access ramps. In the region the shortest drive times are found along I-81 and where US 33 and US 340 meet in Elkton. Even the most rural parts of the region are within a 35 minute drive of a highway interchange (**Figure 15**).

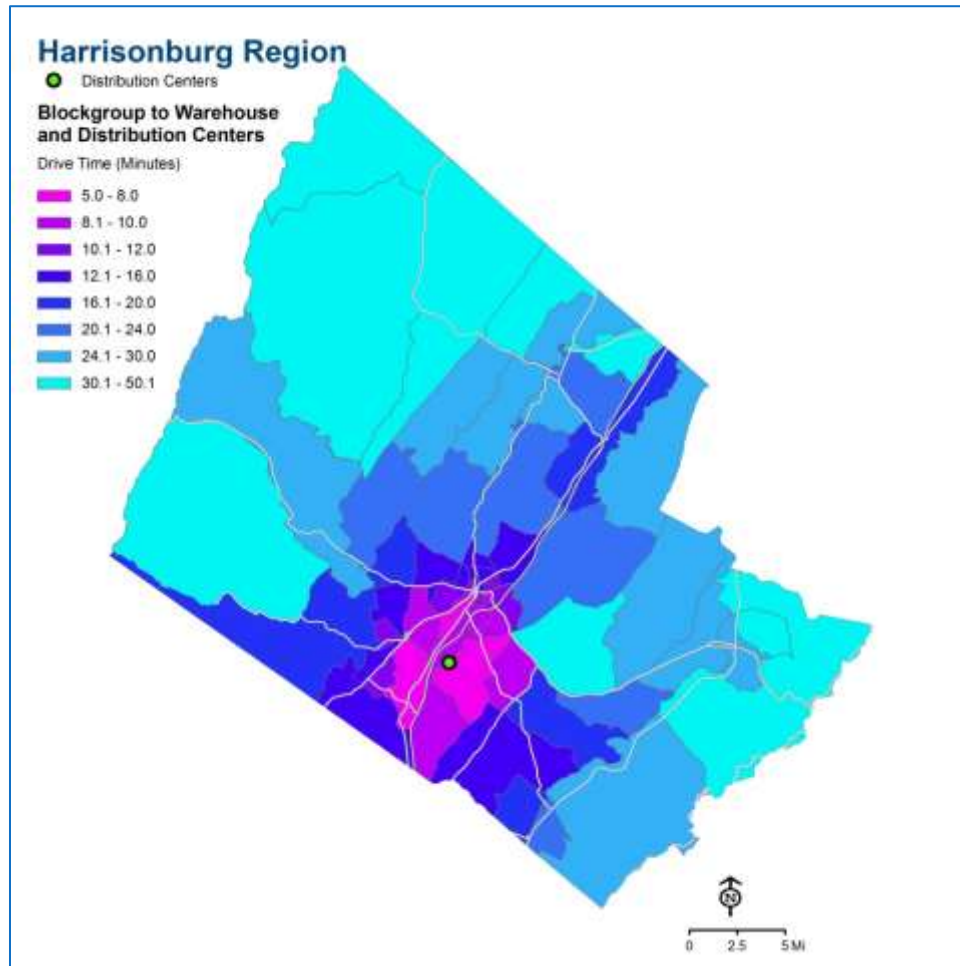
Figure 15: HR Region Access to Interstate and Principal Arterial Ramps



Source: GIS analysis conducted using US Census Boundary Files, ramps from Navteq database.

The location of warehouses and distribution centers is another important factor in the level of freight accessibility for the region. There is one warehouse or distribution center located off of US 11 and US 340. Access to it is the greatest within the south-central portion of the region, averaging less than a 10 minute drive (**Figure 16**).

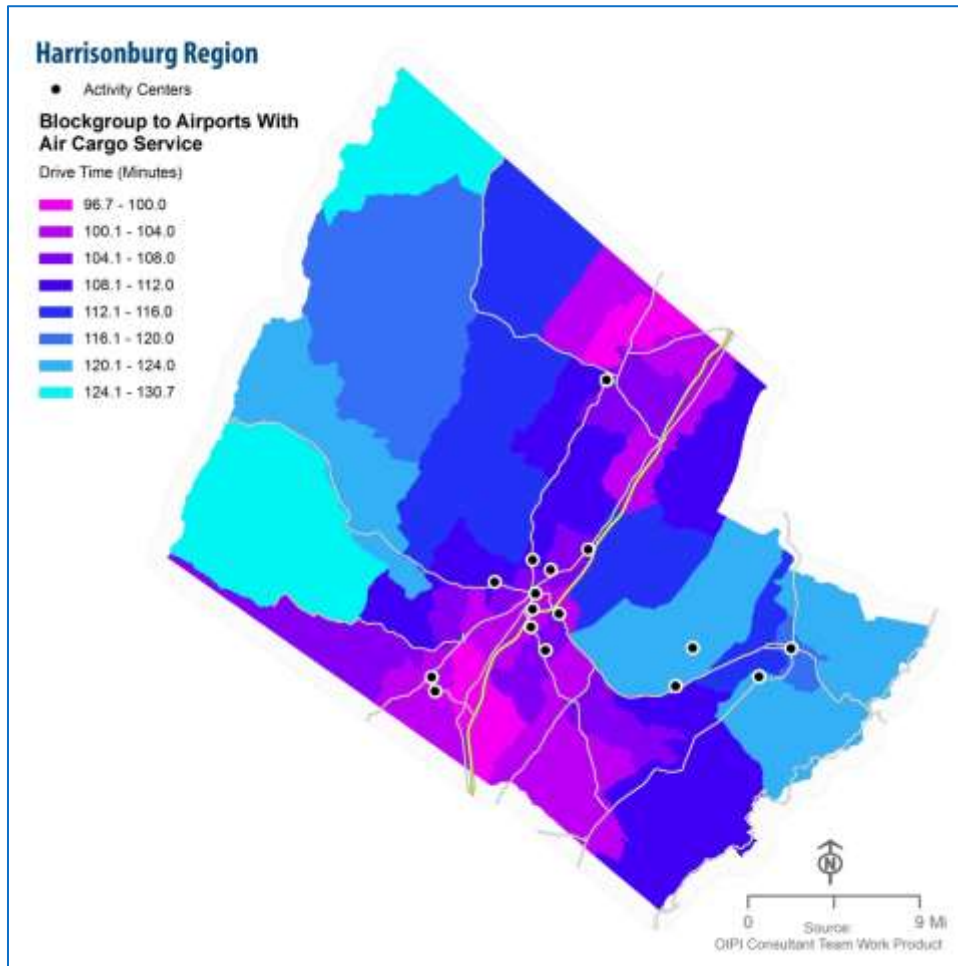
Figure 16: HR Region Access to Warehouses & Distribution Centers



Source: GIS analysis conducted using US Census Boundary Files and Virginia Office of Intermodal Planning and Investment data on Warehouse and Distribution Center Locations.

Figure 17 displays proximity to commercial service airports that handle air cargo, which is important for some types of freight distribution. In general, the HR Region is within a 90 minute to 2 hour drive to the closest airport that handles air cargo.

Figure 17: HR Region Access to Airports with Air Cargo Service



Source: GIS analysis conducted using US Census Boundary Files and location of airports with air cargo service.

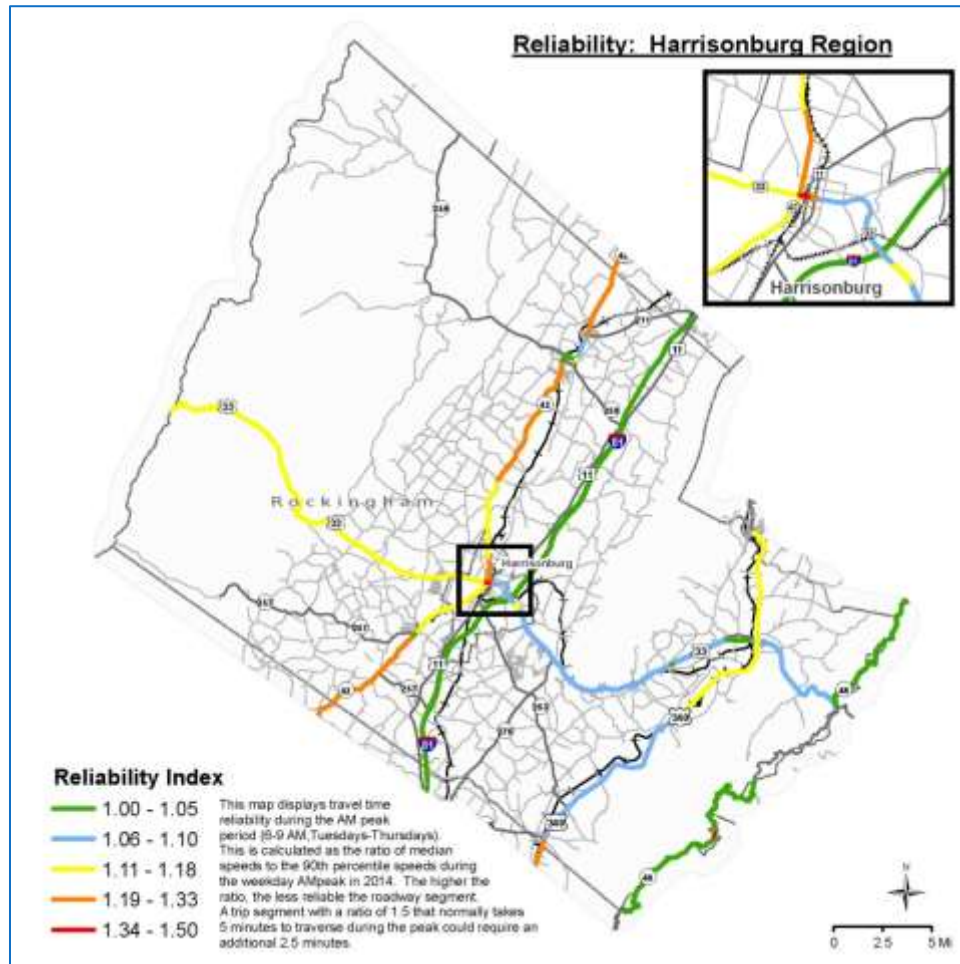
D. Roadway Measures

This assessment identified the transportation conditions in the HR 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 80th percentile travel time during the weekday AM peak period in 2014. Overall, scores indicate that travel time is very reliable for the corridors with available data. The VA 42 corridor has a slightly higher travel time reliability index compared with the other corridors analyzed, however, it equates to a few minutes of additional travel time.

Figure 18: HR Region Travel Time Reliability



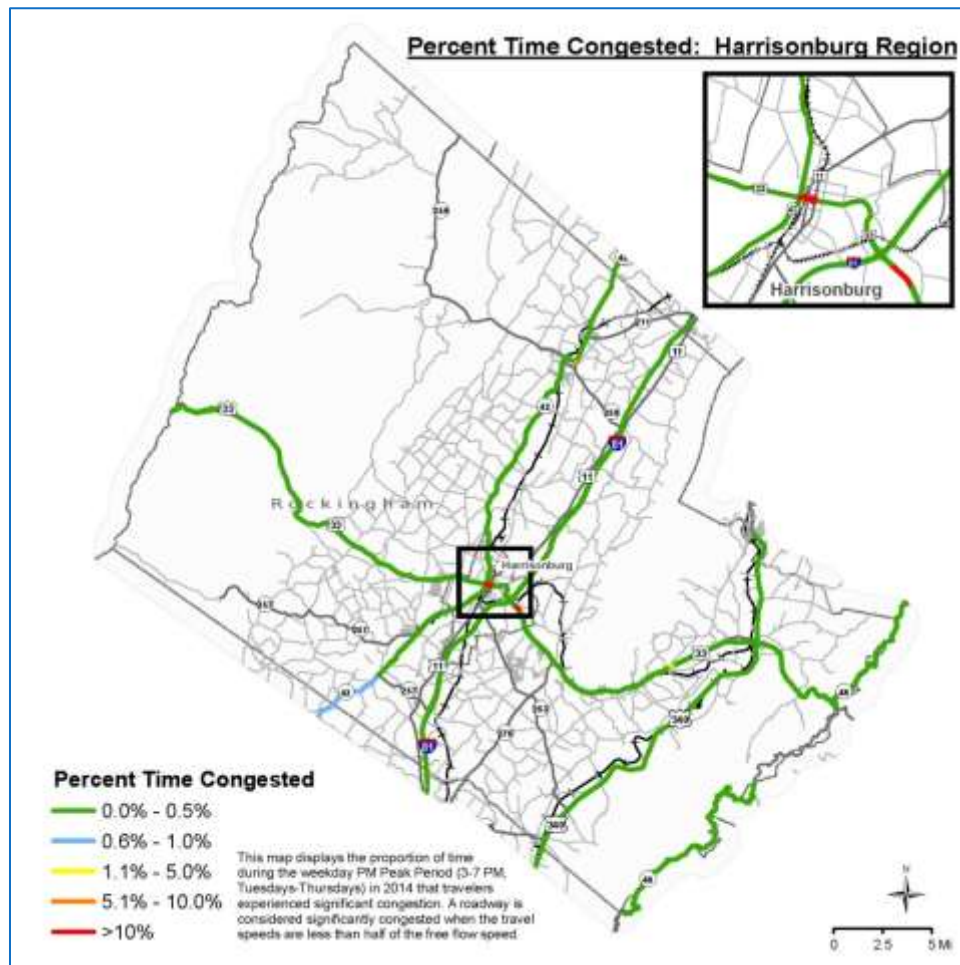
Source: INRIX Data and Virginia Department of Transportation

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

Percent of Time Congested

Percent of time congested is an important determinant of roadway Level of Service. The percentage of time congested was calculated for evening peak times in 2014. According to the analysis, a majority of the corridors analyzed are congested less than 0.5 percent of the time (**Figure 19**). A few intersections on US 33 and VA 42 experience slight congestion.

Figure 19: HR Region Percent of Time Congested

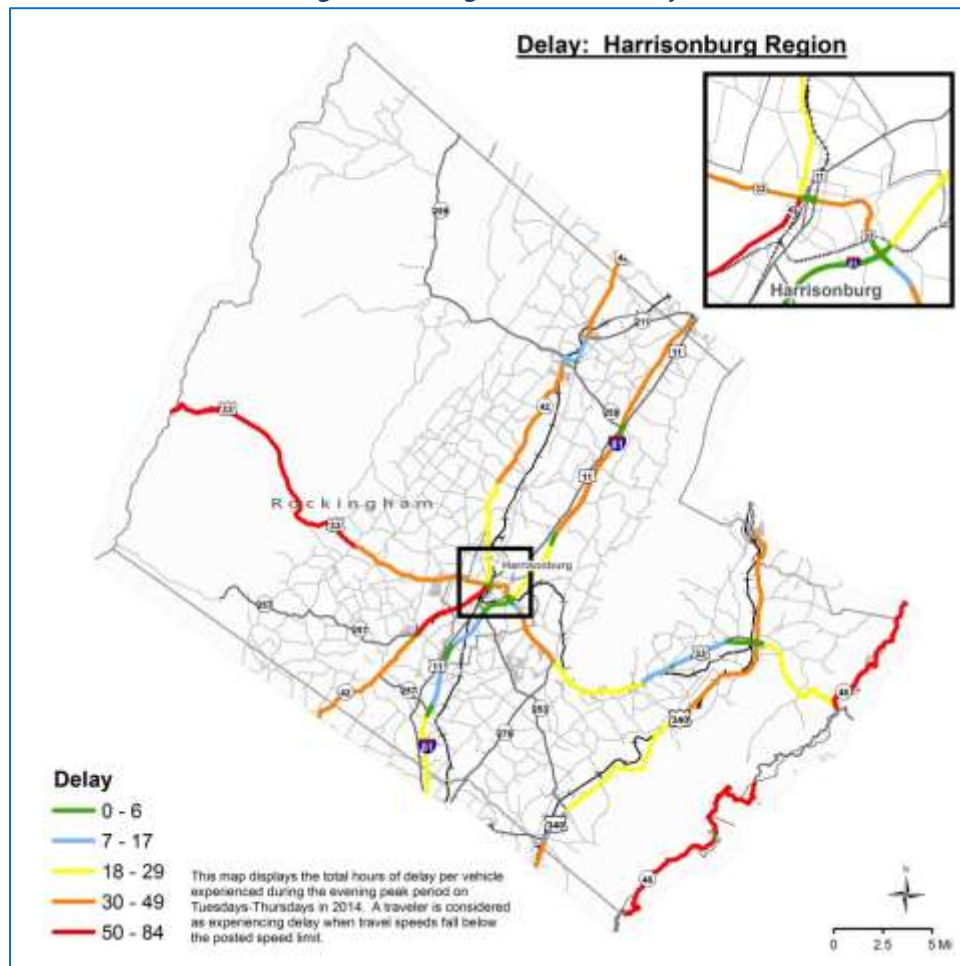


Source: INRIX Data and Virginia Department of Transportation.

Travel Time Delay

Travel time delay is defined as the total hours of delay per vehicle during weekday evening peak times in 2014. If travel speeds fall below the posted speed limit, a trip is considered delayed. In the HR Region, the most significant delays occurred along portions of US 33, VA 48, and VA 42 (Figure 20).

Figure 20: HR Region Travel Time Delay

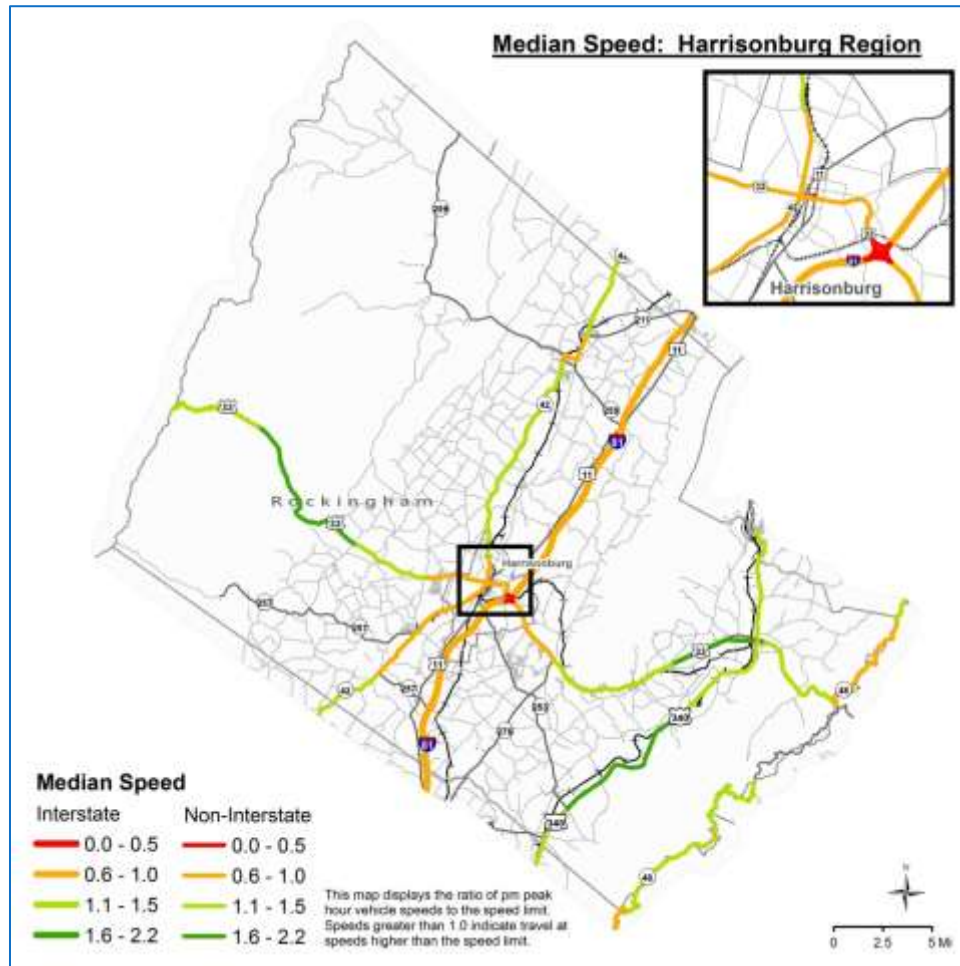


Source: INRIX Data and Virginia Department of Transportation.

Median Speeds

The median speed map (**Figure 21**) displays the ratio of pm peak hour vehicle speeds to the speed limit for both interstate and non-interstate corridors in 2014. Speeds greater than 1.0 indicate travel at speeds higher than the speed limit. The I-81 corridor and a portion of the US 11 corridor south of US 33 experience median speeds of less than 1.0.

Figure 21: HR Region Median Speeds



Source: INRIX Data and Virginia Department of Transportation.

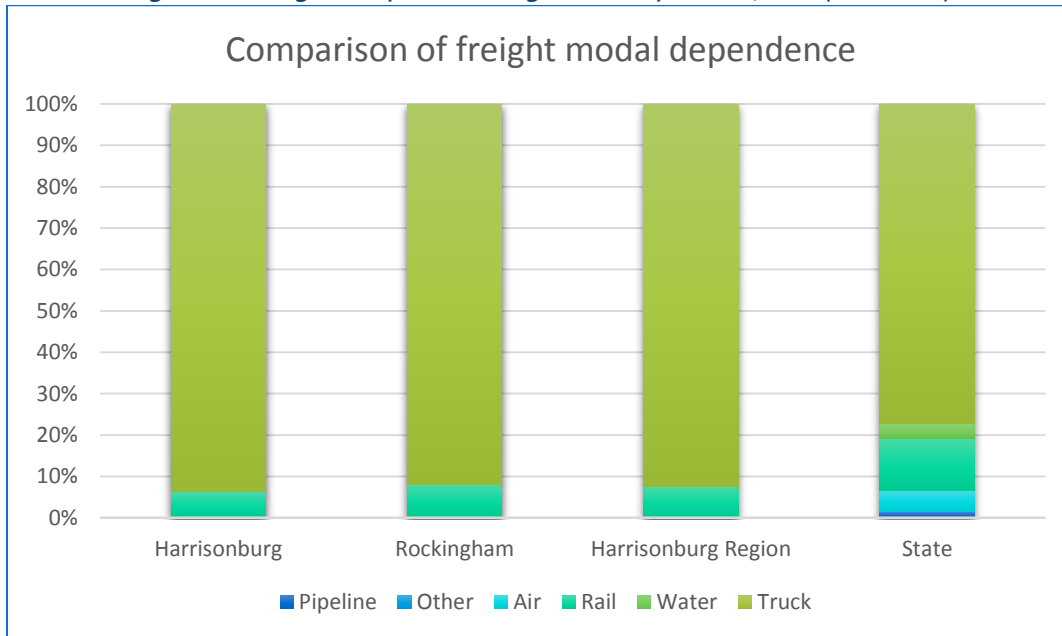
D. Regional & Local Commodity Flows

Another set of measures vital to the regional transportation profile are specific to the regional and local commodity flows via the various freight corridors in the region. 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

In the HR Region, about 92 percent of the dollar value of all goods that are moved through the region are moved by truck (**Figure 22**). The region does not utilize pipeline, air, or water freight modes. The region uses rail, but is just over half as dependent on rail as the state as a whole.

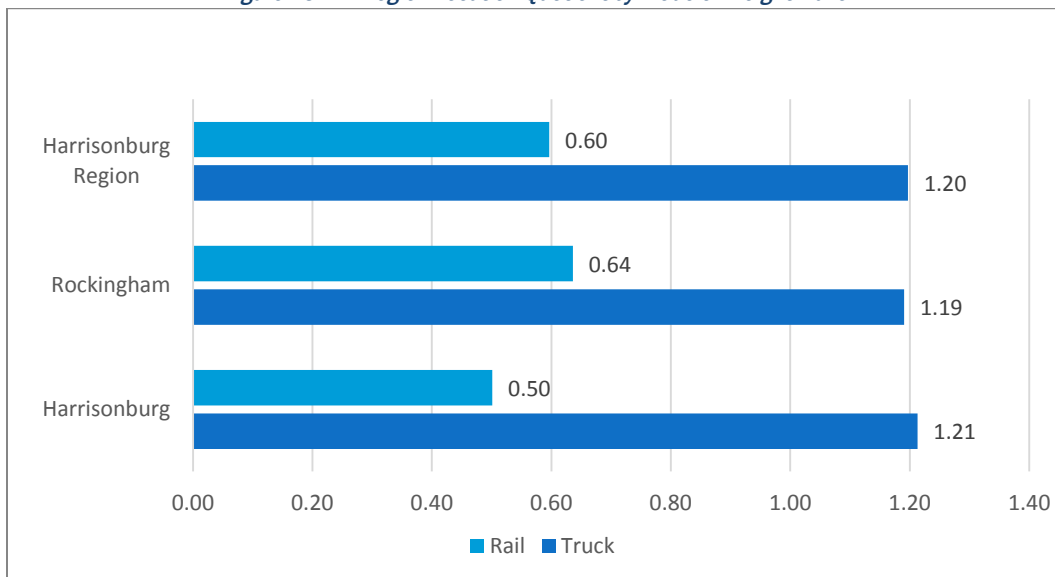
Figure 22: HR Region Comparison of Freight Modal Dependence, 2012 (in \$Millions)



Source: TranSearch, 2012

Location Quotients are used to compare the prominence of freight modes between the HR Region, and the State as a whole. The HR Region relies on rail for freight movement only 0.60 times and on trucks for freight movement 1.20 times more than the State does as a whole (**Figure 23**).

Figure 23: HR Region Location Quotient by Mode of Freight Travel

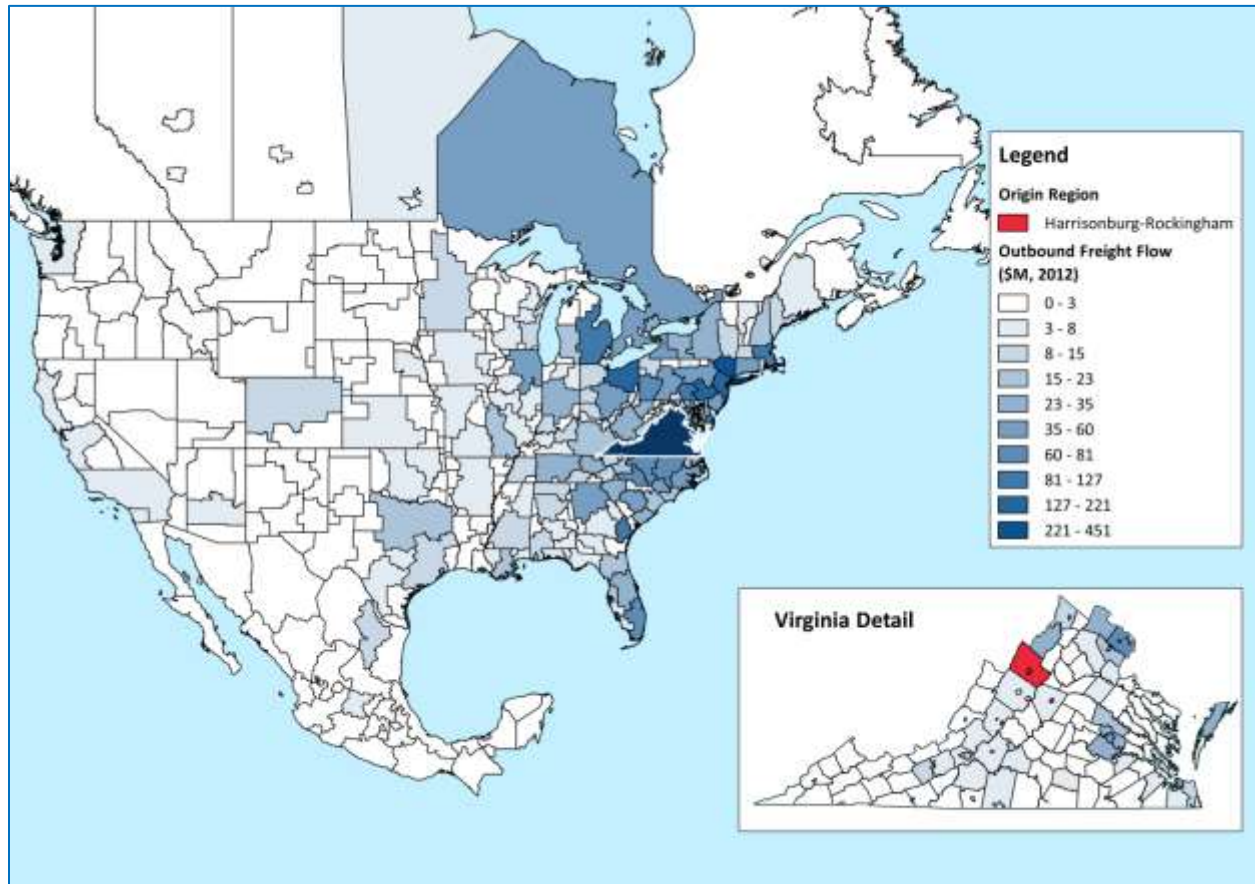


Source: Transearch, 2012

Top Commodities

Outbound locations for freight by value from the HR Region in 2012 are shown in **Figure 24**. A majority of the freight in terms of value originating in the region is destined for states along the eastern seaboard.

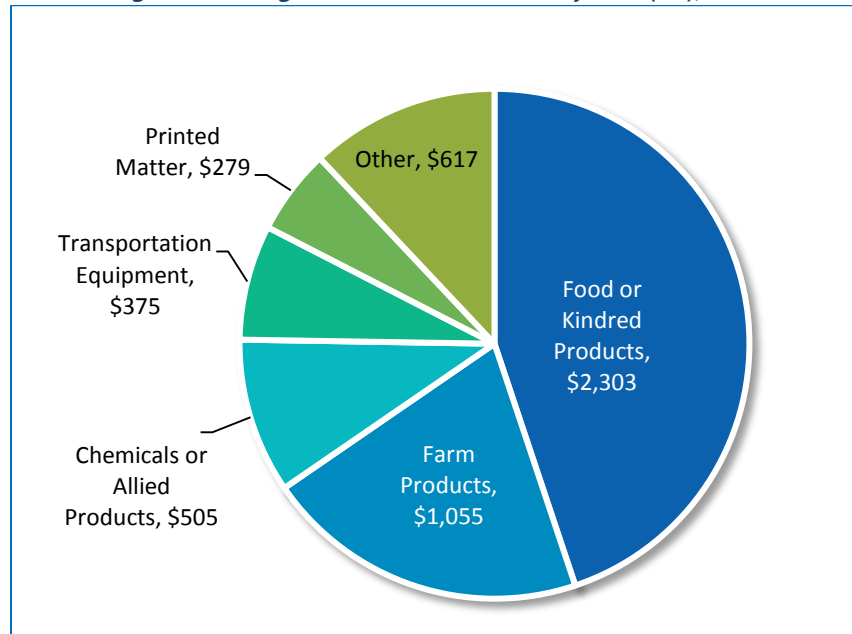
Figure 24: Outbound Freight Flow from the HR Region, 2012



Source: Transearch, 2012

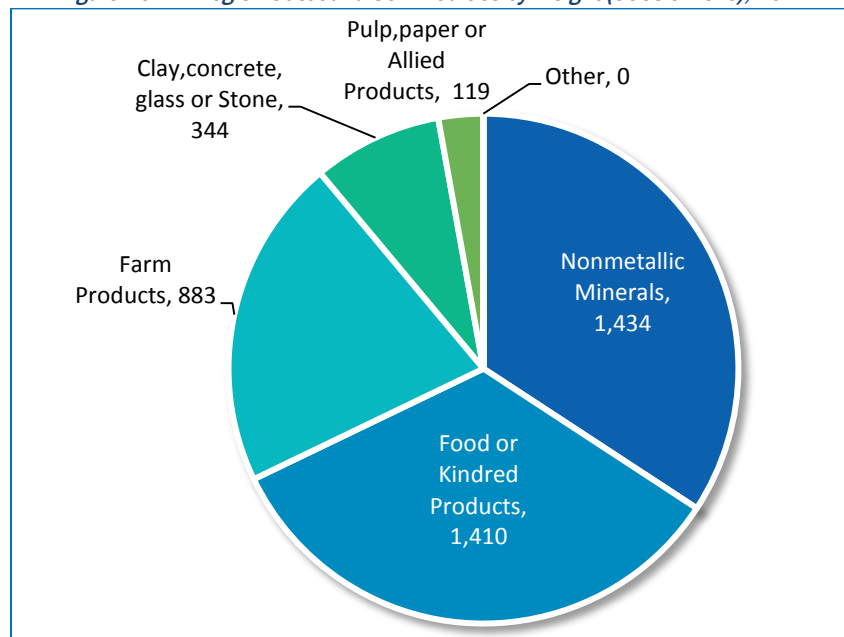
Figures 25 and 26 summarize the value and tonnage of commodities that originated in the HR Region in 2012. Over 65 percent of the outbound commodities in terms of value are food and agriculture related products. The largest commodity by weight was nonmetallic minerals followed closely by food products.

Figure 25: HR Region Outbound Commodities by Value (\$M), 2012



Source: Transearch, 2012

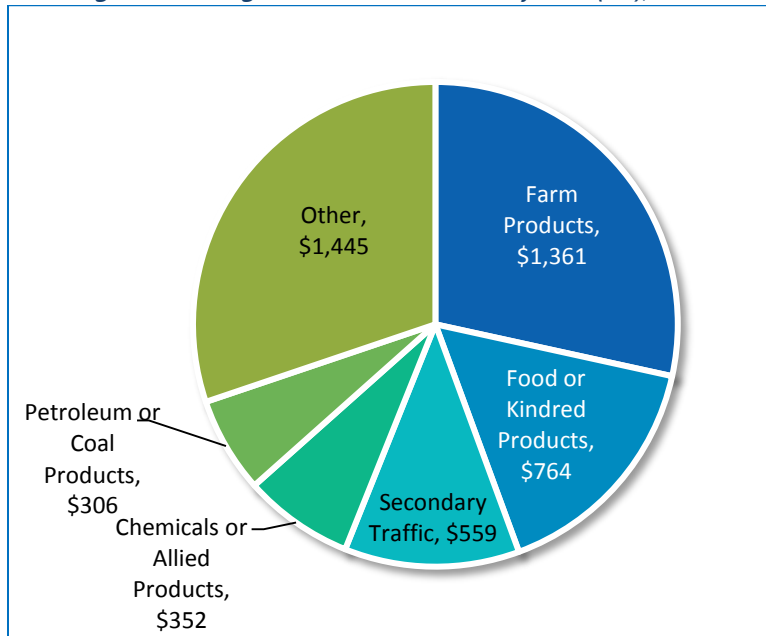
Figure 26: HR Region Outbound Commodities by Weight (000s of Tons), 2012



Source: Transearch, 2012

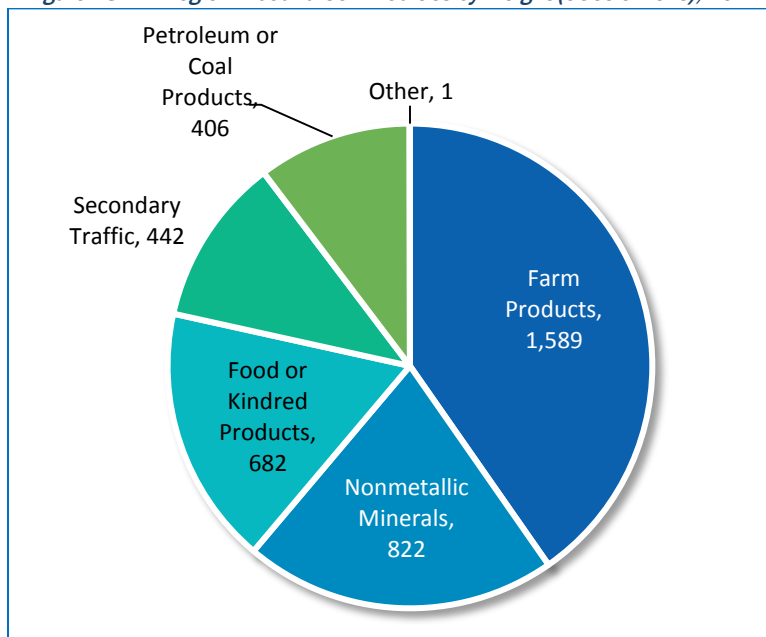
Figures 27 and 28 summarize the value and tonnage of commodities that were destined for the HR Region in 2012. Almost 59 percent of commodities in terms of value were farm and other products. The largest commodity by weight was farm products.

Figure 27: HR Region Inbound Commodities by Value (\$M), 2012



Source: Transearch, 2012

Figure 28: HR Region Inbound Commodities by Weight (000s of Tons), 2012



Source: Transearch, 2012

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. The key economic and transportation conditions have been identified in the Economic and Transportation profiles above and key correlations have been described above as Economic and Transportation Linkages.

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 Needs. The Needs Assessment also uses a spatial analysis for the HR 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 (Passenger and Freight Reliability, Bottleneck Relief, Modal Choice and Walkability), as well as general Non-Capacity Needs (i.e. Safety, Operations and State of Good Repair Needs). 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 OIPI 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 21st century workforce needed for each region's 2025 economy.

B. Economic and Transportation Needs Correlation

The OIPI consultant team conducted a number of research efforts aimed at identifying key correlations between industries and their transportation needs. 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 **Table 9** only represents

where there were apparent correlations between industry sectors and basic categories of transportation needs.

Table 9: Economic and Transportation Correlation

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

Source: Summary correlations based on national research and survey of national Industry Site Selection Professionals conducted by OIPI Consultant Team.

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 HR Region, it showed a predominance among the Freight Dependent economic sector at 53 percent. The Local Serving economic sector accounts for about a third of the economy with Knowledge-based industries accounting for 11 percent of the economic output. As outlined in the Economic and Transportation Correlation table above, the Freight Dependent sector priority transportation needs include highway access, bottleneck relief, freight reliability, and freight accessibility.

In addition, the local input received in the outreach to regional stakeholders and in local plans such as the Comprehensive Economic Development (CEDS) plan for the region indicate a strong desire to continue to support the industrial, commercial and agricultural industries, particularly with respect to goods movement needs, but also to support the expected growth of the health care, high tech and tourism industries with the need for reliable commuting and additional modal travel options.

This translates into transportation needs such as freight and passenger reliability on the region’s key corridor, such as I-81, US 250 and US 11. It also indicates the need for addressing any bottlenecks along these corridors to further support reliable travel for both commuters and goods movement as well as provide improved modal choices and transportation demand management for commuters. In addition, the US 33, US 340, VA 42, VA 253, VA 259, and VA 211 corridors support multiple existing and emerging activity centers in the region, are important freight and commuter routes, and serve economic growth in the City of Harrisonburg.

The forecasted growth in the Freight Depending economic sector for this region brings the potential for additional transportation needs such as freight reliability and accessibility, as well as access to the interstate to support the movement of goods while minimizing conflict with passenger travel. Transportation needs in the region should also include supporting the existing Local and Knowledge-Based economic sectors which drive many of the existing activity centers. These activity centers would benefit from improved access to modal options and additional transportation demand management programs to provide better workforce access. Further support for the Local Serving sector would also come from enhanced walkable and bikeable places.

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

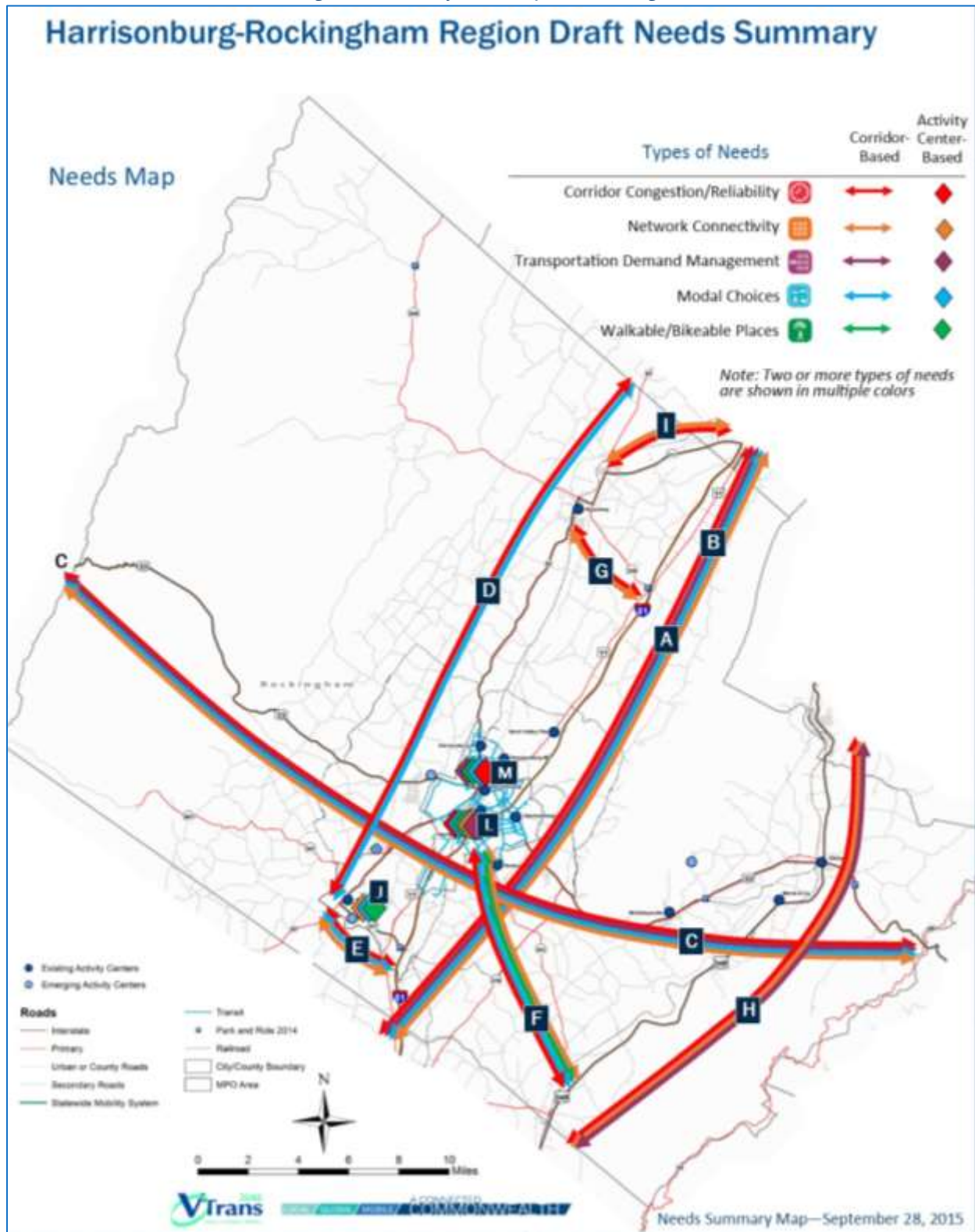
Summary of Needs

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.

Map of Needs

Figure 29 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.

Figure 29: Summary Needs Map for the HR Region



Findings of Needs

Table 10 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:

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 in the economic and transportation profiles. 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 30: Transportation Icons for Needs Assessment














Table 10: Findings of Needs for the HR Region

A. I-81 Corridor and Interchanges	
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Need</p> <p style="writing-mode: vertical-rl; transform: rotate(180deg);">Economic</p> <p style="writing-mode: vertical-rl; transform: rotate(180deg);">Transportation</p>	<p>The I-81 corridor is the principal high volume, high mobility artery in the region and serves interstate, regional and local travel. It accommodates demand from both commuter and freight traffic, and connects Rockingham County to other parts of Virginia. There is a need to mitigate inconsistent travel times at Exits 245 and 247. Transportation demand management services and modal choices within the corridor to improve commutes and access to recreational and tourist destinations are needed. I-81 bisects the City of Harrisonburg and James Madison University Campus and is a barrier to local network connectivity.</p>
	<p>A number of existing and emerging activity centers along the I-81 corridor serve local, freight dependent, and knowledge-based industries for both goods movement and commuter traffic. The corridor is an essential and high-priority corridor for freight movement. It connects activity centers of all types and supports tourism.</p>
	<p>I-81 has intermittent passenger and freight reliability and bottleneck issues at several interchanges in the region. Additional modal choices for passenger service to inter-regional markets are vital to supporting the regional economy. Multimodal access to jobs is lacking. I-81 accommodates high volumes of through freight traffic.</p>
B. US 11 Corridor	
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Need</p> <p style="writing-mode: vertical-rl; transform: rotate(180deg);">Economic</p> <p style="writing-mode: vertical-rl; transform: rotate(180deg);">Transportation</p>	<p>The US 11 corridor is a north/south artery in the region, parallel to I-81, that provides access to local destinations. Multiple existing and emerging activity centers serving both passengers and freight are located near the corridor. Improved passenger and freight reliability, modal choices, network connectivity, and transportation demand management services are needed.</p>
	<p>A number of existing and emerging activity centers along the US 11 corridor serve local, freight dependent, and knowledge-based industries for both freight and commuter traffic.</p>
	<p>US 11 is a major connector between activity centers in the HR Region and an alternative travel corridor when I-81 is congested due to incidents. Multimodal access to jobs is lacking. This is a freight corridor. Vehicular safety is a concern along portions of the corridor.</p>







C. US 33 Corridor

Need	 	The US 33 corridor is an east/west artery in the region connecting passengers and freight with West Virginia and Greene County. Improved modal choices, corridor reliability, transportation demand management services, and network connectivity are needed.
	 	
	 	
Economic	 	Multiple existing local serving activity centers are located along US 33 between downtown Harrisonburg and Elkton.
Transportation	 	The US 33 corridor is the primary east/west connector in the region, a commute corridor from West Virginia, and lacks safe bicycling and pedestrian facilities. The section of the corridor between the City of Harrisonburg and US 340 needs improved freight and passenger reliability. A regional park is located along US 33.
	 	
	 	

D. VA 42 Corridor

Need	 	The VA 42 corridor is a north/south artery in the region connecting the City of Harrisonburg to the local serving Bridgewater activity center. There is a need to mitigate congestion from freight traffic along the northern part of VA 42 between Broadway and the City of Harrisonburg, as well as the southern portion of VA 42 through Bridgewater. There is a lack of east-west connectors from VA 42 to I-81.
		
Economic	 	VA 42 supports passenger and freight traffic between the Broadway, Harrisonburg, and Bridgewater activity centers which serve mostly freight-dependent and local serving industries.
Transportation	 	VA 42 lacks modal options including transit, bicycling and pedestrian facilities along portions of the corridor. Improved reliability for both passenger and freight traffic is needed.
	 	
	 	

E. VA 257 Corridor

Need	 	The VA 257 corridor serves as an east/west local connector in the region connecting the local serving Bridgewater activity center with I-81. There is also a need to mitigate congestion from freight traffic coming off of I-81 headed to various industrial, commercial, and agricultural facilities in the region.
		
Economic	 	VA 257 supports the local serving Bridgewater activity center as well as freight traffic connecting from I-81 to various agricultural, industrial, and educational facilities in the region.
		

E. VA 257 Corridor

Transportation

This corridor runs through the Bridgewater College campus and lacks modal options including transit, bicycling and pedestrian facilities. Connectivity between VA 42 north of Bridgewater and VA 257 east of Bridgewater is lacking. The corridor experiences intermittent congestion from the influx of local traffic and pedestrian activity as it enters the Town of Bridgewater.

F. VA 253 Corridor

Need

The VA 253 corridor connects the City of Harrisonburg southeast to US 340 with the Sentara RMH Medical Center local serving activity center as well as the Massanetta Springs residential area located along the corridor. There is a need for improved modal choices, improved passenger reliability, network connectivity and enhanced walkable/bikeable places in the Massanetta Springs area.

Economic

VA 253 supports the local serving and knowledge-based industries in Harrisonburg with the predominantly local serving activity center near Sentara RMH Medical Center, a regional hospital.

Transportation

This corridor serves the Massanetta Springs residential area which lacks modal options including transit, bicycling, and pedestrian facilities. The corridor between Harrisonburg experiences intermittent congestion.

G. VA 259 Corridor

Need

The VA 259 corridor is a local connector in the northern part of the region between I-81, VA 42 and West Virginia. From West Virginia to I-81, the corridor serves regional freight traffic and some commuters. The section of VA 259 between I-81 and Broadway serves more local passenger and freight traffic. Improved passenger and freight reliability is needed as well as network connectivity.











Economic

VA 259 supports the freight dependent and local serving Broadway activity center.











Transportation

This corridor experiences intermittent congestion and improved freight and passenger reliability is needed.










H. US 340 Corridor

Need	 	The US 340 corridor is a north/south connector in the eastern part of the region that serves commuters and freight traffic. There is a need for improved corridor reliability, transportation demand management services, modal choices and network connectivity as activity centers near the corridor continue to grow.
		
	 	There are a number of existing and emerging activity centers along the US 340 corridor that serve local and freight dependent industries for both freight and commuter traffic. Two of the region's largest industrial employers Merck and Miller Coors are located along the corridor.
Economic		
	 	Regional connector between activity centers and commute destinations outside the region. The corridor lacks multimodal access to jobs and handles some through freight traffic.
Transportation	 	
		

I. VA 211 Corridor

Need	 	The VA 211 corridor is a local connector in the northern part of the region between I-81, VA 42 just north of Broadway. The corridor serves local passenger and freight traffic. Improved passenger and freight reliability is needed as well as network connectivity.
	 	VA 211 supports the freight dependent and local serving Broadway activity center.
	 	This corridor experiences intermittent congestion and improved freight and passenger reliability is needed.
Economic		
	 	
Transportation		
		

J. Emerging Local Serving Activity Center

Need	 	Improved network connectivity is needed to support the emerging local serving activity center along VA 257 near Bridgewater as well as improved opportunities for transit, bicycle and pedestrian facilities.
		
	 	The emerging local activity center is anticipated to be the future home of a satellite facility of Sentara RMH Medical Center which is the second largest employer in the region.
Economic		
	 	The emerging activity center is expected to be a major employment area in the region and will need improved network connectivity as well as access to modal options, including transit, bicycling and pedestrian facilities.
Transportation		
		

K. Various Activity Centers

Need		Multiple existing and emerging activity centers serving local industries as well as regional outdoor recreation destinations lack connectivity to transit, pedestrian and bicycle facilities. Access to transit in the region is limited to within the City of Harrisonburg and east to Sentara RMH Medical Center area. Improved network connectivity is needed in the northeastern part of the City of Harrisonburg and surrounding area, specifically alternatives to US 11; near the Belmont residential area; and in the Massanetta Springs area between US 33 and VA 253.
		Activity centers support local serving and knowledge-based industries in multiple emerging and existing activity centers in the region.
		Existing connections between and within activity centers lack efficient modal choices. Improved walkable and bikeable places would enhance existing communities. Regional transit and transportation demand management for commuters are needed.

L. James Madison University Activity Center

Need		There is a need to improve the network connectivity into the JMU activity center and alternative access to I-81, improve modal choices, and enhance the activity center as a walkable/bikeable place. Freight trains regularly move through the activity center blocking roadways. Improved passenger and freight reliability and transportation demand management services are needed.
		The knowledge- based James Madison University activity center is the largest employer in the region. A freight rail corridor moves through the campus.
Transportation		The lack of network connectivity around the JMU campus and periodic congestion from freight rail moving through the activity center impacts passenger reliability. As a college based activity center, there is a need to enhance the community as a bikeable/walkable place with improved modal options to transit, biking and walking.

M. Downtown Harrisonburg Activity Center

Need		The Downtown Harrisonburg activity center is predominantly local serving. There is a need to improve modal choices and enhance the activity center as a walkable/bikeable place. Freight trains regularly move through the activity center blocking roadways. Improved passenger and freight reliability and transportation demand management services are needed.
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M. Downtown Harrisonburg Activity Center

Economic



Supports the predominantly local serving industries. A freight rail corridor moves through the downtown.

Transportation



Periodic congestion from freight rail moving through the activity center impacts passenger reliability. As a local serving activity center, there is a need to enhance the community as a bikeable/walkable place with improved options for transit, biking and walking.