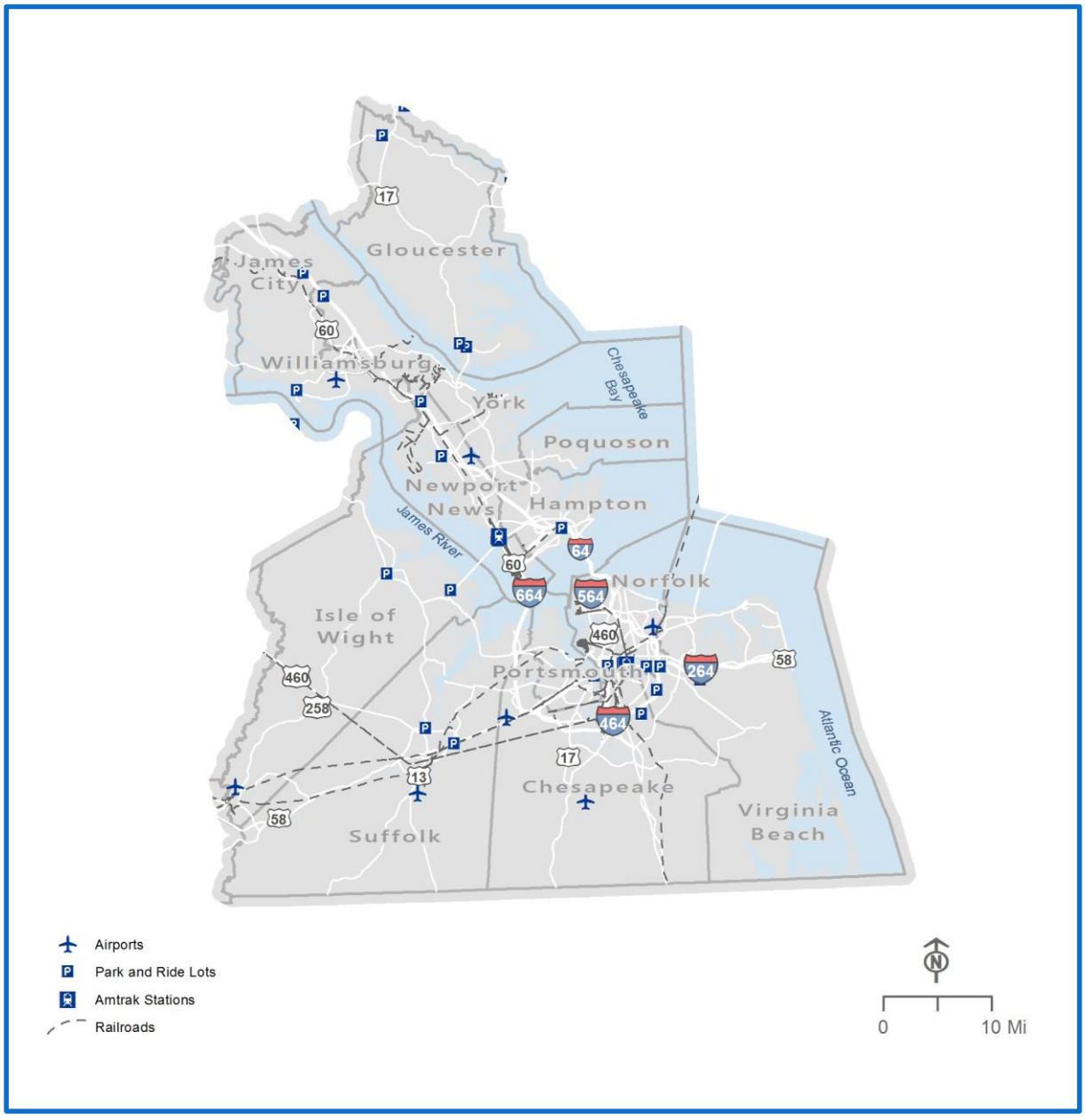
VMTP 2025 Needs Assessment

Regional Needs Profile



Hampton Roads 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 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 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 addresses the Needs Assessment for the Hampton Roads 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 Hampton Roads 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 existing 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 Hampton Roads 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 was developed as part of the outreach process in working with each region, as explained in the Regional Network Needs Assessment Introduction.

The Hampton Roads Region is defined as Gloucester County, Isle of Wight County, James City County, York County, Chesapeake City, Hampton City, Newport News, City of Norfolk, City of Poquoson, City of Portsmouth, Suffolk County, City of Virginia Beach, and the City of Williamsburg for the Needs Analysis.

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 Hampton Roads 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 Woods & 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 to 1.5 million. Statewide per-capita incomes are expected to rise 21%, from $44,765 to $54,226.

Table 1: Statewide Population Projections.

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

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, substantial population growth is projected for the Hampton Roads Region. Projections estimate 100,000 new residents in the region by the year 2025.

Table 2: Hampton Roads Region Population Projections.

Current Population (2012)	Weldon Cooper Projection (2025)
1,655,095	1,773,165

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

Table 3 provides a closer look at population projections by jurisdiction within the Hampton Roads Region. Note that the projections by jurisdiction are less reliable than those at the regional level and should be regarded with some caution. These projections are for reference only and were not applied in the Needs Analysis.

Table 3: County and City Population Projections.

Jurisdiction	Current Population (2012)	Weldon Cooper Projection (2025)	% Change (2012 – 2025)
Gloucester County	36,886	40,992	11%
Isle of Wight County	35,399	40,280	14%
James City County	68,967	97,328	41%
York County	66,146	80,741	22%
City of Chesapeake	228,417	268,770	18%
City of Hampton	136,836	136,765	0%
City of Newport News	180,726	187,046	3%
City of Norfolk	245,782	254,551	4%
City of Poquoson	12,097	14,357	19%
City of Portsmouth	96,470	96,515	0%
City of Suffolk	85,181	106,588	25%
City of Virginia Beach	447,021	433,155	-3%
City of Williamsburg	15,167	16,077	6%

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

According to the Woods and & Poole *2014 State Profile*, per-capita income for the region is expected to rise 21% (the same percentage as the state average) from $40,572to $49,197. Population growth is also projected to be accompanied by a demographic shift, with a higher percentage of the population over the age of 60. However, the Hampton Roads region's population has a strong component of young adults and will continue to do so, likely due to the presence of the military and universities in the region.

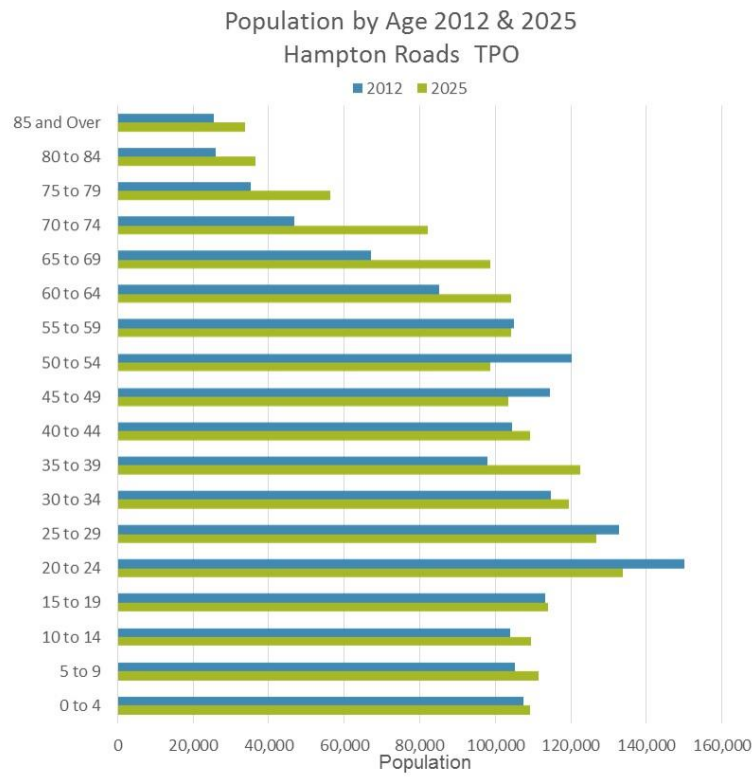


Figure 1: Population of Region 2000 in the years 2012 and 2025.

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 Hampton Roads.

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 needs would be a greater concern.

Figure 2 provides a summary of the shares of each economic cluster in the Hampton Roads Region, as analyzed by the methodology developed by the Study Team and used in all regional analyses throughout

the state (see the Regional Network Needs Assessment Introduction for a full discussion of methodology).

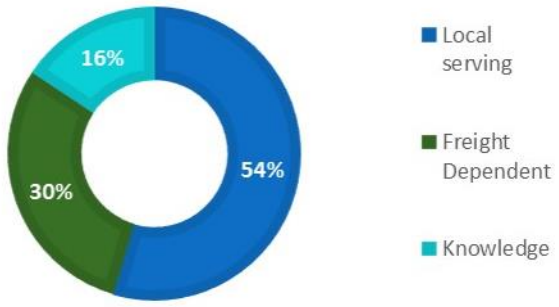


Figure 2: Top Sectors by Output (2012).
Source: IHS Global Insight, 2012.

The local services cluster is clearly the strongest in this region. Local services make up 54% of the economic output in the Hampton Roads Region. Conversely, the knowledge and freight-dependent clusters account for 16% and 30% 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. Also, note that while the relative share of the freight-dependent sector as measured in output is small, this does not necessarily reflect the amount of goods movement in the unique economy of the Hampton Roads Region. Shipping is a substantial activity, but for much of the freight volume there is no value added to the commodities as they enter and exit the region.

Top Industries by Output

Based on available employment data, health care and social assistance is the strongest industry in the Hampton Roads Region when measured by economic output. The real estate industry comes in a close second, reflecting the region's activity in real estate transactions and new development. Utilities, professional services, and wholesale trade round out the top five industries in the region with the greatest economic output. (Refer to Table 4).

Table 4: Current Industries by Output.

Top Industries	NAICS	% of Output
Health Care and Social Assistance	62	18%
Retail Trade	44-45	14%
Wholesale Trade	42	11%
Mining	21	10%
Public Administration	92	8%

Source: IHS Global Insight Data, 2012

Top Industries by Employment

In Hampton Roads, public administration, health care, retail trade, accommodation/food service, and manufacturing are the top industries by employment. (Refer to Table 5). Note that government employment, including the military, is included in public administration to the extent that these jobs are well documented by employment statistics.

Table 5: Current Top Industries by Employment.

Top Industries	NAICS	% of Workforce
Public Administration	92	20%
Health Care and Social Assistance	62	11%
Retail Trade	44-45	11%
Accommodation and Food Services	72	10%
Manufacturing	31-33	8%

Source: IHS Global Insight Data, 2012

The largest employer in the Hampton Roads Region is the U.S. Government, given that the Hampton Roads region hosts the largest naval base in the United States as well as several specialized military facilities such as Oceana and the Joint Expeditionary Base at Little Creek-Fort Story. Huntington Ingalls, the second largest employer in the region, is a major manufacturing company that specializes in building military ships. Sentara Healthcare, a non-profit multistate healthcare organization and the third largest employer, is headquartered in the City of Norfolk. In addition to its headquarters, Sentara Healthcare operates multiple healthcare facilities throughout the region.

Table 6: Current Top Employers.

Employers	Employees
United States Government	50,000+
Huntington Ingalls Industries	20,000
Sentara Healthcare	20,000
Norfolk Naval Shipyard	9,000

Sources: InfoUSA, supplemented with VEDP, VEC, and local 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.

Location quotients for 20 different industry categories were calculated for the Hampton Roads Region. The industries expressed in Table 7 have the highest LQ scores in the region. The scores for professional services and real estate, for example, can be inferred to mean that these services are more than two times more concentrated in the region than in the entire nation, on average. The high-location quotient industries include those related to tourism and also “other services’ which encompasses automobile and electronic repair and maintenance, social and religious organizations, and personal care services.

Table 7: Current Top Industries by Location Quotient.

Top Industries	NAICS	Location Quotient
Professional Services	54	2.24
Real Estate	53	2.16
Arts, Entertainment, and Recreation	71	1.43
Administration and Support	56	1.38
Other Services	81	1.35

Source: IHS Global Insight Data, 2012

Data Comparisons

Multiple data sources were used to inform the analysis of industries in Hampton Roads due to the region's unique employment composition. Due to the large number of government workers, specifically in defense, many datasets do not or cannot report government employment numbers. In order to capture this portion of regional employment, employment data was drawn from multiple sources: IHS Global Insight; InfoUSA; the Virginia Employment Commission (VEC); Virginia Economic Development Partnership (VEDP); Hampton Roads Economic Development Alliance; and the Hampton Roads Transportation Planning Organization's (HRTPO) 2040 Socio-Economic Forecast and TAZ Allocation used in the regional travel demand model. Each of these sources uses a different methodology to collect and categorize data – some use different geographical analysis areas and, therefore, they often arrive at slightly different conclusions about top employers or industries by certain measures.

In order to estimate the number of existing workers and their location the Study Team primarily utilized regional sources provided by the HRTPO, namely the 2040 Socio-Economic Forecast and TAZ Allocation. The socio-economic forecast is used for the HRTPO travel demand model to forecast travel patterns in the region. The dataset provides employment numbers from the base year (2009) for each transportation analysis zone (TAZ) in the region. Since most of the employment analysis is by block group, the Study Team overlaid the TAZ and block group files to preserve the location of the employment from the TAZ data. While these boundaries are not exact, many of the TAZs follow census boundaries and are close to the block groups.

Once the employment data from the TAZ was allocated the block group, the Study Team could estimate the number of employees by location. The HRTPO 2040 Socio-Economic Forecast and TAZ Allocation organized the employment data into four categories, retail, office, industrial, and other. Since the Needs Analysis used slightly different categories, (local serving, knowledge based, and freight dependent), the study team applied the HRTPO categories to the Needs Analysis categories. The categories are provided in Table 8.

Table 8: HRTPO and Needs Analysis Employment Category Conversion

HRTPO Employment Categories	Needs Analysis Employment Categories
Retail	Local Serving
Office	Knowledge Based
Industrial	Freight Dependent
Other	Local Serving

While the 2040 Socio-Economic Forecast and TAZ Allocation is the primary source for employment in the region, some areas of employment are not reported in accordance to Virginia Employment Commission regulations. Only one activity center in the Needs Analysis was affected by these regulations, the

Pembroke activity center. In this case, InfoUSA data supplemented the HRTPO 2040 Socio-Economic Forecast and TAZ Allocation.

InfoUSA data provides individual business records by name, location, county, latitude/longitude coordinates, and two-digit NAICS code for the year 2012. However, the InfoUSA dataset has been shown to have incomplete coverage of government entities which would greatly underrepresent the employment in the Hampton Roads Region. Therefore, it was used in the Needs Analysis only as a supplement when necessary, rather than as the main dataset.

The issue of government employment was encountered when identifying the top employers for the Hampton Roads Region. Since many of the datasets do not include government employment, it is difficult to ascertain the top employers in the region. The top employers are based on three datasets, VEC, VEDP, and the Hampton Roads Economic Development Alliance (HREDA).

Both VEC and VEDP report their figures using the same data source: the Quarterly Census of Employment and Wages (QCEW) from the 3rd quarter of 2014. This source includes all workers covered by state unemployment insurance laws, and all workers covered by federal insurance laws, but excludes self-employed workers and some agricultural workers. The difference between these sources comes in the way top industries are reported. VEC uses number of employees to rank industries, while VEDP computes a percentage of total workforce.

The Study Team used data from HREDA to supplement VEC and VEDP to identify top employers in the region. HREDA tracks various employment and economic indicators for the region. HREDA surveys the communities in the region to identify the top employers and estimate the number of employees. Unlike other sources, HREDA captures the number of government employees in the region.

IHS Global Insight is a city/county-level 2012 data set categorized by NAICS codes used for overall employment and output for the Needs Analysis. This data was collected in a different year than that used in VEDP and VEC, which may have some effect on the difference between the reported numbers of employees. Despite these differences, however, each reflects broadly similar trends in regional employment.

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 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 based on contiguous census block groups, were then developed for these areas. The primary purpose of the activity center analysis was to identify large regional centers of employment so that the commuting and related travel markets could be analyzed in relation to these areas. 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.

Due to the complexity and scale of the Hampton Roads Region, both geographically and economically, the Study Team organized the activity centers into two different categories. These categories, the

regional activity centers and local activity centers differentiate whether the activity center is a major employment destination for the region or a smaller-scale center of activity, even though a smaller center could serve some regional purposes. The Study Team selected regional activity centers based on the existing regional share of employment and locations of economically strategic development (i.e. ports and military installations). Many of the future growth centers are not identified in this analysis as regional centers because they do not yet serve as major regional employment centers.

Activity centers were revised, refined, or amended after discussing economic conditions with regional stakeholders. In the Hampton Roads Region, centers of high economic or social activity such as Craney Island weren't represented as areas of high job density through the InfoUSA jobs data that was used in the mapping exercise. 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. Figure 3 below shows the activity centers as blue circles. Figure 4 shows the area included in each activity center. This graphic addresses concerns by stakeholders that the dot location map of activity centers omits activity centers or shows them in incorrect locations – most in fact cover a fairly large area and in some cases represent multiple nearby employment sites such as Burton Station and the joint amphibious base at Little Creek in Virginia Beach. It is more effective in the Regional Network Analysis to combine these contiguous areas in order to analyze travel patterns and accessibility at the appropriate scale.

Once activity centers were identified, the next step was to analyze the type and scale of economic activity that took place in those locations. Using the categorization of jobs into the three economic clusters (described previously) of local, freight, and knowledge-based, analysts developed charts that represent 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 5 below shows the mapping of each activity center broken down by industry sector and scaled by relative number of jobs.

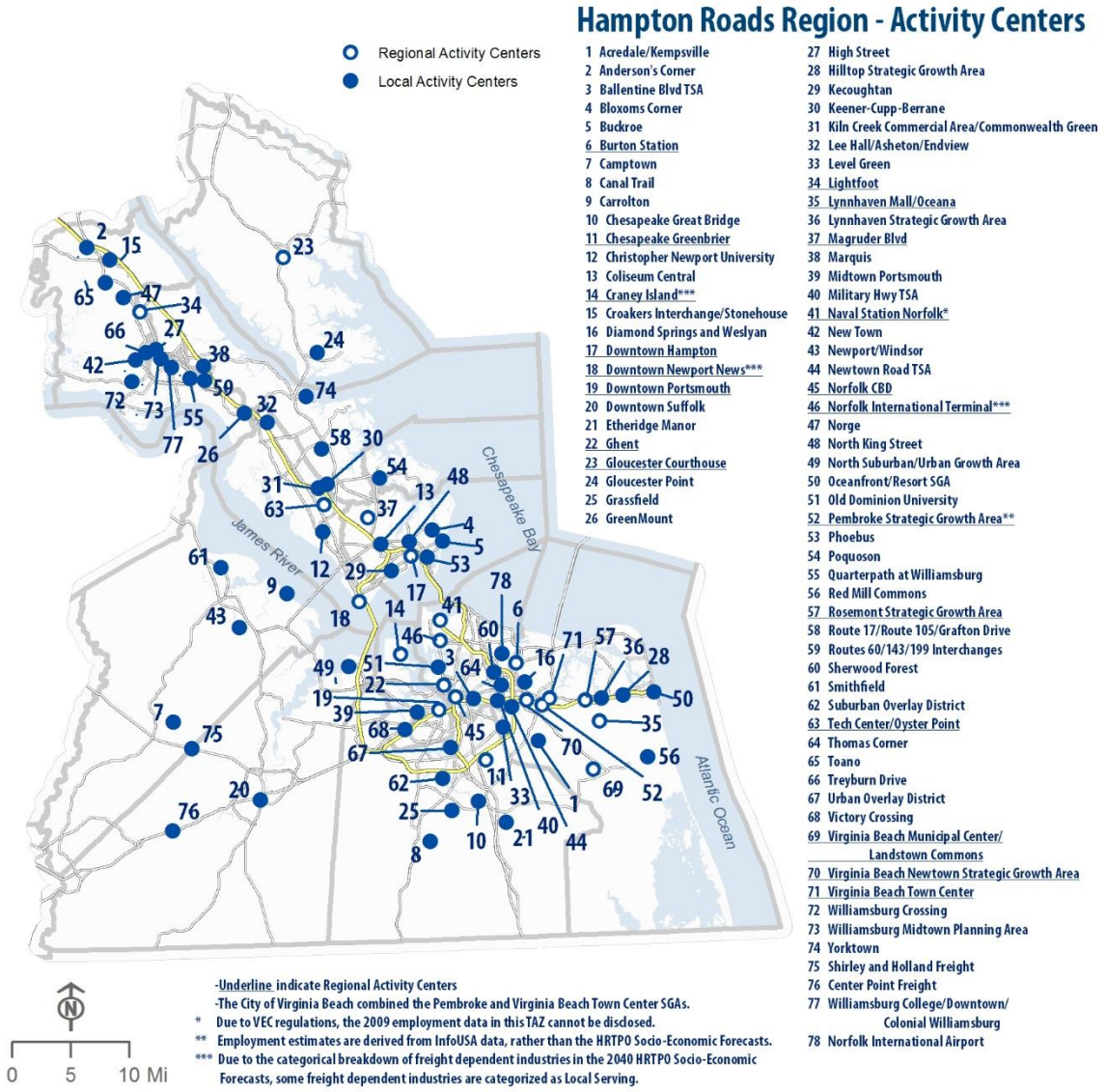
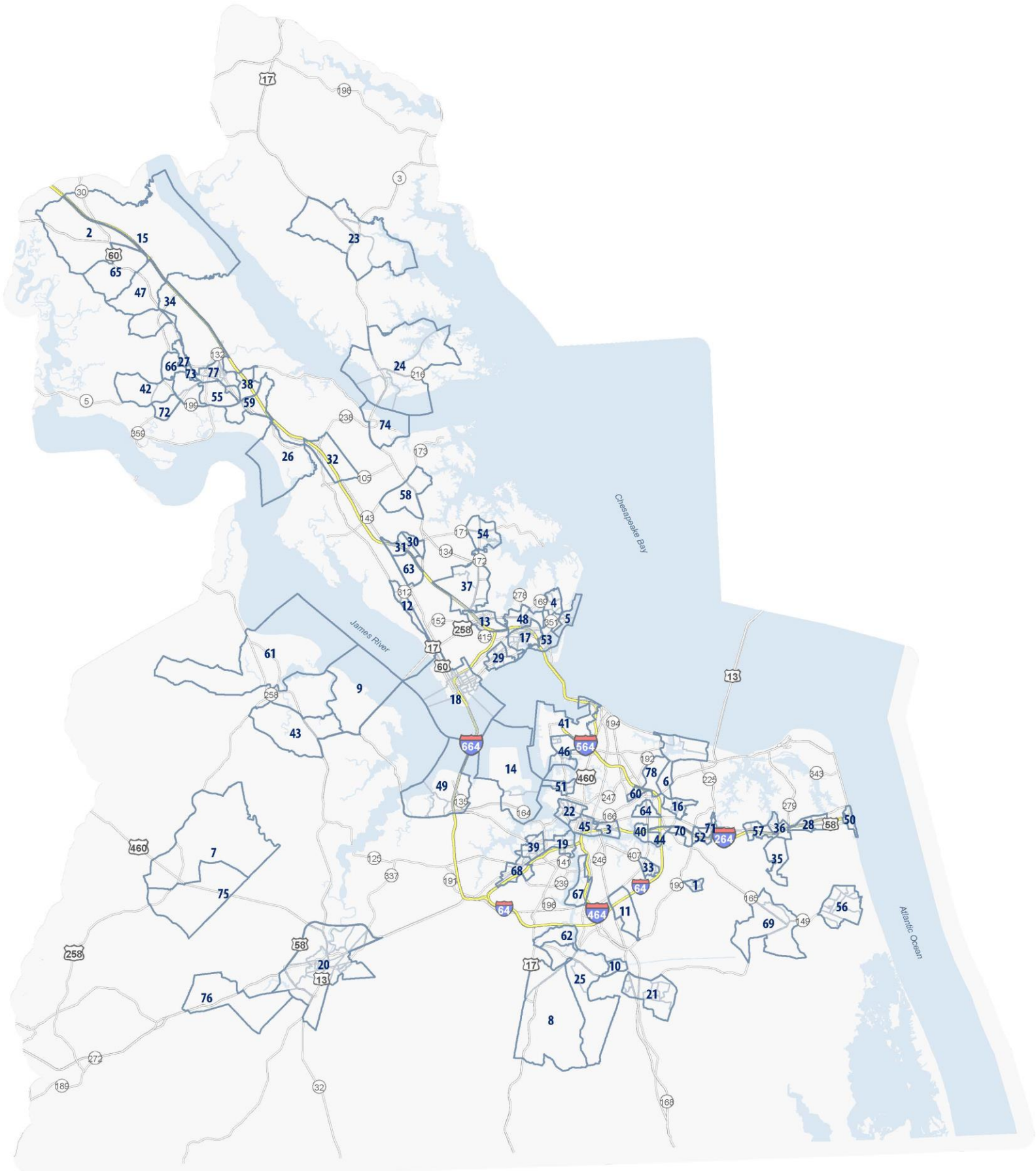


Figure 3: Map of Activity Centers based on Job Density and Stakeholder Input

Hampton Roads Region - Activity Centers



1	Acredale/Kempsville	21	Etheridge Manor	41	Naval Station Norfolk*	61	Smithfield
2	Anderson's Corner	22	Ghent	42	New Town	62	Suburban Overlay District
3	Ballentine Blvd TSA	23	Gloucester Courthouse	43	Newport/Windsor	63	Tech Center/Oyster Point
4	Bloxoms Corner	24	Gloucester Point	44	Newtown Road TSA	64	Thomas Corner
5	Buckroe	25	Grassfield	45	Norfolk CBD	65	Toano
6	Burton Station	26	GreenMount	46	Norfolk International Terminal***	66	Treyburn Drive
7	Camptown	27	High Street	47	Norge	67	Urban Overlay District
8	Canal Trail	28	Hilltop Strategic Growth Area	48	North King Street	68	Victory Crossing
9	Carrolton	29	Kecoughtan	49	North Suburban/Urban Growth Area	69	Virginia Beach Municipal Center/ Landstown Commons
10	Chesapeake Great Bridge	30	Keener-Cupp-Berrane	50	Oceanfront/Resort SGA	70	Virginia Beach Newtown Strategic Growth Area
11	Chesapeake Greenbrier	31	Kiln Creek Commercial Area/Commonwealth Green	51	Old Dominion University	71	Virginia Beach Town Center
12	Christopher Newport University	32	Lee Hall/Asheton/Endview	52	Pembroke Strategic Growth Area**	72	Williamsburg Crossing
13	Coliseum Central	33	Level Green	53	Phoebus	73	Williamsburg Midtown Planning Area
14	Craney Island***	34	Lightfoot	54	Poquoson	74	Yorktown
15	Croakers Interchange/Stonehouse	35	Lynnhaven Mall/Oceana	55	Quarterpath at Williamsburg	75	Shirley and Holland Freight
16	Diamond Springs and Weslyan	36	Lynnhaven Strategic Growth Area	56	Red Mill Commons	76	Center Point Freight
17	Downtown Hampton	37	Magruder Blvd	57	Rosemont Strategic Growth Area	77	Williamsburg: College/Downtown/ Colonial Williamsburg
18	Downtown Newport News***	38	Marquis	58	Route 17/Route 105/Grafton Drive	78	Norfolk International Airport
19	Downtown Portsmouth	39	Midtown Portsmouth	59	Routes 60/143/199 Interchanges		
20	Downtown Suffolk	40	Military Hwy TSA	60	Sherwood Forest		

Activity Center Boundaries

Activity Center Block Groups

-Underline indicate Regional Activity Centers

-The City of Virginia Beach combined the Pembroke and Virginia Beach Town Center SGAs.

* Due to VEC regulations, the 2009 employment data in this TAZ cannot be disclosed.

** Employment estimates are derived from InfoUSA data, rather than the HRTPO Socio-Economic Forecasts.

*** Due to the categorical breakdown of freight dependent industries in the 2040 HRTPO Socio-Economic Forecasts, some freight dependent industries are categorized as Local Serving.

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Figure 4: Activity Center Boundaries (Census Block Groups)

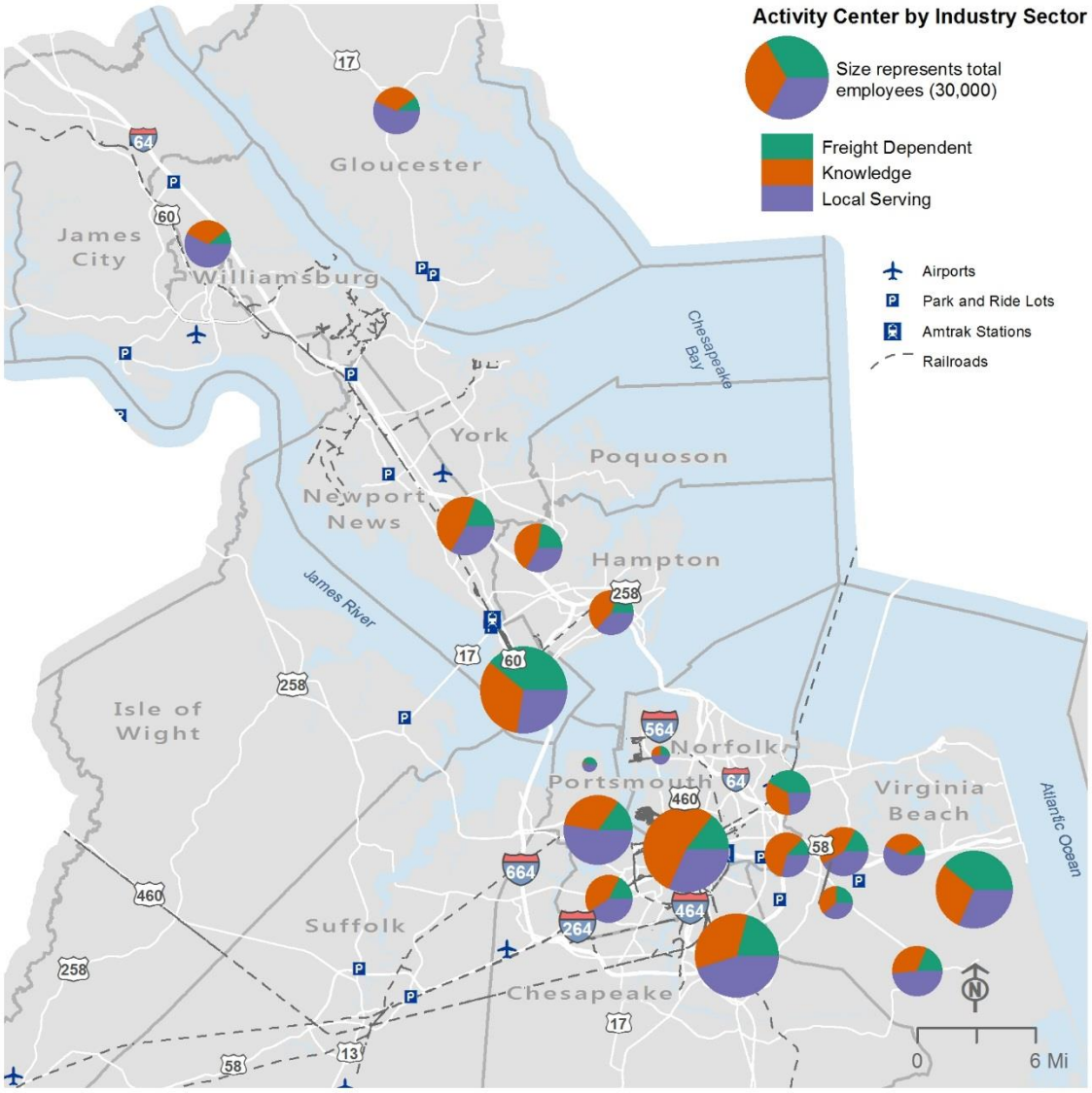


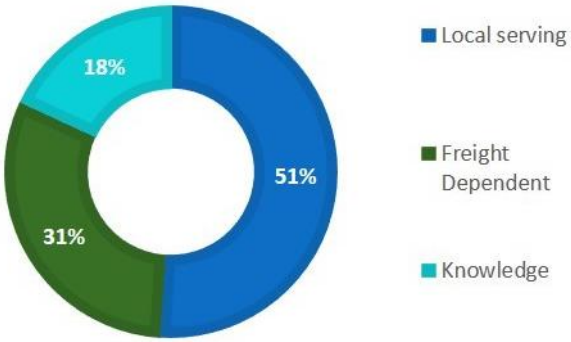
Figure 5: Activity Center Employment by Industry Sector,
Source: HRTPO 2040 Socio-Economic Forecasts augmented with InfoUSA data..

E. Forecasted 2025 Industry and Employment Strengths

Through a series of work sessions with the Hampton Roads stakeholders, the Study Team used IHS Global Insight economic forecasts for 2025 and received input from stakeholders to determine the future desired economic profiles for each region. The 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 Hampton Roads' economic future, but to allow input from stakeholders to affirm or modify these basic economic forecasts according to regional desires. The region's available economic plans, including the Comprehensive Economic Development Strategy, were reviewed and found to be highly consistent with the 2025 forecasts from IHS.

The future economic profiles were used as the basis for determining future transportation needs to support the future economic vision in the Hampton Roads 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



The local services sector will continue to be the largest portion of regional output in 2025, estimated to make up 51% of the economic output in the Hampton Roads Region. The knowledge and freight-dependent sectors will both grow, accounting for 18% and 31% of regional economic output, respectively.

Figure 6: Top Sectors by Output (2025).
Source: IHS Global Insight Data, 2012

Substantial growth is forecasted for the Hampton Roads Region by 2025. According to statewide and national datasets used, the corporate management and the administrative sector industries will see the largest growth in output. Combined, they are expected to produce $7.4 billion more in 2025 than was produced in 2012.

The only industries projected to produce lower levels of output in 2025 than in 2012 is the health care industry. In all industries combined, economic output in Hampton Roads is expected to increase by $9.7 billion by 2025. Figure 8 shows the forecasted changes in employment for the largest economic sectors. While the health care industry will decrease slightly in output, it is nevertheless forecasted to grow in employment from 2012 to 2025. The highest amount of employment growth will occur in the health care sector, followed by the accommodations and food service sector.

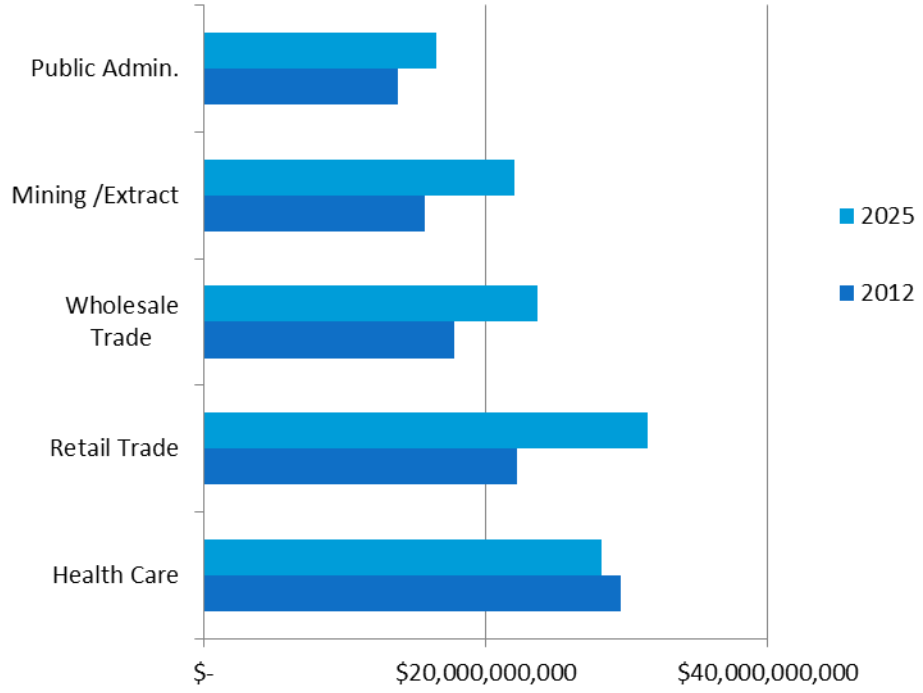


Figure 7: Top Industries by Output
Source: IHS Global Insight Data, 2012

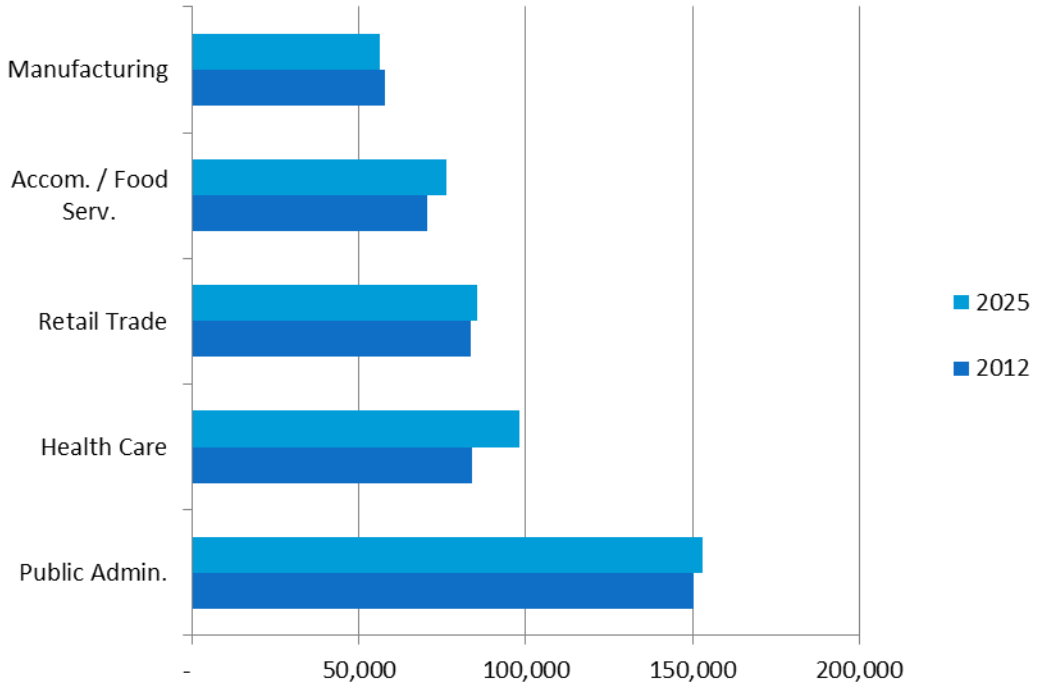


Figure 8: Top Industries by Employment.
Source: IHS Global Insight Data, 2012

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 Hampton Roads region such as typical commute times and overall travel reliability. The following categories of performance metrics were used to create a regional transportation profile for the Hampton Roads Region:

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

B. Commuting Patterns

Regional Commuting Patterns

Regional commuting patterns indicate that many workers do not cross major water bodies during their commutes. On the peninsula, patterns move toward the Cities of Newport News and Hampton. In the southern jurisdictions, major commuting destinations are the Cities of Norfolk, Virginia Beach, Portsmouth and Chesapeake. In all jurisdictions in the Hampton Roads Region, a small minority of workers work outside the region. For all jurisdictions, the Hampton Roads Region, a large majority of workers either live and work in the same jurisdiction or work in another jurisdiction in the region. (Refer to Figure 9).

Activity Center Commuting Patterns

An analysis of commuting patterns to activity centers provided further insight for the regional transportation profile. Figures 9 through 19 below provide the spatial commuting patterns for eleven of the activity centers in the Hampton Roads 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.

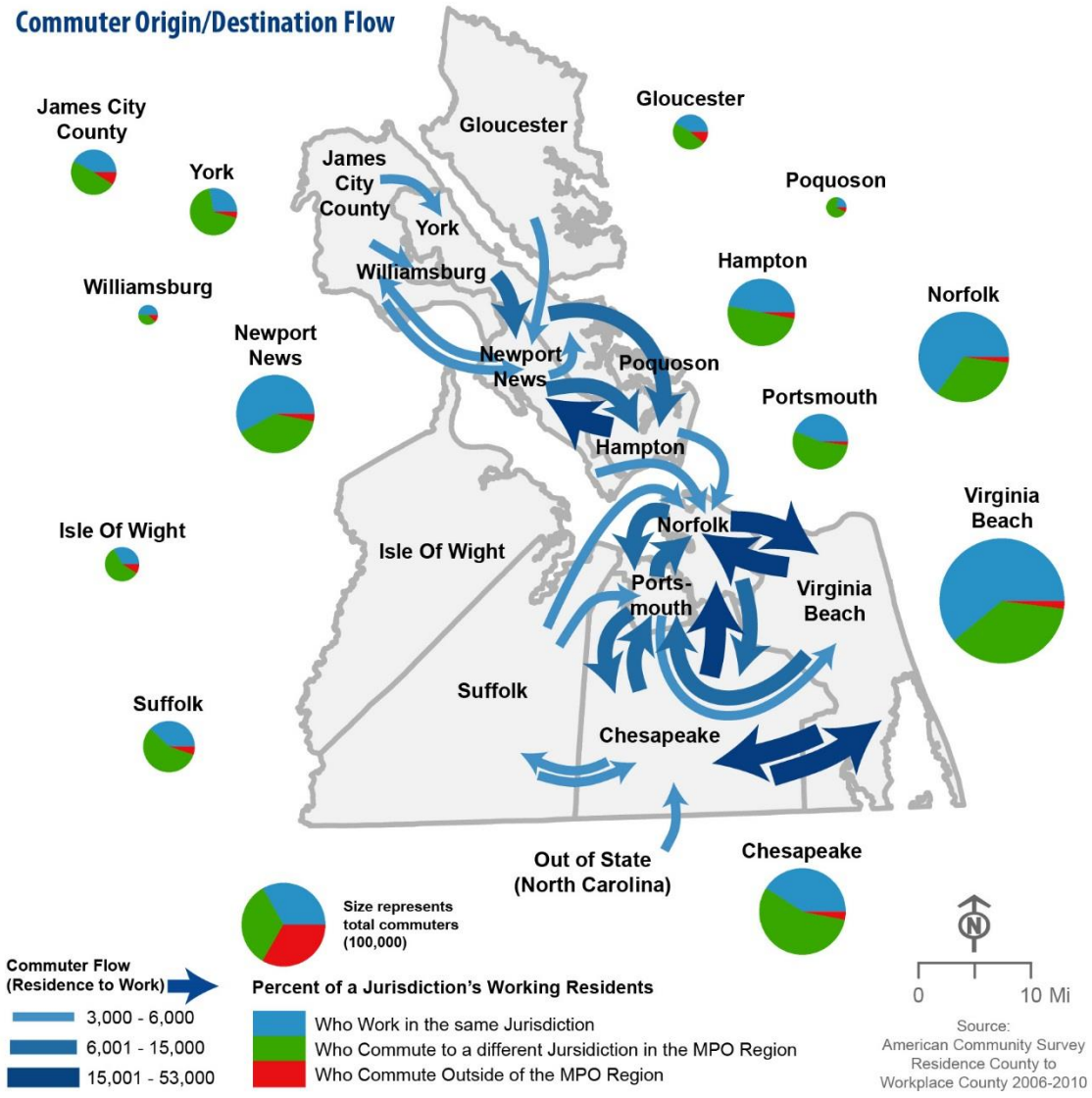


Figure 9: Regional Commuting Patterns.
Source: Census Commuting Data, 2006-2010

As shown on the map, the Ghent activity center sees a significant number of commuters from the surrounding area, especially in the Cities of Norfolk and Virginia Beach. Fewer commutes originate from the peninsula, which requires commuters to cross major waterbodies. (Refer to Figure 10). A more modest number of commutes originate within the Cities of Suffolk and Chesapeake.

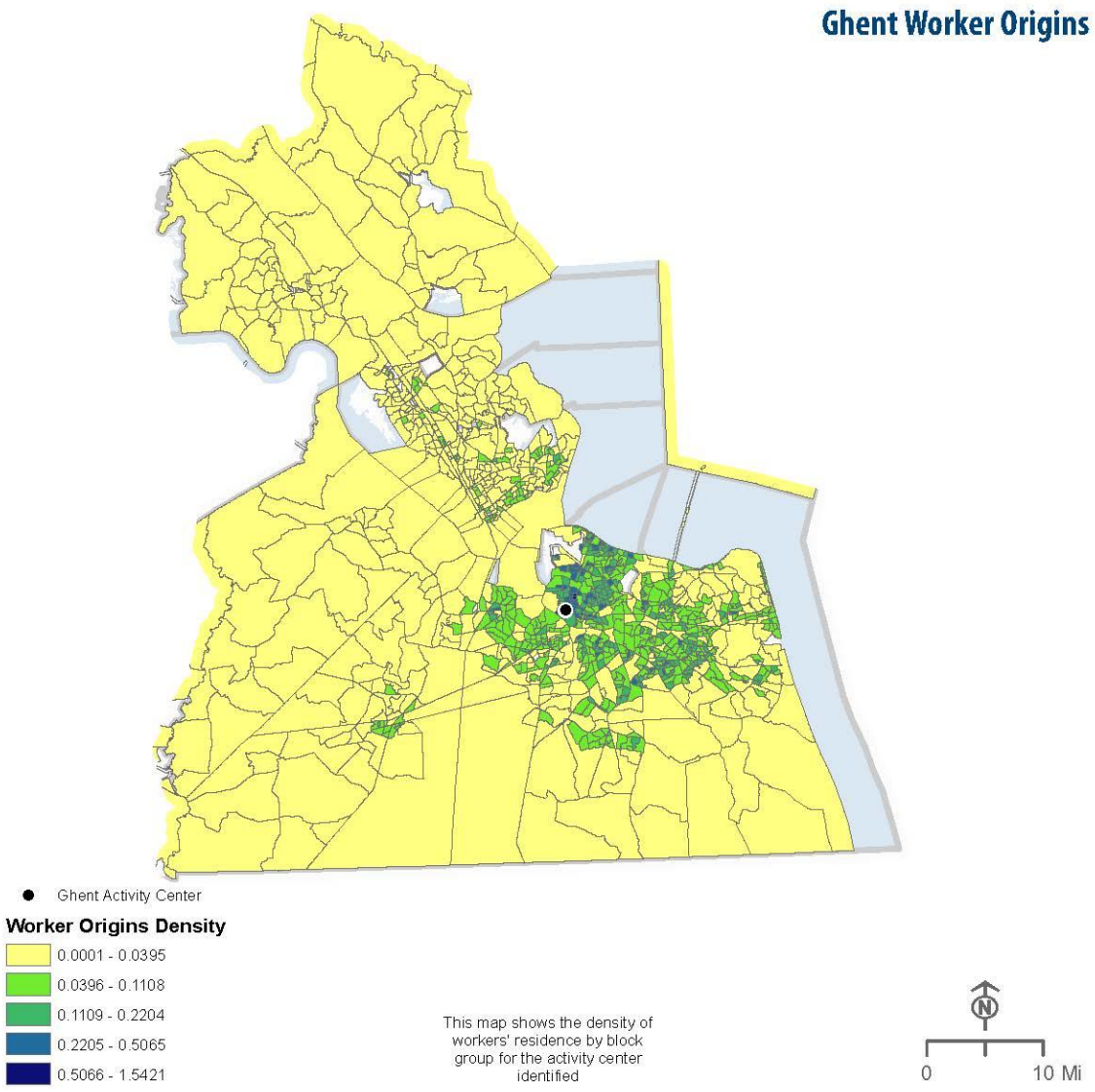


Figure 10: Commuting Patterns to Ghent Activity Center.
Source: US Census, LEHD Origin-Destination Employment Statistics (LODES), 2011

Commute origins for the Norfolk Central Business District (CBD) are concentrated in the Cities of Norfolk and Virginia Beach. (Refer to Figure 11). As with the Ghent activity center, fewer trips originate in the peninsula which requires crossing major water bodies.

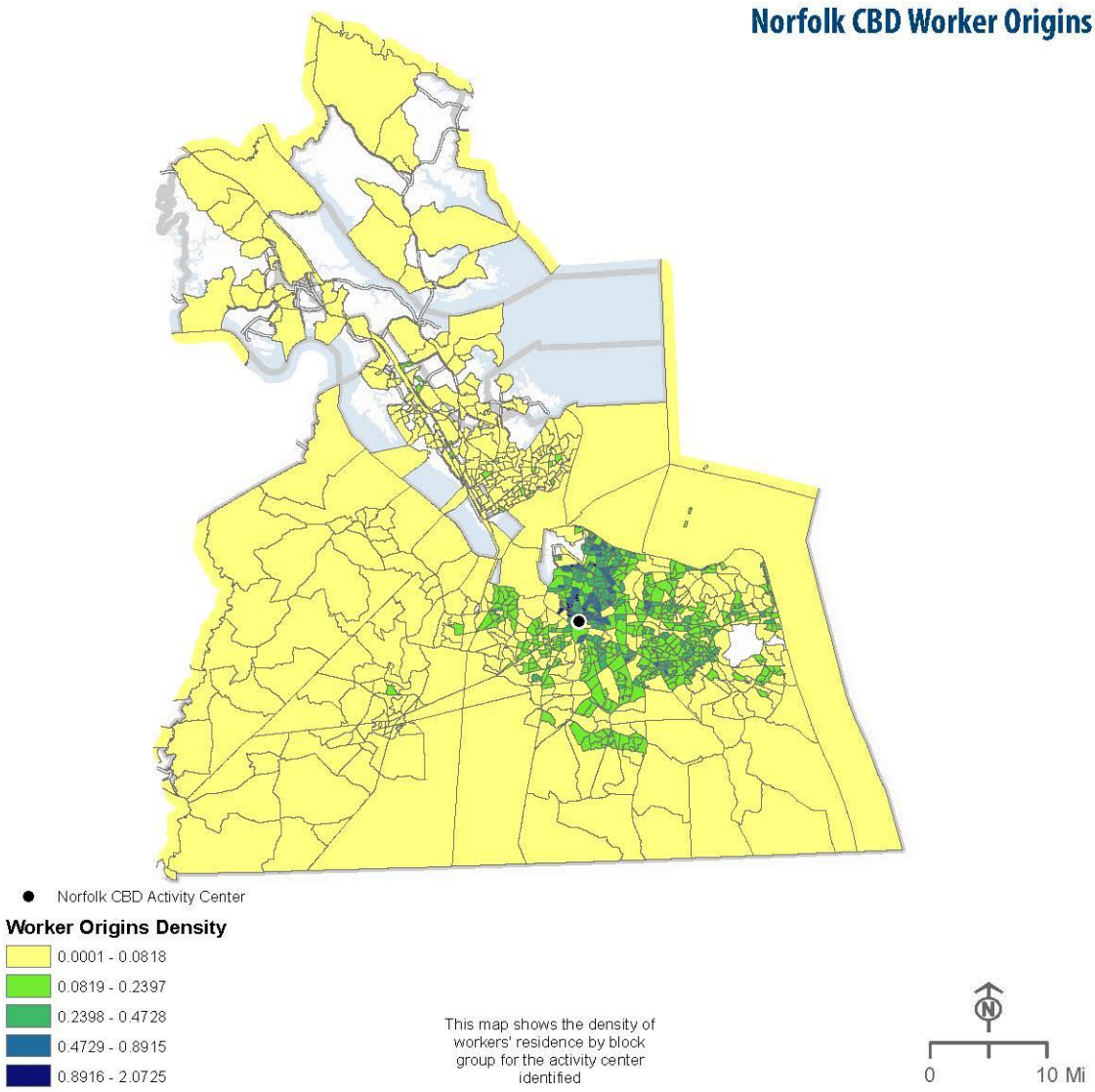


Figure 11: Commuting Patterns to Norfolk CBD Activity Center.
Source: US Census, LEHD Origin-Destination Employment Statistics (LODES), 2011

Like other major activity centers in the City of Norfolk, many of the commutes to the Naval Station Norfolk activity center originate in the Cities of Norfolk and Virginia Beach. Overall, fewer commutes originate in the peninsula, which requires crossing major waterbodies. However, compared to other employment centers in Norfolk, there are clusters of workers in the peninsula that do cross major waterbodies to this employment center. (Refer to Figure 12).

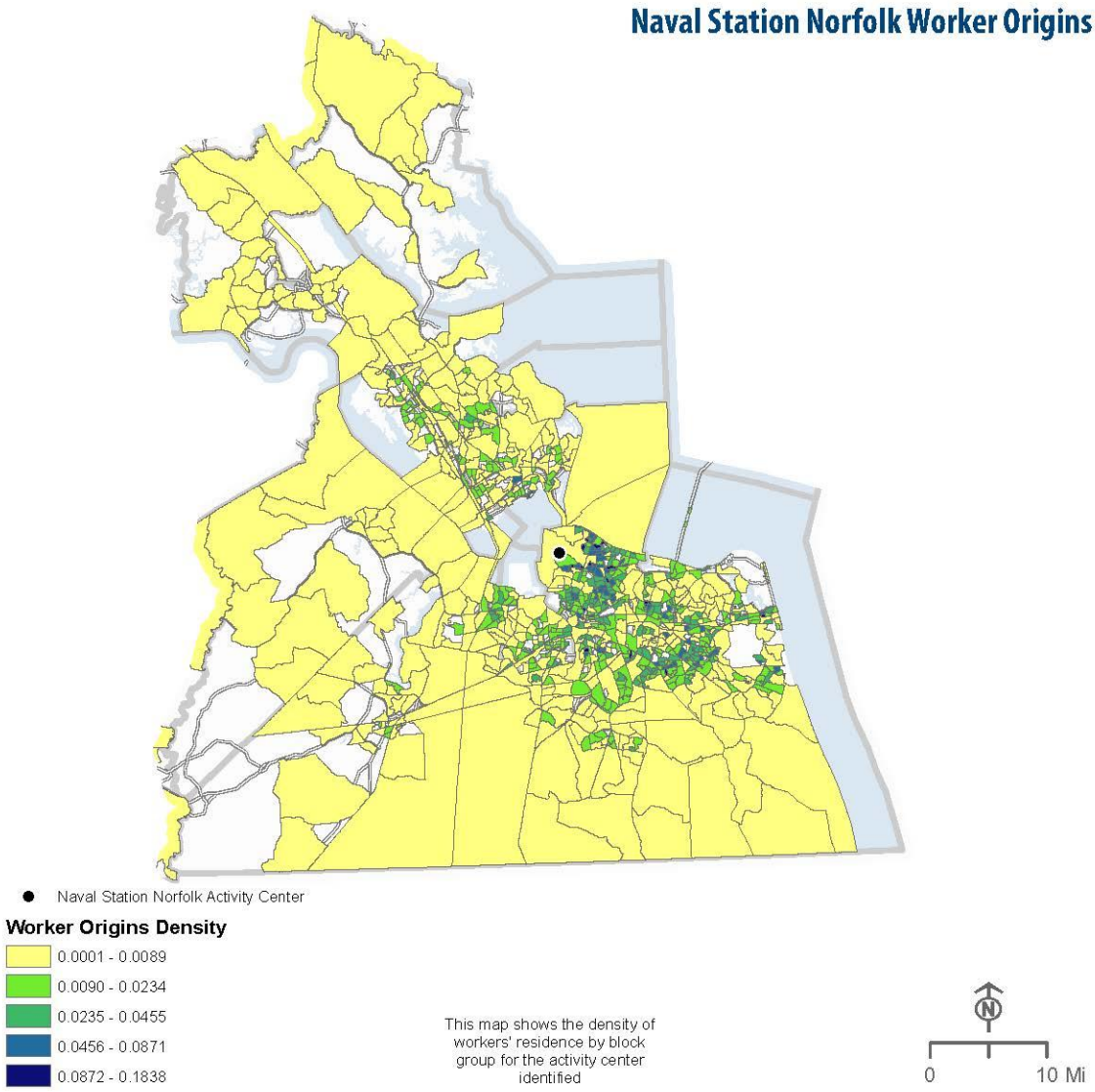


Figure 12: Commuting Patterns to Naval Station Norfolk Activity Center.
Source: US Census, LEHD Origin-Destination Employment Statistics (LODES), 2011

The highest concentration of commutes for the Lynnhaven Mall/Oceana activity center originate in the City of Virginia Beach, with a lower density of commutes originating in the City of Norfolk and the City of Chesapeake. (Refer to Figure 13).

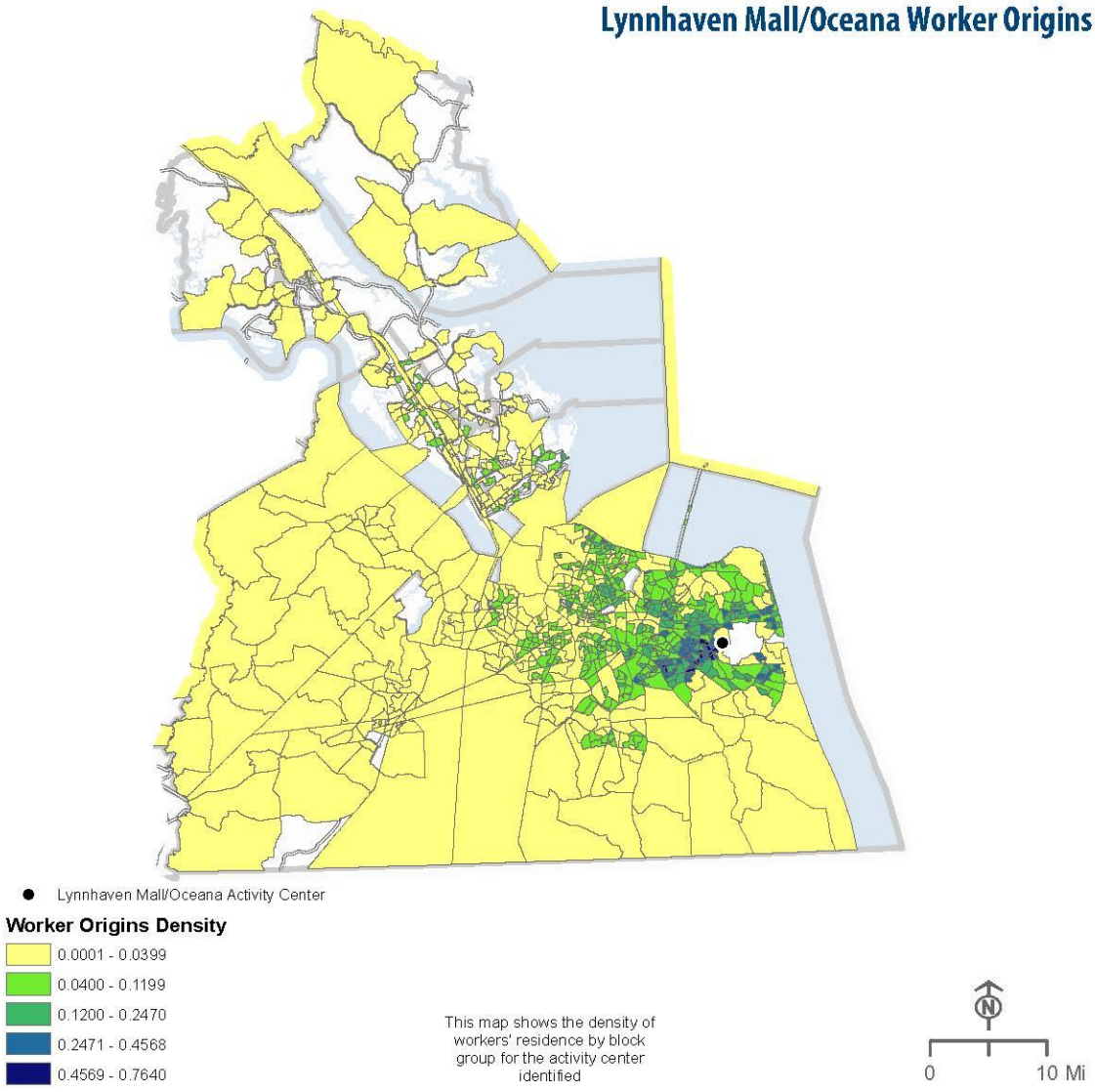


Figure 13: Commuting Patterns to Lynnhaven Mall/Oceana.
Source: US Census, LEHD Origin-Destination Employment Statistics (LODES), 2011

The origins of the commutes to the Pembroke SGA activity center are densest in the block groups closest to the activity center, mostly in the City of Virginia Beach and areas of the City of Norfolk. (Refer to Figure 14).

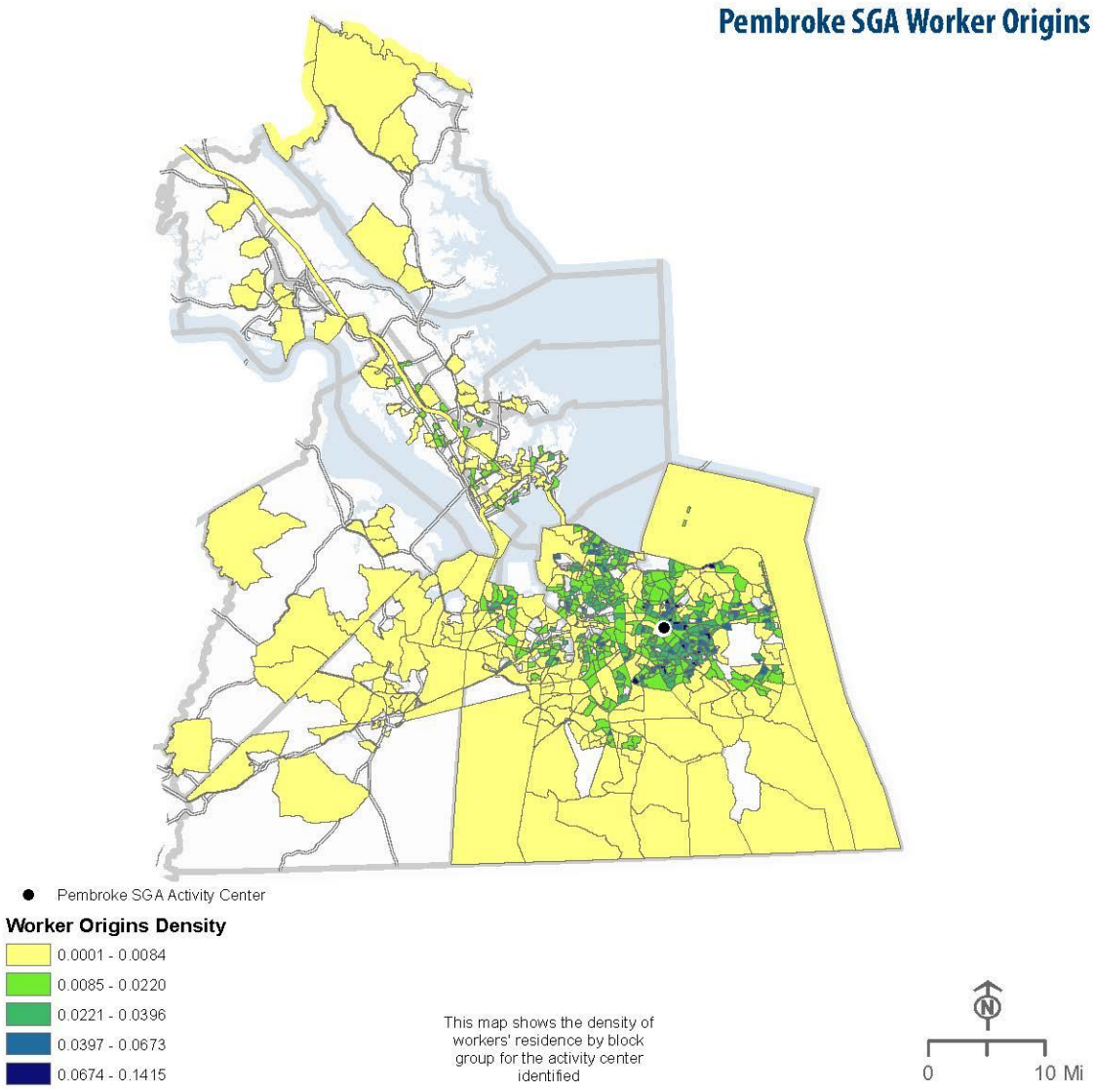


Figure 14: Commuting Patterns to Pembroke SGA.
Source: US Census, LEHD Origin-Destination Employment Statistics (LODES), 2011

As with many of the activity centers discussed, many of the commutes to the Chesapeake Greenbrier activity center originate in census block groups closest to the activity center. The worker origins are densest in the Cities of Chesapeake, Virginia Beach, and Norfolk. Worker origins are least dense in the peninsula, which would require crossing major water bodies. (Refer to Figure 15).

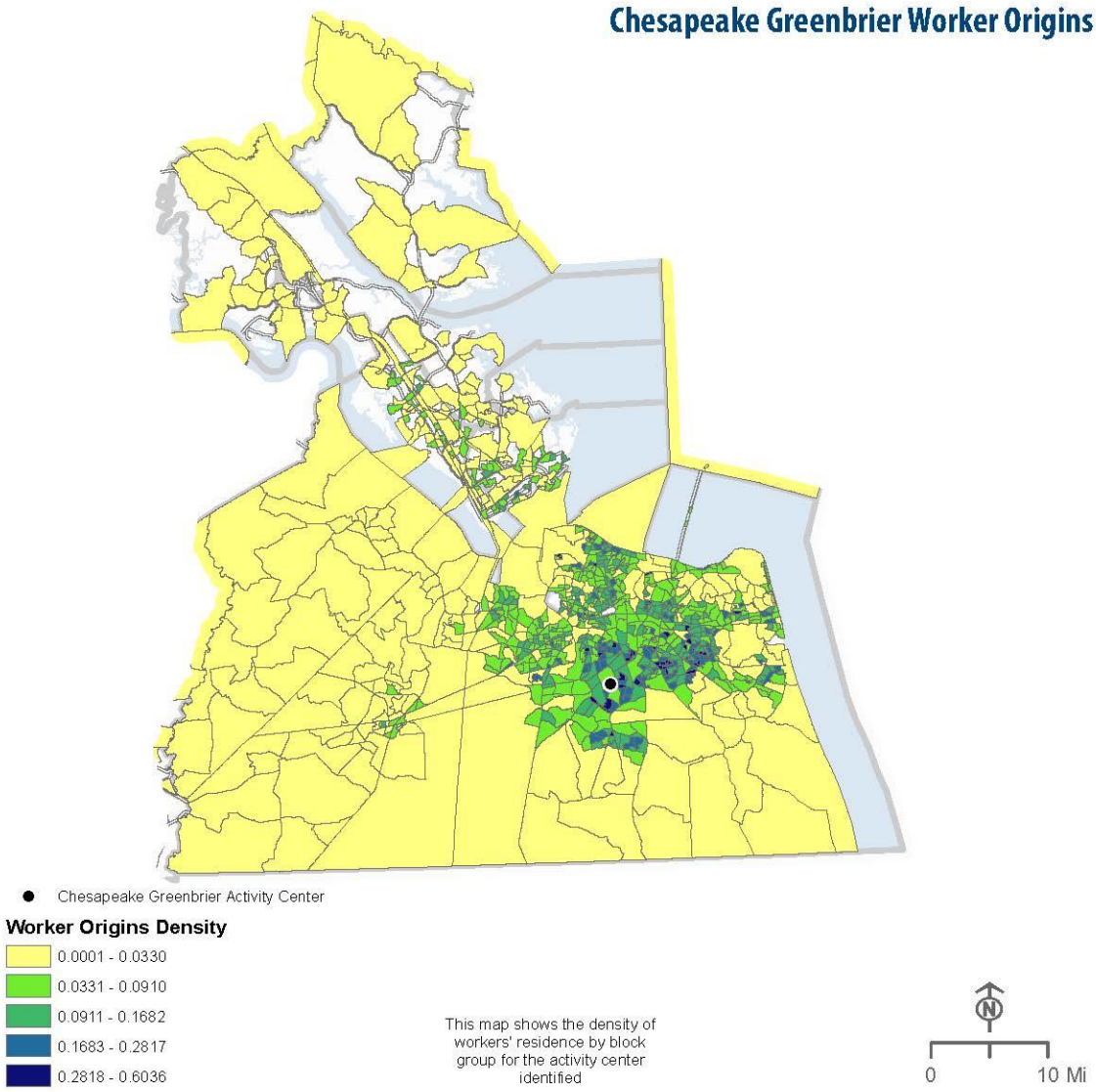


Figure 15: Commuting Patterns to Chesapeake Greenbrier.
Source: US Census, LEHD Origin-Destination Employment Statistics (LODES), 2011

Commuting patterns to the Burton Station activity center mostly originate from the surrounding block groups in the Cities of Norfolk and Virginia Beach. Outside of these aforementioned jurisdictions, commute origins are sparse, especially in the peninsula jurisdictions as well as Isle of Wight County and the City of Suffolk. (Refer to Figure 16).

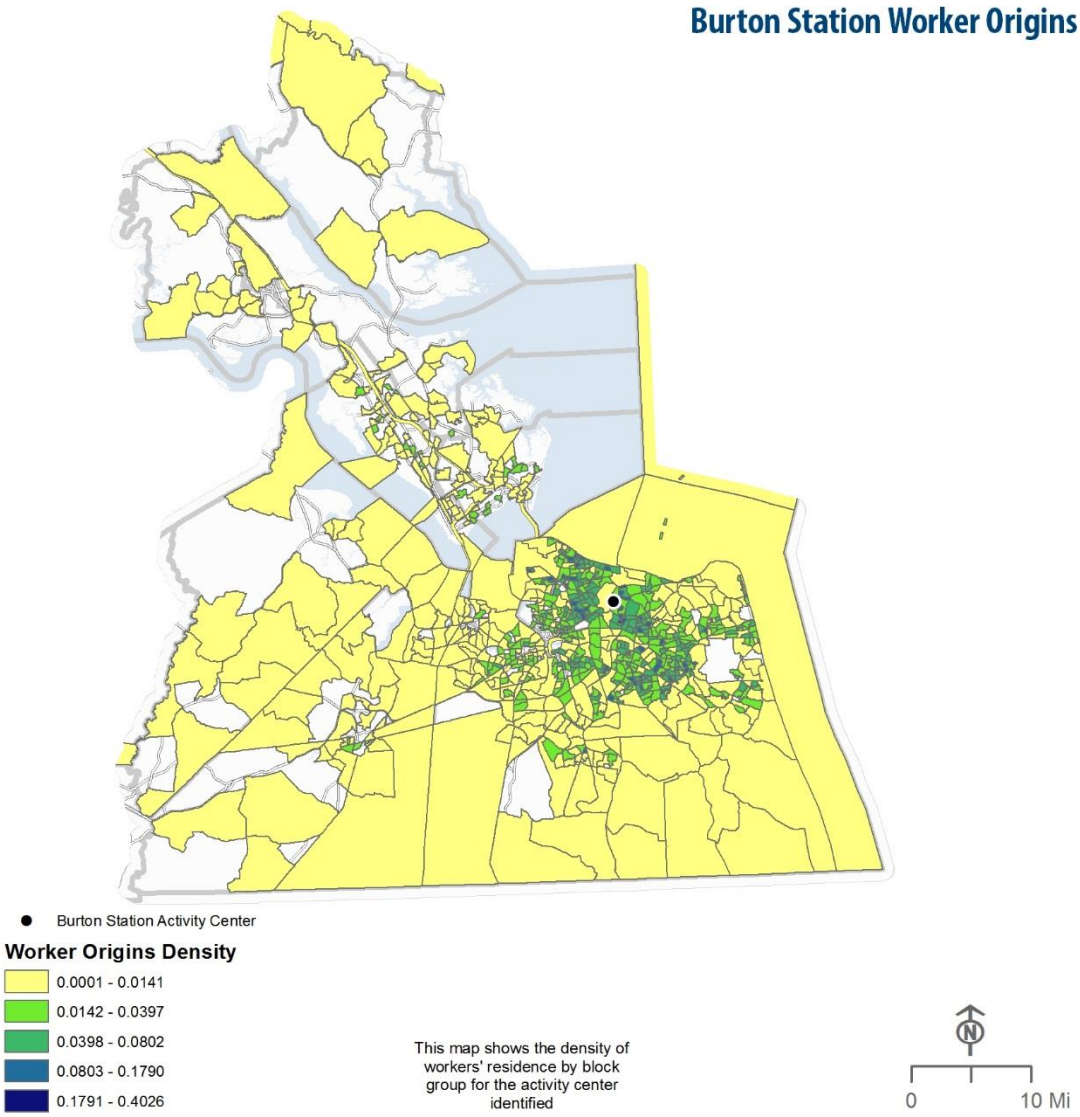


Figure 16: Commuting Patterns to Burton Station.
Source: US Census, LEHD Origin-Destination Employment Statistics (LODES), 2011

Worker origins for Downtown Portsmouth are densest in the City of Portsmouth, with a modest density of worker origins in the Cities of Norfolk and Virginia Beach. There are a modest number of commutes originating in the Cities of Suffolk and Chesapeake as well as along the I-64 corridor in the peninsula. However, commute origins are more scattered in the northern block groups of the peninsula. (Refer to Figure 17).

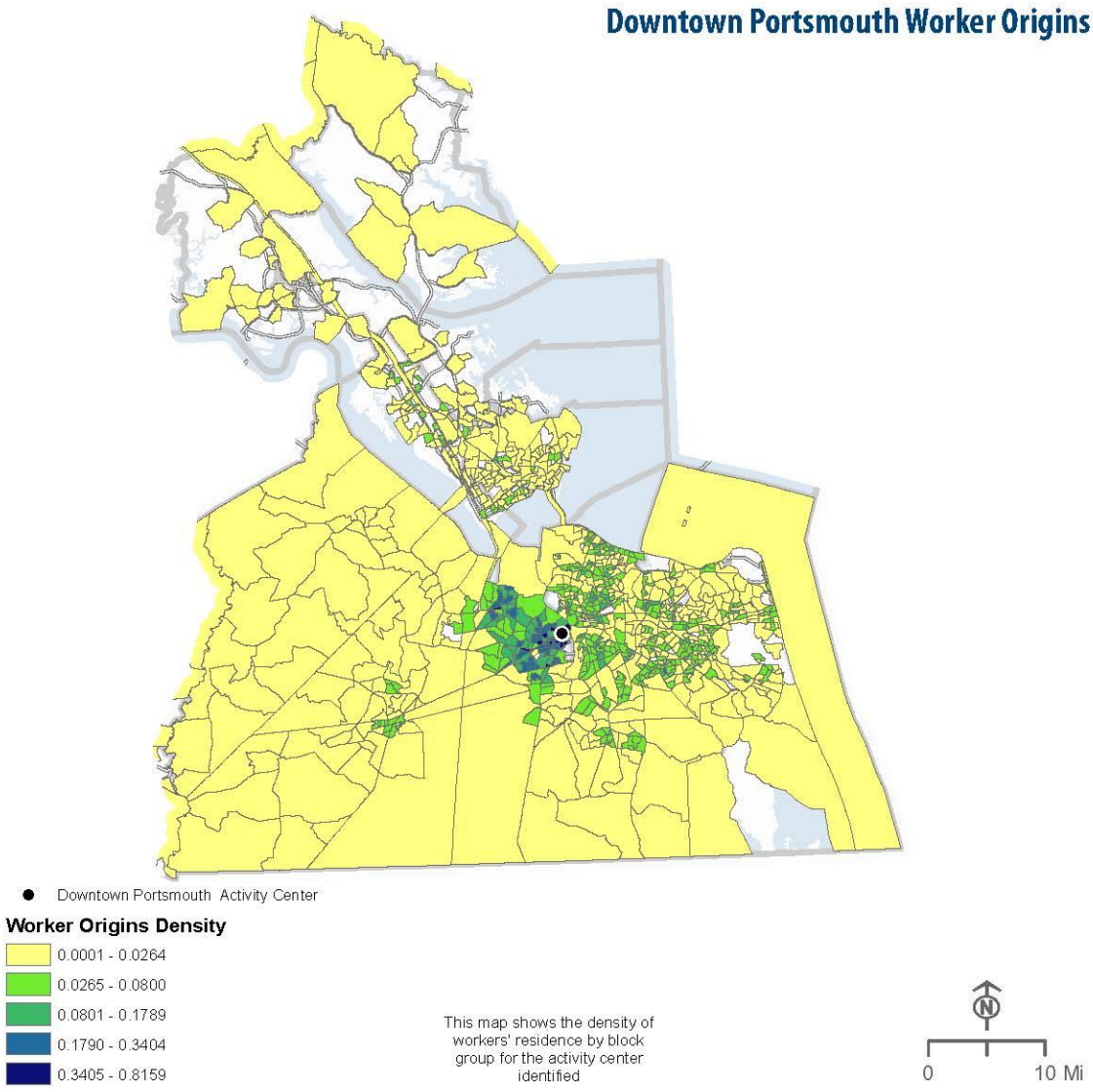


Figure 17: Commuting Patterns to Downtown Portsmouth.
Source: US Census, LEHD Origin-Destination Employment Statistics (LODES), 2011

Commute origins to the Magruder Boulevard activity center are densest in areas the City of Newport News and the City of Hampton. While the density of worker origins is lower in the southside area of the region, there are widespread commuter origins destined for this activity center. (Refer to Figure 18).

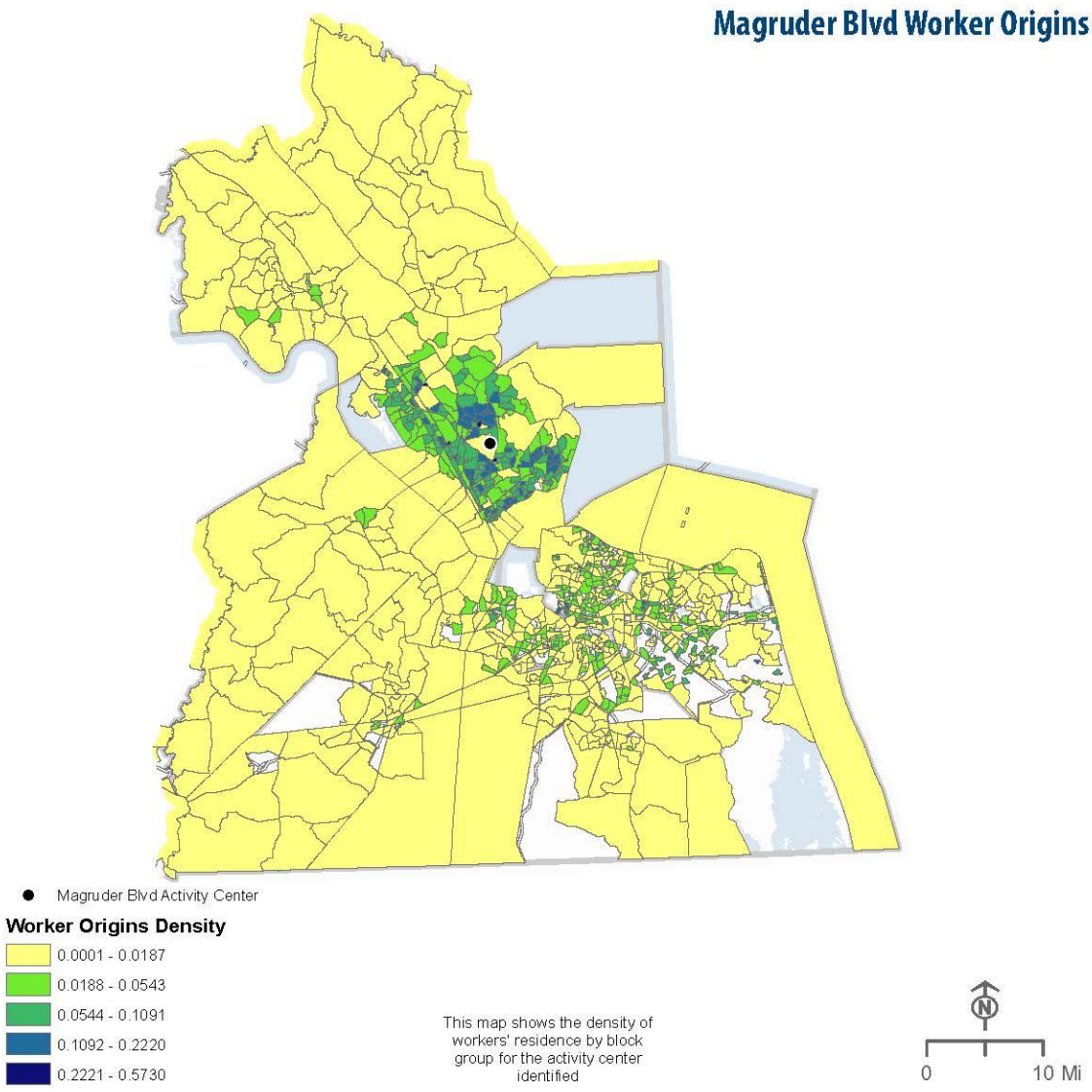


Figure 18: Commuting Patterns to Magruder Boulevard.
Source: US Census, LEHD Origin-Destination Employment Statistics (LODES), 2011

The commuting patterns to Tech Center/Oyster Point are concentrated in the Cities of Newport News and Hampton. A more modest density of commutes originate in the City of Williamsburg and James City County. Relatively few commuters cross the water from the southside for jobs in this activity center. (Refer to Figure 19).

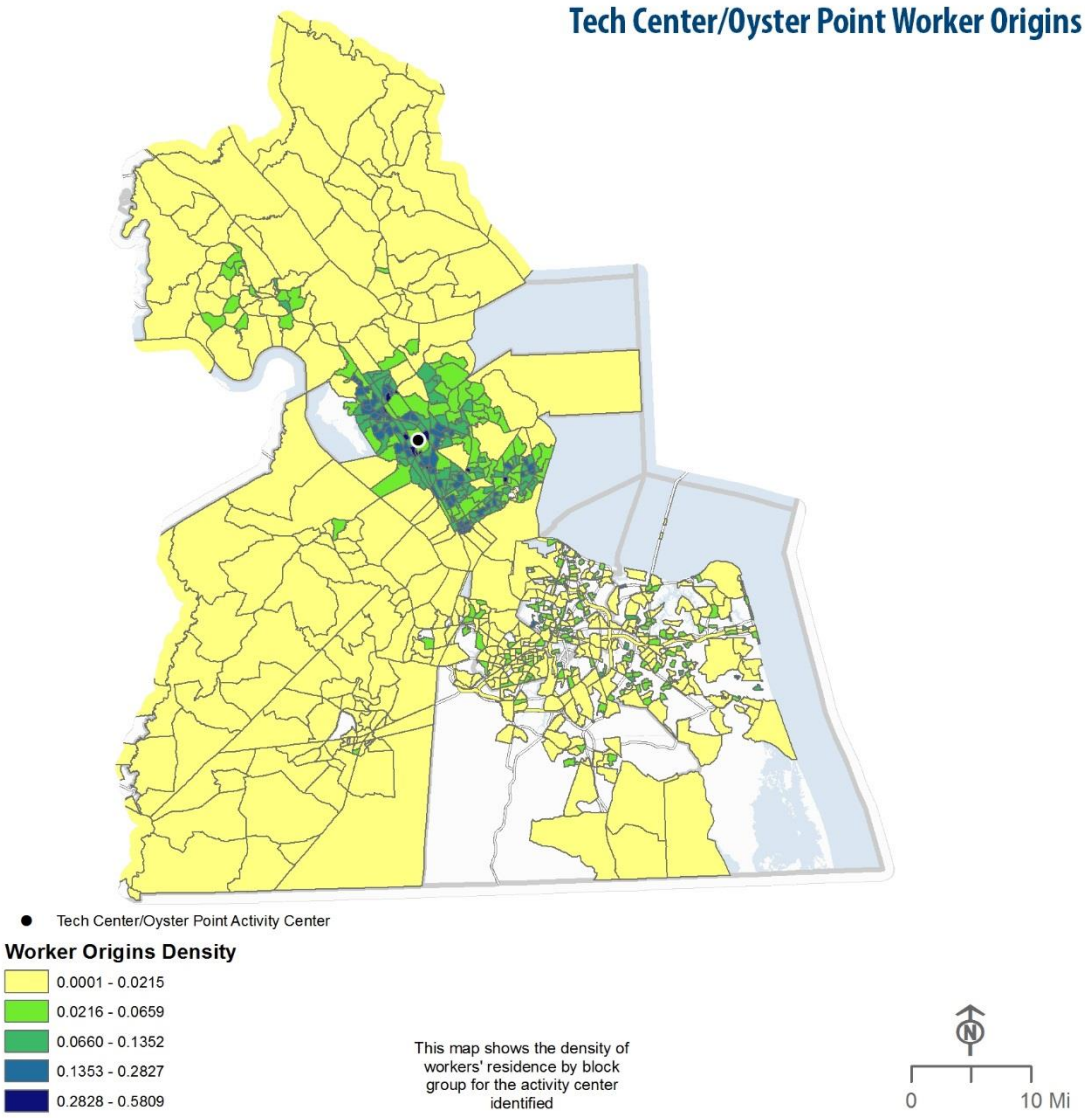


Figure 19: Commuting Patterns to Tech Center/Oyster Point.
Source: US Census, LEHD Origin-Destination Employment Statistics (LODES), 2011

As with the other major activity center in the peninsula, a majority of commutes to Downtown Hampton originate in the Cities of Hampton and Newport News. However, a modest number of commutes originate in the southside jurisdictions. This makes water crossings more important than some other activity centers. Few commutes originate in the southern-most areas of the region. (Refer to Figure 20).

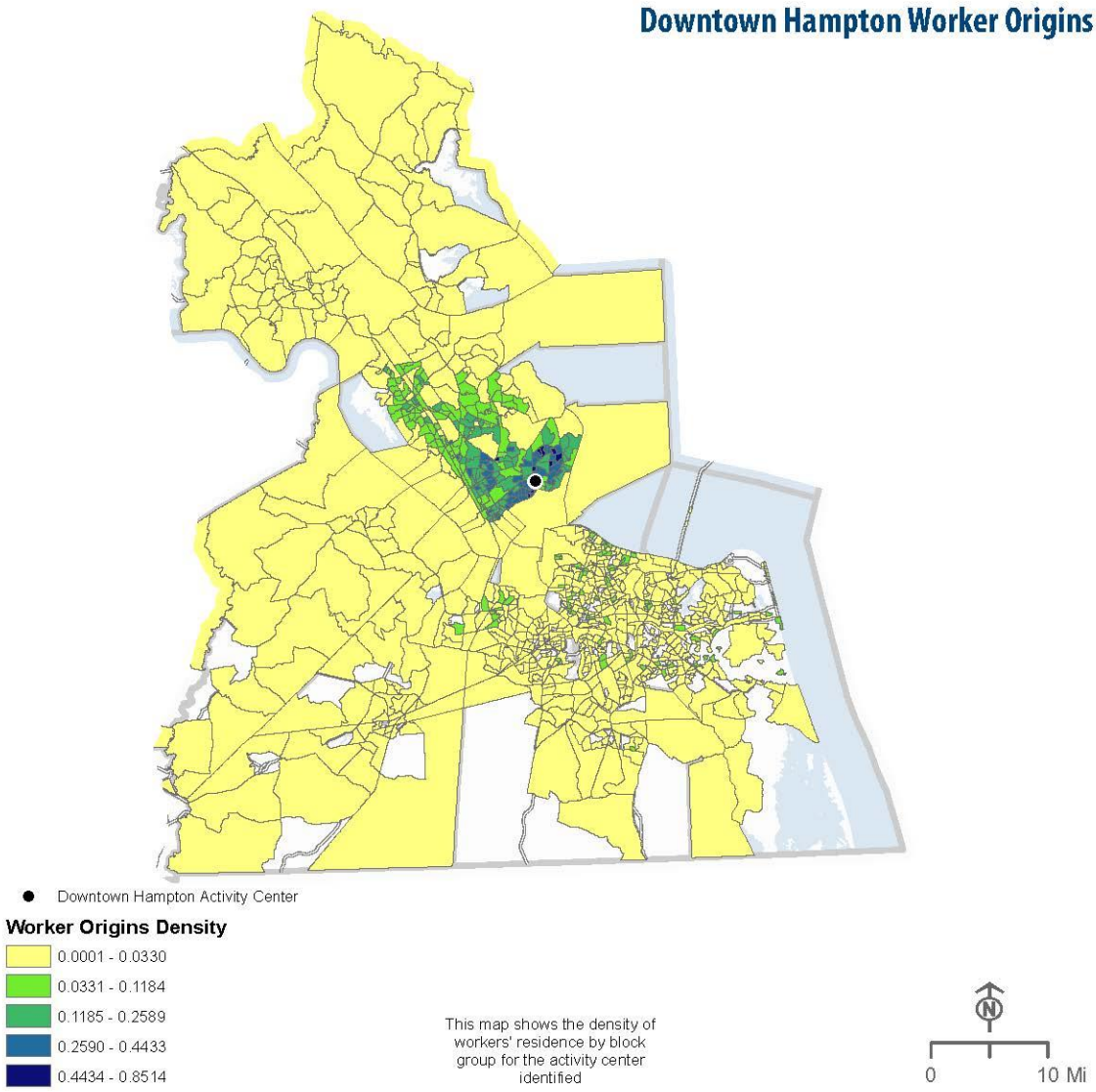


Figure 20: Commuting Patterns to Downtown Hampton.
Source: US Census, LEHD Origin-Destination Employment Statistics (LODES), 2011

Mode Choice

In the Hampton Roads Region, the majority of commuters drive alone to work. While there is some variation between jurisdictions, 81% of all commuters in the region drive alone to work. Carpooling is the second most popular commuting option in the Hampton Roads Region, accounting for almost 9% of the mode share. Overall, only 2% of commuters in the region use public transportation. Less than 1% biked to work while 3% walk to work. More than 4% of people work at home and do not commute. (Refer to Figure 21).

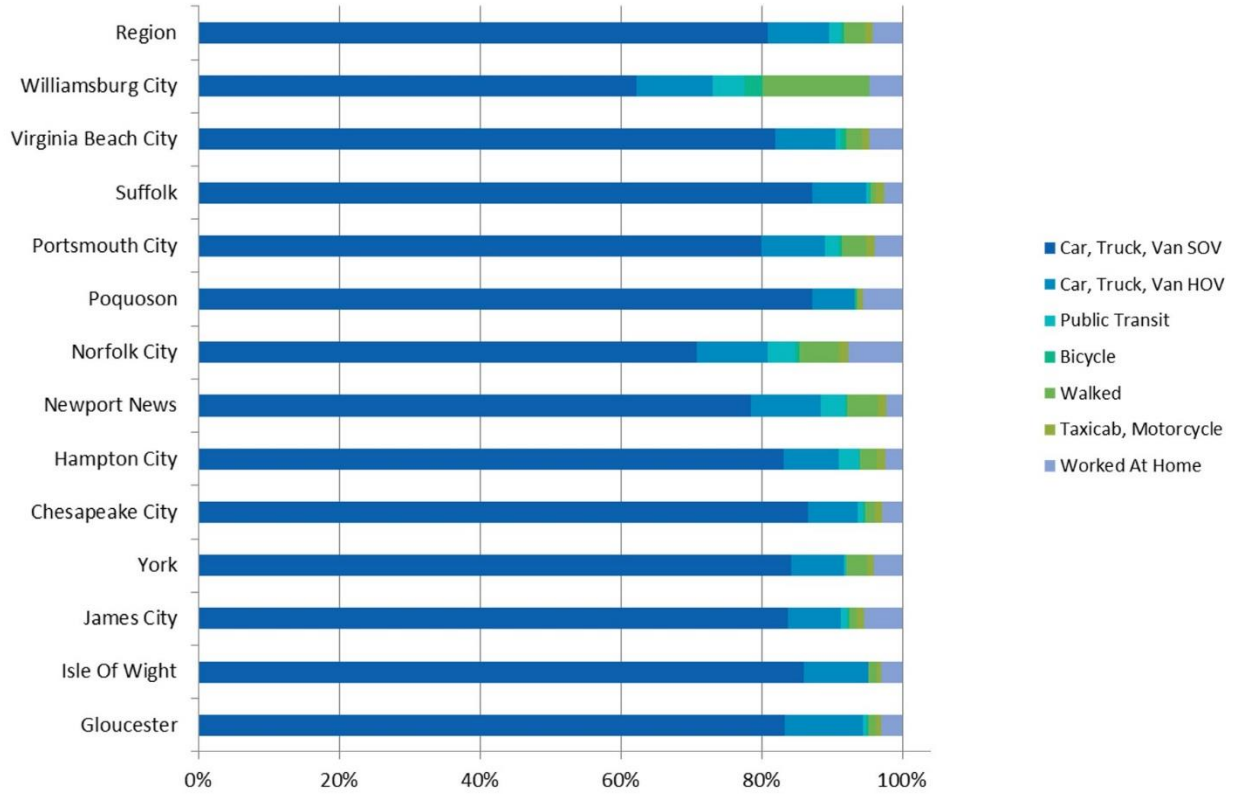


Figure 21: Mode Share Split by Jurisdiction.
Source: ACS 2013 5-Year Estimates

Average Commute Times

In the Hampton Roads Region, average commute times range from 20 to 35 minutes among the various jurisdictions. (Refer to Table 9). The City of Williamsburg has the shortest average commute, while more rural areas, such as Isle of Wight and Gloucester Counties, have longer commutes on average.

Table 9: Mean Commute Time by Jurisdiction. Source: ACS 2013 5-Year Estimates.

Jurisdiction	Mean Commute Time (Minutes)
Chesapeake	26.1
Gloucester	35.4
Isle of Wight	30.7
James City	26.3
Newport News	24.3
Norfolk	23.4
Poquoson	24.9
Portsmouth	26.0
Suffolk	30.6
Virginia Beach	24.6
Williamsburg	20.6
York	23.4

Commutes of over 45 minutes are relatively rare in the Hampton Roads Region. Gloucester County has the highest percentage of workers who commute over 45 minutes at nearly 33%; this is three times as high as both the City of Norfolk and the City of Virginia Beach's rate of long commutes. (Refer to Figure 22).

Source: ACS 2013 5-Year Estimates

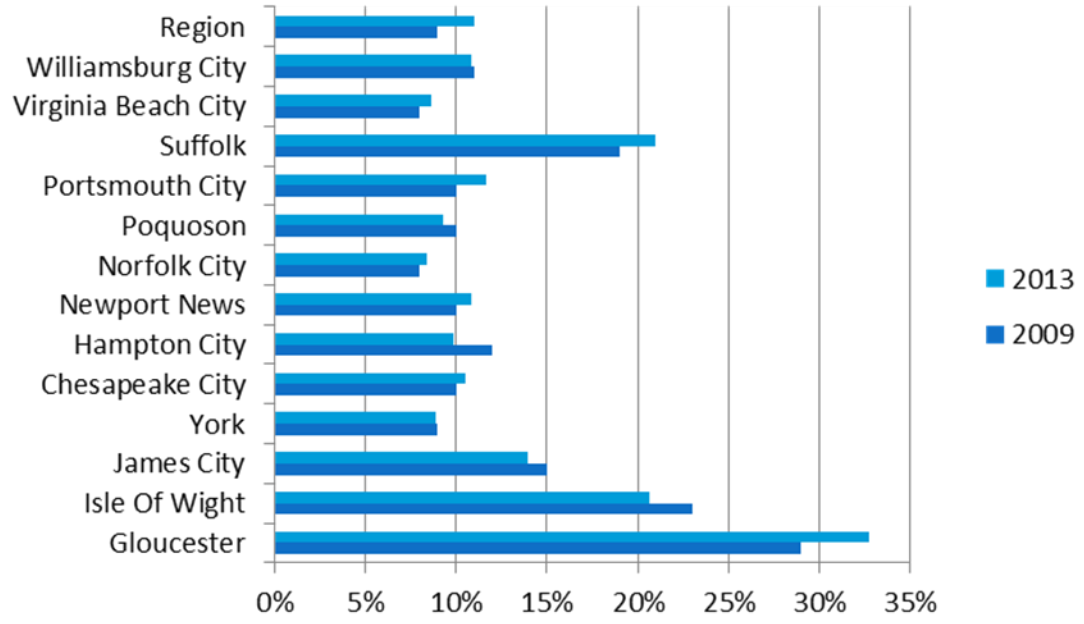


Figure 22: Percent of Commutes Long than 45 Minutes.
Source: ACS 2013 5-Year Estimates

Figure 23 provides a closer look at where longer commutes originate. In the City of Williamsburg and around the Cities of Norfolk and Portsmouth, commute times are well below average for the region as a whole. Block Groups on the fringes of the region, and in rural areas of the City of Suffolk, Isle of Wight

and Gloucester Counties have commute times that are longer than the regional average, as these areas have fewer jobs in close proximity, and less access to transportation networks than more developed areas.

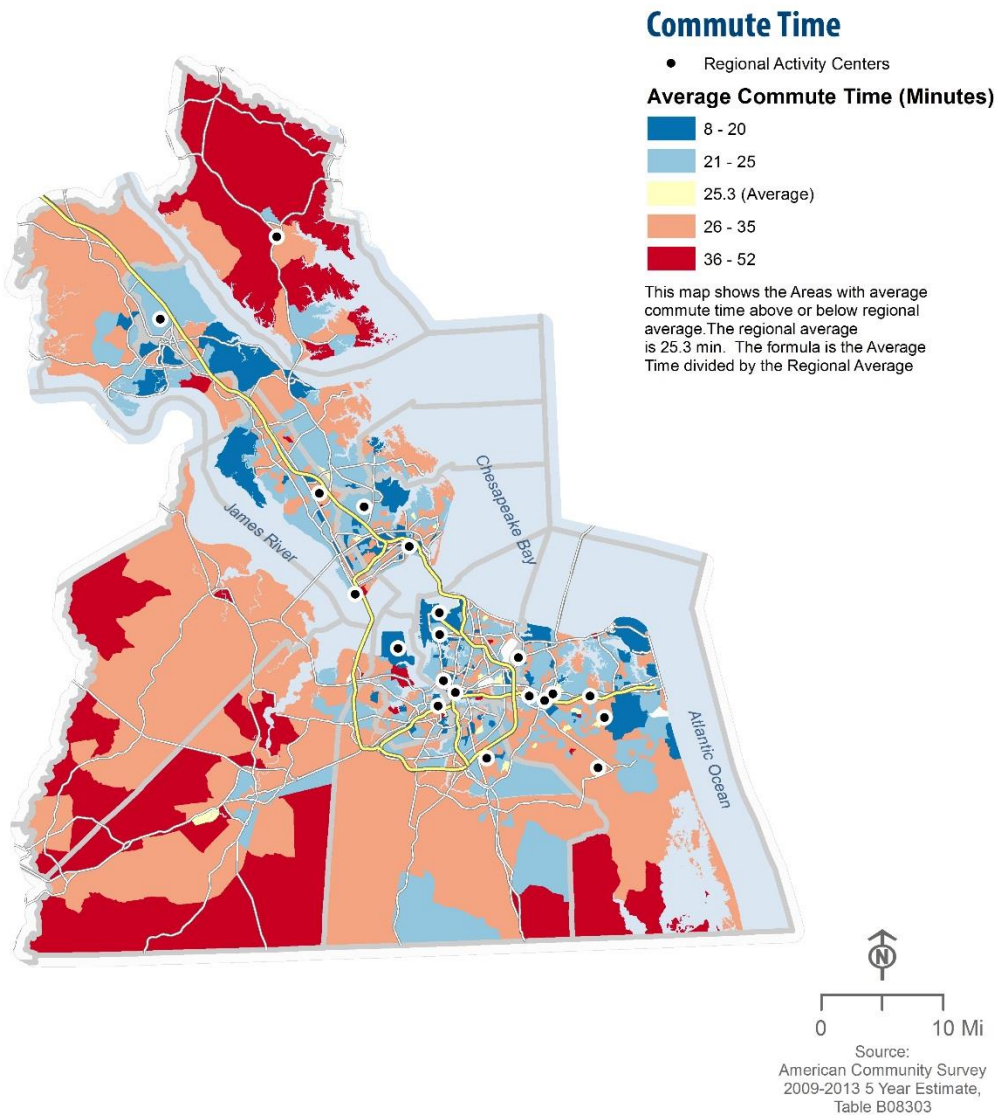


Figure 23: Hampton Roads Region Commute Times.
Source: ACS 2013 5-Year Estimates

C. Accessibility to Employment

As part of the transportation conditions assessment, a set of accessibility performance measures and attributes were developed to assess the workforce and freight accessibility at the general regional scale. This set of performance measures reflects regional characteristics such as travel times and the availability of multimodal transportation between activity centers. The accessibility to employment measure was calculated using an accessibility model developed by the Study Team that measures the number of jobs reachable in a given travel time, using actual travel times on a network, whether highway, transit or pedestrian. The total number of jobs accessible was also "distance decayed," that is, the value of each job was decayed by a factor based on how long it took to travel to it. The distance decay factors were developed from traveler surveys that reflect actual preferences for travel to employment based on the length of the trip.

Auto Accessibility

Auto Accessibility in the Hampton Roads Region area 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 exist around the Cities of Newport News, Norfolk, Portsmouth, and Virginia Beach. 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 24).

Transit Accessibility

Transit accessibility varies greatly within the Hampton Roads Region. In the more urban areas of the region, transit accessibility is high. However, in the more rural parts of the region, there is low transit accessibility. 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. (Refer to Figure 25).

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. Urbanized areas in Hampton Roads scored the highest, as was expected, with the highest scoring areas located within the Cities of Newport News, Hampton, Norfolk, and Virginia Beach. The high variability within even the highest scoring areas reflects the significance of land use and job density in determining walk accessibility. (Refer to Figure 26).

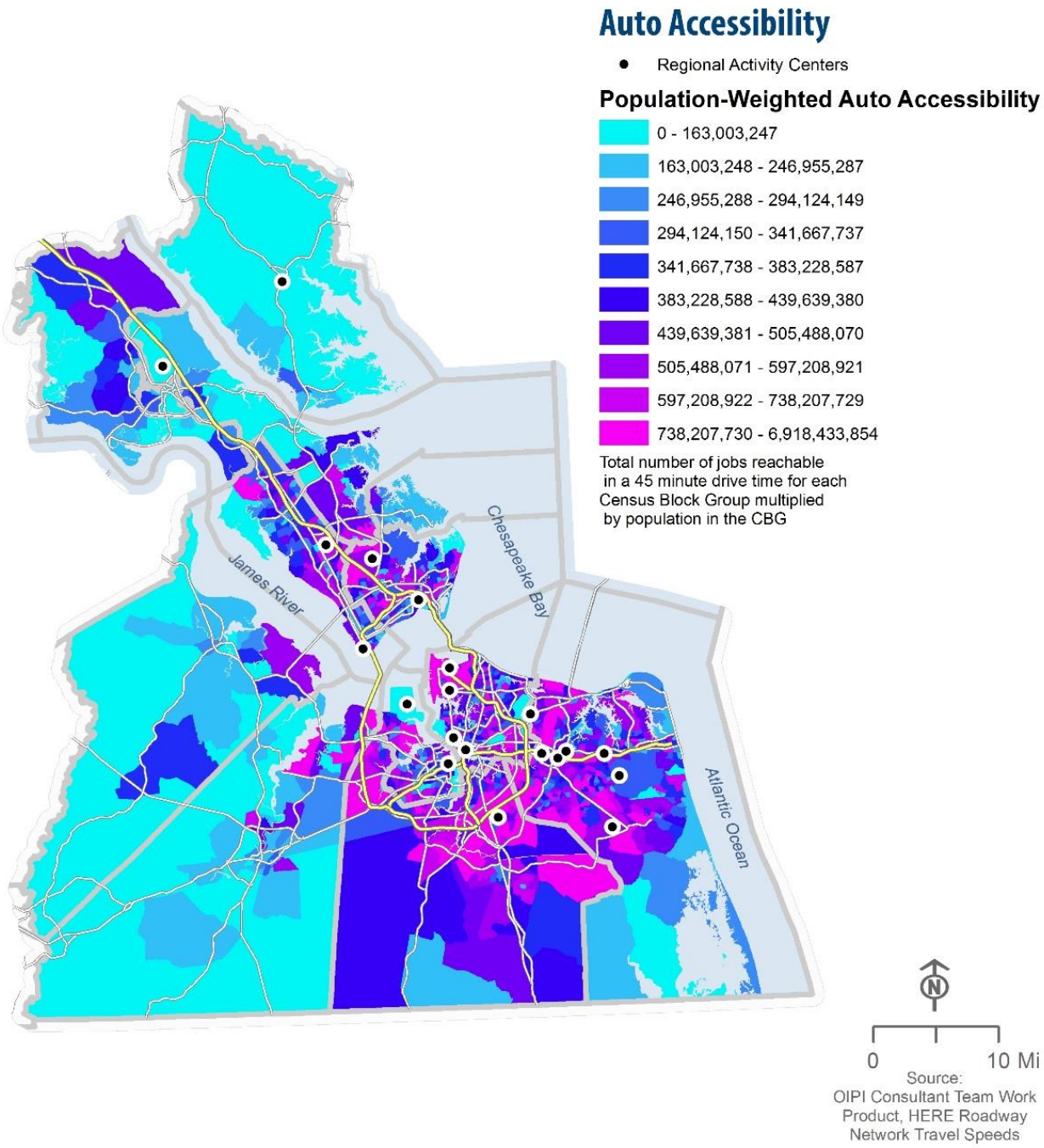


Figure 24: Auto Accessibility

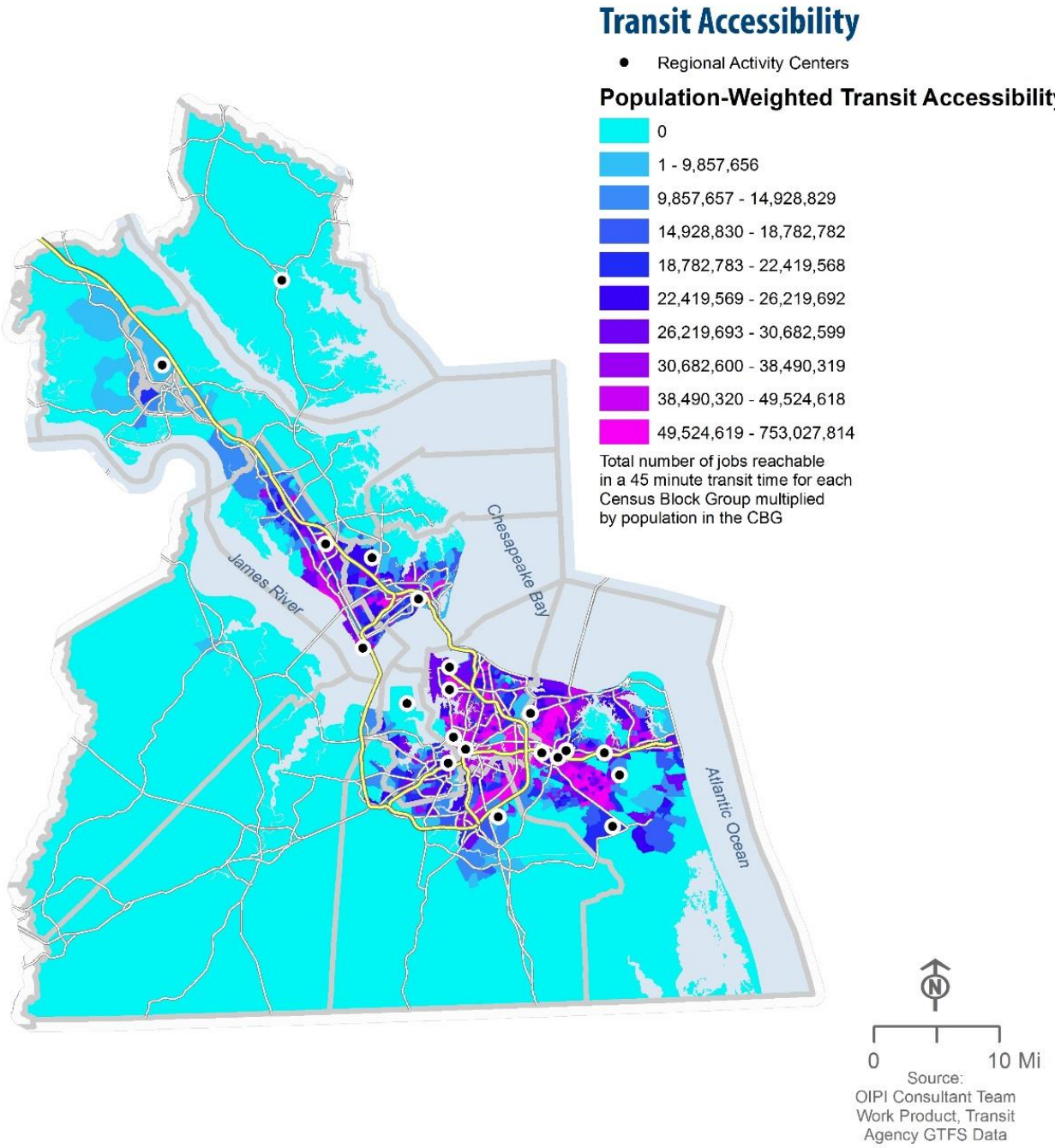


Figure 25: Transit Accessibility

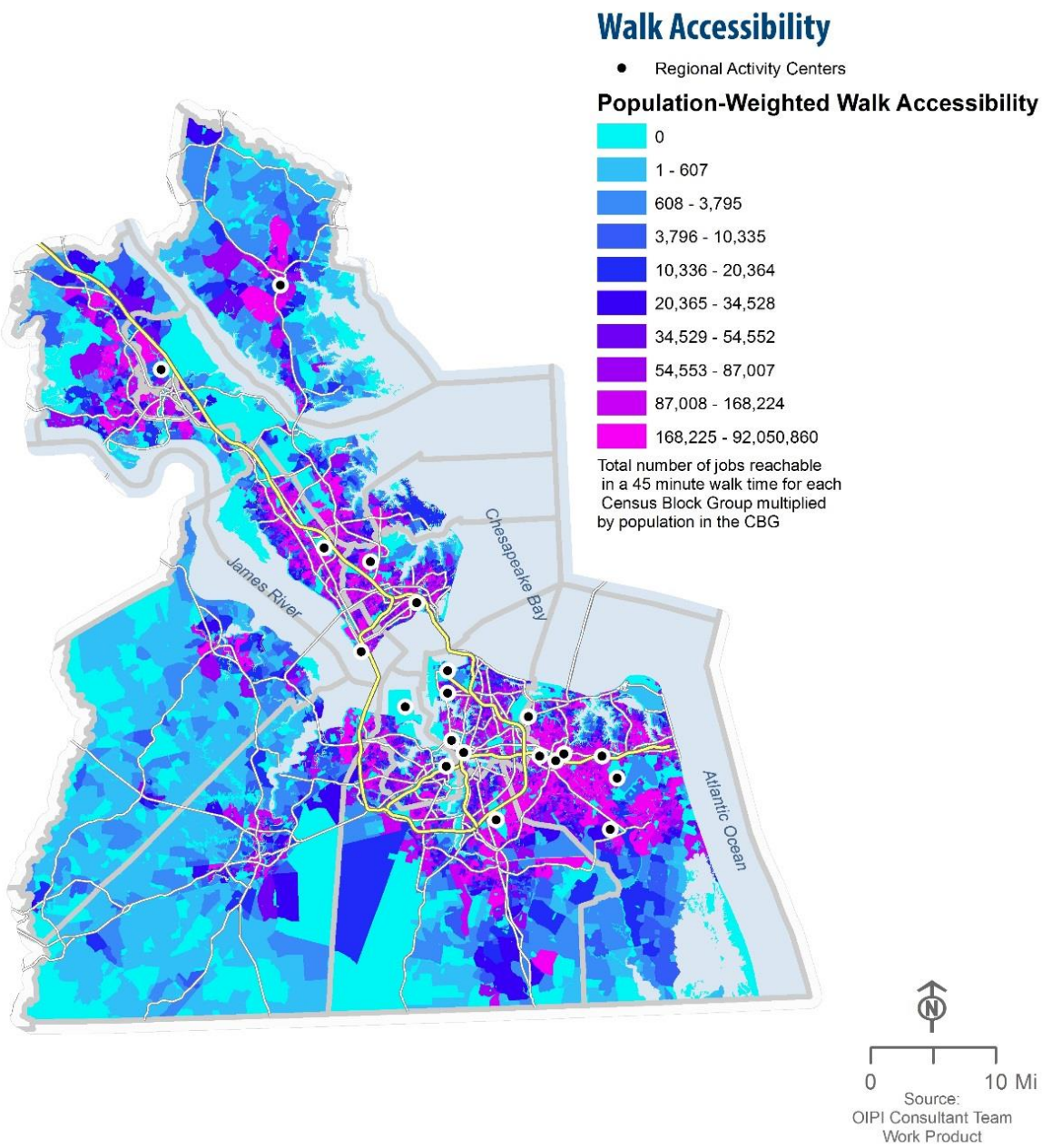


Figure 26: Walk Accessibility

Freight Accessibility

In addition to railways, I-64, US Route 13/58, US 460 and I-264 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 regional activity centers in the region are within a three minute drive from a major arterial ramp. (Refer to Figure 27).

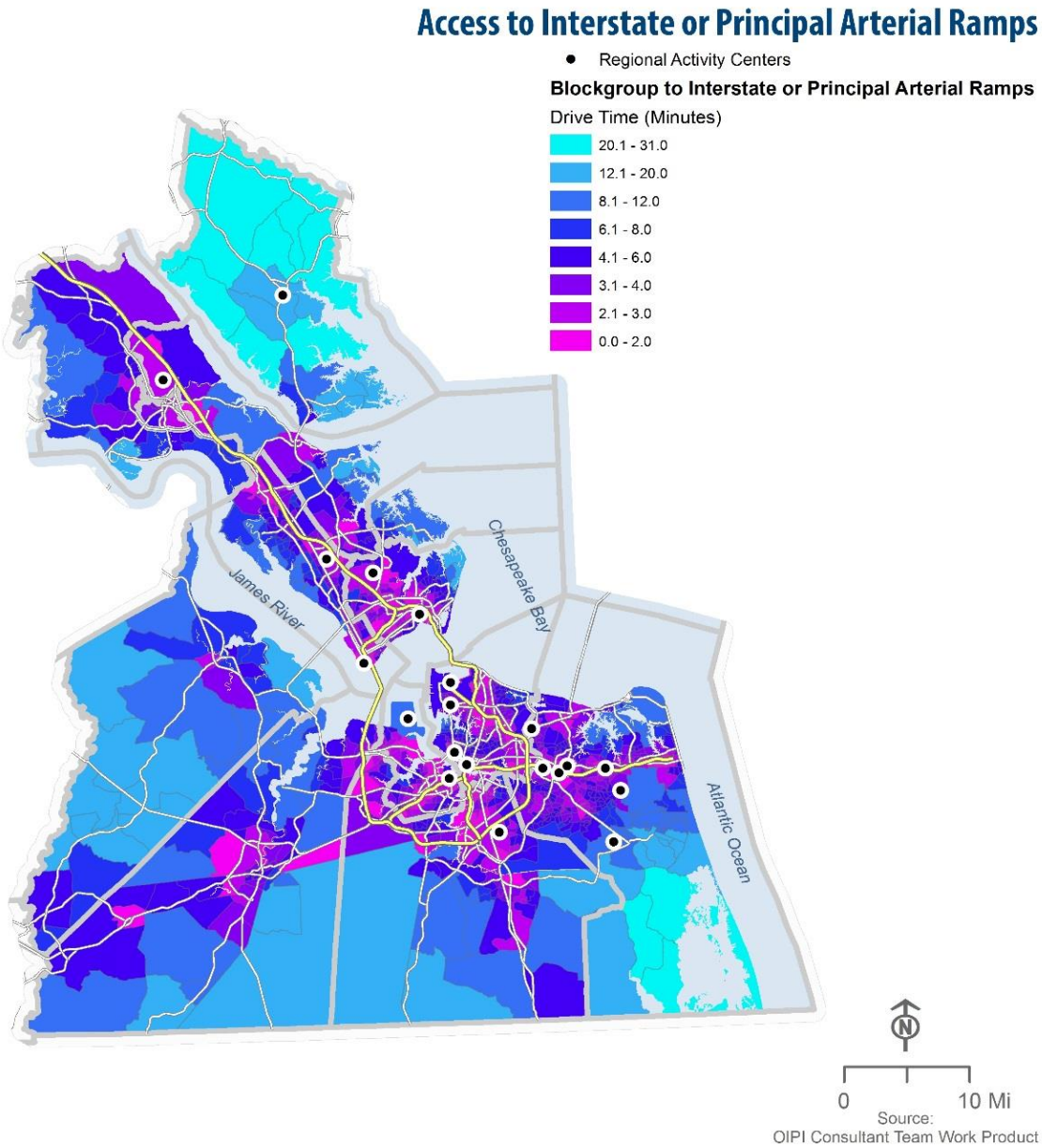


Figure 27: Access to Interstate and Principal Arterial Ramps

The location of warehouses and distribution centers is another important factor in the level of freight accessibility for the region. Most warehouses and distribution centers in Hampton Roads are clustered around the port terminals in the Cities of Newport News, Portsmouth, and Norfolk. Most regional activity centers have access to a warehouse or distribution centers within a four minute drive, with the notable exception of some port facilities. (Refer to Figure 28).

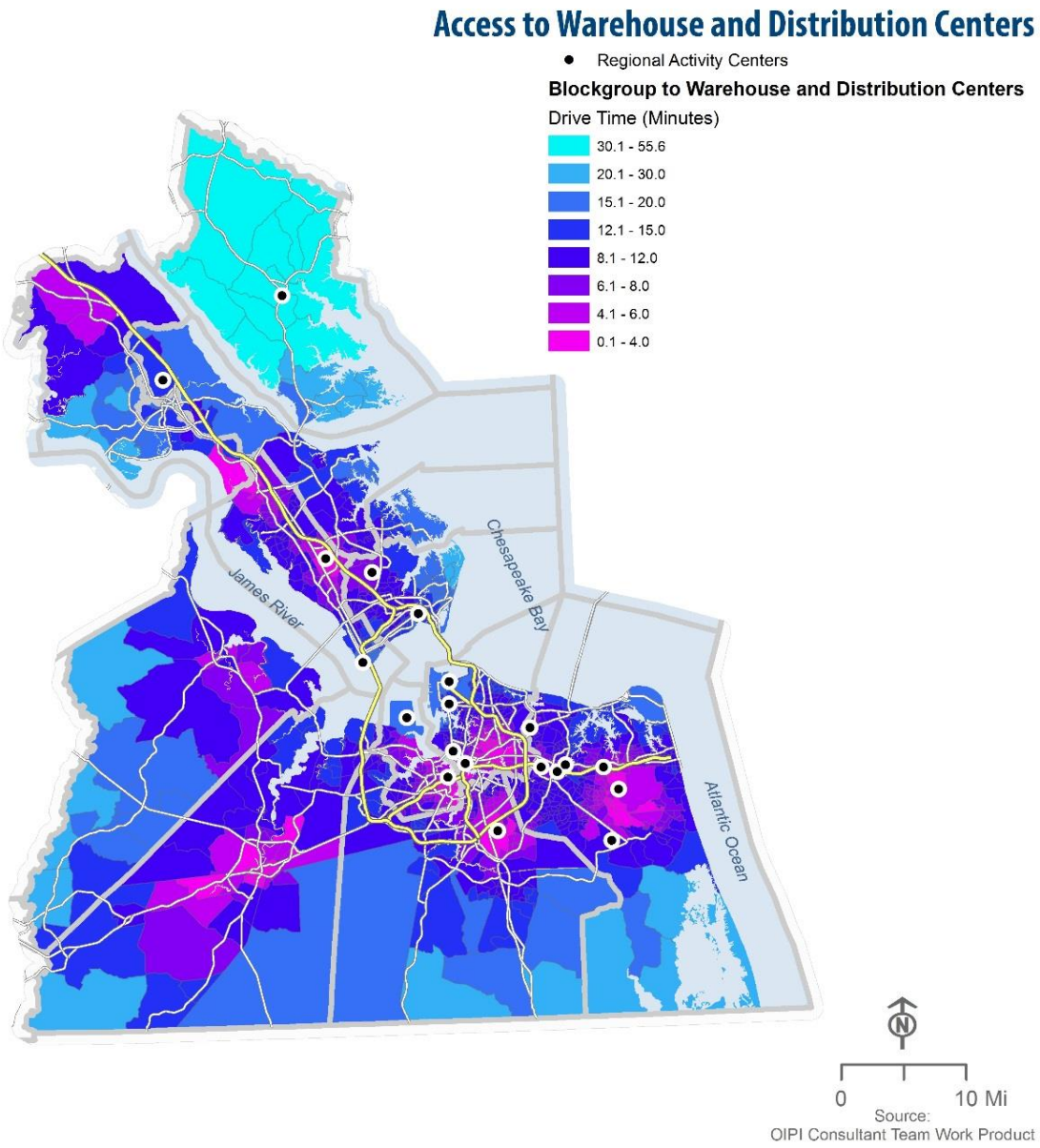


Figure 28: Access to Warehouses & Distribution Centers

Both CSX and Norfolk Southern operate freight rail lines that pass through multiple jurisdictions in the Hampton Roads Region. There is one major freight airport in the region, Norfolk International Airport. To the west, Richmond International Airport is the closest major airport that handles large quantities of freight. (Refer to Figure 29).

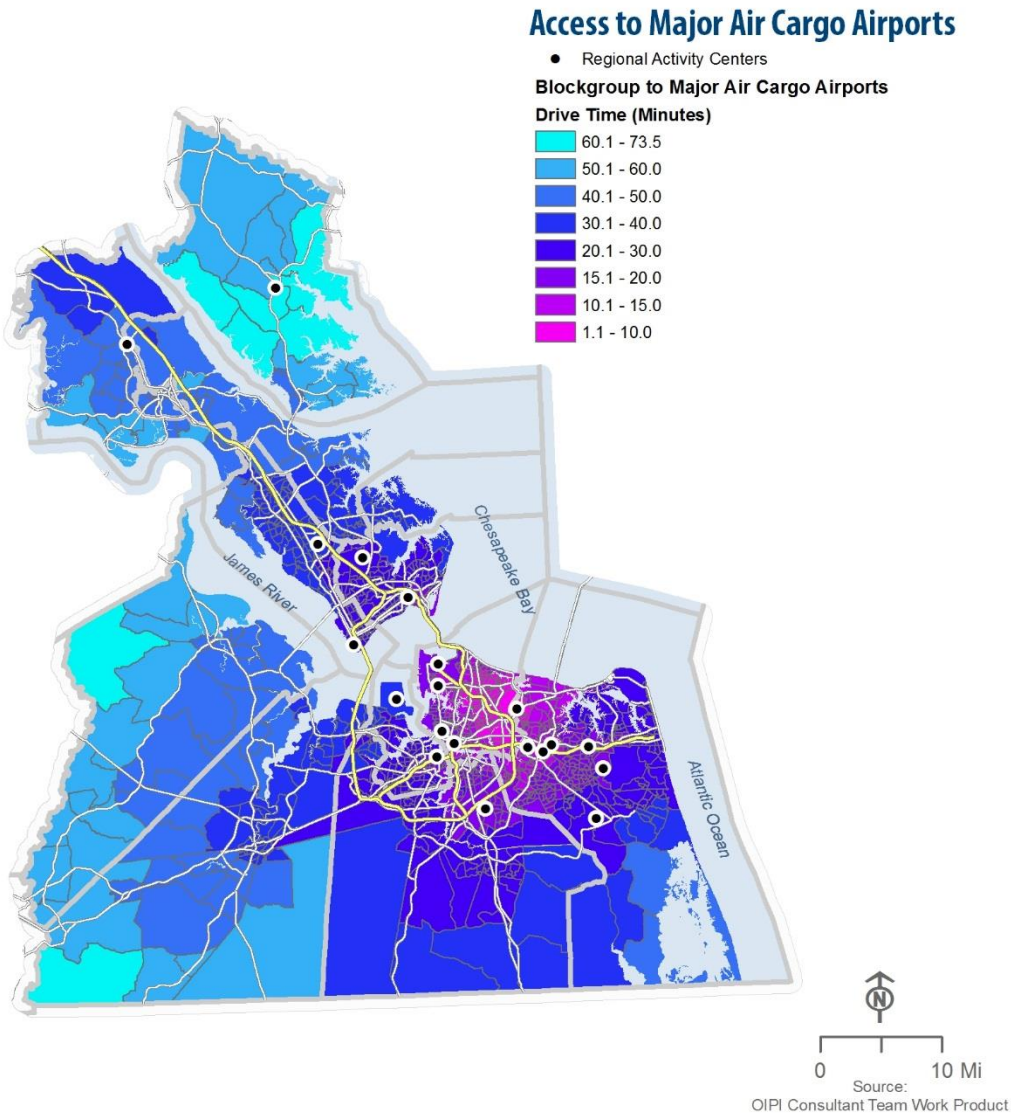


Figure 29: Access to Freight Airports

D. Roadway Measures

This assessment identified the transportation conditions in Hampton Roads 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 29 below, is defined as the ratio of the median speed to the 90th percentile speed during the weekday AM peak period. Data for major corridors were available for analysis in the Hampton Roads Region. Overall, scores on the travel time reliability index indicated that reliability varies greatly throughout the region. The reliability index scores are higher in urbanized areas of the region, representing slightly lower levels of travel time reliability. These areas include the City of Virginia Beach, Norfolk, Portsmouth, Newport News, and Hampton. Rural areas of the region, such as Isle of Wight County, City of Suffolk, James City County, and Gloucester County have fewer reliability issues. (Refer to Figure 30).

Percent of Time Congested

Congestion is an important determinant of roadway level of service. The percentage of time congested was calculated for morning peak times from 2013 to 2014 for major corridors in Hampton Roads. According to the analysis, congestion occurs at interchanges. These points, throughout the region, operate at 10.1% – 96% percent time congested. (Refer to Figure 31).

Median Speeds

This map displays the ratio of pm peak hour vehicle speeds and the speed limit for the PM peak period. Speeds greater than 1.0 indicate travel at speeds higher than the speed limit. The ratio of median speed to speed limit shows problems in congested areas such as bridges/tunnels, interchanges, and also arterials that have many traffic signals. Note that the PM peak period has a distinct pattern in the I-64 corridor on the peninsula, which is different than AM congestion patterns. (Refer to Figure 32).

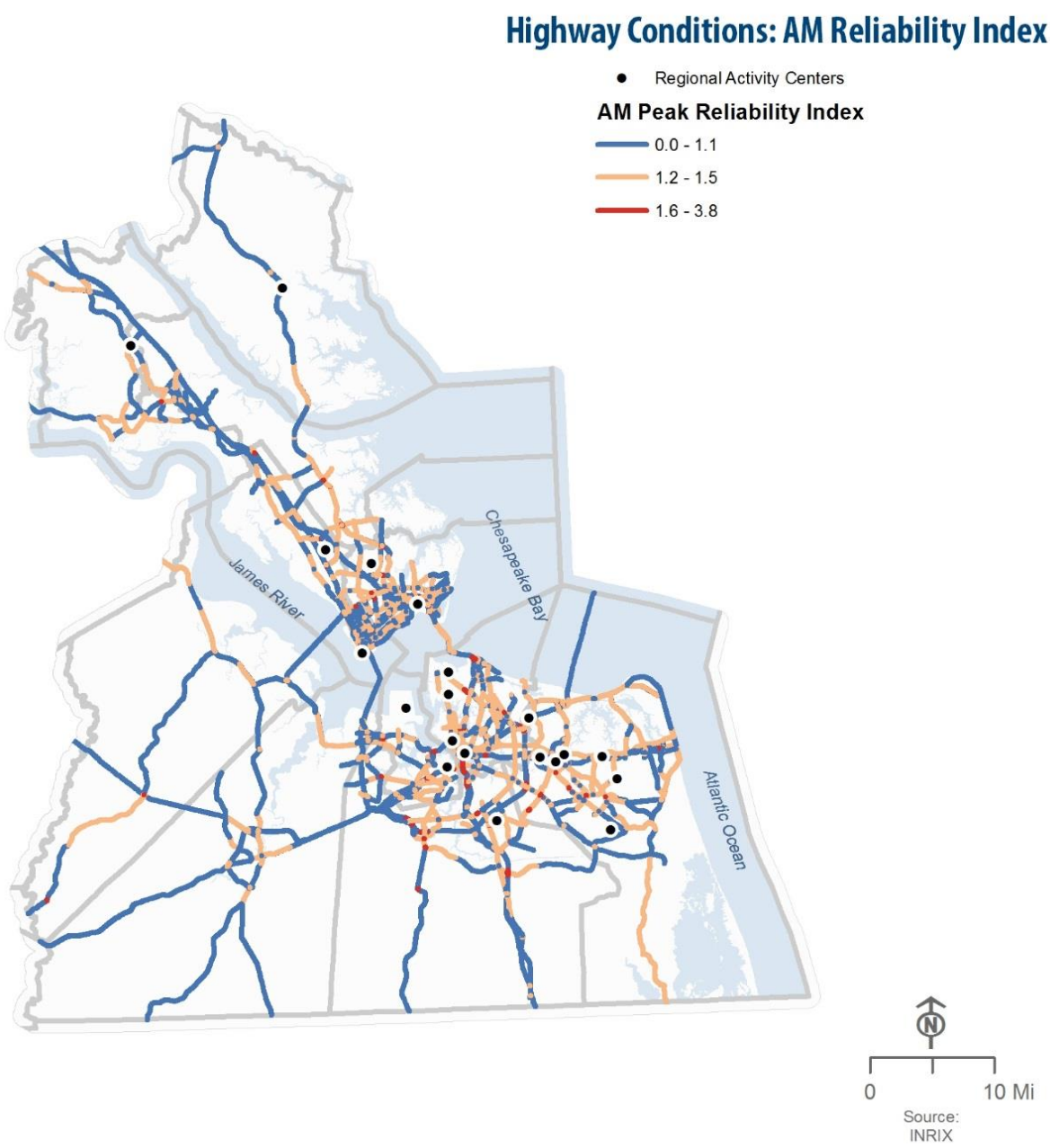


Figure 30: Travel Time Reliability

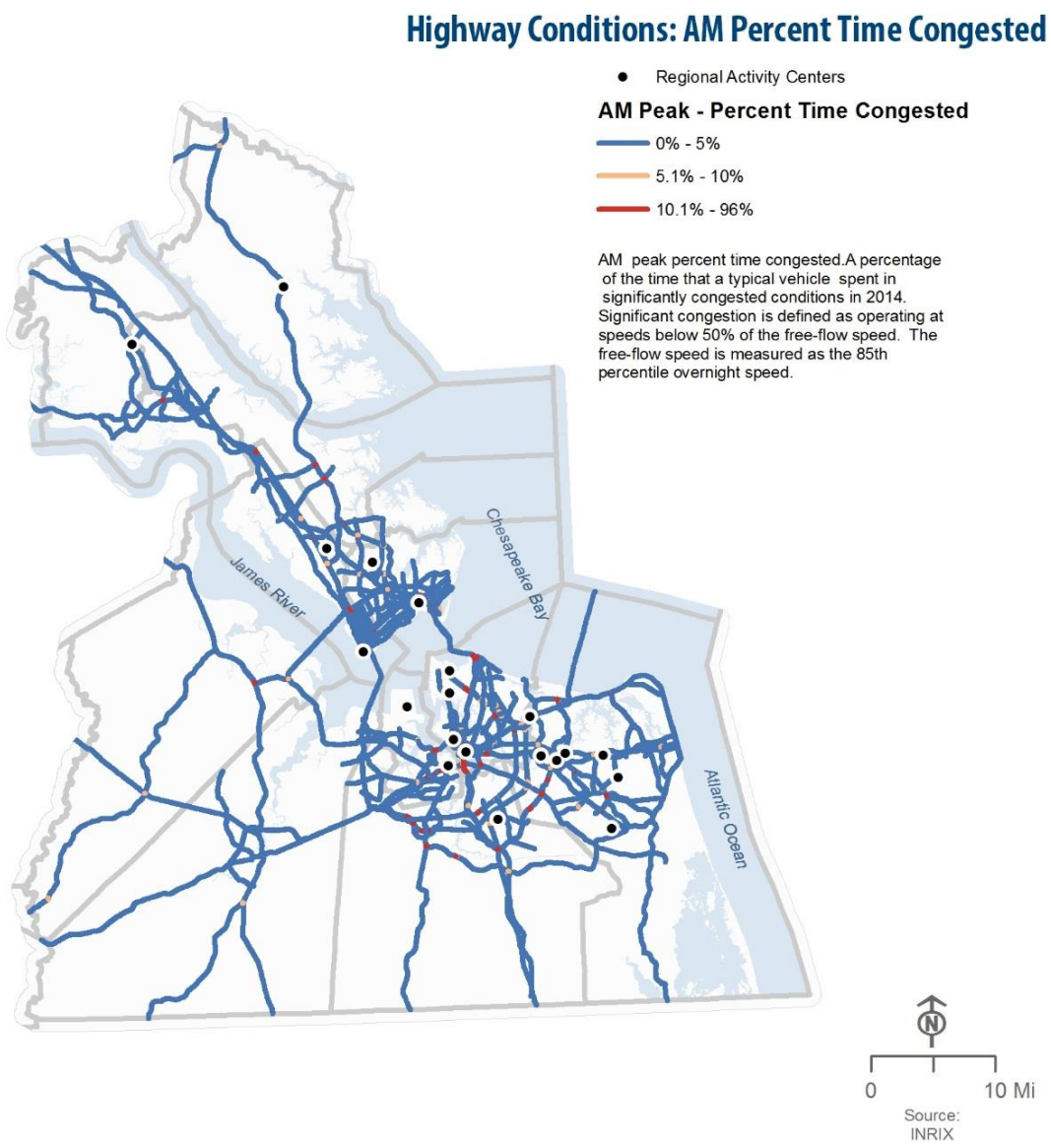


Figure 31: Percent of Time Congested

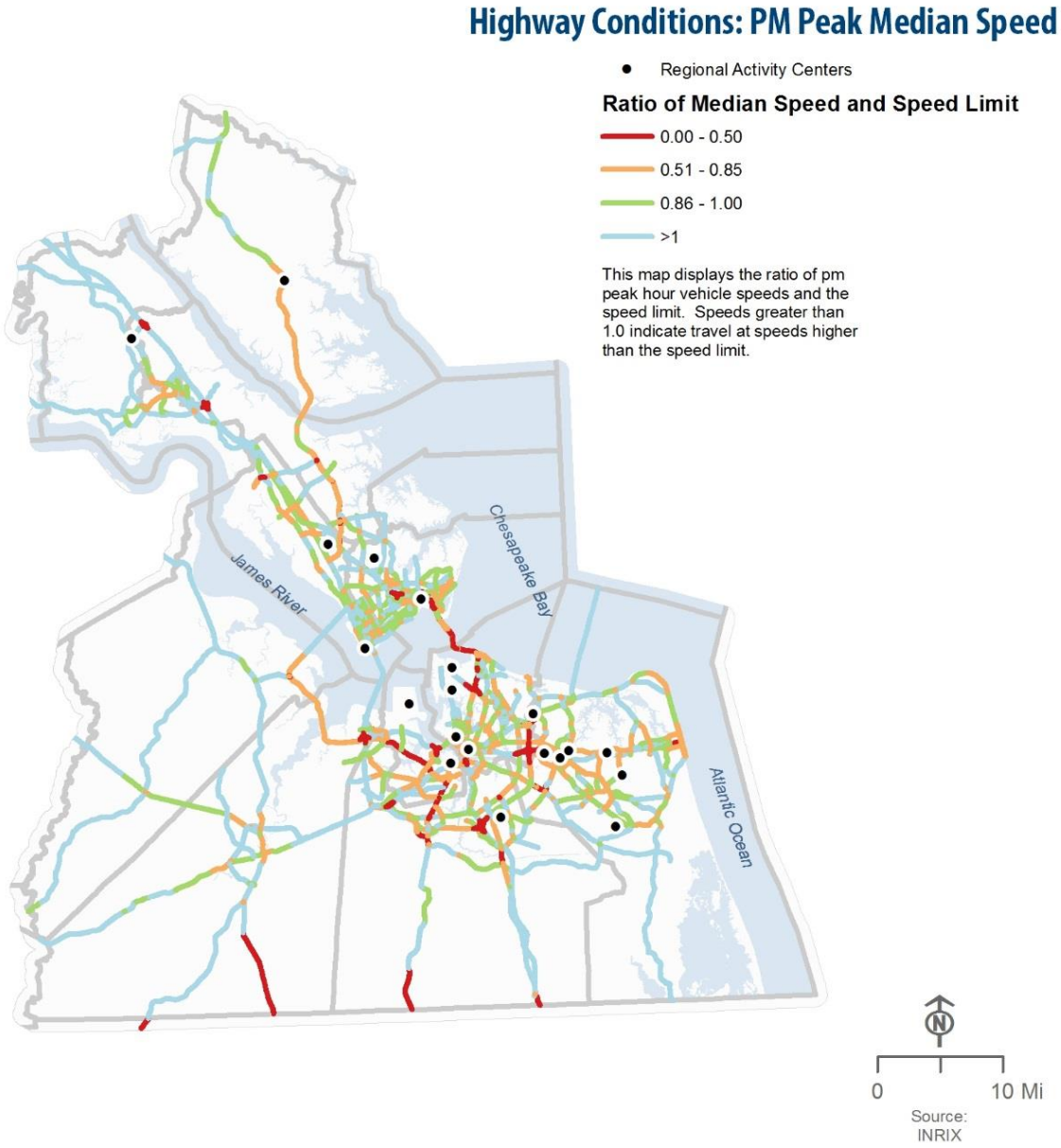


Figure 32: Median Speeds

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 Hampton Roads Region, an average of 88% of the dollar value of all goods that are moved through the region are moved by truck. Water is the second most important mode, carrying around 7% of the total dollar value of goods. In comparison to the other jurisdictions in the region, the Cities of Norfolk, Suffolk, Portsmouth, Virginia Beach, Williamsburg, and York County are more dependent on rail service than water service, but overall throughout all jurisdictions in the region, trucks are the primary means of moving goods. (Refer to Figure 33).

Location quotients are used to compare the prominence of freight modes between the Hampton Roads Region and the state as a whole. The Hampton Roads Region relies on water for freight movement almost two times more than the state as a whole. While rail and air are widely used for freight movement in the Hampton Roads Region, the region is less dependent on rail and air than the state as a whole. While a there is a freight airport in the region, Norfolk International Airport, the multiple port facilities are the dominant way of moving freight in Hampton Roads. Trucks are used only slightly more than the state, with a location quotient slightly greater than one. (Refer to Figure 34).

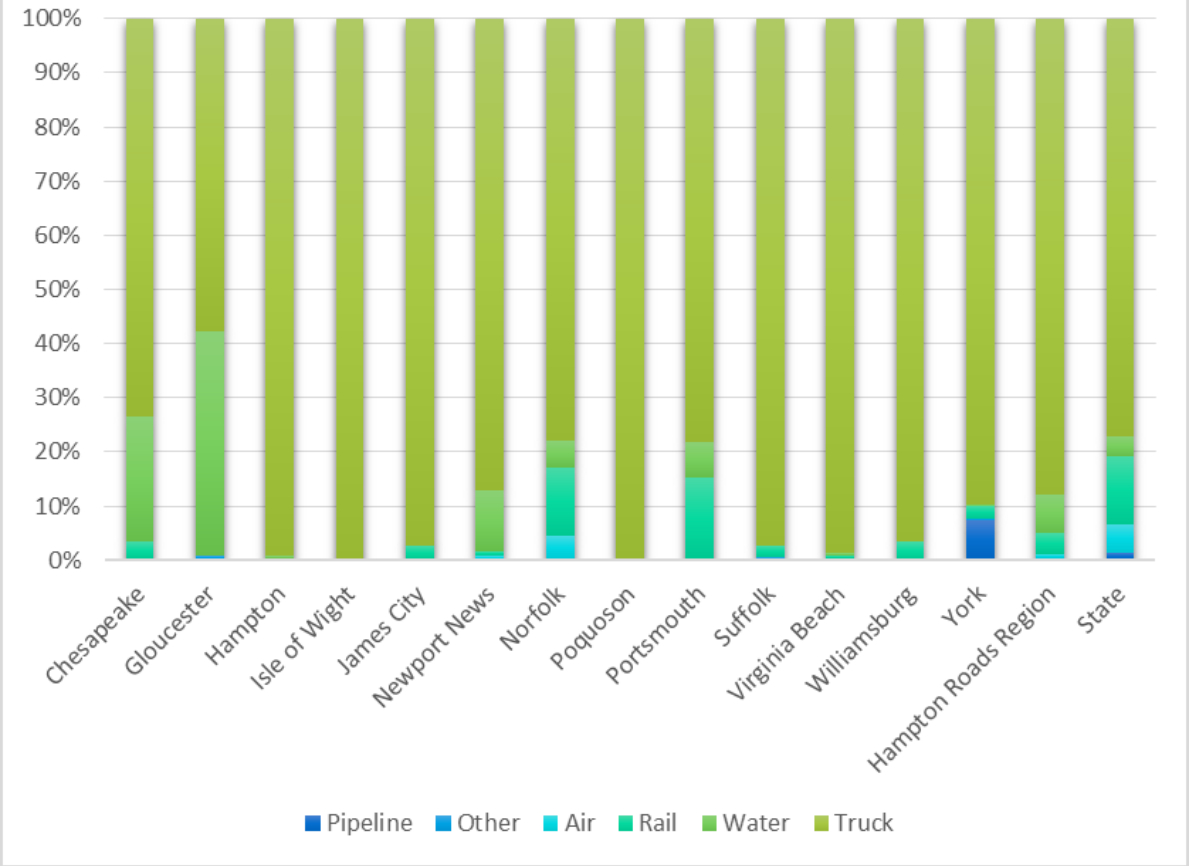


Figure 33: Comparison of Freight Modal Dependence
Source: TranSearch, 2012

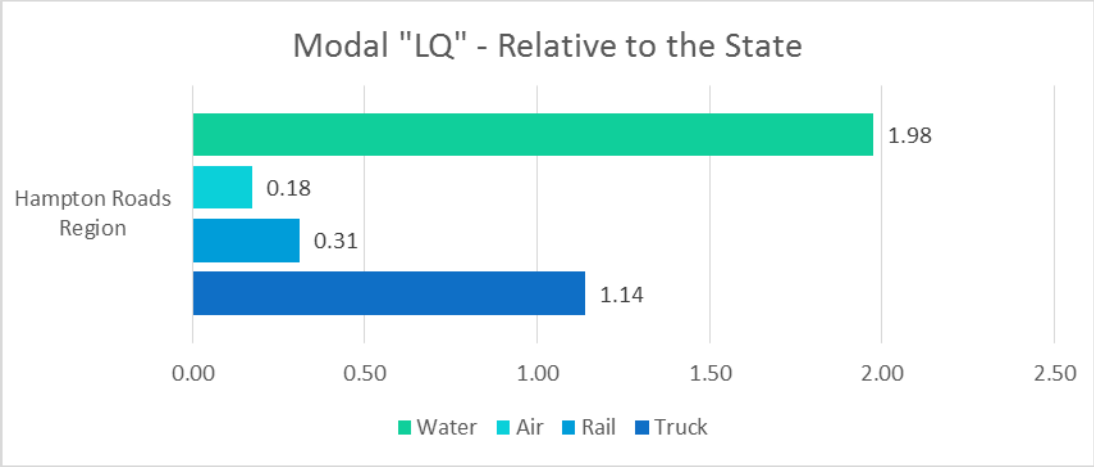


Figure 34: Location Quotient by Mode of Freight Travel
Source: TranSearch, 2012

Top Commodities

While the 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. Other freight is the sector with the highest total dollar value imported and exported to the Hampton Roads Region. Secondary traffic (i.e. freight that is made up of goods being transferred between warehouses or retail centers) was the second highest total dollar value imported to and exported from the region. Overall, the Hampton Roads Region imported $92 billion worth of goods and exported $85 billion worth of goods, resulting in $7 billion of net imports in 2012. (Refer to Figures 35 and 36).

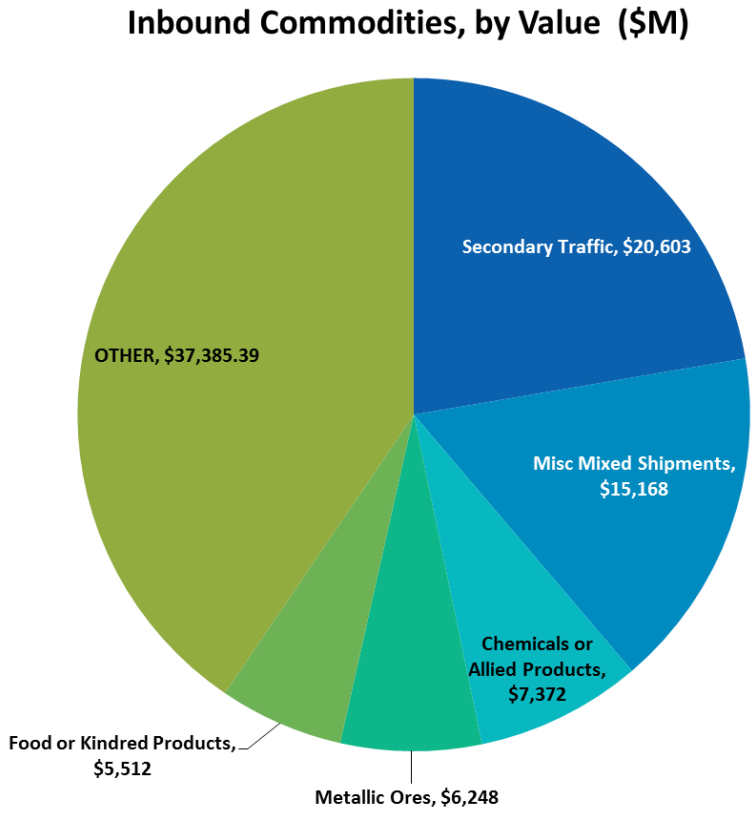


Figure 35: Top Freight Values by Commodities - Inbound.
Source: TranSearch, 2012

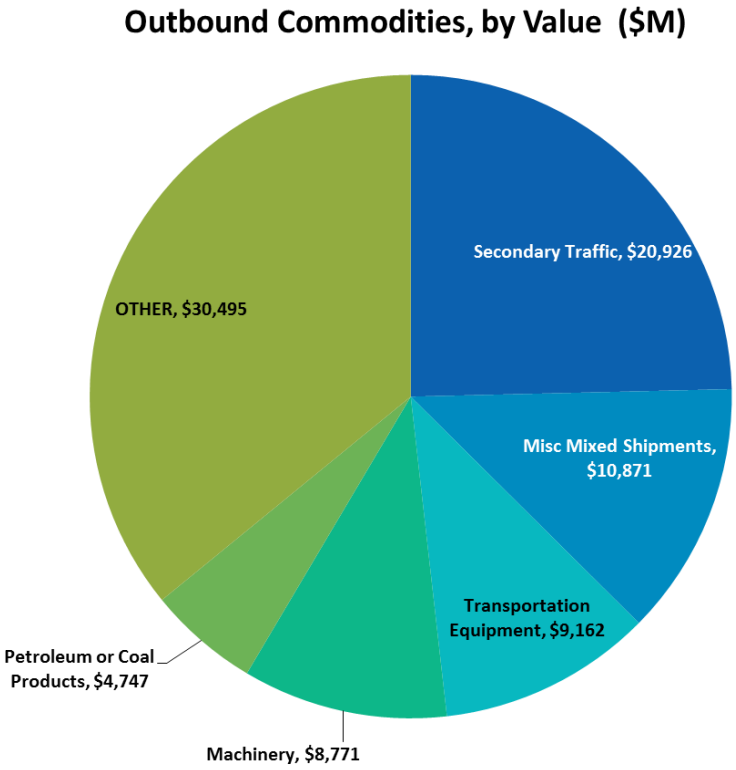


Figure 36: Top Freight Values by Commodities - Outbound.
Source: TranSearch, 2012

The Southeast Region, as defined by the Bureau of Economic analysis, is the most important destination for freight from the Hampton Roads Region in terms of value. In 2012, $16.6 billion of freight was exported to the Southeast. In terms of tonnage, the destination for the most tonnage is the Hampton Roads Region itself. Over 277,000 tons of freight was destined for the Hampton Roads Region. (Refer to Figure 37).

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, coal made up the highest total tonnage imported to the region, accounting for two-thirds of total tonnage imported to the Hampton Roads Region. This tonnage imported analysis includes any freight bound for the regional ports for export. It can be assumed that much of this coal is intended for export either internationally or domestically. Secondary traffic made up the highest total tonnage exported to the region, followed closely by petroleum and coal production. (Refer to Figures 38 and 39). The importance of secondary traffic is

consistent with the region's high levels of economic activity in freight movement and wholesale trade and with relatively high demand from end-consumers (e.g. retail trade and consumption by service sector industries).

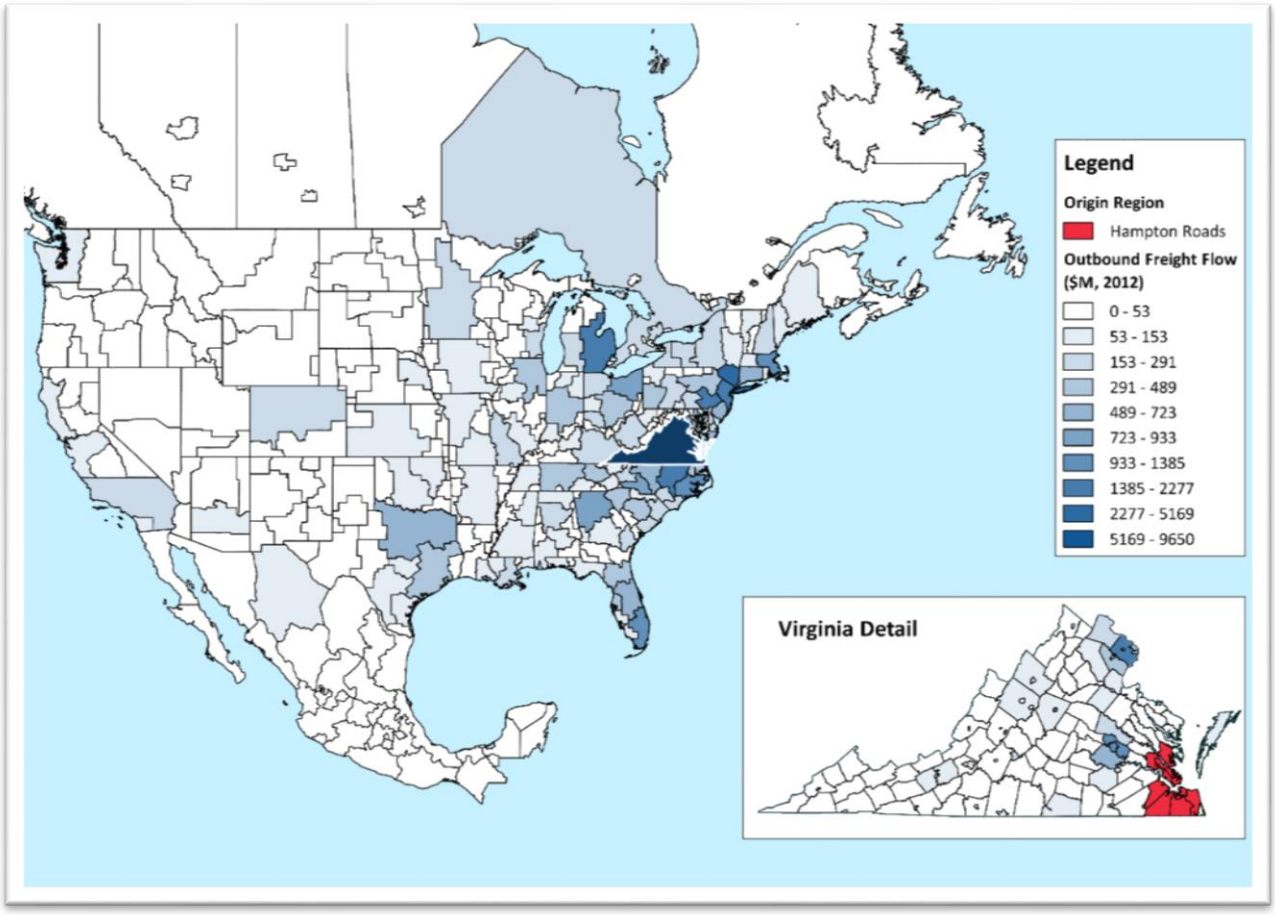


Figure 37: Top Freight Values by Region.
Source: TranSearch 2012

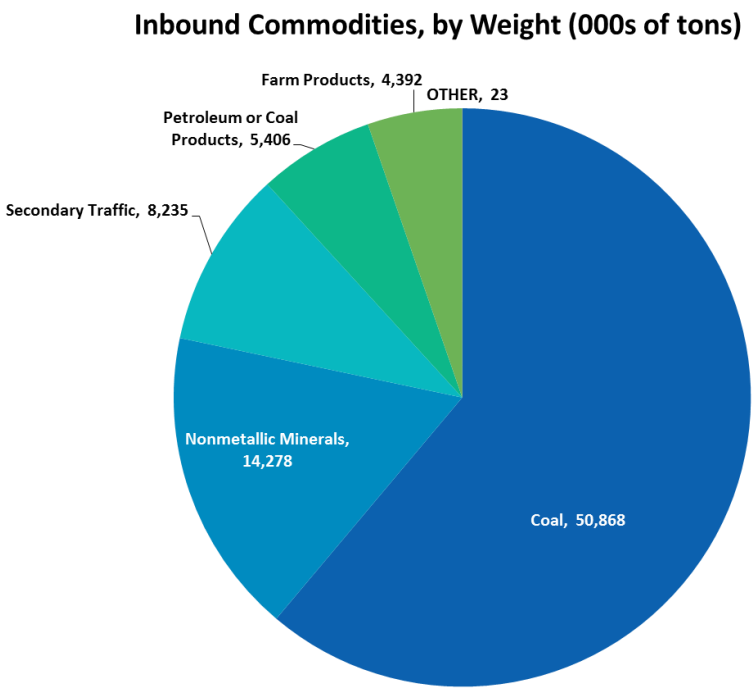


Figure 38: Top Commodities by Weight – Inbound.
Source: TranSearch, 2012

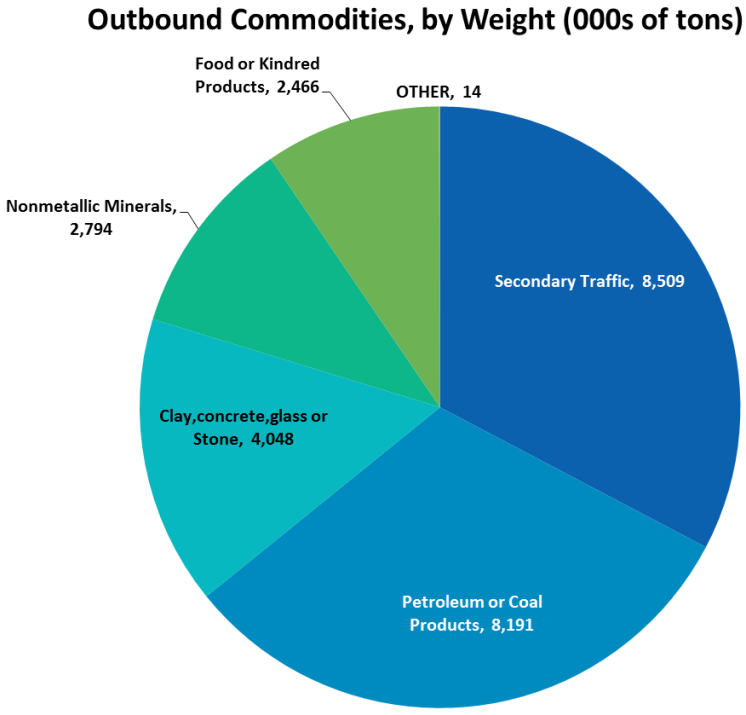


Figure 39: Top Commodities by Weight - Outbound.
Source: TranSearch, 2012

4. NEEDS PROFILE

A. Introduction

Based on the overall approach to the VMTP Needs Assessment, Transportation Needs are 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 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 the areas within the region where 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/Operations Needs (i.e. Safety 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 21st 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 (SIR). 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 10: Economic and Transportation Correlation. Source: Summary correlations based on national research and survey of national Industry Site Selection Professionals conducted by the Study Team.

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

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 Hampton Roads Region, it showed the local serving sector will make up 51% of regional economic output, a moderate portion in the freight dependent sector (31%), with a smaller segment of the knowledge sector (18%). However, the knowledge sector is projected to have the greatest relative growth.

As outlined in the economic and transportation correlation above, the general transportation needs of these two dominant sectors (freight and local) are as follows. The freight cluster emphasizes highway access and overall freight access, as well as freight reliability and bottleneck relief, as their most important transportation factors. Several key freight studies in the Hampton Roads Region, including the *Port of Virginia 2040 Master Plan* (2014), the Port of Virginia *Master Rail Plan* (2015), the HRTPO *Hampton Roads Regional Freight Study* (2012), and the HRTPO *Traffic Impact of an Inland Port* study (2011) all point to several key issues for freight movement in the region that are consistent with the correlation findings and add further insight:

- Ten freight gateways provide the critical highway access for freight to and from the region. Among the gateways, nearly half of the port traffic entering/exiting the region uses I-64, followed by Route 58 and Route 460.
- Highway bottlenecks are a chief concern, with substantial truck delay occurring in locations such as the Elizabeth River tunnel crossings, the convergence of routes to US 460 in the Bowers Hill area, the four-lane portion of I-64 on the peninsula, and much of the Interstate highway loop around the Hampton Roads including the Hampton Roads Bridge-Tunnel and the Monitor-Merrimac Memorial Bridge-Tunnel
- Increased mode-share for rail is helping to accommodate rapid growth in freight movement, but with the result that areas with at-grade rail crossings have heightened local safety and accessibility issues

The local-serving sector shows highest concern for highway access, network connectivity, and mode choice. The Needs Assessment for Hampton Roads highlights the importance of these issues for these employment centers, for example by examining where transit accessibility is lacking for major government centers in the region, and where barriers exist to mobility among activity centers and residential areas, such as the I-64 corridor on the peninsula and the I-264 corridor in Virginia Beach where the interstates form barriers to activity center accessibility.

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 modal choice, transit access and walkable places. 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. While the Hampton Roads Region is served by transit, connectivity between some activity centers is lacking and there are many obstacles to active transportation modes (walking and biking). The expansion of knowledge-based and local-based sectors would benefit from additional fixed route transit in the region, expanded rapid transit, and commuter services such as commuter buses and park-and-ride lots to improve mode choice in congested corridors as well as access to jobs region-wide. Further support for the knowledge sector would also come from additional walkable places and modal options for walking and biking in the activity centers that feature these jobs. The discussion above represents 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 developed in part 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 in the introduction to this chapter. 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

The map below summarizes the regional Transportation Needs with reference to to Activity Centers and corridors, as well as overall regional needs. 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/Congestion
2. General Description of Need
3. Economic findings to support need
4. Transportation findings to support need

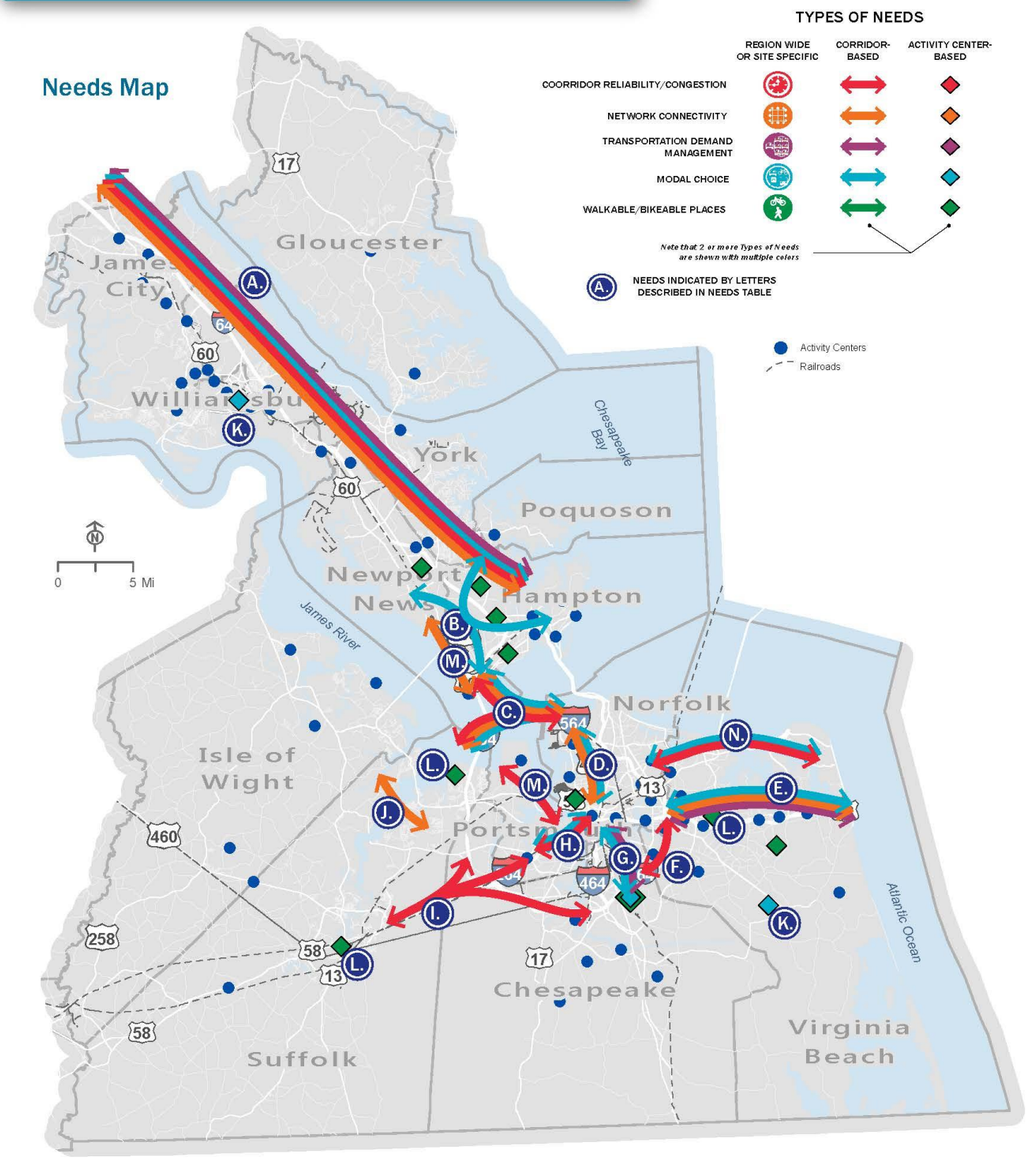
The findings to support the determination of need generally came from the statewide datasets of economic and transportation conditions summarized above. However, in cases where the statewide data is not of a fine enough grain or level of detail to accurately determine a Need, it was supplemented by locally 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 40: Summary Needs Map for the Hampton Roads Region

Hampton Roads Region Needs Summary

Needs Map



Needs Table (Page 1)

A. I-64 Corridor Reliability

The I-64 Corridor serves as a major artery for the region, handling commuter and freight traffic as well as connecting Hampton Roads to other parts of Virginia. There is a need for more capacity for freight and commuters, and more options for commuters such as passenger rail and transportation demand management, to better connect residents with destinations and ease congestion in the I-64 Corridor. The parallel roads in the corridor share the reliability issues, and improved connectivity across the peninsula is also needed to improve mobility and reduce congestion.

B. Newport News, Poquoson, and Hampton Activity Center Mode Choice

The regional activity centers of the lower peninsula currently lack efficient transit access. These routes would connect to other regional transit facilities and add to overall transit accessibility.

C. Peninsula - Southside Crossing

The region's major water bodies limit network connectivity. The limited connectivity is exacerbated by limited mode choice. The infrastructure connecting the peninsula and southside is critical for the region's freight movement as well as commuter and thru traffic. There is a need for transit options as well as enhancement of interchanges, bridges and tunnels.

D. Naval Station Norfolk and NIT Access and Safety

Naval Station Norfolk and Norfolk International Terminal generate complex traffic patterns. Currently, there is substantial congestion on the surrounding roadway network. Rail connectivity and rail crossing constraints affect freight movement and safety. The transportation system needs include improvements in network connectivity, increased multimodal/transit accessibility, and safety enhancements.

E. Route 58/I-264 Corridor

The Route 58/I-264 Corridor is an important artery for the movement of commuters and connects multiple regional activity centers with knowledge based workforces. This corridor lacks transit access, bike access, transportation demand management programs, and has lower network connectivity. The I-264 corridor itself is a barrier to north-south movements.

F. I-64 Interchanges

The I-64/Indian River Road Interchange and the I-64/I-264 interachange are points of congestion for commuter, freight, and thru traffic. The transportation network requires strategies to address bottlenecks and improve reliability in these areas.

G. I-464/Greenbrier to Norfolk

The I- 464 Corridor connects major activity centers Norfolk CBD and Chesapeake/Greenbrier, which are both knowledge based activity centers. The corridor has limited transit options, barriers to active transportation, and would benefit from enhanced transportation demand management programs.

H. Elizabeth River Crossings

The Elizabeth River is another waterbody that is a challenge for the movement of people and freight in the region. The bridge and tunnel crossings are often points of bottlenecks and congestion, making freight and passenger travel unreliable. Mode choices are very limited.

I. US 58/US 13/US 460, I-664/I-264 Corridor

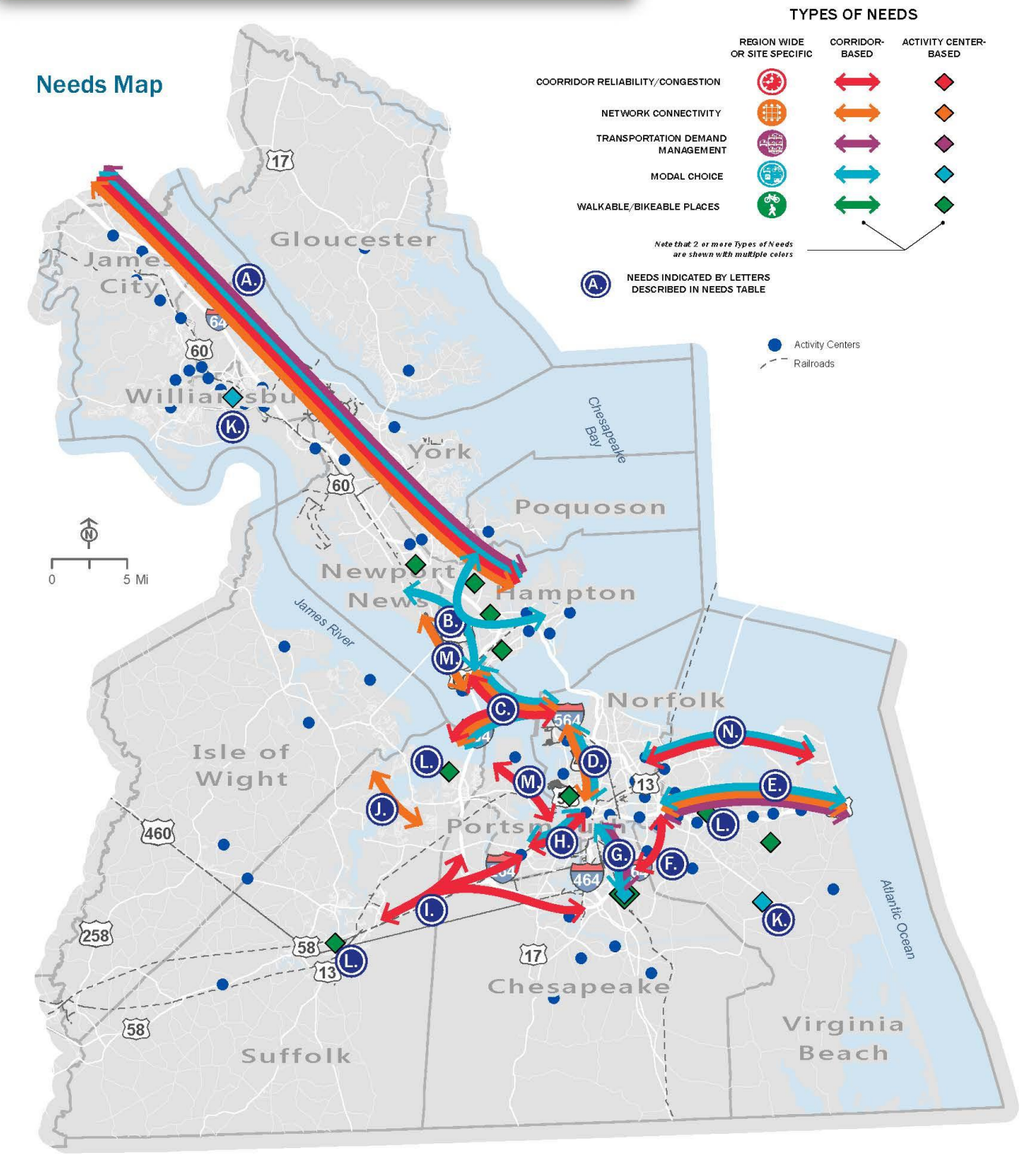
The US 58/13/460 and I-664/I-264 Corridors are a major freight gateway for the region, carrying freight in and out of the region from the southwest. The corridor is also an important artery for evacuation during extreme weather events. The corridor is in need of strategies to improve freight reliability, congestion and safe evacuation.

J. Nansemond River Crossings

Network connectivity in this area is hindered by deteriorating infrastructure and limited crossings. Currently, there is not a connection between Nansemond Parkway and Godwin Boulevard, causing circuitous travel patterns.

Hampton Roads Region Needs Summary

Needs Map



Needs Table (Page 2)

K. Various Activity Centers - Mode Choice

Key regional activity centers featuring government centers in the area have inadequate transit accessibility. These activity centers are in need of enhanced transit for both employees and customers.

L. Various Activity Centers - Walkable/Bikeable Places

There are multiple activity centers that have limited pedestrian facilities. Walk/bike-ability appeals to the future workforce, attracts knowledge-based industries and reduces the reliance on vehicular travel.

M. Freight Terminals

The corridors between freight terminals experience truck bottlenecks that impede goods movement and affect the surrounding community's safety and mobility.

N. US 60/Burton-Little Creek Accessibility

The roads along the Chesapeake Bay in this area serve major employment centers, the shoreline tourist attractions, the Chesapeake Bay Bridge-Tunnel and local residents. The constraints of the corridor and its many users create reliability and safety concerns. Bicycle and pedestrian accommodations are lacking, particularly to cross the corridor. Access management should be preserved but multimodal access parallel to and across the corridor should be improved.

O. Regional Need - Modal Choice

To support active transportation, water crossings of all scales need to accommodate bicycles and pedestrians. Constraints are widespread and create circuitous trips of unsurmountable obstacles. Other barriers include railroads and interstate highway corridors.

P. Regional Need - Corridor Reliability from Modal Conflicts

Increasing freight rail traffic radiating from port terminals will affect at-grade rail crossings throughout the region with longer/more frequent closings, increasing delays for other travel modes and raising safety concerns.

Q. Regional Need - Corridor Reliability for Freight Gateways

The region's ten freight gateways are (clockwise): I-64 West, US 17 North, US 13 North, VA 168 South, US 17 South, US 13 South, US 58 West, US 258 West, US 460 West, and VA 10 West. These routes are critical to moving to and from the ports and affect intra-regional travel where bottlenecks occur.

Figure 41: VMTP Icon Key

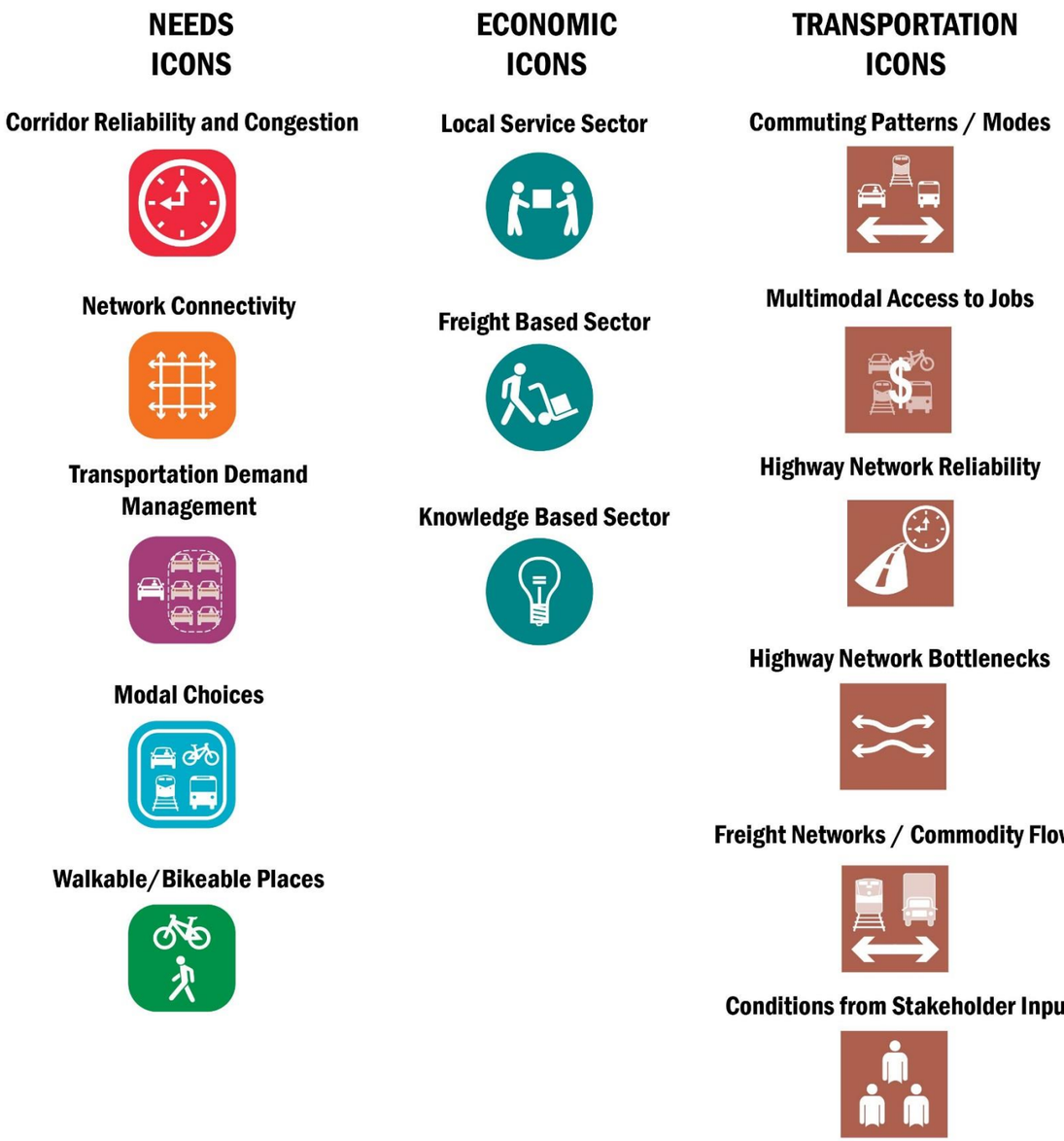


Table 11: Findings of Needs for the Hampton Roads Region

A. I-64 Corridor Reliability

NEED	**The I-64 Corridor serves as a major artery for the region, handling commuter and freight traffic as well as connecting Hampton Roads to other parts of Virginia. There is a need for more capacity for freight and commuters, and more options for commuters such as passenger rail and transportation demand management, to better connect residents with destinations and ease congestion in the I-64 Corridor. The parallel roads in the corridor share the reliability issues, and improved connectivity across the peninsula is also needed to improve mobility and reduce congestion.**
ECONOMIC	Supports major regional activity centers not only on the peninsula but throughout the region. The corridor is an essential and high-priority corridor for the ports and freight movement. It connects activity centers of all types and supports tourism.
TRANSPORT.	Bottlenecks and congestion hinder the reliability of the corridor, which is a freight gateway corridor. Multimodal access to jobs is lacking. The interstate corridor is a barrier to movement within the Peninsula.

B. Newport News, Hampton, and Poquoson, Activity Centers Mode Choice

NEED	**The regional activity centers of the lower peninsula currently lack efficient transit access. These routes would connect to other regional transit facilities and add to overall transit accessibility.**
ECONOMIC	Supports major local and knowledge-based regional activity centers including Tech Center/Oyster Point, Magruder Boulevard, and Downtown Hampton, while enhancing access to local centers such as Poquoson.
TRANSPORT.	Existing connections between activity centers are not efficient, involving low speeds, many stops and transfers. More efficient point-to-point transit would improve mobility and travel choices in the lower peninsula.

C. Peninsula - Southside Crossing

NEED	**The region's major water bodies limit network connectivity. The limited connectivity is exacerbated by limited mode choice. The infrastructure connecting the peninsula and southside is critical for the region's freight movement as well as commuter and thru traffic. There is a need for transit options as well as enhancement of interchanges, bridges and tunnels.**
ECONOMIC	Connects all of the activity centers in the region, of all types. The connections are critical to the ports and freight movement, to tourism, and to many commuters.
TRANSPORT.	Some of the region's worst reliablity hot spots and bottlenecks occur along the access to existing water crossings. The existing crossings lack dedicated transit access and connection to regional transit networks. Additional transit options such as light rail, bus rapid transit, and/or rapid ferry are needed.

D. Naval Station Norfolk and NIT Access and Safety

NEED	**Naval Station Norfolk and Norfolk International Terminal generate complex traffic patterns. Currently, there is substantial congestion on the surrounding roadway network. Rail connectivity and rail crossing constraints affect freight movement and safety. The transportation system needs include improvements in network connectivity, increased multimodal/transit accessibility, and safety enhancements.**
ECONOMIC	Naval Station Norfolk is a regional activity center, a major regional employer, and an important military installation for the United States Navy. The Norfolk International Terminal is one of the major ports in the region, served by intensive rail facilities as well as trucks.
TRANSPORT.	The major issues in this busy area of the region are modal conflicts for freight, local congestion, and lack of multimodal access for passengers.

E. Route 58/I-264 Corridor

NEED	**The Route 58/I-264 Corridor is an important artery for the movement of commuters and connects multiple regional activity centers with knowledge based workforces. This corridor lacks transit access, bike access, transportation demand management programs, and has lower network connectivity. The I-264 corridor itself is a barrier to north-south movements.**
ECONOMIC	This corridor serves multiple knowledge-based and local-serving activity centers. Several are targeted future growth areas with plans for higher density, mixed-use development that can improve transportation efficiency through walk, bike and transit access.
TRANSPORT.	The issues along this corridor include lack of connectivity for north-south movements, which puts pressure on the east-west routes and particularly the I-264 crossings and interchanges; and lack of mode choice for peak period trips and to avoid high traffic levels associated with beach access.

F. I-64 Interchanges

NEED	**The I-64/Indian River Road Interchange and the I-64/I-264 interachange are points of congestion for commuter, freight, and thru traffic. The transportation network requires strategies to address bottlenecks and improve reliability in these areas.**
ECONOMIC	This area serves diverse traffic including major commuter movements, freight traffic, and traffic accessing the activity centers that straddle I-64, including Acredale and Level Green.
TRANSPORT.	This area appears to be a pinch-point for travelers between Chesapeake and Virginia Beach and also those avoiding the congested Elizabeth River tunnel crossings. The I-64/I-264 interchange is a significant point of truck delay in the region.

G. I-464/Greenbrier to Norfolk

NEED	**The I- 464 Corridor connects major activity centers Norfolk CBD and Chesapeake/Greenbrier, which are both knowledge based activity centers. The corridor has limited transit options, barriers to active transportation, and would benefit from enhanced transportation demand management programs.**
ECONOMIC	These major employment centers have significant knowledge-based and local-serving workers as well as the customers that are attracted to major retail and service centers.
TRANSPORT.	This is an important commuter and freight route, with congestion focused in interchange areas. Transit access to jobs is lacking along the corridor despite the large amount of employment at the ends of the corridor, and barriers to walk/bike modes further inhibit mode choice.

H. Elizabeth River Crossings

NEED	**The Elizabeth River is another waterbody that is a challenge for the movement of people and freight in the region. The bridge and tunnel crossings are often points of bottlenecks and congestion, making freight and passenger travel unreliable. Mode choices are very limited.**
ECONOMIC	This area serves diverse traffic accessing the major regional activity centers on both sides of the river, including Portsmouth, Norfolk CBD and Ghent. It is a significant east-west route for freight traffic.
TRANSPORT.	According to the 2013 HRTPO Freight Plan, the worst freight delays in terms of hours of delay occur in this corridor. The limitations of the Elizabeth River tunnels create reliability issues for freight and commuters. Note that major improvements to both the Downtown and Midtown Tunnels are underway. Modal alternatives to the tunnels could include roll-on/roll-off (RORO) ferries.

I. US 58/US 13/US 460, I-664/I-264 Corridor - Bowers Hill

NEED: **The US 58/13/460 and I-664/I-264 Corridors are a major freight gateway for the region, carrying freight in and out of the region from the southwest. The corridor is also an important artery for evacuation during extreme weather events. The corridor is in need of strategies to improve freight reliability, congestion and safe evacuation.**

ECONOMIC: The corridor is of particular importance to freight-dependent industries, but also serves both local-serving and knowledge-based activity centers in the surrounding area.

TRANSPORT.: This corridor has classic bottlenecks where multiple routes feed into a single segment of roadway and branch out again on the other side. This produces reliability and safety issues. Capacity and operations for evacuation is a particular safety concern.

J. Nansemond River Crossings

NEED: **Network connectivity in this area is hindered by deteriorating infrastructure and limited crossings. Currently, there is not a connection between Nansemond Parkway and Godwin Boulevard, causing circuitous travel patterns.**

ECONOMIC: The corridors affected serve a variety of activity centers and form critical linkages within the south side area of the region.

TRANSPORT.: This corridor is currently experiencing a lack of capacity and access, which is reflected in the reliability measure in particular.

K. Various Activity Centers - Mode Choice

NEED: **Key regional activity centers featuring government centers in the area have inadequate transit accessibility. These activity centers are in need of enhanced transit for both employees and customers.**

ECONOMIC: Government centers have diverse constituents from all parts of the general public. They need to compete for young, well-educated workers and also effectively serve all income groups.

TRANSPORT.: The measure of transit access to jobs is the prime indicator of this need. Many government centers in the region appear to have good or reasonable transit accessibility; this need addresses those that are lacking in this regard.

L. Various Activity Centers - Walkable/Bikeable Places

NEED: **There are multiple activity centers that have limited pedestrian facilities. Walk/bike-ability appeals to the future workforce, attracts knowledge-based industries and reduces the reliance on vehicular travel.**

ECONOMIC: Knowledge and local serving centers compete for the workforce segment that prioritizes walk and bike commutes and amenities.

TRANSPORT.: In addition to inhibiting transportation mode choice for trips that might otherwise be made by car, this need affects the mobility of non-drivers who desire access to these areas.

M. Freight Terminals

NEED: **The corridors between freight terminals experience truck bottlenecks that impede goods movement and affect the surrounding community's safety and mobility.**

ECONOMIC: This need affects the freight activity centers, but it is also a concern that it creates a conflict between the freight centers and surrounding communities.

TRANSPORT.: This need is a function of terminal operations, which are becoming increasingly 'pulsed' with larger ships accessing deep water ports. The resulting peaks in truck traffic are reflected in the reliability measures.

N. US 13/60 Burton-Little Creek Accessibility

NEED: **The roads along the Chesapeake Bay in this area serve major employment centers, the shoreline tourist attractions, the Chesapeake Bay Bridge-Tunnel and local residents. The constraints of the corridor and its many users create reliability and safety concerns. Bicycle and pedestrian accommodations are lacking, particularly to cross the corridor. Access management should be preserved but multimodal access parallel to and across the corridor should be improved.**

ECONOMIC: Employment centers in the area include a large joint amphibious base at Little Creek, Norfolk International Airport and industrial development adjacent to the airport. The corridor also serves residential developments and resorts.

TRANSPORT.: Reliability issues occur along the corridor during commute times and weekends. The transportation network is limited by extensive wetlands, streams and inlets, leaving few alternatives in times of incidents and daily congestion.

O. Regional Need - Modal Choice

NEED

To support active transportation, water crossings of all scales need to accommodate bicycles and pedestrians. Constraints are widespread and create circuitous trips of unsurmountable obstacles. Other barriers include railroads and interstate highway corridors.

ECONOMIC

All activity centers with employees seeking a bicycle commute may be affected by this need. Knowledge and local serving centers appear the most likely to be affected, as they compete for the workforce segment that prioritizes walk and bike commutes and amenities.

TRANSPORT.

In addition to inhibiting transportation mode choice for trips that might otherwise be made by car, this need particularly affects the mobility of non-drivers in the region. It also affects recreational walking and bicycling in the region.

P. Regional Need - Corridor Reliability from Modal Conflicts

NEED

Increasing freight rail traffic radiating from port terminals will affect at-grade rail crossings throughout the region with longer/more frequent closings, increasing delays for other travel modes and raising safety concerns.

ECONOMIC

This issue can affect activity centers, neighborhoods and other areas, but its economic impact is a loss of productivity due to the increased frequency of at-grade crossing closures.

TRANSPORT.

Freight analysis shows that the region's investment in rail infrastructure will generate a substantial rise in goods movement by rail. While there will be congestion and other benefits from increased rail freight mode share, there are local impacts to mobility. In addition to being a safety concern, the increased at-grade crossing closures will create localized bottlenecks and hamper mobility by all modes of transportation.

Q. Regional Need - Corridor Reliability for Freight Gateways

NEED

The region's ten freight gateways are (clockwise): I-64 West, US 17 North, US 13 North, VA 168 South, US 17 South, US 13 South, US 58 West, US 258 West, US 460 West, and VA 10 West. These routes are critical to moving to and from the ports and affect intra-regional travel where bottlenecks occur.

ECONOMIC

Freight movement is critical as this region serves as a gateway not only for Virginia, but for points beyond, via the ports.

TRANSPORT.

As documented in the Port of Virginia Master Plan and the HRTPO Freight Plan and confirmed by the VMTP profile data, many of the 10 gateways are affected by congestion and reliability issues or other forms of connectivity challenges. In addition to the corridor-specific recommendations in this plan, all of the gateways should have consideration for improvements that enhance truck movements and reduce incident-related delays.