

APPENDIX G: EXPANDED ECONOMIC ANALYSIS



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2017 **VIRGINIA** STATEWIDE RAIL PLAN



EXPANDED ECONOMIC ANALYSIS

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EXECUTIVE SUMMARY

This report expands upon an economic analysis in the State Rail Plan by evaluating freight flows within Virginia by district and corridor. The principal source of data on freight flows is IHS TRANSEARCH (Transearch), which includes estimates of current and future freight flows to, from, and through counties in Virginia. These data on flows are integrated with several different sources of data about the businesses and other sites to determine where freight volumes may be shipping to or from. The allocation of freight flows is estimated by separately estimating potential volumes by sector (as indicated by Transearch and business characteristics) and identifying locations of shippers by their proximity to rail.

The estimation of volumes by location of shippers and receivers is intended to enhance discussions about the opportunities and constraints in the existing rail and road transportation network. The scope of work includes: Freight Demand Baseline Analysis, Freight Forecast and a Regional Economic Analysis of Expanded Freight Demand. County-level results are aggregated and reported for each Virginia Transportation District.

KEY FINDINGS

The majority of freight flows attributed to Virginia businesses are truck freight flows, reflecting the fact that total truck flows are three times greater than total rail flows in terms of overall tonnage. One of the key outputs from the integration of Transearch and shipper / receiver location data is **Figure E-1**. This map shows how freight flows originating within the state are allocated to different types of businesses, power plants and waste management locations around the state. Rail service primarily carries coal. Coal mines in the west of Bristol dominate outbound freight flows for that District and outbound coal mining freight flows for the state in general. Hampton Roads is one of the top destinations for Coal mining goods, which is why that District has the heaviest Coal Mining freight flow associated with it. In contrast, trucks primarily carry Mining and Quarrying of Nonmetallic Minerals, Except Fuels. As can be seen in **Figure E-1** production of this commodity group is spread out across Virginia, through it is slightly more concentrated in Northern Virginia. **Table E-1** presents the top products by tonnage in each Virginia Transportation District.

Figure E-1: Freight Flows Originating within Virginia

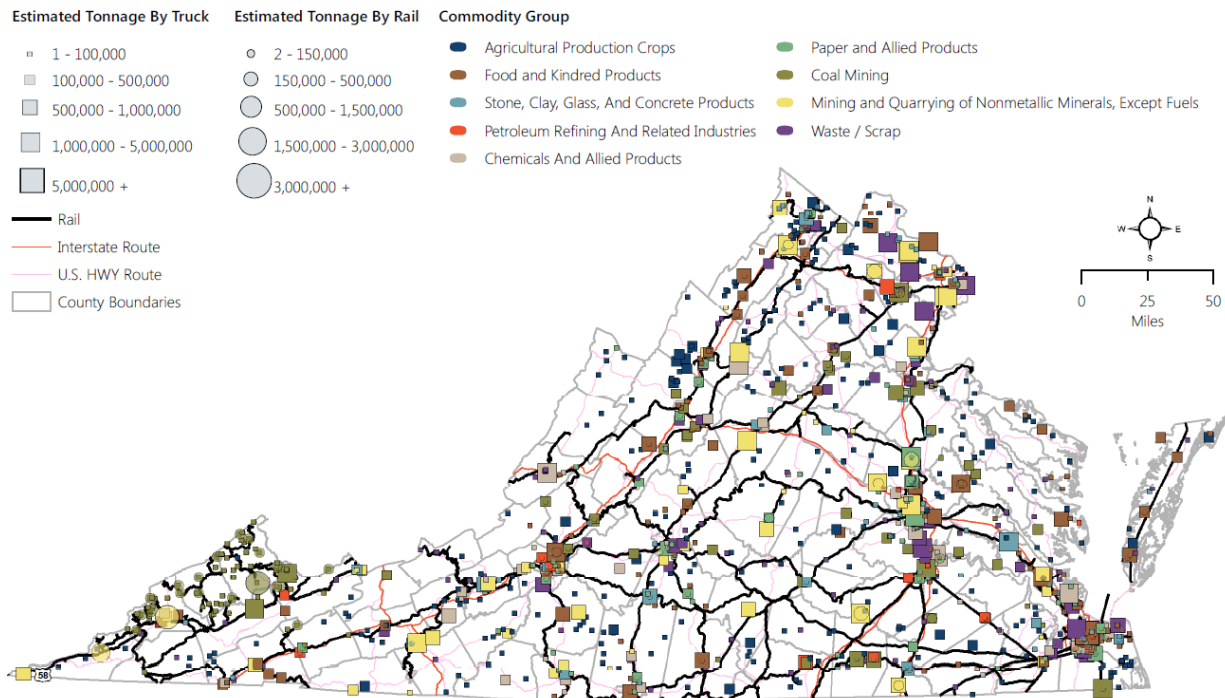


Table E-1: Top Products by Tonnage and District

Rank	Staunton	Bristol	Salem	Lynchburg	Fredericks- burg	Richmond	Hampton Roads	Culpeper	Northern Virginia
1	Mining and Quarrying of Nonmetallic Minerals, Except Fuels	Coal Mining	Mining and Quarrying of Nonmetallic Minerals, Except Fuels	Mining and Quarrying of Nonmetallic Minerals, Except Fuels	Mining and Quarrying of Nonmetallic Minerals, Except Fuels	Mining and Quarrying of Nonmetallic Minerals, Except Fuels	Coal Mining	Mining and Quarrying of Nonmetallic Minerals, Except Fuels	Mining and Quarrying of Nonmetallic Minerals, Except Fuels
2	Agricultural Production Crops	Mining and Quarrying of Nonmetallic Minerals Except Fuels	Stone, Clay, Glass, And Concrete Products	Petroleum Refining And Related Industries	Lumber and Wood Products, Except Furniture	Petroleum Refining And Related Industries	Mining and Quarrying of Nonmetallic Minerals, Except Fuels	Agricultural Production Crops	Petroleum Refining And Related Industries
3	Food and Kindred Products	Petroleum Refining And Related Industries	Petroleum Refining And Related Industries	Lumber and Wood Products, Except Furniture	Petroleum Refining And Related Industries	Waste / Scrap	Petroleum Refining And Related Industries	Lumber and Wood Products, Except Furniture	Stone, Clay, Glass, And Concrete Products
4	Petroleum Refining And Related Industries	Agricultural Production Crops	Waste / Scrap	Agricultural Production Crops	Agricultural Production Crops	Chemicals And Allied Products	Food and Kindred Products	Stone, Clay, Glass, And Concrete Products	Food and Kindred Products
5	Stone, Clay, Glass, And Concrete Products	Food and Kindred Products	Agricultural Production Crops	Waste / Scrap	Waste / Scrap	Food and Kindred Products	Stone, Clay, Glass, And Concrete Products	Food and Kindred Products	Waste / Scrap



Rank	Staunton	Bristol	Salem	Lynchburg	Fredericks- burg	Richmond	Hampton Roads	Culpeper	Northern Virginia
6	Paper and Allied Products	Lumber and Wood Products, Except Furniture	Lumber and Wood Products, Except Furniture	Food and Kindred Products	Stone, Clay, Glass, And Concrete Products	Lumber and Wood Products, Except Furniture	Agricultural Production Crops	Petroleum Refining And Related Industries	Agricultural Production Crops
7	Lumber and Wood Products, Except Furniture	Stone, Clay, Glass, And Concrete Products	Food and Kindred Products	Stone, Clay, Glass, And Concrete Products	Paper and Allied Products	Stone, Clay, Glass, And Concrete Products	Pipelines, Except Natural Gas	Waste / Scrap	Chemicals And Allied Products
8	Chemicals And Allied Products	Waste / Scrap	Chemicals And Allied Products	Chemicals And Allied Products	Food and Kindred Products	Coal Mining	Chemicals And Allied Products	Chemicals And Allied Products	Lumber and Wood Products, Except Furniture
9	Waste / Scrap	Chemicals And Allied Products	Primary Metal Industries	Coal Mining	Chemicals And Allied Products	Agricultural Production Crops	Waste / Scrap	Coal Mining	Electronic and Other Electrical Equipment



Future growth in freight flows by sector is estimated in Transearch and shown in **Figure E-2**. The dominant source of demand for rail in Virginia through 2040 will remain the mining sector, and this will primarily be coal, but at the same time, volumes are projected to decline. The growth in goods being carried by Rail between 2012 and 2040, in terms of tonnage, will be primarily driven by manufacturing goods, however mining goods will increase slightly from 2012 to 2025, while falling from 2025 to 2040. This fall is primarily driven by a statewide decline in Coal Mining.

Figure E-2: Rail Tonnage by Industry and Year

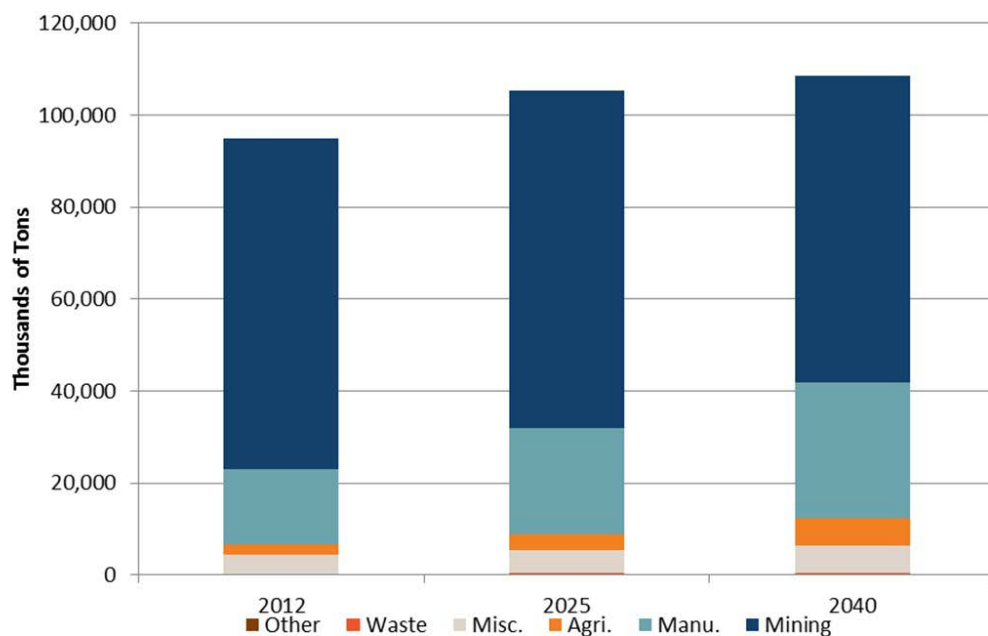
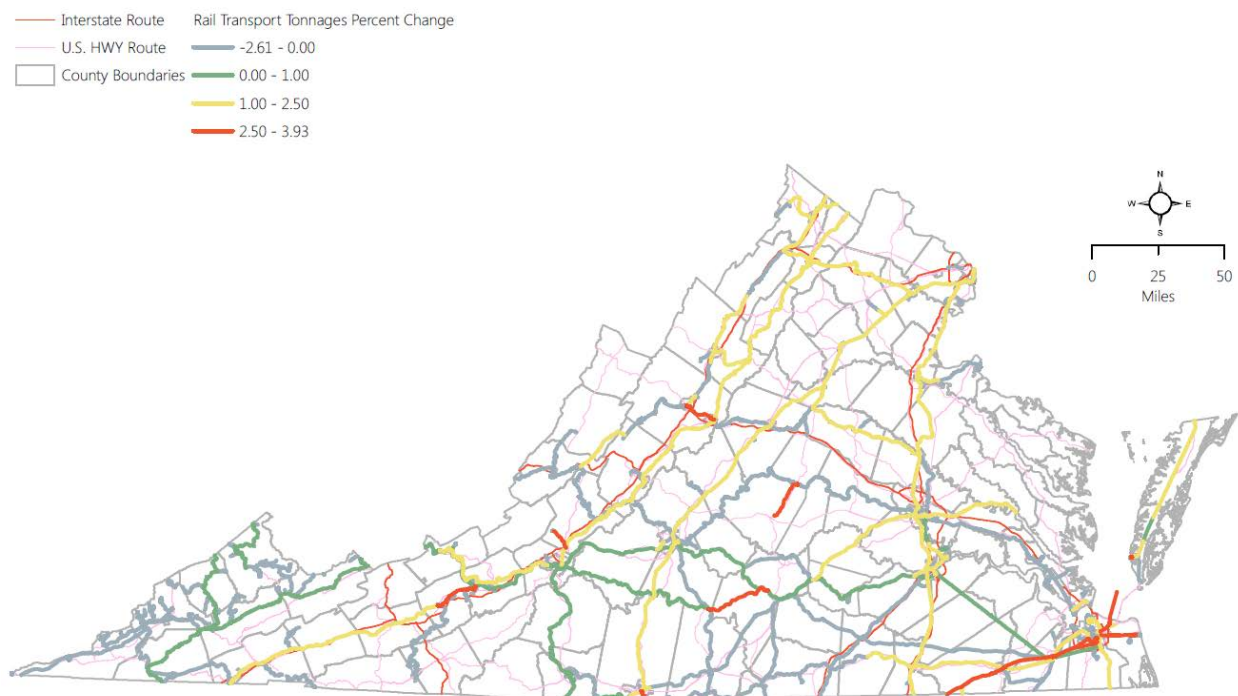


Figure E-3 shows the expected growth in tonnage carried by rail.

- The negative percentage change in Rail tons along the western Bristol corridors corresponds to the statewide fall in Coal Mining, which primarily makes up freight flows in the area; and
- Strong growth along Norfolk-Southern's North-South Corridor is expected; however, the East-West corridor is predicted to see far less growth.

Figure E-3: Rail Tonnage Percentage Changer 2012-2040



REGIONAL ECONOMIC ANALYSIS OF RAIL

The study team estimated rail economic impacts at the district level to supplement analyses conducted statewide in the State Rail Plan. For passenger rail (services and users) impacts, ridership was estimated for each district based on Amtrak data and was used as a proxy to assign the statewide impacts at the district level.

Table E-2: Amtrak Boardings and Alightings, 2016

District	Total Ridership	Percentage
Northern Virginia	567,938	36.6
Richmond	457,026	29.4
Culpeper	156,915	10.1
Staunton	8,651	0.6
Fredericksburg	127,484	8.2
Lynchburg	82,786	5.3
Hampton Roads	152,210	9.8
Salem	0	0.0
Bristol	0	0.0
Total	1,553,010	100.0

Source: HDR Analysis of Amtrak Ridership Data

For freight rail, two indicators were used as proxies: track miles for freight services and total value of outbound/intra and inbound shipments. Track miles data were obtained through GIS shape files provided by DRPT and total value of shipments are derived from Transearch.



Table E-3: Track Miles, 2016

District	Track Miles	Percentage
Hampton Roads	699	15
Northern Virginia	120	3
Staunton	611	13
Lynchburg	659	14
Salem	621	13
Richmond	776	16
Bristol	831	18
Fredericksburg	113	2
Culpeper	279	6
Total	4,709	100

Table E-4: Value in 2016 Dollars of Goods Carried by Rail

District	Outbound/Intra	Inbound	Outbound/Intra Percentage	Inbound Percentage
Hampton Roads	\$11,145,618,695	\$16,779,212,766	66.6	64.0
Northern Virginia	\$16,210,198	\$505,927,037	0.1	1.9
Staunton	\$457,983,869	\$2,261,278,239	2.7	8.6
Lynchburg	\$197,292,238	\$1,161,743,889	1.2	4.4
Salem	\$580,780,037	\$1,069,040,770	3.5	4.1
Richmond	\$2,402,735,657	\$3,013,228,458	14.4	11.5
Bristol	\$1,573,488,268	\$450,248,299	9.4	1.7
Fredericksburg	\$346,550,247	\$883,057,549	2.1	3.4

District	Outbound/Intra	Inbound	Outbound/Intra Percentage	Inbound Percentage
Culpeper	\$17,090,696	\$103,435,289	0.1	0.4
Total	\$16,737,749,905	\$26,227,172,296	100.0	100.0

Source: HDR Analysis of TRANSEARCH Data

Impacts are calculated and presented by activity (service provision and rail users), type (direct, indirect, induced, and total), and measure (employment, income, value added, output, and tax revenue) for year 2015 to provide a comprehensive perspective on how rail in each district impacts the economy. There are no passenger rail impacts in Bristol and Salem since there is currently no Amtrak service in both districts. For Salem, regional service to Roanoke is anticipated to begin in late 2017 or early 2018. The results presented in the tables in this chapter are in millions of 2016 Dollars. Employment is rounded to the nearest 10 job-years. Totals may not sum up due to rounding. Supplementary tables are provided in **Attachment A**.

CONCLUSION

Rail provides a major contribution in Virginia to the movement of both goods (freight) and people (passengers), which facilitates economic activity. Freight movements reflect the reallocation of intermediate goods for production and final goods for consumption; and, passenger movements are linked with personal consumption patterns.

An economic analysis provides an important perspective on the relative importance of freight rail. In instances, the volume of a certain commodity movement is substantial and would thus be considered relevant from a traditional freight analysis perspective; however, that same high-volume movement may be a low-value (per weight) commodity with little economic relevance (e.g., certain waste material movements). Consequently, not all traditionally-assessed freight movements (from a volume perspective) would be considered equally relevant, as compared with other freight movements observed from an economic perspective. In effect, volumes do not always translate into relevant values, and into direct economic impacts (and thus, into total impacts, reflective of multiplier effects as economic activity permeates through the economy).

1.0 INTRODUCTION

This project is conducted in conjunction with and as an extension to the 2017 Virginia State Rail Plan. The State Rail Plan produced an analysis on current conditions for freight and passenger service across Virginia and included an assessment of the total value of freight rail to Virginia. The scope of that analysis included:

- Using IHS Transearch (Transearch) data to determine how commodity movements generate direct economic impacts in Virginia.
- Using data from Amtrak intercity and tourist railroads, economic impacts will be estimated for “the provision of passenger rail transport, as well as the impacts associated with out-of-state visitors arriving by rail.”

This report expands upon the analysis in the State Rail Plan to provide information about freight flows within Virginia by district and corridor. The principal source of data on freight flows is Transearch, which includes estimates of current and future freight flows to, from, and through counties in Virginia. A key feature of this analysis is the estimation of freight flows to specific locations within a district and corridor. For example, data on specific businesses likely involved in shipping (e.g. sales, employment, location, etc.), are identified through a database from InfoUSA, a firm that specializes in cataloging business characteristics. For the coal and mining sector and related freight flows, the locations of power plants are obtained from the U.S. Energy Information Administration (EIA). Finally, solid waste collection sites were identified with data from Virginia Department of Environmental Quality (DEQ), to enable allocation of the Transearch data on waste transport.

The specific locations of shippers and receivers in each of these datasets creates additional information about where the freight flows estimated in Transearch are likely to be coming from and going to. This estimation is intended to enhance discussions about the opportunities and constraints in the existing rail and road transportation network. Ultimately, the goal of this analysis is to improve evaluation of the potential for and value of expanding industrial rail access by construction district. For reporting and analysis purposes, the county-level Transearch data is aggregated into nine (9) Virginia Transportation Districts.

Several activities make use of Transearch and InfoUSA databases, and IMPLAN multipliers in this analysis. These are described briefly as:



- **Task 1: Freight Demand Baseline Analysis:** estimate potential shipping activity and rail / truck mode split for businesses in Virginia by integrating Transearch estimates of freight flows and data on locations of likely shippers, by type of shipment;
- **Task 2: Freight Forecast:** based on Transearch forecast for freight flows in 2040; and
- **Task 3: Transportation Analysis of Expanded Freight Demand:** determines the economic value of services provided by rail.

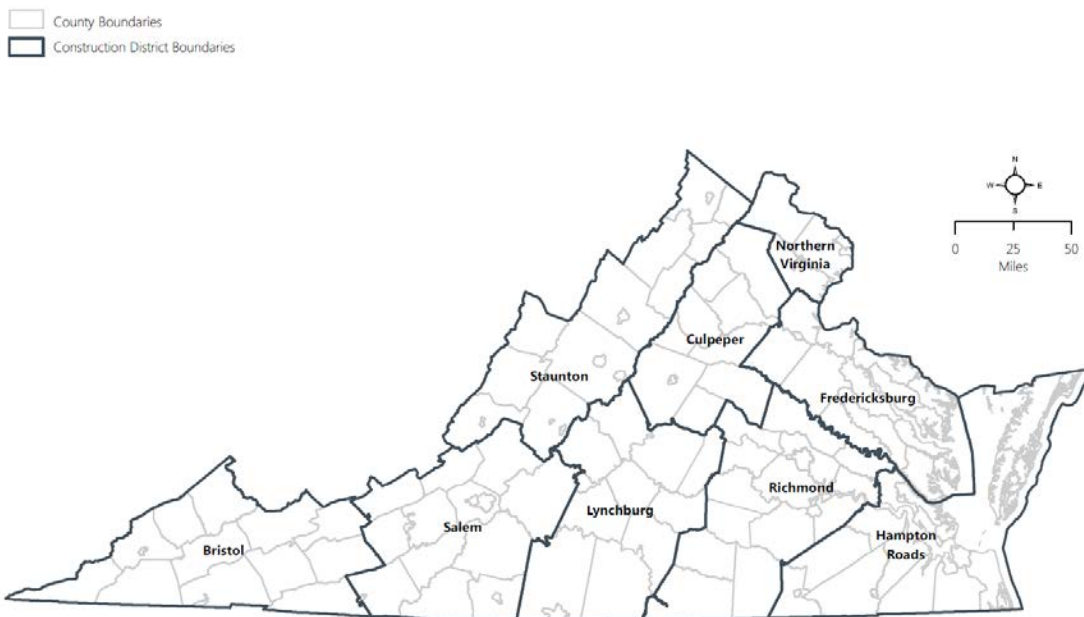


2.0 OVERVIEW OF DATA AND METHODS DESCRIPTION

2.1 Virginia Districts, Counties and Independent Cities

The Commonwealth of Virginia is comprised of 95 counties and 38 independent cities, which are considered county-equivalents for census purposes. The Virginia Department of Transportation (VDOT) divides the state into nine Construction Districts, each of which oversees maintenance and construction on the state-maintained highways, bridges and tunnels in its region, as shown in **Figure 2-1**. A summary of the VDOT Construction Districts is shown in **Table 2-1**. A breakdown of counties and independent cities by District is presented in **Attachment A**. These construction districts are the bases of the Virginia Transportation Districts used in this analysis.

Figure 2-1: Construction Districts



Source: VDOT

The following analysis was conducted at the county/independent city level, however for readability results are presented at the Construction District level.

Table 2-1: Construction District Profile

District ID	District Name	Population ¹	Unemployment Rate (percentage)	Household Median Income	Miles of Major Roadway	Miles of Class I and Shortline Rail
1	Bristol	352,369	6.8	\$37,033	1,006	831
2	Culpeper	406,760	3.5	\$66,916	796	279
3	Fredericksburg	494,045	4.2	\$72,614	812	206
4	Hampton Roads	1,765,205	4.7	\$58,621	1,026	693
5	Lynchburg	400,300	5.0	\$41,113	975	659
6	Northern Virginia	2,461,620	3.2	\$108,124	454	120
7	Richmond	1,287,852	4.3	\$59,569	1,254	682
8	Salem	694,098	4.5	\$46,774	1,173	627
9	Staunton	550,054	4.1	\$52,245	1,190	611

Source: VDOT

2.2 Transearch Data

IHS² develops economic models for U.S. freight flows based on county-level production data and freight data gathered from various sources. From these models, IHS develops Transearch databases tailored for a given state. These databases record the tonnage, units (carloads or

¹ https://www.virginia-demographics.com/counties_by_population

² <https://www.ihs.com/products/transearch-freight-transportation-research.html>

truckloads), origin and destination (OD), the four-digit Standard Transportation Commodity Code (STCC) and the route taken of freight flows entering, leaving or passing through the given state.

2.2.1 DESCRIPTION OF HOW TRANSEARCH DATA WAS USED FOR THIS ANALYSIS

While the Transearch database produced by IHS provided freight flow data at the individual product level (the four-digit STCC level), few other sources in this analysis had data at this level of detail. For this reason, it was necessary to aggregate the Transearch data to the commodity group level (the two-digit STCC level) and to aggregate the commodity group level to an Industry level. An example of the allocation of products to commodity groups is the Forestry commodity group, which includes crude barks/gums products and misc. forest products. **Table 2-2** shows the 2012 tonnage ranking of all the commodity groups. The allocation of commodity groups to Industries is shown in **Table 2-2**.

Table 2-2: 2012 Commodity Group Ranking by Total Tonnage

Rank	Commodity
1	Mining and Quarrying of Nonmetallic Minerals, Except Fuels
2	Coal Mining
3	Petroleum Refining And Related Industries
5	Food and Kindred Products
6	Agricultural Production Crops
7	Waste / Scrap
8	Lumber and Wood Products, Except Furniture
9	Chemicals And Allied Products
10	Paper and Allied Products
11	Pipelines, Except Natural Gas
12	Primary Metal Industries
13	Rubber And Miscellaneous Plastics Products
14	Fabricated Metal Products, Except Machinery And Transportation Equipment
15	Industrial And Commercial Machinery And Computer Equipment
16	Electronic and Other Electrical Equipment and Components, Except Computer Equipment

Rank	Commodity
17	Printing, Publishing, And Allied Industries
18	Textile Mill Products
19	Furniture and Fixtures
20	Miscellaneous Manufacturing Industries
21	Apparel and Other Finished Products Made From Fabrics And Similar Materials
22	Tobacco Products
23	Fishing, hunting, and trapping
24	Metal Mining
25	Forestry
26	Measuring, Analyzing, And Controlling Instruments; Photographic, Medical and Optical Goods; Watches and Clocks
27	Oil and Gas Extraction
28	Leather And Leather Products
29	Transportation Services
30	Local and Suburban Transit And Interurban Highway Passenger Transportation
31	Communications
32	United States Postal Services
33	Motor Freight Transportation And Warehousing

Source: Transearch



Table 2-3: Commodity Groups to Industries

Industry	Commodity Groups
Agriculture, Forestry, And Fishing (Agri.)	Agricultural Production Crops, Agriculture production livestock and animal specialties, Agricultural Services, Forestry, Fishing, hunting, and trapping
Manufacturing (Manu.)	Food and Kindred Products, Tobacco Products, Textile Mill Products, Apparel and Other Finished Products Made From Fabrics And Similar Materials, Lumber and Wood Products, Except Furniture, Furniture and Fixtures, Paper and Allied Products, Printing, Publishing, And Allied Industries, Chemicals And Allied Products, Petroleum Refining And Related Industries, Rubber And Miscellaneous Plastics Products, Leather And Leather Products, Stone, Clay, Glass, And Concrete Products, Primary Metal Industries, Fabricated Metal Products, Except Machinery And Transportation Equipment, Industrial And Commercial Machinery And Computer Equipment, Electronic and Other Electrical Equipment and Components, Except Computer Equipment, Transportation Equipment, Measuring, Analyzing, And Controlling Instruments; Photographic, Medical and Optical Goods; Watches and Clocks, Miscellaneous Manufacturing Industries
Mining	Metal Mining, Coal Mining, Oil and Gas Extraction, Mining and Quarrying of Nonmetallic Minerals, Except Fuels
Transportation, Electric, Gas, And Sanitary Services (Misc.)	Electric, Gas, And Sanitary Services, Wholesale Trade-durable Goods
Other	Local and Suburban Transit And Interurban Highway Passenger Transportation, United States Postal Services, Pipelines, Except Natural Gas, Transportation Services, Communications
Waste / Scrap (Waste)	Waste / Scrap

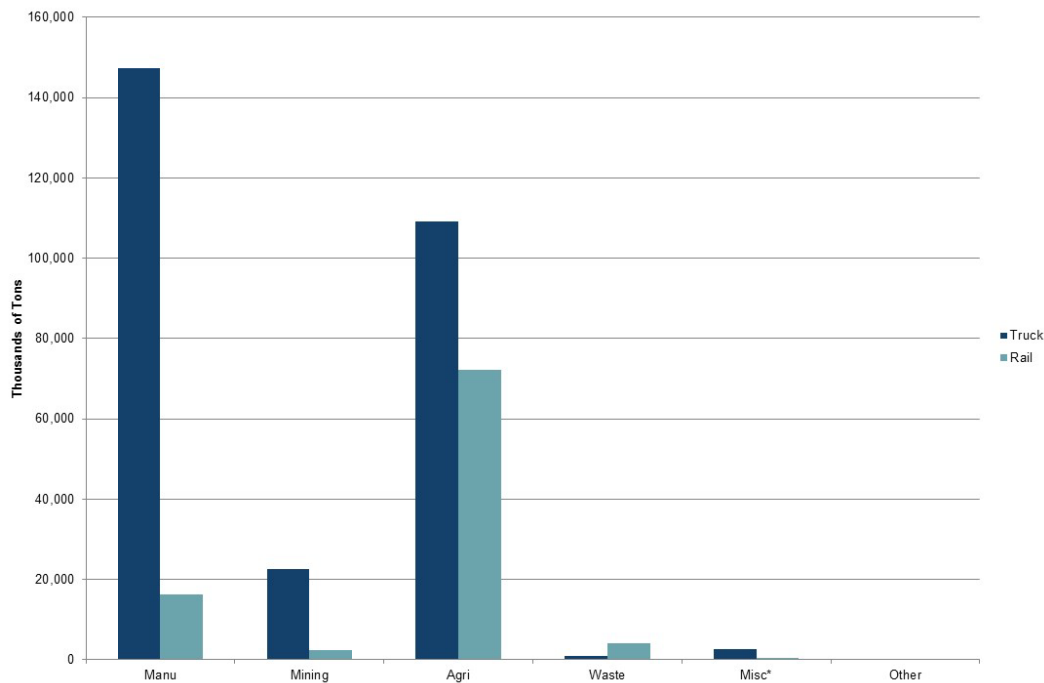
Source: Transearch

The 2012 statewide industry tonnages are shown in **Figure 2-2**. In 2012, 378 million tons of freight departed from and/or arrived in Virginia, 282 million tons of freight was carried by truck and rail carried 95 million tons. In order of total tonnage:

- Agriculture, Forestry, And Fishing (Agri.) accounts for 181 million tons (48 percent of total tonnage);
- Manufacturing (Manu.) accounts for 164 million tons (43 percent of total tonnage);
- Mining accounts for 25 million tons (7 percent of total tonnage);
- Waste / Scrap (Waste) accounts for 5 million tons (1 percent of total tonnage);

- Transportation, Electric, Gas, And Sanitary Services (Misc.*) accounts for 3 million tons (1 percent of total tonnage); and
- Other accounts for 52 thousand tons.

Figure 2-2: Statewide Industry Tonnages by Mode, 2012



Source: Transearch

Transearch records freight flows for all counties and independent cities in Virginia. As shown in **Table 2-4**, freight flows were aggregated into the following directions:

- Outbound: those flows which start in Virginia and end in another state;
- Inbound: those flows which start in another state and end in Virginia;
- Intra: those flows which start and end in Virginia; and
- Through: the flows which neither start nor end in Virginia, but pass through the state.

For this part of the analysis, only freight flows associated with businesses in Virginia were considered. Through freight flows were not allocated to an industry, nor were freight flows to warehouses. Table 8 summarizes the freights by direction and the allocation at the industry level.

Table 2-4: Transearch Summary by Freight Flow Direction, 2012

Direction	Truck Tons in Transearch	Rail Tons in Transearch	Total Tons in Transearch	Tons Allocated to Warehouses, etc.	Tons Allocated to an Industry
Outbound	120,397,041	18,256,425	138,653,466	7,559,572	131,093,894
Inbound	133,571,429	61,956,141	195,527,570	12,663,919	182,863,651
Intra	65,388,642	14,828,445	80,217,087	16,651,019	63,566,068
Through	180,741,391	56,291,706	237,033,097	N/A	N/A
Total	500,098,503	151,332,717	651,431,220	36,874,510	377,523,613

Source: Transearch

2.2.2 INFOUSA SUMMARY

InfoUSA³ produces a U.S. business database that is comprehensive and up-to-date for finding business sales lead and mailing lists. The database records information such as sales volume, industry, NAICS / SIC codes or ranges, number of employees, location, and other firmographics such as credit rating, square footage, years in business, and office type (e.g., headquarters, branch, etc.).

InfoUSA compiles the data by gathering information from multiple directories and event-driven sources which include new business filings, daily utility connections, press releases, corporate websites, annual reports, user-generated feedback, and thousands of Yellow Page directories. Furthermore, they ensure the data is current, accurate, and relevant by making over 24 million calls each year in order to gather and verify valuable information.

In 2016, HDR purchased data from InfoUSA of businesses in Virginia that may ship or receive goods, which were classified by primary and secondary types of commodities to determine those that are likely to ship high volumes of goods. HDR synthesized this data at the Construction District level and then geo-located businesses to identify common characteristics of businesses with proximity to major truck and rail transportation corridors.

HDR used Google Earth to verify that the locations listed in the database matched their physical location. The InfoUSA locations sometimes referred to head offices of businesses rather than sites of production. Where possible these were filtered out of the database, primarily based on

³ <https://www.infousa.com/product/business-lists/>

the business office type description recorded in the InfoUSA database and partly through comparing the sales volume to the number of employees of similar businesses. A summary of the information by commodity group in InfoUSA is shown in **Table 2-5**. The majority of businesses are agricultural however; food and kindred businesses have the highest average sales volume per employee.⁴

Table 2-5: Summary of InfoUSA Data by Commodity Group

Commodity Group ID	Commodity Group Description	Number of Businesses	Average Sales Volume per Business (\$M)	Average Sales Volume per Employee (\$M)	Number within 1 Mile of Rail
1. Paper and Allied Products (Manufacturing)	Goods such as boxes, etc.	95	\$135.6	\$0.3	71
2. Food and Kindred Products (Manufacturing)	Goods such as candy, etc.	159	\$35.7	\$0.9	74
3. Chemicals And Allied Products (Manufacturing)	Goods such as inks, etc.	88	\$38.9	\$0.6	53
4. Stone, Clay, Glass, And Concrete Products (Manufacturing)	Goods such as cement, etc.	95	\$11.5	\$0.2	62
5. Petroleum Refining And Related Industries (Manufacturing)	Goods such as roofing materials, etc.	28	\$13.2	\$0.7	20
6. Mining and Quarrying of Nonmetallic Minerals, Except Fuels (Mining)	Goods such as sand, etc.	71	\$2.1	\$0.09	36

⁴ Average sales volume and sales volume per employee has not been filtered for non-production sites.

Commodity Group ID	Commodity Group Description	Number of Businesses	Average Sales Volume per Business (\$M)	Average Sales Volume per Employee (\$M)	Number within 1 Mile of Rail
7. Agricultural Production Crops (Agriculture, Forestry, And Fishing)	Goods such as wheat, corn, etc.	534	\$0.5	\$0.07	99
8. Coal Mining (Mining)	Primarily coal.	14	\$18.4	\$0.2	9
9. Waste / Scrap	Waste for landfills, etc.	54	\$10.9	\$0.5	34

Source: HDR Analysis of InfoUSA Data

2.3 Geographical Socioeconomic, Demographic and Infrastructural Data

ArcGIS was used for spatial analysis (such as determining the distance of an InfoUSA business from a rail line) and visualization of the InfoUSA data. The ArcGIS files were gathered from various sources:

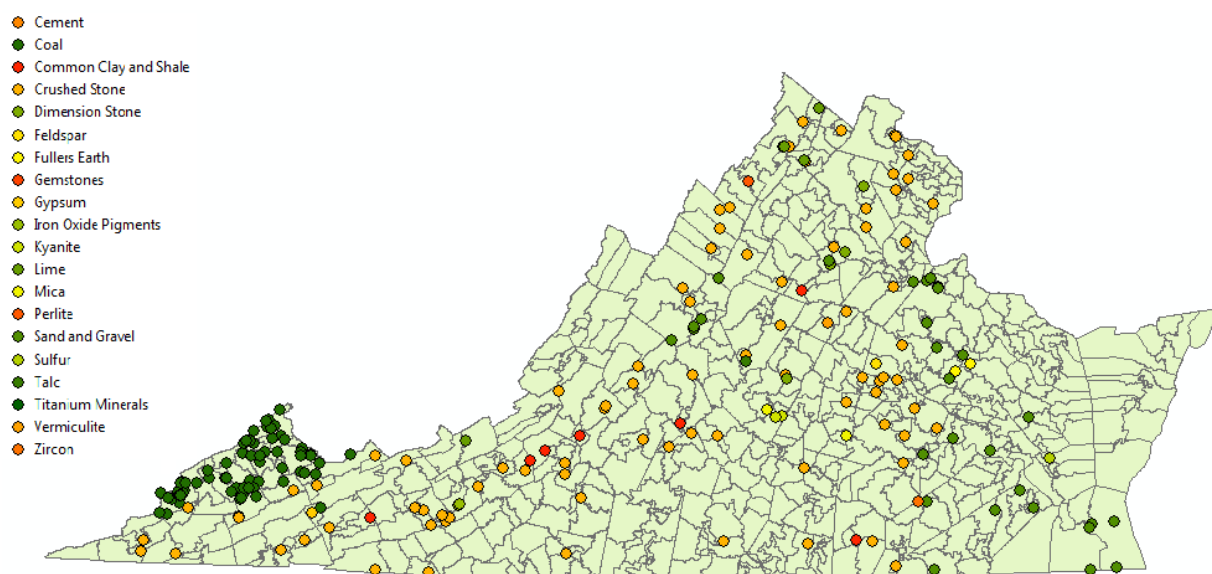
- DRPT supplied the highway and rail network files;
- InfoUSA supplied the latitude and longitude of the businesses in Virginia; and
- EIA has ArcGIS files on the location and production of mines, power plants and waste collection centers in Virginia.

2.3.1 MINING INFORMATION

The EIA shapefile for "Coal Mines, Surface and Underground" has a record of the tonnage produced by every active mine in 2014. The coal production for each mine was scaled to 2012 values by using the statewide percentage change in coal production between 2012 and 2014. As coal production was declining during this period and coal mines closed from 2012 to 2014 this may have over-represented the tonnage of some of the coalmines. In addition, information was available for the types of mines throughout Virginia, shown in **Figure 2-3**.



Figure 2-3: Mine locations in Virginia



Source: EIA

This data was linked to the Transearch dataset by using the two-digit SIC code level. Potentially different definitions in the two datasets prevented a product level comparison.

2.3.2 COAL CONSUMPTION INFORMATION

Table 2-6 shows the EIA records of the coal used in by power plants in Virginia.

Table 2-6: Coal-Fired Power Plants in Virginia

Name	County	City	2012 Coal Consumption (Tons)
Appalachian Power Co	Russell	Cleveland	384,068
Virginia Electric & Power Co	Chesterfield	Chester	1,435,370
Virginia Electric & Power Co	Halifax	Clover	1,812,923
Hopewell Operating Services LLC	Hopewell City	Hopewell	154,672
Virginia Electric & Power Co	Mecklenburg	Clarksville	80,981
U S Army-Radford	Montgomery	Radford	96,344
Spruance Genco LLC	Richmond City	Richmond	361,641

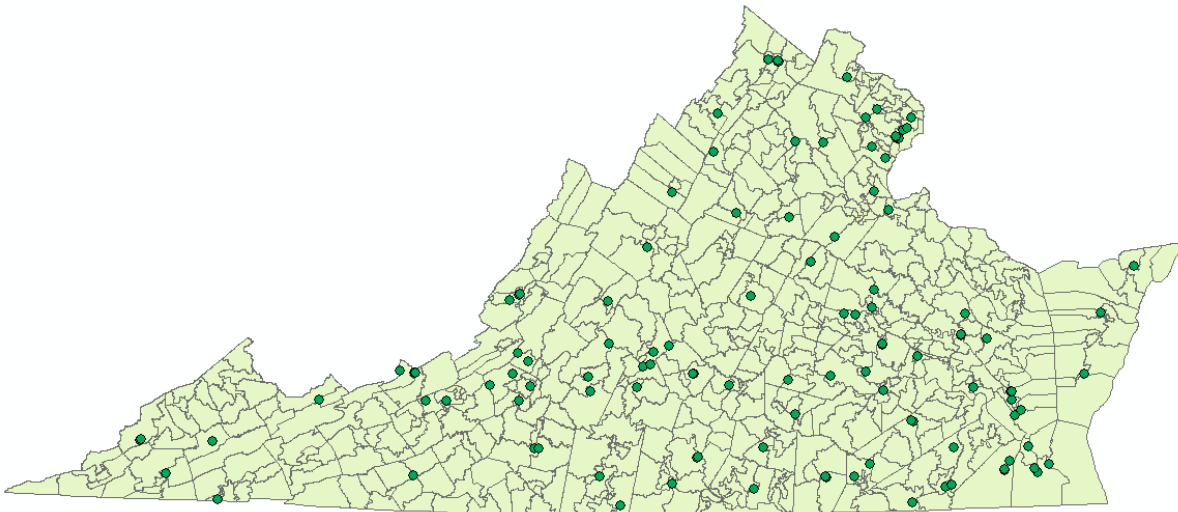
Name	County	City	2012 Coal Consumption (Tons)
Birchwood Power Partners LP	King George	King George	173,261
Virginia Polytechnic Inst and State Univ	Montgomery	Blacksburg	26,221
Virginia Electric & Power Co	Wise	St. Paul	805,221

Source: EIA

2.3.3 WASTE COLLECTION INFORMATION

The Virginia Department of Environmental Quality has datasets of solid waste collection sites in Virginia⁵, as shown in **Figure 2-4**.

Figure 2-4: Waste locations in Virginia



Source: Virginia Department of Environmental Quality

2.4 Approach to Data Integration

In this chapter the outbound, inbound and intra flows were allocated to Virginia businesses. As there are freight flows from Virginia businesses to other Virginia business, the intra freight flow is considered in both.

⁵ <http://www.deq.virginia.gov/ConnectWithDEQ/VEGIS/VEGISDatasets.aspx>

2.4.1 OUTBOUND AND INTRA FREIGHT FLOWS

To estimate the potential for Virginia businesses to shift the transportation of goods to customers from trucks to rail the freight flows in Transearch were allocated to the business locations previously outlined. For some of those businesses, the tonnage produced or consumed by that business was known, for the majority however, only the sales volume of that business was known and for the rest, only the location was known. The methodology for the allocation of the Transearch freight flows to these businesses reflects the differences in the information available:

- Modal freight flows for businesses with known production and consumption of freight were estimated though simply comparing datasets;
- Modal freight flows for businesses with known sales volume were estimated through making assumptions of the relationship between sales volume and tonnage, as well as the tendency for businesses to ship freight by a given mode based on their proximity to rail facilities; and
- For modal freight flows from businesses where only the industry and location was known, the estimate was based on allocating the residual Transearch freight flows that could not be allocated in the previous two steps equally among businesses of the same type in the county.

Table 2-7 shows the allocated freight flows. A breakdown of assumptions and methods for outbound and intra freight flows is in **Chapter 2.4.2**.

Table 2-7: Outbound Allocated Freight Flows, 2012

Outbound Freight Flows	Rail Tonnage	Truck Tonnage
Allocated to Individual Business	29,366,980	131,274,805
Potentially from Mines	909,160	17,120,081
Potentially from Waste Collection Sites	1,325,864	4,957,014
Total Allocated Freight from Transearch	31,602,004	153,351,900
Total Unallocated Freight from Transearch	1,482,866	8,223,192
Total Freight from Transearch allocated to Industry (Outbound and Intra)	33,084,870	161,575,092
Percentage of Unallocated Freight	4	5

Source: HDR Analysis of Transearch and InfoUSA Databases



2.4.2 INBOUND AND INTRA FREIGHT FLOWS

The analysis for the inbound/intra freight flows followed a similar three step process as the analysis of the outbound freight flows, however due to data constraints the last step primarily drove the analysis.

Table 2-8 shows how much of the freight flows recorded in Transearch could be allocated to Virginia businesses in this manner. Fifty-seven percent of the Transearch inbound and intra freight flows which could be allocated to an industry could then be allocated to a Virginia business.

Table 2-8: Inbound and Intra Estimated Modal Freight Flows by District, 2012

District	Estimated Rail Tonnage allocated to a business	Estimated Truck Tonnage allocated to a business	Total Tonnage allocated to a business	Transearch Inbound and Intra freight flows allocated to industry	Percentage of Transearch Flows Explained
Hampton Roads	56,127,334	21,995,418	78,122,752	88,481,269	88
Culpeper	108,438	2,970,204	3,078,642	8,995,780	34
Northern Virginia	2,017,178	14,806,303	16,823,481	33,141,331	51
Staunton	502,195	3,756,827	4,259,022	16,324,419	26
Richmond	2,776,024	11,899,978	14,676,002	31,171,204	47
Lynchburg	1,540,212	3,968,469	5,508,681	12,193,178	45
Salem	543,934	7,299,378	7,843,312	18,557,782	42
Bristol	144,142	3,617,036	3,761,178	21,438,831	18
Fredericksburg	901,611	5,328,313	6,229,924	16,125,925	39
Statewide	64,661,068	75,641,931	140,302,994	246,429,719*	57

* 182 million tons of inbound freight could be allocated to an industry and 64 million tons of intra freight could be allocated to an industry.

Source: Transearch and InfoUSA

3.0 FREIGHT DEMAND BASELINE ANALYSIS

3.1 Overview and Methodology

The purpose of this task is to set a baseline for understanding the current demand among business for rail/truck freight demand in each of the Construction Districts of the Commonwealth.

3.2 Results

This chapter outlines the tables and maps to be presented and discussed. The data is primarily shown at the state level in maps and tables, or as a list of summary data by construction district.

Table 3-1 shows the total tonnage volumes, going inbound, intra and outbound, by District being carried by rail. **Table 3-2** shows the same for truck. The Commodity Groups shown are the top 9 Commodity Groups, in terms of tonnage.

Key:

- Volumes include total inbound and outbound shipments
- Commodity Groups:
 - 1 = Mining and Quarrying of Nonmetallic Minerals, Except Fuels;
 - 2 = Coal Mining;
 - 3 = Petroleum Refining And Related Industries;
 - 4 = Stone, Clay, Glass, And Concrete Products;
 - 5 = Food and Kindred Products;
 - 6 = Agricultural Production Crops;
 - 7 = Waste / Scrap;
 - 8 = Lumber and Wood Products, Except Furniture; and
 - 9 = Chemicals and Allied Products.

Table 3-1: Total Tonnage Volumes of Major Commodity Type by District – Rail (thousands of tons), 2012

District ID	Commodity Groups									
	1	2	3	4	5	6	7	8	9	Total
Bristol	135	19,629	846	39	11	3	0	5	220	20,887
Culpeper	1,560	108	0	36	51	212	0	69	4	2,039
Fredericks- burg	0	294	41	102	135	75	619	51	299	1,618
Hampton Roads	443	42,056	161	331	752	1,160	1,036	202	900	47,041
Lynchburg	51	755	42	185	66	33	77	177	398	1,785
Northern Virginia	339	61	2	39	23	0	33	0	293	791
Richmond	2,450	1,910	20	248	147	0	384	33	1,619	6,811
Salem	304	525	143	662	55	61	417	13	379	2,560
Staunton	665	492	90	321	1,034	740	42	80	498	3,963
Total	5,947	65,830	1,346	1,965	2,275	2,283	2,608	630	4,609	87,493

Source: Transearch

**Table 3-2: Total Tonnage Volumes of Major Commodity Type by District – Truck
(thousands of tons), 2012**

District ID	Commodity Groups									
	1	2	3	4	5	6	7	8	9	Total
Bristol	13,085	490	2,668	1,164	1,307	1,537	425	1,243	201	22,120
Culpeper	6,957	10	605	908	673	1,650	452	987	136	12,377
Fredericks- burg	9,639	406	2,910	1,556	756	2,673	1,477	2,907	534	22,858
Hampton Roads	13,707	1,162	10,657	6,324	6,215	4,641	3,233	2,365	3,692	51,996
Lynchburg	4,952	0	2,540	882	1,364	2,000	1,514	2,357	359	15,969
Northern Virginia	23,710	17	5,180	4,912	3,884	1,335	2,806	786	771	43,401
Richmond	14,996	93	5,554	2,252	2,629	1,989	4,498	2,623	2,578	37,213
Salem	11,678	17	2,475	3,898	1,405	1,712	1,386	1,481	1,046	25,097
Staunton	7,956	8	2,612	1,974	3,747	4,367	636	1,382	353	23,035
Total	106,679	2,204	35,201	23,869	21,978	21,905	16,428	16,132	9,670	254,066

Source: Transearch

Table 3-3 shows the modal shares for the Districts and the major commodity groups. **Figure 3-1** shows the outbound/intra freight flows from the known business locations. The majority of freight flows attributed to Virginia businesses are truck freight flows, reflecting, as can be seen in **Table 3-1** and **Table 3-2**, that total truck flows are three times greater than total rail flows in terms of tonnage.

Rail primarily carries coal. **Table 3-3** shows the modal share by county and major commodity group. As seen in **Figure 3-1**, the coal mines in the west of Bristol dominate outbound freight flows for that District and outbound/intra coal mining freight flows for the state in general. Hampton Roads is one of the top destinations for Coal mining goods, which is why in **Table 3-1** and **Table 3-2** that District has the heaviest Coal Mining freight flow associated with it.

Truck primarily carries Mining and Quarrying of Nonmetallic Minerals, Except Fuels. As can be seen in **Figure 3-1** production of this commodity group is spread out across Virginia, through it is slightly more concentrated in Northern Virginia. **Table 3-4** which shows the top product by

inbound and outbound tonnage for each District reflects that Mining and Quarrying of Nonmetallic Minerals, Except Fuels is the top product across the majority of Districts in Virginia.

Commodity Groups:

- 1 = Mining and Quarrying of Nonmetallic Minerals, Except Fuels;
- 2 = Coal Mining;
- 3 = Petroleum Refining And Related Industries;
- 4 = Stone, Clay, Glass, And Concrete Products;
- 5 = Food and Kindred Products;
- 6 = Agricultural Production Crops;
- 7= Waste / Scrap;
- 8 = Lumber and Wood Products, Except Furniture; and
- 9 = Chemicals and Allied Products.

Table 3-3: Total Highway vs. Rail Tonnage Volumes Shares (percent) by Major Commodity Type by District, 2012

District ID		Commodity Groups (percentage)																	
	1		2		3		4		5		6		7		8		9		
Mode	Highway	Rail	Highway	Rail	Highway	Rail	Highway	Rail	Highway	Rail	Highway	Rail	Highway	Rail	Highway	Rail	Highway	Rail	
Bristol	99	1	2	98	76	24	97	3	99	1	100	0	100	0	100	0	48	52	
Culpeper	82	18	8	92	100	0	96	4	93	7	89	11	100	0	93	7	97	3	
Fredericksburg	100	0	58	42	99	1	94	6	85	15	97	3	70	30	98	2	64	36	
Hampton Roads	97	3	3	97	99	1	95	5	89	11	80	20	76	24	92	8	80	20	
Lynchburg	99	1	0	100	98	2	83	17	95	5	98	2	95	5	93	7	47	53	
Northern Virginia	99	1	22	78	100	0	99	1	99	1	100	0	99	1	100	0	72	28	
Richmond	86	14	5	95	100	0	90	10	95	5	100	0	92	8	99	1	61	39	
Salem	97	3	3	97	95	5	85	15	96	4	97	3	77	23	99	1	73	27	
Staunton	92	8	2	98	97	3	86	14	78	22	86	14	94	6	95	5	41	59	

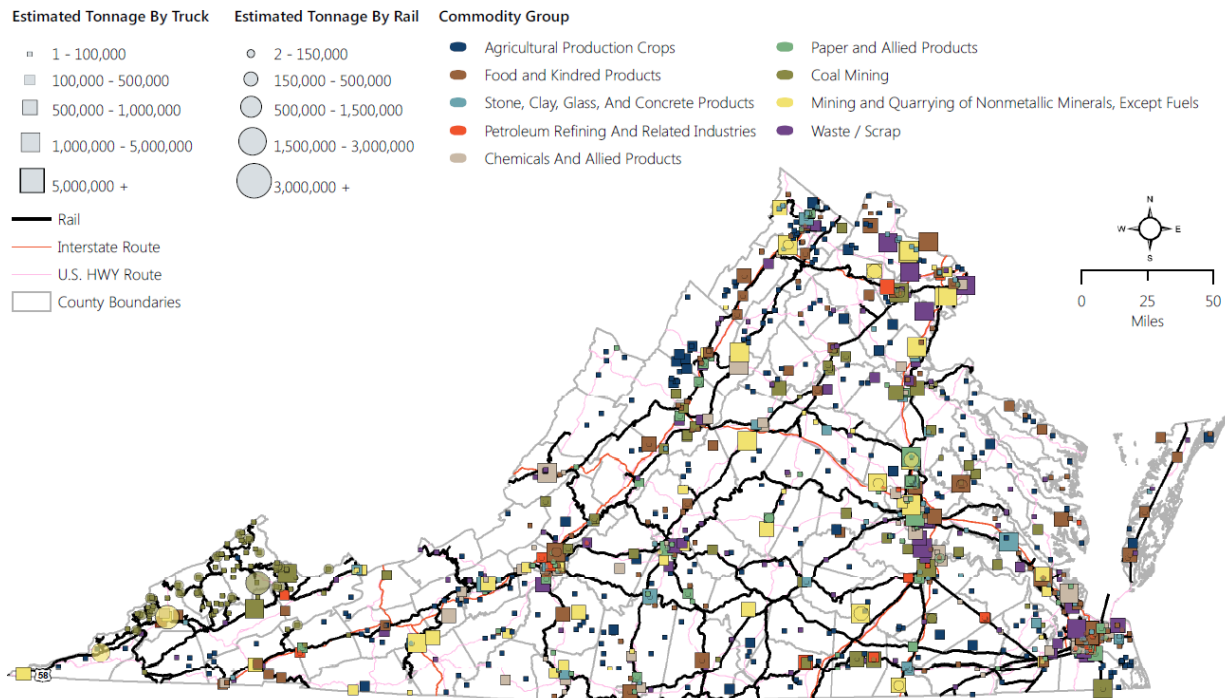
Table 3-4: Top Products by Tonnage and District, 2012

Rank	Staunton	Bristol	Salem	Lynchburg	Fredericks- burg	Richmond	Hampton Roads	Culpeper	Northern Virginia
1	Mining and Quarrying of Nonmetallic Minerals, Except Fuels	Coal Mining	Mining and Quarrying of Nonmetallic Minerals, Except Fuels	Mining and Quarrying of Nonmetallic Minerals, Except Fuels	Mining and Quarrying of Nonmetallic Minerals, Except Fuels	Mining and Quarrying of Nonmetallic Minerals, Except Fuels	Coal Mining	Mining and Quarrying of Nonmetallic Minerals, Except Fuels	Mining and Quarrying of Nonmetallic Minerals, Except Fuels
2	Agricultural Production Crops	Mining and Quarrying of Nonmetallic Minerals, Except Fuels	Stone, Clay, Glass, And Concrete Products	Petroleum Refining And Related Industries	Lumber and Wood Products, Except Furniture	Petroleum Refining And Related Industries	Mining and Quarrying of Nonmetallic Minerals, Except Fuels	Agricultural Production Crops	Petroleum Refining And Related Industries
3	Food and Kindred Products	Petroleum Refining And Related Industries	Petroleum Refining And Related Industries	Lumber and Wood Products, Except Furniture	Petroleum Refining And Related Industries	Waste / Scrap	Petroleum Refining And Related Industries	Lumber and Wood Products, Except Furniture	Stone, Clay, Glass, And Concrete Products
4	Petroleum Refining And Related Industries	Agricultural Production Crops	Waste / Scrap	Agricultural Production Crops	Agricultural Production Crops	Chemicals And Allied Products	Food and Kindred Products	Stone, Clay, Glass, And Concrete Products	Food and Kindred Products
5	Stone, Clay, Glass, And Concrete Products	Food and Kindred Products	Agricultural Production Crops	Waste / Scrap	Waste / Scrap	Food and Kindred Products	Stone, Clay, Glass, And Concrete Products	Food and Kindred Products	Waste / Scrap
6	Paper and Allied Products	Lumber and Wood Products, Except Furniture	Lumber and Wood Products, Except Furniture	Food and Kindred Products	Stone, Clay, Glass, And Concrete Products	Lumber and Wood Products, Except Furniture	Agricultural Production Crops	Petroleum Refining And Related Industries	Agricultural Production Crops

Rank	Staunton	Bristol	Salem	Lynchburg	Fredericks- burg	Richmond	Hampton Roads	Culpeper	Northern Virginia
7	Lumber and Wood Products, Except Furniture	Stone, Clay, Glass, And Concrete Products	Food and Kindred Products	Stone, Clay, Glass, And Concrete Products	Paper and Allied Products	Stone, Clay, Glass, And Concrete Products	Pipelines, Except Natural Gas	Waste / Scrap	Chemicals And Allied Products
8	Chemicals And Allied Products	Waste / Scrap	Chemicals And Allied Products	Chemicals And Allied Products	Food and Kindred Products	Coal Mining	Chemicals And Allied Products	Chemicals And Allied Products	Lumber and Wood Products, Except Furniture
9	Waste / Scrap	Chemicals And Allied Products	Primary Metal Industries	Coal Mining	Chemicals And Allied Products	Agricultural Production Crops	Waste / Scrap	Coal Mining	Electronic and Other Electrical Equipment

Source: InfoUSA and Transearch

Figure 3-1: Outbound and Intra Freight Flows, 2012



4.0 FREIGHT GROWTH RATE FORECAST

Transearch provides freight flows estimates and forecasts for 2012, 2025, and 2040 derived from the IHS long-term 30-year macroeconomic forecasts of the US economy. The initial forecast is based on county level estimates at the 4-digit STCC level, which are then constrained by national forecasts. This forecast includes data from:

- The World Trade Service to forecast international trade flows;
- U.S. Agricultural Service;
- U.S. Energy Service;
- Automotive Service;
- World Trade Service; and
- The Business Transactions Matrix.

Figure 4-1 shows the expected growth between 2012 and 2040 of tonnage carried by trucks along the Virginia highway network and **Figure 4-2** shows the expected growth in tonnage carried by rail. As the Transearch freight forecast includes available demographic data it has been used as the basis for forecasting in this report.

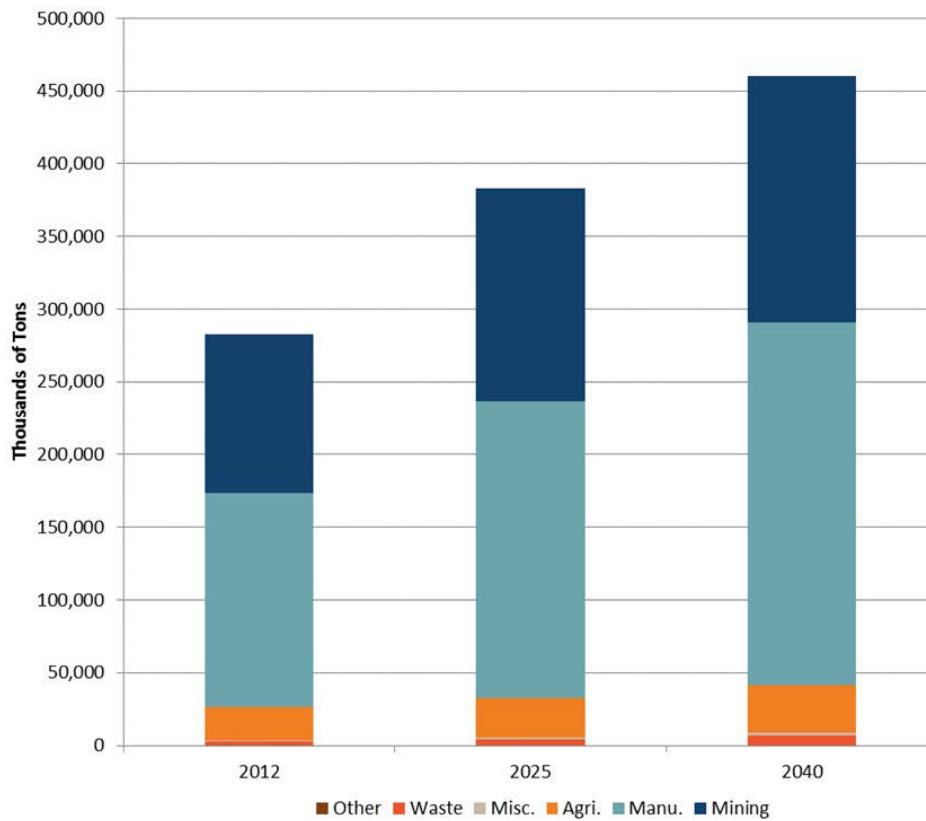
Alternatives to the Transearch forecast were considered, but were deemed less useful:

- The Freight Analysis Framework, which also forecasts future freight flows but does not do so at a county level;
- Zip/County level population forecasts, such as the one from Fairfax County⁶, which could be applied to the growth of inbound consumer goods to produce a forecast, but could not be used reliably for the growth of other goods and/or for freight flows in other directions. In addition Transearch already has socio-economic forecasts used as inputs in its models; and
- Using historical trends in local business announcements and closings to predict the change in employment and production in Virginia. We did not have sufficient length of historical data to adjust Transearch results with confidence and no clear means to make this forecast compatible with the rest of the analysis.

⁶ <http://www.fairfaxcounty.gov/demogrph/demrpts/report/section04.pdf>

As shown in **Figure 4-1** the growth in goods being carried by Truck between 2012 and 2040, in terms of tonnage, will be primarily driven by manufacturing goods.

Figure 4-1: Truck Tonnages by Industry and Year



As shown in **Figure 4-2** the growth in goods being carried by Rail between 2012 and 2040, in terms of tonnage, will be primarily driven by manufacturing goods, however mining goods will increase slightly from 2012 to 2025, while falling from 2025 to 2040. This fall is primarily driven by a statewide decline in Coal Mining.

Figure 4-2: Rail Tonnages by Industry and Year

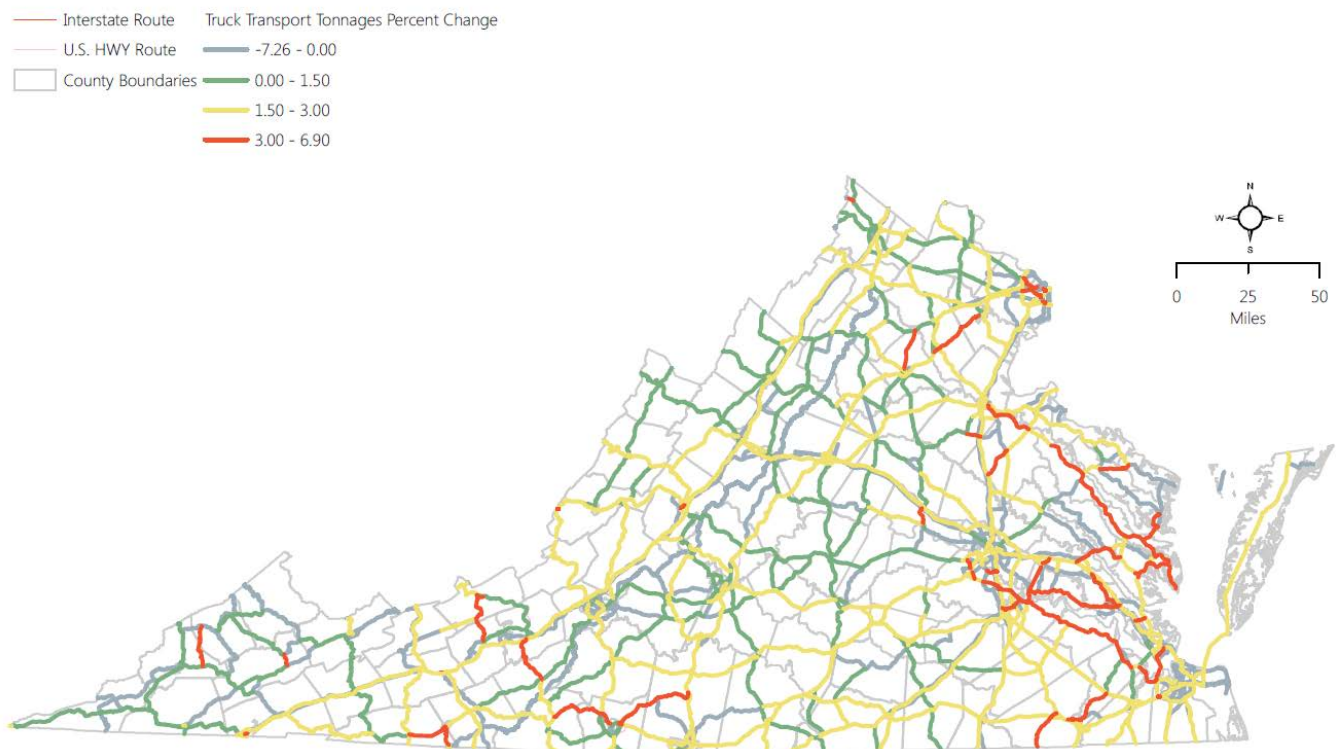


Figure 4-3 shows the expected growth between 2012 and 2040 of tonnage carried by trucks along the Virginia highway network and **Figure 4-4** shows the expected growth in tonnage carried by rail. Key Observations about growth trends include:

- Truck activity in Northern and Eastern Virginia appears likely to see the highest growth rates;
- The negative percentage change in Rail tons along the western Bristol corridors corresponds to the statewide fall in Coal Mining, which primarily makes up freight flows in the area; and

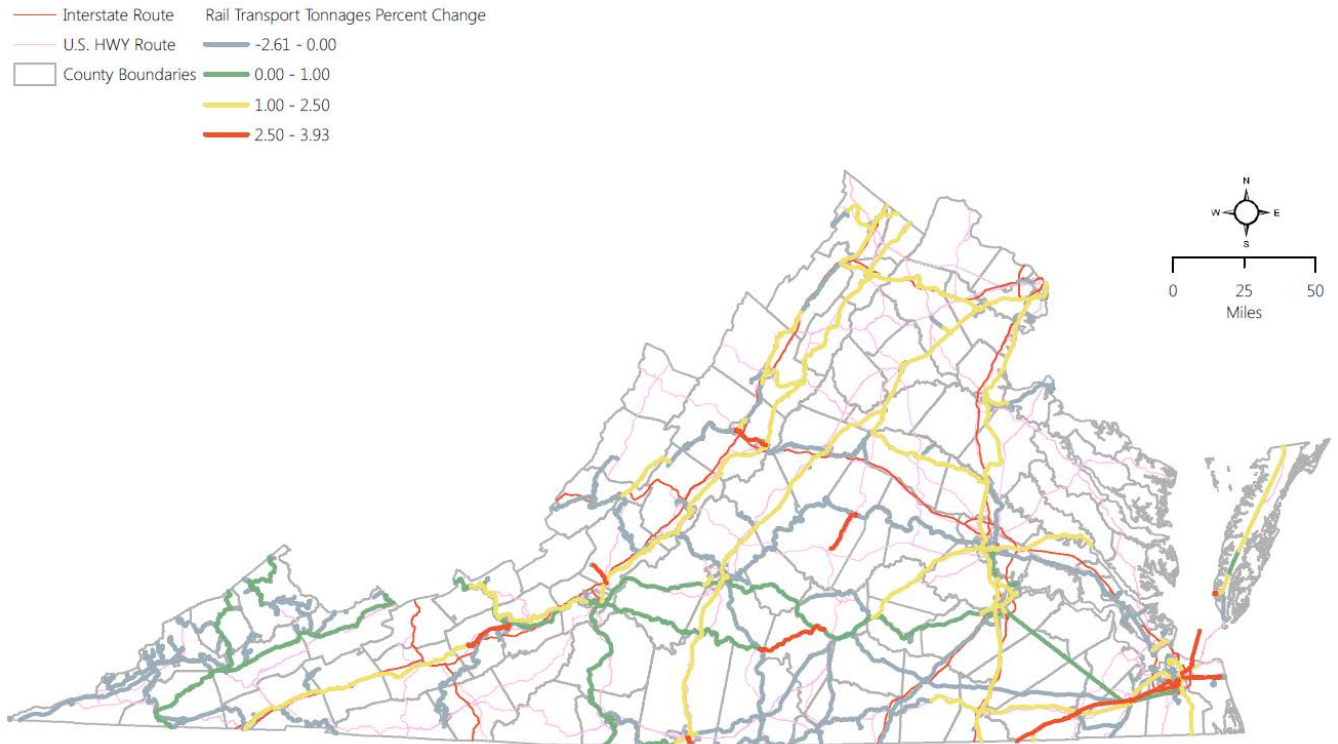
Strong growth along Norfolk-Southern's North-South Corridor is expected; however, the East-West corridor is predicted to see far less growth.

Figure 4-3: Truck Tonnage Percentage change 2012 – 2040



Source: Transearch

Figure 4-4: Rail Tonnage Percentage Change 2012- 2040



Source: Transearch

5.0 FREIGHT AND PASSENGER RAIL ECONOMIC IMPACT ANALYSIS

5.1 Background

Rail economic impacts to Virginia are estimated using the IMPLAN® economic model with input data and assumptions from freight movement data (via the STB WAYBILL) and passenger rail operations and visitor characteristics. The impact of rail activities on the economy of Virginia emanates from railroads' capital and operating expenditures involved in providing freight and passenger transport services, industries using rail to trade goods (shippers/receivers), and the expenditures of visitors to Virginia who arrived by rail. Of these activities, freight-users generate the most significant impact.

Impacts are calculated and presented by activity (service provision and rail users), type (direct, indirect, induced, and total), and measure (employment, income, value added, output, and tax revenue) for year 2015 to provide a comprehensive perspective on how rail in Virginia impacts the economy in **Table 5-1** and the following summary:

Employment – Economic impacts of rail extend beyond the 6,762 directly employed in the provision of rail transport (both passenger and freight). When the freight and visitor impact activities and multiplier impacts are included, rail-related employment in Virginia total 341,519 jobs, which represent 6.7 percent of the 5.1 million jobs statewide.

Income – \$19.8 billion earned by these total employees represent 6.4 percent of Virginia's total labor income. Labor income includes employee compensation and proprietary income. Employee compensation, in turn, consists of wage and salary payments as well as benefits (health, retirement, etc.) and employer paid payroll taxes (employer side of social security, unemployment taxes, etc.). Proprietary income consists of payments received by self-employed individuals and unincorporated business owners.

Value Added – The combined value added impact of rail services is over \$30.1 billion and represents 6.0 percent of the state's Gross State Product (GSP).

Output –In terms of total revenue, the rail industry generated about \$72.9 billion in output, which represents 8.8 percent of Virginia's total output.



Tax Revenue – Federal, state and local tax revenues generated by the rail industry totaled \$1.9 billion.

The results presented in the tables in this chapter are in millions of 2016 Dollars. Employment is rounded to the nearest 10 job-years. Totals may not sum up due to rounding.

Economic impacts of rail activities in Virginia emanate from firms providing freight and passenger rail services, industries using such services to trade goods (shippers/receivers), and tourism-related visitors to Virginia via rail. Of these activities, freight-users generate the most significant impacts.

The Surface Transportation Board (STB) WAYBILL SAMPLE freight database is used to analyze Virginia rail goods movements. WAYBILL-derived, inbound, outbound, and intrastate commodity volumes and values⁷ are applied, together with the IMPLAN® economic model, to determine how commodity movements generate direct economic impacts in Virginia relating to shippers/receivers.

Additionally, visits to Virginia via rail (spending on accommodations, food and beverages, recreational activities, etc.) and the provision of freight and passenger rail services also yield direct economic impacts.

Indirect impacts associated with suppliers, and induced impacts associated with the re-spending of income, are also quantified. The total economic impact comprises the direct, indirect, and induced types of market transactions. Total impact across these levels of market transactions is measured in terms of employment, income, value added (i.e., Gross State Product), output, and taxes.

The analysis discussed below addresses a range of economic impacts that are directly and tangentially related to rail transportation. The methodology, data sources, economic model, and the applied assumptions for freight and passenger movements are thoroughly presented in **Appendix F** of the State Rail Plan.

⁷ Freight rail volumes are readily available from the STB WAYBILL database; however, values for the movements are not supplied; as such, values per ton for commodities from the TRANSEARCH® database pertaining to proximate geographies were applied to the STB WAYBILL data for Virginia.

Table 5-1: Rail and Economic Impacts in Virginia

Measure and Type	Transport Services			Transport Users			Total		
	Passenger	Freight	Services	Passenger	Freight	Users	Passenger	Freight	Total
EMPLOYMENT									
Direct	914	5,848	6,762	438	163,674	164,111	1,352	169,522	170,873
Total	2,344	14,999	17,343	1,123	323,054	324,176	3,467	338,052	341,519
INCOME									
Direct	\$84.9	\$543.0	\$627.9	\$40.6	\$9,417.3	\$9,457.9	\$125.5	\$9,960.3	\$10,085.8
Total	\$168.4	\$1,077.4	\$1,245.8	\$80.6	\$18,502.8	\$18,583.5	\$249.0	\$19,580.2	\$19,829.2
VALUE ADDED									
Direct	\$146.6	\$937.9	\$1,084.5	\$70.2	\$12,999.8	\$13,070.0	\$216.8	\$13,937.7	\$14,154.5
Total	\$280.3	\$1,793.6	\$2,074.0	\$134.3	\$27,948.1	\$28,082.4	\$414.6	\$29,741.8	\$30,156.4
OUTPUT									
Direct	\$320.1	\$2,047.8	\$2,367.9	\$153.3	\$42,193.1	\$42,346.3	\$473.3	\$44,240.9	\$44,714.2
Total	\$553.1	\$3,538.8	\$4,091.9	\$264.9	\$68,529.0	\$68,793.9	\$818.0	\$72,067.9	\$72,885.8
TAX REVENUE									
Direct	\$2.8	\$18.2	\$21.1	\$1.4	\$629.0	\$630.4	\$4.2	\$647.2	\$651.4
Total	\$12.8	\$82.2	\$95.0	\$6.2	\$1,805.3	\$1,811.5	\$19.0	\$1,887.5	\$1,906.5

Source: Amtrak, VRE, WAYBILL, IHS TRANSEARCH and IMPLAN. Monetary values in millions of 2016 Dollars.



5.2 Rail Economic Impacts

Rail impacts total 341,519 jobs across Virginia, reflecting the various impact activities (services provision and users) and types (direct plus multipliers). A vast majority of these total employment impacts arise from rail users who move goods via the freight system, with the fractional balance attributable to transport services and visitor impacts.

The ensuing discussion details the composition of the employment impact estimates, as well as the other impact measures (e.g., output, value added, income, and taxes). Impact types (e.g., direct, indirect, and induced) and measures are first presented for rail transport-services, and then for freight and visitor users.

5.2.1 TRANSPORT SERVICE IMPACTS

Provisioning rail transportation to Virginia yields a direct employment impact of 6,762 jobs, comprised of 914 passenger-related transport jobs and 5,848 freight transport jobs. The indirect and induced effects in other related industries due to spending on rail operations generates an additional 10,581 jobs (5,148 and 5,433 indirect and induced, respectively) throughout the State. Combined, an estimated 17,343 people owe their jobs, directly or tangentially to the provision of rail for freight and passenger service. Note, that as discussed in **Table 5-2**, additional job impacts are associated with impact of rail users.

Direct – Combining the passenger and freight providers yield a direct impact of 6,762 jobs, earning \$627.9 million in labor income, producing \$1.08 billion in value added activity, which equates to \$2.37 billion in economic output, with tax revenues (on direct output) of \$21.1 million.

Total – Including the Virginia multiplier effects, transport service-related activity impacts total 17,343 jobs, earning \$1.25 billion in labor income, producing \$2.07 billion in economic value added, which equates to a total economic output of \$4.09 billion, and yields a tax impact of \$95.0 million to the State and Federal governments.

Table 5-2: Transport Service Impacts

Measure and Type	Passenger	Freight	Services Total
EMPLOYMENT			
Direct	914	5,848	6,762
Indirect	696	4,452	5,148
Induced	734	4,699	5,433
Total	2,344	14,999	17,343
INCOME			
Direct	\$84.9	\$543.0	\$627.9
Indirect	\$50.0	\$320.1	\$370.1
Induced	\$33.5	\$214.3	\$247.8
Total	\$168.4	\$1,077.4	\$1,245.8
VALUE ADDED			
Direct	\$146.6	\$937.9	\$1,084.5
Indirect	\$72.2	\$462.0	\$534.2
Induced	\$61.5	\$393.7	\$455.3
Total	\$280.3	\$1,793.6	\$2,074.0
OUTPUT			
Direct	\$320.1	\$2,047.8	\$2,367.9
Indirect	\$128.4	\$821.3	\$949.6
Induced	\$104.7	\$669.7	\$774.4
Total	\$553.1	\$3,538.8	\$4,091.9
TAX REVENUE			
Direct	\$2.8	\$18.2	\$21.1
Indirect	\$4.6	\$29.3	\$33.9
Induced	\$5.4	\$34.7	\$40.1
Total	\$12.8	\$82.2	\$95.0

Source: Amtrak, VRE, and IMPLAN. Monetary values in millions of 2016 Dollars.



5.2.2 TRANSPORT USER IMPACTS

Passenger-related activities reflect expenditures within the region by out-of-state visitors, based on Amtrak related passenger movements and assumptions regarding visitors (versus residents), average length of stay, average visitor expenditure per day, and an allocation to various expenditure categories (e.g., retail purchases, ground transportation, entertainment and recreation, lodging, and food purchases).

Freight-related activities reflect the extent to which inbound goods via rail are absorbed into the existing production processes as intermediates into the final production of saleable goods and services, and how outbound/intrastate goods via rail are produced by the various existing industries in the region.

A breakdown of the directional-related freight user impacts is also provided in **Table 5-3**. Combining passenger and freight users yields the following combined impacts:

Direct – The combined direct impact of passenger and freight users amounts to 164,111 jobs, earning \$9.46 billion in labor income, producing \$13.07 billion in value added activity, which equates to \$42.35 billion in economic output; with tax revenues (on direct output) equating to \$630.4 million.

Total – The wider indirect and induced impacts of these direct expenditures is estimated to be 324,176 jobs, earning \$18.58 billion in labor income, producing \$28.08 billion in economic value added, which equates to a total economic output of \$68.79 billion, and yields a tax impact of \$1.81 billion to the State and Federal governments.

Table 5-3: Transport User Impacts

Measure and Type	Passenger	Freight			Users Total
		Outbound / Intra	Inbound	Subtotal	
EMPLOYMENT					
Direct	438	62,947	100,727	163,674	164,111
Indirect	333	29,638	49,263	78,901	79,235
Induced	352	31,402	49,076	80,478	80,830
Total	1,123	123,987	199,067	323,054	324,176
INCOME					
Direct	\$40.6	\$3,724.3	\$5,693.0	\$9,417.3	\$9,457.9
Indirect	\$24.0	\$2,069.8	\$3,348.6	\$5,418.4	\$5,442.4
Induced	\$16.0	\$1,430.6	\$2,236.5	\$3,667.1	\$3,683.1
Total	\$80.6	\$7,224.7	\$11,278.1	\$18,502.8	\$18,583.5
VALUE ADDED					
Direct	\$70.2	\$5,065.8	\$7,934.0	\$12,999.8	\$13,070.0
Indirect	\$34.6	\$3,136.2	\$5,071.5	\$8,207.7	\$8,242.3
Induced	\$29.5	\$2,629.8	\$4,110.8	\$6,740.7	\$6,770.1
Total	\$134.3	\$10,831.8	\$17,116.3	\$27,948.1	\$28,082.4
OUTPUT					
Direct	\$153.3	\$16,273.6	\$25,919.5	\$42,193.1	\$42,346.3
Indirect	\$61.5	\$5,727.4	\$9,145.8	\$14,873.2	\$14,934.7
Induced	\$50.1	\$4,471.8	\$6,990.9	\$11,462.7	\$11,512.9
Total	\$264.9	\$26,472.8	\$42,056.2	\$68,529.0	\$68,793.9
TAX REVENUE					
Direct	\$1.4	\$238.9	\$390.2	\$629.0	\$630.39
Indirect	\$2.2	\$233.4	\$348.6	\$582.1	\$584.3
Induced	\$2.6	\$231.9	\$362.3	\$594.2	\$596.8
Total	\$6.2	\$704.2	\$1,101.1	\$1,805.3	\$1,811.5

Source: Amtrak, VRE, WAYBILL, IHS TRANSEARCH and IMPLAN. Monetary values in millions of 2016 Dollars.



5.2.3 VISITOR IMPACTS

The results show that passenger-related rail user impacts are significantly smaller than freight-user impacts. This result is not surprising considering the overall volumes carried by each mode (i.e. annual passengers as compared to annual freight volumes). The impact differential is a function of the relative volumes and the value carried. In addition, the passenger-related user impacts reflect spending in service industries. In contrast, freight-related user impacts are dispersed throughout various industries in the economy, including those almost entirely rail dependent. As such, the narrowly-focused passenger user-related impacts are overshadowed by the more broadly-encompassing freight-related impacts.

Direct – Passengers and the tourism-related spending yields a direct impact of 438 jobs, earning \$40.6 million in labor income, producing \$70.2 million in value added activity, which equates to \$153.3 million in economic output, with tax revenues (on direct output) of \$1.4 million.

Total - Including the multipliers, passenger-related user activity impacts a total of 1,123 jobs, earning \$80.6 million in labor income, producing \$134.3 million in economic value added, which equates to a total economic output of \$264.9 million, and yields a tax impact of \$6.2 million to the State and Federal governments.

5.2.4 FREIGHT USER IMPACTS

In addition to the transport-service impacts detailed above, many consignees and shippers heavily rely on rail service to receive and/or ship freight; in doing so, they generate significant impacts. While these firms/ industries are not entirely dependent on rail for shipping freight (as alternative modes are available, such as trucking), it is hard to envision continued operations without such access. In fact, rail access is often instrumental in major manufacturing business location decisions.

If railroads did not accommodate demand, consignees and shippers could use other modes (i.e., truck, water, air, etc.) to transport freight. However, the use of other modes would likely entail higher transport costs (due to longer transport distances, price, logistics, etc.) and could increase overall demand (and resulting handling costs) for all users of other modes (both the diverted rail users as well as current users). In the long-run, without rail, rail-dependent industries could shift away from Virginia to other locations with relatively better rail accessibility and better modal options/mix.

The results that follow then represent the share of the economy in Virginia that is influenced in some way by freight rail use. Recognizing that rail is the preferred but not only choice of these

shippers, these results indicate the contribution of rail to the state's economy based on sound business decisions in a competitive economy. If the low cost shipping services provided by rail were compromised, the impact of transportation cost increases would ripple through the economy and likely lead to a significant decline overall.

The following analysis estimates the economic impacts associated with industries in Virginia that rely on freight rail transport. To estimate such impacts associated with rail tonnage movements requires an understanding of how the various inbound and outbound/intrastate commodities are used or produced by various industries to generate output, income, and employment. To do so, the IMPLAN® commodity-to-industry matrices and other algorithms were applied to estimate direct impact measures. Indirect and induced multipliers were then applied to the direct impact estimates to derive total economic impacts.

Outbound/Intrastate – 33.1 million tons of freight originating in Virginia is either shipped via rail out-of-state (18.2 million tons) or internally (14.9 million tons). Combined, rail freight originating in Virginia is valued at \$16.8 billion and generates an estimated 123,987 total jobs.

Inbound – 62.0 million tons of inbound freight originating beyond Virginia, valued at \$26.2 billion, are used by Virginia industries and institutions to generate 199,067 total jobs. Inbound freight user impacts comprise final demand and intermediate demand. Final demand goods are distributed via wholesale or retail outlets, or through direct sales, with economic impacts stemming from the trade margins associated with the transfer of goods from suppliers to end-users.

Direct – Combining the directional components of freight users yields a direct subtotal impact of 163,674 jobs, earning \$9.42 billion in labor income, producing \$13.00 billion in value added activity, which equates to \$42.35 billion in economic output, with tax revenues (on direct output) of \$630.39 million.

Total – Including the multipliers, freight user activity impacts total 323,054 jobs, earning \$18.50 billion in labor income, producing \$27.95 billion in economic value added, which equates to a total economic output of \$68.53 billion, and yields a tax impact of \$1.81 billion.

5.2.5 TOTAL RAIL ACTIVITY IMPACTS

Rail service is essential to Virginia's economy. While the actual provision of rail service generates 6,762 direct jobs (17,343 including multipliers), the impact of rail users generates 164,111 direct jobs, a significant majority of which relates to freight users (compared with passengers). Impacts to Virginia by rail activity (transport services and users, differentiated by passenger and freight



rail purposes), by impact measure (output, employment, labor income, value-added, and taxes), and by type (direct, indirect, induced, and total) are summarized in **Table 5-4**.

Direct – Combining the various rail-related activities yields a direct impact of 170,873 jobs, earning \$10.09 billion in labor income, producing \$14.15 billion in value added activity, which equates to \$44.71 billion in economic output, with tax revenues (on direct output) of \$651.4 million.

Total – Including the multipliers, the various rail-related activities total 341,519 jobs, earning \$19.83 billion in labor income, producing \$30.16 billion in economic value added, which equates to a total economic output of \$72.89 billion, and yields a tax impact of \$1.91 billion.

Table 5-4: Rail Impacts

Measure and Type	Transport Services			Transport Users			Total		
	Passenger	Freight	Services	Passenger	Freight	Users	Passenger	Freight	Total
EMPLOYMENT									
Direct	914	5,848	6,762	438	163,674	164,111	1,352	169,522	170,873
Total	2,344	14,999	17,343	1,123	323,054	324,176	3,467	338,052	341,519
INCOME									
Direct	\$84.9	\$543.0	\$627.9	\$40.6	\$9,417.3	\$9,457.9	\$125.5	\$9,960.3	\$10,085.8
Total	\$168.4	\$1,077.4	\$1,245.8	\$80.6	\$18,502.8	\$18,583.5	\$249.0	\$19,580.2	\$19,829.2
VALUE ADDED									
Direct	\$146.6	\$937.9	\$1,084.5	\$70.2	\$12,999.8	\$13,070.0	\$216.8	\$13,937.7	\$14,154.5
Total	\$280.3	\$1,793.6	\$2,074.0	\$134.3	\$27,948.1	\$28,082.4	\$414.6	\$29,741.8	\$30,156.4
OUTPUT									
Direct	\$320.1	\$2,047.8	\$2,367.9	\$153.3	\$42,193.1	\$42,346.3	\$473.3	\$44,240.9	\$44,714.2
Total	\$553.1	\$3,538.8	\$4,091.9	\$264.9	\$68,529.0	\$68,793.9	\$818.0	\$72,067.9	\$72,885.8
TAX REVENUE									
Direct	\$2.8	\$18.2	\$21.1	\$1.4	\$629.0	\$630.4	\$4.2	\$647.2	\$651.4
Total	\$12.8	\$82.2	\$95.0	\$6.2	\$1,805.3	\$1,811.5	\$19.0	\$1,887.5	\$1,906.5

Source: Amtrak, VRE, WAYBILL, IHS TRANSEARCH and IMPLAN. Monetary values in millions of 2016 Dollars.



5.2.6 IMPACTS AS PERCENTAGE OF ECONOMY

It is important to contextualize the preceding economic impact estimates, as it is difficult to visualize millions of jobs and billions of dollars, etc. As such, the economic impacts can be compared with existing economic composition of Virginia in 2015, by the same measures as the presented economic impacts.

Impacts, as measured in terms such as employment, income, value added, and output, span all industries and reach every region of the state as described in the following and shown in **Table 5-5**:

Employment – Economic impacts of rail extend beyond the 6,762 directly employed in the provision of rail transport (both passenger and freight). When the freight and visitor impact activities and multiplier impacts are included, rail-related employment in Virginia total 341,519 jobs, which represent 6.7 percent of the 5.1 million jobs statewide.

Income – \$19.8 billion earned by these total employees represent 6.4 percent of Virginia’s total labor income. Labor income includes employee compensation and proprietary income. Employee compensation, in turn, consists of wage and salary payments as well as benefits (health, retirement, etc.) and employer paid payroll taxes (employer side of social security, unemployment taxes, etc.). Proprietary income consists of payments received by self-employed individuals and unincorporated business owners.

Value Added – The combined value added impact of rail services is over \$30.1 billion and represents 6.0 percent of the state’s Gross State Product (GSP).

Output –In terms of total revenue, the rail industry generated about \$72.9 billion in output, which represents 8.8 percent of Virginia’s total output.

Tax Revenue – Federal, state and local tax revenues generated by the rail industry totaled \$1.9 billion.

Table 5-5: Virginia Economic Measures, 2015

Measure	Value
Employment	5,059,628
Labor Income*	\$309,064
Value Added*	\$500,175
Output*	\$831,490
Tax Revenue*	\$29,625

Source: IMPLAN. *Monetary values are in millions of 2016 Dollars.



It would be erroneous to conclude that all of these impacts are entirely and solely dependent on rail and would disappear if rail ceased operating (i.e., no modal substitutability). Rather, the findings show that rail service facilitates business throughout the State. Specifically, these impacts highlight the magnitude of the contribution of freight rail use by manufacturers across the State, as well as dealers, retailers, and others who transport materials, component parts, and products.

Of the rail activities analyzed, passenger-related economic impacts are relatively smaller in comparison to the comparatively large-scale freight-related impacts but provide an important contribution to local markets where stops occur. The impact of freight users, including both outbound/intrastate and inbound movements, pertaining to production and absorption, respectively, far exceeds the economic impacts associated with provisioning the services that facilitate the movement of both people and goods. In conclusion, the rail industry provides some economic activity, in itself; but, it facilitates far more economic activity via the services rendered to people and industries, particularly by enabling the movement of goods necessary to conduct economic pursuits.

5.2.7 DISTRICT-LEVEL ANALYSIS

The study team also estimated rail economic impacts at the district level. For passenger rail (services and users) impacts, ridership was estimated for each district based on Amtrak data and was used as a proxy to assign the statewide impacts at the district level as shown in **Table 5-6**.

Table 5-6: Amtrak Boardings and Alightings, 2016

District	Total Ridership	Percentage
Northern Virginia	567,938	36.6
Richmond	457,026	29.4
Culpeper	156,915	10.1
Staunton	8,651	0.6
Fredericksburg	127,484	8.2
Lynchburg	82,786	5.3
Hampton Roads	152,210	9.8
Salem	0	0.0
Bristol	0	0.0
Total	1,553,010	100.0

Source: HDR Analysis of Amtrak Ridership Data

For freight rail, two indicators were used as proxies: track miles for freight services and total value of outbound/intra and inbound shipments (**Table 5-7** and **Table 5-8**). Track miles data were obtained through GIS shape files and total value of shipments are derived from Transearch.

Table 5-7: Track Miles

District	Track Miles	Percentage
Hampton Roads	699	15
Northern Virginia	120	3
Staunton	611	13
Lynchburg	659	14
Salem	621	13
Richmond	776	16
Bristol	831	18
Fredericksburg	113	2
Culpeper	279	6
Total	4,709	100

Source: HDR

Table 5-8: Value in 2016 Dollars of goods carried by rail

District	Outbound/Intra	Inbound	Outbound/Intra Percentage	Inbound Percentage
Hampton Roads	\$11,145,618,695	\$16,779,212,766	66.6	64.0
Northern Virginia	\$16,210,198	\$505,927,037	0.1	1.9
Staunton	\$457,983,869	\$2,261,278,239	2.7	8.6
Lynchburg	\$197,292,238	\$1,161,743,889	1.2	4.4
Salem	\$580,780,037	\$1,069,040,770	3.5	4.1
Richmond	\$2,402,735,657	\$3,013,228,458	14.4	11.5
Bristol	\$1,573,488,268	\$450,248,299	9.4	1.7
Fredericksburg	\$346,550,247	\$883,057,549	2.1	3.4
Culpeper	\$17,090,696	\$103,435,289	0.1	0.4

District	Outbound/Intra	Inbound	Outbound/Intra Percentage	Inbound Percentage
Total	\$16,737,749,905	\$26,227,172,296	100.0	100.0

Source: HDR Analysis of TRANSEARCH Data

Impacts are calculated and presented by activity (service provision and rail users), type (direct, indirect, induced, and total), and measure (employment, income, value added, output, and tax revenue) for year 2015 to provide a comprehensive perspective on how rail in each district impacts the economy. There are no passenger rail impacts in Bristol and Salem since there is currently no Amtrak service in both districts. For Salem, regional service to Roanoke is anticipated to begin in late 2017 or early 2018. The results presented in the tables (**Table 5-9** through **Table 5-17**) in this chapter are in millions of 2016 Dollars. Employment is rounded to the nearest 10 job-years. Totals may not sum up due to rounding. Supplementary tables are provided in **Attachment A**.

Table 5-9: Bristol Rail Impacts, 2015

Measure and Type	Transport Services			Transport Users			Total		
	Passenger	Freight	Services	Passenger	Freight	Users	Passenger	Freight	Total
EMPLOYMENT									
Direct	0	1,032	1,032	0	7,647	7,647	0	8,679	8,679
Total	0	2,647	2,647	0	15,073	15,073	0	17,720	17,720
INCOME									
Direct	\$0.0	\$95.8	\$95.8	\$0.0	\$447.8	\$447.8	\$0.0	\$543.7	\$543.7
Total	\$0.0	\$190.1	\$190.1	\$0.0	\$872.8	\$872.8	\$0.0	\$1,062.9	\$1,062.9
VALUE ADDED									
Direct	\$0.0	\$165.5	\$165.5	\$0.0	\$612.4	\$612.4	\$0.0	\$778.0	\$778.0
Total	\$0.0	\$316.5	\$316.5	\$0.0	\$1,312.1	\$1,312.1	\$0.0	\$1,628.6	\$1,628.6
OUTPUT									
Direct	\$0.0	\$361.4	\$361.4	\$0.0	\$1,974.8	\$1,974.8	\$0.0	\$2,336.2	\$2,336.2
Total	\$0.0	\$624.5	\$624.5	\$0.0	\$3,210.7	\$3,210.7	\$0.0	\$3,835.2	\$3,835.2
TAX REVENUE									
Direct	\$0.0	\$3.2	\$3.2	\$0.0	\$29.2	\$29.2	\$0.0	\$32.4	\$32.4
Total	\$0.0	\$14.5	\$14.5	\$0.0	\$85.1	\$85.1	\$0.0	\$99.6	\$99.6

Source: Amtrak, WAYBILL, IHS TRANSEARCH and IMPLAN. Monetary values in millions of 2016 Dollars.

Bristol

- 17,720 jobs – 11.3 percent of the 157,151 jobs district wide
- \$1.1 billion earned by employees – 16.2 percent of the district's total labor income
- \$1.6 billion of added value – 14.4 percent of the district's Gross Regional Product
- \$3.8 billion of output – 15.8 percent of the district's total output
- \$99.6 million of tax revenue – 10.2 percent of the district's total tax revenue



Table 5-10: Culpeper Rail Impacts, 2015

Measure and Type	Transport Services			Transport Users			Total		
	Passenger	Freight	Services	Passenger	Freight	Users	Passenger	Freight	Total
EMPLOYMENT									
Direct	92	346	439	44	462	506	137	808	945
Total	237	889	1,125	113	912	1,025	350	1,800	2,151
INCOME									
Direct	\$8.6	\$32.2	\$40.7	\$4.1	\$26.3	\$30.4	\$12.7	\$58.4	\$71.1
Total	\$17.0	\$63.8	\$80.8	\$8.1	\$51.9	\$60.0	\$25.2	\$115.7	\$140.9
VALUE ADDED									
Direct	\$14.8	\$55.6	\$70.4	\$7.1	\$36.5	\$43.6	\$21.9	\$92.0	\$113.9
Total	\$28.3	\$106.3	\$134.6	\$13.6	\$78.6	\$92.1	\$41.9	\$184.8	\$226.7
OUTPUT									
Direct	\$32.3	\$121.3	\$153.7	\$15.5	\$118.8	\$134.3	\$47.8	\$240.2	\$288.0
Total	\$55.9	\$209.7	\$265.6	\$26.8	\$192.9	\$219.7	\$82.6	\$402.6	\$485.2
TAX REVENUE									
Direct	\$0.3	\$1.1	\$1.4	\$0.1	\$1.8	\$1.9	\$0.4	\$2.9	\$3.3
Total	\$1.3	\$4.9	\$6.2	\$0.6	\$5.1	\$5.7	\$1.9	\$9.9	\$11.8

Source: Amtrak, WAYBILL, IHS TRANSEARCH and IMPLAN. Monetary values in millions of 2016 Dollars.

Culpeper

- 2,151 jobs – 0.9 percent of the 249,313 jobs district wide
- \$140.9 million earned by employees – 1.2 percent of the district's total labor income
- \$226.7 million of added value – 1.1 percent of the district's Gross Regional Product
- \$485.2 million of output – 1.4 percent of the district's total output
- \$11.8 million of tax revenue – 0.9 percent of the district's total tax revenue



Table 5-11: Fredericksburg Rail Impacts, 2015

Measure and Type	Transport Services			Transport Users			Total		
	Passenger	Freight	Services	Passenger	Freight	Users	Passenger	Freight	Total
EMPLOYMENT									
Direct	75	140	215	36	4,695	4,731	111	4,835	4,946
Total	192	360	552	92	9,270	9,362	285	9,630	9,914
INCOME									
Direct	\$7.0	\$13.0	\$20.0	\$3.3	\$268.8	\$272.1	\$10.3	\$281.8	\$292.1
Total	\$13.8	\$25.9	\$39.7	\$6.6	\$529.3	\$535.9	\$20.4	\$555.2	\$575.6
VALUE ADDED									
Direct	\$12.0	\$22.5	\$34.5	\$5.8	\$372.0	\$377.8	\$17.8	\$394.5	\$412.3
Total	\$23.0	\$43.0	\$66.1	\$11.0	\$800.6	\$811.6	\$34.0	\$843.6	\$877.6
OUTPUT									
Direct	\$26.3	\$49.1	\$75.4	\$12.6	\$1,209.6	\$1,222.2	\$38.9	\$1,258.8	\$1,297.6
Total	\$45.4	\$84.9	\$130.3	\$21.7	\$1,964.1	\$1,985.9	\$67.1	\$2,049.0	\$2,116.2
TAX REVENUE									
Direct	\$0.2	\$0.4	\$0.7	\$0.1	\$18.1	\$18.2	\$0.3	\$18.5	\$18.9
Total	\$1.1	\$2.0	\$3.0	\$0.5	\$51.7	\$52.2	\$1.6	\$53.6	\$55.2

Source: Amtrak, WAYBILL, IHS TRANSEARCH and IMPLAN. Monetary values in millions of 2016 Dollars.

Fredericksburg

- 9,914 jobs – 2.5 percent of the 390,385 jobs district wide
- \$575.6 million earned by employees – 2.5 percent of the district's total labor income
- \$877.6 million of added value – 2.0 percent of the district's Gross Regional Product
- \$2.1 billion of output – 3.0 percent of the district's total output
- \$55.2 million of tax revenue – 1.2 percent of the district's total tax revenue



Table 5-12: Hampton Roads Rail Impacts, 2015

Measure and Type	Transport Services			Transport Users			Total		
	Passenger	Freight	Services	Passenger	Freight	Users	Passenger	Freight	Total
EMPLOYMENT									
Direct	90	868	958	43	106,358	106,400	132	107,226	107,358
Total	230	2,226	2,456	110	209,918	210,028	340	212,145	212,484
INCOME									
Direct	\$8.3	\$80.6	\$88.9	\$4.0	\$6,122.2	\$6,126.2	\$12.3	\$6,202.8	\$6,215.1
Total	\$16.5	\$159.9	\$176.4	\$7.9	\$12,026.2	\$12,034.2	\$24.4	\$12,186.2	\$12,210.6
VALUE ADDED									
Direct	\$14.4	\$139.2	\$153.6	\$6.9	\$8,449.2	\$8,456.1	\$21.2	\$8,588.4	\$8,609.6
Total	\$27.5	\$266.2	\$293.7	\$13.2	\$18,163.3	\$18,176.5	\$40.6	\$18,429.5	\$18,470.2
OUTPUT									
Direct	\$31.4	\$304.0	\$335.3	\$15.0	\$27,418.9	\$27,433.9	\$46.4	\$27,722.9	\$27,769.3
Total	\$54.2	\$525.3	\$579.5	\$26.0	\$44,534.2	\$44,560.2	\$80.2	\$45,059.5	\$45,139.7
TAX REVENUE									
Direct	\$0.3	\$2.7	\$3.0	\$0.1	\$408.7	\$408.8	\$0.4	\$411.4	\$411.8
Total	\$1.3	\$12.2	\$13.5	\$0.6	\$1,173.4	\$1,174.0	\$1.9	\$1,185.6	\$1,187.4

Source: Amtrak, WAYBILL, IHS TRANSEARCH and IMPLAN. Monetary values in millions of 2016 Dollars.

Hampton Roads

- 212,484 jobs – 20.3 percent of the 1.05 million jobs district wide
- \$12.2 billion earned by employees – 20.6 percent of the district's total labor income
- \$18.5 billion of added value – 18.5 percent of the district's Gross Regional Product
- \$45.1 billion of output – 27.7 percent of the district's total output
- \$1.2 billion of tax revenue – 22.2 percent of the district's total tax revenue



Table 5-13: Lynchburg Rail Impacts, 2015

Measure and Type	Transport Services			Transport Users			Total		
	Passenger	Freight	Services	Passenger	Freight	Users	Passenger	Freight	Total
EMPLOYMENT									
Direct	49	818	867	23	5,204	5,227	72	6,022	6,094
Total	125	2,099	2,224	60	10,279	10,339	185	12,378	12,563
INCOME									
Direct	\$4.5	\$76.0	\$80.5	\$2.2	\$296.1	\$298.2	\$6.7	\$372.1	\$378.8
Total	\$9.0	\$150.8	\$159.8	\$4.3	\$584.7	\$589.0	\$13.3	\$735.5	\$748.8
VALUE ADDED									
Direct	\$7.8	\$131.3	\$139.1	\$3.7	\$411.1	\$414.9	\$11.6	\$542.4	\$554.0
Total	\$14.9	\$251.0	\$266.0	\$7.2	\$885.9	\$893.0	\$22.1	\$1,136.9	\$1,159.0
OUTPUT**									
Direct	\$17.1	\$286.6	\$303.6	\$8.2	\$1,339.9	\$1,348.1	\$25.2	\$1,626.5	\$1,651.8
Total	\$29.5	\$495.2	\$524.7	\$14.1	\$2,174.9	\$2,189.1	\$43.6	\$2,670.2	\$2,713.8
TAX REVENUE									
Direct	\$0.2	\$2.5	\$2.7	\$0.1	\$20.1	\$20.2	\$0.2	\$22.6	\$22.9
Total	\$0.7	\$11.5	\$12.2	\$0.3	\$57.1	\$57.4	\$1.0	\$68.6	\$69.6

Source: Amtrak, WAYBILL, IHS TRANSEARCH and IMPLAN. Monetary values in millions of 2016 Dollars.

Lynchburg

- 12,563 jobs v 6.2 percent of the 201,504 jobs district wide
- \$748.8 million earned by employees – 8.8 percent of the district's total labor income
- \$1.2 billion of added value – 8.2 percent of the district's Gross Regional Product
- \$2.7 billion of output – 8.9 percent of the district's total output
- \$69.6 million of tax revenue – 6.1 percent of the district's total tax revenue



Table 5-14: Northern Virginia Rail Impacts, 2015

Measure and Type	Transport Services			Transport Users			Total		
	Passenger	Freight	Services	Passenger	Freight	Users	Passenger	Freight	Total
EMPLOYMENT									
Direct	334	149	483	160	2,004	2,164	494	2,153	2,647
Total	857	382	1,239	411	3,960	4,371	1,268	4,342	5,610
INCOME*									
Direct	\$31.0	\$13.8	\$44.9	\$14.9	\$113.4	\$128.3	\$45.9	\$127.3	\$173.2
Total	\$61.6	\$27.5	\$89.0	\$29.5	\$224.6	\$254.0	\$91.1	\$252.0	\$343.1
VALUE ADDED									
Direct	\$53.6	\$23.9	\$77.5	\$25.7	\$158.0	\$183.6	\$79.3	\$181.9	\$261.1
Total	\$102.5	\$45.7	\$148.2	\$49.1	\$340.7	\$389.8	\$151.6	\$386.4	\$538.0
OUTPUT									
Direct	\$117.0	\$52.2	\$169.2	\$56.1	\$515.8	\$571.8	\$173.1	\$567.9	\$741.0
Total	\$202.3	\$90.2	\$292.4	\$96.9	\$836.9	\$933.8	\$299.1	\$927.1	\$1,226.2
TAX REVENUE									
Direct	\$1.0	\$0.5	\$1.5	\$0.5	\$7.8	\$8.3	\$1.5	\$8.2	\$9.8
Total	\$4.7	\$2.1	\$6.8	\$2.2	\$21.9	\$24.2	\$6.9	\$24.0	\$31.0

Source: Amtrak, WAYBILL, IHS TRANSEARCH and IMPLAN. Monetary values in millions of 2016 Dollars.

Northern Virginia

- 5,610 jobs – 0.3 percent of the 1.68 million jobs district wide
- \$343.1 million earned by employees – 0.3 percent of the district's total labor income
- \$538.0 million of added value – 0.3 percent of the district's Gross Regional Product
- \$1.2 billion of output – 0.4 percent of the district's total output
- \$31.0 million of tax revenue – 0.4 percent of the district's total tax revenue



Table 5-15: Richmond Rail Impacts, 2015

Measure and Type	Transport Services			Transport Users			Total		
	Passenger	Freight	Services	Passenger	Freight	Users	Passenger	Freight	Total
EMPLOYMENT									
Direct	269	964	1,233	129	20,609	20,737	398	21,572	21,970
Total	690	2,472	3,161	330	40,669	41,000	1,020	43,141	44,161
INCOME									
Direct	\$25.0	\$89.5	\$114.5	\$12.0	\$1,188.7	\$1,200.7	\$36.9	\$1,278.2	\$1,315.1
Total	\$49.6	\$177.5	\$227.1	\$23.7	\$2,332.9	\$2,356.6	\$73.3	\$2,510.4	\$2,583.7
VALUE ADDED									
Direct	\$43.1	\$154.6	\$197.7	\$20.7	\$1,638.7	\$1,659.4	\$63.8	\$1,793.3	\$1,857.1
Total	\$82.5	\$295.6	\$378.1	\$39.5	\$3,521.4	\$3,560.9	\$122.0	\$3,817.0	\$3,939.0
OUTPUT									
Direct	\$94.2	\$337.5	\$431.7	\$45.1	\$5,314.0	\$5,359.1	\$139.3	\$5,651.4	\$5,790.7
Total	\$162.8	\$583.2	\$745.9	\$78.0	\$8,632.0	\$8,710.0	\$240.7	\$9,215.2	\$9,455.9
TAX REVENUE									
Direct	\$0.8	\$3.0	\$3.8	\$0.4	\$79.1	\$79.5	\$1.2	\$82.1	\$83.4
Total	\$3.8	\$13.5	\$17.3	\$1.8	\$227.6	\$229.4	\$5.6	\$241.1	\$246.7

Source: Amtrak, WAYBILL, IHS TRANSEARCH and IMPLAN. Monetary values in millions of 2016 Dollars.

Richmond

- 44,161 jobs – 5.5 percent of the 806,369 jobs district wide
- \$2.6 billion earned by employees – 5.5 percent of the district's total labor income
- \$3.9 billion of added value 4.7 percent of the district's Gross Regional Product
- \$9.5 billion of output – 6.7 percent of the district's total output
- \$246.7 million of tax revenue – 3.5 percent of the district's total tax revenue



Table 5-16: Salem Rail Impacts, 2015

Measure and Type	Transport Services			Transport Users			Total		
	Passenger	Freight	Services	Passenger	Freight	Users	Passenger	Freight	Total
EMPLOYMENT									
Direct	0	771	771	0	6,290	6,290	0	7,061	7,061
Total	0	1,978	1,978	0	12,416	12,416	0	14,394	14,394
INCOME									
Direct	\$0.0	\$71.6	\$71.6	\$0.0	\$361.3	\$361.3	\$0.0	\$432.9	\$432.9
Total	\$0.0	\$142.1	\$142.1	\$0.0	\$710.4	\$710.4	\$0.0	\$852.5	\$852.5
VALUE ADDED									
Direct	\$0.0	\$123.7	\$123.7	\$0.0	\$499.2	\$499.2	\$0.0	\$622.9	\$622.9
Total	\$0.0	\$236.5	\$236.5	\$0.0	\$1,073.5	\$1,073.5	\$0.0	\$1,310.1	\$1,310.1
OUTPUT									
Direct	\$0.0	\$270.1	\$270.1	\$0.0	\$1,621.2	\$1,621.2	\$0.0	\$1,891.2	\$1,891.2
Total	\$0.0	\$466.7	\$466.7	\$0.0	\$2,632.8	\$2,632.8	\$0.0	\$3,099.5	\$3,099.5
TAX REVENUE									
Direct	\$0.0	\$2.4	\$2.4	\$0.0	\$24.2	\$24.2	\$0.0	\$26.6	\$26.6
Total	\$0.0	\$10.8	\$10.8	\$0.0	\$69.3	\$69.3	\$0.0	\$80.2	\$80.2

Source: Amtrak, WAYBILL, IHS TRANSEARCH and IMPLAN. Monetary values in millions of 2016 Dollars.

Salem

- 14,394 jobs – 3.7 percent of the 393,199 jobs district wide
- \$852.5 million earned by employees – 5.0 percent of the district's total labor income
- \$1.3 billion of added value – 4.7 percent of the district's Gross Regional Product
- \$3.1 billion of output – 5.3 percent of the district's total output
- \$80.2 million of tax revenue – 3.5 percent of the district's total tax revenue



Table 5-17: Staunton Rail Impacts, 2015

Measure and Type	Transport Services			Transport Users			Total		
	Passenger	Freight	Services	Passenger	Freight	Users	Passenger	Freight	Total
EMPLOYMENT									
Direct	5	759	764	2	10,407	10,409	8	11,166	11,173
Total	13	1,946	1,959	6	20,556	20,562	19	22,502	22,521
INCOME									
Direct	\$0.5	\$70.5	\$70.9	\$0.2	\$592.8	\$593.0	\$0.7	\$663.2	\$663.9
Total	\$0.9	\$139.8	\$140.7	\$0.4	\$1,170.1	\$1,170.5	\$1.4	\$1,309.9	\$1,311.3
VALUE ADDED									
Direct	\$0.8	\$121.7	\$122.5	\$0.4	\$822.7	\$823.1	\$1.2	\$944.4	\$945.6
Total	\$1.6	\$232.7	\$234.3	\$0.7	\$1,772.1	\$1,772.9	\$2.3	\$2,004.9	\$2,007.2
OUTPUT									
Direct	\$1.8	\$265.7	\$267.5	\$0.9	\$2,680.0	\$2,680.9	\$2.6	\$2,945.7	\$2,948.4
Total	\$3.1	\$459.2	\$462.2	\$1.5	\$4,350.4	\$4,351.9	\$4.6	\$4,809.6	\$4,814.1
TAX REVENUE									
Direct	\$0.0	\$2.4	\$2.4	\$0.0	\$40.2	\$40.2	\$0.0	\$42.5	\$42.6
Total	\$0.1	\$10.7	\$10.7	\$0.0	\$114.2	\$114.2	\$0.1	\$124.9	\$125.0

Source: Amtrak, WAYBILL, IHS TRANSEARCH and IMPLAN. Monetary values in millions of 2016 Dollars.

Staunton

- 22,521 jobs – 7.4 percent of the 303,570 jobs district wide
- \$1.3 billion earned by employees – 9.7 percent of the district's total labor income
- \$2.0 billion of added value – 8.8 percent of the district's Gross Regional Product
- \$4.8 billion of output – 9.9 percent of the district's total output
- \$125.0 million of tax revenue – 7.0 percent of the district's total tax revenue



6.0 CONCLUSION

Rail provides a major contribution in Virginia to the movement of both goods (freight) and people (passengers), which facilitates economic activity. Freight movements reflect the reallocation of intermediate goods for production and final goods for consumption; and, passenger movements are linked with personal consumption patterns. Both types of movements are supported by rail and can be captured by economic impact metrics via tracing the movement volumes, translated into applicable values (and, subject to economic/geographic factors) through the various interrelationships within the economy.

Translation of rail passenger and freight volumes into economic impacts demonstrates the vital role rail provides in Virginia's economy. Such economic impact analysis provides a complementary perspective for traditional freight-related analysis that predominately emphasizes the volume (units and/or tons) of the movements and the capacity of the transportation route.

An economic analysis provides an important perspective on the relative importance of freight rail. In instances, the volume of a certain commodity movement is substantial and would thus be considered relevant from a traditional freight analysis perspective; however, that same high-volume movement may be a low-value (per weight) commodity with little economic relevance (e.g., certain waste material movements). Consequently, not all traditionally-assessed freight movements (from a volume perspective) would be considered equally relevant, as compared with other freight movements observed from an economic perspective. In effect, volumes do not always translate into relevant values, and into direct economic impacts (and thus, into total impacts, reflective of multiplier effects as economic activity permeates through the economy).

ATTACHMENT A

COUNTIES, CITIES AND DISTRICTS

Table A-1 summarizes the Virginia Transportation Districts in terms of counties and cities.

Table A-1: Virginia Transportation Districts - Counties, Cities and Districts

District ID	District Name	Counties / Independent cities	Major Cities
1	Bristol	Bland, Bristol City, Buchanan, Dickenson, Grayson, Lee, Norton City, Russell, Scott, Smyth, Tazewell, Washington, Wise, Wythe	Bristol and Norton
2	Culpeper	Albemarle, Charlottesville City, Culpeper, Fauquier, Fluvanna, Greene, Louisa, Madison, Orange, Rappahannock	Charlottesville
3	Fredericksburg	Caroline, Essex, Fredericksburg, Gloucester, King And Queen, King George, King William, Lancaster, Mathews, Middlesex, Northumberland, Richmond, Spotsylvania, Stafford, Westmoreland	Fredericksburg
4	Hampton Roads	Accomack, Chesapeake City, Emporia City, Franklin City, Greenville, Hampton City, Isle Of Wight, James City, Newport News, Norfolk City, Northampton, Poquoson City, Portsmouth, Southampton, Suffolk City, Surry, Sussex, Virginia Beach, Williamsburg City, York	Chesapeake, Emporia, Franklin, Hampton, Newport News, Norfolk, Poquoson, Portsmouth, Suffolk, Virginia Beach and Williamsburg
5	Lynchburg	Amherst, Appomattox, Buckingham, Campbell, Charlotte, Cumberland, Danville City, Halifax, Lynchburg City, Nelson, Pittsylvania, Prince Edward	Danville and Lynchburg
6	Northern Virginia	Alexandria City, Arlington, Fairfax, Fairfax City, Falls Church, Loudoun, Manassas City, Manassas Park City, Prince William	
7	Richmond	Amelia, Brunswick, Charles City, Chesterfield, Colonial Heights City, Dinwiddie, Goochland, Hanover, Henrico, Hopewell City, Lunenburg, Mecklenburg, New Kent, Nottoway, Petersburg, Powhatan, Prince George, Richmond City	Colonial Heights, Hopewell, Petersburg and Richmond

District ID	District Name	Counties / Independent cities	Major Cities
8	Salem	Bedford, Bedford City, Botetourt, Carroll, Craig, Floyd, Franklin, Galax City, Giles, Henry, Martinsville, Montgomery, Patrick, Pulaski, Radford City, Roanoke, Roanoke City, Salem City	Galax, Martinsville, Radford, Roanoke and Salem
9	Staunton	Alleghany, Augusta, Bath, Buena Vista, Clarke, Covington City, Frederick, Harrisonburg, Highland, Lexington City, Page, Rockbridge, Rockingham, Shenandoah, Staunton City, Warren, Waynesboro, Winchester	Buena Vista, Covington, Harrisonburg, Lexington, Staunton, Waynesboro and Winchester

Source: VDOT



ADDITIONAL COMMODITY FLOW TABLES

Table A-2 through Table A-4 provides additional details on the commodities in Virginia by sales volumes, district, and industry.

Table A-2: Total Sales Volumes (2016 Millions of Dollars)

Commodity Group	Staunton	Bristol	Salem	Lynchburg	Fredericks- burg	Richmond	Hampton Roads	Culpeper	Northern Virginia
Stone, Clay, Glass, And Concrete Products	\$38	\$22	\$87	\$160	\$23	\$112	\$158	\$17	\$470
Coal Mining	\$0	\$257	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Petroleum Refining And Related Industries	\$0	\$48	\$48	\$0	\$12	\$47	\$139	\$0	\$74
Agricultural Production Crops	\$56	\$4	\$12	\$23	\$12	\$27	\$65	\$32	\$16
Food and Kindred Products	\$722	\$306	\$404	\$145	\$115	\$378	\$2,972	\$266	\$365
Mining and Quarrying of Nonmetallic Minerals, Except Fuels	\$21	\$22	\$26	\$21	\$1	\$11	\$13	\$4	\$27



Commodity Group	Staunton	Bristol	Salem	Lynchburg	Fredericks- burg	Richmond	Hampton Roads	Culpeper	Northern Virginia
Chemicals And Allied Products	\$1,777	\$68	\$242	\$89	\$23	\$834	\$295	\$19	\$79
Paper and Allied Products	\$290	\$21	\$193	\$226	\$7	\$11,844	\$291	\$3	\$8
Waste / Scrap	\$83	\$24	\$71	\$0	\$10	\$245	\$50	\$13	\$95

Source: InfoUSA



Table A-3: Top Products by Sales Volume

Commodity Group	Staunton	Bristol	Salem	Lynchburg	Fredericks- burg	Richmond	Hampton Roads	Culpeper	Northern Virginia
Stone, Clay, Glass, And Concrete Products	Cut Stone & Stone Products (Mfrs)	Minerals/ Earths-Ground Or Treated (Mfrs)	Glass-Manufacturers	Fiber Glass Fabricators (Mfrs)	Concrete Prods-Ex Block & Brick (Mfrs)	Granite Products-Manufacturers	Abrasive Products (Mfrs)	Minerals/ Earths-Ground Or Treated (Mfrs)	Concrete Prods-Ex Block & Brick (Mfrs)
Coal Mining		Coal Mining & Shipping							
Petroleum Refining And Related Industries		Oils- Petroleum-Manufacturers	Oils- Petroleum-Manufacturers		Oils- Petroleum-Manufacturers	Paving Materials-Manufacturers	Petroleum Products-Manufacturers		Petroleum Products-Manufacturers
Agricultural Production Crops	Apple Products	Farms	Farms	Farms	Farms	Farms	Farms	Farms	Farms
Food and Kindred Products	Poultry Processing Plants (Mfrs)	Bottlers (Mfrs)	Bottlers (Mfrs)	Bottlers (Mfrs)	Dog & Cat Food (Mfrs)	Shortening Tbl Oils Margarine Etc (Mfrs)	Brewers (Mfrs)	Bottlers (Mfrs)	Bottlers (Mfrs)
Mining and Quarrying of Nonmetallic Minerals, Except Fuels	Quarries	Quarries	Stone-Crushed	Mining Companies	Quarries	Construction-Sand & Gravel	Stone-Crushed	Construction-Sand & Gravel	Stone-Natural
Chemicals And Allied Products	Chemicals-Manufacturers	Fiber Glass Products-Manufacturers	Cyclic Organic Crudes/Dyes/ Pgmnts (Mfrs)	Resins-Manufacturers	Plastics-Manufacturers	Chemicals-Manufacturers	Chemicals-Manufacturers	Biological Products (Mfrs)	Drug Millers (Mfrs)



Commodity Group	Staunton	Bristol	Salem	Lynchburg	Fredericksburg	Richmond	Hampton Roads	Culpeper	Northern Virginia
Paper and Allied Products	Corrugated & Solid Fiber Boxes (Mfrs)	Packaging Materials-Manufacturers	Paper-Manufacturers	Paper-Manufacturers	Corrugated & Solid Fiber Boxes (Mfrs)	Boxes-Paper (Mfrs)	Paper-Manufacturers	Converted Paper/Paperbrd Prod Nec (Mfrs)	Boxes-Paper (Mfrs)
Waste / Scrap	Waste Rdctn Dpsl/Recycle Svc-Ind (Whls)	Scrap Metals & Iron (Whls)	Waste Rdctn Dpsl/Recycle Svc-Ind (Whls)		Waste Rdctn Dpsl/Recycle Svc-Ind (Whls)	Waste Rdctn Dpsl/Recycle Svc-Ind (Whls)	Waste Disposal	Scrap Metals & Iron (Whls)	Scrap Metals & Iron (Whls)

Source: InfoUSA



Table A-4: Top Business by District and Industry

Commodity Group	Staunton	Bristol	Salem	Lynchburg	Fredericksburg	Richmond	Hampton Roads	Culpeper	Northern Virginia
Stone, Clay, Glass, And Concrete Products	Carmeuse Lime & Stone	Limestone Dust Corp	Corning Inc	BGF Industries Inc	Oldcastle Precast	Luck Co	Hermes Abrasives LTD	Virginia Vermiculite LLC	Continental Building Prods Inc
Coal Mining		Greater Wise Inc							
Petroleum Refining And Related Industries		Mga	Cap Oil Change Systems		Wroten Oil Co	Trans Montaigne	C & M Industries Inc		Mobil Saudi Arabia Inc
Agricultural Production Crops	National Fruit Product Co Inc	Hawkins Farm	Bryant Orchards	Abraham Tillotson Farm	Westmoreland Berry Farm	Dodd's Acres Farm	Robert C Darby & Sons	Battlefield Farms Inc	Ayrshire Farm
Food and Kindred Products	George's Inc	Southwest Beverage Co	Pepsi Bottling Group	Coca-Cola Bottling Co Cons	Nestle Purina Pet Care Co	Bunge Oils	Anheuser-Busch Brewery	Pepsi Bottling Group	Pepsi Bottling Group
Mining and Quarrying of Nonmetallic Minerals, Except Fuels	Frazier Quarry Inc	Pounding Mill Quarry Corp	Rockydale Quarries Corp	Kyanite Mining Corp	Chesapeake Materials	Martin Marietta Aggregates	Skippers Quarry	Martin Marietta Aggregates	Lorton Contracting Co Inc
Chemicals And Allied Products	Ingevity	Strongwell Corp	Hutchens Petroleum Inc	Sartomer USA	Applied Rapid Technologies	Synalloy Corp	Advex	Indoor Biotechnologies Inc	Ascend Therapeutics



Commodity Group	Staunton	Bristol	Salem	Lynchburg	Fredericksburg	Richmond	Hampton Roads	Culpeper	Northern Virginia
Paper and Allied Products	Packaging Corp Of America	Scholle IPN Packaging Inc	Hollingsworth & Vose Co	International Paper Co	Hollinger Corp	West Rock Co	Yupo Corp America	Jake Alexander Wood Yard Inc	Conservation Resources Intl
Waste / Scrap	Republic Services	Wise Recycling LLC	Omni Source Corp		Doggett Disposal Systems Inc	Tidewater Fibre Corp	Waste Industries Inc	Wise Services	Milestone Metals Inc

Source: InfoUSA



DATA INTEGRATION METHODOLOGY

OUTBOUND AND INTRA FREIGHT FLOWS

To estimate the potential for Virginia businesses to shift the transportation of goods to customers from trucks to rail the freight flows in Transearch were allocated to the business locations previously outlined. For some of those businesses the tonnage produced or consumed by that business was known, for the majority only the sales volume of that business was known and for some only the location was known.

OUTBOUND AND INTRA MODAL FREIGHT FLOWS FOR KNOWN PRODUCTION OF FREIGHT ESTIMATES

If freight was known to be produced by a particular business, e.g. production of coal from a coal mine, then the ratio of modal freight flows, of the same industry, for the county the business is located in were used to estimate the modal freight flows leaving that business. **Table A-5** shows the estimated modal freight flows leaving coalmines in Virginia. As the coal production from the mines was greater than the estimated freight flow from the counties those mines were located in, according to Transearch, the excess production is assumed to be unsold (or used locally in a

Table A-5: Coal Mine Production

District	Production of Coal	Coal Tons Recorded by Transearch	Truck Tonnage Estimate	Rail Tonnage Estimate
Buchanan	7,223,564	5,847,450	2,676	5,844,774
Dickenson	3,738,135	1,874,789	111,893	1,762,896
Wise	2,774,644	2,774,644	122,454	2,652,190
Tazewell	1,324,602	1,188,940	86,056	1,102,884
Russell	445,844	11,631	11,631	0

Source: EIA and Transearch

OUTBOUND AND INTRA MODAL FREIGHT FLOWS FOR KNOWN SALES VOLUME ESTIMATES

Once modal freight flows for known production had been determined, modal freight flows estimated from sales volume were then estimated. The InfoUSA database included the sales volume of individual businesses in Virginia, as well as the SIC codes of what was produced by those businesses. The central assumption made in this part of the analysis was the assumed

tendency of businesses to send goods by truck or by rail based on their distance from a rail line or a rail spur. It was assumed that businesses on a rail line or rail spur would only use rail, businesses a certain distance from a rail line or rail spur would only use truck and any business in between the two would use both.

The distance used for this task was based on the industry of the firm and the industry distances are chosen to minimize unallocated freight as shown in **Table A-6**. Business labeled as "Headquarters" in the InfoUSA database were removed as they potentially had sales attributed to them, which had nothing to do with the production of good.

Table A-6: Zone Distances

Industry	Rail Only Distance (Miles)	Mixed Truck/Rail Distance (Miles)	Truck Only Distance (Miles)
Agriculture, Forestry, And Fishing	0 to 0.3	0.3	5
Mining	0 to 0.1	0.1	10
Manufacturing	Not used	0	10
Waste / Scrap	0 to 0.3	0.3	5
Other	0 to 0.175	0.175	7.5

Freight outbound from the county was then aggregated at the 2-digit SIC code level and then allocated to InfoUSA businesses based on the mode group of the business, its 2 digit SIC code level production and its sales volume as shown in **Table A-7**. For example:

- Let's assume \$100 of sales volume was recorded in the InfoUSA database for manufacturing businesses in the county and Transearch recorded 50 tons of manufacturing freight leaving the county by rail. Then a manufacturing business with a sales volume of \$10, if it was in the Rail only mode group, would be assumed to be shipping five tons of freight by rail.

Table A-7: Commodity Group Outbound and Intra Allocated Freight Flows by Mode, 2012

Commodity Group	Rail Tonnage	Truck Tonnage
Paper and Allied Products	830,162	11,290,874
Food and Kindred Products	1,605,297	35,217,912
Chemicals And Allied Products	1,840,847	15,346,452
Stone, Clay, Glass, And Concrete Products	195,942	7,732,896
Petroleum Refining And Related Industries	230,058	4,352,522
Mining and Quarrying of Nonmetallic Minerals	13,045,386	36,357,430
Agricultural Production Crops	97,432	11,259,287
Coal Mining	11,362,744	5,150,502
Waste / Scrap	159,112	4,566,930

Source: HDR Analysis of Transearch and InfoUSA Databases

OUTBOUND AND INTRA MODAL FREIGHT FLOW ESTIMATES FOR UNALLOCATED TRANSEARCH FREIGHT

Freight, which could not be allocated to those firms, which were Rail or Truck only, was allocated to firms in the Truck/Rail Mix group, if there were firms of the same industry in the county. Unallocated mining freight and unallocated waste freight was assumed to be coming from mines and waste collection sites, respectively.

INBOUND AND INTRA FREIGHT FLOWS

The analysis for the inbound/intra freight flows followed a similar three step process as the analysis of the outbound freight flows, however due to data constraints the last step primarily drove the analysis.

INBOUND AND INTRA MODAL FREIGHT FLOWS FOR KNOWN CONSUMPTION OF FREIGHT ESTIMATES

If freight was known to be destined for a particular business, e.g. consumption of coal by a coal power plant, then the ratio of modal freight flows, of the same industry, for the county the business is located in were used to estimate the modal freight flows leaving that business. For example, of the power plants, the Appalachian Power Co is the only one in Russell County, which consumed 384 thousand tons of coal in 2012. Transearch recorded 328 thousand tons of coal destined for the county in 2012, 59 percent by truck and 41 percent by rail as shown in **Table A-8**. As the coal consumption from the power plant was greater than the estimated freight flow all the Transearch freight flows were assumed to be destined for the power plant, with the modal ratios as described. The 55 thousand tons not found in the Transearch estimate was assumed to be from local sources that could not be switched from one mode to the other.

Table A-8: Coal-Fired Power Plants Modal Freight Flows

Name	Truck Tonnage Estimate	Rail Tonnage Estimate
Appalachian Power Co	192,521	136,102
Virginia Electric & Power Co	11,636	1,423,734
Virginia Electric & Power Co	0	1,392,332
Hopewell Operating Services LLC	0	154,672
Virginia Electric & Power Co	0	80,981
U S Army-Radford	204	41,444
Spruance Genco LLC	0	22,908
Birchwood Power Partners LP	0	160,335
Virginia Polytechnic Inst and State Univ	56	11,280
Virginia Electric & Power Co	48,109	0

Source: EIA

In addition Transearch freight flows exported out of Virginia were removed from the analysis. As would be expected, it is primarily the cities which make up the Hampton Roads area

(Chesapeake city, Norfolk city, Newport News, Portsmouth, Suffolk, Williamsburg, and Virginia Beach) through which the majority tonnage exported flows as shown in **Table A-9**.

Inbound/Intra Modal freight flows for known sales volume estimates and estimates for unallocated Transearch freight.

Table A-9: Tonnage of Exports by Exit County

County	Truck Tonnage	Rail Tonnage
Alexandria city, VA	7	0
Chesapeake city, VA	1,210,412	1,272,994
Chesterfield County, VA	372,542	0
Loudoun County, VA	57,685	0
Newport News city, VA	109,370	16,903
Norfolk city, VA	4,948,779	469,664
Portsmouth city, VA	2,503,998	461,867
Richmond city, VA	3,085	12,200
Williamsburg city, VA	0	13,897
Hopewell city, VA	0	39,560
James City County, VA	0	5,947
King William County, VA	0	19,760
Franklin city, VA	0	911
Petersburg city, VA	0	4,078
York County, VA	0	6,414
Southampton County, VA	0	4,640
Suffolk city, VA	0	4,098
Virginia Beach city, VA	0	6,205

Source: Transearch

INBOUND AND INTRA MINING FREIGHT

The Mining Industry freight destined for each District, shown in **Table A-10**, once known freight flows have been removed. It was assumed that these freight flows were destined for the manufacturing companies in **Table A-11**. Its relative share of total county manufacturing sales volume determined the share of freight allocated to each company within a county.

Table A-10: Inbound Mining Freight by Destination District

Mining	Rail Tonnage	Truck Tonnage
Hampton Roads	52,839,821	12,610,761
Culpeper	107,527	2,889,709
Northern Virginia	2,017,178	15,918,059
Staunton	502,195	3,895,304
Richmond	815,047	7,195,338
Lynchburg	106,640	2,664,739
Salem	565,842	7,788,655
Bristol	8,040	4,934,052
Fredericksburg	133,920	5,142,126

Source: Transearch

Table A-11: Manufacturing Companies by District

District	Number of Manufacturing Companies	Average Tonnage Allocated to Each Business
Hampton Roads	93	703,770
Culpeper	18	166,513
Northern Virginia	71	252,609
Staunton	59	74,534
Richmond	62	129,200
Lynchburg	35	79,182
Salem	61	136,959
Bristol	19	260,110
Fredericksburg	47	112,256

Source: InfoUSA

INBOUND AND INTRA WASTE/SCRAP FREIGHT

The Waste/Scrap Industry freight destined for each District, shown in **Table A-12**, once known freight flows have been removed. It was assumed that these freight flows were destined for the Waste/Scrap companies in **Table A-13**. Total county Waste/ Scrap sales volume determined the share of freight allocated to each company within a county. For Waste/Scrap freight which could not be allocated to location with a known sales volume, the freight was allocated equally to remaining Waste/Scrap locations in the county.

Table A-12: Inbound and Intra Waste/Scrap Freight by Destination District

Mining	Rail Tonnage	Truck Tonnage
Hampton Roads	1,024,884	617,392
Culpeper	0	202,949
Northern Virginia	0	141,586
Staunton	0	232,996
Richmond	429,164	4,546,732
Lynchburg	59,240	1,407,437
Salem	384,400	647,082
Bristol	0	114,456
Fredericksburg	568,848	785,730

Source: Transearch

Table A-13: Waste/Scrap Companies by District

District	Number of Waste Collection Sites	Average Tonnage Allocated to Each Site
Hampton Roads	6	273,713
Culpeper	2	101,475
Northern Virginia	15	9,439
Staunton	6	38,833
Richmond	10	497,590
Lynchburg	0	0
Salem	7	147,355
Bristol	4	28,614
Fredericksburg	4	338,645

Source: InfoUSA

ADDITIONAL ECONOMIC IMPACT TABLES

The results presented in **Table A-14 through Table A-31** are in millions of 2016 dollars. Employment is rounded to the nearest 10 job-years. Totals may not sum up due to rounding. Results were generated using IMPLAN.

Table A-14: Bristol, Transport Service Impacts

Measure and Type	Passenger	Freight	Services Total
EMPLOYMENT			
Direct	0	1,032	1,032
Indirect	0	786	786
Induced	0	829	829
Total	0	2,647	2,647
INCOME			
Direct	\$0.0	\$95.8	\$95.8
Indirect	\$0.0	\$56.5	\$56.5
Induced	\$0.0	\$37.8	\$37.8
Total	\$0.0	\$190.1	\$190.1
VALUE ADDED			
Direct	\$0.0	\$165.5	\$165.5
Indirect	\$0.0	\$81.5	\$81.5
Induced	\$0.0	\$69.5	\$69.5
Total	\$0.0	\$316.5	\$316.5
OUTPUT			
Direct	\$0.0	\$361.4	\$361.4
Indirect	\$0.0	\$144.9	\$144.9
Induced	\$0.0	\$118.2	\$118.2
Total	\$0.0	\$624.5	\$624.5
TAX REVENUE			
Direct	\$0.0	\$3.2	\$3.2
Indirect	\$0.0	\$5.2	\$5.2
Induced	\$0.0	\$6.1	\$6.1

Measure and Type	Passenger	Freight	Services Total
Total	\$0.0	\$14.5	\$14.5

Table A-15: Bristol, Transport User Impacts

Measure and Type	Passenger	Freight			Users Total
		Outbound/Intra	Inbound	Subtotal	
EMPLOYMENT					
Direct	0	5,918	1,729	7,647	7,647
Indirect	0	2,786	846	3,632	3,632
Induced	0	2,952	843	3,795	3,795
Total	0	11,656	3,417	15,073	15,073
INCOME					
Direct	\$0.0	\$350.1	\$97.7	\$447.8	\$447.8
Indirect	\$0.0	\$194.6	\$57.5	\$252.1	\$252.1
Induced	\$0.0	\$134.5	\$38.4	\$172.9	\$172.9
Total	\$0.0	\$679.2	\$193.6	\$872.8	\$872.8
VALUE ADDED					
Direct	\$0.0	\$476.2	\$136.2	\$612.4	\$612.4
Indirect	\$0.0	\$294.8	\$87.1	\$381.9	\$381.9
Induced	\$0.0	\$247.2	\$70.6	\$317.8	\$317.8
Total	\$0.0	\$1,018.3	\$293.8	\$1,312.1	\$1,312.1
OUTPUT					
Direct	\$0.0	\$1,529.9	\$445.0	\$1,974.8	\$1,974.8
Indirect	\$0.0	\$538.4	\$157.0	\$695.4	\$695.4
Induced	\$0.0	\$420.4	\$120.0	\$540.4	\$540.4
Total	\$0.0	\$2,488.7	\$722.0	\$3,210.7	\$3,210.7
TAX REVENUE					
Direct	\$0.0	\$22.5	\$6.7	\$29.2	\$29.15
Indirect	\$0.0	\$21.9	\$6.0	\$27.9	\$27.93
Induced	\$0.0	\$21.8	\$6.2	\$28.0	\$28.02
Total	\$0.0	\$66.2	\$18.9	\$85.1	\$85.1

Table A-16: Culpeper Transport Service Impacts

Measure and Type	Passenger	Freight	Services Total
EMPLOYMENT			
Direct	92	346	439
Indirect	70	264	334
Induced	74	278	353
Total	237	889	1,125
INCOME			
Direct	\$8.6	\$32.2	\$40.7
Indirect	\$5.1	\$19.0	\$24.0
Induced	\$3.4	\$12.7	\$16.1
Total	\$17.0	\$63.8	\$80.8
VALUE ADDED			
Direct	\$14.8	\$55.6	\$70.4
Indirect	\$7.3	\$27.4	\$34.7
Induced	\$6.2	\$23.3	\$29.5
Total	\$28.3	\$106.3	\$134.6
OUTPUT			
Direct	\$32.3	\$121.3	\$153.7
Indirect	\$13.0	\$48.7	\$61.6
Induced	\$10.6	\$39.7	\$50.3
Total	\$55.9	\$209.7	\$265.6
TAX REVENUE			
Direct	\$0.3	\$1.1	\$1.4
Indirect	\$0.5	\$1.7	\$2.2
Induced	\$0.5	\$2.1	\$2.6
Total	\$1.3	\$4.9	\$6.2

Table A-17: Culpeper Transport User Impacts

Measure and Type	Passenger	Freight			Users Total
		Outbound/Intra	Inbound	Subtotal	
EMPLOYMENT					
Direct	44	64	397	462	506
Indirect	34	30	194	225	258
Induced	36	32	194	226	261
Total	113	127	785	912	1,025
INCOME					
Direct	\$4.1	\$3.8	\$22.5	\$26.3	\$30.4
Indirect	\$2.4	\$2.1	\$13.2	\$15.3	\$17.7
Induced	\$1.6	\$1.5	\$8.8	\$10.3	\$11.9
Total	\$8.1	\$7.4	\$44.5	\$51.9	\$60.0
VALUE ADDED					
Direct	\$7.1	\$5.2	\$31.3	\$36.5	\$43.6
Indirect	\$3.5	\$3.2	\$20.0	\$23.2	\$26.7
Induced	\$3.0	\$2.7	\$16.2	\$18.9	\$21.9
Total	\$13.6	\$11.1	\$67.5	\$78.6	\$92.1
OUTPUT					
Direct	\$15.5	\$16.6	\$102.2	\$118.8	\$134.3
Indirect	\$6.2	\$5.8	\$36.1	\$41.9	\$48.1
Induced	\$5.1	\$4.6	\$27.6	\$32.1	\$37.2
Total	\$26.8	\$27.0	\$165.9	\$192.9	\$219.7
TAX REVENUE					
Direct	\$0.1	\$0.2	\$1.5	\$1.8	\$1.92
Indirect	\$0.2	\$0.2	\$1.4	\$1.6	\$1.83
Induced	\$0.3	\$0.2	\$1.4	\$1.7	\$1.93
Total	\$0.6	\$0.7	\$4.3	\$5.1	\$5.7

Table A-18: Fredericksburg Transport Service Impacts

Measure and Type	Passenger	Freight	Services Total
EMPLOYMENT			
Direct	75	140	215
Indirect	57	107	164
Induced	60	113	173
Total	192	360	552
INCOME			
Direct	\$7.0	\$13.0	\$20.0
Indirect	\$4.1	\$7.7	\$11.8
Induced	\$2.7	\$5.1	\$7.9
Total	\$13.8	\$25.9	\$39.7
VALUE ADDED			
Direct	\$12.0	\$22.5	\$34.5
Indirect	\$5.9	\$11.1	\$17.0
Induced	\$5.1	\$9.4	\$14.5
Total	\$23.0	\$43.0	\$66.1
OUTPUT			
Direct	\$26.3	\$49.1	\$75.4
Indirect	\$10.5	\$19.7	\$30.2
Induced	\$8.6	\$16.1	\$24.7
Total	\$45.4	\$84.9	\$130.3
TAX REVENUE			
Direct	\$0.2	\$0.4	\$0.7
Indirect	\$0.4	\$0.7	\$1.1
Induced	\$0.4	\$0.8	\$1.3
Total	\$1.1	\$2.0	\$3.0

Table A-19: Fredericksburg Transport User Impacts

Measure and Type	Passenger	Freight			Users Total
		Outbound/Intra	Inbound	Subtotal	
EMPLOYMENT					
Direct	36	1,303	3,391	4,695	4,731
Indirect	27	614	1,659	2,272	2,300
Induced	29	650	1,652	2,303	2,331
Total	92	2,567	6,702	9,270	9,362
INCOME					
Direct	\$3.3	\$77.1	\$191.7	\$268.8	\$272.1
Indirect	\$2.0	\$42.9	\$112.7	\$155.6	\$157.6
Induced	\$1.3	\$29.6	\$75.3	\$104.9	\$106.2
Total	\$6.6	\$149.6	\$379.7	\$529.3	\$535.9
VALUE ADDED					
Direct	\$5.8	\$104.9	\$267.1	\$372.0	\$377.8
Indirect	\$2.8	\$64.9	\$170.8	\$235.7	\$238.5
Induced	\$2.4	\$54.5	\$138.4	\$192.9	\$195.3
Total	\$11.0	\$224.3	\$576.3	\$800.6	\$811.6
OUTPUT					
Direct	\$12.6	\$336.9	\$872.7	\$1,209.6	\$1,222.2
Indirect	\$5.0	\$118.6	\$307.9	\$426.5	\$431.6
Induced	\$4.1	\$92.6	\$235.4	\$328.0	\$332.1
Total	\$21.7	\$548.1	\$1,416.0	\$1,964.1	\$1,985.9
TAX REVENUE					
Direct	\$0.1	\$4.9	\$13.1	\$18.1	\$18.19
Indirect	\$0.2	\$4.8	\$11.7	\$16.6	\$16.75
Induced	\$0.2	\$4.8	\$12.2	\$17.0	\$17.21
Total	\$0.5	\$14.6	\$37.1	\$51.7	\$52.2

Table A-20: Hampton Roads Transport Service Impacts

Measure and Type	Passenger	Freight	Services Total
EMPLOYMENT			
Direct	90	868	958
Indirect	68	661	729
Induced	72	697	769
Total	230	2,226	2,456
INCOME			
Direct	\$8.3	\$80.6	\$88.9
Indirect	\$4.9	\$47.5	\$52.4
Induced	\$3.3	\$31.8	\$35.1
Total	\$16.5	\$159.9	\$176.4
VALUE ADDED			
Direct	\$14.4	\$139.2	\$153.6
Indirect	\$7.1	\$68.6	\$75.7
Induced	\$6.0	\$58.4	\$64.5
Total	\$27.5	\$266.2	\$293.7
OUTPUT			
Direct	\$31.4	\$304.0	\$335.3
Indirect	\$12.6	\$121.9	\$134.5
Induced	\$10.3	\$99.4	\$109.7
Total	\$54.2	\$525.3	\$579.5
TAX REVENUE			
Direct	\$0.3	\$2.7	\$3.0
Indirect	\$0.4	\$4.3	\$4.8
Induced	\$0.5	\$5.1	\$5.7
Total	\$1.3	\$12.2	\$13.5

Table A-21: Hampton Roads Transport User Impacts

Measure and Type	Passenger	Freight			Users Total
		Outbound/Intra	Inbound	Subtotal	
EMPLOYMENT					
Direct	43	41,916	64,441	106,358	106,400
Indirect	33	19,736	31,517	51,253	51,285
Induced	34	20,910	31,397	52,308	52,342
Total	110	82,563	127,356	209,918	210,028
INCOME**					
Direct	\$4.0	\$2,480.0	\$3,642.2	\$6,122.2	\$6,126.2
Indirect	\$2.3	\$1,378.3	\$2,142.3	\$3,520.6	\$3,523.0
Induced	\$1.6	\$952.6	\$1,430.8	\$2,383.5	\$2,385.0
Total	\$7.9	\$4,810.9	\$7,215.3	\$12,026.2	\$12,034.2
VALUE ADDED					
Direct	\$6.9	\$3,373.3	\$5,075.9	\$8,449.2	\$8,456.1
Indirect	\$3.4	\$2,088.4	\$3,244.6	\$5,333.0	\$5,336.3
Induced	\$2.9	\$1,751.2	\$2,630.0	\$4,381.2	\$4,384.1
Total	\$13.2	\$7,212.9	\$10,950.4	\$18,163.3	\$18,176.5
OUTPUT					
Direct	\$15.0	\$10,836.5	\$16,582.4	\$27,418.9	\$27,433.9
Indirect	\$6.0	\$3,813.9	\$5,851.2	\$9,665.0	\$9,671.1
Induced	\$4.9	\$2,977.8	\$4,472.5	\$7,450.3	\$7,455.2
Total	\$26.0	\$17,628.2	\$26,906.1	\$44,534.2	\$44,560.2
TAX REVENUE					
Direct	\$0.1	\$159.1	\$249.6	\$408.7	\$408.81
Indirect	\$0.2	\$155.4	\$223.1	\$378.5	\$378.71
Induced	\$0.3	\$154.4	\$231.8	\$386.2	\$386.46
Total	\$0.6	\$468.9	\$704.5	\$1,173.4	\$1,174.0

Table A-22: Lynchburg Transport Service Impacts

Measure and Type	Passenger	Freight	Services Total
EMPLOYMENT			
Direct	49	818	867
Indirect	37	623	660
Induced	39	658	697
Total	125	2,099	2,224
INCOME			
Direct	\$4.5	\$76.0	\$80.5
Indirect	\$2.7	\$44.8	\$47.5
Induced	\$1.8	\$30.0	\$31.8
Total	\$9.0	\$150.8	\$159.8
VALUE ADDED			
Direct	\$7.8	\$131.3	\$139.1
Indirect	\$3.8	\$64.7	\$68.5
Induced	\$3.3	\$55.1	\$58.4
Total	\$14.9	\$251.0	\$266.0
OUTPUT			
Direct	\$17.1	\$286.6	\$303.6
Indirect	\$6.8	\$114.9	\$121.8
Induced	\$5.6	\$93.7	\$99.3
Total	\$29.5	\$495.2	\$524.7
TAX REVENUE			
Direct	\$0.2	\$2.5	\$2.7
Indirect	\$0.2	\$4.1	\$4.3
Induced	\$0.3	\$4.9	\$5.1
Total	\$0.7	\$11.5	\$12.2

Table A-23: Lynchburg Transport User Impacts

Measure and Type	Passenger	Freight			Users Total
		Outbound/Intra	Inbound	Subtotal	
EMPLOYMENT					
Direct	23	742	4,462	5,204	5,227
Indirect	18	349	2,182	2,531	2,549
Induced	19	370	2,174	2,544	2,563
Total	60	1,461	8,818	10,279	10,339
INCOME					
Direct	\$2.2	\$43.9	\$252.2	\$296.1	\$298.2
Indirect	\$1.3	\$24.4	\$148.3	\$172.7	\$174.0
Induced	\$0.9	\$16.9	\$99.1	\$115.9	\$116.8
Total	\$4.3	\$85.2	\$499.6	\$584.7	\$589.0
VALUE ADDED					
Direct	\$3.7	\$59.7	\$351.4	\$411.1	\$414.9
Indirect	\$1.8	\$37.0	\$224.6	\$261.6	\$263.5
Induced	\$1.6	\$31.0	\$182.1	\$213.1	\$214.7
Total	\$7.2	\$127.7	\$758.2	\$885.9	\$893.0
OUTPUT					
Direct	\$8.2	\$191.8	\$1,148.1	\$1,339.9	\$1,348.1
Indirect	\$3.3	\$67.5	\$405.1	\$472.6	\$475.9
Induced	\$2.7	\$52.7	\$309.7	\$362.4	\$365.0
Total	\$14.1	\$312.0	\$1,862.9	\$2,174.9	\$2,189.1
TAX REVENUE					
Direct	\$0.1	\$2.8	\$17.3	\$20.1	\$20.17
Indirect	\$0.1	\$2.8	\$15.4	\$18.2	\$18.31
Induced	\$0.1	\$2.7	\$16.0	\$18.8	\$18.92
Total	\$0.3	\$8.3	\$48.8	\$57.1	\$57.4

Table A-24: Northern Virginia Transport Service Impacts

Measure and Type	Passenger	Freight	Services Total
EMPLOYMENT			
Direct	334	149	483
Indirect	254	113	368
Induced	269	120	388
Total	857	382	1,239
INCOME			
Direct	\$31.0	\$13.8	\$44.9
Indirect	\$18.3	\$8.2	\$26.5
Induced	\$12.2	\$5.5	\$17.7
Total	\$61.6	\$27.5	\$89.0
VALUE ADDED			
Direct	\$53.6	\$23.9	\$77.5
Indirect	\$26.4	\$11.8	\$38.2
Induced	\$22.5	\$10.0	\$32.5
Total	\$102.5	\$45.7	\$148.2
OUTPUT			
Direct	\$117.0	\$52.2	\$169.2
Indirect	\$46.9	\$20.9	\$67.9
Induced	\$38.3	\$17.1	\$55.3
Total	\$202.3	\$90.2	\$292.4
TAX REVENUE			
Direct	\$1.0	\$0.5	\$1.5
Indirect	\$1.7	\$0.7	\$2.4
Induced	\$2.0	\$0.9	\$2.9
Total	\$4.7	\$2.1	\$6.8

Table A-25: Northern Virginia Transport User Impacts

Measure and Type	Passenger	Freight			Users Total
		Outbound/Intra	Inbound	Subtotal	
EMPLOYMENT					
Direct	160	61	1,943	2,004	2,164
Indirect	122	29	950	979	1,101
Induced	129	30	947	977	1,106
Total	411	120	3,840	3,960	4,371
INCOME					
Direct	\$14.9	\$3.6	\$109.8	\$113.4	\$128.3
Indirect	\$8.8	\$2.0	\$64.6	\$66.6	\$75.4
Induced	\$5.9	\$1.4	\$43.1	\$44.5	\$50.4
Total	\$29.5	\$7.0	\$217.6	\$224.6	\$254.0
VALUE ADDED					
Direct	\$25.7	\$4.9	\$153.0	\$158.0	\$183.6
Indirect	\$12.6	\$3.0	\$97.8	\$100.9	\$113.5
Induced	\$10.8	\$2.5	\$79.3	\$81.8	\$92.6
Total	\$49.1	\$10.5	\$330.2	\$340.7	\$389.8
OUTPUT					
Direct	\$56.1	\$15.8	\$500.0	\$515.8	\$571.8
Indirect	\$22.5	\$5.5	\$176.4	\$182.0	\$204.5
Induced	\$18.3	\$4.3	\$134.9	\$139.2	\$157.5
Total	\$96.9	\$25.6	\$811.3	\$836.9	\$933.8
TAX REVENUE					
Direct	\$0.5	\$0.2	\$7.5	\$7.8	\$8.26
Indirect	\$0.8	\$0.2	\$6.7	\$7.0	\$7.75
Induced	\$0.9	\$0.2	\$7.0	\$7.2	\$8.16
Total	\$2.2	\$0.7	\$21.2	\$21.9	\$24.2

Table A-26: Richmond Transport Service Impacts

Measure and Type	Passenger	Freight	Services Total
EMPLOYMENT			
Direct	269	964	1,233
Indirect	205	734	938
Induced	216	774	990
Total	690	2,472	3,161
INCOME			
Direct	\$25.0	\$89.5	\$114.5
Indirect	\$14.7	\$52.8	\$67.5
Induced	\$9.9	\$35.3	\$45.2
Total	\$49.6	\$177.5	\$227.1
VALUE ADDED			
Direct	\$43.1	\$154.6	\$197.7
Indirect	\$21.2	\$76.1	\$97.4
Induced	\$18.1	\$64.9	\$83.0
Total	\$82.5	\$295.6	\$378.1
OUTPUT			
Direct	\$94.2	\$337.5	\$431.7
Indirect	\$37.8	\$135.3	\$173.1
Induced	\$30.8	\$110.4	\$141.2
Total	\$162.8	\$583.2	\$745.9
TAX REVENUE			
Direct	\$0.8	\$3.0	\$3.8
Indirect	\$1.3	\$4.8	\$6.2
Induced	\$1.6	\$5.7	\$7.3
Total	\$3.8	\$13.5	\$17.3

Table A-27: Richmond Transport User Impacts

Measure and Type	Passenger	Freight			Users Total
		Outbound/Intra	Inbound	Subtotal	
EMPLOYMENT					
Direct	129	9,036	11,572	20,609	20,737
Indirect	98	4,255	5,660	9,914	10,012
Induced	103	4,508	5,638	10,146	10,250
Total	330	17,799	22,871	40,669	41,000
INCOME					
Direct	\$12.0	\$534.6	\$654.1	\$1,188.7	\$1,200.7
Indirect	\$7.1	\$297.1	\$384.7	\$681.8	\$688.9
Induced	\$4.7	\$205.4	\$257.0	\$462.3	\$467.0
Total	\$23.7	\$1,037.1	\$1,295.7	\$2,332.9	\$2,356.6
VALUE ADDED					
Direct	\$20.7	\$727.2	\$911.5	\$1,638.7	\$1,659.4
Indirect	\$10.2	\$450.2	\$582.7	\$1,032.9	\$1,043.0
Induced	\$8.7	\$377.5	\$472.3	\$849.8	\$858.5
Total	\$39.5	\$1,554.9	\$1,966.5	\$3,521.4	\$3,560.9
OUTPUT					
Direct	\$45.1	\$2,336.1	\$2,977.9	\$5,314.0	\$5,359.1
Indirect	\$18.1	\$822.2	\$1,050.8	\$1,872.9	\$1,891.0
Induced	\$14.8	\$641.9	\$803.2	\$1,445.1	\$1,459.9
Total	\$78.0	\$3,800.2	\$4,831.8	\$8,632.0	\$8,710.0
TAX REVENUE					
Direct	\$0.4	\$34.3	\$44.8	\$79.1	\$79.52
Indirect	\$0.6	\$33.5	\$40.1	\$73.6	\$74.21
Induced	\$0.8	\$33.3	\$41.6	\$74.9	\$75.68
Total	\$1.8	\$101.1	\$126.5	\$227.6	\$229.4

Table A-28: Salem Transport Service Impacts

Measure and Type	Passenger	Freight	Services Total
EMPLOYMENT			
Direct	0	771	771
Indirect	0	587	587
Induced	0	620	620
Total	0	1,978	1,978
INCOME			
Direct	\$0.0	\$71.6	\$71.6
Indirect	\$0.0	\$42.2	\$42.2
Induced	\$0.0	\$28.3	\$28.3
Total	\$0.0	\$142.1	\$142.1
VALUE ADDED			
Direct	\$0.0	\$123.7	\$123.7
Indirect	\$0.0	\$60.9	\$60.9
Induced	\$0.0	\$51.9	\$51.9
Total	\$0.0	\$236.5	\$236.5
OUTPUT			
Direct	\$0.0	\$270.1	\$270.1
Indirect	\$0.0	\$108.3	\$108.3
Induced	\$0.0	\$88.3	\$88.3
Total	\$0.0	\$466.7	\$466.7
TAX REVENUE			
Direct	\$0.0	\$2.4	\$2.4
Indirect	\$0.0	\$3.9	\$3.9
Induced	\$0.0	\$4.6	\$4.6
Total	\$0.0	\$10.8	\$10.8

Table A-29: Salem Transport User Impacts

Measure and Type	Passenger	Freight			Users Total
		Outbound/Intra	Inbound	Subtotal	
EMPLOYMENT					
Direct	0	2,184	4,106	6,290	6,290
Indirect	0	1,028	2,008	3,036	3,036
Induced	0	1,090	2,000	3,090	3,090
Total	0	4,302	8,114	12,416	12,416
INCOME					
Direct	\$0.0	\$129.2	\$232.1	\$361.3	\$361.3
Indirect	\$0.0	\$71.8	\$136.5	\$208.3	\$208.3
Induced	\$0.0	\$49.6	\$91.2	\$140.8	\$140.8
Total	\$0.0	\$250.7	\$459.7	\$710.4	\$710.4
VALUE ADDED					
Direct	\$0.0	\$175.8	\$323.4	\$499.2	\$499.2
Indirect	\$0.0	\$108.8	\$206.7	\$315.5	\$315.5
Induced	\$0.0	\$91.3	\$167.6	\$258.8	\$258.8
Total	\$0.0	\$375.9	\$697.7	\$1,073.5	\$1,073.5
OUTPUT					
Direct	\$0.0	\$564.7	\$1,056.5	\$1,621.2	\$1,621.2
Indirect	\$0.0	\$198.7	\$372.8	\$571.5	\$571.5
Induced	\$0.0	\$155.2	\$285.0	\$440.1	\$440.1
Total	\$0.0	\$918.6	\$1,714.2	\$2,632.8	\$2,632.8
TAX REVENUE					
Direct	\$0.0	\$8.3	\$15.9	\$24.2	\$24.19
Indirect	\$0.0	\$8.1	\$14.2	\$22.3	\$22.31
Induced	\$0.0	\$8.0	\$14.8	\$22.8	\$22.81
Total	\$0.0	\$24.4	\$44.9	\$69.3	\$69.3

Table A-30: Staunton Transport Service Impacts

Measure and Type	Passenger	Freight	Services Total
EMPLOYMENT			
Direct	5	759	764
Indirect	4	578	582
Induced	4	610	614
Total	13	1,946	1,959
INCOME			
Direct	\$0.5	\$70.5	\$70.9
Indirect	\$0.3	\$41.5	\$41.8
Induced	\$0.2	\$27.8	\$28.0
Total	\$0.9	\$139.8	\$140.7
VALUE ADDED			
Direct	\$0.8	\$121.7	\$122.5
Indirect	\$0.4	\$59.9	\$60.3
Induced	\$0.3	\$51.1	\$51.4
Total	\$1.6	\$232.7	\$234.3
OUTPUT			
Direct	\$1.8	\$265.7	\$267.5
Indirect	\$0.7	\$106.6	\$107.3
Induced	\$0.6	\$86.9	\$87.5
Total	\$3.1	\$459.2	\$462.2
TAX REVENUE			
Direct	\$0.0	\$2.4	\$2.4
Indirect	\$0.0	\$3.8	\$3.8
Induced	\$0.0	\$4.5	\$4.5
Total	\$0.1	\$10.7	\$10.7

Table A-31: Staunton Transport User Impacts

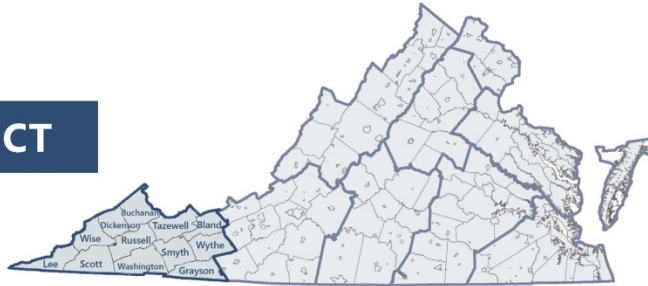
Measure and Type	Passenger	Freight			Users Total
		Outbound/Intra	Inbound	Subtotal	
EMPLOYMENT					
Direct	2	1,722	8,685	10,407	10,409
Indirect	2	811	4,247	5,058	5,060
Induced	2	859	4,231	5,091	5,093
Total	6	3,393	17,163	20,556	20,562
INCOME					
Direct	\$0.2	\$101.9	\$490.8	\$592.8	\$593.0
Indirect	\$0.1	\$56.6	\$288.7	\$345.3	\$345.5
Induced	\$0.1	\$39.1	\$192.8	\$232.0	\$232.1
Total	\$0.4	\$197.7	\$972.4	\$1,170.1	\$1,170.5
VALUE ADDED					
Direct	\$0.4	\$138.6	\$684.1	\$822.7	\$823.1
Indirect	\$0.2	\$85.8	\$437.3	\$523.1	\$523.3
Induced	\$0.2	\$72.0	\$354.4	\$426.4	\$426.6
Total	\$0.7	\$296.4	\$1,475.7	\$1,772.1	\$1,772.9
OUTPUT					
Direct	\$0.9	\$445.3	\$2,234.7	\$2,680.0	\$2,680.9
Indirect	\$0.3	\$156.7	\$788.5	\$945.3	\$945.6
Induced	\$0.3	\$122.4	\$602.7	\$725.1	\$725.4
Total	\$1.5	\$724.4	\$3,626.0	\$4,350.4	\$4,351.9
TAX REVENUE					
Direct	\$0.0	\$6.5	\$33.6	\$40.2	\$40.18
Indirect	\$0.0	\$6.4	\$30.1	\$36.4	\$36.46
Induced	\$0.0	\$6.3	\$31.2	\$37.6	\$37.60
Total	\$0.0	\$19.3	\$94.9	\$114.2	\$114.2

ECONOMIC ANALYSIS BY DISTRICT



BRISTOL DISTRICT

Population
352,369



Socioeconomics Breakdown and Business Facts

UNEMPLOYMENT RATE	6.8%	HOUSEHOLD MEDIAN INCOME	\$37,033
	↑ Highest: 10.8% Buchanan County ↓ Lowest: 4.5% Washington County		↑ Highest: \$45,294 Bland County ↓ Lowest: \$27,731 Norton City

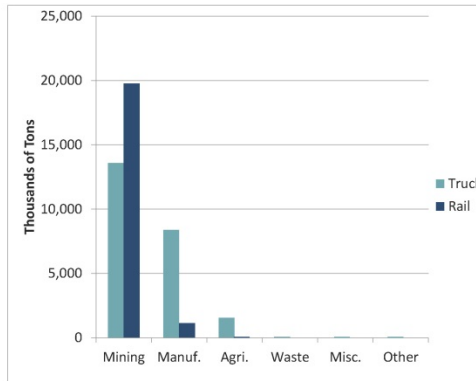
SALES	33% Coal Mining	3% Paper and Allied Products
	3% Mining and Quarrying of Nonmetallic Minerals, Except Fuels	3% Chemicals and Allied Products
	40% Food and Kindred Products	6% Petroleum Refining and Related Industries

EMPLOYMENT	47% Coal Mining	20% Paper and Allied Products
	14% Mining and Quarrying of Nonmetallic Minerals, Except Fuels	6% Chemicals and Allied Products
	7% Food and Kindred Products	1% Petroleum Refining and Related Industries

Source: Weldon Cooper Center for Public Service, U.S. Census Bureau, Bureau of Labor Statistics, and InfoUSA

Tonnage Facts (in Thousands of Tons)

Total Truck Tonnage: 23,582
Total Rail Tonnage: 20,893



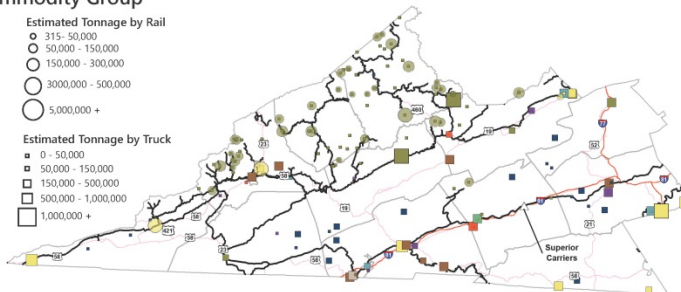
Outbound Tonnage by Commodity Group

- Commodity Group**
- Agricultural Production Crops
 - Food and Kindred Products
 - Stone, Clay, Glass and Concrete Products
 - Petroleum Refining and Related Industries
 - Chemicals and Allied Products
 - Paper and Allied Products
 - Mining and Quarrying of Nonmetallic Minerals, Except Fuels
 - Waste / Scrap

- Estimated Tonnage by Rail**
- 315 - 50,000
 - 50,000 - 150,000
 - 150,000 - 300,000
 - 300,000 - 500,000
 - 500,000 - 1,000,000
 - 1,000,000 +

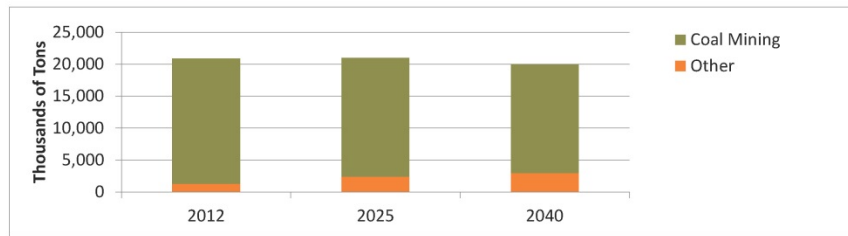
- Estimated Tonnage by Truck**
- 0 - 50,000
 - 50,000 - 150,000
 - 150,000 - 500,000
 - 500,000 - 1,000,000
 - 1,000,000 +

- ▲ Bulk Transload Facilities
 — Rail
 — Interstate Route
 — U.S. HWY Route
 — County Boundaries



Commodity Outlook





By Rail

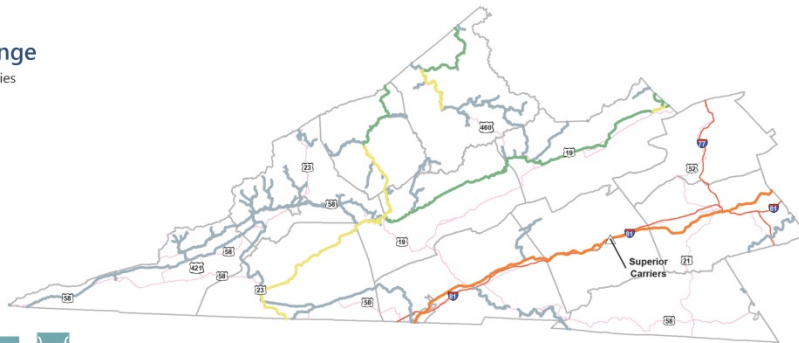


Rail Tonnage Change

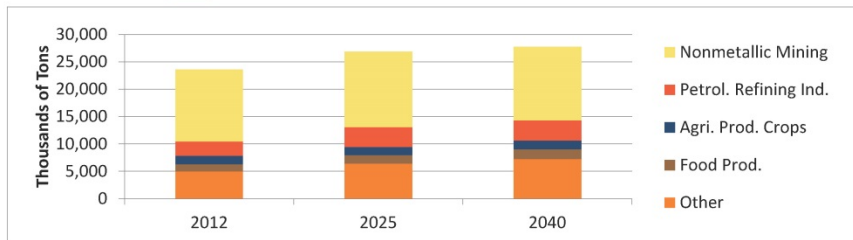
-  Bulk Transload Facilities
-  Interstate Route
-  U.S. HWY Route
-  County Boundaries

Rail Transport Tonnes Percent Change

-  -2.61 - 0.00
-  0.00 - 0.50
-  0.50 - 1.00
-  1.00 - 2.00



By Truck

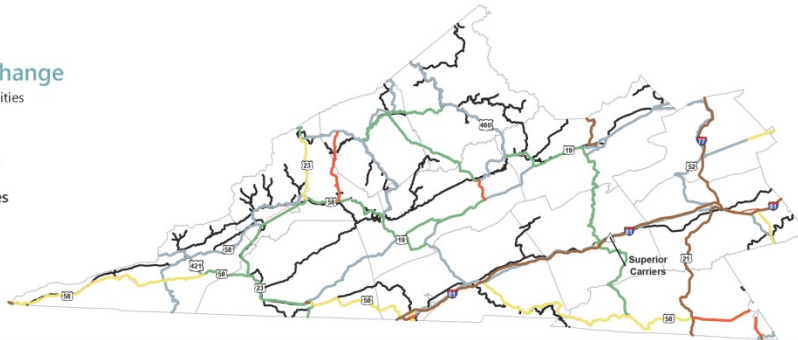


Truck Tonnage Change

-  Bulk Transload Facilities
-  Rail
-  Interstate Route
-  U.S. HWY Route
-  County Boundaries

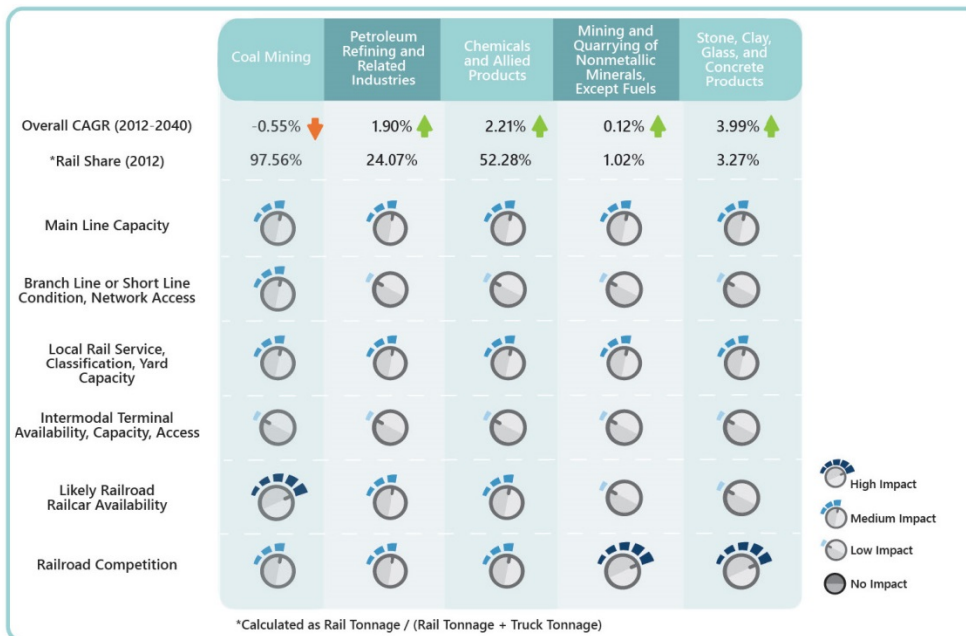
Truck Transport Tonnes Percent Change

-  -7.26 - 0.00
-  0.00 - 1.00
-  1.00 - 2.00
-  2.00 - 3.00
-  3.00 - 4.50



Market Outlook

- Develop new uses for underutilized coal rail lines
- Develop rail corridor preservation policies
- Identify new rail shippers based on possible diversion of appropriate commodities from truck to rail



Source: AASHTO

- The products with the largest contribution to Highway truck tonnages in 2012 are: Broken Stone or Riprap (11 million tons), Petroleum Refining Products (2.3 million tons) and Gravel/Sand (1.9 million tons).
- Truck freight tonnages (not including drayage) see an overall increase between 2012 and 2040 of 4.2 million tons leading to a Compound Annual Growth Rate (CAGR) of 0.6 percent.
- Coal mining dominates rail freight in the Bristol Planning District, accounting for 94 percent of rail freight tons and 45 percent of total freight tons movements either originating or destined for the district.
- Bristol Planning District is forecast to see a fall in rail Coal tonnage of 13 percent between 2012 and 2040. This is part of a state wide fall in Coal rail tonnage.
- Rail freight tonnages (not including drayage) see an overall decrease between 2012 and 2040 of 0.9 million tons leading to a CAGR of -0.2 percent.

Economic Profile of Freight and Passenger Activities

Benefit Categories	Freight		Passenger	
	Total Freight Service Benefits (\$M)	Freight Service Benefits per Thousand Ton Miles (\$/'000 Ton Miles)	Total Passenger Service Benefits (\$M)	Passenger Service Benefits per Thousand Passenger Miles (\$/'000 Passenger Miles)
User Cost Savings	\$344.8	\$65.2	\$0.0	\$0.0
Pavement Savings	\$9.3	\$1.8	\$0.0	\$0.0
Congestion Savings	\$19.1	\$3.6	\$0.0	\$0.0
Truck / Auto Emissions	\$12.0	\$2.3	\$0.0	\$0.0
Truck / Auto Crash Reduction	\$5.4	\$1.0	\$0.0	\$0.0
Total	\$390.6	\$73.9	\$0.0	\$0.0

*No Amtrak/VRE Services in Bristol

Network Facts

Bristol has

831 

total miles of rail and

1006 

total miles of highway

Major Highways and Interstates: US-58, US-23, US-19, US-52, US-421, I-81 and I-77

Railroad Systems: CSXT, DUMX, NS

Freight and Passenger Rail Economic Impacts



17,720 jobs. 11.3% of the 157,151 jobs district wide



\$1.1 billion earned by employees. 16.2% of the district's total labor income



\$1.6 billion of added value. 14.4% of the district's Gross Regional Product



\$3.8 billion of output. 15.8% of the district's total output



\$99.6 million of tax revenue. 10.2% of the district's total tax revenue

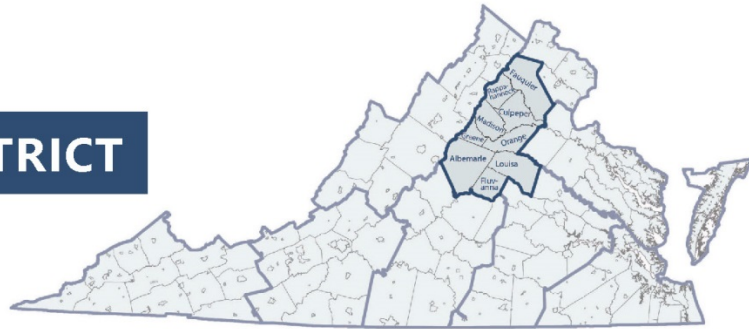
Freight-users generate the most significant impact.



STATEWIDE RAIL PLAN

CULPEPER DISTRICT

Population
406,760



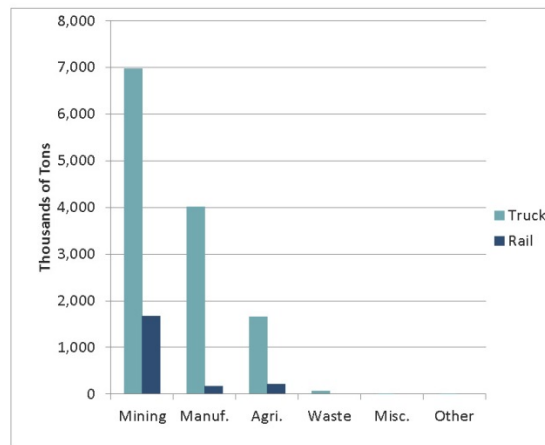
Socioeconomics Breakdown and Business Facts

Tonnage Facts (in Thousands of Tons)

UNEMPLOYMENT RATE	3.5%	HOUSEHOLD MEDIAN INCOME	\$66,916
	↑ Highest: 4.0% Orange County ↓ Lowest: 3.1% Madison County		↑ Highest: \$91,609 Fauquier County ↓ Lowest: \$47,736 Madison County

Total Truck Tonnage: 12,693
Total Rail Tonnage: 2,041

SALES	75% Food and Kindred Products	5% Stone, Clay, Glass, and Concrete Products
	9% Agricultural Production Crops	4% Waste / Scrap
	5% Chemicals and Allied Products	1% Mining and Quarrying of Nonmetallic Minerals, Except Fuels

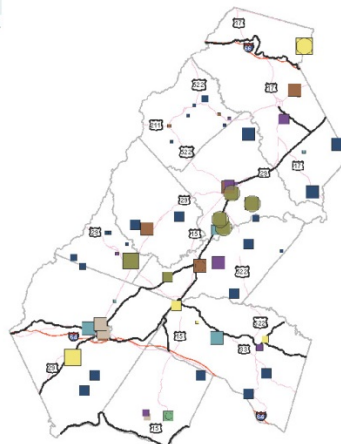


EMPLOYMENT	18% Food and Kindred Products	8% Stone, Clay, Glass, and Concrete Products
	60% Agricultural Production Crops	3% Waste / Scrap
	5% Chemicals and Allied Products	4% Mining and Quarrying of Nonmetallic Minerals, Except Fuels

Source: Weldon Cooper Center for Public Service, U.S. Census Bureau, Bureau of Labor Statistics, and InfoUSA

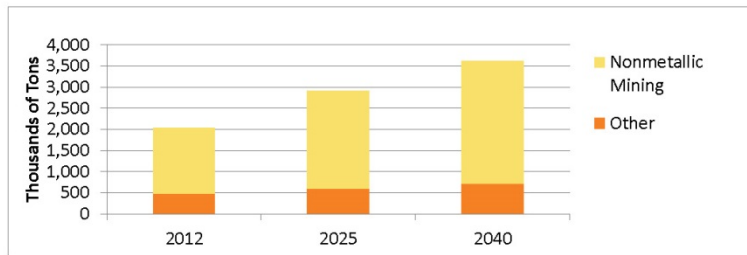
Outbound Tonnage by Commodity Group

Commodity Group	Estimated Tonnage by Rail	Estimated Tonnage by Truck
■ Agricultural Production Crops	○ 1,010 - 1,500	■ 2,013 - 15,000
■ Food and Kindred Products	○ 1,500 - 3,000	■ 15,000 - 30,000
■ Stone, Clay, Glass and Concrete Products	○ 3,000 - 10,000	■ 30,000 - 100,000
■ Petroleum Refining and Related Industries	○ 10,000 - 50,000	■ 100,000 - 500,000
■ Chemicals and Allied Products	○ 50,000 +	■ 500,000 +
■ Paper and Allied Products		
■ Coal Mining		
■ Mining and Quarrying of Nonmetallic Minerals, Except Fuels		
■ Waste / Scrap		



Commodity Outlook

By Rail

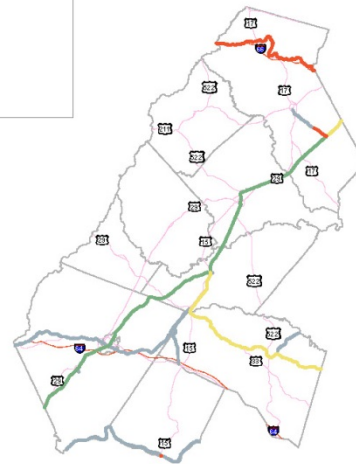


Rail Tonnage Change

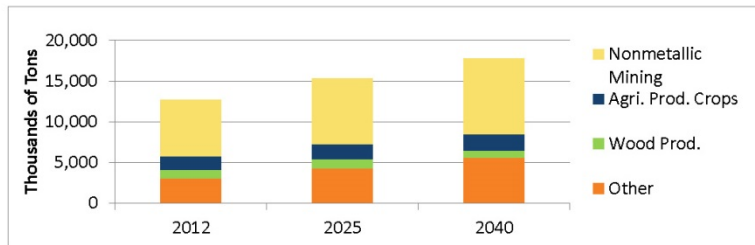
 Interstate Route
 U.S. HWY Route
 County Boundaries

Rail Transport Tonnages Percent Change

 -0.43 - 0.00
 0.00 - 1.50
 1.50 - 2.00
 2.00 - 2.68







By Truck

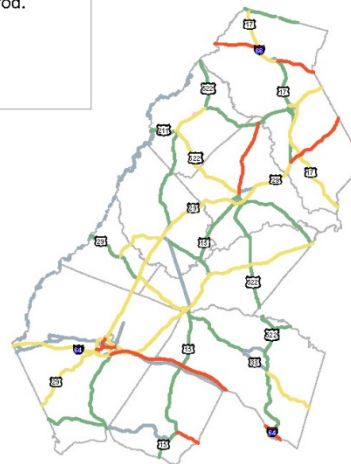


Truck Tonnage Change

 Interstate Route
 U.S. HWY Route
 County Boundaries

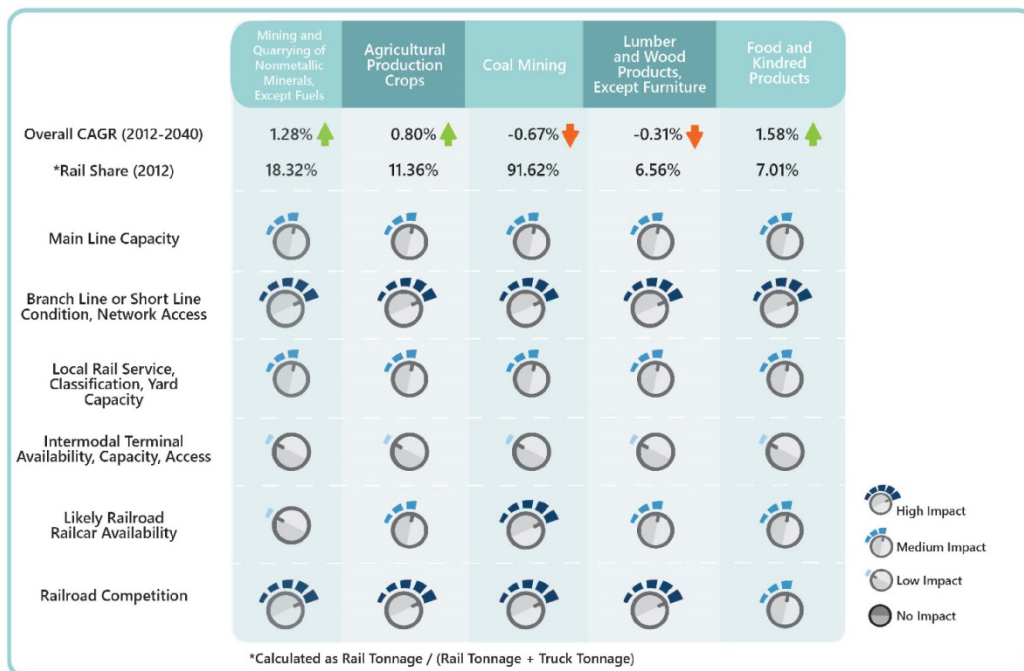
Truck Transport Tonnages Percent Change

 -0.519000 - 0.000000
 0.000001 - 1.500000
 1.500001 - 2.000000
 2.000001 - 3.440000



Market Outlook

- Develop rail capacity improvements to enhance freight mobility on principal rail lines
- Identify new rail shippers based on possible diversion of appropriate commodities from truck to rail



Source: AASHTO

- The products with the largest contribution to Highway truck tonnages in 2012 are: Broken Stone or Riprap (6.2 million tons), Misc. Field Crops (1 million tons) and Gravel/Sand (0.7 million tons).
- Truck freight tonnages (not counting drayage) see an overall increase between 2012 and 2040 of 5.1 million tons leading to a Compound Annual Growth Rate (CAGR) of 1.2 percent.
- Mining and Quarrying of Nonmetallic Minerals dominates rail freight in the Culpeper Planning District, accounting for over 55 percent of total freight tons movements either originating or destined for the district.
- Coal Mining only accounts for 5 percent of total freight rail tons movements in 2012. The share is projected to decrease to approximately 16 percent by 2040.
- Culpeper Planning District is forecast to see an increase in rail Mining and Quarrying of Nonmetallic Minerals tonnage of 85 percent between 2012 and 2040, with a CAGR of 2.2 percent.
- Rail freight tonnages see an overall increase between 2012 and 2040 of 1.6 million tons leading to a CAGR of 2.1 percent.

Economic Profile of Freight and Passenger Activities

Benefit Categories	Freight		Passenger	
	Total Freight Service Benefits (\$M)	Freight Service Benefits per Thousand Ton Miles (\$/'000 Ton Miles)	Total Passenger Service Benefits (\$M)	Passenger Service Benefits per Thousand Passenger Miles (\$/'000 Passenger Miles)
User Cost Savings	\$113.7	\$65.2	\$6.1	\$232.9
Pavement Savings	\$7.8	\$4.5	\$0.0	\$1.2
Congestion Savings	\$15.9	\$9.1	\$3.9	\$147.9
Truck / Auto Emissions	\$10.0	\$5.7	\$0.3	\$9.7
Truck / Auto Crash Reduction	\$4.5	\$2.6	\$1.8	\$68.9
Total	\$151.9	\$87.1	\$12.1	\$460.5

Network Facts

Culpeper has

279 

total miles of rail and

796 

total miles of highway

Major Highways

and Interstates: US-29, US-15, US-33, US-522, US-211, US-17, I-66 and I-64

Railroad Systems: BB, CSXT, NS, PVTX

Freight and Passenger Rail Economic Impacts



2,151 jobs. 0.9% of the 249,313 jobs district wide



\$140.9 million earned by employees. 1.2% of the district's total labor income



\$226.7 million of added value. 1.1% of the district's Gross Regional Product



\$485.2 million of output. 1.4% of the district's total output



\$11.8 million of tax revenue. 0.9% of the district's total tax revenue

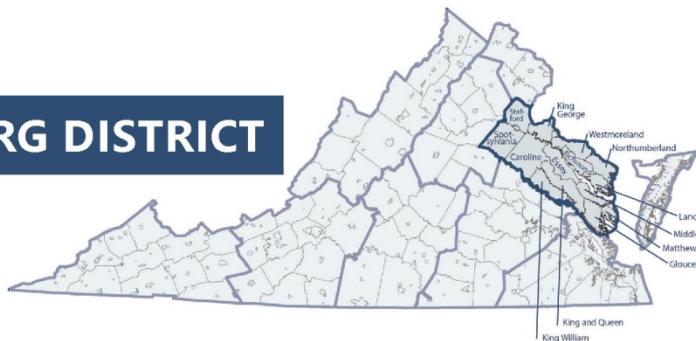
Freight-users generate the most significant impact.



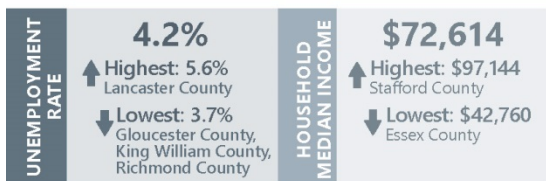
STATEWIDE RAIL PLAN

FREDERICKSBURG DISTRICT

Population
494,045



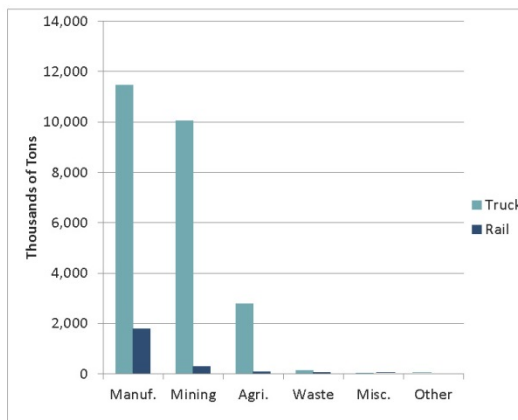
Socioeconomics Breakdown and Business Facts



Source: Weldon Cooper Center for Public Service, U.S. Census Bureau, Bureau of Labor Statistics, and InfoUSA

Tonnage Facts (in Thousands of Tons)

Total Truck Tonnage: 24,456
Total Rail Tonnage: 2,210



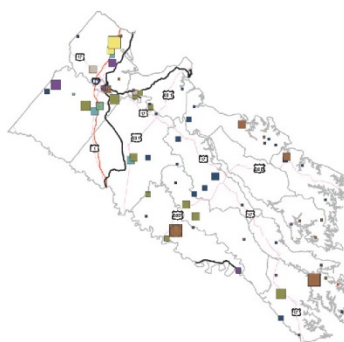
Outbound Tonnage by Commodity Group

- Commodity Group**
- Agricultural Production Crops
 - Food and Kindred Products
 - Stone, Clay, Glass and Concrete Products
 - Petroleum Refining and Related Industries
 - Chemicals and Allied Products
 - Paper and Allied Products
 - Coal Mining
 - Mining and Quarrying of Nonmetallic Minerals, Except Fuels
 - Waste / Scrap

- Estimated Tonnage by Rail**
- 3,560 - 5,000
 - 5,000 - 50,000
 - 50,000 +

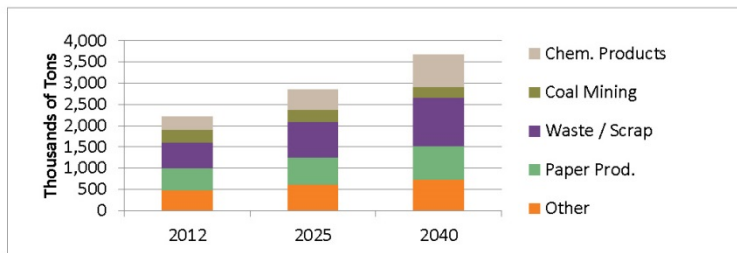
- Estimated Tonnage by Truck**
- 23 - 50,000
 - 50,000 - 150,000
 - 150,000 - 350,000
 - 350,000 - 600,000
 - 600,000 +

- Rail
 — Interstate Route
 — U.S. HWY Route
 — County Boundaries



Commodity Outlook



By Rail

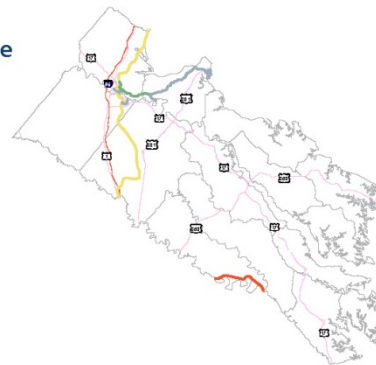


Rail Tonnage Change

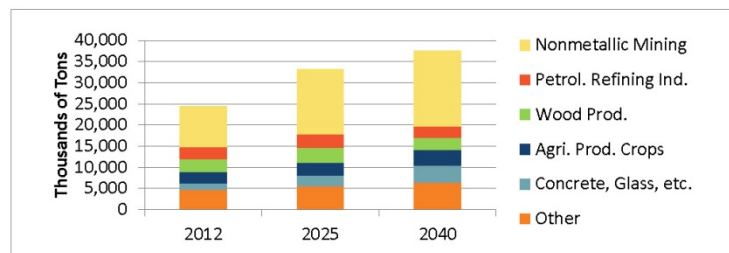
 Interstate Route
 U.S. HWY Route
 County Boundaries

Rail Transport Tonnages Percent Change

 0.00
 0.00 - 1.64
 1.64 - 1.68
 1.68 - 1.77







By Truck



Truck Tonnage Change

 Interstate Route
 U.S. HWY Route
 County Boundaries

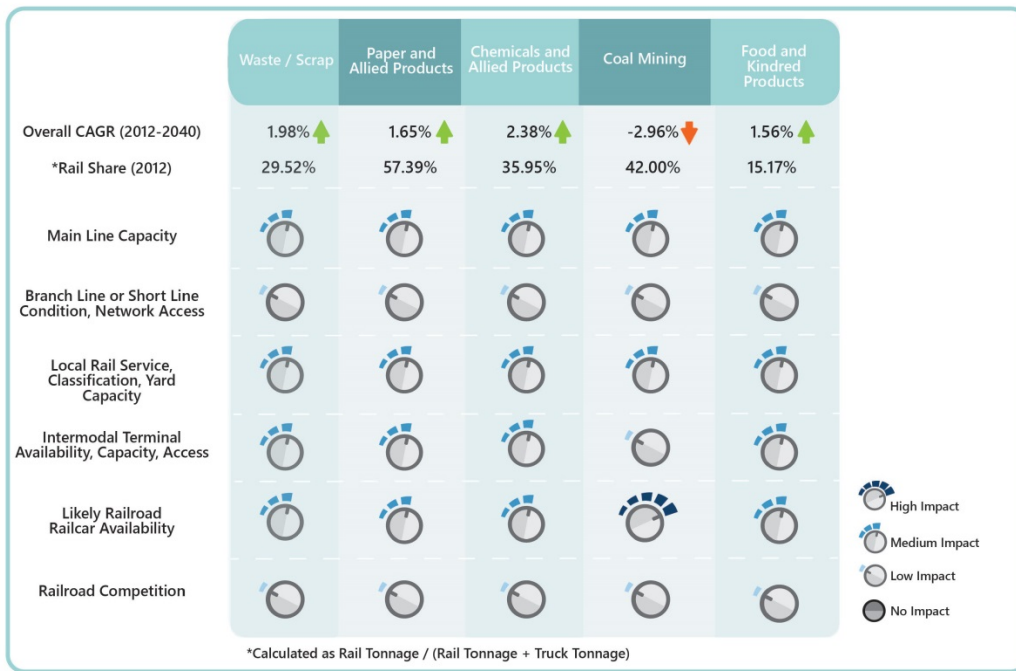
Truck Transport Tonnages Percent Change

 -0.61 - 0.00
 0.00 - 2.50
 2.50 - 4.00
 4.00 - 6.62



Market Outlook

- Develop rail capacity improvements to enhance freight mobility on principal rail lines
- Develop an industrial park or transload facility to enhance rail access
- Identify new rail shippers based on possible diversion of appropriate commodities from truck to rail





- The products with the largest contribution to Highway truck tonnages in 2012 are: Broken Stone or Riprap (6.9 million tons), Gravel/Sand (2.5 million tons) and Primary Forest Materials (2.3 million tons).
- Truck freight tonnages (not counting drayage) see an overall increase between 2012 and 2040 of 13.1 million tons leading to a Compound Annual Growth Rate (CAGR) of 1.5 percent.
- Rail freight in the Fredericksburg Planning District is primarily made up of Waste/Scrape (28 percent) and Paper and Allied Products (24 percent).
- Coal Mining accounts for 13 percent of total freight rail tons movements in 2012. The share is projected to decrease to approximately 16 percent by 2040.
- Fredericksburg Planning District is forecast to see an increase in rail Chemical and Allied Products between 2012 and 2040, with a CAGR of 3.4 percent. Waste /Scrap is also expected to increase by 2.2 percent.
- Rail freight tonnages see an overall increase between 2012 and 2040 of 1.5 million tons leading to a CAGR of 1.8 percent.

Economic Profile of Freight and Passenger Activities

Benefit Categories	Freight		Passenger	
	Total Freight Service Benefits (\$M)	Freight Service Benefits per Thousand Ton Miles (\$/'000 Ton Miles)	Total Passenger Service Benefits (\$M)	Passenger Service Benefits per Thousand Passenger Miles (\$/'000 Passenger Miles)
User Cost Savings	\$63.1	\$65.2	\$13.8	\$232.9
Pavement Savings	\$5.1	\$5.3	\$0.1	\$1.2
Congestion Savings	\$10.5	\$10.9	\$8.8	\$147.9
Truck / Auto Emissions	\$6.6	\$6.8	\$0.6	\$9.7
Truck / Auto Crash Reduction	\$3.0	\$3.1	\$4.1	\$68.9
Total	\$88.3	\$91.3	\$27.4	\$460.5

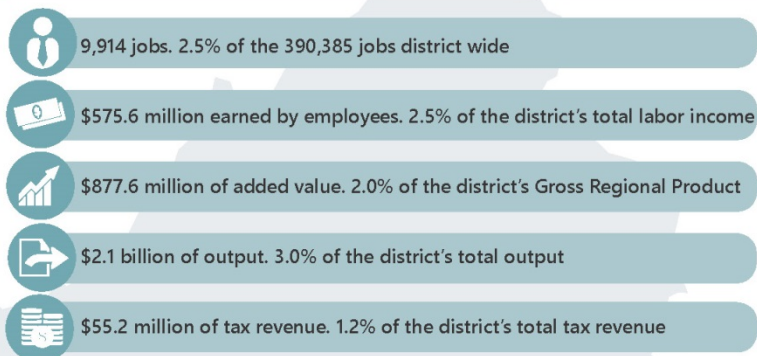
Network Facts

Fredericksburg has
113 
 total miles of rail and
737 
 total miles of highway

Major Highways and Interstates: US-17, US-1, US-301 and US-360

Railroad Systems: BB, CSXT, GOVX, NS, PVTX

Freight and Passenger Rail Economic Impacts



Freight-users generate the most significant impact.

HAMPTON ROADS DISTRICT

Population
1,765,205



Socioeconomics Breakdown and Business Facts

UNEMPLOYMENT RATE

4.7%

↑ Highest: 6.5%
Emporia City
↓ Lowest: 3.5%
Poquoson City

HOUSEHOLD MEDIAN INCOME

\$58,621

↑ Highest: \$83,735
Poquoson City
↓ Lowest: \$28,601
Emporia City

SALES

75%
Food and Kindred Products

7%
Chemicals and Allied Products

7%
Paper and Allied Products

2%
Agricultural Production of Crops

4%
Stone, Clay, Glass, and Concrete Products

4%
Petroleum Refining and Related Industries

EMPLOYMENT

40%
Food and Kindred Products

10%
Chemicals and Allied Products

17%
Paper and Allied Products

15%
Agricultural Production of Crops

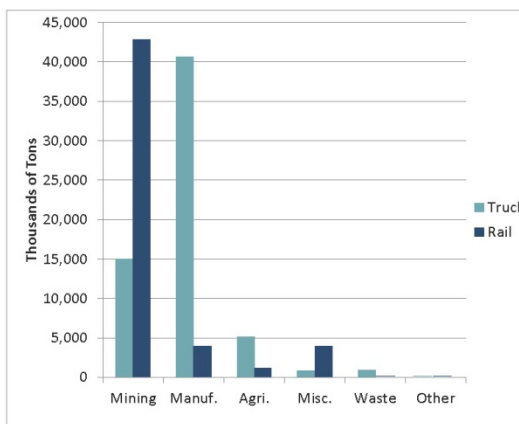
11%
Stone, Clay, Glass, and Concrete Products

2%
Petroleum Refining and Related Industries

Source: Weldon Cooper Center for Public Service, U.S. Census Bureau, Bureau of Labor Statistics, and InfoUSA

Tonnage Facts (in Thousands of Tons)

Total Truck Tonnage: 62,505
Total Rail Tonnage: 51,975



Outbound Tonnage by Commodity Group

Commodity Group

- Agricultural Production Crops
- Food and Kindred Products
- Stone, Clay, Glass and Concrete Products
- Petroleum Refining and Related Industries
- Chemicals and Allied Products
- Paper and Allied Products
- Coal Mining
- Mining and Quarrying of Nonmetallic Minerals, Except Fuels
- Waste / Scrap

Estimated Tonnage by Rail

- 2 - 10,000
- 10,000 - 30,000
- 30,000 - 90,000
- 90,000 - 150,000
- 150,000 +

Estimated Tonnage by Truck

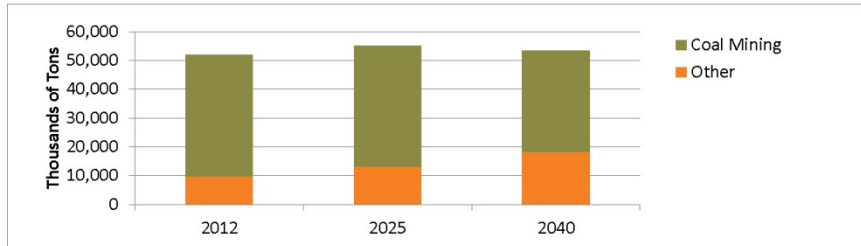
- 10 - 150,000
- 150,000 - 500,000
- 500,000 - 1,500,000
- 1,500,000 - 3,000,000
- 3,000,000 +

- Rail
- Interstate Route
- U.S. HWY Route
- County Boundaries



Commodity Outlook





By Rail

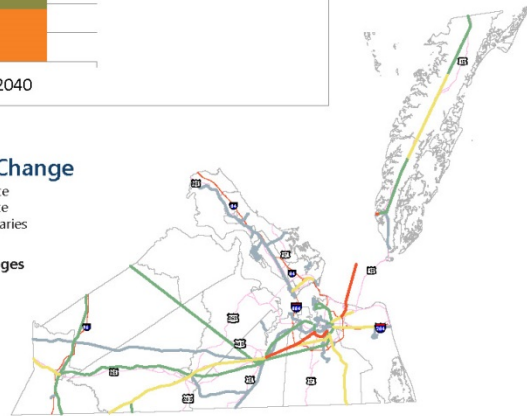


Rail Tonnage Change

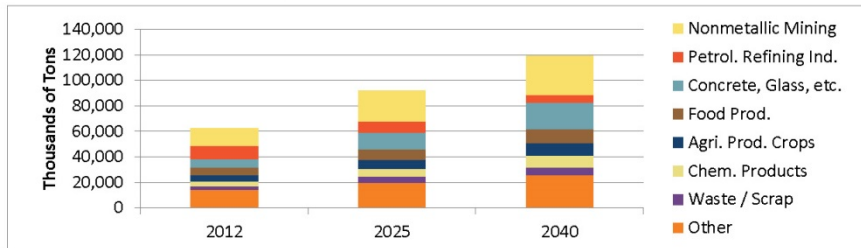
 Interstate Route
 U.S. HWY Route
 County Boundaries

Rail Transport Tonnages
Percent Change

 -0.72 - 0.00
 0.00 - 2.00
 2.00 - 3.00
 3.00 - 3.92



By Truck



Truck Tonnage Change

 Interstate Route
 U.S. HWY Route
 County Boundaries

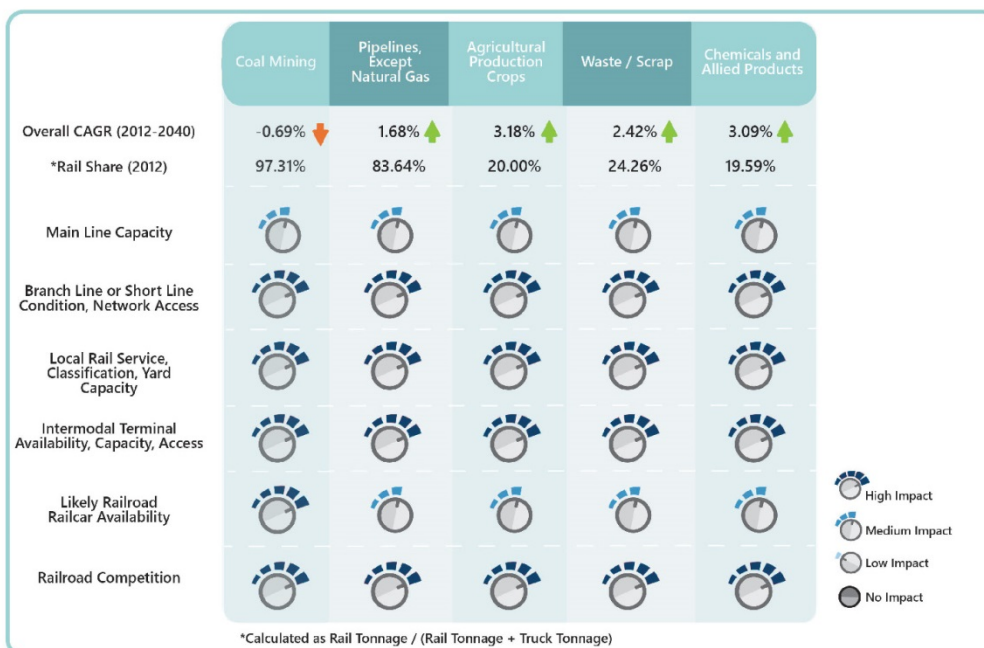
Truck Transport Tonnages
Percent Change

 -0.56 - 0.00
 0.00 - 2.50
 2.50 - 4.50
 4.50 - 6.49



Market Outlook

- Develop rail capacity improvements to enhance freight mobility on principal rail lines
- Develop enhanced multimodal access to existing multimodal and port facilities
- Identify new rail shippers based on possible diversion of appropriate commodities from truck to rail



Source: AASHTO

- The products with the largest contribution to Highway truck tonnages in 2012 are: Broken Stone or Riprap (6.8 million tons); Gravel/Sand (6.3 million tons) and Petroleum Refining Products (5.8 million tons)
- Truck freight tonnages see an overall increase between 2012 and 2040 of 57.0 million tons leading to a Compound Annual Growth Rate (CAGR) of 2.3 percent
- Coal Mining dominates rail freight in the Hampton Roads Planning District, accounting for 81% of total freight tons movements either originating or destined for the district
- Hampton Roads Planning District is forecast to see a fall in rail Coal tonnage of 17 percent between 2012 and 2040. This is part of a state wide fall in Coal rail tonnage.
- Hampton Roads Planning District is forecast to see an increase in rail Agricultural Production Crops between 2012 and 2040 (+2.9 million tons), with a CAGR of 4.6 percent.
- Rail freight tonnages see a slight increase between 2012 and 2040 of 1.3 million tons leading to a CAGR of 0.1 percent.

Economic Profile of Freight and Passenger Activities

Benefit Categories	Freight		Passenger	
	Total Freight Service Benefits (\$M)	Freight Service Benefits per Thousand Ton Miles (\$/'000 Ton Miles)	Total Passenger Service Benefits (\$M)	Passenger Service Benefits per Thousand Passenger Miles (\$/'000 Passenger Miles)
User Cost Savings	\$514.3	\$65.2	\$5.9	\$232.9
Pavement Savings	\$55.2	\$7.0	\$0.0	\$1.2
Congestion Savings	\$112.7	\$14.3	\$3.8	\$147.9
Truck / Auto Emissions	\$71.1	\$9.0	\$0.2	\$9.7
Truck / Auto Crash Reduction	\$32.0	\$4.1	\$1.7	\$68.9
Total	\$785.3	\$99.6	\$11.7	\$460.5

Network Facts

Hampton Roads has

699 

total miles of rail and

1030 

total miles of highway

Major Highways

and Interstates: US-58, US-258, US-13, US-460, US-17, US-60, I-95, I-64, I-664 and I-264

Railroad Systems: CSXT, CWRV, ESHR, GOVX, NCVA, NPB, USG

Freight and Passenger Rail Economic Impacts



212,484 jobs. 20.3% of the 1.05 million jobs district wide



\$12.2 billion earned by employees. 20.6% of the district's total labor income



\$18.5 billion of added value. 18.5% of the district's Gross Regional Product



\$45.1 billion of output. 27.7% of the district's total output



\$1.2 billion of tax revenue. 22.2% of the district's total tax revenue

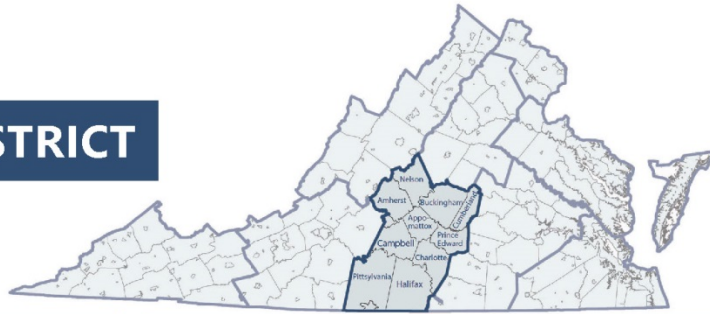
Freight-users generate the most significant impact.



STATEWIDE RAIL PLAN

LYNCHBURG DISTRICT

Population
400,300

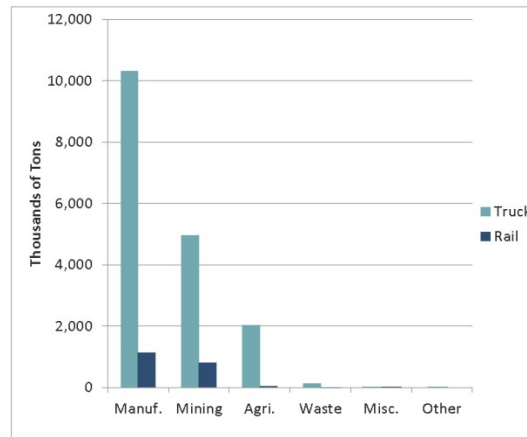


Socioeconomics Breakdown and Business Facts

Tonnage Facts (in Thousands of Tons)

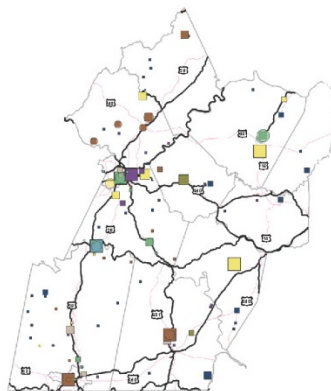
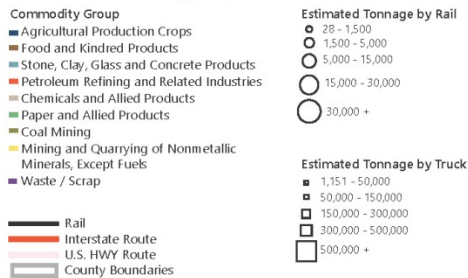


Total Truck Tonnage: 17,414
Total Rail Tonnage: 1,980



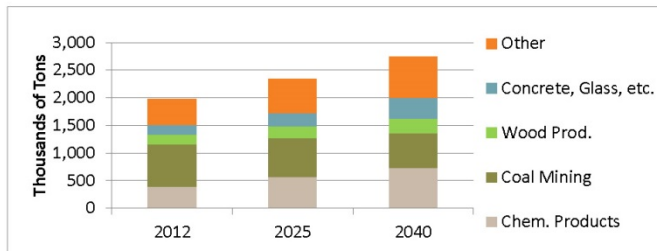
Source: Weldon Cooper Center for Public Service, U.S. Census Bureau, Bureau of Labor Statistics, and InfoUSA

Outbound Tonnage by Commodity Group



Commodity Outlook

By Rail

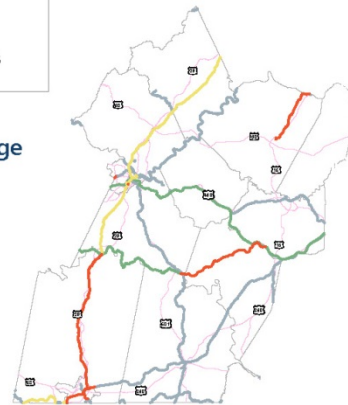


Rail Tonnage Change

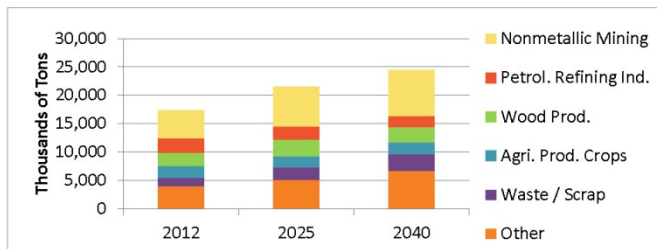
 Interstate Route
 U.S. HWY Route
 County Boundaries

Rail Transport Tonnages Percent Change

 -2.61 - 0.00
 0.00 - 0.50
 0.50 - 1.50
 1.50 - 3.45



By Truck

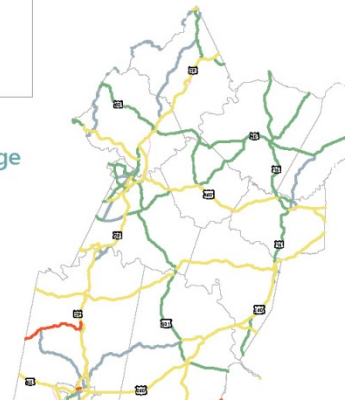


Truck Tonnage Change

 Interstate Route
 U.S. HWY Route
 County Boundaries

Truck Transport Tonnages Percent Change

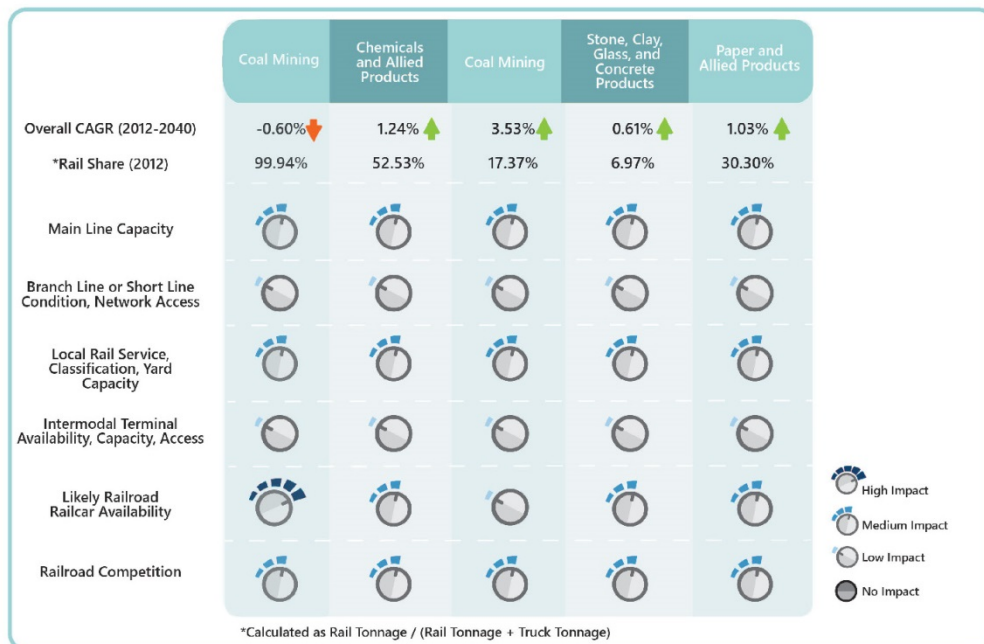
 -1.69 - 0.00
 0.00 - 1.50
 1.50 - 2.50
 2.50 - 6.85



STATEWIDE RAIL PLAN

Market Outlook

- Make infrastructure improvements on rail lines that cannot accommodate 286K railcars
- Develop an industrial park or transload facility to enhance rail access
- Identify new rail shippers based on possible diversion of appropriate commodities from truck to rail



Source: AASHTO

- The products with the largest contribution to Highway truck tonnages in 2012 are: Broken Stone or Riprap (3.8 million tons); Primary Forest Materials (1.8 million tons) and Petroleum Refining Products (1.7 million tons).
- Truck freight tonnages see an overall increase between 2012 and 2040 of 7.0 million tons leading to a Compound Annual Growth Rate (CAGR) of 1.2 percent.
- While Coal Mining makes up 38 percent of tonnage carried by rail in the Lynchburg Planning District, Coal Mining is forecast to see a fall of 16 percent between 2012 and 2040. This is part of a state wide fall in Coal rail tonnage.
- Of the top ten commodities by overall tonnage, Stone, Clay, Glass, and Concrete Products will see the largest increase between 2012 and 2040, by CAGR, of 3.5 percent.
- Rail freight tonnages see an overall increase between 2012 and 2040 of 0.8 million tons leading to a CAGR of 1.2 percent.

Economic Profile of Freight and Passenger Activities

Benefit Categories	Freight		Passenger	
	Total Freight Service Benefits (\$M)	Freight Service Benefits per Thousand Ton Miles (\$/'000 Ton Miles)	Total Passenger Service Benefits (\$M)	Passenger Service Benefits per Thousand Passenger Miles (\$/'000 Passenger Miles)
User Cost Savings	\$143.3	\$65.3	\$3.2	\$232.9
Pavement Savings	\$10.6	\$4.8	\$0.0	\$1.2
Congestion Savings	\$21.6	\$9.8	\$2.0	\$147.9
Truck / Auto Emissions	\$13.6	\$6.2	\$0.1	\$9.7
Truck / Auto Crash Reduction	\$6.1	\$2.8	\$1.0	\$68.9
Total	\$195.2	\$88.9	\$6.4	\$460.5

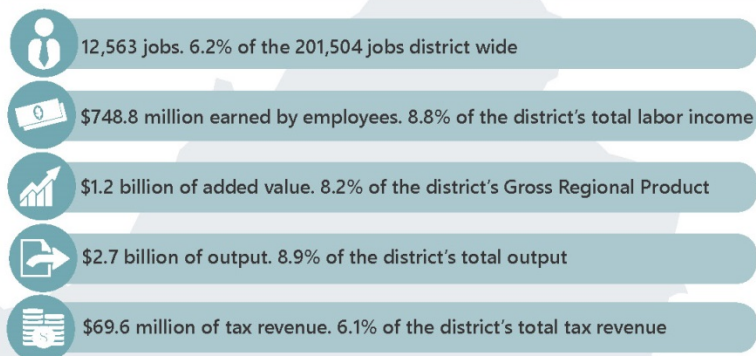
Network Facts

Lynchburg has
659 
 total miles of rail and
975 
 total miles of highway

Major Highways and Interstates: US-29, US-60, US-15, US-460, US-360, US-501, US-29 and US-58

Railroad Systems: BB, CSXT, NS, VSRR

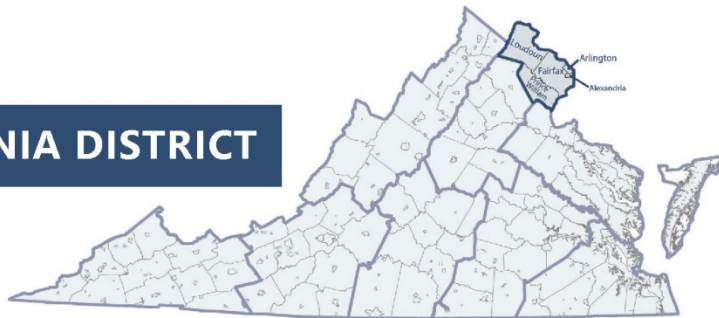
Freight and Passenger Rail Economic Impacts



Freight-users generate the most significant impact.

NORTHERN VIRGINIA DISTRICT

Population
2,461,620



Socioeconomics Breakdown and Business Facts

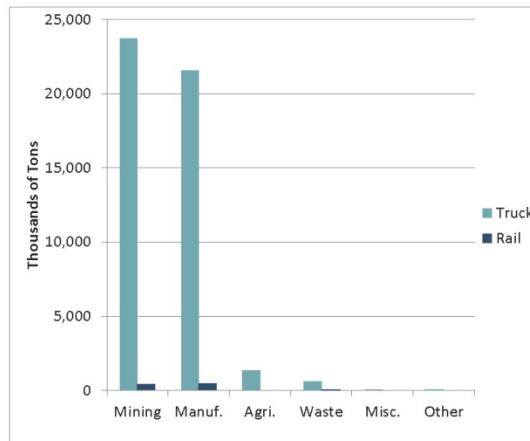
Tonnage Facts (in Thousands of Tons)

UNEMPLOYMENT RATE	3.2%	HOUSEHOLD MEDIAN INCOME	\$108,124
	↑ Highest: 3.6% Manassas City, Prince William County ↓ Lowest: 2.6% Arlington County		↑ Highest: \$123,453 Loudoun County ↓ Lowest: \$72,890 Manassas City

SALES	41% Stone, Clay, Glass, and Concrete Products	8% Waste/Scrap
	32% Food and Kindred Products	7% Chemicals and Allied Products
	2% Mining and Quarrying of Nonmetallic Minerals, Except Fuels	1% Agricultural Production

EMPLOYMENT	26% Stone, Clay, Glass, and Concrete Products	3% Waste/Scrap
	15% Food and Kindred Products	7% Chemicals and Allied Products
	11% Mining and Quarrying of Nonmetallic Minerals, Except Fuels	4% Agricultural Production Crops

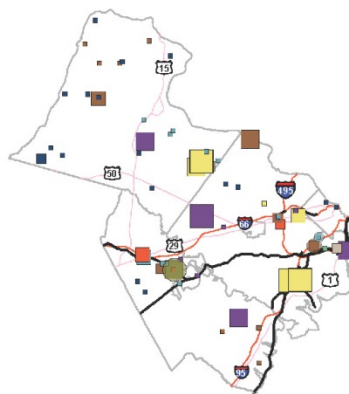
Total Truck Tonnage: 47,327
Total Rail Tonnage: 866



Source: Weldon Cooper Center for Public Service, U.S. Census Bureau, Bureau of Labor Statistics, and InfoUSA

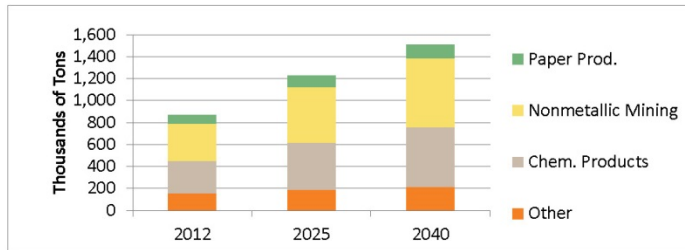
Outbound Tonnage by Commodity Group

Commodity Group	Estimated Tonnage by Rail	Estimated Tonnage by Truck
Agricultural Production Crops	685 - 1,000	14 - 100,000
Food and Kindred Products	1,000 - 1,500	100,000 - 300,000
Stone, Clay, Glass and Concrete Products	1,500 - 3,000	300,000 - 1,000,000
Petroleum Refining and Related Industries	3,000 - 15,000	1,000,000 - 2,000,000
Chemicals and Allied Products	15,000 +	2,000,000 +
Paper and Allied Products		
Coal Mining		
Mining and Quarrying of Nonmetallic Minerals, Except Fuels		
Waste / Scrap		
Rail		
Interstate Route		
U.S. HWY Route		
County Boundaries		



Commodity Outlook

By Rail



Rail Tonnage Change

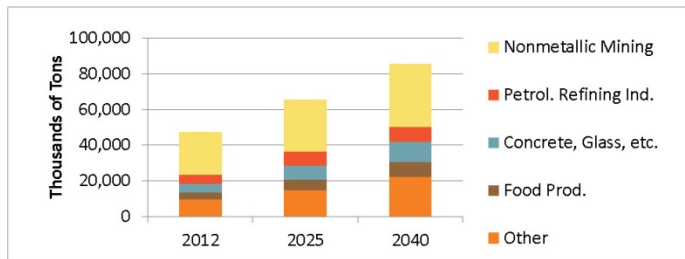
- Interstate Route
- U.S. HWY Route
- County Boundaries

Rail Transport Tonnes Percent Change

- 0.00 - 1.00
- 1.00 - 1.50
- 1.50 - 2.00
- 2.00 - 2.21



By Truck



Truck Tonnage Change

- Interstate Route
- U.S. HWY Route
- County Boundaries

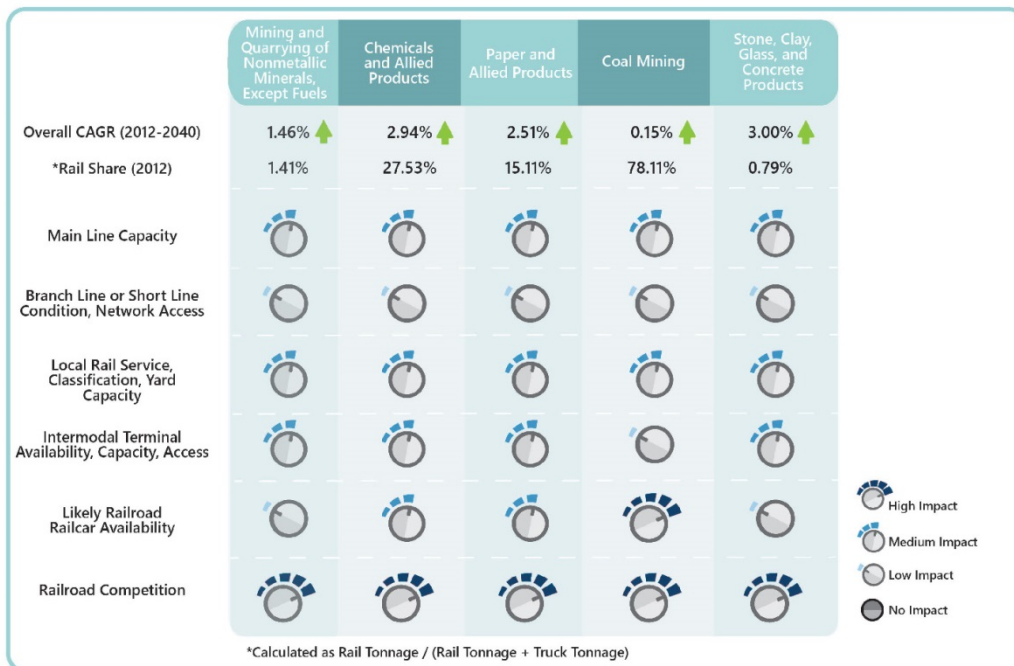
Truck Transport Tonnes Percent Change

- 0.01 - 0.00
- 0.00 - 2.00
- 2.00 - 3.00
- 3.00 - 4.62



Market Outlook

- Develop new uses for underutilized coal rail lines
- Develop rail corridor preservation policies
- Identify new rail shippers based on possible diversion of appropriate commodities from truck to rail



Source: AASHTO

- The products with the largest contribution to Highway truck tonnages in 2012 are: Broken Stone or Riprap (20 million tons), Gravel/Sand (3.8 million tons)
- Truck freight tonnages see an overall increase between 2012 and 2040 of 38.3 million tons leading to a Compound Annual Growth Rate (CAGR) of 2.1 percent.
- Mining and Quarrying of Nonmetallic Minerals and Chemicals and Allied Products dominate rail freight in the Northern Virginia Planning District, accounting for a combined 39% of total freight tons movements either originating or destined for the district. In addition, this commodity represents 50 percent of overall freight tonnage.
- Coal Mining only accounts for 7 percent of total freight tons movements in 2012. The share is projected to decrease to approximately 3 percent by 2040.
- Rail freight tonnages see an overall increase between 2012 and 2040 of 0.6 million tons leading to a CAGR of 2.0 percent.

Economic Profile of Freight and Passenger Activities

Benefit Categories	Freight		Passenger	
	Total Freight Service Benefits (\$M)	Freight Service Benefits per Thousand Ton Miles (\$/'000 Ton Miles)	Total Passenger Service Benefits (\$M)	Passenger Service Benefits per Thousand Passenger Miles (\$/'000 Passenger Miles)
User Cost Savings	\$42.3	\$65.3	\$48.7	\$232.9
Pavement Savings	\$4.2	\$6.5	\$0.2	\$1.2
Congestion Savings	\$8.6	\$13.3	\$30.9	\$147.9
Truck / Auto Emissions	\$5.4	\$8.3	\$2.0	\$9.7
Truck / Auto Crash Reduction	\$2.4	\$3.7	\$14.4	\$68.9
Total	\$62.9	\$97.1	\$96.3	\$460.5

Network Facts

Northern Virginia has

120 

total miles of rail and

454 

total miles of highway

Major Highways

and Interstates: US-15, US-50, US-29m, US-1, Interstate 95, Interstate 66, and Interstate 495

Railroad Systems: CSXT, NS, WMAT

Freight and Passenger Rail Economic Impacts



5,610 jobs. 0.3% of the 1.68 million jobs district wide



\$343.1 million earned by employees. 0.3% of the district's total labor income



\$538.0 million of added value. 0.3% of the district's Gross Regional Product



\$1.2 billion of output. 0.4% of the district's total output



\$31.0 million of tax revenue. 0.4% of the district's total tax revenue

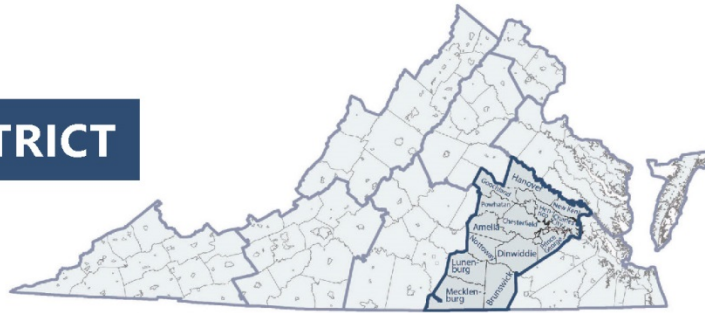
Freight-users generate the most significant impact.



STATEWIDE RAIL PLAN

RICHMOND DISTRICT

Population
1,287,852



Socioeconomics Breakdown and Business Facts

UNEMPLOYMENT RATE	4.3%	HOUSEHOLD MEDIAN INCOME	\$59,569
	↑ Highest: 7.6% Petersburg City ↓ Lowest: 3.4% New Kent County		↑ Highest: \$79,330 Goochland County ↓ Lowest: \$31,798 Petersburg City

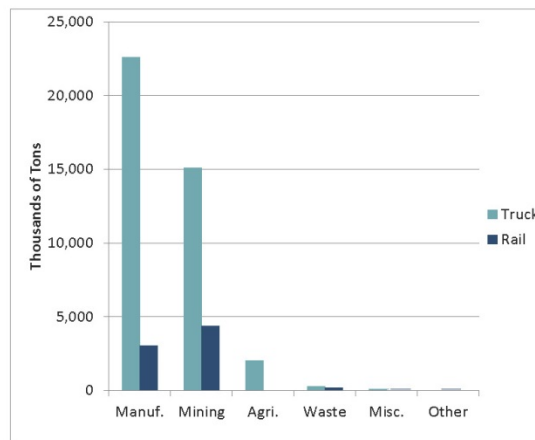
SALES	1% Stone, Clay, Glass, and Concrete Products	88% Paper and Allied Products
	2% Waste / Scrap	6% Chemicals and Allied Products
	3% Food and Kindred Products	

EMPLOYMENT	3% Stone, Clay, Glass, and Concrete Products	90% Paper and Allied Products
	1% Waste / Scrap	4% Chemicals and Allied Products
	1% Food and Kindred Products	1% Agricultural Production Crops

Source: Weldon Cooper Center for Public Service, U.S. Census Bureau, Bureau of Labor Statistics, and InfoUSA

Tonnage Facts (in Thousands of Tons)

Total Truck Tonnage: 39,961
Total Rail Tonnage: 7,585



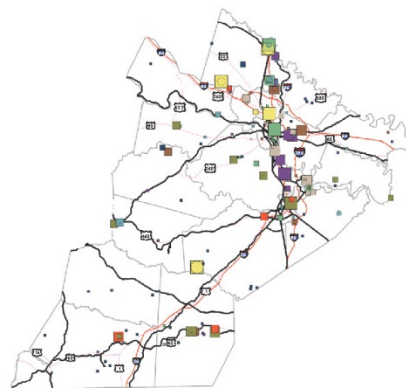
Outbound Tonnage by Commodity Group

- Commodity Group**
- Agricultural Production Crops
 - Food and Kindred Products
 - Stone, Clay, Glass and Concrete Products
 - Petroleum Refining and Related Industries
 - Chemicals and Allied Products
 - Paper and Allied Products
 - Coal Mining
 - Mining and Quarrying of Nonmetallic Minerals, Except Fuels
 - Waste / Scrap

- Estimated Tonnage by Rail**
- 266 - 15,000
 - 15,000 - 50,000
 - 50,000 - 250,000
 - 250,000 - 500,000
 - 500,000 +

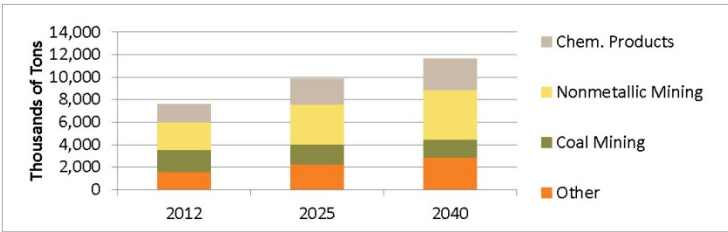
- Estimated Tonnage by Truck**
- 23 - 75,000
 - 75,000 - 250,000
 - 250,000 - 500,000
 - 500,000 - 1,000,000
 - 1,000,000 +

- Rail
 — Interstate Route
 — U.S. HWY Route
 — County Boundaries



Commodity Outlook





By Rail



Rail Tonnage Change

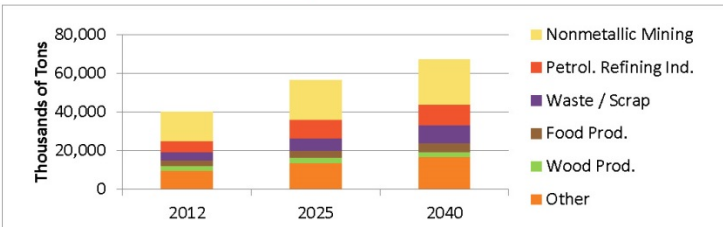
 Interstate Route
 U.S. HWY Route
 County Boundaries

Rail Transport Tonnages Percent Change

 -0.60 - 0.00
 0.00 - 1.50
 1.50 - 2.00
 2.00 - 2.34



By Truck



Truck Tonnage Change

 Interstate Route
 U.S. HWY Route
 County Boundaries

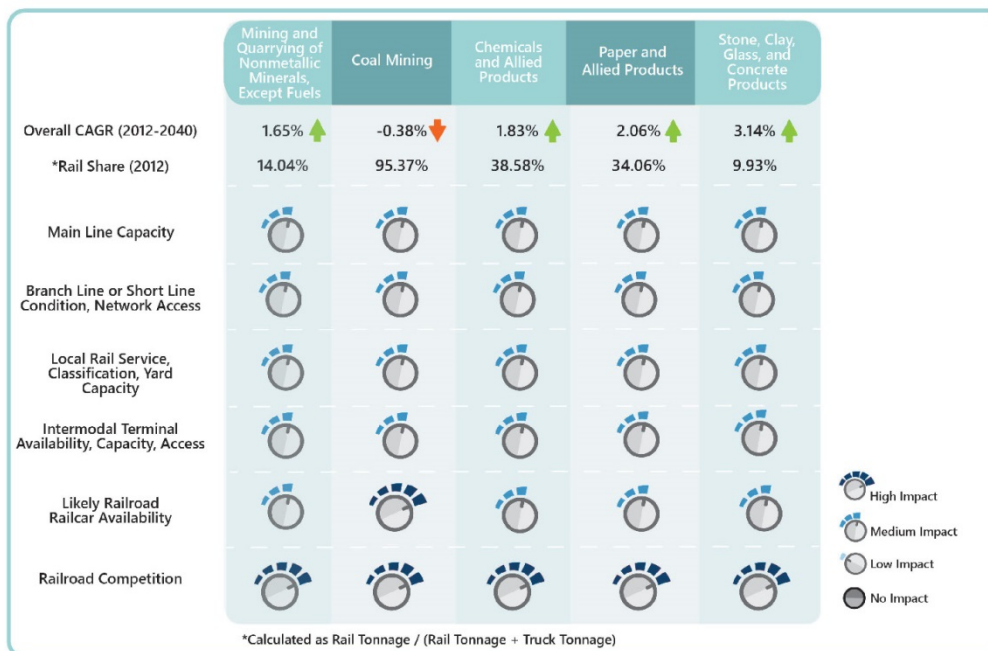
Truck Transport Tonnages Percent Change

 -1.75 - 0.00
 0.00 - 1.50
 1.50 - 2.50
 2.50 - 3.69



Market Outlook

- Develop new uses for underutilized coal rail lines
- Develop rail corridor preservation policies
- Identify new rail shippers based on possible diversion of appropriate commodities from truck to rail



Source: AASHTO

- The products with the largest contribution to Highway truck tonnages in 2012 are: Broken Stone or Riprap (12 million tons); Petroleum Refining Products (4.7 million tons) and Waste / Scrap (4.7 million tons).
- Truck freight tonnages see an overall increase between 2012 and 2040 of 27.1 million tons leading to a Compound Annual Growth Rate (CAGR) of 1.9 percent.
- Mining and Quarrying of Nonmetallic Minerals, Coal Mining, and Chemicals and Allied Products dominate rail freight in the Richmond Planning District, accounting for a combined 79 percent of total freight tons movements either originating or destined for the district.
- Richmond Planning District is forecast to see a fall in rail Coal tonnage (-0.3 million tons) of 16 percent between 2012 and 2040. This is part of a state wide fall in Coal rail tonnage.
- Rail freight tonnages see an overall increase between 2012 and 2040 of 4.1 million tons leading to a CAGR of 1.5 percent.

Economic Profile of Freight and Passenger Activities

Benefit Categories	Freight		Passenger	
	Total Freight Service Benefits (\$M)	Freight Service Benefits per Thousand Ton Miles (\$/'000 Ton Miles)	Total Passenger Service Benefits (\$M)	Passenger Service Benefits per Thousand Passenger Miles (\$/'000 Passenger Miles)
User Cost Savings	\$152.8	\$65.2	\$17.8	\$232.9
Pavement Savings	\$11.4	\$4.9	\$0.1	\$1.2
Congestion Savings	\$23.3	\$9.9	\$11.3	\$147.9
Truck / Auto Emissions	\$14.7	\$6.3	\$0.7	\$9.7
Truck / Auto Crash Reduction	\$6.6	\$2.8	\$5.3	\$68.9
Total	\$208.8	\$89.2	\$35.2	\$460.5

Network Facts

Richmond has

776 

total miles of rail and

1329 

total miles of highway

Major Highways

and Interstate: US-1, US-58, US-15, US-460, US-360, US-60, US-522, US-250, US-360, US-33, I-85, I-95, I-295 and I-64

Railroad Systems: BB, CSXT, DUMX, NS, PVTX, USG, VSRR

Freight and Passenger Rail Economic Impacts



44,161 jobs. 5.5% of the 806,369 jobs district wide



\$2.6 billion earned by employees. 5.5% of the district's total labor income



\$3.9 billion of added value. 4.7% of the district's Gross Regional Product



\$9.5 billion of output. 6.7% of the district's total output



\$246.7 million of tax revenue. 3.5% of the district's total tax revenue

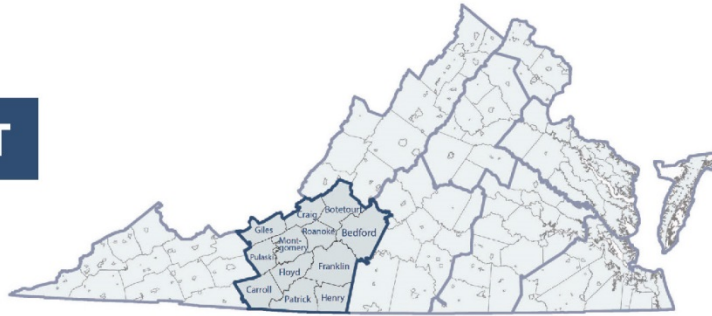
Freight-users generate the most significant impact.



STATEWIDE RAIL PLAN

SALEM DISTRICT

Population
694,098



Socioeconomics Breakdown and Business Facts

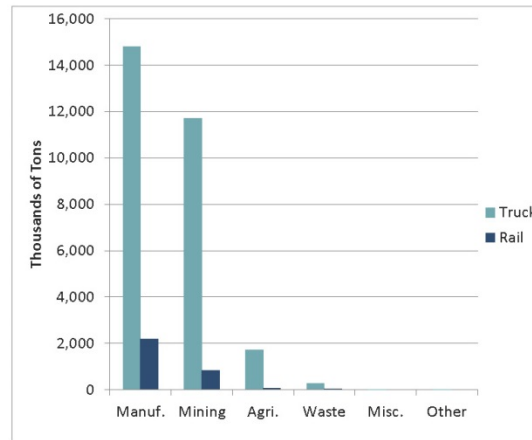
Tonnage Facts (in Thousands of Tons)

UNEMPLOYMENT RATE	4.5%	HOUSEHOLD MEDIAN INCOME	\$46,774
	↑ Highest: 7.1% Martinsville City ↓ Lowest: 3.5% Roanoke County		↑ Highest: \$60,519 Roanoke County ↓ Lowest: \$29,587 Martinsville City

SALES	1% Agricultural Production Crops	18% Paper and Allied Products
	2% Mining and Quarrying of Nonmetallic Minerals, Except Fuels	22% Chemicals and Allied Products
	37% Food and Kindred Products	8% Stone, Clay, Glass, and Concrete Products

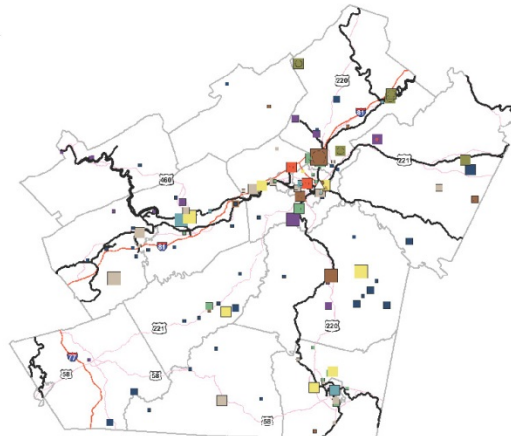
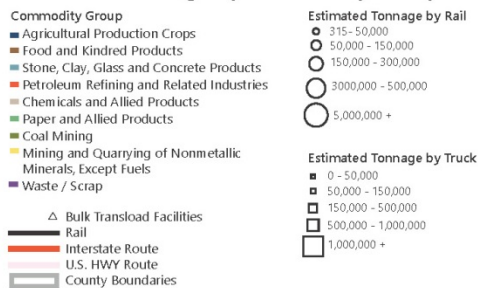
EMPLOYMENT	7% Agricultural Production Crops	32% Paper and Allied Products
	10% Mining and Quarrying of Nonmetallic Minerals, Except Fuels	17% Chemicals and Allied Products
	13% Food and Kindred Products	17% Stone, Clay, Glass, and Concrete Products

Total Truck Tonnage: 28,545
Total Rail Tonnage: 3,101



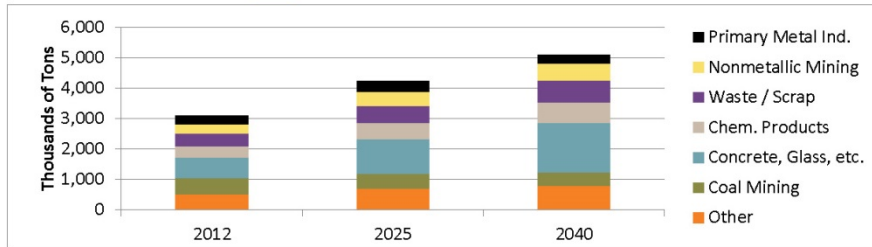
Source: Weldon Cooper Center for Public Service, U.S. Census Bureau, Bureau of Labor Statistics, and InfoUSA

Outbound Tonnage by Commodity Group



Commodity Outlook

By Rail

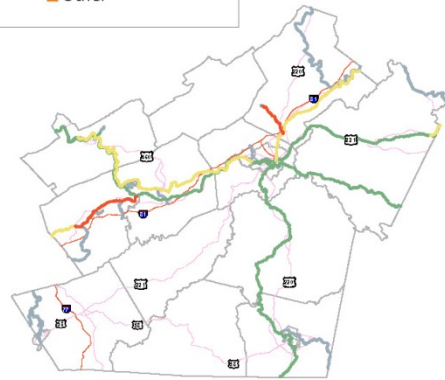


Rail Tonnage Change

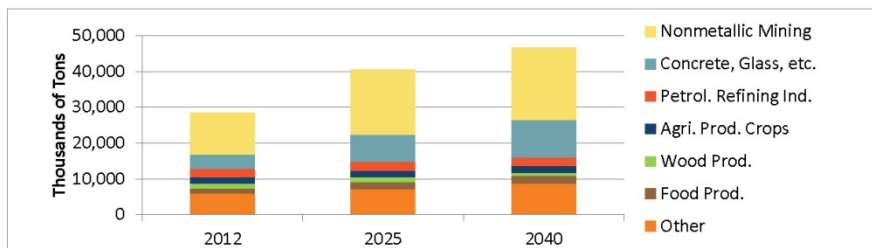
Interstate Route
U.S. HWY Route
County Boundaries

Rail Transport Tonnages Percent Change

-0.42 - 0.00
0.00 - 1.00
1.00 - 2.00
2.00 - 2.86



By Truck



Truck Tonnage Change

Rail
Interstate Route
U.S. HWY Route
County Boundaries

Truck Transport Tonnages Percent Change

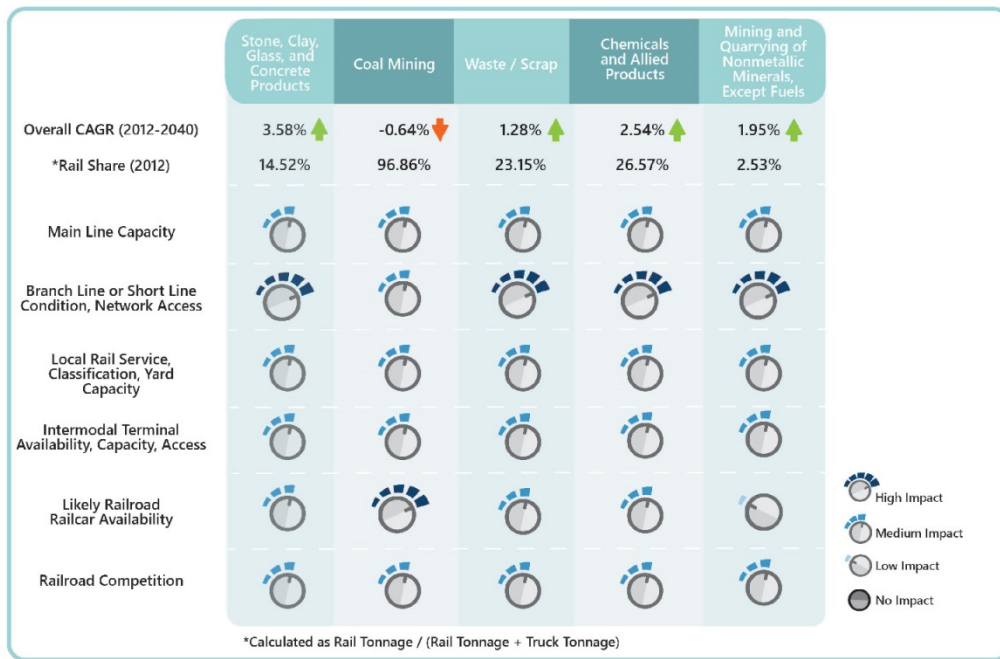
-0.075000 - 0.000000
0.000001 - 1.500000
1.500001 - 2.500000
2.500001 - 6.910000



STATEWIDE RAIL PLAN

Market Outlook

- Develop new uses for underutilized coal rail lines
- Develop rail corridor preservation policies
- Identify new rail shippers based on possible diversion of appropriate commodities from truck to rail



Source: AASHTO

- The products with the largest contribution to Highway truck tonnages in 2012 are: Broken Stone or Riprap (8.7 million tons); Gravel/Sand (2.6 million tons) and Petroleum Refining Products (2 million tons).
- Truck freight tonnages see an overall increase between 2012 and 2040 of 18.0 million tons leading to a Compound Annual Growth Rate (CAGR) of 1.8 percent.
- Stone, Clay, Glass, and Concrete Products, Coal Mining, and Waste /Scrap products dominate rail freight in the Salem Planning District, accounting for a combined 52 percent of total freight tons movements either originating or destined for the district.
- Salem Planning District is forecast to see a fall in rail Coal tonnage of 17 percent between 2012 and 2040. This is part of a state wide fall in Coal rail tonnage.
- Rail freight tonnages see an overall increase between 2012 and 2040 of 2.0 million tons leading to a CAGR of 1.8 percent.

Economic Profile of Freight and Passenger Activities

Benefit Categories	Freight		Passenger	
	Total Freight Service Benefits (\$M)	Freight Service Benefits per Thousand Ton Miles (\$/'000 Ton Miles)	Total Passenger Service Benefits (\$M)	Passenger Service Benefits per Thousand Passenger Miles (\$/'000 Passenger Miles)
User Cost Savings	\$134.9	\$65.2	\$0.0	\$0.0
Pavement Savings	\$10.1	\$4.9	\$0.0	\$0.0
Congestion Savings	\$20.6	\$10.0	\$0.0	\$0.0
Truck / Auto Emissions	\$13.0	\$6.3	\$0.0	\$0.0
Truck / Auto Crash Reduction	\$5.8	\$2.8	\$0.0	\$0.0
Total	\$184.4	\$89.2	\$0.0	\$0.0

*No Amtrak/VRE Services in Salem
Regional service to Roanoke is expected to begin in late 2017 or early 2018

Network Facts

Salem has

621 

total miles of rail and

1168 

total miles of highway

Major Highways

and Interstates: US-58,
US-221, US-220, US-460 and
I-81

Railroad Systems: CSXT,
DUMX, NS, USG

Freight and Passenger Rail Economic Impacts



14,394 jobs. 3.7% of the 393,199 jobs district wide



\$852.5 million earned by employees. 5.0% of the district's total labor income



\$1.3 billion of added value. 4.7% of the district's Gross Regional Product



\$3.1 billion of output. 5.3% of the district's total output



\$80.2 million of tax revenue. 3.5% of the district's total tax revenue

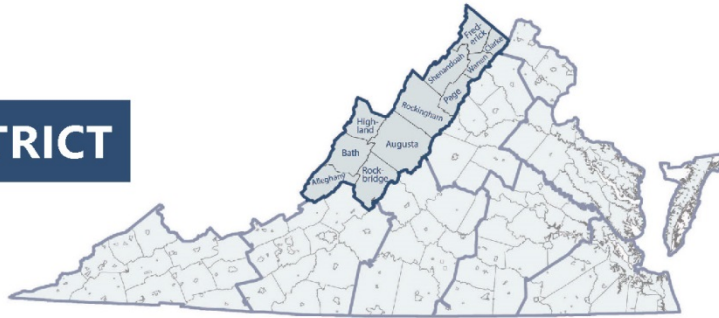
Freight-users generate the most significant impact.



STATEWIDE RAIL PLAN

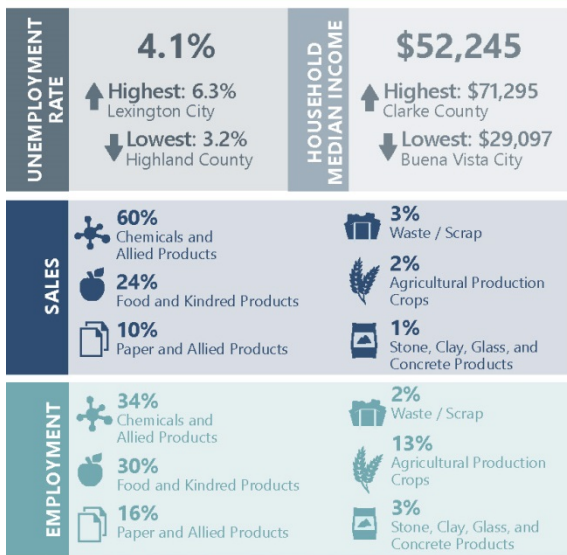
STAUNTON DISTRICT

Population
550,054

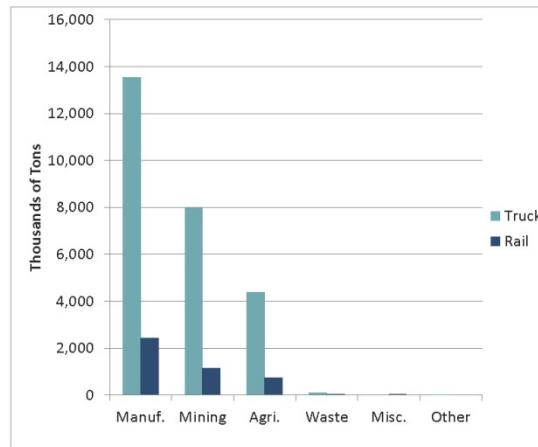


Socioeconomics Breakdown and Business Facts

Tonnage Facts (in Thousands of Tons)

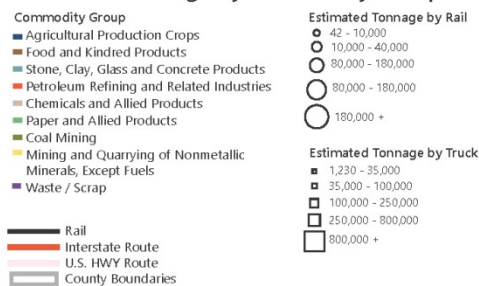


Total Truck Tonnage: 26,000
Total Rail Tonnage: 4,391



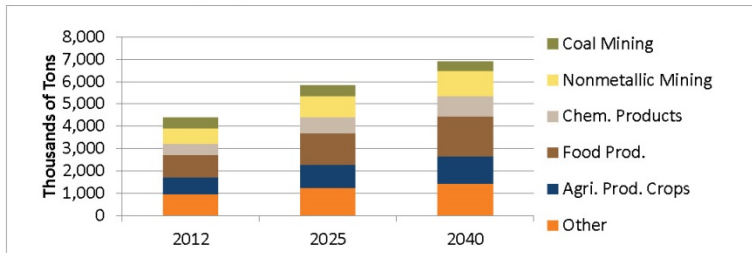
Source: Weldon Cooper Center for Public Service, U.S. Census Bureau, Bureau of Labor Statistics, and InfoUSA

Outbound Tonnage by Commodity Group



Commodity Outlook

By Rail

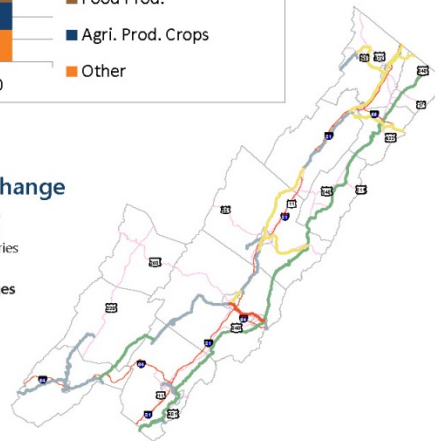


Rail Tonnage Change

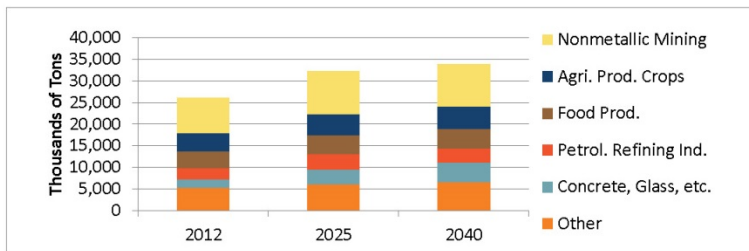
Interstate Route
U.S. HWY Route
County Boundaries

Rail Transport Tonnages Percent Change

-0.44 - 0.00
0.00 - 1.50
1.50 - 2.50
2.50 - 3.70



By Truck



Truck Tonnage Change

Interstate Route
U.S. HWY Route
County Boundaries

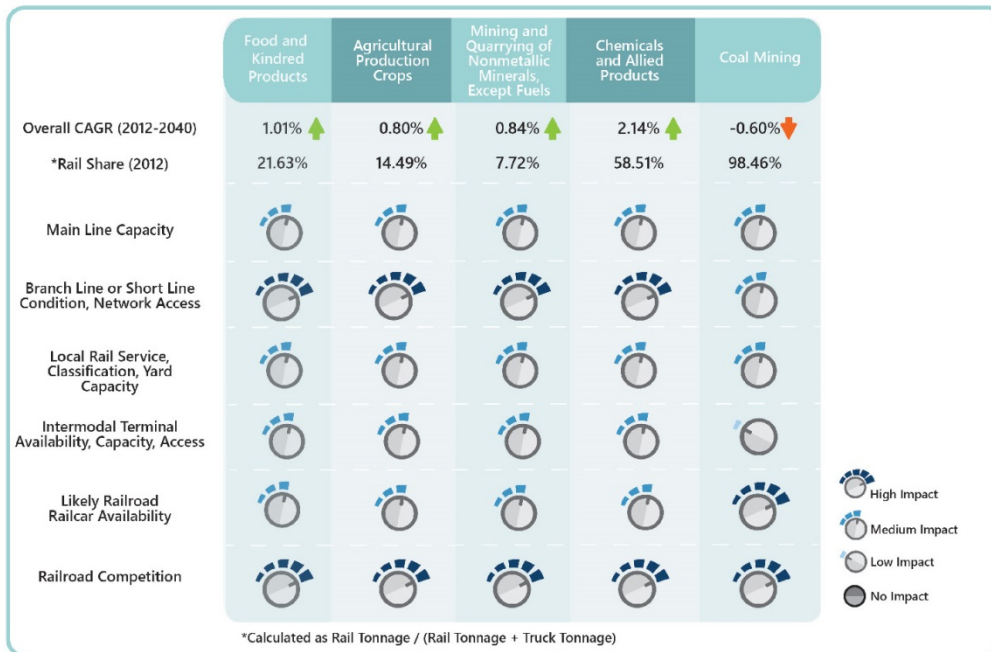
Truck Transport Tonnages Percent Change

0.00 - 0.50
0.50 - 1.50
1.50 - 2.50
2.50 - 3.64



Market Outlook

- Develop new uses for underutilized coal rail lines
- Develop rail corridor preservation policies
- Identify new rail shippers based on possible diversion of appropriate commodities from truck to rail



Source: AASHTO

- The products with the largest contribution to Highway truck tonnages in 2012 are: Broken Stone or Riprap (6.8 million tons); Petroleum Refining Products (1.9 million tons) and Misc. Field Crops (1.5 million tons).
- Truck freight tonnages see an overall increase between 2012 and 2040 of 7.8 million tons leading to a Compound Annual Growth Rate (CAGR) of 0.9 percent.
- Food and Kindred Products, Agricultural Production Crops, and Mining and Quarrying of Nonmetallic Minerals dominate rail freight in the Staunton Planning District, accounting for a combined 56 percent of total freight tons movements either originating or destined for the district.
- Coal Mining accounts for 11 percent of total freight rail tons movements in 2012. The share is projected to decrease to approximately 6 percent by 2040.
- Rail freight tonnages see an overall increase between 2012 and 2040 of 2.5 million tons leading to a CAGR of 1.6 percent.

Economic Profile of Freight and Passenger Activities

Benefit Categories	Freight		Passenger	
	Total Freight Service Benefits (\$M)	Freight Service Benefits per Thousand Ton Miles (\$/'000 Ton Miles)	Total Passenger Service Benefits (\$M)	Passenger Service Benefits per Thousand Passenger Miles (\$/'000 Passenger Miles)
User Cost Savings	\$126.3	\$65.2	\$0.3	\$232.9
Pavement Savings	\$9.2	\$4.8	\$0.0	\$1.2
Congestion Savings	\$18.9	\$9.8	\$0.2	\$147.9
Truck / Auto Emissions	\$11.9	\$6.1	\$0.0	\$9.7
Truck / Auto Crash Reduction	\$5.4	\$2.8	\$0.1	\$68.9
Total	\$171.7	\$88.7	\$0.6	\$460.5

Network Facts

Staunton has

611 

total miles of rail and

1190 

total miles of highway

Major Highways

and Interstates: US-220, US-250, US-33, US-11, US-501, US-340, US-211, US-522, US-17, US-50, I-64, I-81 and I-66

Railroad Systems: BB, CSXT, NS, SV, WW

Freight and Passenger Rail Economic Impacts



22,521 jobs. 7.4% of the 303,570 jobs district wide



\$1.3 billion earned by employees. 9.7% of the district's total labor income



\$2.0 billion of added value. 8.8% of the district's Gross Regional Product



\$4.8 billion of output. 9.9% of the district's total output



\$125.0 million of tax revenue. 7.0% of the district's total tax revenue

Freight-users generate the most significant impact.



STATEWIDE RAIL PLAN