DRAFT

National Capital Region Freight Plan

National Capital Region

Transportation Planning Board

Metropolitan Washington Council of Governments

May 27, 2016

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This plan is dedicated to Karin C. Foster (1977-2013), friend, colleague, freight planning expert, and consummate professional.

Summary of Key Points

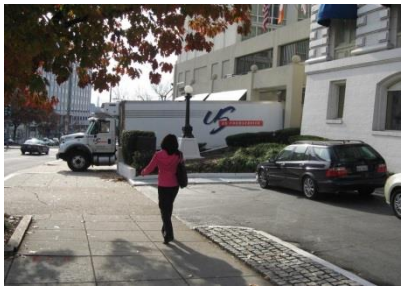
Text under development

Section 1.0 Introduction

The National Capital Region's (hereafter referred to as "the Region") multimodal transportation system is vital to the economy of the Region and to the quality of life of its residents. It connects people and businesses to important regional activity centers and to major domestic and international markets. Each year hundreds of millions tons of freight valued in the billions of dollars move over the Region's roadways and railways and pass through its airports. The Region's service-based economy, with its growing employment, population, and wealth will continue to drive demand for freight in the foreseeable future. Economic growth along the eastern seaboard, throughout the nation, and across the world will also result in greater quantities of goods moving into, out of, and through the Region– especially along the I-95 corridor. Evolving logistics practices, changes in where goods are produced and how they are distributed, expansion of the Panama Canal, and increasing urbanization are but a few of the factors that will impact how freight will move across the Region in the future. The Transportation Planning Board (TPB) as the Metropolitan Planning Organization (MPO) for the National Capital Region has an important role to play in ensuring that the regional transportation system continues to be responsive to and supportive of the freight demands placed upon it by its residents, businesses, and visitors.

The Region's service-based economy, growing employment and population, and increasing wealth will continue to drive demand for freight.

1.2 About the Plan



The **NATIONAL CAPITAL REGION FREIGHT PLAN** (the Plan) describes the role freight transportation plays in the Region's economy, provides an overview of the Region's multimodal freight transportation system, describes the drivers of freight demand and the freight flows resulting from it, identifies the most significant freight issues in the region, and provides recommendations to ensure the multimodal freight transportation system continues to support the economy of the region and the quality of life of its residents and visitors. The Plan serves as a foundation for future regional freight planning activities and builds on the results of the previous **NATIONAL CAPITAL REGION FREIGHT PLAN** published in 2010. Much of the content in the Plan has its origins in that previous Plan and in the extensive freight and rail planning efforts of the Federal Highway Administration, the Federal Motor Carrier Safety Administration; the Federal Railroad Administration; a wide range of State and regional freight plans – especially those of the Commonwealth of Virginia, the District of Columbia, and the State of Maryland; and numerous publications of the Transportation Research Board. It provides relevant context and support for the freight element of the **CONSTRAINED LONG-RANGE TRANSPORTATION PLAN**. It provides the basis for understanding the goods movement impacts of transportation projects included in the Region's **TRANSPORTATION IMPROVEMENT PROGRAM**. Because the efficient and safe movement freight is important to the economic health of the Region and the quality of life of its residents, this freight plan is intended to be a helpful reference to planners and elected officials in their continuing efforts to make the Region a better place to live, work, and visit.

1.2.1 Overview

The Plan is organized into the following major sections:

Executive Summary – provides highlights of the Plan.

1.0 Introduction – underscores the importance of freight to the Region, provides an overview of the Plan, and describes its institutional and regulatory context.

2.0 Multimodal Freight Transportation System – describes the physical infrastructure, including roadways, railways, airports, and intermodal facilities, that comprise the Region's freight transportation system.

3.0 Freight Demand – identifies the key commodities transported into, out of, within, and through the region; describes the relative importance of the various transportation modes used to move these commodities; identifies their origins and destinations; and forecasts how these elements are expected to change in the future.

4.0 Freight Trends and Issues – discusses the broad trends impacting freight and identifies some of the key issues associated with freight transportation in the Region.

5.0 Regional Freight Policies – describes the freight-related policies that the Transportation Planning Board promotes. Member jurisdictions are also encouraged to consider these policies within their respective transportation planning processes.

6.0 National Capital Region Projects Important to Freight - lists projects that are important to goods movement in the Region.

7.0 Recommendations and Next Steps – a brief summary of the Plan's key findings and recommendations.

Appendices – provides additional background and technically detailed materials that support the content within the body of the main document.

1.3 Freight Planning in the National Capital Region

1.3.1 Transportation Planning Board Vision

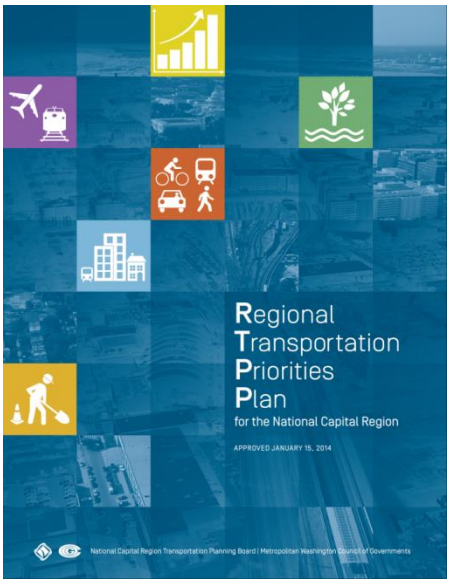
The TPB Transportation Vision, adopted in 1998, provides a framework to guide the Region's transportation planning and investment decisions into the 21st century. It lays out eight broad goals with associated objectives and strategies. Two of the goals are closely tied to freight transportation (see below) and are supported by this Plan:

- Goal 2: The Washington metropolitan region will develop, implement, and maintain an interconnected transportation system that enhances quality of life and promotes a strong and growing economy throughout the region, including a healthy regional core and dynamic regional activity centers with a mix of jobs, housing, and services in a walkable environment.
- Goal 2, Objective 3. A web of multi-modal transportation connections which provide convenient access (including improved mobility with reduced reliance on the automobile) between the regional core and regional activity centers, reinforcing existing transportation connections and creating new connections where appropriate.
- Goal 8, Strategy 5: Develop a regional plan for freight movement.

Issues that indirectly relate to freight transportation (e.g. safety) are included within other goals.

Regional Transportation Priorities Plan

On January 15, 2014, the TPB approved the **REGIONAL TRANSPORTATION PRIORITIES PLAN** (RTPP). The RTPP builds on the Vision goals by identifying strategies with the greatest potential to respond to our most significant transportation challenges. The strategies are intended to be complementary, to make better use of existing infrastructure, and to be within reach both financially and politically. The RTPP identifies priorities and strategies that impact freight, including the following:



- Ensure maintenance of roads and bridges;
- Alleviate roadway bottlenecks;
- Concentrate growth in activity centers; and
- Enhance circulation within activity centers.

1.3.2 Regional Freight Planning

The TPB included a dedicated freight planning task within its unified planning work program beginning in fiscal year 2007. While freight issues were addressed in overall transportation planning before that time, such involvement was mostly limited to participation in freight-related groups such as the I-95 Corridor Coalition and the Baltimore Metropolitan Council's Freight Movement Task Force. Responding to recommendations described in a May 2007 consultant-led study entitled, **ENHANCING CONSIDERATIONS OF FREIGHT IN REGIONAL TRANSPORTATION PLANNING**, the TPB strengthened its freight planning capacity by hiring an additional staff person with responsibility to further the Region's freight program. This additional resource enabled the TPB to engage public- and private-sector stakeholders, gather and analyze freight data, and better integrate freight considerations into overall transportation planning activities. The increased focus on these activities led to the establishment of the TPB Freight Subcommittee in April 2008, providing a venue in which both public- and private-sector representatives share information and provide input on the regional transportation planning process.

In July 2009, TPB staff published the **INTEGRATE FREIGHT REPORT** highlighting regional freight trends and identifying the steps necessary to incorporate freight into the transportation planning process. This was followed by the publication of the first **NATIONAL CAPITAL REGION FREIGHT PLAN** in 2010. This 2016 edition of the **NATIONAL CAPITAL REGION FREIGHT PLAN** builds upon the foundation provided by that initial effort.

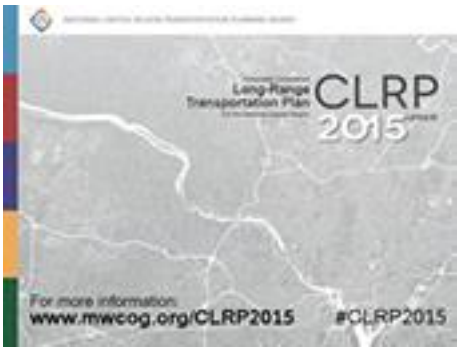
1.3.3 Role of the Metropolitan Planning Organization

The TPB is the federally designated Metropolitan Planning Organization (MPO) for the Region. The role of an MPO is to implement the comprehensive regional transportation planning process as initially required by the Federal-Aid Highway Act of 1962 and amended by subsequent legislation. One of the primary objectives of any MPO is to ensure that expenditures for transportation projects and programs are part of a continuing, cooperative, and comprehensive planning process. The

The TPB brings key decision-makers together to coordinate planning activities for the Region's transportation system.

TPB accomplishes these objectives by bringing key decision-makers together to coordinate planning activities for the Region's transportation system. The TPB is composed of representatives from 22 local governments; the Departments of Transportation of Maryland, Virginia, and the District of Columbia; the state legislatures of Maryland, Virginia, and the District of Columbia; the Washington Metropolitan Area Transit Authority (WMATA); the Metropolitan Washington Airports Authority (MWAA); the Federal Highway Administration (FHWA); the Federal Transit Administration (FTA); the National Park Service (NPS); and the National Capital Planning Commission (NCPC). See Figure 1.1 on page 6 for a map of TPB member jurisdictions. These members collaborate through the TPB process to develop two federally mandated documents; the financially **CONSTRAINED LONG-RANGE TRANSPORTATION PLAN** (CLRP) and the **TRANSPORTATION IMPROVEMENT PROGRAM** (TIP).

Constrained Long-Range Transportation Plan



The **CONSTRAINED LONG-RANGE TRANSPORTATION PLAN** (CLRP) identifies all significant transportation projects and programs that are planned in the Region over a 25 to 30 year period. This list of projects is financially constrained; meaning that they have a reasonable expectation of funding. Some of these projects will be completed in the near future, while others are only in the initial planning stages. A major update of the CLRP is done every four years.

Transportation Improvement Program

The **TRANSPORTATION IMPROVEMENT PROGRAM** (TIP) is a six-year financial program that describes the schedule for obligating federal funds to state and local transportation projects. The TIP contains projects and funding information for all modes of transportation including highways and transit. The TIP is formally updated every two years, however state, regional and local transportation agencies frequently amend or modify the TIP as priorities arise.

CLRP and TIP updates are made through an annual "Call for Projects" process that enables member agencies to submit new projects or updates to existing projects. As part of the project submittal process, agencies complete a project description form that describes what the project entails, its estimated cost, and how it will benefit the region. Each project submittal requires the agency to indicate which regional goals the project supports and which of the federally required planning factors apply to it. The project description form has included language designed to identify the freight benefits of candidate projects since November of 2009. The following two freight-related questions are included in the current project description form.

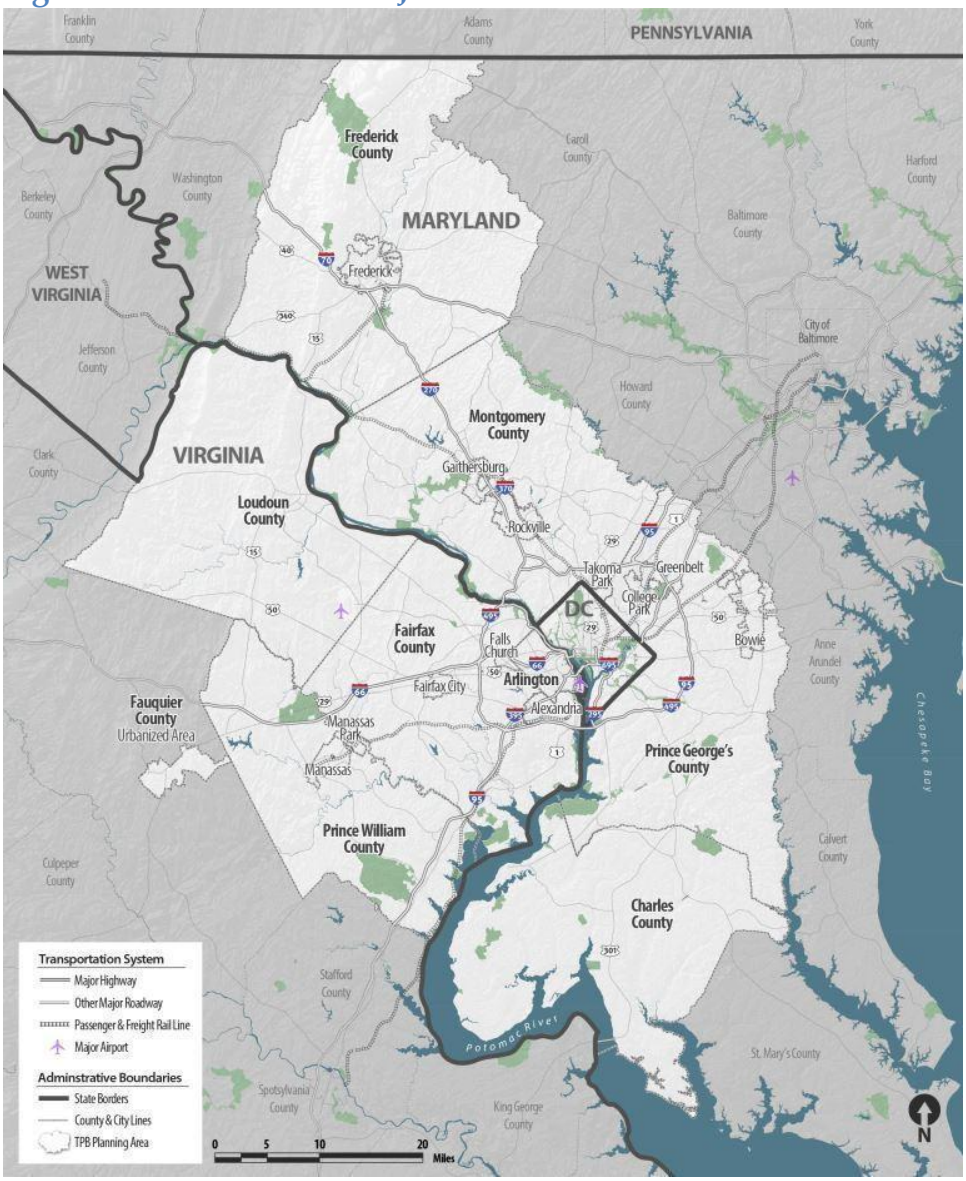
Question 27: Support Interregional and International Travel and Commerce

- Please identify all freight carrier modes that this project it enhances, supports, or promotes:
  Long Haul Truck
  Local Delivery
  Rail
  Air

Question 29: (MAP-21 Planning Factors) please identify any and all planning factors that are addressed by this project:

- (a) Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and deficiency
- (e) Increase accessibility and mobility of freight
- (g) Enhance the integration and conductivity of the transportation system, a cross and between modes, for people and freight

Figure 1.1 TPB Member Jurisdictions



1.3.4 Federal Context for Freight Planning in Metropolitan Areas

The federal government, primarily through its legislative and executive branches, establishes the legal framework through which regional transportation planning in general, and freight planning in particular, operates. In addition to this legal function, the federal government also provides funding, technical assistance, data, and data analysis tools to support transportation planning activities at the state, regional, and local levels.

The various administrations and offices of the United States Department of Transportation (USDOT) influence the freight transportation planning activities at all levels of government for each mode and vehicle type. USDOT administrations with important roles in freight transportation planning include:

- Federal Highway Administration (FHWA): supports state and local governments in the design, construction, and maintenance of the Nation's highway system and provides financial and technical assistance to state and local governments.
- Federal Motor Carrier Safety Administration (FMCSA): issues and enforces commercial vehicle related safety regulations; works to improve safety information systems and commercial motor vehicle technologies; and works to strengthen vehicle standards and increase safety awareness.
- Federal Railroad Administration (FRA): issues, implements, and enforces railroad safety regulations; makes selective investments in rail corridors; conducts research; and develops technology.
- Federal Aviation Administration (FAA): ensures that aircraft and the national airport system is safe, efficient, and environmentally responsible.
- Maritime Administration (MARAD): works in areas involving ships and shipbuilding, port operations, vessel operations, national security, the environment, and safety.
- Pipeline and Hazardous Materials Safety Administration (PHMSA): establishes national policy on pipelines and hazardous materials transport; sets and enforces standards; conducts research to prevent incidents; and prepares first responders.

Among the agencies listed above, the FHWA has the greatest influence on freight transportation planning for the Region. By law, every four years the FHWA, together with the FTA, must jointly certify the TPB's transportation planning process. This certification process includes a review of the Region's freight transportation planning activities.

Compliance with Federal Law – MAP-21 and FAST

The Moving Ahead for Progress in the 21st Century Act (MAP-21) was signed by the President of the United States on July 6, 2012 and became law on October 1, 2012. While it did not significantly change the existing MPO planning goals or the process of administering federal planning funds to the MPOs, it did include provisions to improve national, state, and regional freight policy and planning and to improve the condition and performance of the national freight network. Most of MAP-21's freight provisions affect federal transportation agencies and State Departments of Transportation. The most significant change for MPOs with respect to freight transportation is the requirement to, in consultation with State DOTs, establish, monitor, and set targets for freight performance. The Fixing America's Surface Transportation (FAST) Act was signed by the President of the United States on December 4, 2015. It is the first federal law in over a decade to provide long-term funding certainty for surface transportation planning and

investment. The FAST Act continues the requirements developed under MAP-21 to establish, monitor, and set targets for freight performance. Key freight provisions affecting all levels of government include[1]:

- Establishment of a National Multimodal Freight Policy: The FAST Act established a national multimodal freight policy that includes national goals to guide decision-making.
- Development of a National Freight Strategic Plan: The USDOT will develop a national freight strategic plan to implement the goals of the National Multimodal Freight Policy. The National Freight Strategic Plan will address the conditions and performance of the multimodal freight system, identify strategies and best practices to improve intermodal connectivity and performance of the national freight system, and mitigate the impacts of freight movement on communities.
- Creation of the Fostering Advancements in Shipping and Transportation for the Long-Term Achievement of National Efficiencies (FASTLANE) grant program: This discretionary freight-focused grant program will invest $4.5 billion over 5 years. It allows States, Metropolitan Planning Organizations (MPOs), local governments, tribal governments, special purpose districts and public authorities (including port authorities), and other parties to apply for funding to complete projects that improve safety and hold the greatest promise to eliminate freight bottlenecks and improve critical freight movements.
- Establishment of a National Highway Freight Network: The USDOT will establish a national highway freight network consisting of:
  - the primary highway freight system (PHFS);
  - critical rural freight corridors;
  - critical urban freight corridors; and
  - those portions of the Interstate System that are not part of the PHFS.
- Establishment of a National Highway Freight Program: The Act provides $6.3 billion in formula funds over five years for States to invest in freight projects on the National Highway Freight Network. Up to 10 percent of these funds may be used for intermodal projects..
- Establishment of a National Multimodal Freight Network: The USDOT will establish a National Multimodal Freight Network consisting of:
  - The National Highway Freight Network;
  - The freight rail systems of the Class I railroads;
  - U.S. public ports that have total annual foreign and domestic trade of at least 2 million short tons;
  - U.S. inland and intracoastal waterways;
  - The Great Lakes, the St. Lawrence Seaway, and coastal and ocean domestic freight routes;
  - The 50 largest U.S. airports with the highest annual landed weight; and
  - Other strategic freight assets, including strategic intermodal facilities and other freight rail lines.
- Establishes new requirements to improve project delivery and facilitate innovative finance: The FAST Act includes provisions intended to reduce the time it takes to break ground on new freight transportation projects, including by promoting best contracting practices and innovating financing and funding opportunities and by reducing uncertainty and delays with respect to environmental reviews and permitting.

1 This list of FAST provisions is adapted from several USDOT and FHWA web pages.

- Encouragement of state freight advisory committees: the USDOT will encourage states to establish freight advisory committees that consist of a representative cross-section of public and private freight stakeholders.
- State Freight Plans: To receive funding under the National Highway Freight Program the FAST Act requires each State to develop a State freight plan, which must comprehensively address the State's freight planning activities and investments (both immediate and long-range). A State may develop its freight plan either separately from, or incorporated within, its statewide strategic long-range transportation plan.
- Freight conditions and performance report: The FAST Act continues the MAP-21 requirement for the USDOT to provide Congress with a biennial report on the condition and performance of the National Highway Freight Network.
- Performance: The emphasis on performance under MAP-21 is continued under the FAST Act. USDOT will continue to establish national performance goals, measures, and targets in the areas of safety, infrastructure condition, congestion reduction, system reliability, freight movement and economic vitality, and environmental sustainability. States will be required to set targets in each of the above areas and MPOs will set targets in some cases as well. To the maximum extent practicable, state and MPO target setting should be coordinated.

The federal planning factors issued by Congress through SAFETEA-LU and MAP-21 have been enhanced through FAST to include the topics of; 1) system resiliency and reliability, and 2) the reduction or mitigation of storm-water impacts on the surface transportation system. The two planning factors that apply directly to freight planning remain unchanged and are:

- Increase the accessibility and mobility of people and freight; and
- Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight.

TPB's ongoing regional freight planning program addresses each of these factors.

TPB Activities to Address FAST Act Requirements

At the time of this Plan's release, the FHWA together with the FTA are in the process of translating the MAP-21 legislation (also supported by the FAST Act) into regulations that define what states, local governments, MPOs, and other entities must do to comply with the law. The TPB is monitoring the federal government's periodic releases of MAP-21/FAST Act notices of proposed and final rule makings, reviewing their contents, identifying the requirements within them that are relevant to MPOs, and developing preliminary plans and processes to address them. The recently released freight performance management proposed rule requires states and MPOs such as the TPB to develop and track freight performance measures and set freight performance targets. Complying with these requirements will require close coordination with DDOT, VDOT, and MDOT. Key freight performance management personnel within each of these organizations have been identified and preliminary meetings to discuss their various performance management approaches, including data sources and methodologies, have been scheduled. Further TPB actions related to the FAST Act will be developed as additional proposed rules, final rules, and guidance are released.

1.3.5 Freight Planning in Member Jurisdictions

Among TPB member jurisdictions, the state-level agencies (Maryland, Virginia, and the District of Columbia) are the most engaged in freight planning activities.

District of Columbia Freight Planning

The District of Columbia has recently published two major documents that include significant freight provisions.

- The District of Columbia Freight Plan: (2014) This plan addresses issues surrounding urban goods movement and includes strategies and recommendations to support sustainable future economic growth and balance the needs of communities and industries within the District. It is the foundation for integrating freight priority projects into the District's capital programming process.
- MoveDC: (2014) MoveDC is the District's multimodal long-range transportation plan. It includes a freight element based on information developed in the District of Columbia Freight Plan.
- The District of Columbia State Rail Plan (under development): This long range (20+ year) Plan will provide a vision for rail transportation in the District of Columbia. It will inform and educate the public, identify needed improvements along with funding sources, and place rail within a multimodal transportation context. It is scheduled for completion during calendar year 2016..

The urban goods delivery issues identified in the Freight Plan and MoveDC are likely to become relevant in the future for those areas of the Region becoming more urbanized as growth is concentrated in activity centers.

Commonwealth of Virginia Freight Planning

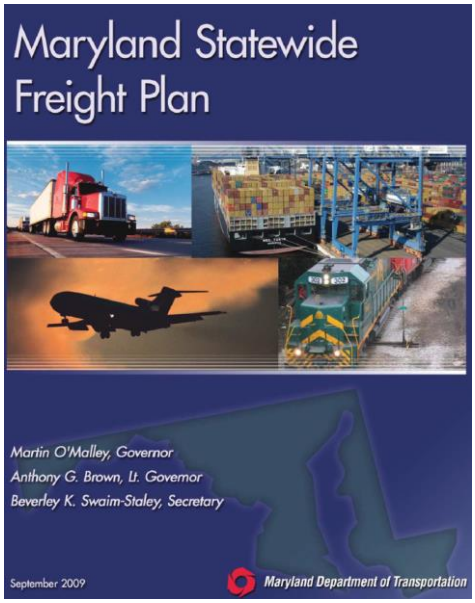
The Commonwealth's Office of Intermodal Planning and Investment (OIPI) coordinates freight planning efforts of several state agencies, including the Virginia Department of Transportation (VDOT), the Virginia Department of Rail and Public Transportation (DRPT), and the Virginia Port Authority (VPA). Representatives from both VDOT's Northern Virginia region office and DRPT are regular participants in TPB freight planning and coordinating activities. The Commonwealth has published several freight planning documents that are important to the National Capital Region including:

- Virginia Statewide Multimodal Freight Study, Phase I: (2007) This study established a guiding framework for near-term and long-range freight policy and investment strategies. It compiled available information, identified current and projected future needs, and provided implementable recommendations for Commonwealth freight planning and programming. Many structural elements of this Plan were modeled on this Phase I Study.
- Virginia Statewide Multimodal Freight Study, Phase II: (2011) This study developed analysis tools, analyzed corridor and regional freight needs and alternatives, and evaluated infrastructure projects and policy alternatives based on public benefits and return on investment to the Commonwealth.
- Virginia Multimodal Freight Plan: (2013) This plan provides the vision, goals, and investment strategies designed to keep freight moving in Virginia. It describes the relationship among statewide transportation goals, freight specific priorities, and investment strategies; identifies key performance indicators to track progress; and summarizes outreach efforts to engage public agencies and freight stakeholders.

- Virginia Statewide Rail Plan: (2013) This plan provides a vision for passenger and freight rail transportation in Virginia through 2040. It profiles the Commonwealth's current rail assets, services, and capacity choke points. It includes recommended improvement projects and is part of a multimodal interagency transportation planning effort guided by VTrans, Virginia's statewide long-range multimodal policy plan.
- Virginia Truck Parking Study: (2015) This study documents the supply of truck parking spaces throughout the state, including public and private facilities, and estimates truck parking demand for each Corridor of Statewide Significance (CoSS) The study also provides recommendations for actions that VDOT can take to increase the supply of truck parking spaces in appropriate areas.

State of Maryland Freight Planning

Most of Maryland's statewide and regional freight planning activities are coordinated through the Maryland Department of Transportation (MDOT) Office of Freight and Multimodalism (OFM). Representatives from MDOT and the Maryland State Highway Administration (SHA) are regular participants in TPB freight planning and coordinating activities. MDOT has published several relevant freight planning documents including:



- Maryland Statewide Freight Plan: (2009) This plan provides a comprehensive overview of Maryland's current and long-range freight system performance and identifies the public and private investments and policies needed to ensure the efficient movement of freight across the state.
- Maryland State Rail Plan: (2015) This Plan provides an overview of the current and planned rail network and services within Maryland and outlines the public and private investments and policies needed to ensure the efficient, safe, and sustainable movement of freight and passengers by rail.
- Maryland Strategic Goods Movement Plan: (draft) This update to the Maryland Statewide Freight Plan will examine existing conditions and long range projections, and recommend policy positions and strategies for MDOT and freight stakeholders to advance over the next five years.
- Maryland Freight System Performance Annual Report(s): This periodically updated report identifies freight performance measures for each Modal Administration within MDOT.

Freight Planning in Other Member Jurisdictions

While many of the TPB's non-state member jurisdictions have not developed freight-specific plans, some of them address freight issues within their respective planning documents. One member jurisdiction, Frederick County Maryland, developed a freight-specific document. The **FREDERICK COUNTY FREIGHT AND LAND USE PLAN** (2011) provides transportation infrastructure recommendations and a set of land-use tools the county can use to improve the coordination between freight related land uses and the multimodal transportation system. TPB staff works closely with the states and local jurisdictions to ensure coordination among state, regional, and local freight plans.

Section 2.0 The Multimodal Freight System

This section describes the elements that make up the regional freight system. Understanding these elements enables the TPB to better assess the way that freight vehicles use the system and how freight movements contribute to congestion, pavement consumption, bridge stress, economic development, and quality of life.

2.1 Freight Transportation System Overview

The region's multimodal freight transportation system consists of:

- More than 16,000 miles of roadways carrying more than 300 million tons of goods annually.
- Two Class I railroads – CSX Transportation and the Norfolk Southern Corporation – operating over 250 miles of mainline track and carrying more than 47 million tons of local freight annually.
- Two major cargo airports – Washington Dulles International Airport and Baltimore Washington International Thurgood Marshall Airport.
- An extensive pipeline network that carries more than nine million tons of freight per year.
- A number of key intermodal connectors – short roadway segments that tie rail terminal facilities, airports, and pipeline terminal facilities to the National Highway System (NHS).

2.2 Trucking and the Region's Roads

The region's highway system is organized into the following categories:

- **Interstate –** More than 230 miles of 4- to 10-lane highways that connect the region to the rest of the nation.
- **Primary –** More than 2,400 miles of 2- to 8-lane roads that connect communities within the Region to each other and to the interstates.
- **Secondary –** More than 2,100 miles of connector roads.
- **Local –** More than 12,000 miles of local streets.

2.2.1 Truck Types

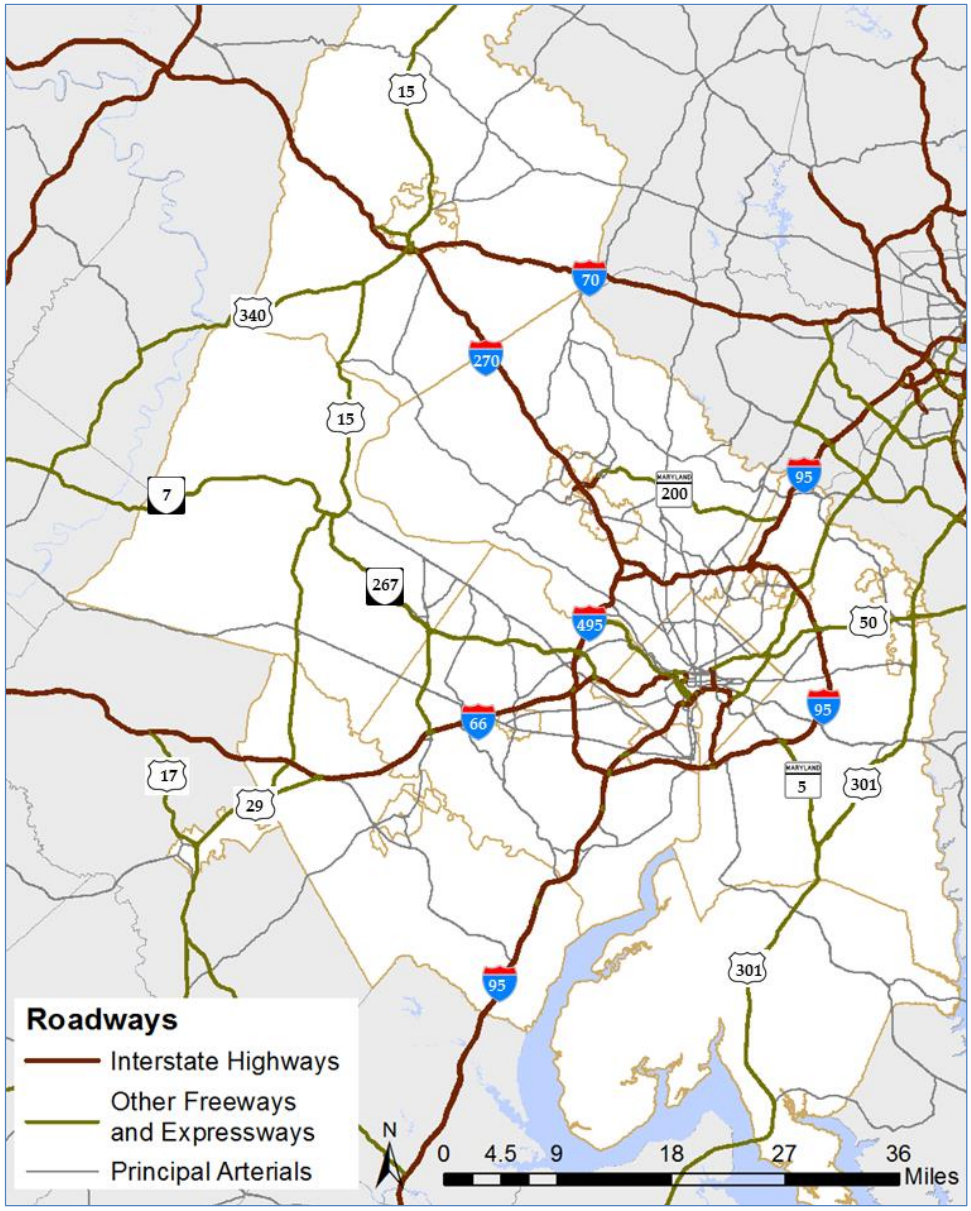
The Region's highway network is publicly owned, and the majority of truck freight is moved over the interstate and primary highway systems. However, the trucks and trailers using that network are privately owned. Different types and sizes of trucks are used to haul certain types of cargo. Trucks vary in size from small delivery vans, to medium-size "single-unit" vehicles, or large combination tractor-trailer vehicles. Cargo can be carried in a "dry van", on a flatbed trailer, on a specialized "auto rack", in a hopper or a liquid bulk tank, or in an intermodal shipping container designed for direct transfer between truck, ship, and train using specialized overhead lift equipment. There may be a refrigerator unit for keeping the cargo at a suitably cool temperature.[2]

2.2.2 Highway Inventory

Figure 2.1 below illustrates the locations of the National Capital Region's major highways.

[2] Virginia Multimodal Freight Study – Phase I

Figure 2.1 Interstate and Primary Highway Systems in the Region



2.2.3 The Regional Freight Significant Network

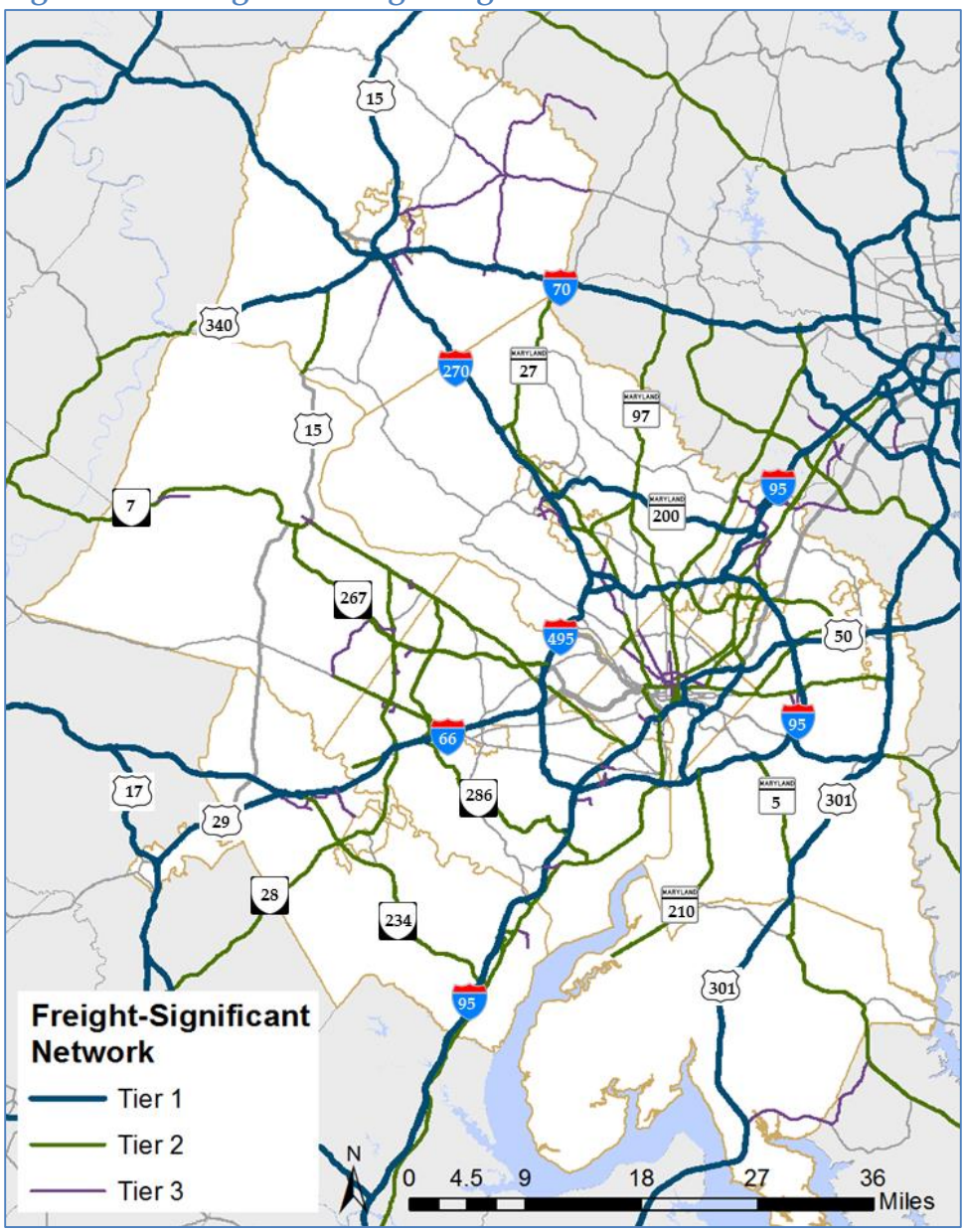
Certain components of the region's highway system are particularly important for goods movement. Each of the Region's member states, Maryland, Virginia, and the District of Columbia have identified a designated truck network linking major freight shipping and receiving areas and accommodating through state freight movement. Within the Region, most of these state designated truck routes are represented by interstate highways and major arterials. At the regional level, the importance of roadways other than state designated truck routes is also recognized. These regionally freight-significant roadways function as important connectors between retail establishments, warehouse and distribution centers, and state-designated truck routes.

TPB staff, in consultation with the TPB Freight Subcommittee, identified a network of these freight-important roadways using a combination of data analysis and collective expertise. The resulting regional freight significant network is organized into three tiers.

- **Tier 1 -** roadways in this tier include state-designated truck routes, interstates, and other high volume roadways. These roads are the means by which most freight enters and leaves the Region and are typically used by pass-through trucks.
- **Tier 2 -** roadways in this tier allow trucks to permeate the Region and provide access to important freight generators and attractors.
- **Tier 3 -** roadways in this tier provide last mile connectivity.

The regional freight significant network is a system of truck-allowed routes that are particularly important for goods movement. The freight significant network is intended for regional data analysis and is not promoted as truck routes in the same way that officially state-designated truck routes are. The primary purpose of developing the regional freight-significant network is to facilitate performance monitoring. For example, congestion can be measured on the freight significant network and compared to that of the overall region. Similar comparisons can be made for pavement condition, bridge condition, or safety. The regional freight-significant network is shown in Figure 2.2. Additional information on the components of the regional freight-significant network are provided in Table 2.1 and detailed maps are provided in Appendix B.

Figure 2.2 Regional Freight-Significant Network



Developed in consultation with the TPB Freight Subcommittee – route inclusion supported by truck volume and percentage analysis – for planning purposes only.

Table 2.1 Components of the Regional Freight-Significant Network

Route Name	Tier	From	To	Comments
Frederick County, MD				
I-70	Tier 1	Washington-Frederick County line	Frederick-Carroll County line	Part of Maryland Truck Route System
I-270	Tier 1	Montgomery-Frederick County line	I-70	Part of Maryland Truck Route System
US-15	Tier 1	US-340	Maryland-Pennsylvania line	Provides good truck access from Frederick to Gettysburg, PA and points north
US-340	Tier 1	Washington-Frederick County line	I-70	Part of Maryland Truck Route System
US-15	Tier 2	MD 28	US-340	Provides access to commercial and freight routes to Point of Rocks and points south – note vehicle length restrictions in place on US-15 in Loudoun County, VA
MD 140	Tier 2	US-15	Frederick-Carroll County line	Provides truck access to various facilities in northern Frederick and Carroll Counties
MD 26	Tier 3	US-15	Frederick-Carroll County line	Provides access to commercial and industrial areas including MD 75 and to Carroll County and beyond
MD 75	Tier 3	W. Baldwin Road	Frederick-Carroll County line	South of I-70: provides truck access to W. Baldwin Road / Intercoastal Drive and on to Costco distribution facility – note vehicle height restrictions south of W. Baldwin Road North of I-70: provides truck access to cement plant in Carroll County
MD 85	Tier 3	I-70	Manor Woods Road	Provides truck access to industrial areas
MD 355	Tier 3	MD 85	New Technology Way	Provides truck access to commercial and industrial areas – note trucks are not encouraged beyond New Technology Way
MD 550	Tier 3	MD 194	MD 26	Provides truck access to Woodsboro Mining and connection to MD 75 via MD 26
Monocacy Blvd	Tier 3	South Street / Reichs Ford Road	MD 26	Provides truck access to industrial areas in and around Frederick
Reichs Ford Road	Tier 3	I-70	Ray Smith Road	Provides truck access to industrial and commercial areas

Route Name	Tier	From	To	Comments
W. Baldwin Road & Intercoastal Drive	Tier 3	MD 75	Costco distribution facility	Provides truck access to Costco distribution facility
Montgomery County, MD				
I-270	Tier 1	I-495	Montgomery-Frederick County line	Part of Maryland Truck Route System
I-270 SPUR	Tier 1	I-495	I-270	Part of Maryland Truck Route System
I-370	Tier 1	I-270	MD 200	Provides truck connection between I-270 and I-95
I-495	Tier 1	Virginia – Maryland line	Montgomery-Prince George's County line	Part of Maryland Truck Route System
MD 200	Tier 1	I-370	Montgomery-Prince George's County line	Provides truck connection between I-270 and I-95
US-29	Tier 2	DC-Maryland line	Montgomery-Howard County line	Connects to DC Truck Route (Georgia Ave.) and provides truck access to a variety of commercial areas in Silver Spring, White Oak, and Columbia
MD 27	Tier 2	MD 355	Montgomery-Howard County line	Provides truck access to northern Montgomery County
MD-28	Tier 2	I-270	MD 97	Provides truck access to commercial areas in central Montgomery County
MD 97	Tier 2	US-29	Montgomery-Howard County line	Connects to DC Truck Route (Georgia Ave.) via US-29 and provides access to commercial areas of Silver Spring, Wheaton and points north
MD 355	Tier 2	I-495	MD 27	Provides truck access to commercial areas of Rockville and Gaithersburg
MD 355	Tier 2	MD 410 / MD 187	DC-Maryland line	Connects to DC Truck Route (Wisconsin Ave.) and provides truck access to a variety of commercial areas in the District of Columbia and Bethesda
MD 193	Tier 2	I-495	Montgomery-Prince George's County line	Provides truck access to commercial areas in southern Montgomery and western Prince George's Counties
Father Hurley Blvd & Ridge Road	Tier 2	I-270	MD 27 / MD 355	Provides truck access to commercial areas in Germantown and connects I-270 to MD 27 and MD 355
MD 28	Tier 3	I-270	Darnestown Road	Provides truck access to Johns Hopkins and Adventist Hospital as well as adjacent commercial areas

Route Name	Tier	From	To	Comments
MD 119	Tier 3	Sam Eig Highway	MD 28	Provides truck access to Johns Hopkins and Adventist Hospital as well as adjacent commercial areas
MD 187	Tier 3	MD 355 (in Bethesda)	MD 355 (north of I-495)	Provides truck access to commercial and medical facilities including the National Institutes of Health, Montgomery Mall, and Bethesda
MD 198	Tier 3	U.S-29	Montgomery-Prince George's County line	Provides truck access from U.S. 29 to industrial areas along Sweitzer Ln – also provides truck access to Laurel and Fort Meade.
Sam Eig Highway	Tier 3	I-270 / I-370	MD 119	Provides truck access to Johns Hopkins and Adventist Hospital as well as adjacent commercial areas
Prince George's County, MD				
I-95	Tier 1	Virginia – Maryland line	Prince George's-Howard County line	Part of Maryland Truck Route System
I-295	Tier 1	I-495	Maryland-DC line	Part of Maryland Truck Route System
I-495	Tier 1	Montgomery-Prince George's County line	I-95	Part of Maryland Truck Route System
US-50	Tier 1	DC-Maryland line	Prince George's-Anne Arundel County line	Part of Maryland Truck Route System – provides connectivity to DC Truck route System (New York Ave)
US-301	Tier 1	Charles-Prince George's County line	Prince George's-Anne Arundel County line	Part of Maryland Truck Route System
MD 3	Tier 1	US-50	Prince George's-Anne Arundel County line	Part of Maryland Truck Route System
MD 4	Tier 1	I-95	US-301	Part of Maryland Truck Route System
MD 200	Tier 1	Montgomery-Prince George's County line	US-1	Provides truck connection between I-270 and I-95 / US-1
MD 201	Tier 1	US-50	Maryland-DC line	Provides critical truck connection between US-50 and DC-295 (DC Truck Route) and for trucks leaving DC to reach US-50 and I-95 / I-495
US-1	Tier 2	DC-Maryland line	Prince George's-Howard County line	Provides truck access to a variety of commercial and industrial areas along the entire length of the corridor. Connects to DC Truck Route (Rhode Island Avenue)

Route Name	Tier	From	To	Comments
US-1 ALT	Tier 2	DC-Maryland line	US-1	Connects to DC Truck Route (Bladensburg Rd) – provides access to commercial and industrial areas in and around Hyattsville
MD 4	Tier 2	US-301	Prince George's-Anne Arundel County line	Provides truck access from US-301 to points east and south and to commercial areas of Calvert County
MD 5	Tier 2	I-95	Prince George's-Charles County line	Provides truck connection between Southern Maryland and the National Capital Region - connects Southern Maryland to the National Freight Network
MD 193	Tier 2	Montgomery-Prince George's County line	MD 450	Provides truck access to commercial areas in Langley Park, College Park, Greenbelt, and Bowie
MD 201	Tier 2	US-50	MD 212	Provides truck access to commercial and industrial areas of Greenbelt, Bladensburg, Cheverly, and Hyattsville – including the Pepsi bottling plant in Cheverly and the Tuxedo Road industrial area in Hyattsville
MD 210	Tier 2	I-95	Prince George's-Charles County line	Provides truck access to Indian Head from I-95 / I-495
MD 214	Tier 2	DC-Maryland line	US-301	Provides truck connection to East Capitol St. (DC Truck Route) – provides truck access to and from the industrial areas off Ritchie Rd and Hampton Park Blvd
MD 450	Tier 2	MD 193	MD 704	Links MD-193 to MD-704
MD 704	Tier 2	DC-Maryland line	MD 450	Connects DC Truck Route system (East Capitol St. via 63rd St) to commercial areas in central Prince George's County and to US-50
MD 198	Tier 3	Montgomery-Prince George's County line	Prince George's-Anne Arundel County line	Provides access from I-95 and US-29 to industrial areas along Sweitzer Ln – also provides truck access to Laurel and Fort Meade
MD 212	Tier 3	US-1	MD 201	Connects the industrial areas in Beltsville (east of the CSX Capital Subdivision) to US-1 – note: the portion of MD-212 (Powder Mill Rd) between Ammendale Rd and US-1 is "not" part of the Regional Freight-Significant Network
MD 212 – Ammendale Rd – Virginia Manor Road	Tier 3	I-95	Konterra Dr – Muirkirk Rd	Provides truck access between I-95 and the commercial and industrial areas along Virginia Manor Rd and Konterra Dr., including the FedEx and Frito Lay facilities along Trolley Lane - the portion of MD-212 (Powder Mill Rd) between Ammendale Rd and US-1 is "not" part of the Regional Freight-Significant Network

Route Name	Tier	From	To	Comments
Edmonston Rd – Old Baltimore Pike	Tier 3	MD-201 / MD-212	Muirkirk Rd	Provides truck access to industrial areas in and around Beltsville
Leeland Rd	Tier 3	Safeway distribution center entrance	US-301	Provides truck access to and from major Safeway distribution center – note: Leeland Rd east of the Safeway distribution center is not recommended for trucks
Muirkirk Rd	Tier 3	Virginia Manor Rd / Konterra Dr	Old Baltimore Pike	Provides truck access from MD-200 and I-95 to Beltsville industrial areas (via Konterra Dr and Virginia Manor Rd / MD-212 – note: Bridge over CSX on Muirkirk Rd is weight restricted - 56,000 lbs for single unit trucks and 54,000 lbs for combinations
Ritz Way	Tier 3	Virginia Manor Rd	US-1	Provides access to US-1 in Beltsville from MD-200 via Konterra Dr and Virginia Manor Rd and from I-95 via MD-212 and Virginia Manor Rd
Sweitzer Ln – Konterra Dr	Tier 3	MD 198	Virginia Manor Rd / Muirkirk Rd	Provides truck access to industrial areas including a major UPS facility and a WSSC Filtration Plant
Charles County, MD				
US-301	Tier 1	Virginia-Maryland line	Charles-Prince George's County line	Part of Maryland Truck Route System
MD 5	Tier 2	US-301	Charles-St. Mary's County line	Provides truck connection between Southern Maryland and the National Capital Region - connects Southern Maryland to the National Freight Network
MD 210	Tier 2	Prince George's-Charles County line	Naval Support Facility Indian Head	Provides truck access to Indian Head from I-95 / I-495
MD 234	Tier 3	US-301	Charles-St. Mary's County line	Provides a connection (in combination with MD-236, MD-5, and MD-235) between industrial and commercial areas of St. Mary's county and US-301
District of Columbia				
I-295	Tier 1	Maryland-DC line	I-695 / DC-295	Provides truck access to the District of Columbia from I-95 / I-495 and points south
I-395	Tier 1	Virginia – DC line	New York Avenue	Provides truck access to the District of Columbia from I-95 / I-495 and points south
I-695	Tier 1	I-395	I-295 / DC-295	Major east-west Interstate connection through the District of Columbia
DC-295	Tier 1	I-295 / I-695	DC-Maryland line	Provides truck access to the District of Colombia from Maryland and points east

Route Name	Tier	From	To	Comments
New York Avenue (US-50)	Tier 1	Maryland-DC line	I-395	Provides truck access to the District of Colombia from Maryland and points east
Benning Road	Tier 2	Bladensburg Road	East Capitol Street	Provides truck connections between commercial areas in the District and Maryland
Bladensburg Road	Tier 2	Benning Road	DC-Maryland line	Provides truck connections between commercial areas in the District and Maryland
East Capitol Street	Tier 2	Benning Road	DC-Maryland line	Provides truck connections between commercial areas in the District and Maryland
Georgia Avenue	Tier 2	7th Street NW	DC-Maryland line	Provides truck connections between commercial areas in the District and Maryland
Independence Avenue	Tier 2	14th Street NW	7th Street NW	Provides truck connections between 7th Street NW and access points to I-395 via 12th and 14th Streets NW
Rhode Island Avenue	Tier 2	7th Street NW	DC-Maryland line	Provides truck connections between commercial areas in the District and Maryland
Western Avenue	Tier 2	Wisconsin Avenue	Massachusetts Avenue	Provides truck connection between Wisconsin and Massachusetts Avenues
Whitehurst Freeway	Tier 2	M Street NW	K Street NW	Links Key Bridge and Virginia to the central business district
Wisconsin Avenue	Tier 2	Maryland-DC line	K Street NW	Provides truck connections between commercial areas in the District and Maryland
H Street (NW and NE)	Tier 2	Massachusetts Avenue	Benning Road	Provides truck connections from the central business district to Maryland and points east
K Street NW	Tier 2	Georgetown	12th Street NW	Provides truck connections between the central business district, Georgetown, the Whitehurst Freeway, Virginia and points south
M Street NW	Tier 2	Wisconsin Avenue	US-29	Provides truck connection between Wisconsin Avenue, Virginia, and points south
7th Street NW	Tier 2	Independence Avenue	Georgia Avenue	Provides truck connections from the central business district to Maryland
12th Street NW	Tier 2	I-395	Massachusetts Avenue	Provides truck access from I-395 to the central business district
Connecticut Avenue	Tier 3	K Street NW	DC-Maryland line	Provides truck access to commercial areas along Connecticut Avenue
Florida Avenue	Tier 3	Benning Road	Massachusetts Avenue	Provides truck access to commercial areas in the District

Route Name	Tier	From	To	Comments
Massachusetts Avenue	Tier 3	H Street NW	DC-Maryland line	Provides truck access to commercial areas along Massachusetts Avenue
14th Street NW	Tier 3	I-395	Upshur Avenue NW	Provides truck access to commercial areas along 14th Street NW
Loudoun County, VA				
US-50	Tier 2	VA-606	Loudoun-Fairfax County line	Provides truck access to Dulles Airport and to Arcola and Chantilly industrial areas
VA-7	Tier 2	Loudoun-Frederick County line	Loudoun-Fairfax County line	Provides truck access to Purcellville, Leesburg, and the commercial areas along VA-7 in eastern Loudoun County - STAA National Network (western Loudoun County), STAA Virginia Qualifying Highway (eastern Loudoun County)
VA-28	Tier 2	VA-7	Loudoun-Fairfax County line	Provides truck access to commercial and industrial areas in Loudoun, Fairfax, and Prince William Counties and the Cities of Manassas and Manassas Park – STAA Virginia Qualifying Highway
VA-267	Tier 2	VA-7	Loudoun-Fairfax County line	Provides truck connections to Leesburg, Dulles Airport, Reston/Herndon, and I-495 – STAA Virginia Access Route
VA-606	Tier 3	VA-28	US-50	Links warehouse area north of Dulles Airport to VA-28, VA-267, and US-50
Cascades Pkwy – Bartholomew Fair Dr	Tier 3	VA-7	Price Cascades Plaza	Provides truck access to Costco and Potomac Run Plaza retail areas - STAA Virginia Access Route
E. Market St	Tier 3	VA-7	Catoctin Circle	Provides truck access to commercial areas of Leesburg - STAA Virginia Access Route
W. Main St	Tier 3	VA-7	N. 23rd St	Provides truck access to downtown Purcellville - STAA Virginia Access Route
Fairfax County, VA				
I-66	Tier 1	Prince William-Fairfax County line	I-495	STAA National Network
I-95	Tier 1	Prince William-Fairfax County line	Fairfax County-City of Alexandria line	STAA National Network
I-395	Tier 1	I-95 / I-495	Fairfax County-City of Alexandria line	STAA National Network
I-495	Tier 1	I-95 / I-395	Virginia-Maryland line	STAA National Network

Route Name	Tier	From	To	Comments
US-1	Tier 2	Prince William-Fairfax County line	Fairfax County-City of Alexandria line	Provides truck access to Fort Belvoir, Quantico, and an assortment of businesses in Stafford, Prince William, and Fairfax Counties as well as the City of Alexandria
US-29	Tier 2	Luck Stone quarry just east of the Manassas National Battlefield Park	I-66	Provides truck access to Luck Stone quarry
US-50	Tier 2	Loudoun-Fairfax County line	I-66	Provides access to Dulles Airport and to Arcola and Chantilly industrial areas - STAA Virginia Access Route between Lee Rd and I-66
VA-7	Tier 2	Loudoun-Fairfax County line	Fairfax County-City of East Falls Church line	Provides truck access to commercial areas along VA-7 in Fairfax County
VA-7	Tier 2	City of East Falls Church-Fairfax County line	Fairfax County-City of Alexandria line	Provides truck access to commercial areas along VA-7 in Fairfax County
VA-28	Tier 2	Loudoun-Fairfax County line	Fairfax-Prince William County line	Provides truck access to commercial and industrial areas
VA-267	Tier 2	Loudoun-Fairfax County line	I-495	Provides truck connections to Dulles Airport, Reston/Herndon, and I-495 - STAA Virginia Access Route
VA-286	Tier 2	VA-7	US-1	Provides truck connections between VA-7, I-66, and I-95 and access to Fort Belvoir
Braddock Rd – Port Royal Rd	Tier 3	I-495	Terminus of Port Royal Rd	Provides truck access to industrial areas along Port Royal Rd - STAA Virginia Access Route
Centreville Rd	Tier 3	VA-267	Coppermine Rd	Provides truck access to commercial areas along Centreville Rd - STAA Virginia Access Route
Franconia Rd – Fleet Rd	Tier 3	I-95	Fleet Industrial Park	Provides truck access to commercial and industrial areas including Springfield Town Center and Fleet Industrial Park - STAA Virginia Access Route
Lee Rd	Tier 3	US-50	Flint Lee Rd	Provides truck access to industrial areas along Lee Rd and to the Chantilly Crossing Shopping Center (Costco) - STAA Virginia Access Route
Lorton Rd	Tier 3	I-95	US-1	Provides a truck connection between I-95 and US-1 in Lorton - STAA Virginia Access Route

Route Name	Tier	From	To	Comments
McLearen Rd – Towerview Rd – Park Center Rd	Tier 3	VA-28	Terminus of Park Center Rd	Provides truck access to industrial areas along Park Center and Towerview Roads - STAA Virginia Access Route
Terminal Rd	Tier 3	VA-286	Terminus	Provides truck access to Plantation Pipeline Terminal facilities and other industrial areas - STAA Virginia Access Route
Walney Rd – Willard Rd	Tier 3	US-50	Brookfield Corporate Drive	Provides truck access to the Dulles Expo Center and other commercial areas - STAA Virginia Access Route
City of Falls Church, VA				
VA-7	Tier 2	Fairfax County-City of Falls Church line	City of Falls Church- Fairfax County line	Provides truck access to commercial areas along VA-7 in Falls Church and connects to VA-7 on either side of Falls Church
Prince William County, VA				
I-66	Tier 1	Fauquier-Prince William County line	Prince William-Fairfax County line	STAA National Network
I-95	Tier 1	Stafford-Prince William County line	Prince William-Fairfax County line	STAA National Network
US-29	Tier 1	Fauquier-Prince William County line	I-66	STAA National Network
US-1	Tier 2	Stafford-Prince William County line	Prince William-Fairfax County line	Provides truck access to Fort Belvoir, Quantico, and an assortment of businesses in Stafford, Prince William, and Fairfax Counties
VA-28	Tier 2	Fairfax-Prince William County line	Prince William County-City of Manassas Park line	Provides truck access to commercial and industrial areas in Loudoun, Fairfax, and Prince William Counties and the Cities of Manassas and Manassas Park
VA-28	Tier 2	City of Manassas-Prince William County line	Prince William-Fauquier County line	Provides truck access to commercial and industrial areas in Loudoun, Fairfax, and Prince William Counties and the Cities of Manassas and Manassas Park
VA-234	Tier 2	I-66	City of Manassas-Prince William County line	Provides truck connection through Prince William County between US-1, I-95, City of Manassas, I-66, and the Balls Ford Road industrial area
VA-234	Tier 2	City of Manassas-Prince William County line	US-1	Provides truck connection through Prince William County between US-1, I-95, City of Manassas, I-66, and the Balls Ford Road industrial area

Route Name	Tier	From	To	Comments
Balls Ford Road	Tier 3	Wellington Rd	Terminus of Balls Ford Rd	Provides truck access to industrial areas along the length of Balls Ford Rd – provides truck connection to Wellington Rd industrial and commercial areas - STAA Virginia Access Route
Dale Blvd – Neabsco Mills Rd	Tier 3	I-95	US-1	Provides truck connection between I-95 and US-1 - STAA Virginia Access Route
Featherstone Rd – Farm Creek Dr	Tier 3	US-1	Terminus of Farm Creek Dr	Provides truck access to industrial areas along Farm Creek Dr - STAA Virginia Access Route
Opitz Blvd	Tier 3	I-95	US-1	Provides truck connection between I-95 and US-1 - STAA Virginia Access Route
Sudley Rd	Tier 3	I-66	Godwin Dr	Provides truck access to industrial and commercial areas, including Costco, Westgate Plaza Shopping Center, and Manassas Mall - STAA Virginia Access Route
Wellington Rd	Tier 3	Limestone Dr	Livingston Rd	Provides truck access to industrial areas - STAA Virginia Access Route
City of Manassas, VA				
VA-28	Tier 2	City of Manassas Park-City of Manassas line	City of Manassas – Prince William County line	Provides truck access to commercial and industrial areas in Loudoun, Fairfax, and Prince William Counties and the Cities of Manassas and Manassas Park
VA-234	Tier 2	Prince William County-City of Manassas line	City of Manassas – Prince William County line	Provides truck connection through Prince William County between US-1, I-95, City of Manassas, I-66, and the Balls Ford Road industrial area
City of Manassas Park, VA				
VA-28	Tier 2	Prince William County-City of Manassas Park line	City of Manassas Park– City of Manassas line	Provides truck access to commercial and industrial areas in Loudoun, Fairfax, and Prince William Counties and the Cities of Manassas and Manassas Park
Fauquier County, VA (Urbanized Area)				
US-29	Tier 1	Through urbanized area		STAA National Network
US-17	Tier 1	Through urbanized area		STAA National Network – trucks prohibited on US-17 between I-66 and US-50
Arlington County, VA				
I-395	Tier 1	City of Alexandria-Arlington County line	Virginia-DC line	STAA National Network

Route Name	Tier	From	To	Comments
US-1	Tier 2	City of Alexandria-Arlington County line	Virginia-DC line	Provides truck access to an assortment of businesses in Arlington County and the City of Alexandria
VA-110	Tier 2	I-395	Rosslyn	Provides a truck connection between I-395 and US-29 / Key Bridge
Lynn St – Fort Meyer Dr	Tier 2	VA-110	Virginia-DC line – Key Bridge	Provides truck connection between the Key Bridge and VA-110
VA-27	Tier 3	I-395	2nd Street S.	Provides truck access Fort Myer - STAA Virginia Access Route
VA-233	Tier 3	US-1	Washington Reagan National Airport	Provides truck access to Washington Reagan National Airport
City of Alexandria, VA				
I-95	Tier 1	Fairfax County-City of Alexandria line	Virginia-Maryland line	STAA National Network
I-395	Tier 1	Fairfax County-City of Alexandria line	City of Alexandria-Arlington County line	STAA National Network
US-1	Tier 2	Fairfax County-City of Alexandria line	City of Alexandria-Arlington County line	Provides truck access to Arlington and Fairfax Counties as well as the City of Alexandria
VA-7	Tier 2	Arlington County-City of Alexandria line	I-395	Provides truck access to the commercial areas along VA-7 in Fairfax County
Duke Street	Tier 3	I-395	S. Pickett St	Provides truck access to the Landmark Mall and other commercial areas - STAA Virginia Access Route
Van Dorn St – Metro Rd	Tier 3	I-95 / I-495	Edsall Rd	Provides truck access to industrial areas and CSX intermodal facility - STAA Virginia Access Route and FHWA Intermodal Connector

2.2.4 Truck Parking

Commercial motor vehicle operators often drive long hours on busy roadways. To ensure that truck drivers remain alert, federal regulations require them to keep track of how many hours they are on duty and to stop driving when they have reached certain hours of service limits. Truck drivers, however, cannot always find parking spaces at rest areas or commercial truck stops, and often choose to park on shoulders (of roadways or ramps) or at other undesignated locations, increasing the risk of crashes and accelerating the deterioration of shoulder pavements. The USDOT's findings in the **JASON'S LAW TRUCK PARKING SURVEY RESULTS AND COMPARATIVE ANALYSIS** show most states reported having truck parking shortages occurring at all times of the day during every day of the week. The demand for truck parking spaces in the

National Capital Region is significantly greater than the supply. VDOT estimates that Northern Virginia alone has a shortage of over 1,000 truck parking spaces. MDOT highlights truck parking as safety and security issue in the **MARYLAND STRATEGIC GOODS MOVEMENT PLAN** (draft). Both Maryland and Virginia are actively working to address truck parking shortages in and around the National Capital Region.

According to the **VIRGINIA TRUCK PARKING STUDY** (2015), the most frequently reported reason for trucks parking in undesignated areas was a shortage of available official/formal truck parking spaces at the time of need. Contributing reasons include:

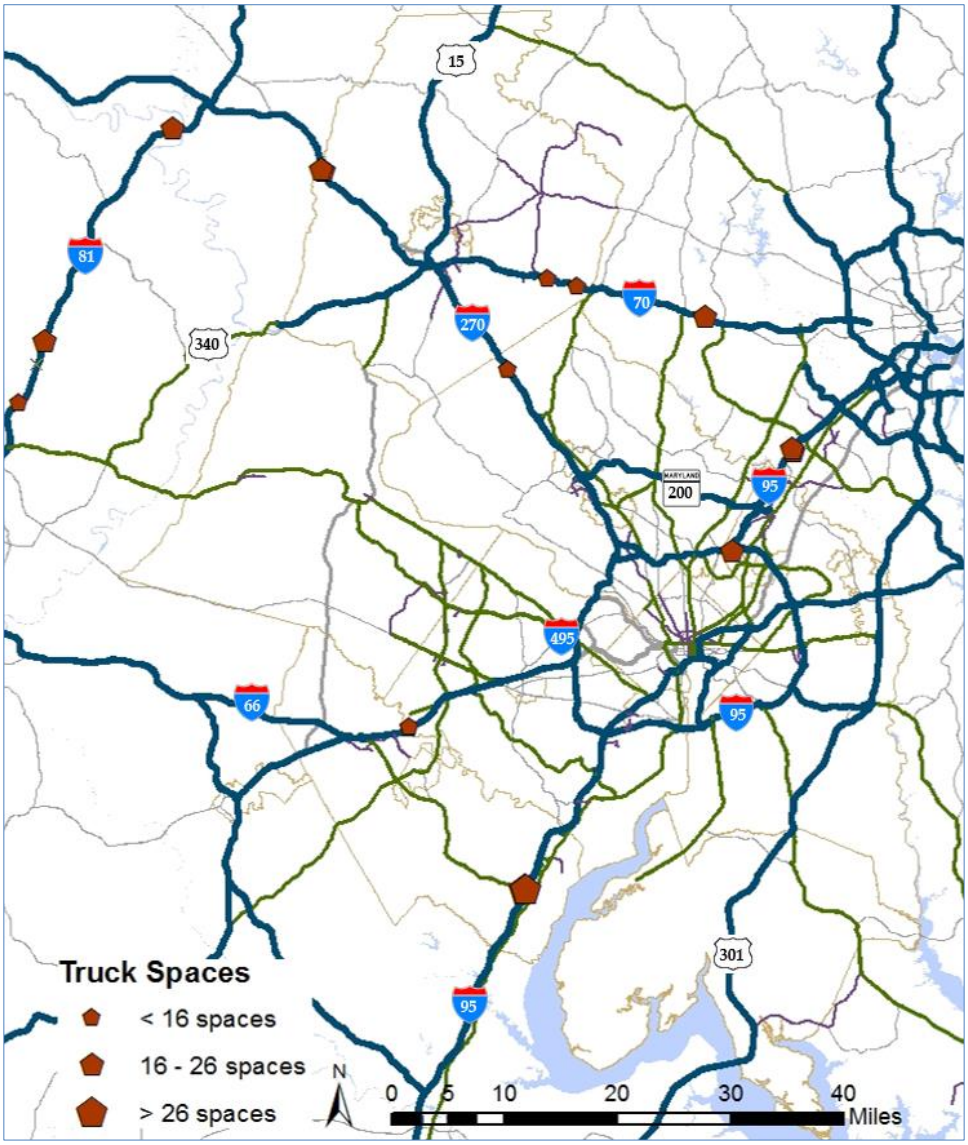
- Truckers do not know where available truck parking spaces are located.
- Truck parking facilities, if they exist, are oftentimes already at or over capacity when truckers arrive.
- Many shippers and receivers have scheduled delivery and pick-up times that are not flexible and do not allow on-site truck parking, which increases the demand for staging areas with available parking near the shippers and receivers.

There are several issues that contribute to the challenges of increasing truck parking in the Region. Three of the primary issues are:

- Transportation Congestion: The delays that frequently occur in the Region result in fewer miles of travel for trucks before drivers use up their available "hours of service", after which they are required to rest – and therefore to find an available truck parking space. This has the effect of increasing the demand for truck parking spaces.
- Land Acquisition Costs: Truck parking spaces consume a great deal of land. Land costs in and near urban areas are very high compared to rural locations. This makes the business case for private-sector developers difficult when it comes to truck parking.
- Public Perception: Support of local residents for plans to build truck parking facilities is difficult to come by due to perceptions that such facilities generate noise and air pollution, and attract crime. This is a particular headwind because land use decisions are the purview of local governments who are responsive to the concerns of their residents.

Both VDOT and MDOT are working to overcome these challenges and increase the supply of truck parking spaces in the Region through partnering with private industry and local governments to increase capacity, working to provide real-time parking supply and availability information, and increasing the supply of truck parking facilities at State-owned facilities. Figure 2.3 shows the location of public truck parking facilities in the Region.

Figure 2.3 Public Truck Parking Areas

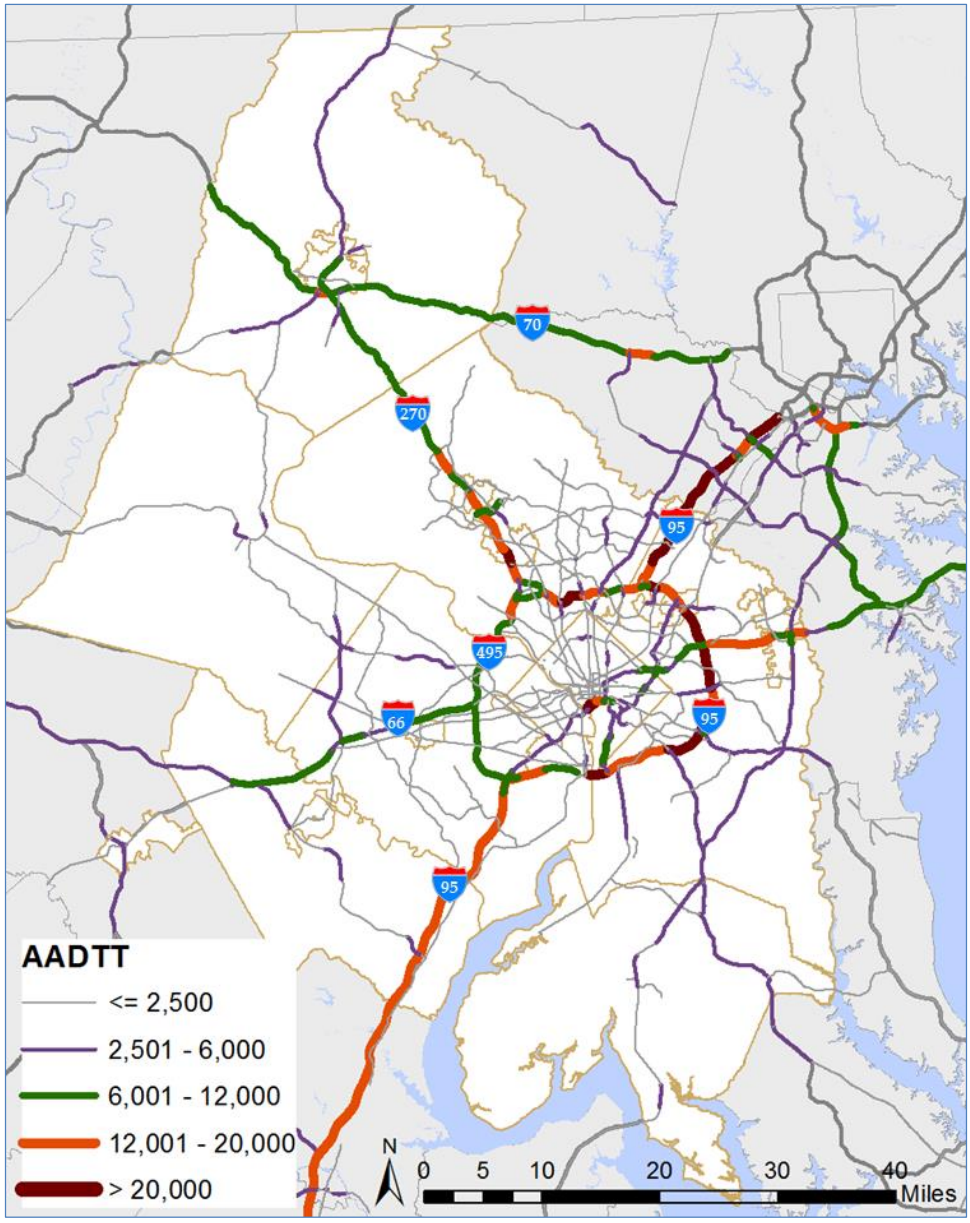


Source: Facilities and Spaces shape file from FHWA Office of Operations

2.2.5 Truck Utilization

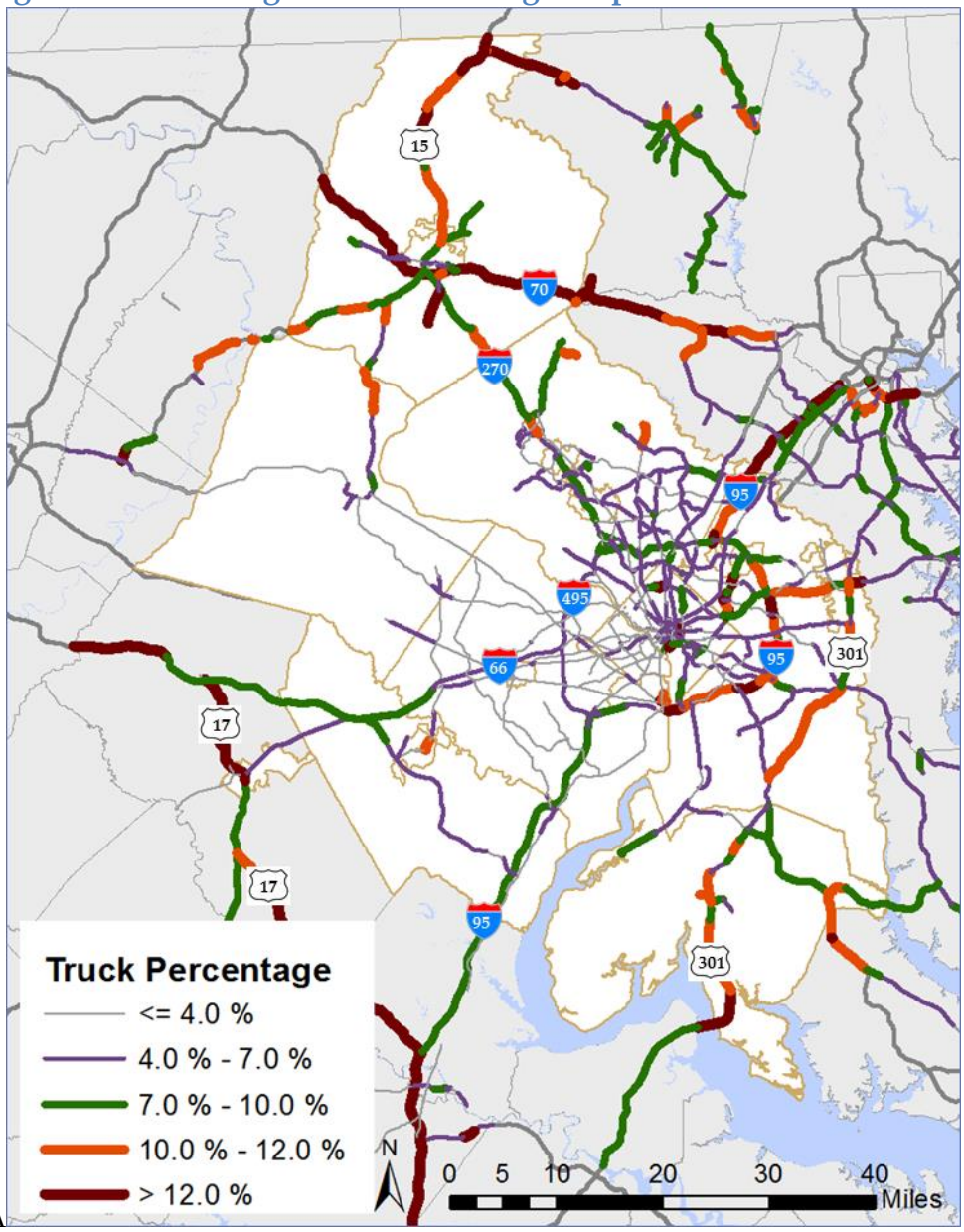
Analysis of Highway Performance Monitoring System (HPMS) data provides average annual daily truck traffic (AADTT) and truck percentage data by roadway segment. Viewing these data (See Figures 2.4 and 2.5) provide an understanding of which roadways have the most truck volume and which roadways have a high proportion of truck traffic.

Figure 2.4 Average Truck AADT Map



Source: MWCOG Analysis of 2013 Highway Performance Monitoring System Submittal – for planning purposes only.

Figure 2.5 Average Truck Percentage Map



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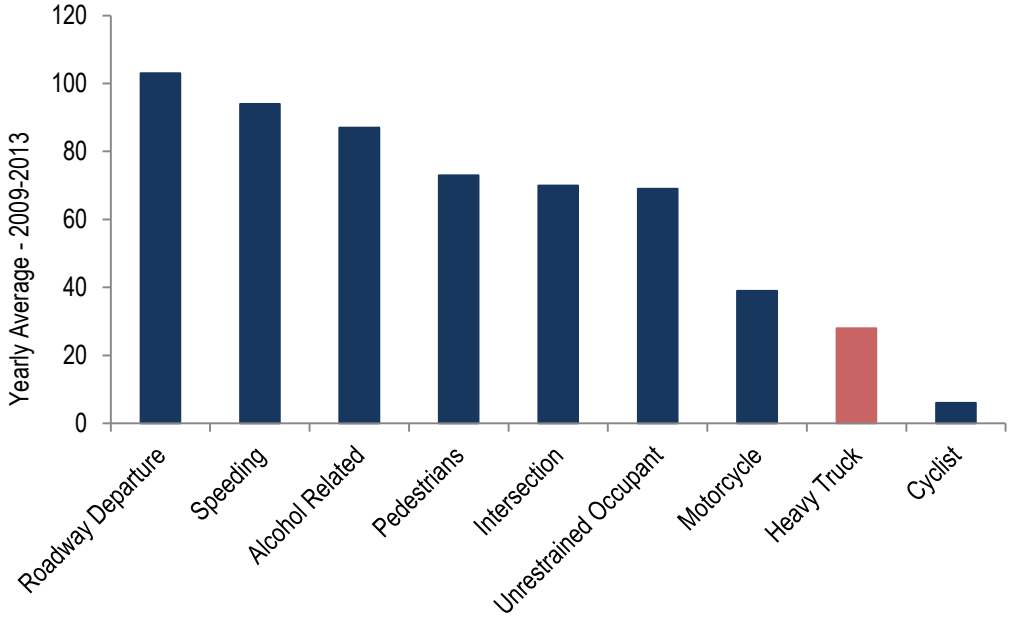
Source: MWCOG Analysis of 2013 Highway Performance Monitoring System Submittal – for planning purposes only.

2.2.6 Truck Safety

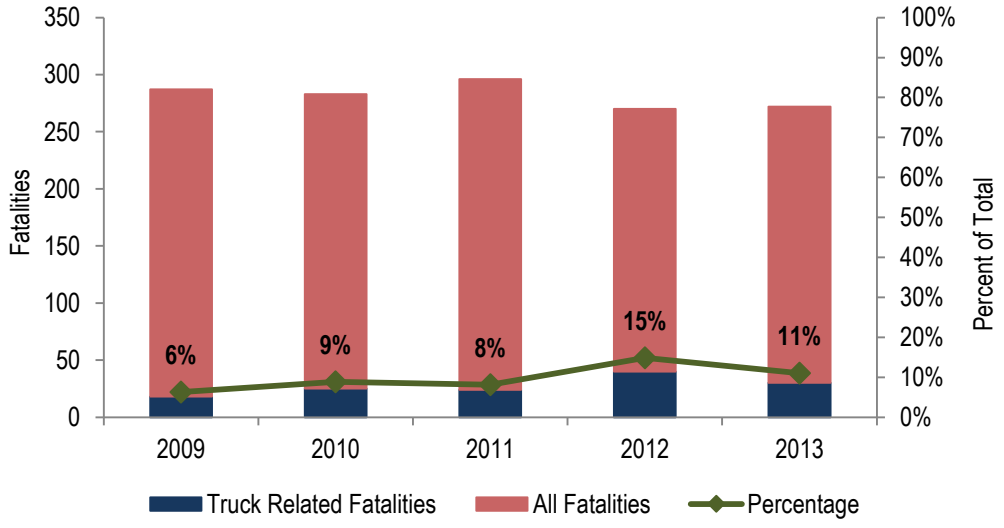
The involvement of heavy trucks is less a contributing factor in fatal crashes in the Region than are roadway departure, speeding, alcohol involvement, pedestrian involvement, intersections, failure to wear safety belts, and motorcycle involvement (see Figure 2.6). However, crashes involving trucks are typically more severe than other types of crashes due to their greater size and weight. As shown in Figure 2.7, the proportion of total fatalities represented by truck-involved crashes in the period from 2009 to 2013 ranged from 6 percent to 13 percent, and was 11 percent in 2013, the most recent year for which data were available.

Figure 2.6 Fatalities in the Region by Emphasis Area



Source: MWCOG analysis of District Department of Transportation, Maryland Highway Safety Office, and Virginia Department of Motor Vehicles safety data - for planning purposes only

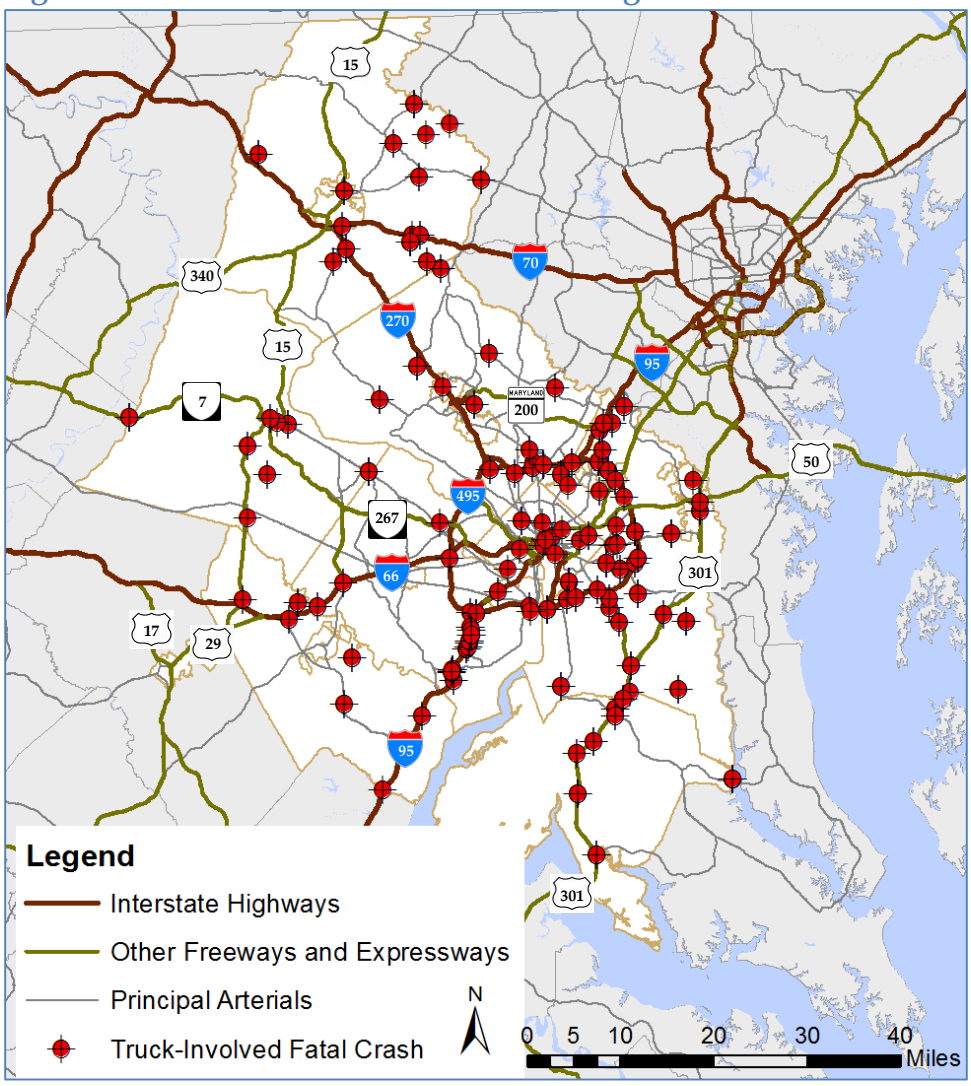
Figure 2.7 National Capital Region Crash-Related Fatalities



Source: MWCOG analysis of District Department of Transportation, Maryland Highway Safety Office, and Virginia Department of Motor Vehicles safety data - for planning purposes only

Between 2009 and 2013 fatal truck-involved crashes in the Region were clustered along the I-95 corridor, around the Capital Beltway, and along the U.S. 301 / MD 5 corridor (see Figure 2.8).

Figure 2.8 Fatal Truck Crashes in the Region – 2009 – 2013



2.3 Railroads

The Region's rail system consists of more than 300 miles of mainline track, most of which are operated by two railroads – CSX (211 miles), and the Norfolk Southern Corporation (46 miles). Additionally, the Region is served by Maryland Midland Railway, a short line operating in Frederick County, Maryland. Three passenger systems – Amtrak, Virginia Railway Express, and MARC – also operate over the Region's freight rail system.

2.3.1 Rail System Inventory

Table 2.2 provides information about each of the railroads operating in the Region by class[3] and miles of mainline track owned. Figures 2.9 and 2.10 show the rail system by ownership and by rail density respectively.

Table 2.2 National Capital Region Railroads

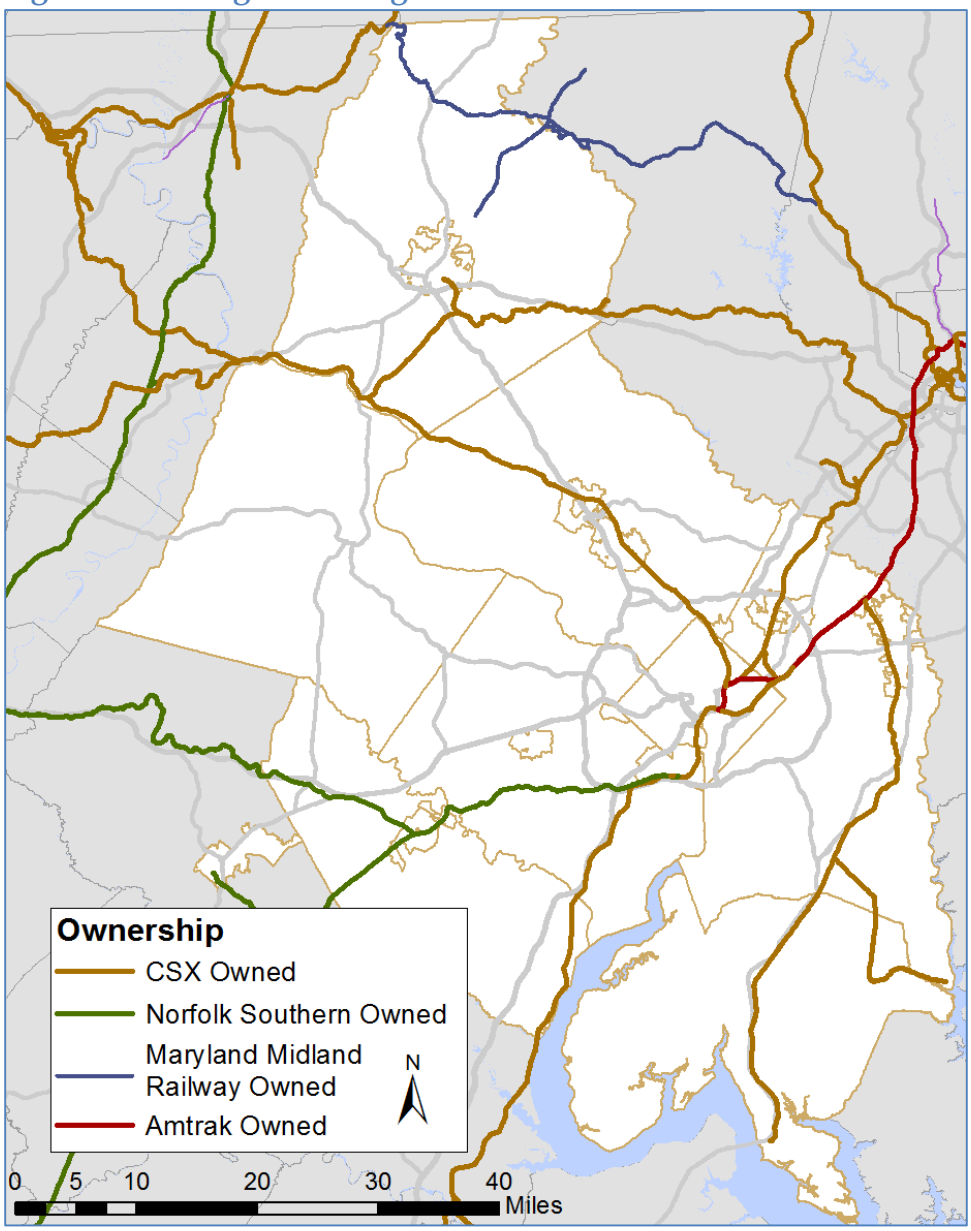
Railroad	Class I Freight	Class III Freight	Passenger	Miles Owned in the Region
CSX Transportation	√			211
Norfolk Southern Corporation	√			46
Maryland Midland Railway*		√		26
Amtrak			√	18

* Maryland Midland Railroad is a subsidiary of Genesee & Wyoming Inc.

Source: Metropolitan Washington Council of Governments analysis of National Transportation Atlas Database Rail Network file – 2013.

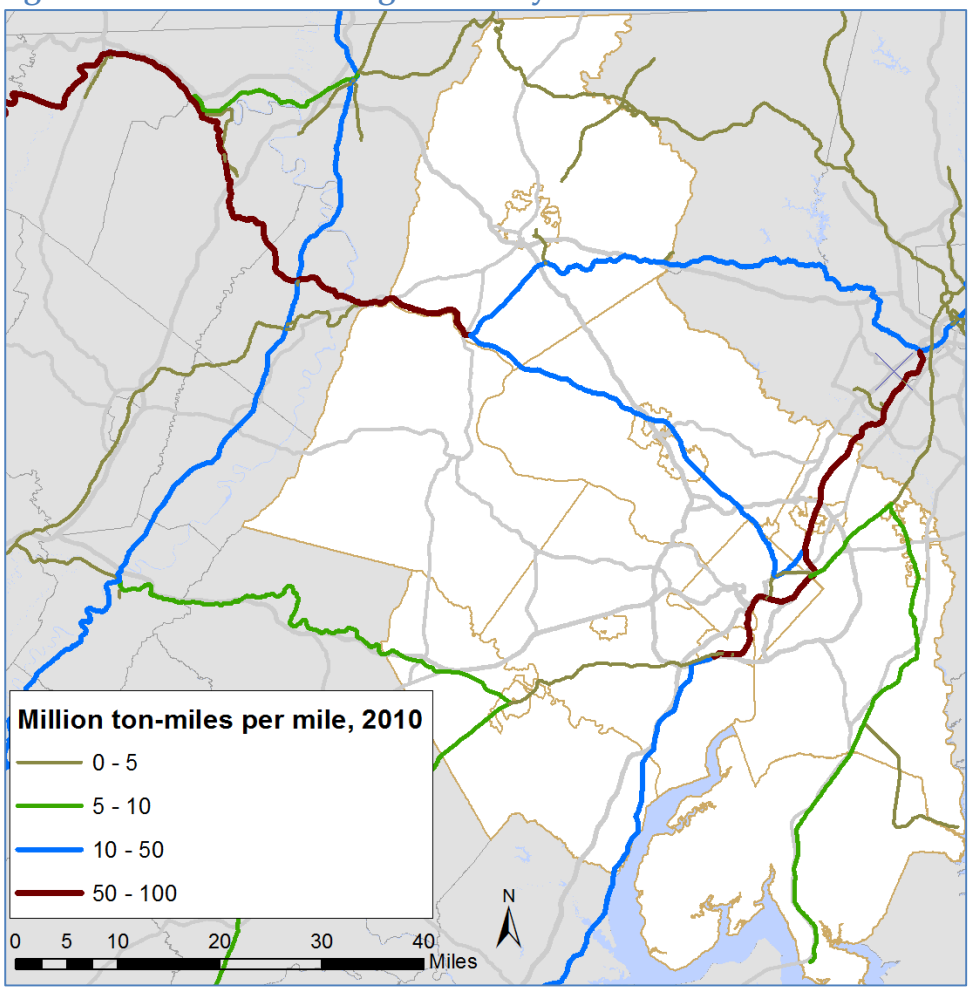
[3] Railroad classifications are set by the Surface Transportation Board and are based on annual operating revenue. After adjusting for inflation, annual operating revenues must exceed $250 million to be classified as Class I, be less than $250 million but in excess of $20 million for Class II, and $20 million or less for Class III.

Figure 2.9 Regional Freight Rail Network



Source: MWCOG Analysis of 2013 National Transportation Atlas Database – for planning purposes only

Figure 2.10 Railroad Freight Density



Source: MWCOG Analysis of 2013 National Transportation Atlas Database – for planning purposes only

2.3.2 Rail Services

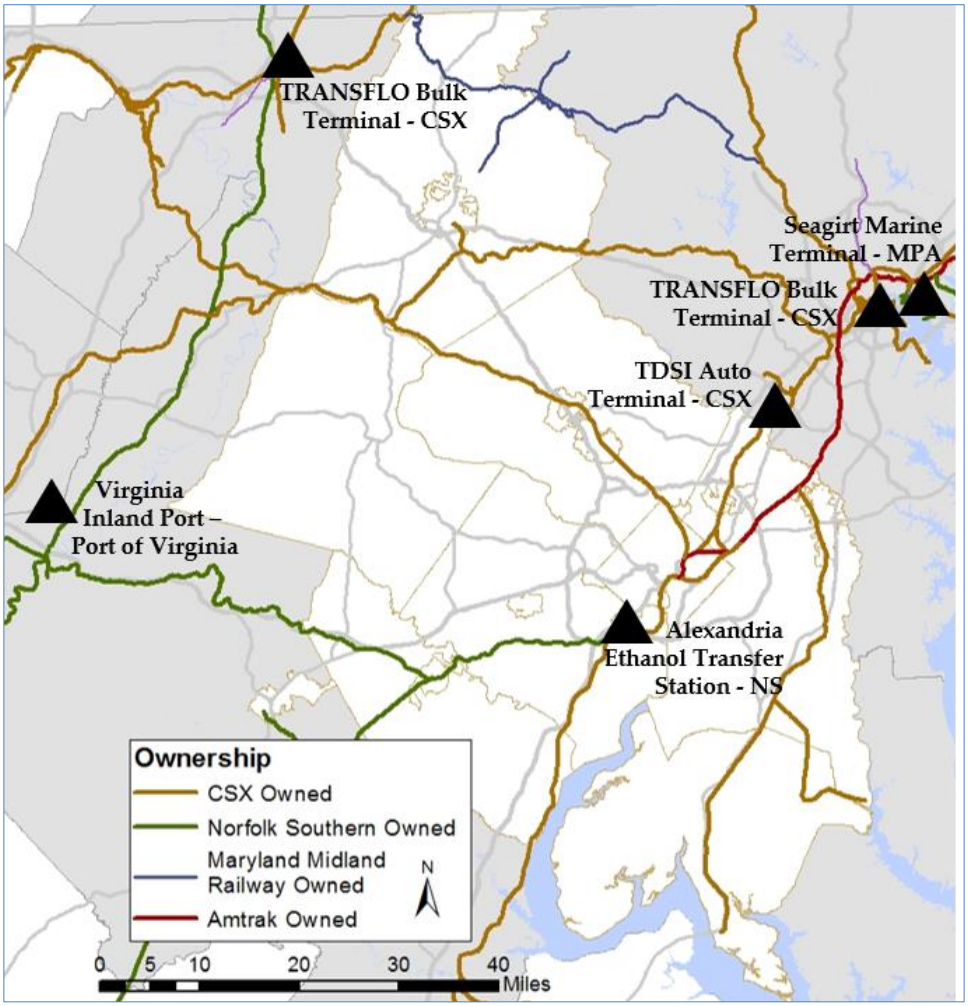
The many types of services offered by freight railroads fall into three main categories; bulk, intermodal, and carload or "mixed" service.[4]

- **Bulk services** utilize liquid or dry-bulk carrying railcars, often assembled in long "unit trains" consisting of a single commodity and railcar type. Unit trains offer economies of scale because they involve long trains made up of a single railcar type, moving between major origins and destinations. Coal and grain are often moved in unit trains.
- **Intermodal services** involve transporting containers (single-stacked or double-stacked), truck trailers (on flat cars), entire trucks (known as "piggyback" service), and sometimes "autoracks" (specialized two-level or three-level railcars carrying automobiles). Intermodal trains aim to provide a level of service comparable to trucking, with scheduled high-speed service. Figure 2.11 shows where the major rail-intermodal terminals within and near the Region are located.

[4] This section adapted from the Virginia Multimodal Freight Study – Phase I.

- **Carload services:** Carload trains carry a mix of different types of railcars and commodities, coming from different origins and moving to different destinations. Smaller shippers and receivers who might use a few railcars per day or per week, or larger shippers and receivers who handle multiple types of commodities, are typical carload customers.

Figure 2.11 Major Intermodal Facilities Served by Rail



2.4 Air Cargo

Air cargo refers to the shipment of commercial freight in either dedicated cargo aircraft or passenger aircraft. Because size and weight in an aircraft is at a premium, air cargo typically consists of high value and/or time sensitive goods. While large and heavy materials are sometimes shipped as air cargo, especially if they are time sensitive, more typical examples include pharmaceuticals, computer chips and electronic components, medical supplies, automotive parts, documents, and perishable commodities such as flowers, fresh fruits, and fish.

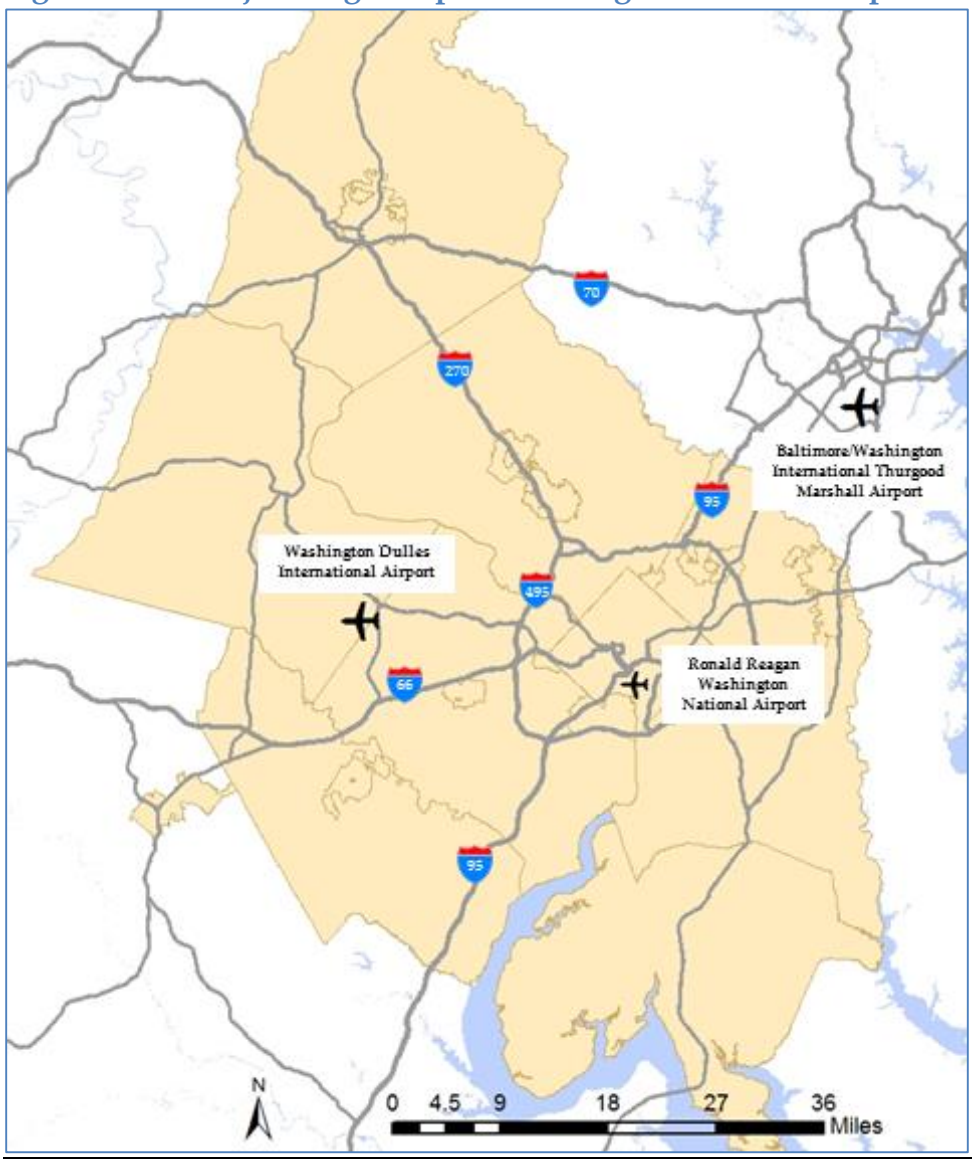
2.4.1 Air Cargo Service Types

Air cargo is handled on pallets or in small, specialized containers called unit load devices that are shaped to fit different aircraft types. These can be loaded on dedicated all-cargo planes (like those operated by UPS and FedEx), or as belly cargo on passenger planes.

2.4.2 Air Cargo System Inventory

Of the 13 public use airports serving the National Capital Region, two of them, as shown in Figure 2.13 below, provide for nearly all of the reported air cargo tonnage. While small amounts of air cargo are handled out of Washington Reagan National Airport, the vast majority is handled at Washington Dulles International Airport (Dulles) and Baltimore/Washington Thurgood Marshall International Airport (BWI).

Figure 2.13 Major Cargo Airports Serving the National Capital Region



2.4.3 Air Cargo Operations

Table 2.3 shows the Airports Council International (ACI) 2014 rankings of the top 50 North American airports for total air cargo. Dulles and BWI are ranked 23rd and 36th respectively and are both among the top 50 cargo airports in North America. While these airports are important economic drivers of the National Capital Region's economy, they are dwarfed in size by the largest national air cargo hubs. For example, New York's JFK airport handled nearly five times as much cargo as Dulles and more than 12 times as much cargo as BWI in 2014.

Table 2.3 Top 50 North American Airports for Air Cargo – 2014

Rank	City (Airport Code)	Total Cargo (metric tons)
1	Memphis TN (MEM)	4,258,531
2	Anchorage AK (ANC)	2,492,754
3	Louisville KY (SDF)	2,293,231
4	Miami FL (MIA)	1,998,779
5	Los Angeles CA (LAX)	1,816,269
6	Chicago IL (ORD)	1,377,663
7	New York NY (JFK)	1,303,889
8	Indianapolis IN (IND)	1,070,196
9	Cincinnati OH (CVG)	652,666
10	Newark NJ (EWR)	639,930
11	Dallas/Fort Worth TX (DFW)	634,997
12	Atlanta GA (ATL)	601,269
13	Oakland CA (OAK)	503,568
14	Houston TX (IAH)	461,492
15	Toronto ON (YYZ)	448,634
16	Ontario CA (ONT)	430,319
17	Honolulu HI (HNL)	414,870
18	San Francisco CA (SFO)	400,614
19	Philadelphia PA (PHL)	392,506
20	Seattle WA (SEA)	326,582
21	Phoenix AZ (PHX)	283,739
22	Boston MA (BOS)	275,522
23	**Washington DC (IAD)**	**267,735**
24	Vancouver BC (YVR)	256,935
25	Denver CO (DEN)	235,572
26	Portland OR (PDX)	207,785
27	Detroit MI (DTW)	202,032
28	Minneapolis MN (MSP)	198,574
29	Orlando FL (MCO)	172,869
30	Salt Lake City UT (SLC)	161,860
31	San Diego CA (SAN)	156,149
32	Fort Worth TX (AFW)	110,329
33	Charlotte NC (CLT)	105,845
34	San Antonio TX (SAT)	105,839
35	Hartford CT (BDL)	105,310
36	**Baltimore MD (BWI)**	**105,153**
37	Rockford IL (RFD)	101,912
38	Las Vegas NV (LAS)	98,658
39	Huntsville AL (HSV)	86,752
40	Kansas City MO (MCI)	85,002
41	Tampa FL (TPA)	84,975
42	Montreal QC (YMX)	82,972
43	Montreal QC (YUL)	82,463
44	El Paso TX (ELP)	78,435
45	Fort Lauderdale, FL (FLL)	77,967
46	Raleigh-Durham NC (RDU)	76,200
47	Pittsburgh PA (PIT)	75,658
48	Cleveland OH (CLE)	75,012
49	Greensboro NC (GSO)	74,284
50	Manchester, NH (MHT)	72,289

Source: Airports Council International

Table 2.4 shows historical air cargo tonnage handled at Dulles and BWI airports. Figures 2.14 and 2.15 display these tonnages for Dulles and BWI airports respectively. Total air cargo has declined by nearly 12

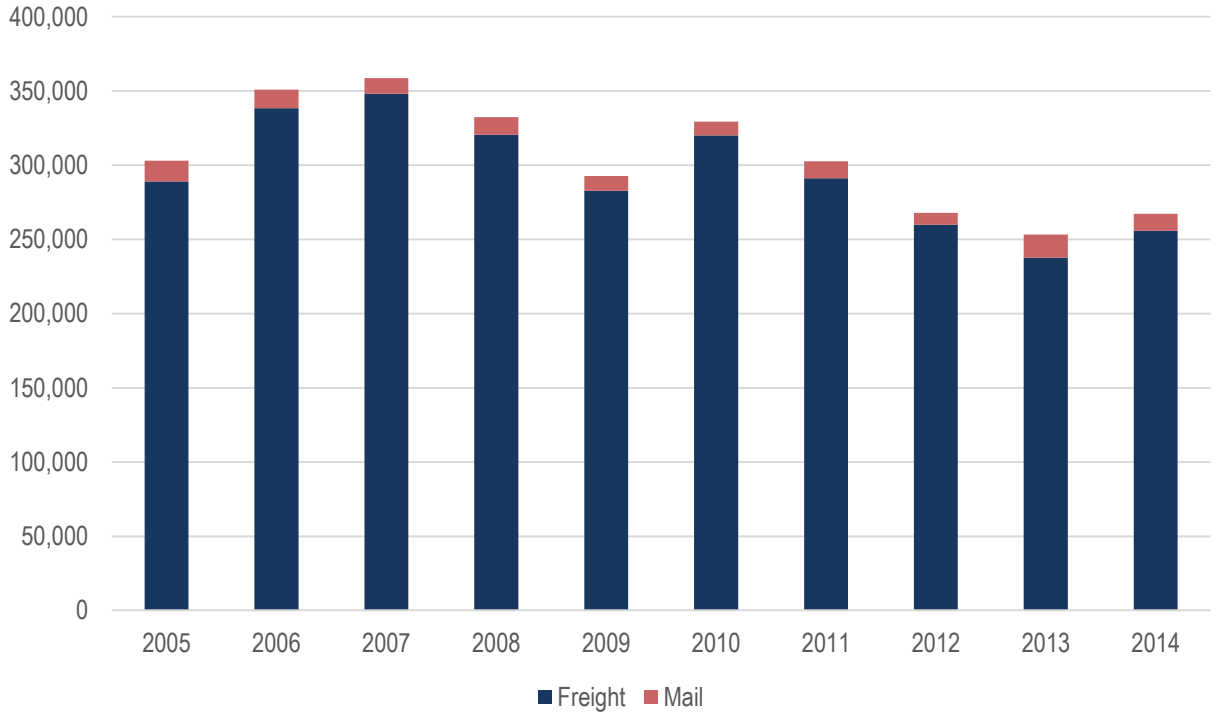
percent between 2005 and 2014 at Dulles and by nearly 19 percent over the same time period at BWI. Between 2005 and 2014 international freight tonnage at Dulles increased by 24 percent, partially offsetting a 35 percent decline in domestic freight tonnage. The decline in domestic tonnage has occurred as the airlines serving Dulles transitioned from wide-body aircraft to narrow-body aircraft. The spike in Dulles cargo from 2006 through 2008 was due to the increase in military support activity to Europe and the Middle East.

Table 2.4 Freight Activity at Cargo Airports Serving the Region

Year	IAD-Freight (metric tons)	IAD-Mail (metric tons)	**IAD-Total (metric tons)**	BWI-Freight (metric tons)	BWI-Mail (metric tons)	**BWI-Total (metric tons)**
2005	288,929	14,135	**303,064**	119,018	10,114	**129,132**
2006	338,449	12,437	**350,885**	113,545	10,430	**123,975**
2007	348,194	10,486	**358,680**	108,952	6,470	**115,422**
2008	320,603	11,759	**332,362**	94,529	7,654	**102,183**
2009	282,686	10,088	**292,774**	94,229	6,152	**100,381**
2010	319,993	9,280	**329,273**	96,969	5,410	**102,379**
2011	291,152	11,510	**302,662**	102,668	5,091	**107,759**
2012	259,814	8,058	**267,872**	106,764	4,986	**111,750**
2013	237,713	15,622	**253,335**	104,192	4,804	**108,996**
2014	255,753	11,395	**267,148**	100,465	4,665	**105,130**

Source: BWI and IAD Airport websites

Figure 2.14 Freight Activity at Dulles International Airport



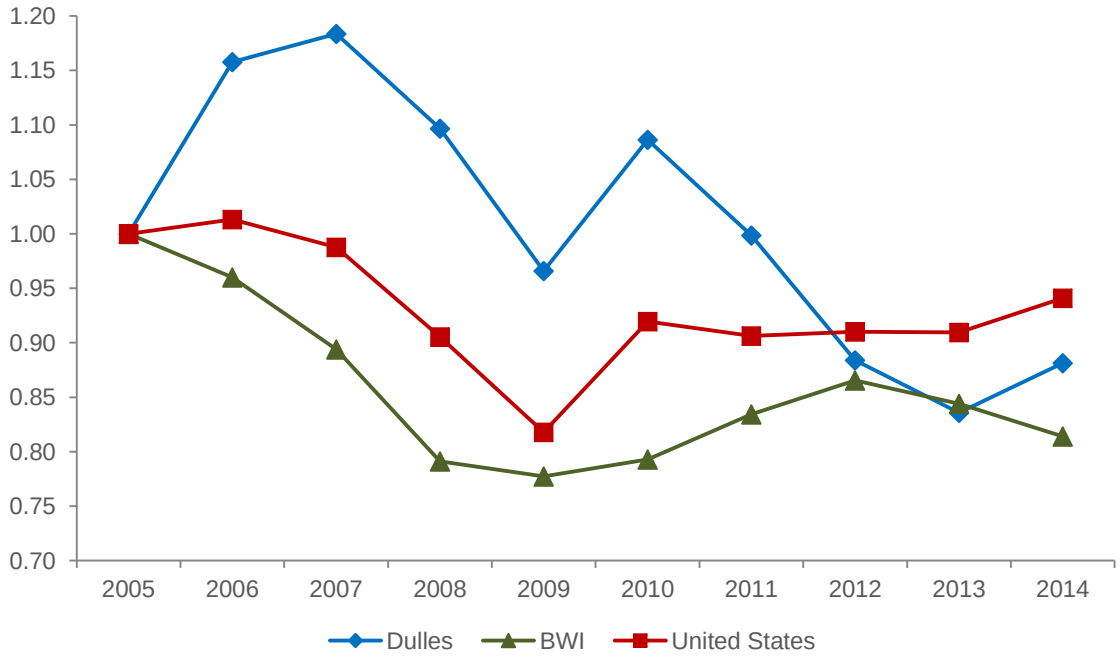
Source: Dulles Airport website

Figure 2.15 Freight Activity at BWI Airport

Source: BWI Airport website

Total combined annual air cargo tonnage at the 50 largest US cargo airports was 5.9 percent lower in 2014 than it was in 2005. Annual tonnage at BWI dropped by 18.6 percent over the same time period while annual tonnage at Dulles declined by nearly 12 percent. Figure 2.16 displays the normalized growth trends for the Region's cargo airports as well as that of the combined top 50 US cargo airports.

Figure 2.16 Historic Air Cargo Growth Trends: Dulles, BWI, and the United States



Source: BWI and IAD Airport websites; Airports Council International sum of top 50 US Cargo Airports

See also Section 4.0 for trends affecting air cargo.

2.5 Intermodal Connectors

NHS intermodal connectors are short roadway segments that tie airport, seaport, and rail terminal facilities to the National Highway System (NHS). They tend to carry lower volumes of traffic at slower speeds than a typical NHS route and are therefore typically designed to lower standards. However, large and heavy trucks use these critical roadways segments to carry the full range of commodities essential to the nation's economy. Ensuring that these connectors are designed properly and kept in good condition helps avoid slowing freight movement or damaging goods in transit. Intermodal connectors also support defense mobilization and national security. The FHWA identifies one freight-related intermodal connector within the National Capital Region and two more that are located just outside of it:

1) Alexandria Intermodal (Ethanol Transfer Station) – Norfolk Southern - Van Dorn Street (I-95 to Metro Road) and Metro Road (Van Dorn Street to facility entrance)
2) Virginia Inland Port – Port of Virginia / Norfolk Southern – U.S. Route 340 (I-66 to facility entrance)
3) Jessup TDSI Auto Terminal – CSX – MD 175 (I-95 to Dorsey Run Road), Dorsey Run Road (MD 175 to MD 32)

While not included on the FHWA list of official intermodal connectors, the following road serves as an important "intermodal connector" in the Region:

4) Plantation Pipeline Terminal – Terminal Road (I-95 to facility entrance)

Section 3.0 Freight Demand

To examine the linkage between the economic and demographic drivers of freight (described in the previous section) and actual freight movement, it is helpful to consider various *commodity flow data*, such as:

- The types of commodities that are being moved in support of the Region's economy including their weights, values, and direction of travel;
- The transportation modes used to move these commodities;
- The origins and destinations of freight in the Region, and
- Forecasts for freight movement in the Region.

The Region's transportation system handled more than 379 million tons of freight worth more than $604 billion in 2007

Information obtained from analyses of these data provide insight into the types of industries that generate the most freight demand in the Region, help to identify the products and are consumed and produced, and highlight the relative importance of key regional trading partners. This Section presents the results of these analyses in the form of summary tables and graphics.

3.1 Freight Analysis Framework

The freight demand analysis presented in this report relies on the Freight Analysis Framework[5] (FAF), a publicly available dataset developed by the Federal Highway Administration. The most recently available FAF dataset (for the 2007 calendar year) provides estimates of the quantity of freight by weight (in tons) and by value (in 2007 dollars) moving between different geographic areas, by various freight transportation modes (truck, rail, water, air, pipeline, multiple modes), and by commodity type for the year 2007 with forecasts at intervals out to the year 2040.[6]

The FAF is constructed primarily from United States Census Bureau's Commodity Flow Survey data. The transportation modes, commodity classifications, and geographies developed for the Commodity Flow Survey are carried through to the FAF and described below.

5 For detailed information about the FAF and to download FAF data please visit the Federal Highway Administration's web site at: http://www.ops.fhwa.dot.gov/freight/freight_analysis/faf/

6 Detailed descriptions of the FAF commodity types as well as a discussion of FAF geographies is provided in Appendix A.

3.1.1 FAF Transportation Modes

The FAF assigns freight moves to one of seven modes as defined in Table 3.1 below.

Table 3.1 FAF Modes

Mode	Description
Truck	Includes private and for-hire truck. Does not include truck that is part of Multiple Modes & Mail or truck moves in conjunction with domestic air cargo.
Rail	Includes any common carrier or private railroad. Does not include rail that is part of Multiple Modes & Mail.
Multiple Modes & Mail	Includes shipments by multiple modes and by parcel delivery services, U.S. Postal Service, or couriers. This category is not limited to containerized or trailer-on-flatcar shipments. Shipments reported as Multiple Modes can include anything from containerized cargo to coal moving from mine to railhead by truck and rail to harbor. The "Mail" component recognizes that shippers who use parcel delivery services typically do not know what modes were involved after the shipment was picked up.
Water	Includes shallow draft, deep draft, Great Lakes and intra-port shipments. Does not include water that is part of Multiple Modes & Mail.
Air (includes truck-air)	Includes shipments typically weighing more than 100 pounds that move by air or a combination of truck and air in commercial or private aircraft. Includes air freight and air express. Does not include shipments weighing 100 pounds or less which are typically classified with Multiple Modes & Mail. In the case of imports and exports by air, domestic moves by ground to and from the port of entry or exit are categorized with Truck.
Pipeline	Includes crude petroleum, natural gas, and product pipelines. Does not include pipeline that is part of Multiple Modes & Mail.
Other & Unknown	Includes movements not elsewhere classified such as flyaway aircraft, and shipments for which the mode cannot be determined.

Source: Federal Highway Administration Freight Analysis Framework

3.2 National Capital Region Commodities

By analyzing the commodities that are most critical to the Region's economy – those that are moving into, out of, and within (but not through) the Region, important links between economic activity and freight movement become apparent.

3.2.1 Weight and Value

The two primary measures of freight activity are weight and value. Value is an indicator of the economic activity associated with freight, while weight is an indicator of the demand that freight places on transportation infrastructure. In this report weight is measured in tons and value in 2007 dollars.

Inbound, outbound, and intraregional commodities totaling nearly 212 million tons and with an equivalent value of more than $240 billion moved over the Region's multimodal transportation system in 2007. These figures include both domestic trade (within the Region or between the Region and other areas of the United States) as well as international trade (between the Region and other countries).

Considering weight first, as shown in Table 3.2:

- Four major commodity groups are responsible for more than 50 percent of the Region's tonnage – gravel and crushed stone, waste and scrap, nonmetallic mineral products, and petroleum products. Other important commodity groups by weight include natural sands, prepared foodstuffs, wood products, nonmetallic minerals, mixed freight, and coal among others. These data show that construction activities, electric power generation, and retail consumption generate much of the freight (by weight) moving across the Region's transportation network.

By weight, gravel and crushed stone is the top commodity type hauled in the Region.

Next, considering value, as shown in Table 3.3:

- Four major commodity groups – electronic and electrical equipment, machinery, mixed freight, and pharmaceutical products – account for more than 40 percent of the total value of commodities moved in the Region. Other important commodity groups include textiles, leather and articles of textiles and leather; motorized vehicles and parts; miscellaneous manufactured products; prepared foodstuffs; articles of base metal; and precision instruments and apparatus among others. These data reflect the importance of the technology and life sciences sectors to the Region's economy as well as the demands for goods by the Region's businesses and consumers.

By value, electronic and electrical equipment is the top commodity type hauled in the Region.

Table 3.2 Top Commodity Types by Weight

Rank	Commodity Class	Total (thousands of tons)	Cumulative Share
1	Gravel & crushed stone	41,277	19%
2	Waste & scrap	32,319	35%
3	Nonmetallic mineral products	25,212	47%
4	Other petroleum products	14,421	53%
5	Natural sands	8,869	58%
6	Other prepared foodstuffs	8,032	61%
7	Wood products	7,821	65%
8	Other nonmetallic minerals	7,212	69%
9	Mixed freight	7,164	72%
10	Coal	6,230	75%
11	Gasoline/aviation fuel/ethanol	5,549	78%
12	Fuel oils	3,709	79%
13	Cereal grains	3,439	81%
14	Machinery	3,438	83%
15	Articles of base metal	2,982	84%
16	Other agricultural products	2,549	85%
17	Alcoholic beverages	1,941	86%
18	Milled grain & bakery products	1,890	87%
19	Printed products	1,725	88%
	All other commodities	21,745	100%
	Grand Total	**211,693**	

Source: Federal Highway Administration Freight Analysis Framework

Table 3.3 Top Commodity Types by Value

Rank	Commodity Class	Total (millions of $)	Cumulative Share
1	Electronic & electrical equipment	31,848	13%
2	Machinery	27,578	25%
3	Mixed freight	22,584	34%
4	Pharmaceutical products	19,225	42%
5	Textiles, leather & their articles	13,143	48%
6	Motorized vehicles & parts	11,280	52%
7	Miscellaneous manufactured products	11,143	57%
8	Other prepared foodstuffs	9,214	61%
9	Articles of base metal	8,231	64%
10	Precision instruments and apparatus	7,102	67%
11	Plastics and rubber	6,359	70%
12	Basic chemicals	5,993	72%
13	Other petroleum products	5,566	74%
14	Other chemical products	5,359	77%
15	Nonmetallic mineral products	5,349	79%
16	Furniture/mattresses/lamps/signs	5,216	81%
17	Printed products	5,065	83%
18	Wood products	4,885	85%
19	Meat/poultry/fish/seafood	3,704	87%
	All other commodities	26,614	100%
	Grand Total	**240,712**	

Source: Federal Highway Administration Freight Analysis Framework

3.2.2 Direction of Trade

The Region's freight moves in different directions, depending on the commodity:

- Inbound freight is moved from other states, or other countries, to the Region.
- Outbound freight is moved from the Region to other areas of the United States, or to other countries.
- Intraregional freight is moved from one point in the Region to another point in the Region.
- Through freight is moved from a location outside of the Region to another location outside of the Region, via transportation infrastructure within the Region. Through freight does not contribute significantly to the region's economy and is not included in the tabulation of commodities.

Tables 3.4 and 3.5 describe the directions of travel for the Region's commodities, based on weight and value.

As shown in Table 3.4, the directions of travel for the Region's top commodities on the basis of weight are:

- Approximately 34 percent of total freight by weight is inbound, 13 percent is outbound, and 54 percent is intraregional. Commodities that are primarily inbound include: petroleum products; wood products; mixed freight; coal; and articles of base metal. Commodities that are primarily intraregional include: gravel and crushed stone; waste and scrap; nonmetallic mineral products; natural sands; nonmetallic minerals; gasoline, aviation fuel. And ethanol; fuel oils; machinery; and alcoholic beverages. Other commodity groups do not

The Region receives over 2 ½ times more inbound freight than it produces outbound freight

show a clearly dominant direction. The fact that inbound freight by weight is more than 2 ½ times greater than outbound freight indicates that the Region's economy consumes significantly more goods than it produces.

Table 3.4 Direction of Travel for Top Commodities by Weight

Rank	Commodity Class	Inbound	Outbound	Intraregional
1	Gravel & crushed stone	18%	3%	78%
2	Waste & scrap	19%	21%	60%
3	Nonmetallic mineral products	22%	16%	61%
4	Other petroleum products	55%	1%	44%
5	Natural sands	27%	3%	70%
6	Other prepared foodstuffs	42%	24%	33%
7	Wood products	54%	17%	29%
8	Other nonmetallic minerals	28%	18%	54%
9	Mixed freight	63%	16%	21%
10	Coal	96%	4%	0%
11	Gasoline/aviation fuel/ethanol	28%	16%	56%
12	Fuel oils	25%	16%	59%
13	Cereal grains	44%	48%	8%
14	Machinery	27%	4%	69%
15	Articles of base metal	50%	7%	43%
16	Other agricultural products	41%	14%	45%
17	Alcoholic beverages	43%	3%	54%
18	Milled grain & bakery products	31%	48%	21%
19	Printed products	44%	28%	28%
	All other commodities	44%	12%	43%
	Grand Total	**34%**	**13%**	**54%**

Source: Federal Highway Administration Freight Analysis Framework

As shown in Table 3.5 below, the directions of travel for the Region's top commodities on the basis of value are:

- Approximately 43 percent of total freight by value is inbound, 17 percent is outbound, and 39 percent is intraregional. Commodities that are primarily inbound include: mixed freight; motorized vehicles and parts; miscellaneous manufactured products; precision instruments and apparatus; plastics and rubber; petroleum products; chemical products; furniture, mattresses, lamps, lighting fittings, and illuminated signs; and wood products. Commodities that are primarily intraregional include machinery and basic chemicals. Other commodity groups do not show a clearly dominant direction. By value, inbound freight is more than 2 ½ times greater than outbound freight, indicating that the Region's economy consumes more goods than it produces.

Table 3.5 Direction of Travel for Top Commodities by Value

Rank	Commodity Class	Inbound	Outbound	Intraregional
1	Electronic & electrical equipment	44%	31%	25%
2	Machinery	16%	5%	79%
3	Mixed freight	67%	12%	21%
4	Pharmaceutical products	39%	25%	36%
5	Textiles, leather & their articles	45%	27%	28%
6	Motorized vehicles & parts	57%	11%	31%
7	Miscellaneous manufactured products	57%	22%	21%
8	Other prepared foodstuffs	46%	25%	28%
9	Articles of base metal	44%	10%	46%
10	Precision instruments and apparatus	54%	10%	36%
11	Plastics and rubber	70%	18%	13%
12	Basic chemicals	15%	4%	81%
13	Other petroleum products	66%	2%	32%
14	Other chemical products	53%	21%	26%
15	Nonmetallic mineral products	44%	16%	40%
16	Furniture/mattresses/lamps/signs	54%	13%	33%
17	Printed products	41%	34%	25%
18	Wood products	56%	14%	30%
19	Meat/poultry/fish/seafood	48%	15%	37%
	All other commodities	35%	13%	53%
	Grand Total	**44%**	**17%**	**39%**

Source: Federal Highway Administration Freight Analysis Framework

3.2.3 Transportation Modes Used

All freight moves utilize either a single mode or a combination of more than one mode of transportation. The FAF categorizes each freight move as being one of the following (see Table 3.1 for more detailed information about the FAF modes):

- Truck;
- Rail;
- Multiple modes and mail;
- Water;
- Air (includes truck-air);
- Pipeline; and
- Other/unknown

From Table 3.6 below it can be seen that trucking accounts for 86 percent of total freight moved by weight, followed by rail at 5 percent, multiple modes and mail at 4 percent and pipelines at 1 percent respectively. Except for coal and petroleum products, the other leading tonnage commodities depend heavily on trucking. Rail has a dominant share of coal traffic and a significant share of cereal grains traffic[7], while petroleum products, especially natural gas, are transported via pipeline. Water and air are not significant modes of regional freight transport in terms of weight.

86 percent of total freight (by weight) in the Region is hauled by truck

7 Except for a few coal-fired power plants, one intermodal terminal, and a relatively small number of businesses with active sidings, there are relatively few significant rail shippers and receivers in the Region. Consequently, most of the rail freight observed in the Region is "through" freight.

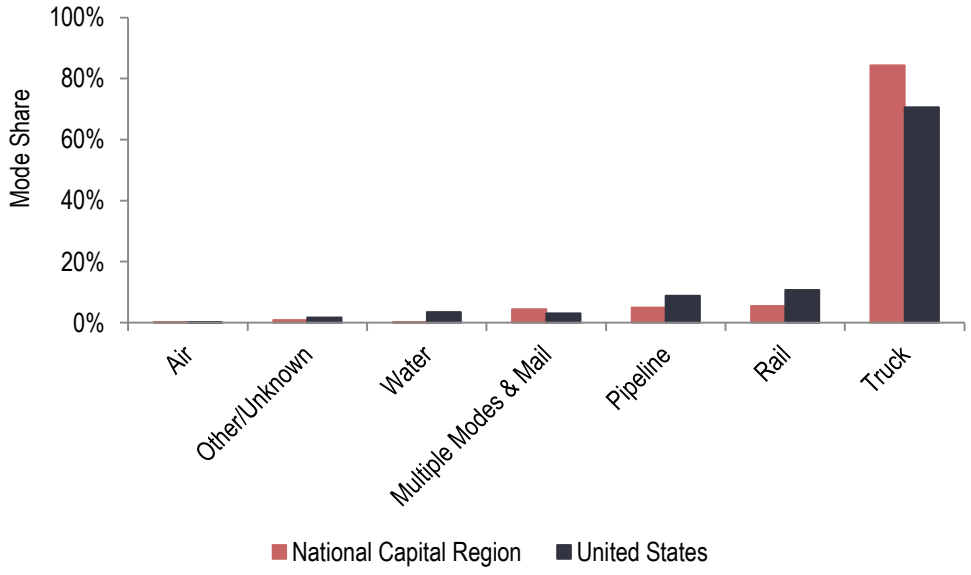
Table 3.6 Commodities Share of Tonnage by Mode

Commodity Class	Truck	Rail	Multiple Modes & Mail	Water	Air	Pipeline	Other / Unknown
Gravel & crushed stone	89%		11%				
Waste & scrap	97%	3%					
Nonmetal mineral. products	95%	4%					1%
Other petroleum products	34%	2%		1%		63%	
Natural sands	98%		1%				1%
Other prepared foodstuffs	93%	2%	5%				
Wood products	92%	6%	1%				1%
Other nonmetallic minerals	96%	2%	2%				
Mixed freight	99%		1%				
Coal	5%	94%	1%				
Gasoline/aviation fuel/ethanol	100%						
Fuel oils	99%						
Cereal grains	65%	17%	17%				
Machinery	98%	1%	1%				
Articles of base metal	95%	1%	3%				1%
Other agricultural products	94%	4%	2%				
Alcoholic beverages	97%	1%	1%				
Milled grain & bakery products	94%		3%				3%
Printed products	88%		4%		1%		7%
All other commodities	90%	4%	4%				2%
Total	**86%**	**5%**	**4%**	**0%**	**0%**	**4%**	**1%**

Source: Federal Highway Administration Freight Analysis Framework

Trucks haul a greater proportion of total freight (by weight) in the Region than in the nation overall. Relatively less freight is hauled by rail, water, or pipeline in the Region than in the broader nation (see Figure 3.1).

Figure 3.1 Transportation Modes Used (by Weight) – National Capital Region and United States



Source: Federal Highway Administration Freight Analysis Framework

From Table 3.7 below we see that trucking accounts for 79 percent, multiple modes and mail for 15 percent, air for 2 percent, and rail and pipeline each for 1 percent of total freight moved by value. Pipelines carry the majority of petroleum products by value (especially natural gas), and a meaningful share of precision instruments are transported via air freight. Water is not a significant mode of regional freight transport in terms of either value or weight.

79 percent of total freight (by value) in the Region is hauled by truck

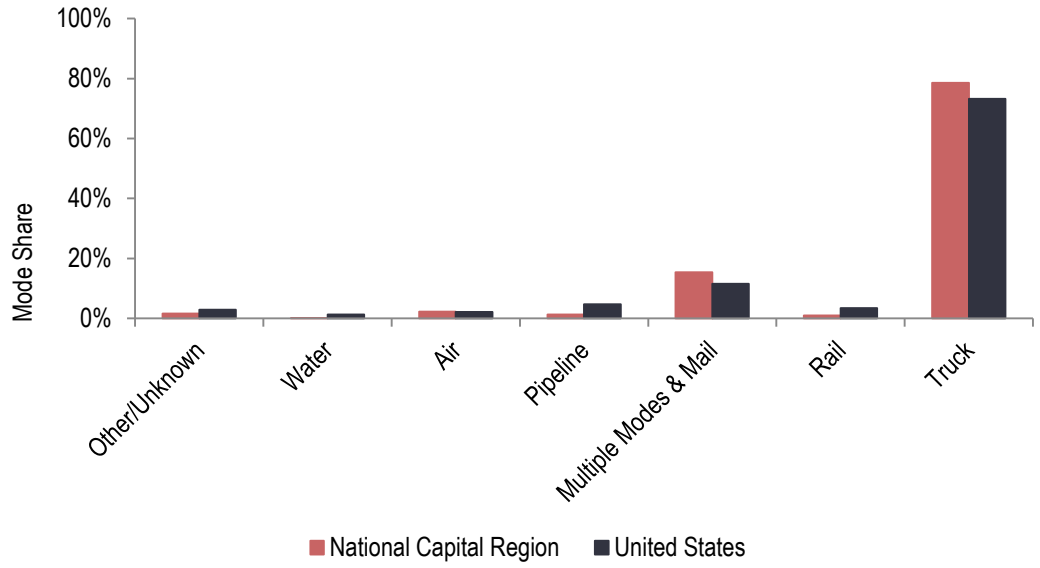
Table 3.7 Commodities Share of Tonnage by Value

Commodity Class	Truck	Rail	Multiple Modes & Mail	Water	Air	Pipeline	Other / Unknown
Electronic & electrical equipment	56%	1%	31%		9%		3%
Machinery	95%		4%				
Mixed freight	92%		6%				1%
Pharmaceutical products	69%		31%		1%		
Textiles, leather & their articles	68%		29%		3%		1%
Motorized vehicles & parts	82%		6%				12%
Misc. manufactured products	65%		33%		2%		1%
Other prepared foodstuffs	89%	2%	9%				
Articles of base metal	88%	1%	10%				1%
Precision instruments & apparatus	44%		38%		18%		
Plastics & rubber	78%	3%	17%				2%
Basic chemicals	94%	3%	3%				
Other petroleum products	41%	1%	1%	1%		56%	
Other chemical products	83%	2%	13%				2%
Nonmetallic mineral products	79%	1%	10%		4%		6%
Furniture/mattresses/lamps/signs	91%		9%				
Printed products	63%		32%		1%		4%
Wood products	94%	3%	2%				1%
Meat/poultry/fish/seafood	99%		1%				
All other commodities	91%	3%	6%				1%
Total	**79%**	**1%**	**15%**	**0%**	**2%**	**1%**	**2%**

Source: Federal Highway Administration Freight Analysis Framework

A greater proportion of total freight (by value) in the Region is hauled via truck or multiple modes and mail than in the nation overall. Relatively less freight is hauled by rail, water, or pipeline in the Region than in the broader nation (see Figure 3.2).

Figure 3.2 Transportation Modes Used (by Value) – National Capital Region and United States



Source: Federal Highway Administration Freight Analysis Framework

3.3 The National Capital Region's Freight Transportation Modes

3.3.1 Trucking

Trucks are essential to freight transportation. They are responsible for the most tonnage handled[8], the largest number of trips, and the largest number of ton-miles in the United States. Trucks are enormously flexible in that they can accommodate a broad range of commodities, from raw materials to semi-finished goods to consumer goods to post-consumer products. Trucks, unlike any of the other modes, can access virtually any origin or destination. Often they provide key links between other modes within complex, multimodal supply chains. Every freight shipper or receiver that is not located on an active rail line, next to a navigable waterway, or inside the gates of an airport, is dependent on trucking. The continued growth and evolution of e-commerce systems, reliance on just-in-time inventory practices, and expansion of expedited small package home delivery services, points to the growing significance of the role that trucks will play in the future.

Gravel and crushed stone, waste and scrap, and nonmetallic mineral products are the leading truck-hauled commodities in the Region

By tonnage, the leading truck-hauled commodities in the Region are gravel and crushed stone, waste and scrap, and nonmetallic mineral products followed by natural sands, other foodstuffs, wood products, and mixed freight. By value, machinery; mixed freight; electronic and electrical equipment; and pharmaceutical

8 According to the 2007 Commodity Flow Survey, trucks carried about 85 percent of total tonnage and total value shipped in the United States.

products are the leading commodities followed by motorized vehicles and parts; textiles, leather and products of textiles and leather; and prepared foodstuffs.

Table 3.8 Commodity Types Handled via Truck

Top Tonnage Commodities	Thousands of Tons	Top Value Commodities	Millions of Dollars
Gravel & crushed stone	36,668	Machinery	26,318
Waste & scrap	31,231	Mixed freight	20,820
Nonmetallic mineral products	23,949	Electronic & electrical equipment	17,910
Natural sands	8,723	Pharmaceutical products	13,208
Other prepared foodstuffs	7,432	Motorized vehicles & parts	9,244
Wood products	7,202	Textiles, leather & their articles	8,980
Mixed freight	7,061	Other prepared foodstuffs	8,191
Other nonmetallic minerals	6,925	Articles of base metal	7,233
Gasoline/aviation fuel/ethanol	5,549	Misc. manufactured products	7,221
Other petroleum products	4,865	Basic chemicals	5,631

Source: Federal Highway Administration Freight Analysis Framework

3.3.2 Rail

Rail operations specialize in long-haul transportation of high-value containerized goods; transportation of bulk goods, such as coal; and long-haul transportation of mixed car types (known as carload service). The availability of rail service can reduce the dependence on trucking. This can be particularly important for heavy commodities that can damage pavements if hauled by truck.

Coal is the leading rail-hauled commodity in the Region

By weight, the leading commodity moved by rail in the Region by far is coal, followed by waste and scrap, and nonmetallic mineral products. By value, the leading rail commodities are electronic and electrical equipment, coal, prepared foodstuffs, and basic chemicals.

Table 3.9 Commodity Types Handled via Rail

Top Tonnage Commodities	Thousands of Tons	Top Value Commodities	Millions of Dollars
Coal	5,864	Electronic & electrical equipment	305
Waste & scrap	1,029	Coal	280
Nonmetallic mineral products	984	Other prepared foodstuffs	200
Cereal grains	597	Basic chemicals	171
Wood products	432	Plastics & rubber	165
Other petroleum products	343	Wood products	152
Basic chemicals	313	Cereal grains	109
Plastics & rubber	199	Chemical products	100
Other nonmetallic minerals	157	Articles of base metal	92
Other prepared foodstuffs	155	Machinery	92

Source: Federal Highway Administration Freight Analysis Framework

3.3.3 Multiple Modes and Mail

Due to the nature of the available data underlying the FAF dataset, some freight flows cannot be assigned to a specific mode. These flows are reported as *multiple modes and mail* in FAF and include truck-rail, truck-water, and rail-water intermodal shipments involving one or more end-to-end transfers of cargo between two different modes.[9] It also includes parcel delivery service shipments weighing 100 pounds or less (because shippers that use such services do not typically know what modes are involved in the actual shipping process).

By tonnage, the leading multiple modes and mail commodity is gravel and crushed stone, followed by cereal grains and prepared foodstuffs. By value, the leading multiple modes and mail commodities are electronic and electrical equipment, pharmaceutical products, textile and leather products, miscellaneous manufactured products, and precision instruments, among others.

Table 3.10 Commodity Types Handled via Multiple Modes and Mail

Top Tonnage Commodities	Thousands of Tons	Top Value Commodities	Millions of Dollars
Gravel & crushed stone	4,608	Electronic & electrical equipment	9,875
Cereal grains	587	Pharmaceutical products	5,870
Other prepared foodstuffs	427	Textiles, leather & their articles	3,749
Electronic & electrical equipment	133	Misc. manufactured products	3,681
Chemical products	132	Precision instruments & apparatus	2,688
Plastics & rubber	128	Printed products	1,639
Other nonmetallic minerals	117	Mixed freight	1,410
Nonmetallic mineral products	104	Plastics & rubber	1,098
Wood products	101	Machinery	990
Articles of base metal	98	Articles of base metal	858

Source: Federal Highway Administration Freight Analysis Framework

9 The Freight Analysis Framework, Version 3: Overview of the FAF3 National Freight Flow Tables. pg. 6. Federal Highway Administration, Washington, D.C.

3.3.4 Water

A small quantity of cargo, mainly petroleum products, is transported by water in the National Capital Region. Because there are no major port facilities within the Region, such waterborne shipments rely solely on barge transport.

Table 3.11 Commodity Types Handled via Water

Top Tonnage Commodities	Thousands of Tons	Top Value Commodities	Millions of Dollars
Other petroleum products	95	Other petroleum products	34
Other nonmetallic minerals	5	Plastics & rubber	1
Cereal grains	2		

Source: Federal Highway Administration Freight Analysis Framework

3.3.5 Air

Air cargo enables fast, reliable, just-in-time delivery service that integrated carriers such as UPS and FedEx have perfected. Air freight is more expensive than other modes and is therefore typically used for transport of high value, time-sensitive goods such as mail and express packages, perishable products, specialized machinery, consumer goods, etc.

By value, electronic / electrical equipment and precision instruments are the leading air cargo commodities in the Region

The leading air freight commodities in the Region by weight are electronic and electrical equipment, printed products, motorized vehicle parts, and textile products. By value, the leading air freight commodities are electronic and electrical equipment, precision instruments and apparatus, and textile products.

Table 3.12 Commodity Types Handled via Air

Top Tonnage Commodities	Thousands of Tons	Top Value Commodities	Millions of Dollars
Electronic & electrical equipment	37	Electronic & electrical equipment	2,906
Printed products	12	Precision instruments & apparatus	1,258
Motorized vehicles & parts	4	Textiles, leather & their articles	330
Textiles, leather & their articles	4	Nonmetallic mineral products	216
Precision instruments & apparatus	2	Misc. manufactured products	180
Misc. manufactured products	2	Pharmaceutical products	108
Pharmaceutical products	2	Railway equipment/aircraft/boats.	87
Articles of base metal	1	Printed products	62
Machinery	1	Machinery	54
Railway equipment/aircraft/boats	1	Motorized vehicles & parts	54

Source: Federal Highway Administration Freight Analysis Framework

3.3.6 Pipeline

Pipelines are a very efficient way to transport large quantities of liquids or gas. In the National Capital Region, pipelines carry refined petroleum products, including natural gas. The Plantation Pipeline Terminal in Newington, VA receives petroleum products via pipeline from Gulf Coast refineries, performs various blending operations, distributes gasoline products via truck to area gas stations, and distributes jet fuel via pipelines to Dulles International Airport and Ronald Reagan Washington National Airport.

Table 3.13 Commodity Types Handled via Pipeline

Top Tonnage Commodities	Thousands of Tons	Top Value Commodities	Millions of Dollars
Other petroleum products	9,061	Other petroleum products	3,105

Source: Federal Highway Administration Freight Analysis Framework

3.3.7 Total Weight and Value

In 2007, the Region's transportation system handled about 379 million tons of freight worth more than $604 billion, including inbound, outbound, intraregional, and through traffic.

Total weight and value handled by the Region's multimodal freight transportation system is summarized in Figure 3.3 and Tables 3.14 and 3.15 below.

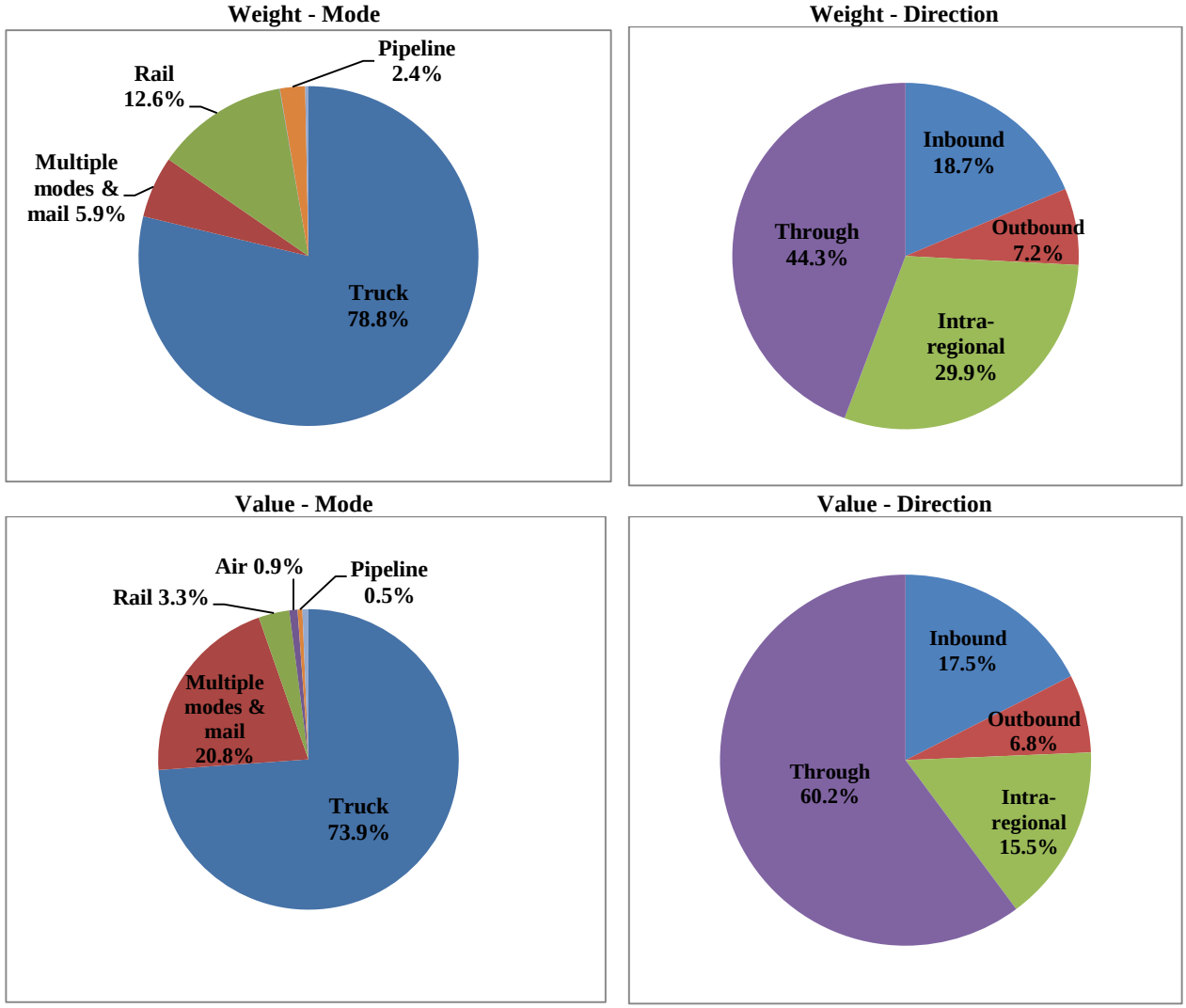
On the basis of weight:

- Trucks handled about 79 percent of total tonnage, followed by rail at 13 percent, multiple modes and mail at 6 percent, pipeline at 2 percent, and air at less than 0.1 percent.
- Approximately 19 percent of total tonnage was inbound, 7 percent was outbound, 30 percent was intraregional, and 44 percent was through.

On the basis of value:

- Trucks handled around 74 percent of value, followed by multiple modes and mail at 21 percent, rail at 3 percent, air at 1 percent, and pipeline at 0.5 percent.
- Around 18 percent of value was inbound, 7 percent was outbound, 16 percent was intraregional, and 60 percent was through.

Figure 3.3 Total Freight Weight and Value by Mode and Direction



Source: Federal Highway Administration Freight Analysis Framework and Metropolitan Washington Council of Governments

Table 3.14 National Capital Region Freight Modes – Weight (thousands of tons)

Mode	Inbound	Outbound	Intraregional	Through	Total
Truck	48,690	24,544	109,810	116,144	**299,188**
Multiple modes & mail	6,559	909	24	14,791	**22,283**
Rail	9,232	1,520	0	37,240	**47,991**
Air	35	34	0	N/A	**68**
Water	100	2	0	N/A	**102**
Pipeline	5,675	31	3,355	N/A	**9,061**
Other / Unknown	641	133	400	N/A	**1,174**
Total	**70,931**	**27,173**	**113,589**	**168,174**	**379,867**

Source: Federal Highway Administration Freight Analysis Framework and Metropolitan Washington Council of Governments

Table 3.15 National Capital Region Freight Modes – Value (millions of dollars)

Mode	Inbound	Outbound	Intraregional	Through	Total
Truck	70,469	30,179	88,550	257,359	**446,557**
Multiple modes & mail	25,617	8,124	3,212	88,542	**125,495**
Rail	1,932	267	0	17,847	**20,047**
Air	3,802	1,519	0	N/A	**5,321**
Water	36	0	0	N/A	**36**
Pipeline	2,046	11	1,048	N/A	**3,105**
Other / Unknown	1,993	1,100	805	N/A	**3,889**
Total	**105,896**	**41,200**	**93,616**	**363,748**	**604,460**

Source: Federal Highway Administration Freight Analysis Framework and Metropolitan Washington Council of Governments

3.4 National Capital Region's Freight Origins and Destinations

3.4.1 Trading Partners

Analyses of FAF data reveal the relative importance of other regions in terms of the quantity and value of goods moved. These National Capital Region *trading partners* are sorted in terms of the sum of freight flows (inbound to the National Capital Region from the other region plus outbound from the National Capital Region to the other region). According to these analyses, the leading trading partner regions are listed in Tables 3.16 (by weight) and 3.17 (by value) below.

The Region's top three trading partners (by weight) are the Baltimore region, and the states of West Virginia and Virginia

Table 3.16 Top Trading Partner Regions by Weight

Rank	Partner Region	Thousands of Tons	Percent	Cumulative Percent
1	Baltimore MD MSA	20,673	21%	21%
2	West Virginia	10,940	11%	32%
3	Remainder of Virginia	10,113	10%	43%
4	Remainder of Pennsylvania	7,226	7%	50%
5	Richmond VA MSA	6,132	6%	56%
6	Remainder of Maryland	5,466	6%	62%
7	Norfolk VA MSA	4,382	4%	66%
8	New York NY CSA	3,608	4%	70%
9	Philadelphia PA CSA	3,310	3%	73%
10	Houston TX CSA	2,619	3%	76%
11	Remainder of New York	1,303	1%	77%
12	Remainder of North Carolina	1,117	1%	78%

Source: Federal Highway Administration Freight Analysis Framework

Table 3.17 Top Trading Partner Regions by Value

Rank	Partner Region	Millions of Dollars	Percent	Cumulative Percent
1	Baltimore MD MSA	20,959	14%	14%
2	New York NY CSA	12,334	8%	23%
3	Remainder of Pennsylvania	8,323	6%	28%
4	Philadelphia PA CSA	6,928	5%	33%
5	Remainder of Virginia	6,531	4%	37%
6	Los Angeles CA CSA	6,084	4%	42%
7	Richmond VA MSA	5,742	4%	45%
8	Memphis TN MSA	3,903	3%	48%
9	Norfolk VA MSA	3,560	2%	51%
10	Chicago IL CSA	2,757	2%	52%
11	Remainder of Maryland	2,755	2%	54%
12	Houston TX CSA	2,719	2%	56%

Source: Federal Highway Administration Freight Analysis Framework

3.5 Freight Transportation Forecasts

3.5.1 National Capital Region Freight Forecasts

Freight Analysis Framework data for the National Capital Region includes a set of forecasts for growth in freight tonnage and value, by mode, by commodity, and by origin-destination pair. These forecasts are derived from broader forecasts for the national economy. Like most forecasts, these represent a base case scenario. More detailed forecasting would consider a range of scenarios and reflect a variety of "what if" conditions, such as significant changes in economic activity, fuel prices, climate, and logistics practices.

National Capital Region Commodities

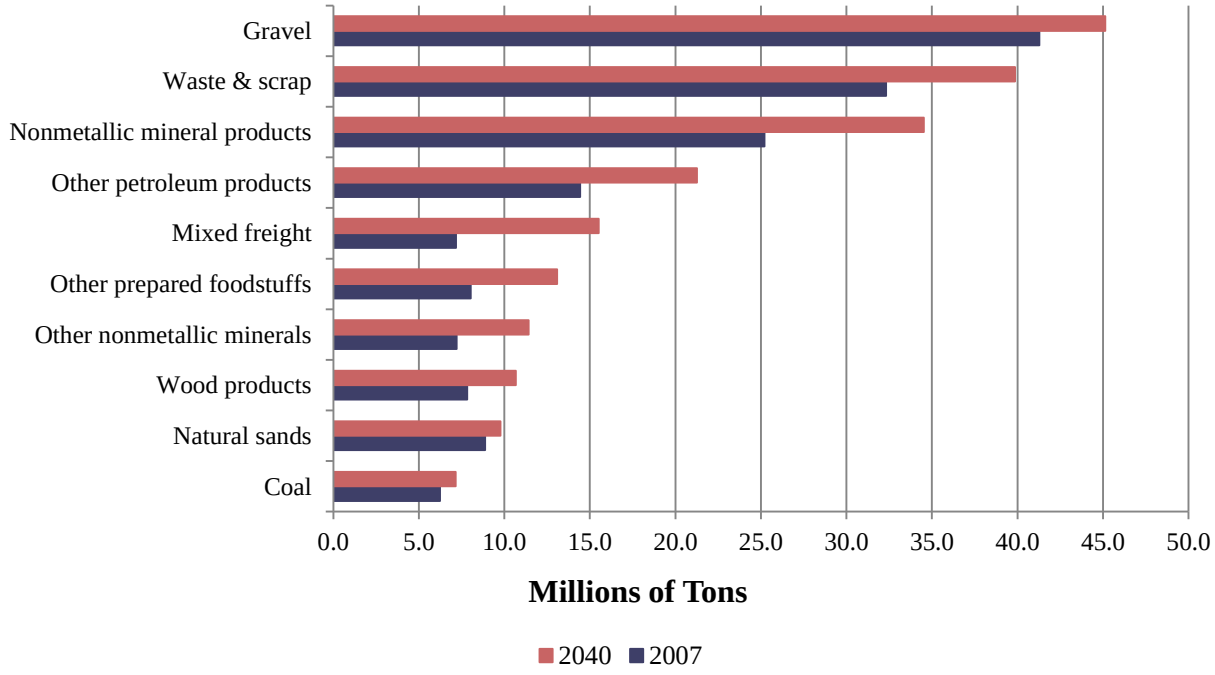
Growth in output and consumption drive growth in freight demand and result in increased tonnage moving across the Region's transportation infrastructure and increased in inflation-adjusted dollars. Growth in some types of commodities will be greater than others and will change the relative proportions of commodity types transported within the Region.

Commodities in the mixed freight category are projected to more than double in volume (by weight) by 2040

On the basis of weight (see Figure 3.4 below):

The volume of gravel and crushed stone is projected to grow slightly yet remain the top commodity type in 2040. Similarly, waste and scrap, nonmetallic mineral products, and petroleum products are forecasted to grow in volume and retain their 2nd, 3rd, and 4th rankings in 2040. Mixed freight is projected to more than double in volume by 2040 causing it to rise in ranking from 9th to 5th overall.

Figure 3.4 Forecasted Growth in Regional Commodities by Weight



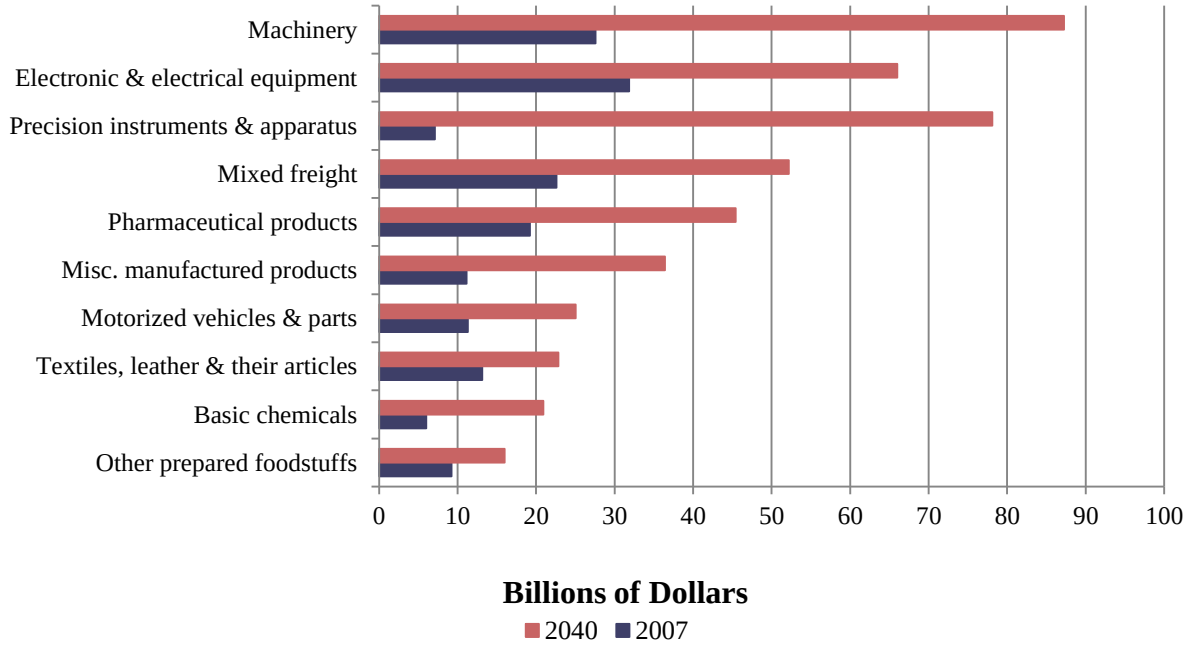
Source: Federal Highway Administration Freight Analysis Framework

On the basis of value (see Figure 3.5 below):

Eight of the ten top regional commodities by value are expected to more than double by 2040 with the value of precision instruments and apparatus projected to grow nearly tenfold. Machinery, miscellaneous manufactured products, and basic chemicals are each projected to grow over threefold in value over the same time period.

Precision instruments and apparatus are projected to grow more than tenfold (by value) by 2040

Figure 3.5 Forecasted Growth in Regional Commodities by Value



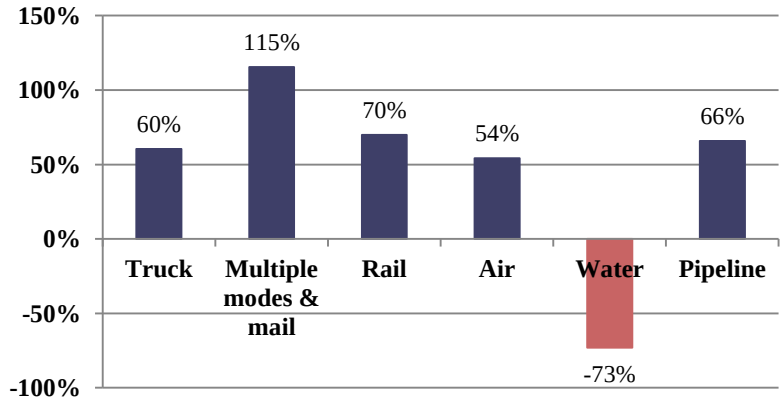
Source: Federal Highway Administration Freight Analysis Framework

National Capital Region Modes

Different transportation modes will experience different growth rates. Modes that specialize in the fastest growing commodities will grow fastest.

The fastest growth is for multiple modes and mail which is anticipated to increase by 115 percent by 2040. Trucking, rail, air, and pipeline traffic are expected to increase at rates between 54 percent and 66 percent over the same time period. Waterborne freight, which is very small relative to the other modes, is projected to decline significantly.

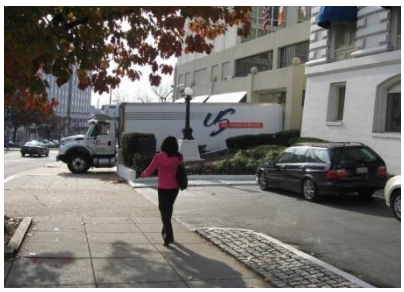
Figure 3.6 Forecasted Growth in Tonnage by Mode



Source: Federal Highway Administration Freight Analysis Framework

Section 4.0 Freight Trends and Issues

While the freight transportation system is currently performing at a level that supports the Region's economy and quality of life, recurring bottlenecks on some roadways and railways negatively affect the reliability of freight deliveries. The growth in freight volumes forecasted for the region is a result of an increasing demand for goods – demand driven by the Region's expanding economy, growing population, and increasing standard of living. To fully realize the benefits associated with the forecasted growth in freight traffic, the Region will need to address the challenges to the multimodal transportation system in light of that growth. These challenges include more trucks sharing the roadways with passenger vehicles, bicycles, and pedestrians; more commuter and intercity passenger trains sharing the railways with freight trains; and increased wear and tear on pavements, bridges, and rail infrastructure. Because trucks are the primary means by which goods are delivered to stores, restaurants, businesses, and residences, the more dense and vibrant a neighborhood becomes, the more that trucks must share the streets in close proximity to pedestrians, bicyclists, and other vulnerable road users. Addressing the challenges associated with truck deliveries in dense and vibrant regional activity centers is a key planning issue.



4.1 Trends Impacting Freight in the Region

4.1.1 Demographic and Economic Drivers of Freight Demand

The physical movement of freight is of critical importance to any region's economy. Consumers rely on efficient and reliable freight transportation for shipments of consumer products to homes and retail establishments and for product returns and trash removal. Commercial enterprises rely on efficient and reliable freight transportation for inbound shipments of raw materials, intermediate goods, and other supplies required for the production of finished goods as well as outbound shipments of intermediate goods and finished products to regional, national, and global markets. Commercial enterprises in the service sector stimulate freight demand by providing income to their employees, who in turn use that income to purchase goods and services.

All commercial enterprises depend on freight, but those that are directly involved in activities such as transporting goods, farming, mining, manufacturing, construction, and managing retail operations depend on it more strongly than others. These freight-dependent industries account for 19 percent of the Region's gross domestic product (GDP) and 18 percent of its total employment.

Freight-dependent industries account for 19 percent of the Region's gross domestic product.

To understand freight movement in the Region, it is therefore useful to examine the key economic and demographic drivers of freight demand, including overall employment, GDP, economic structure, population, and wealth.

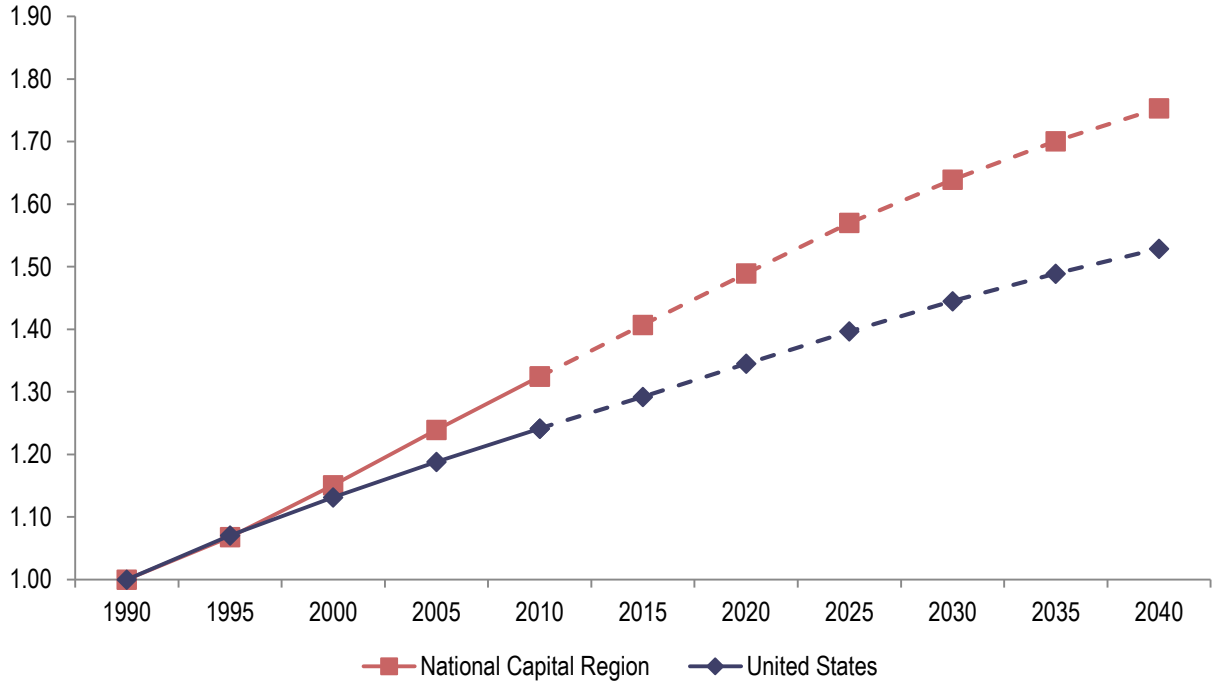
Recent Trends

Population

As of 2013 the Washington-Arlington-Alexandria Metropolitan Statistical Area was home to 5.6 million people, making it the 7th most populous metropolitan statistical area in the nation. The Region is adding population at a faster pace than the nation as a whole (see Figure 4.1 on the next page). Expanding employment in the business and professional service- and government-sectors attracts highly educated people from throughout the United States and the world. The Region's population is expected to grow by an additional 32 percent by the year 2040. Each new resident creates additional demand for consumer goods – residents with higher disposable income generate greater demand for material goods and correspondingly greater overall demand for freight transportation. The Region ranks second in the nation for median household income ($90,149 in 2013), 73 percent above the national average.[10] This means that the median regional household earns approximately $38,000 more per year than the median American household. The combination of a growing population and rising consumer affluence generates high demand for consumer goods, which translates into high demand for freight transportation services.

The Region's population is expected to grow by 32 percent by 2040.

Figure 4.1 Population Growth Trends - National Capital Region and United States



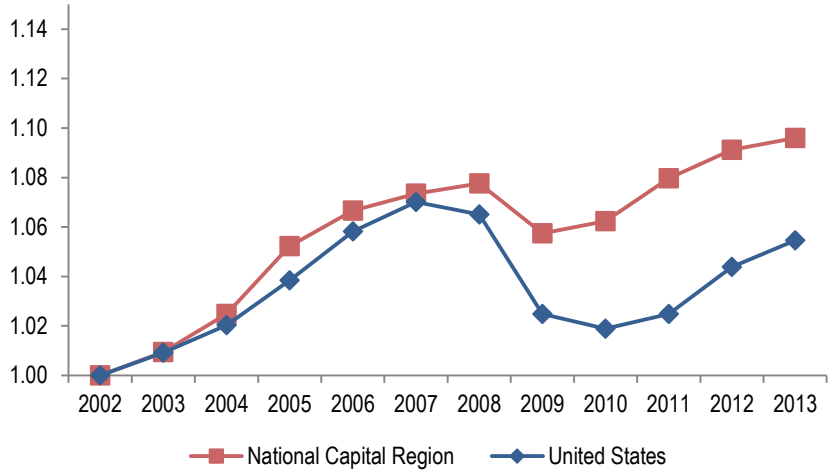
Sources: U.S. Census Bureau[11]; Metropolitan Washington Council of Governments[12]

10 U.S. Census Bureau, 2013 American Community Survey 1-Year Estimates.
11 For all historical data points; 1990 – 2010 and United States population projections; 2015 – 2040.
12 For TPB Planning Area and District of Columbia population projections; 2015 – 2040.

Employment and Gross Domestic Product

The Region's economy employed 2.8 million people in 2013[13], roughly 1.9 percent of all U.S. jobs. Between 2002 and 2013, total employment in the Region increased by 245,000 or 9.6 percent, compared to a U.S. growth rate of 5.5 percent (see Figure 4.2 on the next page).

Figure 4.2 Historic Employment Trends - National Capital Region and United States

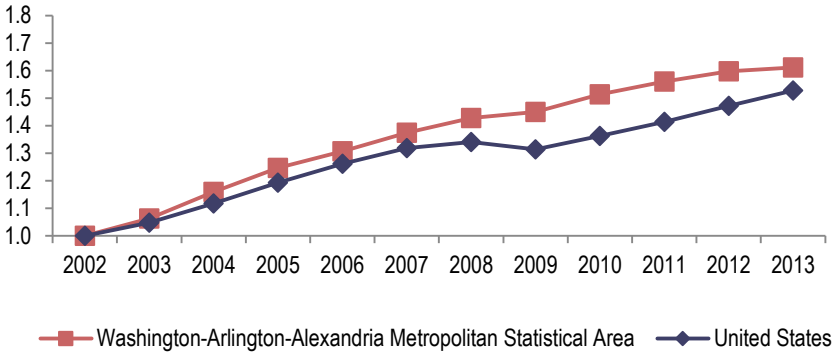


Sources: U.S. Bureau of Labor Statistics and Metropolitan Washington Council of Governments compilation of Quarterly Census of Employment and Work (QCEW) summaries for TPB Planning Area jurisdictions.

In 2013, the Region's gross domestic product (or GDP) was $464 billion. GDP is a measure of the total value added to goods and services due to economic activity in the Region. As with employment, the Region has been surpassing the United States as a whole in terms of GDP growth. In nominal terms, the Region's GDP grew by 61 percent between 2002 and 2013, compared to 53 percent for the United States overall (see Figure 4.3). There is a direct relationship between the growth in economic activity, as measured by GDP, and the demand for freight transportation. The United States Bureau of Transportation Statistics (BTS) defines this relationship as the ratio of total ton-miles[14] of freight to total GDP. In 2002 this *freight transportation intensity* ratio was 0.38 ton-miles per dollar, indicating that every marginal dollar of GDP would be expected to generate an additional 0.38 ton-miles of freight activity.[15]

13 Quarterly Census of Employment and Work (QCEW)
14 A ton-mile is defined as one ton of freight carried one mile.
15 Measured in year 2000 dollars. See U.S. Bureau of Transportation web site http://www.rita.dot.gov/bts/programs/freight_transportation/html/freight_and_growth.html accessed June 6, 2015.

Figure 4.3 Regional and U.S. Gross Domestic Product



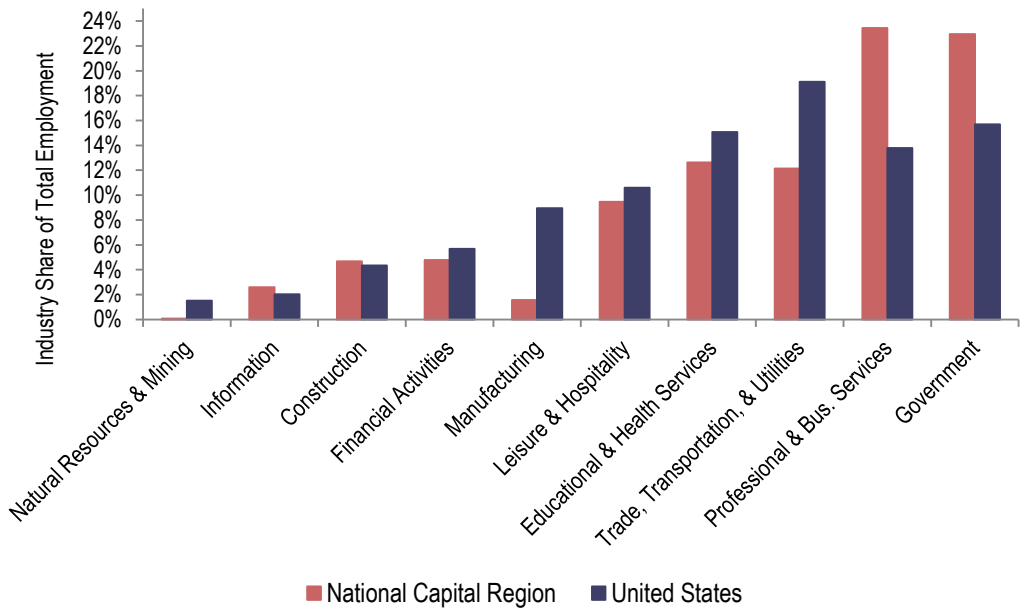
Source: U.S. Bureau of Economic Analysis

Structure of the Economy

The structure of the Region's economy is significantly different than that of the United States as a whole. The proportion of total employment in the government sector and in the professional and business services sector is higher in the Region than it is nationwide. Conversely, the proportion of total employment in the manufacturing; trade, transportation, and utilities; and natural resources and mining sectors is lower in the Region than it is nationwide. The Region's other sectors; information, construction, financial activities, leisure and hospitality, and educational and health services, are roughly equivalent to that of the United States as a whole (see Figure 4.4) in terms of employment proportions.

This relatively high representation of government and professional and business services employment and relatively low representation of manufacturing, mining, and trade, transportation and utilities employment is consistent with service-based regional economy that demands more goods than it produces.

Figure 4.4 Economic Structure – Share of Employment by Major Industry Sector, National Capital Region and United States



Sources: U.S. Bureau of Labor Statistics and Metropolitan Washington Council of Governments

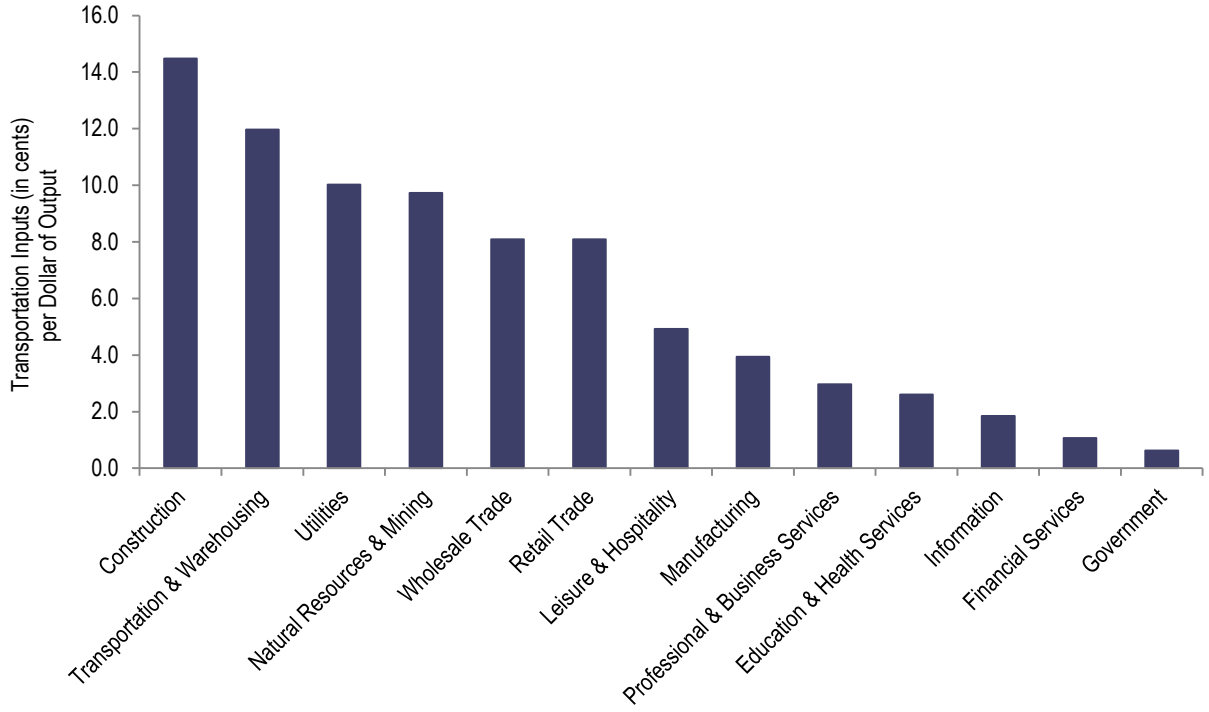
Freight Demand by Industry

Transportation is a cost of doing business and an important input for major sectors of the Region's economy. The impact of transportation costs on a given business depends in large part upon the type of industry the business is in. By examining the transportation inputs required to produce a given output by industry sector, it is possible to identify which sectors are particularly dependent on freight transportation.

Demand for Freight Transportation Services

Figure 4.5 shows the relative use of freight and passenger transportation services by industry, and illustrates the industry sectors that are most dependent on transportation services. In order, the most transportation dependent industries are: construction, transportation and warehousing, utilities, wholesale and retail trade, leisure and hospitality, and manufacturing. Except for leisure and hospitality, these sectors are primarily dependent on freight transportation, rather than passenger transportation.

Figure 4.5 Transportation Reliance by Industry



Source: U.S. Department of Transportation, Bureau of Transportation Statistics Transportation Satellite Accounts, 1997

Freight Dependent Industries

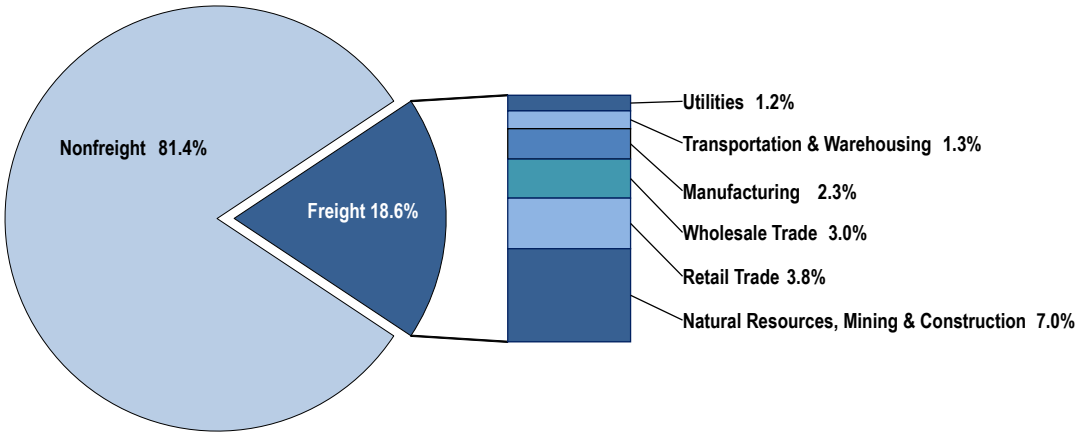
Regional businesses, such as farms that grow crops or raise animals, and quarries that extract gravel for use in construction, depend on freight movement to move the products they produce to processing plants, wholesalers, and retail outlets. Other producing businesses, like manufacturers and construction firms, also depend on freight transportation to bring them the intermediate products – fabricated steel, component parts, concrete, etc. – needed to manufacture finished products or construct buildings and infrastructure. Businesses in the transportation, warehousing and logistics, and wholesale trade industries connect producers and consumers; ensuring that needed goods are transported where and when they are needed. Finally, consumers such as retail establishments, residents, and utilities rely on freight movement to deliver goods and materials to the final point-of-sale or point-of-use. These freight dependent industries can be organized into three categories or clusters:

- The **goods movement cluster** is composed of businesses that provide freight transportation services, such as trucking companies, logistics firms, railroads, air cargo firms, wholesalers, and warehouse / distribution / fulfillment center operators. Overall, the goods movement cluster represents a little more than four percent of the Region's GDP.
- The **freight intensive industry cluster** is composed of industries where the transportation of raw materials, intermediate products, and finished goods accounts for a significant share of their cost of doing business such as natural resources, mining, manufacturing, construction, and utilities. The freight intensive industry cluster represents around 11 percent of the Region's GDP.

- The **retail cluster** is composed of consumer outlets – such as supermarkets, auto dealers, and apparel stores – that require freight transportation services to stock and replenish their inventory. The retail cluster represents a little less than four percent of the Region's GDP.

While other industries depend on freight movement to some extent they are not considered freight dependent in this analysis. These non-freight dependent industries include government, financial services, information, education and health services, professional and business services, and leisure and hospitality and represent about 81 percent of the Region's GDP.

Figure 4.6 National Capital Region Freight- and Nonfreight-Related Industry Sectors by Share of Gross Regional Product



Source: U.S Bureau of Economic Analysis

Forecasts

Population and employment forecasts (see Table 4.1) for the Region indicate that demand for goods, along with the associated demand for freight transportation services, will continue to grow in the future.

Table 4.1 National Capital Region Population and Employment Growth Projections

	2010 (thousands)	2040 (thousands)	Growth (absolute)	Growth (percentage)
Population	5,046.6	6,682.2	1,635.7	32.4%
Employment	3,069.6	4,386.7	1,317.1	42.9%

Source: Metropolitan Washington Council of Governments, Round 8.3 Cooperative Forecasts[16]

The Region's population is forecast to increase by 32 percent through 2040. By 2040, the Region is expected to have over 6.6 million people, an increase of 1.6 million people. This population growth will have a direct impact on freight transportation demand. More people mean more freight trips generated, more services required, and more goods purchased. In addition, population and economic growth in the rest

16 note: Cooperative Forecast numbers include military employees and the self-employed – people that are not included in the Quarterly Census of Employment and Work (QCEW) figures used in the review of historical employment shown in Figure 4.2.

of the nation and around the world will result in increased freight shipments on the regions highways, railroads, and airports.

Employment in the Region is forecasted to grow even faster than population. By 2040 the Region is expected to employ over 4.3 million people, an increase of 1.3 million or 43 percent. This expansion of jobs provides evidence that the Region's businesses, including those that are freight dependent, will generate increasing demand for freight transportation services in the future.

4.1.2 Evolving Supply Chains and Logistics Patterns

Thirty to forty years ago most businesses operated within a *push* supply chain paradigm. Materials, supplies, and finished products were *pushed* from suppliers to manufacturers to distributors and finally to retail outlets. A key feature of this supply chain paradigm is the requirement for businesses to maintain large and expensive inventories as insurance against stockouts. Because businesses and this paradigm have access to significant inventories, they can generally absorb late deliveries with little impact to their operations. However, having large inventories presented several problems including the high cost of owning and storing inventoried items and the inability to quickly respond to changes in customer demand.[17] To reduce these costs and to better respond to changing consumer preferences, businesses have engaged in a long-term and sustained effort to reduce inventories. These efforts have resulted in a shift towards a *pull* or on-demand supply chain paradigm.

Pull supply chains feature an emphasis on replenishing parts or products whenever they are consumed or sold. Once a part is consumed in a manufacturing process or a product is sold in a retail outlet, a signal is generated up the supply chain causing the part or product to be replenished on a just-in-time basis. Instead of relying on a large stock (or inventory) to ensure product availability, businesses in a *pull* supply chain environment will typically only have enough inventory on hand to meet customer demand for a short period of time – sometimes less than a day. To satisfy customers by always having products available when demanded while at the same time holding a minimal level of stock on hand, businesses must manage inventories very closely and develop systems to make sure products arrive where they are needed on schedule. This is why private sector businesses place a high value on the reliability of the freight transportation system.

The current *pull* or on-demand supply chain paradigm has resulted in retail businesses locating their distribution centers at the periphery of major urban areas. These large distribution centers are strategically placed so as to service retail establishments in one or more metropolitan area. To maximize efficiency, trucks must be able to leave the distribution center, deliver goods to retail stores, and return in one shift. While it is most efficient to use trucks with 53 foot trailers to service multiple stores, congestion in many urban areas has caused a shift towards more trucks, albeit often smaller ones - each of which services fewer stores.

New technology coupled with increasingly demanding customer expectations are continuing to push businesses to further reduce costs and improve responsiveness. The various aspects of e-commerce are

17 The following two examples illustrate how the presence of large inventories reduces the ability of a business to respond quickly to the market or address quality issues: (1) a clothing retailer has a large inventory of a particular style of shirt – if that style goes out of fashion, the retailer will have to mark down or scrap a large number of them do to the excess inventory; (2) an auto manufacturer maintains a large inventory of transmissions – if a quality problem with the transmission is discovered, the manufacturer will have to rework or scrap a large number of them. With just-in-time inventory, the negative impacts of these issues are minimized.

enabling some businesses to accomplish both of these imperatives while transforming the supply chain in the process. Consumers are spending less time in retail stores and more time shopping via the internet. They increasingly expect immediate gratification and successful businesses are working to satisfy those expectations. Businesses that do not keep up with these changing expectations are at increased risk of failure. The confluence of e-commerce and customer's high expectations are changing the retail landscape and introducing new transportation providers.

Retailers are increasingly moving toward an omni-channel model where merchants utilize multiple channels to serve their customer base. It involves planning and utilizing traditional brick and mortar stores in combination with e-commerce. Examples of how retail merchants are using omni-channel ideas include:

- If a customer does not find the item they want in a brick and mortar store, there is an e-commerce booth available where it can be ordered;
- Customers can purchase an item online and pick it up in the brick and mortar store;
- Customers can return an item purchased online at a brick and mortar store.

The combination of ever tightening inventory control systems and consumers increasing use of e-commerce is affecting the way goods are distributed. These changes are being manifested in terms of the designs and locations of distribution centers and in the way products are distributed to the end customer.

Evolving Distribution Center Design and Locations

A typical distribution center is roughly rectangular in shape and features a large number of loading docks. Traditional distribution centers typically employ about 0.3 workers per thousand square feet whose primary work tasks involve shipping and receiving activities. The rise in e-commerce is resulting in a transformation of the typical distribution center into an e-commerce fulfillment center. An e-commerce fulfillment center typically employs about 1.0 workers per thousand square feet whose primary work tasks include picking and packing in addition to shipping and receiving activities. These additional workers require places to park, so fulfillment centers have larger employee parking lots. While traditional distribution centers are typically not located to maximize transit options, newer fulfillment centers are better able to attract the work force needed if they have robust transit options available. Fulfillment centers also require more secured truck parking, typically two or three trailer locations per loading dock. This allows truck drivers to drop off and pick up trailers during off-peak hours thereby enabling full use of the available loading docks.

The Changing Last Mile

In an effort to increase speed to market, traditional retailers are converting their brick and mortar stores into centrally located urban distribution centers. This enables same day fulfillment of a customer's online order from the urban department store. Online retailers such as Amazon are installing lockers in locations such as transit stations, Dunkin Donut shops, and convenience stores to enable secure delivery of packages while customers are away from home. As the emphasis of last mile logistics continues to shift towards personalized delivery services, the number of trucks on the Region's streets and roadways will grow. However, these additional trucks are likely to be smaller on average.

The potential impact of automated trucks, drone deliveries, and other disruptive technologies is difficult to plan for, however, regional planners and transportation officials at all levels would be wise to keep abreast of developments in these areas and be prepared to engage elected official and the general public as needed.

4.1.3 Trends in the Freight Transportation Industry

The freight transportation industry is dynamic and continues to evolve with large firms making strategic investments in infrastructure and technology.

Trucking

Over the past 30 years the trucking industry has undergone a series of consolidations and restructurings – a trend that industry observers expect to continue. Larger trucking firms have been making significant investments in GPS and other technologies to help track and manage shipments. Smaller trucking firms, of which there are still a large number, often lack the expertise and capital required to implement tracking technology to the same degree as the larger firms can.

While small trucking firms will continue to exist, they will increasingly contract to larger carriers and utilize load-matching services in an effort to maximize their return on capital. Trucking firms that effectively utilize information technology are likely to prosper relative to firms that are less technology-adept. This trend favors larger firms. Driver shortages will continue to be a problem for the industry, particularly for long haul routes, but as the economy continues to generate high value time sensitive goods, demand for trucking services will continue to be high.

As of early 2015, the profitability of trucking firms was at multi-year highs due to the combination of record tonnage, high shipping rates, and low fuel prices. Industry observers expect this environment to continue through 2015 and fleet owners are investing part of their profits in equipment upgrades and expansion. While the incentives for these investments are related to the need to expand capacity rather than the desire for greater fuel efficiency, fleet turnover is likely to result in a higher proportion of cleaner and more fuel-efficient trucks across the nation and in the Region.

Rail

Deregulation of the railroad industry in the 1980s enabled railroads to steadily increase productivity by restructuring the rail system, shedding unprofitable lines, creating new business opportunities through long-haul intermodal service, and by transporting coal from mines in Appalachia and Wyoming's Powder River Basin. Improvements in hydraulic fracturing techniques enable oil to be extracted more economically from shale deposits and have provided business opportunities for railroads to transport this oil to refineries primarily along the Gulf Coast and in the Northeast. However, due to the steep decline in crude oil prices from midyear 2014 to the publication of this Plan in midyear 2016, shale oil production has fallen substantially resulting in less demand for rail transport. This illustrates the cyclical nature of rail transport demand for energy products such as coal and crude oil.

Due to the chemical makeup of the crude oil extracted from many shale deposits, the likelihood of fire and explosions as a result of a derailment is greater than it is with other types of crude oil. The resulting headline-grabbing effects of recent derailments has elevated public safety concerns about crude oil shipments by rail throughout the nation and issues are therefore national in scope. The National Capital Region does not have petrochemical refineries or terminals where crude oil is transferred from rail to barges. CSX's north-south rail line through the Region is not geographically oriented to be a major transportation artery for crude oil transport. However, CSX's east-west rail line through Frederick County is a probable route for the transport of crude oil from the middle of the continent to refineries in the Philadelphia area or to barge terminals in Baltimore.

The two Class I railroads operating in the National Capital Region, Norfolk Southern and CSX Transportation, are also working to expand their intermodal business through major initiatives to add additional track, straighten curves, increase clearances, and add intermodal terminals on key rail corridors to clear the way for trains hauling double stack container cars moving between Mid-Atlantic ports and the Midwestern markets (CSX National Gateway) and between the Southeast and the Northeast (Norfolk Southern Crescent Corridor).

Air Cargo

In the air cargo industry, freight forwarder and air carrier networks route freight through operationally efficient, cost-effective airports that provide the highest level of customer service. To realize the benefits of these efficient and cost-effective airports, cargo is sometimes trucked many hundreds of miles before being loaded onto an aircraft.

There are several key factors that determine how attractive a particular airport is to air cargo shippers, receivers, and forwarders. The leading factors include the following:

- Local and regional air cargo demand patterns, including a rough balance of inbound and outbound freight opportunities;
- Available aircraft cargo capacity, including international and wide-body flights;
- Sufficient airport cargo infrastructure such as runway length, aircraft parking ramps, air cargo warehouse space, and truck maneuvering and parking space;
- Connectivity to the interstate highway system; and
- A critical mass of logistics and freight forwarding companies to support cargo consolidations.

Air cargo is, in most cases, fluid and has many airport options. This means that, unless an airport meets almost all of the above key factors, it is not likely that its "fair" share of the cargo market will be captured. The ultimate efficiency of airport cargo facilities depends largely on the degree of connectivity among freight forwarders, cross-dock and warehouse facilities, and off airport properties. Access in and out of the airport is important to air cargo businesses, and truck transportation is the critical link to the end-user.

The Region's cargo airports play an important role in supporting the regional economy, enabling businesses and residents to conveniently ship and receive high-value, time-sensitive goods and materials. The Region's economic structure features a higher proportion of government and professional services employment and a lower proportion of manufacturing employment than occurs in the nation overall. This, coupled with the relative affluence of the Region's residents, creates demand for more inbound air cargo than outbound. Despite this imbalance, the Region's cargo airports have been, and are continuing to, invest in the infrastructure needed to support cargo operations and are aggressively marketing their individual strengths. Dulles airport for example, is leveraging their frequent service to the Middle East and Europe to attract air cargo from states like Georgia, Tennessee, and North Carolina. These goods are trucked via regularly scheduled shuttles from Charlotte-Douglas and Atlanta-Hartsfield to Dulles airport for departure. However, the structural imbalance between inbound and outbound air cargo opportunities is a headwind that Dulles and BWI have to contend with as they compete with other, larger cargo airports such as JFK and Atlanta.

The information below correlates each of the Region's primary cargo airports with the key factors listed above.

Key Factor	**Regional Cargo Airports**

Local and regional air cargo demand patterns, including a rough balance of inbound and outbound freight opportunities	The imbalance between inbound and outbound demand is a headwind that both Dulles and BWI airports face in the effort to grow their respective air cargo volumes. This is an issue of cost and efficiency because carriers want to fill their cargo holds for outbound as well as inbound flights.
Available aircraft cargo capacity, including international and wide body flights	The strength of Dulles Airport with respect to this factor is its robust international connections to the Middle East and Europe. In terms of air cargo, BWI is primarily a domestic freight facility.
Sufficient airport cargo infrastructure such as runway length, aircraft parking ramps, air cargo warehouse space, and truck maneuvering and parking space	Both Dulles and BWI meet the requirements of this key factor.
Connectivity to the interstate highway system	Both Dulles and BWI meet the requirements of this key factor.
A critical mass of logistics and freight forwarding companies to support cargo consolidations	Compared to their larger competitors (JFK, Atlanta, Miami, Chicago O'Hare) Dulles and BWI are supported by a significantly smaller set of logistics and freight forwarding companies.

Cargo operations at Dulles and BWI airports are well adapted to the structure of the Region's economy. Illustrative examples include:

- Vaccines, pharmaceuticals, and medical devices produced by the Region's biotechnology sector rely on air transportation, primarily out of Dulles airport, to meet the time-sensitive medical needs of people across the globe. Dulles is a key gateway for military support exports to Europe, the Middle East, and beyond due to its international network.
- BWI airport provides a key supply chain link to seafood, fresh produce, and other wholesale food products distributed out of Maryland Food Center Authority facilities in Jessup, a major distribution center that serves Maryland, District of Columbia, Virginia, and other mid-Atlantic states. BWI airport has the only United States Fish and Wildlife Service inspection gateway in the Mid-Atlantic region.

Competition from Other Modes

Recent advances, such as faster container ships and refrigeration for containers on ocean going vessels, have enabled some perishable commodities, including flowers and foodstuffs, to be transported by sea rather than air. This has enabled shippers to realize significant transport cost savings for some perishable but not otherwise time sensitive commodities, thus diverting some portion of global cargo shipments out of airplanes and onto ships.

Role of Out-of-Region Airports

A significant portion of the Region's air cargo demand is handled by major cargo hub airports located outside of the National Capital Region. In today's environment, trucking is approximately 10 times cheaper than air transportation. Much of the National Capital Region is within a one-day drive of a larger cargo airport, such as JFK, Atlanta, or Philadelphia. Many air cargo shippers, receivers, and forwarders select the lower costs and better schedules offered by these major hubs. Even airports as far away as Miami and Chicago are strong cargo competitors to Dulles and BWI. The additional truck haul required to transport cargo to and from large cargo gateway airports is often accepted by forwarders and shippers as part of the cost of doing business.

Ports and Shipping

To realize greater economies of scale, shipping lines have continued to acquire larger and larger ships. To accommodate them, a program to expand the Panama Canal is currently underway and expected to be completed in early 2016. Container terminals at the Port of Baltimore and at the Port of Virginia, along with at least three other East Coast ports, are currently able to accommodate these larger post-Panamax ships and are anticipating increased container traffic as a result. The advent of larger container ships may impact the size of nearby distribution centers. This is not only because greater volumes of containers are expected overall, but also because there are more containers per ship to offload. This creates demand for larger buildings to accommodate the "surge" volume. While it is difficult to predict all of the effects that the Panama Canal expansion will have on the National Capital Region, it will likely result in some increase in economic activity coupled with more rail and truck freight on the Region's multimodal transportation system.

4.2 Regional Freight Issues, Challenges, and Opportunities

4.2.1 Congestion and Delay

Roadways

Congestion on the nation's roadways is a significant cost to shippers and to the economy overall. The American Transportation Research Institute (ATRI) estimates that congestion added over $9.2 billion in operational costs and resulted in 141 million hours in lost productivity to the trucking industry in 2013.[18] This is the equivalent of over 51,000 truck drivers sitting idle for a working year. Freight congestion is concentrated in urban areas and is most apparent at bottlenecks on highways - especially those serving major international gateways, major domestic freight hubs, and in major urban areas where important national truck flows intersect congested urban areas. In fact, ATRI ranked congestion in the Washington, DC metropolitan area as fifth in the nation in terms of its contribution to increased operating costs for the trucking industry (see Table 4.2 below).

Table 4.2 Cost of Congestion for Trucking by Metropolitan Area - 2013

Rank	Metropolitan Area	Cost to the Trucking Industry (millions of dollars)
1	Los Angeles, CA	1,081.7
2	New York, NY	984.3
3	Chicago, IL	466.9
4	Dallas, TX	406.1
5	**Washington, DC**	**379.4**
6	Houston, TX	373.6
7	Philadelphia, PA	292.1
8	San Francisco, CA	288.6
9	Boston, MA	278.2
10	Atlanta, GA	275.1

Source: American Transportation Research Institute

The Transportation Planning Board has been monitoring congestion in the Region for many years. Table 4.3 identifies the 10 most significant bottlenecks on the Region's interstate highways. Because the freight-

18 ATRI, Cost of Congestion to the Trucking Industry report, April, 2014.

significant network includes many of the Region's interstate highways, nine of these top ten general bottlenecks are also freight bottlenecks.

Table 4.3 Regional Bottlenecks

Rank	Location	Direction	Average Duration	Average Maximum Length (miles)	Occurrences	Impact Factor[1]	Located on Freight-significant Network?
1	I-95 at Fredericksburg/ Stafford County Line	SB	5 hr 36 min	33.6	24	270,972	Yes
2	I-270 at I-495/MD 355	SB	2 hr 3 min	18.1	74	165,339	Yes
3	I-395 at 2nd St.	NB	2 hr 30 min	6.6	156	154,793	Yes
4	I-95 at VA-630/Exit 140	SB	3 hr 46 min	22.4	30	151,575	Yes
5	I-95 at VA-3/Exit 130	SB	4 hr 48 min	36.2	13	135,657	Yes
6	I-95 at VA-606/Exit 118	SB	7 hr 57 min	50.1	5	119,430	Yes
7	I-66 at VA-7/Exit 66	WB	1 hr 7 min	1.2	1,410	111,572	No
8	I-95 at Russell Rd/Exit 148	SB	2 hr 18 min	6.4	126	110,853	Yes
9	I-270 at Middlebrook Rd/Exit 13	NB	1 hr 49 min	6.8	138	102,357	Yes
10	I-395 at 2nd St	NB	1 hr 29 min	3.3	318	94,077	Yes

Note 1: The Impact Factor accounts for multiple aspects of the bottleneck including duration, length, number of occurrences, and traffic volumes
Source: COG/TBP

The projected growth in population and employment (see section 4.1.1) will tend to add VMT (of all vehicle types) to the Region's transportation system, potentially exacerbating congestion and delay.

Rail

Congestion on the freight rail network increases costs to shippers and hampers the reliability and on-time performance of commuter and inter-city passenger rail operations. Railroad capacity is not only a function of track infrastructure; but also of rolling stock and railroad operating strategies related to train speed, train size, and scheduling. Typical infrastructure related capacity constraints include insufficient mainline tracks, lack of adequate sidings along single track lines, low ceiling tunnels, antiquated bridges, outdated signal systems, missing connections, and inadequate terminal capacity.

The most significant freight rail capacity constraints in the National Capital Region are the Virginia Avenue Tunnel and the Long Bridge. The Virginia Avenue Tunnel is a roughly ¾ mile passage beneath Virginia Avenue in southeast Washington, DC housing a single track without enough vertical clearance to accommodate double stack container traffic. The Long Bridge is a two-track railroad bridge across the Potomac River between Virginia and the District of Columbia. These two constraints are both located on a critical, CSX-owned, rail line linking port terminals in the Hampton Roads area to markets in the Northeast and Midwest. A project to remove the capacity and clearance constraints of the Virginia Avenue Tunnel is currently underway. The Long Bridge project, which will double the rail capacity over the Potomac River to accommodate additional passenger and freight trains, is currently in the planning stages.

4.2.2 Freight Rail Safety and Security

The Transportation Planning Board (TPB) is particularly interested in and concerned about the safety and security of the Region's freight rail system. Rail incidents such as the May 1, 2016 CSX derailment in northeast Washington, DC, have highlighted the need for continual improvement of preventative safety and security measures on the freight rail system. Major concerns include the operational handling and tracking of railcars that carry Toxic Inhalation Hazard (TIH) materials, which can cause fatalities if released into the atmosphere. Safety on the nation's railroads is regulated by the Federal Railroad Administration (FRA). It enforces regulations for hazardous materials, highway-rail crossings, track conditions, rail motive power and equipment, operating practices, and train control and signaling. Federal rail safety regulations preempt state rail safety laws and the FRA maintains direct oversight of railroad practices relevant to safety. States can participate in railroad-related investigative and surveillance activities through the FRA's State Safety Participation Program. To participate in the Program, states must have an agreement with the FRA to enable the delegation of some federal investigative and surveillance authority to the State. State agency personnel involved in investigative and surveillance activities must be qualified in one or more of the following FRA safety disciplines:

- Track
- Signal and train controls
- Motive power and equipment
- Operating practices
- Hazardous materials
- Highway-rail grade crossings

The FRA reserves exclusive authority to assess penalties, issue emergency orders, and undertake any other enforcement actions under federal railroad safety laws. Maryland's rail safety authority is under the jurisdiction of the Department of Labor, Licensing, and Regulation (DLLR). Virginia's rail safety authority is under the Virginia State Corporation Commission Division of Utility and Railroad Safety. Currently, the District of Columbia does not have an office of rail safety. Fatalities and injuries on the Region's freight rail system have remained roughly constant since 2006. Table 4.4 shows rail fatalities by category and Table 4.5 shows the nonfatal injuries associated with rail accidents and incidents in the Region.

Table 4.4 Rail Accident / Incident Fatalities

Category	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Employee deaths	-	-	1	-	-	-	-	-	-	-
Highway-rail incident deaths	-	-	-	-	-	1	-	-	-	1
Other incident deaths	6	7	4	5	7	6	2	5	6	3
Train accident deaths	-	-	-	-	-	-	-	-	-	-
Total	**6**	**7**	**5**	**5**	**7**	**7**	**2**	**5**	**6**	**4**

Source: FRA Safety Database

Table 4.5 Nonfatal Injuries from Rail Accidents / Incidents

Category	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Highway-rail incident injuries	2	4	4	9	1	1	3	2	1	5
Other incident injuries	184	138	117	131	143	150	154	180	145	142
Train accident injuries	7	-	20	-	9	-	-	2	-	-
Total	**193**	**142**	**141**	**140**	**153**	**151**	**157**	**184**	**146**	**147**

Source: FRA Safety Database

Positive Train Control

As part of their safety oversight responsibilities and in response to a mandate within the Rail Safety Improvement Act of 2008, the FRA published a final rule on January 15, 2010 requiring mainlines that transport any poisonous-inhalation-hazardous (PIH) materials and where regularly scheduled intercity passenger or commuter rail services are provided to implement positive train control (PTC). PTC is a technological system designed to prevent train-to-train collisions, derailments, incursions into work zones, and movement through an improperly positioned switch. The implementation deadline, originally set for December 31, 2015 has been extended to December 31, 2018.

Rail Security

The U.S. Department of Homeland Security (DHS) is the primary federal agency responsible for security of the transportation sector. The DHS National Infrastructure Protection Plan (2013) includes the Transportation Systems Sector-Specific Plan, which is focused on developing strategies to reduce the risks to critical transportation infrastructure from terrorism threats. The leadership of the District of Columbia, the State of Maryland, the Commonwealth of Virginia, area local governments, and the Department of Homeland Security's Office for National Capital Region Coordination (NCRC) are working in partnership with non-profit organizations and private sector interests to reduce the vulnerability of the National Capital Region (NCR) from terrorist attacks. The Metropolitan Washington Council of Governments (MWCOG) coordinates and hosts many of the regional emergency support function (R-ESF) committees that are working together to advance preparedness in the region. The RESF-1 Transportation Committee meets monthly to address role of transportation (including freight rail) in the NCR Homeland Security Program. The committee has representation at the local, state, regional, and federal levels from all NCR jurisdictions and provides a forum for regional transportation officials to exchange information and discuss emergency response, coordination, and recovery requirements.

4.2.3 Freight in Regional Activity Centers

The National Capital Region Transportation Planning Board (TPB) and the Metropolitan Washington Council of Governments (MWCOG) recognize that the Region is supported largely by the economic activity that occurs in major housing and jobs centers, known as activity centers. These mixed-use activity centers are places that are intended to accommodate much of the Region's future growth and development. Concentrating future growth within activity centers enables the more effective and efficient use of existing facilities and fosters increased economic activity.

Because the initial impetus for rethinking how urban and suburban places should be developed came from planners and other stakeholders interested in improving livability, they most often focused on improving accommodations for pedestrians, cyclists, and transit users. Stakeholders involved in goods movement were included less often in the urban design conversation. Recently, however, cities and states around the country are beginning to include the consideration of truck movements in their land-use and transportation planning

activities. In the National Capital Region, the District Department of Transportation (DDOT) is developing and implementing strategies to address goods movement issues in the urban core. The Region has an opportunity to apply the findings of recent and ongoing research as well as the lessons learned by cities and counties across the nation to ensure that as more development is concentrated in activity centers, the needs of all users, including those that move goods, are considered in the planning process.

Section 5.0 Regional Freight Policies

The Regional freight policies described in this section are intended to provide a framework for transportation planning activities conducted by the Transportation Planning Board (TPB). TPB member jurisdictions are also encouraged to consider these freight policies as they conduct their respective transportation planning functions.

5.1 Freight Policy Background

These freight policy statements are the result of an extensive development process based upon TPB member input, a review of existing policy language within published Virginia, Maryland, and District of Columbia documents, regional stakeholder outreach, and multiple TPB freight subcommittee and TPB technical committee reviews. To ensure coverage of all the relevant topic areas, the set of freight policy statements has been correlated with both Regional Transportation Priority Plan goals and National Freight Goals[19] as shown in Figure 5.1.

5.2 TPB Freight Policies

The Transportation Planning Board…

1. supports the prioritized advancement of freight-related transportation projects that provide maximum value, efficiency, and safety with particular emphasis on those that improve freight access to activity centers.
2. supports investments that maintain a state of good repair for the Region's freight transportation system.
3. supports the use of best practices for safety, engineering, and maintenance, of freight-related transportation infrastructure.
4. supports the alleviation of roadway bottlenecks where feasible to improve travel times and reliability for trucks and passenger vehicles.
5. supports maximizing opportunities to expand transportation options, address roadway congestion, and reduce pollution by increasing the use of passenger and freight rail.
6. supports the consideration of potential social, economic, and environmental effects of freight-related programs, policies, and activities on minority populations, low-income populations, and people with disabilities.
7. recognizes freight's role in economic development and supports efforts to maximize the use of important economic drivers, including airports, ports, and intermodal facilities serving the Region's residents and businesses.
8. supports the safe and community-friendly accommodation of freight deliveries within the Region's activity centers.
9. supports improvements in truck safety using education, enforcement, and engineering strategies.

[19] National Freight Goals were established in the MAP-21 legislation and continued under the FAST Act.

10. supports efforts to route hazardous materials away from the National Capital Region; for hazardous materials that must be transported to, from, within, and through the Region, the TPB supports the selection of the safest and most secure modes and routes.
11. encourages information sharing on explosive, toxic by inhalation, and radioactive materials being shipped to, from, within, and through the Region, including real-time notifications and long-term planning information.
12. supports robust first responder training and exercise activities regarding freight in general and hazardous materials transport in particular.
13. supports collaboration among agencies and with the private sector on freight planning and operations concerns to support mutual goals.
14. supports the proactive analysis of freight-related performance measures in the context of overall regional performance measurement to identify lessons learned and promote regional goals.
15. promotes sustainable methods of freight operations that are sensitive to environmental, cultural, and community resources.
16. encourages collaboration among transportation planners, land use planners, private railroads, elected officials, and other stakeholders to find creative ways to facilitate community-beneficial land use development (residential, commercial, or industrial as appropriate) while providing space for necessary future rail expansion along key rail corridors.
17. supports the review and study of new freight-related technologies, emerging business practices, and evolving commodity mixes and mode shares to advance regional goals.

Figure 5.1 Correlation of Freight Policies to RTPP Goals and to National Freight Goals

National Freight Goals	RTPP Goals						
	Provide a Comprehensive Range of Transportation Options	Promote a Strong Regional Economy, Including a Healthy Regional Core and Dynamic Activity Centers	Ensure Adequate System Maintenance, Preservation, and Safety	Maximize Operational Effectiveness and Safety of the Transportation System	Enhance Environmental Quality, and Protect Natural and Cultural Resources	Support Inter-Regional and International Travel and Commerce	Supports all RTPP Goals
To invest in infrastructure and to implement operational improvements that… strengthen the contribution of the national freight network to the economic competitiveness of the U.S., reduce congestion [and that] increase productivity, particularly for domestic industries and businesses that create high-value jobs	P1 P4 P5	P7 P8		P13	P16	P5 P7	
To improve the safety, security, and resilience of freight transportation	P1	P8	P3, P9, P10 P11, P12				
To improve the state of good repair of the national freight network			P2, P3				
To use advanced technology to improve the safety and efficiency of the national freight network			P11				P17
To incorporate concepts of performance, innovation, competition, and accountability into the operation and maintenance of the national freight network				P14			
To improve the economic efficiency of the national freight network	P1	P7				P7	
To reduce the environmental impacts of freight movement on the national freight network	P5, P6		P10 P11		P15	P5	

Section 6.0 National Capital Region Projects Important to Freight

The following two tables list projects that are important to goods movement in the National Capital Region. These two tables represent a compilation of projects beneficial to freight movement in the Region. All projects were gathered from existing or in-process plans or reports and input from the TPB Freight Subcommittee. Sources for these projects include the TPB's Constrained Long Range Plan (CLRP), the MARC Growth and Investment Plan Update, information from Norfolk Southern Corporation and CSX Transportation, Inc, Virginia Railway Express, the Long Bridge Phase II Study, and the Virginia Department of Rail and Public Transportation led DC2RVA study. CLRP sourced projects are already scheduled to be funded and built. Some of the rail projects listed are partially or entirely outside the boundaries of the National Capital Region, but are included in the list because of their importance to the regional economy. Table 6.1 lists rail projects and Table 6.2 lists highway projects.

Table 6.1 Rail Projects Included in Agency/Jurisdictional/Private Railroad Plans Important to Freight

#	Title	Description	Jurisdiction	Source	Owner
1	Potomac Shores and Arkendale to Fredericksburg 3rd Main Line	Add 3rd track from Potomac Shores and Arkendale to Fredericksburg	Stafford County / Prince William County	DC2RVA/VRE	CSX
2	Occoquan River to Powell's Creek 3rd Main Line	Add 3rd track from Occoquan River to Powell's Creek	Prince William County	DC2RVA/VRE	CSX
3	Franconia to the Occoquan River - 3rd Main Line	Add 3rd track between Franconia and the Occoquan River	Fairfax County	DC2RVA/VRE	CSX
4	Potomac River to Alexandria - 4th Main Line	Add 4th track between the Long Bridge and Alexandria	City of Alexandria / Arlington County	DC2RVA/VRE	CSX
5	AF Bypass Track	Project for VRE access to Alexandria Station from NS tracks	City of Alexandria	VRE	VRE
6	Long Bridge	Project to increase the number of main line tracks across the Potomac River from 2 to 4	Washington D.C.	Long Bridge Phase II Study	CSX
7	CP VA to L'Enfant/Potomac River 4th Main Line	Add 4th track from L'Enfant (just north of the Long Bridge) to CP VA (near the split between the RF&P and 1st St. tunnel)	Washington D.C.	VRE	CSX
8	12th Street track lowering	Undercut to lower tracks	Washington D.C.	CSX-National Gateway	CSX
9	10th Street track lowering	Undercut to lower tracks	Washington D.C.	CSX-National Gateway	CSX
10	I-395 ramp track lowering	Undercut to lower tracks	Washington D.C.	CSX-National Gateway	CSX
11	New Jersey Avenue track lowering	Undercut to lower tracks	Washington D.C.	CSX-National Gateway	CSX

#	Title	Description	Jurisdiction	Source	Owner
12	Virginia Avenue Tunnel	Replace existing single track tunnel with a two-track tunnel having double stack clearance	Washington D.C.	CSX-National Gateway	CSX
13	Gainesville-Haymarket Extension	Expand rail infrastructure along Norfolk Southern's 'B' Line to Haymarket and upgrade Manassas Wye	City of Manassas / Prince William County	VRE	NS
14	Manassas to Balls Ford Road - 2nd Main Line	Add a 2nd main line track from Manassas to Balls Ford Road, connecting with a 2-mile passing track constructed several years ago	City of Manassas	NS	NS
15	Manassas to S. Manassas - 3rd Main Line	Add a 3rd main line track from Manassas to South Manassas	City of Manassas / Prince William County	NS	NS
16	Alexandria Ethanol Transload Facility Expansion and Relocation	Reconfigure the track layout at the transload facility, install new equipment including spill-containment gear, and move the rail-to-truck ethanol transfer point 0.25 miles west - farther from residential neighborhoods.	City of Alexandria	NS	NS
17	Barnesville Hill - 3rd Main Line	Add 3rd track at Barnesville Hill on the Metropolitan Subdivision	Montgomery County	MGIP Update	CSX
18	Metropolitan Subdivision - 3rd Main Line	Add additional triple tracking on the Metropolitan Subdivision	Montgomery / Frederick Counties	MGIP Update	CSX
19	Savage to Laurel - 3rd Main Line	Add 3rd track between Savage and Laurel on the Capital Subdivision	Anne Arundel / Prince George's Counties	MGIP Update	CSX
20	Washington D.C. to Baltimore - 3rd Main Line	Continue expansion to 3 main tracks between Baltimore and Washington D.C. on the Capital Subdivision	Anne Arundel / Prince George's / Baltimore Counties and Baltimore City	MGIP Update	CSX
21	Northeast Corridor - 4th Main Line	Add 4th track between BWI Airport and New Carrollton	Anne Arundel / Prince George's Counties	MGIP Update	Amtrak
22	Howard Street Tunnel	Expand the Howard Street Tunnel to provide double-stack clearance and enable efficient rail transport of containers to/from the Port of Baltimore	Baltimore City	MDOT/CSX	CSX

Source Legend:

DC2RVA: District to Richmond Southeast High Speed Rail – A Virginia Department of Rail and Public Transportation (VDRPT) led effort to complete environmental analysis and preliminary engineering for a set of projects to improve intercity passenger rail along the Washington, D.C. to Richmond, VA segment of the Southeast High Speed Rail Corridor

VRE: Virginia Railway Express

CSX: CSX Transportation, Inc.

NS: Norfolk Southern Corporation

MGIP Update: MARC Growth and Investment Plan Update (September 9, 2013)

MDOT: Maryland Department of Transportation

Note: VRE has a program of projects to add a second platform and grade-separated pedestrian access to platforms that contributes to CSX's operational fluidity and improves safety.

Table 6.2 Highway Projects Included in the CLRP That Are Important to Freight

#	Title	Description	Project Completion	Cost Estimate (millions)	Jurisdiction	CLRP ID
1	I-495 HOT/HOV Lanes	Add HOT/HOV lanes to the Capital Beltway between Springfield and VA 193 Georgetown Pike.	2030	$899.0	VDOT-Fairfax County	2069
2	I-395 Construct 4th Southbound Lane	Add a continuous south bound lane on I 395 from north of Duke St. to south of Edsall Rd.	2018	$58.5	VDOT-Fairfax County, City of Alexandria	3179
3	I-395 Construct Northbound Auxiliary Lane	Provide final design and construction of auxiliary lane and noise wall (if required) on northbound I-395 between Duke Street on ramp and Seminary Road off ramp.	n/a	$20.0	VDOT-City of Alexandria	3070
4	I-395 Express Lanes	Convert and reconfigure the two existing reversible HOV lanes on I-395 inside the Capital Beltway to a three-lane, reversible HOT facility (“Express Lanes”).	2019	$220.0	VDOT – Fairfax County, Arlington County, City of Alexandria	3525
5	I-495 Auxiliary Lanes	Connect the on ramps and off ramps along the Capital Beltway between Hemming Ave. underpass and Georgetown Pike in both directions.	2030	$1.0	VDOT-Fairfax County	3272
6	I-66 HOV & SOV Widening	The existing 4-lane roadway will be widened to provide 6 lanes between US 15 Haymarket and Gainesville. During the peak period in the peak direction, the median lane will be marked as a diamond lane and restricted to HOV traffic.	2017	$131.9	VDOT-Prince William County	1752
7	I-66 Auxiliary Lanes	Connect the on ramps and off ramps along the Capital Beltway between Hemming Ave. underpass and Georgetown Pike in both directions.	2030	$1.0	VDOT-Fairfax County	3273
8	I-66 Improvements Outside the Beltway	Add two new HOT lanes in each direction. One lane will be new while the other will come from converting the existing HOV lane.	2021, 2040	$2,000 - $3,000	VDOT – Fairfax County, Prince William County	3448

#	Title	Description	Project Completion	Cost Estimate (millions)	Jurisdiction	CLRP ID
9	I-270/US 15 Corridor Study	Multi-modal corridor study to consider highway and transit improvements in the I-270/US 15 corridor from Shady Grove Metro Station to north of Biggs Ford Road. Alternatives include managed lanes.	2030	$5,471.8	SHA-Montgomery and Fairfax Counties	1186
10	I-70 Widening	Widen I-70 from Mt. Phillip Road to west of MD 355	2020	$142.5	SHA-Frederick County	1187
11	Dulles Toll Road Eastbound Collector/Distributor/Additional Lane	Construct collector-distributor road between VA 684 Spring Hill Rd. and Wiehle Ave. to allow additional closely spaced interchanges to be constructed in Tysons.	2036	$62.0	VDOT-Fairfax County	3151
12	Dulles Toll Road Westbound Collector/Distributor/Additional Lane	Construct collector-distributor road between VA 684 Spring Hill Rd. and Wiehle Ave. to allow additional closely spaced interchanges to be constructed in Tysons.	2037	$124.0	VDOT-Fairfax County	3154
13	Governor Harry W. Nice Bridge Improvement Project	Construct a new four-lane bridge north of the existing bridge, with a barrier-separated, two-way bicycle/pedestrian path on the south side of the bridge.	2030	$850.0	MDTA-Charles County	2617
14	MD 5 Widening and Upgrade	Upgrade MD 5 to a multi-lane freeway from US 301 interchange at T.B. to north of I-95/I-495 Capital Beltway.	2025	$1,354.8	SHA-Prince George's County	1196
15	MD 210 Corridor Study	Multi-modal transportation study to relieve traffic congestion along MD 210 and improve intersections from I-95/I0495 to MD 228.	2030	$585.4	SHA-Prince George's County	1199
16	MD 4 Widening and Upgrade	Upgrade existing MD 4 to a multilane freeway from MD 223 to I-95/I-495 (Capital Beltway). Includes interchanges at Dowerhouse Road and Westphalia Road.	2035	$325.7	SHA-Prince George's County	1194
17	MD 3 Corridor Study	Study to upgrade MD 3 from US 50 to MD 32 to address safety and capacity concerns.	2030	$399.0	SHA-Prince George's County	1195

#	Title	Description	Project Completion	Cost Estimate (millions)	Jurisdiction	CLRP ID
18	US 1 Widening	Improvements to Route 1 to improve the safety and operation of intersections and/or roadway segments. By 2025, widen an additional lane in each direction from VA 235 north to the Capital Beltway. Reconstruct/ replace bridges, as necessitated by maintenance demands or other causes, to the 6-lane width.	2035		VDOT-Stafford, Prince William, and Fairfax Counties	1942
19	US 1 Widening	Construct 6-Lane Divided Roadway between Fuller Rd and Stafford County Line.	2040	$58.0	VDOT-Prince William County	3291
20	US 1 Widening	Construct 6-Lane Divided Roadway between VA 1109 Brady's Hill Rd. and Neabsco Mills Rd.	2025	$23.0	VDOT-Prince William County	2594
21	US 1 Widening	Construct 6-Lane Divided Roadway between Neabsco Mills Rd and Featherstone Rd.	2025	$23.0	VDOT-Prince William County	2685
22	US 1 Widening	Construct 6-Lane Divided Roadway between Featherstone Rd and Mary's Way.	2040	$44.5	VDOT-Prince William County	3173
23	US 1/ VA 123 Interchange, Widening	Construct interchange at intersection of US 1 and VA 123; construct bridge over CSX railroad to provide new access point to Belmont Bay; widen US 1 to 6 lanes from Mary's Way to Annapolis Way; and widen VA 123 to 6 lanes from Annapolis Way to US 1.	2018	$110.1	VDOT-Prince William County	2161
24	US 1 Widening	Construct 6-Lane Divided Roadway between Annapolis Way and Lorton Rd.	2035	$125.0	VDOT-Prince William and Fairfax Counties	3180
25	US 1 Widening	Reconstruct US 1, from College Avenue to Cherry Hill Road to provide a four-lane divided roadway. Widen US 1, from Cherry Hill Road to I-95/I-495, to a six-lane divided roadway.	2025	$145.2	SHA-Prince George's County	1202
26	US 50 Widening	Widen to 6 lanes from VA 695 Relocated to Sully Rd. Reconstruct / replace bridges, as necessary.	2025	$99.9	VDOT-Fairfax and Loudoun Counties	1906

#	Title	Description	Project Completion	Cost Estimate (millions)	Jurisdiction	CLRP ID
27	VA 7 Bypass Widening	Widen the Leesburg Bypass from 4-lane divided to 6-lane divided freeway between the west Business VA 7 interchange and the east Business VA 7/US 15 interchange. Construct overpass at Sycolin Road.	2035	$54.7	VDOT-Loudoun County	1870
28	VA 7 Widening	Widen and upgrade the existing 4-lane roadway to a 6-lane freeway between Leesburg and the Dulles Toll Road. VA 7 between the Dulles Toll Road and I-495 to be widened to 8 lanes/maintained as arterial.	2025	$49.3	VDOT-Fairfax County	2105
29	VA 7 Widening	Road Widening between I-495 and I-66.	2021	$71.0	VDOT-Fairfax County	3161
30	VA 7 Widening	Widen the existing 4-lane roadway to 6 lanes between Seven Corners and Bailey's Crossroads.	2025	$34.3	VDOT-Fairfax County	2175
31	VA 28 Widening	Widen from 2 to 4 lanes from Fauquier County Line to VA 215, and VA 215 to VA 219. Widen from 4 to 6 lanes from VA 219 to Manassas (234 Bypass). Replace the existing bridge over Broad Run with a 6-lane structure and 4-lane approaches.	2025	$11.1	VDOT-Prince William County	2045
32	VA 123 Widening	Widen to 6 lanes from Horner Rd. to Devil's Reach Rd.	2022	$3.0	VDOT-Prince William County	1723
33	VA 286 Fairfax County Parkway Widening	Widen the Parkway to 6 lanes. North of I-66, additional lanes will function as HOV lanes in the peak period. Construct interchange at Fair Lakes Parkway & Monument Drive, widen VA 286 to 8 lanes between I-66 and Fair Lakes Parkway, widen VA 286 to 6 lanes between Fair Lakes Parkway and Rugby Road, and upgrade VA 286 to a freeway between I-66 and US 50.	2035	$295.0	VDOT-Fairfax County	2106
34	Monocacy Blvd & Gashouse Pike Reconstruction	Reconstruct Monocacy Blvd. from Schifferstadt to Gas House Pike	2017	$15.0	Frederick County	1181

#	Title	Description	Project Completion	Cost Estimate (millions)	Jurisdiction	CLRP ID
35	MD 85 Widening	Widen MD 85 to a four-lane divided highway from south of English Muffin Way to the State Highway Administration/ Westview development complex, then 6 lanes through the I-270 interchange area, then 4 lanes to Grove Road.	2020	$242.7	SHA-Frederick County	1210
36	MD 27 Reconstruction	Reconstruct MD 27 from Brink Rd to Skylark Rd	2020		SHA-Montgomery County	1434
37	MD 187 Old Georgetown Rd Widening	Construct 1,600 feet of Old Georgetown Road (MD 197) as a six lane roadway from Nicholson Lane/Tilden Lane to Executive Boulevard.	n/a		Montgomery County	2921
38	MD 355 / Randolph Rd. CSX Grade Separation	Construct a CSX Railroad grade-separated crossing and interchange improvements on Randolph Road/Montrose Road.	2020	$136.0	SHA-Montgomery County	1217
39	MD 97 at Brookeville	Construct a new two-lane roadway on MD 97 from Gold Mine Rd. south of Brookeville to north of Brookville. Two-lane roadway relocated west of Brookeville with roundabouts at northern and southern termini on MD 97.	2018	$37.2	SHA-Montgomery County	1213
40	VA 621 Balls Ford Rd Widening	Widen Rt 621/Balls Ford Rd to 4 lanes from Ashton Ave to Groveton Dr.	2025	$28.4	VDOT-Prince William County	3377
41	VA 621 Balls Ford Rd Widening	Widen Rt 621/Balls Ford Rd to 4 lanes from Rt 234 Business to 234 Bypass and then to Devlin Rd.	2035	$32.0	VDOT-Prince William County	2357
42	Wellington Rd Widening	Widen to 4 lanes from Relocated Linton Hall Road to Rixlew Lane, where it will tie into the recently widened segment between Rixlew Lane and the Western City Limit of Manassas. Relocate Wellington Road from the vicinity of its intersection with Limestone Drive and tie it into Relocated Linton Hall Road in the vicinity the intersection with Lakeview Drive.	2025	$20.6	VDOT-Prince William County	2145
43	Muirkirk Rd Reconstruction	Construction and reconstruction from west of U.S. 1 to Odell Rd. to provide a four-lane facility.	2020	$6.4	Prince George's County	1296

#	Title	Description	Project Completion	Cost Estimate (millions)	Jurisdiction	CLRP ID
44	Florida Avenue Transportation Study Implementation	Implementation of Florida Avenue Transportation Study recommendations, which will include reconstruction of Florida Ave from Benning Rd to New York Ave.	2018	$12.0	DDOT	3382

Section 7.0 Recommendations and Next Steps

The TPB vision is to develop, implement, and maintain an interconnected transportation system that enhances quality of life and promotes a strong and growing economy including a healthy regional core and dynamic regional activity centers. Realizing this vision requires a focus on the efficient transportation of both people and goods. The following recommended actions, which can be accomplished with resources that are already in place, will help the Region move towards its vision. These actions are organized into two categories; those related to maintaining and strengthening the existing regional freight planning process and longer-term, strategic actions.

7.1 Actions Related to Maintaining and Strengthening the Regional Freight Planning Process

- Continue to Support the TPB Freight Subcommittee
- Maintain and Strengthen Private-Sector Participation in the TPB Freight Subcommittee
- Create Opportunities to Hold Joint Meetings with Other TPB Subcommittees
- Develop "Freight Around the Region" Brochures in Coordination with Member Jurisdictions
- Organize Periodic Regional Freight Forums
- Collect and Analyze Freight Data and Make Available to Member Jurisdictions and the Public
- Continue Coordination with Federal, State, Local, and Private-Sector Freight Partners
- Coordinate TPB's MAP-21/FAST Freight-Related Activities – Including Performance Measures
- Identify and Communicate Freight-Related Infrastructure Issues to Member Agencies to Address in their Planning and Programming Activities
- Strengthen Relationships with Local Jurisdiction Planners
- Highlight Economic Development Aspects of Freight with Local Jurisdiction Planners

7.2 Strategic Regional Freight Planning Activities

- Raise Freight Profile within Local and Regional Planning Processes
- Develop and Communicate Helpful Information about Accommodating Freight within Regional Activity Centers
- Continue Participation in FHWA Effort to Develop Innovative Strategies for Improving Freight Movement in Urban Areas
- Monitor Developments of Autonomous and Connected Freight Vehicles
- Monitor Key Economic and Industry Trends Impacting Goods Movement
- Monitor the Development of New and Emerging Freight-Relevant Data Sources and Incorporate them into Transportation Planning Activities as Appropriate
- Provide Information to the TPB and Freight Stakeholders on the Status or Progress on this Plan's Identified Freight Policies When Such Information Becomes Available

Appendix A Freight Analysis Framework

This appendix contains technical information and supplementary materials for the National Capital Region Freight Plan. Relevant sections of the main body of the Freight Plan are referenced directly under each major topic area of this appendix.

A.1 Freight Analysis Framework

This section of the appendix provides additional detail on the commodity codes and geographic regions used within the Freight Analysis Framework (FAF). It relates to Section 2.0: Freight Demand within the main body of the Plan.

A.1.1 FAF Commodity Types

The FAF dataset defines freight commodities according to the Standard Classification of Transported Goods[20] (SCTG) coding system. To provide concise commodity descriptions in the many tables and figures in this report, the FAF commodity descriptions have been shortened as shown in Table A.1 below. Detailed information about the specific types of goods included within each of the FAF commodities is available from the United States Census Bureau.[21]

Table A.1 FAF Commodity Descriptions

SCGT Code	FAF Commodity Description	Commodity Description Used in this Report
1	Live animals and live fish	Animals & fish (live)
2	Cereal grains	Cereal grains
3	Other agricultural products	Other agricultural products
4	Animal feed and products of animal origin, n.e.c.	Animal feed
5	Meat, fish, seafood, and their preparations	Meat/poultry/fish/seafood
6	Milled grain products and preparations, bakery products	Milled grain & bakery products
7	Other prepared foodstuffs and fats and oils	Other prepared foodstuffs
8	Alcoholic beverages	Alcoholic beverages
9	Tobacco products	Tobacco products
10	Monumental or building stone	Monumental or building stone
11	Natural sands	Natural sands
12	Gravel and crushed stone	Gravel & crushed stone
13	Nonmetallic minerals n.e.c.	Other nonmetallic minerals
14	Metallic ores and concentrates	Metallic ores & concentrates
15	Coal	Coal
16	Crude petroleum	Crude petroleum
17	Gasoline and aviation turbine fuel	Gasoline/aviation fuel/ethanol
18	Fuel oils	Fuel oils
19	Coal and petroleum products, n.e.c.* (includes Natural gas)	Other petroleum products
20	Basic chemicals	Basic chemicals
21	Pharmaceutical products	Pharmaceutical products

[20] The SCGT coding system was developed by agencies of the United States and Canadian governments to address statistical needs in regard to products transported.

[21] A thorough description of each of the SCTG codes is available in a document titled **2012 COMMODITY FLOW SURVEY: STANDARD CLASSIFICATION OF TRANSPORTED GOODS (SCGT)** available here: https://bhs.econ.census.gov/bhs/cfs/Commodity%20Code%20Manual%20%28CFS-1200%29.pdf

SCGT Code	FAF Commodity Description	Commodity Description Used in this Report
22	Fertilizers	Fertilizers
23	Chemical products and preparations, n.e.c.*	Other chemical products
24	Plastics and rubber	Plastics & rubber
25	Logs and other wood in the rough	Logs & wood in the rough
26	Wood products	Wood products
27	Pulp, newsprint, paper, and paperboard	Pulp/newsprint/paper/paperboard
28	Paper or paperboard articles	Paper & paperboard articles
29	Printed products	Printed products
30	Textiles, leather, and articles of textiles or leather	Textiles, leather & their articles
31	Nonmetallic mineral products	Nonmetallic mineral products
32	Base metal in primary or semi-finished forms and in finished basic shapes	Base metals in primary forms
33	Articles of base metal	Articles of base metal
34	Machinery	Machinery
35	Electronic and other electrical equipment and components and office equipment	Electronic & electrical equipment
36	Motorized and other vehicles (including parts)	Motorized vehicles & parts
37	Transportation equipment, n.e.c.*	Railway equipment/aircraft/boats
38	Precision instruments and apparatus	Precision instruments & apparatus
39	Furniture, mattresses and mattress supports, lamps, lighting fittings, and illuminated signs	Furniture/mattresses/lamps/signs
40	Miscellaneous manufactured products	Misc. manufactured products
41	Waste and scrap	Waste & scrap
43	Mixed freight	Mixed freight
99	Commodity unknown	Unknown

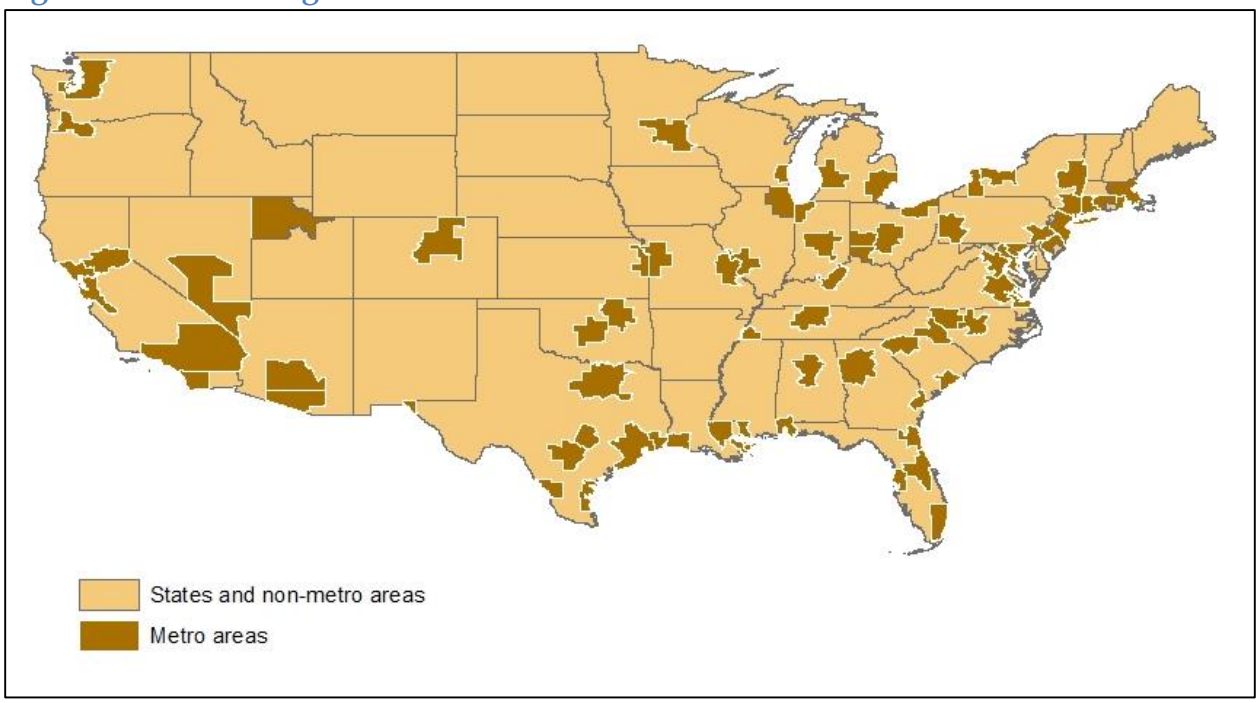
* n.e.c. – not elsewhere classified
Source: Federal Highway Administration Freight Analysis Framework and Metropolitan Washington Council of Governments

A.1.2 FAF Geographies

The FAF dataset is organized into 123 domestic FAF regions (see Figure A.1 below). Each of these FAF regions falls into one of the following categories:

- Census defined Consolidated Statistical Region (CMA)
- Census defined Metropolitan Statistical Area (MSA)
- The rest of a state (everything in a state that is not included in a CSA or MSA)
- An entire state (if that state does not include a CMA or MSA)

Figure A.1 FAF Regions



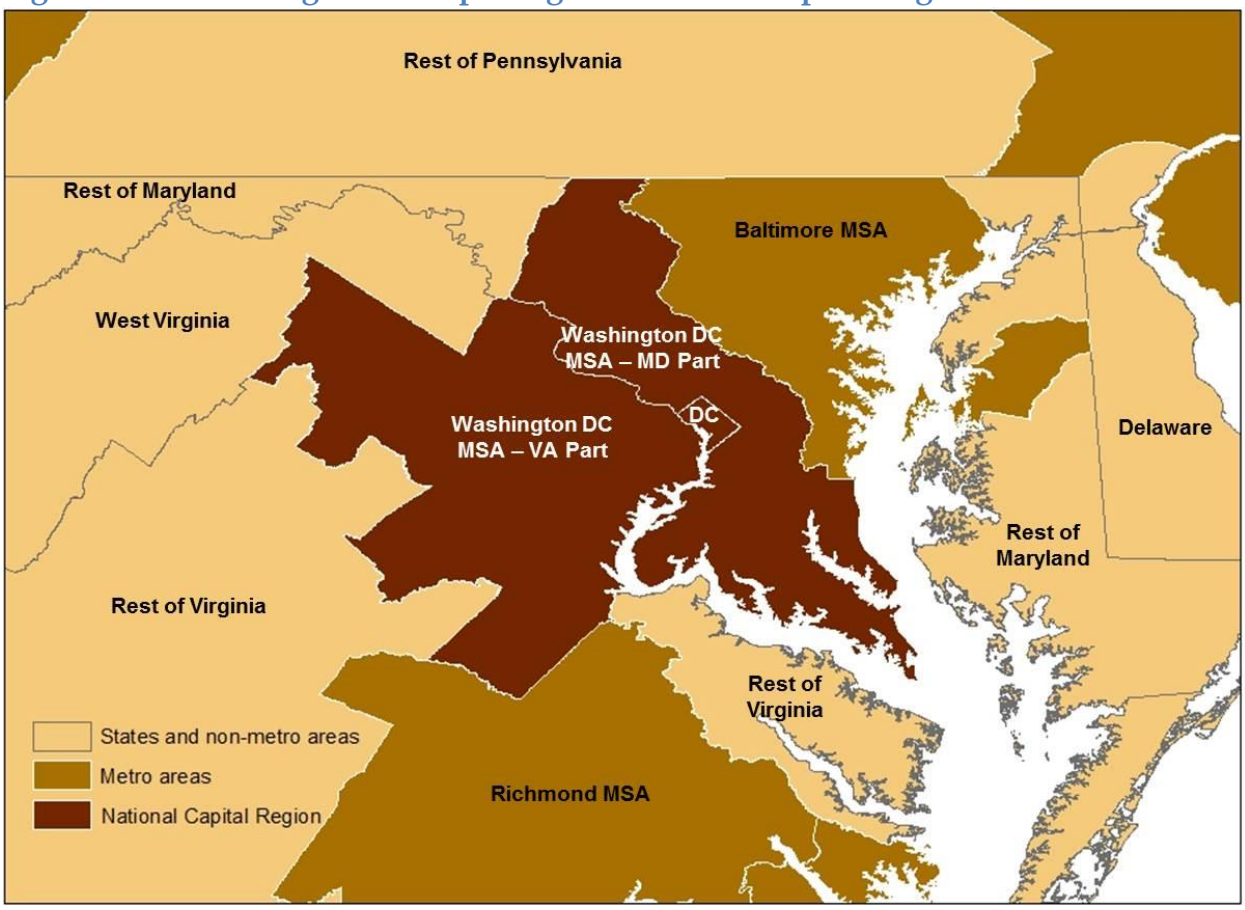
Source: Federal Highway Administration Freight Analysis Framework and Metropolitan Washington Council of Governments

For purposes of FAF analysis, the National Capital Region is an amalgamation of three FAF regions (see Figure A.2):

- Washington, DC MSA – District of Columbia part
- Washington, DC MSA – Maryland part
- Washington, DC MSA – Virginia part

While the geography of these combined FAF regions does not precisely match the boundaries of the National Capital Region's planning area, it is sufficiently proximate to provide useful information.

Figure A.2 FAF Regions Comprising the National Capital Region



Source: Federal Highway Administration Freight Analysis Framework and Metropolitan Washington Council of Governments

Appendix B Regional Freight-Significant Network

This appendix contains a series of detailed maps and tables describing the Regional Freight Significant Network.

Figure B.1 Regional Freight-Significant Network – Frederick County Area

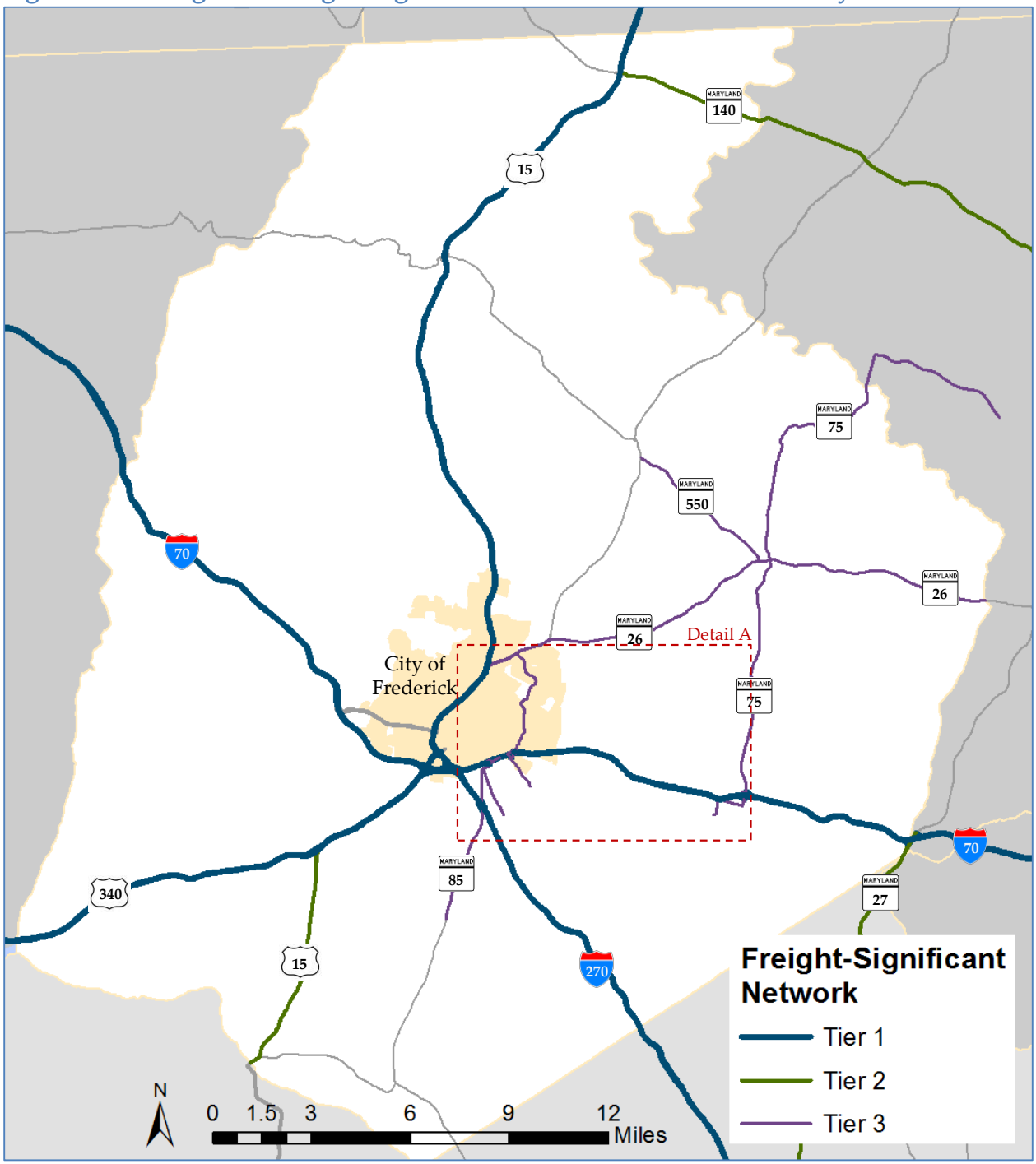


Figure B.2 Regional Freight-Significant Network – Frederick County Detail A

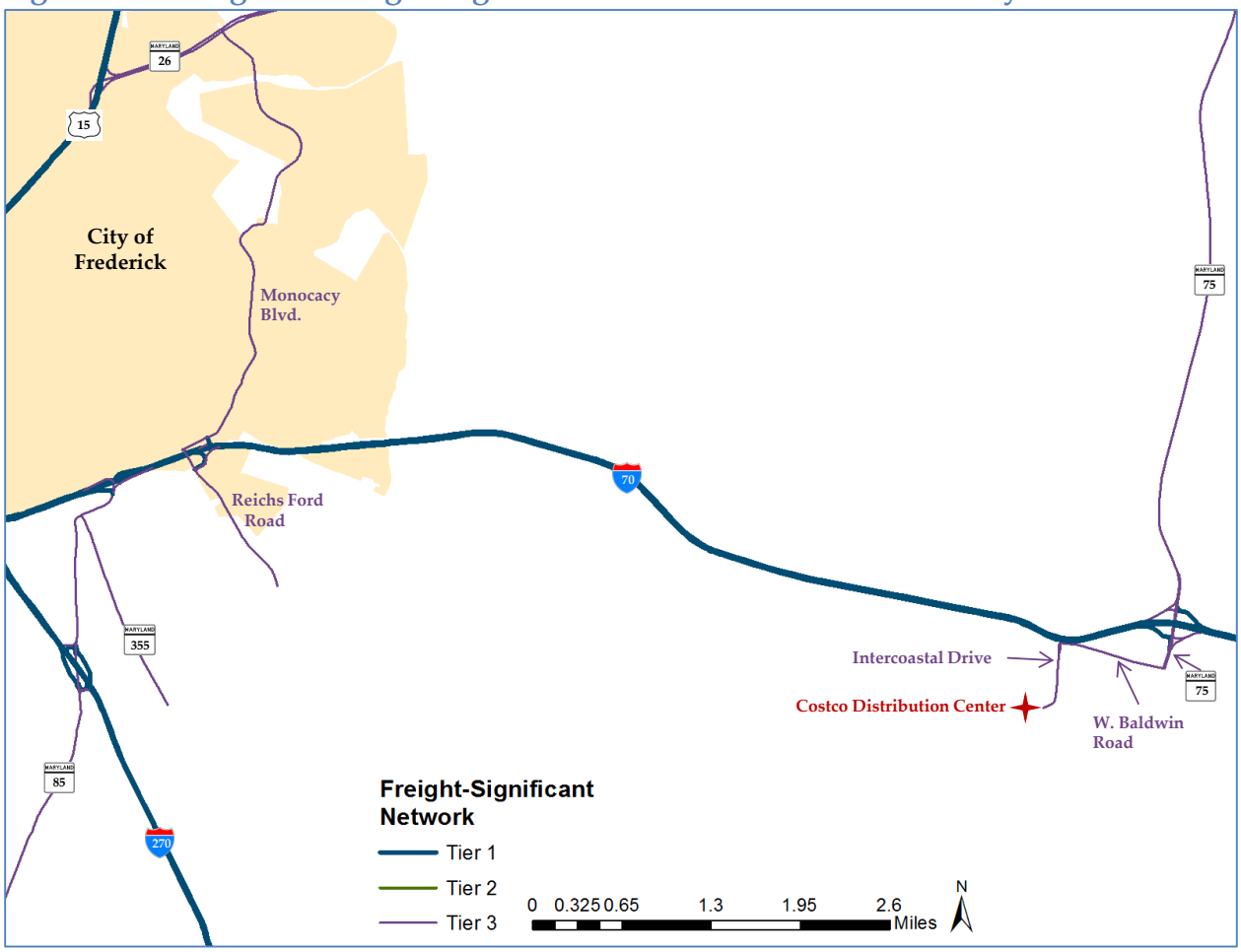


Figure B.3 Regional Freight-Significant Network – Montgomery County Area

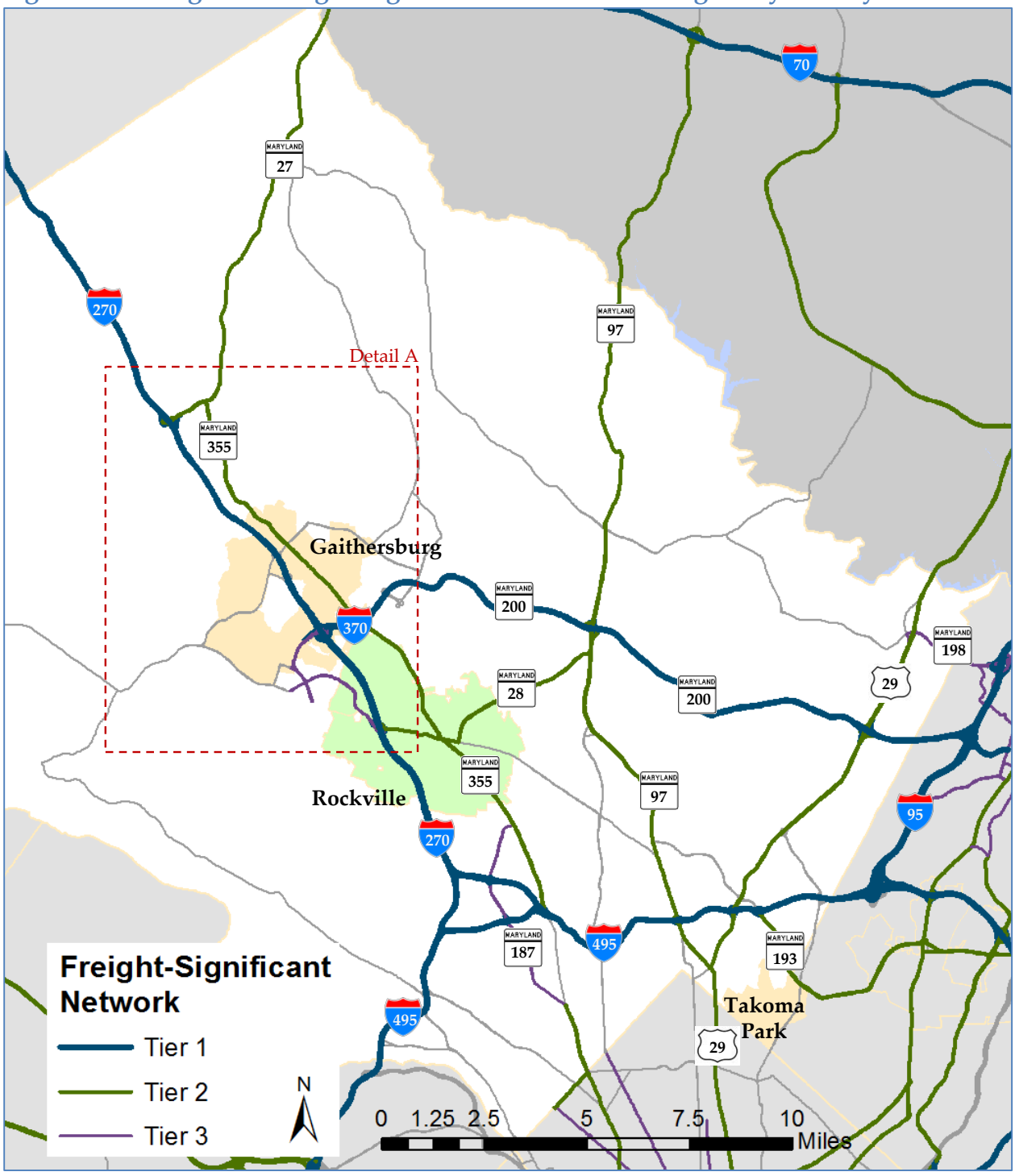


Figure B.4 Regional Freight-Significant Network – Montgomery County Detail A

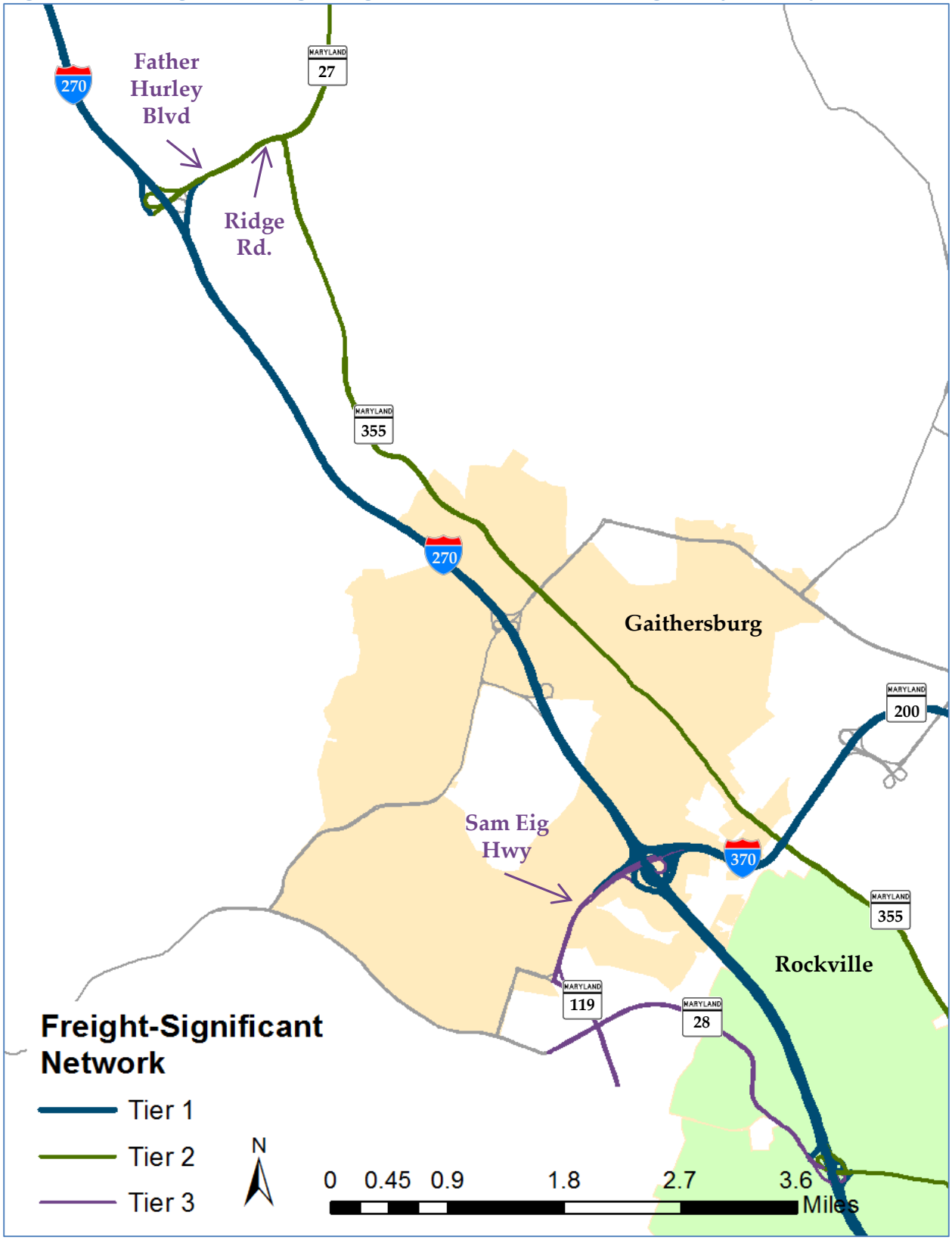


Figure B.5 Regional Freight-Significant Network – Prince George's County

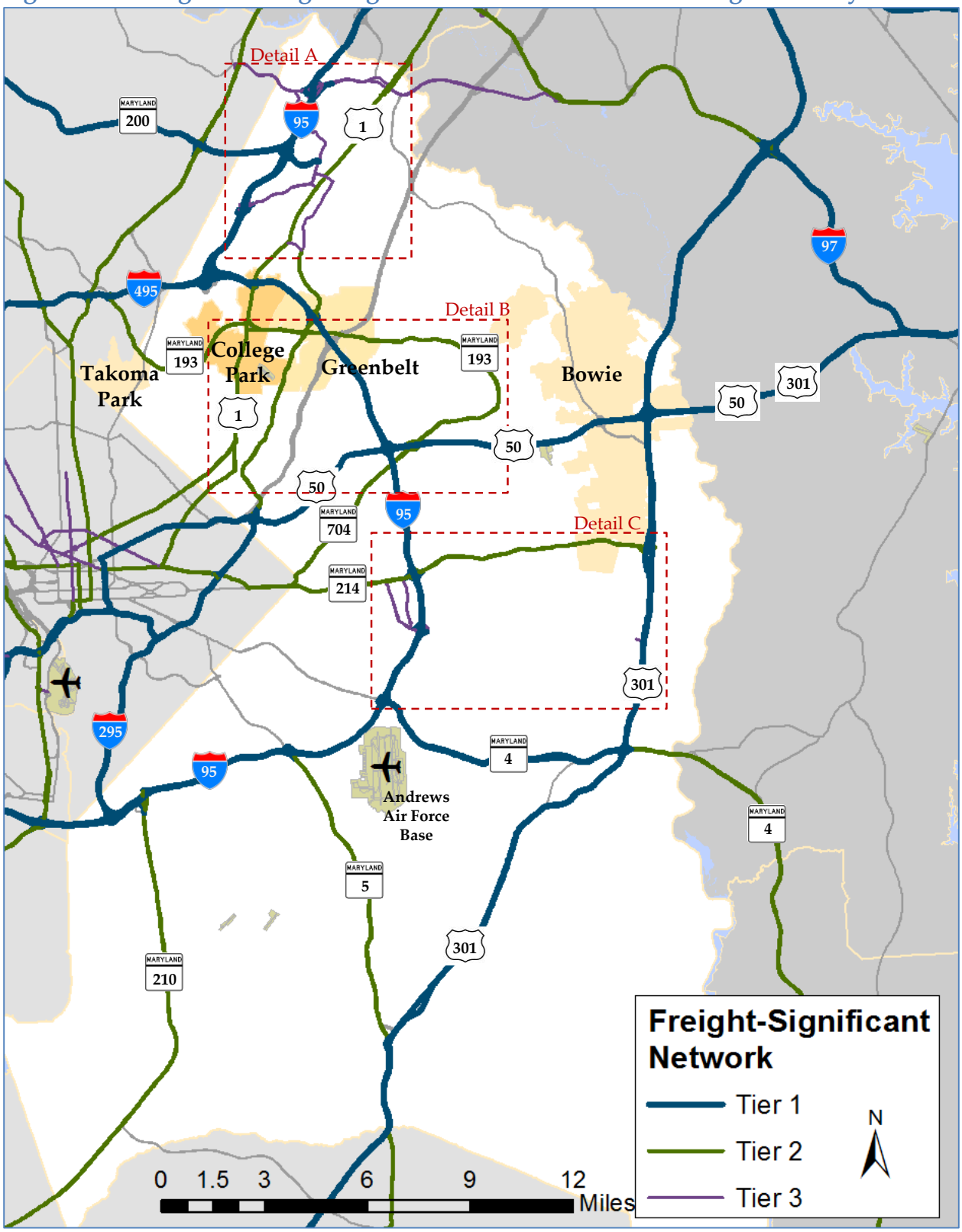


Figure B.6 Regional Freight-Significant Network – Prince George's County Detail A

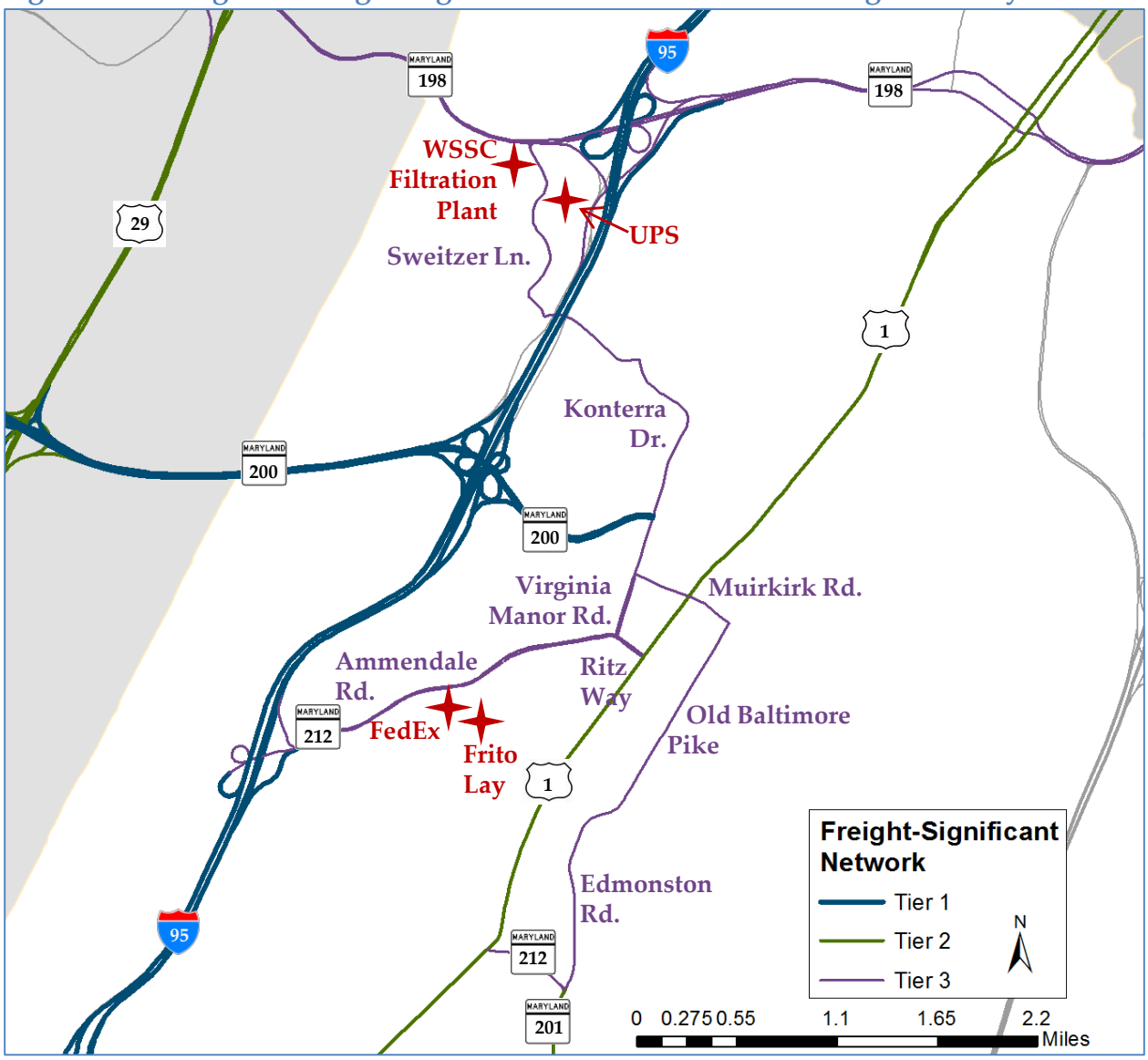


Figure B.7 Regional Freight-Significant Network – Prince George's County Detail B

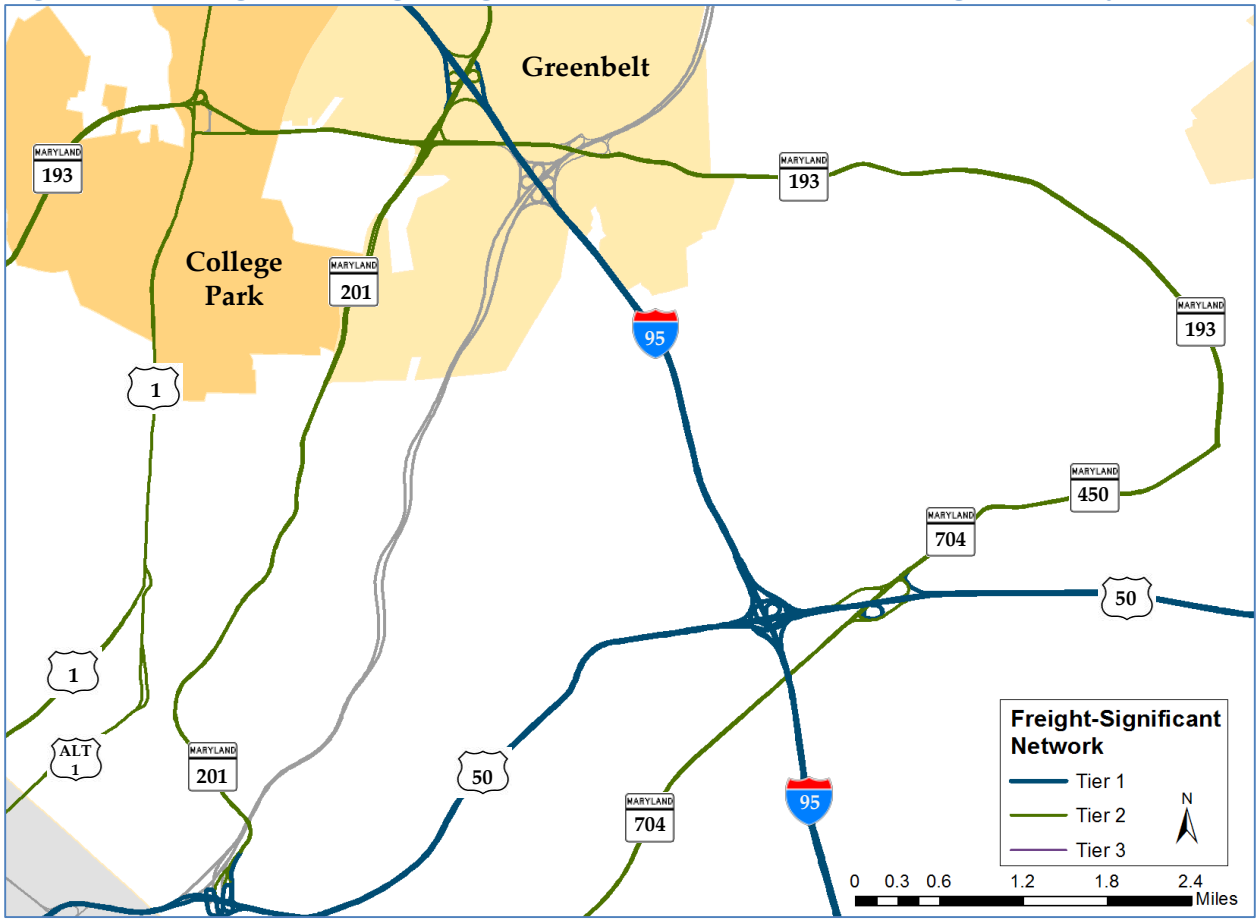


Figure B.8 Regional Freight-Significant Network – Prince George's County Detail C

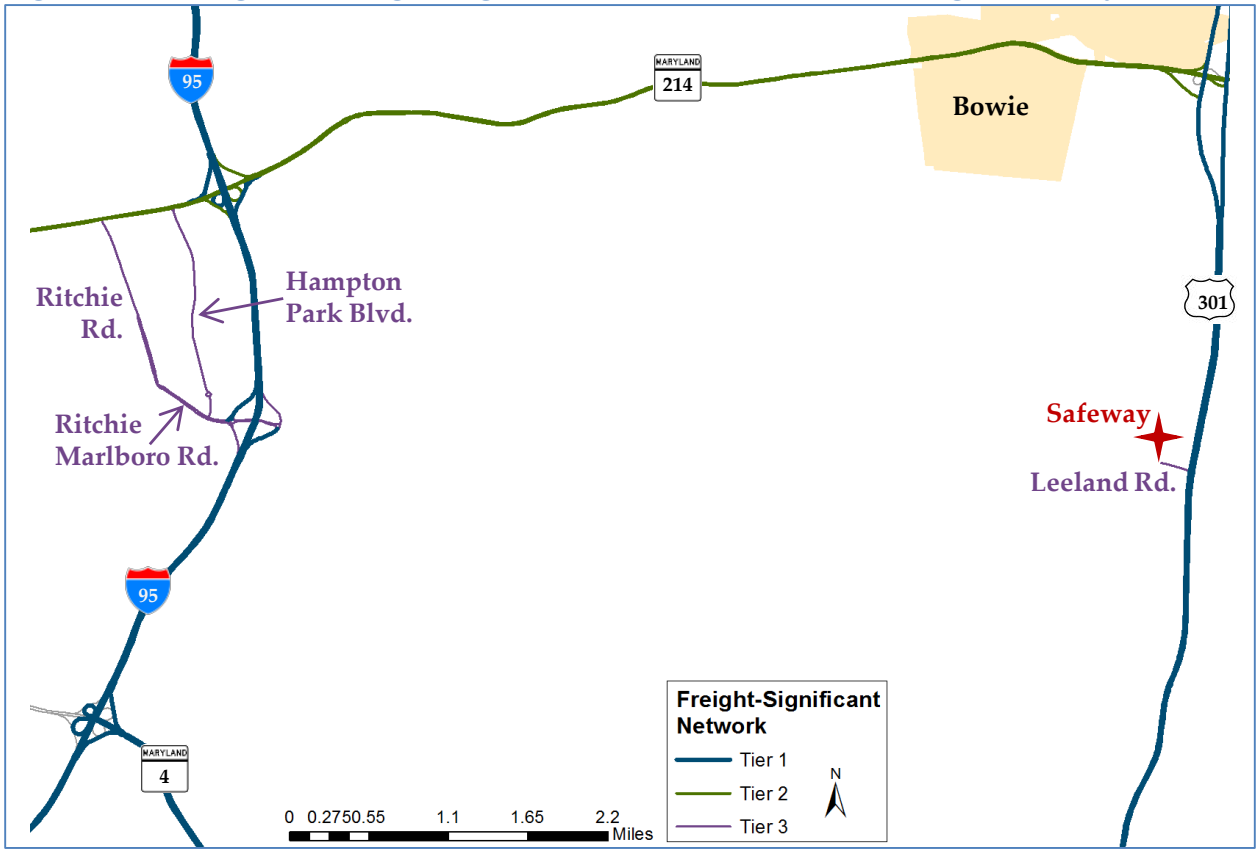


Figure B.9 Regional Freight-Significant Network – Charles County

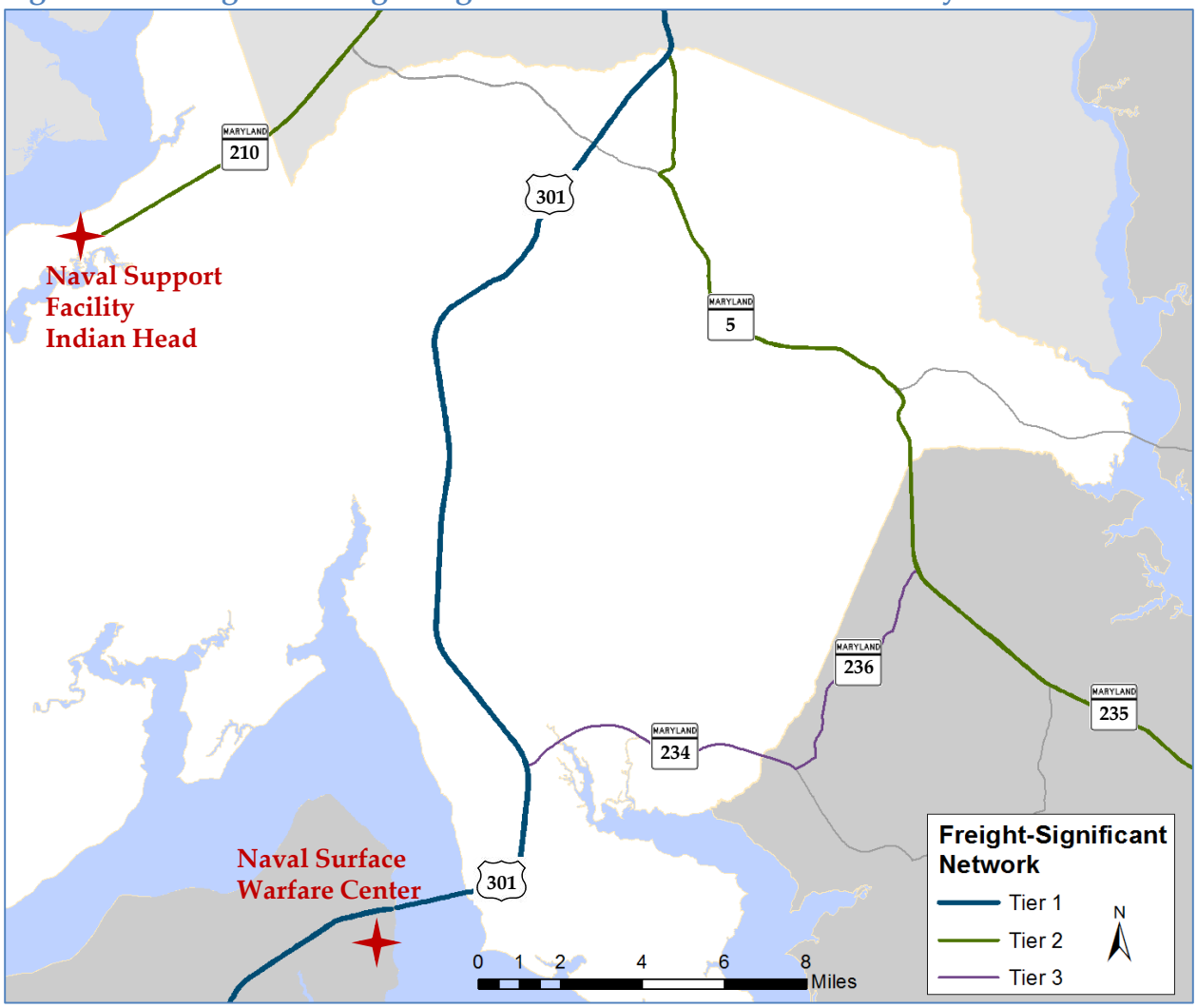


Figure B.10 Regional Freight-Significant Network – District of Columbia

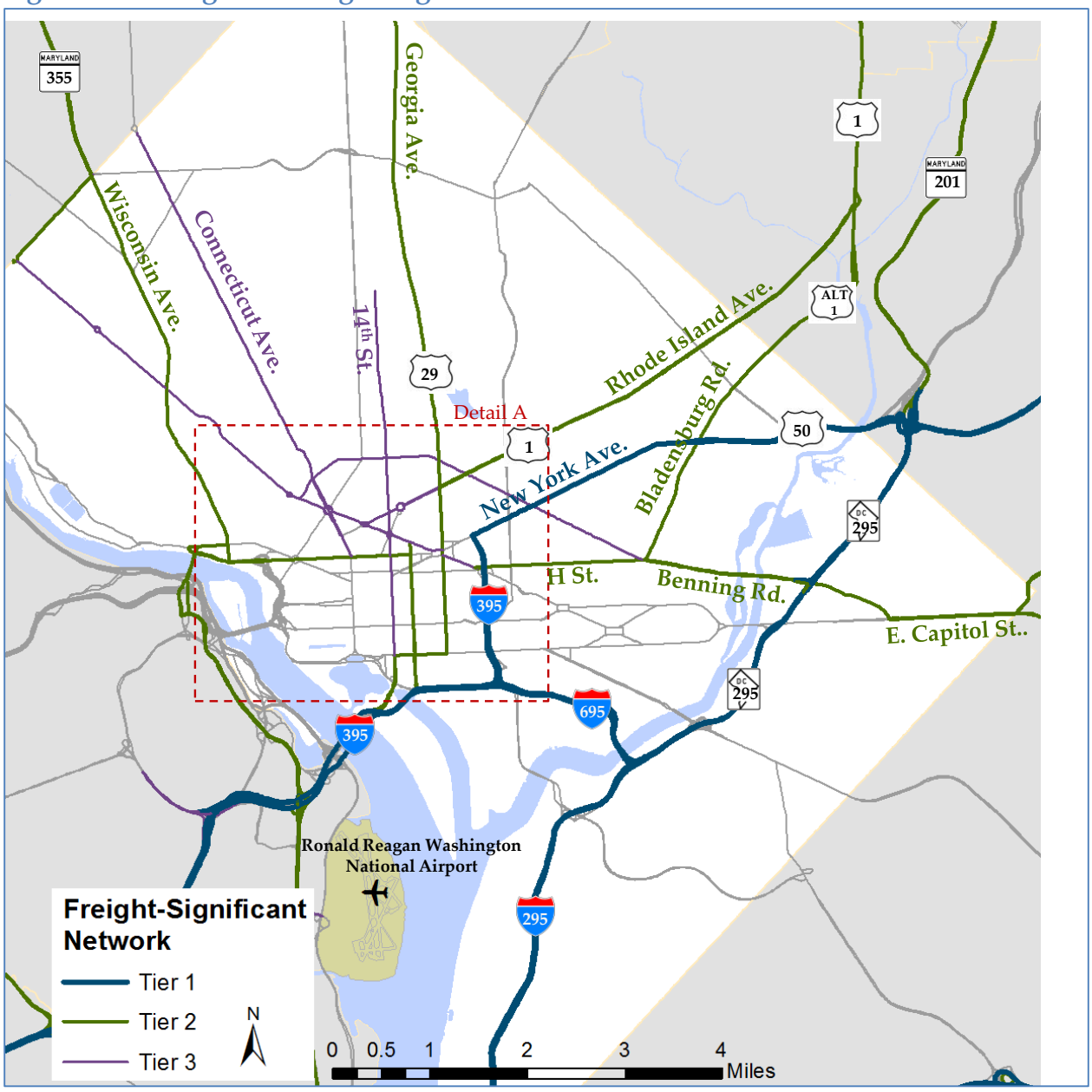


Figure B.11 Regional Freight-Significant Network – District of Columbia Detail A

Figure B.12 Regional Freight-Significant Network – Loudoun County Area

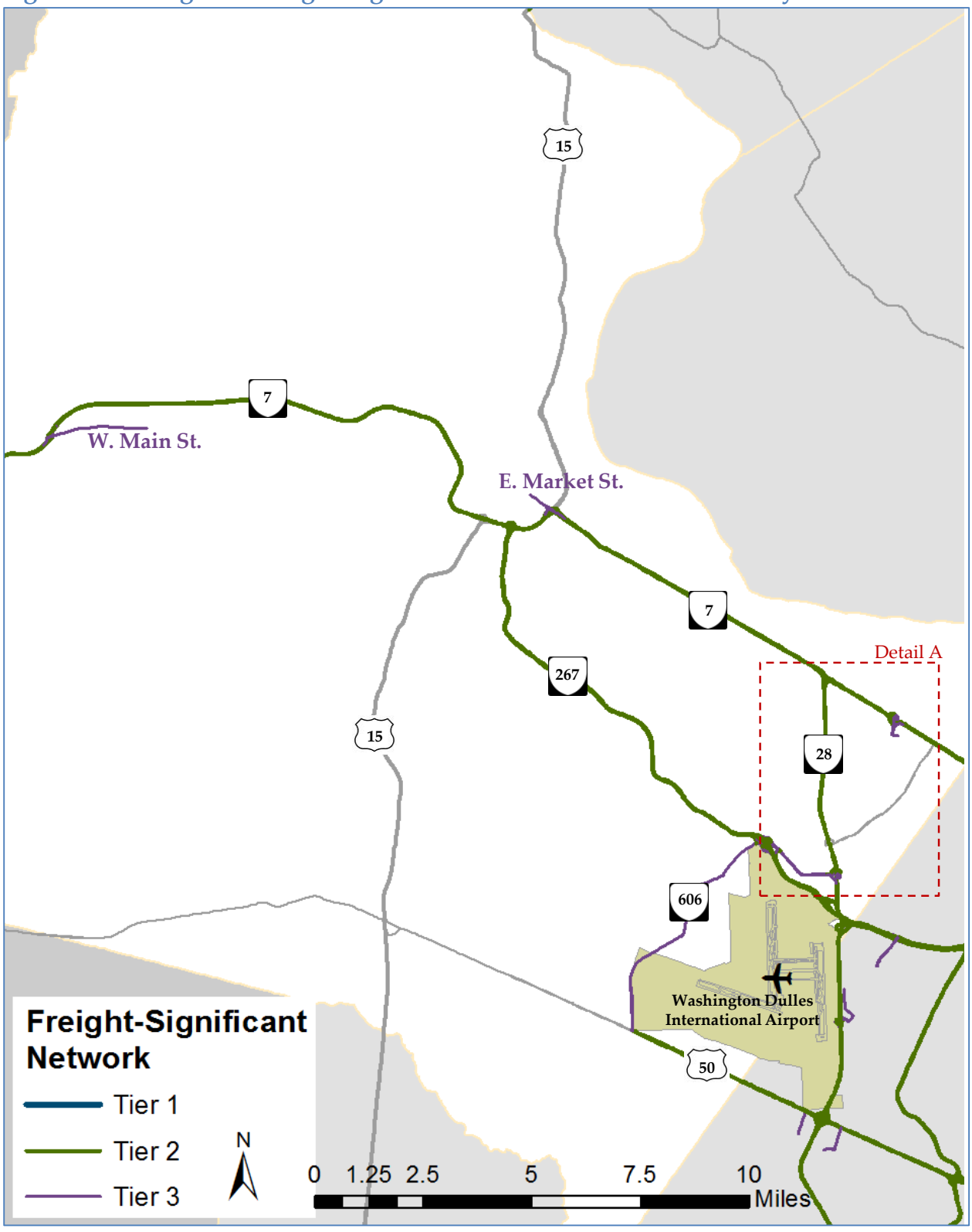


Figure B.13 Regional Freight-Significant Network – Loudoun County Detail A

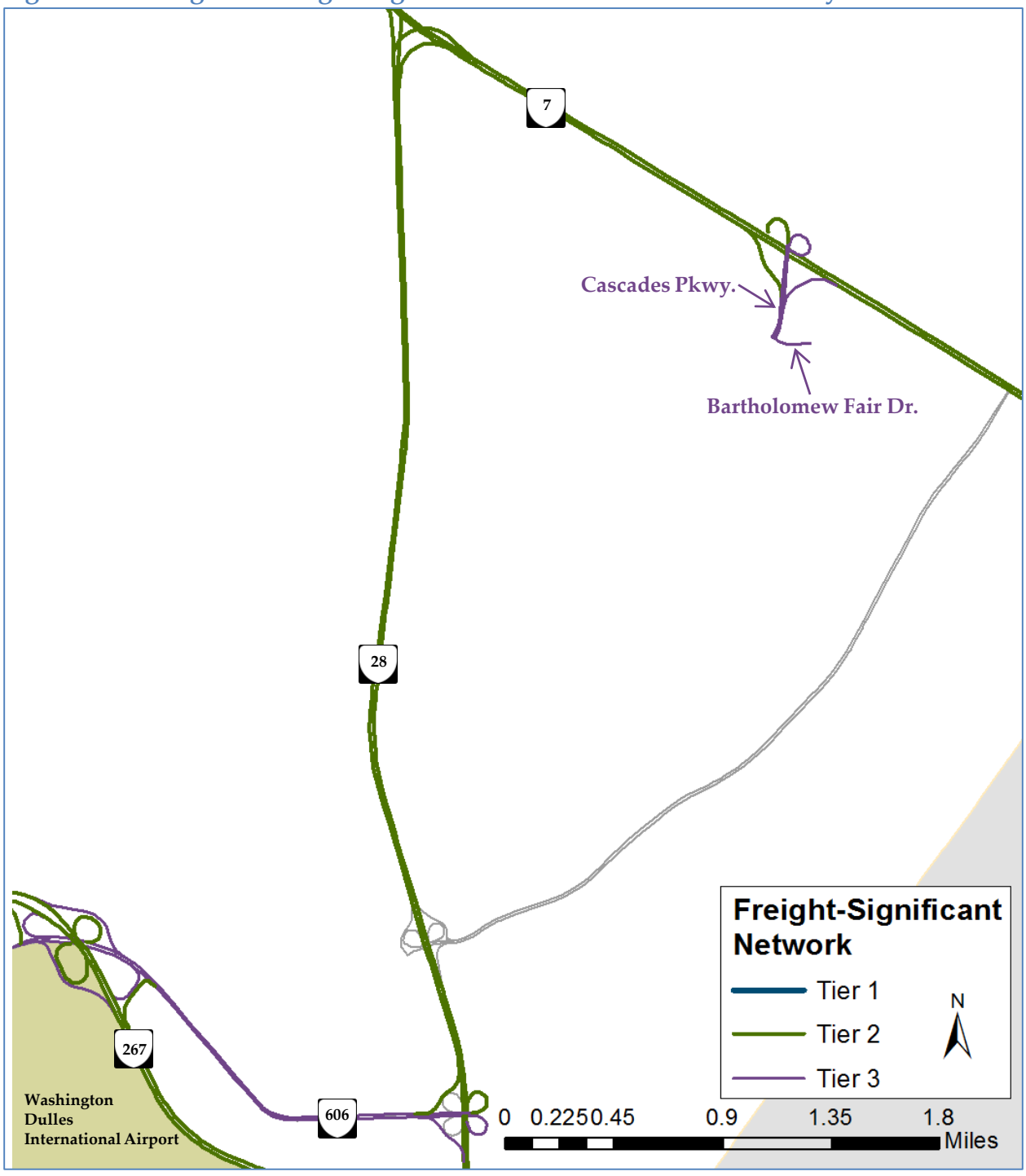


Figure B.14 Regional Freight-Significant Network – Fairfax County Area

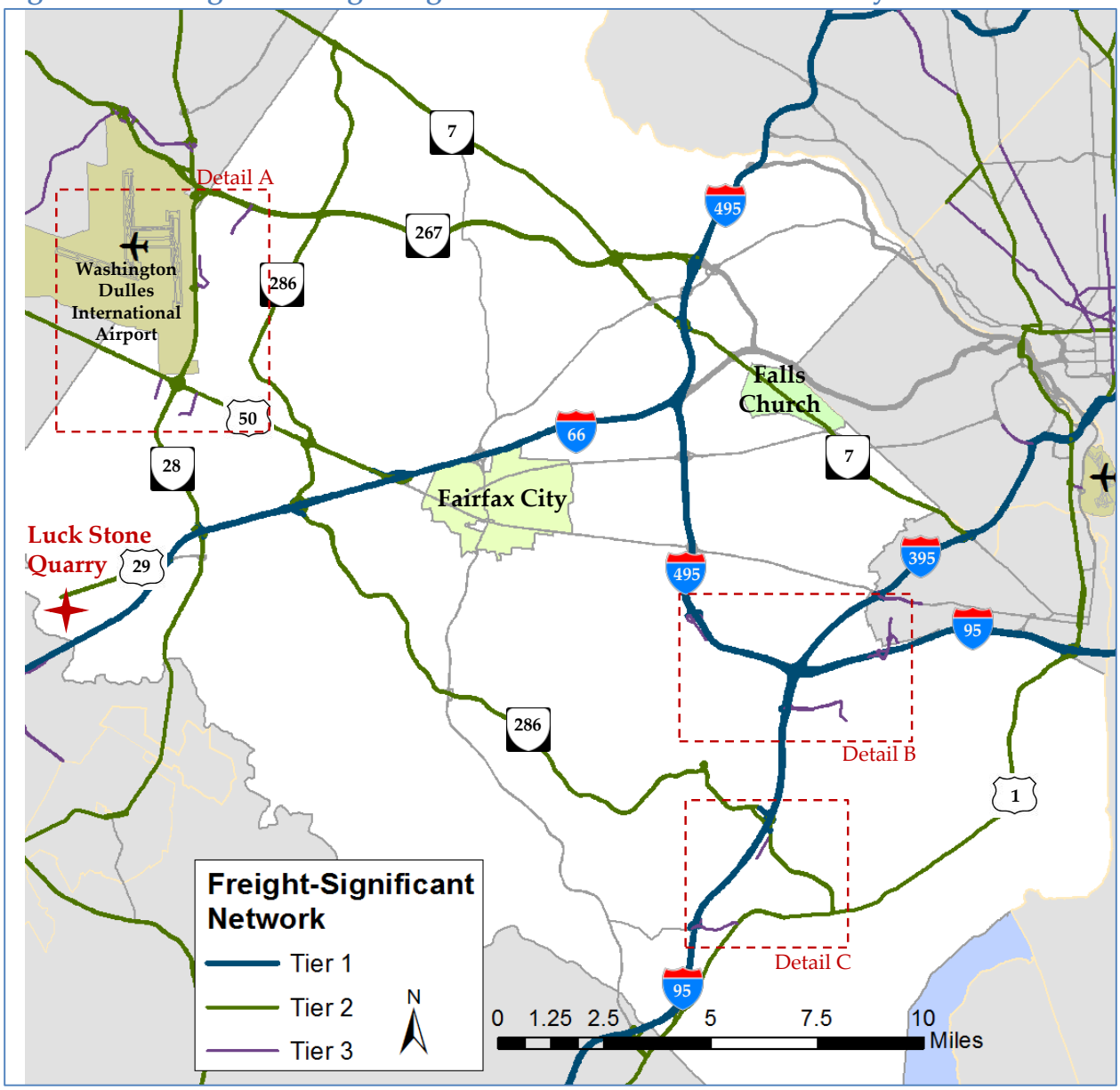


Figure B.15 Regional Freight-Significant Network – Fairfax County Detail A

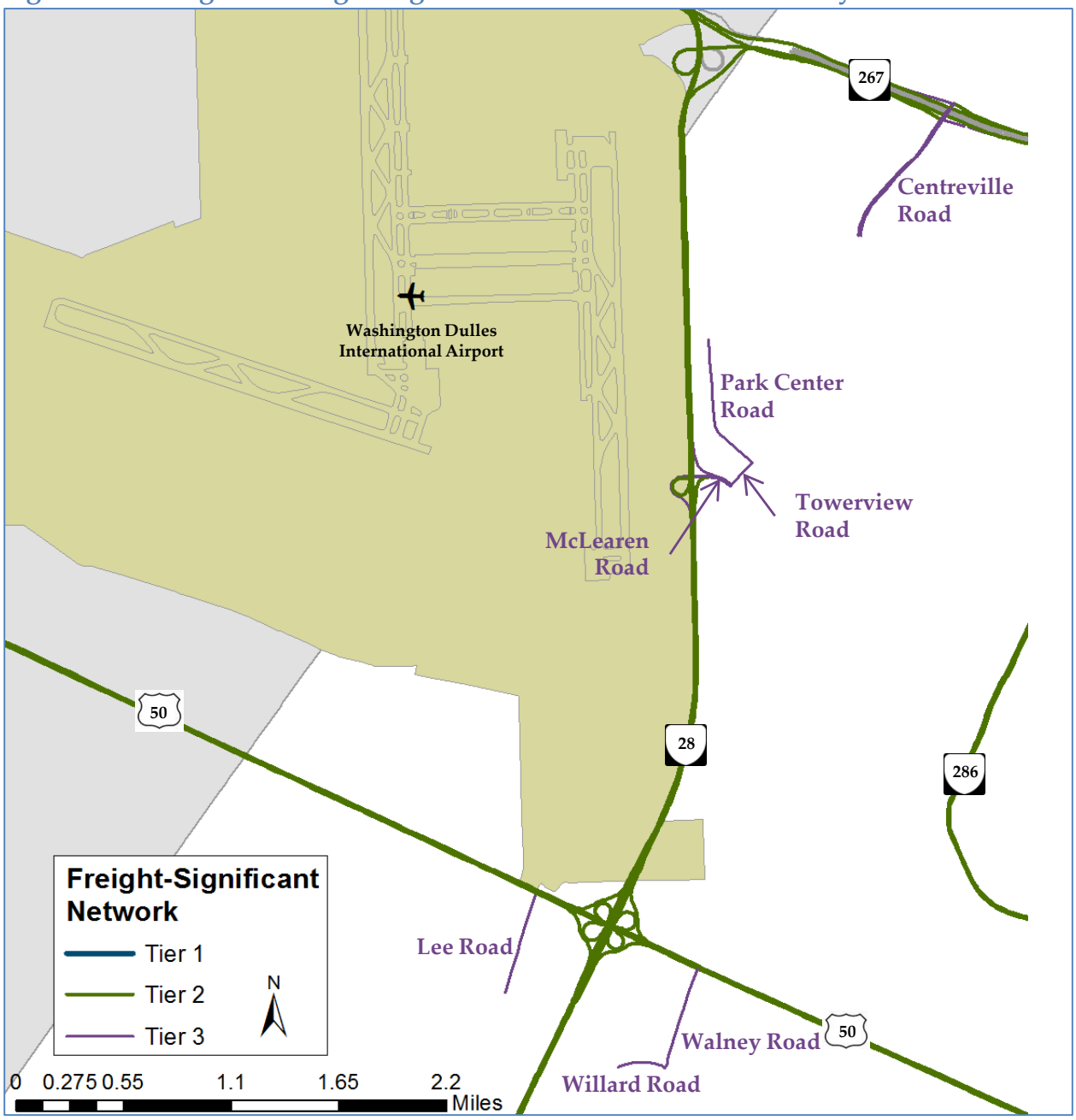


Figure B.16 Regional Freight-Significant Network – Fairfax County Detail B

Figure B.17 Regional Freight-Significant Network – Fairfax County Detail C

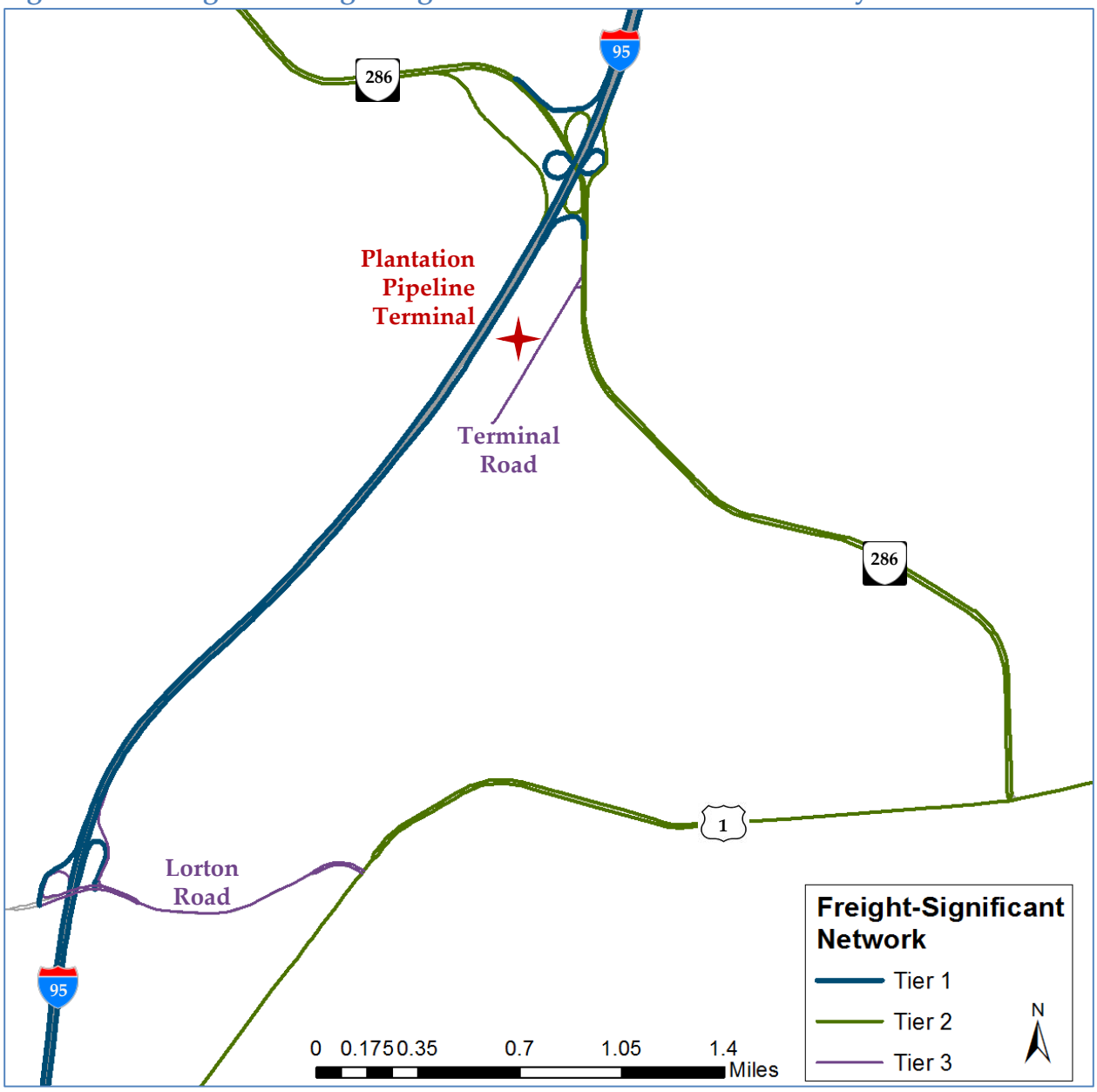


Figure B.18 Regional Freight-Significant Network – Prince William County Area

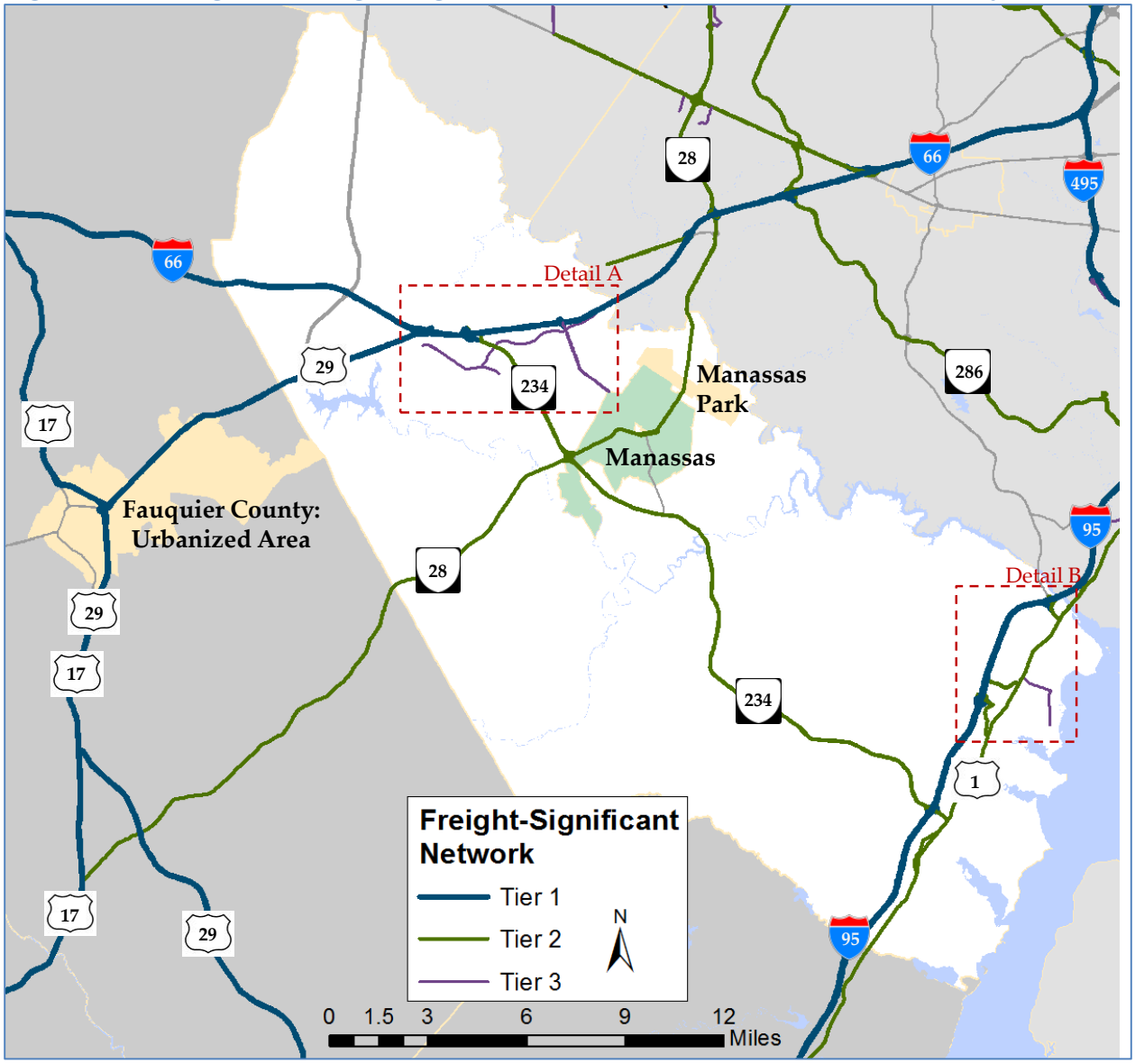


Figure B.19 Regional Freight-Significant Network – Prince William County Detail A

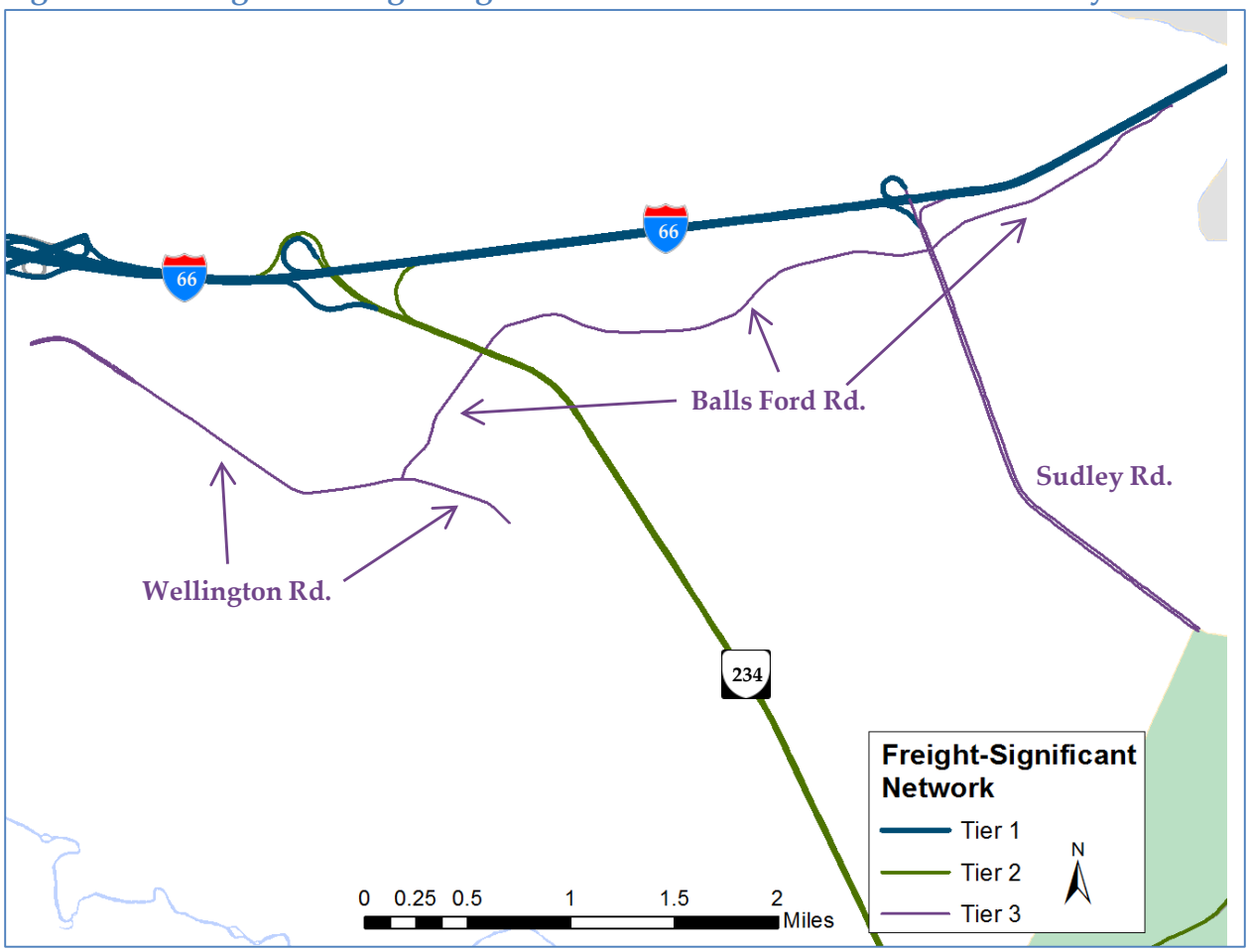


Figure B.20 Regional Freight-Significant Network – Prince William County Detail B

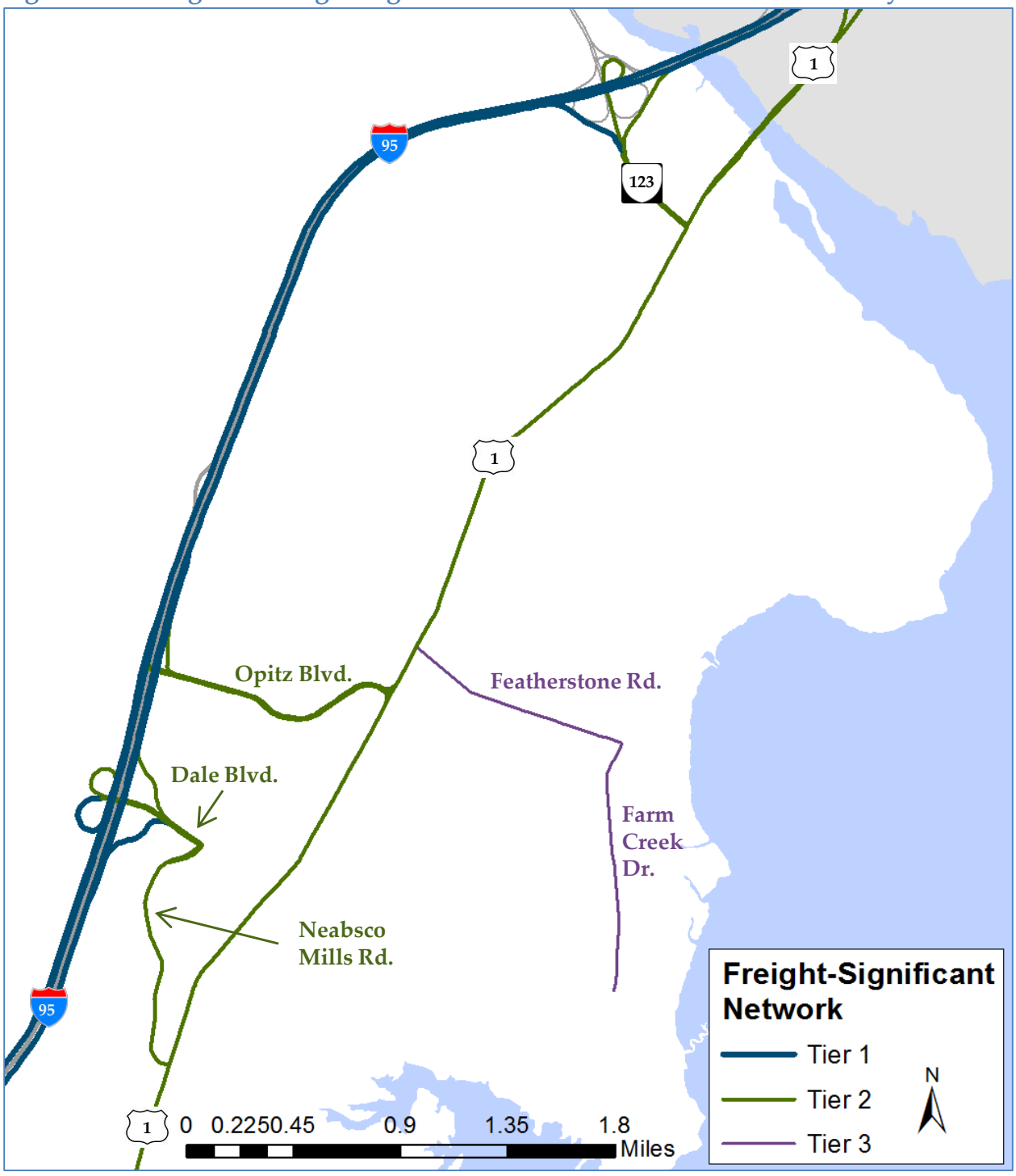


Figure B.21 Regional Freight-Significant Network – Arlington County

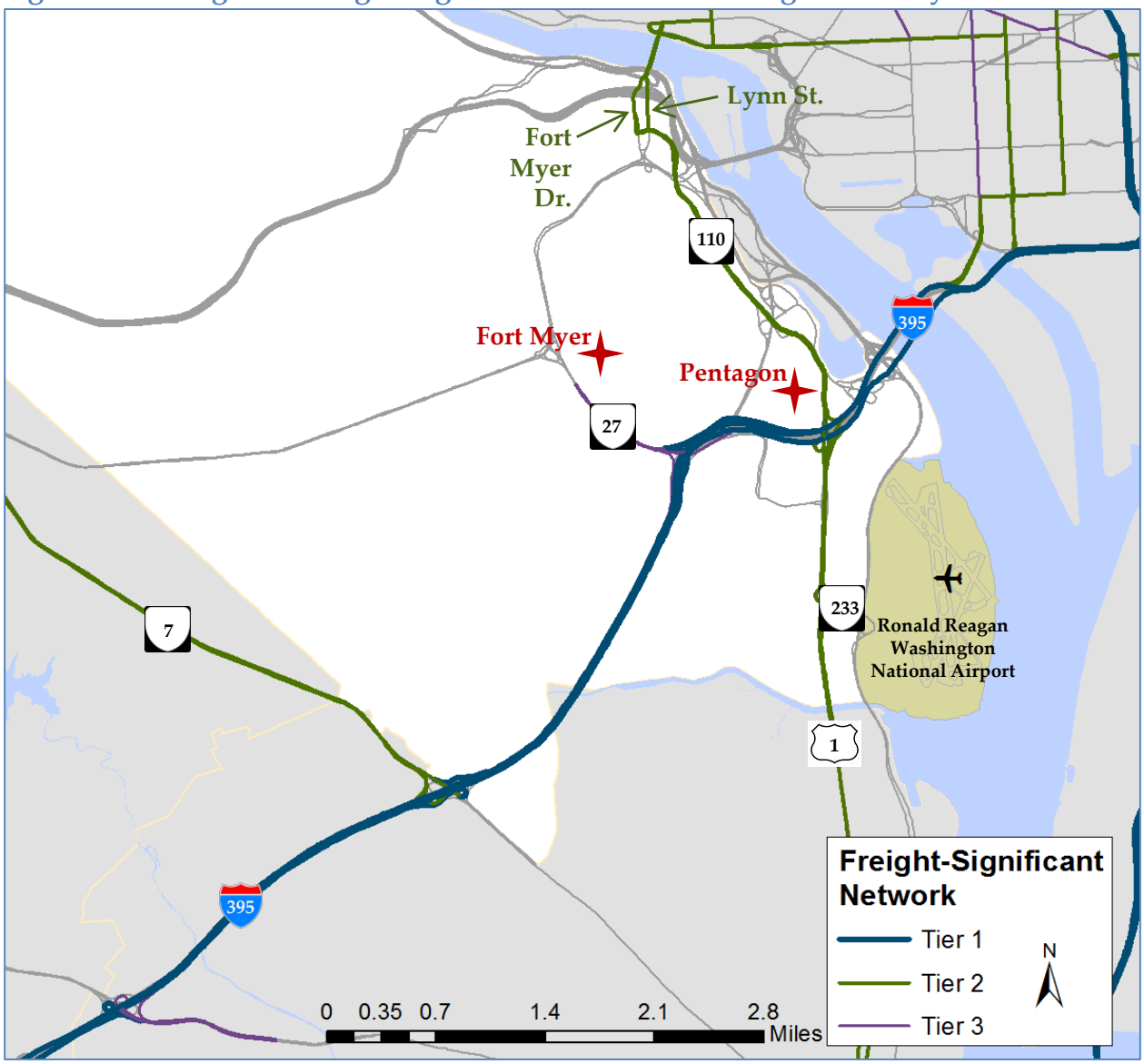


Figure B.22 Regional Freight-Significant Network – City of Alexandria