

# Maryland Statewide Freight Plan



*Martin O'Malley, Governor*  
*Anthony G. Brown, Lt. Governor*  
*Beverley K. Swaim-Staley, Secretary*

September 2009



**Maryland Department of Transportation**



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## A Message From the Governor....

In Maryland, we are committed to building a Statewide vision that achieves balance across all modes of transportation. Today, we have taken this vision one step further by completing Maryland's first Statewide Freight Plan. Freight activity is present in every component of our transportation network, from the Port of Baltimore and Baltimore Washington International Thurgood Marshall Airport, to our highways, toll facilities and rail lines.



This Freight Plan lays out critical issues facing freight and offers strategies to help Maryland prepare for the estimated 75 percent increase in freight by 2030 for the State and the region. Thanks to the hard work of our partners in government and the private sector, this plan outlines more than 100 port, highway and rail projects totaling about \$35 billion that have been prioritized based on specific criteria ranging from safety and security to freight connectivity.

The Plan will help guide our transportation investments and improve local and regional planning for years to come. The framework of consensus that was forged with our freight stakeholders has led to a vision for freight in Maryland and a set of projects for which we can collectively work to fund.

Maryland is the first state in the nation to adopt a Statewide Freight Plan that outlines how freight and effective land use can work together to create opportunities to preserve and improve the environment, while strengthening Maryland's economy at the same time.

Working to support Maryland's *Smart, Green and Growing Initiative*, this Statewide Freight Plan brings us one step closer to implementing a balanced and sustainable transportation vision for the State, even in these challenging economic times.

We hope you will find this plan to be a constructive tool for planning and partnership, and encourage you to work with us going forward.

A handwritten signature in black ink, which appears to read "Martin O'Malley". The signature is fluid and cursive, written in a professional style.

Martin O'Malley  
Governor

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## A Message From the Secretary...

Whether you buy locally or ship globally, improved freight mobility is key to minimizing costs, improving competitiveness, and managing the carbon footprint of our goods movement.

We can maximize success in achieving those goals by reflecting the needs of the supply chain in our local, state and regional plans and in our public, private and joint investment.

This plan represents the experience and vision of a broad coalition of stakeholders.

The collaboration and communication must continue in the development of local plans and priorities, in the programming and pursuit of public and private funding, and in the implementation of freight solutions.

For our part, we will not stop here - we will continue to engage the public and stakeholders in the prioritization of projects, update our forecasts and project lists, and work to secure resources from a variety of sources to implement those projects that rise to the top.

Thank you for your interest and input.



Beverley K. Swaim-Staley  
Secretary



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# Maryland Statewide Freight Plan

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# 1.0 About the Plan

The *Maryland Statewide Freight Plan* provides a comprehensive overview of the State's current and long-range freight system performance and outlines the public and private investments and policies needed to ensure the efficient movement of freight. This document serves as an input to the *Maryland Transportation Plan* and represents the culmination of data analysis and outreach efforts to identify freight policies and both public and private project needs and solutions. This *Plan* is a living document that will be updated as needed based on input from freight stakeholders and in concert with State plans. Because this plan reflects both public and private project needs, it is important to recognize that the solutions to these projects or projects needs are also both public and private. Working together, the freight community can accomplish the needs through implementing the policy recommendations and projects within.

Leadership for this planning effort was provided by the Secretary's Office, the Office of Planning and Capital Programming, and the Office of Freight Logistics. Other Maryland Department of Transportation (MDOT) agencies participated in the effort through their membership on the Interagency Advisory Committee (IAC). Representatives of the private freight community participated through their membership on the Freight Stakeholder Advisory Committee (FSAC) and through the outreach activities of the project, including regional freight workshops throughout the State.

The Plan is organized into the following major sections:

- **2.0 - Maryland's Freight Story** - Provides the context for the State's freight planning activities by describing the role of the Maryland transportation system in supporting population and economic growth;
- **3.0 - Maryland's Freight Strategy** - Outlines the overarching goals that guide the Plan's development and freight activities within the State;
- **4.0 - Maryland's Freight System** - Describes the physical infrastructure, including highways, railways, ports, and airports, that comprise the State's freight system and illustrates how future demand may affect those facilities;
- **5.0 - Maryland Freight Demand** - Summarizes goods movement flows by mode and chief industries;
- **6.0 - Trends and Issues** - Details the current and predicted economic trends that will influence goods movement in the State;
- **7.0 - Freight Transportation Policy Directions** - Presents the policy issues and challenges facing the State's goods movement system and outlines desired outcomes and potential actions;

- **8.0 – Freight Program Development** – Identifies and prioritizes multimodal freight investments to improve current and future freight flows; and
- **9.0 – Implementation and Action** – Assesses opportunities and challenges to implement projects and programs and provides an action plan to guide the State’s efforts.

## 2.0 Maryland's Freight Story

Maryland's multimodal transportation system supports economic vitality and quality of life in the State and region. The smooth functioning of highways, railways, ports, and airports allows businesses and consumers to trade and purchase the goods necessary to sustain business and daily life. While Maryland's transportation infrastructure accommodates current demand reasonably well, future population and economic growth will outpace capacity. With coordinated planning and strategic investments, the State and its partners can provide a transportation system that meets the challenges and opportunities ahead. The following key trends and observations provide the background and highlight the need for integrating freight issues into statewide transportation planning and investment decisions.

### **Maryland has a vibrant and diverse economy**

Maryland's traditional economic strengths come from manufacturing, wholesale and retail trade, transportation, financial services, agriculture, and government contracting. In recent years the State also has experienced growth in information technology, telecommunications, and aerospace.<sup>1</sup> Growth in all industries over the last 10 years has pushed Maryland's Gross State Product (GSP), a measure of state economic activity, to grow from \$163 billion to over \$222 billion (in constant 2000 dollars).<sup>2</sup>

Maryland ranks first in the nation for median household income (\$68,080 in 2007), 34 percent above the national average. Similarly, the State's per capita income ranks sixth in the nation at \$46,646. Having grown over the past 10 years at a faster rate than the U.S. average, 2007 per capita income in Maryland was 21 percent higher than the national average. This means the average Maryland resident earns approximately \$8,100 more per year than the average American.<sup>3</sup> The State's economic diversity and consumer affluence generate high demand for goods and services.

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<sup>1</sup> Maryland Department of Business and Economic Development, Facts & Figures.

<sup>2</sup> U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Accounts.

<sup>3</sup> U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Accounts.

## **The State’s multimodal transportation system helps to sustain the economy**

Maryland’s transportation system is fully multimodal, connecting local population centers and industries to major domestic and international markets. Business and community leaders increasingly recognize that efficient freight transportation is a key factor in statewide and metropolitan economic competitiveness and an important consideration in business attraction and retention decisions. In an increasingly competitive national and global economy, Maryland shippers, carriers, and other business/industry stakeholders rely on a safe, efficient, reliable, and cost-effective freight transportation system. As a result, there is a growing awareness of the importance of freight transportation and a corresponding push at Federal, state, metropolitan, and local levels to link transportation investment, especially freight transportation investment, to economic development.

## **Maryland’s population and economic growth prognosis is good to excellent**

Maryland’s population is characterized by steady growth and high density. Between 1980 and 2007, Maryland’s population grew by 33 percent to 5.6 million, representing approximately 1.9 percent of the U.S. population. Between 2007 and 2030, the U.S. Census Bureau projects that the State’s population will increase by an additional 25 percent to 7.0 million.<sup>4</sup> Overall, Maryland’s population growth has been consistent with the national average, and this trend is expected to continue into the future.

At the same time, population density in Maryland (575 people per square mile) far exceeds the national average (85 people per square mile). While Maryland currently is the 19<sup>th</sup> most populated State in the country, only four other states and the District of Columbia have higher population densities.<sup>5</sup> This population density brings both opportunities and challenges to the State’s freight transportation system.

Similar to population, the Maryland economy also has experienced consistent growth. Despite the recent global economic downturn, Maryland is well-positioned to realize steady long-term growth, with total GSP reaching \$474 billion by 2030.<sup>6</sup> The Bureau of Economic Analysis (BEA) data shows that Maryland GDP grew at a higher rate (7.4 percent) compared to the national growth rate of 6.7 percent between 1997 and 2007.

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<sup>4</sup> U.S. Census Bureau, *Statistical Abstract of the United States: 2009*.

<sup>5</sup> Ibid.

<sup>6</sup> U.S. Bureau of Economic Analysis



## **Freight-intensive industries are a key part of that growth**

Real output among Maryland's freight-intensive industries, a measure of economic performance, is expected to grow by 119.7 percent statewide between 2000 and 2030. As a result of this statewide growth, and the corresponding growth across the country, the tonnage of freight transported into, out of, within, and through Maryland is estimated to increase by about 105 percent by 2035<sup>7</sup>, comprising about 1.4 billion total tons and \$4.98 trillion of value (an increase of 118 percent over 2006 value).<sup>8</sup> While the State's largest concentration of freight-intensive industries and freight flows will remain in the I-95 corridor, freight industries and the resulting goods movement in the I-270 corridor are projected to grow at a faster rate.

## **Growth places additional demand on the State's infrastructure, much of which is aging or unable to provide sufficient current capacity**

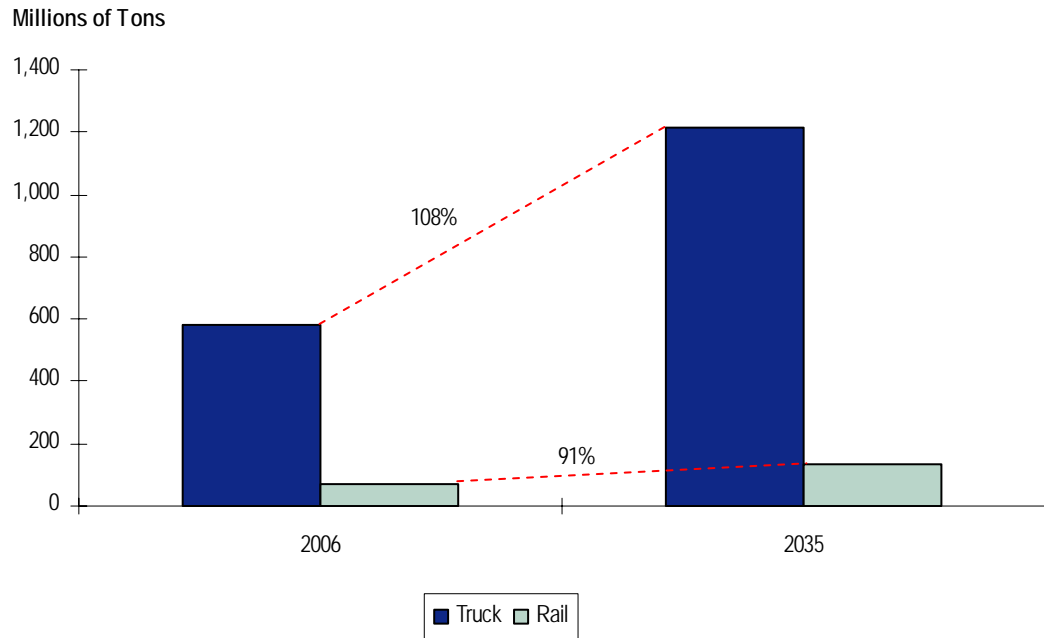
Anticipated population and economic growth trends will continue to increase pressures on Maryland's transportation system and exacerbate existing infrastructure issues (e.g., lack of double-stack rail capacity, shortage of truck parking, increasing demand on rural highway corridors, and urban interchange bottlenecks). Freight tonnage handled by Maryland's highway and rail infrastructure in 2006 as well as that projected for 2035 is illustrated in Figure 2.1 below. Projected economic growth in the State and throughout the nation will lead to increased freight traffic and a corresponding acceleration of road and bridge infrastructure deterioration, a worsening of congestion, and heightened safety and community livability concerns. As congestion increases on key freight corridors, shippers, carriers, and logistics providers will shift to alternate routes, directly impacting mobility for both people and goods – and indirectly, jobs – statewide.

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<sup>7</sup> While real output among Maryland's freight-intensive industries is estimated for 2000 and 2030, the tonnage and value figures are estimated for 2006 and 2035.

<sup>8</sup> 2003 and 2030 TRANSEARCH® Insight forecast updated to 2006 and 2035 by Cambridge Systematics, Inc..

**Figure 2.1 Tonnage Growth Rates by Mode**  
*2006 to 2035*



Source: 2003 TRANSEARCH® Insight, forecast update to 2006 by Cambridge Systematics, Inc.

**Other trends will affect goods movement, posing challenges for the State and its freight stakeholders**

In addition to the continued population and economic growth forecast for Maryland, its position as a “through” state will become more important as the magnitude of goods moving through the State increases. While total percentage of through trips will not change much (remaining just over half of total statewide tonnage), total freight volume will increase, especially on key corridors like I-95 and I-81. The State will also need to prepare for the expected growth of East Coast ports, spurred by Panama Canal expansion, congestion at West Coast ports, rising cost of diesel fuel, and other drivers. Frustrating the effort to accommodate container shipment growth at the Port of Baltimore is the lack of doublestack rail access. To address these issues, the State will have to work closely with industry and neighboring states to make strategic investments.

Other trends and challenges include the need to enhance highway safety, the security of goods movement, and lack of sufficient truck parking. Market forces, including fluctuating energy costs, changing industry patterns, and the development of new intermodal facilities have the potential to change the way shippers and carriers use the State’s transportation system.

### **Balancing freight growth with sustainability will require careful coordination**

Maryland is a leading State in climate change mitigation, Smart Growth, and other environmental initiatives that seek to balance economic progress with livability and sustainability efforts. To realize Maryland’s vision for greener communities and industries, freight transportation stakeholders must work with the State to identify ways to reduce the footprint of goods movement through smarter and more coordinated land use / transportation planning and approaches to reduce emissions. The challenge lies in striking the balance between environmental and economic sustainability, recognizing the potential effects on employment in the local freight industry, as shippers and carriers will likely pass on higher costs for compliance to consumers. Both sides will succeed if solutions reduce logistics costs while providing a safer, cleaner, and greener environment for current and future generations.

### **Without investment and wise planning, the ability of the transportation system to support goods movement may be in jeopardy**

In the context of rising demand, the Maryland transportation system will require substantial investment to maintain existing infrastructure and fund additional capacity. The needed freight improvements identified in this Plan—including facilities that accommodate passenger and freight traffic—exceed \$35 billion and represent needs for freight infrastructure, much of which is privately owned. A key need is develop partnerships with private entities and other stakeholders to develop funding solutions and to support private investment in projects in order to fund improvements. In turn, transportation investment will foster continued growth among the State’s economy by improving industry competitiveness and productivity, creating jobs, and reducing economic losses due to time delays and excess fuel consumption.

Recognizing the link between the efficiency of the statewide freight transportation system and the continued economic competitiveness of the State, the Maryland Department of Transportation (MDOT) and its partners have developed this comprehensive freight plan to confront these challenges. Key strategies include:

- Targeted investments in key infrastructure;
- Operational strategies to make better use of the current system; and
- Policies to keep Maryland's freight transportation system competitive while meeting other goals for the system (as articulated in the MTP) and broader goals, such as Smart Growth.

Developing comprehensive mobility solutions to meet the State's freight transportation needs requires timely action by the State and freight stakeholders including private entities, informed by participation from the public and regional, city, and local leaders. To promote and sustain its future economic vitality, Maryland must plan for ways to expand its multimodal transportation network to accommodate its expected population and economic growth.

## 3.0 Maryland's Freight Strategy

To confront the freight transportation challenges facing the State of Maryland, MDOT and its stakeholders developed a set of overarching goals to guide the Maryland Statewide Freight Plan. These goals, outlined in Table 3.1 below, support the broader multimodal goals established in the *Maryland Transportation Plan*.

**Table 3.1 MTP/Maryland Statewide Freight Plan Goals and Objectives**

Maryland Transportation Plan Goals and Objectives	Maryland Statewide Freight Plan Strategies
<p>Goal: Quality of Service</p> <p>Objectives:</p> <ul style="list-style-type: none"> <li>• Enhance customer experience and service</li> <li>• Provide reliable and predictable travel time across modal options for people and goods</li> <li>• Facilitate coordination and collaboration with agency partners and stakeholders</li> </ul>	<p>Serve as the central implementation guide to assist MDOT in meeting Maryland’s current and future freight challenges through infrastructure, operations, information, policy, and financing solutions; preparing the State for the next Federal transportation authorization compliance.</p> <p>Promote increased multistate coordination of freight planning efforts, especially with respect to multimodal trade corridors, the potential for diverting truck traffic, and effectively managing “pass through” freight traffic.</p>
<p>Goal: Safety and Security</p> <p>Objectives:</p> <ul style="list-style-type: none"> <li>• Reduce the number and rate of transportation-related fatalities and injuries</li> <li>• Secure transportation assets for the movement of people and goods</li> <li>• Coordinate and refine emergency response plans and activities</li> </ul>	<p>Effectively manage the safety and security of Maryland’ freight transportation system.</p>
<p>Goal: System Preservation and Performance</p> <p>Objectives:</p> <ul style="list-style-type: none"> <li>• Preserve and maintain the existing transportation network</li> <li>• Maximize operational performance and efficiency of existing systems</li> </ul>	<p>Enhance Maryland’s vital freight infrastructure by identifying critical needs;</p> <p>Promote demand management policies and tools that will reduce overall demand on the transportation network.</p> <p>Explore alternative funding options for transportation infrastructure maintenance and expansion.</p>
<p>Goal: Environmental Stewardship</p> <p>Objectives:</p> <ul style="list-style-type: none"> <li>• Coordinate land use and transportation planning to better promote smart growth</li> <li>• Preserve and enhance Maryland’s natural, community, and historic resources</li> <li>• Support initiatives that further our commitments to environmental quality</li> </ul>	<p>Protect Maryland’s environment and communities by minimizing negative impacts associated with freight facilities and operations.</p>
<p>Goal: Connectivity for Daily Life</p> <p>Objectives:</p> <ul style="list-style-type: none"> <li>• Provide balanced, seamless, and accessible multimodal transportation options for people and goods</li> <li>• Facilitate linkages within and beyond Maryland to support a healthy economy</li> <li>• Expand network capacity to manage growth</li> </ul>	<p>Ensure Maryland’s economic competitiveness by providing reliable, efficient, and cost-effective freight transportation to its producers, consumers, shippers, and receivers.</p> <p>Examine potential partnerships between public and private sectors with respect to planning, operating, and funding Maryland’s freight system while protecting the State’s and taxpayers’ interests.</p>

## 4.0 Maryland's Freight System

### 4.1 INTRODUCTION

Maryland's statewide multimodal freight system is an interconnected network of highways, railroads, waterways and marine terminals, and cargo airports. This section inventories each modal component of the State's current freight infrastructure and describes existing and forecasted freight demand by mode. It also identifies the condition and performance of the system, identifying locations where the system adequately meets freight needs as well as chokepoints where freight demand overwhelms available capacity.

### 4.2 MARYLAND'S HIGHWAY SYSTEM

#### Highway Inventory

Maryland's highway network is comprised of five systems - Interstate, primary, secondary, county, and municipal - totaling 30,987 miles. Table 4.1 lists the highway mileage and lane mileage for each system component as well as the mileage of each component included in the State toll system. Approximately 55 percent of the State's highway miles have an urban functional classification, while the remaining 45 percent are classified as rural.<sup>9</sup>

In order to facilitate optimal freight movement within and through the State, the Maryland Secretary of Transportation, in conjunction with the Federal Highway Administration (FHWA) has designated certain Federal and State highways as the Maryland Truck Route System. The Maryland Truck Route System, shown in Figure 4.1, is approximately 900 miles long and includes all Interstate segments in Maryland (481 miles), six segments of the U.S. highway system (320 miles), and eight segments of the Maryland State highway network (99 miles). Table 4.2 describes the Maryland Truck Route System components and the intermodal facilities to which they connect.

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<sup>9</sup> State Highway Administration of Maryland, Highway Information Services Division, 2007.

**Table 4.1 Maryland Highway Mileage Distribution**

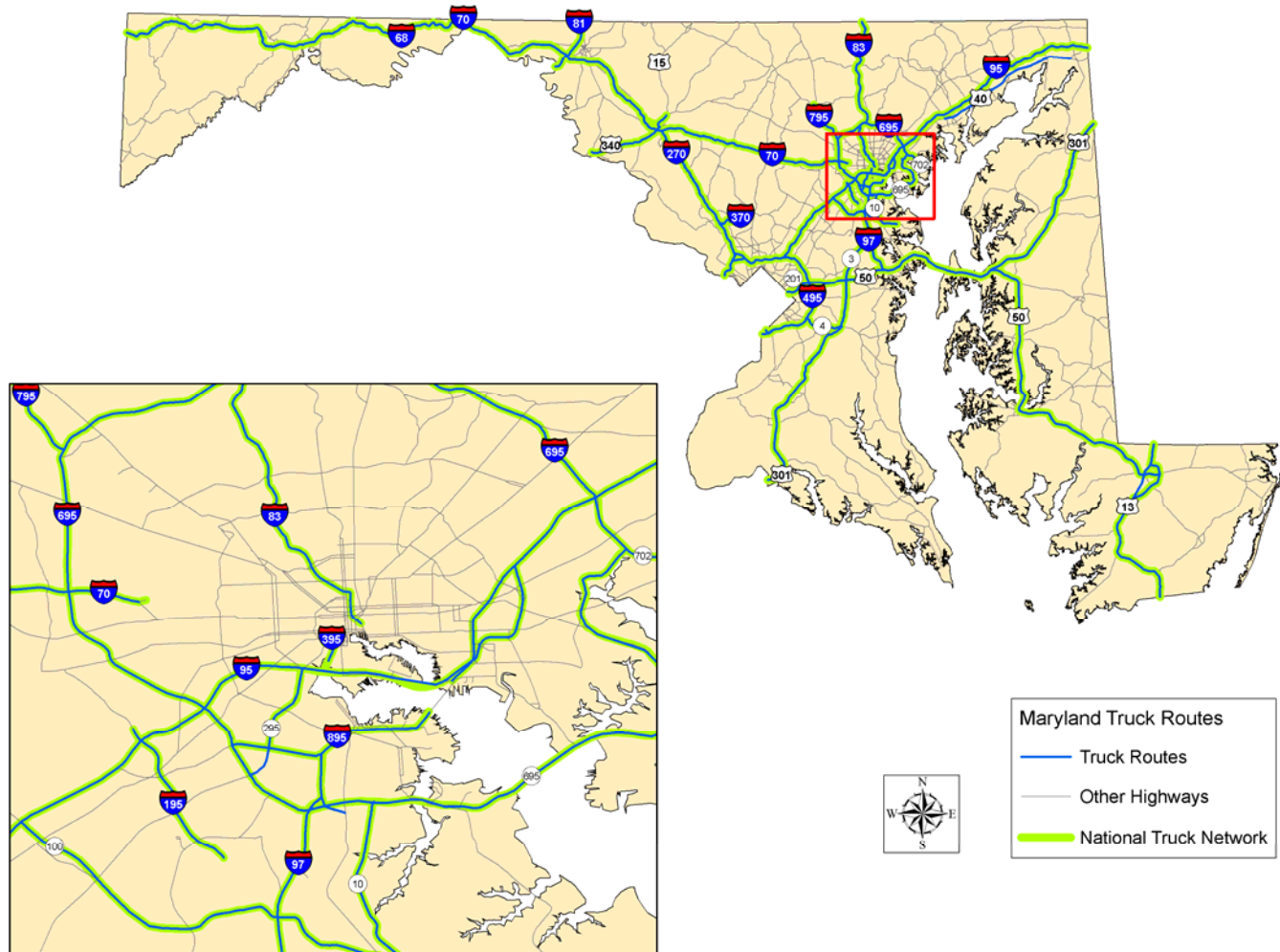
Highway System	Highway Mileage	Highway Lane Mileage	State Toll Mileage
Interstate	481 <sup>a</sup>	2,770 <sup>a</sup>	73
Primary	824	3,095	19
Secondary	3,944	9,429	9
County	21,090	43,068	0
Municipal	4,648	9,946	0
Total	30,987	68,308	101

<sup>a</sup> Includes seven miles of Interstate mileage (about 40 Interstate lane miles) maintained by Baltimore City.

Source: State Highway Administration of Maryland, 2007.



Figure 4.1 Maryland Truck Route System



Source: Maryland National System of Highways, Maryland Motor Carrier Handbook 2007.

**Table 4.2 Maryland Truck Route System and Intermodal Connections**

Physical Description	Significant Connections		
	Roadway	Airport	Seaport
I-68 (east-west route along the Maryland Panhandle)	I-70	Greater Cumberland Regional	
I-70 (connects I-695 to Frederick, Hagerstown, and points west)	I-68, I-81, U.S. 340, U.S. 40, I-270, I-695		
I-81 (alternative north-south route connecting New York to the Mississippi River)	I-70	Hagerstown Regional	
I-83 (extends north from downtown Baltimore to York and Harrisburg, PA)	I-695		Port of Baltimore
I-95 (connects to principal metropolitan centers along the U.S. East Coast)	I-495, MD 100, I-195, I-695, I-895, MD 295, I-395	Andrews AFB	Port of Baltimore
I-97 (connects Annapolis with I-695)	U.S. 50, MD 3, MD 100, I-695, I-895	Baltimore-Washington International	
I-195 (provides access to Baltimore-Washington International Airport from I-95)	I-95	Baltimore-Washington International	
I-270 (connects Rockville and environs to Frederick and I-70 West)	I-70, U.S. 40, I 370, I-495		
I-370 (connector route north of Rockville to I-270)	I-270		
I-395 (provides access to downtown Baltimore from I-95)	I-95		Port of Baltimore
I-495 (Capital Beltway)	I-270, I-95, MD 201, MD 4	Andrews AFB	
I-695 (Baltimore Beltway)	MD 702, MD 695, MD 10, I-895, I-97, MD 295, I-95, I-70, I-795, I-83, I-95	Martin State	Port of Baltimore
I-795 (provides access to Owings Mills and Reisterstown from I-695)	I-695		
I-895 <sup>a</sup> (Baltimore Harbor Tunnel Highway, an I-95 alternative bypassing downtown Baltimore)	I-95, MD 295, I-695		Port of Baltimore
U.S. 13 (from the Virginia state line to the Delaware state line)	U.S. 50	Salisbury-Ocean City Wicomico Regional	Port of Salisbury
U.S. 15 (from U.S. 340 in Frederick to MD 26 north of Frederick)	U.S. 340, U.S. 40		
U.S. 40 (from U.S. 340 in Frederick to I-70 in Frederick)	U.S. 340, I-70, U.S. 15		
U.S. 50 (from MD 201 at Kenilworth Avenue to the U.S. 13 Salisbury Bypass)	U.S. 13, U.S. 301, I-97, I-495, MD 201	Salisbury-Ocean City Wicomico Regional	Port of Salisbury

Physical Description	Significant Connections		
	Roadway	Airport	Seaport
U.S. 301 (from the Virginia state line to the Delaware state line)	U.S. 50, I-97, MD 3, MD 4		
U.S. 340 (from MD 67 at Weverton to U.S. 40 in Frederick)	I-70, U.S. 15, U.S. 40		
MD 3 (from U.S. 50/301 at Bowie to I-97)	U.S. 50, U.S. 30, I-97		
MD 4 (from I-95 to U.S. 301 near Upper Marlboro)	I-95, U.S. 301	Andrews AFB	
MD 10 (from MD 100 in Glen Burnie to the I-695 Baltimore Beltway)	I-695, MD 100		Port of Baltimore
MD 100 (from MD 607 in Jacobsville to I-95)	I-95, I-97, MD 295	Baltimore-Washington International	
MD 201 (from U.S. 50 in Cheverly to the District of Columbia line)	U.S. 50		
MD 295 (from the I-695 Baltimore Beltway to I-85 north of the Baltimore City line)	I-695, I-85		
MD 695 (from I-695 at Exit 1 to North Point Boulevard [MD 151])	I-695		Port of Baltimore
MD 702 (from I-695 east of Baltimore to Old Eastern Avenue)	I-695	Martin State	

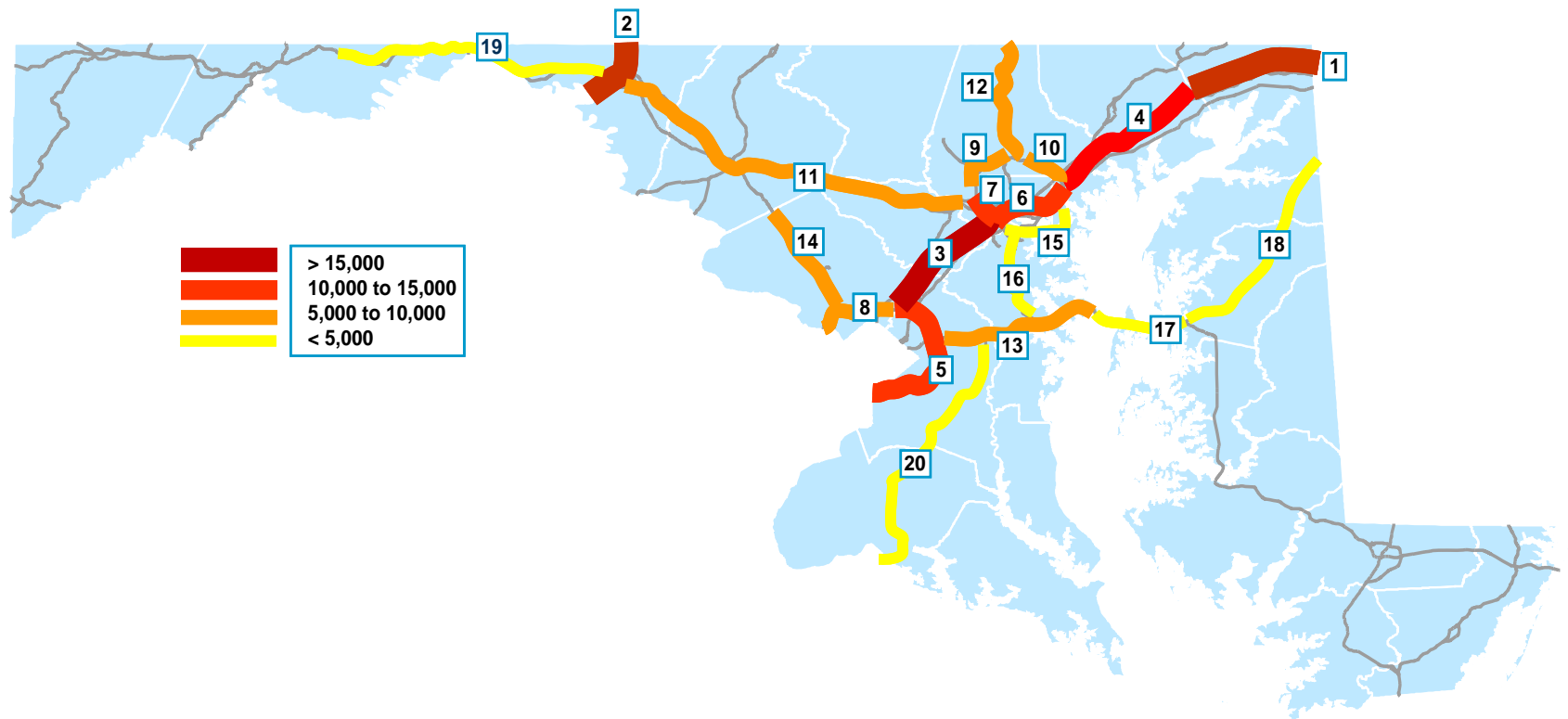
<sup>a</sup> Alternate routing is available via I-695 and the Francis Scott Key Bridge or I-95 Ft. McHenry Tunnel.

Source: Maryland Motor Carrier Handbook, October 2007 and Cambridge Systematics, Inc.

## Highway System Utilization and Truck Demand

The Maryland State Highway Administration maintains a traffic monitoring system to collect traffic volume data and to calculate Average Annual Daily Traffic (AADT) and Average Annual Daily Truck Traffic (AADTT) counts on the State's highways. Figure 4.2, supported by Table 4.3 identifies the highway segments that carried the highest daily truck volumes in 2007. The most heavily utilized highway segments in terms of total AADT have traffic volumes in excess of 200,000 vehicles per day. The busiest 20 truck segments serve an average of over 15,000 trucks per day. Most of them are located along I-95 and I-81.

Figure 4.2 Top Highway Segments by AADTT  
2007



**Table 4.3 Top Maryland Highway Segments by Total AADTT  
2007**

Rank	Location	AADTT Range	Notes
1	I-95 DE state line to Havre de Grace except for the Tydings Bridge	16,300 to 17,700	Lower truck counts on Tydings Bridge (over Susquehanna)
2	I-81 Washington County	15,200 to 16,000	Except a short section between MD 58 and Maugansville Road near Mack Truck plant
3	I-95 Between the Baltimore and Washington Beltways	15,800 to 15,900	Drops to 10,200 between MD 32 and MD 175 (Jessup)
4	I-95 in Baltimore and Harford Counties	13,800 to 15,200	From I-695 to Aberdeen area
5	I-95/I-495 in Prince George's County	12,400 to 13,600	Data for several Beltway sections drops to as low as 8,800 (near MD 214), 6,500 (near Greenbelt Metro), and 6,500 near Woodrow Wilson bridge
6	I-95 Baltimore County/Baltimore City	11,100 to 13,000	Inside I-695 Beltway
7	I-695 Baltimore Beltway	10,200 to 11,100	West side, I-95 to I-70
8	I-495 Capital Beltway in Montgomery County	8,400 to 9,300	
9	I-695 Baltimore Beltway	8,100 to 9,100	NW side I-70 to I-83 (drops to 6,800 between MD 129 and Stevenson Road)
10	I-695 Baltimore Beltway	5,000 to 7,000	NE side I-83 to I-95
11	I-70 Corridor	6,900 to 7,000	I-695 to I-81 (drops to 6,800 in Carroll County)
12	I-83 in Baltimore County	5,200 to 7,900	Increases closer to I-695
13	U.S. 50 in Prince George's and Anne Arundel Counties	4,200 to 7,600	
14	I-270 in Montgomery County	3,700 to 6,500	Increases closer to I-495
15	I-695 Baltimore Beltway South	3,700 to 5,700	Lowest point is near Anne Arundel County line
16	I-97 Baltimore to Annapolis	4,500 to 5,300	
17	U.S. 50 in Queen Anne's County	2,400 to 5,800	
18	U.S. 301 Eastern Shore	2,200 to 4,300	Highest in Queen Anne's County
19	I-68 from I-70 to Cumberland	2,700 to 4,300	Highest in Allegany County
20	U.S. 301 in Southern Maryland	1,000 to 3,000	Highest near U.S. 50

Source: SHA and Cambridge Systematics, Inc.

Building on the highway traffic and truck count data provided by SHA, the TRANSEARCH database (see description below: “Maryland Freight Data”) provides some insight into the origin-destination patterns of truck movements to, from, through, and within the State.<sup>10</sup> Figure 4.3 and Figure 4.4 illustrate total truck tonnage estimates on Maryland highways in 2006 and 2035, respectively. Clearly, the Interstates are the dominant system component for truck freight tonnage in the State. In 2006, I-70, I-270, I-81, and I-95 accommodated the heaviest truck tonnage. Future (2035) forecasts indicate that these Interstates will continue to carry a large share of the truck tonnage moved within the State, non-Interstate corridors such as U.S. 15 through Frederick and U.S. 50 from Annapolis across the Chesapeake Bay will also experience increases in truck tonnage by 2035.

#### Maryland Freight Data

The primary source of commodity flow data is the TRANSEARCH data set developed by IHS Global Insight. TRANSEARCH synthesizes origin-destination data from the trucking industry, freight-rail carriers, and waterborne industry to provide total county and State-level freight flows in Maryland. TRANSEARCH contains information on freight movements by trading partner (e.g. Pennsylvania), commodity (e.g. food products), and forecasts the flows into the future (2035). In addition to the TRANSEARCH data, this study utilizes various Federal and public sources including information from the Maryland Aviation Administration, Port of Baltimore, and U.S. Army Corps of Engineers to provide a picture of freight demand that is comprehensive and multimodal.

Things to consider as you read this report...

- **Base and Forecast Years.** The base year used for all freight data is 2006; the forecast horizon is 2035
- **Forecast Assumptions.** The average growth in the forecast is conservative, following a long-term trend of between 2 and 3 percent average annual growth of the economy. Consequently, the forecast does not adjust for either the high growth freight years between 2003 and 2007 (6+ percent annual growth) or the current national recession (declining freight flows). Instead, the forecast provides a steady long-term growth curve that provides a sufficiently reliable forecast for planning purposes.

Figure 4.5 and Figure 4.6 show the TRANSEARCH estimates of 2006 and 2035 truck tonnage passing through Maryland (representing trips with origins and destinations outside of Maryland). In 2006, the most heavily utilized corridors for through traffic include I-81 and I-95. Both of these Interstate highways have a

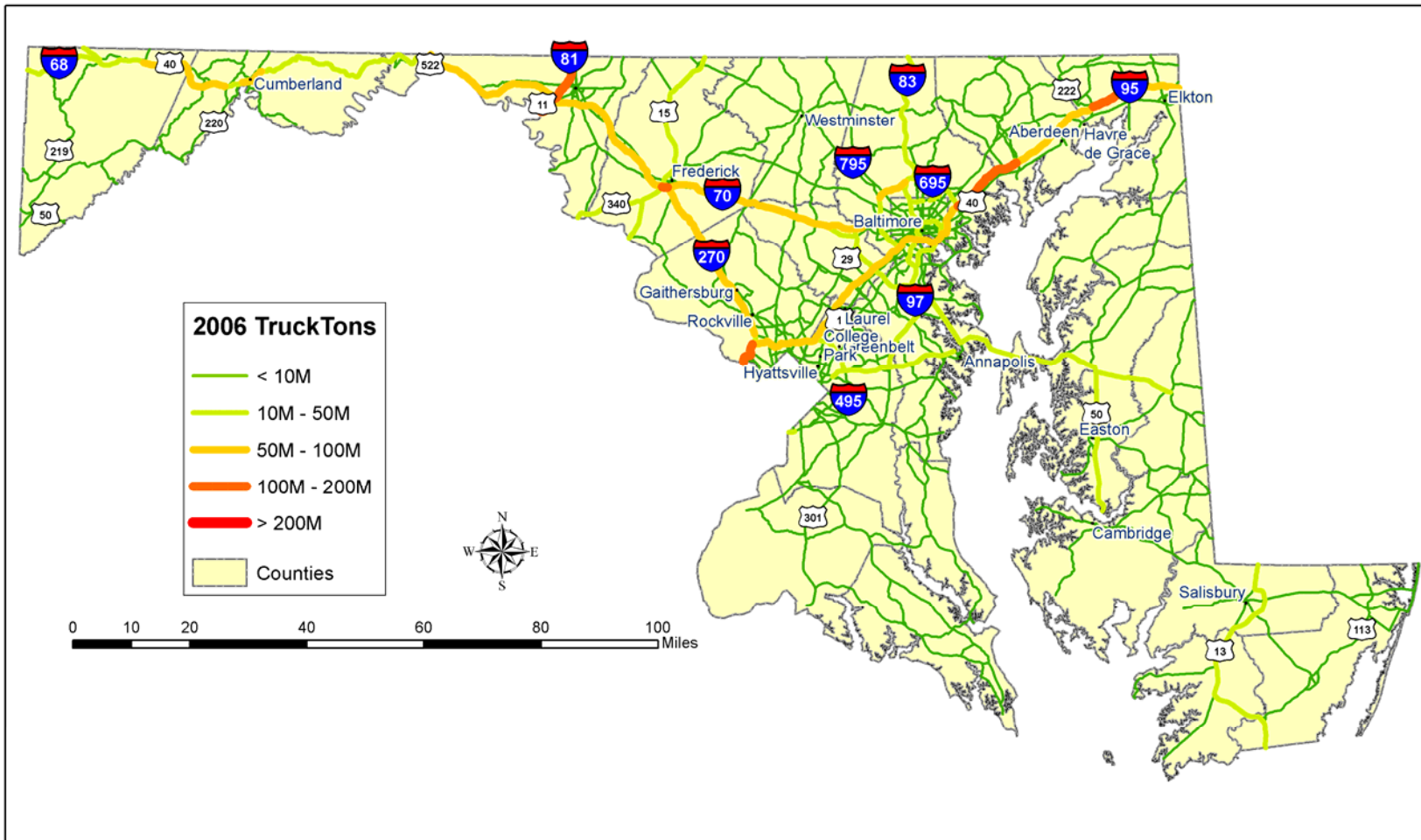
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<sup>10</sup>TRANSEARCH is a proprietary dataset produced by Global Insight.

north-south orientation and connect to large population centers. Interstate 81 links markets between Tennessee and the New York/Canada border and I-95 serves as the main link for the entire U.S. eastern seaboard from Florida to Maine. In 2006, through trips accounted for approximately 97 percent of total truck tonnage on I-81 and 57 percent of total truck tonnage on I-95. This means that trucking and highway conditions in Maryland have far-reaching effects on business and transportation decisions made throughout the country.

By 2035, several other key corridors will emerge as significant through traffic routes. In addition to I-81 and I-95, truck tonnage forecasts show heavy flows concentrated on I-70, I-270, and U.S. 15.

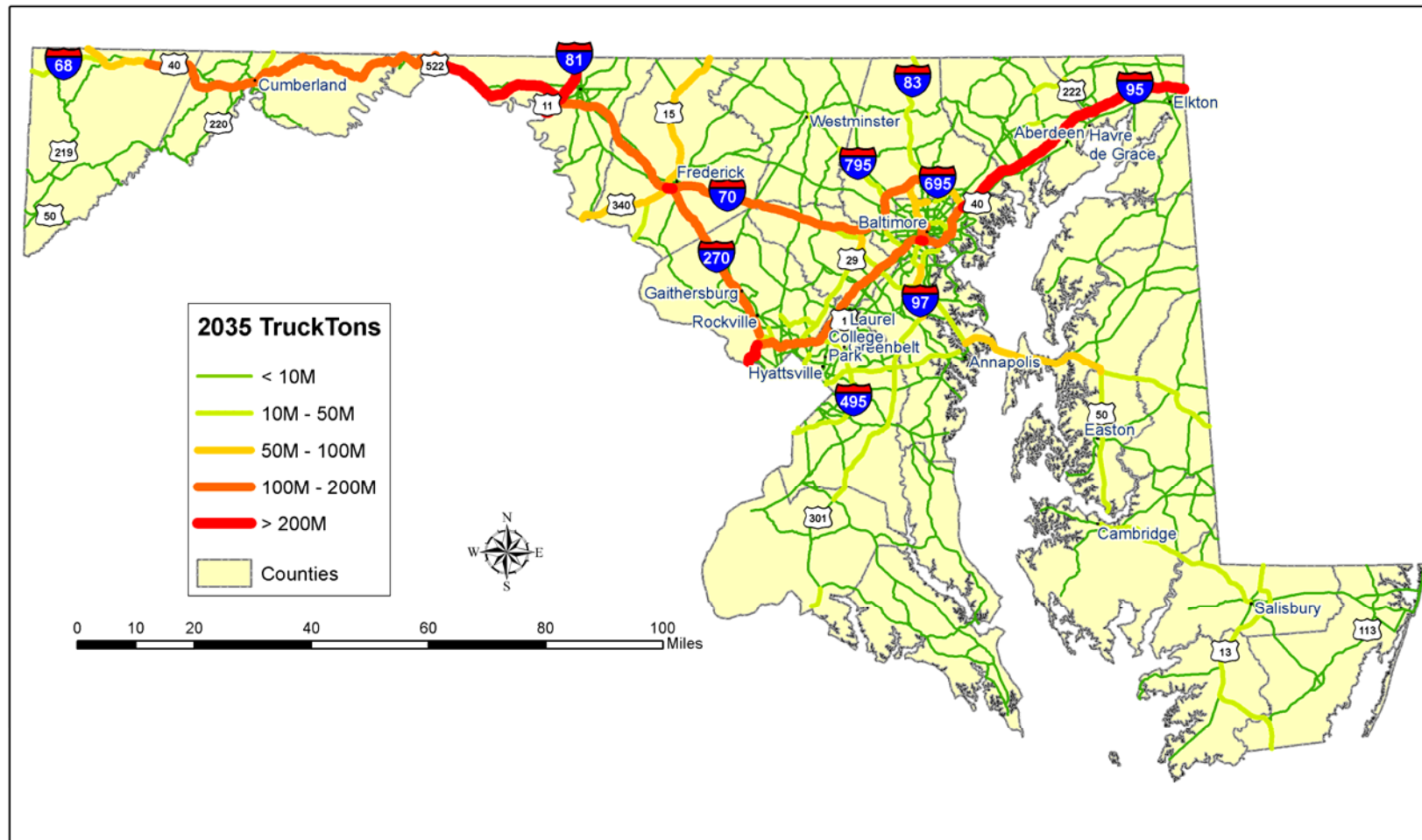
Figure 4.3 Total Truck Tonnage  
2006



Source: 2003 TRANSEARCH® Insight, forecast update to 2006 by Cambridge Systematics, Inc.

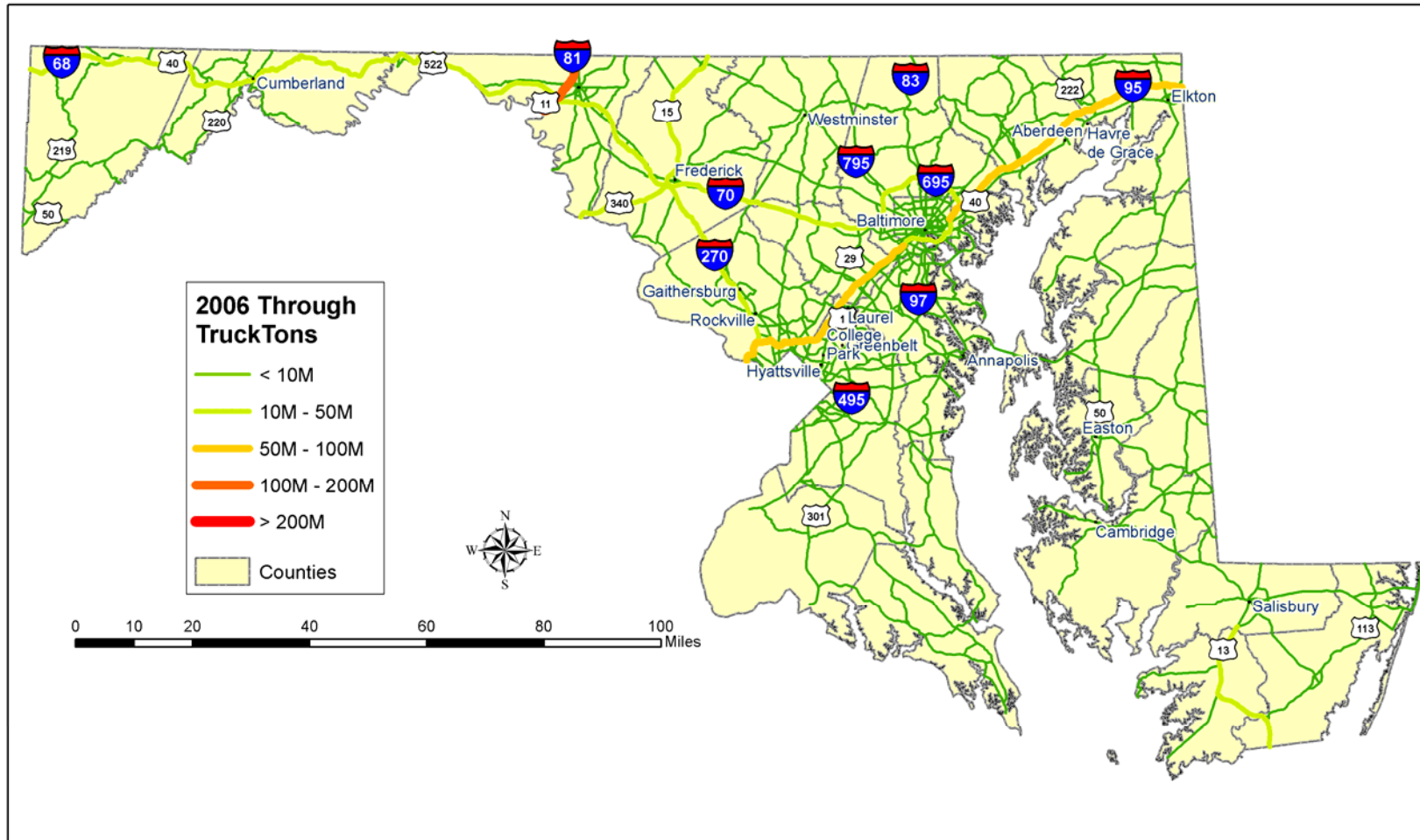


Figure 4.4 Total Truck Tonnage  
2035



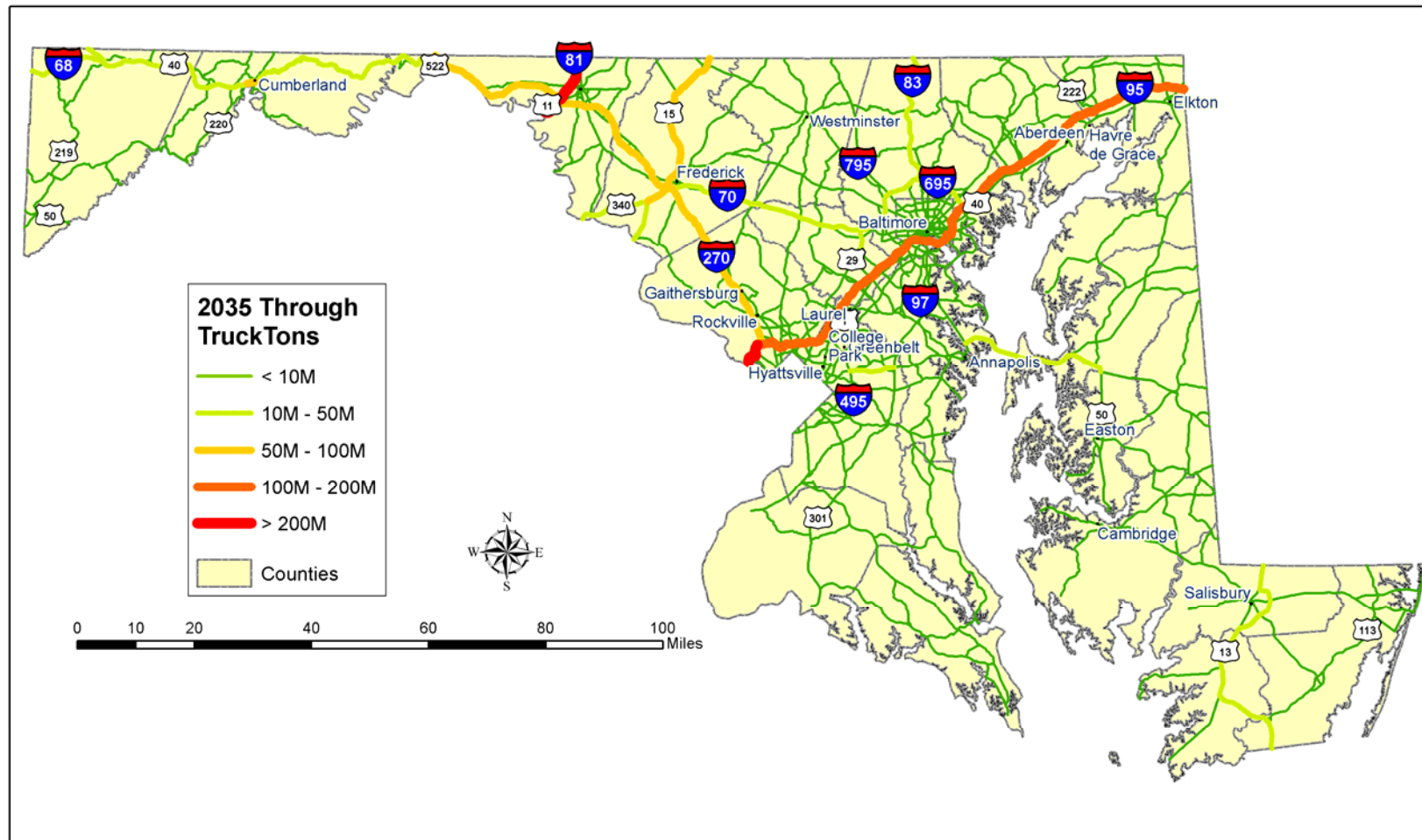
Source: 2003 TRANSEARCH® Insight, forecast update to 2006 by Cambridge Systematics, Inc.

Figure 4.5 Truck Tonnage Passing Through Maryland  
2006



Source: 2003 TRANSEARCH® Insight, forecast update to 2006 by Cambridge Systematics, Inc.

Figure 4.6 Truck Tonnage Passing Through Maryland  
2035



Source: 2003 TRANSEARCH® Insight, forecast update to 2006 by Cambridge Systematics, Inc.

## Highway Safety

Growth in truck volumes – particularly on emerging corridors (i.e., non-Interstates) – will contribute to safety and reliability concerns. Table 4.4 compares the average annual incident rates by highway section involving commercial motor vehicles that resulted in fatalities, injuries, or tows.<sup>11</sup> On a per-mile basis, the commercial vehicle accident rates are highest on the I-495 (the Capital Beltway), I-695 (the Baltimore Beltway), and I-95 between the two Beltways. The density of background automobile traffic is extremely high in these corridors, thereby contributing to the high-accident rates. Conversely, crash rates per mile on I-68 and U.S. 301 are comparatively low, due presumably to the low density of background auto traffic in the rural areas through which these corridors pass.

**Table 4.4 Top 15 Highway Sections Involving Commercial Vehicle Crashes**

Highway Section	Average Yearly Crashes	Miles	Average Crashes per Mile
Capital Beltway – Prince George’s County	198	27	7.33
I-95 Between Beltways – Howard County	72	11	6.55
I-95 Between Beltways – Baltimore County	26	4	6.50
Capital Beltway – Montgomery County	75	14	5.36
I-95 Between Beltways – Prince George’s County	38	8	4.75
Baltimore Beltway – Baltimore County	168	42	4.00
Baltimore Beltway – Anne Arundel County	12	6	2.00
I-70 – Baltimore County	9	5	1.80
I-81 – Washington County	21	12	1.75
U.S. 301 – Prince George’s County	43	25	1.72
I-270 – Montgomery County	36	21	1.71
I-70 – Frederick County	41	29	1.41
I-83 – Baltimore County	37	27	1.37
U.S. 301 – Charles County	28	26	1.08
Baltimore Beltway – Baltimore City	3	3	1.00

Source: SHA.

In addition to serious public safety impacts, truck crashes cause significant delay in travel times, decreasing the overall reliability of the transportation system. Truck-related accidents in particular reduce transportation reliability since they

<sup>11</sup> Commercial motor vehicles include trucks with a gross vehicle weight rating (GVWR) of more than 10,000 pounds and buses that carry more than 10 passengers

can involve multiple lanes, infrastructure damage, cargo spills (including hazardous materials), and injuries. Consequently, these crashes can have a negative effect on freight movement reliability in Maryland.

## **4.3 FREIGHT RAIL**

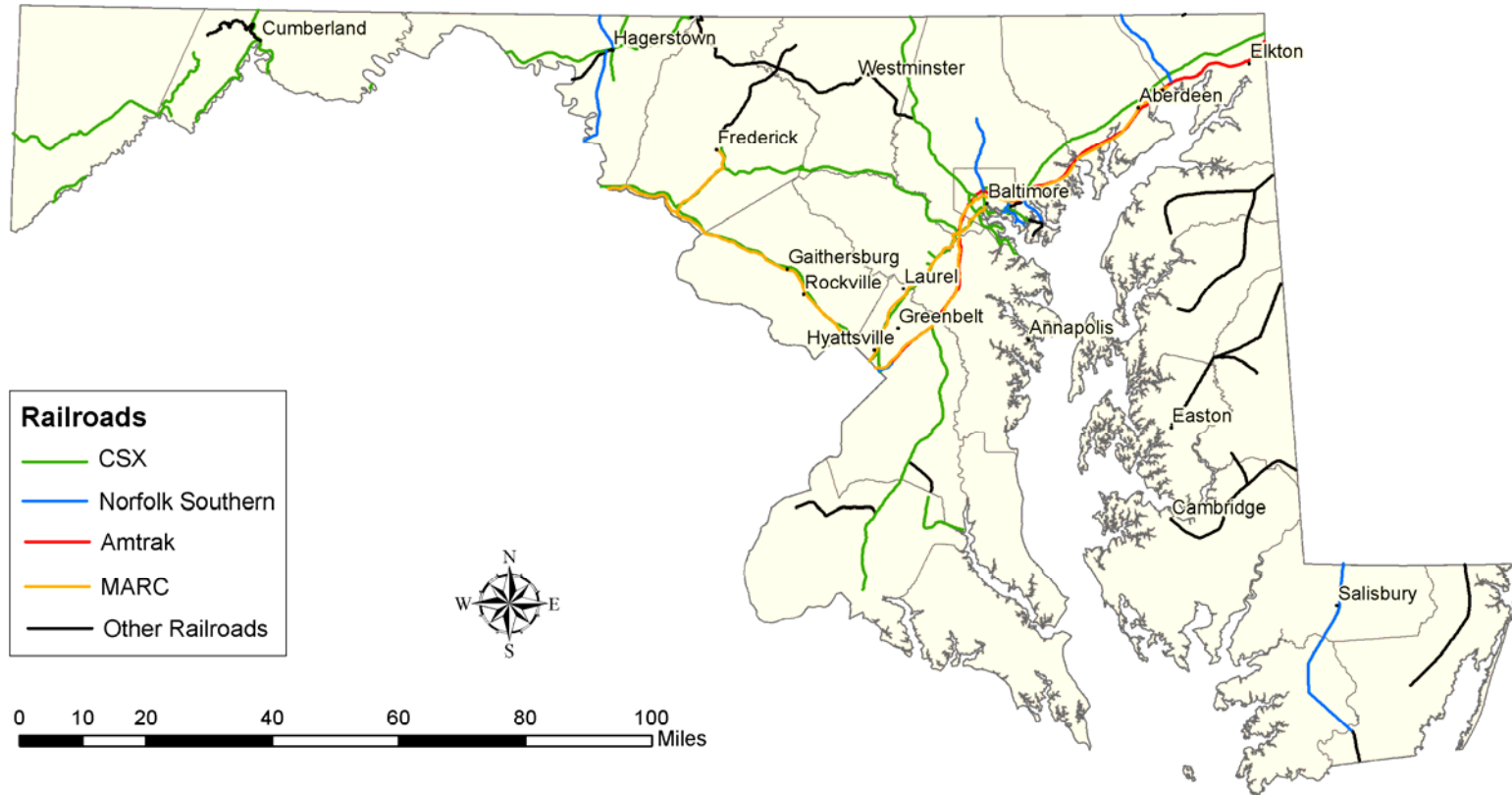
### **Rail System Inventory**

Maryland's rail system includes tracks, terminals, switching yards, sidings, and intermodal facilities. The railroad network is approximately 1,157 miles long, comprised of two Class I freight railroads, four Class III short line freight carriers, one switching/terminal railroad, and one passenger railroad.<sup>12</sup> Four of these railroads, CSX Transportation (CSX), Norfolk Southern Railway, Maryland and Delaware Railroad, and Amtrak, and also the State of Maryland, account for 76 percent of the entire network. The other 24 percent of the rail network includes short lines, rail operating within ports, or track banked by the Department of Transportation for future use. There are additional freight and passenger rail carriers that operate in the State, such as the Maryland Area Regional Commuter (MARC), but they operate exclusively with trackage rights on other rail lines and do not contribute to additional railroad network mileage. Figure 4.7 and Table 4.5 provide an overview of the State's rail system.

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<sup>12</sup> Railroad classifications 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 4.7 Overview of Maryland's Rail System



Source: National Transportation Atlas Database 2007.

Table 4.5 Maryland Rail System Summary

Railroad Name	Class I	Class II	Class III	Terminal/ Switching	Miles Operated in Maryland
CSX Transportation	●				557
Norfolk Southern Railway	●				118.9
Canton Railroad			●	●	6
Bay Coast Railroad			●		5.8
Maryland and Delaware Railroad			●		109.2*
Maryland Midland Railway			●		63
Patapsco and Back Rivers Railroad				●	26.5
Amtrak	●				93.5
Wheeling and Lake Erie Railway		●			Trackage Rights Only
Maryland Area Regional Commuter (MARC)					Trackage Rights Only

Source: Maryland Department of Business and Economic Development, Railroad Web Sites.

\* 81 active miles of the Maryland and Delaware Railroad are owned by the State of Maryland, 10 of which are located in the State of Delaware.

### *Freight Railroads*

Two private Class I rail carriers, CSX and Norfolk Southern, own a majority of Maryland's freight rail track infrastructure.

**CSX Transportation** operates 557 miles of track as part of five interstate mainlines within the State:

- **Eastern Gateway Corridor** - Connects Baltimore to Chicago via Cumberland and Pittsburgh;
- **St. Louis Gateway Corridor** - Links Baltimore to St. Louis via Cumberland, Pittsburgh, and Indianapolis;
- **Memphis Gateway Corridor** - Connects Baltimore to Memphis via Cumberland, Cincinnati, and Nashville;
- **Atlantic Coast Corridor** - Connects Florida to Boston via Savannah, Baltimore, and New York; and
- **New Orleans Gateway Corridor** - Connects New Orleans to New York via Atlanta, Richmond, and Baltimore.

In addition, CSX has major rail yards in Baltimore and Cumberland, an intermodal terminal in Baltimore, bulk transfer terminals in Baltimore and

Hagerstown, and automotive distribution centers in Jessup and Baltimore.<sup>13</sup> Through trackage rights agreements, Amtrak intercity service and MARC commuter service trains operate daily over CSX tracks.

**Norfolk Southern Railway** operates almost 120 miles in Maryland. The routes follow a primarily north-south orientation that parallels the East Coast. Routes include:

- **Port Road Line** providing a linkage between Harrisburg, Pennsylvania and Perryville, Maryland;
- **Delmarva Route** serving the State's eastern shore;
- **Piedmont Route** connecting New York to the Southern states; and
- **Shenandoah Route** that provides the shortest rail link between the Southwest and the Northeast, also known as NS' "Crescent Corridor."

Norfolk Southern also retains trackage rights over Amtrak's Northeast Corridor between Philadelphia, Baltimore, and Washington, D.C.

Maryland's **short line carriers** provide rail, switching, and/or terminal service within the State.

- **Canton Railroad** is located in East Baltimore City and Baltimore County and connects with both CSX and Norfolk Southern. It also provides access to the Port of Baltimore.
- The **Bay Coast Railroad** serves the eastern shore of Maryland and Virginia, operating the former Eastern Shore Railroad. It connects with the Norfolk Southern Railway in Pocomoke City, Maryland. The railroad also operates a rail ferry service across the Chesapeake Bay. Two barges with 15 and 25 rail car capacities traverse the 26-mile route across the bay.
- Serving the central portion of the Delmarva Peninsula, the **Maryland and Delaware Railroad** provides rail service to Maryland's eastern shore. While it does not connect to any Class I railroads in Maryland, it connects to Norfolk Southern at three points in Delaware.
- The **Maryland Midland Railway** operates in Carroll and Frederick counties. The short line has two intermodal facilities for transfer between rail and truck in the communities of Westminster and Union Bridge.
- Similar to Canton Railroad, the **Patapsco and Back Rivers Railroad** is located in East Baltimore City and Baltimore County and interchanges with both CSX

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<sup>13</sup>CSX Transportation. "CSX and Maryland Fact Sheet" July 10, 2008. <[http://www.csx.com/share/general/fastfacts/docs/Ma\\_Fact\\_Sheets\\_0506-15-REF21845.pdf](http://www.csx.com/share/general/fastfacts/docs/Ma_Fact_Sheets_0506-15-REF21845.pdf)> Accessed January 29, 2009.



and Norfolk Southern. It serves as a short line switching and terminal railroad.

### *Passenger Rail*

Passenger rail operations share infrastructure with freight operations in the State. Due to this relationship, investments in either Amtrak-owned or freight-owned facilities often provide mutual benefits. The Maryland passenger rail system is comprised of the following:

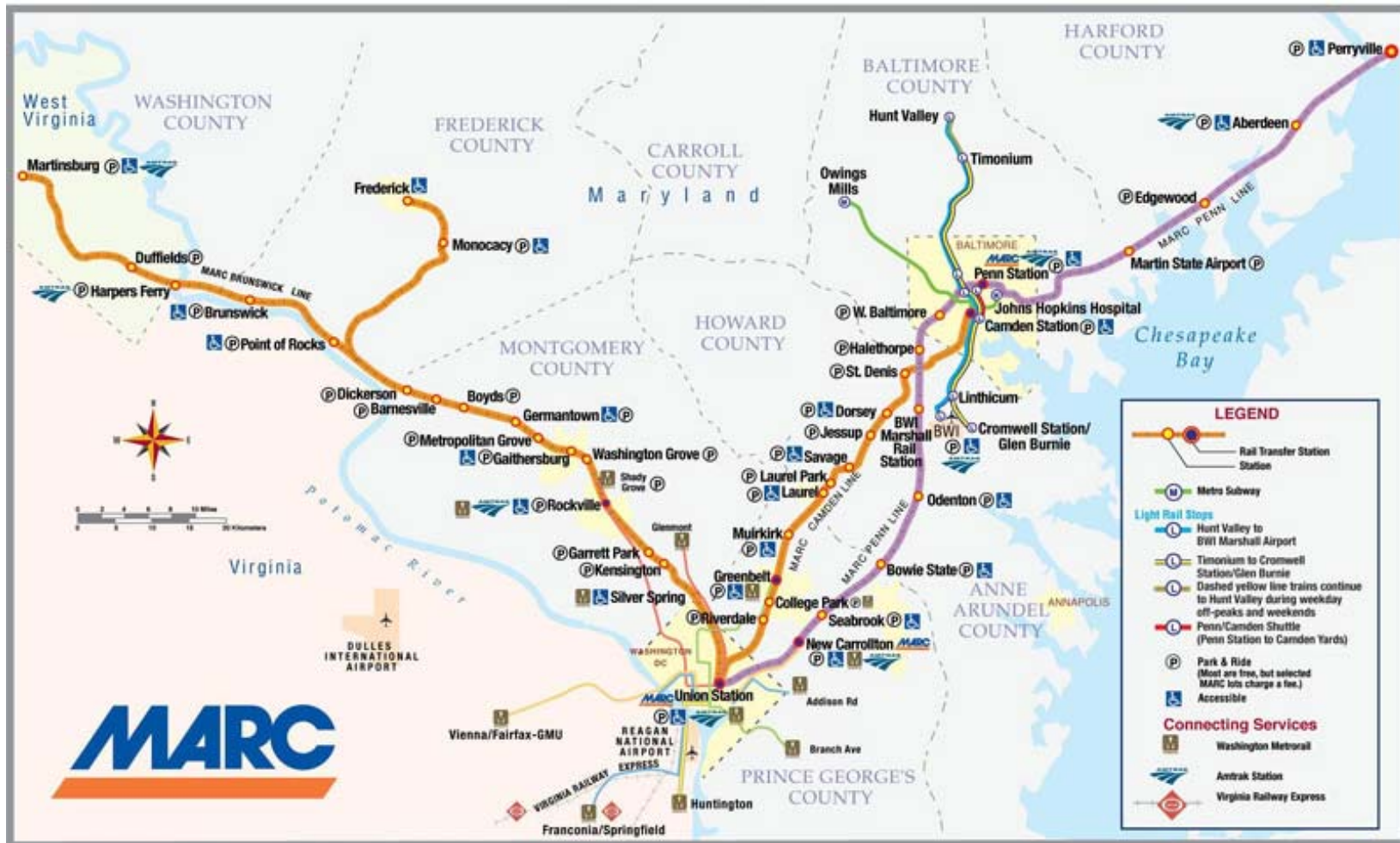
#### **Amtrak**

The National Railroad Passenger Corporation, known as Amtrak, provides passenger service along two corridors in Maryland. The first corridor stretches from the District of Columbia to the border between Maryland and West Virginia and operates on CSX track by way of trackage rights agreements. The second corridor stretches from Washington, D.C. to the border between Maryland and Delaware on track owned by Amtrak.

#### **MARC**

The Maryland Transit Administration operates MARC rail service into Baltimore and the District of Columbia along the Penn, Camden, and Brunswick Lines (Figure 4.8). The Penn Line operates on Amtrak-owned right-of-way between Washington, D.C.'s Union Station, Penn Station in Baltimore, and Perryville in Cecil County. While Amtrak and commuter service take priority along this corridor, both CSX and Norfolk Southern have trackage rights. The Camden and Brunswick lines operate on CSX-owned right-of-way. The Camden Line operates between Camden Station in Baltimore and Union Station in Washington, D.C. The Brunswick Line operates from Union Station to both Frederick, Maryland and Martinsburg, West Virginia.

Figure 4.8 MARC Commuter Rail Service

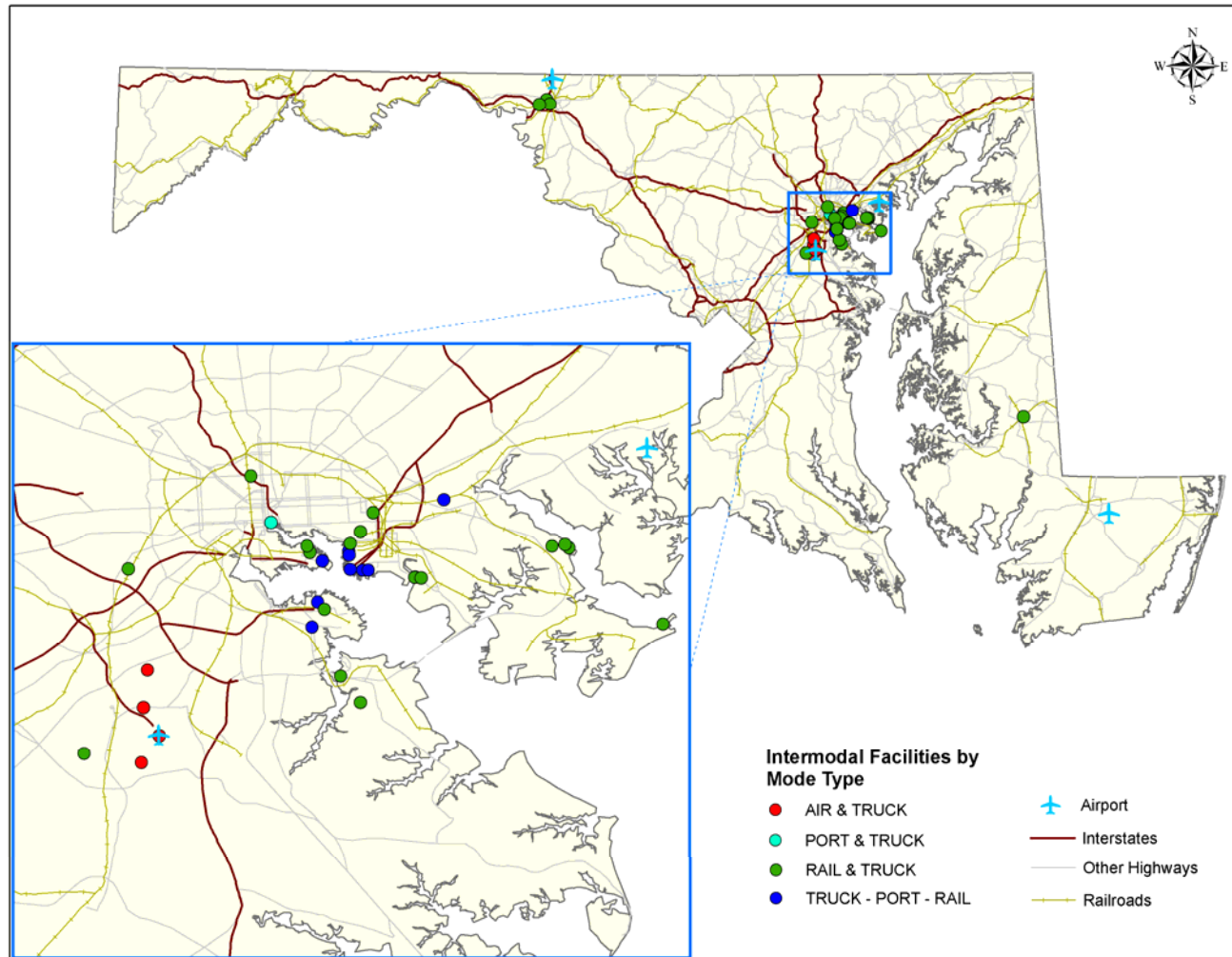


Source: Maryland Transit Administration.

## **Intermodal Facilities**

An efficient freight network requires intermodal facilities to shift freight between modes. Figure 4.9 identifies the locations of the intermodal facilities Maryland. The rail-truck intermodal facilities are primarily located within the greater Baltimore region, with several additional facilities located in Frederick and along U.S. 50 on the Delmarva Peninsula.

Figure 4.9 Intermodal Facilities by Mode

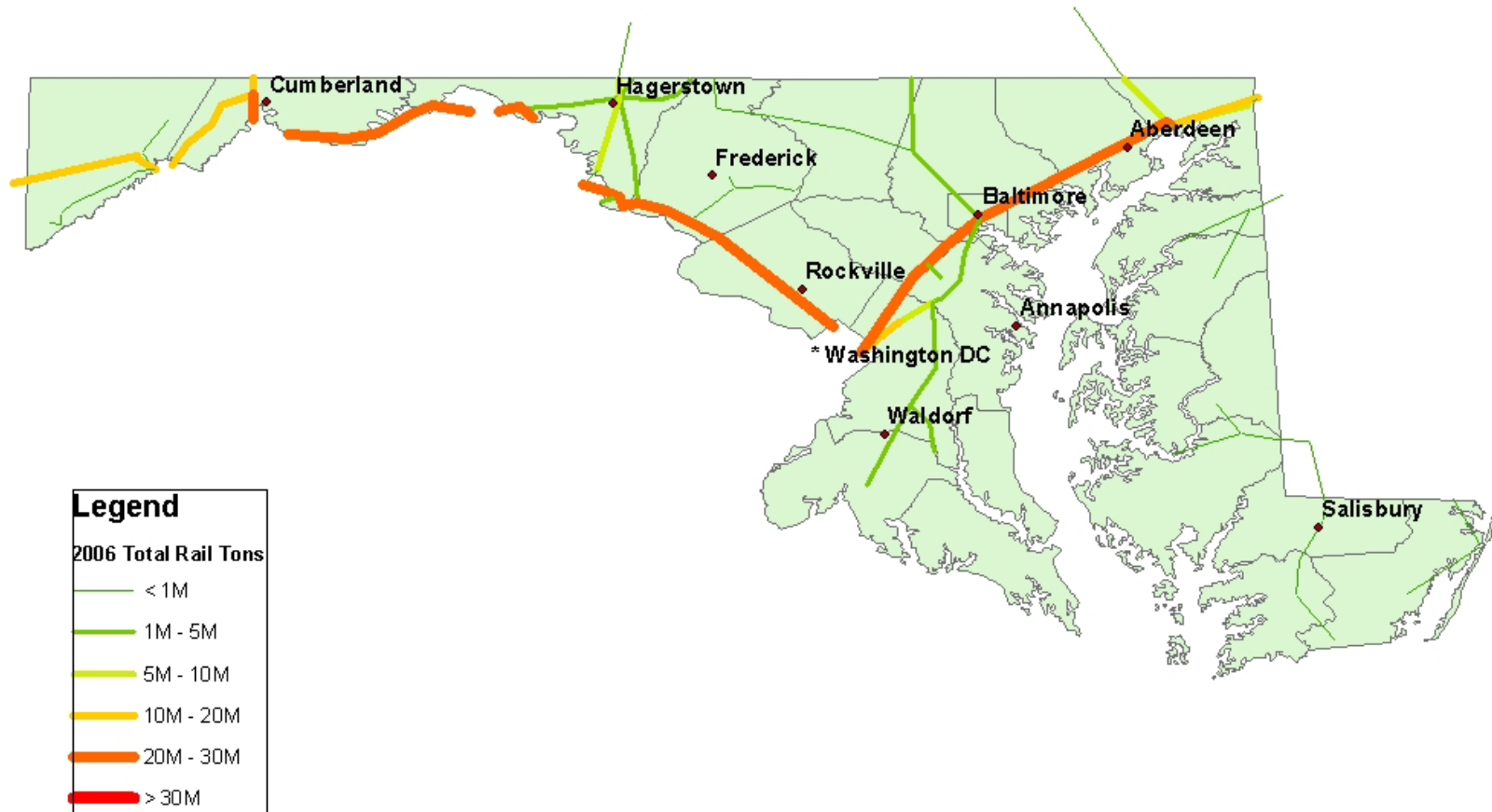


Source: 2008 National Transportation Atlas Database.

## **Freight Rail Demand and System Utilization**

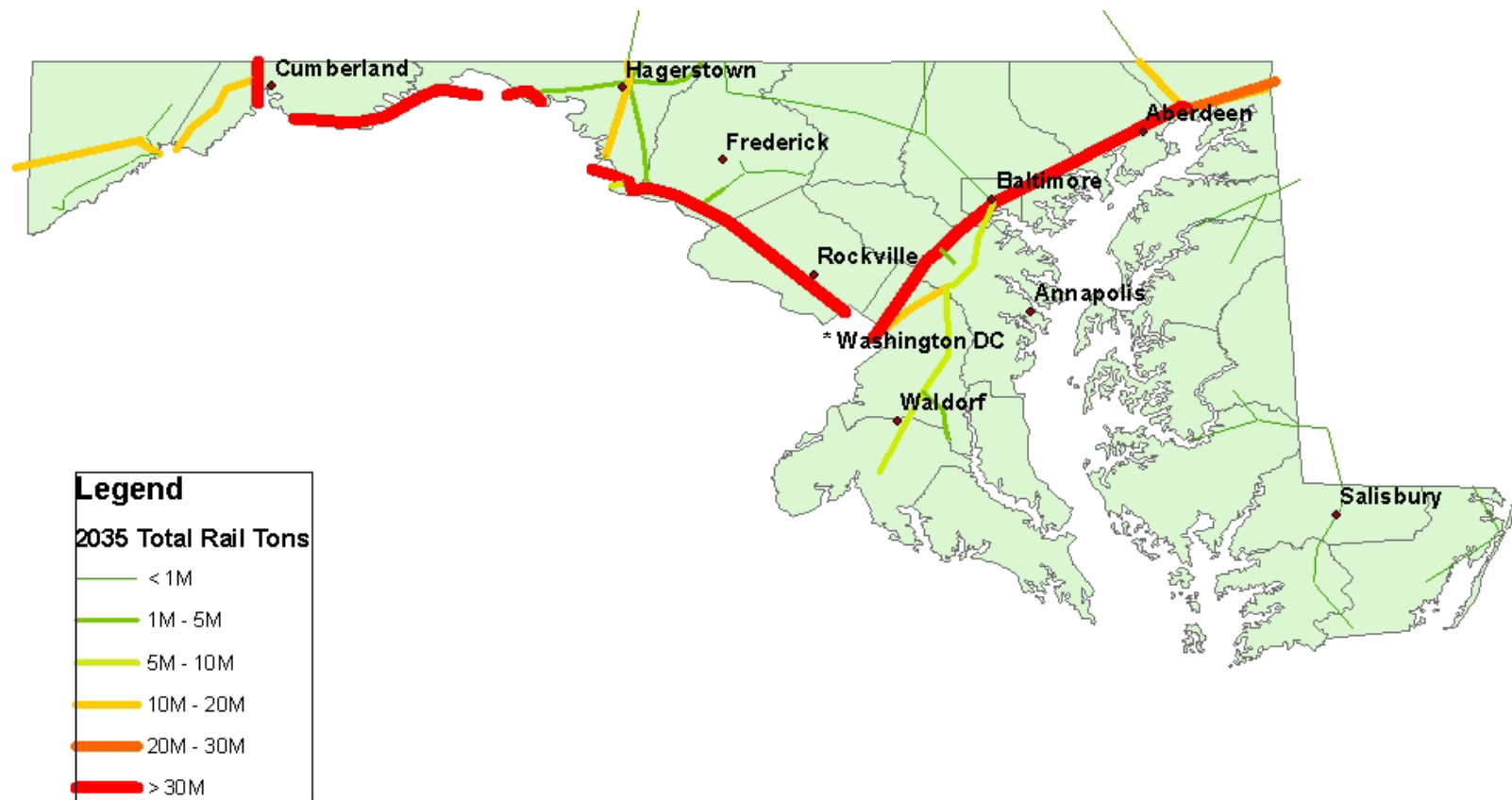
Similar to the truck flow maps previously discussed, the TRANSEARCH database includes information on freight rail flows to, from, through, and within Maryland. As shown in Figure 4.10, 2006 total rail tonnage flows orient in both the east-west direction on the CSX line connecting Baltimore, Washington D.C., and points west, and in the north-south direction along the Northeast Corridor. Through 2035 the growth in rail tonnage on both corridors is significant (Figure 4.11).

Figure 4.10 Total Rail Tonnage  
2006



Source: 2003 TRANSEARCH® Insight, forecast update to 2006 by Cambridge Systematics, Inc.

Figure 4.11 Total Rail Tonnage  
2035

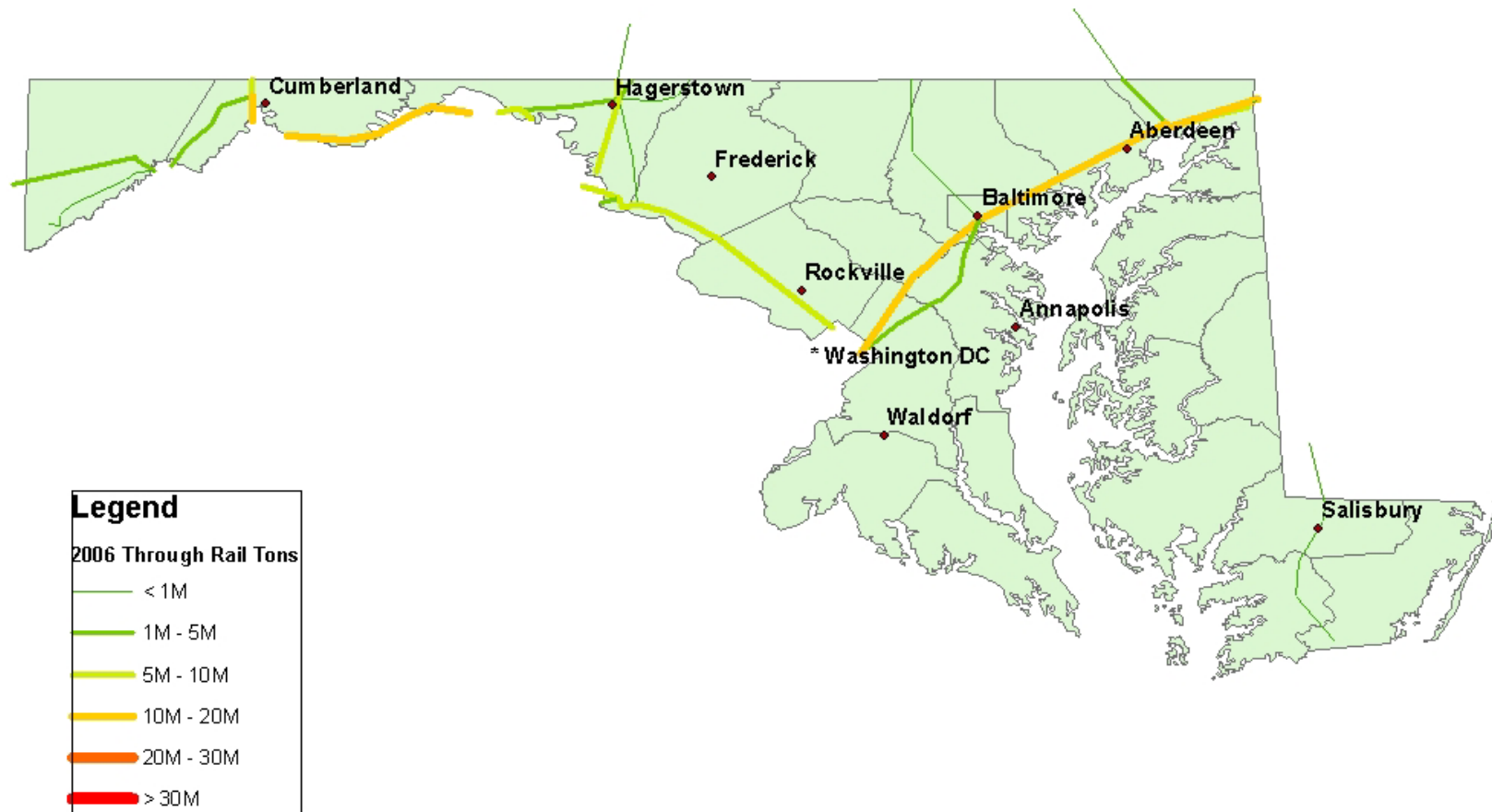


Source: 2003 TRANSEARCH® Insight, forecast update to 2006 by Cambridge Systematics, Inc.

Through rail trips have a north-south orientation and generally parallel the I-95 corridor (Figure 4.12). As shown in the 2035 forecast in Figure 4.13, the CSX line paralleling the I-95 corridor will continue to accommodate the heaviest flows of freight rail tonnage.



Figure 4.12 Through Rail Tonnage  
2006



Source: 2003 TRANSEARCH® Insight, forecast update to 2006 by Cambridge Systematics, Inc.

Figure 4.13 Through Rail Tonnage  
2035



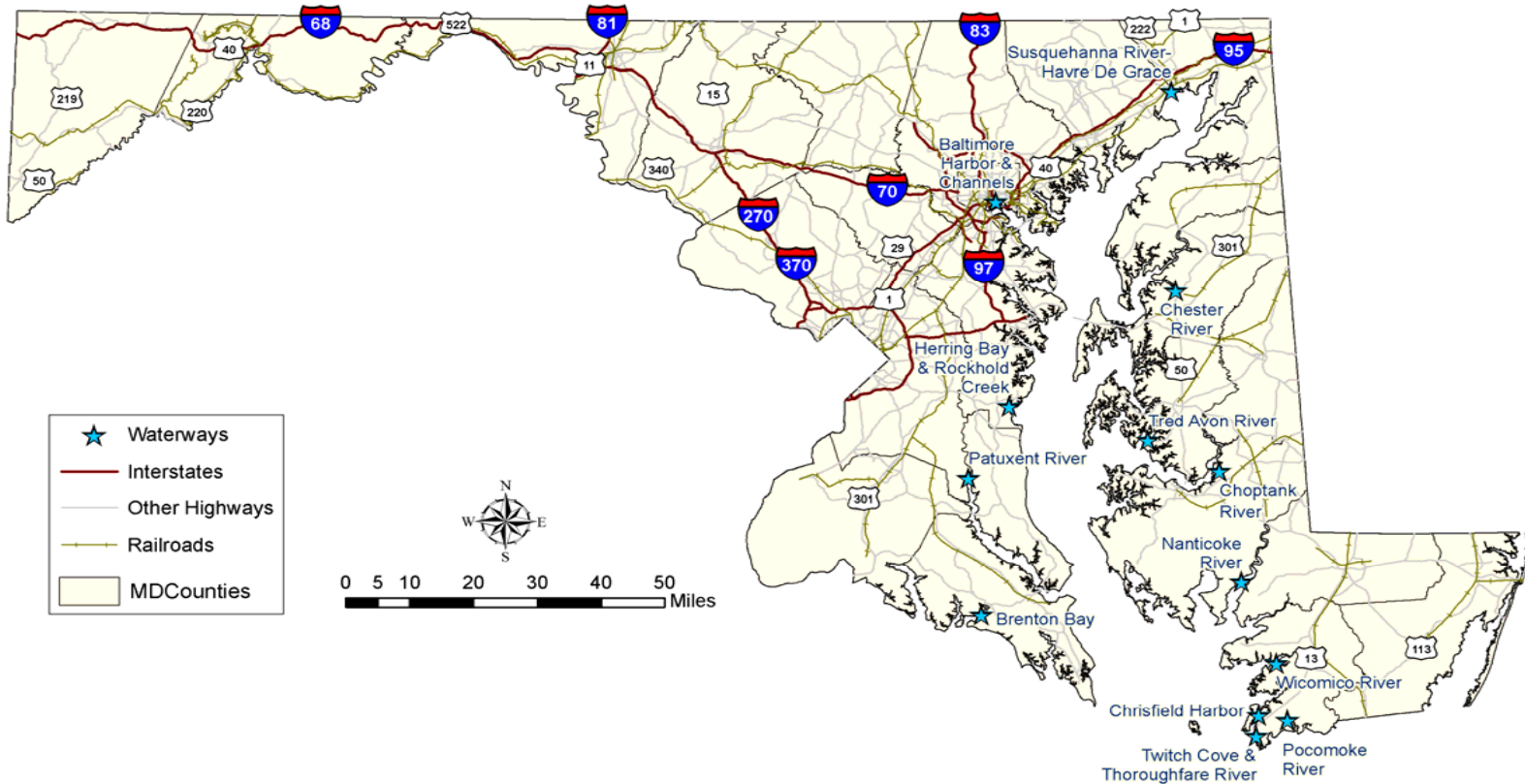
Source: 2003 TRANSEARCH® Insight, forecast update to 2006 by Cambridge Systematics, Inc.

## **4.4 WATERWAYS AND MARINE TERMINALS**

### **Waterways and Marine Terminals Inventory**

Maryland's position on the Chesapeake Bay has provided the State with a rich history in maritime trade and goods movement. The Port of Baltimore is the dominant port on the Chesapeake, supported by numerous smaller facilities. According to the most recent data available from the U.S. Army Corps of Engineers, Maryland has 65 ports and waterways located throughout the State. Of these 65 ports, 13 port facilities reported commerce activity in 2006. The locations of these 13 port facilities are shown in Figure 4.14.

Figure 4.14 Maryland's Waterways with Active Commerce  
2006



Source: U.S. Army Corps of Engineers.

Operated by the Maryland Port Administration (MPA), the Port of Baltimore is the State's largest port with facilities in both Baltimore City and Anne Arundel County. The port was founded in 1706 on the banks of the Patapsco River and has grown to be one of the busiest ports on the East Coast. With its strategic inland setting and Mid-Atlantic location, the Port of Baltimore is the closest Atlantic port to major Midwestern population and manufacturing centers. While the Port specializes in Roll-On/Roll-Off (Ro/Ro) cargoes, it also operates modern container facilities and special break bulk facilities for steel and forest products. The Port of Baltimore's main shipping channel is 800 feet wide and one of only two East Coast deepwater ports with a channel depth of 50 feet.

Seven public terminals and approximately 30 private terminals handle the Port's traffic (Figure 4.15). The public terminals, owned by MPA, include:<sup>14</sup>

- **Dundalk Marine Terminal** - With six general cargo berths, seven container berths, nine container cranes, and inside and outside storage located within the terminal's 570 acres, the Dundalk Marine Terminal is the MPA's largest general cargo facility. The terminal is capable of handling containers, breakbulk cargo, wood pulp, Ro/Ro equipment, automobiles, and project cargo. Norfolk Southern provides direct rail access to the terminal for breakbulk and automobile cargoes. Two private terminals, Wallenius Wilhemsen Logistics and Ports America, also operate within Dundalk.
- **Fairfield/Masonville Automobile Terminals** - MPA owns four specialized terminals for handling and processing automobiles, light trucks, and similar Ro/Ro cargo with a total terminal area of 50 acres. Private companies, such as Mercedes-Benz, often lease space within the automobile terminals for processing. CSX provides spurs and direct connections to the automobile terminals.
- **Seagirt Marine Terminal** - The Seagirt Marine Terminal has an automated system that helps to maximize intermodal efficiency. With the use of four single-hoist and three dual-hoist cranes, the 284-acre container terminal is capable of handling 450,000 containers per year. CSX provides direct rail service to the adjacent Intermodal Container Transfer Facility.
- **Intermodal Container Transfer Facility** - Located on 66 acres adjacent to the Seagirt Marine Terminal, the Intermodal Container Transfer Facility shifts containers from bulkhead to rail. CSX provides direct rail service to the facility. Operating 24 hours a day, seven days a week, the facility utilizes four loading tracks, two storage tracks, one bypass track to fill six trains daily going out to the Midwest.
- **Hawkins Point Marine Terminal** - Leased to Alcoa's Eastalco Works, this terminal handles aluminum ore, cement, and liquid fertilizer.

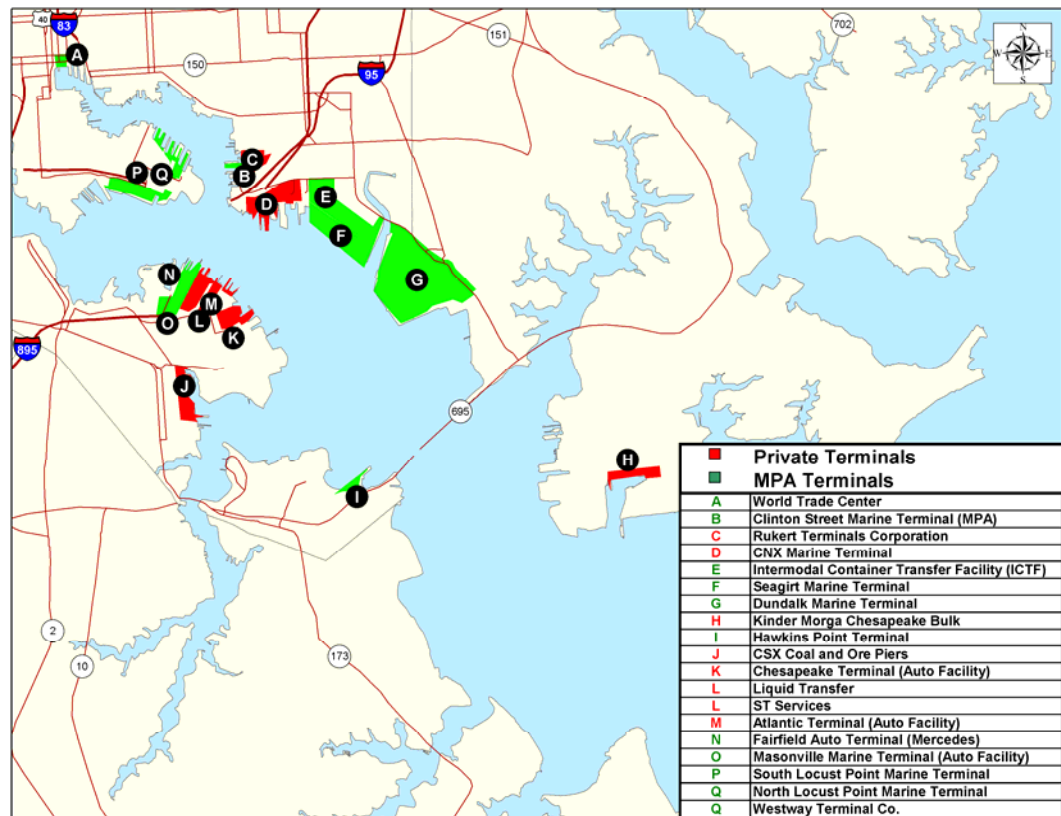
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<sup>14</sup> Maryland Port Administration, <http://www.marylandports.com/index.htm>.

- **North Locust Point Marine Terminal** - The 90-acre North Locust Point Marine Terminal handles paper, latex, steel, and molasses. The terminal has 10 finger piers, one container crane, and both covered and outside storage space. CSX provides on-dock rail access for steel, breakbulk, and other special cargo.
- **South Locust Point Marine Terminal** - This terminal doubles as a freight and passenger facility, accommodating both cruise and cargo ships. The 79-acre terminal primarily handles forest products. It has four general cargo berths, one revolving gantry crane, and inside and outside storage. CSX provides direct breakbulk and special cargo rail service to the terminal.

The private terminals operating at the Port of Baltimore handle more combined tonnage and account for more jobs than the Port’s public terminals. The private terminals provide diversity to attract different types of cargoes and increase the Port’s competitiveness.

Figure 4.15 Port of Baltimore Terminal Locations



Source: MPA and Cambridge Systematics, Inc.

The Port of Salisbury, located in Wicomico County at the headwaters of the Wicomico River, is Maryland’s second largest port. Located 30 miles from the Chesapeake Bay, a dredged 17-foot deep, 150-foot-wide channel allows barges to

transport grain, petroleum, and building aggregates. Other ports are highlighted in the summary tables below.

### Waterways and Marine Terminal Utilization

Maryland's ports and marine terminals handled over 54 million short tons<sup>15</sup> in 2006, ranking 18<sup>th</sup> in the nation in terms of total tonnage (Table 4.6). Based on the U.S. Army Corps of Engineers 2006 waterborne commerce statistics, Maryland ranked 13<sup>th</sup> for international waterborne trade, 23<sup>rd</sup> for domestic trade, and 22<sup>nd</sup> for intrastate trade.

**Table 4.6 Waterborne Commerce by State**  
*2006, in Thousands of Short Tons*

Rank	State	Grand Total <sup>a</sup>	Shipping		Receiving		Intrastate
			Domestic	Foreign	Domestic	Foreign	
1	Louisiana	489,935	106,486	98,460	115,607	121,465	47,916
2	Texas	488,357	39,348	78,023	27,052	285,614	58,320
3	California	237,954	6,352	47,362	21,652	146,987	15,602
4	New Jersey	134,666	27,508	11,297	23,777	67,218	4,867
5	Florida	128,737	8,962	17,103	51,461	49,712	1,499
6	Washington	121,233	14,682	41,999	25,394	28,280	10,877
7	Illinois	120,350	82,819	1,617	19,153	1,548	15,214
8	Ohio	117,000	18,928	14,002	58,823	10,278	14,970
9	Kentucky	108,661	57,658	0	33,021	0	17,982
10	Pennsylvania	105,011	18,560	1,096	32,518	37,544	15,293
18	Maryland	54,407	6,118	10,518	11,779	22,938	3,055

<sup>a</sup> Excludes duplication.

Source: U.S. Army Corps of Engineers, Waterborne Commerce of the United States, 2006.

Over three quarters of Maryland's domestic and international waterborne freight falls into one of three commodity groups: coal, petroleum products, and crude materials. Table 4.7 illustrates 2006 port activity and commodity data for the waterways in Maryland that transported over one million short tons during 2006. Crude materials, which include forest products, building aggregate, and ore, accounted for 34.5 percent of commodities transported through Maryland ports in 2006. Coal comprised 27.6 percent, followed by petroleum and petroleum products at 14.4 percent. In addition to these dominant commodities, Maryland's ports handle a variety of other commodity types, including primary manufactured goods, food and farm products, and manufactured equipment.

<sup>15</sup> One short ton equals 2,000 pounds.

**Table 4.7 Commodity Movements on Maryland's Waterways**  
*2006, Thousands of Short Tons*

Port/Waterway	Commodity	Total <sup>a</sup>	International	Domestic
Baltimore Harbor and Channels/Port of Baltimore	<b>Total</b>	<b>42,439</b>	<b>28,014</b>	<b>14,425</b>
	Coal	14,101	8,006	6,095
	Petroleum and Petroleum Products	6,302	1,459	4,843
	Chemicals and Related Products	1,509	933	576
	Crude Materials Except Fuel	10,270	9,311	959
	Primary Manufactured Goods	4,485	3,669	816
	Food and Farm Products	1,574	1,531	43
	Manufactured Equipment	3,842	2,750	1,092
	Waste and Scrap	2	-	2
Other	355	355	-	
Susquehanna River (above and below Havre de Grace)	<b>Total</b>	<b>3,166</b>	<b>-</b>	<b>3,166</b>
	Crude Materials Except Fuel	3,166	-	3,166
Wicomico River (Eastern Shore)/Port of Salisbury	<b>Total</b>	<b>1,823</b>	<b>-</b>	<b>1,823</b>
	Petroleum and Petroleum Products	979	-	979
	Chemicals and Related Products	37	-	37
	Crude Materials Except Fuel	759	-	759
	Food and Farm Products	50	-	50
Nanticoke River (including Northwest Fork)	<b>Total</b>	<b>1,246</b>	<b>-</b>	<b>1,246</b>
	Petroleum and Petroleum Products	11	-	11
	Crude Materials Except Fuel	1,081	-	1,081
Breton Bay	<b>Total</b>	<b>1,061</b>	<b>-</b>	<b>1,061</b>
	Crude Materials Except Fuel	1,061	-	1,061

<sup>a</sup> Numbers may not sum due to rounding.

Source: U.S. Army Corps of Engineers, Waterborne Commerce of the United State, 2006.

Of the 13 active port facilities in Maryland, the Port of Baltimore is the most active, handling over 83 percent of the State's waterborne trade.<sup>16</sup>

In 2006 with over 42 million tons handled, the Port of Baltimore ranked 18<sup>th</sup> among all U.S. ports for total trade measured by total tonnage (Table 4.8). Foreign imports and exports accounted for approximately two-thirds of this total, ranking Baltimore 14<sup>th</sup> among U.S. ports for total foreign trade. Handling

<sup>16</sup> U.S. Army Corps of Engineers, Waterborne Commerce of the United States, 2006.



over 14 million tons of domestic cargo, the Port of Baltimore ranked 22<sup>nd</sup> for domestic trade in 2006.

**Table 4.8 Port Rankings by Total Tonnage**  
*2006, Short Tons*

Rank	Port and State	Grand Total	Foreign	Domestic
1	South Louisiana, Louisiana	225,489,499	106,711,736	118,777,763
2	Houston, Texas	222,146,750	152,877,416	69,269,334
3	New York/New Jersey	157,630,099	91,351,981	66,278,118
4	Long Beach, California	84,393,795	71,559,140	12,834,655
5	Beaumont, Texas	79,485,704	57,316,078	22,169,626
6	Corpus Christi, Texas	77,557,478	53,757,643	23,799,835
7	Huntington – Tristate	77,157,809	0	77,157,809
8	New Orleans, Louisiana	76,901,327	38,830,890	38,070,437
9	Los Angeles, California	65,978,238	57,032,289	8,945,949
10	Mobile, Alabama	59,832,197	34,337,030	25,495,167
18	<b>Baltimore, Maryland</b>	<b>42,439,383</b>	<b>28,013,963</b>	<b>14,425,420</b>

Source: American Association of Port Authorities.

The Port of Baltimore ranked seventh among U.S. ports for total foreign trade in 2006, measured by cargo value. The Port also ranked tenth in the nation for exports and ninth for imports, together handling over \$35.6 billion of foreign waterborne trade. In terms of container traffic (measured in TEUs, or 20-foot equivalent units), the Port of Baltimore ranked 17<sup>th</sup> in the United States with over 600,000 TEUs.

## 4.5 AIR CARGO

Passenger airlines and dedicated cargo carriers transport high-value, time-sensitive goods ranging from medical devices to fresh flowers. Because size and weight in an aircraft is at a premium, air cargo is typically handled on pallets or in specialized containers called “unit load devices” that are shaped to fit different aircraft types. Carriers move air freight on dedicated all-cargo planes (like the fleets operated by UPS and FedEx) or in the cargo holds of passenger planes.

### Airport System Inventory

The Maryland Aviation Administration (MAA), a modal administration of the Maryland Department of Transportation (MDOT), owns and operates Baltimore/Washington International Thurgood Marshall (BWI Marshall) and Martin State Airport. The MAA also coordinates State aviation matters with the

owners and operators of the 34 other public-use airports in the State. (Figure 4.16) However, scheduled cargo service is only offered from three of these airports: BWI Marshall (BWI), Salisbury-Ocean City Wicomico Regional (SBY), and Greater Cumberland Regional (CBE). The runway characteristics of each of the State’s air cargo airports are summarized in Table 4.9.

**Table 4.9 Runway Characteristics of Maryland’s Air Cargo Airports**

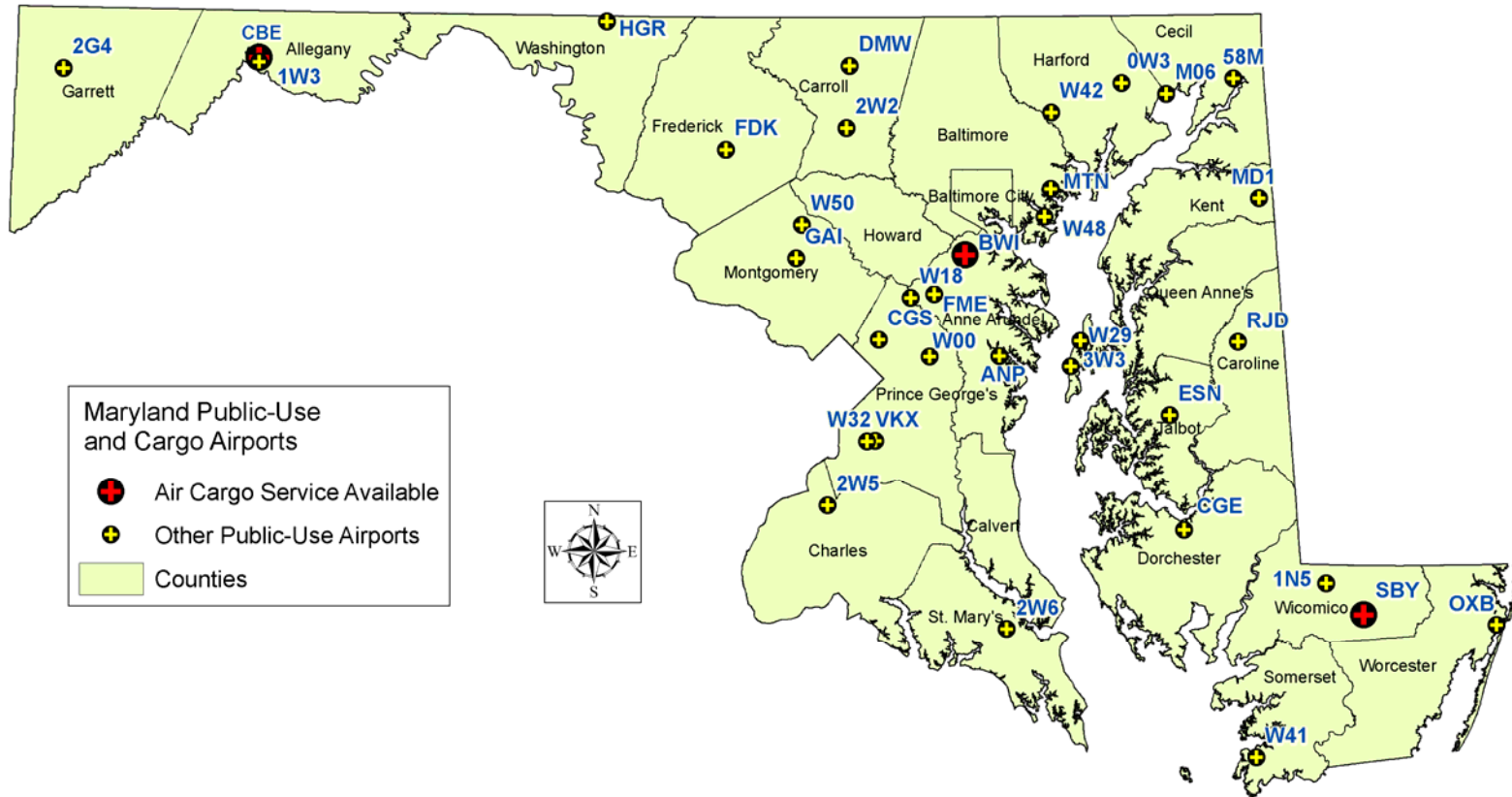
Airport	City	Longest Runway Length (Feet)	Number of Runways
Baltimore/Washington International Thurgood Marshall (BWI)	Baltimore	10,502	5
Salisbury-Ocean City Wicomico Regional (SBY)	Salisbury	5,550	2
Greater Cumberland Regional (CBE)	Cumberland	5,048	2

Source: MAA Office of Regional Aviation Assistance, Andrews Air Force Base.

With 30 air cargo carriers, including four all-cargo carriers (ABX Air Cargo/DHL, FedEx, Mountain Air/FedEx, and UPS) and several nonscheduled charters, BWI Marshall is Maryland’s largest and busiest air cargo airport.<sup>17</sup> The airport has 17 acres of total ramp/tarmac surface for cargo handling, over 414,000 square feet of warehouse space in 10 cargo buildings, and 24,000 square feet of cold storage space (Figure 4.17). The cargo facilities are easily accessible to nearby rail and truck terminals, Interstates, and the Port of Baltimore for multimodal transfers. Customs clearance time through the air cargo facility is typically two hours.

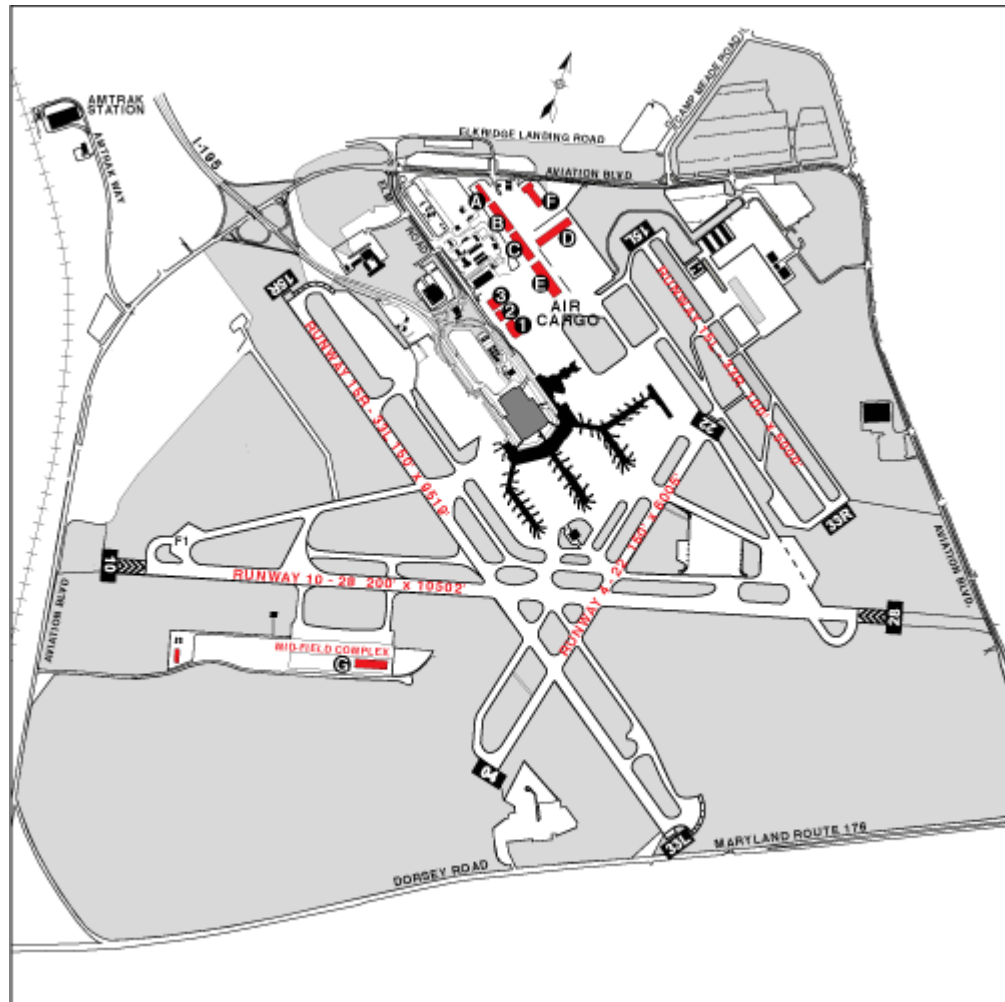
<sup>17</sup> Air Cargo World Online, 2009 Airports Directory, <<http://www.aircargoworld.com/directories/2009ad/md.htm>> Accessed February 9, 2009.

Figure 4.16 Maryland’s Public-Use Airports and Cargo Airports



Source: Maryland Aviation Administration, Office of Regional Aviation Assistance.

Figure 4.17 BWI Air Cargo Facilities



Notes: Area of cargo buildings (square feet): A – 14,000; B – 46,626; C – 43,312; D – 60,000; E – 64, 290; F – 56,257.

Source: Baltimore/Washington International Airport Cargo Directory.

### *Role of Out-of-State Airports*

The freight and passenger traffic flying through BWI Marshall is primarily domestic. As a result, most of the State’s international air cargo flies through airports outside of Maryland.

Many air cargo shippers, receivers, forwarders utilize major international gateways located within a one-day drive from Maryland, such as John F. Kennedy International (JFK) in New York City, Newark Liberty International, Washington Dulles International Airport and Philadelphia International. While air eligible commodities are generally time sensitive due to the physical or economic perishable nature of the goods, the major cargo gateways exert a very

strong “gravitational” pull largely due to the immense cargo capacity provided on wide-body<sup>18</sup> passenger flights. The belly cargo capacity on these flights is incrementally priced, often three to four times cheaper than main-deck freighter capacity, which is extremely attractive to the freight forwarding and logistics communities. The additional long truck haul required to transport the cargo to/from these cargo gateway airports is commonly accepted as part of the cost of doing business.

Increasingly, with fiercer competition for long-haul domestic and international flights, BWI has experienced reduced wide-body airline service capable of accommodating unit load devices and other significant cargo shipments. Price wars by long-haul airlines at other regional East Coast airports have encouraged additional leakage of air cargo from Maryland shippers away from BWI to John F. Kennedy International Airport in New York City and to Dulles International Airport in Northern Virginia.

### Air Cargo Operations

Table 4.10 summarizes the total weight of freight and mail enplaned at Maryland’s three airports with scheduled cargo service in 2007. BWI Marshall clearly dominates the other airports for air cargo tonnage, with more than 255 million pounds in 2007. The Salisbury airport came in a distant second with just over two million pounds followed by Greater Cumberland Regional with just under 600 thousand pounds.

**Table 4.10 Domestic and International Air Cargo Activity**  
*2007*

Airport	City	Pounds		
		Enplaned Freight	Enplaned Mail	Total Air Cargo
Baltimore/Washington International Thurgood Marshall (BWI)	Baltimore	243,364,864	12,098,206	255,463,070
Salisbury-Ocean City Wicomico Regional (SBY)	Salisbury	2,047,516	1,513	2,049,029
Greater Cumberland Regional (CBE)	Cumberland	597,380	0	597,380

Source: Bureau of Transportation Statistics, T-100 Market (All Carriers) Data.

The Federal Aviation Administration (FAA) classifies BWI Marshall as an all-cargo airport, meaning that, in addition to any other air transportation services are available, it is served by aircraft carrying only cargo with a total annual landed weight of more than 100 million pounds. The primary commodities shipped from BWI Marshall include machine parts, electrical machinery,

<sup>18</sup> Typically two-aisle aircraft such as Boeing 767 or Airbus A-330 or larger, providing larger cargo holds.

aircraft/spacecraft components, seafood, chemicals, and pharmaceutical/biological products.<sup>19</sup> BWI Marshall is the only airport in Maryland to receive FAA's all-cargo designation. As shown in Table 4.11, BWI Marshall ranked 50<sup>th</sup> among the nation's all-cargo airports, with more than 520 million pounds of landed weight in 2007. This represents a decline of over two percent from 2006 levels. Neighboring airport, Washington Dulles International, ranked 43<sup>rd</sup> in the nation, landing almost 580 million pounds of landed weight in 2007.<sup>20</sup>

**Table 4.11 All-Cargo Airport Rankings**  
*2007, Millions of Pounds*

Rank	Airport Name, City	Landed Weight		Percent Change
		2007	2006	
1	Ted Stevens Anchorage International	21,124	21,175	-0.24
2	Memphis International	19,544	18,849	3.68
3	Louisville International – Standiford Field	10,431	10,030	4.01
4	Miami International	7,430	7,181	3.46
5	Los Angeles International	6,861	7,253	-5.41
6	Indianapolis International	5,305	5,253	0.98
7	John F. Kennedy International, New York	5,114	5,231	-2.23
8	Chicago O'Hare International	4,401	4,416	-0.33
9	Newark Liberty International	3,747	3,734	0.35
10	Metropolitan Oakland International	3,623	3,596	0.75
50	Baltimore/Washington International Thurgood Marshall	522	533	-2.10

Source: FAA Passenger and All Cargo Data for CY 2007.

Numerous air carriers, both domestic and international, provide air cargo service in Maryland. Among these are combination carriers that transport both cargo and passengers in the same aircraft; integrated carriers (such as FedEx and UPS) that provide door-to-door service by managing a fleet of aircraft, ground delivery trucks, and freight sorting and processing terminals; and traditional/line-haul freight carriers that provide airport-to-airport service only. Table 4.12 lists the top 10 air carriers operating at BWI Marshall and Table 4.13 identifies the air cargo carriers serving Maryland's regional airports. Two integrated carriers, Federal Express Corporation (FedEx) and United Parcel

<sup>19</sup> Maryland Aviation Administration, BWI Marshall Facts and Figures, <[http://www.bwiairport.com/about\\_bwi/facts\\_figures/](http://www.bwiairport.com/about_bwi/facts_figures/)>, Accessed February 10, 2009.

<sup>20</sup> Federal Aviation Administration, Passenger and All Cargo Data for CY 2007.

Service (UPS), transported the highest volume of air cargo in 2007. While UPS serves only BWI Marshall, FedEx also serves Salisbury Regional and Greater Cumberland Regional in addition to BWI Marshall. Southwest Airlines was the largest combination air carrier for air cargo at BWI Marshall. Two line-haul freight carriers, Astar Air Cargo and Kitty Hawk, also ranked among the top five air cargo carriers at BWI Marshall. However, Kitty Hawk has since gone out of business and ABX Air has replaced Astar Air Cargo operating for DHL.

**Table 4.12 Top 15 Air Cargo Carriers Serving BWI**  
*2007*

Rank	Air Carrier	Pounds			Carrier Category
		Origin Air Cargo	Destination Air Cargo	Total Air Cargo	
1	Federal Express Corporation	53,490,760	65,144,120	118,634,880	Integrated
2	United Parcel Service	25,967,522	32,559,322	58,526,844	Integrated
3	Southwest Airlines Co.	15,930,806	17,497,580	33,428,386	Combination
4	Astar Air Cargo Inc.	4,511,042	6,027,983	10,539,025	Line-Haul
5	Kitty Hawk Aircargo	4,377,497	4,632,424	9,009,921	Line-Haul
6	American Airlines Inc.	4,134,062	1,466,859	5,600,921	Combination
7	British Airways Plc	1,690,411	3,099,610	4,790,021	Combination
8	United Air Lines Inc.	881,984	1,775,206	2,657,190	Combination
9	Delta Air Lines Inc.	1,096,344	1,374,075	2,470,419	Combination
10	Continental Air Lines Inc.	976,449	1,233,830	2,210,279	Combination

Source: Bureau of Transportation Statistics, T-100 Market (All Carriers) Data

**Table 4.13 Air Cargo Carriers Serving Maryland's Regional Airports**  
*2007*

Airport	Air Carrier	Pounds			Carrier Category
		Origin Air Cargo	Destination Air Cargo	Total Air Cargo	
Salisbury-Ocean City Wicomico Regional	Total	1,102,813	946,216	2,049,029	
	FedEx	1,057,260	903,260	1,960,520	Integrated
	Piedmont Airlines	45,553	42,956	88,509	Combination
Greater Cumberland Regional	Total	335,880	261,500	597,380	
	FedEx	335,880	261,500	597,380	Integrated

Source: Bureau of Transportation Statistics, T-100 Market (All Carriers) Data.

As previously described, BWI Marshall primarily serves domestic markets some nonstop international service. BWI Marshall's international flights currently serve the United Kingdom, Canada, Mexico and several islands in the Caribbean.

As a result, less than three percent of BWI Marshall's total air cargo is classified as international. While approximately one-third of the cargo that leaves through BWI Marshall is destined to leave the country, it does so through Philadelphia International, JFK, Dulles, Newark or other international gateways.



## 5.0 Maryland Freight Demand

About 692 million tons of freight was transported into, out of, within, and through Maryland in 2006, accounting for approximately \$2.3 trillion in combined value.<sup>21</sup> By 2035, the overall tonnage is estimated to more than double, comprising about 1.4 billion total tons and \$5.0 trillion of value (an increase of 118 percent over the 2006 value). Tables 5.1 and 5.2 show 2006 and 2035 tonnage by mode, while Tables 5.3 and 5.4 report value.

**Table 5.1 Summary of Statewide Freight Flows by Weight  
2006**

Flow Type	Tons				
	Total	Truck	Rail	Water	Air
Inbound	138,635,597	106,409,842	22,222,466	9,917,661	85,628
Outbound	105,749,758	91,826,819	6,818,081	7,034,312	70,546
Intrastate	64,331,867	57,811,129	2,353,711	4,166,191	836
Through	383,591,149	328,243,703	37,661,974	17,685,471	-
<b>Total</b>	<b>692,308,371</b>	<b>584,291,493</b>	<b>69,056,232</b>	<b>38,803,636</b>	<b>157,010</b>

**Table 5.2 Summary of Statewide Freight Flows by Weight  
2035**

Flow Type	Tons				
	Total	Truck	Rail	Water	Air
Inbound	292,333,322	233,103,214	43,708,369	15,291,171	230,567
Outbound	235,171,285	197,538,445	15,739,792	21,681,626	211,422
Intrastate	151,202,333	137,062,856	4,974,477	9,162,952	2,048
Through	743,198,399	647,471,591	67,707,461	28,019,346	-
<b>Total</b>	<b>1,421,905,338</b>	<b>1,215,176,106</b>	<b>132,130,100</b>	<b>74,155,094</b>	<b>444,037</b>

<sup>21</sup> The 2003 TRANSEARCH® Insight database did not have a “value” table associated with it. Cambridge Systematics developed a value table derived from FAF2 data. This is different than the value table used in the Draft Report published in 2007.

**Table 5.3 Summary of Statewide Freight Flows by Value (in Millions)**  
2006

Flow Type	Millions Dollars				
	Total Value	Truck Value	Rail	Water	Air
Inbound	362,334	299,265	37,791	24,901	378
Outbound	353,352	287,019	32,702	33,271	361
Intrastate	142,312	129,716	4,865	7,727	4
Through	1,430,555	1,256,507	112,505	61,442	-
<b>Total</b>	<b>2,288,454</b>	<b>1,972,507</b>	<b>187,683</b>	<b>127,341</b>	<b>743</b>

**Table 5.4 Summary of Statewide Freight Flows by Value (in Millions)**  
2035

Flow Type	Total Value (\$ Millions)	Truck	Rail	Water	Air
Inbound	790,497	677,488	71,208	40,261	1,540
Outbound	935,677	755,662	71,402	106,993	1,619
Intrastate	346,582	310,780	14,074	21,718	9
Through	2,909,078	2,604,168	188,204	116,706	-
<b>Total</b>	<b>4,981,834</b>	<b>4,348,099</b>	<b>344,889</b>	<b>285,678</b>	<b>3,168</b>

Source for Tables 5.1, 5.2, 5.3, and 5.4: 2003 TRANSEARCH® Insight, forecast update to 2006 by Cambridge Systematics, Inc.

## 5.1 DIRECTION AND MODE SHARE

- **Inbound** freight is moved from other states or countries to Maryland. In 2006, inbound freight accounted for 20 percent, or 139 million tons, by weight and 16 percent, or \$362 billion, by value. In 2035, inbound movements account for 21 percent, or 292 million tons, by weight and 16 percent, or \$790 billion, by value.
- **Outbound** freight is moved from Maryland to other states, or other countries. In 2006, outbound movements accounted for 15 percent, or 106 million tons, by weight, and 15 percent, or \$353 billion, by value. In 2035, outbound movements account for 17 percent, or 235 million tons, by weight and 19 percent, or \$936 billion, by value.
- **Intrastate** freight is moved from one point in Maryland to another point in Maryland. This tonnage is counted only once, rather than counting it at both its origin jurisdiction (as an outbound move) and its destination jurisdiction

(as an inbound move). In 2006, these accounted for 9 percent, or 64 million tons, by weight and 6 percent, or \$142 billion, by value. In 2035, intrastate movements account for 11 percent, or 151 million tons, by weight, and 7 percent, or \$347 billion, by value.

- **Through** freight is moved from one point outside of Maryland to another point outside of Maryland via transportation infrastructure within the State. In 2006, these accounted for 56 percent, or 384 million tons, by weight and 63 percent, or \$1.4 trillion, by value. In 2035, inbound movements reflect 51 percent, or 743 million tons, by weight and 58 percent, or \$2.9 trillion, by value.

Figures 5.1 and 5.2 show the mode split and directionality of freight in Maryland by weight for 2006 and 2035 while figures 5.3 and 5.4 show the same by value.

Figure 5.1 Maryland Mode and Direction  
2006 Tons

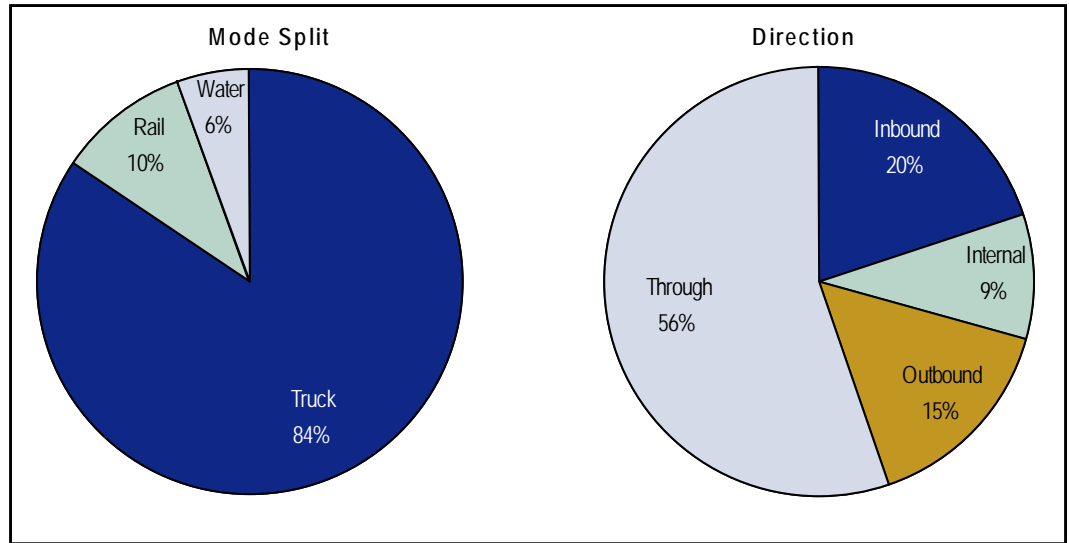
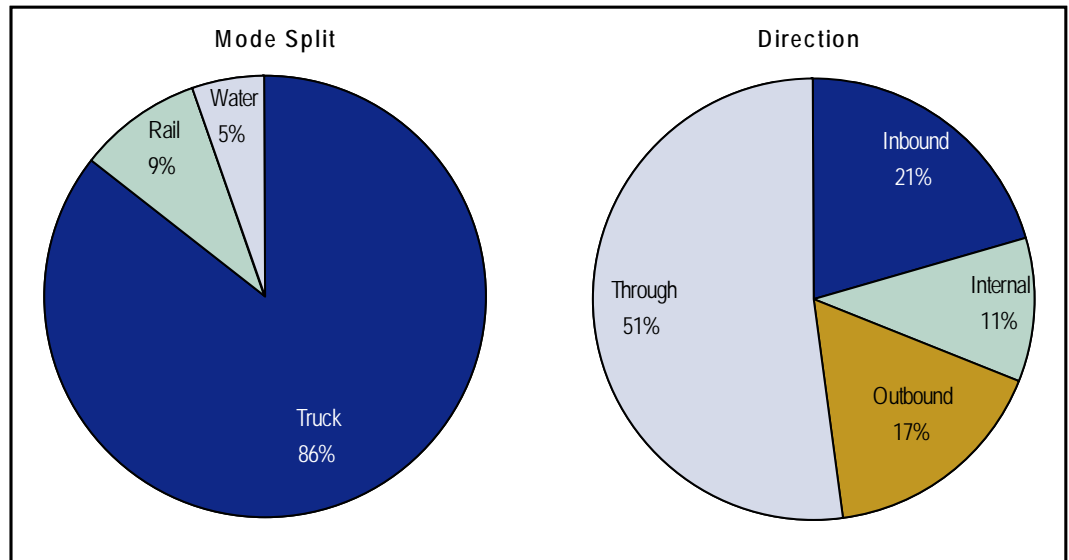
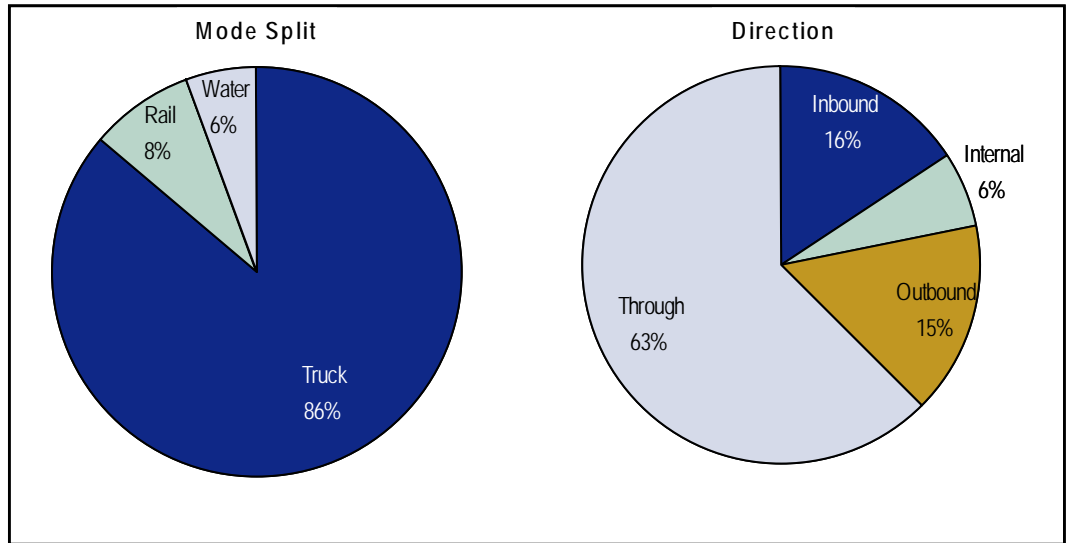


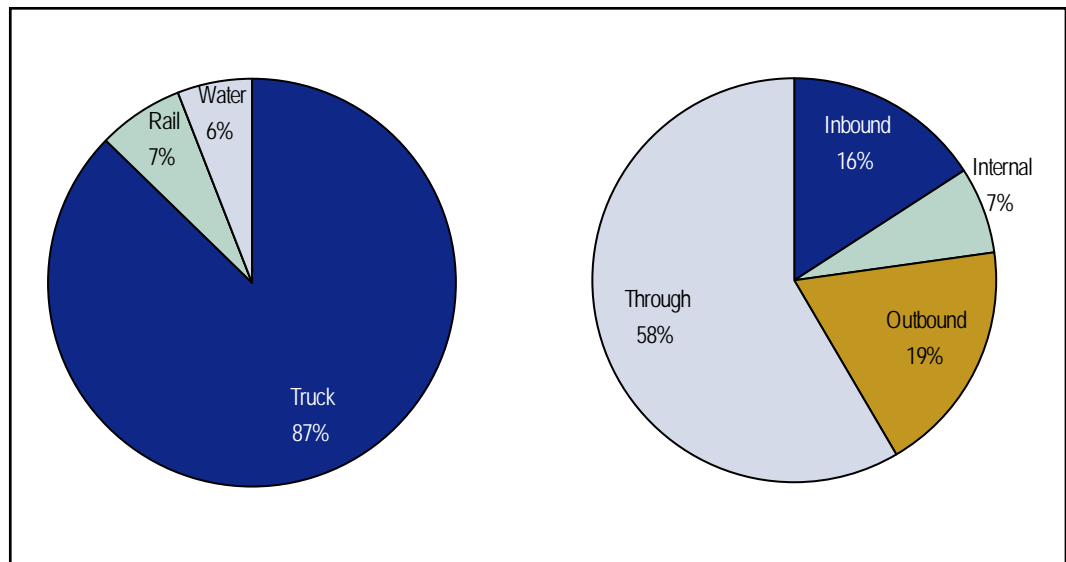
Figure 5.2 Maryland Mode and Direction  
2035 Tons



**Figure 5.3 Maryland Mode and Direction**  
*2006 Value*



**Figure 5.4 Maryland Mode and Direction**  
*2035 Value*

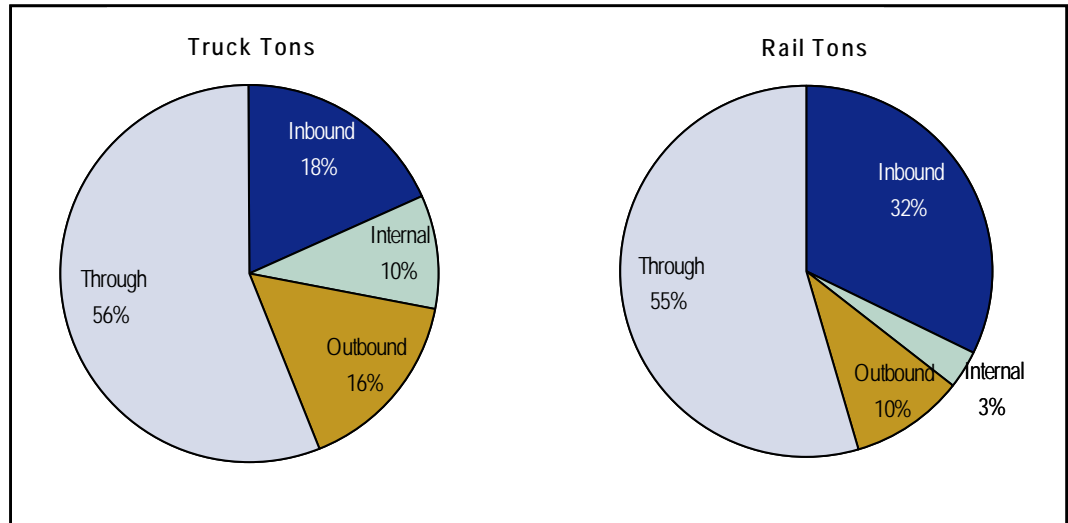


Source for Figures 5.1, 5.2, 5.3, and 5.4: 2003 TRANSEARCH® Insight, forecast update to 2006 by Cambridge Systematics, Inc.

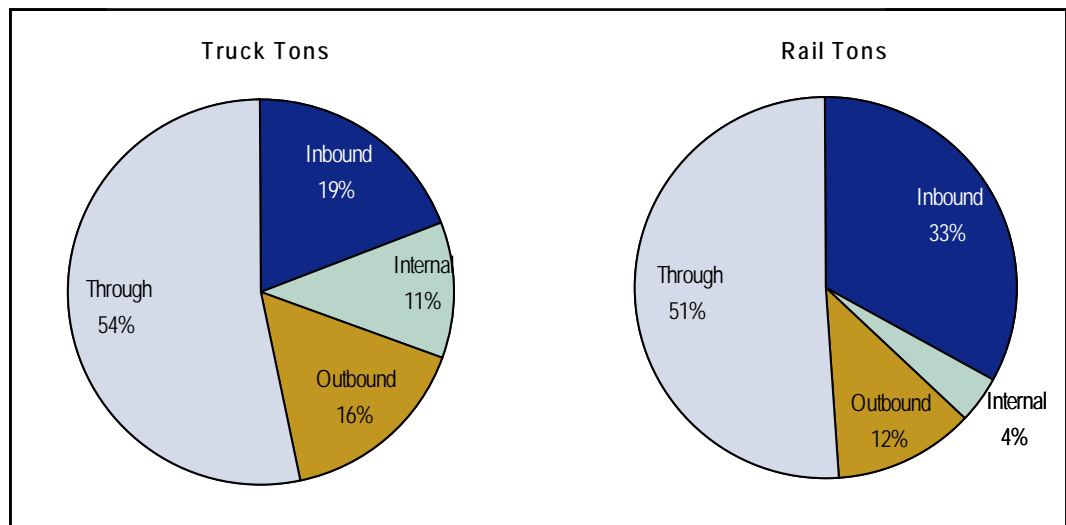
- Trucks carried the most freight by weight and value in 2006 (84 percent and 86 percent, respectively) and their share is projected to increase slightly by 2035 (to 86 percent of weight and 87 percent of value).
- The rail and water modes haul the remaining tonnage and are projected to capture a slightly smaller share of freight moves by 2035.
- Air freight accounts for less than one percent of freight moves in Maryland and is not shown in the charts.

Figures 5.5 and 5.6 display truck and rail direction for 2006 and 2035.

**Figure 5.5 Maryland Truck and Rail Direction**  
2006 Tons



**Figure 5.6 Maryland Truck and Rail Direction**  
2035 Tons



Source for Figures 5.5 and 5.6: 2003 TRANSEARCH® Insight, forecast update to 2006 by Cambridge Systematics, Inc.

- The majority of freight hauled by truck and rail is going through Maryland; however, that proportion is projected to decline slightly by 2035.
- Rail hauls proportionally more inbound and less outbound and intrastate freight than trucks.

The commodity flow data demonstrate that Maryland is a “through” state. More than half of its tonnage in 2006 and in 2035 consists of through movements. In the base and future years, about one-fifth of tonnage is attributable to inbound movements, and a slightly smaller share (about 15 percent and 17 percent in 2006 and 2035, respectively) reflects outbound movements. The smallest share – 9 percent in 2006, and 11 percent in 2030 – constitutes intrastate moves. Maryland’s size and geography contribute to these distributions. As a geographically small State, the proportion of trips originating and terminating within the State also is small. Two major north-south freight corridors (I-81 and I-95) cross Maryland and contribute to the high proportion of through freight reflected in the numbers.

## 5.2 MARYLAND COMMODITIES

The two primary measures of freight activity are tonnage and value. Value is a good indicator of economic activity associated with freight, while tonnage is a good indicator of the demand that freight places on the transportation infrastructure.

Considering tonnage first, as shown in Table 5.5:

- Four commodity groups are responsible for more than 50 percent of Maryland’s inbound, outbound, and intrastate tonnage – nonmetallic minerals (rock, sand, soil, etc.), secondary traffic (which is mixed freight typically moving to and from warehouse and distribution facilities), clay/concrete/glass/stone, and food products. Other important commodity groups include petroleum, coal, chemicals, primary metal products, waste and scrap materials, and lumber/wood products.

Next, considering value, as shown in Table 5.6:

- Five commodity groups – clay/concrete/glass/stone, primary metal products, transportation equipment, lumber/wood products, and chemicals – account for more than 50 percent of the value of Maryland’s inbound, outbound, and intrastate moves. Other important commodity groups include petroleum, nonmetallic minerals, pulp/paper, and machinery.

The numbers in Tables 5.5 and 5.6 reflect “trip chaining.” For example, if 10 tons of equipment worth \$50 thousand starts in White Marsh, is moved by truck to the Bayview Yard, then by rail to Chicago, it shows up as 20 tons and \$100 thousand in the data. This is in the nature of all available freight data, and there is no good way to correct for it without introducing other distortions.

Even so, the data are useful for descriptive purposes, as long as it is recognized that some “double counting” occurs for commodities that: 1) are imported and exported, because the international legs and the domestic legs are counted separately; and/or 2) are transferred among different transportation modes, because the truck and rail and water and air legs are counted separately.



**Table 5.5 Maryland's Top Commodities by Weight, 2006**  
(Inbound, Outbound, and Intrastate Moves)

STCC2	Commodity Description	Total Tons	Share
14	Nonmetallic Minerals	71,967,391	23.3%
50	Secondary Traffic	41,225,464	13.4%
32	Clay, Concrete, Glass or Stone	33,406,521	10.8%
20	Food or Kindred Products	26,671,452	8.6%
29	Petroleum or Coal Products	22,369,295	7.2%
11	Coal	20,838,717	6.8%
28	Chemicals or Allied Products	16,649,587	5.4%
33	Primary Metal Products	12,661,026	4.1%
40	Waste or Scrap Materials	9,769,211	3.2%
24	Lumber or Wood Products	9,659,504	3.1%
	Remaining Commodities	43,499,055	14.1%
	<b>Total</b>	<b>308,717,222</b>	<b>100.0%</b>

Source: 2003 TRANSEARCH® Insight, forecast update to 2006 by Cambridge Systematics, Inc.

**Table 5.6 Maryland's Top Commodities by Value (Millions of Dollars), 2006**  
(Inbound, Outbound, and Intrastate Moves)

STCC2	Commodity Description	Total	Share
32	Clay, Concrete, Glass or Stone	\$ 108,760	12.7%
33	Primary Metal Products	104,737	12.2%
37	Transportation Equipment	79,656	9.3%
24	Lumber or Wood Products	74,181	8.6%
28	Chemicals or Allied Products	74,000	8.6%
29	Petroleum or Coal Products	64,824	7.6%
40	Waste or Scrap Materials	57,471	6.7%
14	Nonmetallic Minerals	46,127	5.4%
26	Pulp, Paper or Allied Products	43,087	5.0%
35	Machinery	40,818	4.8%
	Remaining Commodities	164,337	19.2%
	<b>Total</b>	<b>\$ 857,999</b>	<b>100.0%</b>

Source: 2003 TRANSEARCH® Insight, forecast update to 2006 by Cambridge Systematics, Inc.

## **Intermodal Traffic**

Intermodal traffic is an increasingly important component of goods movement in Maryland and in the United States in general. All modes and shippers continue to experience productivity gains as they shift towards more fully intermodal operations through the use of international and domestic shipping containers capable of rapid transfer between modes. While the TRANSEARCH data for this analysis do not specifically call out intermodal moves, these shipments are embedded within the category containing STCC 50 "Secondary Traffic" which is mixed freight typically moving to and from warehouse and distribution facilities). An examination of the TRANSEARCH data for the period of 2006 to 2035 shows that Secondary Traffic (containing intermodal) will experience the highest tonnage growth of any commodity class in the State, with volumes expected to grow by more than two and a half times over current volume (267 percent) through 2035.

To prepare for this rapid increase, the State should work closely with major shippers and carriers to identify projects to accommodate the movement and transfer of intermodal containers in a way that meets State goals for moderating VMT growth. These projects may include increased or new terminal or line capacity for containers, especially to accommodate doublestack rail movement.

## 6.0 Trends and Issues

A number of trends will affect the demand for goods movement and the performance of the freight transportation system. These broad trends and issues range from population growth to energy use and climate change.

### 6.1 STATEWIDE ECONOMIC CONDITIONS AND TRENDS

#### Socioeconomic and Population Characteristics

Freight demand in Maryland is driven not only by industry growth or decline, but also by population growth, population distribution patterns, and income changes in the State. The following sections summarize the socioeconomic and population data and trends in Maryland and describe how these patterns might influence freight demand in the State.

#### *Population Trends*

Maryland's population is characterized by steady growth and high density. Between 1980 and 2005, Maryland's population grew by 32 percent to 5.6 million, representing approximately 1.9 percent of the U.S. population. Between 2005 and 2030, the Maryland Department of Planning projects that the State's population will increase by an additional 20 percent to 6.7 million.<sup>22</sup> Overall, Maryland's population growth rate has been consistent with the national average, and this trend is expected to continue into the future.

While Maryland is currently the 19<sup>th</sup> most populated State in the country, only four other states and the District of Columbia have higher population densities.<sup>23</sup> Maryland's average population density of 575 people per square mile far exceeds the national average (85 people per square mile). This population density brings both opportunities and challenges to the State's freight transportation system. For example, density can make distribution more efficient with shorter trip distances, but congestion—resulting from high population density—can make delivery more difficult.

Like many states, there are stark differences in population patterns between Maryland's rural and urban areas, as shown in Figure 6.1. The Baltimore Region, the most populated of Maryland's six regions, includes three of the State's five most populated counties and has an average population density of 1,163 people

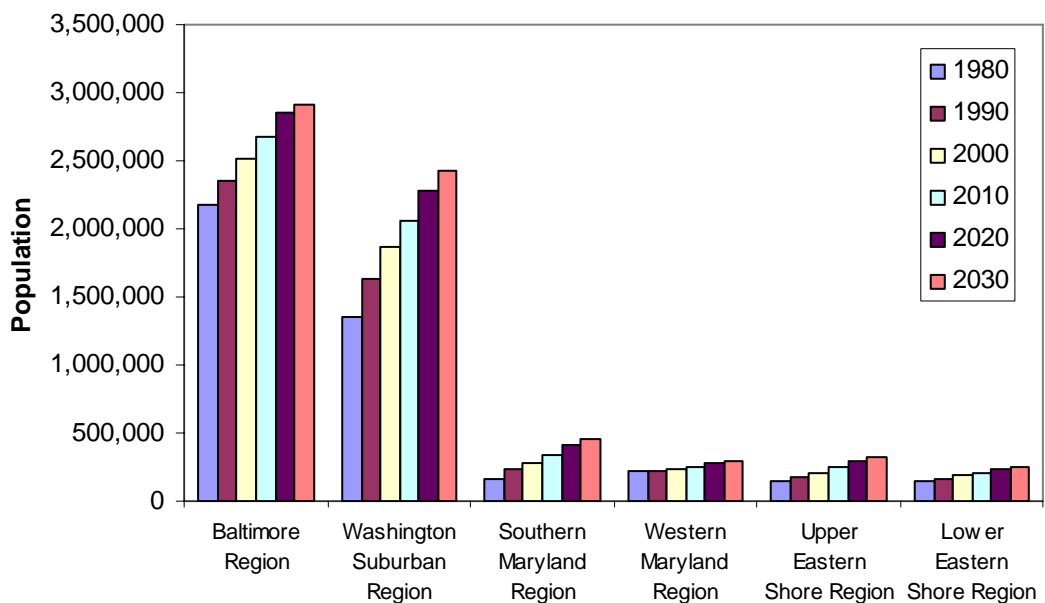
<sup>22</sup>Maryland Department of Planning, Planning Data Services, December 2008.

<sup>23</sup>U.S. Census Bureau, *Statistical Abstract of the United States: 2009*.

per square mile.<sup>24</sup> In 2005, the populations of the six counties in the Baltimore Region totaled 2.6 million, accounting for almost 47 percent of the State total. The region’s population is expected to grow to 2.9 million by 2030.

While the Washington Suburban Region had the second highest population (nearly 2.0 million), accounting for almost 36 percent of the State total in 2005, it had the highest population density among the State’s regions at 1,210 people per square mile.<sup>25</sup> The region grew by over 46 percent between 1980 and 2005, adding over 630,000 people. The Washington Suburban Region is expected to grow to 2.4 million by 2030.

**Figure 6.1 Population Trends by Region**



Source: Maryland Department of Planning, Planning Data Services, December 2008.

The remaining 17 percent of the Maryland population is distributed among the State’s four other regions: Southern Maryland, Western Maryland, Upper Eastern Shore, and Lower Eastern Shore.<sup>26</sup> Among these, the Southern Maryland

<sup>24</sup>The Baltimore Region includes Anne Arundel, Baltimore, Carroll, Harford, and Howard Counties and Baltimore City.

<sup>25</sup>The Washington Suburban Region includes Frederick, Montgomery, and Prince George’s Counties.

<sup>26</sup>The Southern Maryland Region includes Calvert, Charles, and St. Mary’s Counties. The Western Maryland Region includes Allegany, Garrett and Washington Counties. The Upper Eastern Shore Region includes Caroline, Cecil, Kent, Queen Anne’s, and Talbot Counties. The Lower Eastern Shore Region includes Dorchester, Somerset, Wicomico, and Worcester Counties.

Region has the largest and most dense population with 319,500 residents and 308 people per square mile in 2005. Growing by 91 percent between 1980 and 2005, Southern Maryland was the fastest growing region in the State. While the populations of Western Maryland, the Upper Eastern Shore, and the Lower Eastern Shore are small relative to the rest of the State's population, the population densities of all three regions exceed the national average and all regions are expected to grow through 2030. This growth is creating new patterns of demand for freight transportation services.

### *Per Capita Income Trends*

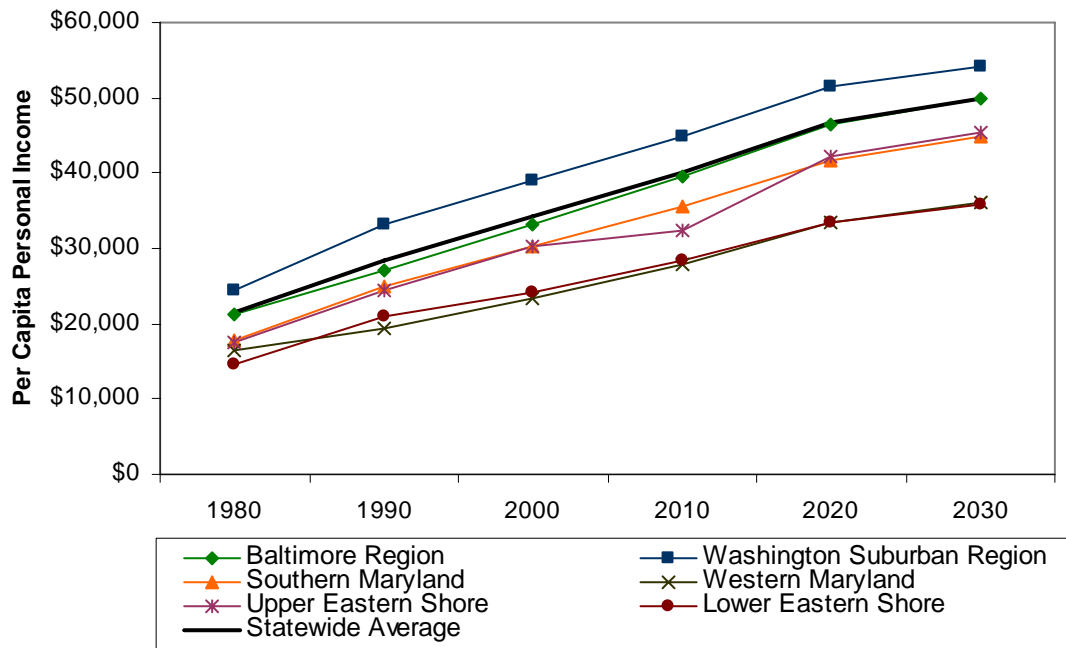
As a measure of average wealth per person, per capita income reflects the relative economic well-being of the people in a region. This can translate to higher levels of health and education as well as more substantial government revenues available for infrastructure investments and other priorities. It is, therefore, a barometer of demand for goods and services, which in turn affects demand for freight transportation.

As shown in Figure 6.2, per capita income has increased steadily in Maryland since 1980. At present, the State's per capita income ranks sixth in the nation at \$46,646.<sup>27</sup> The State's economic diversity and consumer affluence generates high demand for goods and services.

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<sup>27</sup>U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Accounts.

Figure 6.2 Maryland per Capita Income by Region  
Constant 2000 Dollars



Source: Projections by the Maryland Department of Planning, Planning Data Services, February 2009. Historical data, 1970-2005, from the U.S. Bureau of Economic Analysis.

In addition to having the highest population and population density, the Baltimore and Washington Suburban Regions have the highest per capita incomes in the State. As shown in Figure 6.2, the per capita incomes in both regions have consistently exceeded or been approximately equal to the statewide average since 1980. While the Washington Suburban Region had the highest annual per capita income (\$42,150) in 2005, per capita income in the Eastern Upper Shore Region had the largest percent increase since 1980, growing by 85 percent to \$32,545 by 2005. Per capita income in the primarily rural regions (Southern Maryland, Western Maryland, Lower Eastern Shore, and Upper Eastern Shore) have been consistently lower than the State average. Reaching \$25,305 in 2005, the Western Maryland Region maintained the lowest per capita income and slowest growth among the regions between 1980 and 2005. However, while the Maryland Department of Planning forecasts steady per capita income growth through 2030 for all of the State’s regions, Western Maryland is forecasted to have the highest percent growth over the next 25 years at nearly 43 percent.<sup>28</sup>

<sup>28</sup>Maryland Department of Planning, Planning Data Services, February 2009.

## Industry Characteristics

Changes in the industrial composition of the State’s economy affect the demand for freight transportation. Freight transportation is often described as a “derived demand”, because the level of demand (and the modes that are used) is driven by the characteristics of the economy. As a result, a state’s goods movement system often reflects the industries and businesses that make up its economy. Industries and businesses can be divided into two groups according to their dependence on freight transportation services:

- **Goods Dependent Industries** are businesses that rely on transportation to receive raw supplies and manufactured goods and to send their refined/finished product to market. As shown in Table 6.1, this group includes industries such as natural resources and mining, agriculture, retail and wholesale trade, manufacturing, construction, and the transportation and warehousing sectors.
- **Service Industries** are not as dependent on movement of raw or manufactured materials, but do rely on shipments of materials, office products, or other small shipments of goods and supplies. This category includes industries such as government, education, health care, and other professional categories, as shown in Table 6.1.

**Table 6.1 Goods Dependent and Service Industry Summary**

Goods Dependent Industries	Service Industries
Agriculture, forestry, fishing, and hunting	Information
Mining (including oil and gas extraction)	Finance and insurance
Utilities	Real estate and rental and leasing
Construction	Professional and technical services
Manufacturing (durable and nondurable goods)	Management of companies and enterprises
Wholesale trade	Administrative and waste services
Retail Trade	Educational services
Transportation and warehousing (excludes postal service)	Health care and social assistance
	Arts, entertainment, and recreation
	Accommodation and food services
	Other services, except government
	Government (Federal civilian, Federal military, state, and local)

Note: The “other services” industry category comprises establishments that provide services not otherwise categorized in the service classification system. These activities primarily include equipment and machinery repair, dry cleaning and laundry services, personal care services, death care services, advocacy, and promoting or administering religious activities.

Within these industry categories, industry growth and decline can be measured by two different indicators:

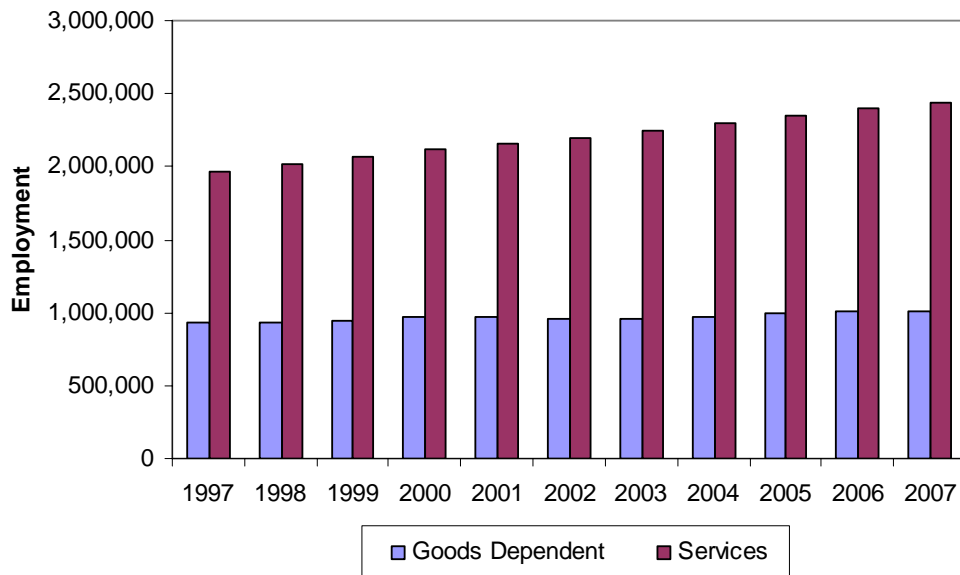
1. Growth or decline in industry employment and
2. Growth or decline in the industry contribution to Gross State Product (GSP).

Employment growth or decline is generally proportional to economic growth or decline in that, as an industry expands or contracts, it needs to either employ additional people to accommodate the growth, or shed jobs to try and make up for economic losses from business contraction. However, using employment figures alone to track industry trends can be deceiving, as it can mask important trends such as productivity or efficiency improvements. Evaluating the economic output trends of each industry in terms of its contribution to the State’s GSP makes up for this deficiency by capturing additional output realized from productivity improvements. The following sections evaluate industry trends in Maryland by considering both indicators.

### *Statewide Employment Patterns*

Total employment in Maryland grew by nearly 19 percent between 1997 and 2007 to 3.4 million, representing an expansion of over half a million jobs. Service industries comprised nearly 71 percent of this total employment. While service industry employment increased by 24 percent over the last 10 years, employment growth among the goods dependent industries was more modest at eight percent during the same period. As shown in Figure 6.3, service industry growth has outpaced employment gains in goods dependent industries over the last 10 years, resulting in a continued shift toward a service-based economy.

**Figure 6.3 Statewide Goods Dependent versus Service Industry Employment Trends**  
*1997 to 2007*



Source: U.S. Department of Commerce, Bureau of Economic Analysis, Table CA-25N, February 2009.



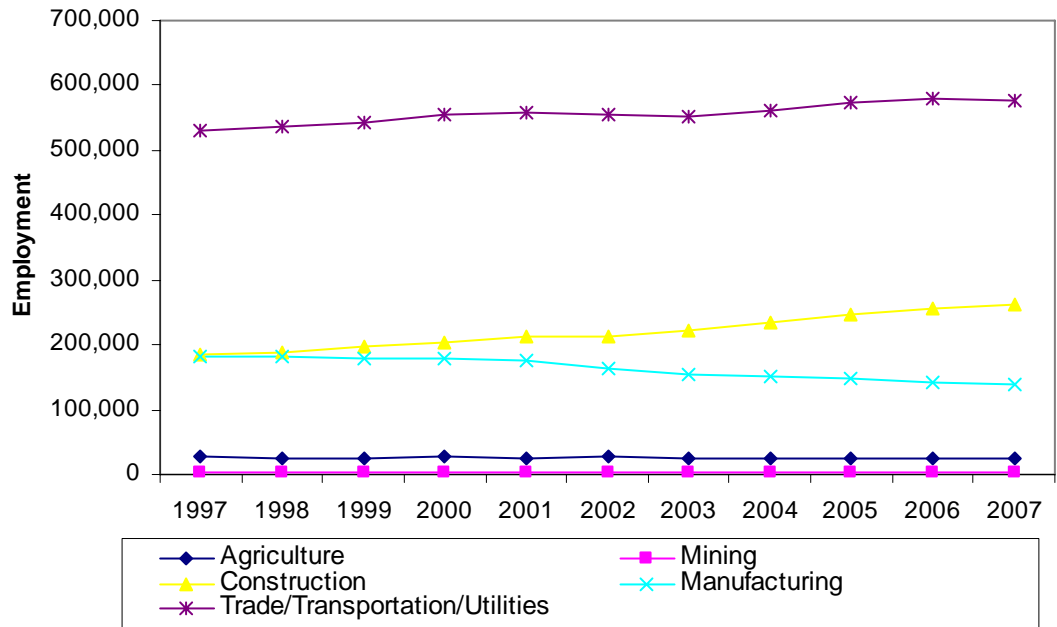
### **Goods Dependent Industry Employment Trends**

As shown in Figure 6.4, trade, transportation, and utilities have the highest employment among the goods dependent industries. Combined, these industries, which include wholesale and retail trade, all modes of transportation, warehousing, and utilities, accounted for over 575,000 jobs or 57 percent of the total goods dependent industry employment in 2007. Employment in the wholesale trade, transportation, and warehousing industries is primarily clustered along I-95, with the heaviest concentration located between I-95 and the Chesapeake Bay near Baltimore (Figure 6.5). Heavily dependent upon the State's freight transportation network to transport goods to market, these industries are strategically located near the State's primary multimodal freight facilities.

Following trade, transportation, and utilities industries, the construction industry was the second largest goods dependent employer and the fastest growing industry between 1997 and 2007. By 2007, the construction industry accounted for 7.6 percent of the State's total employment with over 260,000 jobs.

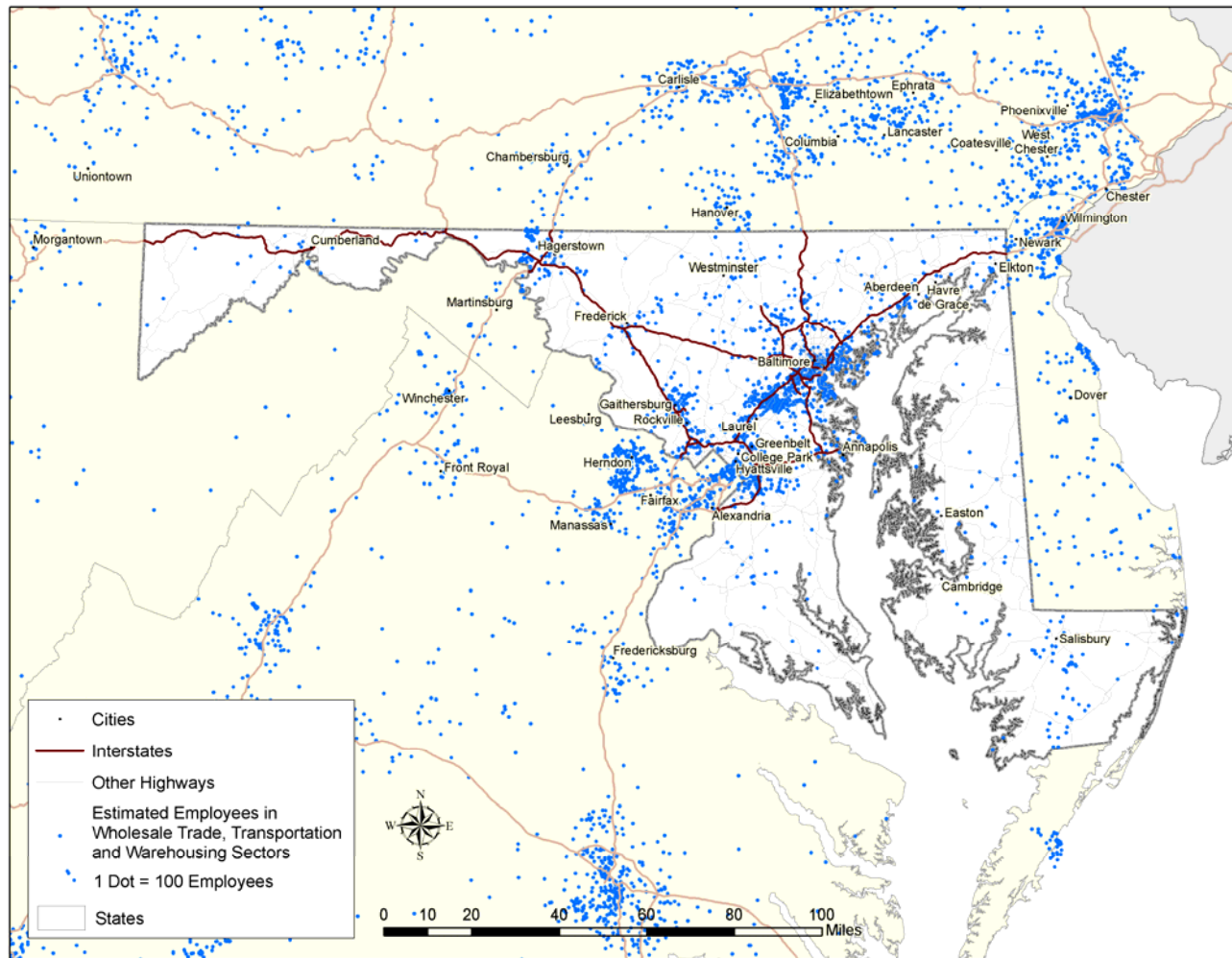
Maryland's manufacturing employment declined by nearly 43,000 jobs (nearly 24 percent) between 1997 and 2007. Despite this decline in employment, manufacturing GSP increased by nearly 21 percent during the same period (described in more detail in subsequent sections). Employment contraction among durable goods manufacturing industries accounted for over 50 percent of the State's manufacturing employment loss, with primary metal and machinery manufacturing sustaining the highest absolute employment losses at 5,300 and 6,200, respectively. As shown in Figure 6.6, manufacturing employment is clustered along the State's Interstates. The highest concentration of manufacturing employment occurs where two or more Interstates converge, such as in Baltimore, Washington, D.C., and Hagerstown.

Figure 6.4 Statewide Goods Dependent Industry Employment Trends  
1997 to 2007



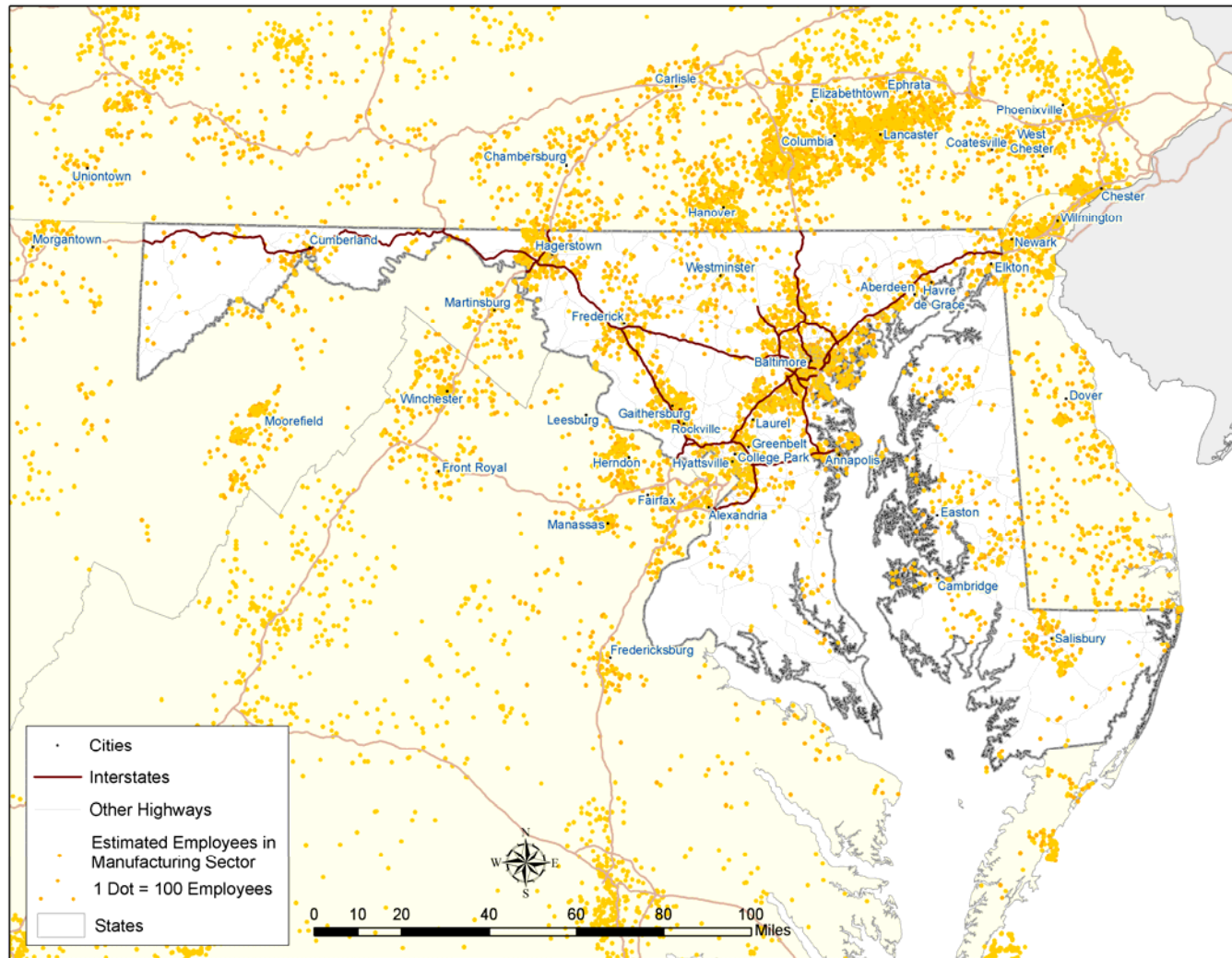
Source: U.S. Department of Commerce, Bureau of Economic Analysis.

Figure 6.5 Wholesale Trade, Transportation, and Warehousing Employment Clusters



Source: US Census County Business Patterns estimates, 2005.

Figure 6.6 Manufacturing Employment Clusters



Source: US Census County Business Patterns estimates, 2005.

Traditionally important freight generating industries mining and agriculture account for less than one percent of the State's total employment but represent about a quarter of goods moved in the State. Agriculture employment declined 10.8 percent to 24,500 jobs between 1997 and 2007. While mining grew by nearly 14 percent during the same period, mining employment represents a very small proportion of the State's employment (3,100 jobs in 2007). Figure 6.7 identifies the locations of mining employment clusters in the State.

Other important freight-generating industries include Maryland's growing technology and biotechnology industries, which are clustered primarily in the Baltimore-Washington corridor and the I-270 Corridor between Montgomery and Frederick Counties. Maryland's tech and biotech firms require premium freight service, often from freight forwarders specializing in international airborne freight or consolidated carriers such as UPS and FedEx.

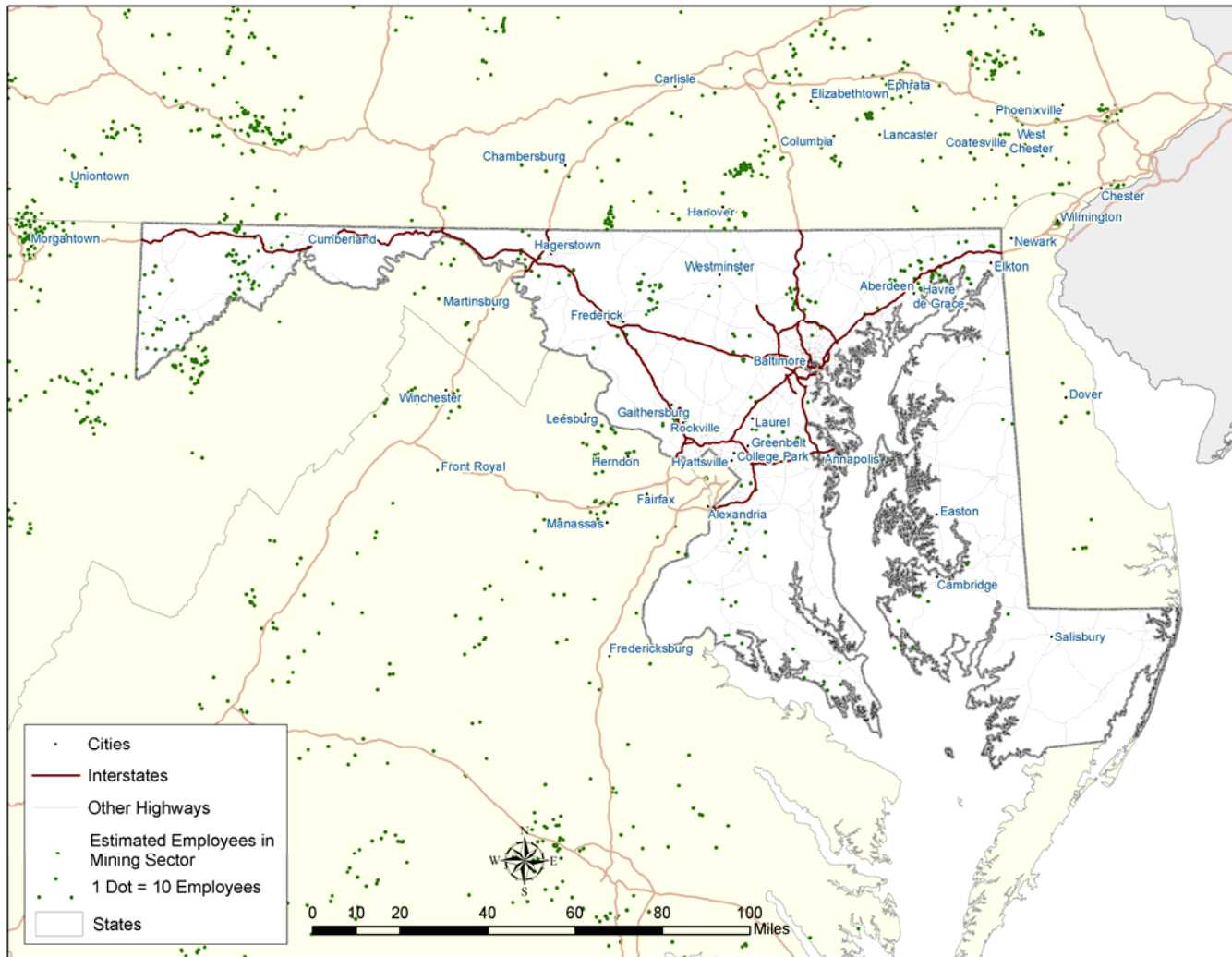
Finally, the influx of defense related jobs—military, civilian, and contractors—following the Base Closure and Realignment Commission (BRAC) recommendations, will have a profound impact on the State. The relocation and expansion of defense activities will mostly occur near existing freight activity clusters. The State will continue to coordinate the transportation needs of the military and private developments to ensure adequate access to freight facilities and corridors.

In the future, employment projections by the Maryland Department of Planning forecast that goods dependent employment will grow by 4.4 percent between 2007 and 2030.<sup>29</sup> While goods dependent employment as a percentage of total statewide employment is forecasted to decline to 25.7 percent by 2030, goods dependent industries (especially trade, transportation, and utilities) will remain a substantial part of the State's economy.

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<sup>29</sup>Maryland Department of Planning, Maryland State Data Center, February 2009.

Figure 6.7 Mining Sector Employment Clusters

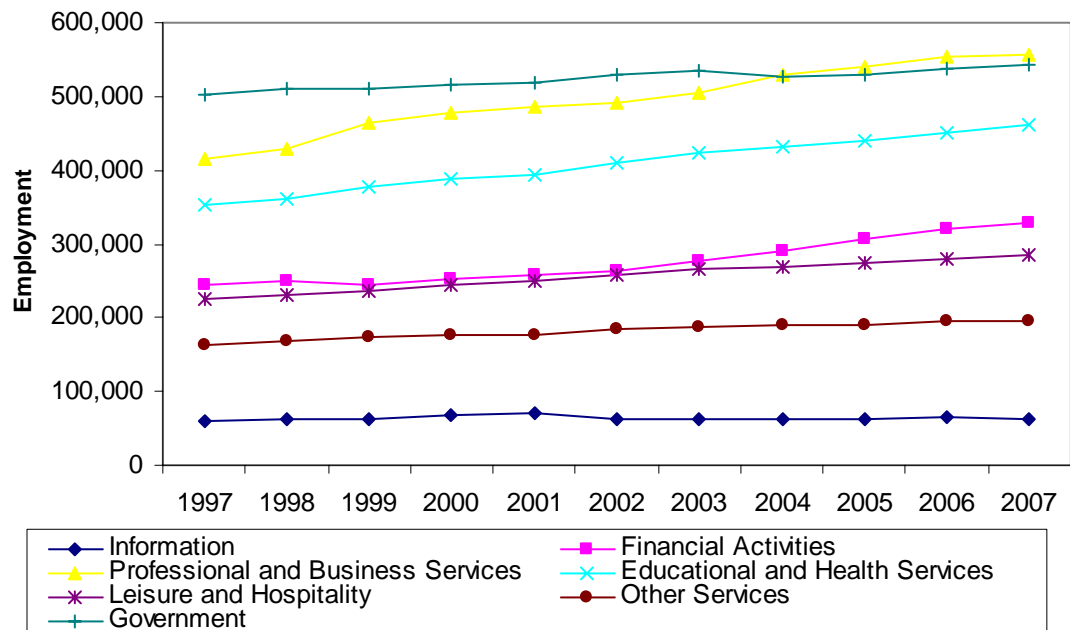


Source: US Census County Business Patterns estimates, 2005.

### Service Industry Employment Trends

Whereas employment growth in goods dependent industries is mixed across the State, growth in the service industries is clearly the driving force behind the State’s overall 19 percent employment growth over the past 10 years. Between 1997 and 2007, Maryland’s service industries added over 470,000 jobs and all service sectors experienced positive growth at the statewide level.<sup>30</sup> As shown in Figure 6.8, professional and business services (including technical, managerial, and administrative services) overtook government employment as the leading service industry employer in Maryland. Growing by 34 percent, the professional and business services industries added over 141,000 jobs since 1997 to comprise almost 23 percent of all service sector employment in 2007. Government employment remained relatively steady, adding just under 41,000 jobs during the same period.

**Figure 6.8 Statewide Service Industry Employment Trends**  
1997 to 2007



Source: U.S. Department of Commerce, Bureau of Economic Analysis.

<sup>30</sup>U.S. Department of Commerce, Bureau of Economic Analysis

With the exception of the government and information industries, employment within all of the services industries expanded by 20 percent or more between 1997 and 2007. Employment forecasts by the Maryland Department of Planning indicate that growth in the service industries will continue to outpace goods dependent growth through 2030. As a result, Maryland will continue to shift towards a serviced-based economy, mirroring a similar transition on the national economy.

### *Contribution to GSP by Industry*

Growth in most industries over the last 10 years has helped Maryland's Gross State Product (GSP), a measure of state economic activity, grow from \$163 billion in 1997 to over \$222 billion in 2007 (in constant 2000 dollars).<sup>31</sup> Maryland's traditional economic strengths come from manufacturing, wholesale and retail trade, transportation, financial services, and government contracting. In recent years, however, the State also has experienced growth in information technology, telecommunications, and aerospace.<sup>32</sup>

Mirroring national trends, growth among Maryland's service industries has outpaced growth among the goods movement dependent industries over the last decade. As shown in Figure 6.9, the services sector increased by 42.8 percent between 1997 and 2007, while Maryland's goods dependent industries grew by 26.1 percent. As a result, the service sector's percent contribution to the Maryland GSP grew from 69.4 percent in 1997 to 72.4 percent in 2007 (as compared to the goods dependent contribution of 30.8 percent in 1997 to 28.4 percent in 2007).

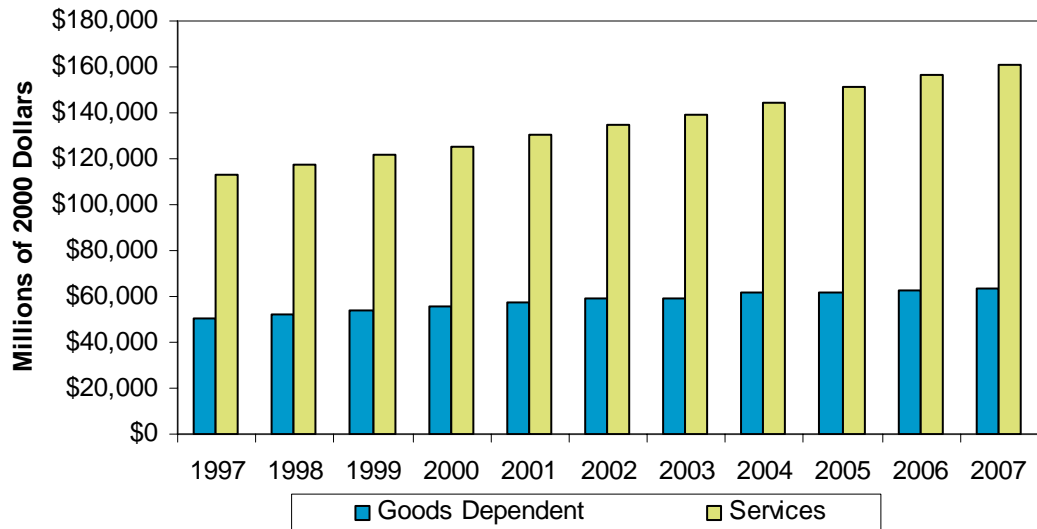
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<sup>31</sup>U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Accounts.

<sup>32</sup>Maryland Department of Business and Economic Development, Facts & Figures.



**Figure 6.9 Goods Dependent versus Service Industry Contribution to GSP  
1997 to 2007**



Source: U.S. Department of Commerce, Bureau of Economic Analysis.

### Goods Dependent Industry GSP Trends

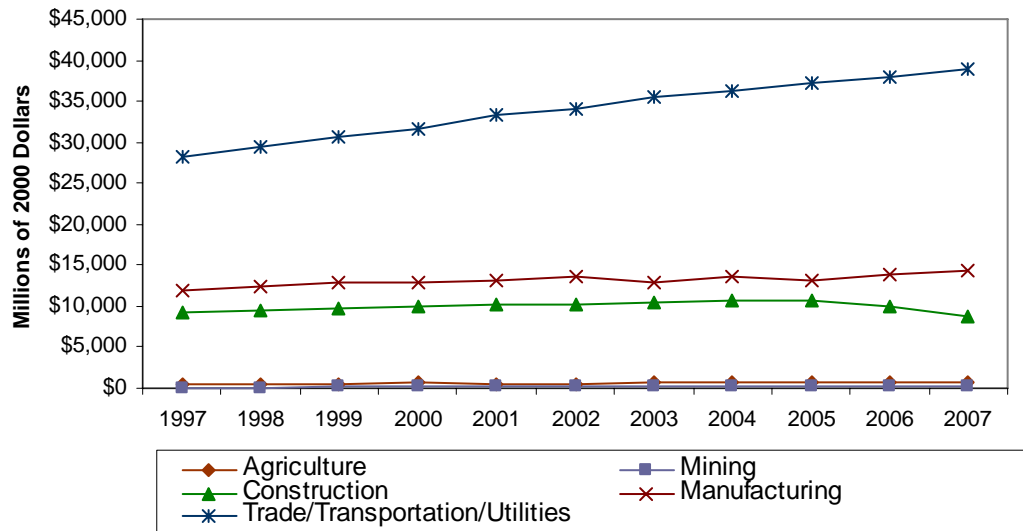
As shown in Figure 6.10, the trade, transportation, and utilities industries are the dominant goods dependent industries in Maryland, contributing 17.5 percent to the State's total GSP in 2007. These industries grew by 38 percent over the last decade to nearly \$39 billion in 2007.

Although the mining industry comprises the smallest percentage of the State's economy at 0.1 percent, it was Maryland's fastest growing goods dependent industry over the last 10 years. It grew by 89 percent (\$91 million) between 1997 and 2007.

While the construction industry had the highest percentage of employment growth, the construction industry was the only industry in Maryland to contract in GSP output over the last 10 years. After reaching a peak in 2005, two years of negative growth have reduced the construction industry's GSP contribution from 5.8 percent in 1997 to 4.0 percent in 2007.

Despite the small decline in the construction industry, Maryland's goods dependent industries grew over 26 percent overall between 1997 and 2007, contributing \$63 billion to the State's economy in 2007. As these goods movement-dependent industries rely on the transportation system to receive raw supplies and manufactured goods and to send their refined/finished product to market, demand of the State's transportation system will grow apace.

**Figure 6.10 Goods Dependent Industry Contribution to GSP**  
1997 to 2007

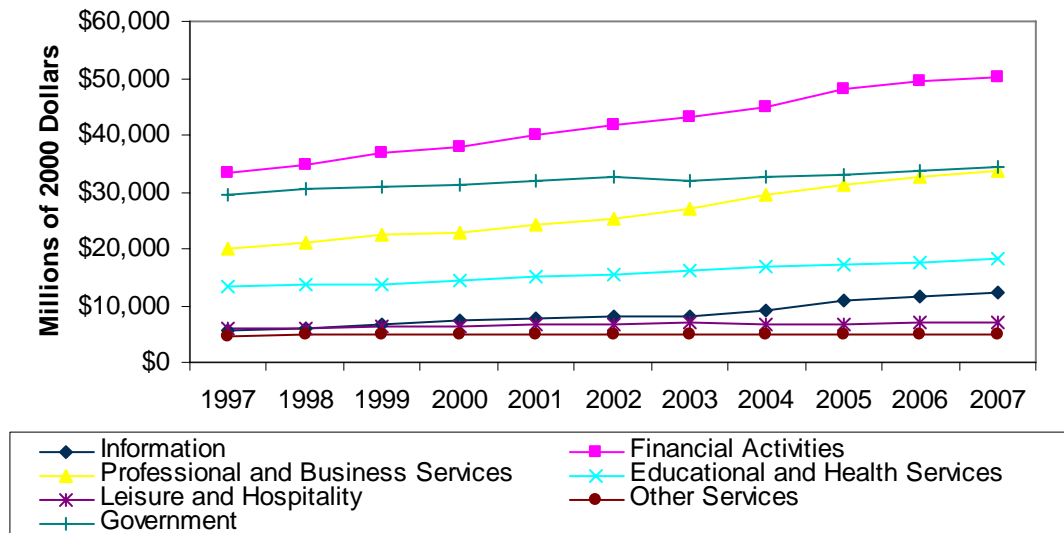


Source: U.S. Department of Commerce, Bureau of Economic Analysis.

### Service Industry GSP Trends

As shown in Figure 6.11, all of the State’s service-based industries have experienced overall growth over the past 10 years. As service industries are closely tied to population growth, the State’s steady population growth over this period has contributed to the service sector’s growth. Maryland’s three leading service sector industries, financial activities (including finance, insurance, and real estate), professional and business services (including technical, managerial, and administrative services), and government combined to account for over half of the State’s GSP in 2007. The information sector, which includes publishing and telecommunications, was the fastest growing service industry between 1997 and 2007. It grew by nearly 119 percent during this period, contributing \$12.3 billion in 2007.

Figure 6.11 Service Industry Contribution to GDP  
1997 to 2007

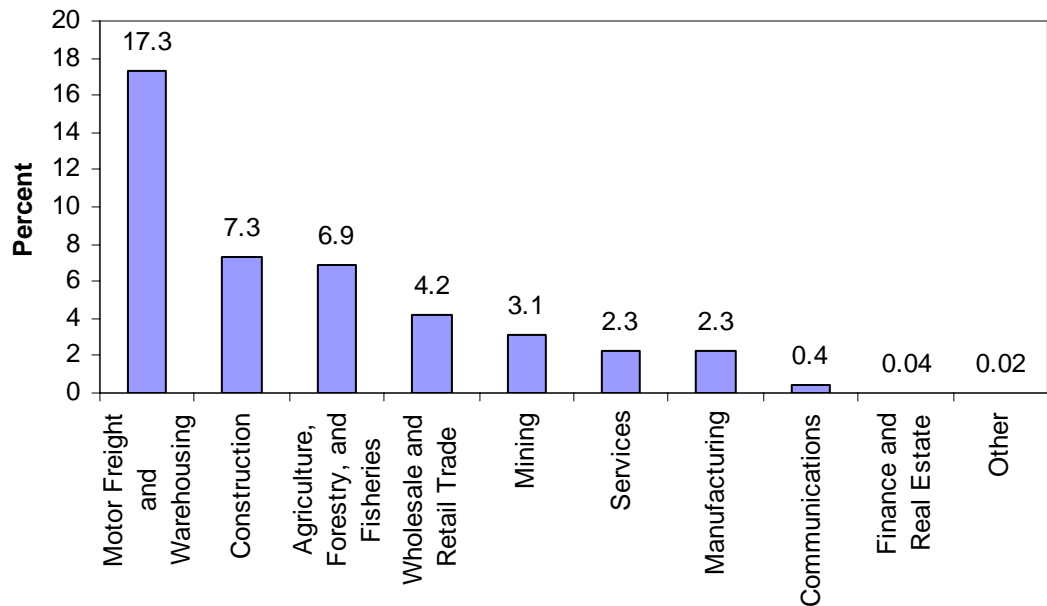


Source: U.S. Department of Commerce, Bureau of Economic Analysis.

### Modal Dependencies

Many of Maryland’s key industries are heavily dependent upon freight transportation. Figure 6.12 which shows the percentage of total business costs devoted to transportation costs by industry. Not surprisingly, motor freight and warehousing (including truck/rail intermodal services) are the State’s most transportation-dependent industries. More than 17 percent of these businesses’ total costs can be attributed to freight transportation. As transportation costs rise (whether in terms of fuel costs, handling costs, or costs associated with delays and inefficiencies on the system), they impact transportation-dependent industries more heavily than those that are not as reliant on goods movement. This has the potential to harm the competitive position of key Maryland industries and limit job and revenue growth throughout the State.

Figure 6.12 Transportation Dependence of Key Maryland Industries  
*Percentage of Business Costs Devoted to Transportation*



Source: U.S. Bureau of Economic Analysis, Transportation Satellite Accounts.

## 6.2 INDUSTRY INTERVIEW SUMMARIES

To supplement the analysis of freight flow and economic data, the study team and MDOT conducted interviews with a range of carriers and shippers that use Maryland’s transportation assets to move goods. Through the interviews, participants identified several economic trends affecting their industries.

### *Key Economic Trends*

- **Congestion** - Freight stakeholders identify congestion as having a major impact on operations, with increasing delays on the Interstates, especially during rush hours. The most consistently notable locations are I-695, I-495, I-95, I-270 - especially the Baltimore and Washington Beltways. The greatest impact of congestion is lower reliability of delivery times for customers.
- **Fuel Costs** - To soften the effects of swings in the price of fuel, Maryland shippers are consolidating warehouse operations to reduce miles traveled and to be closer to customers. Carriers are more fully loading each truck and are more frequently using rail to decrease unit costs (although recently shippers are switching back to truck as fuel costs have decreased).
- **Intermodal Use** - Freight dependent industries rely heavily on trucking, especially for last-mile moves from a regional distribution center to the point of delivery. However, for long-haul moves, to reduce overall shipping costs,

shippers and truckload carriers are increasingly using intermodal freight rail. Increasingly, the local distribution centers do not have rail service – instead, companies are draying materials to and from regional intermodal rail yards (such as Harrisburg, Pennsylvania), for the long-haul portion of the supply chain move. The exception is maritime shipping, where many local companies use either the Port of Baltimore or other regional container ports (Hampton Roads, Wilmington, New York/New Jersey).

- **Truck Productivity** – Several interviewed firms said that Maryland’s size and weight restrictions – and the restrictions of other states – reduce their ability to move more freight while simultaneously reducing truck VMT.

### *Supply Chains and Logistics Patterns*

To illustrate the importance of the transportation system in sustaining Maryland businesses, the following supply chain profiles highlight current operations and challenges faced by specific companies. These profiles feature several of the most widely-recognized companies in the State and offer a glimpse of the industry-specific goods movement issues these firms confront.

#### **McCormick – Food Distribution**

The McCormick name is synonymous with spices. In Maryland, the company maintains headquarters and 4 manufacturing facilities in Baltimore County’s Hunt Valley. In addition, McCormick has two distribution facilities – one also in Hunt Valley, the other in Belcamp (Harford County), Maryland. The Maryland manufacturing plants import raw materials, much of it coming on containerized cargo ships calling on U.S. ports, including Baltimore. From its Maryland production and distribution facilities, McCormick serves the Northeast regional market, supported by other regional distribution facilities in Atlanta, Georgia; Gretna, Louisiana; Dallas, Texas; South Bend, Indiana; and Benton Harbor, Michigan. The company uses truckload carriers for more than 90 percent of its freight movement, including all movements in Maryland. Like other Maryland firms, to access rail, the company drays goods to and from intermodal centers in the Harrisburg, Pennsylvania region.

*Greatest Challenges:* The greatest challenges facing McCormick’s freight transportation operations are rising fuel costs (which they expect will increase again in the near future); availability of carriers (their capacity and reliability have plummeted); and congestion negatively affecting level of service and on-time delivery.

#### **Rite-Aid – Retail Distribution**

Rite-Aid’s Harford County distribution center serves stores in Maryland, New Jersey, Delaware, Pennsylvania, Virginia, West Virginia, and Washington, D.C. About 30 percent of the moves are intrastate (Maryland to Maryland) with 70 percent out of state. Like other major retailers, location on the I-95 corridor in Maryland allows them to cover a wide swath of the Mid-Atlantic region. The distribution center receives inbound shipments by truck only, although some

goods travel by rail intermodal to Baltimore, where the company offloads to truck for the final move to the distribution center. The company also receives shipments from vendors throughout the Mid-Atlantic.

*Greatest Challenges:* Like McCormick, two of the greatest challenges facing Rite-Aid's freight business are transportation costs (fuels, tolls) and the capacity of the trucking fleet (equipment/drivers) to accommodate future demand. The company urges the State to reduce toll facility bottlenecks – especially on I-95 at the Susquehanna River, by providing more high-speed EZ pass lanes.

#### **Severstal North America – Steel**

Sparrows Point Severstal Steel is one of the largest manufacturers in the Eastern U.S. From the plant in Baltimore County, Severstal distributes to customers principally East of the Mississippi and also in Texas and Canada. The company uses both truck and rail extensively and maintains direct freight-rail access to its plant with its own short line. The rail principally brings in raw materials for manufacture.

*Greatest Challenges –* Severstal indicates that truck size and weight restrictions in Maryland restrict the company's ability to reduce truck volume. On some Maryland roads Severstal can load trucks up to only 45,000 pounds, even though trucks are allowed to carry the maximum Federal weights on Interstate and National Highway Network roads in Maryland.

#### **Rukert Terminals Corporation – Bulk Stevedoring/Transfer/Warehousing**

Rukert specializes in stevedoring, warehousing, and transfer of bulk materials from its Port of Baltimore location. Among its chief commodities are metals, ores, fertilizers, alloys, and other dry bulk and break-bulk. Its materials originate from all corners of the planet – including South Africa, China, and Russia. More than 80 percent of the inbound cargoes transit Maryland to another North American destination. The company relies heavily on freight-rail, and is served competitively by CSXT and Norfolk Southern via the Canton Short Line.

*Greatest Challenges –* To maintain a competitive position, the Port of Baltimore must continue to focus on dredging to clear channels to 50 feet. Other challenges include traffic congestion, residential encroachment, and the need for improved rail service. Local truck routing restrictions in Baltimore also impede productivity.

## 6.3 FREIGHT INDUSTRY TRENDS

In addition to the economic and industry trends outlined above, several national and global freight trends have the potential to affect intensity of use of the freight system, the routing and distribution patterns or traffic, and mode share in the future.

### Energy Effects

Over the last five years, up until the beginning of the current global recession, the single greatest influence on the freight industry had been the escalating cost of fuel. Prior to this period, beginning in the 1960s, the world had experienced decades of rapid globalization where companies sought to maximize profit by outsourcing to low labor cost regions, creating supply chains thousands of miles long and very complex. This model worked well when the cost of transportation was relatively inexpensive. With the recent uptick in the price of fuel, provoked by a number of converging political and economic influences, the way companies ship goods is changing.

Most recently, during the fast escalation of oil prices during 2007 and 2009, companies started making different types of supply chain decisions to reduce energy consumption. This largely resulted in the shortening of supply chains – including more proximate location of manufacturing and distribution facilities – to minimize fuel consumption while continuing to meet market demand. This shift in supply chain activity has been coined “localism” or “reverse globalization” by industry analysts and academics studying the phenomenon.

### Congestion and Delay

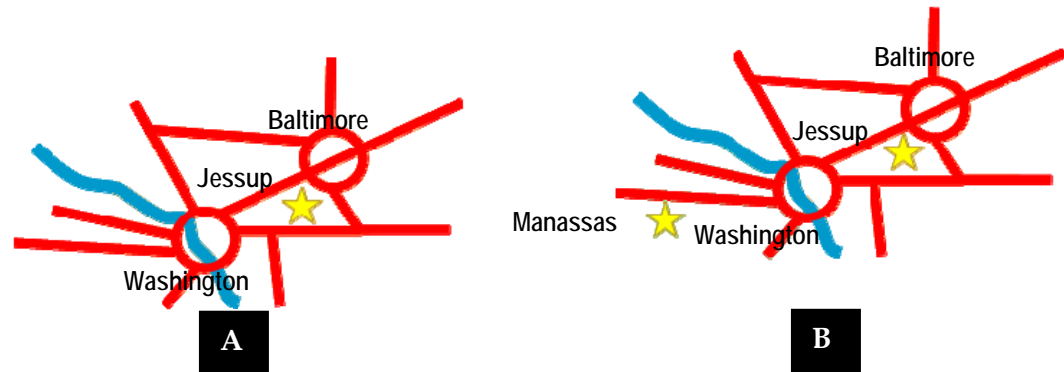
In addition to energy costs, other factors have recently influenced companies to consider different goods movement paradigms. Chief among them is the decreasing reliability of the transportation networks, especially in large metropolitan areas. Congestion and delay add cost to the shipment of goods and services as carriers incur additional labor and equipment costs to provide the same number of deliveries, but requiring twice the fleet and personnel. The result in the greater Baltimore-Washington region has been a bifurcation in distribution patterns, as reported in a recent Washington Post article<sup>33</sup>. Previously, shippers would often serve the entire Baltimore-Washington region from a single distribution point – often in Jessup area of central Maryland. However, due to mounting congestion, especially at the Potomac River crossings, many companies are setting up separate regional distribution networks – serving

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<sup>33</sup> “Traffic Cure Worse Than the Disease.” Weiss, Eric M. Washington Post. October 6, 2008.

Northern Virginia from one center while serving the District of Columbia and Maryland from other. The following graphic illustrates this trend, showing (A) the existing regime, and (B) the emerging trend of multiple urban distribution sheds.

**Figure 6.13 Potential Bifurcation of Urban Distribution**  
*Example of Multiple Distribution Hubs in Greater Baltimore-Washington*



The effects of these shorter supply chain trends on the transportation system are difficult to measure. Where firms are setting up multiple distribution hubs in urban areas, there would be more vehicles – potentially adding to congestion and incurring more vehicle miles traveled. On a national or world scale, shorter supply chains would have positive environmental effects of reduced carbon emissions but could intensify the use of the transportation system where supply chains are more regional.

## 6.4 CLIMATE CHANGE AND FREIGHT

Global climate change will have an increasingly noticeable impact on freight transportation and operations in the State in the future. Primary impacts include sea level change and surface heating, creating the need for strategies to adapt infrastructure to meet these challenges. For the freight system, this means adaptation of important highway and rail infrastructure – especially vulnerable structures along the rising Chesapeake Bay. Rails, highways, and tarmacs also can buckle under the stress of increased heat during prolonged summer warmth. While the State can soften the direct environmental effects of global warming through investment in adaptation, the long-term solutions are policy-related.

These policies include measures to limit carbon emissions by freight transportation sources. Strategies to achieve lower freight carbon output include policies and investments that incentivize mode shift to lower carbon-emitting modes, such as rail and waterborne. Phased Federal standards for locomotive and diesel truck engines will provide further air quality improvements. Maryland currently participates in a regional cap and trade program, but that



program does not yet include transportation. This is one potential avenue to achieve lower-carbon freight footprint. Other options include participation in a national cap and trade regime; a carbon tax; investment in rail infrastructure; and increased attention to coordination of freight distribution/industrial land use and transportation infrastructure.

Measures to alleviate the effects of climate change on the State will only gain importance in the future, especially given the prediction of future output, showing that Maryland's freight carbon footprint may grow commensurate with ton-miles traveled by mode. This forecast shows that under current conditions, truck ton-miles will grow slightly faster than rail, increasing by 115 percent between 2006 and 2035 versus 85 percent growth of rail ton-miles. The following table shows the current and future ton-miles and estimated carbon footprint. Maryland figures are for the portion of the freight move touching Maryland. The columns marked "Total" show the entire trip length of freight moves touching Maryland, and include miles accrued from origin to destination (e.g., Miami to New York City via I-95 in Maryland).

**Table 6.2 Maryland Freight Carbon Footprint**  
*2006-2035*

	Ton/Miles Traveled 2006 to 2035			
	2006		2035	
	Maryland	Total	Maryland	Total
Truck	6.7	33.7	14.5	71.8
Rail	6.9	7.9	9.2	12.9
Carbon Footprint (Billions of Grams)				
Truck	0.91	4.58	1.97	9.8
Rail	0.32	0.45	0.59	.082

Source: 2003 TRANSEARCH® Insight, forecast update to 2006 by Cambridge Systematics and Modal Comparison of Domestic Freight Transportation.

"A MODAL COMPARISON OF DOMESTIC FREIGHT TRANSPORTATION EFFECTS ON THE GENERAL PUBLIC" 2009, Texas Transportation Institute

Table 6.2 is represents an order-of-magnitude estimate of carbon impacts representing current truck and locomotive emissions outputs. The overall influence of freight modes on carbon output will decrease on a ton-mile basis as the trucking and rail industries adopt cleaner technologies, including those mandated by the US Environmental Protection Agency. Also, rail's contribution to greenhouse gases may not grow commensurate with ton-mile forecasts because most trains are capable of pulling more cars with the same locomotive power—so freight railroads will likely add cars before they add locomotives. The same is not true of the trucking industry which is weight and size limited.

MDOT's ongoing activities to chart a path to implementation of the State's Climate Action Plan will shed further light on freight's contribution to greenhouse gas emissions and will also provide goals and actions for the freight industry to reduce its carbon footprint over time.

## 7.0 Freight Transportation Policy Directions

The previous sections have described the current and future conditions of Maryland’s freight transportation system. The forecasts and trends indicate that freight demand will more than double in the coming decades. To accommodate, this growth, the State must ambitiously advance an agenda to provide efficient and expanded freight infrastructure. Capacity investment is of paramount importance as Maryland positions itself to remain economically competitive, sustain the natural environment, and ensure a high quality of life for Marylanders. At the same time, policy and operational actions and programs can ameliorate some impacts of the demand-capacity gap instead of capital-intensive capacity improvements.

In order to assist the State to understand the dimensions of the policy issues facing Maryland, MDOT has collected and synthesized key issues and problems affecting goods movement. These policy issues were drawn from interviews and meetings with stakeholders and the public, including agency staff and many private freight interests, including carriers, shippers, and manufacturers. The purpose of this outreach and collection effort was to identify the range of freight-related opportunities and obstacles to address near-term issues and plan effectively for the future. The outreach activities also served the purpose of validating and enriching the data-driven analysis of conditions and trends.

The following table summarizes the policy issues (left column) and outlines the desired outcomes to improve the issues or problem and more specific actions and programs to implement change. This policy directions matrix benefits from the careful screening by key stakeholders on the committees supporting the freight planning effort - the Interagency Advisory Committee (Maryland DOT modal officials) and the Freight Stakeholder Advisory Committee (private freight stakeholders and Federal agencies). The issues are not listed in any particular order of importance.

**Table 7.1 Freight Policy Directions Matrix**

Issue/Challenge	Desired Outcome	Potential Actions and Programs
Congestion and bottlenecks	Improve system productivity	<ul style="list-style-type: none"> <li>• Encourage passenger mode shift to public transportation</li> <li>• Develop strategies to reduce peak-hour goods movement</li> <li>• Implement congestion pricing/tolling</li> <li>• Promote reduction of empty trucks on highways (e.g., support development of backhaul cooperatives and dispatch technologies)</li> <li>• Educate carriers that compliance with safety regulations reduces bottlenecks at inspection stations</li> <li>• Work with Class I railroads and Amtrak to provide double-stack rail serving the Port of Baltimore.</li> </ul>
High predicated freight in and through Maryland	Balanced system	<ul style="list-style-type: none"> <li>• Encourage freight rail-truck coordination or short sea mode shift of divertible commodities</li> <li>• Coordinate freight-intensive land uses with transportation</li> <li>• Develop strategies to reduce growth of VMT for cars and trucks</li> </ul>
System preservation	Maintain system condition and performance	<ul style="list-style-type: none"> <li>• Continued maintenance on key freight corridors (e.g., highway paving and bridges; waterway dredging)</li> <li>• Invest in structurally deficient or structurally obsolete facilities – including bridges</li> <li>• Develop transportation operations strategies (traffic information, truck routing, truck size and weight compliance)</li> </ul>
Limited Financial Resources	Increase financial resources	<ul style="list-style-type: none"> <li>• Consider changes to State law to allow alternative financing options, including: toll lanes, congestion pricing, carload/container fee (for rail improvements, including tunnels), fuel tax increase, VMT-based fee, performance-based funding, state rail infrastructure tax credit</li> </ul>
Rail capacity constraints	Improve freight and passenger rail effectiveness	<ul style="list-style-type: none"> <li>• Expand double-stack network</li> <li>• Provide new freight and/or passenger tunnel to increase efficiency of freight and Amtrak and provide improved access to the Port of Baltimore</li> <li>• Utilize existing and new rail capacity to encourage shift of freight from highway to rail</li> </ul>
Truck parking shortage	Safe operating environment	<ul style="list-style-type: none"> <li>• Provide better utilization/notification of existing safe parking locations</li> <li>• Promote underutilized State assets (unused weigh stations) for truck parking</li> </ul>

Issue/Challenge	Desired Outcome	Potential Actions and Programs
		<ul style="list-style-type: none"> <li>• Develop additional truck parking capacity (truck stops, rest areas, park-and-ride lots, etc.)</li> <li>• Incorporate truck parking areas into zoning laws (development conditions)</li> </ul>
Rail safety	Improve rail safety	<ul style="list-style-type: none"> <li>• Develop routing that minimizes hazmat exposure to communities (must be at the regional level) – develop hazmat plan for region</li> <li>• Implement public outreach campaign on dangers of walking on or near railroad tracks</li> <li>• Reduce conflict between highway and rail modes by closing or separating grade crossings (e.g., sealed rail corridors)</li> </ul>
Highway freight safety (truck crashes – fatalities, injuries, property damage)	Improve highway freight safety	<ul style="list-style-type: none"> <li>• Improve data collection and analysis and apply to prevention programs</li> <li>• Support Maryland Strategic Highway Safety Plan elements related to commercial vehicles, including enforcement</li> <li>• Boost truck driver safety through improved education, credentialing, and other programs</li> <li>• Enhance passenger-car driver education to drive with trucks, grade crossings</li> </ul>
Freight and air quality	Reduce freight contribution to emissions	<ul style="list-style-type: none"> <li>• Promote strategies to reduce truck idling (e.g., encourage adoption of newer technologies)</li> <li>• Reduce truck VMT</li> <li>• Link environment and planning (consider AQ freight effects in project planning of investment)</li> </ul>
Land/Use Zoning Conflict Freight versus Residential	Increase compatibility of land uses	<ul style="list-style-type: none"> <li>• Identify ample locations for freight expansion through regional industrial master planning and clustering of freight activities with transportation facilities</li> <li>• Coordinate with local governments’ comprehensive plans</li> <li>• Mediate concerns (suburban residential threatened by freight encroachment/urban freight threatened by residential encroachment)</li> <li>• Incorporate “goods movement activity grandfather” clause into real estate purchase contracts or development agreements</li> </ul>
Truck routing impacts (safety, hazmat, noise, vibration, local traffic)	Direct truck traffic to appropriate infrastructure	<ul style="list-style-type: none"> <li>• Develop truck routing, conditions of OS/OW permitting (geofencing), tollbooth/weigh station avoidance reduction strategies</li> <li>• Work with truckers to identify and correct inefficient routing</li> <li>• Provide good level of maintenance on truck routes</li> <li>• Identify truck routing in land use master plans</li> <li>• Provide incentives (e.g., PrePass or HOT lanes credit) to encourage trucks to use approved</li> </ul>

Issue/Challenge	Desired Outcome	Potential Actions and Programs
		routes and/or suggested bypass options during congestion/incidents
Increasing logistics costs	Lower logistics costs	<ul style="list-style-type: none"> <li>• Improve predictability of industrial land use</li> <li>• Improve information and reliability of routing</li> <li>• Decrease surface transportation operational costs</li> </ul>
Air cargo	Increase belly cargo capacity at BWI-Marshall	<ul style="list-style-type: none"> <li>• Continue to promote BWI Marshall cargo strengths (highway access, proximity to large markets, Trans-Atlantic market links)</li> </ul>
BRAC expansion in Maryland	Provide adequate transportation infrastructure to support BRAC freight-related activities	<ul style="list-style-type: none"> <li>• Ensure goods movement access connections to BRAC expansion areas</li> </ul>
Incomplete (poor) public perception of freight	Educate the public	<ul style="list-style-type: none"> <li>• Educate that efficient goods movement provides savings to consumers, businesses</li> </ul>
Limited opportunities for multimodal connectivity	Increase multimodal connectivity	<ul style="list-style-type: none"> <li>• Increase rail-truck transloads</li> <li>• Increase marine highway (short sea shipping) usage with truck to barge and rail to barge operations</li> </ul>
Multijurisdictional traffic effects (e.g., through traffic outside MD control)	Improve planning and operations coordination	<ul style="list-style-type: none"> <li>• Understand and recognize the effects of external influences</li> <li>• Develop mutually beneficial operational, policy strategies</li> <li>• Coordinate at state-to-state; regional, corridor, and town/county levels</li> </ul>
Freight/Passenger Rail Conflicts	Optimize operations of freight and passenger rail	<ul style="list-style-type: none"> <li>• Develop strategies and technologies to improve shared use</li> <li>• Increase capacity and separate freight and passenger rail lines for simultaneous operation</li> <li>• Promote the required deployment of Positive Train Control (PTC) on shared corridors</li> </ul>
Insufficient coordination with non-DOT planning agencies	Improve coordination	<ul style="list-style-type: none"> <li>• More fully engage DBED, MDD, MTA, Office of Smart Growth, and law enforcement (State Police, MdTA Police) in freight planning</li> <li>• Enhance coordination with local governments to identify freight infrastructure needs potentially requiring special State assistance.</li> <li>• Continue to increase level of interaction and coordination with neighboring states and Federal agencies (FWHA, FRA, USACE etc.)</li> </ul>
Freight planning data for decision making	Continue to improve data and tools	<ul style="list-style-type: none"> <li>• Explore options for developing improved truck flow data through origin-destination surveys</li> <li>• Collaborate with SHA and other agencies to develop and utilize models and other tools to</li> </ul>

Issue/Challenge	Desired Outcome	Potential Actions and Programs
		sharpen investment decision making





# 8.0 Freight Program Development

## 8.1 PRIORITIZATION METHODOLOGIES

Most of the projects identified during the course of this study, if implemented, would benefit a wide range of stakeholders, not just those primarily concerned with freight. The only relatively “pure” freight projects are those that specifically improve freight rail operations, improve marine cargo handling operations, improve or maintain vessel access to Port terminal areas, and to a somewhat lesser extent improve landside access to intermodal terminals. To help guide the selection of ‘freight projects’, the stakeholder committees and study team developed the following definition:

### Freight Project Definition

*A freight project is a planned improvement to the Maryland transportation system that sustains goods movement and supports the state's economic competitiveness. The project may provide improved operations, expansion, or new capacity. It is distinguished from other transportation projects because it provides improved service or capacity to one of the freight modes (highway, rail, water, air) on a transportation facility that significantly supports the local, regional, state, or national economy.*

Prioritization efforts outlined here focus on the freight aspects of the projects but also consider the impacts of background traffic, especially in the Quality of Service and Safety and Security criteria.

### Project Selection

The project list was developed from these sources and activities:

- Freight stakeholder outreach;
- Maryland’s 2008 CTP;
- SHA Highway Needs Inventory (HNI);
- BMC Transportation Outlook 2035;
- Mid-Atlantic Rail Operations Study (MAROps);
- MARC Growth and Investment Plan; and
- MDOT, SHA, MdTA, and MPA personnel.

The initial list of freight projects was generated through public outreach to freight stakeholders. Projects, bottlenecks, and chokepoints identified by the stakeholders were compared with the various State-identified projects<sup>34</sup> and where a match was found, the outreach project was replaced by the State-identified project. This step allowed the project team to use the State-developed data associated with the project in the evaluation process. The resulting list includes both public and private projects and will be updated as circumstances change and as additional information becomes available.

The projects in this Plan are generally of statewide significance, meaning that they either enhance multistate freight flows or facilitate goods movement to a major freight activity center (e.g., Port of Baltimore). The projects are often long-term in nature and the list generally excludes improvements already captured in the Consolidated Transportation Plan (CTP). MDOT intends to use this list in discussions with local governments about transportation priorities and about which projects should be advanced through the CTP development process. This project list is also intended to foster regional and local freight planning efforts. There are likely other projects outside the scope of this effort – including relatively small geometric or technology investments – that could improve access to freight generating facilities, especially at the local level.

Also, this Plan focuses on projects that improve freight flows through new investments in capacity or operations, however the projects may not be accomplished as described. The congestion indicated by a roadway widening project may be addressed through alternative means, i.e., intelligent transportation system (ITS) strategies. The policy section of this Plan addresses the importance of maintenance projects but specific maintenance projects are not identified in this Plan.

Collectively, the projects considered in this exercise represent over \$35 billion in freight transportation needs. This estimate only includes those projects with estimated costs; a small portion of the projects lack cost estimates. Much of this total is currently unfunded and would require Federal assistance, heightened State dedication, and innovative partnerships to make a dent in the backlog of needs.

Finally, this project list is extensive but may not be comprehensive. Despite the State's best efforts to collect freight needs from all relevant public and private stakeholders, important projects may be missing from this list. MDOT looks forward to receiving continuing input and dialogue in the future to ensure that subsequent freight planning efforts encompass an increasingly relevant set of projects and policies.

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<sup>34</sup>These include projects in the SHA Highway Needs Inventory, MDOT CTP, and various MPO long-range plans and TIPs.

## Project Evaluation

Projects within each mode are evaluated and classified as either high-, medium-, or low-priority based on the criteria described in Table 8.1. The following key demonstrates the assignment. A project's overall classification is based on the weighted average of the scores for the component criteria. The resulting evaluations are based on the application of readily available information combined with the judgment of the project team and should be viewed as order of magnitude estimates rather than precise rankings.

**Table 8.1 Evaluation Criteria for Freight Projects**

Criteria	Weighting	Description
Quality of Service	30 %	Potential for the project to reduce delay and increase reliability
Safety and Security	25 %	Potential for the project to provide a safer operating environment and reduce opportunities to compromise the supply chain
Environmental Stewardship/Development Plan Goals	10 %	Potential for the project to reinforce the development of freight-related land uses within existing freight activity centers or direct new development to PFAs and sites with adequate infrastructure
Connectivity for Freight Mobility	25 %	Potential for the project to enhance connectivity between freight modes and/or improve access to clusters of freight-intensive industries
Coordination	10 %	Potential for the project to fulfill the plans, programs or goals of multiple agencies

### *Project Evaluation Criteria*

The evaluation criteria are based on the goals of the Maryland Transportation Plan (MTP) and the draft goals of the Maryland Development Plan. The Quality of Service, Safety and Security, and Environmental Stewardship criteria come directly from the MTP goals while the Connectivity for Freight Mobility criteria is derived from the MTP Connectivity for Daily Life goal. Coordination is a criteria specific to this Plan and was included based on a recommendation of the Interagency Advisory Committee (IAC). Scores are based on the criteria described below and supplemented with professional judgement where data were unavailable.

### *Evaluation Criteria Weighting*

The criteria weightings were developed iteratively using feedback from the IAC, the Freight Stakeholder Advisory Committee (FSAC), and other freight stakeholders. They reflect the primary importance of quality of service and safety to freight stakeholders as well as a recognition of the importance of

connectivity. A concern for environmental stewardship and coordination also were expressed by the stakeholders, but were emphasized to a lesser degree than these other criteria.

### *Project Evaluation – Highway Mode*

**Quality of Service:** The Quality of Service rating is an equal weighted combination of Average Annual Daily Truck Traffic (AADT), truck percentage, current Volume/Capacity ratio (V/C), and future V/C ratio. Each project is given a score of high (5.0), medium (3.0) or low (1.0) for each characteristic based on where it stands relative to the other projects.<sup>35</sup>

**Safety and Security:** The Safety and Security rating is a combination of a safety rating (90 percent) and a security rating (10 percent). The safety rating is based on the average yearly truck crash rate per mile and the security rating is based on whether the project involves the development of a truck inspection/weigh station.<sup>36</sup>

**Environmental Stewardship/Development Plan Goals:** The Environmental Stewardship/Development Plan Goals rating is based on whether the project is entirely within a Priority Funding Area (PFA) or connecting two PFAs. If a project is entirely within a PFA, it is scored high (5.0); if it is not entirely within a PFA but connects two PFAs, it is scored medium (3.0); and if it is neither in a PFA nor connects PFAs, it is scored low (1.0).

**Connectivity for Freight Mobility:** The Connectivity for Freight Mobility rating is based on whether the project is within or connects to a freight cluster either within Maryland or within 20 miles of Maryland’s border. Clusters of freight-intensive industries were mapped using Census Bureau employment data. The following areas have high concentrations of freight-intensive industry employment:

- Hagerstown;
- Frederick;
- Gaithersburg/Rockville;
- Eastern Prince George’s County/Northeast D.C.;
- Laurel/Beltsville;

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<sup>35</sup>For each subcriteria (AADTT, truck percentage, current V/C, and future V/C) all the highway projects are sorted in descending order with the top third given a high score (5.0), the middle third given a medium score (3.0) and the bottom third given a low score (1.0). Where data are unavailable the project is given a medium score (3.0).

<sup>36</sup>Truck crash rates are sorted and scored in a way similar to the Quality of Service sub criteria as described in the above footnote. If a project includes a weigh / inspection station it is scored high (5.0) for security and if not it is scored low (1.0).

- I-95 Corridor from Jessup to White Marsh and south to Glen Burnie;
- Hanover, Pennsylvania;
- Newark/Wilmington, Delaware; and
- Herndon, Virginia.

If a project is within or connects to one of the freight clusters listed, it is scored high (5.0); if it does not lie within or connect to one of the freight clusters, it is scored low (1.0).

**Coordination:** The Coordination rating is based on the extent to which the project is identified in various agency plans. Three types of plans are considered:

- Local Plans;
- Mid-Atlantic Truck Operations (MATOps), i.e., does the project address a bottleneck identified in MATOps; and
- Priority Letters, i.e., is the project listed in the County's Priority Letter to the Secretary of Transportation.

If a project is identified in all three types of plans it is scored high (5.0), if it is identified in two types it is scored medium (3.7), if it is identified in one type it is scored medium (2.3), and if it is not identified in any type it is scored low (1.0).

### *Project Evaluation – Rail Mode*

**Quality of Service:** The Quality of Service rating is an equal weighted combination of current and future level of service (LOS) indicators. A project is scored high (5.0) if it is on a section with a LOS of E or F, medium (3.0) if it is on a section with a LOS of D, and low (1.0) if it is on a section with a LOS of A, B, or C.

**Safety and Security:** A high (5.0) Safety and Security rating is given to most rail projects under the assumption that rail transportation is safer and more secure than truck transportation. The only projects given a medium rating (3.0) were those suggested during outreach efforts that had no counterpart in MAROps, National Gateway, or Crescent Corridor initiatives.

**Environmental Stewardship/Development Plan Goals:** A high (5.0) Environmental Stewardship/Development Plan Goals rating is given to most rail projects under the assumption that rail transportation is more environmentally friendly than truck transportation due its greater fuel efficiency. The only projects given a medium rating (3.0) were those suggested during outreach efforts that had no counterpart in MAROps, National Gateway, or Crescent Corridor initiatives.

**Connectivity for Freight Mobility:** A high (5.0) Connectivity for Freight Mobility rating is given to projects that are part of the Crescent Corridor, National Gateway, or MARC Growth and Investment Plan Initiatives. This is based on the idea that both the Crescent Corridor and National Gateway efforts are primarily concerned with providing greater rail connectivity between certain

east coast ports and the Midwest while the MARC plan is oriented to improving rail connectivity for passengers.

**Coordination:** A high (5.0) Coordination rating is given to projects that are part of the MAROps, Crescent Corridor, National Gateway, or MARC Growth and Investment Plan Initiatives. This is based on the idea that all of these initiatives are coordinating extensively with the states and other concerned jurisdictions affected by them.

*Project Evaluation – Marine Mode*

Each of the projects were scored using the professional judgment of Maryland Port Administration (MPA) officials.

## 8.2 PRIORITIZED PROJECT LIST

The following tables summarize the results of the prioritization process and rank the selected projects based on the weightings suggested by the stakeholder committees, public outreach participants, and MDOT. The key (below) illustrates the range of scores—high, medium, and low—achieved by each project to guide the prioritization.

**Project Evaluation Key**

High	Medium	Low
●	◐	○

Table 8.2 Highway Projects

Map ID	Name of Project	Jurisdiction	Overall Score	Quality of Service (30 %)	Safety and Security (25 %)	Environmental Stewardship/ Development Plan Goals (10%)	Connectivity for Freight Mobility (25%)	Coordination (10%)
3	Interstate 81 Reconstruct and widen- WV Line to PA Line	Washington County	●	●	◐	●	●	◐
5	Interstate 70 Reconstruct and widen – I-81 to Frederick County Line	Washington County	●	●	◐	◐	●	◐
6	Interstate 70 Reconstruct and widen – Washington County Line to west of Mt. Phillip Road	Frederick County	●	●	◐	○	●	◐
8	Reconstruct and widen U.S. 40-U.S. 15 to I-270	Frederick County	●	◐	◐	●	●	◐
9	Reconstruct and widen MD 85 – English Muffin Way to N. of Grove Road	Frederick County	●	●	◐	●	●	◐
10	Interstate 270 Reconstruct and widen – Montgomery County Line to I-70	Frederick County	●	●	◐	◐	●	◐
11	Interstate 270 Reconstruct and widen – I-370 to Frederick County Line	Montgomery County	●	●	◐	◐	●	●
13	Interstate 270 Reconstruct and widen – I-495 to I370	Montgomery County	●	●	◐	●	●	●
15	Interstate 495 Reconstruct and widen – Montgomery County Line to I-95	Prince George’s County	●	●	●	●	●	◐
16	Interstate 95 Reconstruct and widen – South of MD 210 to I-495	Prince George’s County	●	●	●	●	●	○
17	Reconstruct and widen U.S. 50-D.C. Line to MD 410	Prince George’s County	●	◐	●	●	●	◐
25	Interstate 95 Reconstruct and widen – I-495 to Howard County Line	Prince George’s County	●	●	●	●	●	◐
26	Interstate 95 interchange and collector road construct – Contee Road	Prince George’s County	●	●	●	●	●	◐
27	Reconstruct and widen MD 175 – Anne Arundel County Line to I-95	Howard County	●	○	●	●	●	◐
29	Interstate 95 Reconstruct and widen – Prince George’s County Line to Baltimore County Line	Howard County	●	●	●	●	●	◐

Map ID	Name of Project	Jurisdiction	Overall Score	Quality of Service (30 %)	Safety and Security (25 %)	Environmental Stewardship/ Development Plan Goals (10%)	Connectivity for Freight Mobility (25%)	Coordination (10%)
30	Interstate 95 Reconstruct – Howard County Line to Baltimore City Line	Baltimore County	●	●	●	●	●	◐
31	Interstate 695 Reconstruct and widen – Anne Arundel County Line to I-95	Baltimore County	●	●	●	●	●	●
37	Interstate 695 Reconstruct and widen – MD 122 to MD 140	Baltimore County	●	●	●	●	●	●
41	Interstate 695 Reconstruct and widen – I-95 to MD 122	Baltimore County	●	●	●	●	○	●
42	Widen Russell St and improve intersections – I-95 to City Line	Baltimore City	●	◐	◐	●	●	◐
46	Interstate 695 Reconstruct and widen – West of MD 648E to Baltimore County line	Anne Arundel County	●	●	◐	●	●	◐
47	Reconstruct and widen MD 695 – MD 10 to I-895B (Spur)	Anne Arundel County	●	●	◐	●	●	◐
49	Interstate 97 Reconstruct and widen – North of MD 32 to I-695	Anne Arundel County	●	●	◐	◐	●	◐
50	Interstate 97 Reconstruct and widen – U.S. 50/301 to North of MD 32	Anne Arundel County	●	●	◐	◐	●	●
71	Interstate 695 Reconstruct and widen – I-83 to I-95	Baltimore County	●	●	●	●	●	●
72	Widen Boston Street – Conkling Street to Ponca Street	Baltimore City	●	●	◐	●	●	◐
73	Dundalk Truck Bypass (Interchange at Keith and Broening)	Baltimore City	●	●	◐	●	●	◐
74	New Vail Street Extension	Baltimore City	●	●	◐	●	●	◐
75	Construct New Road between Boston and O'Donnell Streets	Baltimore City	●	●	◐	●	●	◐
76	Danville Street Extension	Baltimore City	●	●	◐	●	●	◐
77	Improve turning radii for I-95 SB exit ramp at Keith Avenue	Baltimore City	●	●	◐	●	●	◐
78	Increase two-lane storage distance on I-95 NB exit ramp at Keith Avenue	Baltimore City	●	●	◐	●	●	◐
79	Realign Keith Avenue, flatten curve and provide EB right turn at Vail Street	Baltimore City	●	●	◐	●	●	◐
80	Reconstruct Broening Highway	Baltimore City	●	●	◐	●	●	◐



Map ID	Name of Project	Jurisdiction	Overall Score	Quality of Service (30 %)	Safety and Security (25 %)	Environmental Stewardship/ Development Plan Goals (10%)	Connectivity for Freight Mobility (25%)	Coordination (10%)
81	Reconstruct Interchange at I-695 and Quarantine Road	Baltimore City	●	●	◐	●	●	◐
84	Reconstruct and widen I-95 – MdTA Section 400	Cecil County	●	●	●	◐	●	◐
88	New interchange to access relocated CSX IMX	Baltimore/Anne Arundel Counties	●	●	◐	●	●	○
89	I-70, Route 85 South under I-70	Frederick County	●	●	◐	●	●	○
2	Interstate 70 Reconstruct and widen – I-68 to I-81	Washington County	◐	●	◐	○	●	◐
7	Reconstruct and widen U.S. 15 – U.S. 40 to north of Biggs Ford Road	Frederick County	◐	○	◐	◐	●	◐
12	Interstate 370 Reconstruct and widen – I -270 to Shady Grove Metro	Montgomery County	◐	◐	○	●	●	◐
14	Interstate 495 Reconstruct and widen – American Legion Bridge to Prince George’s County Line	Montgomery County	◐	●	●	●	○	◐
18	Interstate 295 Reconstruct and widen – I-95 to D.C. line	Prince George’s County	◐	◐	◐	●	○	◐
20	Construct Interchange at MD 5/MD 228	Charles County	◐	◐	◐	●	○	◐
21	Reconstruct and widen U.S. 301 – S. of La Plata to N. of LaPlata	Charles County	◐	◐	◐	●	○	◐
28	Reconstruct and widen MD 100 – W. of Snowden River Pkwy to Anne Arundel County Line	Howard County	◐	◐	○	●	●	○
34	Interstate 795 and Dolfield Blvd Interchange Construct	Baltimore County	◐	◐	◐	●	○	◐
35	Interstate 795 Reconstruct and widen – I-695 to MD 940 (Owings Mills Boulevard)	Baltimore County	◐	◐	◐	●	○	◐
36	Interstate 695 and MD 26 Interchange Reconstruct	Baltimore County	◐	●	●	●	○	◐
38	Reconstruct and widen U.S. 29 – MD 100 to I-70	Howard County	◐	◐	●	●	○	◐
39	Interstate 70 Reconstruct and widen – U.S. 29 to Baltimore County Line	Howard County	◐	●	◐	●	○	◐
40	Interstate 70 Reconstruct and widen – Howard County Line to I-695	Baltimore County	◐	●	◐	●	○	◐

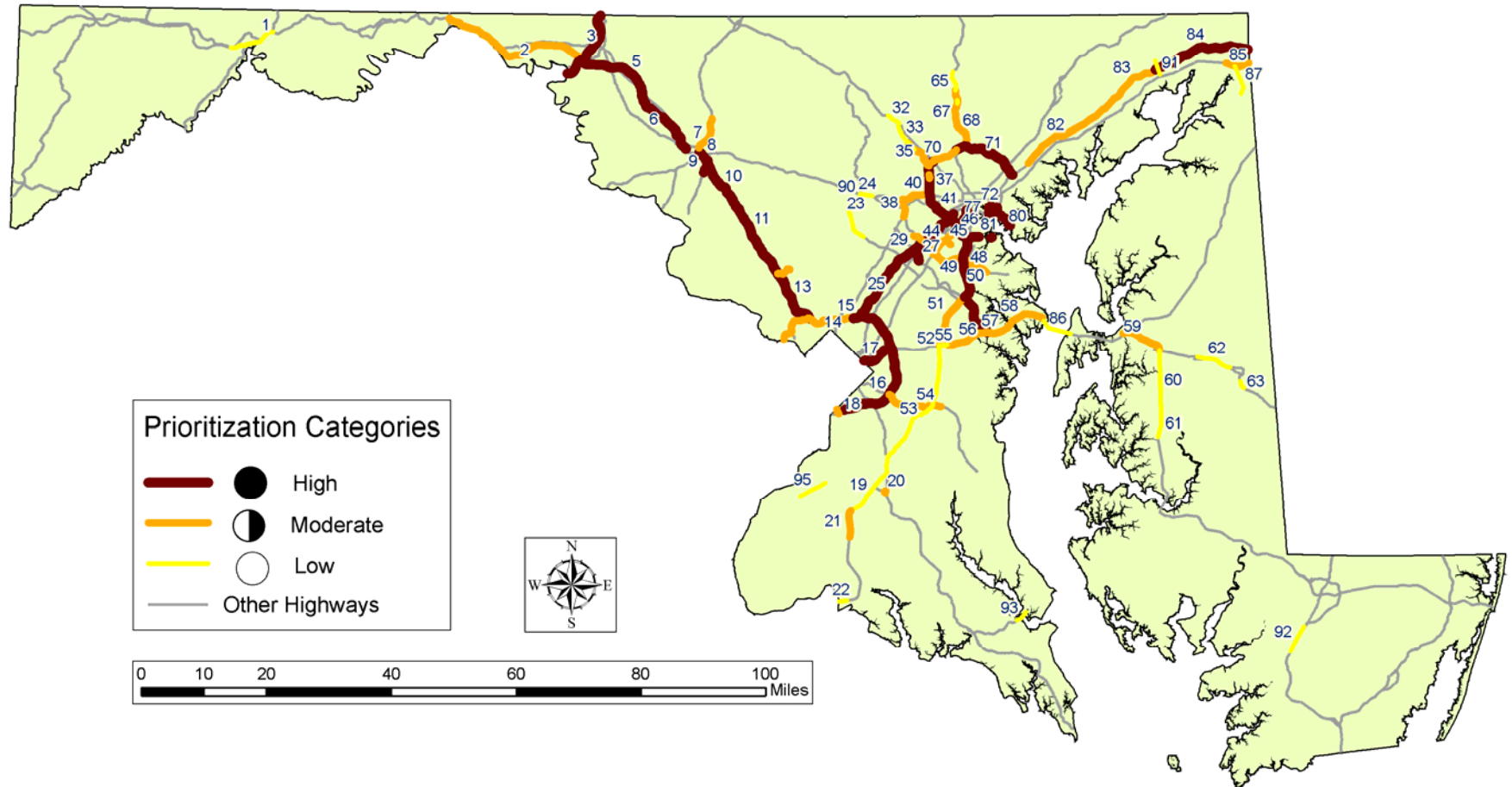
Map ID	Name of Project	Jurisdiction	Overall Score	Quality of Service (30 %)	Safety and Security (25 %)	Environmental Stewardship/ Development Plan Goals (10%)	Connectivity for Freight Mobility (25%)	Coordination (10%)
43	Reconstruct and widen MD 295 – Anne Arundel County Line to Baltimore City Line	Baltimore County	●	○	●	●	●	●
44	Reconstruct and widen MD 295 – S. of MD 100 to I-695	Anne Arundel County	●	●	○	●	●	●
45	Interstate I-195 Reconstruct and widen – MD 170 to MD 295	Anne Arundel County	●	○	●	●	●	●
48	Reconstruct and widen MD 100 – Howard County Line to MD 10	Anne Arundel County	●	●	○	●	●	●
51	Reconstruct and widen MD 3 from Prince George’s County Line to MD 32	Anne Arundel County	●	●	●	●	○	●
52	Reconstruct and widen MD 3 – U.S. 50 to Anne Arundel County Line	Prince George’s County	●	○	●	●	○	●
54	Reconstruct and widen MD 4 – Patuxent River to I-95	Prince George’s County	●	●	●	●	○	●
56	U.S. 50/301 Reconstruct and widen – Prince George’s County Line to I-97	Anne Arundel County	●	○	●	●	○	●
57	U.S. 50/301 Reconstruct and widen – I-97 to MD 70	Anne Arundel County	●	●	●	●	○	●
58	Reconstruct and widen U.S. 50 – MD 70 to Begin Toll Maintenance	Anne Arundel County	●	●	●	●	○	●
59	Reconstruct and widen U.S. 50 – U.S. 301 to MD 404	Queen Anne’s County	●	●	●	○	○	●
67	Interstate 83 Reconstruct and widen – I-695 to Belfast Road	Baltimore County	●	●	●	●	○	●
68	Interstate 83 and Warren Road Interchange Reconstruct	Baltimore County	●	●	●	●	○	●
69	Interstate 83 and Padonia Road Interchange Reconstruct	Baltimore County	●	●	●	●	○	●
70	Interstate 695 Reconstruct and widen – MD 140 to I-83	Baltimore County	●	●	●	●	○	●
82	Reconstruct and widen I-95 – MdTA Section 200	Baltimore/Harford Counties	●	●	●	●	○	○
83	Reconstruct and widen I-95 – MdTA Section 300	Harford/Cecil Counties	●	●	●	○	○	○
85	Reconstruct and widen U.S. 40 – MD 279 to Delaware State Line	Cecil County	●	○	●	●	●	●

Map ID	Name of Project	Jurisdiction	Overall Score	Quality of Service (30 %)	Safety and Security (25 %)	Environmental Stewardship/ Development Plan Goals (10%)	Connectivity for Freight Mobility (25%)	Coordination (10%)
1	Interstate 68 Reconstruct and widen – MD 85 to U.S. 220 North	Allegany County	○	◐	○	●	○	◐
19	Reconstruct and widen U.S. 301 – N. of LaPlata to Prince George’s County line*	Charles County	○	○	◐	◐	○	◐
22	Expand U.S. 301 Harry Nice Bridge	Charles County	○	○	◐	○	○	◐
23	Reconstruct and widen MD 32 – MD 108 to I-70	Howard County	○	◐	◐	○	○	◐
24	Interstate 70 Reconstruct and widen – MD 32 to U.S. 29	Howard County	○	●	◐	○	○	◐
32	Reconstruct and widen MD 140 – I-795 to Carroll County Line	Baltimore County	○	○	◐	○	○	○
33	I-795 Reconstruct and widen – MD 940 (Owings Mills Boulevard) to MD 140	Baltimore County	○	○	◐	●	○	◐
53	Reconstruct and widen U.S. 301 – Charles County Line to U.S. 50	Prince George’s County	○	◐	◐	◐	○	◐
55	U.S. 50/301 Reconstruct and widen – 0.14 miles East of U.S. 301 to Anne Arundel County Line	Prince George’s County	○	○	◐	◐	○	◐
60	Reconstruct and widen U.S. 50 – MD 404 to MD 322	Talbot County	○	○	○	○	○	◐
61	Reconstruct and widen U.S. 50 – MD 322 N. of Easton to MD 322 S. of Easton	Talbot County	○	○	○	●	○	◐
62	Reconstruct and widen MD 404 – Queen Anne’s County line to MD 404 Bus	Caroline	○	○	○	○	○	◐
63	Reconstruct and widen MD 404 – S. of Double Hills Rd to Sennett Road	Caroline	○	○	○	○	○	◐
65	Interstate 83 Reconstruct and widen – Belfast Road to MD 137	Baltimore County	○	●	◐	○	○	◐
66	Interstate 83 and Thornton Mill Road Interchange Construct	Baltimore County	○	●	◐	○	○	◐
86	Add capacity to Chesapeake Bay Bridge	Anne Arundel/Queen Anne’s Counties	○	◐	◐	○	○	○
87	Reconstruct and widen MD 213 – MD 285 to U.S. 40	Cecil County	○	○	○	◐	○	◐
90	I-70, Route 32 Interchange, Weigh Inspection Stations	Howard County	○	◐	◐	○	○	○

Map ID	Name of Project	Jurisdiction	Overall Score	Quality of Service (30 %)	Safety and Security (25 %)	Environmental Stewardship/ Development Plan Goals (10%)	Connectivity for Freight Mobility (25%)	Coordination (10%)
91	New interchange between I-95 and Belvidere Road	Cecil County	○	◐	◐	◐	○	◐
92	Reconstruct and widen U.S. 13 – MD 675 to Wicomico Line	Somerset County	○	○	○	○	○	◐
93	Construct new bridge span – Thomas Johnson Bridge	Calvert/St. Mary’s Counties	○	○	○	◐	○	◐
94	Reconstruct and widen MD 210 – MD 227 to Prince George’s County Line	Charles County	○	○	◐	●	○	◐
95	Reconstruct and widen MD 210 – MD 225 to MD 227	Charles County	○	○	◐	●	○	◐

\* The Tri-County Council for Southern Maryland endorses a Western Bypass of Waldorf.

Figure 8.1 Highway Project Locations



**Table 8.3 Rail Projects**

Map ID	Description	Facility	Source	Railroad Ownership/ User <sup>a</sup>	Overall Score <sup>b</sup>	Quality of Service (30%)	Safety and Security (25%)	Environmental Stewardship/Development Plan Goals (10%)	Connectivity for Freight Mobility (25%)	Coordination (10%)
1A	Increase capacity between Baltimore and DE state line	NEC	MAROps/ MARC	Amtrak/NS/ MARC	●	◐	●	●	◐	●
(4A)	Rehabilitate bridge over Gunpowder River	NEC	MAROps	Amtrak/NS/ MARC	●	◐	●	●	◐	●
(4B)	Rehabilitate bridge over Susquehanna River	NEC	MAROps	Amtrak/NS/ MARC	●	◐	●	●	◐	●
(4C)	Rehabilitate bridge over Bush River	NEC	MAROps	Amtrak/NS/ MARC	●	◐	●	●	◐	●
(5)	Construct new freight-only track between Bayview Yard and Perryville	NEC	MAROps	Amtrak/NS	●	◐	●	●	◐	●
(6)	Improve clearance, alignment, and grade through B&P and Union tunnels – FRA Tunnel Study Phase 2	NEC	MAROps	Amtrak/ MARC	●	◐	●	●	◐	●
(11A)	MARC Growth and Investment Plan – Add additional track between Baltimore and Elkton	Penn Line/NEC	MARC	Amtrak/NS/ MARC	●	●	●	●	●	●
(17)	Add third track so trains can better access NEC from Port Road – (Track A Study)	NEC	MAROps	Amtrak/NS	●	◐	●	●	◐	◐
1B	Increase capacity and improve clearances between Baltimore and DE state line	Philadelphia subdivision	MAROps	CSX	●	◐	●	●	◐	●
3	Increase capacity and improve clearances between Washington, D.C. and Baltimore	Capital subdivision	MAROps	CSX	●	◐	●	●	◐	●
(2)	Increase capacity through Baltimore – includes Howard Street Tunnel	Capital and Philadelphia subdivisions	MAROps	CSX	●	◐	●	●	◐	●
(12)	MARC Growth and Investment Plan – Add third track between Dorsey and Washington, D.C.	Camden Line	MARC	CSX/MARC	●	●	●	●	●	●
(14A)	National Gateway – Increase capacity and provide double-stack clearance between Washington, D.C. and Baltimore	Capital subdivision	CSX	CSX	●	◐	●	●	●	●

Map ID	Description	Facility	Source	Railroad Ownership/ User <sup>a</sup>	Overall Score <sup>b</sup>	Quality of Service (30%)	Safety and Security (25%)	Environmental Stewardship/Development Plan Goals (10%)	Connectivity for Freight Mobility (25%)	Coordination (10%)
8	Increase capacity and improve clearances between Washington, D.C. and Baltimore	NEC	MAROps/MARC	Amtrak/NS/MARC/CSX	●	◐	●	●	◐	●
(11B)	MARC Growth and Investment Plan – Add additional track between New Carrollton and Baltimore	Penn Line/NEC	MARC	Amtrak/NS/MARC	●	●	●	●	●	●
9	Proposed Crescent Corridor – Add second track in Maryland		MAROps	NS	●	◐	●	●	●	●
10	Improve clearances between Baltimore and Sparrows Point	Sparrows Point Branch	MAROps	CSX	●	◐	●	●	◐	●
13	MARC Growth and Investment Plan – Add third track between Silver Spring and Point of Rocks	Brunswick Line	MARC	CSX/MARC	●	●	●	●	●	●
(14B)	National Gateway – Increase capacity and provide double-stack clearance between Washington, D.C. and WV state line	Metropolitan subdivision	CSX	CSX	●	◐	●	●	●	●
14C	National Gateway – Increase capacity and provide double-stack clearance between West Virginia and Pennsylvania state lines	Cumberland subdivision	CSX	CSX	●	◐	●	●	●	●
15	Upgrade Winchester and Western Railroad bridge over the Potomac River		Outreach		◐	◐	◐	◐	◐	○
16	Need new interchange between Maryland Midland Railroad and York Railroad		Outreach		◐	◐	◐	◐	◐	○
18	Relocate CSX Intermodal facility from Seagirt		CSX	MPA/CSX	●	●	●	●	●	●
19	Increase capacity between Enola, Pennsylvania and Perryville, Maryland		Outreach	NS	◐	◐	◐	◐	◐	◐
20	Rehabilitate main line between Harrington, Delaware and Pokomoke, Maryland		Outreach	NS	◐	◐	◐	◐	◐	◐
21	Upgrade Snow Hill Line to 286,000 pound capacity between Frankford, DE and Snow Hill, MD		MDOT	MDDE <sup>c</sup>	●	●	●	●	◐	●
22	Upgrade rail line between Massey and Centerville to 286,000 pound capacity		MDOT	MDDE <sup>c</sup>	●	●	●	●	◐	●
23	Upgrade rail line between Massey and Chestertown to 286,000 pound capacity		MDOT	MDDE <sup>c</sup>	●	●	●	●	◐	●

Map ID	Description	Facility	Source	Railroad Ownership/ User <sup>a</sup>	Overall Score <sup>b</sup>	Quality of Service (30%)	Safety and Security (25%)	Environmental Stewardship/Development Plan Goals (10%)	Connectivity for Freight Mobility (25%)	Coordination (10%)
24	Upgrade rail line between Hurlock and Cambridge to 286,000 pound capacity		MDOT	MDDE <sup>c</sup>	●	●	●	●	◐	●
25	Build rail connector bridge between Seagirt and Dundalk Marine Terminals		MDOT	CTN	●	●	●	●	●	●
26	Raise the catenaries between Perryville and the Port of Baltimore on the NEC to allow for double stack.	NEC	NS	NS	●	●	●	●	●	●
27	Canton Area Rail Improvement to relocate track and yard on Kane Street Property	CRC	CRC/MDTA	CRC	●	●	●	●	●	●

<sup>a</sup> Ownership is listed first followed by other primary users.

<sup>b</sup> Overall score is the weighted average of the scores for each category

<sup>c</sup> Maryland and Delaware Railroad



Figure 8.2 Rail Project Locations

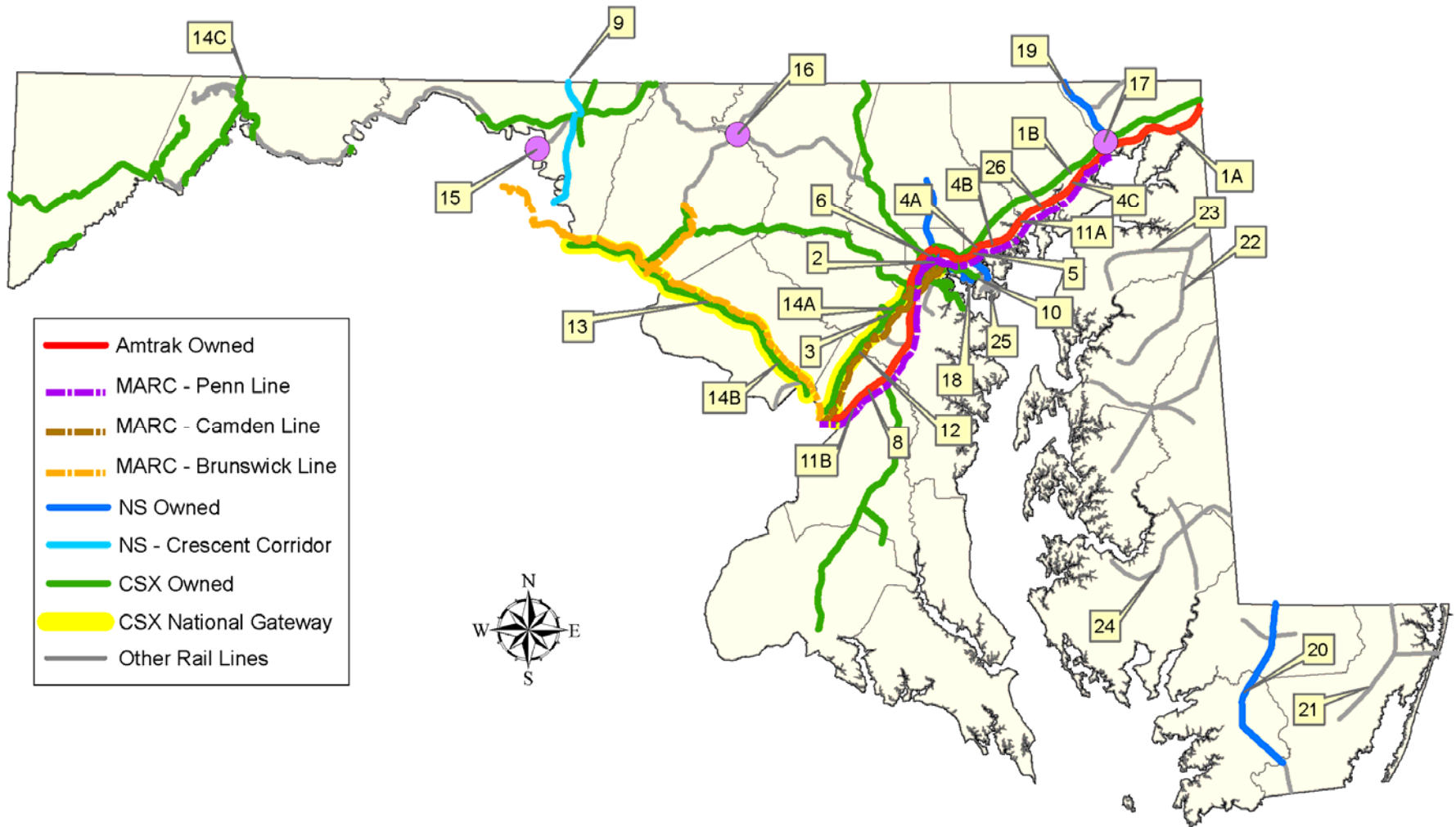


Table 8.4 Port Projects

Map Loc	Name of Project	Facility	Jurisdiction	Source	Overall Score <sup>a</sup>	Quality of Service (30%)	Safety and Security (30%)	Environmental Stewardship/ Development Plan Goals (10%)	Connectivity for Freight Mobility (20%)	Coordination (10%)
1	Canton Warehouse–Pave	Canton Facility	Baltimore City	MPA Unfunded Needs	●	●	◐	◐	◐	◐
2	Cox Creek Terminal Development	Cox Creek Terminal	Anne Arundel	MPA Unfunded Needs	●	●	◐	◐	◐	◐
3	Dundalk Dredge Berths 1-4 to 45 Feet	Dundalk Terminal	Baltimore City	MPA Unfunded Needs	◐	◐	◐	◐	◐	◐
4	Dundalk Property Development	Dundalk Terminal	Baltimore City	MPA Unfunded Needs	◐	◐	◐	◐	◐	◐
5	Fairfield Pier 4 Renovation	Fairfield Pier	Baltimore City	MPA Unfunded Needs	●	●	◐	◐	◐	◐
6	Fairfield, Fill Wet Basin	Fairfield Pier	Baltimore City	MPA Unfunded Needs	◐	◐	◐	◐	◐	◐
7	Fairfield New Pier 3	Fairfield Pier	Baltimore City	MPA Unfunded Needs	●	●	◐	◐	◐	◐
8	James Island Dredged Material Containment Facility (DMCF)	Port	Dorchester	MPA Unfunded Needs	●	●	◐	●	○	◐
9	Seagirt Six additional Rubber-Tired Gantry Cranes (RTG)	Seagirt Terminal	Baltimore City	MPA Unfunded Needs	◐	◐	◐	◐	◐	◐
10	Seagirt Develop Intermodal Container Transfer Facility (ICTF)	Seagirt Terminal	Baltimore City	MPA Unfunded Needs	◐	◐	◐	◐	◐	◐
11	Seagirt Two Additional Cranes	Seagirt Terminal	Baltimore City	MPA Unfunded Needs	◐	◐	◐	◐	◐	◐
12	Seagirt Berth 4, Four Cranes	Seagirt Terminal	Baltimore City	MPA Unfunded Needs	●	●	◐	◐	◐	◐
13	Seagirt Berth 4, Wharf	Seagirt Terminal	Baltimore City	MPA Unfunded Needs	●	●	◐	◐	◐	◐
14	South Locust Point, Fill Fruit Slip	South Locust Terminal	Baltimore City	MPA Unfunded Needs	◐	◐	◐	◐	◐	◐
15	Sparrows Point Dredged Material Containment Facility (DMCF)	Sparrows Point	Baltimore County	MPA Unfunded Needs	●	●	◐	●	○	◐
16	Niche Cargo Shed, Lot 600	Dundalk Terminal	Baltimore City	MPA Unfunded Needs	◐	◐	◐	◐	◐	◐
	Security Projects, All MPA Terminals	MPA Terminals	Baltimore City	MPA Unfunded Needs	◐	○	●	◐	○	◐

Figure 8.3 Port Project Locations





## 9.0 Implementation and Action

The research, analysis, and outreach for this planning effort has introduced a number of trends that will challenge State policy makers and the freight industry in the future. This section outlines steps to and tools help the State advance a proactive freight agenda that matches actions to challenges, the greatest of which is funding freight projects.

### 9.1 FREIGHT ACTION PLAN TO GUIDE NEXT STEPS

In order to implement the investments and program changes necessary to better accommodate today and tomorrow's freight demand, the State should advance the following actions.

#### **Step 1 - Narrow and Focus Policy Actions**

Through the outreach and research of this Plan, MDOT collected numerous categories of policy issues, trends, and challenges with corresponding "desired outcomes" which are backstopped by "potential actions." This information is presented in Section 7.0 of this Plan. To move toward action, the State and its freight partners should narrow the list of potential actions to those most immediately important and then assign responsibility and accountability to MDOT agencies and representatives to provide forward momentum. This activity might occur through future meetings of the IAC or FSAC.

#### **Step 2 - Review/Adopt Prioritized Projects**

The State expended much energy and time to identify, organize, and prioritize freight investments (as outlined in the previous section). The next step is to determine which projects to move forward into programming and implementation, including inclusion into the Consolidated Transportation Program. This exercise will require MDOT to match funding to needed projects to take these projects from planned to programmed.

#### **Step 3 - Identify Funding**

The greatest obstacle to implementation is funding. With more than \$35 billion in unfunded needs identified through this study, consisting of many worthy and beneficial projects, the State will have to pursue Federal funding sources, boost State spending, and establish public-private partnerships to begin to close the gap between available resources and freight infrastructure needs.

To advance this step, the State should work with its partners to identify funding - including public-private partnership opportunities - for each project. This will likely require incremental funding to move projects forward, first

through more detailed planning and preliminary engineering, then more detailed environmental and engineering culminating in construction. The likelihood of funding will be the major filter limiting progression of freight projects to the CTP. Section 9.2 contains additional detail and steps to identify and secure funding.

#### **Step 4 – Raise Awareness**

The Statewide Freight Plan serves as a means of communicating freight transportation needs to policy-makers and business in the State. In the future, the Plan should help sustain the freight planning actions of MDOT by expanding the base of advocates for freight transportation projects and programs. One key action may be the presentation of Plan concepts and findings at the “Maryland Freight Summit” series, which began in 2007 and continues in 2009.

#### **Step 5 – Institutional Support and Outreach**

The State should continue to engage its internal (IAC) and external (FSAC) groups in regular, meaningful, and actionable dialogue to preserve the momentum of this effort and to advance the needs and actions contained in the Plan. In addition, the State should seek ways to expand the circle of stakeholders through regional outreach meetings, increased engagement of the State’s MPO freight coordinators, and through other means. Maintaining a continuous dialogue will help the State better fulfill the actions under Step 6: “Keep Planning”.

#### **Step 6 – Keep Planning**

This document represents the first comprehensive freight transportation plan for Maryland. To keep pace with ever-changing economic and political conditions, MDOT will update this Plan in the future on about a 2 or 3 year cycle to maintain a living document that reflects current and anticipated conditions. Through this initial planning effort, the State has identified several potential improvements and enhancements for the first update cycle of this Plan, including

- Increased focus on multimodal corridor performance and investment;
- Additional emphasis and attention to intermodal freight transportation, including key linkages and connectors to activity centers;
- Heightened attention to the potential for maritime transport—including short sea shipping on the Chesapeake—to alleviate some growth;
- Cultivation of Maryland-specific freight flow data through truck origin-destination surveys and other methods;
- Expanded use of modeling tools—where available—to provide more quantitative depth to prioritization and metrics;

- Identification of a more formal mechanism or linkage to move freight priority projects to the Consolidated Transportation Program (CTP);
- Integration of measures to track freight performance and efficacy of the State's policies and programs (Section 9.4).

The State may choose to engage in these update activities immediately to accrue information in anticipation of the first Plan update.

## 9.2 FUNDING ASSESSMENT AND FINANCING STRATEGIES

The State should conduct an assessment of the funding and financing strategies which Maryland can utilize to advance projects identified in this Plan. At the Federal level many of the existing Federal funding programs and financing tools could be used to facilitate freight investments in Maryland. Federal funding programs target specific projects which also can address freight transportation needs. Financing tools include loans, credit enhancement, and tax exempt financing programs. Federal funding is available through traditional transportation agencies (U.S. DOT, FHWA, etc.) but also through nontransportation agencies. Federal funds can be used for a variety of freight-related projects and the Federal share of projects is often based on a sliding scale and can cover up to the full cost of a project.

Maryland can tap Federal highway funding provided through the Federal-Aid Highway System and Federal-Aid Programs. The roadway systems eligible for Federal highway aid are those designated as part of the National Highway System (NHS) and those eligible for Surface Transportation System (STP) funds, which are administered by Maryland. Federal funding is distributed to Maryland by apportionment or allocation. Apportionments are distributed to all States via formula provided in law. The Federal funds distributed to Maryland are programmed by State agencies and local governments. Allocations are a set of Federal funds for discretionary programs. Freight projects seeking discretionary funding would need to go through a selection process broadcast by U.S. DOT. In general, the application of Federal funds for freight projects in Maryland requires close coordination between proponents such as port authorities, local governments, and industry members with Maryland's agencies and MPOs.

Specific Federal funding programs can be used to fund freight transportation improvements. These are categorized as Special Funding Programs, such as Highway Bridge Program, Railway-Highway Crossings, Truck Parking Facilities, Capital Grants for Rail Line Relocation projects, the Fixed Guideway Modernization Program, and other Federal funding programs, or Discretionary Programs, such as Projects of National and Regional Significance (PNRS), National Corridor Infrastructure Improvement Program and the Freight Intermodal Distribution Grant Program. For the projects related to air cargo

freight, the FAA's Airport Improvement Program (AIP) provides funding for airport planning and development projects.

One special funding program is the Congestion Mitigation and Air Quality Improvement Program (CMAQ) which funds transportation projects and programs that improve air quality. CMAQ funds have been used for freight-related projects that improve air quality by reducing truck, locomotive, or other emissions. Examples of CMAQ-funded freight projects include construction of intermodal facilities for moving containers off of highways and onto rail, defraying barge operating costs, rail track rehabilitation, diesel engine retrofits, idle-reduction projects, and new rail sidings. CMAQ is often the only funding source that many freight projects can access.

There are a host of Federal financing tools available to fund freight transportation projects. The list of tools include loans, credit enhancement, debt financing, and Special Experimental Project Number 15 (SEP-15), which allows the Secretary to waive the requirements of Title 23 and the regulations under Title 23 on a case-by-case basis. These tools allow states to leverage both public and private resources to stimulate capital investment in transportation infrastructure.

At the Federal level, nontransportation agency funding programs also are available for freight projects. This includes the Harbor Maintenance Trust Fund (HMTF) which provides funding for operations and maintenance (i.e., dredging costs) of Federally authorized channels for commercial navigation; Economic Development Administration (EDA) Funds; the USDA Rural Housing Service's Community Facility Program which provides three funding mechanisms to fund construction, enlargement, extension, or improvement of community facilities; and the Environmental Protection Agency's (EPA) Brownfield Revitalization Program, which provides grants and loans for brownfield site cleanup.

Although Federal funding programs for freight improvement projects have increased, it should be noted that issues remain which affect the ability of Maryland to use these programs and funds. For example, many programs are limited to specific modes or specific types of projects. Even though CMAQ has been widely used for several freight projects, CMAQ funds cannot be used for highway improvements that increase capacity for single-occupant vehicles, and are limited to projects that improve air quality in nonattainment or maintenance areas.<sup>37</sup> Freight projects also must compete with other priorities for scarce funding. The structure of Federal funding programs allocated by formula and matched by state and local funds also can pose a challenge to multistate freight investments which extend beyond Maryland's borders. Funding for complex projects which include multiple funding programs is another challenge but has

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<sup>37</sup>U.S. DOT, FHWA. 2007. Financing Freight Improvements.



successfully been used to fund freight investments such as the North Carolina Railroad Improvement Program.

At the State level, grant and loan programs and financing tools are used to facilitate freight investments. A number of states have programs ranging from direct financial assistance (loans and grants) funded through sources such as bond revenue, to the first statewide, maritime-specific public investment bank in the United States. The *Financing Freight Improvements* report by FHWA documented some of these innovative State programs that provide ongoing capital resources to support freight-related improvements.

Maryland does not currently have a dedicated freight funding mechanism, although several States have established such programs, including those in Table 9.1. The range of options illustrated in the table shows the wide variation in funding amount, project eligibility, and approach taken by different states – from the multimodal and statewide Florida Strategic Intermodal System (SIS) approach to the more targeted Virginia Rail Enhancement Fund program. Among the states with established programs to fund freight projects, there is no predominant approach. For Maryland this means the State should expend some resources to determine the feasibility and scope of a program that best fits its needs.

**Table 9.1 State Freight Financing Programs**

State	Program	Project Eligibility	Annual Funding	Funding Source	Grant (G) or Loan (L)
Virginia	Virginia Rail Enhancement Fund	Freight or passenger rail	~\$30M	Various fees, including hotel and car rental fee	G
Ohio	Ohio Rail Development Commission	Freight or passenger rail	Varies	Various, including State funds	L
Florida	Florida Strategic Intermodal System	Highway, rail, port, intermodal	~\$2B	State funds, innovative financing, PPP revenues	G
Washington	Washington Freight Mobility Strategic Investment Board (FMSIB)	Highway, rail, port (on a strategic corridor)	\$350M	State funds	G (matching funds formula)

Source: FHWA. *Financing Freight Improvements Guidebook*. January 2007.

Beyond the Federal and State programs and funds, nontraditional funding methods and financing tools are available to fund freight improvements in Maryland. These are grouped into three major categories: funding sources, which refers to dedicated revenue sources (user fees/tolls, dedicated taxes, special taxing and assessment districts); financing tools that use debt; and

institutional arrangements, which include public-private partnerships and tax-exempt corporations.

Finally, the greatest opportunity for freight funding at the present time may be the Federal stimulus package through the American Reinvestment and Recovery Act (ARRA). ARRA provides discretionary funding through FHWA that may be used for highway or other modal projects. The FRA also has ARRA funding for intercity capital rail improvements, which may be mutually beneficial if applied to shared passenger / freight corridors.

### 9.3 INSTITUTIONAL AND ORGANIZATIONAL RELATIONSHIPS

To effectively carry out the projects, programs, and policy directions suggested by this Plan, the State should formalize the institutional freight planning regime that has evolved during the development of this Plan and through other activities of the Office of Planning and Capital Programming (OPCP) and the Office of Freight Logistics (OFL). The current freight structure consists of:

- **OPCP** offering statewide planning and freight integration advice, and as the planning arm of the Secretary’s Office, continuing to serve in a custodian role over the two standing freight committees – the Internal Agency Committee (IAC) and the Freight Stakeholder Advisory Committee (FSAC).
- **OFL** providing day-to-day monitoring of freight activities and programs, including State support of short line rail services and liaison to State, regional, and local agencies engaged in freight operations and planning activities, such as economic development officials or safety officials.

Beyond OPCS and OFL, several other State agencies engage in freight planning activities. Representatives of these agencies are members of the Interagency Advisory Committee (IAC) as shown in the graphic below.

**Table 9.1 Interagency Advisory Committee**

Agency	Role	Freight Activities
Office of Planning and Capital Programming	Lead	Statewide multimodal planning and coordination
Office of Freight Logistics	Co-Lead	Motor carrier support, freight rail support, regional coordination and planning
State Highway Administration	Member	Commercial vehicle safety, commercial vehicle permits, highway planning and modeling
Maryland Transportation Authority	Member	Commercial vehicle operations and tolling on MdTA facilities, facilities planning
Maryland Port Authority	Member	Oversight, planning, administration of Port of Baltimore
Maryland Aviation Administration	Member	Air cargo planning, management, promotion at BWI and other airports

### *Interagency Advisory Committee*

The IAC has met at key milestones during the development of the Freight Plan. In the future, experience of other states has demonstrated the value of retaining this committee and scheduling periodic meetings to discuss freight issues and especially to promote coordination across modes. Many states' internal freight committees meet on a quarterly basis. For Maryland, continuing the IAC would maintain the connections and relationships cultivated through the Statewide Freight Plan development. The following graphic presents the mission of the IAC.

#### **Interagency Advisory Committee (IAC) Mission**

*The Interagency Advisory Committee is the public agency freight voice for Maryland. Members represent their constituencies' economic, environmental, and transportation needs relative to goods movement. The committee will seek ways to enhance freight mobility in Maryland; increase Maryland's global connectivity and competitiveness; enhance safety and security of the freight system; and balance freight demand with environmental preservation. The Committee will support the analysis of statewide, multi-jurisdictional, regional, and corridor freight movement challenges beyond the capacity of individual agencies, MPOs and local jurisdictions to address separately.*

### *Freight Stakeholder Advisory Committee*

The other important institutional body that should continue to support freight planning activities in Maryland and advocate for implementation is the Freight Stakeholder Advisory Committee (FSAC). Like the IAC, this group was formed during the Statewide Freight Plan development, and convened several times at important milestones. Members include executive-level representatives of trucking companies, freight-rail carriers, steamship lines, major shippers, and facility operators. In addition, USDOT representatives of FHWA and FRA participate. In the future, the FSAC should meet on a more regular basis to inform MDOT, other State agencies, or the General Assembly of private sector freight needs.

### Freight Stakeholder Advisory Committee (FSAC) Mission

*Freight Stakeholder Advisory Committee (FSAC) is a high-level group of freight industry leaders representing the best interests of Maryland businesses and consumers. Members represent diverse commercial and business interests that, through their operations and ownership, determine how the State's freight system is used and--in some cases--improved with private capital. Members also represent the diverse geographies and local communities that are impacted by freight movement. Like the Interagency Advisory Committee (IAC), the FSAC will seek ways to enhance freight mobility in Maryland; increase Maryland's global connectivity and competitiveness; enhance safety and security of the freight system; and balance freight demand with environmental preservation. The Committee will support the analysis of private freight operations in Maryland and provide insight into future goods movement patterns and needs.*

### External Coordination

Building on efforts to strengthen and perpetuate recently initiated efforts to engage State agencies and the freight firms, the State should continue to cultivate freight planning relationships with neighboring states. Unilateral interaction with Delaware (on Delmarva freight issues) and other neighboring states will result in more careful planning and mutually beneficial investments for the region. Similarly, continued involvement with the I-95 Corridor Coalition's freight planning efforts will improve both Maryland and corridor states' goods movement actions.

## 9.4 CONTINUING PERFORMANCE OVER TIME

A comprehensive and consistent set of performance measures of the freight transportation system in Maryland is essential for ensuring the continued movement of goods through the State's highways, rails, waterways, and the air and port systems. Freight-specific performance measures help to identify needed transportation improvements and monitor their effectiveness. Measuring performance is more critical than ever given the challenging economic climate and budget constraints MDOT is facing. The need to allocate resources wisely is vital if Maryland is to meet its goals of providing a high standard of service quality, maintaining safe and secure systems, improving the efficiency and performance of the existing network, protecting and preserving Maryland's environment, and pursuing increased system connectivity. In Maryland, continually evaluating the performance of the transportation system not only makes sense but is legally mandated for MDOT and other State agencies.

This section identifies key measures to gauge the performance of Maryland's freight transportation system by assessing the condition of the system, identifying problems, and setting priorities on actions to resolve those problems. Some areas to consider for developing performance measures include:<sup>38</sup>

- Linking freight performance measures to the decision-making process regarding State investments, operations, and policies for the entire system and critical components (corridors, links, and nodes);
- Measures supporting investment, operations, and policy decisions by a range of stakeholders, both public and private, and reflect local, regional, national, and global perspectives;
- Discussion of data collection for freight performance measures requires coordination from both the private sector and the public sector;
- When developing performance measures for freight, ensure that data is applicable and comparable at various geographic levels to reduce duplication of efforts (e.g., use data collected by Federal agencies); and
- Potential performance measures include: efficiency, effectiveness, capacity, safety, security, infrastructure condition, congestion, energy, and environment.

MDOT already has in place processes that track performance measures which also can be used to evaluate the movement of freight. The annual Attainment Report on Transportation System Performance presents performance results from MDOT and its five modal agencies and shows progress towards strategic goals and objectives that guide transportation decisions in Maryland. For example, the 2009 Annual Attainment Report tracks the tonnage of freight moving through the Port of Baltimore and at MPA terminals. Mobility and travel-time reliability performance measures can be used to guide investments in traffic management systems to better treat congestion.

The Maryland Managing for Results (MFR) is a strategic planning, performance measurement, and budgeting process that emphasizes use of resources to achieve measurable results, accountability, efficiency, and continuous improvement in State government programs. Managing for Results is linked to the State budget process and decision-making. MDOT is legislatively mandated to submit an overall agency mission, vision, key goals, and performance measures, with an annual budget submission. These existing State processes, which MDOT is required to do, can be adapted to incorporate freight performance measures.

Freight performance measures also are important at the Federal level. FHWA has established a Performance Measurement Exchange site with a section

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<sup>38</sup><http://www.trb.org/TRBNet/ProjectDisplay.asp?ProjectID=1575>.

specifically on Performance Measurement of Freight and Private Sector. The FHWA website focuses on developing performance measures (and supporting data) to monitor how well transportation systems are meeting the needs of private sector freight users. It also discusses how public agencies can obtain data from the private sector and/or reuse measures that already have been developed by the private sector.

Travel times, travel rates, congestion costs, and delay times at freight bottleneck areas are examples of measures used to monitor freight performance. Some of the specific FHWA freight performance measures that also could be applicable in Maryland include:

- Travel Time in Freight Significant Corridors;
- Expenses per Mile for the Motor Carrier Industry;
- Measuring Improvements in the Movement of Highway and Intermodal Freight; and
- Railroad Performance Measures.

The challenge for Maryland is developing up with the key freight-specific performance measures the State can use to assess the condition of the transportation system, identify needed transportation improvements, set priorities on actions to resolve problems, and monitor their effectiveness.

## 9.5 CONCLUSION

Goods movement in the State of Maryland has a bright future ahead if the State can continue to progressively plan for freight growth while balancing livability and environmental sustainability goals. Projected freight volumes have the potential to overwhelm the current system unless the State takes steps to provide more capacity for all modes and to embrace policies and investments that strategically coordinate and direct growth. The Maryland Statewide Freight Plan serves as a living and evolving blueprint to help the State focus its efforts. Through heightened coordination and careful investment decisions, MDOT stands ready to confront the challenges that lie ahead to provide an increasingly reliable, intermodal, safe, and sustainable goods movement system.