

*I-95 Corridor Coalition*

# Mid-Atlantic Rail Operations Study *Summary Report*



*April 2002*

---

---

# Mid-Atlantic Rail Operations Study

## *Summary Report*

*Prepared for:*

I-95 Corridor Coalition

*Sponsored by:*

Amtrak  
CSX Transportation  
Norfolk Southern

Delaware Department of Transportation  
Maryland Department of Transportation  
New Jersey Department of Transportation  
Pennsylvania Department of Transportation  
Virginia Department of Transportation

I-95 Corridor Coalition

*Prepared by:*

Cambridge Systematics, Inc.  
Parsons Brinckerhoff Quade and Douglas, Inc.

*April 2002*

---

---

# Table of Contents

<b>Introduction</b> .....	1
The Nation’s Transportation System: Dramatic Growth and Change .....	1
Congestion and Security Challenges Require Planning “Across Boundaries” .....	1
Study Recommends a Targeted \$6.2 Billion Rail Investment Program and Public-Private Partnership .....	2
<b>The Situation</b> .....	3
The Mid-Atlantic is a Transportation Corridor of National Significance.....	3
Transportation System Performance in the Mid-Atlantic is Deteriorating .....	4
Deteriorating Transportation Performance Has Significant Costs.....	5
<b>The Challenge</b> .....	6
The Performance of All Transportation Modes Must be Improved.....	6
Rail Can Play a Bigger Role in Meeting the Region’s Transportation Needs.....	6
Choke Points Must be Addressed for Rail to Serve More Passengers and Freight .....	7
<b>The Program</b> .....	14
Consensus Recommendation for \$6.2 Billion Dollar Program Over 20 Years.....	14
The Near-Term Program (\$2.4 Billion Dollars, Within Five Years).....	14
The Medium-Term Program (\$1.9 Billion Dollars, Five to 10 Years) .....	16
The Long-Term Program (\$1.9 Billion Dollars, 10 to 20 Years).....	18
<b>The Results</b> .....	20
Eliminating Choke Points Affecting Passengers Will Generate Public Benefits ...	20
Eliminating Choke Points Affecting Freight Will Generate Public Benefits .....	21
Benefits Will Accrue to the Region and the Nation.....	23
<b>The Partnership</b> .....	23
A Public-Private Partnership is Needed to Fund the Program and Achieve Benefits .....	23
<b>Conclusions and Next Steps</b> .....	24
A Choice Between Two Futures .....	24
Moving This Initiative Forward .....	25

# List of Figures

1. Mid-Atlantic Rail Network ..... 3

2. Bridge and Tunnel Choke Points ..... 9

3. Rail Capacity Choke Points..... 10

4. Rail Connection Choke Points ..... 11

5. Rail Clearance Choke Points ..... 12

6. Grade Crossing, Station, and Terminal Choke Points..... 13

7. Mid-Atlantic Rail Near-Term Program ..... 15

8. Mid-Atlantic Rail Medium-Term Program..... 17

9. Mid-Atlantic Rail Long-Term Program..... 19

# Summary Report

*This study is an initiative of the I-95 Corridor Coalition, five Mid-Atlantic states, and three railroads to address regional transportation as a system. The study recognizes the need to manage system capacity; build system-oriented institutional relationships; and develop system-responsive funding strategies. The Mid-Atlantic Rail Operations Study is a necessary turning point in the region's approach to transportation investments and operations.*

## ■ Introduction

### **The Nation's Transportation System: Dramatic Growth and Change**

Over the last two decades, passenger and freight movements on the nation's transportation system have increased dramatically. Vehicle-miles-of-travel by passenger cars and trucks grew by 72 percent while road-lane-miles grew by only one percent (Federal Highway Administration data). Over the same period, ton-miles-of-freight moving over the nation's railroads increased by 55 percent while system mileage actually declined (Eno Foundation data). Some of this growth has been accommodated by taking actions that improved the efficiency of the transportation system.

Within the public sector, the Intermodal Surface Transportation Efficiency Act (ISTEA, 1991) returned transportation decision-making to the states and metropolitan regions, promoted improved intermodal connections among transportation modes, and funded aggressive use of intelligent transportation system (ITS) technologies. The Transportation Equity Act for the 21<sup>st</sup> Century (TEA-21, 1998) reinforced these initiatives, paid for better maintenance and targeted infrastructure improvements, and emphasized the need to re-link transportation investment to economic development and trade strategies.

Within the private sector, an expanding economy and economic deregulation of the trucking, railroad, airline, and ocean shipping industries triggered explosive growth in productivity. Competition increased; firms were consolidated, merged, and restructured; investments were made in larger trucks, double-stack trains, bigger containerships, and modern terminal facilities; and new and better-coordinated services were introduced.

### **Congestion and Security Challenges Require Planning "Across Boundaries"**

However, the nation is seeing diminishing returns from the transportation initiatives of the last decades. Capacity and congestion problems today are eroding the productivity of the transportation system. Travel time and cost are increasing, service reliability is

decreasing, and the ability of the system to recover from emergencies and disruption of service is severely taxed. The capacity and congestion problems are apparent at the Coalition region's international freight gateways, across its metropolitan regions, and along its national transportation routes.

Layered on top of these concerns is a renewed mandate for contingency planning that will protect the freight and passenger transportation systems from terrorism as well as from natural disasters and criminal activity. The public and private sectors have just begun to address the issue of how to balance the need for open, cost-effective, transportation flows to encourage economic development and trade with the need for closely controlled flows and redundant transportation infrastructure to ensure national security and public safety.

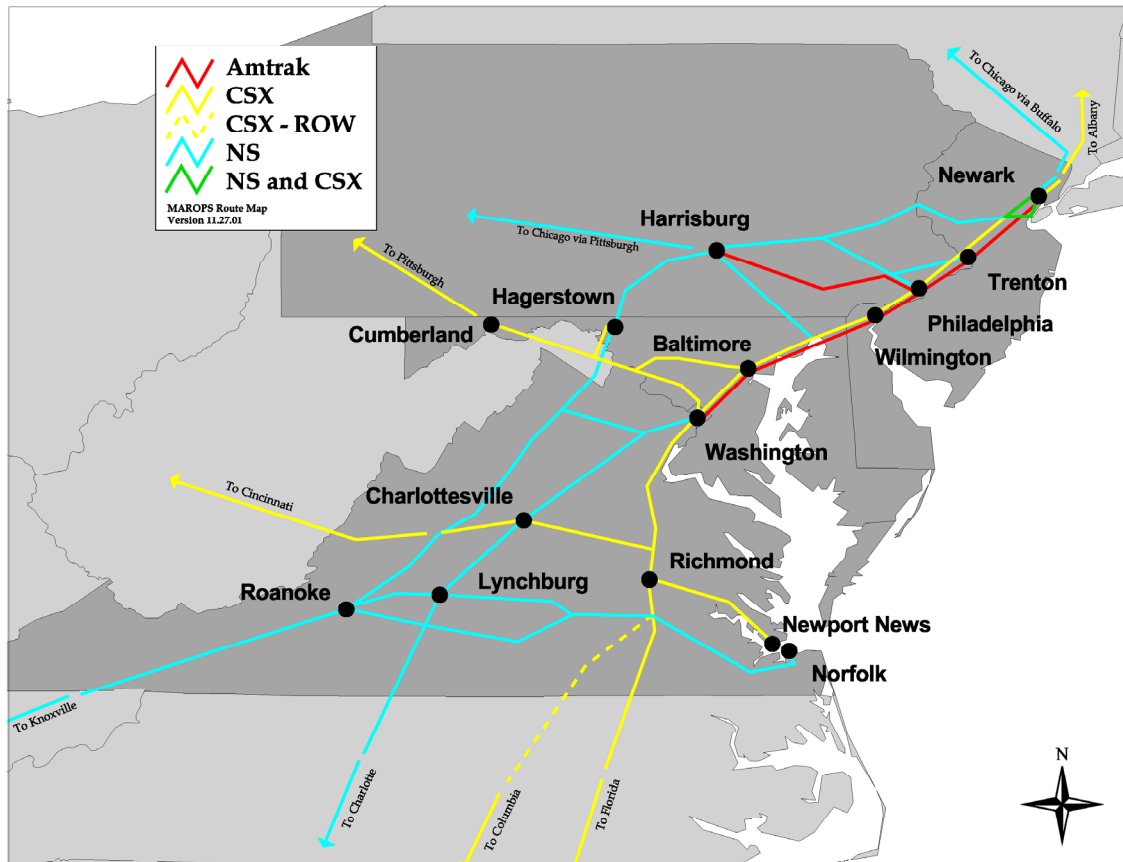
Solving these problems in the coming decade will require a willingness to plan and fund transportation system improvements across boundaries – across the jurisdictional boundaries between states and cities, across the interest boundaries between the public agencies and private firms, and across the financial boundaries between highway and rail programs.

## **Study Recommends a Targeted \$6.2 Billion Rail Investment Program and Public-Private Partnership**

The Mid-Atlantic Rail Operations Study begins to address these barriers. It is the result of a cooperative process to identify transportation solutions across boundaries. It is the joint product of five states (Delaware, Maryland, New Jersey, Pennsylvania, and Virginia), the I-95 Corridor Coalition (representing these five states and eight others in the Northeast Corridor), and three railroads (Amtrak, CSX, and Norfolk Southern). The study examines the deteriorating performance of the Mid-Atlantic's highway, aviation, and rail systems. It focuses on the region's rail system (Figure 1). The study identifies opportunities to better utilize the region's existing rail assets; formulates a program of systemwide rail investments in all five states; and recommends a public-private partnership to fund and implement the improvements. The most important findings are:

- The Mid-Atlantic rail system is constrained by significant choke points that must be eased if the region's increasing demands for passenger and freight movements are to be met. A program of 71 infrastructure and information system improvements must be implemented across the five states and the District of Columbia over the next 20 years to relieve these choke points. The estimated cost of these improvements is \$6.2 billion dollars. However, neither the railroads nor the states can bear the financial burden of these improvements entirely on their own.
- These rail improvements serve a public purpose by helping to relieve the pressure on the region's highway system and meeting the region's social, economic, and quality-of-life needs. It is in the public interest for all levels of government – federal, state, regional, and local – to work cooperatively with the railroads to plan, finance, and deliver projects that deal with these Mid-Atlantic rail-system choke points.

**Figure 1. Mid-Atlantic Rail Network**



- Although this study focused on the five participating states, the Mid-Atlantic region is an integral part of the larger Coalition region. Rail improvements in the Mid-Atlantic region, or the lack thereof, directly affect New York State and New England. The Coalition should undertake a comparable assessment of rail issues and needs in New York State (especially East of the Hudson) and New England to complement the Mid-Atlantic study findings and recommendations.

## ■ The Situation

### **The Mid-Atlantic is a Transportation Corridor of National Significance**

The Mid-Atlantic region – comprising Virginia, Maryland, Delaware, Pennsylvania, and New Jersey – is a strategic corridor of national significance for moving people and goods. The transportation network in the Mid-Atlantic region serves and connects the nation’s political capital, its financial capital, and 47 million people – 33 million in the five Mid-Atlantic states and another 14 million in the New York City metropolitan area. (The total

population of the New York-Northern New Jersey metropolitan region is nearly 20 million.) The Mid-Atlantic is the gateway to New York State and New England. All together, the 13 states of the Coalition region served by the Mid-Atlantic region account for a quarter of the nation's population and jobs.

The Mid-Atlantic is the nation's largest producing and consuming market. About half of the truck-freight tonnage on its interstate highways and most of the rail-freight tonnage on its rail lines moves to and from states outside the region, which means that transportation conditions in the Mid-Atlantic region affect business and transportation decisions throughout the country.

The Mid-Atlantic also is the gateway to European, South American, and increasingly, Asian markets. Its highway and rail networks provide landside connections to the region's major international seaports, including Hampton Roads (Virginia), Baltimore (Maryland), Wilmington (Delaware), Philadelphia (Pennsylvania), and the ports of New York and New Jersey. The Mid-Atlantic region transportation system is vital to the economic well-being of the region and the nation.

### **Transportation System Performance in the Mid-Atlantic is Deteriorating**

The Mid-Atlantic region is facing a transportation capacity crisis. Its transportation network is severely and unacceptably congested. Its airports face a critical shortage of runway capacity. Its seaports require improved terminals and better landside highway and rail connections to ensure their continued growth and vitality. And its rail system must accommodate the conflicting demands of high-volume passenger and freight movement over an aging infrastructure. But the most significant problems are on its highways, which are among the most heavily traveled in the nation.

The Federal Highway Administration's (FHWA) 1999 Highway Performance Monitoring System (HPMS) data show that the annual average daily traffic (AADT) volume on I-95 through the five-state region exceeds 100,000 vehicles. At the Washington, Baltimore, Philadelphia, and Newark metropolitan nodes along I-95, traffic volumes, which include commuter traffic as well as intercity traffic, range from 175,000 to 225,000 AADT. Comparable levels of traffic are seen only in similarly congested urban corridors such as Los Angeles-San Diego and San Jose-San Francisco-Sacramento.

The HPMS data also show that I-95 is one of the nation's preeminent freight corridors, carrying more than 10,000 trucks per day. The only corridors with comparable truck volumes are I-5 between Los Angeles and San Francisco, I-85 between Charlotte and Atlanta, and I-65 between Chicago and Nashville. Trucks represent 10 percent to 20 percent of all vehicles on I-95. Although I-81 carries fewer trucks than I-95, trucks on I-81 represent an even higher share of total vehicle traffic – 20 percent to 30 percent on a daily basis with peak-period volumes of up to 60 percent (Virginia Department of Transportation statistics). I-81 carries about the same tonnage as I-95 because it has a higher share of long-haul, freight-truck traffic.



The FHWA's Freight Analysis Framework project estimates that the tonnage of truck and rail freight moving in the region may increase by 70 to 80 percent (about three percent annually) by 2020. The FHWA's HPMS projections also show significant increases in total AADT on I-95 and I-81 by 2020, ranging from 10 percent on low-growth segments to 196 percent on high-growth segments. Level-of-service measures show that many segments of I-95 and I-81 are already at or near capacity. The situation will only deteriorate further with continuing growth in freight and passenger movement.

## **Deteriorating Transportation Performance Has Significant Costs**

These capacity and congestion problems impose substantial costs on the people living, working, visiting, and doing business in the region. According to the 2000 Census, of the 100 counties in the nation with the longest commute times, 25 are in the Mid-Atlantic region. The Texas Transportation Institute's Urban Mobility Report estimates that the per capita cost of congestion in the region's major metropolitan areas ranges from \$500 to \$800 per year, depending on the metropolitan area. This represents only the cost of time and fuel wasted by the region's commuters.

Capacity and congestion problems impose a similar burden on businesses and consumers. To meet customer demands and global competition, businesses are shifting from "push" to "pull" logistics systems - from "manufacture-to-supply" or inventory-based logistics to "manufacture-to-order" or replenishment-based logistics. Massive warehouse inventories and large, consolidated shipments have given way to just-in-time manufacturing operations and smaller, more frequent shipments.

Pull systems are cost-effective. By reducing the time between manufacture and sale, businesses reduce uncertainty about how much they should produce and minimize the cost of carrying extra inventory of expensive parts and products. They can produce what the customer wants and deliver it when the customer wants. But pull logistics systems place tremendous demands on the transportation system. Shippers operating manufacture-to-order and time-definite-delivery systems must have reliable, timely, and visible door-to-door freight transportation. An accident, congestion, labor disputes, storms - even unanticipated spikes in supply and demand - can unravel these tightly strung systems. The FHWA's Highway Economic Requirement System (HERS) values travel time at \$14.33 per hour for a medium-size auto (in 1995 dollars) and up to \$32.25 per hour for a five-axle combination truck, so congestion has an even greater dollar impact on truck trips than on commuter trips.

Overall, congestion means increased time, cost, and uncertainty for businesses and travelers, resulting in higher prices for consumers and reduced competitiveness for producers. Moreover, congestion in one mode adversely affects all modes because many passengers and most freight move in chained trips involving multiple modes. Capacity and congestion problems diminish the region's quality of life and attractiveness to business, impact emergency response capability, and make it more difficult to achieve public-policy goals for livable communities and economic development.

## ■ **The Challenge**

### **The Performance of All Transportation Modes Must be Improved**

The era of building major new transportation system facilities in the Mid-Atlantic region – highways, airports, seaports, and rail systems – is largely past. Construction of new facilities and major expansion of existing facilities is limited by a shortage of developable land, high costs, and environmental constraints. But the region’s capacity and congestion problems must be addressed. Solutions must come from state, local, and private-sector projects that relieve choke points; better utilization of transit, trucks, and trains; improved intermodal services and facilities; and closer attention to highway and rail operations.

The region has made significant transportation investments and improvements. The states and metropolitan planning organizations have invested heavily to maintain the existing highway system, provide safety improvements, and add capacity where feasible. The I-95 Corridor Coalition has been the national leader in deploying intelligent transportation systems (ITS) technologies to increase highway system performance. The Mid-Atlantic airports and seaports each have plans to improve their facilities. The Port Authority of New York & New Jersey is exploring development of the Port Inland Distribution Network; and in cooperation with the I-95 Corridor Coalition, the Port Authority recently inaugurated FIRST Port, a Internet web-based information system that helps truckers serving the port community schedule their trips.

The railroads in the Mid-Atlantic, like the airports and seaports, also have invested heavily in their systems. Amtrak made major improvements to its Northeast Corridor to support the introduction of its Acela high-speed intercity passenger rail service. And CSX and Norfolk Southern have acquired Conrail’s assets and are improving track, signals, and terminals to provide competitive services in the region.

### **Rail Can Play a Bigger Role in Meeting the Region’s Transportation Needs**

The Mid-Atlantic region’s extensive rail network evolved incrementally over the last 150 years to meet public and private needs. The system includes a private freight network with two Class I freight railroads (CSX and Norfolk Southern), an intercity railroad operating as a for-profit enterprise (Amtrak), and five commuter rail services (NJ Transit, SEPTA, MARC, Delaware DOT’s contracted services with SEPTA, and the VRE). The freight, intercity, and commuter railroads share trackage across much of the region.

Given its complexity, the system is remarkably successful. The Northeast Corridor (NEC) is Amtrak’s most productive service. Amtrak runs more than 80 trains per day between Washington and New York, including four added since September 11, 2001, and carries more than 13 million riders per year on the NEC. The commuter railroads operate as many as 250 trains per day and collectively carry more than 100 million riders per year over their systems. On an annual basis, the freight railroads move more than 250 million tons of intermodal (containerized) and non-containerized goods into and out of the region

and carry an additional 100 million tons of freight through the region. And while the rail freight system carries more east-west than north-south traffic, the freight railroads run as many as 27 trains per day on the major north-south lines – in many cases threading their way through higher priority intercity and commuter rail passenger traffic.

Although the Mid-Atlantic rail system is a major carrier of passengers and freight, it is not operating at its full potential. Many segments of the system are capable of handling higher volumes of passenger and freight traffic, but these volumes cannot be accommodated because of critical choke points in the rail system.

## **Choke Points Must be Addressed for Rail to Serve More Passengers and Freight**

Choke points are physical points in the rail system (bridges, tunnels, track segments) that have reduced capacity and operational capabilities in comparison to the rest of the system. Also included are deficient information and management systems that constrain the effective utilization of the system as a whole. Like a three-inch diameter valve connecting 12-inch diameter water mains, each choke point restricts passenger and freight flows over the rest of the network.

The most critical choke points must be eliminated to unlock the full capacity of the Mid-Atlantic rail network and enable it to make its maximum contribution to the overall transportation system. The critical choke points include:

- Antiquated and undersized bridges and tunnels (Figure 2). Between Perryville and Baltimore, Maryland, there are three bridges on Amtrak’s Northeast Corridor (over the Gunpowder, Susquehanna, and Bush Rivers) that require rehabilitation because of age, limited capacity, and height and weight restrictions. In Baltimore, the Northeast Corridor runs through the Union Tunnels (built in the 1920s) to the north of the Amtrak station and the B&P Tunnel (built in the 1870s) to the south; major rehabilitation of both is needed because of deterioration and lack of vertical clearance. The CSX Howard Street Tunnel in Baltimore and the Virginia Avenue Tunnel in Washington, D.C., are antiquated, single-track tunnels with limited vertical clearances that preclude double-stack trains; both need to be double-tracked and double-stack cleared. Finally, increased bridge capacity crossing the Potomac River between Virginia and Washington, D.C., is needed.
- Lack of capacity on critical segments of freight and passenger lines (Figure 3). There are more than 25 locations in the five states where an additional mainline track must be added to provide increased capacity and reduce or eliminate operating conflicts between passenger and freight trains.
- Inadequate vertical clearances for double-stack container traffic on freight mainlines (Figure 4). There are 11 problem spots in Virginia, eight in Washington D.C., 17 in Maryland, eight in Delaware, 45 in Pennsylvania, and one in New Jersey where low

bridges, catenary wires, or other structures preclude double-stack service. These barriers need to be raised.

- Inadequate connections between rail lines (Figure 5). In Baltimore, a link is needed between the Northeast Corridor Penn Line and the CSX Camden Line to provide MARC access to their new maintenance facility. In Delaware, restoration of the Shellpot Bridge is needed to provide Norfolk Southern with a direct connection to the Port of Wilmington without using the Northeast Corridor and impeding AMTRAK and SEPTA passenger rail service. In Philadelphia, SEPTA needs a way around the congested “Phil Interlocking” to increase its rail service to the airport; and connecting tracks are needed at “Zoo Interlocking.”
- Congested grade crossings, stations, and terminals (Figure 6). In New Jersey, an overpass is needed at the Croxton Yard and additional space is needed at the Oak Island Yard. In Pennsylvania, 13 grade crossings need improvement to eliminate delays to local traffic and trains. In Washington, DC, a new L’Enfant Station is needed to accommodate the growing volume of VRE passengers; and in Virginia, a series of grade crossings between Washington, D.C., and Richmond must be upgraded to accommodate more and higher-speed trains along the corridor.
- Outmoded and inadequate information and control systems. Each of the railroads has sophisticated dispatch and control systems, but information moves among the railroads by telephone and fax. The railroads need a regional rail information network to share information among dispatchers and improve emergency response. Opportunities such as a common system of cab signals, Positive Train Control, and other potential technology applications are under consideration.

## ■ **The Program**

### **Consensus Recommendation for \$6.2 Billion Dollar Program Over 20 Years**

To address these choke points, the I-95 Coalition, the participating states, and the participating railroads worked closely and cooperatively in a process that crossed jurisdictional, modal, and public-private boundaries. Together, they developed a consensus program of 71 infrastructure and information-technology improvements to be implemented over 20 years. The initial order-of-magnitude cost estimate for the improvements (not based on detailed engineering) is \$6.2 billion.

The proposed improvements cover all five Mid-Atlantic states and the District of Columbia, and they address both passenger and freight needs. The improvements are described below by state. The improvements are grouped according to the length of time it will take to implement them: near-term projects that can be completed within five years; medium-term projects that can be completed within 10 years; and long-term projects that can be completed within 20 years. Planning, design, and initial funding of some of the near-term improvements are already underway.

### **The Near-Term Program (\$2.4 Billion Dollars, Within Five Years)**

The Near-Term Program includes the following projects (Figure 7):

- New Jersey: Highway grade separation at the NS Croxton Yard; second main track and 11 related projects on the two Shared Assets mainlines; and second main track on CSX from Manville to Trenton.
- Pennsylvania: Clearance improvements (33 locations) on the CSX between Philadelphia and Trenton; clearance improvements (11 locations) on CSX in the Philadelphia area; second main track on CSX in the Philadelphia area; connection on NS Lurgen Branch at Harrisburg for yard access; and second main track on NS line from Harrisburg to the Pennsylvania-Maryland state line.
- Delaware: Clearance improvements (eight locations) on CSX; restored Shellpot Connection to eliminate NS- and passenger-train conflicts and serve the Port of Wilmington; dedicated freight track to eliminate NS- and passenger-train conflicts from Wilmington to Perryville, Maryland.
- Maryland: Design for reconstruction of the Howard Street Tunnel and approaches on CSX; connection between Amtrak Penn Line and CSX Camden Line to serve MARC; second and third main track on CSX from West Baltimore to Washington; clearance projects (17 locations) on CSX north from Baltimore; rehabilitation of Amtrak's Gunpowder, Susquehanna, and Bush River bridges; design for reconstruction of Amtrak's Union Tunnels and the B&P Tunnel; dedicated freight track to eliminate NS- and passenger-train conflicts between Perryville and Baltimore, Maryland; and second main track on NS from the Pennsylvania-Maryland state line to Berryville, Virginia.

- Washington, D.C.: Virginia Avenue Tunnel reconstruction and related projects on CSX; design for second track to serve the VRE L'Enfant Plaza Station and third track to eliminate CSX- and passenger-train conflicts; and studies for a new rail bridge over the Potomac adjoining the CSX Long Bridge to eliminate train conflicts.
- Virginia: Various capacity projects (second and third main track segments, crossover, and pedestrian bridge) on CSX south of Alexandria; crossovers on CSX at Rose and South Anna to eliminate CSX- and passenger-train conflicts; third main track on CSX from Alexandria to Crossroads to eliminate CSX- and passenger-train conflicts; Norfolk Southern mainline improvements; additional track on NS from Berryville, Virginia to Front Royal; and upgrade of NS interlocking at Front Royal (Riverton).
- Systemwide: Develop a regional Advanced Traffic Information System (Regional Rail ATIS) to electronically exchange information among the freight and passenger railroad dispatch and control systems in real time, thereby allowing the railroads to monitor the status and location of all traffic on the rail network, anticipate and compensate for traffic delays, and respond quickly to emergencies. Undertake feasibility studies of other advanced technology and information applications to achieve maximum efficiency from the rail infrastructure.

### **The Medium-Term Program (\$1.9 Billion Dollars, Five to 10 Years)**

The Medium-Term Program includes the following projects (Figure 8):

- New Jersey: Third main track on Shared Assets line, and various improvements (additional tracks, bridge rehabilitation, crossovers, etc.) on NS Lehigh Line from Manville to Phillipsburg.
- Pennsylvania: Second main track on CSX from Philadelphia to Trenton, and second main track on CSX south of Philadelphia to the Pennsylvania-Delaware state line.
- Delaware: Second main track on CSX from the Pennsylvania-Delaware state line to the Delaware-Maryland state line; and relocate Delaware DOT's Newark station to reduce NS- and passenger-train conflicts.
- Maryland: Second main track on CSX from the Delaware-Maryland state line to Baltimore; reconstruct the Howard Street Tunnel and approaches on CSX; and construct new freight bridges over the Gunpowder, Susquehanna, and Bush Rivers to eliminate NS- and passenger-train conflicts; reconstruct Amtrak's Union Tunnels and the B&P Tunnel.
- Washington, D.C.: Siding on CSX Capital Subdivision and crossovers to Northeast Corridor to improve operations and reduce CSX- and passenger-train conflicts; clearance projects (five locations) on CSX; second track to serve VRE's L'Enfant Plaza Station; and third track to eliminate CSX- and passenger-train conflicts.



- Virginia: Highway-rail grade crossings and track speed improvements on CSX north of Richmond; various upgrades to tracks, signals, and highway grade crossings on CSX to serve VRE from Fredericksburg to Washington; sections of third track and clearance projects (11 locations) on CSX south of Washington.
- Systemwide: Implement recommended improvements identified by the near-term program feasibility studies.

### **The Long-Term Program (\$1.9 Billion Dollars, 10 to 20 Years)**

The Long-Term Program includes the following projects (Figure 9):

- New Jersey: Improvements to Bergen and Waldo tunnels in Shared Asset region.
- Pennsylvania: Various improvements (additional track, rehabilitation and replacement of bridges, crossovers, etc.) on multiple segments of NS Reading Line; clearance projects (four locations) on NS Reading Line in Reading; grade crossing elimination projects (13 crossings) at Lebanon on NS Harrisburg Line; improve Amtrak's Phil Interlocking to allow more frequent SEPTA service to Philadelphia International Airport; provide connection between Amtrak's north-south line and east-west line at Zoo Interlocking; second main track on NS from Norristown to Morrisville; add dispatcher signal control in both directions for 10 miles on NS Harrisburg Line; and add separate freight track from Philadelphia to Wilmington to eliminate NS- and passenger-train conflicts.
- Delaware: Various improvements (track reconfiguration, interlockings, and overhead structures) on Amtrak in Wilmington to reduce passenger train congestion.
- Maryland: Reconfigure existing tracks on Amtrak from West Baltimore to Baltimore Washington International Airport (BWI), construct new passenger station at BWI, and construct fourth main track from Halethorpe to Landover to eliminate freight and passenger-train conflicts.
- Washington, D.C.: New rail bridge over the Potomac adjoining the CSX Long Bridge to eliminate train conflicts; and third and fourth main track on CSX feeding into new rail bridge to eliminate train conflicts.
- Virginia: Third main track on CSX from Crossroads to Richmond and Centralia to eliminate CSX- and passenger-train conflicts; and additional highway grade crossings and track speed improvements on CSX north of Richmond.
- Systemwide: Implement recommended improvements identified by the near- and mid-term feasibility studies.

While each of the projects in this program has independent benefit and utility, the fullest systemwide benefit would be realized by implementing the entire program.

## ■ **The Results**

### **Eliminating Choke Points Affecting Passengers Will Generate Public Benefits**

Eliminating choke points over portions of the rail network used by Amtrak and the commuter railroads will provide significant benefits to the public, including:

- Increased passenger capacity, helping offset the burden on congested air and highway systems;
- Enhanced safety, reliability, and emergency response; and
- Greater ability to help the nation's passenger transportation network recover from service disruptions.

Amtrak is a major beneficiary of this program. The antiquated and undersized Union Tunnels, B&P Tunnel, Gunpowder River Bridge, Bush River Bridge, and Susquehanna River Bridge would be reconstructed, allowing for higher speeds, increased capacity, and enhanced safety and emergency response capability. Other improvements will reduce conflicts between passenger and freight operations over Amtrak lines, increasing the number of passenger trains that can operate over the system.

These improvements would help support the continued growth of Amtrak's Northeast Corridor (NEC) service. According to Amtrak, it carries more than 13 million riders per year that use some portion of the NEC mainline between Washington and New York. Amtrak's services include the Acela Express, the Metroliners, and intercity, long-distance trains to and from Washington, Philadelphia, and New York. Amtrak accounts for 40 percent of the travel market between Washington and New York and virtually 100 percent of the air-rail travel market between Philadelphia and New York. Amtrak passenger volumes have been growing at approximately five percent per year for the last three years and are forecast to increase by 50 percent over the next 20 years. Since the September 11<sup>th</sup> terrorist attacks, there has been a sharp upswing in passenger rail traffic. Air travel dropped between 25 percent and 30 percent in the two months following September 11<sup>th</sup>, but Amtrak's NEC volumes increased by 40 percent compared to the same period in prior years. This dramatic shift suggests that the current, long-range forecasts for passenger rail travel in the NEC may be low.

The program also supports the continued growth and vitality of the extensive commuter rail system that serves the Mid-Atlantic. Commuter railroads are absolutely critical to reducing peak-hour automobile traffic in the Mid-Atlantic region. According to the National Transit Database, commuter railroads in the NEC carry approximately 100 million riders per year (around 350,000 per day). Over the past five years, commuter rail ridership has grown at a rate of 5.6 percent annually. If this rate were to be sustained over the next 20 years, it would mean a tripling of commuter rail traffic. During the last three years, NJ Transit's growth has been most dramatic. Ridership increased 35 percent



after NJ Transit restructured its rail network to link directly to the NEC mainline at Kearny Interlocking just north of Newark. Since September 11<sup>th</sup>, NJ Transit volumes have grown an additional 45 percent, and virtually all trains to Manhattan in the expanded peak periods have standing room only. The other commuter railroads – SEPTA, MARC, and VRE – are also experiencing significant growth, which should continue as highway congestion increases and improvements to commuter rail systems and services are implemented.

Each of the region’s commuter railroads will benefit from this program. NJ Transit will see reduced congestion in North Jersey. SEPTA will see additional capacity for its airport-to-downtown service. Delaware DOT’s SEPTA-contracted service will benefit from reduced scheduling conflicts with freight traffic. MARC will benefit from better connections to its facilities. And VRE will benefit from increased capacity and reduced scheduling conflicts with freight traffic.

### **Eliminating Choke Points Affecting Freight Will Generate Public Benefits**

Eliminating choke points will benefit Norfolk Southern and CSX by making it possible for them to improve freight service and attract new business. But there are also significant public benefits:

- Increased freight capacity, helping offset the need to run more trucks on congested highways;
- Upgraded service for double-stack intermodal container traffic and better access to international seaports;
- More freight service at competitive rates for shippers and receivers;
- Enhanced safety, reliability, and emergency response;
- Greater ability to help the nation’s freight transportation network recover from service disruptions; and
- Improved capability to support military mobilization.

Improving the rail freight network also helps address congestion on the highway system. Trucking is – and will remain – a principal mode of transportation for freight because of its flexibility and cost, particularly for high-value, time-sensitive freight and shorter distance moves. For longer distance intermodal shipments and for bulk commodities, rail is highly competitive. A shipper’s choice between truck and rail depends on the cost, speed, and reliability of the service offered by each. The proposed program would increase, but not guarantee, the railroads’ ability to provide services that are more attractive to shippers. A rigorous analysis of shipper mode choice by commodity is beyond the scope of this study, but the following general effects are anticipated:

- Elimination of choke points would support the railroads in maintaining and growing their existing core business of hauling bulk commodities and intermodal freight. According to Reebe's TRANSEARCH data for 2000, the Mid-Atlantic rail system handles more than 386 million tons of freight annually (mostly bulk freight moving east-west), equivalent to 82,000 truck trips per day. At growth forecast at 79 percent, rail would add another 300 million tons by 2020, the equivalent of more than 60,000 trucks per day. If the rail system cannot absorb this growth, the highway system must handle it. As an example, the rail corridor between Washington to Baltimore is one of the busiest north-south rail freight segments in the Mid-Atlantic network. It handles almost 67 million tons per year, or approximately 27 trains and 200,000 tons per day (CSX data). This is the equivalent of 11,000 trucks per day. At the forecast rate of growth, this rail segment must handle another 21 trains and another 160,000 tons per day in 2020, the equivalent of nearly 9,000 more trucks per day. It rail cannot absorb this growth, upwards of 9,000 more trucks must be accommodated on the highways between Washington and Baltimore. Eliminating rail choke points along the Mid-Atlantic rail corridor would keep this expanding base of core north-south freight on the rail system and off the highways.
- The Mid-Atlantic states are more dependent on long-haul trucking (moves longer than 500 miles) than the nation as a whole. Nationally, 16 percent of total domestic tonnage moves by long-haul truck compared to 18 percent for trips starting or ending in the study area and 35 percent for trips passing through the study area (mostly serving New York and New England). If these choke points were eliminated, thereby enabling the freight railroads to offer more competitive levels of service and making it possible for the region to lower its reliance on long-haul trucking to the national average, then approximately 25 percent of long-haul traffic could divert to rail intermodal. If only new truck traffic between 2000 and 2020 is considered, leaving existing truck traffic in place, this amounts to around 12,000 trucks per day that could be diverted to rail, generating about 60 additional intermodal trains per day. About half of the long-haul truck tonnage in the study area is moving north-south, so diversion effects would be similarly distributed. This scenario would require the elimination of choke points, better rail service, and for some freight lanes and markets, rail improvements in other states. If this level of diversion were realized, total truck tonnage would still grow by about 73 percent through 2020 (Cambridge Systematic estimate based on FHWA Freight Analysis Framework forecast) compared to 79 percent without improved rail service. Nevertheless, the additional rail capacity would benefit automobile drivers and truckers using the key long-haul trucking corridors such as I-81, I-78, and I-95.

With stronger north-south networks – including clearance for double-stack intermodal traffic, the two freight railroads could provide better connections between the Mid-Atlantic region's seaports and the national double-stack rail freight network. Double-stack rail service is critical in making these ports more attractive to the shipping community. The improvements would support forecasted increases in cargo moving through the Mid-Atlantic seaports, which will translate into more jobs, better transportation choices for the region's producers, and reduced costs for consumers of international goods.

The military also depends heavily on the national rail-freight network for port access and domestic repositioning of troops and equipment, especially during periods of mobilization. The military would be a direct beneficiary of the rail system improvements.

By making the rail freight system more attractive, the Mid-Atlantic corridor improvements would make the redevelopment of underutilized “brownfield” sites adjoining the system more attractive, and thereby help concentrate freight activity and economic development along corridors where a choice of modes is available. This would counter the recent trend toward “freight sprawl,” where large distribution centers are developed in outlying areas that offer cheaper land, forcing shippers and receivers to truck goods over increasingly longer distances.

Finally, information and technology improvements would enable more effective coordination and management of traffic over the entire rail system, improving incident and emergency response capability and gaining the highest possible efficiencies from the available infrastructure.

## **Benefits Will Accrue to the Region and the Nation**

Because the Mid-Atlantic rail network is a key element of the national transportation system, the nation as well as the five Mid-Atlantic states will benefit from improvements to the rail network. Passenger and freight trips over the Mid-Atlantic transportation network that begin or end outside the study area itself also will benefit.

## ■ **The Partnership**

### **A Public-Private Partnership is Needed to Fund the Program and Achieve Benefits**

By themselves, CSX, the Norfolk Southern, and Amtrak cannot support the full cost of the program. The three railroads collectively invest about \$2.6 billion annually in their national systems, but these investments generally cover system maintenance and support of near-term business opportunities with near-term revenue streams. The choke-point elimination program will allow the railroads to increase their business and their revenues, but such increases will be realized over the long term rather than the near term. However, the choke-point elimination program requires significant near-term investment to achieve a critical mass of long-term, systemwide, private and public benefits. Borrowing on the open market is an option, but it is not an attractive option because the freight railroads are not currently earning their full cost of capital, and Amtrak is dependent on federal funding.

To achieve the public and private sector benefits of choke-point elimination, a public-private partnership to fund Mid-Atlantic rail improvements is both warranted and necessary. The goal of this partnership is to bridge the gap between near-term capital

needs and long-term revenue streams, and to facilitate direct public investment in rail projects with clearly defined public purposes and benefits. The study has examined a number of national models for innovative, public-private financing of rail improvements. The following options are the most promising:

- Direct funding out of railroad revenues, state and local appropriations, and congressional earmarks as available.
- Existing or pending federal rail assistance programs, including the Railroad Rehabilitation and Improvement Financing program (RRIF), a \$3.5 billion dollar loan program, and the Transportation Infrastructure Finance and Innovation Act (TIFIA), which provides loans and loan guarantees for large projects. The recently proposed High-Speed Rail Infrastructure Improvement Act, which would authorize more than \$71 billion dollars in tax-exempt state bond financing, loans, and loan guarantees, would expand these assistance programs.
- Federal-aid formula grant programs such the Congestion Mitigation and Air Quality (CMAQ) program, which has been used to fund transportation improvements that reduce congestion and engine emissions in regions that do not meet national air quality standards.
- Highway and rail safety programs, which can be used to eliminate dangerous highway-rail grade crossings or improve grade separations.
- Federal tax credit bond programs, which could be used to generate capital for investment in rail infrastructure projects.
- Toll or user charges on increased rail freight traffic and revenue, which can be used to repay loans, bonds, and state infrastructure bank programs.
- Sale of freight assets for passenger-rail use. In New Jersey, the State obtained access to rail rights-of-way from the freight railroads for passenger use, but rather than paying cash for the assets, the State matched the funds with additional dollars and pledged those funds to track, signal, and improvements that benefit the freight railroads.
- State-based approaches. States could elect to provide property tax relief to the railroads in exchange for public-purpose improvements by the railroads.

## ■ **Conclusions and Next Steps**

### **A Choice Between Two Futures**

The Mid-Atlantic region has a choice of two futures: a positive one in which the rail system is improved and makes a greater contribution to the efficiency, capacity, and safety of the entire transportation system; and a negative one in which the rail system is not

improved, and the burden on other transportation modes becomes even more severe. The region already faces a transportation capacity crisis. The Mid-Atlantic region must seize this opportunity to improve the rail system.

The Mid-Atlantic rail network is constrained by significant choke points that must be eased if the region's increasing demand for passenger and freight movement is to be met. To accomplish this, the Mid-Atlantic Rail Operations Study proposes a \$6.2 billion, 20-year investment program. Additional work will be needed to define the final form of these projects, but moving forward is absolutely critical to the region's transportation infrastructure and the millions of people and businesses that depend on it every day.

The railroads cannot bear the financial burden of these improvements alone. Innovative public-private partnerships are needed to fund and implement them. These rail improvements serve a legitimate public purpose by helping meet the region's transportation, economic, and quality-of-life needs. It is in the public interest for all levels of government to work cooperatively with the railroads to plan, finance, and deliver these projects.

Finally, this study recognizes that the national transportation system extends beyond the borders of the Mid-Atlantic region. Rail improvements in the Mid-Atlantic region will affect national transportation patterns, and conditions in the Mid-Atlantic region are heavily influenced by the transportation systems in other states, particularly New York State and New England.

## **Moving This Initiative Forward**

To move this initiative forward, the following steps are recommended:

1. The project steering committee of railroads and states, working through the Coalition, should continue their dialog to:
  - Further refine the program elements;
  - Secure federal participation on the project steering committee;
  - Establish the appropriate funding mechanisms for the choke-point elimination program;
  - Develop a continuing process to inform and guide the planning, delivery, and utilization of these improvements; and
  - Include shippers, other carriers, receivers, and other stakeholders in the process.
2. The project steering committee should obtain federal support for planning, engineering, design, and implementation of:
  - “Quick start” projects identified in the Near-Term Program; and
  - Longer-range capital projects, including the Howard Street Tunnel, the Union Tunnels, the B&P Tunnel, the L’Enfant Plaza Station, and a new Potomac River rail bridge.

3. The project steering committee, in cooperation with the Coalition, should initiate:
  - Feasibility study and pilot program for a corridor-wide, advanced traffic information system for rail operations;
  - Feasibility study of applying state-of-the-art train control and related systems that will improve rail system management and productivity; and
  - Development of a network simulation model and other tools to quantify the benefits of program improvements.
4. The Coalition should work with its members and other interested organizations to undertake a comparable assessment of rail issues and needs in New York State (especially East of the Hudson) and New England.

## ■ **Appendices**

The full report comprises the Summary Report and six appendices:

Appendix A. Mid-Atlantic Study Region Demographic and Economic Conditions

Appendix B. Mid-Atlantic Rail Capacity Issues

Appendix C. Mid-Atlantic Region Freight and Passenger Flows and Potential Diversion

Appendix D. Description of Potential Mid-Atlantic Rail Projects

Appendix E. Summary of Potential Mid-Atlantic Rail Projects

Appendix F. Summary of Related Rail Projects

Copies of the Summary Report and the appendices are available in electronic format from the I-95 Corridor Coalition's website at [www.i95coalition.org](http://www.i95coalition.org).