Section 2
Railroad and Regional Characteristics

As a first step in developing freight railroad realignment alternatives, this study analyzed various regional characteristics that relate to the project goals. The functional and operational characteristics of the railroad, its security considerations, the markets that it serves, and regional environmental, social, and emergency response characteristics are all important factors. Their analysis in the study led to the identification of several potential alternative corridors.

Railroad Characteristics

The study identified the key characteristics and issues of the railroad network through the Washington, DC region including major travel routes, choke points, and existing and future traffic levels.

Train Types

Within the broad categories of passenger and freight, there are several types of trains operated on the railroad network—each with its distinctive market niche, operational characteristics, and performance measures.

Passenger Trains

Passenger trains carry people, baggage, and small package express shipments. Within this broad definition, there are four different types of trains for different traveling needs, all of which can be found in the study area. The general measures of a passenger train's success are ridership and on-time performance. On-time performance is a measure of schedule adherence against a standard deviation or tolerance. The types of passenger trains are:

High-speed trains

These trains are built for speed, operate between major cities in corridors up to 500 miles long, and are intended to be competitive with travel by automobile and, in some cases, air. Within the Northeast Corridor between Washington, DC and Boston, Amtrak's Acela Express achieves speeds as high as 150 miles per hour on fixed-length trains that carry up to 300 people. Hourly service is provided between Washington and New York. The Amtrak Northeast Corridor currently is the only operating high-speed corridor in the United States, although the U.S. Department of Transportation has designated other emerging corridors nationwide. One such corridor, Washington to Charlotte, includes the CSX mainline right-of-way between Washington and Richmond.

Regional trains

These standard Amtrak trains operate at lower speeds and with more frequent stops. They generally consist of a locomotive and however many passenger coaches are required for the passenger load. The customer payload may vary from 200 to 1,000 people depending on train size. The regional trains in the northeast are intended to be a reasonable alternative to long-distance automobile travel via I-95. Amtrak operates hourly regional service on the Northeast Corridor north of the District.

Approximately five regional round trip trains per day are extended south from Washington to either Richmond or Newport News, VA via the CSX north-south Line.

Long-distance trains

These are Amtrak trains with a trip length of 500 miles or more that generally offer once-a-day, every-day service to distant cities. They are generally outfitted with feature cars such as sleepers, diners, and lounges in addition to coaches. One long-distance train, the Auto Train, operates from Lorton, Virginia to Sanford, Florida and offers auto-rack cars so people can travel with their automobiles. These trains offer people comfort and a measure of enjoyment as a trade-off for speed and convenience and generally carry about 200 people per trip. Other Amtrak long distance trains run from New York via Washington to Florida and New Orleans, and from Washington to Chicago.

Commuter trains

These short-distance trains generally run on a route that is 60 miles or less and primarily serve commuters. These trains offer speed, convenience, and cost saving over driving. During rush hours, they generally operate with 20- to 50-minute headways and make multiple

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stops. The Washington, DC region has two commuter rail operators that share a common terminus at Washington Union Station: the Virginia Railway Express (VRE) and the Maryland Rail Commuter (MARC) service. VRE and MARC trains are hauled by locomotives and consist of between three and eight passenger coaches. Generally, commuter trains are sized to accommodate their anticipated peak load and carry from 200 to 1,100 passengers.

Freight Trains

Freight trains carry trailers or containers including mail; automobiles and other vehicles; lumber; agricultural products; other general cargo that can be solid, liquid, or gas; aggregates; phosphates; and minerals such as coal, coke, or iron ore. There are four categories of freight trains based on the type of freight carried. The success of a freight operation is generally measured commercially by the revenue associated with the train and its contribution to overhead and profit. Operationally, success is measured by velocity, an indication of how fast freight moves through a given territory or terminal. The types of freight trains are:

Intermodal freight

These are time-sensitive shipments loaded in trailers or containers. Intermodal trains generally contain higher-value merchandise but, irrespective of the cargo's monetary value, intermodal freight is always time-sensitive. In some cases, the term intermodal also includes automobiles loaded in special automobile rack cars. Intermodal trains are generally price-competitive and service-competitive with long-haul trucks. Intermodal trains are always accorded the highest dispatching priority among freight trains. Moreover, they often are assigned a speed differential greater than ordinary freight, equal to or less than passenger trains.

Merchandise freight

This is general cargo and some containers that are accorded a lower priority than intermodal freight but higher than mineral freight or local freight. There is generally no speed differential associated with these trains and they move at ordinary freight train speeds. Merchandise freight is the class of train that is most likely to contain cars carrying hazardous materials (hazmats) in bulk. Some of these trains may be classified as "expedited freight" and receive a higher dispatching priority than ordinary merchandise trains.

Mineral freight

Mineral freight consists of coal, coke, ore, stone, clay, or grain and the empty return of the equipment. When mineral freight is combined with ordinary freight in merchandise trains, the proportion of mineral cars to general cargo determines the classification. A train with more than 25 percent of its cars loaded with mineral commodities is classified as a mineral freight. Mineral freights often operate at a slower speed than ordinary freight and they are usually given the lowest priority of revenue freight trains.

Local freight

Whereas the three previous categories of trains generally operate as through trains between major terminals, local freight trains primarily pick up and drop off blocks of cars or individual cars at industries located along the rail line. These trains are based at local rail yards and operate in windows between through trains. Because they spend a lot of time switching cars, these trains tend to consume a considerable amount of line capacity.

Non-revenue freight

These are work, wire, and wreck trains used for repairs and maintenance along the line and do not carry revenue shipments. Also included in this category are trips to and from local yards made by helper engines, which are required in some areas to assist trains on relatively steep grades.

Functional Configuration

The rail network in the study area, shown in Figure 2-1, comprises main lines and several branch lines owned and operated by two freight railroads—CSX and Norfolk Southern—as well as Amtrak.

CSX

The CSX freight routes through the District function

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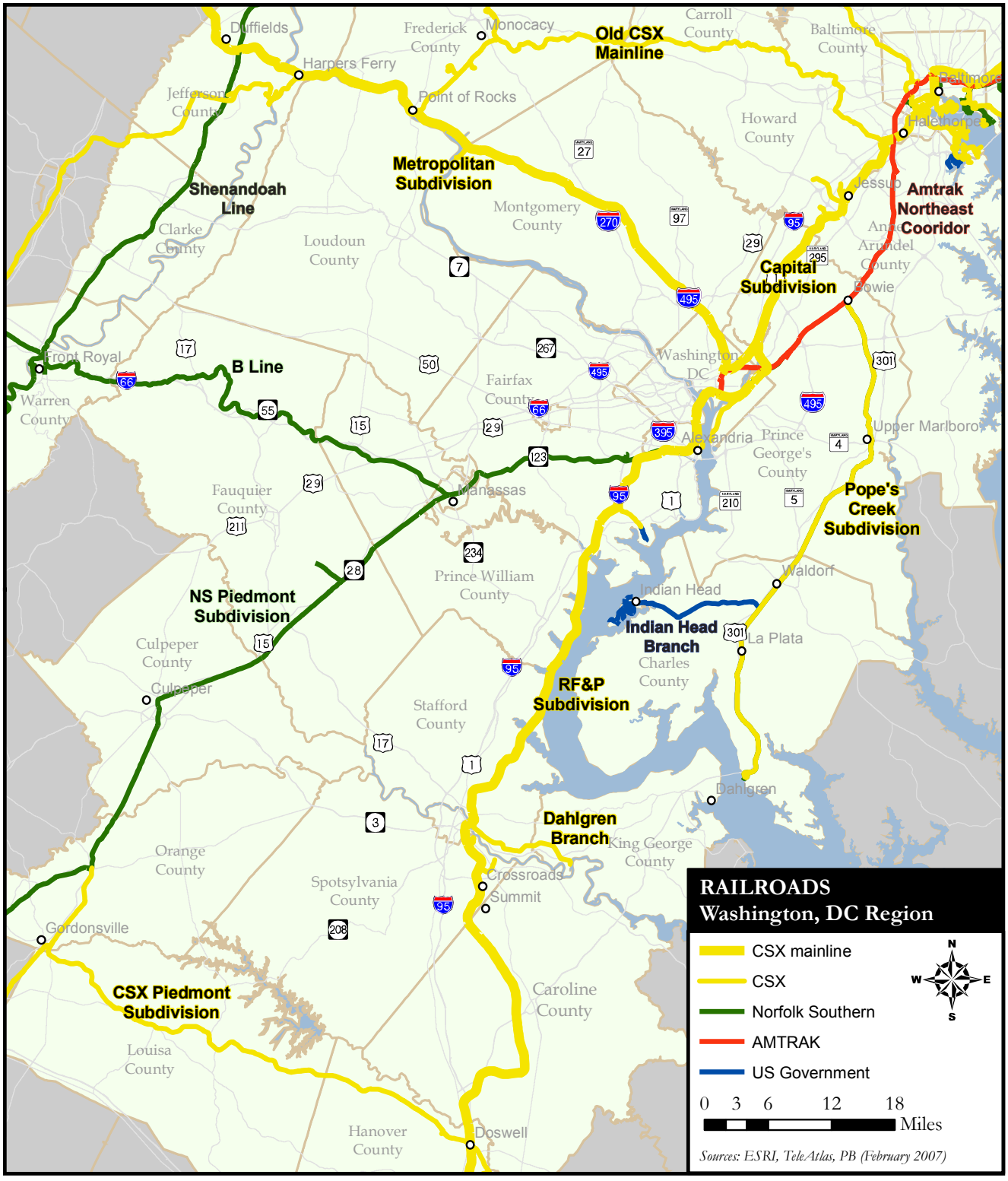

Figure 2-1. Regional Railroads

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like two interstate rail highways (north-south and east-west) that come together at Hyattsville, Maryland, northeast of the District's border. Nearly all the freight traffic on these interstate rail highways is through, or overhead, traffic. That means that the freight neither originates nor terminates in the District, but it transits the District on its way to its destination. Both CSX's north-south and east-west main lines come close to the U.S. Capitol and Washington's Monumental Core. The north-south line is the subject of this study.

From a freight marketing and commodity flow standpoint, the CSX main lines through the District are part of a seamless rail network that links New York and the East Coast with the South, and Philadelphia and Baltimore with the West. While these CSX lines are major freight corridors, they are also commuter rail corridors, serving four of the five commuter lines emanating from Washington Union Station. Two of the lines carry the MARC service, a division of the Maryland Transit Administration. The CSX line to the south is common to both the Fredericksburg Line and the Manassas Line of the VRE, which is a partnership of the Northern Virginia Transportation Commission and the Potomac and Rappahannock Transportation Commission. At Alexandria, the Manassas Line diverts from CSX and operates on the Norfolk Southern tracks while the Fredericksburg Line continues south on the CSX main line. These lines together serve

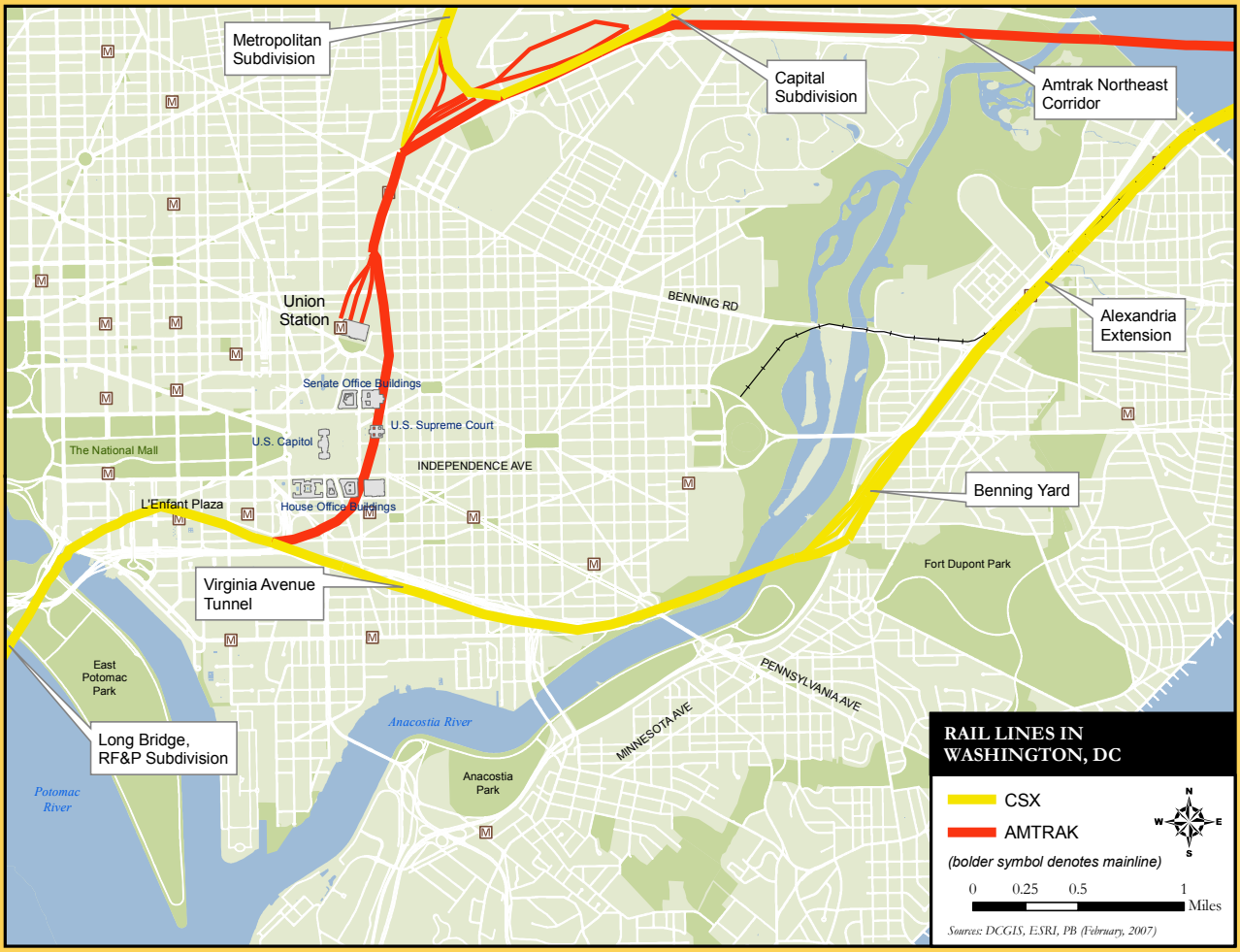

Figure 2-2. Washington, DC Railroads

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approximately 15,000 passenger trips each weekday. Most VRE passengers commute to and from work in the District, Crystal City, or Alexandria, Virginia. Based on surveys by the commuter agencies, between 50 and 60 percent of their riders are government employees.

The CSX north-south main line from the Potomac River to Fredericksburg and Richmond is the former Richmond, Fredericksburg & Potomac (RF&P) Railroad (now RF&P Subdivision) which has linked the North and South under various ownerships since post-Civil War reconstruction. While it is a key corridor for north-south freight, the RF&P carries a significant number of passenger trains. As shown in Figure 2-2, north of Virginia Avenue, SW (Control Point (CP) Virginia in the railroad timetables) in Washington, DC, the line splits. The passenger trains go northeast to Union Station via the First Street tunnel and the freight trains continue through the 3,600-foot-long Virginia Avenue tunnel, across the Anacostia River to BenningYard, and then north to join the CSX east-west line at JD Tower in Hyattsville, Maryland.

The Virginia Avenue tunnel is an important geographic feature of the freight line. The tunnel restricts both horizontal and vertical dimensions of loads, exactly as Baltimore's B&P Tunnel on the Amtrak Line and the CSX Howard Street tunnel restrict load dimensions to the north. Essentially, rail cars are limited to a dimension identified as Plate C in the Official Railway Equipment Register. This means that double-stack container trains (Plate H) cannot fit through either the Baltimore or Washington tunnels.

Most of the line between CP Virginia and Hyattsville is relatively slow-speed (25 mph) with some intervals of single track. The single-track segments through the Virginia Avenue tunnel and at the north end of the branch near Hyattsville create a bottleneck for the current freight operation.

The territory has fixed signals along the right-of-way that control the movement of trains. The

Figure 2-3. RF&P Subdivision through Fredericksburg

The CSX north-south line from the Potomac River to Fredericksburg and Richmond is the RF&P Subdivision. While it is a key corridor for north-south freight, the RF&P carries a significant number of passenger trains.

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RF&P Subdivision and the right-of-way between the Long Bridge and CP Virginia is equipped with a supplementary signal system with cab signals as a further safety feature. Cab signals give the crew in the locomotive cab a constant signal indication, supplementing the information conveyed by the fixed signals.

The east-west route is the former Baltimore & Ohio Railroad (B&O). This route was originally intended for fast passenger service from Baltimore and Washington to Chicago and St. Louis. Though the intercity passenger market had decreased well before Amtrak was formed, and the B&O merged with other railroads to become CSX, the route remains an important freight link between the port of Baltimore and the Midwest. The original route, the first railroad line in the country, is appropriately referred to as the Old Main Line. As shown in Figure 2-1, it generally heads westward from Baltimore but follows meandering river valleys and has only a single track in many places. CSX has upgraded and improved this line over the past decade, but its slower speeds and restricted clearances through its five tunnels make it a secondary route.

Instead of the Old Main Line, the fastest, highest-capacity east-west route for CSX actually goes through Washington, DC. Operationally, this primary east-west route is divided in two segments: the Capital Subdivision from Baltimore to Washington and the Metropolitan Subdivision from Washington to Brunswick, Maryland, with the break occurring near Union Station at F Tower, located at the point where 9th Street, NE crosses over the railroad right-of-way. The route is shown in Figure 2-1.

The east-west route carries more tonnage than the north-south route. There are significant numbers of both passenger and freight trains on both legs of the east-west route. Two different MARC commuter routes share tracks with CSX freights—the Brunswick Line to the Potomac Valley and the Camden Line to Baltimore. The Metropolitan Subdivision also has one daily Amtrak train, the Capitol Limited, which operates between Washington and Chicago.

Definitions

Bottleneck - A section of a highway or rail network that experiences operational problems such as congestion. Bottlenecks may result from factors such as reduced roadway width or steep freeway grades that can slow trucks.

Commodity - An item that is traded in commerce. The term usually implies an undifferentiated product competing primarily on price and availability.

Container - A "box"" typically 10 to 40 feet long, which is used primarily for ocean freight shipment. For travel to and from ports, containers are loaded onto truck chassis' or on railroad flatcars.

Double-stack - Railcar movement of containers stacked two high.

Hazardous Material - A substance or material which the Department of Transportation has determined to be capable of posing a risk to health, safety, and property when stored or transported in commerce.

Source: Federal Highway Administration, Office of Freight Management and Operations

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While the vast majority of CSX's main lines in Virginia and Maryland are double-track, the operation of passenger trains introduces a significant challenge to the freight operation because of the speed differential between passenger and freight trains and the frequent need to hold freight trains on the main line because of single-track bottlenecks off the corridor—both of which consume precious line capacity and contribute to delays for both the passenger and freight services.

During the hours that passenger trains operate, two of the three CSX main lines (the Metropolitan and RF&P Subdivisions) are effectively operated as two single-track railroads side by side, one track for passenger trains, one track for freight, rather than as an integrated double-track system of mixed passenger and freight. The MARC and VRE commuter trains on these lines operate almost exclusively in one direction—toward Washington in the morning and away from Washington in the evening. The higher-speed passenger trains absorb the capacity of one of the two tracks. The second track is used by CSX to operate its freight trains in both directions, as if the line were single-tracked. In the case of the VRE Fredericksburg service operating on the RF&P, which is part of the CSX line under study, this division of the tracks by type of service is further reinforced because VRE's station platforms are all located on the easternmost track south of Alexandria, restricting the commuter trains to this track.

On the CSX Capital Subdivision, MARC operates commuter trains in both directions during the peak periods—to and from both Washington and Baltimore—so this line operates with freight trains intermingled among the passenger trains.

The freight realignment alternatives considered in this study have the potential to divert freight traffic away from these shared-use lines feeding Washington, DC–freeing up capacity that potentially could be used to run more passenger service, and to run the service more reliably. The greatest potential for diversion is on the RF&P Subdivision in Virginia, which is on the freight line under study. Portions of the Capital Subdivision in Maryland also could significantly benefit from diverted freight traffic.

Norfolk Southern (NS)

Norfolk Southern, like CSX, operates a north-south freight thoroughfare linking the South with Baltimore, Philadelphia, and New York. NS owns no track in Washington, DC. Their access to and through Washington is via tracks owned by CSX or Amtrak. Although NS has trackage rights through Washington, DC, the usual NS freight routing is more circuitous, bypassing Washington, DC to the west.

The most direct multiple-track route from the South runs from Washington to the New York area via the Amtrak Main Line from Union Station via Baltimore, Wilmington, and Philadelphia. NS does not generally exercise their trackage rights over this line because the frequent passenger train service—a combination of Acela Express, Regional, long-distance and commuter rail—does not leave many paths for freight trains, except for a window between 10:00 p.m. and 6:00 a.m., when passenger service is much less frequent. Similarly, the frequent CSX freight service and the MARC commuter service discourage NS from exercising their trackage rights over the CSX line from Washington to Baltimore and Philadelphia.

As shown in Figure 2-1, NS routes freight from the South (Georgia and the Carolinas) via Charlottesville, Virginia to Manassas, Virginia via the Piedmont Main Line, then from Manassas to Front Royal, Virginia via the single-track, un-signaled B-Line, then via the Hagerstown Line, parallel to Interstate 81 to Hagerstown, Maryland and subsequently on to Harrisburg, Pennsylvania. From Harrisburg, the freight is routed along different NS lines to Baltimore, Wilmington, Philadelphia, and the Jersey Coast. Most of these lines are either single-track or composed of alternating single- and double-track sections.

This NS main line has far fewer passenger trains than the CSX routes in Virginia and Maryland. VRE shares a short portion of the line between Manassas and its terminal station and yard at Broad Run. Between

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Manassas and Alexandria, where it joins the CSX RF&P Subdivision, there are relatively few NS freight trains and the line is double-track. As on the RF&P, during the commuter peak periods VRE uses one of the tracks while the second track is available for freight trains operating in either direction, though, unlike the Fredericksburg Line, there are some reverse-peak commuter trains.

One intercity passenger train operates in each direction along the NS line from Alexandria to Atlanta, Georgia and beyond.

Amtrak and Commuter Rail

Amtrak plays an important role in Washington area railroad operations. Union Station, located at 60 Massachusetts Ave, NE, is the southern terminus of Amtrak's Northeast Corridor with Acela Express arriving or departing every hour from 5:00 a.m. to 11:00 p.m. Similarly, Amtrak regional service arrives or departs at least once every hour throughout the day and night. Eighteen daily Amtrak trains travel through the District on the RF&P Subdivision on their way between Boston/New York and Richmond/Newport News or points further south. A daily train operates between New York, Atlanta and New Orleans via the NS Piedmont Subdivision from Alexandria and a tri-weekly New York-Chicago train, the Cardinal, operates on the same NS line as far as Orange, VA.

In addition to the intercity trains, the facilities at Union Station—the Washington Terminal—also handles and dispatches the MARC and VRE commuter trains. Most of these trains operate during the weekday morning and evening commuter peak periods. Washington Terminal includes Union Station, various train storage yards and maintenance shops, and the four sets of tracks leading into Union Station–from the Long Bridge and CSX RF&P Subdivision to the south, from the CSX Metropolitan Subdivision to the west, and from the CSX Capital Subdivision and Amtrak Northeast Corridor to the north. The terminal and its facilities are owned and operated by Amtrak. CSX owns a double-track segment of railroad that directly connects the Metropolitan and Capital

Figure 2-4. Long Bridge

Figure 2-5. Virginia Avenue Tunnel

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Subdivisions, creating its east-west mainline route that passes through the middle of Washington Terminal.

The Amtrak line between Washington and New York is the busiest passenger corridor in the Western Hemisphere and is a working, high-speed (135 mph) passenger line. Freight service using the corridor has declined considerably over the last 20 years because of capacity and safety issues. The frequent passenger service, which currently is denser than at any time in history, consumes a great deal of the line's capacity. Because of the enormous speed differential between passenger trains (100 to 135 mph) and freight trains (50 mph or less), there are few slots available on the corridor for freight trains during daylight hours. Freight traffic, therefore, generally is restricted to the hours between 10:00 p.m. and 6:00 a.m.

The Amtrak Northeast Corridor, shown in Figures 2-1 and 2-3, is an electrified railroad (11,000 V AC), with power supplied from a catenary system of suspended overhead wires. The tracks are generally signaled in both directions, and cab signals linked to speed control in the locomotive give the train engineer a constant representation of the signal indication. The system also enforces speed limits and restrictions.

Physical Characteristics

Each existing line within the study area has unique characteristics and operating challenges reflecting its location, history, and present use.

CSX Main Line, South Leg

The CSX main line network in the region has three legs or segments that radiate in three directions from Hyattsville, Maryland, just north of Washington, DC, at a rail junction known as JD. These are shown in Figure 2-6. The CSX RF&P Subdivision is the primary segment of the CSX main line under study, as it runs through the District's Monumental Core. Other segments under study include the Alexandria Extension, the Landover Subdivision, and the Capital Subdivision.

The southern leg of the network crosses the Anacostia River twice and the Potomac River once on its way to Richmond, Virginia and includes the portion of the rail line that passes closest to the U.S. Capitol and other federal buildings in Southwest Washington, DC. It combines three distinct railroad subdivisions:

- The Alexandria Extension is a single-track line approximately six miles long with 25 to 30 mph maximum speeds that runs from Hyattsville to near the Virginia Avenue Tunnel in Southeast Washington, DC.
- The Landover Subdivision is approximately 5.4 miles long with 25 mph speeds. This line connects the CSX north-south route, the RF&P Subdivision, with the Amtrak Northeast Corridor at Landover and includes the freight yard at Benning. The route provides a physical connection for freight trains through the District, avoiding Union Station.
- The third and longest segment is the RF&P Subdivision, which runs from the Anacostia River Bridge and includes the Virginia Avenue Tunnel and the Long Bridge across the Potomac River. It extends to Richmond, VA. Between Arlington and Alexandria, the line has three main tracks. South of Alexandria, it is essentially double track, with sections of triple track planned. The RF&P

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Subdivision is signaled in both directions, with cab signals with 60 mph freight speeds in some locations.

Key constraints on the south leg of CSX's main line include:

- Virginia Avenue tunnel: single-track, restricted vertical clearance
- Long Bridge: double-track, with one track fully utilized by commuter and Amtrak trains during weekday peak periods
- Alexandria Extension: single- and double-track segments
- Quantico Creek Bridge: currently single-track, but being expanded to a three-track capability

CSX Main Line, West Leg

Heading westward from the junction at JD (Hyattsville), the CSX main line runs for 2.5 miles towards Washington as the southernmost portion of the Capital Subdivision, as shown in Figure 2-6, then turns northwestward when the line reaches Washington Terminal. From Washington, the line, called the Metropolitan Subdivision, runs through Silver Spring and Rockville, Maryland toward Brunswick, Maryland and Harper's Ferry, West Virginia. A portion of this route passes through Northeast and Northwest Washington, DC. The line

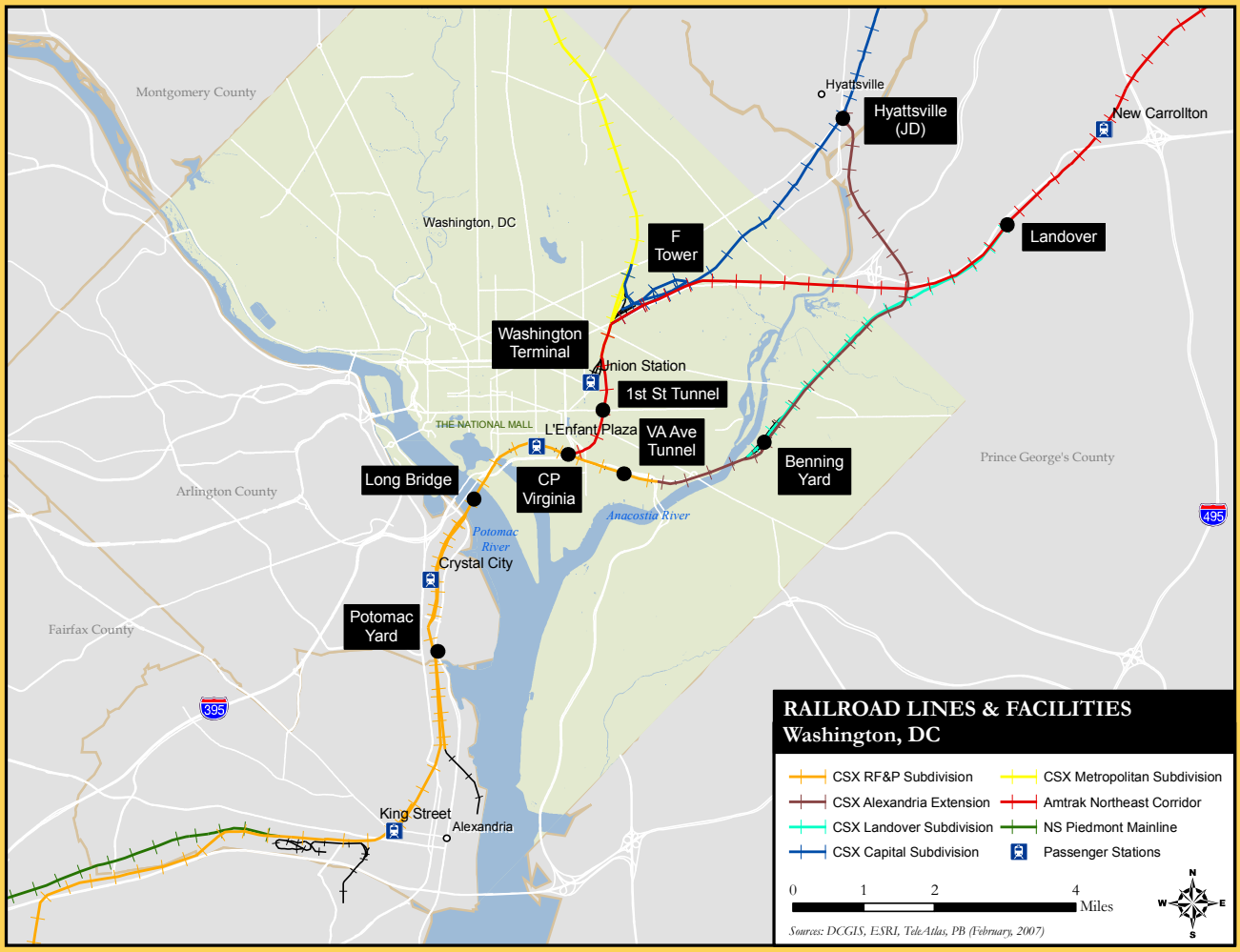

Figure 2-6. Washington, DC Area Railroad Segments

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is fully double-tracked. Heading westward, the line generally follows the Potomac River.

Key constraints on this route include:

- At-grade junctions at Washington, DC, which permit MARC commuter trains from Baltimore and Brunswick to access Washington Union Station. These junctions are known as F (Capital Subdivision) and QN (Metropolitan Subdivision).
- Portion of Metropolitan Subdivision between Washington and Silver Spring where the two main tracks are separated by the Washington Metrorail Red Line in the center of the right-of-way. The speed limit on this segment is restricted to 30 mph for freight trains because of the proximity of Metrorail, and the constrained right-of-way width makes the creation of additional track capacity difficult.
- Barnesville Hill, a significant grade for eastward trains ascending from the Potomac River valley, which limits the speed of freight trains and requires the addition of helper engines on certain trains. The substantial difference in speed between passenger and freight trains in this segment can cause congestion during the commuter peak periods.
- Brunswick, the terminal point for several MARC commuter trains and is the site of a MARC overnight storage and maintenance facility as well as a freight yard and crew change point for CSX.

CSX Main Line, Northeast Leg

The Capital Subdivision of CSX is the primary rail freight route between Washington, DC and Baltimore. The line is double track for approximately 28 miles from JD (Hyattsville) to Halethorpe, Maryland, where it connects with the Old Main Line and becomes a three-track line entering the Baltimore Terminal area. The Baltimore Terminal is the CSX line from Halethorpe, Maryland to near the eastern Baltimore boundary, including the Howard Street Tunnel and CSX's Bay View Yard.

While the line itself has significant capacity, congestion on the line is generated by capacity constraints within the Baltimore Terminal to the north (most notably the single-track Howard Street tunnel through downtown Baltimore) and on the single-track Alexandria Extension to the south. The inter-mingling of CSX freight and MARC commuter trains operating in both directions during the weekday peak periods is another factor contributing to congestion on this line. The CSX yard at Jessup also creates a constraint when freight trains working the yard occupy main line tracks for considerable periods of time. Clearance restrictions through both the Virginia Avenue tunnel and Howard Street tunnel preclude the operation of double-stack freight trains through the Mid-Atlantic corridor.

CSX Old Main Line

The Old Main Line, as its names suggests, is the original route of the B&O Railroad from the Baltimore area to the west. The line connects with the east-west mainline (Metropolitan Subdivision) at Point of Rocks, Maryland, and with the Washington-Baltimore mainline (Capital Subdivision) at Halethorpe. In Figure 2-1, this route appears to offer a short cut between Baltimore and Brunswick, Maryland, bypassing Washington, DC and the busy commuter lines. However, the line follows stream valleys and has many curves that limit the speed that trains can achieve. As a result, the route actually takes longer to navigate than the Metropolitan and Capital Subdivisions for intermodal and merchandise freight trains. Therefore, CSX prefers to operate most of its trains via Washington.

The Old Main Line is a single-track line with five intermediate passing sidings. The Old Main Line also passes through five tunnels, which have been single-tracked to achieve the maximum possible vertical clearance. The tunnels are both a physical constraint for vertical clearance and an operating constraint because of horizontal clearance. This line cannot accommodate double-stack freights in its current state.

Unit coal trains use this route because this traffic is less time-sensitive than intermodal traffic. The Old Main Line also offers a capacity safety valve—an alternative routing for trains between Baltimore and

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the West at times when the Capital and Metropolitan Subdivisions are congested or blocked.

At Point of Rocks, east of Brunswick, Maryland where the Old Main Line meets the Metropolitan Subdivision, there is a full wye connection that permits train movements in any direction. The eastern end of the Old Main Line at Relay, Maryland, in west Baltimore has a connection only in the Baltimore direction.

CSX Pope's Creek Branch

As shown in Figure 2-1, the Pope's Creek Branch is a single-track, un-signaled branch line that roughly parallels U.S. Route 301 in Prince George's and Charles Counties, Maryland. This line was owned and operated by Conrail and was acquired by CSX from Conrail. The primary purpose of the line is to provide coal to two power plants owned by Mirant Energy, at Chalk Point on the Patuxent River in Prince George's County, and at Morgantown on the Potomac River in Charles County. Approximately four to six freight trains travel this branch per week.

The only mainline access to the Pope's Creek Branch is from the Amtrak Northeast Corridor at Bowie, Maryland. The line has two passing sidings, one at the north end of the branch at Bowie and the other in the vicinity of Waldorf, Maryland.

The line is relatively flat and straight with two one-percent grades for southbound trains. There are 47 grade crossings along the whole length of the line from "Bowie" to "Pope." Upgrading the line to mainline standards would entail double-tracking, installation of signals, and extensive grade-crossing eliminations. The route runs alongside the built-up portions of several communities, with both residential and commercial development alongside the right-of-way. The most prominent towns along the line are Bowie, Upper Marlboro, Waldorf, St. Charles, and La Plata.

Definitions

Siding - A very short branch off a main railway line with only one point leading onto it. Sidings are used to allow faster trains to pass slower ones or to conduct maintenance.

Unit Train - A train of a specified number of rail-cars handling a single commodity type that remain as a unit for a designated destination or until a change in routing is made.

Wye - A track arrangement with three switches and three legs, used to turn equipment or to access another rail line from either direction at a junction.

Source: Federal Highway Administration, Office of Freight Management and Operations

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Norfolk Southern North-South Main Line

The north-south NS mainline route in Virginia and Maryland connects with other NS lines in Lynchburg, Virginia and Harrisburg, Pennsylvania. The route bypasses Washington, DC to the west and uses portions of what were historically three different railroads:

- Piedmont Mainline: historically a double-track railroad, the line now has alternating ten-mile segments of single and double track.
- B Line: the mainline route now diverges at Manassas and follows the 50-mile long B Line to Front Royal, Virginia. This route was built initially as a minor branch line. It is single track, lacks a signal system, and is relatively circuitous and slow.
- Shenandoah Line: predominantly a single-track line with sidings for approximately 60 miles between Front Royal, Virginia and Hagerstown, Maryland.

As the level of traffic grows on this route, the number and length of double-track sections will need to increase along the entire line. The B Line, with its limited speed, single track, short and infrequent passing sidings, and lack of signals and centralized traffic control, is the major capacity constraint and barrier to traffic growth on this line.

Norfolk Southern Manassas-Alexandria Branch

This segment comprises the northern end of the Norfolk Southern Piedmont main line. The line is fully double-tracked, primarily to accommodate VRE commuter service. VRE station platforms are located only on the southernmost track, which restricts VRE service to this track. VRE operates primarily eastbound towards Washington in the morning peak and westbound in the evening peak.

Amtrak Northeast Corridor

The Northeast Corridor is the primary passenger rail route linking Washington, Baltimore, Philadelphia, New York, and Boston. Though Amtrak service continues south of the District, it uses lines owned by others. Between Washington and Baltimore, the number of tracks varies from two to four, with three tracks as the most common configuration (normally two operating northbound and one southbound). The line is electrified with an overhead catenary system. Freight traffic on the corridor is minimal, although both NS and CSX have trackage rights over portions of the line.

Key bottlenecks on this route include:

- Lack of a southbound express track between Baltimore and Washington (northbound direction has both express and local tracks between New Carrollton and West Baltimore)
- First Street Tunnel, Washington: two-track line with limited overhead clearance
- Washington (NY Avenue) to Landover: two-track line
- B&P Tunnel/West Baltimore to Baltimore: two-track line with limited vertical clearances. Restricted to cars of Plate C Dimensions or less.

Operational Characteristics and Railroad Facilities

The terminals and yards located in or adjacent to the District are shown in Figure 2-6.

Terminals

Washington, DC is not a major terminal location for rail freight. Most freight trains run through the Washington area without stopping to pick up and drop off cars or change train crews. Major terminal and yard facilities for CSX are located at Baltimore to the north, Cumberland to the west, and Richmond to the south. NS has major terminals at Harrisburg, Pennsylvania and Spencer Yard in Linwood, North Carolina, as well as several yards within the study area, described below.

Washington is a major terminal for passenger operations and the southern end of Northeast Corridor electrification and Amtrak-owned rail lines. Washington Terminal is owned and operated by Amtrak; MARC and VRE are effectively tenants of Amtrak and have executed agreements with Amtrak that enable them to use facilities within the terminal.

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The terminal has connections to four different rail lines:

- CSX RF&P Line to the south, at CP Virginia near the south portal of the First Street Tunnel
- CSX Metropolitan Subdivision and Capital Subdivision, each accessed via track connections from C Interlocking north of Union Station.
- Amtrak Northeast Corridor, which connects to the terminal just north of the New York Avenue Bridge over the rail right-of-way.

Rail Yards and Equipment Maintenance/ Storage Locations

The passenger and freight rail yards, maintenance, and storage locations related to the study area are discussed below. The number of sets, or combination of passenger locomotives and cars, is listed for each passenger facility. The sets are made up at each yard and eventually dispatched as a train.

Passenger

Virginia Railway Express commuter trains are stored, cleaned, inspected and serviced overnight at two locations:

- Crossroads (south of Fredericksburg, on the CSX RF&P line), 6 sets
- Broad Run (west of Manassas, on the NS Piedmont mainline), 5 sets

MARC stores trains overnight at four locations:

- Baltimore Penn Station (on the Amtrak Northeast Corridor), 6 sets
- Riverside, Baltimore, 5 sets
- Frederick (MARC), 3 sets
- Brunswick (MARC) 4 sets
- Martinsburg, WV, 2 sets

The facilities at Brunswick and Riverside are on CSX-owned land adjacent to freight yard facilities. MARC diesel locomotives are maintained at Riverside. Limited coach maintenance is performed at both locations. The yard and shop at Frederick are relatively new facilities owned by the Maryland Transit Administration. Baltimore Penn Station has minimal facilities for equipment maintenance and is used primarily for overnight storage, cleaning and inspection of equipment.

Both commuter railroads store trains during the midday period at Washington Terminal. VRE uses several tracks in the Ivy City Coach Yard. MARC currently stores trains at the platform in Washington Union Station but is planning to construct its own storage yard adjacent to the Coach Yard.

Amtrak has a major maintenance facility at Ivy City in Washington Terminal. Amtrak stores and maintains its own Northeast Corridor equipment at this location and also performs maintenance for both MARC and VRE. VRE's diesel locomotives and MARC's electric locomotives are maintained by Amtrak at Ivy City.

CSX

CSX has yard facilities at the following locations:

- Benning Yard, Washington, DC: primarily used for staging coal train movements to the power plants along the Pope's Creek Branch
- Baltimore Terminal: three major yards within the terminal, supplemented by several minor yard facilities:
  - ◊ Curtis Bay: south side of Baltimore harbor, primarily serving coal and other bulk unit trains, including the coal export terminal
  - ◊ Locust Point: south side of Baltimore harbor, serving general cargo traffic
  - ◊ Bay View: north side of Baltimore harbor, serving the Baltimore container port, roll-on roll-off terminal and general cargo
- Jessup Yard: facility for off-loading of automobiles, and origin point for local trains operating on the Capital and Metropolitan Subdivisions and Alexandria Extension
- Brunswick Yard: origin point for local trains operating on the Metropolitan Subdivision
- Acca Yard, Richmond, Virginia: origin point for local trains operating on the RF&P Subdivision

Norfolk Southern (NS)

NS has yard facilities at the following locations:

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- Manassas Yard, Virginia: located at the junction of the Piedmont mainline and the B Line, this yard is the origin point for local trains operating on both lines in the study area, as well as a daily merchandise train that operates over the B Line and Shenandoah Line.
- Linwood Yard, North Carolina: this is a major classification yard for freight from the Carolinas and Georgia destined for the Northeast.

NS also has a major yard in Baltimore, serving the Port of Baltimore. It is located near the CSX yard at Bay View and is accessed from the north via the Amtrak Northeast Corridor and the Port Road Branch, an NS line that follows the Susquehanna River between Perryville, Maryland and Harrisburg, Pennsylvania.

Although the trackage rights are infrequently used, NS also has access to Baltimore, Wilmington, and Philadelphia via either the Amtrak Northeast Corridor from Washington or the CSX line from Washington to Philadelphia.

Current and Future Traffic Levels

Figure 2-7 shows the present and projected traffic levels for intercity, commuter, and freight rail traffic through the study area. The future year numbers represent 2012-2015 planned or projected traffic levels based on CSX data and passenger railroad plans. The RF&P Subdivision, the primary CSX line being studied, presently carries 62 trains per day. Within five years, intercity traffic on this line is expected to

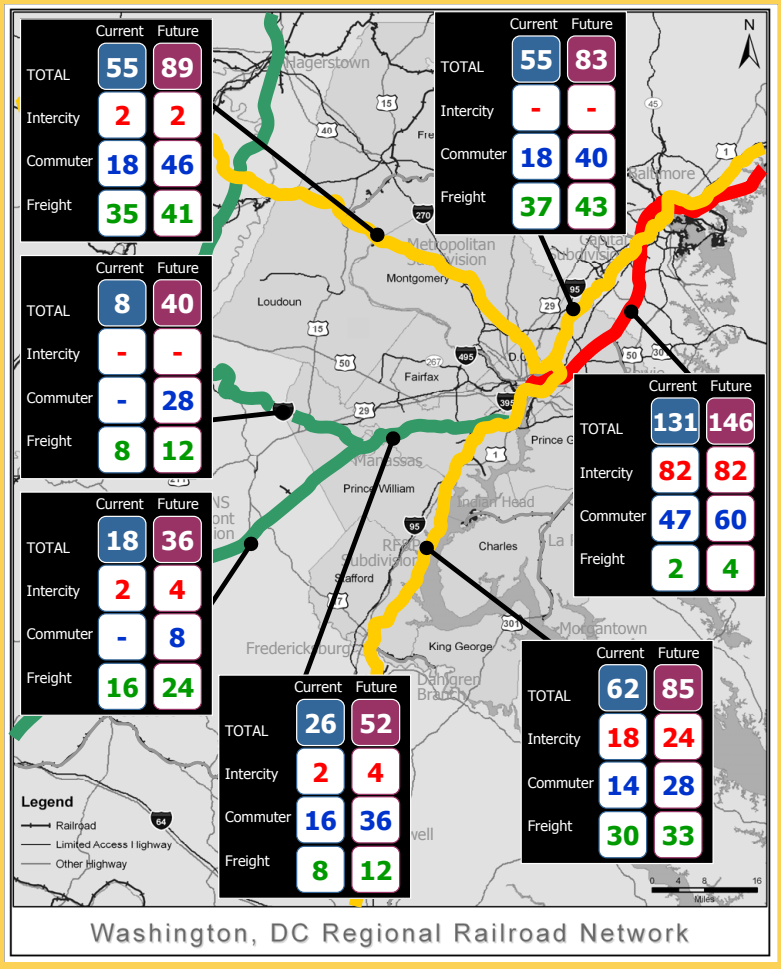

Figure 2-7. Current and Future Traffic Levels
Source: CSX, Amtrak, VRE, and MARC

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increase by 33 percent, commuter by 100 percent, and freight by 10 percent.

The current railroad is both physically and operationally constrained. Without investment to increase the capacity of existing rail infrastructure, the ability of these rail lines to attract and successfully accommodate future growth in both freight and passenger traffic will be limited. The operating railroads and the commuter authorities in Maryland and Virginia recognize this and have embarked on a program of capacity improvements, which CSX and NS will construct and the states will underwrite.

The committed capacity improvements address and ameliorate the 2002 levels of service, but traffic has grown to the point where the additional capacity has already been consumed and a next round of capacity improvements is necessary. For long-range planning, and to account for the increase in capacity that a Washington freight realignment could provide, additional potential future traffic would need to be allowed for—including increased diversion of freight in the I-95 and I-85 corridors from truck to rail.

Both MARC and VRE are projected to double their current ridership levels by 2025. As passenger traffic grows, the number of trains operated also will increase. Projected increases in intercity passenger traffic on the RF&P were identified in the Washington-Richmond corridor plan of 1999. Future commuter train volumes depend on negotiations between the commuter authority and the operating railroad.