DC TO RICHMOND
SOUTHEAST HIGH SPEED RAIL

1 PURPOSE AND NEED FOR THE PROPOSED ACTION

D.C. TO RICHMOND SOUTHEAST HIGH SPEED RAIL

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1.1 INTRODUCTION

The Federal Railroad Administration (FRA) and Virginia Department of Rail and Public Transportation (DRPT) propose passenger rail service and rail infrastructure improvements in the north-south travel corridor between Washington, D.C. and Richmond, VA. These passenger rail service and rail infrastructure improvements are collectively known as the Washington, D.C. to Richmond Southeast High Speed Rail Project (DC2RVA Project). The Project will increase capacity to deliver higher speed passenger rail, expand commuter rail, and accommodate growth of freight rail service, in an efficient and reliable multimodal rail corridor. While there is overlap in how intercity passenger rail and commuter rail services are defined, typically intercity passenger rail facilitates business and leisure travel between central business districts. Intercity passenger rail includes both regional and long-distance services; long-distance passenger rail covers distances longer than 750 miles and does not receive financial support from the states it serves. Regional passenger rail includes routes less than 750 miles and receive funding support from states. Typically, the termini for regional passenger rail service fall within geographic areas that share similar characteristics, such as economic, environmental, infrastructure, and historical/cultural ties. Commuter rail service can travel through multiple central business districts but generally provides short-haul rail service with morning and evening peaks in ridership and service levels that facilitates travel to work. The increased capacity will improve passenger rail service frequency, reliability and travel time in a corridor shared by growing volumes of passenger, commuter, and freight rail traffic, thereby providing a door-to-door time-competitive option for travelers between Washington, D.C. and Richmond and those traveling to and from adjacent connecting corridors. The Project is part of the larger Southeast High Speed Rail (SEHSR) corridor (Figure 1.1-1), which extends from Washington, D.C. through Richmond, and continues east to Hampton Roads (Norfolk), VA, and south to Raleigh, NC, and Charlotte, NC, and then continues west to Atlanta, GA and south to Florida. The Project connects to the National Railroad Passenger Corporation (Amtrak) Northeast Corridor (NEC) at Union Station in Washington, D.C.

As sponsoring agencies for the Project, FRA and DRPT have maintained close coordination with the major stakeholders in the corridor, including rail operators Amtrak, Virginia Railway Express (VRE), and CSX Transportation (CSXT). FRA and DRPT have engaged federal and state agencies that have jurisdiction by law and/or special expertise to serve as Cooperating Agencies, including the Federal Highway Administration (FHWA), Federal Transit Administration (FTA), U.S. Army Corps of Engineers (USACE), U.S. Coast Guard (USCG), U.S. Environmental Protection Agency (EPA), and the Virginia Department of Transportation (VDOT). FRA and DRPT have also coordinated Project development with the Washington, D.C. District Department of Transportation (DDOT), the North Carolina Department of Transportation (NCDOT), and affected Virginia localities.

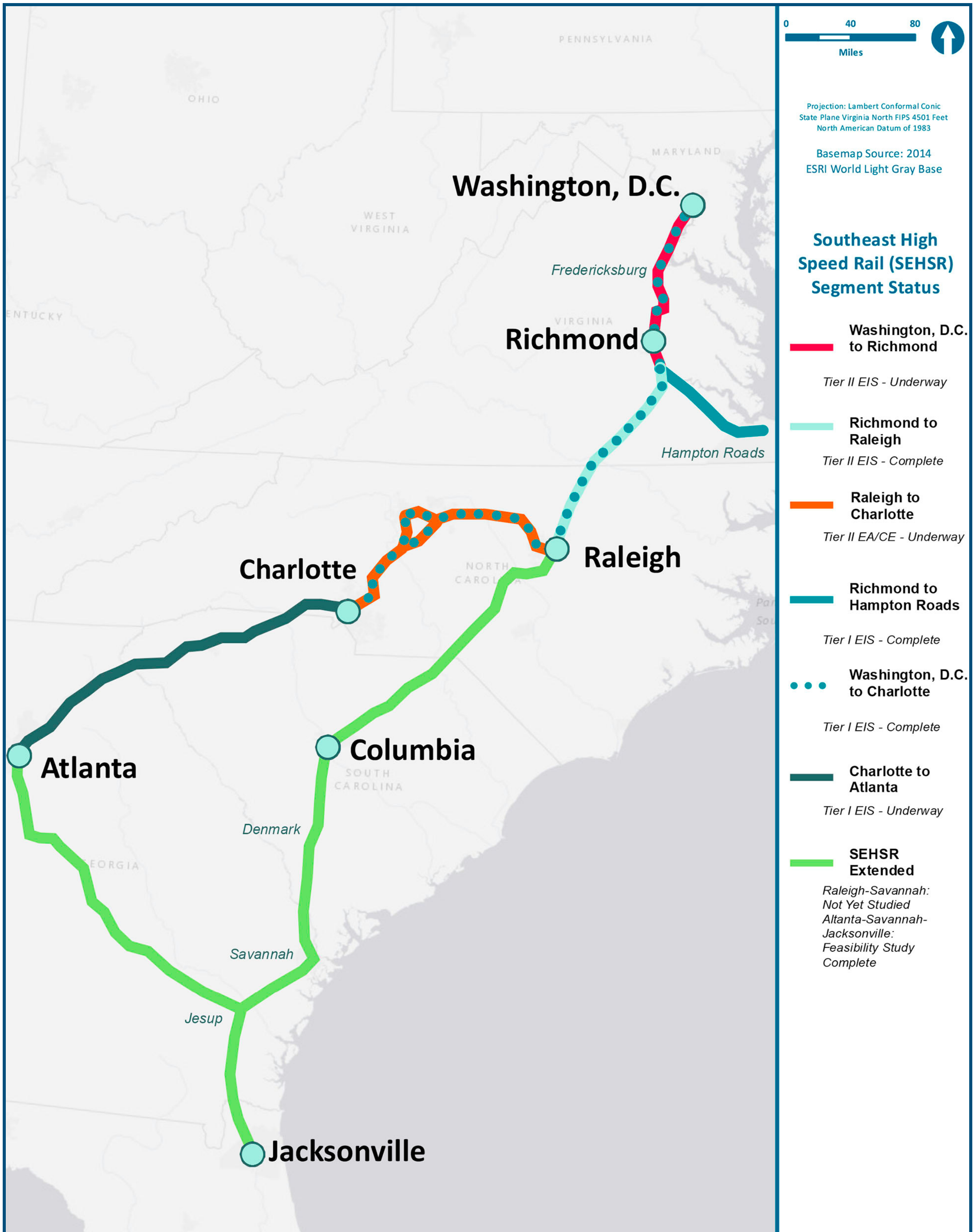

Figure 1.1-1: SEHSR Corridor

This chapter presents the purpose of and need for the 123-mile DC2RVA Project and builds on the purpose and need defined for the full SEHSR corridor in the Tier I Environmental Impact Statement (EIS), articulating and addressing the specific needs in the Washington, D.C. to Richmond segment of the SEHSR corridor. The following sections in this chapter introduce the background of the Project; describe its location; provide a synopsis of the DC2RVA Project; discuss the purpose and need identified for both the overall SEHSR corridor and the DC2RVA Project specifically; provide background information and highlight related studies; and identify the benefits of the Project.

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA Public Law 120-240, Section 1036) authorized a program of high speed rail corridors in the United States. In 1992, the United States Department of Transportation (U.S. DOT) designated the SEHSR corridor, from Washington, D.C. to Charlotte, as one of five original national high speed rail corridors. The SEHSR corridor is made up of a number of segments covering the south Atlantic states with passenger rail service to and from the NEC, including Amtrak's service north to New York and Boston. U.S. DOT administratively designated an extension of the SEHSR corridor from Richmond to Hampton Roads in 1996. In 1998, U.S. DOT extended the SEHSR corridor into South Carolina, Georgia, and Florida. Further extensions in 2000 added additional corridor connections in Georgia and Florida. System linkages through Atlanta would also connect passengers to Alabama, Mississippi, Louisiana, and Texas.

In October 2002, DRPT and NCDOT, together with FHWA and FRA, completed a service-level Tier I EIS[1] for the SEHSR corridor between Washington, D.C. and Charlotte, NC. This Tier I EIS established the SEHSR program-level Purpose and Need, established the preferred modal alternative (rail) and selected a preferred rail corridor. It also provided a programmatic-level environmental analysis of the various alternatives in the selection of the preferred. Note that a Tier I program level document is not a "Build" document, and requires one or more follow-on Tier II documents (such as this DC2RVA EIS process) before construction. The purpose of the SEHSR program, as stated in the Tier I EIS, is to provide a door-to-door time-competitive transportation choice to travelers within the Washington, D.C. to Charlotte travel corridor. The Tier I EIS stated that implementation of improved passenger rail service in the Washington, D.C. to Charlotte SEHSR corridor could:

- Divert trips from air and highway travel modes within the corridor, thereby relieving pressure on these congested modes.
- Provide a more balanced and energy-efficient use of the corridor's transportation infrastructure.

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[1] The Tier I EIS evaluated the SEHSR program pursuant to the National Environmental Policy Act (NEPA) using a tiered approach as described in 23CFR 777.111(g) and Council on Environmental Quality (CEQ) regulations 1502.20 and 1508.28. This tiered approach is composed of a first level document (Tier I) that is general in nature and provides a program-level or corridor-level overview of study area alternatives and potential effects. Following completion of the Tier I evaluation, a second level of documents can be developed (Tier II) that is more detailed in the level of analysis. Generally, the Tier I document evaluates what is to be done at the program level, and the Tier II document(s) evaluates the specific actions necessary to accomplish the preferred Tier I alternative. A public Record of Decision (ROD) for the Tier I and Tier II NEPA evaluations provides a concise record of the NEPA decision-making process, identifies the selected alternative, presents the basis for the decision, identifies alternatives considered but not selected, specifies the "environmentally preferable alternative," and provides information on the adopted means to avoid, minimize, and compensate for environmental impacts.

- Increase the safety and effectiveness of the transportation system within the travel corridor.
- Serve long-distance travelers between and beyond Virginia and North Carolina, including Amtrak's Northeast Corridor, which extends from Washington, D.C. to Boston, MA.

The 2002 Tier I Record of Decision (ROD) for the Washington, D.C. to Charlotte SEHSR program selected an incremental approach to develop the SEHSR program. Key elements of the selected incremental approach are:

- Upgrade existing rail corridors (instead of developing new corridors).
- Utilize fossil-fuel burning equipment rather than electric-powered equipment.
- Add service as market demand increases and/or when funding is available.

The incremental approach seeks to minimize cost and potential impacts to the environment by utilizing existing railroad tracks and rail rights-of-way as much as possible. Subsequently, the SEHSR corridor was separated into discrete sections (Washington, D.C. to Richmond, Richmond to Raleigh, and Raleigh to Charlotte) for further detailed (Tier II) "build" studies. Later studies added additional segments to the SEHSR corridor, including Richmond to Hampton Roads, and segments extending south and west of Charlotte.

1.2 PROJECT LOCATION

The Washington, D.C. to Richmond corridor spans 123 miles along an existing rail corridor owned by CSXT between Control Point[2] Rosslyn (RO) at milepost (MP) CFP 110 in Arlington County, VA to the junction of the CSXT North End Subdivision (sometimes referred to as the A-Line) between West Acca Yard in Richmond and Centralia, VA, and the CSXT Bellwood Subdivision (sometimes referred to as the S-Line) between Control Point Hermitage in Richmond and Centralia, VA (CE) at MP A-11 in Chesterfield County, VA (Figure 1.2-1). At the northern terminus in Arlington County, the Project limit is marked by the southern approach to Long Bridge, a double-track rail bridge connecting the rail corridor over the Potomac River[3] to Washington, D.C. The Project corridor follows the CSXT Richmond, Fredericksburg & Potomac (RF&P) Subdivision from the Potomac River to Richmond. The southern terminus in Centralia is the junction of two CSXT routes (the A-Line and the S-Line) that begin in Richmond and rejoin approximately 11 miles south of the city. The theoretical study area for ridership and revenue estimation, and capacity modeling extends beyond the physical Project limits north to Union Station in Washington, D.C. (which is owned by Amtrak) and the NEC, and south to Norfolk and Newport News, VA and to cities in North Carolina and beyond to Florida.

Additional segments of the Project include approximately 8.3 miles of the CSXT Peninsula Subdivision CA-Line from Beulah Road (MP CA-76.1) in Henrico County, VA east of Richmond to AM Junction in downtown Richmond, and the approximately 26-mile Buckingham Branch Railroad (BBR) from AM Junction to the RF&P Crossing (MP CA-111.8) north of Richmond in Doswell, VA.

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[2] A control point is an interlocking (a switch or crossing between two tracks), location of a signal, or other designated point used by dispatchers in identifying and controlling train movements.

[3] A separate NEPA study of alternatives to replace and/or expand Long Bridge began in 2015. The study is funded under a 2014 TIGER Grant to the District Department of Transportation (DDOT) (see Section 1.6.4 for additional details).

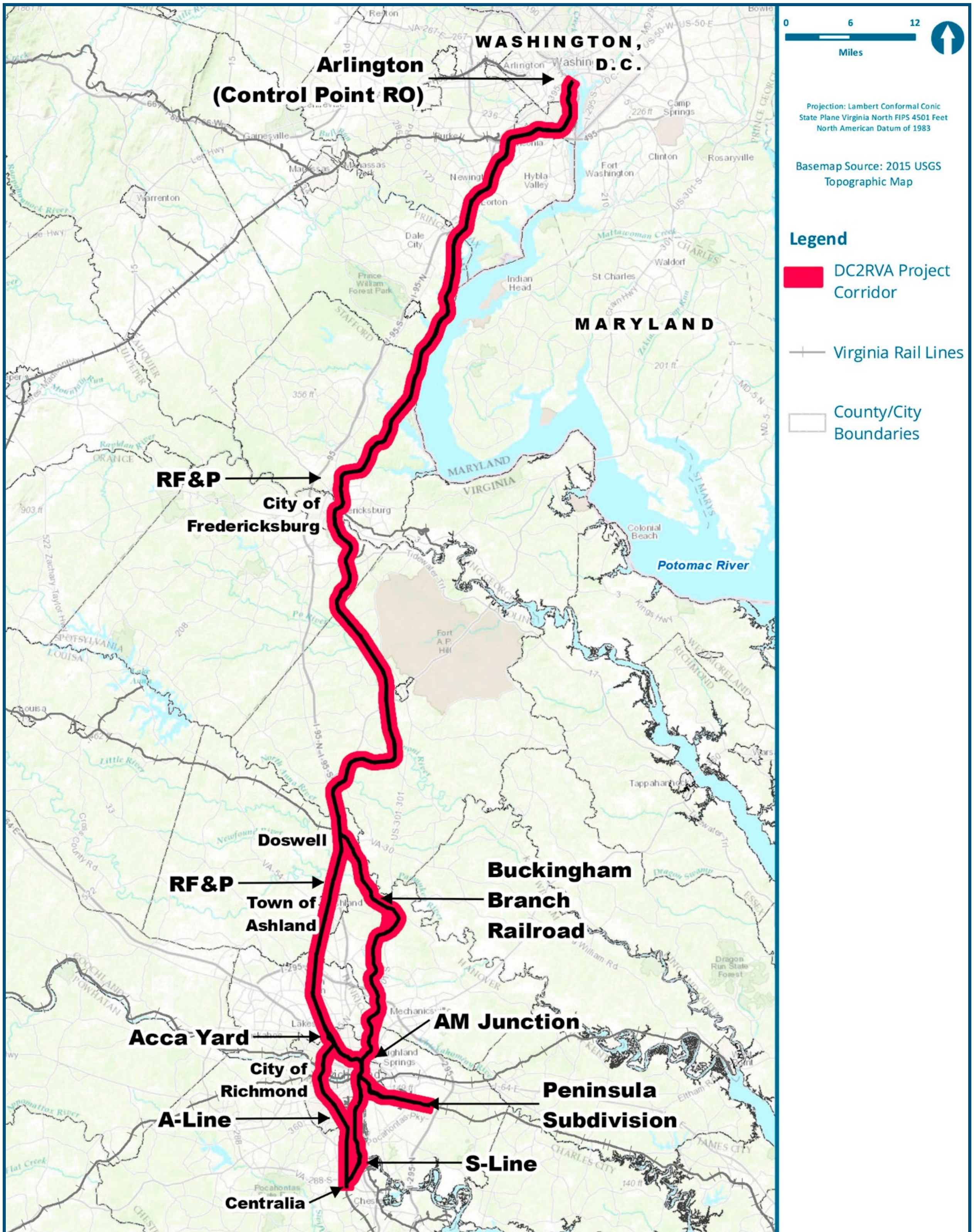

Figure 1.2-1: DC2RVA Project Corridor

In Arlington, the Project connects to existing CSXT track extending across the Potomac River on the Long Bridge into Washington, D.C. and Union Station, the southern terminus of Amtrak's NEC. In downtown Richmond and at Centralia, the Project connects to both the Richmond to Raleigh segment of the SEHSR corridor and the Richmond to Hampton Roads segment of the SEHSR corridor.[4] The Washington, D.C. to Richmond segment is an integral part of the overall Washington, D.C. to Charlotte SEHSR corridor and provides a critical link between high speed passenger service from Boston to Washington, D.C. and the southeastern United States.

1.3 PROJECT DESCRIPTION

The Project will include specific rail infrastructure improvements and service upgrades to deliver higher speed passenger rail, expand commuter rail, and accommodate growth of freight rail service in an efficient and reliable multimodal rail corridor. The increased capacity will improve passenger rail service frequency, reliability, and door-to-door competitive travel time in a corridor shared by growing volumes of passenger, commuter, and freight rail traffic. Specific improvements to the existing rail infrastructure between Arlington, VA, and Centralia, VA, include:

- Corridor-wide improvements to train operating capacity to accommodate efficient operation of passenger, commuter, and freight rail service with increased frequency, reliability, and speed, including an additional main track along most of the corridor, additional sidings, crossovers, yard bypasses and leads, and other capacity and reliability improvements at certain locations.
- Corridor-wide upgrades to existing track and signal systems to achieve higher operating speeds, including curve realignments, higher-speed crossovers between tracks, passing sidings, and grade crossing improvements.
- Station and platform improvements for Amtrak and VRE stations to improve the efficiency of railroad operations, improve quality of service, and accommodate increased ridership.

The environmental impacts of these improvements and measures to avoid, minimize, or otherwise mitigate such impacts are described in Chapter 4.

The Project will include locations for new or replacement passenger stations on the Project corridor. Additionally, the Project will include rail capacity improvements to address congestion in the Richmond area, including on the CSXT Peninsula Subdivision from AM Junction in downtown Richmond east to Beulah Road in Henrico County, and on the Buckingham Branch Railroad from AM Junction north of Richmond to Doswell, VA.

Studies in support of the Project addressed passenger and freight rail operations and service between Union Station in Washington, D.C. and Richmond and beyond, but the Project will not include physical improvements to the Long Bridge across the Potomac River or to rail

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[4] The Tier II Final EIS (September 2015) and ROD (anticipated in 2016) for the Richmond to Raleigh SEHSR segment and the Tier I Final EIS (August 2012) and ROD (December 2012) for the Richmond to Hampton Roads SEHSR segment identify the Richmond terminus as Main Street Station with rail access from the south along the CSXT S-Line. The Washington, D.C. to Richmond project's southern terminus of Centralia overlaps with these prior NEPA evaluations to provide additional detailed study of potential passenger and freight rail improvements in the Richmond area that support the Project's Purpose and Need.

infrastructure within Washington, D.C. Other projects will address these improvements as well as improvements to the rail infrastructure north of Arlington and south of Centralia along the SEHSR corridor.

1.4 PROJECT PURPOSE

The 2002 Tier I EIS established the overall purpose for the SEHSR program, which, as stated in the Tier I EIS, is to provide a competitive transportation choice to travelers within the Washington, D.C. to Richmond, Raleigh, and Charlotte travel corridor. The current DC2RVA project carries forward the purpose of the SEHSR Tier I EIS within the Washington, D.C. to Richmond segment of the larger SEHSR corridor by identifying the infrastructure improvements necessary to provide a competitive transportation choice for current and future conditions. As detailed below, the Purpose of the DC2RVA project is to increase railroad capacity between Washington, D.C. and Richmond to deliver higher speed passenger rail, expand commuter rail, and accommodate growth of freight rail service in an efficient and reliable multimodal rail corridor. This Project will enable passenger rail to be a competitive transportation choice for intercity travelers between Washington, D.C. and Richmond and beyond. DRPT anticipates that the Project will provide multiple benefits to the traveling public and the Commonwealth of Virginia, including:

- Providing an efficient and reliable multimodal rail corridor between Washington, D.C. and Richmond and beyond
- Increasing the capacity of the multimodal rail system between Washington, D.C. and Richmond
- Improving the frequency, reliability, and travel time of passenger rail operations in Virginia and beyond, and providing a competitive alternative to highway and air travel
- Accommodating VRE commuter rail service operations
- Accommodating freight rail movement through the corridor, including to and from Virginia's ports
- Improving modal connectivity with other public transportation systems within the corridor to further expand travel options for passengers within Virginia and beyond
- Improving multimodal rail operations safety in the corridor
- Improving air quality and reducing greenhouse gas (GHG) emissions by diverting passenger trips by automobile and movement of freight by trucks to more environmentally sustainable rail transportation

Higher speed passenger rail service would also encourage economic development in the Commonwealth and along the Eastern Seaboard travel corridors by expanding competitive travel options in the corridor for business and leisure travelers. Additionally, because the Project corridor is a multimodal corridor shared with freight, intercity passenger and commuter service, the proposed improvements would also enhance the efficiency of freight rail movements within the corridor. Improvements to freight rail operations in the corridor would encourage economic development by increasing freight traffic through Virginia's ports, and present an opportunity for greater diversion of freight transport from congested highways to rail.

1.5 PROJECT NEED

The Project is a key component of the SEHSR program. The need for the SEHSR program was established in the Tier I EIS and is further supported by current conditions in the corridor, described below.

1.5.1 SEHSR Program Need

The Tier I Final EIS and ROD for the SEHSR corridor between Washington, D.C. and Charlotte established the needs for the overall SEHSR program, including this Project. The following needs for the SEHSR program were identified in the Tier I EIS, and remain current for the SEHSR corridor:

- **Growth.** Population growth and economic growth in the SEHSR corridor have burdened airport and highway networks, which are experiencing capacity problems that are projected to worsen over the next several decades, despite planned improvements. If the region's transportation systems do not provide options for reliable and convenient movement of goods and people, its economy may suffer.
- **Congestion**. Population growth and economic development have caused a severe increase in traffic congestion on interstates and major highways. Daily traffic volumes regularly exceed the design capacity of I-95 in the corridor, causing delays and safety concerns. Average highway speeds, particularly during rush hours, are declining, while concerns about air quality are rising. Virginia is planning or implementing improvements to I-95 and other major highways in the corridor to provide additional vehicle capacity; however, experience has shown that traffic volumes quickly reach or exceed the capacity of highway improvements. The increasing cost and potential environmental impacts of continual highway expansion make it less desirable to implement further improvements.
- **Air Travel.** Demand for air travel is increasing nationwide and within the corridor. The expansion of air travel has outpaced the growth in airport capacity, resulting in delays. Air travel delays increase airline-operating costs and generate additional noise and emissions. Delays affect the traveling public due to missed time at work, on vacation, or at home, and missed business opportunities.
- **Travel Time**. Travel time and service reliability are key factors affecting the traveling public's choice of transportation mode. The Tier I EIS found that conventional rail travel times were not competitive with travel by air or auto within the SEHSR corridor. Rail passenger service competitiveness will not increase without reductions in travel time and improvements in service frequency and reliability.
- **Air Quality.** Several localities within the Northern Virginia portion of the SEHSR corridor experience air quality impacts from mobile source emissions. Moving passengers and freight by rail produces substantially less pollution per mile than automobile or truck travel; therefore, diverting some of the passenger and freight movements from auto and truck to rail would help reduce GHG emissions through the corridor.
- **Safety**. The Tier I EIS concluded that passenger rail is one of the safest ways to travel nationally and that railroad safety in the U.S. steadily improved over the several decades prior to the Tier I EIS. The Tier I EIS also noted the most common type of rail-related accidents do not occur as a result of unsafe railroad operations or equipment, but from

incursions onto the railroad right-of-way by highway vehicles, most often as trains are approaching locations where roadways cross railroads at grade.

- **Energy Efficiency.** Diverting passenger and freight movements from highway vehicles to rail would reduce energy consumption, as well as GHG emissions within the corridor.

1.5.2 DC2RVA Project Need

Current conditions experienced in the Project corridor support the Tier I EIS purpose and need and are the foundation for the Project today. These conditions are detailed in the sections below and include:

- **Population Growth.** Population in the corridor and adjacent urban regions continues to grow, increasing demand for reliable and safe travel options for passengers. In addition to overall population growth, changing demographics in the corridor and adjacent urban regions are increasing the demand for passenger rail service.
- **Freight Growth.** Demand for freight movement through and within the corridor is growing as economic activity and population increase. Ongoing expansion of Virginia's deep water ports and intermodal facilities further increases the need for efficient shipment of freight.
- **Congestion in the I-95 Corridor.** The I-95 corridor between Washington, D.C. and Richmond remains congested, despite ongoing and planned improvements. As a result, trip times by highway vehicle are not reliable.
- **Air Travel Congestion.** Travel by air is increasingly at capacity at airports, resulting in frequent delays and causing commercial carriers to reduce flights and increase fares, which limits the transportation options between Washington, D.C., Richmond and adjacent corridors, and generates detrimental economic effects such as lost productivity for travelers and excessive fuel consumption.
- **Rail Capacity in the Corridor.** The shared freight and passenger rail corridor between Washington, D.C. and Richmond is nearing capacity and requires improvements to effectively and efficiently meet existing and future demands for passenger service, commuter passenger service, and freight service.
- **Providing Options for Reliable and Convenient Movement of Goods and People.** The transportation network must provide options for reliable and convenient movement of goods and people for the Commonwealth and the southeast region's economy to remain strong and grow.
- **Air Quality.** There is a need to reduce growth of transportation-related mobile source emissions and the resultant impacts to air quality. Travel or freight movement by train provides a safe and efficient travel mode, and it uses less energy and produces fewer emissions per passenger or ton of freight moved per mile.

1.5.2.1 Population Growth

Population growth is recognized as a critical driver of passenger and freight rail needs by the 2013 *Virginia Statewide Rail Plan*. The plan notes:

- Most of the nation's population growth and its economic expansion is expected to occur in 10 or more emerging mega-regions—large networks of metropolitan regions. Virginia is part of the Northeast mega-region and abuts the Piedmont Atlantic mega-region to the south. The Washington, D.C. to Richmond corridor is a key link between these two mega-regions.

Virginia's population increased 13 percent between 2000 and 2010, significantly faster than the national growth rate (10 percent) (Tippet, 2011). Most of this growth—more than 80 percent—occurred in the Urban Crescent[5] of Northern Virginia, the Richmond region, and Hampton Roads, as shown in Figure 1.5-1. Two-thirds of Virginia's current population is within the Urban Crescent. The Washington, D.C. to Richmond corridor parallels the I-95 corridor and connects to the Richmond to Hampton Roads rail corridor, forming an integrated passenger and freight rail corridor within the Urban Crescent.

- Between 2010 and 2040, Virginia's population is expected to increase from 8 million to close to 11 million residents; a 37 percent increase occurring largely in the Urban Crescent (Virginia Statewide Rail Plan, 2013).
- One in eight Virginians is 65 or older, and this group of the population is increasing in greater proportions as the "Baby Boom" generation turns 65. The largest concentration of Virginia's aging population lives in the Urban Crescent.

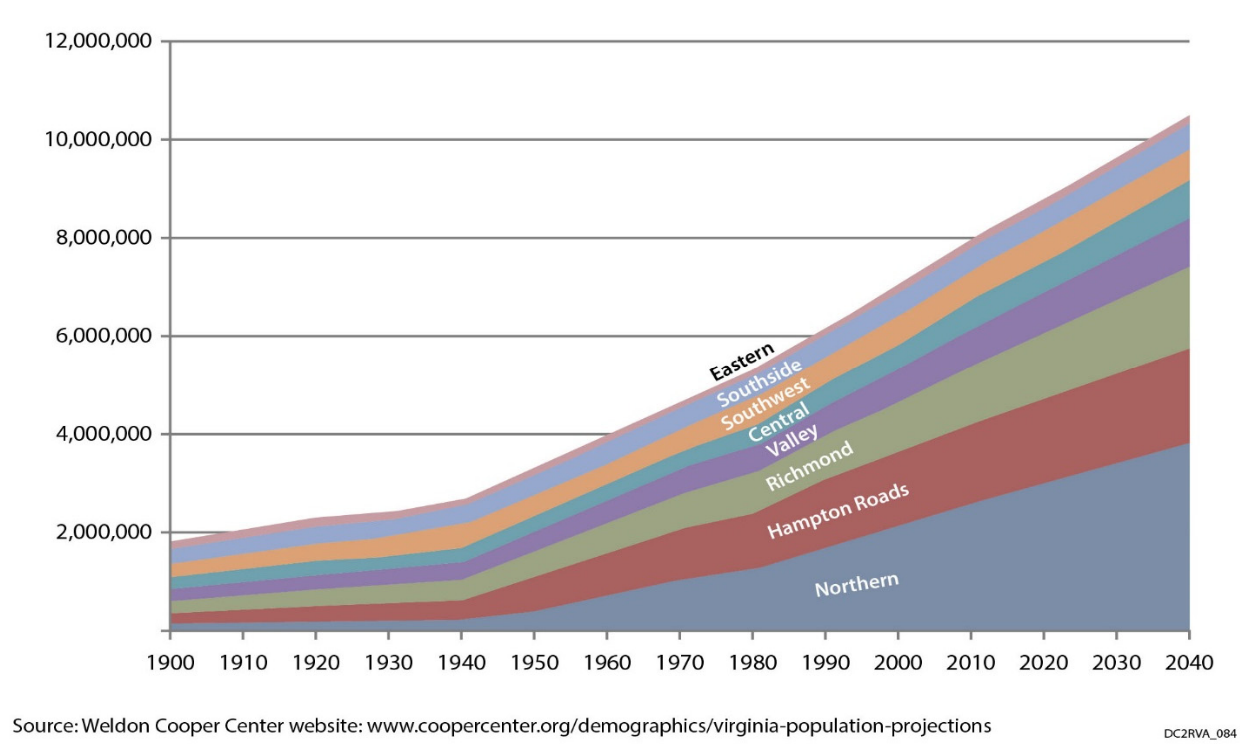

Figure 1.5-1: Virginia Population Trends by Region

[5] The Northern Virginia, Richmond, and Hampton Roads regions are highly urbanized and densely populated compared to the rest of the state. These regions are connected by the I-64 and I-95 transportation corridors, which intersect to form a "crescent"; hence, this section of the state has been named the Urban Crescent.

Much of the projected population growth in the Urban Crescent, and particularly Northern Virginia, is young professionals, typically defined as people under 40. The increasing number of young professionals and the increasing proportion of those over 65 within urban areas affect the need for public transportation choices. Both the young and the elderly are driving less, and they are even declining car ownership in favor of using public transportation options in the urban areas.

1.5.2.2 Freight Growth

Freight coming into and through Virginia is a key driver for rail services and for economic development. The Virginia Port Authority (VPA), a political subdivision of the Commonwealth of Virginia, owns and operates three marine terminals—Norfolk International Terminals (NIT), Portsmouth Marine Terminal (PMT), and Newport News Marine Terminal (NNMT)—and an inland intermodal facility, the Virginia Inland Port (VIP) located in Front Royal. VPA also leases two additional general cargo marine terminals—the Virginia International Gateway (VIG) and the Port of Richmond. These six facilities are collectively known as the Port of Virginia. The Port of Virginia currently offers 50-foot-deep harbor channels and berths, and it is the only United States East Coast port authorized by Congress for 55-foot deep channels. The Port had 2.22 million TEUs[6] in 2013. Of these, 34 percent arrived or departed by rail, the largest percentage for rail movement of cargo of any East Coast port. CSXT and Norfolk Southern (NS) rail lines link the Port facilities with 16 Midwest and Southeast inland terminals, plus many distribution facilities and other private customers. Overall, the Port of Virginia is a major source of economic growth for the Commonwealth.

Over the next 20 years, containerized cargo volume coming into the United States is expected to triple, far surpassing the capacity of existing United States ports. In addition, container ships are growing larger and requiring deeper harbors. The Panama Canal improvements, completed in 2016, are anticipated to increase the demand for deep water ports on the East Coast. The Port of Virginia is the eighth largest port by tonnage in the United States and is one of the fastest growing ports on the East Coast (American Shipper, 2015). The Port has averaged 6.5 percent growth in volume since 2010 and has exceeded 200,000 standard shipping units in six of the last seven months of 2014. The Port's TEU growth in containerized cargo is expected to increase by 330 percent between 2013 and 2040. VPA plans to construct a fifth terminal—Craney Island Marine Terminal—which is scheduled to open its first phase in 2026 and its second phase in 2038, doubling the terminal's 2026 capacity. This new facility, coupled with expansions and renovations at existing facilities, such as NIT, would allow the Port of Virginia to accommodate more than 9.5 million TEUs per year by 2038. With the completion of ongoing maritime and rail improvements, including the double stack clearance of CSXT's National Gateway Corridor, DRPT expects that rail freight will remain a competitive choice and that a similar percentage of the cargo entering the Port of Virginia in the future would be shipped by rail, including along the important north-south CSXT rail line (the RF&P Subdivision identified as the Project corridor) between Washington, D.C. and Richmond.

1.5.2.3 Congestion in the I-95 Corridor

Population and economic growth have led to increasing vehicle use on the I-95 corridor, causing congestion and adversely affecting travel time. I-95 facilitates the movement of people and freight along the entire eastern seaboard, including serving as the primary roadway linking Washington,

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[6] TEU stands for 20-foot equivalent unit and represents the volume of cargo that fits within a 20-foot-long intermodal shipping container. A 40-foot intermodal shipping container, commonly used in international trade, equals two TEUs.

D.C. and Richmond. I-95 is also a regional route for commuters to the Washington, D.C. and Richmond metropolitan areas, and it is a local route for traffic in northern Virginia, the City of Fredericksburg and City of Richmond. I-95 has become so congested in recent years that the general-purpose lanes, and oftentimes the high occupancy vehicle (HOV) lanes, cannot provide reliable travel times during the peak periods.

The Commonwealth's Secretary of Transportation's Fiscal Year (FY) 2013 report to the General Assembly summarized efforts to leverage the state's investment in passenger rail and other transit programs to address highway congestion. The Secretary's report stated:

> "As Virginia's population grows, so too, will traffic congestion. Our culture's dependency on the car as the primary means of travel, in general, and single occupancy vehicle travel (SOV) auto travel, in particular, translates into increasing levels of congestion. Recognizing the correlation between an increasing population and vehicles on the road is key to understanding the congestion equation. Despite our all-out push to increase Virginia's roadway supply, the Commonwealth cannot keep pace with demand, especially in the urban areas. The lack of funding and lack of space for more roadways creates an imbalance. The result: an increasing level of congestion and a decreasing level of access and mobility. Over the next 25 years, two thirds of Virginia's I-95 infrastructure will be at or above capacity, resulting in an increase in travel times of as high as 40 percent." (Commonwealth of Virginia Report Document No 316, 2013)[7]

Recurring daily congestion resulting from travel demand exceeding available highway capacity on I-95 results in slower travel speeds and increased travel times, and it predictably occurs during morning and evening rush hours. Average travel time along the I-95 corridor is increasing, and the variability of travel time is also increasing. As traffic flows approach and exceed capacity, the higher traffic densities result in abrupt stop-and-go traffic movements, creating nonrecurring congestion (nonrecurring because it happens at different times and places every day). Because of the unstable nature of the traffic flow, the onset, severity, and frequency of congested conditions are difficult to predict. Actual travel times may vary considerably from the average from one day to the next, especially when crashes or breakdowns result in lane restrictions or closures. Such nonrecurring congestion increases the unreliability of travel times in the corridor. Because of the unreliable travel times, interstate travelers must allow extra time to be sure that they will arrive at their destinations on time.

VDOT has implemented or initiated several improvement projects to address congestion on I-95, including the recently opened I-95 Express Lanes, a 29-mile express system using dynamic tolling that adjusts tolls based on real-time traffic conditions, designed to alleviate some of the traffic bottlenecks between Stafford County and Fairfax County. However, FHWA's 2011 Environmental Assessment (EA) for the project concluded that while the I-95 Express Lanes would improve the overall traffic situation, several road segments would remain at failing service levels, and after completion of the Express Lanes, the merge areas at the northern and southern ends of the Express Lanes would operate at failing levels. The EA also concluded traditional highway capacity expansion—adding general purpose travel lanes—was not an option to meet the growing interstate travel demand. Such expansion has become increasingly expensive, and

[7] The Virginia's Secretary of Transportation FY 2013 report to the General Assembly is compiled from data/documentation provided by VDOT, DRPT, and others.

the human impacts and physical constraints in the highly-urbanized areas in the northern section of the I-95 project corridor make highway capacity expansion exceedingly difficult to implement.

Table 1.5-1 compares train, bus, and auto travel times between Washington, D.C. and a selection of Virginia cities. As shown in table, in the absence of roadway congestion, the current intercity passenger rail travel service in Virginia is typically slower than highway travel; however, once roadway congestion is considered, passenger rail can be the faster option, even when travel time to the train station is included. This suggests that even modest improvements in passenger rail travel time could result in substantial ridership growth.

Table 1.5-1: Modal Comparison of Travel Times

Origin/Destination	Train[1]	Bus	Drive[2]
Washington D.C. (Union Station) to Richmond (Staples Mill Road Station)	2 hr, 2 min to 2 hr 22 min	2 hr 5 min to 2 hr 45 min (Greyhound[4])	1 hr 50 min to 3 hr 10 min (107 miles)
Washington D.C. (Union Station) to Richmond (Main Street Station)	2 hr 40 min to 2 hr 45 min	2 hr 33 min to 2 hr 43 min (Megabus[3])	1 hr 50 min to 3 hr 10 min (109 miles)
Washington D.C. (Union Station) to Petersburg (Ettrick Train Station)	2 hr 46 min to 3 hr 3 min	5 hr 15 min to 5 hr 30 min (Greyhound[7])	2 hr 30 min to 3 hr 40 min (132 miles)
Washington D.C. (Union Station) to Newport News Train Station	4 hr 15 min to 4 hr 22 min	4 hr 5 min to 4 hr 28 min (Megabus[6])	2 hr 50 min to 4 hr 20 min (177 miles)
Washington D.C. (Union Station) to Norfolk Train Station	4 hr 43 min to 5 hr 7 min	4 hr 54 minutes (Megabus) to 5 hr 40 min (Greyhound[8])	(3 hr 10 min to 4 hr 40 min (195 miles)
Washington D.C. (Union Station) to Lynchburg Train Station	3 hr 30 min to 3 hr 46 min	5 hr 5 min to 5 hr 50 min (Greyhound[5])	3 hr 20 min to 5 hr (183 miles)

Notes: 1. Train trip times are from Amtrak's web-based schedule (www.amtrak.com); 2. Estimated drive time along I-95 and I-64 assuming weekday pm peak travel. Range represents free flow and congested flow, and it was provided by Google Maps (https://maps.google.com); 3. Megabus runs directly between Union Station in Washington, D.C. and Richmond's Main Street Station. Megabus trip times are from Google Maps estimates based on routes and verified by the Megabus website (us.megabus.com); 4. Greyhound stops at 1300 North Boulevard, Richmond, VA, which is 5 miles from Staples Mill Station (Greater Richmond Transit Commission [GRTC] local bus service connects the Greyhound Station with Amtrak's Staples Mill Road Station). Greyhound trip times are from Greyhound's website (www.greyhound.com); 5. Greyhound stops at the Lynchburg Amtrak Station; 6. Megabus stops 9 miles from the Newport News Train Station. Hampton Roads Transit provides bus service between the Newport News Megabus stop (2 W Pembroke Avenue) and the Newport News Train Station. Trip time includes the Hampton Roads Transit bus travel, but it does not include wait time between buses. The estimated Megabus trip time alone, from the Megabus website (us.megabus.com) is 3 hours and 30 minutes; 7. Greyhound stops 2.2 miles away from the Petersburg Amtrak Station; 8. The Greyhound Station in Norfolk is 1.5 miles from the Norfolk Amtrak Station.

1.5.2.4 Air Travel Congestion

Increasingly, air travel is becoming congested throughout the major airports of the United States, with travelers experiencing frequent delays. Since 2008, airlines have experienced greater travel demand, reducing capacity and resulting in flights becoming more crowded and load factors[8] reaching record-high levels (Bureau of Transportation Statistics 2014). A recent article by the U.S. Travel Association, citing a study by Cambridge Systematics of the nation's top 30 airports, projected that as travel levels

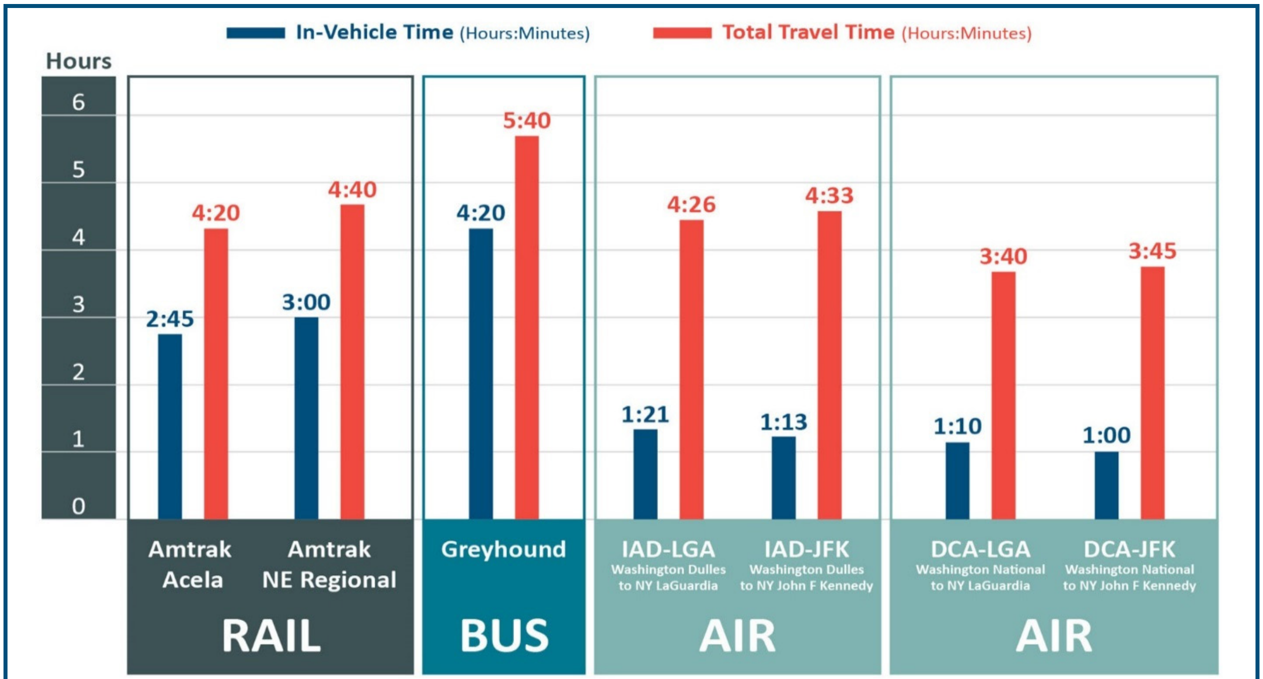
[8] Passenger load factor is a standard measure for capacity utilization of public transport services, including airlines, passenger trains, and bus service. It is typically used to assess how efficiently a transport system "fills seats" and generates fare revenue. Load factor is calculated by dividing the total revenue passenger miles by available seat miles.

grow, the average day of air travel in the United States will increasingly resemble its busiest day—the Wednesday before Thanksgiving—unless there is substantial investment in new airport infrastructure (Cambridge Systematics, 2014). Overall, the analysis found that the outlook for efficient and on-time air travel is becoming bleaker as air traffic congestion increases. The article concluded:

- Almost half (13) of the top 30 airports in the United States are already experiencing Thanksgiving-like congestion levels at least one day every week.
- Within the next six years, all of the top 30 airports will reach their Thanksgiving-peak on an average of one day per week.
- Within the next decade, 27 of the nation's top 30 airports will experience the same congestion as the Wednesday before Thanksgiving two days each week; for 20 of these airports, this will happen in the next five years.

Within the next 20 years, two-thirds of the nation's top 30 airports will feel like the Wednesday before Thanksgiving on the average day.

As noted in a recent article in the *Transport Policy Journal*, Amtrak's rail service in the NEC between Washington, D.C. and New York, NY, travels on a designated passenger corridor and provides a reliable and competitive travel choice in the corridor compared to air and motor vehicle travel modes (Kamga, 2014). The article compared intercity travel times between Washington, D.C. and New York, NY for air, rail, and bus, and it found that while actual in-vehicle travel time is much less for air versus train or bus travel, total door-to-door travel time for train travel is competitive with air travel (Figure 1.5-2) (Kamga, 2014).



Note: Total travel time includes average travel times to the originating train station, bus station, or airport; average pre-departure terminal waiting times of 30 minutes for rail, 15 minutes for bus, and 75 minutes for air; in-vehicle travel time; and average travel times from the arriving bus station, train station, or airport to a final destination.

Source: Camille Kamga, Transport Policy 37 (2015)

DC2RVA_065

Figure 1.5-2: Travel Time by Mode – Washington, D.C. – New York

Airports are typically located away from city centers due to the large land area required, airplane operational requirements, and concerns over noise and safety. Intercity (downtown-to-downtown) travelers experience longer ground travel and waiting times just going to and from the airport compared to rail and bus stations located in the city centers. Door-to-door travel times from Washington, D.C. to New York City for passengers on Amtrak's trains are only slightly greater than for air travelers. Kamga notes that although air takes less time door-to-door, rail provides an advantage because it is more reliable within the NEC, conveniently accessible, and the travel time can be more productive for business travelers. Train travel is frequently considered more desirable for travel within the NEC. Kamga's study shows that reliable passenger rail service with reasonable travel time can be competitive with air travel for intercity travel.

According to the Bureau of Transportation Statistics (2014), in 2012, 18.1 percent (more than 1.1 million) of scheduled flights were delayed, canceled, or diverted. The Bureau's data show flight cancellations are more likely to occur in winter (February in particular) than other times of the year due to the effects of snow and ice on airport operations. Trains, while not immune to extreme weather, are typically not as affected by winter weather. Amtrak[9] states that, "in general, trains are more resistant to bad weather than either planes or cars." High winds, foggy conditions, snow, and ice, which can cause trouble for planes, do not normally cause problems for trains, although these conditions may affect travel to the train station.

The north and south termini of the DC2RVA corridor are served by two airports, Ronald Reagan Washington National Airport in Arlington County, alongside the rail corridor, and Richmond International Airport in Henrico County, just east of the rail corridor. Table 1.5-2 gives the typical travel time (not including the time required for advance check-in at each departure, estimated at 1 hour 30 minutes), connections, and costs for flights originating in Richmond or Washington, D.C., terminating in cities served by passenger trains traveling the DC2RVA corridor. Other than a few selected cities, there are few direct flights, so airline travelers must first fly to a hub airport and then continue to their destination by a connecting flight. In addition to the air travel time, there is time spent at the airport for check-in and security screening (1 hour 30 minutes), connections within an airport (1 hour or more), exiting the airport to ground transportation (15 to 30 minutes), and then ground transportation to the destination city center. This has led passenger rail to be an increasingly competitive choice for medium-distance destinations, especially in terms of door-to-door travel time and cost.

Due to airport congestion, travel time and competitive pricing, air travel is neither a convenient nor affordable transportation option between Washington, D.C. and Richmond. Although frequent service is available between Richmond and cities along both the Northeast and SEHSR corridors, the high fare and collective travel time limit the accessibility of air as an option for the Richmond population and cities along the SEHSR corridor. Improved passenger rail service along the DC2RVA corridor, as part of the SEHSR corridor, will provide an additional travel alternative to the limited availability and accessibility of air service between Washington, D.C. and Richmond and to destinations both south and north.

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[9] www.railpassenger.org/Amtrak/Frequently Asked Questions; response to "Does weather delay trains?" March 5, 2015.

Table 1.5-2: Typical Air Travel Time

Departure	Direct Flight Available[1]	Destination	Cost One-Way (Per Person)[2]	Air Travel Time[3]	Distance to City Center (Train Station)[4]	Drive Time (free flow)[5]
Richmond	No	Baltimore, MD				
Richmond	Yes	Boston, MA	$270	1 hr 28 min	4.2 mi	15 min
Richmond	Yes	Charlotte, NC	$450	1 hr 14 min	11 mi	18 min
Richmond	Yes	New York, NY (JFK)	$370	1 hr 20 min	15.9 mi	41 min
Richmond	Yes	New York, NY (LaGuardia)	$390	1 hr 17 min	9.7 mi	23 min
Richmond	Yes	Newark, NJ	$370	1 hr 15 min	4.9 mi	14 min
Richmond	Yes	Philadelphia, PA	$420	56 min	9.1 mi	21 min
Richmond	No	Raleigh, NC				
Richmond	No	Washington D.C.				
Richmond	Yes	Washington D.C. (Dulles)	$390	50 min	31.1 mi	43 min
Richmond	No	Newport News, VA				
Richmond	No	Norfolk, VA				
Washington D.C.	Yes	Baltimore, MD	$1,200 (Linear Air Taxi)	27 min	12.8 mi	26 min
Washington D.C.	Yes	Boston, MA	$80	1 hr 22 min	4.2 mi	15 min
Washington D.C.	Yes	Charlotte, NC	$350	1 hr 28 min	11 mi	18 min
Washington D.C.	Yes	New York, NY (JFK)	$80	1 hr 21 min	15.9 mi	41 min
Washington D.C.	Yes	New York, NY (LaGuardia)	$280	1 hr 6 min	9.7 mi	23 min
Washington D.C.	Yes	Newark, NJ	$150	1 hr 8 min	4.9 mi	14 min
Washington D.C.	Yes	Philadelphia, PA	$350	59 min	9.1 mi	21 min
Washington D.C.	Yes	Raleigh, NC	$100	1 hr 5 min	17.8 mi	23 min
Washington D.C.	No	Newport News, VA				
Washington D.C.	Yes	Norfolk, VA	$120	1 hr	10.4 mi	15 min

Source: Airfare costs and air travel times were determined using orbitz.com and kayak.com. Non-stop flight availability was verified using Richmond International Airport's website (www.flyrichmond.com) and Reagan National Airport's website (www.flyreagan.com). Google Maps (www.maps.google.com) was then used to determine the driving distances and travel time estimates between the airport and the city center.

Notes: 1. To compare air travel with other travel modes, only non-stop flights from the specified destinations were reviewed. Destinations from Richmond or Washington, D.C. that did not have direct flights are shaded in the table; 2. Cost is for single ticket, one way. The cost information was estimated from mid-week travel day costs (Tuesdays – Thursdays); 3. Air travel time is gate to gate and does not include time required for check-in and security screening (recommended at 1.5 hours) or departure (93 percent of flights leave the ground within 30 minutes of gate departure according to the U.S. DOT Bureau of Transportation Statistics in May 2008); 4. Airports are typically located some distance from the city center, requiring additional trip time for comparison to passenger rail station-to-station travel. Distance is from airport to city's downtown passenger rail station; 5. Additional trip time required by auto to connect from airport to city center (e.g., passenger rail station).

1.5.2.5 Rail Capacity in the Corridor

The Project's rail corridor from Washington, D.C. to Richmond is owned by CSXT, a freight railroad, which shares the corridor with other rail service providers through a series of negotiated agreements. This arrangement is unlike the NEC between Boston and Washington, D.C., which largely operates on a dedicated passenger service corridor. All passenger trains operating within Washington, D.C. between Union Station and CP Virginia, just north of the VRE commuter rail station at L'Enfant, are on Amtrak-owned track. At CP Virginia and to the south, the passenger trains operate on CSXT-owned tracks leading across the Potomac River on the Long Bridge, continuing on the CSXT-owned RF&P Subdivision to Richmond. Passenger rail service also operates on the CSXT-owned property in Richmond, on the S-Line through downtown and to the east, and on the A-Line to the west of downtown. The Project's corridor is one of the most heavily used rail corridors in the nation, with four providers of rail service operating in the corridor:

- CSXT, the owner of the corridor, operates approximately 30 through and local freight trains per day along the length of the corridor. Additional local freight trains and related train movements are also operated along the corridor depending on location and customer demand.
- Amtrak operates an average of 20 passenger trains per day between Washington and Richmond (10 round trips), including 8 long distance trains (4 round trips), 10 Northeast Regional (VA) state supported regional trains (5 round trip trains supported by Virginia), 2 interstate corridor (NC) state supported trains (1 round trip train supported by North Carolina), and Amtrak's Auto Train (1 round trip) which operates between Lorton, VA and Sanford, FL.
- In the northernmost end of the corridor, between Washington, D.C. and Alexandria, VA, Amtrak operates an additional 5 passenger trains per day, including 2 daily long distance trains (1 round trip) to Atlanta and New Orleans, LA and 2 long distance trains (1 round trip) to Chicago 3 times each week (counted as ½ train per day), and 2 daily Northeast Regional (VA) trains (1 round trip) to Lynchburg, VA.
- VRE operates 16 daily commuter trains (8 round trips) between Washington, D.C. and Crossroads in Spotsylvania County, VA, and an additional 16 daily commuter trains (8 round trips) between Washington, D.C. and Manassas, VA, for a total of 32 daily commuter trains (16 round trips) on the corridor between Washington, D.C. and Alexandria during the work week (Monday – Friday). In addition, VRE operates 2 trains on non-revenue trips between Washington, D.C. and Alexandria.
- On the northern end of the corridor, NS has trackage rights on CSXT lines to access freight customers in Alexandria and to access the Northeast Corridor, and it operates up to two trains per day.

Based on these train services, daily peak volumes of trains[10] on various portions of the corridor, shown graphically in Figure 1.5-3, are approximately:

- Washington to Alexandria: 23 Amtrak trains + 34 VRE trains + 30 CSXT trains + 2 NS trains = 89 trains per day
- Alexandria to Crossroads (end of VRE operations): 20 Amtrak trains + 16 VRE trains + 30 CSXT trains = 66 trains per day
- Crossroads to Acca Yard: 20 Amtrak trains + 30 CSXT trains = 50 trains per day

The Arlington to Alexandria portion of the corridor is largely triple track, while the remainder of the corridor between Alexandria and Richmond is double track. Most of the existing capacity of the rail corridor north of VRE's Spotsylvania Station is taken up by existing passenger and commuter trains.

Several major studies of rail capacity improvements in the Washington, D.C. to Richmond corridor have been conducted (see Section 1.6.2), all of which identified the need for additional track capacity to provide fast, frequent, and reliable passenger rail service.

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[10] The daily peak volumes of trains shown are conservative estimates of current train traffic along the corridor during the peak travel period of Monday – Friday. Train volumes are less on the weekend because VRE commuter trains are not operating. CSXT and NS daily train volumes may fluctuate based on customer demands, rail system capacity, and the need to accommodate passenger and commuter train schedules.

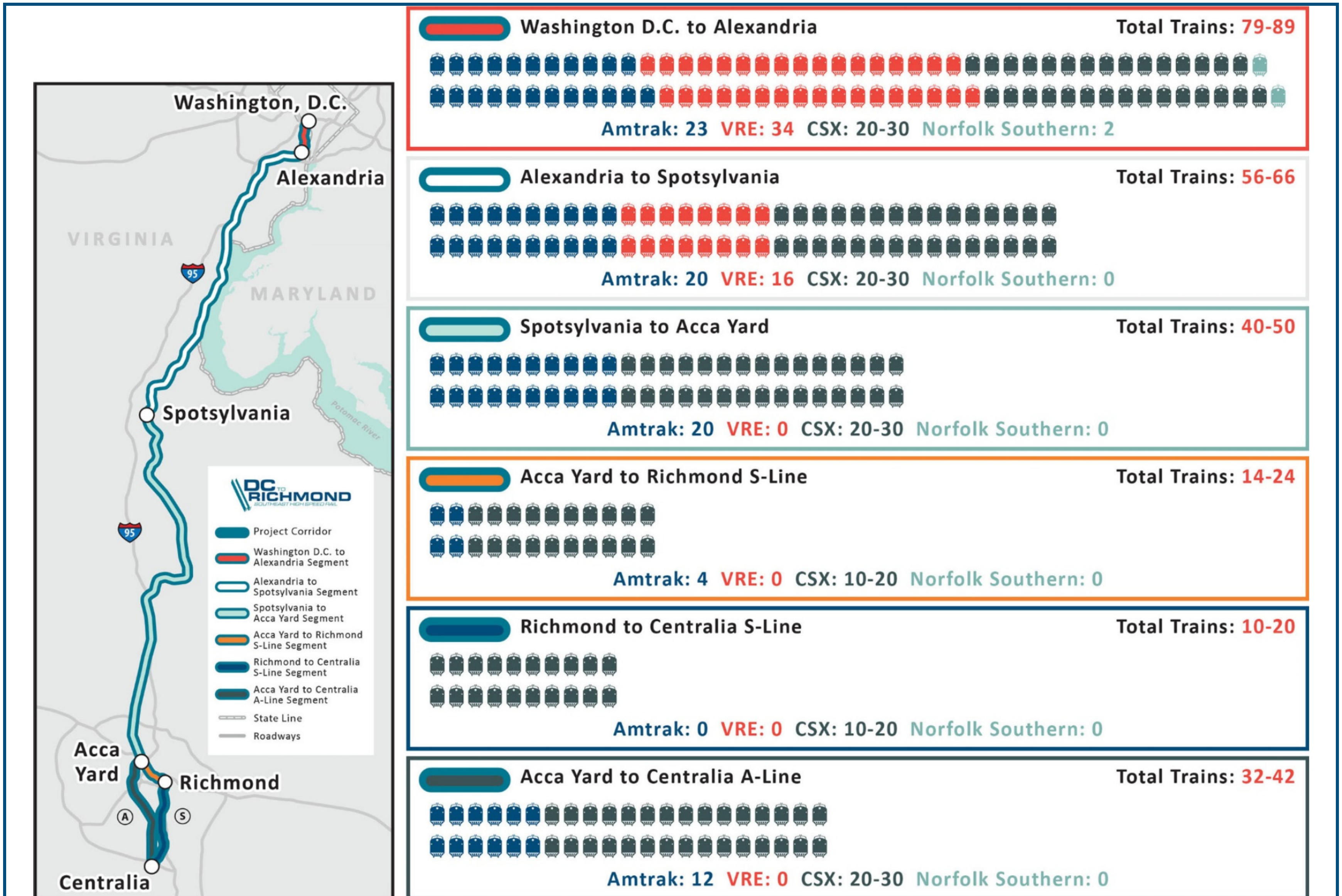

Figure 1.5-3: Number of Daily Trains by Segment in 2015

When Amtrak was created in 1970, there were few commuter trains providing corridor services and substantially less freight rail traffic nationally; however, since the early 1990s, average freight rail density has increased substantially, resulting in a scarcity of available capacity on major rail corridors. This is particularly true of the Washington, D.C. to Richmond corridor. CSXT's A-Line and RF&P corridor in Virginia are part of the greater National Gateway Corridor, which extends from inland ports in the Midwest through Maryland, Washington, D.C. and Virginia to ocean ports in Hampton Roads and Wilmington, NC. The National Gateway Corridor is the primary intermodal train corridor for CSXT connecting the Port of Virginia to national markets and is currently being improved to accommodate double-stack intermodal freight trains.[11] The Virginia Avenue Tunnel project in Washington, D.C. is currently addressing the last remaining bottleneck for double-stack freight trains on the National Gateway Corridor.[12] In addition, CSXT's A-Line and RF&P corridor through Virginia is also part of the railroad's I-95 Corridor between New York and Jacksonville, FL, which plays a vital role in moving food products, consumer products, and other rail freight for shippers in Virginia and along the entire eastern seaboard.

Ridership demand for Virginia's passenger rail services is growing rapidly, setting records over the past five years. In 2012, Amtrak operated 24 daily passenger trains (12 round trips) and 2 tri-weekly trains (1 round trip) in the Commonwealth with 1,466,965 passengers either boarding or alighting within Virginia and another 5,013,991 boarding or alighting in Washington, D.C. The 2013 State Rail Plan (DRPT, 2013) notes that Amtrak ridership in Virginia has grown 77 percent between FY 2004 and FY 2012, which is much more than the 24 percent ridership increase Amtrak has seen on the National System during that period. Virginia's efforts to bring expanded Northeast Regional rail service into the Commonwealth are largely responsible for the ridership growth experienced on routes serving Virginia.

VRE operates commuter rail service along a portion of the Washington, D.C. to Richmond corridor, from Union Station in Washington, D.C. south to its terminus in Spotsylvania County, just south of Fredericksburg.[13] VRE service currently operates at or near capacity along the corridor and provides commuter capacity that is the equivalent of a full interstate lane in the peak direction in the I-95 corridor, with less pollution, energy consumption, and accident cost than highway operations (*Virginia Railway Express System Plan 2040 Study*, 2014). Growth in ridership and demand for commuter service has continued to fill available seats on many trains, and parking at VRE stations often exceeds capacity at peak travel times. The capital projects contained in the VRE FY 2015-2020 Capital Improvement Plan and planned service expansion are expected to increase VRE's passenger-carrying capacity from 20,000 to approximately 25,000 daily passengers.

In addition to general corridor capacity issues, unique capacity constraints and operational issues affect rail operations in Richmond. CSXT has two north-south mainlines that operate through Richmond, the A-Line's Florence North End Subdivision and the S-Line's Bellwood Subdivision, and one east-west line along the James River (Rivanna and Peninsula Subdivisions) that passes through the City of Richmond along with the BBR's westerly connection (Figure 1.5-4), making

[11] A double-stack freight train carries intermodal containers stacked two high, allowing a train of a given length to carry twice as many containers. Double-stack is common in the United States for intermodal freight movements on rail lines that have sufficient vertical clearance.

[12] http://www.virginiaavenuetunnel.com/index.php

[13] VRE currently provides commuter rail service to Spotsylvania County, just south of Fredericksburg, with VRE trains continuing south a short distance to the VRE yard at Crossroads for service and storage.

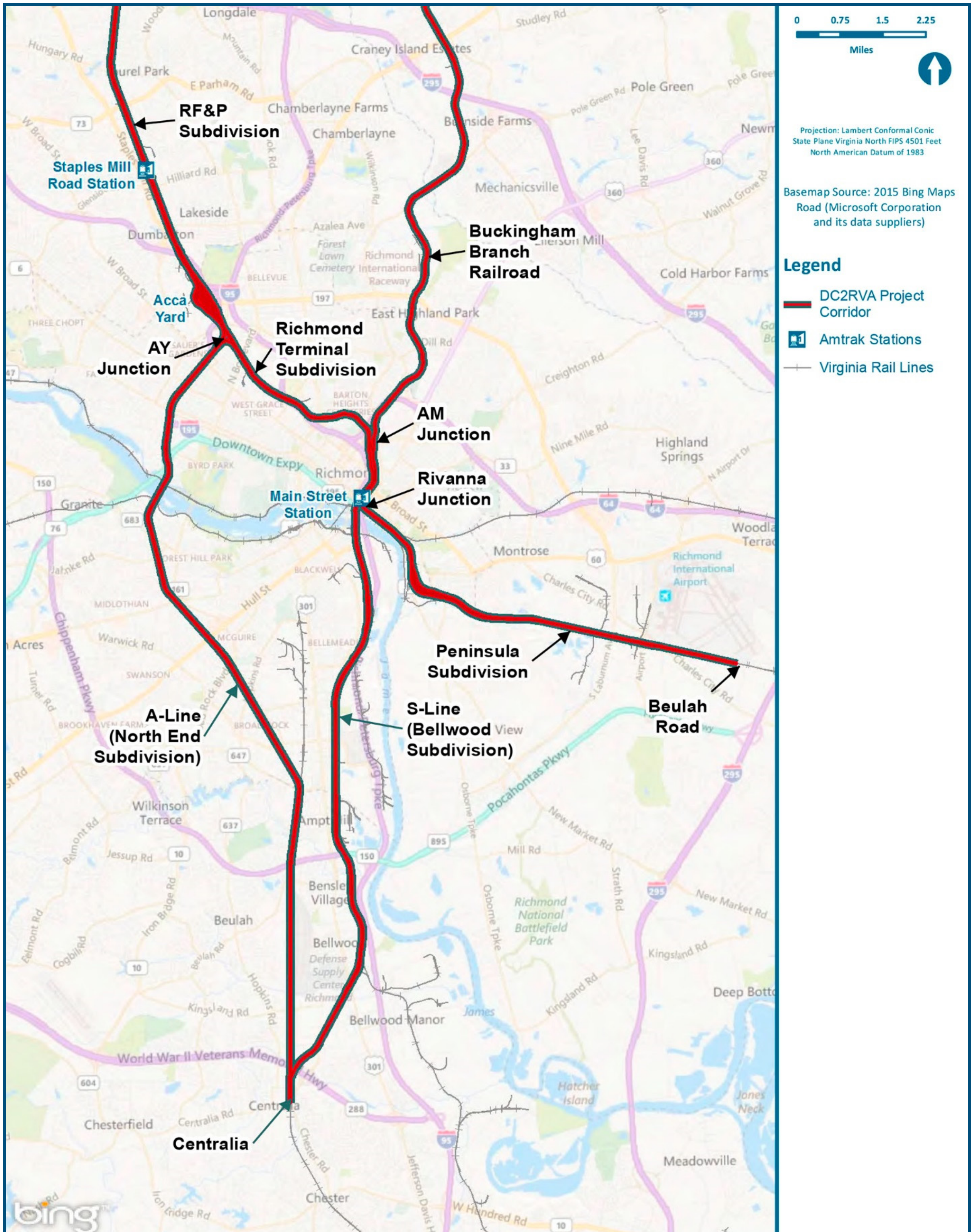

Figure 1.5-4: Richmond Area Corridor

the city a crossroads for north-south and east-west rail traffic. There is enough grade separation between the one east-west and two north-south main lines that, for the most part, east-west trains passing through the city have little impact on north-south movements passing through the city, and vice-versa. However, when trains have to change their primary direction, from east-west to north-south, the process is slow and cumbersome due to the nature of the low-speed track along the S-Line, the uphill grade between Main Street Station and Acca Yard, and switch arrangements that dictate less-than-ideal operating solutions and have the potential to introduce delays.

Acca Yard is located at the junction of the two CSXT north-south mainlines through Richmond and the RF&P Subdivision and is the hub of local freight operations serving both the east-west and north-south lines. It is a 20-track yard that is flat-switched.[14] Additionally, all through freight trains passing through Richmond must stop for a change of crews. On the north-south A-Line, this crew change typically occurs at Acca Yard, further straining the yard's limited capacity.

Amtrak long distance, Interstate Corridor (NC), and Northeast Regional (VA) trains operating into or through Richmond use one of three typical train movements:

- North-south long-distance, Interstate Corridor (NC), and Northeast Regional (VA) trains passing through Richmond between the NEC and points in Florida, Georgia, North Carolina, or Norfolk, VA. These trains stop at Staples Mills Road Station in Richmond's northern suburbs and continue north-south on the primary freight line, using the CSXT A-line between Acca Yard and Centralia to bypass downtown Richmond. Currently, there are six daily round trips that operate north-south through Richmond.
- North-south Northeast Regional (VA) trains terminating or beginning their journeys at Richmond. These trains operate between Richmond and the NEC, and lay overnight at the Staples Mill Road Station. After arriving in Richmond from the north, these trains must continue south through CSXT's Acca Yard to a wye[15] where they can be turned to face back north, then move north through the yard to reach the Staples Mill Road Station for the overnight layover. Currently, two daily round trips originate in Richmond and operate between Richmond and the Northeast.
- Northeast Regional (VA) trains operating between Boston, MA and Newport News, VA, which change their primary direction of travel at Richmond from north-south to east-west, or vice versa. These trains must use the same low-speed S-Line connecting tracks that freight trains use from Acca Yard to AM Junction, just north of Main Street Station. From AM Junction, these trains move along the east side of Main Street Station and pass through Fulton Yard onto the Peninsula Subdivision towards Newport News. Use of these low-speed connecting tracks from Acca Yard to AM Junction and AM Junction to Fulton Yard permits these trains to serve Main Street Station in downtown Richmond. These trains also stop at Staples Mill Road Station north of the city. Currently, there are two daily round trips that operate between Boston and Newport News along this route.

Some of the bottlenecks that affect Amtrak operations in Richmond are:

[14] In a flat-switched yard (also called a flat-shunted yard), freight cars are pushed by a locomotive and coast to their required location between the different classification tracks.

[15] A "wye" is a triangular-shaped rail junction that allows a train to change direction.

- The AY Junction at Acca Yard, where the S-Line/Bellwood Subdivision diverges from the double-track north-south A-Line and RF&P subdivision, requires Northeast Regional (VA) trains to and from Newport News to cross all main tracks at the southern throat of Acca Yard. Two daily pairs of Northeast Regional (VA) trains use the S-Line/Bellwood Subdivision (trains 66/67 and 94/95), en route between Boston and Newport News. These trains face several operating constraints that contribute to a slow average speed as they make their way through Richmond between Staples Mill Road and Main Street Station, beginning with the configuration of the junction at AY.
- Southbound Northeast Regional (VA) trains originating from Boston and New York City call at Staples Mill Road Station, whose platforms are on the west side of CSXT's mainline. This makes it fairly easy to access the bypass track around the west side of Acca Yard on the A-Line. However, at the south end of Acca Yard, where the bypass track ends, trains to Newport News must cross over the double-track A-Line mainline at AY Junction to enter the S-Line/Bellwood Subdivision and continue on to Main Street Station on a single mainline track. This cross-over move may often be delayed if there is switching within Acca Yard or if a freight train on the S-Line/Bellwood Subdivision is stopped to cut off a helper[16] or change operating direction.
- The S-Line/Bellwood Subdivision is single-track, with a maximum operating speed of 30 miles per hour (mph) for passenger trains. At AM Junction, Northeast Regional (VA) trains traveling to/from Newport News use the same connecting track used by unit coal, grain, sulfur and general merchandise trains transferring between the east-west (Rivanna/Peninsula Subdivisions) and north-south CSXT A-Line/S-Line routes through the city. The station stop at Main Street Station is in the middle of this single connecting track.

1.5.2.6 Providing Options for Reliable and Convenient Movement of Goods and People

Passenger service in the Commonwealth is provided on rail lines owned and operated by freight railroads; shorter, faster passenger trains must share the rail infrastructure with longer and slower freight trains. The Rail Passenger Service Act of 1970 that created Amtrak guaranteed Amtrak access ("trackage") rights to use railroad lines owned by other railroads to operate passenger trains. Amtrak currently owns no track in Virginia and pays CSXT and NS for the incremental use of their tracks[17]. Amtrak's on-time performance is impacted by delays such as rail traffic congestion, speed restrictions imposed by the host railroad due to weather or maintenance issues, and available capacity—even with modern signals and train dispatch models, only a limited number of trains can use a specific segment of track per day.

Passenger train travel in the Washington, D.C. to Richmond corridor does not demonstrate consistent, reliable, on-time performance. Travelers not only want reduced travel times but also reliable travel times and schedules. Recent Amtrak on-time performance statistics (average travel times and on-time performance of Amtrak trains in the corridor) are shown in Figures 1.5-5 and 1.5-6.

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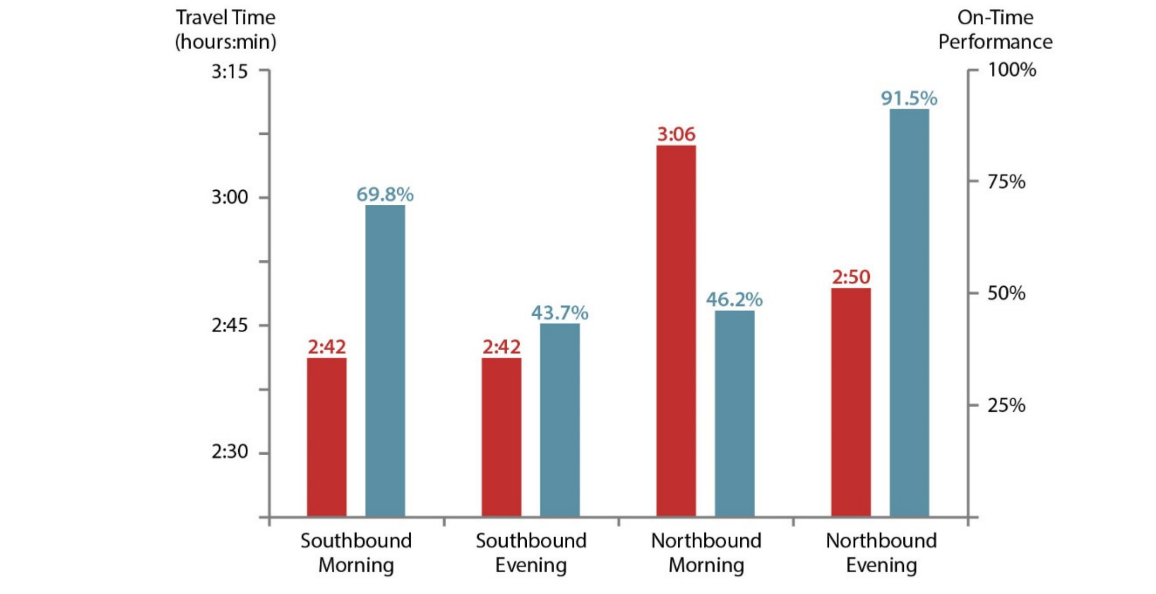
[16] A "helper" is an additional locomotive added to a train temporarily to assist the train moving up a steep gradient.

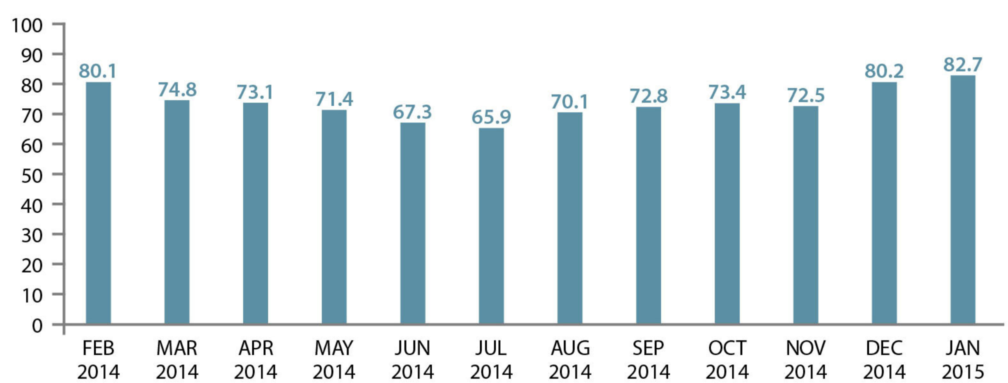
[17] Amtrak is required by Title 49 of the Rail Passenger Service Act of 1970 (RPSA) to compensate freight railroads for the incremental costs associated with accommodating passenger service over their tracks. The RPSA allows the incremental costs to include payment for incremental maintenance costs from Amtrak's use of freight railroad tracks, incremental services provided by the freight railroads such as developing and maintaining tracks and other facilities for Amtrak's exclusive use, and incentive payments for higher quality service.



Note: Information provided in this figure pertains to the existing four trains that operate between Washington D.C. and Richmond (Amtrak Northeast Regional trains 66, 67, 94, and 95).

DC2RVA_085

Figure 1.5-5: Washington, D.C. to Richmond Main Street Station – Travel Time and On-Time Performance (January 2014-January 2015)



Note: Includes all Northeast Regional trains between Richmond, Newport News, or Norfolk and points on the Northeast Corridor. On-time is defined as operation within 15 minutes of schedule.

Source: Amtrak Monthly Performance Reports, February 2014 through January 2015.

DC2RVA_086

Figure 1.5-6: On-Time Performance for DC2RVA Northeast Regional Trains to/from Richmond, Newport News, and Norfolk

FRA defines the standard for percent on-time performance as 90 percent for NEC Regional and state-supported passenger services, and 85 percent for long-distance routes, operating outside of the NEC[18]. Amtrak's own on-time performance standards reflect this standard and require most of its trains to run on schedule 85 to 95 percent of the time.

Likewise, maintaining the efficient and reliable movement of goods on the corridor through adequate freight rail capacity directly benefits area automobile travelers by keeping trucks off the interstate. Freight traffic that cannot be reliably moved by rail will end up on area roads, compounding the increase in road congestion caused by the growth of the area's population. As noted in the 2013 *Virginia Statewide Rail Plan*, average annual daily truck traffic on I-95 is projected to increase 78 percent over the next several decades, from 15,448 in 2011 to 27,420 in 2040 (DRPT, 2013). Increasing freight rail capacity in the corridor could help mitigate this impact, improving travel in the corridor for both people and goods.

1.5.2.7 Air Quality

The U.S. transportation sector is one of the largest contributors of GHG emissions, including carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and various hydrofluorocarbons (HFCs).[19] Transportation is the largest end-use sector emitting CO_2, the most prevalent GHG. CO_2, CH_4, and N_2O are emitted from the combustion of fuels, while HFCs are by-products from air conditioners. EPA's *Fast Facts, U.S. Transportation Sector Greenhouse Gas Emissions 1990 – 2013* states:

> "According to the *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2013* (the Inventory), the national inventory that the U.S. prepares annually under the United Nations Framework Convention on Climate Change (UNFCCC), transportation represented 27% of total U.S. GHG emissions in 2013. Cars, trucks, commercial aircraft, and railroads, among other sources, all contribute to transportation end-use sector emissions. Within the sector, light-duty vehicles (including passenger cars and light-duty trucks) were by far the largest category, with 60% of GHG emissions, while medium- and heavy-duty trucks made up the second largest category, with 23% of emissions. Between 1990 and 2013, GHG emissions in the transportation sector increased more in absolute terms than any other sector (i.e., electricity generation, industry, agriculture, residential, or commercial)."

EPA established National Ambient Air Quality Standards (NAAQS)[20] for six criteria pollutants: sulfur dioxide (SO_2), particulate matter (PM_{10} with an aerodynamic diameter less than 10 microns and $PM_{2.5}$ with an aerodynamic diameter less than 2.5 microns), nitrogen dioxide (NO_2), carbon monoxide (CO), ozone (O_3), and lead (Pb). EPA designates areas as meeting (attainment) or not meeting (nonattainment) the standards. The Clean Air Act (CAA) requires states to develop a general plan to attain and maintain the NAAQS. Additional planning, subject to EPA approval, is

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[18] Section 207 of the Passenger Rail Investment and Improvement Act of 2008 (Division B of Pub. L. 110-432) (PRIIA) charged FRA and Amtrak jointly and in consultation with other parties, with developing new or improving existing metrics and minimum standards for measuring the performance and service quality of intercity passenger train operations. In compliance with the statute, FRA and Amtrak jointly issued Final Metrics and Standards under Section 207 of PRIIA, effective May 12, 2010. https://www.fra.dot.gov/eLib/Details/L02875.

[19] U.S. Environmental Protection Agency, *Fast Facts, U.S. Transportation Sector Greenhouse Gas Emissions, 1990 – 2013*, Office of Transportation and Air Quality, EPA-420-F-15-032. October 2015

[20] NAAQS are based on the 1970 Clean Air Act and the 1990 Clean Air Act Amendments to protect the health and welfare of the public from the adverse effects of air pollution.

required for areas not meeting the standards. In the congested Northern Virginia region traversed by the DC2RVA corridor, nine jurisdictions are in nonattainment status for ozone, triggering certain general conformity requirements. The cities of Alexandria, Fairfax, Falls Church, Manassas and Manassas Park, and the counties of Arlington, Fairfax, Loudoun, and Prince William are currently nonattainment areas for the 2008 8-hour ozone standard.

The greater fuel efficiency of moving people and goods by rail offers a simple and relatively immediate way to reduce emissions of GHG and NAAQS pollutants. Diverting passengers and freight from passenger cars and trucks to rail means less fuel is burned and GHG and NAAQS emissions are reduced on a per mile basis. In the *2013 Virginia Statewide Rail Plan*, Amtrak is recognized as the most efficient form of motorized passenger transport. As shown in Table 1.5-3, Amtrak is approximately 12 percent more efficient than domestic airline travel and 33 percent more efficient than auto travel on a per passenger-mile basis, according to the U.S. Department of Energy.

Table 1.5-3: Passenger Travel and Energy (2013)

Mode	Passenger-miles (millions)	BTU[21] per passenger-mile	Energy use (trillion BTU)
Cars	2,241,300	3,144	7,046.6
Personal trucks	1,899,899	3,503	6,655.4
Motorcycles	23,625	2,475	58.5
Demand response[1]	2,171	12,182	26.4
Buses	[2]	[2]	204.1
Transit	22,306	4,071	90.8
Intercity[3]	[2]	[2]	32.8
School[3]	[2]	[2]	80.5
Air	[2]	[2]	1,599.1
Certificated route[4]	579,944	2,406	1,395.5
General aviation	[2]	[2]	203.6
Recreational boats	[2]	[2]	245.0
Rail	39,053	2,455	95.9
Intercity (Amtrak)	6,810	2,118	14.4
Transit	20,381	2,404	49.0
Commuter	11,862	2,737	32.5

Source: U.S. Department of Energy, 2015

Notes: 1. Includes passenger cars, vans, and small buses operating in response to calls from passengers to the transit operator who dispatches the vehicles. 2. Data are not available. 3. Energy use is estimated. 4. Only domestic service and domestic energy use are shown in this table. These energy intensities may be inflated because all energy use is attributed to passengers–cargo energy use is not taken into account.

[21] A British Thermal Unit (BTU) is the approximate amount of energy required to heat 1 pound of water from 39 to 40 degrees Fahrenheit and is used to compare the efficiency of different fuel types accomplishing the same task.

The *2013 Virginia Statewide Rail Plan* found that freight railroads were 12 times more fuel-efficient than trucks (291 BTUs per ton-mile versus 3,717 BTUs per ton-mile). Double-stack freight trains are even more efficient. The *Plan* notes that every ton-mile of freight moved by rail instead of truck emits 67 percent less greenhouse gas emissions. In 2014, according to the Association of American Railroads, freight railroads moved a ton of freight an average of 479 miles per gallon of fuel. If just 5 percent of the freight moved by truck was diverted to rail, fuel savings would be approximately 800 million gallons per year, and GHG emissions would fall by approximately 9 million tons—equivalent to taking 1.8 million cars off the road or planting more than 200 million trees[22].

1.5.3 Public Comments on Need

FRA and DRPT solicited public comment as part of the scoping process to guide development of the Project's Tier II EIS. During the scoping process, FRA and DRPT invited comments from interested agencies and the public to ensure the full range of issues related to the Project would be addressed, that all reasonable alternatives would be considered, and that significant issues would be identified. To provide an early and open scoping process, FRA and DRPT employed many forms of outreach to engage diverse audiences, inform them of the Project, and enable them to contribute their input. These initial efforts culminated in fall 2014 with one agency scoping meeting, four in-person public scoping meetings, and one self-guided online meeting. In total, 3,307 parties participated in the scoping process, providing 1,625 comments. The results of the scoping process are summarized in the Scoping Summary Report.[23]

During scoping, 428 members of Virginians for High Speed Rail (VHSR), which advocates for improved rail service in the Commonwealth, submitted a form letter that provided the following suggestions for the Project:

- The travel time from Washington, D.C. to Richmond should be shorter than a trip in an automobile.
- Reliability of the service is vital to the corridor's success, thus reaching a threshold of 90 percent on-time performance is important.
- Improvements to the level of service on the corridor should take into account future expansions of service to Newport News, Norfolk, and Roanoke/Lynchburg, as well as Raleigh/Charlotte.
- The study should put a priority on stations/stops that serve a greater density of citizens, transit-oriented development communities, and central business districts.
- The service quality should capture the choice passenger (i.e., the traveler that has a choice of more than one mode for their trip) while also providing safe, reliable, and convenient transportation options to all of the corridor's citizens.

In addition, individuals offered statements of general support of (38 comments) or opposition to (9 comments) the Project. Several commenters offered specific alignment and/or station alternatives, either through Richmond or for the full corridor; DRPT evaluated all of these proposals as part of the Project's alternatives identification and screening process described in Chapter 2 of this Tier II EIS.

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[22] Association of American Railroads, *The Environmental Benefits of Moving Freight by Rail*, August 2015.

[23] Scoping Summary Report is available on the Project website at www.DC2RVArail.com.

1.6 PROJECT BACKGROUND AND RELATED STUDIES

The following sections provide an overview of the Project's history and background, including a summary of previous rail planning studies in the corridor and adjacent segments of the SEHSR corridor.

1.6.1 National High Speed Rail Program

The High Speed Ground Transportation (HSGT) Act of 1965 is considered the first act establishing federal interest in high speed rail in the United States. Initially authorized at $90 million, this act started the federal government effort to develop and demonstrate modern and advanced HSGT technologies in the United States. Using the HSGT Act funding, FRA deployed modern HSGT technologies such as the self-propelled Metroliner cars and the Turbotrain in the NEC between Boston and Washington, D.C., in 1969 (FRA, 1997).

In 1970, Congress passed the Rail Passenger Service Act (RPSA), which led to the creation of Amtrak to ensure continued operation of an intercity rail passenger network in the United States. By 1975, appropriations from the HSGT Act of 1965 ended, which led to congressional efforts shifting towards upgrading the railroad infrastructure in the Northeast Corridor. In 1976, Congress passed the Railroad Revitalization and Regulatory Reform Act that included funding for the Northeast Corridor Improvements. These improvements included engineering and construction work to improve performance and reliability of the Northeast Corridor, which provided the foundation for a reliable high speed intercity service in the Northeast.

In 1980, Congress set aside $4 million in the Passenger Railroad Rebuilding Act of 1980 for HSGT corridor studies. In late 1980s, Congress requested that FRA assess the feasibility of maglev technology for high speed rail in the United States. The preliminary findings of this report were submitted to Congress by FRA in 1990 (FRA, 2015). Soon afterward in 1991, the National Maglev Initiative (NMI) was launched among the U.S. DOT, USACE, the U.S. Department of Energy (DOE), and other agencies to further research and evaluate maglev technology in the United States. In 1991, Congress passed the Intermodal Surface Transportation Efficiency Act (ISTEA), a six-year transportation authorization bill, which authorized a $725 million Maglev prototype development program and requested selection of five corridors to be designated as high speed rail corridors. However, no funding was appropriated pending the results of the NMI (FRA, 1993). The five corridors designated by FRA were:

- Midwest corridor linking Chicago, IL with Detroit, MI, St. Louis, MO, and Milwaukee, WI
- Florida corridor linking Miami with Orlando and Tampa
- California corridor linking San Diego and Los Angeles with the Bay Area and Sacramento via the San Joaquin Valley
- Southeast corridor connecting Charlotte, NC, Richmond, VA, and Washington, D.C.
- Pacific Northwest corridor linking Eugene and Portland, OR, with Seattle, WA, and Vancouver, BC, Canada

In 1997, FRA completed and submitted a report to Congress called *High Speed Ground Transportation for United States*, which analyzed the economics aspects of developing high speed ground transportation for high-population cities in the United States. The Transportation authorization bill passed in 1998, *The Transportation Equity Act for the 21st Century (TEA-21)*, authorized 6 additional corridor designations, for a total of 11, as well as the extension of other previously designated corridors:

- Gulf Coast corridor
- Keystone corridor from Philadelphia to Harrisburg, PA
- Empire State corridor from New York, NY, to Albany, NY, to Buffalo, NY
- Extension of the Southeast corridor from Charlotte to Greenville, SC, to Atlanta, GA, to Macon, GA; and from Raleigh to Columbia, SC, and to Savannah, GA, and Jacksonville, FL
- Extension of the Midwest corridor (now called the Chicago Hub corridor) from Milwaukee, WI, to Minneapolis/St. Paul, MN
- Extension of the Chicago Hub corridor to Indianapolis, IN and Cincinnati, OH

In 2008, Congress passed the Passenger Rail Investment and Improvement Act (PRIIA), establishing the initial framework for the development of the high speed rail corridors. In 2009, Congress passed the American Recovery and Reinvestment Act (ARRA), which allocated $8 billion to be granted to states for intercity rail projects, giving priority to projects that support the development of high speed intercity rail[24]. In 2009, FRA released the *High Speed Rail Strategic Plan*. Figure 1.6-1 shows the high speed rail network map proposed in the plan.

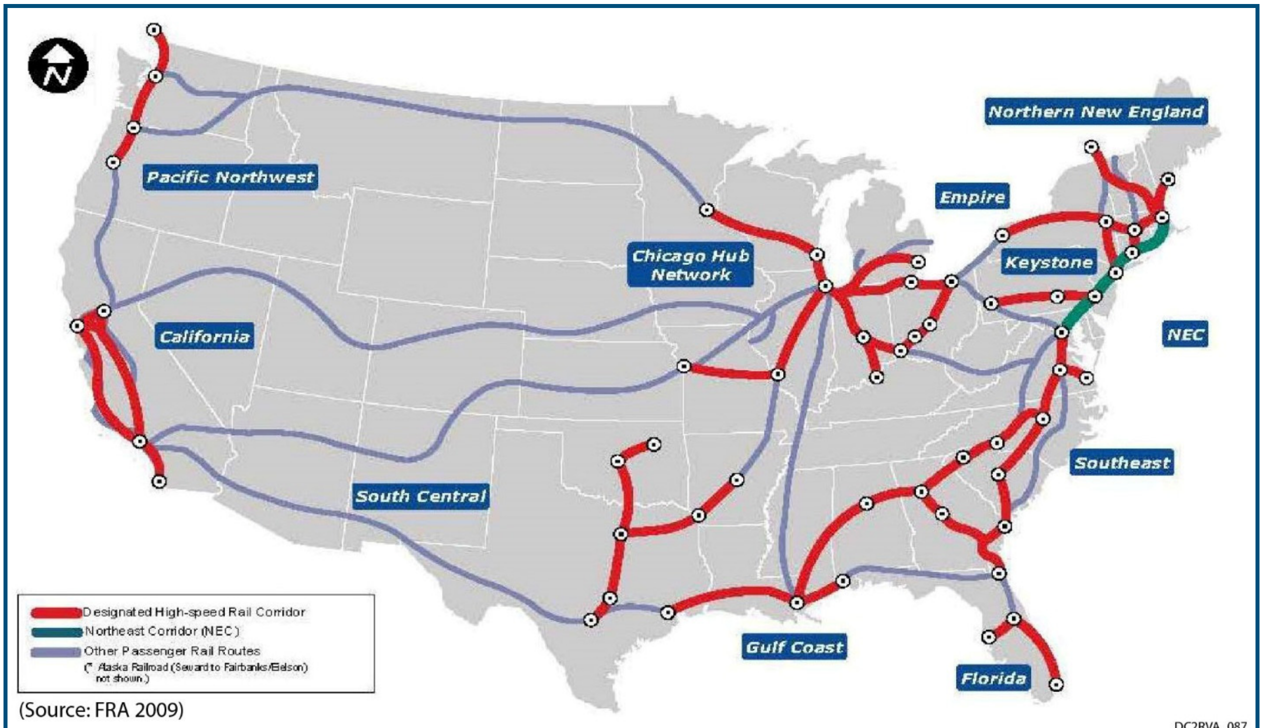

Figure 1.6-1: U.S. High Speed Intercity Passenger Rail Network Map

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[24] Congress continued to build upon the Recovery Act by making available an additional $2.1 billion through annual appropriations for FY 2009 and 2010, using the framework initially established by PRIIA, bringing the total program funding to $10.1 billion.

Shortly after the publication of the *High Speed Rail Strategic Plan*, FRA launched the High Speed Intercity Passenger Rail (HSIPR) program with the following objectives:

- Build new high speed rail corridors that expand and fundamentally improve passenger transportation in the geographic regions they serve.
- Upgrade existing intercity passenger rail corridors to improve reliability, speed, and frequency of existing services.
- Lay the groundwork for future high speed rail services through corridor and state planning efforts.

The same year, U.S. DOT announced the extension of the California High Speed Rail Corridor to Las Vegas, NV. In 2011, U.S. DOT designated the NEC as the eleventh high speed rail corridor, which includes the existing NEC main rail line and any alternative routings for intercity passenger train service between the metropolitan areas of Washington, D.C., Philadelphia, New York, and Boston.

The *High Speed Rail Strategic Plan* recommended the tiered strategy currently being used by FRA. The Plan also defined various levels of high speed rail and conventional intercity passenger rail. The DC2RVA corridor would be considered an "emerging" HSR corridor according to the FRA definition below (FRA, 2009):

- **Core Express:** Frequent service between major population centers. Top speeds of at least 125 mph on completely grade-separated, dedicated rights-of-way (with the possible exception of some shared track in terminal areas). Intended to relieve air and highway capacity constraints.
- **Regional:** Relatively frequent service between major and moderate population centers. Top speeds of 90 to 125 mph, grade-separated, with some dedicated and some shared track (using positive train control [PTC] technology). Intended to relieve highway and, to some extent, air capacity constraints.
- **Emerging:** Developing corridors with strong potential for future HSR Regional and/or Express service. Top speeds of up to 90 mph on primarily shared track (eventually using PTC technology), with advanced grade crossing protection or separation. Intended to develop the passenger rail market and provide some relief to other modes.
- **Conventional Rail:** Traditional intercity passenger rail services with as little as 1 to as many as 7 to 12 daily frequencies; may or may not have strong potential for future high speed rail service. Top speeds of up to 79 mph generally on shared track. Intended to provide travel options and to develop the passenger rail market for further development in the future.

1.6.2 SEHSR Program

SEHSR is an important element of the national high speed rail program. The SEHSR corridor was one of the five originally designated high speed rail corridors identified by FRA in 1991. The SEHSR corridor extends from Washington, D.C. to Jacksonville, FL. This corridor connects with the NEC in the northand extends southwest to Atlanta. In coordination with FRA, Virginia, North Carolina, South Carolina, Georgia, and Florida have joined together with the business communities in each state to form a Southeast Rail Coalition to plan, develop, and implement high speed rail in the Southeast. The SEHSR corridor will be developed incrementally, upgrading existing rail rights-of-way where feasible. The components of the SEHSR corridor, shown in Figure 1.1-1, are in different stages of the planning process due to need and funding. Below is an outline of the status of major components of the SESHR corridor:

- Washington, D.C. to Charlotte
  - Tier I Final EIS and ROD completed in 2002
  - Richmond to Raleigh Tier II Final EIS completed in September 2015; ROD issued in March 2017
  - Washington, D.C. to Richmond Tier II Final EIS and ROD anticipated in 2017
- Richmond to Hampton Roads
  - Tier I Final EIS and ROD completed in 2012
- Charlotte to Atlanta to Jacksonville
  - The Georgia Department of Transportation (GDOT) is leading a study to extend development of the SEHSR into Georgia. The Atlanta to Charlotte Passenger Rail Corridor Investment Plan will be conducted in tiers. The Tier I EIS will analyze passenger service between Atlanta and Charlotte on a broad scale and is anticipated to be complete in 2018.

Since the corridor was identified, DRPT and NCDOT have been working with their federal partners, FRA and FHWA, to improve rail transportation options in this key area of the national high speed rail program that joins to Amtrak's NEC. Several studies have been conducted in this corridor since 1991, which include the 1996 DRPT feasibility study for fast passenger rail service from Washington, D.C. to Richmond; the 1997 SEHSR Market and Demand Study; the 1999 FRA and Amtrak operational analysis and preliminary engineering study; and the 2002 SEHSR Washington, D.C. to Charlotte, NC Tier I EIS and ROD. Later studies added additional sections to the SEHSR corridor, including Richmond to Hampton Roads, and the sections extending southwest of Charlotte. Figure 1.1-1 shows different sections of the SEHSR program and status of projects in the corridor.

1.6.2.1 Tier I EIS for the SEHSR Project from Washington, D.C. to Charlotte, NC

In October 2002, DRPT and NCDOT, together with FHWA and FRA, completed a service-level Tier I EIS for the SEHSR corridor between Washington, D.C. and Charlotte. This Tier I EIS established the SEHSR program purpose and selected preferred rail corridors, and it provided a programmatic-level environmental analysis. The purpose of the SEHSR program, as stated in the Tier I EIS, is to provide a competitive transportation choice to travelers within the Washington, D.C. to Charlotte travel corridor. Implementation of improved passenger rail service in the Washington, D.C. to Charlotte SEHSR corridor could:

- Divert trips from air and highway travel modes within the corridor
- Provide a more balanced and energy-efficient use of the corridor's transportation infrastructure
- Increase the safety and effectiveness of the transportation system within the travel corridor
- Serve long-distance travelers between and beyond Virginia and North Carolina, including Amtrak's NEC, which extends from Washington, D.C. to Boston

The Tier I ROD for the Washington, D.C. to Charlotte SEHSR selected an incremental (step-by-step) approach to develop the SEHSR program. Key elements of the selected incremental approach are:

- Upgrade existing rail corridors (instead of developing new corridors)
- Utilize fossil-fuel burning equipment rather than electric-powered equipment
- Add service as market demand increases and/or when funding is available

The incremental approach seeks to minimize cost and potential impacts to the environment by utilizing existing railroad tracks and rail rights-of-way as much as possible. Subsequently, the SEHSR corridor was divided into discrete sections (Washington, D.C. to Richmond, Richmond to Raleigh, and Raleigh to Charlotte) for further detailed (Tier II) studies.

The Tier I EIS also considered maglev as an option for the SEHSR program. The Tier I EIS determined that the high costs, lack of currently operating systems, and character of the proprietary maglev guideway, make its implementation an unlikely economical solution to the transportation problems in the Southeast Corridor; therefore, FRA and FHWA, together with DRPT and NCDOT, eliminated this implementation option from further consideration.

1.6.2.2 Washington, D.C. to Richmond SEHSR Corridor Segment

Over the past two decades, various passenger and freight rail studies and improvement projects have been completed for the Virginia segments of the SEHSR corridor. These have addressed rebuilding aging infrastructure; accommodating demand; increasing connectivity and capacity; and improving service to provide a better and more reliable passenger and freight rail system. A timeline of the previous corridor studies and other actions which included the Washington, D.C. to Richmond rail segment is as follows:

- 1994—Virginia, North Carolina, South Carolina, and Georgia formed a four-state coalition (Southeast Rail Coalition) to facilitate development of the SEHSR corridor.
- 1996—DRPT conducted an initial study addressing the feasibility of implementing fast, frequent, and reliable passenger rail service in the Washington, D.C. to Richmond segment of the SEHSR corridor.
- 1998—DRPT, NCDOT, FHWA, and FRA signed a Memorandum of Understanding (MOU) to jointly develop environmental documentation (Tier I EIS) for the SEHSR in Virginia and North Carolina.
- 1999—FRA and Amtrak conducted an operational analysis and preliminary engineering study, which was submitted to Congress in May 1999. The operational analysis evaluated then current facilities, services, and operating conditions, and it simulated the performance of future services over multiple configurations of infrastructure improvements. The result of the study was a set of recommended necessary improvements that would enable the Washington, D.C. to Richmond corridor to reliably accommodate the mix and volume of higher speed passenger, commuter, and freight services that the line's operators (CSX, Amtrak, and VRE) and public partners (FRA and DRPT) envisioned for 2015.
- 2002—Completion of SEHSR Washington, D.C. to Charlotte Tier I EIS and ROD.

- 2003—DRPT completed the *Richmond Area Rail Master Plan – Phase I* document in which near-term improvements were identified supporting the redirection of passenger trains terminating at Staples Mill Road Station to a refurbished Main Street Station in downtown Richmond. This document was based on several earlier studies, including the range of proposed improvements that was identified by FRA in the May 1999 Report to Congress titled *Potential Improvements to the Washington – Richmond Railroad Corridor,* and considered to be a living document that would continue to evolve over time. At about the same time, the *Interim Phase Improvements – Staples Mill Rd. Station to Main Street Station* and *Final Phase Improvements – Staples Mill Rd. Station to Centralia* reports were prepared by FRA. Both of these reports identified potential improvements required to support various levels of future passenger and freight traffic in the Washington, D.C. to Richmond rail corridor, and more specifically, within the metro Richmond area.
- 2004—DRPT conducted a *Third Track Conceptual Location Study* in which a third mainline track was proposed for the 92.7-mile-long corridor between the Richmond Staples Mill Road Station and the Ravensworth Interlocking, a crossover between mainline tracks that is located south of Franconia in the Northern Virginia suburbs of Washington, D.C. Additionally, DRPT released the Virginia Statewide Rail Plan.
- 2005—The General Assembly created the Rail Enhancement Fund and dedicated 3 percent of the 10 percent tax on car rentals to finance rail infrastructure and Amtrak operations that expand service within Virginia. Since then, Virginia has invested public funds to upgrade privately owned rail lines to increase the competitive status of its ports, to reduce truck traffic on state highways, and to increase passenger rail service capacity. All Rail Enhancement Fund investments must meet a public benefit test showing a return on the investment of public funds.
- 2006—DRPT conducted a more detailed *Third Track Feasibility Study* in which an 8.1-mile-long rail corridor connecting Richmond's Main Street Station to Staples Mill Road Station via Acca Yard was studied in conjunction with the 92.7-mile-long corridor of the previous (2004) study. This study, like the 2004 *Third Track Conceptual Location Study*, did not include parts of the corridor through Fredericksburg and Ashland, VA.
- 2008—On May 3, FRA issued a Finding of Infeasibility from the Americans with Disabilities Act (ADA) and U.S. DOT that allowed for level boarding at Main Street Station to be provided with a low-level platform and alternate means of access.
- 2008—PRIIA established the initial guidance for the high speed rail corridors throughout the United States. In January 2008, Amtrak published its short-term action plan, *Part I for Advancing Passenger Rail in the Commonwealth of Virginia*. Additionally, DRPT released the updated rail plan *Virginia Statewide Rail Plan* and a *Rail Resource Allocation Plan* in July 2008.
- 2009—On May 29, FRA issued a letter to DRPT stating that it had considered but dismissed the Buckingham Branch Route between Doswell, VA and Main Street Station from further consideration in the SEHSR corridor.
- 2009—Virginia and Amtrak partnered to provide state-subsidized passenger rail service under the name "Amtrak Virginia," later rebranded as "Northeast Regional" service. Amtrak Virginia assumed responsibility for four regional trains traveling the Project corridor from Washington, D.C. to Richmond (Staples Mill Road Station). Two of these

Northeast Regional (VA) trains terminated in Richmond (Staples Mill Road Station), and two continued to Richmond's Main Street Station and then on to Newport News. In 2010, this partnership introduced three new Amtrak NEC service expansions in Virginia by extending trains that had previously terminated in Washington, D.C.:

- A new round trip extending to Richmond (Staples Mill Road Station) for a fifth daily Northeast Regional (VA) train between Washington, D.C. and Richmond
- A future extension of one Northeast Regional (VA) round-trip train from Richmond (Staples Mill Road Station) to Norfolk (implemented in 2012)
- One round-trip Northeast Regional (VA) extending to Lynchburg, VA

- 2009—As part of the SEHSR program, DRPT conducted a comprehensive study of the Virginia I-95 High Speed Rail Corridor and formulated a *Service Development Plan*.
- 2010—Amtrak completed the *NEC Infrastructure Master Plan* that identified investment needed to maintain the current Amtrak NEC system so that it could be easily integrated into future freight/passenger service plans.
- 2010—Amtrak presented a high speed rail concept for the NEC - *A Vision of High-Speed Rail in the Northeast Corridor* (the 2010 HSR Vision).
- 2010—The Virginia-North Carolina High Speed Rail Compact held their first meeting. The purpose of the Compact is to examine and discuss strategies to advance multi-state high speed rail initiatives. The SEHSR project is the primary multi-state high speed rail initiative advanced by the Compact. Congress authorized the creation of interstate compacts in 1997, and the Virginia and North Carolina legislatures formally established this compact in 2004.
- 2011—Virginia's General Assembly established the Intercity Passenger Rail Operating and Capital Fund, providing a mechanism for the Commonwealth Transportation Board (CTB) and General Assembly to allocate transportation funds to passenger rail operations and development projects.
- 2011—On September 23, FRA and DRPT executed Grant/Cooperative Agreement No. FR-HSR-0093-11-01-00, which allotted $44,308,000 in federal funding to develop a Tier II EIS and conduct preliminary engineering for the Washington, D.C. to Richmond segment of the SEHSR corridor. This grant was supplemented by $11,077,000 in funding from DRPT and CSXT.
- 2012—FRA initiated a Northeast Corridor comprehensive planning effort to study, assess, and prioritize the investments in the NEC from Washington, D.C. to Boston. The NEC FUTURE Tier I EIS and Service Development Plan will be completed in 2016. In July 2012, Amtrak also released its plans for the NEC, *The Amtrak Vision for the Northeast Corridor—2012 Update Report*.
- 2012—DRPT joined with CSXT in a Joint Corridor Planning and Investment Agreement to promote planning for high speed passenger rail in the Washington, D.C. to Richmond corridor. The Agreement calls for CSXT to invest no less than $15 million in projects that benefit high speed passenger rail in the corridor, including improvements to track, signals and communications, and other infrastructure. The Agreement stands in addition to various other agreements between CSXT and the Commonwealth of Virginia regarding state-funded freight and passenger rail improvements and commitments, and among

CSXT, the Commonwealth of Virginia, and the Potomac and Rappahannock Transportation Commission and the Northern Virginia Transportation Commission pertaining to VRE's commuter operations.

- 2013—DRPT updated Virginia's *Statewide Rail Plan* that identified passenger and freight rail improvements within this corridor along with various other corridors. An accompanying *Virginia Rail Resource Allocation Plan* was also released.

DRPT maintains a framework agreement with CSXT that defines respective roles and responsibilities in developing and improving the efficiency of CSXT-owned rail lines in Virginia. Through various state rail improvement programs, such as Virginia's Rail Enhancement Fund, DRPT and CSXT continue to advance incremental capacity improvements along the Project corridor and other CSXT-owned rail lines to improve both passenger and freight service. Under the agreement, DRPT and CSXT are reconfiguring the Acca switching yard in Richmond to allow a western bypass of the yard to relieve the current bottleneck. The $132 million reconfiguration of the yard began in November 2015 and is scheduled to be finished in spring 2018. The bypass will allow passenger trains to avoid freight involvement and increase from current speeds of 25 mph to an estimated 40 mph.

DRPT, working with FRA, CSXT, NS, VRE, Amtrak, and others, has also initiated and/or completed several track and system upgrades along the corridor in recent years, including:

- A new rail bridge over Quantico Creek.
- Adding a third track between Virginia Avenue to 10th Street in Washington, D.C. and between rail points SRO (Crystal City) to RO (Rosslyn), AF (Alexandria) to RW (Ravensworth), and FB (Fredericksburg) to XR (Crossroads) in Virginia.
- Crossovers at Arkendale (AR) and Elmont (EL) in Virginia.

In addition, FRA awarded Virginia a $74.8 million grant to build up to 11 miles of third track and related improvements from Arkendale in Stafford County to Powell's Creek in Prince William County as well as final design and improvements to the station at the Quantico Marine Base in Quantico. This third track project is currently under construction.

DRPT, in cooperation with VDOT, has been working to improve safety at crossings by constructing highway and pedestrian bridges over rail lines; expanding the use of protection devices at private crossings; and installing constant warning time protection devices. Section 1103(c) of TEA-21 provides funds to improve highway-rail crossings and accommodate high speed rail in designated high speed rail corridors, including the SEHSR corridor.

1.6.2.3 Richmond to Raleigh SEHSR Corridor Segment

In 2017, FRA in partnership with DRPT and NCDOT completed a Tier II EIS for the Richmond to Raleigh segment of the SEHSR corridor. The Final EIS was completed in September 2015, and FRA issued a ROD in March 2017. The EIS/ROD identified specific improvements to the Richmond to Raleigh corridor in support of the earlier SEHSR Tier I EIS. The corridor studied in the Richmond to Raleigh Tier II EIS overlaps slightly with that of the Washington, D.C. to Richmond Tier II EIS, specifically along the CSXT S-line from Centralia in Chesterfield County north to Main Street Station in Richmond, which is the designated northern terminus for the Richmond to Raleigh study. The Richmond to Raleigh segment will achieve maximum operating speeds up to 110 miles per hour with up to 8 trains per day (4 round trips) between Petersburg, VA, and Norlina, NC, on dedicated right-of-way. The DC2RVA project includes capacity to extend the Richmond to Raleigh SEHSR service—Interstate Corridor (NC)—trains from Richmond to Washington, D.C.

1.6.2.4 Richmond to Hampton Roads SEHSR Corridor Segment

In 2012, FRA, in partnership with DRPT, completed a Tier I EIS and ROD for the Richmond to Hampton Roads Passenger Rail Project, defining the route and service for the extension of the SEHSR corridor from Richmond Main Street Station south and east to Hampton Roads. The preferred alternative endorsed by DRPT, CTB, and FRA would provide higher-speed passenger rail service from Richmond Main Street Station to the south side of Hampton Roads (Richmond to Norfolk) while improving conventional speed passenger rail service on the Peninsula (Richmond to Newport News). The Richmond to Norfolk higher speed service would utilize the S-line from the west side of Main Street Station south to Petersburg, and then access the east-west NS line to Norfolk. The Richmond to Norfolk segment will achieve maximum operating speeds up to 90 miles per hour with up to 12 trains per day (6 round trips). The Richmond to Newport News conventional service would follow the existing route for Amtrak's service to Newport News, which utilizes CSXT tracks (Peninsula Subdivision) from the east side of Main Street Station through Fulton Yard to Newport News with up to 6 trains per day (3 round trips).

In 2012, Amtrak Virginia initiated conventional speed passenger service from Richmond to Norfolk, which runs from Staples Mill Road Station south through Acca Yard and then along CSXT's A-line to Centralia and on to Petersburg, and then east along the NS line from Petersburg to Norfolk. The DC2RVA project includes capacity to extend the Richmond to Hampton Roads SEHSR service—Northeast Regional (VA)—trains from Richmond to Washington, D.C.

1.6.3 Virginia Avenue Tunnel

In 2014, DDOT and FHWA completed an EIS and issued a ROD for reconstruction of the CSXT Virginia Avenue Tunnel in southeast Washington, D.C. The purpose of the project is two-fold: first, to provide CSXT with the ability to operate double-stack intermodal container freight trains on CSXT's National Gateway, and second, to eliminate a chokepoint caused by the Virginia Avenue Tunnel's single track. The existing tunnel is approximately 4,000 feet long, contains a single railroad track, lacks sufficient vertical clearance for double-stack freight, and is more than 100 years old. The project will also re-establish a second set of tracks (the tunnel was originally constructed with two tracks), eliminating a chokepoint that currently delays all trains traveling through the Washington, D.C. region, including passenger trains on the Washington, D.C. to Richmond corridor. CSXT opened the first of two tracks for double-stack operation in 2016, with completion of both tracks planned for 2017. The DC2RVA project assumes the Virginia Avenue Tunnel will be completed prior to implementation of the 2025 DC2RVA service plan and includes the tunnel in the No-Build alternative.

1.6.4 Long Bridge

DDOT is currently studying expanding capacity across Long Bridge, the double-track rail bridge that carries the Washington, D.C. to Richmond corridor track across the Potomac River from Washington, D.C. into Arlington. The Long Bridge Study is considering improvements to rail infrastructure from L'Enfant Interlocking across the Potomac River to RO Interlocking in Arlington. In early 2015, DDOT and FRA completed a feasibility report on project alternatives, and a subsequent National Environmental Policy Act (NEPA) evaluation of project alternatives is being led by DDOT in conjunction with FRA, DRPT, VRE, CSXT, and other stakeholders. The DC2RVA project assumes the Long Bridge study will be complete and an expanded bridge constructed prior to implementation of the 2025 DC2RVA service plan and includes the bridge in the No-Build alternative.

1.6.5 Washington Union Station Master Plan

In July 2012, Amtrak and other stakeholders, including the Union Station Redevelopment Corporation (USRC), U.S. DOT, Maryland Transit Administration (MTA), DRPT, and the Washington Metropolitan Area Transit Authority (WMATA), developed a master plan that served as a visioning document to address existing deficiencies and future growth. Since that time, Amtrak and USRC have incorporated initial planning efforts into an ongoing "Washington Union Station's 2nd Century" Master Planning process, which is a series of coordinated near- and long-term projects that seek to triple passenger capacity and double train capacity by modernizing and expanding station facilities over the next 20 years. The series of projects includes:

- Claytor Concourse Modernization Project: Led by Amtrak, the near-term Concourse Modernization will be the first set of improvements as part of the 2nd Century Plan with early construction tasks starting fall 2016. The environmental clearance process for this project is likely to be a categorical exclusion.
- Station Operational Improvement Projects: Led by Amtrak, these near-term improvements are immediate projects that are needed to create redundancy and additional capacity in today's intercity and commuter operations, as well as provide better phasing of the reconstruction in the future. The environmental clearance process for this project is likely to be a categorical exclusion.
- Washington Union Station Expansion Project: led by USRC and Amtrak, this project will provide improved multi-modal transportation infrastructure and passenger/user facilities to meet future demand and operational requirements. An EIS is being prepared to evaluate environmental impacts and select a preferred action; a Master Development Plan is being prepared to create a feasible, long-term, cohesive implementable project.
- Burnham Place Project: A 3-million-square-foot mixed-use development, envisioned over the rail yard, will be developed by Akridge, a private company that owns the air rights above the terminal infrastructure. The development will be a vital economic driver for Washington, D.C. because it will reconnect the urban fabric of the station's adjacent neighborhoods.

1.7 PROJECT BENEFITS

Fast, efficient passenger rail service is important for Virginia, as evidenced by the body of work described in Section 1.6, dating back to 1996. The Commonwealth participates in multi-state coalitions such as the Southeast Rail Coalition and the Virginia-North Carolina High Speed Rail Compact, to improve passenger rail services in the Mid-Atlantic region. The Commonwealth also participates in multiple state-based funding programs, including the Rail Enhancement Fund and Intercity Passenger Rail Operating and Capital Fund, for rail enhancement. Virginia is also an active member in the American Association of State Highway and Transportation Officials (AASHTO), Standing Committee on Rail Transportation (SCORT). SCORT works with its members to address policy, regulatory, safety, and enforcement issues affecting the ability of states to develop and maintain the freight and passenger rail transportation network within their borders.

The Commonwealth has initiated environmental studies and preliminary design associated with high speed rail corridors passing through Virginia using its own funds and in partnership with FRA and other agencies. Because of the high capital cost associated with high speed rail systems, the Commonwealth has been following an incremental approach to plan for and construct rail improvements that eliminate key rail chokepoints and to increase rail speeds and on-time performance on existing passenger rail corridors.

The SEHSR corridor, originally designated in ISTEA and TEA-21, would extend high speed rail service south from the NEC in Washington, D.C. to Richmond and on to Raleigh and Charlotte. The SEHSR corridor would later expand farther south to Jacksonville via Charlotte and Atlanta or via Raleigh and Columbia, SC, and east from Richmond to Hampton Roads.

Implementing the Washington, D.C. to Richmond DC2RVA project would address the purpose described in Section 1.4, providing the following benefits:

- Providing an efficient and reliable multimodal rail corridor between Washington, D.C. and Richmond and beyond
- Increasing the capacity of the multimodal rail system between Washington, D.C. and Richmond
- Improving the frequency, reliability and travel time of passenger rail operations in Virginia and beyond, and providing a competitive alternative to highway and air travel
- Accommodating VRE commuter rail service operations
- Accommodating the movement of freight by rail through the corridor, including to and from Virginia's ports
- Improving modal connectivity with other public transportation systems within the corridor to further expand travel options for passengers within Virginia and beyond
- Improving rail operational safety in the corridor
- Improving air quality and reducing GHG emissions by diverting passenger trips by automobile and movement of freight by trucks to more environmentally sustainable rail transportation