EXECUTIVE SUMMARY

The Federal Railroad Administration (FRA), in partnership with the North Carolina Department of Transportation (NCDOT) and the Virginia Department of Rail and Public Transportation (DRPT) have prepared this Environmental Impact Statement (EIS) for the proposed development of the Southeast High Speed Rail (SEHSR) Corridor between Richmond, VA and Raleigh, NC (Richmond to Raleigh - Tier II EIS or Project) as required by the National Environmental Policy Act (NEPA). This document contains a Tier II Final EIS (FEIS) for the Richmond to Raleigh Project, as a continuation of the Tier II Draft EIS (DEIS), which was published for review in 2010.

DESCRIPTION OF PROPOSED PROJECT

The Project involves the incremental development, implementation, and operation of high speed rail (HSR) passenger service in the approximately 450-mile travel corridor from Washington, DC, through Richmond, VA, and Raleigh, NC, to Charlotte, NC. NCDOT and DRPT, with their Federal partners, FRA and the Federal Highway Administration (FHWA), have been working together since the early 1990s to develop the SEHSR corridor. The Project background is summarized in Section 1.2.

This Project addresses the Richmond, VA to Raleigh, NC portion of the corridor, which is approximately 162 miles long. While there are active freight and passenger rail operations between Richmond, VA, and Petersburg, VA, as well as freight service between Raleigh, NC and Norlina, NC, there is no continuous rail connection between Petersburg, VA, and Raleigh, NC, in the Study Area (approximately 132 miles largely on the CSX S-Line). From Petersburg, VA, to Norlina, NC (approximately 76 miles), right of way (ROW) is largely intact, but rail service was discontinued in the 1980s, and the tracks were removed. From Norlina to Raleigh, NC, there is only minor active freight service (approximately 1-4 trains per day).

PURPOSE AND NEED OF THE PROPOSED PROJECT

NCDOT, DRPT, FRA, and FHWA confirmed the purpose and need of the Project in October 2002. As detailed in Section 1.6, the need for the Project relates to:

- Population growth in Virginia and NC
- Congestion of both roadways and airports
- Lack of a passenger rail option with competitive travel times with air and highway travel
- Connectivity needs
- Air quality concerns
- Perceived gap in safety between passenger rail and other modes of travel
- Need for increased energy efficiency for passenger travel options.

As described in Section 1.7, the purpose of the Project is to:

- Divert trips from air and highways
- Provide a more balanced use of transportation infrastructure in the Study Area
- Increase the safety and effectiveness of the transportation system in the Study Area
- Serve long-distance business and leisure travelers between Virginia and NC, as well as those accessing Amtrak's Northeast Corridor (NEC), which extends from Washington, DC, to New York, NY, and Boston, MA, and allowing patrons in the NEC area to reach destinations to the south.

More information about the purpose of the SEHSR Corridor can be found in the SEHSR Corridor Tier I EIS and on the program's website at www.sehsr.org. A discussion of assumptions used in the Project evaluations is provided in Section 1.4.1.

STUDY AREA

The Study Area defines the boundaries for potential SEHSR rail and associated roadway improvements and includes areas where construction of the Richmond to Raleigh Project could have direct impacts on the environment. Once potential alignments were proposed, corridors approximately 1,000 feet wide were analyzed. Modifications were made to accommodate design changes developed in response to comments on the Tier II Richmond to Raleigh DEIS. Section 1.4 describes the corridor.

Three alternative railroad alignments were developed initially within each of the 26 sections of the project (described below and shown in Figure ES-1). As presented in the Project Tier II DEIS, the alternatives were named VA1, VA2, and VA3 in Virginia, and NC1, NC2, and NC3 in North Carolina. In order to minimize impacts, throughout much of the Study Area the alternatives are within existing railroad ROW; in many locations the alternatives are on common (concurrent) alignment. Except where otherwise specified, alternative VA3 is concurrent with alternative VA1, and alternative NC3 is concurrent with alternative NC1.

The endpoints of each of the 26 sections are in locations where the alternative alignments are in a common location. This approach allowed for the broadest range of options during evaluation and selection of the preferred alternatives. Joined together, the preferred alternatives form a "best-fit" preferred alternative for the entire Study Area.

The Study Area begins at Main Street Station in Richmond, VA, and extends to the south, following the existing CSX S-line railroad to Centralia, then transitions to the CSX-A line, traveling through Petersburg, VA, crossing the Appomattox River, and continuing south to Collier Yard (a CSX rail yard). At the south end of Collier Yard, the Study Area turns west, following the alignment of the inactive Burgess Connector rail line. At Burgess, the Study Area curves south, rejoining the alignment of the CSX S-line, which it follows into North Carolina.

In North Carolina, the Study Area continues along the inactive S-line through Warren County to the Town of Norlina, NC (where the S-line returns to an active CSX freight railroad). The Study Area follows the S-line to the north side of downtown Raleigh near Capital Boulevard, where it increases to approximately 2,000 feet wide to encompass the existing Norfolk Southern (NS) line through Glenwood Yard (the NS switching yard) on the west side and the CSX S-line through Capital Yard (the CSX switching yard) on the east side. Near Jones Street in downtown Raleigh, the NS line joins the CSX S-line, and the Study area narrows to follow the S-line south for two blocks to the Boylan Wye, the southern terminus of the Project.

Figure ES-1

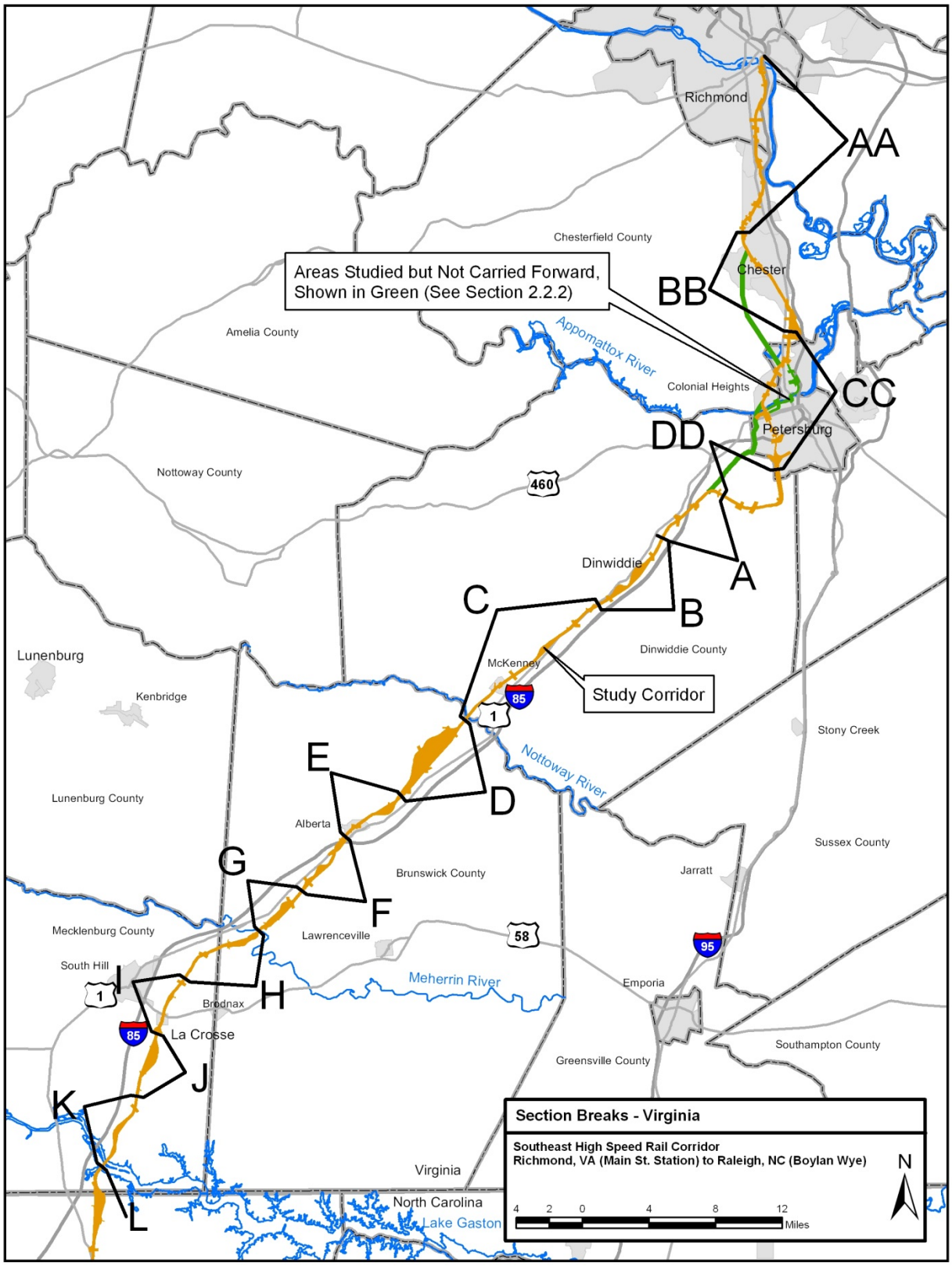

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Figure ES-1 Continued

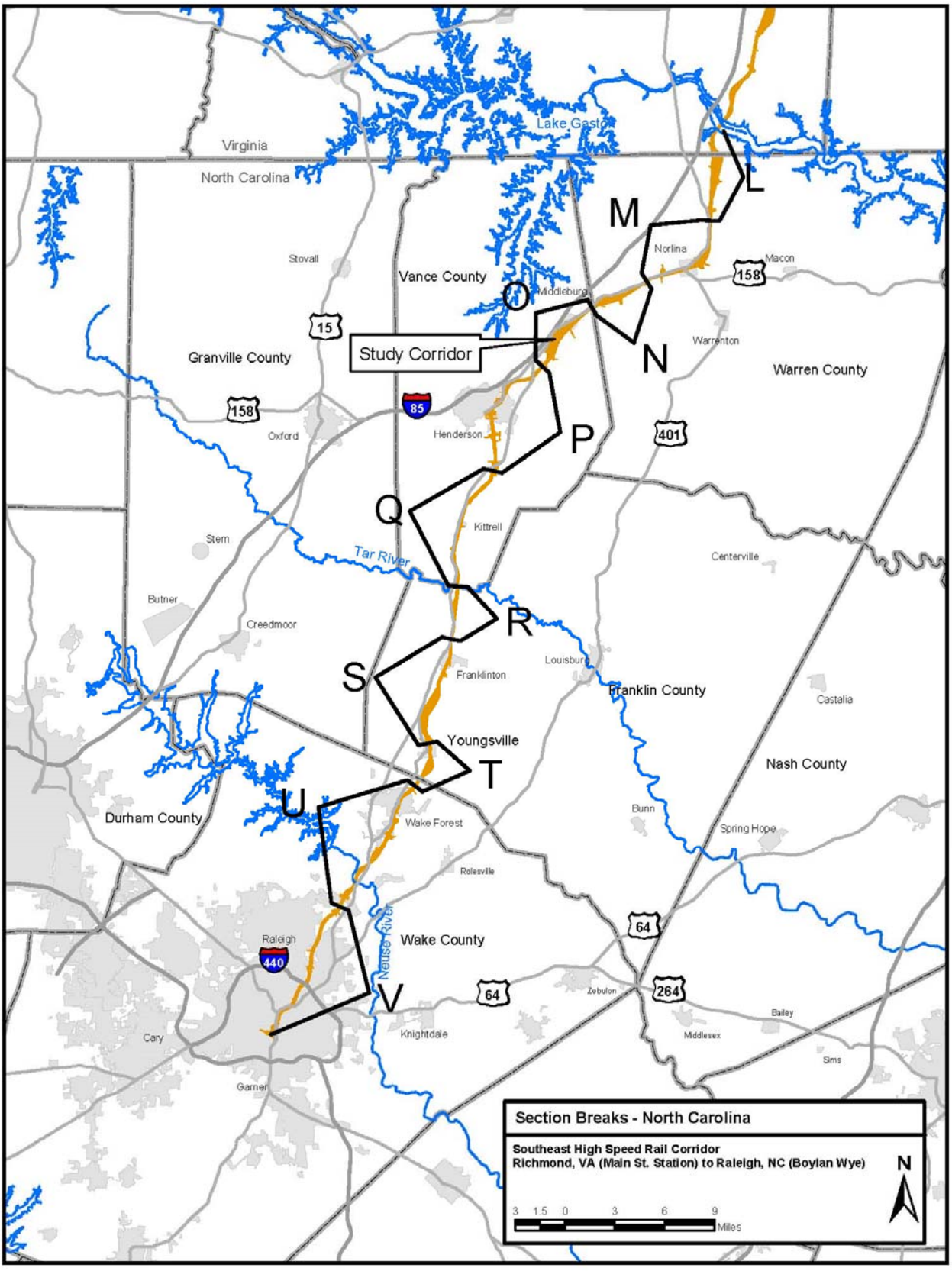

Table ES-1
Preferred Alternative Impact Summary

Section	Stream (linear feet)	Wetland (acres)	Floodplain (acres)	Farmland (acres)	Forest (acres)	Hazardous Waste (sites)	Residential Relocations	Business Relocations	Noise (receptors)	Vibration (structures)
AA	3,919	2.32	25.72	0.0	42.57	59	40	7	0	1
BB	2,078	5.22	11.4	13.3	54.16	10	7	1	0	2
CC	2,405	2.52	6.16	16.4	45.05	20	48	1	11	15
DD	585	2.37	4.63	35.7	62.41	1	2	0	0	0
A	3,094	2.84	4.67	51.8	64.20	1	0	0	5	0
B	760	0.64	0.85	64.8	81.45	3	3	1	13	2
C	2,803	2.17	6.38	86.3	155.05	3	4	8	9	10
D	1,998	2.03	1.31	99.9	101.71	1	3	2	6	2
E	860	1.21	0.85	59.8	52.01	0	2	7	29	9
F	1,004	0.62	3.20	25.0	67.02	0	0	0	6	0
G	510	0.26	0.32	33.1	43.56	0	2	0	2	0
H	2,808	0.35	0.06	82.0	110.64	0	1	0	20	5
I	22	0.00	0.00	57.6	35.53	2	14	0	55	24
J	420	0.22	0.00	72.1	63.06	1	5	0	22	5
K	1,419	0.91	0.19	37.6	79.21	0	0	5	9	1
L	2,502	0.72	0.04	128.5	88.46	1	8	1	21	7
M	442	0.49	0.00	113.5	40.50	0	18	4	47	30
N	386	1.25	0.00	76.1	43.43	1	2	0	4	6
O	3,102	0.30	0.00	124.4	46.22	1	3	0	15	3
P	1,532	0.91	0.00	87	12.86	31	33	8	89	74
Q	1,127	0.03	0.00	96.7	49.22	4	10	0	18	20
R	438	0.00	0.04	25.1	29.45	0	1	0	1	3
S	1,620	0.48	0.42	91.7	92.19	7	4	0	23	22
T	415	0.07	0.00	41.7	25.65	4	5	0	25	5
U	3,394	0.38	0.00	0	71.94	20	8	12	176	45
V	1,036	0.05	1.38	0	17.05	79	0	59	81	4
Total	**40,679**	**28.36**	**67.62**	**1,520.1**	**1,574.6**	**249**	**223**	**116**	**687**	**295**

Project impacts are discussed in Chapter 4; a more detailed breakdown of impacts can be found both within Chapter 4 and in Table ES-5 at the end of this Executive Summary. "Farmland" refers to Prime and Important Farmland impacts. "Noise" includes number of impacted and severely impacted receptors. "Vibration" refers to number of impacted structures (single family, multi-family, and commercial).

RAIL ALIGNMENT

The Project goal was to use existing rail lines and rail right of way (ROW) as much as practicable. Changes were made to minimize impacts and allow for higher speed travel. The Preferred Alternative utilizes approximately 60 percent of the existing rail alignment.

The maximum authorized speed (MAS) for the Project is established as 110 miles per hour (mph) using locomotives powered by fossil fuels. The MAS guided selection of the maximum allowable horizontal and vertical curvature (both set at one degree). In some areas, curves could not be sufficiently straightened, and the MAS was lowered. Speeds were reduced in urban areas.

- Rail designs for the Project use existing rail lines in conjunction with areas of new alignment. The proposed designs for all rail alignment alternatives call for new ballast (the rock surface underneath the railroad ties); concrete ties, and welded steel rails. Throughout the Study Area, the alternatives provide for a combination of high speed passenger service, conventional passenger service, conventional freight, and intermodal freight. Requirements to achieve this shared system differ depending on existing rail operations, as well as existing railroad and rail bed conditions (Figure 1-4); Table 2-1 shows the track configuration in the Study Area. Depending on the location, the proposed rail designs include:
- Construction of new single track with approximate five-mile long passing sidings approximately every ten miles on new segments of the Study Area (CSX S-Line between Collier, VA and Norlina, NC)
- Rebuilding existing single track with approximate five-mile long passing sidings approximately every ten miles on active freight segments of the Study Area (CSX S-Line between Norlina, NC and north of Raleigh, NC)
- Construction of new single track adjacent to existing active freight track, with 30 feet of separation; and crossovers to allow passing for freight and passenger operations on segments with heavy mainline freight traffic (CSX A-Line between Collier, VA and Centralia, VA)
- Rebuilding existing double track, with crossovers to allow passing for shared freight and passenger operations in urban segments of the Study Area near Richmond (CSX S-Line between Centralia, VA and Downtown Richmond).

ROAD ALIGNMENTS

During the Project design process, railroad-roadway crossings were consolidated, to the extent practicable, and grade separated (bridge over road or rail) for safety and ease of operations. Grade separations are proposed to replace at-grade crossings (i.e., locations where railroads and roadways cross at the same elevation) with bridges or underpasses. Section 1.4.1.7 discusses the reason for removing at-grade crossings.

The construction of these grade separations, and the impacts associated with these required improvements, are included in the Project impacts. The locations selected for grade separation are based on: input from local officials and the public; connectivity to the existing road network; minimization of impacts to natural and cultural resources; and constructability.

STATIONS

The Richmond to Raleigh Tier II DEIS modeled five municipal locations for SEHSR stops in the Project service area:, Richmond, VA; Petersburg, VA; and Raleigh, NC; which have existing passenger service and stations, and La Crosse, VA; and Henderson, NC, which do

not. All trains are assumed to stop in Richmond, VA; Petersburg, VA; and Raleigh, NC. One daily round trip train stop is assumed to stop in La Crosse, VA; and one in Henderson, NC.

This EIS does not evaluate impacts related to specific station locations. Potential station locations are evaluated generally in terms of accessibility to the larger transportation network. Station locations within municipalities will be determined in the future by the respective municipalities and passenger service operator, and appropriate environmental documentation will be undertaken at that time.

SERVICE

Proposed service consists of four round trips per day between Washington, DC, and Charlotte, NC, and four additional round trips between Raleigh, NC, and Charlotte, NC. Round trips to Washington, DC, are expected to continue on to New York, NY and Boston, MA.

Section 1.5 discusses total patronage (ridership and revenue) estimated for the SEHSR Study Area. The section provides several scenarios that were evaluated for train traffic along the corridor in addition to the proposed Richmond to Raleigh service.

Table ES-2 lists average travel times between cities in the SEHSR Study Area and New York, NY. The travel time for SEHSR service between Richmond, VA, and Raleigh, NC, will be approximately two hours and fourteen minutes. Schedules and travel times may vary in the future due to other corridor constraints.

Table ES-2
Projected Average Travel Time Between Cities
(In Hours : Minutes)

	Current Service	SEHSR (Full Build)
Richmond, VA - Raleigh, NC	**3:36**	**2:14**
New York, NY – Raleigh, NC	9:57	7:25
Washington, DC - Raleigh, NC	5:59	4:22
New York, NY - Charlotte, NC	13:25	10:16
Washington, DC - Charlotte, NC	9:27	7:14
Richmond, VA – Charlotte, NC	7:03	5:07
Raleigh, NC - Charlotte, NC	3:13	2:49

Source: “S-line Trains Only” travel times are derived from the schedules used in the Southeast High Speed Rail Ridership Report, AECOM, 2013

FUNDING

Funding for ROW acquisition and construction of the Richmond to Raleigh Project has not yet been secured or identified. At this time, NCDOT and DRPT anticipate that the states will pursue Federal funding through various methods, including the Passenger Rail Investment and Improvement Act (PRIIA) of 2008, reauthorization of Federal transportation programs, and other Federal funding sources. Public-private partnership funding opportunities may also be sought along with state funding. Decisions regarding future funding of the SEHSR will be made at the completion of the environmental review process for respective segments of the

Study Area. The Richmond to Raleigh Project is not anticipated to be funded by local governments. A more detailed discussion of Project funding is included in Section 1.4.2.

Construction costs for the Richmond to Raleigh portion of the Project were never intended to be fully financed by the system's ridership; however, most long-term operational costs are estimated to be covered through ridership fees.

RIDERSHIP & REVENUE

To meet the purpose and need for the Richmond to Raleigh Project, stops must be placed at reasonable intervals to serve the population centers along the route. The Ridership/Revenue model originally prepared for the SEHSR Tier I EIS was revised in 2013 to provide updated forecasts for service in the Study Area, and feeder line corridors in Virginia and North Carolina (AECOM 2013). The 2013 updated AECOM report is included in Appendix C of the Richmond to Raleigh Tier II FEIS.

Table ES-3 summarizes the proposed service (round trips) for the Baseline ("No Build") and SEHSR ("Full Build") scenarios. Table ES-4 lists the updated ridership and ticket revenue forecasts for Baseline ("No Build") and SEHSR ("Full Build") scenarios for design year 2030 and a SEHSR ("Full Build") scenario forecast for the year 2040. Current Amtrak fares were used with 25 percent higher fares assumed for the faster SEHSR service. The AECOM study projected revenues of the SEHSR system would exceed annual operating costs by the design year (2030); refer to Section 1.5 for additional discussion of updated ridership and revenue projections.

Table ES-3
Proposed Service - Number of Round Trips

	Service	Route[1]	Baseline No Build	SEHSR Full Build[2]
Trains Originating in North Carolina				
Raleigh-Charlotte (Intrastate)	*Piedmont*	NS/NCRR	4	4
Washington-Raleigh-Charlotte	*Carolinian*	CSX A-Line	1	1
Washington-Raleigh	*SEHSR Corridor*	CSX S-Line	-	1
Washington-Raleigh-Charlotte			-	3
Subtotal:			**5**	**9**
Trains Originating in Virginia				
Washington-Richmond	*NEC Regional*	CSX A-Line	2	2
Washington-Richmond-Newport News		CSX A-Line	2	2
Washington-Richmond-Norfolk		CSX A-Line	1	1
Washington-Alexandria-Lynchburg		NS-Crescent	1	1
Subtotal:			**6**	**6**
Amtrak Long Distance Service[3]				
Washington-Richmond-Points South	*Palmetto Silver Meteor*	CSX A-Line	2	2
Washington-Richmond-Raleigh-Points South	*Silver Star*	CSX A-Line	1	-
		CSX S-Line	-	1

Table ES-3 Proposed Service - Number of Round Trips				
	Service	**Route[1]**	**Baseline No Build**	**SEHSR Full Build[2]**
Washington- Alexandria-Lynchburg-Charlotte-Points South	*Crescent*	NS-Crescent	1	1
Subtotal:			**4**	**4**
Total Trains:			**15**	**19**

Source: Southeast High Speed Rail Ridership, AECOM, 2013

1. Trains operating on the CSX S-Line route follow the CSX A-Line in Virginia between Centralia and Collier Yard.
2. The "Full Build" scenario does not include the full implementation of the Richmond-Hampton Roads project. Those trains were modeled separately as "Full Build with Additional Services" in the ridership and revenue assessment. See Appendix C for more information.
3. These do not include the Amtrak auto-train, which travels through Virginia and North Carolina, but does not influence ridership and revenue estimates.

Table ES-4
Summary of Forecast Results

	Base Line[1] (No Build)	SEHSR Corridor[3] (Full Build)	SEHSR Corridor[3] (Full Build)
	Year 2030	Year 2030	Year 2040
Ridership (persons)			
North Carolina Service			
Charlotte/Raleigh Trains	996,100	2,075,500	2,526,900
Virginia Service			
Richmond/Norfolk/Virginia Beach Trains	808,300	805,600	911,100
Lynchburg Trains	241,300	261,600	301,200
Amtrak Long-Distance Trains[2]	241,900	241,900	282,400
Total Ridership	**2,287,600**	**3,384,600**	**4,021,600**
Ticket Revenue (2013 dollars)			
North Carolina Service			
Charlotte/Raleigh Trains	$39,034,000	$138,667,000	$165,575,000
Virginia Service			
Richmond/Norfolk/Virginia Beach Trains	$45,947,000	$57,799,000	$64,867,000
Lynchburg Trains	$15,070,000	$16,474,000	$18,825,000
Amtrak Long-Distance Trains[2]	$30,474,000	$30,460,000	$35,277,000
Total Ticket Revenue	**$130,525,000**	**$243,400,000**	**$284,544,000**

Source: Southeast High Speed Rail Ridership, AECOM 2013

1. Baseline (No Build): NC service includes 5 round trips Raleigh to Charlotte, w/1 round trip (the Carolinian) continuing to NY via the A-Line. VA service includes 6 round trips that begin/end in Virginia including 5 round trips Richmond to NY/Boston, w/ 2 extending to/from Newport News and 1 extending to/from Norfolk, and 1 round trip Lynchburg to NY/Boston; and 4 round trips provided by Amtrak Long-Distance trains that pass though NC and VA
2. Activity from NEC through NC only; includes connecting buses.
3. Full Build scenarios include SEHSR Corridor service for 8 round trips Raleigh to Charlotte, w/3 continuing to NY, and 1 starting in Raleigh and continuing to NY; and 1 (the Carolinian) beginning in Charlotte continuing to NY via the A-Line

SELECTION OF THE PREFERRED ALTERNATIVE

Following the May 2010 publication of the Richmond to Raleigh Tier II DEIS, more than 1,850 individuals and 50 agencies and organizations submitted comments. Many of the comments were several pages in length, and most covered multiple topics. The Project team evaluated impacts to the natural and human environment for each alternative, along with information on speed, cost, and constructability. All Richmond to Raleigh Tier II DEIS comments pertaining to each section were reviewed and discussed, and preferences for alternatives were tallied. In some sections, additional coordination, analysis, or design work was undertaken prior to publishing the SEHSR Richmond to Raleigh Recommendation Report (NCDOT, May 2, 2012).

Chapter 2 discusses the alternative selection process. Section 2.2 lists the Preferred Alternative by section. More detailed information can be found in the following Appendices: Appendix R

contains detailed maps of the Preferred Alternative, including associated roadwork; Appendix E contains schematic track charts of the alternative rail designs; and Appendix F contains detailed information on associated road work.

Advanced technologies (where operating speeds average 185 to 200 mph) and solely electric-powered locomotives were evaluated and dismissed in the Tier I EIS. Many comments received from the public on the Richmond to Raleigh Tier II DEIS asked why these alternatives were not still under consideration. Advanced high speed trains were dismissed because they require the construction of an entirely new, separate rail system that cannot be shared with freight, they would involve substantially higher costs and a longer implementation time, and they would cause substantially greater community and environmental impacts. Electrified systems were dismissed because they have substantial initial costs (both monetary and environmental) that made them infeasible at this time, relative to the ridership/revenue projections for the SEHSR corridor, as well as potential negative public reaction to catenary wire systems needed for electric trains.

GREENWAY CORRIDOR PLAN

Section 2.4 of the Richmond to Raleigh Tier II DEIS included discussion of conceptual planning for a greenway corridor, noting that potential greenway impacts would be documented in the Richmond to Raleigh Tier II FEIS. The construction of the greenway was not intended to be funded as part of the Project because FRA (the source of Federal funding for HSR projects) does not have a mechanism to provide funding for greenways. FRA, FHWA, and the states of Virginia and North Carolina have jointly determined that the greenway project is more suitable for a pre-NEPA Greenway Corridor Plan, rather than its inclusion in the SEHSR FEIS. This will give local jurisdictions (who will ultimately construct the greenway) greater flexibility to pursue various funding options. The details for the greenway will, therefore, not be included in this FEIS, but rather in a separate Greenway Corridor Plan. This document is currently under development, with completion anticipated at the time of the Richmond, VA; to Raleigh, NC; SEHSR Record of Decision (ROD). The SEHSR website will include links to this plan and provide opportunities for its public review and comment.

THE AFFECTED ENVIRONMENT

Chapter 3 summarizes new and updated information pertaining to the affected environment. This includes updated stream and wetland impact delineations, information on water quality monitoring, floodplain mapping, wild and scenic rivers, U.S. Coast Guard waters, soils, farmlands, mineral resources, hazardous waste sites, air quality, noise and vibration, visual environment, natural communities, and protected species. The chapter also updates community information with results from the 2010 U.S. Census and the American Community Survey (ACS). An update on community planning documents in the Study Area is also included.

Chapter 3 also summarizes the extensive evaluation of potential archaeological and historical resources within the SEHSR Study Area (see Section 3.12). These studies identified 18 Virginia archaeological sites that were listed or considered eligible for the National Register of Historic Places (NRHP). No eligible archaeological resources were identified in North Carolina. In Virginia, a total of 64 historical architecture sites were listed or considered eligible for the NRHP. In North Carolina, 75 sites were listed or considered eligible for the NRHP.

The Federal, state, and local parklands, public recreational areas and wildlife refuges located within the vicinity of the study area are also summarized in Chapter 3. These include the Petersburg National Battlefield (a National Park), Staunton River State Park in VA, Kerr Lake

State Recreation Area just north of Henderson, NC, and Falls Lake State Recreation Area just north of Raleigh, NC.

SUMMARY OF IMPACTS FOR THE PREFERRED ALTERNATIVE

The following summarizes primary environmental consequences that may result from the construction and operation of the Project. The impacts presented here are based on the preliminary engineering designs. Specific total impacts for the alternative alignments are listed in Table ES-5.

WATER RESOURCE IMPACTS

Surface Water

The Project may impact approximately 40,679 linear feet (LF) of jurisdictional intermittent and perennial channels, including 3,651 LF of streams listed as impaired under Section 303(d) of the Clean Water Act of 1970 (CWA) as of the 2012 303(d) list. Section 4.1.1.1 discusses stream impacts.

In VA, the Preferred Alternative had the least impacts to streams in each section, with a few exceptions. The Preferred Alternative for Section B was selected, in part, to minimize noise impacts, to reduce business relocations, and to maintain operating speed. In Section D, a new alternative (VA4) was developed to avoid an historic property, avoid impacts to a Federally endangered Michaux's sumac site, and reduce wetland impacts. In all, Project stream impacts to Virginia streams are estimated at 25,182 LF, 3,056 LF of which impact 303(d)-listed streams.

In North Carolina, the Preferred Alternative had the least impacts to streams in each section, with the exceptions of Sections L, O, T, and U. In sections L and O, the Preferred Alternatives avoid historic properties. In Sections T and U, selection of the Preferred Alternative was based on many factors including operating speed, operability, and construction limitations. In North Carolina, the Project stream impacts are estimated at 15,497 LF, 660 LF of which impact 303(d)-listed streams.

Streamside riparian zones within the Study Area in North Carolina are protected under provisions of the Tar-Pamlico and the Neuse River Basin Riparian Buffer Rules administered by North Carolina Division of Water Resources (NCDWR). The rules protect two riparian zones: Zone 1 extends 30 feet from stream bank and Zone 2 extends from 30 to 50 feet from the stream bank. The Preferred Alternative impacts 1,274,249 square feet (sq ft) of riparian buffer: 739,490 sq ft in Zone 1 and 534,759 sq ft in Zone 2. Mitigation will be required for stream and buffer impacts.

Public Water Supplies and Groundwater Wells

The Preferred Alternative is not anticipated to impact public water supplies. The Preferred Alternative impacts one public groundwater well in Section U (Wake Forest, NC) and one private well serving a mobile home park near La Crosse, VA (Section I).

Wetlands

The Preferred Alternative may impact approximately 23.7 acres of jurisdictional wetlands in Virginia and 4.19 acres in North Carolina. Wetland impacts are discussed in Section 4.1.2.

Floodplains and Floodways

FEMA Executive Order 11988, (May, 1977) (Floodplain Management) requires that Federal agencies to avoid long- and short-term adverse impacts associated with the occupancy and modification of flood plains and avoid direct and indirect support of floodplain development wherever there is a practicable alternative. Data from Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) were analyzed and the FEMA zone designations were determined for the 100-year FEMA floodplains crossed by the Study Area. The Preferred Alternative impacts 67.6 acres of floodplains and floodways, and a detailed discussion of these impacts is included in Section 4.1.3.

Permits

Because the Preferred Alternative has impacts to jurisdictional streams and wetlands, which are considered to be "Waters of the United States," the Project will require permitting under Section 404 of the CWA (33 USC 1344). "Waters of the United States" are regulated by the US Army Corps of Engineers (USACE). Any action that proposes to dredge or place fill material into surface waters or wetlands is subject to these provisions.

Due to the placement of fill associated with crossing over and filling in "Waters of the United States," it will be necessary to obtain permits for the Project from the USACE, Virginia Department of Environmental Quality (VDEQ), and NCDWR. Section 401 of the CWA requires each state to certify that state water quality standards will not be violated for activities that either involve issuance of a Federal permit or license, or require discharges to waters of the United States. The USACE will not issue a Section 404 permit until a Section 401 certification is issued. Therefore, the Project sponsor must apply to VDEQ and NCDWR for Section 401 Water Quality Certification. A discussion of Federal and state permits required for the Project can be found in Section 4.1.5.

Mitigation

Compensatory mitigation may be accomplished separately for the Virginia and North Carolina portions of the Project, as discussed in Section 4.1.6.

In Virginia, mitigation could be provided through the use of mitigation banks and/or the Virginia Aquatic Resources Trust Fund (VAQRTF). The use of the VAQRTF as a mitigation option is at the discretion of the appropriate regulatory agencies.

In North Carolina, mitigation could be provided through coordination with the North Carolina Ecosystem Enhancement Program (NCEEP). The USACE, NCDOT, and North Carolina Department of Environment and Natural Resources (NCDENR) entered into a Memorandum of Agreement in July 2003 that established procedures for providing compensatory mitigation through NCEEP to offset impacts to streams and wetlands from NCDOT projects.

SOILS

Prime and Other Important Farmlands

As required by the Farmland Protection Policy Act (FPPA) of 1981 (7 CFR Part 658) and State Executive Order Number 96, coordination with the Natural Resources Conservation Service (NRCS) for the Project was initiated by submittal of Form AD-1006, requesting the Farmland Conversion Impact Rating for each jurisdiction. Design changes after publication of the Richmond to Raleigh Tier II DEIS changed the total impacted acres of prime and important farmland, increasing acreage by 28.3 acres of in Virginia, and decreasing the total by 38 acres in North Carolina. Updated AD-1006 forms were developed for Sections D and

G in Virginia and all sections in North Carolina and are included in Appendix D. Prime and Important farmland is discussed in Section 4.3.

MINERAL RESOURCES/HAZARDOUS WASTE SITES

The preferred alternative would purchase land for ROW (called takes) from Vulcan-Greystone Quarry and Carolina Sun Rock L.L.C. in North Carolina. These takes are not anticipated to impact current mining operations.

The Project will not impact Superfund sites in Virginia or North Carolina. Two Resource Conservation and Recovery Act (RCRA) Corrective Action Facility sites, one in Virginia and the other in North Carolina, are impacted by the Preferred Alternative. The Virginia site, the First Energy Corporation (FEC) Bioremediation Facility, is in Section AA and the North Carolina site, Covidien/Mallinckrodt SCC Raleigh, is located in Section U. One polychlorinated biphenyl (PCB) site, owned by the Town of Wake Forest, NC, is located in Section U and is impacted by the Preferred Alternative. Table 4-10 shows hazardous waste impact sites for each section of the Preferred Alternative. Additional information is provided in Appendix Q.

AIR QUALITY

FRA, FHWA, NCDOT, Virginia Department of Transportation (VDOT), and U.S. Environmental Protection Agency (USEPA) guidance manuals were used to analyze the potential air quality impacts. Data sources for the project level analysis in Virginia included VDOT and project traffic data. Data sources for the project-level analysis in North Carolina included NCDOT, NCDENR Division of Air Quality, Capital Area Metropolitan Planning Organization (CAMPO), Triangle Air Quality Partnership, and Project traffic data. Air quality is discussed in Section 4.6.1. Detailed information on highway vehicle air emissions is provided in Appendix M.

Locomotive Emissions

Locomotive operations are subject to Federal air quality conformity regulations (40 CFR 51.853). Based on modeling (detailed in Section 4.6.1), the predicted annual emissions from the Project fall below the level at which additional actions or mitigation are required. Constructing the Project will likely increase the number of intermodal or freight trains in the area. However, from an air quality perspective, these additional trains would result in a regional efficiency improvement as a result of freight providers switching from long haul trucking to intermodal and freight rail (which has lower emissions than long haul trucks).

Highway Vehicle Emissions

The primary concern for emissions from automobiles or trucks relates to carbon monoxide (CO) emissions for areas with large volumes of slow-moving traffic. Areas with high emissions of CO are called CO “hot spots.” Closing and consolidating rail crossings throughout the Study Area will require some vehicles to travel an additional distance to reach a grade-separated crossing. It is likely that the additional emissions caused by the extra distance will be offset by eliminating the vehicle idling that takes place when trains pass through at-grade road crossings. For example, a vehicle idling for one minute will produce approximately 70 grams of CO. The same car traveling two additional miles to use a grade-separated crossing (one mile in each direction), would generate approximately 16 grams of CO. No air quality impacts are anticipated based on highway vehicle emissions.

Construction Emissions

Construction activities will result in temporary increases in air pollution. The greatest increases are likely to occur in the areas where new bridges are proposed for construction. However, it is not expected that increased pollutants from trucks and site equipment will cause violations of air quality standards.

NOISE AND VIBRATION

Noise and vibration impacts are discussed in Section 4.7.1 and Table ES-5. The Richmond to Raleigh Tier II DEIS modelled the impacts of the Project only, not any associated intermodal or freight trains. Mitigation for noise and vibration impacts is discussed in Section 4.7.3.

Most impacted receptors were considered to be classified as Category 2 (e.g., residences, hospitals, hotels). Table 4-14 provides a summary of anticipated noise impacts for the Project. The most impacts (moderate and severe) in Virginia were associated with Section I. The most impacts in North Carolina were associated with Sections P and U. Table 4-16 provides information on impacted noise receptors at each diverted roadway in the Study Area. There were no impacted receptors at diverted roadways in Virginia. In North Carolina, diverted roadways had potential impacted receptors at East Main Street/Holden Road in Youngsville (Section T). Construction noise impacts are discussed in Section 4.7.2.1.

As per FRA guidance, field vibration measurements were taken at 10 locations in the Study Area with active tracks. Measurements were taken of freight train passbys. These field measurements were below FRA reference vibration levels for freight trains, so it was determined that the FRA levels would present a conservative (worst case) way to estimate SEHSR vibration impacts. Section 4.7.1.3 provides background information on vibration testing, results of the analysis are shown in Table 4-18. Section I had the most vibration impacts in Virginia, and Sections P and U had the highest impacts in North Carolina. Construction vibration noise impacts are discussed in Section 4.7.2.2.

VISUAL IMPACTS

The FRA Procedures for Considering Environmental Impacts require an EIS to identify any significant changes likely to occur in the natural landscape and in the developed environment (see Section 4.9.1). Trains are most visible when they pass by a given location, or when trains are idling at sidings. To minimize idling trains, the Project is designed to include double tracks or passing sidings (about five miles long, located approximately every ten miles between ends).

In general, the greatest visual impacts will take place in areas with no active rail service (from the Burgess Connector in Dinwiddie County, VA, southward to Norlina in Warren County, NC). Communities without active rail lines include the Dinwiddie Courthouse area, McKenney, Alberta, and La Crosse in Virginia, and Norlina in North Carolina. Although each of these towns developed along the railroad and had active rail service until the 1980s, the return of rail operations in a community could serve as a visual intrusion, albeit a short and periodic one.

After publication of the Tier II Richmond to Raleigh DEIS, design changes were made that could impact the visual environment in Sections D in Virginia and to reduce impacts to segment R. Visual impacts are summarized in Table 4-23. Potentially high levels of visual impacts were found in portions of Section I in Virginia and in portions of Sections L, M, Q, U, and V in North Carolina.

BIOLOGICAL RESOURCES

Terrestrial Communities

Terrestrial communities are groups of land plants that share a common environment and interact with each other. They are typically classified by the main tree or shrub species that can be easily identified in the field. Terrestrial communities are discussed in Section 4.10.1.1, and Appendix N.

Potential impacts (in acres) for Virginia and North Carolina were summarized into broad groups: "Mixed Forest," "Pine Forest," and "Maintained/Disturbed." Appropriate land cover types were combined to summarize the impacts in Table 4-24. Section C in Virginia has the most impacted forest acres. Section S has the most forest impacts in North Carolina. Potential habitat fragmentation may occur in Section D (VA), where the Preferred Alternative is on new location, bisecting existing forested areas. Habitat fragmentation is also a concern in portions of Sections L and M in North Carolina.

Aquatic Communities

As discussed in Section 4.10.1.2, aquatic habitat in the Study Area will be both directly and indirectly affected by the construction of the Project. Direct impacts will include the destruction of habitat by the placement and replacement of culverts at stream crossings and the clearing and filling of adjacent floodplain and wetlands. Tables 4-1 through 4-7 show impacts of the Preferred Alternative to streams and other waterbodies.

Rare and Protected Species

Biological conclusions regarding potential Project impacts for the nine Federally protected species within the Study Area described in Sections 3.10.2 and 4.10.2 and are summarized in Table 4-25. More detailed information can be found in the natural resource technical reports for the Project.

There are known populations of bald eagle (*Haliaeetus leucocephalus*) west of Petersburg, VA, and a known population of Michaux's sumac (*Rhus michauxii*) in Section D. The Preferred Alternative is anticipated to have no effect on these species, based on coordination with the U.S. Fish and Wildlife Service (USFWS).

Additional surveys for freshwater mussels [dwarf wedgemussel (*Alasmidonta heterodon*), Tar River spinymussel (*Elliptio steinstansana*), and James River spinymussel (*Pleurobema collina*)] and the Roanoke logperch (*Percina rex*) will be scheduled prior to Project construction and coordinated with USFWS.

The USFWS recently listed the Northern Long-eared Bat (*Myotis septentrionalis*) as "Threatened" and issued an interim species-specific rule under Section 4(d) of the Endangered Species Act of 1973, effective May 4, 2015. Furthermore, this species is included in USFWS's current list of protected species for the project study area. Virginia DRPT and NCDOT will continue working closely with the USFWS to determine how this listing may impact the SEHSR project. Approximately 1,575 acres of trees (see Table 4-26) and numerous structures may be impacted by project construction over the anticipated three-year phased schedule. Prior to project permitting, Virginia DRPT and NCDOT will coordinate with USFWS to determine if this project will incur potential effects to the Northern long-eared bat and how to address these potential effects, if necessary.

COMMUNITY RESOURCES

Economic Impacts

Economic consequences of the Project are summarized in Section 4.11.1.1. The proposed Project is not anticipated to cause a significant loss in property values in the Study Area. The Preferred Alternative will impact approximately 2,288 acres of potentially developable land (e.g., farm, forest, open, undeveloped), as shown on Table 4-26.

Economic Benefits

The addition of SEHSR passenger service will provide substantial transportation, environmental, and community benefits to the residents of Virginia and North Carolina, and are summarized in Section 4.11.1.2. Although the economic consequences discussed above are not quantified, the economic benefits of the Project would appear to far exceed any negative economic impacts. Cost benefit study results are presented in Table 4-27, and estimates for annual economic and fiscal impacts are shown in Tables 4-28 and 4-29.

Changes in Economic Activity

In addition to impacts from direct expenditures on system construction and operation, the proposed SEHSR system will increase the flow of travelers between cities along the route and thus enhance economic activity in those communities with station stops.

Previous studies have estimated that, by 2030, over two million riders will be utilizing North Carolina service trains each year. Most of these trips will be for personal and other discretionary travel. Based on current trends and experience along the HSR corridor between New York and Washington, DC, business travel is anticipated to be the fastest growing sector of rail travel.

Neighborhood and Community Impacts

Many types of neighborhoods and communities are found in the Study Area. Section 4.11.2 and Table 4-30 summarizes rail and road impacts and benefits of the Preferred Alternative for communities in the Study Area. For all communities in the Study Area, there is a potential for short-term benefits to the local economy during Project construction and for an increase in manufacturing jobs due to increased/improved freight access.

Negative impacts to neighborhoods and communities include relocations (see Section 4.11.6), noise and vibration effects (see Section 4.7), and community disruption. Other changes are driven by the need to improve the safety of the Study Area, including changes to the transportation network caused by improving existing rail crossings and the need for fencing, especially in urban areas. Maps for each crossing and associated roadway improvement are shown in Appendices F and R. The impacts of the proposed crossing consolidations are summarized in Table 4-31. Impacts to specific communities are summarized in Section 4.11.2.2.

Generalized Benefits for Communities without SEHSR Stops

While some communities in the Study Area are not currently identified as receiving a SEHSR stop, this does not preclude those communities from receiving a stop in the future. Also, communities without a station within their community will have the option for new or improved freight rail service, which will provide economic benefits. The Project will also allow future, conventional passenger rail service for communities without SEHSR stops.

Generalized Benefits for Communities with SEHSR Stops

For communities that have SEHSR stops, potential benefits are anticipated to center primarily in the vicinity of passenger rail stations. Benefits include potential economic development and revitalization around the stations, and creating jobs in the office, commercial, hotel, and housing management industries. It is anticipated that the Project will also increase tourism and reduce the magnitude or timing of improvements to airports or highways, as the number of viable transportation options increase.

Community Facilities and Services Impacts

There are 27 public educational facilities located within the designated communities of the Study Area, with 11 in Virginia and 16 in North Carolina. Table 4-32 provides a summary of the public educational facility impacts associated with the Preferred Alternative by section. Table 4-33 provides a summary of impacts from the Preferred Alternative to the 98 places of worship and cemeteries within the Study Area.

Closing existing at-grade railroad crossings and consolidating access across the Study Area will have some effect on police, fire, and EMS response in the communities along the Project during construction and once the corridor is in operation. Seven current facilities are close to the Study Area and would experience changes in access. In some cases, it would take longer to reach certain areas due to road closings along the corridor. However, "always open" grade-separated crossings would eliminate possible conflicts with emergency vehicles when trains pass through the corridor. Coordination with public response agencies in the Study Area will continue during construction to avoid and minimize disruptions to emergency response. In response to comments design changes were made several locations throughout the Study Area after publication of the Tier II Richmond to Raleigh DEIS. Subsequent to publication of the Tier II Richmond to Raleigh DEIS, designs changed. This resulted in a change to the service area analysis for nearby emergency response facilities at Woods Edge Road in Chesterfield County, VA and Ridgway-Warrenton Road in Warren County, NC. Section 4.11.3.3 presents a new analysis and discussion for these locations in Henderson, NC and Raleigh, NC.

Land Use Planning

Prior to publication of the Tier II Richmond to Raleigh DEIS, many planning documents for communities in the Study Area did not address the Project; however, all of the reviewed local planning documents developed by these communities after publication of the Richmond to Raleigh Tier II DEIS included the Project. The Project impacts on land use and development are generally a function of:

Existing land uses and current zoning;

- Availability of undeveloped land for new development;
- Regional and local markets;
- Proposed station locations;
- Local effect of crossing closures and redirected traffic patterns;
- Potential for existing uses to be redeveloped; and
- Local land use plans, economic development programs and land use controls such as zoning and land development ordinances.

Table 4-34 reviews SEHSR compatibility with future land use plans in VA, while Table 4-35 shows compatibility of the Project with future land use plans in North Carolina. Table 4-36

shows the compatibility of the Project with transportation plans for communities in Virginia, while Table 4-38 shows the compatibility of transportation plans in North Carolina.

VULNERABLE POPULATIONS/ENVIRONMENTAL JUSTICE

Elderly & Disabled Populations

Section 4.11.5.1 states that the Project is not anticipated to introduce any barriers to the elderly or disabled, or to have adverse impacts to either of these special populations.

Environmental Justice (EJ)

Section 4.11.5.2 of the FEIS provides a detailed discussion of this topic. The Project seeks to improve approximately 234 combined miles of road and rail main-line track in the Study Area. Approximately 57 percent of those improvements are located within EJ communities. EJ communities have the potential to receive a disproportionately high level of adverse impacts in comparison to non-EJ communities. On the other hand, EJ communities also have the potential to receive a disproportionately high level of project benefits compared to non-EJ communities.

EJ communities will be subject to a disproportionately high number of at-grade road and rail crossing closures. However, these closures are not considered severe given the maximum reroute distance of approximately one mile. In addition, closures and reroutes were discussed with community representatives to develop the most beneficial and least impactful design. Overall, EJ communities would experience disproportionately high and adverse impacts in the areas of residential relocations, the need for housing of last resort, rail operation noise impacts to Category 2 receptors (residences and buildings where people normally sleep), and rail noise vibration impacts to sensitive receptors.

Residential Relocations & Housing of Last Resort

Of the approximately 223 residential relocations resulting from the Preferred Alternative, 189 (85 percent) are within EJ communities (FEIS Table 4-41). The greatest number of residential displacements in EJ communities will occur in Richmond, VA; Ettrick, VA; and Henderson, NC. Residences located along the existing rail corridor in a developed, urban area are difficult to avoid due to rail engineering standards and constraints that limit flexibility in the proposed designs.

The only communities where housing of last resort may be needed are in EJ communities. As discussed in FEIS Section 4.11.6, housing of last resort will likely be necessary in Sections L (North Carolina -portion), M, N, and Q in Warren and Vance Counties. Where displacements are unavoidable, fair and equitable compensatory mitigation will be implemented in accordance with the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Public Law 91-646).

While residential displacements and the need for housing of last resort are disproportionately high and adverse, the surrounding EJ communities would be served by and will directly benefit from the safety improvements afforded by the Project.

Rail Operations Noise Impacts to Category 2 Receptors

Severe noise impacts to Category 2 receptors (residences and buildings where people normally sleep) would be disproportionately high and adverse in EJ communities. Of the 65 residences identified as severely impacted Category 2 receptors, 42 (65 percent) would be within EJ communities (FEIS Table 4-42). This is due in large part to the presence of properties adjacent to the existing railroad corridor. The towns of Alberta and La Crosse,

VA, and Norlina, Henderson, Middleburg, and Kittrell, NC, would receive the greatest number of predicted severe Category 2 noise impacts. In addition, all four of the Category 3 receptors (institutional land uses with primary daytime uses) impacted are located within EJ communities (Alberta, La Crosse, Middleburg, and Kittrell). During the design phase of the Project, a detailed noise assessment will be performed that considers mitigation.

Rail Noise Vibration Impacts to Sensitive Receptors

Of the receptors identified in the Study Area, single-family, multi-family, and commercial receptors would experience disproportionately high and adverse effects of rail noise vibration within EJ communities (FEIS Table 4-43). For single family residences, 135 (75 percent) of the 180 receptors are within EJ communities, with the towns of Norlina and Middleburg, NC; having the greatest number of impacts. For multi-family residences, all seven of the impacts would be within the EJ community of Ettrick, VA. For commercial receptors, 71 (66 percent) of the 108 impacted receptors would be within EJ communities, with Middleburg, NC; having the greatest number of impacts.

Vibration mitigation may be required for the areas where noise vibration impacts exist, and will be assessed during the final design phase of the Project when more detailed data are available. The building damage criteria of 0.50 inch-per-second for rail operation vibrations would not be exceeded at any building in the Study Area due to train passbys. Therefore, the Project is not expected to cause damage due to vibration to any buildings in the Study Area, regardless of EJ applicability.

Mitigation

As presented in FEIS Section 4.11.5.2.11, extensive community outreach efforts resulted in the following mitigation for community impacts, including EJ communities:

- The decision that all new, grade-separated crossings will include room for sidewalks on at least one side of the bridge to accommodate pedestrians.
- The decision to provide, non-vehicular, grade-separated crossings at heavily used pedestrian/cyclist/scooter locations, including:
  - Lincoln Street in Petersburg, VA
  - Burwell Avenue/Peachtree Street in Henderson, NC
  - Mason Street in Franklinton, NC
  - College Street in Franklinton, NC
  - Hawkins Street (Franklinton Elementary School) in Franklinton, NC.
- The two proposed HSR stations are recommended to be located within the EJ communities of La Crosse, VA; and Henderson, NC.
- The Preferred Alternative essentially remains on existing alignment through the EJ communities, thereby minimizing relocation impacts and impacts to EJ community services and facilities.
- All persons, business, and non-profit organizations displaced as a result of the Project would be compensated in a fair and equitable manner in accordance with the Uniform Relocation Assistance and Property Acquisition Policies Act of 1970, as amended, and the North Carolina Relocation Assistance Act (GS-133-5 through 133-18.

<u>Relocations</u>

Table 4-44 presents a summary of the potential residential and business relocation impacts for the Preferred Alternative by section. The highest number of residential relocations would occur in Section AA in Richmond, VA; and Section CC in Petersburg, VA, and Section P in

Henderson, NC. During final design, further measures to avoid and minimize displacements will occur; this will likely lower the numbers ultimately displaced.

Right of Way Costs

Total ROW costs include land and damages, residential and business relocation costs, and acquisition costs. Table 4-45 presents a summary of the estimated ROW costs associated with Preferred Alternative by section. The costs for the Preferred Alternative are the same as those presented in the Tier II Richmond to Raleigh DEIS, except in Sections D and V. As described in Chapter 2, the Preferred Alternatives in these two sections were developed subsequent to the Tier II Richmond to Raleigh DEIS. For Sections D and V, the ROW costs are derived from the 2012 Project Recommendation Report (NCDOT, DRPT, 2012).

ARCHAEOLOGICAL AND HISTORICAL RESOURCES

Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. 306108), and implementing regulations (see 36 CFR Part 800) require Federal agencies to consider the effects of their actions on historic properties and to afford the Advisory Council on Historic Preservation an opportunity to comment if the action would result in an adverse effect on the property listed on or eligible for the NRHP. Eligibility criteria for the NRHP are summarized in Section 3.12, and impacts are discussed in Section 4.12 and Chapter 5.

According to the criteria for Effect and Adverse Effect developed by the Advisory Council on Historic Preservation (36 CFR Section 800.5), potential effect is determined based upon the following:

- No Effect - There would be no effect, neither adverse nor beneficial, on potential cultural resources.
- No Adverse Effect - There would be an effect, but it is determined that the effect would not compromise those characteristics that qualify the property for listing on the NRHP. Archeological sites may be "adversely affected" when they are threatened with unavoidable physical destruction or damage.
- Adverse Effect - There would be an effect that would compromise the physical and/or historic integrity of the resource.

Where the Project has been determined to have an adverse effect on historic resources, Section 106 requires that efforts be undertaken to avoid, minimize, or mitigate the adverse effects. As part of this process, consultation has taken place and is ongoing with the Virginia Department of Historic Resources (VDHR), North Carolina State Historic Preservation Office (NC-HPO), Advisory Council on Historic Preservation (ACHP), and other “consulting parties,” such as the National Park Service, local historical societies, and property owners. This consultation will result in Memorandums of Agreement (MOAs) for both Virginia and North Carolina, which outline the agreed-upon measures that the Project will take to avoid, minimize, or mitigate the adverse effects. The MOA will be included in the Record of Decision (ROD) for the Project.

Determinations of effect for archaeological resources in Virginia are listed in Table 4-46. The resources are listed in the order they appear in the Study Area from north to south. There are no eligible or listed archaeological resources in North Carolina; therefore, impacts were not evaluated in North Carolina. Table 4-47 lists effect determinations for historic architectural resources in VA. Table 4-48 lists effects determinations for battlefields in Virginia. Table 4-49 lists effect determinations for historic architectural resources in North Carolina. Both Virginia and North Carolina have concurred with these effects determinations.

PARKLAND, RECREATIONAL AREAS, AND REFUGES

The Study Area includes Federal parklands, city/county parks, and local greenways; Section 4.13 details the potential effects of the Project on these resources. There are no state parks, natural area preserves, forests, wildlife refuges, or recreation areas in the Study Area.

TRANSPORTATION

The Project will become part of the larger transportation network that includes roads, transit, aviation, and other rail. Section 4.14 provides an assessment of potential impacts from the project to that transportation network. Impacts to connectivity across the railroad are evaluated in Section 4.14.2, while impacts to traffic conditions in the communities throughout the Study Area are evaluated in Section 4.14.3. Section 4.14 also summarizes impacts to existing freight and passenger rail operations, local public transit, and aviation facilities.

Roadway

Because the SEHSR is designed to be completely grade separated through the use of bridges or underpasses, it is important to assess the impact from the Preferred Alternative on connectivity (i.e., the ability to move across the Study Area). In addition to the discussion regarding major corridors in Section 4.14.1, designs for all crossings and associated roadwork are included in Appendix F. Maps displaying the proposed roadwork are included in Appendix R.

Traffic

Detailed traffic analyses were performed at locations in the Study Area based on coordination with state and local officials. These analyses were performed as needed to assist the project design team in developing transportation solutions to associated traffic concerns due the effects of rail crossing closures and consolidations on local traffic conditions. The purpose of these analyses, summarized in Section 4.14.2, was to help ensure that traffic operations with the SEHSR Project were comparable to operations without the Project. Appendix P includes figures displaying future traffic configurations (e.g., crossing closures, new bridges/underpasses, new/extended turn lanes) and predicted 2030 traffic volumes with and without the Project.

Rail

The two main Class I railroads operating in Virginia and North Carolina are CSX and NS. A large portion of the existing rail network is single track, which creates bottlenecks in high traffic areas. The Preferred Alternative provides improvements to the rail network through: provision of additional tracks, which increases capacity; through designs for straighter track, which allows increased speeds; and through use of grade-separated crossings, which improves safety. The track charts provided in the Richmond to Raleigh Tier II DEIS have been updated and can be found in Appendix E.

UTILITIES

Utility impacts for the SEHSR Preferred Alternative vary widely throughout the length of the Project. Table 4-147 summarizes the projected costs associated with impacts to utility infrastructure, by section for the Preferred Alternative.

VDOT and NCDOT estimated utility costs for the alternatives in their service areas during development of the Tier II Richmond to Raleigh DEIS. Costs for the Preferred Alternative are shown in Table 4-127 with the exception of Section V (where a new alternative, NC5, was

developed based on stakeholder input). NCDOT developed utility costs for the new portion of this alignment in 2011. For the other sections, the design changes were deemed to be insufficient to substantially change the costs estimated in the Tier II Richmond to Raleigh DEIS.

SAFETY AND SECURITY

Passenger rail has consistently been one of the safest ways to travel in the U.S. Since 1970, less than four percent of all transportation fatalities have been related to rail operations, and in most cases, train fatalities are due to collisions with vehicles, or trespassers on railroad ROW. To improve rail safety, SEHSR will grade separate crossings to greatly reduce the potential for rail collisions with vehicles. Fencing that would direct pedestrians to bridges/underpasses may be proposed for some locations in urbanized areas. The location and type of fencing will be determined during final design based on coordination between the owner of the rail corridor, the operator of the railroad, and adjacent communities.

SEHSR is proposing the safest design possible by consolidating and grade separating all railroad-roadway crossings. Included in the Project are over 80 new bridges/overpasses/underpasses that, when combined with existing bridges/overpasses and proposed roadway realignments and closures, will create a fully grade-separated system, thereby assuring the highest level of safety to both passengers and the surrounding communities.

The ability of pedestrians to move safely across the Study Area is another important safety consideration. In Virginia, one existing public pedestrian-only underpass will be retained with the Preferred Alternative (there are no existing public pedestrian-only bridges or underpasses in North Carolina). The Preferred Alternative also proposes twelve new pedestrian-only bridges/underpasses to provide increased pedestrian access in certain downtown areas

INDIRECT AND CUMULATIVE EFFECTS

Based on comments received on the Tier II Richmond to Raleigh DEIS, a new assessment of indirect and cumulative effects (ICEs) was developed for the FEIS. The National Environmental Policy Act (NEPA) requires the assessment of direct, indirect, and cumulative impacts as part of the project decision-making process. The Council for Environmental Quality (CEQ) guidelines define direct, indirect, and cumulative impacts as follows:

- Direct effects are caused by the action and occur at the same time and place.
- Indirect effects are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.
- Cumulative effects are the impact on the environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Summaries of concerns relative to the potential for indirect and cumulative effects, as further discussed in this section, are provided in Table 4-128 and Table 4-129, respectively.

ICEs for the Project will be seen at national, regional, and local levels. As one of the ten Federally-designated HSR corridors, the Project will play an important role in modernizing America's transportation system and will promote more energy efficient transport of people and goods through the country.

SEHSR would enhance the existing transportation network in the Washington, DC, to Charlotte, NC, corridor, providing many indirect benefits. It would link cities and major metropolitan areas where highway and airline travel volumes are the greatest, thereby providing a travel alternative that will help ease congestion on the existing highway and airway systems. The proposed SEHSR program would offer an alternative mode of transportation between Virginia and North Carolina.

Despite the importance of national and regional ICEs, ICEs are typically most noticeable on a local level, especially in the vicinity of the railroad stations. The SEHSR Tier I ROD states that future development will occur primarily around these stations, with commensurate levels of noise and traffic associated with the increased use of the stations, as well as with secondary commercial and residential development that may be drawn to the station areas. The chief potential negative impact would be noise and vibration caused by the reintroduction of service along the S-line in VA, where there is presently no rail service.

The project also has the potential to have local effects on natural resources. Impacts to surface waters, wetlands, aquatic and terrestrial communities, and threatened and endangered species are discussed in Sections 4.17.3.2.1 through 4.17.3.2.4, respectively. Cumulative effects from other planned actions are discussed in Section 4.17.4.

RESPONSES TO COMMENTS

A summary of comments received to the Tier II DEIS and responses are provided in Chapter 8.