RECORD OF DECISION

Southeast High Speed Rail Richmond, VA, to Raleigh, NC,
Tier II Environmental Impact Statement

This document records the decision of 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) with regard to the Tier II Environmental Impact Statement (EIS) for the proposed Southeast High Speed Rail (SEHSR) Project from Richmond, VA, to Raleigh, NC (Richmond to Raleigh Project).

FRA has prepared this Record of Decision (ROD) in accordance with the Council on Environmental Quality (CEQ) regulations implementing the National Environmental Policy Act (NEPA) (40 Code of Federal Regulations [CFR] § 1505.2) and FRA's Procedures for Considering Environmental Impacts (64 Federal Register [FR] 28545, May 26, 1999) (FRA Environmental Procedures). Specifically, this ROD:

- Provides background on the NEPA process leading to the Tier II Final Environmental Impact Statement (FEIS), including a summary of public involvement and agency coordination (Chapter 1).
- States and reaffirms the Richmond to Raleigh Project's purpose and need (Chapter 2).
- Summarizes the alternatives analysis process that led to the identification of alternatives not carried forward for study in the Tier II Draft Environmental Impact Statement (DEIS), identifies the alternatives considered in the EIS Documents, and identifies the Preferred Alternative (Chapter 3).
- Summarizes environmental benefits and adverse effects (Chapter 4 and Appendix A).
- Summarizes the comments received on the Tier II FEIS (Chapter 5 and Appendix B).
- Discusses the measures to avoid and minimize environmental harm and the requirement for a monitoring and enforcement program for all mitigation measures (Chapter 6).
- Includes the final Process Programmatic Agreement (Process PA) for the entire SEHSR Corridor from Washington, D.C., to Charlotte, NC (Chapter 7 and Appendix C) and the Virginia- and North Carolina-specific Memoranda of Agreement (MOA) describing the mitigation for adverse effects to historic resources associated with the Richmond to Raleigh Project (Chapter 7 and Appendix D), prepared in accordance with Section 106 of the National Historic Preservation Act (NHPA) of 1966.
- Includes the final Section 4(f) Evaluation for the Richmond to Raleigh Project, prepared in accordance with Section 4(f) of the Transportation Act of 1966 (Chapter 8).
- Identifies Next Steps (Chapter 9).

1. INTRODUCTION

FRA, in partnership with NCDOT and DRPT, has prepared this ROD for the proposed development of the Richmond to Raleigh Project as required by NEPA and based on the findings in the SEHSR Corridor Tier II FEIS published in September of 2015. In reaching decisions on the Preferred Alternative, FRA was assisted by the following Federal Cooperating Agencies: the Norfolk District and the Wilmington District of the U.S. Army Corps of Engineers (USACE), the U.S. Coast Guard (USCG), U.S. Environmental Protection Agency (USEPA), U.S. Fish and Wildlife Service (USFWS), and the U.S. Department of Transportation Federal Highway Administration (FHWA).

1.1 BACKGROUND OF THE NEPA PROCESS

To comply with NEPA, FRA, FHWA, DRPT, and NCDOT implemented a tiered approach to assess potential effects of the full length of the SEHSR Corridor from Washington, D.C., to Charlotte, NC. The Tier I DEIS, completed in 2001, examined the purpose and need for the SEHSR Corridor, established the modal alternative, as well as evaluated the potential impacts on both the natural and human environments at a program level of assessment for nine different Study Area Build Alternatives compared to a No Build Alternative. Public involvement was critical during this phase, with 26 public information workshops and 18 public hearings held in North Carolina and Virginia to solicit feedback about the SEHSR Corridor. FRA completed the Tier I FEIS in June 2002, with a ROD in October 2002, confirming and approving the purpose and need, preferred route, and modal choice for the SEHSR Corridor between Washington, D.C., and Charlotte, NC.

The current Richmond to Raleigh Project Tier II study builds upon the results of the SEHSR Corridor Tier I EIS. This Tier II study further evaluates the Preferred Alternative for the portion of the Tier I SEHSR Corridor between Richmond, VA, and Raleigh, NC. Separately evaluating the Richmond, VA, to Raleigh, NC, portion of the SEHSR Corridor was necessary because much of this area does not have existing passenger rail service, unlike areas south of Raleigh, NC, and north of Petersburg, VA, and, therefore, requires a different level of analysis. The complete Richmond to Raleigh Project Corridor for the Tier II Study is shown in Figure 1.

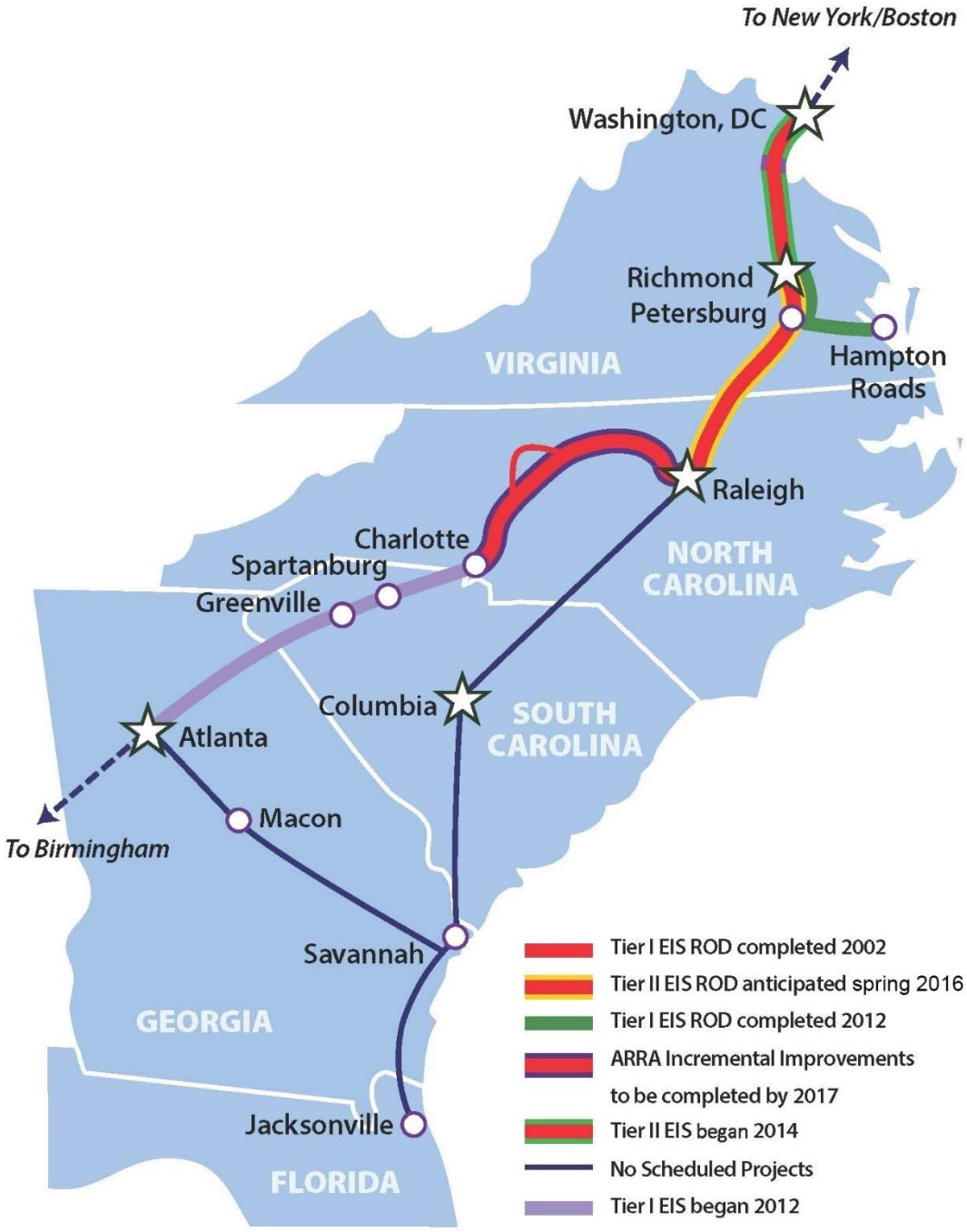
FRA began preparation of the Tier II DEIS for the portion of SEHSR Corridor between Petersburg, VA, and Raleigh, NC, in February 2003. In 2006, the northern study limit was extended to Richmond, VA (approximately 30 miles). In May 2010, FRA published the Richmond to Raleigh Project Tier II DEIS, which included detailed environmental analysis of the impacts of the various project elements, particularly detailed design, track location, and bridge and roadway work. Copies of the Tier II DEIS (May 2010) and maps are available at http://www.ncdot.gov/projects/sehsr/.

In April 2012, DRPT and NCDOT provided FRA with a Recommendation Report on the preferred rail alternatives for each of the 26 sections evaluated in the Richmond to Raleigh Project Tier II DEIS. These recommendations considered the potential impacts to the human and natural environment, costs, and operability/constructability, along with the public and agency comments received following the publication of the Tier II DEIS. Based on public and resource agency input received on the DEIS, additional rail alternatives were included in the recommendations in Brunswick County, VA, and in Raleigh, NC. The recommendations in the report addressed only the selection of preferred rail alignments (i.e., it did not address associated roadway changes, as those are independent of the selection of rail alternative) and require additional design and engineering. In May 2012, FRA accepted the Recommendation Report (April 2012), and authorized DRPT and NCDOT to proceed with preparation of the Tier II FEIS based on the preferred rail alignments presented in the report.

In September 2015, FRA published the SEHSR Richmond to Raleigh Project Tier II FEIS, which provided updated information on impacts associated with the Preferred Alternative, including proposed roadwork. Copies of the FEIS (September 2015) and maps were made available at http://www.ncdot.gov/projects/sehsr/.

The Tier II DEIS and FEIS documents include an analysis and presentation of the benefits and impacts related to the physical route and operating conditions for the Richmond to Raleigh Project as an independent component of the larger SEHSR Corridor.

Figure 1
Southeast High Speed Rail Corridor



1.2 SUMMARY OF PUBLIC INVOLVEMENT AND AGENCY COORDINATION

FRA issued a Notice of Intent (NOI) for filing a Tier II DEIS for the portion of the Tier I SEHSR Corridor between Richmond, VA, and Raleigh, NC, on May 22, 2003 (68 FR 28044). On February 3,

2006, FRA issued an NOI for extending the northern terminus of the study from Collier Rail Yard in Petersburg, VA, to Main Street Station in Richmond, VA (71 FR 5903).

On June 7, 2010, FRA issued a Notice of Availability (NOA) for the Tier II DEIS and public hearings for the Richmond to Raleigh Project (75 FR 32240). In this notice, FRA established a comment period from May 28, 2010, through August 30, 2010, and invited all interested agencies and the public to comment on the Tier II DEIS. The NOA provided information on the dates and locations for the public hearings, information on availability of the Tier II DEIS for review, whom to contact with questions, and how to provide comments.

In response to a high degree of interest in the Richmond to Raleigh Project, as exhibited by robust attendance at the public hearings and a large number of comments submitted early in the comment period, FRA, NCDOT, and DRPT decided to extend the Tier II DEIS comment period for an additional 10 days. On August 19, 2010, FRA issued a notice of extension of comment period for the Tier II DEIS for the Richmond to Raleigh Project (75 FR 51331). This notice extended the comment period to September 10, 2010.

The public was invited to attend five post-DEIS project update meetings held July 14, 2011 (Alberta, VA), September 27, 2011 (Raleigh, NC), May 15, 2012 (Raleigh, NC), September 11, 2012 (Henderson, NC), and February 26, 2013 (Chesterfield County, VA), to present revised road work and new rail alternatives that were developed in response to comments received on the Tier II DEIS. The revised road work included modifications to grade separations at multiple locations along the corridor, and the new rail alternatives were located in Brunswick County, VA, and Raleigh, NC.

On September 18, 2015, FRA published a NOA in the Federal Register for the Tier II FEIS (80 FR 56466) (see Appendix B). The document was made available on the FRA website (https://www.fra.dot.gov/Page/P0482), offered on the SEHSR website (http://www.ncdot.gov/projects/sehsr/), and was provided to 18 local governments and organizations in Virginia, as well as 15 local governments and organizations in North Carolina. The document was also made available at 13 local viewing locations (9 in Virginia and 4 in North Carolina). Comments on the Tier II FEIS received through December 18, 2015 are addressed in this ROD.

1.3 SECTION 106 COORDINATION

Throughout the EIS process, the project team coordinated with numerous individual property owners and officials with jurisdiction over resources protected under Section 106 of the NHPA. This coordination is documented in Chapter 7 of the Tier II DEIS and FEIS. On November 1, 2015, prior to finalizing the MOA addressing adverse effects to Section 106 resources in the Tier II Richmond to Raleigh Project Study Area, the Catawba Indian Nation agreed to participate as a consulting party (see Appendix B).

2. PURPOSE AND NEED

The Tier I EIS and ROD for the SEHSR Corridor between Washington, DC, and Charlotte, NC, established the overall purpose and need for the Richmond to Raleigh Project.

The purpose of the Richmond to Raleigh Project proposed action is to:

- Divert trips from air and highways
- Provide a more balanced use of transportation infrastructure
- Increase the safety and effectiveness of the transportation system in the Study Area
- Serve long-distance business and leisure travelers between Virginia and North Carolina, as well as those accessing (and connecting to) Amtrak's Northeast Corridor (NEC), which extends from

Washington, DC, to New York, NY, and Boston, MA, and allow patrons in the NEC area to reach destinations to the south.

The approved need was refined in the Richmond to Raleigh Project Tier II DEIS and includes the following:

- Population growth in Virginia and North Carolina
- Congestion of both roadways and airports
- Lack of a passenger rail option with travel times that are competitive 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.

3. ALTERNATIVES CONSIDERED

3.1 PROJECT STUDY AREA

The Richmond to Raleigh Project's "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 to this Study Area were made as needed to accommodate design changes/additions developed along the 162-mile corridor in response to comments on the Richmond to Raleigh Project Tier II DEIS and FEIS.

Three alternative railroad alignments were developed initially within each of the 26 sections of the Richmond to Raleigh Project (described below and shown in Figure 2). As presented in the Richmond to Raleigh Project Tier II DEIS, the alternatives were named VA1, VA2, and VA3 in Virginia, and NC1, NC2, and NC3 in North Carolina. To minimize impacts, the alternatives are located within as much of the existing railroad right of way (ROW) as possible throughout much of the Study Area; in many locations, the alternatives are on common (concurrent) alignment. The Study Area includes necessary roadway modifications to enable roadway work to insure safe crossings and accommodate new railroad alignments.

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.

In response to comments on the Richmond to Raleigh Project Tier II DEIS, an additional railroad alternative was developed for evaluation in three sections of the Richmond to Raleigh Project: Alternative VA4 was developed for Sections D and G in Brunswick County, VA; and Alternative NC5 was developed for Section V in Raleigh, NC (various concepts for Section V, generally called "NC4" had previously been proposed by stakeholders). These alternatives were evaluated in the Richmond to Raleigh Project Tier II FEIS.

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 through Petersburg, VA, crossing the Appomattox River, and continues 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 CSX S-line through Warren County to just south of the Town of Norlina, NC (where active CSX freight railroading resumes). The Study Area follows the CSX 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 joint CSX/NS corridor south for two blocks to the Boylan Wye, the southern terminus of the Richmond to Raleigh Project.

Subsequent to the completion of environmental studies for the Tier II FEIS, changes to the proposed roadway design were made in Richmond, VA, at Maury Street to minimize impacts to the Manchester Industrial Warehouse Historic District. These changes expanded the Study Area slightly to both the east and west of Maury Street. FRA does not anticipate that these changes will increase impacts to the human or natural environment; however, additional evaluations will be conducted by DRPT and NCDOT prior to project permitting.

The Tier II FEIS modeled five municipal locations for SEHSR stations in the Richmond to Raleigh Project service area: Richmond, VA[1]; Petersburg, VA[2]; and Raleigh, NC[3], 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 is assumed to stop in La Crosse, VA, and one in Henderson, NC.

The Richmond to Raleigh Project EIS did not evaluate impacts related to the development of specific stations. 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.

3.2 ALTERNATIVES NOT CARRIED FORWARD

Three alternative alignments were considered, but subsequently excluded from detailed study during development of the Tier II DEIS. These alternatives are shown in Figure 2.

3.2.1 ABANDONED S-LINE, FROM NEAR CENTRALIA TO LYNCH

The abandoned Seaboard Air Line Railway S-Line (S-Line) from Centralia, VA, to Lynch, VA (mileposts [MP] S-12.3 through S-20), was considered as a possible alternative to the A-Line in early feasibility studies. This alternative alignment was rejected due to the fact that the railroad ROW was no longer intact and extensive development had taken place within the old ROW, including Chester Linear Park. In addition, there was strong opposition to this alignment from the Chesterfield County government. On October 21, 2001, the Chesterfield County Board of Commissioners passed a resolution in support of

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1. The northern terminus of the Richmond to Raleigh Project is Richmond Main Street Station. FRA and DRPT are currently preparing a Tier II EIS for the continuation of SEHSR corridor service through Richmond to Washington, D.C.

2. Passenger service in Petersburg, VA, is currently located at the Amtrak Station in the Town of Ettrick, Chesterfield County, VA. FRA, in partnership with FHWA, Federal Transit Administration (FTA) and DRPT, is currently preparing an Environmental Assessment (EA) to select the permanent location for a Tri-Cities Area Multimodal Station that will serve Petersburg, Ettrick, and Colonial Heights.

3. FRA, in partnership with NCDOT and the City of Raleigh, completed an EA with a Finding of No Significant Impact (FONSI) for a new Raleigh Union Station in June 2014. Raleigh Union Station is located at the Boylan Wye at the southern terminus of the Richmond to Raleigh Project.

SEHSR with a condition that the abandoned S-Line "not be used to provide service due to the impacts on adjoining neighborhoods, an existing park facility, and future highway construction." Therefore, based on relocation impacts, impacts to a public park, and lack of compatibility with county plans, the alternative was eliminated from further consideration.

3.2.2 S-LINE, FROM APPOMATTOX RIVER TO BURGESS

In Petersburg, VA, the former S-line south of the Appomattox River to Burgess (MP S-24 to S-30) was considered as a possible rail alignment. Use of the former S-Line in this location would affect the operation of the Chaparral Steel processing plant in Dinwiddie County, VA. Just south of Chaparral Steel, the S-line alignment runs through the Petersburg Breakthrough Battlefield Historic District at Pamplin Historic Park, which is listed on the National Register of Historic Places (NRHP) and is both a Virginia Historic Landmark and a National Historic Landmark.

The National Historic Landmark status is the nation's highest designation of historic significance and, thus, has the highest level of protection. Section 110(f) of the National Historic Preservation Act of 1966 requires that Federal agencies, to the maximum extent possible, undertake such planning and actions as may be necessary to minimize harm to any National Historic Landmark that may be directly and adversely affected by an undertaking. National Historic Landmarks, along with other historic resources listed on or eligible for the NRHP, are also protected under Section 4(f) of the Department of Transportation Act of 1966, which states that such lands can only be used for a Federally funded transportation project if there is no other feasible and prudent alternative.

The Virginia Department of Historic Resources (VDHR), in a letter dated March 20, 2007, stated that the S-line south of the Appomattox River to Burgess alternative would:

> "Most probably have an adverse effect on The Breakthrough Battlefield, a National Historic Landmark. The introduction of high speed railroad traffic ….will dramatically alter the resource's setting and character. Additionally, safety concerns resulting from the active rail line will preclude plans by the National Park Service and Pamplin Historic Park to jointly interpret their respective portions of the battlefield."

In a joint letter dated June 23, 2006, the National Park Service Petersburg National Battlefield, Pamplin Historical Park, Civil War Preservation Trust, Chaparral Steel, and Dinwiddie County all recommended that the SEHSR should not be built using the former S-Line ROW. Based on the above information, the alternative using the former S-Line from south of Ettrick Station (MP S-24) to Burgess (MP S-30) was eliminated from further consideration.

Figure 2

Richmond to Raleigh Project Sections

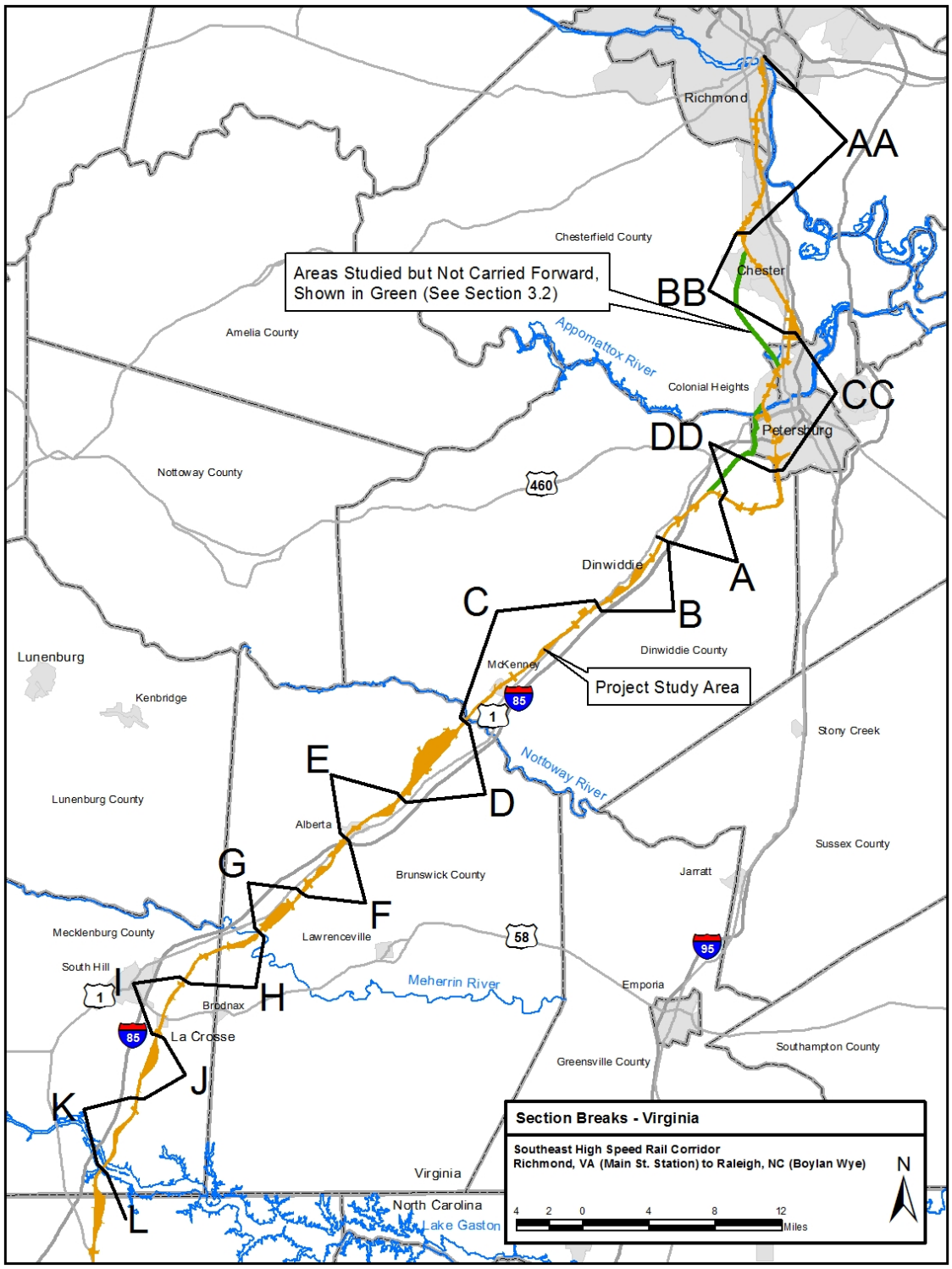

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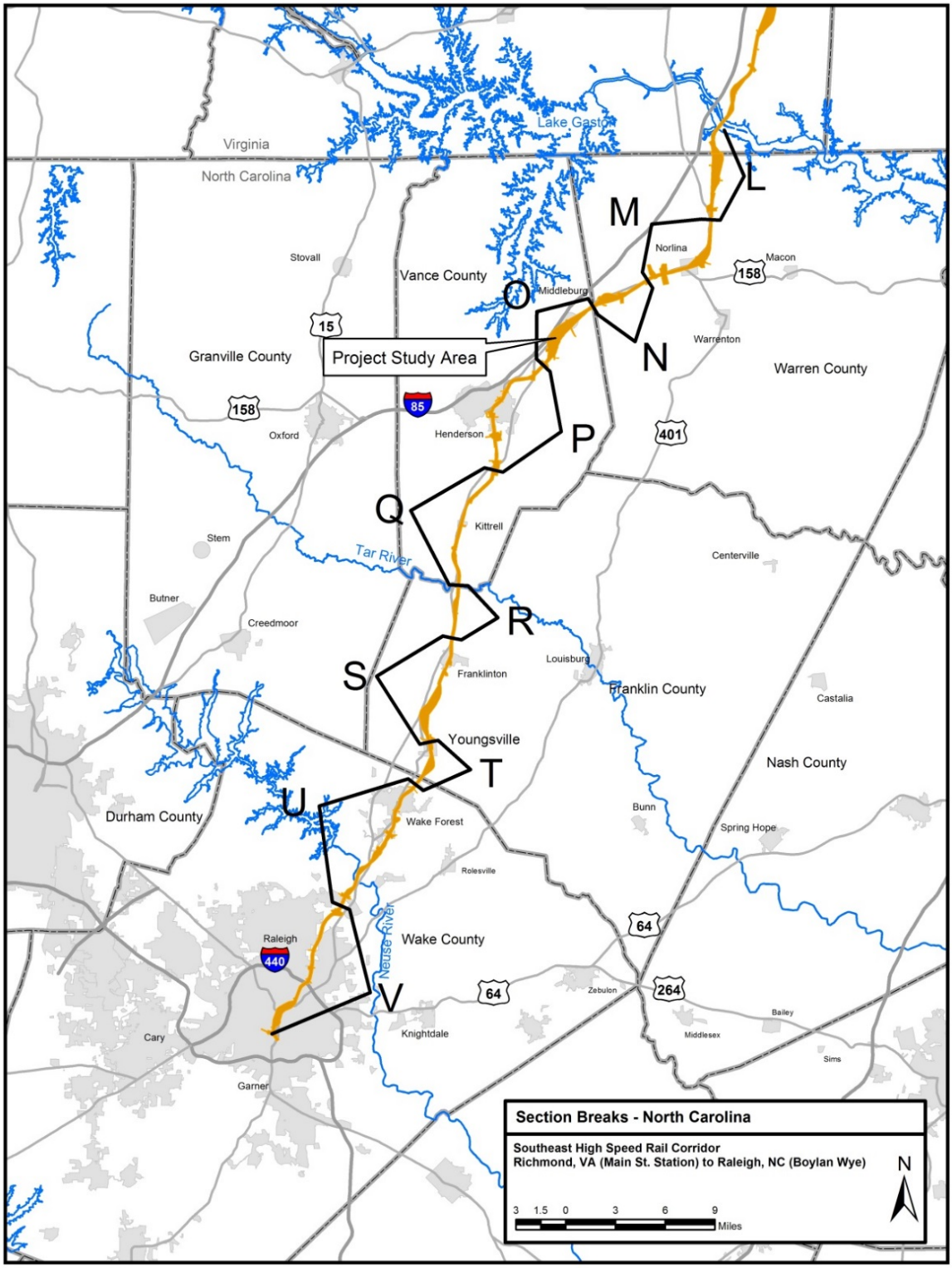
Figure 2 continued



3.2.3 ALTERNATIVES SERVING OLD UNION STATION IN PETERSBURG

Early planning efforts by FRA developed rail alignments that would serve old Union Station in downtown Petersburg, VA. The routing used the former CSX AAP-line (Appomattox Lead) from Dunlop, VA, through Colonial Heights, VA, into Petersburg, VA. Two versions of the concept were developed; both crossed the Appomattox River near old Union Station on the east side of Petersburg, then paralleled the Appomattox River to the west and rejoined the CSX A-line near Washington Street in Petersburg, VA. The alignments varied on the south side of the Appomattox River. One used the NS N-line ROW until curving south on a bridge to re-connect with the CSX A-line. The other followed the NS N-line ROW until reaching the inactive CSX S-line, where it crossed over the NS N-line on a bridge to follow the CSX S-line ROW (past old Commerce Street Station) and re-connect with the CSX A-line.

Design efforts, environmental evaluation, and public involvement identified the following issues associated with the alignments serving old Union Station:

- Conformity with local plans/local support
- Cultural resource conflicts (Battersea Plantation, North Battersea/Prides' Field Historic District, and Petersburg Old Town Historic District)
- Residential and business relocations
- Increase in SESHR travel time
- Engineering feasibility issues and cost.

As a result of these issues, the alternatives serving old Union Station in Petersburg, VA, were eliminated from further consideration. For more details on the evaluation and exclusion of this route, see Appendix G of the Tier II DEIS.

3.3 ALTERNATIVES ANALYSIS PROCESS

Following the May 2010 publication of the Richmond to Raleigh Project 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. All comments were read and coded by topic(s) as well as Richmond to Raleigh Project sections (where identified) to enable sorting. A series of eight internal decision meetings were held by the Richmond to Raleigh Project team (comprised of representatives of DRPT and NCDOT) to discuss comments received by section.

At the decision meetings, the Richmond to Raleigh Project team evaluated and compared impacts to the natural and human environment and assessed information on speed, cost, and constructability for each alternative.

The limiting speed was a critical factor in the review of preferred alternatives. Limiting speed is a subset of design speed. It is the maximum train speed through the most restrictive curve within a section of the Richmond to Raleigh Project corridor based on current design assumptions. In the absence of average running speed, limiting speed is the most useful measure of how well an alternative met the need of a proposed project to reduce travel time and improve fuel efficiency.

All comments on the Richmond to Raleigh Project Tier II DEIS pertaining to a section were reviewed and discussed by the Richmond to Raleigh Project team, and preferences for alternatives were tallied. The Richmond to Raleigh Project team based their recommendations for the preferred railroad alternative (section by section) on all relevant information. In some sections, additional coordination, analysis, or design work was undertaken prior to the Richmond to Raleigh Project team making a final recommendation.

The Preferred Alternative for each section is shown in Table 1 and discussed below. Full details of alternative alignments carried forward in the Tier II DEIS, but not selected as the Preferred Alternative, are included in the Impact Matrix (Appendix A).

Table 1 Preferred Alternative by Section				
Section	**Appendix R FEIS Map Sheet Nos.**	**From**	**To**	**Preferred Alternative**
AA	001-010	Main Street Station Richmond, VA	Centralia, VA	**VA1**
BB	010-016	Centralia, VA	North of Dunlop, VA	**VA1**
CC	017-028	North of Dunlop, VA	Collier Yard Petersburg, VA	**VA1**
DD	028-033	Collier Yard Petersburg, VA	North of Burgess, VA	**VA3**
A	034-038	North of Burgess, VA	North of Dinwiddie, VA	**VA2**
B	038-043	North of Dinwiddie, VA	South of Dinwiddie, VA	**VA1**
C	044-053	South of Dinwiddie, VA	South of Nottaway River	**VA1**
D	053-062	South of Nottaway River	North of Alberta, VA	**VA4**
E	063-066	North of Alberta, VA	South of Alberta, VA	**VA1**
F	067-070	South of Alberta, VA	South of Tower Road Brunswick County, VA	**VA1**
G	071-074	South of Tower Road Brunswick County, VA	Meherrin River	**VA3**
H	075-080	Meherrin River	North of Wray Road Mecklenburg County, VA	**VA1**
I	080-083	North of Wray Road, Mecklenburg County, VA	South of La Crosse, VA	**VA1**
J	084-087	South of La Crosse, VA	North of Bracey, VA	**VA2**
K	087-091	North of Bracey, VA	Roanoke River	**VA1**
L	091-095	Roanoke River	North of Norlina, NC	**VA1/NC1**
M	096-102	North of Norlina, NC	Southwest of Norlina, NC	**NC1**
N	103-106	Southwest of Norlina, NC	North of Middleburg, NC	**NC1**
O	107-111	North of Middleburg, NC	North of Henderson, NC	**NC3**
P	111-118	North of Henderson, NC	North of Kittrell, NC	**NC1**
Q	118-124	North of Kittrell, NC	Tar River	**NC1**
R	124-126	Tar River	North of Franklinton, NC	**NC1**
S	126-132	North of Franklinton, NC	North of Youngsville, NC	**NC1**
T	132-134	North of Youngsville, NC	North of Wake Forest, NC	**NC1**
U	135-142	North of Wake Forest, NC	North Raleigh, NC	**NC1**
V	142-151	North Raleigh, NC	Boylan Wye, Raleigh, NC	**NC5**

3.3.1 ALTERNATIVE DECISIONS IN VIRGINIA

Please refer to Appendix A for details on all of the alternatives studied in detail for each section.

Sections AA, BB and **CC** extend for 27.13 miles from MP A-0 at Main Street Station in Richmond, VA, along the active CSX S-Line and A-Line to MP A-27.5 at CSX's Collier Yard in Petersburg, VA. The Preferred Alternative for these sections is VA1, as it was the only feasible alternative (utilizing the existing rail alignment) for these sections through the Study Area due to dense development in the area, as well as operational concerns.

Section DD extends for 5.66 miles from MP A-27.5 at CSX's Collier Yard in Petersburg, VA, along the inactive Burgess Connector to MP S-29. The Preferred Alternative for this section is VA3. It has fewer stream impacts than Alternative VA2 (and the same as Alternative VA1); the lowest cost; no relocations; and a positive rating for operability and constructability. Alternative VA3 does have slightly greater wetland impacts (less than a quarter acre more), but those impacts will be fully mitigated. No public comments expressed a preference for alternatives in this section. In addition, ROW required for Alternative VA3 can be landscaped to blend into the surrounding "viewshed" and minimize visual impacts to the Petersburg National Battlefield.

Section A extends for 4.95 miles from MP S-29 on the Burgess Connector and along the inactive CSX S-Line to MP S-34 north of Dinwiddie, VA. The Preferred Alternative for this section is VA2. This alternative has the fewest wetland and stream impacts; similar impacts to historic resources compared to Alternatives VA1/VA3; a better operability rating; and accommodates higher speeds.

Section B extends for 5.71 miles from MP S-34 along the inactive CSX S-Line to MP S-40 through Dinwiddie, VA. The Preferred Alternative for this section is VA1. Alternative VA1 has fewer stream and wetland impacts than Alternative VA3. Alternative VA1 has greater impacts to water resources, forested uplands, and prime and other important farmland; two more residential relocations; and a larger total cost compared to Alternative VA2. However, Alternative VA2 has a much lower limiting speed (which does not support the purpose and need for the project) and a negative rating for operability and constructability. In addition, Alternative VA2 has five more potential noise and vibration impacts (compared to Alternative VA1) and one business relocation (whereas Alternative VA1 has none).

Section C extends for 10.75 miles from MP S-40 along the inactive CSX S-Line to MP S-51 south of Dinwiddie, VA. The Preferred Alternative for this section is VA1, as all alternatives are on common alignment.

Section D extends for 6.17 miles from MP S-51 along the inactive CSX S-Line to MP S-57.5 south of the Nottaway River. The Preferred Alternative for this section is VA4, which was developed after the public comment period for the Tier II DEIS through coordination with USACE, USFWS, VDHR, and the Virginia Department of Environmental Quality (VDEQ). The section-specific design objectives for Alternative VA4 in this section were to reduce impacts to wetlands (compared to Alternative VA2), while avoiding a Section 4(f) use of the NRHP-eligible Wynnhurst property, avoiding impacts to a population of a Federally endangered species (Michaux's sumac), and maintaining a limiting speed of 110 mph.

Section E extends for 4.21 miles from MP S-57.5 along the inactive CSX S-Line to MP S-62 through Alberta, VA. The Preferred Alternative for this section is VA1, which has fewer wetland and stream impacts, residential relocations, and vibration impacts, as well as lower estimated construction costs than alternatives V2 and V3.

Section F extends for 4.28 miles from MP S-62 along the inactive CSX S-Line to MP S-66.5 south of Alberta, VA. The Preferred Alternative for this section is VA1, as all alternatives were on common alignment.

Section G extends for 3.55 miles from MP S-66.5 along the inactive CSX S-Line to MP S-70 in Brunswick County, VA. The Preferred Alternative for this section is VA3, based on the results of a "Least

Overall Harm" Analysis under Section 4(f) of the Transportation Act of 1966. This alternative minimizes stream impacts while providing opportunities to mitigate impacts to the NRHP-eligible Tourist Guest House property and avoiding impacts to other historic resources. Three other alternatives were considered (VA1/VA2 and VA4); however, those alternatives presented greater environmental and historic impacts.

Section H extends for 5.53 miles from MP S-70 along the inactive CSX S-Line to MP S-76 in Brunswick and Mecklenburg County, VA. The Preferred Alternative for this section is VA1, which has fewer impacts to streams, prime and important farmland, and forested uplands, along with fewer noise and vibration impacts. Although the alternative has somewhat higher total cost than Alternative VA2, the long-term maintenance cost is anticipated to be lower.

Section I extends for 3.78 miles from MP S-76 along the inactive CSX S-Line to MP S-80 through La Crosse, VA. The Preferred Alternative for this section is VA1, which has fewer impacts to prime and important farmland and forested acres, as well as lower cost than Alternative VA2.

Section J extends for 4.10 miles from MP S-80 along the inactive CSX S-Line to MP S-84 south of La Crosse, VA. The Preferred Alternative for this section is VA2. Alternative VA2 is the Section 4(f) avoidance alternative (i.e., it avoids impacts to historic resources protected under Section 4(f) of the Transportation Act of 1966) in this section and minimizes impacts to streams, prime and important farmlands, and forested uplands.

Section K extends for 4.96 miles from MP S-84 along the inactive CSX S-Line to MP S-89 through Bracey, VA. The Preferred Alternative for this section is VA1. This alternative is the Section 4(f) avoidance alternative in this section and minimizes impacts to streams, wetlands, and prime and important farmlands.

As shown in Figure 2, **Section L** is located in both Virginia and North Carolina. **Section L** extends for 5.75 miles from MP S-89 in Virginia along the inactive CSX S-Line to MP S-95 in North Carolina. The Preferred Alternative for the Virginia portion of **Section L** is VA1/NC1. This alternative is the Section 4(f) avoidance alternative in Section L. The alternative has greater stream and wetland impacts compared to VA2/NC2, but fewer impacts to prime and important farmlands, fewer residential relocations, fewer noise and vibration impacts, and a lower total cost. In addition, it has a neutral constructability and operability rating (compared to a negative rating for Alternative VA2/NC2) and has greater support from the public.

3.3.2 ALTERNATIVE DECISIONS IN NORTH CAROLINA

Reflecting the statement above, the Preferred Alternative for the North Carolina portion of **Section L** is VA1/NC1.

Section M extends for 6.14 miles from MP S-95 along the partially active CSX S-Line to MP S-101 through Norlina, NC. The Preferred Alternative for this section is NC1. This alternative minimizes stream impacts and has fewer impacts to forested uplands compared to Alternative NC2. Alternative NC1 avoids impacts to a repeater tower (for relaying radio dispatch signals) that is a contributing element to the Raleigh and Gaston Railroad Corridor (an NRHP-eligible historic resource), whereas Alternative NC2 would require its relocation. In addition, the limiting speed for Alternative NC1 (110 mph) is 30 mph faster than that of Alternative NC2 (thereby supporting the purpose and need for the project).

Section N extends for 3.71 miles from MP S-101 along the active CSX S-Line to MP S-105 through Manson, NC. The Preferred Alternative for this section is NC1. This alternative minimizes impacts to streams, prime and important farmlands, and forested uplands compared to Alternative NC2. Alternative NC1 also has fewer residential relocations, fewer potentially impacted noise receptors, and a positive operability and constructability rating.

Section O extends for 4.70 miles from MP S-105 along the active CSX S-Line to MP S-110 through Middleburg, NC. The Preferred Alternative for this section is NC3. This alternative is the Section 4(f) avoidance alternative in Section O; minimizes wetland, noise, and vibration impacts; and has the fewest residential relocations. It does have greater stream and riparian buffer impacts; but, those impacts will be fully mitigated. Coordination with USACE will take place during final design. Alternative NC3 also has greater public support.

Section P extends for 7.99 miles from MP S-110 along the active CSX S-Line to MP S-118 through Henderson, NC. The Preferred Alternative for this section is NC1, as all Alternatives are on common alignment.

Section Q extends for 7.70 miles from MP S-118 along the active CSX S-Line to MP S-125.75 through Kittrell, NC. The Preferred Alternative for this section is NC1. This alternative has slightly greater impacts to prime and important farmland and forested uplands and three more residential relocations compared to Alternative NC2; but otherwise, the impacts are comparable between alternatives. Based on the lower limiting speed and negative rating for operability and constructability for Alternative NC2, Alternative NC1 is the preferred alternative.

Section R extends for 3.21 miles from MP S-125.75 along the active CSX S-Line to MP S-129 north of Franklinton, NC. The Preferred Alternative for this section is NC1. This alternative has a more favorable operability and constructability rating, coupled with a similar degree of impacts to the human and natural environment compared to Alternative NC2. Alternative NC1 would impact 500 fewer feet of streams than Alternative NC2, but would impact more forested uplands and prime and important farmland.

Section S extends for 6.88 miles from MP S-129 along the active CSX S-Line to MP S-136 through Franklinton, NC. The Preferred Alternative for this section is NC1. This alternative has strong public support (267 comments supported Alternative NC1, while 3 supported Alternative NC2) and fewer stream impacts.

Section T extends for 2.83 miles from MP S-136 along the active CSX S-Line to MP S-139 through Youngsville, NC. The Preferred Alternative for this section is NC1. This alternative has slightly more impacts to streams, riparian buffers, wetlands, farmland, and forested uplands than Alternative NC2. However, Alternative NC2 has a lower limiting speed and a negative rating for operability and constructability.

Section U extends for 8.88 miles from MP S-139 along the active CSX S-Line to MP S-148 through Wake Forest, NC. The Preferred Alternative for this section is NC1. This alternative was selected primarily to balance impacts to The Factory (a local baseball/softball complex) and Thales Academy (a private school). While each alternative has some impact on The Factory, Alternative NC1 would be least harmful to its operation. Although The Factory is a private facility, its construction costs were defrayed by a grant from Wake County, NC, in recognition of the financial contributions of visitors attending annual tournaments. The facility is required to host baseball and softball tournaments throughout each year as a condition of the grant. It is assumed the Thales Academy would be able to relocate within the community; no comments were received from the Town of Wake Forest, the school, or the public requesting that the Richmond to Raleigh Project avoid impacts to the school. Additionally, Alternative NC1 would avoid impacts to a large planned apartment complex located along Rogers Road.

Section V extends for 9.92 miles from MP S-148 along the active CSX S-Line and Norfolk Southern "NS" Line to MP S-157.5 at Boylan Junction in Raleigh, NC. The Preferred Alternative for this section is NC5, which was developed based on comments received on the Tier II DEIS. NCDOT received 320 comments from the public expressing preference for an alternative in Section V: 188 for Alternative NC1; 57 for Alternative NC2; and 75 for Alternative NC3. Additionally, an iterative series of alternative design proposals (dubbed "NC4" and "hybrid") were submitted by citizens during the public comment period. Based on concerns expressed by the public, community organizations, and Norfolk Southern about the

potential impacts of Alternative NC3, the Raleigh City Council held a public hearing on September 1, 2010, to receive additional input. The hearing was attended by more than 200 people. Afterward, the City Council requested that NCDOT analyze the possibility of developing a "hybrid" approach through downtown Raleigh.

In response to these requests, Alternative NC5 was developed and is the Preferred Alternative for Section V. The alternative was endorsed by the Raleigh City Council on October 4, 2011, and minimizes impacts to neighborhoods, freight operations, and historic resources. NC5 has the least impacts to streams, no residential relocations, fewer business relocations compared to NC3 (but greater than NC1 and NC2), and only one severely impacted noise receptor (compared to 40 for the other alternatives). Additionally, apart from the impact to the historic Raleigh and Gaston Railroad Corridor that is common among all alternatives, Alternative NC5 has no additional impacts to historic resources.

4. SUMMARY OF ENVIRONMENTAL BENEFITS AND ADVERSE EFFECTS

4.1 ADVERSE EFFECTS

Although the selection of the Preferred Alternative in each section of the Richmond to Raleigh Project was largely driven by the goal of minimizing adverse effects to the human and natural environment, construction of the Richmond to Raleigh Project over 162 miles of railroad ROW will have adverse effects. As stated in Section 4.11.1 of the Richmond to Raleigh Project Tier II FEIS, the Preferred Alternative will impact approximately 2,288 acres of potentially developable land (currently farm, forest, open, or undeveloped). This land will be indefinitely lost from existing and future agricultural uses as well as future development. In addition, FRA anticipates that this land will be removed from the tax rolls, and as such will have a fiscal impact on both states.

The Richmond to Raleigh Project will have impacts to streams and wetlands, prime and important farmlands, forested acreage, communities, residences, and businesses. A summary of impacts for each section is provided in Table 2 and a detailed impact matrix is included as Appendix A. This information, previously included in the Executive Summary of the Richmond to Raleigh Project Tier II FEIS, presents a conservative assessment of the adverse effects (erring toward overstating rather than understating impacts) of the Richmond to Raleigh Project. Where impacts were calculated based on aerial photography, final designs will be based on physical surveys and will be more precise. During final design development and permitting, additional efforts will be made to minimize impacts on a more site-specific basis.

Table 2
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

Table 2
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)
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 of the Tier II FEIS and further summarized in Appendix A of this document. “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).

4.2 BENEFITS

4.2.1 PROVIDING TRANSPORTATION OPTIONS

Demand modeling of potential passenger ridership and revenue generated from the high speed operations determined that increasing speeds to 100 mph (even along a non-electrified corridor) and adding frequencies (i.e., additional trips per day) would increase ridership by over 300% and revenues by more than 600% (with enhanced fares) over current levels.

A summary of the 2013 Ridership/Revenue Study update is provided in Section 1.5 of the Tier II FEIS. As shown in Table 3, in Virginia and North Carolina, a full-build of the Richmond to Raleigh Project would increase passenger train ridership by over 1 million additional people than are anticipated under the No-Build Scenario. (Note that the full-build scenario is a combination of the proposed service associated with the implementation of the Richmond to Raleigh Project along with the baseline conventional service that is anticipated regardless of the Richmond to Raleigh Project. This scenario supplements the baseline

North Carolina trains with new SEHSR Corridor trains.) Although the presence of SEHSR might encourage some people to take the train that would not have otherwise traveled (induced travel), the majority of riders are anticipated to divert to the train as opposed to other modes (air or automobile, for example). This diverted traffic will lessen travel demands for those modes of transportation, potentially mitigating projected increases in their use.

Table 3
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			
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, with1 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, with 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. Activity from NEC through NC only; includes connecting buses.

[3.] Full Build scenarios include SEHSR Corridor service for 8 round trips Raleigh to Charlotte, with 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 CSX A-Line. Note that additional service associated with the Richmond-Hampton Roads project was modeled separately.

4.2.2 SAFETY

The proposed improvements to existing at-grade crossings included in the Richmond to Raleigh Project are in response to documented needs for increased safety. Safety improvements are currently underway on active rail lines in North Carolina and Virginia to consolidate and close crossings, where possible, and grade-separate (i.e., replace with bridges or underpasses) those that remain to separate vehicular and

pedestrian traffic from rail traffic. The effects of these at-grade crossing closures are enhanced rail, road traveler, and community safety, as well as a more efficient overall transportation network.

One of the benefits of the Richmond to Raleigh Project is the opportunity to consolidate unsafe and redundant at-grade rail crossings along the corridor into safer, grade-separated crossings that do not adversely affect the surrounding communities. Increased train speeds and frequencies along the Richmond to Raleigh Project corridor will require an increased degree of protection at crossings. The safest such measure is the closure and consolidation of at-grade crossings in proximity to each other, rerouting traffic to new or existing bridges or underpasses. In addition, crossing closures can save money by eliminating installation and maintenance costs associated with warning devices, crossing surfaces, and foliage removal to improve sight distance. Consolidating crossings also improve a community's quality of life by eliminating noise from train horns sounded at crossings. An additional benefit is that grade separations are an “always open” crossing of the rail line for the community. This is especially important for emergency vehicle operations.

4.2.3 ECONOMIC BENEFITS

As stated in the Tier II FEIS, construction of the Richmond to Raleigh Project is estimated to create 23,952 temporary full-time jobs for individuals to upgrade the railroad road bed, install signal and safety devices, build frontage/service roads, improve grade-separated crossings, and build bridges to replace at-grade crossings (KPMG, 1995). Additional jobs, possibly within the Study Area, would be created within the manufacturing sector to produce the equipment and materials needed to make these improvements. The additional jobs would increase income, generate tax revenue, and benefit the regional economy.

During construction, the economic impact would depend on the location of the firms supplying labor and materials. It is estimated that a high percentage of the new employment during the construction phase would come from within the SEHSR Corridor. Communities along the SEHSR Corridor will also benefit as construction crews spend money in local hotels, restaurants, and shops.

The impact from operation expenditures would likely be more concentrated; the majority of new jobs would likely be created in communities served by the proposed service. Ticket agents and other railroad personnel are likely to be located in these communities and the secondary impacts of their employment would be spread throughout the areas in which stations are located. Once high speed rail service is in place there would be additional needs such as maintaining the equipment and the track.

However, it is feasible that once the system is up and running, railroad personnel could live anywhere along the corridor and use the system to get to their work location. In addition, the installation of high speed-compatible track will enable even communities without stations to benefit from potential freight enhancements, which would be an added industrial incentive for all communities in the Study Area. Likewise, it is possible that towns not served by a high speed rail station could potentially be served by a regional passenger train, thereby allowing access to high speed rail service at an adjacent high speed served station.

4.2.3 CONCLUSIONS

In summary, the substantial long-term positive economic, environmental, and fiscal benefits of high speed rail in the SEHSR Corridor will include:

- Creation of jobs in the railroad, roadway, commercial, and residential construction industries, as well as railroad operation and maintenance
- Increased manufacturing jobs in the rail passenger transportation industry, including car, equipment, and part manufacturers
- Enhanced economic development and revitalization of urban areas around stations, creating jobs in the office, commercial, hotel, and housing management industries

- Increased tourism
- Improved transportation safety, including enhanced safety at rail crossings
- Improved speed and reduced cost of service for freight-rail commerce
- Reduced dependence on highways and airports, leading to:
  - Reduced use of carbon fuel, leading to:
    - Reduced greenhouse gas (GHG) emissions
    - Reduced dependence on foreign oil
  - Reduced need to build new (or widen existing) highways
  - Deferred need to invest in airport expansions
  - Reduced transportation delays, including reduced truck congestion on interstates
- Increased productivity of business travel through consistently reliable and comfortable travel combined with the potential for reduced business-travel expenses
- Increased generation of personal and business income and sales
- Additional generation of tax revenues for both Virginia and North Carolina
- Billions of dollars in sustainable economic development.

5. COMMENTS RECEIVED ON THE FEIS

FRA distributed the Tier II FEIS to various Federal and State agencies, organizations, and municipalities along the Richmond to Raleigh Project corridor. For a complete list, see Chapter 6 of the Tier II FEIS. Hard copies of the complete document were provided at 13 viewing locations (9 in Virginia and 4 in North Carolina). Two written comments were received on the Tier II FEIS, as summarized below and shown in Appendix B.

5.1 U.S. ENVIRONMENTAL PROTECTION AGENCY (USEPA) (REGIONS 3 AND 4)

The USEPA recommended that the ROD reference the CEQ's 2014 Revised Draft Guidance for Greenhouse Gas Emissions and Climate Change Impacts, which went into effect in March 2015. More information about this guidance can be found at: https://www.whitehouse.gov/administration/eop/ceq/initiatives/nepa/ghg-guidance.

Section 4.17.1 of the Tier II FEIS examined the national effect of the proposed Richmond to Raleigh Project. The assessment stated that the Richmond to Raleigh Project would promote energy efficiency and environmental quality by reinforcing efforts to foster energy independence and renewable energy, and reduce pollutants and GHG emissions. Rail is already among the cleanest and most energy efficient of the passenger transportation modes. Findings from the National Surface Transportation Policy and Revenue Study Commission (109th Congress, 2007) indicate that the expansion of intercity passenger rail would also address important national goals related to climate change and energy use. The Commission summarized the benefits associated with an expanded intercity passenger rail service:

- Relieve highway and airway congestion
- Improve public safety and air quality
- Reduce fuel consumption per passenger mile, potentially reducing the nation's dependence on imported oil
- Help mitigate the negative impacts of short or prolonged energy supply disruptions and energy price increases
- Provide land use and travel pattern changes that could improve air and water quality, as well as aesthetic appeal

- Provide mobility and economic development opportunities to smaller communities with little or no other access to public transport
- Assure a redundant transportation mode for use in emergency situations
- Provide a mobility option for individuals who do not drive or fly (109th Congress, 2007, p. 7-8).

For these reasons, FRA anticipates that the Richmond to Raleigh Project will have a beneficial impact on GHG emissions in the Study Area.

USEPA agreed with the approach FRA took to address their comments on the Tier II DEIS. FRA has committed to the development of a Compensatory Mitigation Plan during Clean Water Act Section 401/404 permitting. FRA has also committed to performing a detailed noise analysis during the final design phase of the Richmond to Raleigh Project, per FRA's high speed rail noise procedures, to determine if additional measures or mitigation are required for noise or vibration impacts. USEPA proposed that a pedestrian bridge be located in the vicinity of Wake Forest Elementary School to allow students to safely cross over railroad tracks. The Richmond to Raleigh Project designs currently include a pedestrian bridge with stairs along Elm Avenue near the school. Additional design and analysis is needed to coordinate the implementation of an Americans with Disabilities Act (ADA) compliant pedestrian crossing of the railroad in this location. NCDOT and FRA have committed to coordinate the final design and selected access alternatives (e.g., elevators, ramps, or tunnel) with the Town of Wake Forest and the state historic preservation office (due to potential impacts to the Downtown Wake Forest Historic District). USEPA also noted that the ROD would include commitments to address issues associated with Section 106 compliance.

5.2 U.S. ARMY CORPS OF ENGINEERS, NORFOLK VIRGINIA

The USACE noted in their comments that FRA's responses to USACE comments on the Tier II DEIS indicated an understanding of their concerns. USACE noted that they will consider all comments from the public, including Federal Advisory Agencies, in determining the final Least Environmentally Damaging Practicable Alternative (LEDPA). The USACE stated that the measures identified in the Tier II FEIS to avoid and minimize the substantial impacts to streams and wetlands associated with the Richmond to Raleigh Project should be implemented. USACE advised that potential future stations be located outside of waters of the United States.

USACE also noted the discussion of mitigation in Section 4.1.6.3 of the Tier II FEIS, which is expanded in Section 6 below. USACE recommended that the Richmond to Raleigh Project proponents remain informed about mitigation credit availability if the Richmond to Raleigh Project goes forward for permitting. The comments also note that FRA is the lead Federal agency to fulfill the collective Federal responsibilities under Section 106 of the National Historic Preservation Act of 1966 and is the lead Federal agency for consultation with the USFWS concerning the potential effects to Federally listed threatened and endangered species.

6. MITIGATION MEASURES AND MONITORING PROGRAM

Mitigation is defined in NEPA regulations (40 CFR Section 1508.20 and 40 CFR Part 230) as efforts that a) avoid, b) minimize, c) rectify, d) reduce or eliminate, or e) compensate for adverse impacts to the environment. Mitigation of wetland impacts is recommended in accordance with Clean Water Act (CWA) Section 404(b)(1) Guidelines (40 CFR Part 230), mitigation policy mandates articulated in the USACE/USEPA MOA (Page and Wilcher, 1990), Executive Order 11990 (42 FR 26961 [1977]), USFWS mitigation policy directives (46 FR 7644-7663 [1981]), and the USACE/USEPA New Mitigation Rule (Compensatory Mitigation for Losses of Aquatic Resources; Final Rule; 33 CFR Parts 325 and 332 and 40 CFR Part 230, effective on June 6, 2008).

As stated in the Richmond to Raleigh Project Commitments, a compensatory mitigation plan will be developed during the 401/404 permitting process. The plan will be compliant with the 2008 EPA/USACE Final Mitigation Rule, as issued on April 10, 2008 (73 FR 19594).

CWA Section 404(b)(1) Guidelines, the USACE/USEPA MOA, and Executive Order 11990 stress avoidance and minimization as primary considerations for protection of waters of the United States. These efforts, and other measures that may be implemented later in the design process in consultation with the USACE, are described below.

6.1 AVOIDANCE AND MINIMIZATION

The Richmond to Raleigh Project designs attempt to maximize use of the existing rail ROW in order to avoid new impacts to aquatic resources. However, due to the need to straighten curves (to meet design speed dictated by purpose and need) or to avoid impacts to other resources (such as historic properties), there are occasions when it is necessary for Richmond to Raleigh Project impacts to extend outside the existing ROW. During the development of the preliminary engineering designs, efforts were made to avoid and minimize impacts to wetlands and streams wherever practicable. Where stream crossings were unavoidable, they were located, within design constraints, as perpendicular as practicable, in order to minimize the length of stream impacted. Bridges are generally preferred over culverts for road crossings to minimize impacts to streams.

6.2 OTHER AVOIDANCE AND MINIMIZATION MEASURES

Jurisdictional impacts have been minimized by reducing, where applicable, fill slopes at stream and wetland crossings. Conservative use of culverts and sensitive placement of drainage structures have been applied to minimize degradation of water quality and reduce adverse impacts on aquatic habitat viability in streams and tributaries. Sediment and erosion control measures will not be placed in wetlands or streams, and outfalls will be designed to prevent adverse impacts to the receiving stream or wetland. Elimination of construction staging areas in floodplains or adjacent to streams, wetlands, and tributaries will help reduce the potential for petroleum contamination or discharges of other hazardous materials into receiving waters. Impacts to riparian buffers and stream bottom habitat will be minimized to the extent practicable. All relevant directives with regards to invasive species will be complied with during construction. More detailed information concerning potential impacts to “other waters” and mitigation may be developed during the final design and permitting phases of the Richmond to Raleigh Project.

6.3 COMPENSATORY MIGITATION

The purpose of compensatory mitigation is to replace the lost functions and values from the impact of a project to waters of the United States. Mitigation activities include restoration, creation, enhancement, or preservation of wetlands and streams. The amount of mitigation required is determined on a case-by-case basis. Mitigation needs will be determined in consultation with USACE and the individual states will be responsible for providing necessary mitigation. The discussion below summarizes the approaches Virginia and North Carolina currently use for developing and securing mitigation credits for environmental actions.

Typical mitigation ratios (amount of mitigation required compared to amount impacted) for wetland mitigation are 2:1 for restoration (meaning 2 acres must be restored for every 1 acre impacted), 3:1 for creation, from 3:1 to 9:1 for enhancement, and from 10:1 to 20:1 for preservation, depending on the type and quality of the wetland being preserved and the extent of uplands included in the preserved area. Typical ratios for stream mitigation are 2:1 (2 feet of mitigation for every 1 foot impacted) for restoration, 4:1 for enhancement, and 10:1 for preservation. In Virginia, the Unified Stream Methodology (USM) (VDEQ, 2007), developed jointly by the Norfolk District and the VDEQ, provides a guide for determining appropriate stream compensation requirements. Offsite stream mitigation guidelines were

developed in 2008 (VDEQ, 2008). Appropriate specific mitigation ratios for the Norfolk and Wilmington District USACE will be applied during the Section 404 permitting process.

DRPT and NCDOT are responsible for developing compensatory mitigation separately for their respective portions of the Richmond to Raleigh Project according to 33 CFR Parts 325 and 332. This rule creates a flexible preference for the use of mitigation bank credits to satisfy requirements for mitigation, since banks can help reduce many of the risks and uncertainties associated with compensatory mitigation. The watershed approach to mitigation also provides for application of in-lieu fee programs and permittee-responsible mitigation.

In Virginia, mitigation will be provided through the use of mitigation banks and/or the Virginia Aquatic Resources Trust Fund (VARTF). The VARTF pursues stream and wetland mitigation projects throughout Virginia as an in-lieu fee program. It is administered in partnership with the USACE Norfolk District and The Nature Conservancy in Virginia. The use of the VARTF as a mitigation option is at the discretion of the appropriate regulatory agencies. Currently, 12 USACE-pending and 22 USACE-approved mitigation banks are listed for the seven Norfolk District hydrologic units (HU) intersected by the Richmond to Raleigh Project (Regional Internet Banking Information System or "RIBITS"). However, no credits are listed as "available" for the Roanoke River Basin or the Meherrin (03010204) HU of the Chowan River basin. Bank credit availability may not be currently adequate for potential Richmond to Raleigh Project wetland impacts in the Nottoway (03010201) HU or stream impacts in the Blackwater (03010202) HU of the Chowan River basin. As stated in Section 5.2, Richmond to Raleigh Project proponents will remain informed about mitigation credit availability when the Richmond to Raleigh Project advances for permitting and will work with VARTF to ensure that adequate mitigation credits are available.

In North Carolina, mitigation will be provided through coordination with the North Carolina Division of Mitigation Services (DMS) within the same HU as the potential impacts to jurisdictional waters occur. The USACE, NCDOT, and NC Department of Environment and Natural Resources entered into a MOA in July 2003 that established procedures for providing compensatory mitigation through the North Carolina Ecosystem Enhancement Program (NCEEP, now called DMS) to offset impacts to streams and wetlands from NCDOT projects. The three parties agreed that mitigation for transportation projects should occur before impacts and use a watershed approach. The agreement was updated based on the June 2008 Federal Mitigation Rule in July 2010 with an agreement between the current DMS program, USACE, USFWS, NC Wildlife Resources Commission (NCWRC), the North Carolina Division of Water Quality (now called the Division of Water Resources [NCDWR]), the North Carolina Division of Coastal Management (NCDCM), and the National Marine Fisheries Service (NMFS).

Appropriate compensatory mitigation requirements for wetland and stream impacts from the Preferred Alternative will be determined in consultation with the appropriate Federal and State environmental resources and regulatory agencies prior to project permitting.

6.4 MONITORING

In Virginia, the most recent guidance on monitoring for stream mitigation projects was finalized in 2004 (Norfolk District Corps and Virginia Department of Environmental Quality Recommendations for Wetland Compensatory Mitigation: Including Site Design, Permit Conditions, Performance Criteria, and Monitoring Criteria). At the beginning of a project to develop stream or wetland mitigation credits, the State approves a Project Plan, which includes a Contingency Plan for dealing with issues during construction and monitoring to ensure that success criteria for the Richmond to Raleigh Project have been met.

The Project Plan guidance states that monitoring and long-term management responsibilities should be identified in the contingency plan and that methods should be developed to measure success criteria for the Richmond to Raleigh Project, which may include plant survival, the presence or absence of invasive species, and verification of the planned stream or wetland hydrologic regime. The guidance also requires

the preparation of monitoring reports to show that minimum requirements of the Project plan have been met. The final monitoring report is required to include an assessment of the condition of the site following mitigation monitoring. The USACE or VDEQ may require an independent, post-construction assessment.

In North Carolina, requirements for stream restoration projects were most recently updated by DMS in February 2014 (NCEEP, 2014). The requirements include development of a Mitigation Plan (the North Carolina equivalent of the Project Plan) and a baseline monitoring report that details project success criteria. Monitoring duration will depend on the type of mitigation provided and the ability of the Richmond to Raleigh Project to meet success criteria. DMS requirements for project closeout were most recently updated on March 5, 2015 (NCEEP, 2015). Closeout and acceptance of final mitigation credits takes place after approval from the Interagency Review Team (IRT), which includes the NC Department of Environmental Quality (NCDEQ), NCDOT, and the USACE.

7. FINAL SECTION 106 PROCESS PROGRAMMATIC AGREEMENT (PROCESS PA) AND STATE-SPECIFIC MEMORANDA OF AGREEMENT (MOA)

Section 106 of the National Historic Preservation Act of 1966 (Section 106), as amended (16 U.S.C. 306108), and implementing regulations (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 (ACHP) an opportunity to comment if the action would result in an adverse effect on a property listed on or eligible for the NRHP.

The potential effect of the Richmond to Raleigh Project on archaeological and historic architectural resources was evaluated in accordance with Section 106. According to the criteria for Effect and Adverse Effect developed by the ACHP (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 Richmond to Raleigh 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 FRA, the Virginia Department of Historic Resources (VDHR), North Carolina State Historic Preservation Office (NC-HPO), and other “consulting parties,” such as the National Park Service, local historical societies, and property owners. Currently, no unresolved issues are associated with the proposed action.

FRA, the Virginia State Historic Preservation Officer, the North Carolina State Historic Preservation Officer, DRPT, NCDOT, and the ACHP have developed a Programmatic Agreement (Process PA) for the entire Tier I SEHSR corridor to provide a consistent process for considering the effects of each portion of the SEHSR on historic properties and resolving adverse effects where appropriate. The draft agreement was included in the Tier II FEIS and the final, signed agreement is included in Appendix C.

The Process PA specifies that when proposed improvements within the SEHSR result in a finding of adverse effects to historic properties, FRA and the appropriate State Rail Transportation Agency shall develop an MOA to identify measures to avoid, minimize, and mitigate the adverse effects prior to

beginning any work on that portion of the SEHSR Project. As described in the Tier II FEIS, 149 unique historic resources within the Richmond to Raleigh Project corridor are protected under Section 106 (several properties are considered both historic architecture and archaeology resources). Of these, the Preferred Alternative will have an adverse effect on 26 resources. In accordance with the Process PA, MOAs were developed to describe specific efforts that will be undertaken to avoid, minimize, and mitigate the adverse effects of the Richmond to Raleigh Project on these resources.

An MOA specific to each state was developed for Virginia and North Carolina for the Richmond to Raleigh Project. The signed MOAs are included in Appendix D.

8. FINAL DETERMINATIONS UNDER SECTION 4(F) OF THE TRANSPORTATION ACT OF 1966

Section 4(f) of the Department of Transportation Act of 1966, as set forth in Title 49 United States Code (USC) Section 303, protects publicly owned parks, recreation areas, and wildlife/waterfowl refuges, as well as historic sites listed or eligible for listing in the NRHP and archaeological sites that are listed or eligible for inclusion in the NRHP and warrant preservation in place. These lands can only be used for a federally funded transportation project if there is no other feasible and prudent alternative and the project incorporates all possible planning to minimize harm.

The Tier II EIS was prepared in accordance with FRA Procedures for Considering Environmental Impacts (64 FR 28545, May 26, 1999). In addition, the Tier II EIS also followed the procedures for implementing Section 4(f) outlined in 23 CFR 774 (March 12, 2008), which apply to the FHWA and FTA. Although FRA is not directly subject to this rule, FRA has determined these procedures are appropriate for use for the Richmond to Raleigh Project Tier II EIS.

Section 4(f) use, as defined in 23 CFR 774.17, occurs in the following cases:

- Land is permanently incorporated into a transportation facility through partial or full acquisition (i.e., “use”).
- There is temporary occupancy of land that is adverse in terms of the preservationist purpose of Section 4(f) (i.e., “temporary use”).
- There is no permanent incorporation of land, but the proximity of a transportation facility results in impacts so severe that the protected activities, features, or attributes that qualify a resource for protection under Section 4(f) are substantially impaired (i.e., “constructive use”). Examples of constructive use include substantial increases in noise levels at an outdoor amphitheater, impairment to aesthetics, and restrictions on access to a resource.

If the use of a Section 4(f) resource will occur due to a proposed action, a Section 4(f) evaluation must be prepared. The Section 4(f) evaluation determines whether there is a feasible and prudent alternative to the use of land from a Section 4(f) resource and, if not, whether the proposed action includes all possible planning to minimize harm to the resource resulting from its use.

According to 23 CFR 774.17, an alternative is not feasible if it cannot be built as a matter of sound engineering judgment. Likewise, an alternative is not prudent if:

i. It compromises the project to a degree that it is unreasonable to proceed with the project in light of its stated purpose and need;
ii. It results in unacceptable safety or operational problems;
iii. After reasonable mitigation, it still causes:
    a. Severe social, economic, or environmental impacts;
    b. Severe disruption to established communities;
    c. Severe disproportionate impacts to minority or low income populations; or
    d. Severe impacts to environmental resources protected under other Federal statutes;

iv. It results in additional construction, maintenance, or operational costs of an extraordinary magnitude;
v. It causes other unique problems or unusual factors; or
vi. It involves multiple factors in paragraphs (3)(i) through (3)(v) of this definition, that while individually minor, cumulatively cause unique problems or impacts of extraordinary magnitude.

Where analysis concludes there is no feasible and prudent avoidance alternative, the alternative that causes the least overall harm to Section 4(f) resources must be selected. This determination is made by balancing the factors listed in 23 CFR 774.3(c):

i. The ability to mitigate adverse impacts of each Section 4(f) property (including any measures that result in benefits to the property);
ii. The relative severity of the remaining harm, after mitigation, to the protected activities, attributes, or features that qualify each Section 4(f) property for protection;
iii. The relative significance of each Section 4(f) property;
iv. The views of the official(s) with jurisdiction over each Section 4(f) property;
v. The degree to which each alternative meets the purpose and need for the project;
vi. After reasonable mitigation, the magnitude of any adverse impacts to resources not protected by Section 4(f); and
vii. Substantial differences in costs among the alternatives.

The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) of 2005 (23 USC 101), amended existing Section 4(f) legislation to simplify the processing and approval of projects that have only *de minimis* impacts on resources protected by Section 4(f). For historic resources, a *de minimis* impact means that the Federal transportation agency has determined that, in accordance with 36 CFR 800, no historic property is affected by the project or the project will have no adverse effect on the property in question. If after consideration of any impact avoidance, minimization, and mitigation or enhancement measures, a transportation project results in a *de minimis* impact on a Section 4(f) property, an analysis of avoidance alternatives is not required and the Section 4(f) evaluation process is complete. For historic and cultural resources, the State Historic Preservation Officer (SHPO) or Tribal Historic Preservation Officer (THPO), and the ACHP (if participating in the consultation process), must concur in writing with this determination. For other 4(f) resources, such as parks and wildlife refuges, the official with jurisdiction over the resource must concur with the de minimis determination.

FRA's coordination with the U.S. Department of the Interior (U.S. DOI) was ongoing throughout the duration of the Richmond to Raleigh Project. U.S. DOI reviewed the Tier II DEIS and provided comments, concurring with FRA's determination that there are no feasible and prudent alternatives to the uses of Section 4(f) resources, and recommending that FRA continue consultation with the North Carolina and Virginia SHPOs and other Section 106 consulting parties to determine the appropriate mitigation measures for the adverse effects the Raleigh to Richmond Project will have on historic and cultural resources, and to develop MOAs detailing those mitigation measures. The signed MOAs are included in Appendix D.

With regard to the determination of effects to the Petersburg National Battlefield, FRA coordinated directly with the U.S. DOI. In September 2014, U.S. DOI was supplied a draft of the Final 4(f) Evaluation for review, and additional coordination took place in February-April 2015. The following commitment was agreed upon and is included in the Richmond to Raleigh Project commitments: The Richmond to Raleigh Project team will coordinate with the National Park Service (NPS) regarding the need for 30 to 50 feet of right-of-way along the western portion of the Fort Wadsworth Unit of the Petersburg National Battlefield. In a letter dated March 4, 2009, the Petersburg National Battlefield superintendent stated that the Richmond to Raleigh Project may mitigate potential adverse effects to the Fort Wadsworth Unit from a land exchange that is subject to a NEPA and Section 106 process. This land

exchange will be negotiated during the final design stage of the Richmond to Raleigh Project and will be subject to all NPS land acquisition policies, including those identified in the March 4, 2009 letter from the Petersburg National Battlefield superintendent. The cost of these due diligence requirements are to be borne by the project proponent(s) and not the NPS.

U.S. DOI reviewed the Tier II FEIS and had no additional comments on FRA's Section 4(f) Evaluation.

The Tier II FEIS included a Section 4(f) Evaluation (Chapter 5) that assessed whether there are feasible and prudent alternatives to the Richmond to Raleigh Project using land from resources protected by Section 4(f). Final Section 4(f) determinations are included below.

8.1 FINAL DETERMINATIONS UNDER SECTION 4(F)

Based upon the above considerations, there is no feasible and prudent alternative to the use of land from the Seaboard Air Line Railroad Corridor resource, and the proposed action includes all possible planning to minimize harm to the Seaboard Air Line Railroad Corridor resource resulting from such use.

Based upon the above considerations, there is no feasible and prudent alternative to the use of land from the Atlantic Coast Line Railroad Corridor resource, and the proposed action includes all possible planning to minimize harm to the Atlantic Coast Line Railroad Corridor resource resulting from such use.

Based upon the above considerations, there is no feasible and prudent alternative to the use of land from the Williams Bridge Company resource, and the proposed action includes all possible planning to minimize harm to the Williams Bridge Company resource resulting from such use.

Based upon the above considerations, there is no feasible and prudent alternative to the use of land from the Richmond & Petersburg Electric Railway resource, and the proposed action includes all possible planning to minimize harm to the Richmond & Petersburg Electric Railway resource resulting from such use.

Based upon the above considerations, there is no feasible and prudent alternative to the use of land from the Chester Historic District resource, and the proposed action includes all possible planning to minimize harm to the Chester Historic District resource resulting from such use.

Based upon the above considerations, there is no feasible and prudent alternative to the use of land from the Eichelberger House resource, and the proposed action includes all possible planning to minimize harm to the Eichelberger House resource resulting from such use.

Based upon the above considerations, there is no feasible and prudent alternative to the use of land from the Defense Road resource, and the proposed action includes all possible planning to minimize harm to the Defense Road resource resulting from such use.

Based upon the above considerations, there is no feasible and prudent alternative to the use of land from the Dimmock Line/Earthworks resource, and the proposed action includes all possible planning to minimize harm to the Dimmock Line/Earthworks resource resulting from such use.

Based upon the above considerations, there is no feasible and prudent alternative to the use of land from the Bridge over Defense Road resource, and the proposed action includes all possible planning to minimize harm to the Bridge over Defense Road resource resulting from such use.

Based upon the above considerations, there is no feasible and prudent alternative to the use of land from the Tourist Guest House resource, and the proposed action includes all possible planning to minimize harm to the Tourist Guest House resource resulting from such use.

Based upon the above considerations, there is no feasible and prudent alternative to the use of land from the La Crosse Commercial Historic District resource, and the proposed action includes all possible

planning to minimize harm to the La Crosse Commercial Historic District resource resulting from such use.

Based upon the above considerations, there is no feasible and prudent alternative to the use of land from the Henderson Historic District and Proposed Boundary Expansion resource, and the proposed action includes all possible planning to minimize harm to the Henderson Historic District and Proposed Boundary Expansion resource resulting from such use.

Based upon the above considerations, there is no feasible and prudent alternative to the use of land from the South Henderson Industrial Historic District resource, and the proposed action includes all possible planning to minimize harm to the South Henderson Industrial Historic District resource resulting from such use.

Based upon the above considerations, there is no feasible and prudent alternative to the use of land from the Franklinton Historic District (Includes Sterling Mill Historic District) resource, and the proposed action includes all possible planning to minimize harm to the Franklinton Historic District (Includes Sterling Mill Historic District) resource resulting from such use.

Based upon the above considerations, there is no feasible and prudent alternative to the use of land from the Gulf Petroleum Products Warehouse resource, and the proposed action includes all possible planning to minimize harm to the Gulf Petroleum Products Warehouse resource resulting from such use.

Based upon the above considerations, there is no feasible and prudent alternative to the use of land from the Raleigh and Gaston Railroad Corridor resource, and the proposed action includes all possible planning to minimize harm to the Raleigh and Gaston Railroad corridor resource resulting from such use.

9. RICHMOND TO RALEIGH PROJECT SCHEDULE & NEXT STEPS

Final Tier II Draft EIS Published	-	**May 2010**
8 Public Hearings Held on Tier II DEIS (4 in VA, 4 in NC)	-	**July 2010**
Public Update Meetings (2 in VA and 3 in NC)	-	**July 2011 through February 2013**
Recommendation Report Published	-	**April 2012**
Tier II FEIS Published	-	**September 2015**
Tier II ROD	-	**Spring 2016**
Property Acquisition	-	**Schedule subject to funding**
Construction (with 3-5 year Build Out)	-	**Schedule subject to funding** (at least two years after ROD)
Begin SEHSR Passenger Service	-	**Schedule subject to funding**

10. CONCLUSION

FRA has reached a decision that most closely aligns with FRA's statutory mission and responsibilities, based on consideration of the information contained in the Tier II EIS documents. FRA approves the Richmond to Raleigh Project based on the Selected Alternative identified in the Tier II FEIS and ROD. FRA has selected this alternative because it:

1. Best satisfies the Purpose and Need for the proposed action
2. Minimizes impacts to the human and natural environment by using existing active and inactive railroad corridors to the extent practicable and incorporating other mitigation measures.

Accordingly, this alternative has been selected based on processes in compliance with NEPA and other applicable requirements and may be advanced.

Paul Nissenbaum
Associate Administrator for
Railroad Policy and Development
Federal Railroad Administration

Date: March 24, 2017

11. REFERENCES

109th Congress – National Surface Transportation Policy and Revenue Study Commission. Vision for the Future: U.S. Intercity Passenger Rail Network through 2050. December 6, 2007. Page 2. http://www.goiam.org/uploadedfiles/tcunion/tcu_top_stories/future_vision_2007.pdf

KPMG. 1995. *Economic Impact Analysis*. Data for NC only, updated to 2008 dollars (based on the consumer price index, South Urban Region). Bureau of Labor Statistics. http://data.bls.gov/PDQ/servlet/SurveyOutputServlet. Accessed 7/09/09.

NC Division of Mitigation Services (NCDMS). 2014. *As-built Baseline Monitoring Report: Format, Data Requirements, and Content Guidance*. North Carolina Department of Environment and Natural Resources. February 2014. http://portal.ncdenr.org/c/document_library/get_file?p_l_id=60409&folderId=18877169&name=DLFE-86605.pdf

NCDMS (North Carolina Ecosystem Enhancement Program). 2015. *NCEEP Project Closeout Report Template*. North Carolina Department of Environment and Natural Resources. March 2015. http://portal.ncdenr.org/c/document_library/get_file?p_l_id=60409&folderId=18877169&name=DLFE-111008.pdf

Page, R.W., and L.S. Wilcher. 1990. *The Determination of Mitigation Under the Clean Water Act Section 404(b)(1) Guidelines*. Memorandum of Agreement between the Department of the Army and the Environmental Protection Agency. Assistant Secretary of the Army, Civil Works and Assistant Administrator for Water, U.S. Environmental Protection Agency, respectively. February 6. Available at: http://water.epa.gov/lawsregs/guidance/wetlands/mitigate.cfm

VDEQ (Virginia Department of Environmental Quality). 2004. *Norfolk District Corps and Virginia Department of Environmental Quality Recommendations for Wetland Compensatory Mitigation: Including Site Design, Permit Conditions, Performance Criteria, and Monitoring Criteria*. Website viewed November 2, 2015: http://www.deq.virginia.gov/Portals/0/DEQ/Water/WetlandsStreams/mitigationrecommendabbrevjuly2004.pdf

VDEQ (Virginia Department of Environmental Quality. 2007. *Unified Stream Methodology (USM)*. USACE and VDEQ, January 2007. Website viewed November 2, 2015: http://www.deq.virginia.gov/Portals/0/DEQ/Water/WetlandsStreams/USMFinal_01-18-07.pdf

VDEQ (Virginia Department of Environmental Quality. 2008. *Virginia Off-site Mitigation Location Guidelines*. Website viewed November 2, 2015: http://www.deq.virginia.gov/Portals/0/DEQ/Water/WetlandsStreams/VA_Offsite_Mit_Guidelines.pdf