

Improving Hampton Roads Passenger Rail Service



May 2024



T23-10

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INVITED PARTICIPANTS

B. Wayne Coleman, CTB

Frederick T. Stant, III, CTB

Vacant

HRPO PROJECT STAFF

Pavithra Parthasarathi

Deputy Executive Director

Rob Case

Chief Transportation Engineer

Matt Klepeisz

Communications Administrator

Robert Cofield

Graphic and Web Designer

Quan McLaurin

Diversity, Equity, and Inclusion (DEI) and Title VI/Civil Rights Liaison

Andrew Margason

General Services Manager

Christopher W. Vaigneur

Assistant General Services Manager

REPORT DOCUMENTATION

TITLE

Improving Hampton Roads
Passenger Rail Service

ORGANIZATION

Hampton Roads Transportation Planning Org.
723 Woodlake Drive, Chesapeake, VA 23320
<http://www.hrtpo.org>

AUTHORS

Robert B. Case, PhD, PE
Quan McLaurin

REPORT DATE October 2023, revised May 2024

ABSTRACT

HRTPO staff investigated the location and cause of travel time delays for existing service, and identified projects of independent utility for improving Hampton Roads passenger rail service.

ACKNOWLEDGMENT & DISCLAIMERS

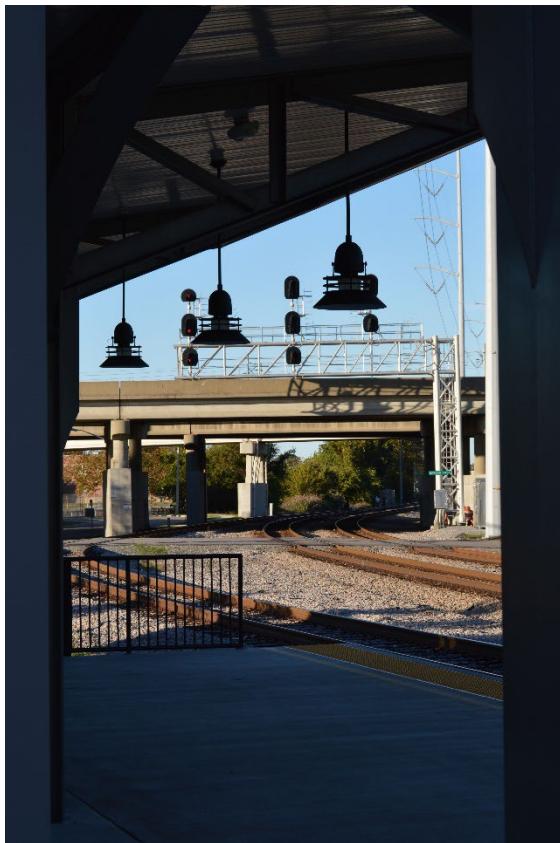
Prepared in cooperation with U.S. Department of Transportation (USDOT), Federal Highway Administration (FHWA), Virginia Department of Transportation (VDOT), the Virginia Department of Rail and Public Transportation (DRPT), the Virginia Passenger Rail Authority (VPRA), and PlanRVA. The contents of this report reflect the views of the Hampton Roads Transportation Planning Organization (HRTPO). The HRTPO is responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the above cooperating agencies or the Hampton Roads Planning District Commission. This report does not constitute a standard, specification, or regulation. FHWA or VDOT acceptance of this report as evidence of fulfillment of the objectives of this planning study does not constitute endorsement/approval of the need for any recommended improvements nor does it constitute approval of their location and design or a commitment to fund any such improvements. Additional project level environmental impact assessments and/or studies of alternatives may be necessary.

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Table of Contents

Background and Purpose	p. 3
Travel Time Delays	p. 5
Improving Hampton Roads Passenger Rail Service	p. 31
Staff Project Idea: The RVA757 Connector	p. 37
Summary and Next Steps	p. 47
Appendix	p. 48



Background and Purpose

Recent years have seen advances in Hampton Roads passenger rail service. After a 35-year absence, service returned to Norfolk in 2012. The new Norfolk station, funded in part by the HRTPO, opened in 2013. A second daily train was added in 2019, and a third train started service in 2022. Using funds from HRTPO and elsewhere, a new station is under construction in Newport News.

Currently, five (5) daily trains serve Hampton Roads:

- three (3) trains arriving and departing Norfolk
- two (2) trains originating and terminating in Newport News, stopping in Williamsburg in each direction

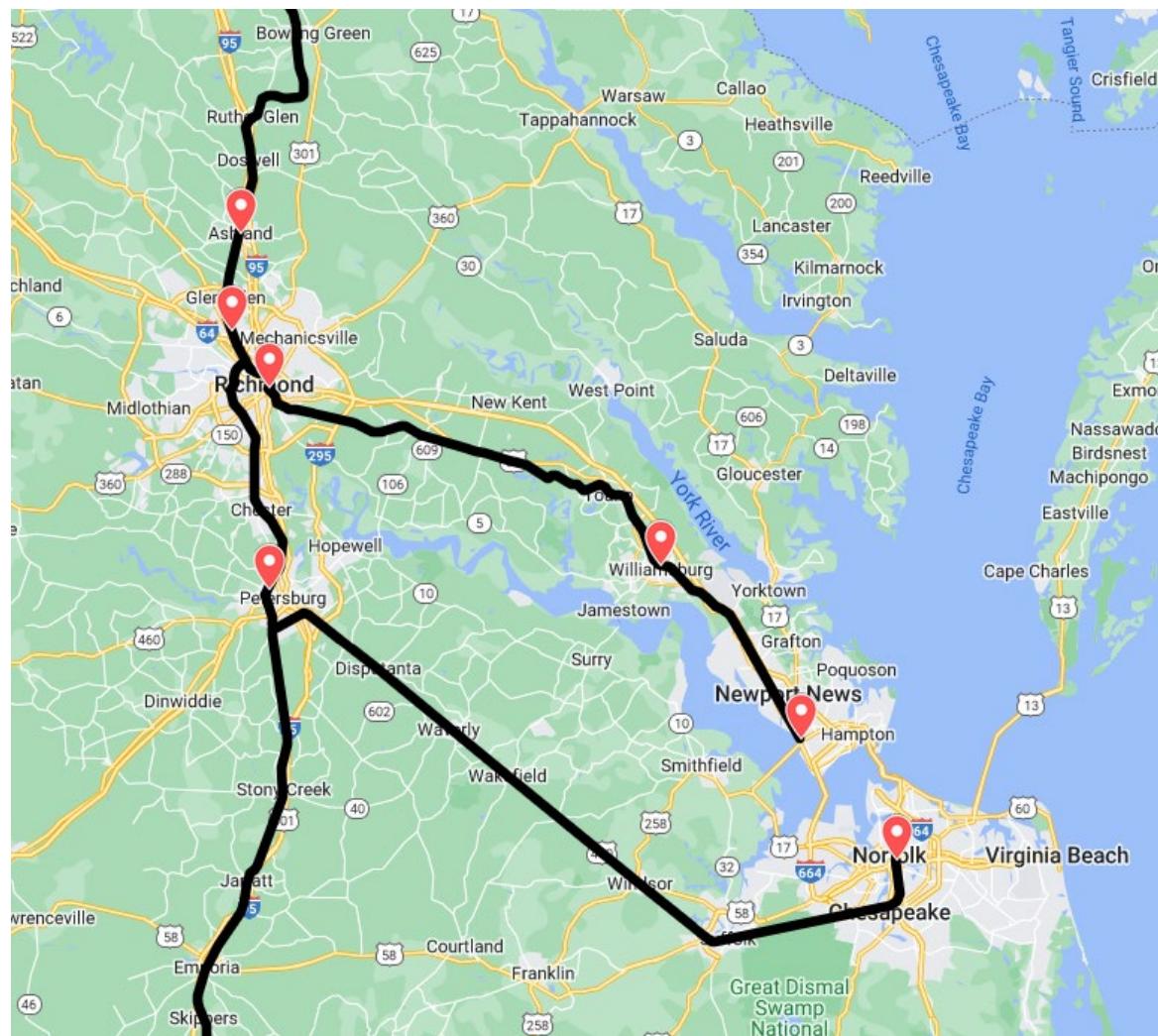


FIGURE 1 Current Passenger Rail Tracks and Stations

Source: HRTPO staff via Google My Maps

In the future—according to the 2022 Virginia State Rail Plan of the Department of Rail and Public Transportation (DRPT)—**three more** daily trains will be added to the Southside (year unspecified) and **one additional** train will run on the Peninsula (2026).

Although these train additions have, and will, improve service for Hampton Roads, more improvement is needed. Even with recent increases in ridership, **less than 1% of trips to/from Hampton Roads are made by rail.**¹ One reason for this is that rail trips take longer than auto trips, as shown below.

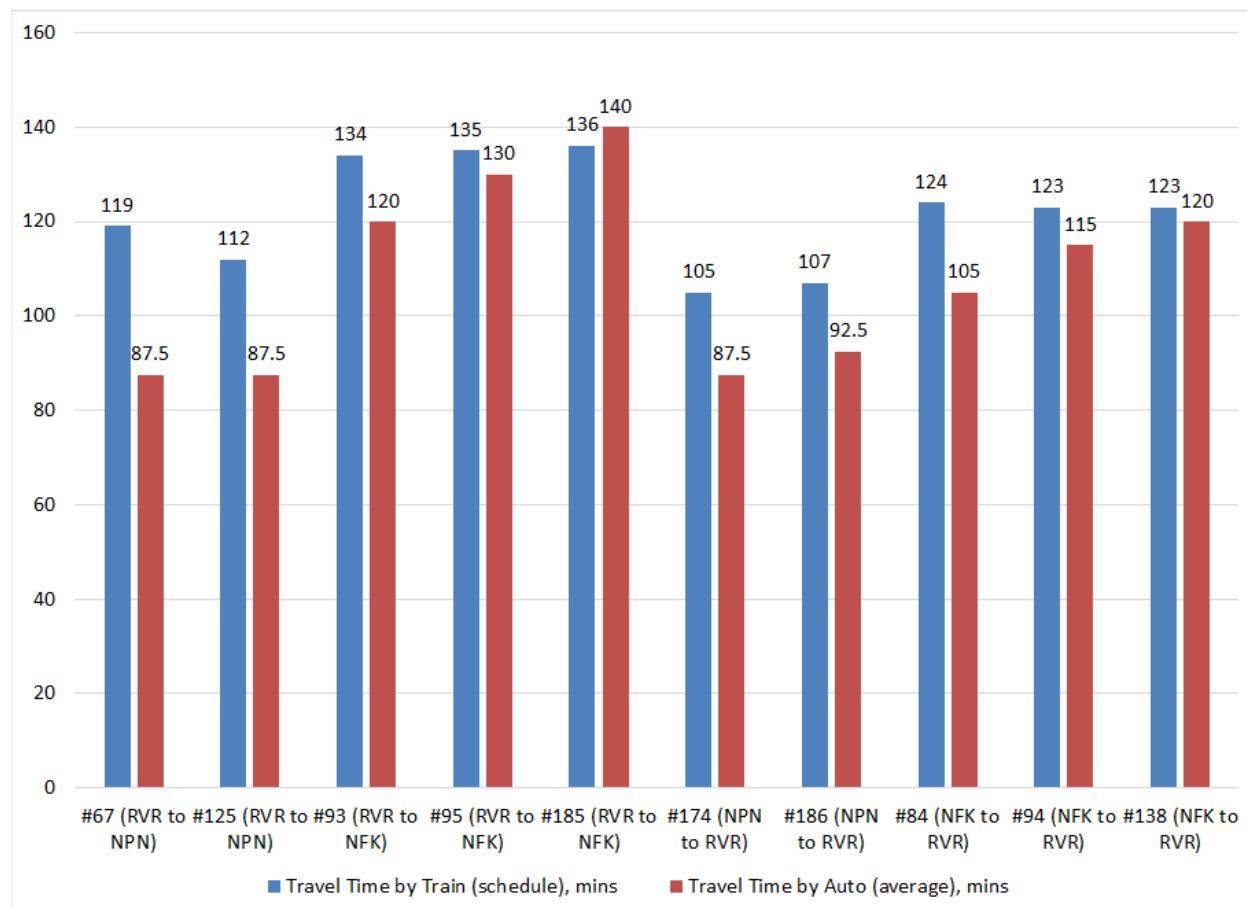


FIGURE 2 Travel Time, Train vs. Auto, between stations², Oct. 2022, minutes

Source: HRTPO staff via Amtrak.com and Google Maps

Therefore, the **purpose of this analysis** is to improve local passenger rail service via:

- identifying travel time delays (e.g. delays caused by conflicts with freight trains) and
- identifying projects designed to improve service—via improvement in travel times and/or increased train frequencies

¹ Approx. 250,000 rail trips per year vs. approx. 30,000,000 per year by highways I-64 and US 460, conservatively ignoring other modes [e.g. air] and other gateway highways.

² RVR: Richmond Staples Mill; NPN: Newport News; NFK: Norfolk

Travel Time Delays

HRTPO staff investigated **travel time delays** using Global Positioning System (GPS) data from Amtrak trains serving Hampton Roads. Each train transmits its location (latitude and longitude) approximately every three minutes, referred to as a “ping”. Amtrak makes this data available publicly.

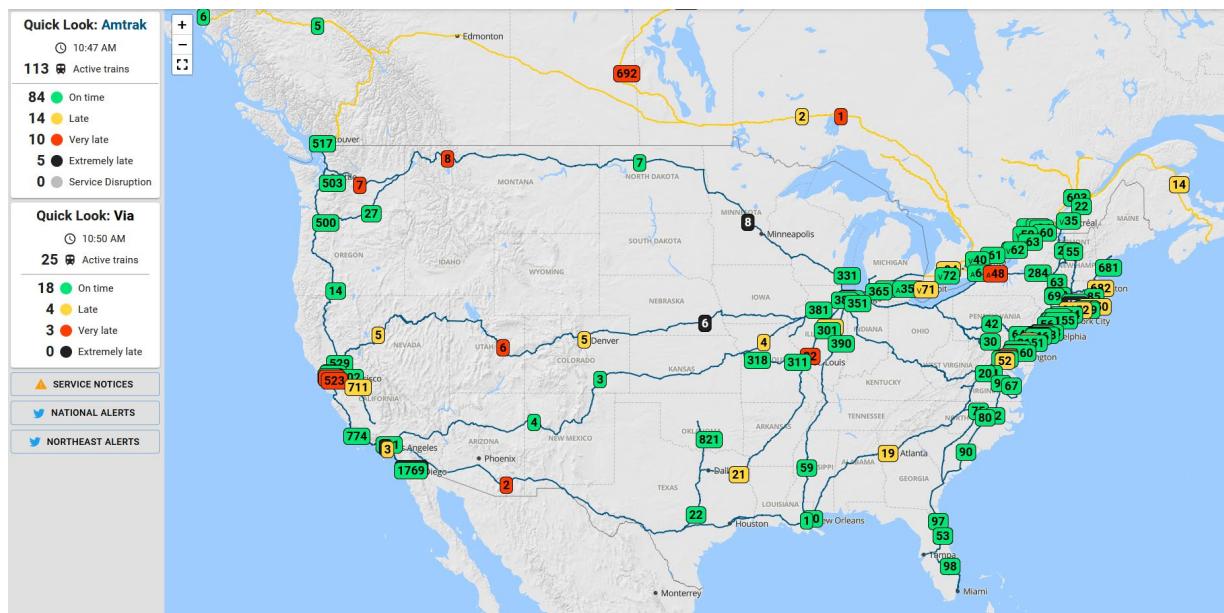


FIGURE 3 Example of Realtime Amtrak Train Locations

Source: [Transitdocs.com](https://transitdocs.com)

HRTPO staff obtained a year's worth of GPS data (2021) for Hampton Roads **weekday trains**³ from [Transitdocs.com](https://transitdocs.com), an organization that processes and displays Amtrak data, a total of 1,758 train runs⁴ (352,372 pings):

• Train 67	Boston (BOS) to Newport News (NPN)	249 train runs ⁵
• Train 84	Norfolk (NFK) to New York (NYP)	251 train runs
• Train 93	BOS to NFK	252 train runs
• Train 94	NFK to BOS	251 train runs
• Train 95	BOS to NFK	251 train runs
• Train 125	NYP to NPN	251 train runs
• Train 174	NPN to BOS	253 train runs
• Train 186	NPN to NYP	<u>no data available</u>
• Total		1,758 train runs

³ Trains running on the weekend tend to have different schedules than those running on weekdays.

⁴ “Train run”: one train running from origination to final destination (e.g. Norfolk to Boston)

⁵ Note that a train running five days/week and 52 weeks/year would complete 260 runs.

A snippet of the raw data appears below. Each ping is one record (one row) in the database.

train_number	origin_date	update_time	lat	lon
67	1/3/2021	21:31:08	42.34912	-71.0552
67	1/3/2021	21:33:33	42.34912	-71.0552
67	1/3/2021	21:35:53	42.34701	-71.066
67	1/3/2021	21:39:38	42.3473	-71.0755
67	1/3/2021	21:42:50	42.3249	-71.0988
67	1/3/2021	21:45:51	42.2753	-71.1207

FIGURE 4 Raw GPS Data for Hampton Roads Trains

Source: HRTPO staff via Transitdocs.com

Given that travel time between Richmond's Staples Mill station (RVR) and Washington DC is being addressed by the Virginia Passenger Rail Authority's "Transforming Rail in Virginia" program, HRTPO staff looked for delays **between Hampton Roads and RVR**.

Staff analyzed the GPS data in two steps. In the first step, we conducted a preliminary examination of the "Eastern Virginia segments"—Richmond Staples Mill station (RVR) to Norfolk for *Southside* trains, and RVR to Newport News for *Peninsula* trains—finding large delays between the Richmond stations. In the second step, we analyzed the segment **between the two Richmond stations** in detail using Peninsula train runs.



FIGURE 5 Train at Staples Mill Station

Source: HRTPO staff

Step One- Analysis of Eastern Virginia Segments

To make the raw GPS data useful for identifying travel time delay locations, staff 1) cleaned the dataset, and 2) assigned each ping's travel time to a mile-based location.

Cleaning the Dataset

The method used to clean the dataset (e.g. removing pings north of Richmond) can be found in the Appendix. Cleaning reduced the dataset from 1,758 train runs (352,372 pings) to 1,244 train runs (45,301 pings):

• Train 67	Boston (BOS) to Newport News (NPN)	174 train runs
• Train 84	Norfolk (NFK) to New York (NYP)	200 train runs
• Train 93	BOS to NFK	132 train runs
• Train 94	NFK to BOS	196 train runs
• Train 95	BOS to NFK	162 train runs
• Train 125	NYP to NPN	171 train runs
• Train 174	NPN to BOS	209 train runs
• Train 186	NPN to NYP	no data available
• subtotal, southbound (67, 93, 95, 125)		639 train runs
• subtotal, northbound (84, 94, 174)		<u>605 train runs</u>
• total		1,244 train runs

Identifying the Location of Delays

For the analysis of Eastern Virginia segments, each ping's travel time⁶ was **assigned to the nearest mile** of the total distance the train had traveled at the time of the subject ping, calculated via a running total of ping distances⁷. For example, for northbound trains, if the total distance at a given ping was 45.2 miles from the Newport News station, staff assigned the subject ping's travel time to mile 45.

The resulting **travel times and delays** are shown on the following pages.

⁶ i.e. the time elapsed between the time stamp of the subject ping and that of the previous ping

⁷ i.e. by adding the distance of the subject ping to an accumulation of the distances of the previous pings

A. Peninsula Trains

1. Southbound

Averaging a year's worth of GPS pings for the two **southbound weekday trains** serving the Peninsula—train #67 from Boston, and train #125 from New York—resulted in the following travel times per mile:

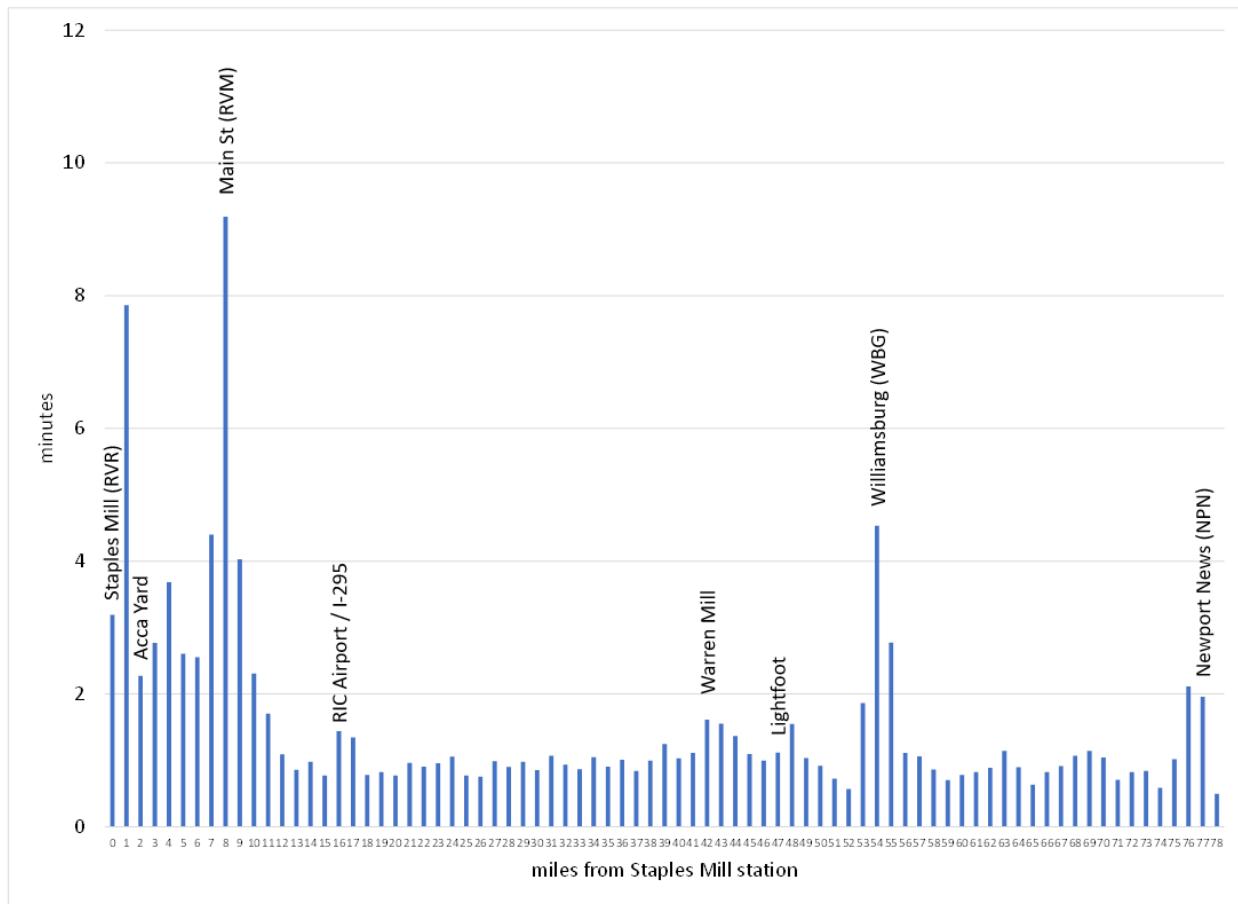


FIGURE 6 Travel Time by mile, Peninsula trains, Southbound, 2021, minutes

Source: HRTPO staff processing of Amtrak data

The chart reveals high travel times per mile **in/near Richmond** (left side of chart).

To more easily see areas of delay, staff colored orange that portion of the travel times which exceed one minute—one minute being the travel time for averaging 60 mph⁸—and labeled that portion as “delay”:

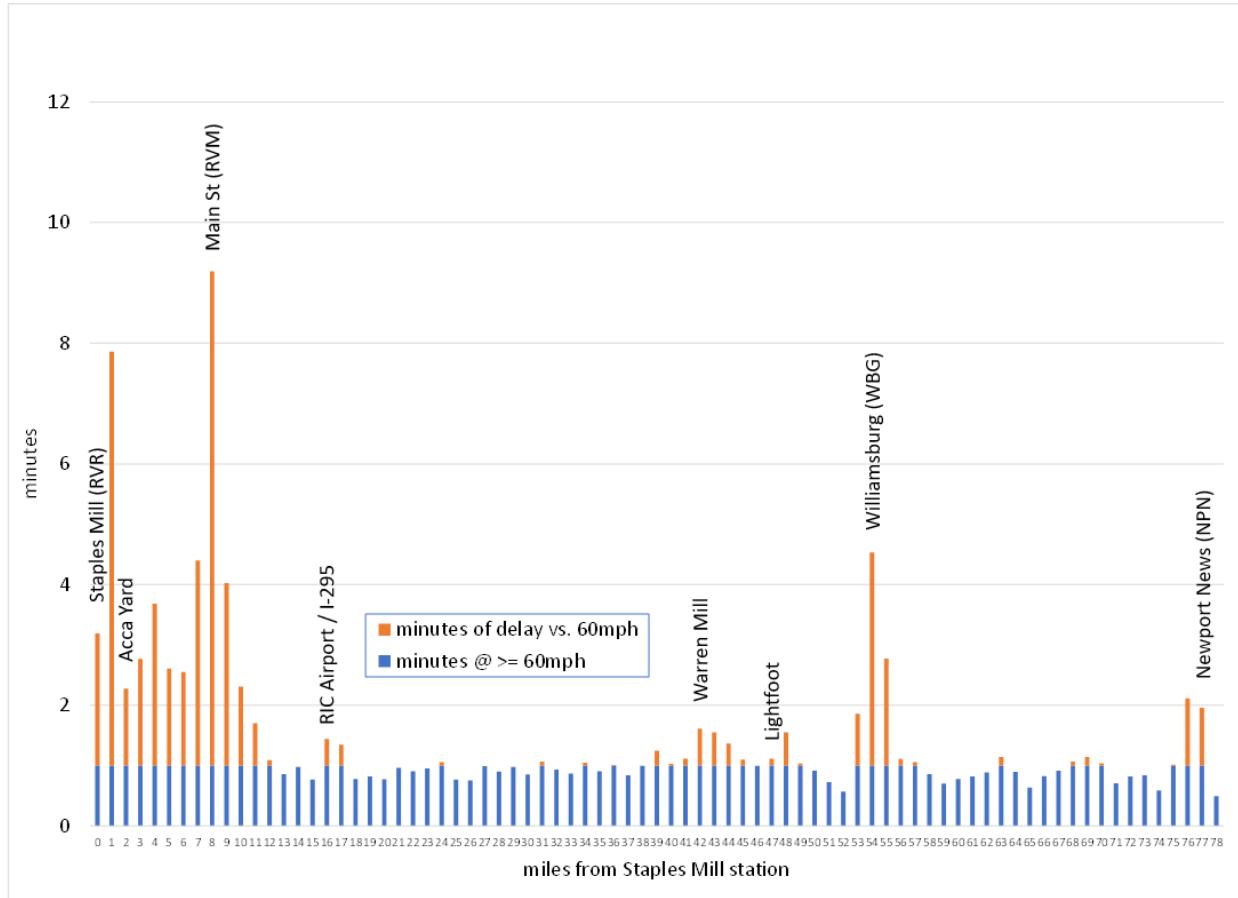


FIGURE 7 Delay by mile, Peninsula trains, Southbound, 2021, minutes

Source: HRTPO staff processing of Amtrak data

Other than delays at stations (RVR, RVM, WBG, and NPN⁹), the greatest delays occur **between the two Richmond stations** (Staples Mill [RVR] and Main St [RVM]).

To see this location, refer to the map on the following page.

⁸ Railroad segments have maximum speeds which vary from segment to segment. The fastest segments in Virginia have a maximum speed of 79 mph.

⁹ For explanation of three-letter station codes, see figure on this page.

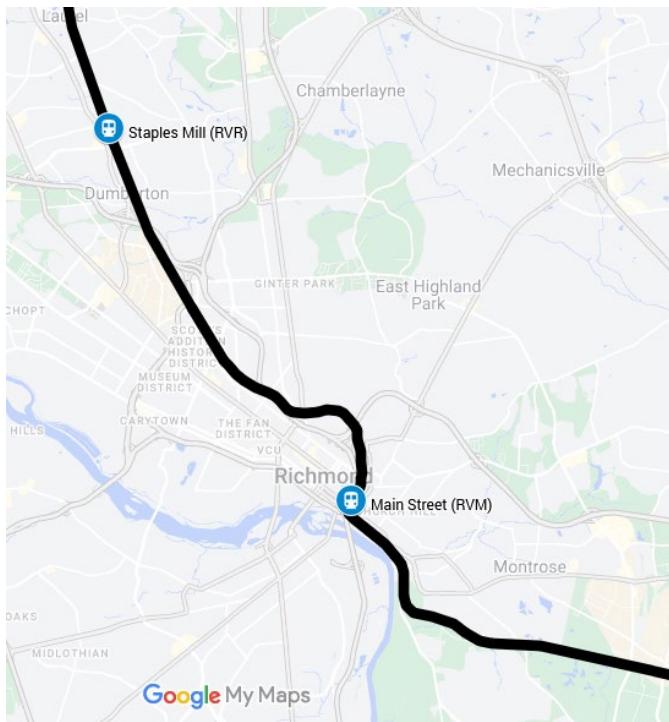


FIGURE 8 Railroad between the Richmond Stations

Source: HRTPO staff via Google My Maps



FIGURE 9 Freight Train

Source: HRTPO staff

2. Northbound

Of the two **northbound weekday trains serving the Peninsula**—train #174 to Boston, and train #186 to New York—data was only available for train #174. Averaging a year's worth of GPS pings for the northbound train #174—resulted in the following travel times per mile:

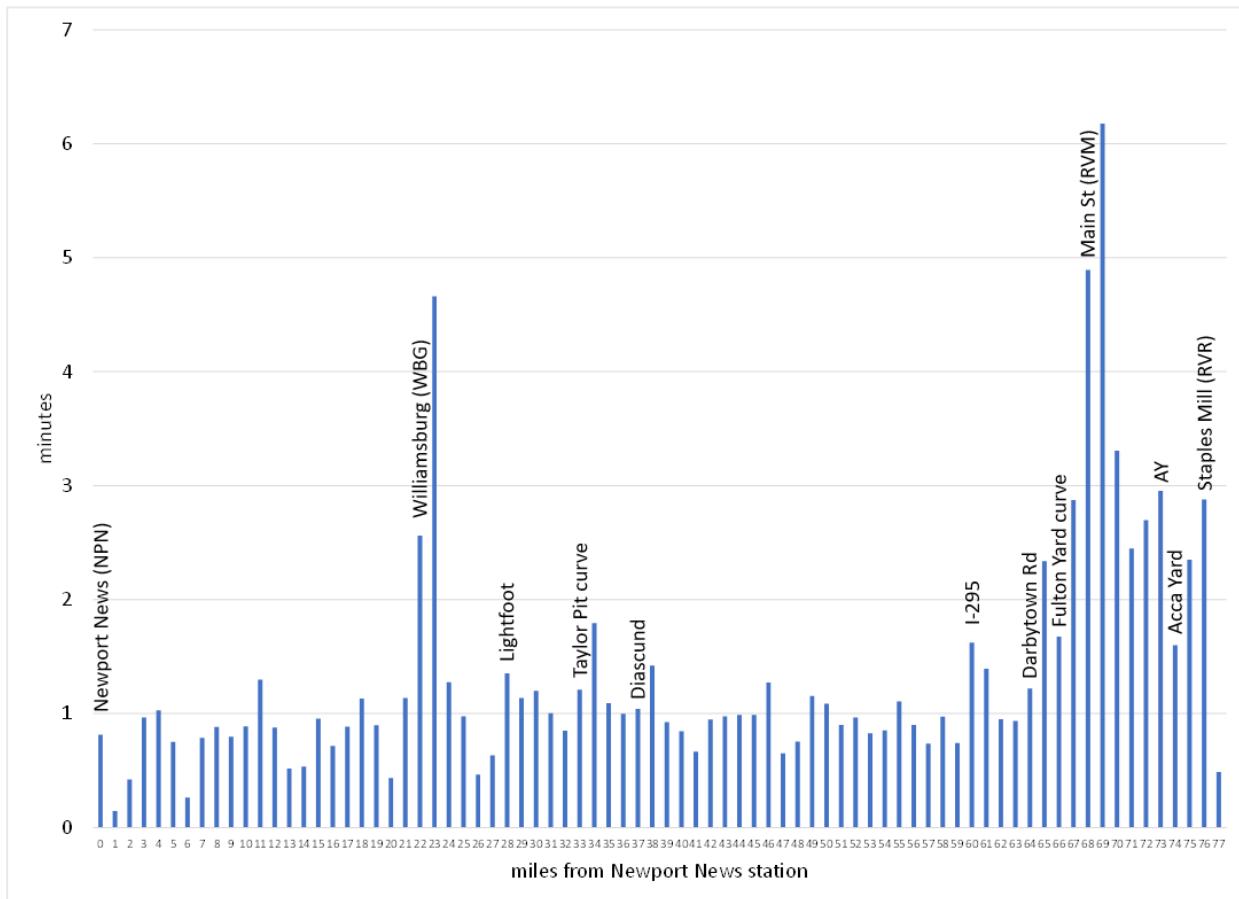


FIGURE 10 Travel Time by mile, Peninsula train #174, Northbound, 2021, minutes

Source: HRTPO staff processing of Amtrak data

The chart reveals high travel times per mile **in/near Richmond** (right side of chart).

To more easily see areas of delay, staff colored orange that portion of the travel times which exceed one minute—one minute being the travel time for averaging 60 mph—and labeled that portion as “delay”:

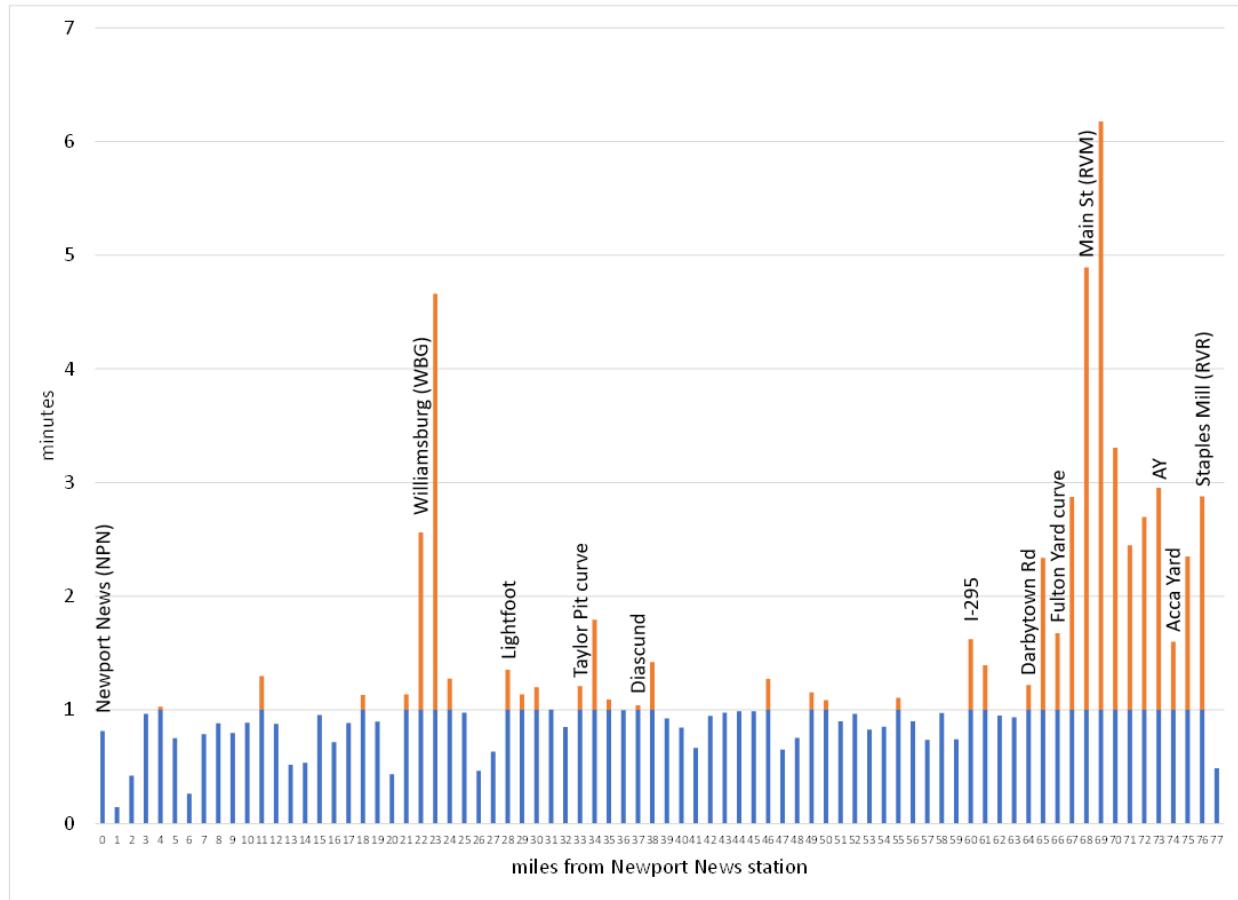


FIGURE 11 Delay by mile, Peninsula train #174, Northbound, 2021, minutes

Source: HRTPO staff processing of Amtrak data

Other than delays at stations (RVR, RVM, WBG, and NPN), the **greatest delays** occur:

- between **Darbytown Rd** (Henrico Co.) and Main Street station (RVM)
- between the **two Richmond stations** (Main Street [RVM] and Staples Mills [RVR])

To see these locations, refer to the map on the following page.

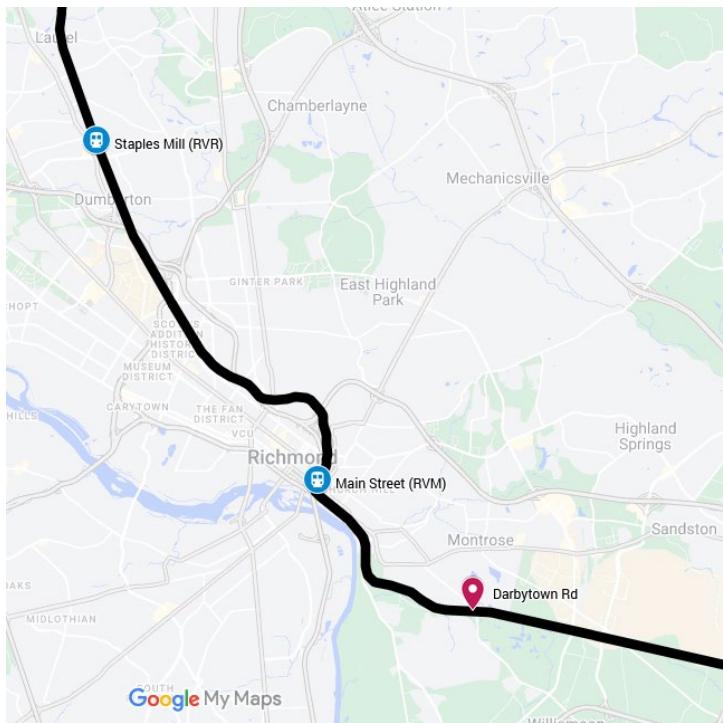


FIGURE 12 Darbytown Rd and Richmond Stations

Source: HRTPO staff via Google My Maps



FIGURE 13 Richmond Main Street Station (RVM)

Source: Amtrak

B. Southside Trains

1. Southbound

Averaging a year's worth of GPS pings for the two¹⁰ **southbound weekday trains serving the Southside**—train #93 from Boston, and train #95 from Boston—resulted in the following travel times per mile:

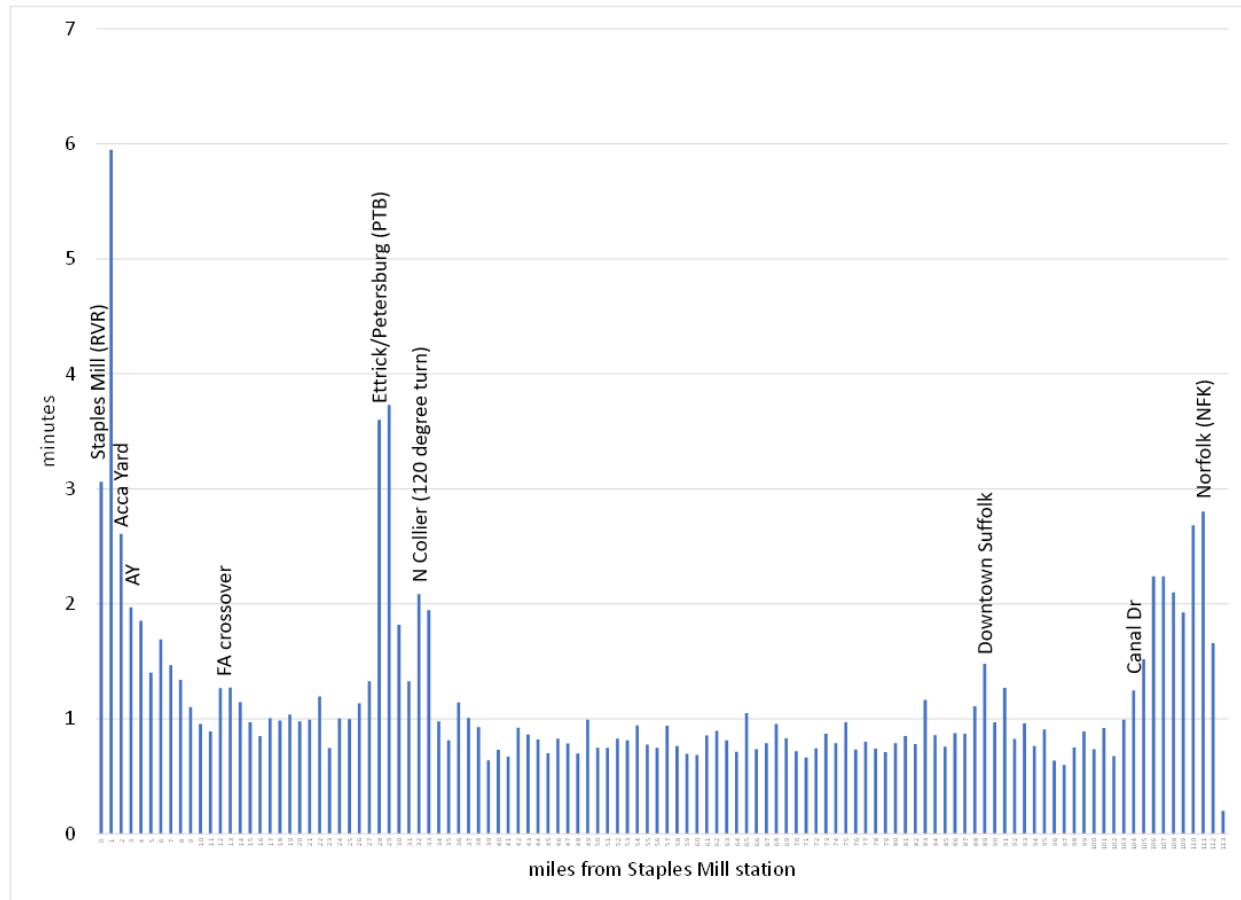


FIGURE 14 Travel Time by mile, Southside trains, Southbound, 2021, minutes
Source: HRTPO staff processing of Amtrak data

The chart reveals high travel times **in/near Richmond** (left side of chart) and **in/near Norfolk** (right side of chart).

¹⁰ Note that the third Southside southbound train (#185) began service in 2022, thus having no 2021 data.

To more easily see areas of delay, staff colored orange that portion of the travel times which exceed one minute—one minute being the travel time for averaging 60 mph—and labeled that portion as “delay”:

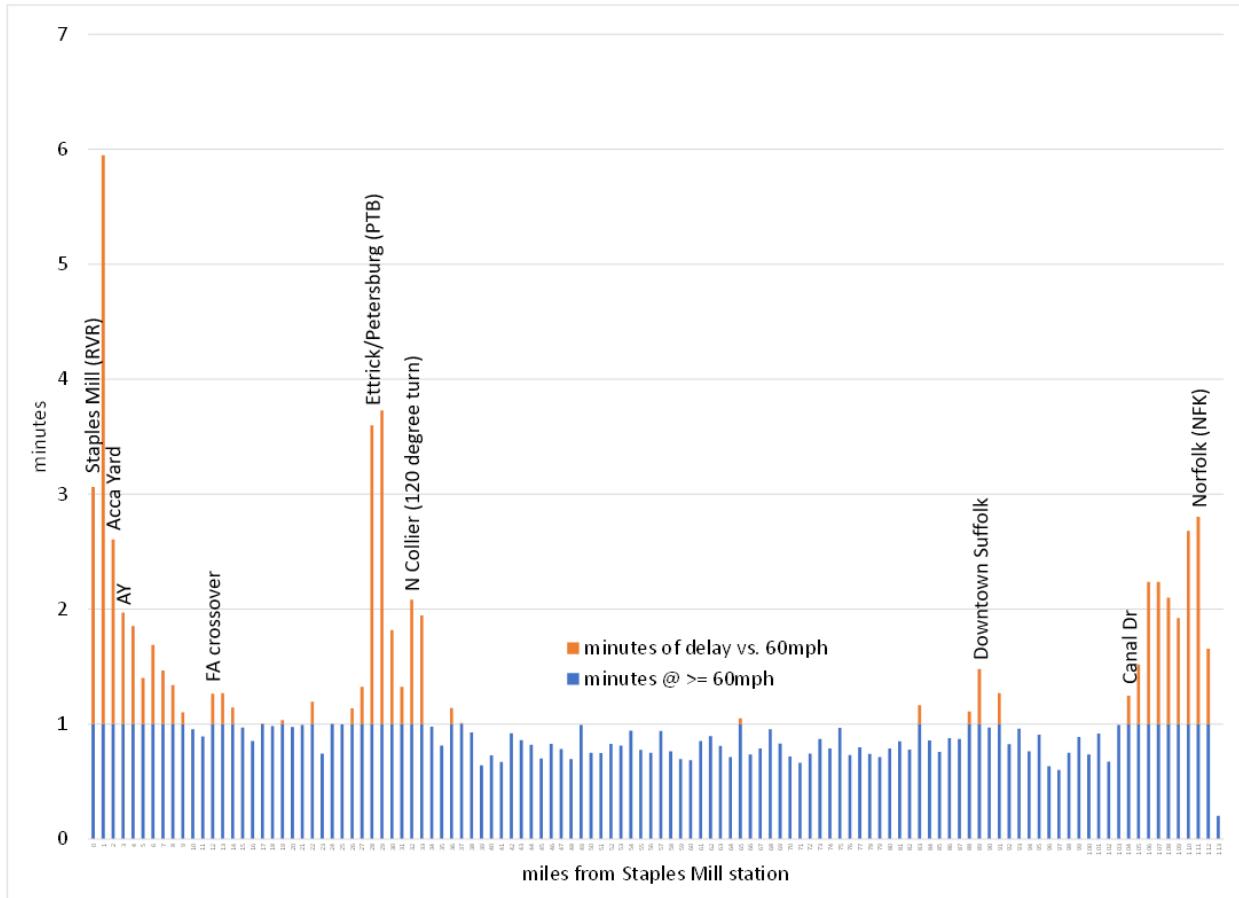


FIGURE 15 Delay by mile, Southside trains, Southbound, 2021, minutes

Source: HRTPO staff processing of Amtrak data

Other than delays at stations (RVR, PTB, and NFK), the **greatest delays** occur:

- between **Staples Mill station (RVR) and AY**¹¹
- between **Canal Dr (Chesapeake) and the Norfolk station (NFK)**

For these locations, see the maps on the following page.

¹¹ Definition and location of “AY” is shown on following page.

“AY” is the name of the “wye” (or “Y”)—a triangular junction—where the Southside and Peninsula routes meet. Note that along the first segment of delays highlighted above—between AY and RVR—the Southside trains are using the same track as the Peninsula trains (as shown below) and thus experiencing delays similar to those of the Peninsula trains.

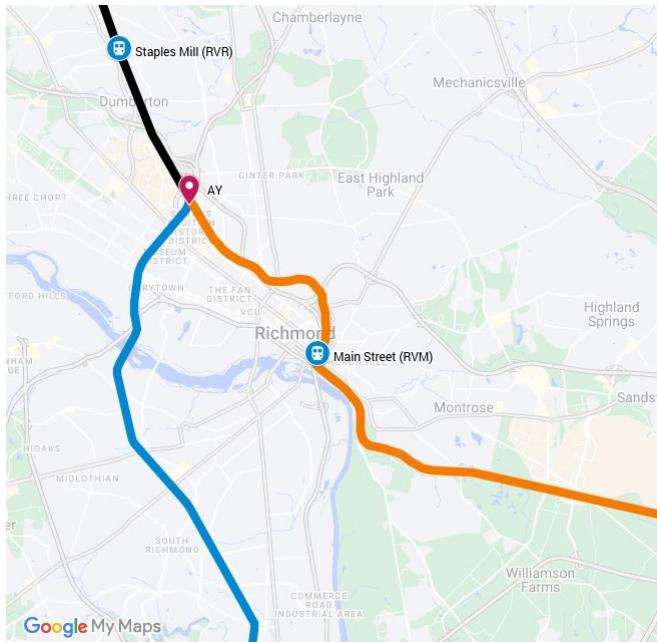


FIGURE 16 AY, Peninsula Route, Southside Route, and Shared Route

Source: HRTPO staff via Google My Maps

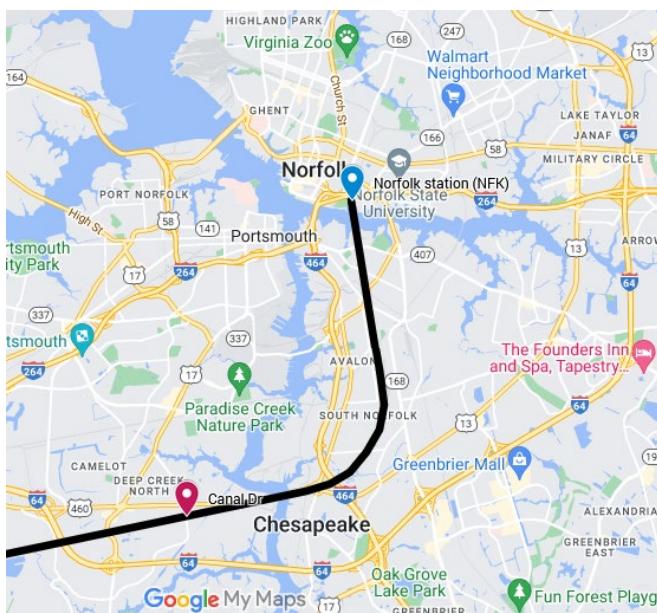


FIGURE 17 Canal Dr (Chesapeake) and Norfolk Station (NFK)

Source: HRTPO staff via Google My Maps

2. Northbound

Averaging a year's worth of GPS pings for the two¹² **northbound weekday trains serving the Southside**—train #84 to New York, and train #94 to Boston—resulted in the following travel times per mile:

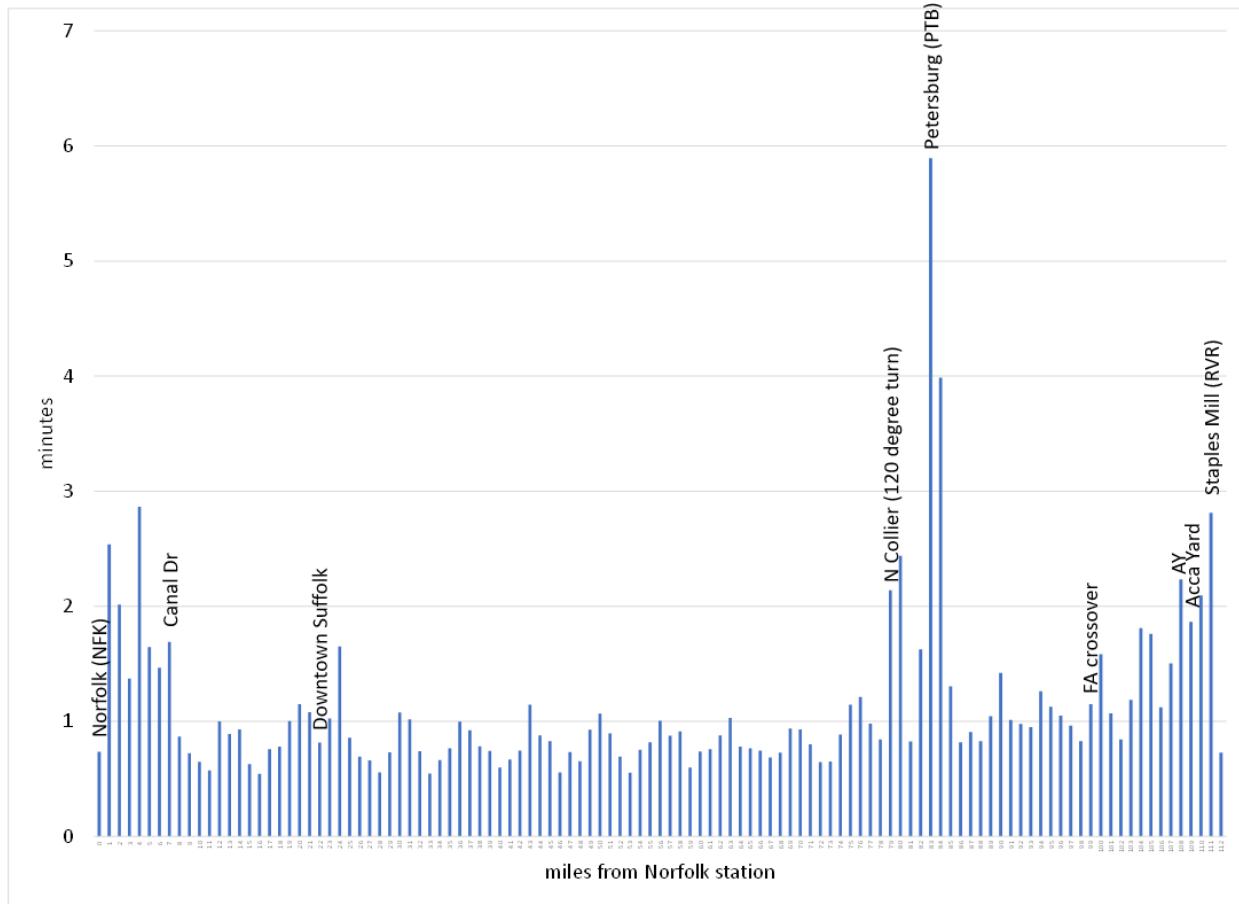


FIGURE 18 Travel Time by mile, Southside trains, Northbound, 2021, minutes

Source: HRTPO staff processing of Amtrak data

The chart reveals high travel times **in/near Richmond** (right side of chart) and **in/near Norfolk** (left side of chart).

¹² Note that the third Southside northbound train (#138) began service in 2022, thus having no 2021 data.

To more easily see areas of delay, staff colored orange that portion of the travel times which exceed one minute—one minute being the travel time for averaging 60 mph—and labeled that portion as “delay”:

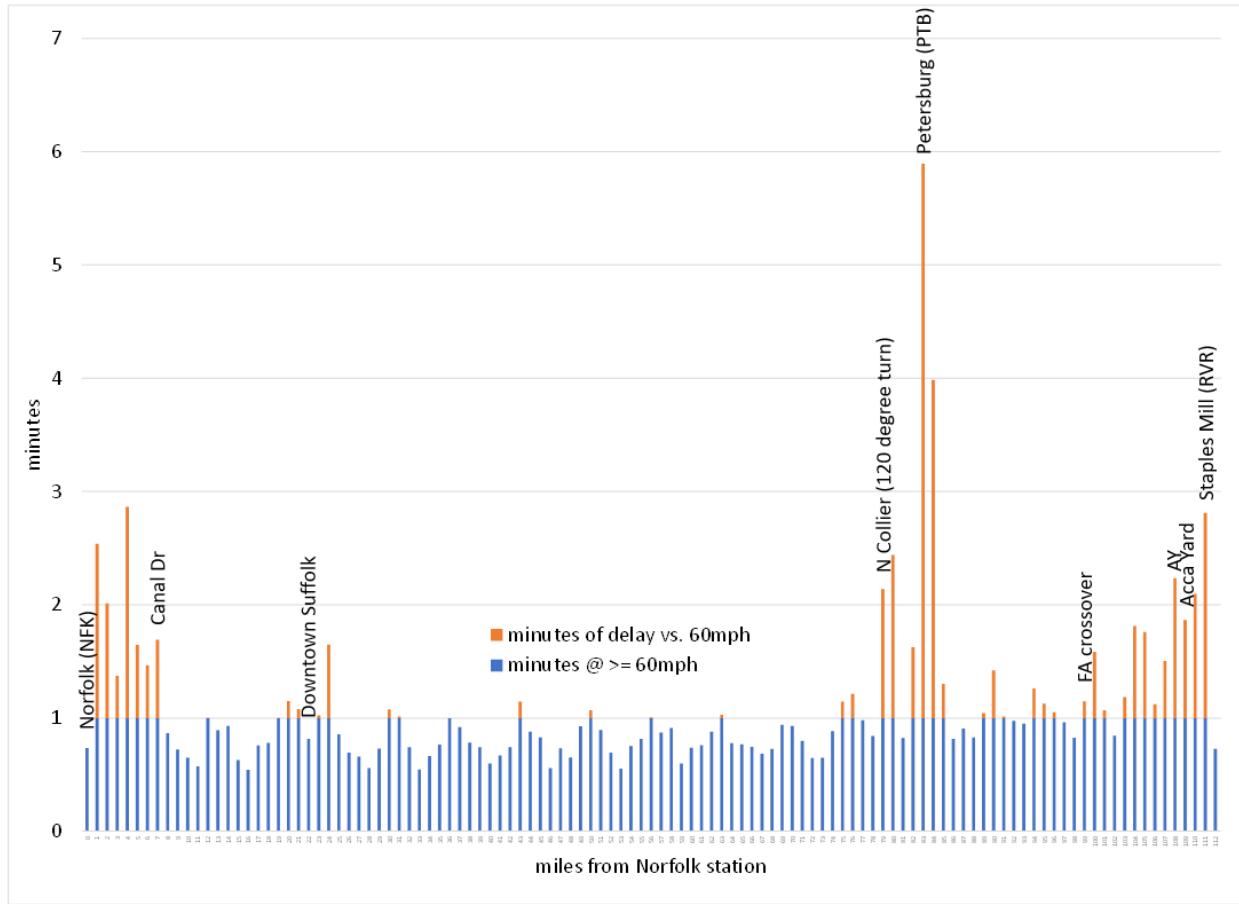


FIGURE 19 Delay by mile, Southside trains, Northbound, 2021, minutes

Source: HRTPO staff processing of Amtrak data

Other than delays at stations (RVR, PTB, and NFK), the **greatest delays** occur:

- between the **Norfolk station (NFK) and Canal Dr (Chesapeake)**
- between the **AY and Staples Mill station (RVR)**

For these locations, see maps in “Southbound” section above.

Note that along the second segment of delays highlighted above—between AY and RVR station—the Southside trains are using the same track as the Peninsula trains and thus experiencing delays similar to those of the Peninsula trains.

Step Two- Analysis of Segment Between Richmond Stations

In Step One, staff analyzed the entire eastern segments of Hampton Roads (HR) trains—between Staples Mill station in Richmond and either Newport News or Norfolk—finding **delays**:

- between Canal Dr (Chesapeake) and the Norfolk station (NFK)
- between Darbytown Rd (Henrico Co.) and the Main Street station (RVM)
- between the two Richmond stations (Main Street [RVM] and Staples Mills [RVR])

In Step Two, of these three locations, staff analyzed **in detail** the one with the **largest delays**—the **segment between the Richmond stations**—using a **more exact method** of assigning the location of travel time. This different method required staff to return to the raw GPS data and use a different method to clean it. Note that, although Southside trains use part of the segment between Richmond stations, only Peninsula trains use the whole segment. Therefore, only **Peninsula trains** were used in this Step Two analysis.

Cleaning the Dataset

The method used to clean the dataset can be found in the Appendix. Cleaning reduced the dataset from 1,758 train runs (352,372 pings) to 685 train runs (7,379 pings):

• Train 67	Boston (BOS) to Newport News (NPN)	230 train runs
• Train 125	New York (NYP) to NPN	221 train runs
• Train 174	NPN to BOS	234 train runs
• Train 186	NPN to NYP	<u>no data available</u>
• Total		685 train runs

Identifying the Location of Delays

Step Two used a more exact method (than Step One) of assigning travel time to mile-based locations: first, the **latitude and longitude of imaginary mile markers** along the route were calculated using GIS (shown on the map below), and then each ping's travel time was assigned to the nearest mile marker.¹³

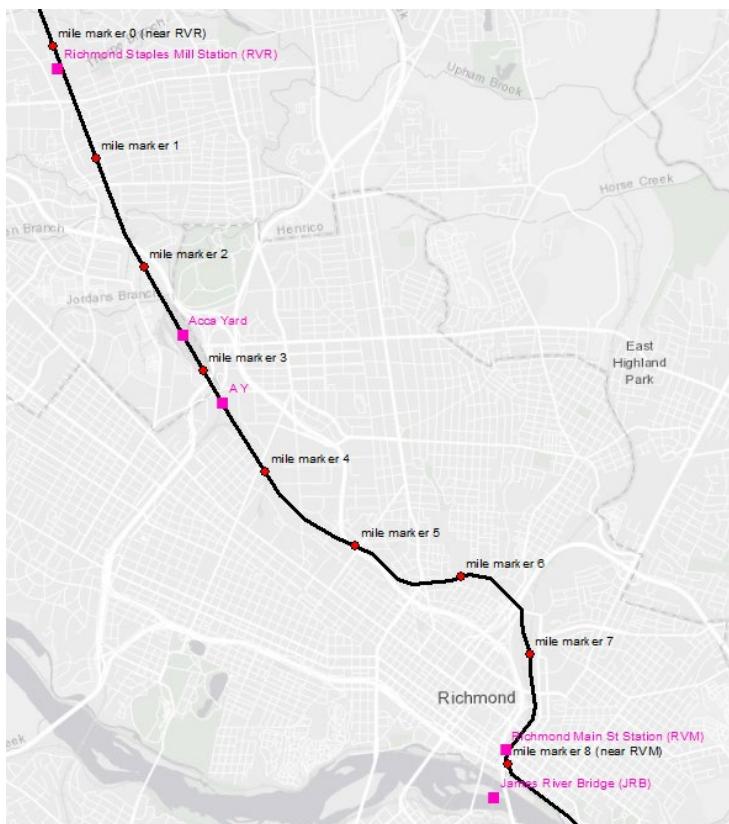


FIGURE 20 Mile Marker Locations in Richmond

Source: HRTPO staff via ArcGIS

¹³ Given that the travel time between a pair of pings occurs along the distance between the first ping and the second ping, staff considered the midpoint between those pings as the location to be assigned to the nearest mile marker. For example, if the subject pair's midpoint was closest to mile marker 45's lat/long, then the travel time between those pings was assigned to mile marker 45.

A. Southbound

Averaging a year's worth of GPS pings for the two **southbound weekday Peninsula trains**—train #67 from Boston, and train #125 from New York—resulted in the following travel times per mile:

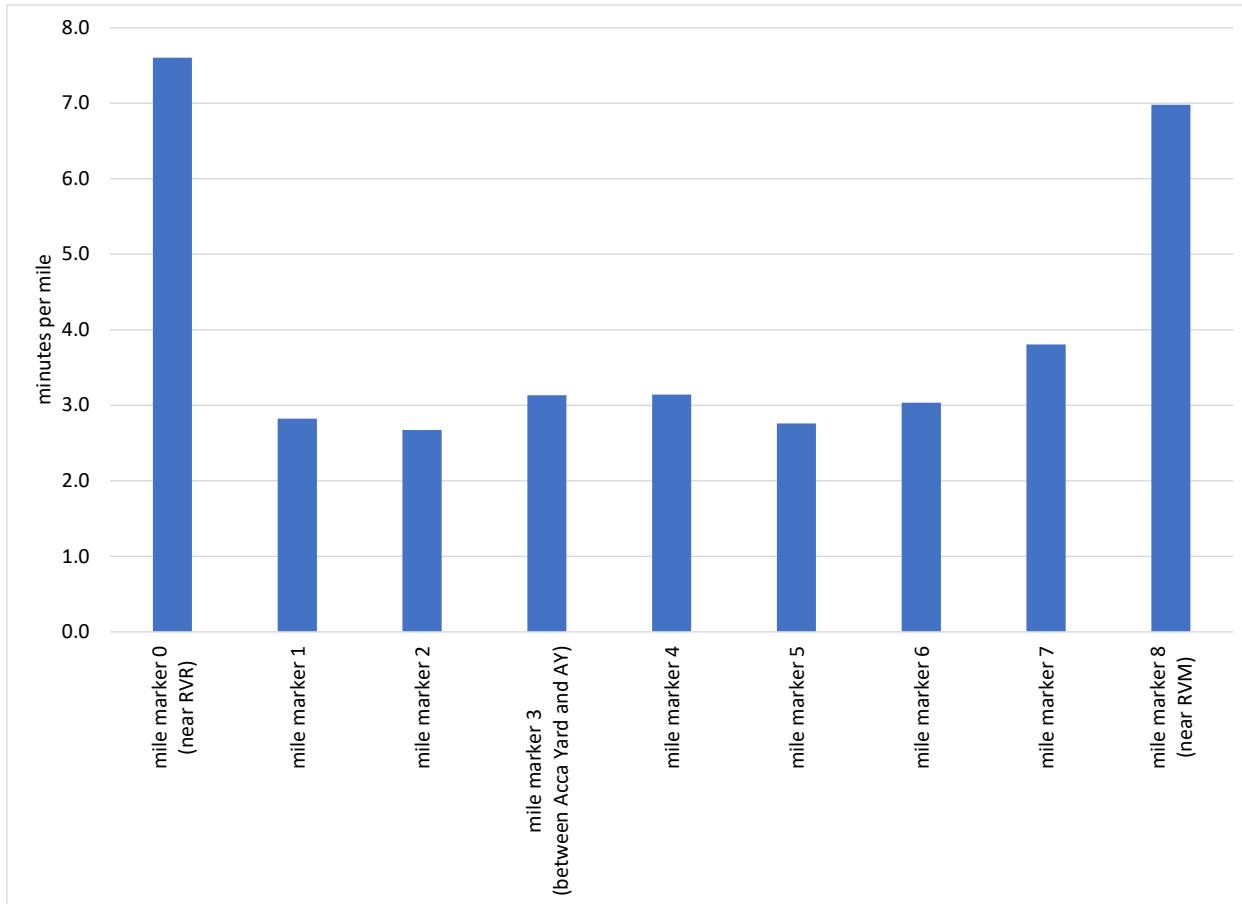


FIGURE 21 Travel Time by mile, Peninsula trains, Southbound, 2021, minutes

Source: HRTPO staff processing of Amtrak data

The chart reveals **consistent travel times**—approximately **3 minutes per mile**—between the stations (mile marker 1 through mile marker 7¹⁴).

¹⁴ The distance between stations is 7.65 miles.

To see delay, staff colored orange that portion of the travel times which exceed one minute—one minute being the travel time for averaging 60 mph—and labeled that portion as “delay”:

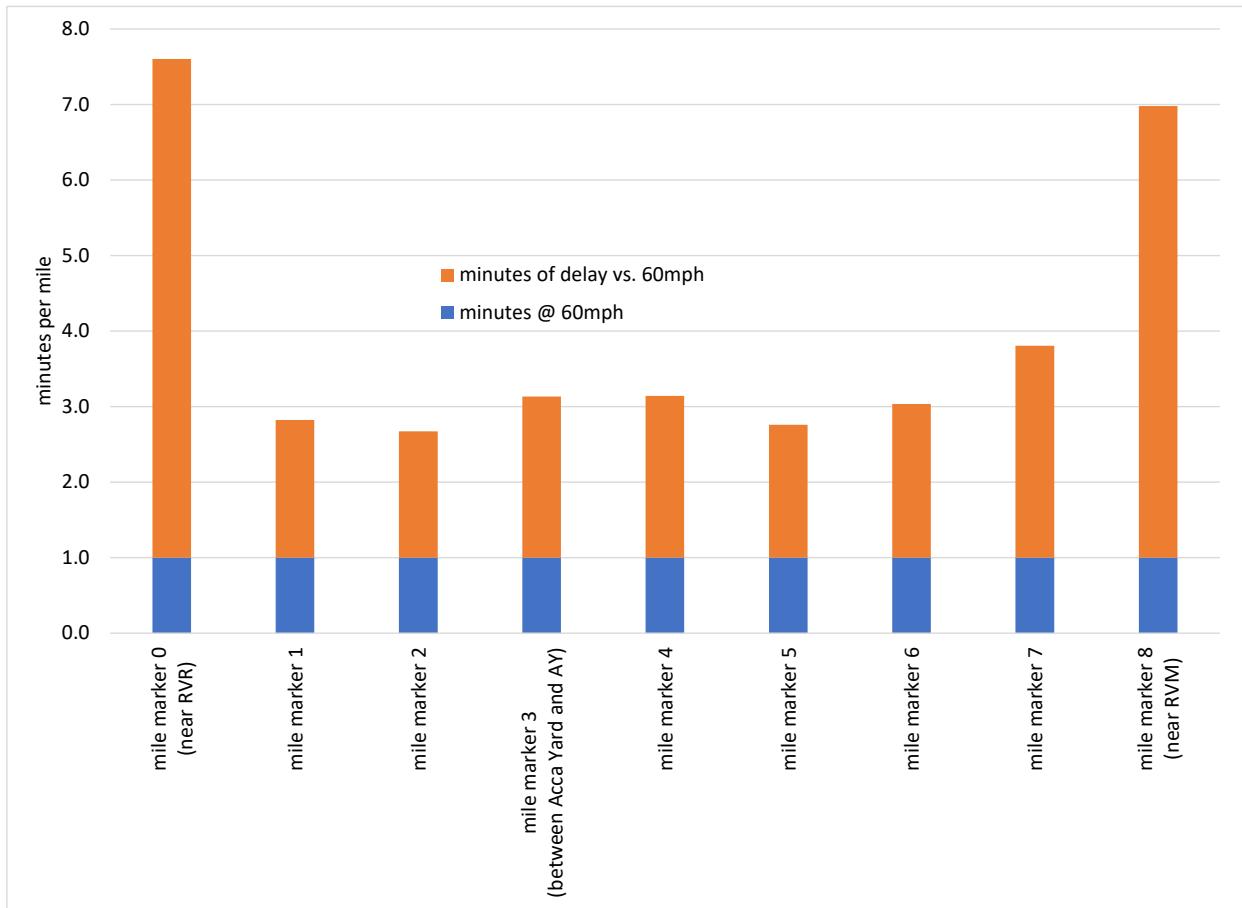


FIGURE 22 Delay by mile, Peninsula trains, Southbound, 2021, minutes

Source: HRTPO staff processing of Amtrak data

The chart shows approximately 2 minutes per mile delay over the seven miles, for a total of **14 minutes of delay** southbound between the stations.

Given that these southbound trains require on average approximately three minutes to cover each mile between the Richmond stations¹⁵, at what speeds are they traveling?

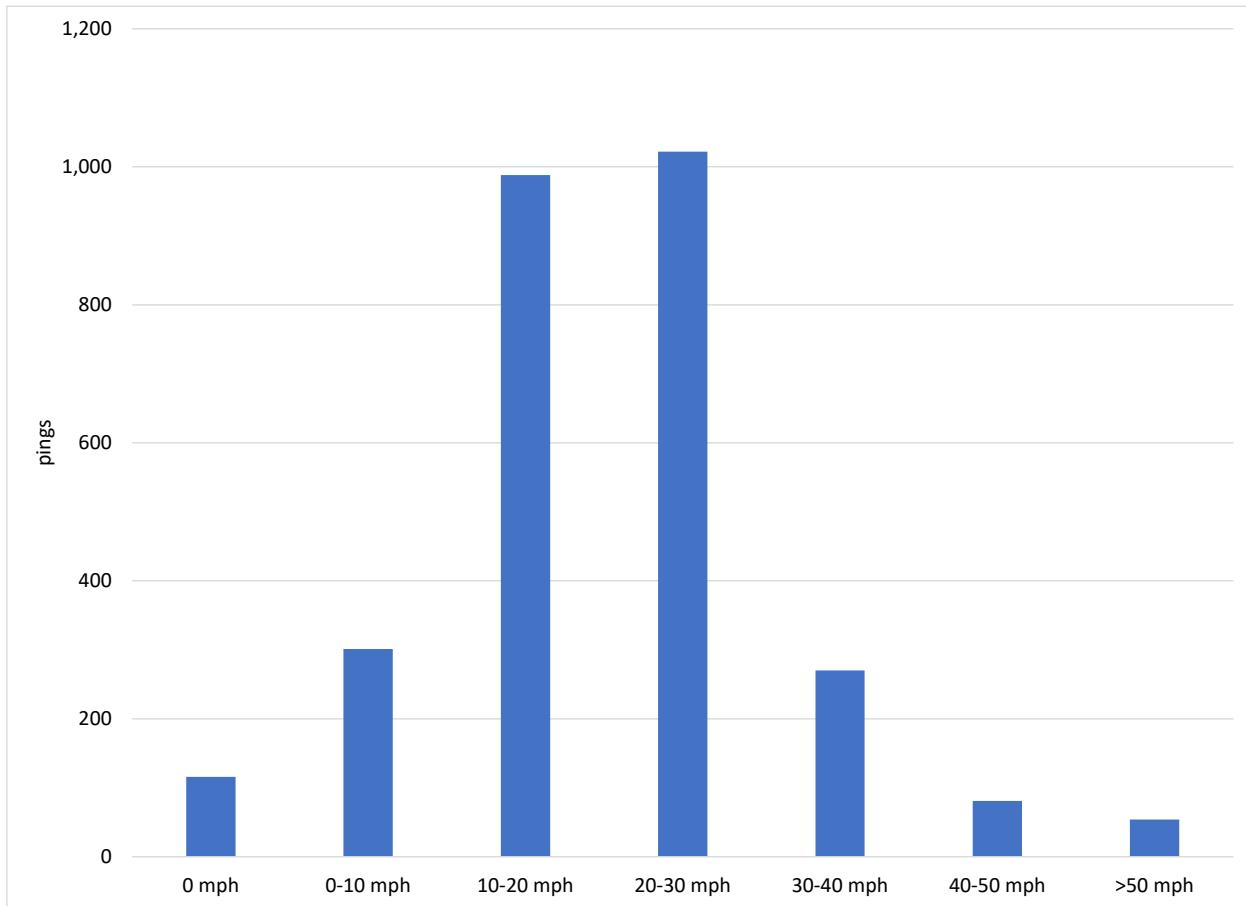


FIGURE 23 Speeds, Peninsula trains, Southbound, 2021

Source: HRTPO staff processing of Amtrak data

As shown above, these trains move slowly—**usually 10-30 mph**—and sometimes **stop** (“0 mph” on chart).

Note that the average time period between pings is approximately three minutes. Therefore, 1) *recorded* stoppages lasted a considerable length of time (one time period), and 2) there were likely many *unrecorded* stoppages (lasting less than one time period).

Of the 451 train runs, **11% (49 runs) included at least one recorded stoppage**, and an additional 31% of the runs (142 runs) included at least one ping indicating 0-to-10 mph.

¹⁵ The data on this page is for mile marker 1 through mile marker 7.

Staff used GIS mapping to investigate the location of stoppages and speeds.

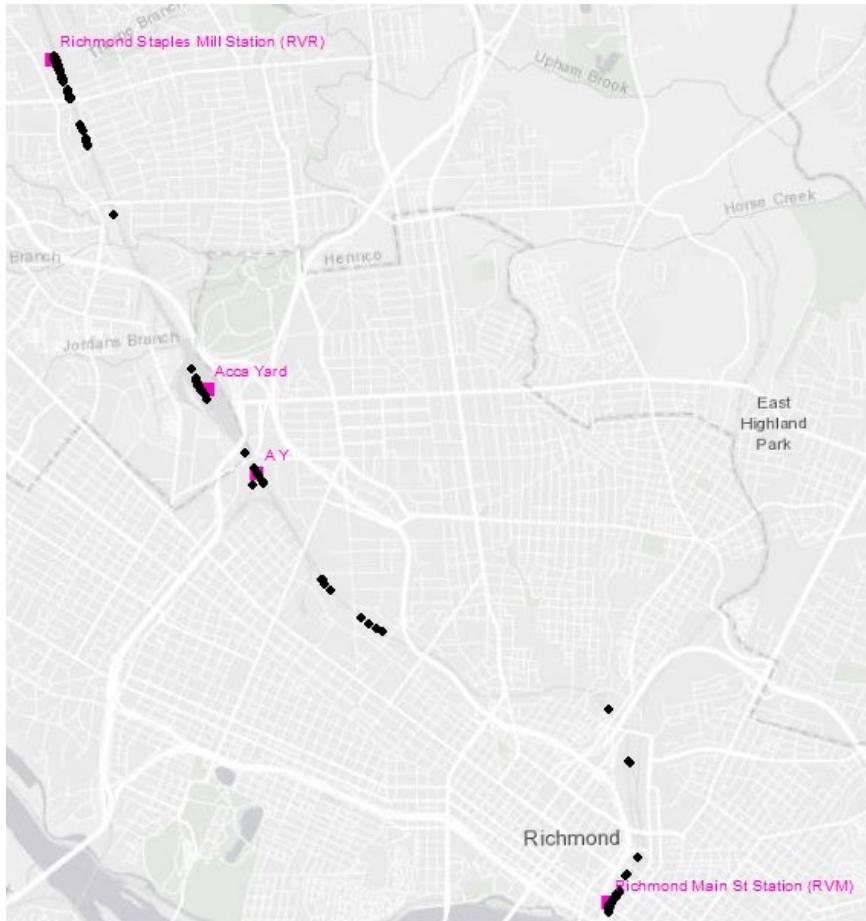


FIGURE 24 Stoppages, Peninsula trains, Southbound, 2021

Source: HRTPO staff processing of Amtrak data

Base map: ESRI, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community

Southbound Peninsula trains are stopping mostly between RVR and AY, i.e. in **the northern section**.

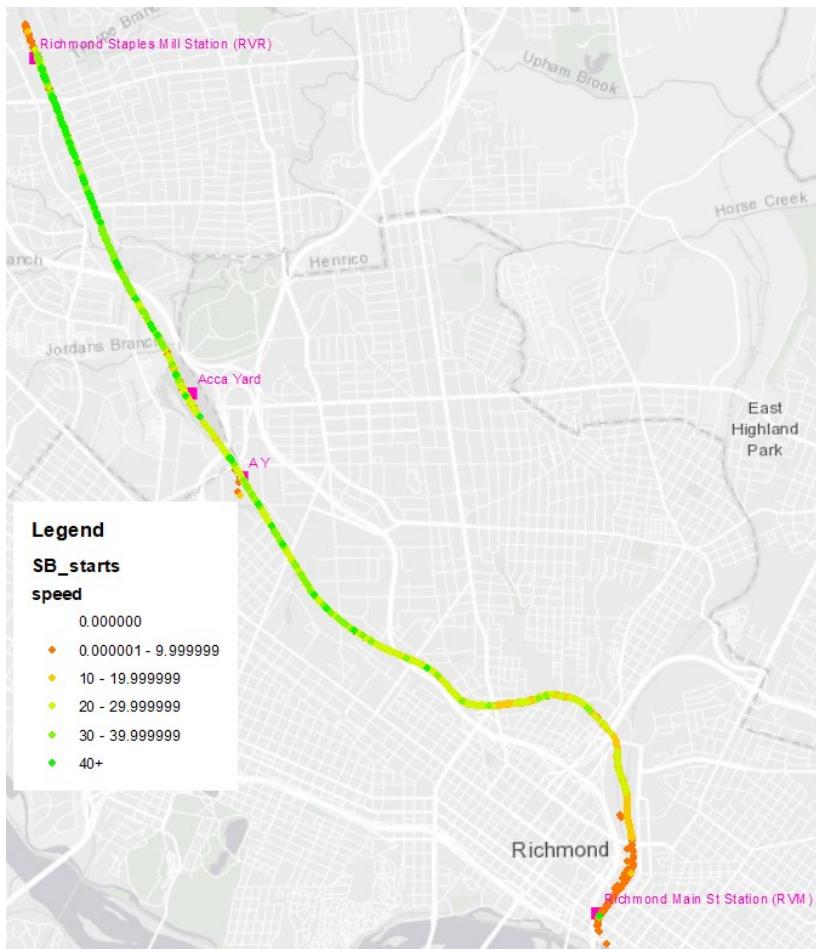


FIGURE 25 Speeds, Peninsula trains, Southbound, 2021, mph

Source: HRTPO staff processing of Amtrak data

Base map: ESRI, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community

Ironically, the higher speeds are also in the **northern section**.

Given that 1) the northern section contains both many stoppages and higher speeds, and 2) the southern section contains fewer stoppages and lower speeds, the **travel times of the two sections are similar** (as shown on the delay chart above).

B. Northbound

Of the two **northbound weekday Peninsula trains**—train #174 to Boston, and train #186 to New York—data was only available for train #174. Averaging a year's worth of GPS pings for the northbound train #174—resulted in the following travel times per mile:

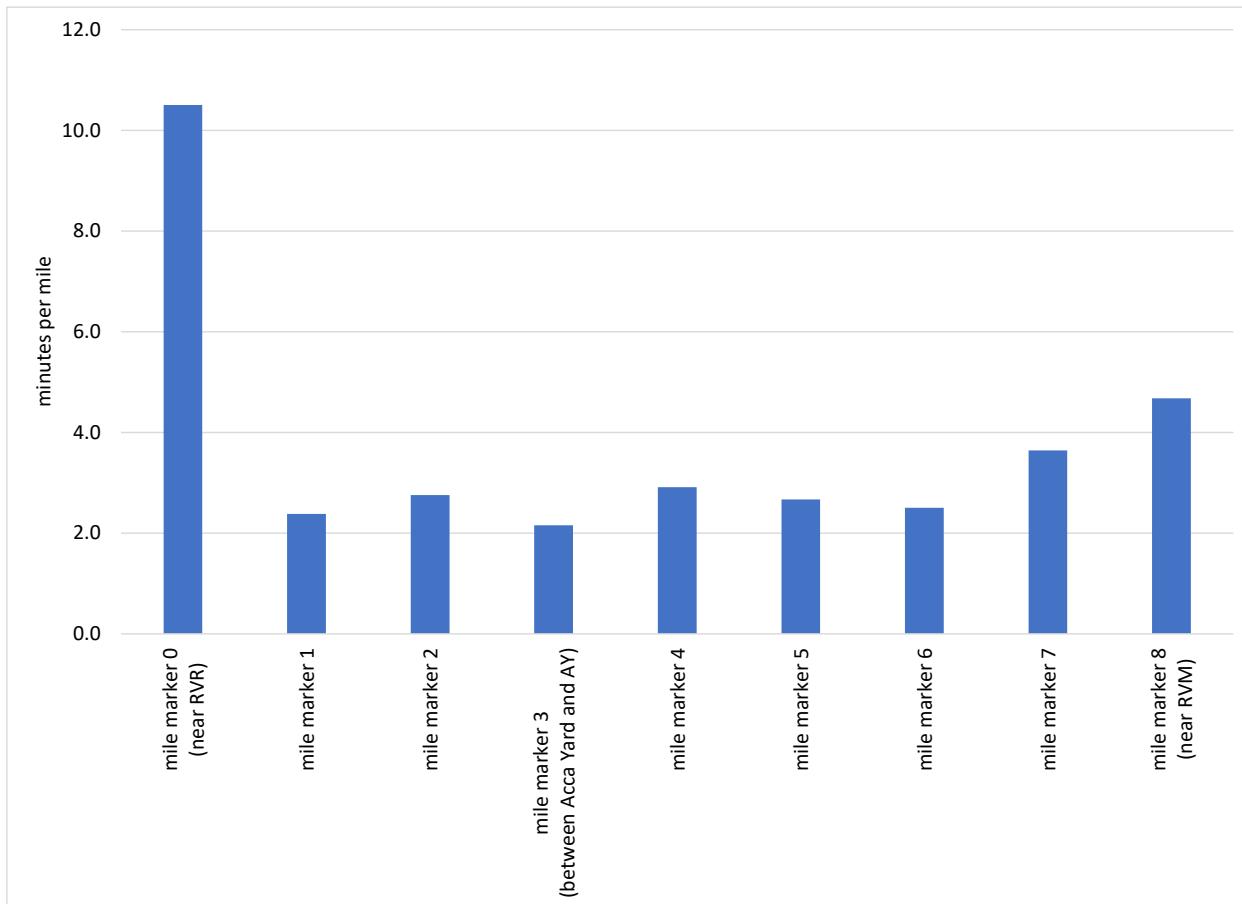


FIGURE 26 Travel Time by mile, Peninsula train #174, Northbound, 2021, minutes
Source: HRTPO staff processing of Amtrak data

The chart reveals **consistent travel times**—approximately **2.5 minutes per mile**—between the stations (mile marker 1 through mile marker 7¹⁶).

¹⁶ The distance between stations is 7.65 miles.

To see **delay**, staff colored orange that portion of the travel times which exceed one minute—one minute being the travel time for averaging 60 mph—and labeled that portion as “delay”:

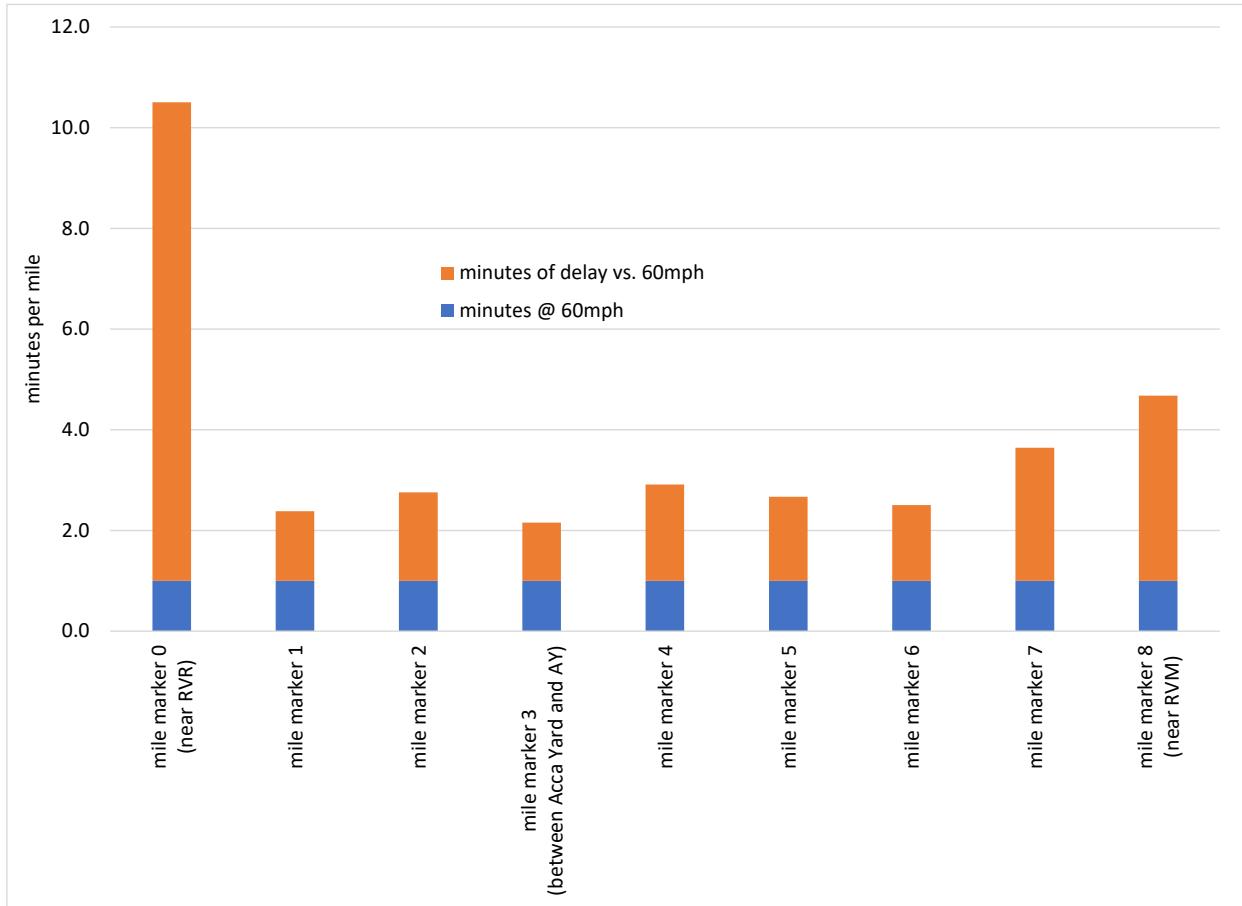


FIGURE 27 Delay by mile, Peninsula train #174, Northbound, 2021, minutes

Source: HRTPO staff processing of Amtrak data

The chart shows approximately 2 minutes per mile delay over the seven miles, for a total of **12 minutes of delay** northbound between the stations, slightly less than that for southbound (14 minutes, above).

Given that these northbound trains require on average approximately 2.5 minutes to cover each mile between the Richmond stations¹⁷, at what speeds are they traveling?

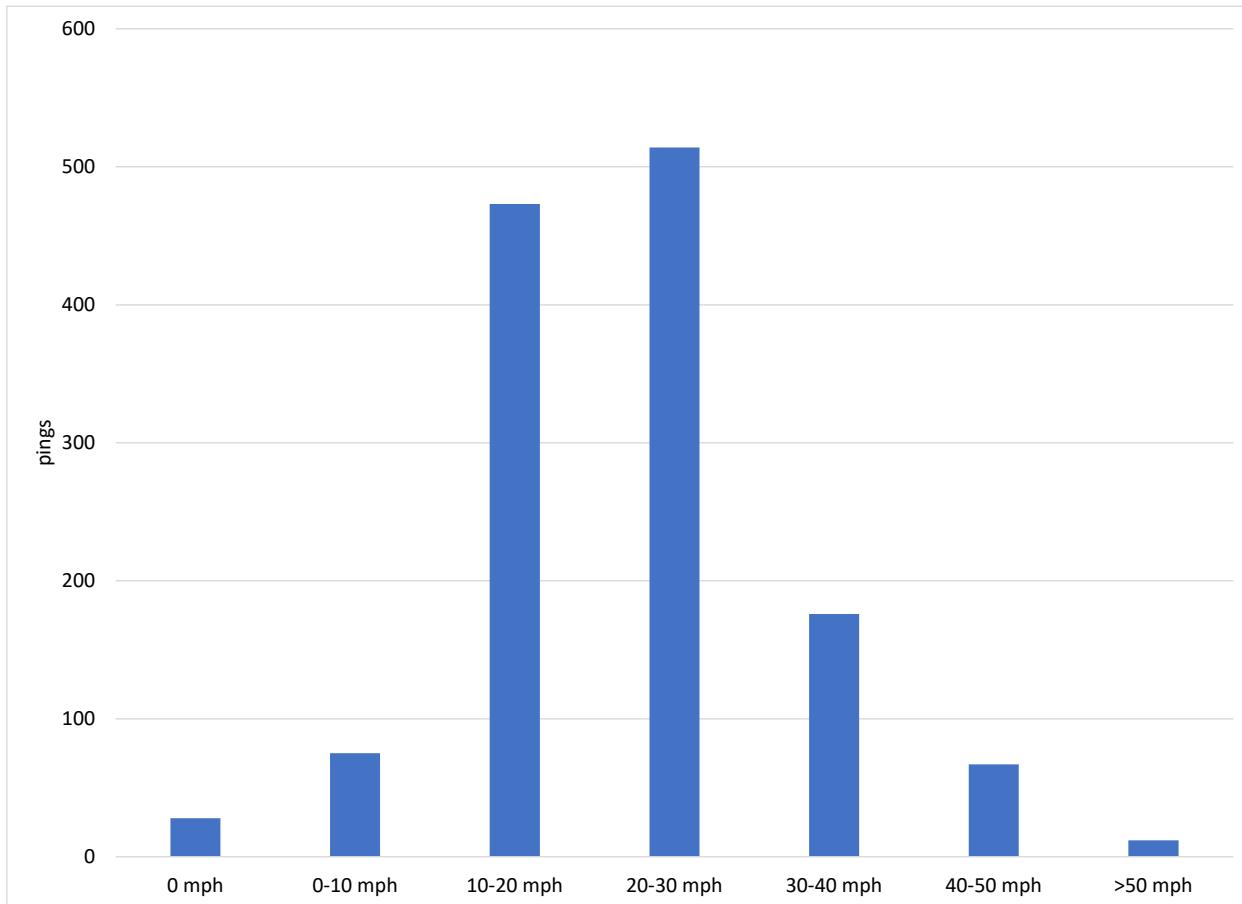


FIGURE 28 Speeds, Peninsula train #174, Northbound, 2021

Source: HRTPO staff processing of Amtrak data

As shown above, these trains move slowly—**usually 10-30 mph**. Unlike the southbound trains, however, these northbound trains rarely stop between Richmond stations¹⁸.

¹⁷ The data on this page is for mile marker 1 through mile marker 7.

¹⁸ Of the 233 train runs, 14 (or 6%) included one or more recorded stoppages.

Staff used GIS mapping to investigate the location of stoppages and speeds.

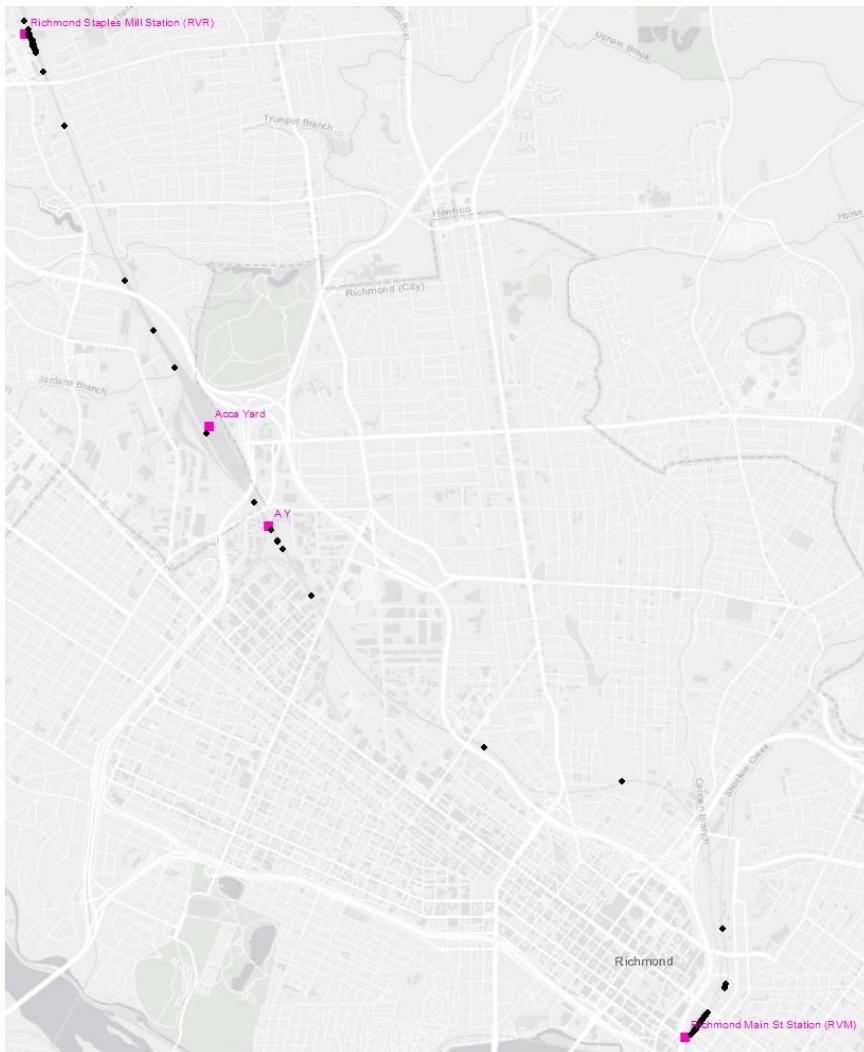


FIGURE 29 Stoppages, Peninsula trains, Northbound, 2021

Source: HRTPO staff processing of Amtrak data

Base map: ESRI, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community

As mentioned above, **northbound trains rarely stop** between Richmond stations.

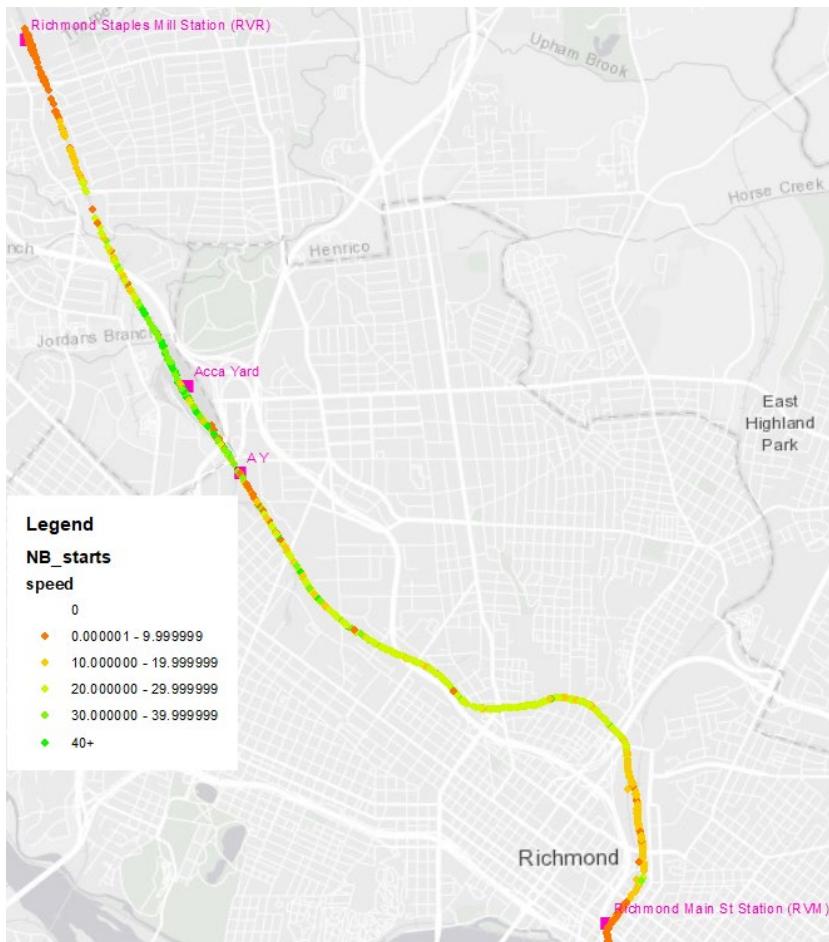


FIGURE 30 Speeds, Peninsula trains, Northbound, 2021, mph

Source: HRTPO staff processing of Amtrak data

Base map: ESRI, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community

Other than near the Main Street station, the southern section appears to contain mostly 20-30 mph speeds. The northern section, however, appears to contain both high speeds (30+ mph) and low speeds (< 20 mph). Therefore, other than near the Main Street station, the **travel times of the two sections are similar** (as shown on the delay chart above).

Improving Hampton Roads Passenger Rail Service

Having found—in the Travel Time Delays section above, between the Richmond stations—**slow speeds** (usually 10-30 mph, southbound and northbound), and **frequent southbound stoppages**, staff searched for projects for reducing these delay factors.

Reducing Delays between Richmond Stations

First staff searched for the *causes* of these delay factors.

Concerning the observed slow speeds, staff understands that the “control speeds” (similar to speed limits) along this section are low, due to issues such as **track geometry** (radius of curvature, superelevation, etc.).

Concerning the frequent stoppages of southbound Peninsula trains: Having originated in Boston or New York, i.e. hundreds of miles from Richmond, southbound trains often arrive in Richmond later than scheduled, missing the time windows allotted to them, and thus **conflict with other trains** (both freight and passenger), causing stoppages.¹⁹

¹⁹ Northbound trains, having originated in Newport News (only approx. 80 miles from Richmond) can more easily arrive in Richmond on schedule.

Perhaps in response to these delays, the “preferred alternative” in the 2019 “DC to Richmond Southeast High Speed Rail” (DC2RVA) final Environmental Impact Statement (EIS) included “**Constructing one main track [between the Richmond stations]**, with track shifts to improve speed...”²⁰

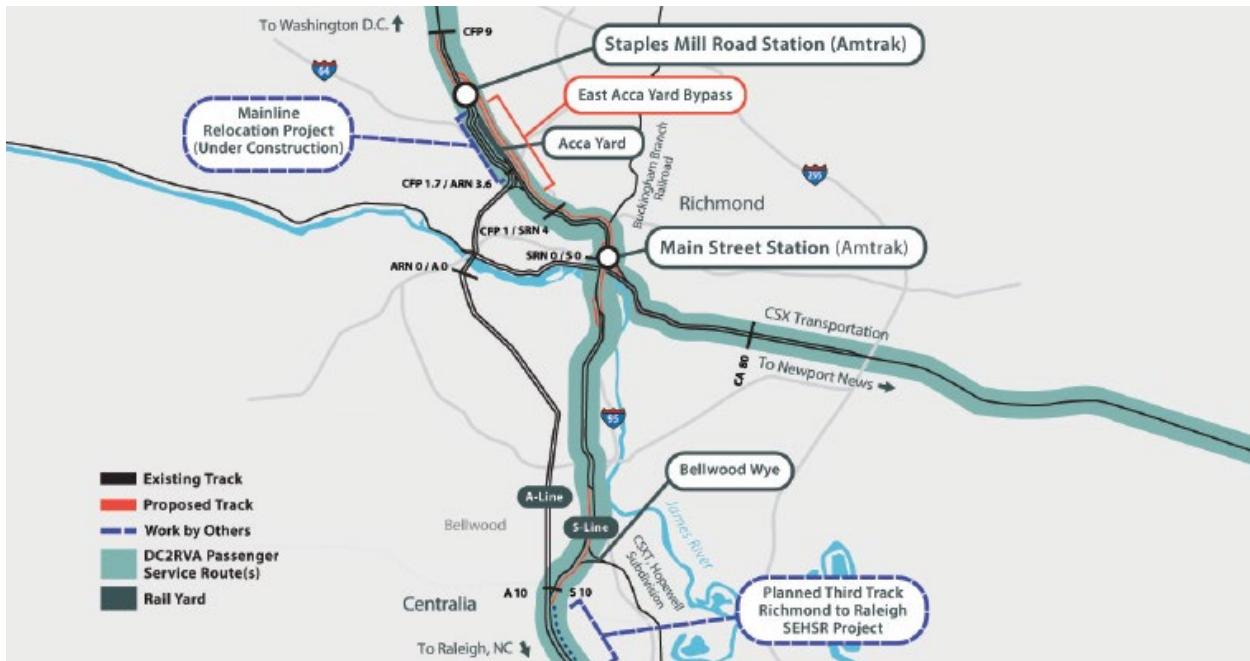


FIGURE 31 Preferred Alternative

Source: DC2RVA EIS, May 2019, p. 21

This additional track is shown (in red) above.

²⁰ DC2RVA EIS, May 2019, p. 21

State rail agencies, however, **do not intend to build this additional track**. As shown on the following page, the subject rail right-of-way is located in The Shockoe Hill African Burying Ground²¹—“the City’s primary burying ground for the enslaved and free people of color who died in Richmond between 1816 and 1879.”²² According to Gerica Goodman, spokesperson for the Virginia Passenger Rail Authority (VPRA), “Our leadership is committed to not disrupting and disturbing this space.”²³ Likewise, the 2022 Virginia Statewide Rail Plan prepared by the Virginia Department of Rail and Public Transportation (DRPT) does not include the additional track.

²¹ According to the National Park Service’s National Register of Historic Places, the Shockoe Hill Burying Ground Historic District is “Bounded by 2nd St., **northern limit of CSX right-of-way**, historic property line and former stream courses.” (<https://www.nps.gov/subjects/nationalregister/database-research.htm> accessed 11-2-23). According to the application for this historic designation

https://www.dhr.virginia.gov/wp-content/uploads/2022/03/127-7231_Shockoe_Hill_Burying_Ground_2022_NRHP_FINAL.pdf, 1) the District includes a “Hebrew” cemetery, a “White” cemetery, and the Shockoe Hill African Burying Ground (Section 7 pages 7-9), and 2) the subject rail right-of-way is in the Shockoe Hill African Burying Ground portion of the District (Figure 10, included above).

²² National Register of Historic Places Registration Form (4-14-2022) for Shockoe Hill Burying Ground Historic District https://www.dhr.virginia.gov/wp-content/uploads/2022/03/127-7231_Shockoe_Hill_Burying_Ground_2022_NRHP_FINAL.pdf, Section 7 page 9.

²³ “At any speed, we don’t need a train station in Shockoe Bottom”, by Michael Paul Williams, Richmond Times-Dispatch, 2-21-23.

**Figure 10: Shockoe Hill African Burying Ground
(44HE1203), within Shockoe Hill Burying Ground Historic District
City of Richmond, VA; DHR No. 127-7231**

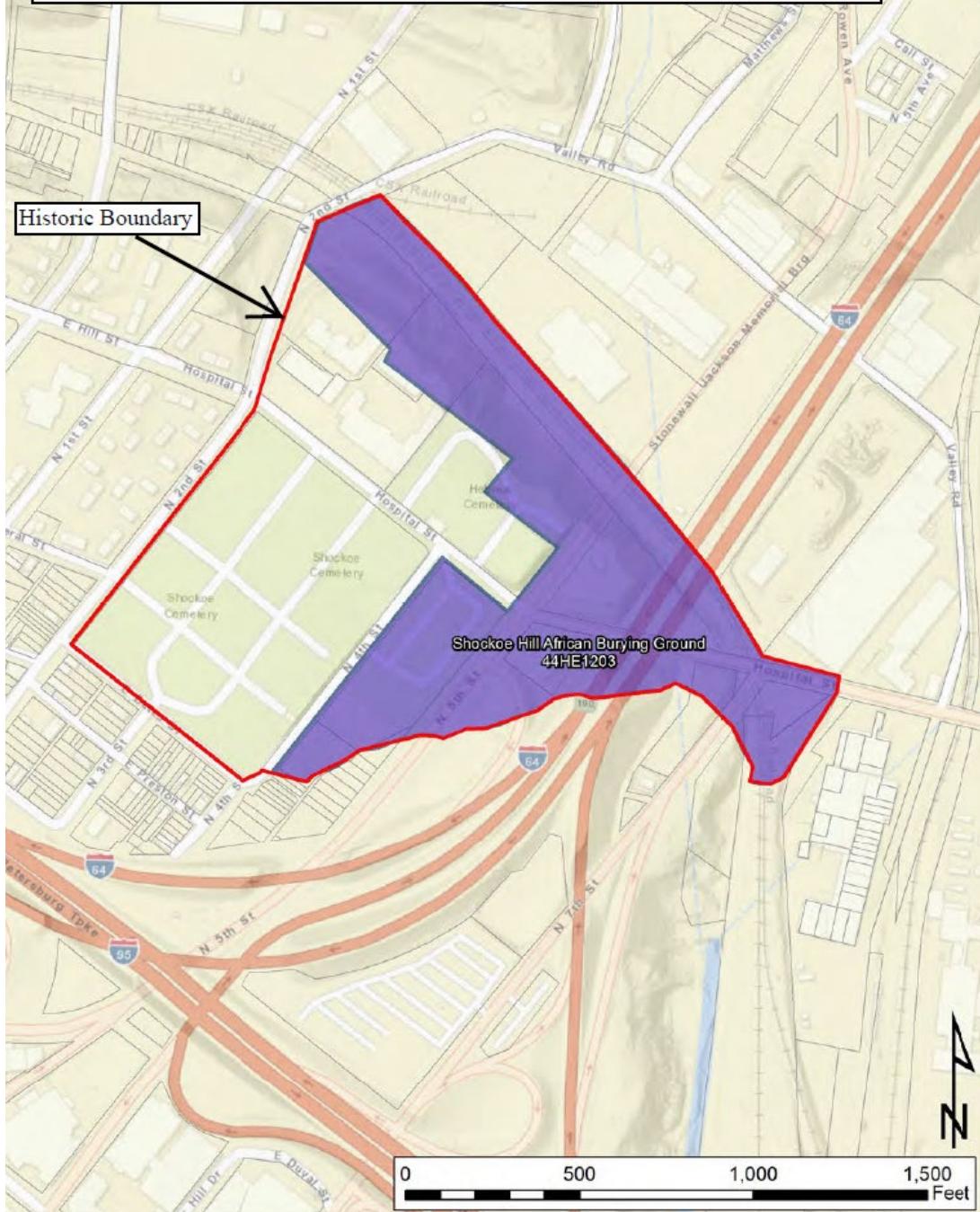


FIGURE 32 Shockoe Hill African Burying Ground

Source: National Register of Historic Places Registration Form (4-14-2022) for Shockoe Hill Burying Ground Historic District
https://www.dhr.virginia.gov/wp-content/uploads/2022/03/127-7231_Shockoe_Hill_Burying_Ground_2022_NRHP_FINAL.pdf

A Look at Shockoe Hill African Burying Ground²⁴

The Shockoe Hill African Burying Ground was first established in 1816 and remained in use until 1879. It was initially slated to provide a final resting place for the remains of both freed and enslaved African American people. Due to the growth of the population of African Americans in Richmond, the burying ground expanded from its initial 2 acres to approximately 31 acres. An estimated 22,000 people found their final resting place, and today, it is suggested that this Shockoe Hill African Burying Ground could be the nation's largest African American resting place. In 2021, Shockoe Hill Burying Ground was approved for a highway historical marker by the Virginia Department of Historic Resources (image below).



FIGURE 33 Marker for Shockoe Hill African Burying Ground

Sources: marker- Virginia Department of Historic Resources; photo- Google Maps

Since the United States' inception, Black people have faced many forms of oppression and harm as a people group. Unfortunately, Shockoe Hill African Burying Ground is no different. The site has been repurposed, excluded from maps, the remains have been disrupted and used as construction fill, and today is almost unrecognizable as the sacred place it once was. Transportation and municipal projects, in particular, have played a significant role in the disruption of the sanctity of this land, which is the final resting place for the ancestors of countless African American descendants living today.

While the Hampton Roads Transportation Planning Organization (HRTPO) is committed to furthering projects that provide accessible and adequate transportation for all, the HRTPO

²⁴ Source: The Cultural Landscape Foundation. (n.d.). *Shockoe Hill African Burying Ground*. <https://www.tclf.org/sites/default/files/microsites/landslide2021/locations/shockoe.html>

recognizes the cultural, social, and personal significance that this land holds to so many. As described in the background of this report, this study intended to seek ways to improve passenger rail between Hampton Roads and Richmond. As recognized by the Virginia Passenger Rail Authority (VPRA), there are no current plans for expansion into the Shockoe Hill African Burying Ground. The HRTPO does not wish to advocate for any future site disruption.

It should also be noted, that while HRTPO is interested in improving passenger rail, the agency would not wish to do so at such a significant and irrevocable expense. Additionally, the Shockoe Hill African Burying Ground falls outside the HRTPO planning jurisdiction, or Metropolitan Planning Area (MPA), and all passenger rail projects within the Commonwealth of Virginia fall within the purview of VPRA.

The HRTPO will continue to look at ways in which to improve access to reliable transportation for Hampton Roads residents and is committed to following planning practices that evaluate the full impact of projects.

Staff Project Idea: The RVA757 Connector

Seeing the unlikelihood of reducing the delay between Richmond stations, staff sought projects for **increasing the frequency** of Hampton Roads train service, particularly accessing downtown Richmond.

Being the closest metro and the state capital, **Richmond is the largest transportation partner for Hampton Roads**. More trips are made to/from Richmond than any other external area—via all modes (highway, rail, bus, etc.) as indicated by the large mass of dots northwest of Hampton Roads on the map below.

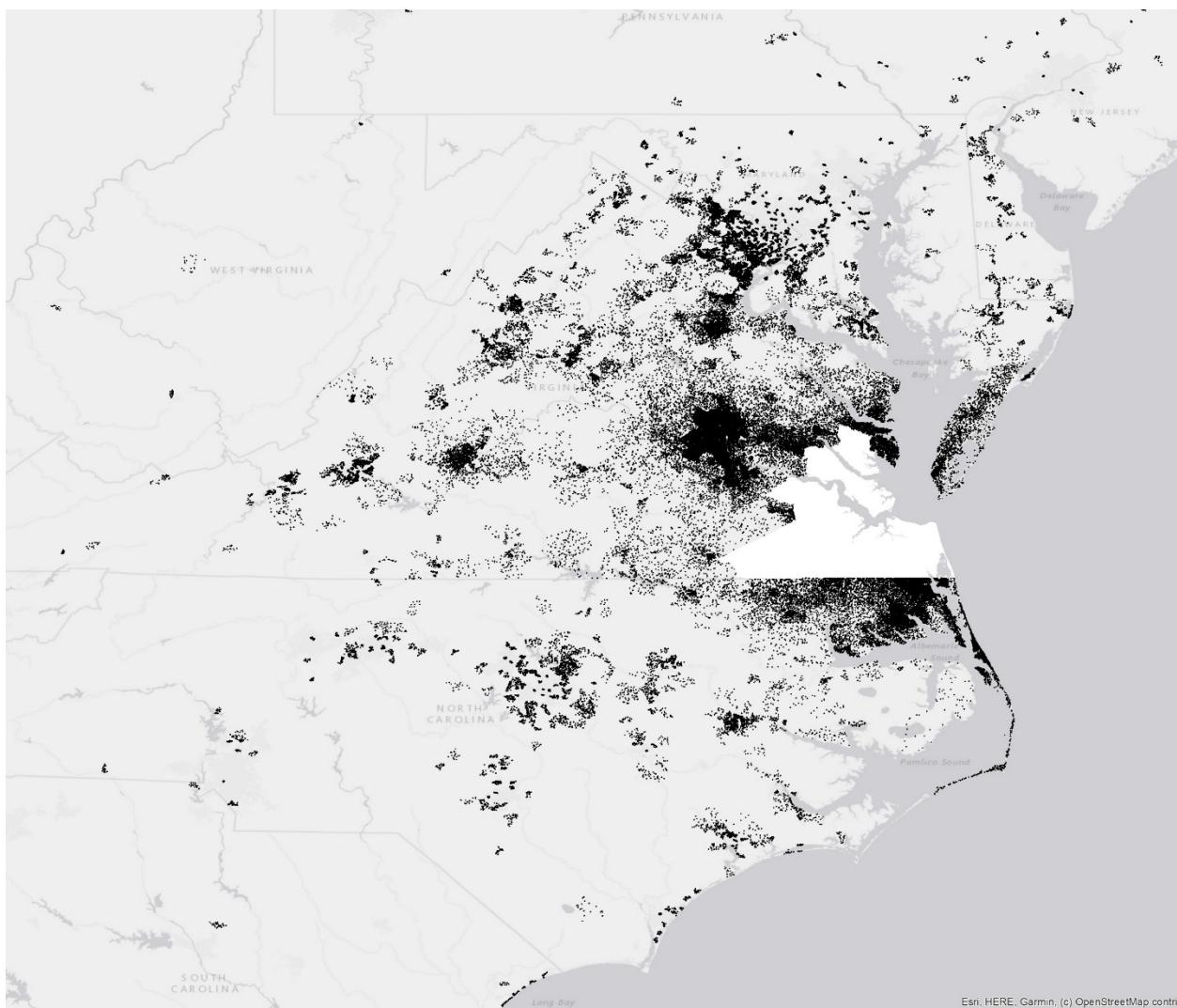


FIGURE 34 Existing Trips to Hampton Roads (white area) per day, all modes, 2019
Source: HRTPO staff via StreetLight Data

Hampton Roads is currently served by **five (5) daily weekday trains**²⁵:

- Three Southside trains terminating and originating in Norfolk
- Two Peninsula trains terminating and originating in Newport News

According to the 2022 Virginia Statewide Rail Plan:

- One train will be added to the Peninsula by 2026 (for a total of three trains)
- Three trains may²⁶ be added to the Southside by 2040 (for a total of six trains)
- Three trains will be added to the Southside by “Full Buildout”²⁷ (for a total of six trains)

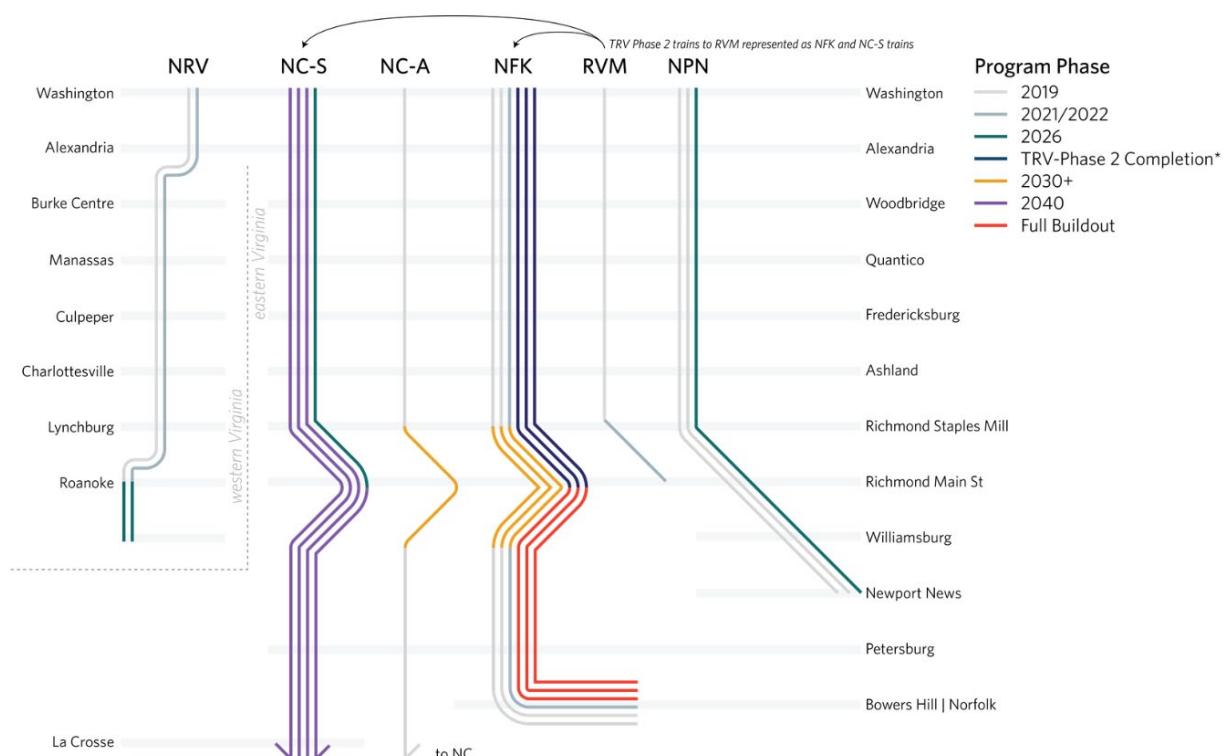


FIGURE 35 Anticipated Service Improvement Phases

Source: 2022 Virginia Statewide Rail Plan, section 3.4

No footnote for the “” in the figure could be found in the Statewide Rail Plan.

²⁵ A physical train set that arrives in Hampton Roads then later departs Hampton Roads is counted as one “train”.

²⁶ Under “Alternative 1”, these trains would travel between Richmond (and points north) and North Carolina; under “Alternative 2”, these trains would travel between Richmond (and points north) and Norfolk.

²⁷ No explanation or timeline for “full buildout” could be found in the Statewide Rail Plan.

Today (as shown in the figure above), of the five Hampton Roads trains, **only the two Peninsula trains take passengers to/from downtown Richmond**; Southside trains travel directly between Petersburg and Richmond's Staples Mill station, bypassing Main Street station. Although the graphic on the preceding page shows Norfolk trains being diverted through Main Street station by "2030+", the Statewide Rail Plan does not include the necessary work, e.g. improvement of the James River (rail) Bridge. Therefore, it appears that **Norfolk trains will not use Main Street station in the foreseeable future**.



FIGURE 36 Richmond Main Street Station (RVM)

Source: Amtrak

Given (as discussed above) that 1) the implementation date of the additional three trains for Norfolk is unspecified in the Statewide Rail Plan and 2) Norfolk trains will not use Main Street station (RVM) for the foreseeable future, staff developed a project idea for a **special train to improve Hampton Roads passenger rail service** called the **RVA757 Connector**.

Unlike all existing and proposed Hampton Roads trains which run to/from the Northeast (Boston or New York), the **RVA757 Connector** would run back and forth between Hampton Roads and Richmond. The short distance enables one physical trainset to complete eight (8) runs per day (four eastbound and four westbound), the equivalent of adding four of the existing type of trains. In addition to typical Amtrak **trip purposes**—personal visits, business, and vacation—because of its short length, the RVA757 Connector would also serve shopping, commuting, and dining trips. The Connector would triple the current number of train runs between the Peninsula and **downtown Richmond**, and provide **new connections** to/from the north and south at Staples Mill station (RVR).



FIGURE 37 Staff Project Idea: RVA757 Connector

Source: HRTPO staff via Google My Maps

In addition to stopping at Williamsburg (WBG), note that the RVA757 Connector (as proposed) would stop at **Providence Forge (PRF)** in New Kent County, where a new station would be built.

Based on existing travel times, modified as necessary²⁸, travel times between stations (15 to 110 minutes) are provided below.

	NPN	WBG	PRF	RVM	RVR
NPN	X	15	45	80	110
WBG	15	X	30	65	95
PRF	45	30	X	30	60
RVM	80	65	30	X	30
RVR	110	95	60	30	X

FIGURE 38 Staff Project Idea: RVA757 Connector Station-to-Station Travel Times, minutes

Source: HRTPO staff

Based on an end-to-end travel time of approximately two hours²⁹, an example schedule³⁰ for the RVA757 Connector with eight (8) runs is provided showing intermediate stations:

1. “1WB”³¹ Depart NPN **6am**—WBG—PRF—RVM—Arrive RVR 7:50am
2. “1EB”³² Depart RVR **8am**—RVM—PRF—WBG—Arrive NPN 9:50am
3. “2WB” Depart NPN **10am**—WBG—PRF—RVM—Arrive RVR 11:50am
4. “2EB” Depart RVR **noon**—RVM—PRF—WBG—Arrive NPN 1:50pm
5. “3WB” Depart NPN **2pm**—WBG—PRF—RVM—Arrive RVR 3:50pm
6. “3EB” Depart RVR **4pm**—RVM—PRF—WBG—Arrive NPN 5:50pm
7. “4WB” Depart NPN **6pm**—WBG—PRF—RVM—Arrive RVR 7:50pm
8. “4EB” Depart RVR **8pm**—RVM—PRF—WBG—Arrive NPN 9:50pm

²⁸ See appendix for calculation of travel times. Note that the new NPN station is 8 miles west of the existing station.

²⁹ See appendix for calculation of round-trip time.

³⁰ The ultimate schedule must be designed not to conflict with the many existing passenger trains running in the subject corridors (NPN-AY, AY-RVR) and must be negotiated with the owner of the corridors (CSX).

³¹ i.e. the first westbound run

³² i.e. the first eastbound run

Adding these eight (8) RVA757 Connector runs to the six (6) existing/planned Peninsula runs (three trains) would render the following fourteen (14) run schedules:

1. Depart NPN **5:39am**, arrive RVR 7:24am (existing NE Regional)
2. Depart NPN **6:00am**, arrive RVR 7:50am (proposed Connector)
3. Depart RVR **8:00am**, arrive NPN 9:50am (proposed Connector)
4. Depart RVR **9:34am**, arrive NPN 11:33am (existing NE Regional)
5. Depart NPN **10:00am**, arrive RVR 11:50am (proposed Connector)
6. Depart RVR **noon**, arrive NPN 1:50pm (proposed Connector)
7. Depart NPN **2:00pm**, arrive RVR 3:50pm (proposed Connector)
8. Depart NPN **3:45pm**, arrive RVR 5:32pm (existing NE Regional)
9. Depart RVR **4:00pm**, arrive NPN 5:50pm (proposed Connector)
10. Depart NPN **6:00pm**, arrive RVR 7:50pm (proposed Connector)
11. Depart RVR **6:23pm**, arrive NPN 8:15pm (existing NE Regional)
12. Depart RVR **8:00pm**, arrive NPN 9:50pm (proposed Connector)
13. Unknown³³ (proposed third westbound NE Regional)
14. Unknown (proposed third eastbound NE Regional)



FIGURE 39 Newport News Station (currently under construction)

Source: nnva.gov

³³ Staff is unaware of a schedule for the proposed third NE Regional train.

Connections to North and South

In addition to improving the rail connection between the Peninsula and Richmond, the RVA757 Connector would improve the connection between the Peninsula and points north and south via **transfers at Richmond's Staples Mill station (RVR)** through which twelve (12) candidate trains³⁴—eight (8) trains traveling north³⁵ and four (4) trains traveling south³⁶—each weekday.

In addition to the transfer opportunities provided by existing Peninsula trains, the RVA757 Connector would provide **ten (10) new connections**:

- The 2WB³⁷ from the Peninsula arrives at RVR at 11:50am, providing connection to:
 - #89 Palmetto departing RVR at 12:19pm for **Charleston and Savannah**
 - #92 Silver Star departing RVR at 12:39pm for **Washington, Philadelphia, and New York**
 - #29 Carolinian departing RVR at 1:36pm for **Raleigh, Durham, Greensboro, and Charlotte**
- The 3WB from the Peninsula arrives at RVR at 3:50pm, providing connection to:
 - #90 Palmetto departing RVR at 4:41pm for **Washington, Philadelphia, and New York**
 - #91 Silver Star departing RVR at 5:23pm for **Raleigh, Columbia, Savannah, Jacksonville, Orlando, Tampa, and Miami**
- The 4WB from the Peninsula arrives at RVR at 7:50pm, providing connection to:
 - #97 Silver Meteor departing RVR at 9:49pm for **Charleston, Savannah, Jacksonville, Orlando, and Miami**
- The 1EB departs RVR for the Peninsula at 8:00am, providing connection from:
 - #98 Silver Meteor arriving RVR at 4:42am from **Charleston, Savannah, Jacksonville, Orlando, and Miami**
- The 3EB departs RVR for the Peninsula at 4:00pm, providing connection from:
 - #92 Silver Star arriving at RVR at 12:30pm from **Miami, Tampa, Orlando, Jacksonville, Savannah, Columbia, and Raleigh**
 - #80 Carolinian arriving RVR at 2:04pm from **Charlotte, Greensboro, Durham, and Raleigh**
 - #185 Northeast Regional arriving RVR at 2:24pm from **New York, Philadelphia, and Washington**

³⁴ This set of trains exclude all Peninsula trains and southbound Norfolk trains (trains to/from which a Peninsula passenger would not desire to transfer) and can therefore be considered “candidates” for transfers.

³⁵ Train numbers 98, 86, 84, 94, 92, 80, 138, 90

³⁶ Train numbers 89, 79, 91, 97

³⁷ i.e. the second westbound run of the RVA757 Connector

Commuting for Work

One of the types of trips served by the RVA757 Connector would be **commuting trips**, i.e. trips to/from work. The travel times between stations from above are repeated below for this discussion of commuting.

	NPN	WBG	PRF	RVM	RVR
NPN	X	15	45	80	110
WBG	15	X	30	65	95
PRF	45	30	X	30	60
RVM	80	65	30	X	30
RVR	110	95	60	30	X

FIGURE 40 Staff Project Idea: RVA757 Connector Commuting Times, minutes

Source: HRTPO staff

Shorter commutes of 15 to 45 minutes could be made every workday, for example:

- Newport News to Williamsburg 15 minutes
- Williamsburg to Newport News 15 minutes
- Providence Forge to Williamsburg 30 minutes
- Providence Forge to Newport News 45 minutes
- Providence Forge to downtown Richmond 30 minutes

Given the hybrid schedules some workers use today, longer commutes of 65 to 80 minutes could be made a few times per week, for example:

- Newport News to downtown Richmond 80 minutes
- Williamsburg to downtown Richmond 65 minutes
- Downtown Richmond to Williamsburg 65 minutes
- Downtown Richmond to Newport News 80 minutes

Given the example schedule and travel times above, **commuting options** for two example commute pairs are provided below:

- Living near Williamsburg, working in Newport News
 - Options for traveling to **work**:
 - Depart 9:35am, arrive 9:50am
 - Depart 11:35am, arrive 11:50am
 - Options for traveling **home**:
 - Depart 2:00pm, arrive 2:15pm
 - Depart 3:45pm, arrive 4:00pm³⁸
 - Depart 6:00pm, arrive 6:15pm
- Living near Providence Forge, working in downtown Richmond³⁹
 - Options for traveling to **work**:
 - Depart 6:21am, arrive 6:51am⁴⁰
 - Depart 6:50am, arrive 7:20am
 - Depart 10:50am, arrive 11:20am
 - Options for traveling **home**:
 - Depart 4:30pm, arrive 5:00pm
 - Depart 8:30pm, arrive 9:00pm

Shockoe Hill African Burying Ground

As discussed above, the tracks linking the two Richmond stations are located in the Shockoe Hill African Burying Ground (SHABG). The RVA757 Connector, as proposed, would use these tracks⁴¹. According to comments received by HRTPO staff, a leading advocate of the SHABG opposes running “more trains disrespectfully upon and through it.”⁴² Making Main Street Station (RVM) the western terminus—as opposed to Staples Mill Station (RVR) being the western terminus (as indicated above)—would:

- prevent the RVA757 trains from using the tracks in the SHABG
- result in a three-hour round trip, enabling five daily round trips—as opposed to the four daily round trips indicated above

but would also:

- prevent RVA757 Connector passengers from transferring to/from the many trains that run north and south through the RVR station.

³⁸ Existing 174 Northeast Regional, modified for new location of Newport News station

³⁹ Options from existing trains are not provided

⁴⁰ Existing 174 Northeast Regional, modified for new PRF station

⁴¹ As do the existing two Peninsula trains and the proposed third Peninsula train expected in 2026

⁴² 10-26-23 email from Lenora McQueen to HRTPO staff (see appendix)

In summary, the **pros and cons of the RVA757 Connector** are as follows:

- Cons
 - Increases usage of tracks located in the Shockoe Hill African Burying Ground (unless designed to use Main Street station as the western terminus)
 - Requires a transfer for service to/from the north (DC, New York, etc.)⁴³
 - Requires negotiation with CSX for eight slots in Peninsula and Richmond rail corridors
- Pros
 - Provides eight (8) new daily runs- four westbound and four eastbound
 - Requires only one trainset
 - Requires no additional slots in the I-95 rail corridor between Richmond and the Northeast
 - Provides shopping, commuting, and dining options
 - Provides connections to/from the north and south at Staples Mill station
 - Triples the current number of Peninsula – downtown Richmond train runs

⁴³ Note that existing and proposed Northeast Regional trains require transfers for service to/from the *south*.

Summary and Next Steps

Processing a year's worth of GPS pings for Hampton Roads trains revealed **delays**:

- between Canal Dr (Chesapeake) and the Norfolk station (NFK)
- between Darbytown Rd (Henrico Co.) and the Main Street station (RVM)
- between the two Richmond stations (Main Street [RVM] and Staples Mills [RVR])

Further analysis **between the Richmond stations** revealed slow speeds (usually 10-30 mph) southbound and northbound, and frequent southbound stoppages (11% of southbound train runs). Due to the Shockoe Hill African Burying Ground being in the vicinity, the planned additional rail is not expected to be built between the stations. Consequently, staff searched for projects to **increase the frequency of train service**.

Given that 1) the implementation date of the additional three trains for Norfolk is unspecified in the Statewide Rail Plan and 2) Norfolk trains will not use Main Street station (RVM) for the foreseeable future, staff developed a project idea for a special train to improve Hampton Roads passenger rail service: the **RVA757 Connector**. The Connector would 1) triple the current number of train runs between the Peninsula and downtown Richmond, 2) provide commuting options, and 3) provide new connections to/from the north and south at Staples Mill station (RVR).

On December 21, 2023, HRTPO staff discussed this report with VPRA staff, who expressed interest in evaluating Amtrak bus service between Newport News and Richmond, as opposed to the train service additions included in the above RVA757 Connector section. On January 5, 2024, HRTPO staff submitted the draft report to PlanRVA staff.

In the future, staff intends to **discuss improvements** to Hampton Roads passenger rail service—including additional Amtrak bus service—with state rail representatives and stakeholders from the Richmond and Hampton Roads regions.

Appendix

Cleaning the Datasets

Under Step One

To prepare the dataset for the Step One analysis, HRTPO staff:

- calculated the total distance traveled per “train run” (i.e. one movement from origin to destination) to/from the Northeast
- examined some runs⁴⁴ with unusual total distance
 - deleting or fixing pings with bad lat/lon
 - deleting train runs with large distances between pings⁴⁵
- deleted pings occurring north of Richmond’s RVR station, preparing a database including only the subject segments between RVR and Hampton Roads
- deleted train runs with total *calculated* distances **significantly higher or lower** than the *known* distances between RVR and Norfolk or Newport News

Under Step Two

To prepare the dataset for the Step Two analysis, HRTPO staff:

- **eliminated Southside train runs**
- eliminated train #67’s 8-23-21 data because it contained two runs starting that day
- eliminated train runs that did not include at least two pings between/including Richmond stations
- eliminated pings occurring north of Staples Mill station or south of Main Street station

⁴⁴ Staff started cleaning the database in its original form, i.e. containing whole train runs to/from the Northeast, then realized the efficiency of trimming the database to include only partial runs, i.e. to/from Richmond, before completing the cleaning of the database.

⁴⁵ Given that pings occur approximately every three minutes, the distance between pings should not greatly exceed three miles.

Staff Project Idea: RVA757 Connector

Estimation of Travel Times

New Newport News station (NPN)⁴⁶ to/from Main Street station (RVM) according to GPS pings discussed in the body of this report:

- Northbound (NB): 76 minutes
- Southbound (SB): 79 minutes

Therefore, assume an **80 minute travel time** between new NPN and RVM for the RVA757 Connector, including a short stop at Providence Forge (PRF).

Main Street station (RVM) to/from Staples Mill station (RVR) according to Amtrak website (accessed 2-24-23):

- 86 (NB) 25 minutes
- 174 (NB) 30 minutes
- 186 (NB) 32 minutes
- 67 (SB) 26 minutes
- 125 (SB) 26 minutes
- 85 (SB) 26 minutes

Therefore, assume a **30 minute travel time** between RVM and RVR for the RVA757 Connector.

NPN-RVR-NPN round trip:

- NPN to RVM 80 minutes (above)
- RVM to RVR 30 minutes (above)
- At RVR 10 minutes (say)
- RVR to RVM 30 minutes (above)
- RVM to NPN 80 minutes (above)
- At NPN 10 minutes (say)
- Total 240 minutes, or 4 hours

Therefore, assume a **4 hour round-trip** for the RVA757 Connector.

⁴⁶ New station being built 8 miles west of current station.

Comments Received via 10-26-23 email

Dear Dr. Case;

I write to you as a descendant and a leading advocate of the Shockoe Hill African Burying Ground. My ancestors are buried in this place. I am in the process of reading your draft report. At least twice it is mentioned that the burial ground is in the vicinity. This statement is misleading. The burial ground is not simply near or in the area of the railroad tracks between the Main Street Station and Staples Mill Road. The existing CSX railroad tracks on which these trains are being run, was constructed literally directly upon this burial ground. This track runs through the burial ground over the distance of 5 1/2 blocks, from 2nd Street to past 7th Street. Solutions being sought to improve passenger rail should seek to get the railroad track off of this burial ground, not ones that run more trains disrespectfully upon and through it. I ask please that your report make clear the relationship between the burial ground and the railroad tracks. The additional track that was being proposed, would also be constructed directly upon this burial ground, and not in its vicinity. See image below.

Previously there was an option on the table for a single new station to operate at Arthur Ash Blvd., verses the two stations that are Main Street Station and Staples Mill Road. Though the Shockoe Hill African Burying Ground was not part of that conversation in 2017. It occurred before the Shockoe Hill African Burying Ground was made publicly known. That one station option on Arthur Ash Blvd. to my understanding, could get passenger rail off of the Shockoe Hill African Burying Ground. And in my opinion, the CSX track should go with it. This burial ground, the largest burial ground for enslaved as well as free people of color, is the largest in the entire nation. Over 22,000 people of African descent are buried there. This burial ground deserves much greater respect than to have trains run over its dead. And constructing a new track upon it (that would cause it irreparable harm) should never be a consideration. Additionally the entire northern portion of the burial ground is completely blocked off, and inaccessible to anyone wishing to pay homage to the thousands who were buried upon the hillside and along, under, and even past the railroad tracks. The people buried there deserve to be properly honored, and respected, and they deserve to be allowed to rest in peace. I ask that other options for solutions to the rail problem be considered, especially the revival of the one station option on Arthur Ash Blvd. Thank you for your consideration.

Yours truly,

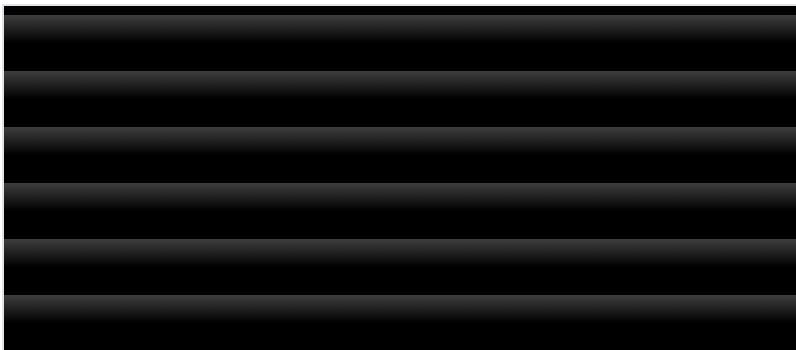
Lenora McQueen

"State rail agencies, however, do not intend to build this additional track. The Shockoe Hill African Burying Ground, where slaves were interred, is located in the vicinity. According to Gerica Goodman, spokesperson for the Virginia Passenger Rail Authority (VPRA), "Our leadership is committed to not disrupting and disturbing this space."²¹ Likewise, the 2022 Virginia Statewide Rail Plan prepared by the Virginia Department of Rail and Public Transportation (DRPT) does not include the additional track." (page 32)

"Further analysis between the Richmond stations revealed slow speeds (usually 10-30 mph) southbound and northbound, and frequent southbound stoppages (11% of southbound train runs). Due to the Shockoe Hill African Burying Ground being in the vicinity, the planned additional rail is not expected to be built between the stations. Consequently, staff searched for projects to increase the frequency of train service." (page 42)

<https://www.hrpo.org/uploads/docs/Improving%20HR%20Passenger%20Rail-%20w%20DRAFT.pdf>

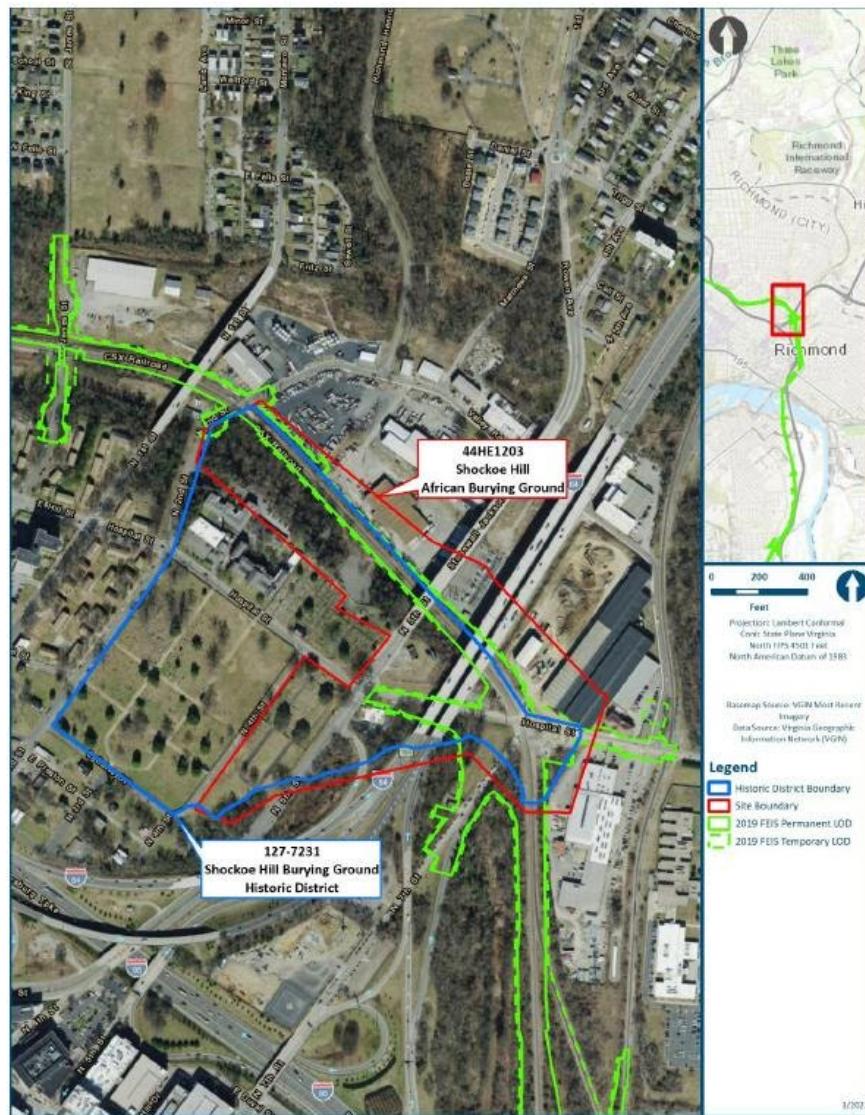
All aboard! Transportation board looks at study to improve local train service



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Local transportation engineers say less than one percent of travel in and out of Hampton Roads is by train. A ne...





Approved Nomination for the Shockoe Hill Burying Ground Historic District

[127-7231](#)



127-7231

The Shockoe Hill Burying Ground Historic District in Richmond emerged following the disestablishment of the Angl...