May 11, 2016

DC TO RICHMOND
SOUTHEAST HIGH SPEED RAIL

Appendix OO

At-Grade Crossing Evaluation

Technical Memorandum

FINAL

DRPT
Virginia Department of Rail and Public Transportation

U.S. Department of Transportation
Federal Railroad Administration

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1. INTRODUCTION & BACKGROUND

1.1 PROJECT PURPOSE & HISTORY

The Federal Railroad Administration (FRA) and Virginia Department of Rail and Public Transportation (DRPT) propose passenger rail service and rail infrastructure improvements in the north-south travel corridor between Washington, D.C. and Richmond, VA. These passenger rail service and rail infrastructure improvements are collectively known as the Washington, D.C. to Richmond Southeast High Speed Rail (DC2RVA) project. The Project will deliver higher speed passenger rail service, increase passenger and freight rail capacity, and improve passenger rail service frequency and reliability in a corridor shared by growing volumes of passenger, commuter, and freight rail traffic, thereby providing a competitive option for travelers going between Washington, D.C. and Richmond and those traveling to and from adjacent connecting corridors. The Project is part of the larger Southeast High Speed Rail (SEHSR) corridor, which extends from Washington, D.C. through Richmond, VA, and from Richmond continues east to Hampton Roads (Norfolk), VA and south to Raleigh, NC, and Charlotte, NC, and then continues west to Atlanta, GA, and south to Florida. The Project connects to the National Railroad Passenger Corporation (Amtrak) Northeast Corridor (NEC) at Union Station in Washington, D.C.

The purpose of the SEHSR program, as stated in the 2002 Tier I Final Environmental Impact Statement (EIS) completed for the full SEHSR corridor, is to provide a competitive transportation choice to travelers within the Washington, D.C. to Charlotte travel corridor. The purpose of the current Washington, D.C. to Richmond Southeast High Speed Rail project described here is to fulfill the purpose of the SEHSR Tier I EIS within this segment of the larger SEHSR corridor. The Project, by increasing rail capacity and improving travel times between Washington, D.C. and Richmond, will improve passenger train performance and reliability in the corridor, enabling intercity passenger rail to be a competitive transportation choice for travelers between Washington, D.C. and Richmond and beyond.

1.2 PROJECT LOCATION

The Washington, D.C. to Richmond corridor spans 123 miles along an existing rail corridor owned by CSX Transportation (CSXT) between Control Point RO (milepost (MP) CFP 110) in Arlington, VA to the CSXT A-Line and S-Line junction at MP A-11 in Centralia, VA (Chesterfield County) (**Figure OO-1**). At the northern terminus in Arlington, VA, the Project limit ends at the southern approach to Long Bridge, a double-track rail bridge taking the rail corridor over the Potomac River; however, the northern terminus of Union Station in Washington, D.C. will be used for ridership and revenue forecasting, as well as service development planning within the Project corridor. The southern terminus in Centralia is the junction of two CSXT routes that begin in Richmond and rejoin approximately 11 miles south of the city.

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

In Arlington, the Project connects to existing CSXT track extending across the Potomac River on the Long Bridge into Washington, D.C. and Union Station, the southern terminus of Amtrak's NEC. The northern section of the DC2RVA corridor is shared with Virginia Railway Express (VRE), which operates commuter rail service from Union Station to just south of Fredericksburg, VA. At Centralia, the Project connects to both the Richmond to Raleigh segment of the SEHSR corridor and the Richmond to Hampton Roads segment of the SEHSR corridor. The Washington, D.C. to Richmond segment is an integral part of the overall Washington, D.C. to Charlotte SEHSR corridor and provides a critical link between high speed intercity passenger service from Boston to Washington, D.C. and the southeastern United States.

1.3 PURPOSE OF THIS TECHNICAL MEMORANDUM

The DC2RVA rail corridor crosses public and private roadways as well as pedestrian paths, other rail corridors, and major and minor waterways throughout its extents. These crossings include both at-grade crossings (roadways or pedestrian paths) as well as grade-separated crossings (all modes). Evaluation of existing at-grade roadway crossings was conducted in support of the alternatives development screening process for the DC2RVA project[1]. This technical memorandum documents the evaluation of at-grade roadway crossings within the corridor to identify a proposed action(s) at each individual crossing as part of the Build Alternative. The proposed actions described herein are intended to modify the existing crossing treatment and/or condition in accordance with Federal guidance criteria for high speed rail corridors and, as necessary, based on site-specific physical and/or operating characteristics.

Note that this evaluation does not include existing at-grade crossings along DC2RVA project segments that were eliminated from further consideration as part of the alternatives development screening process prior to this evaluation[2].

1.4 TERMINOLOGY USED IN THIS TECHNICAL MEMORANDUM

The terms "grade crossing" and "at-grade crossing" are often used interchangeably, both colloquially and within Federal documentation, to indicate a roadway-rail crossing that occurs at the same level (i.e., the roadway pavement and railroad tracks directly intersect). While the term "grade crossing" is more utilized within official documentation, this technical memorandum uses the term "at-grade crossing" to ensure a distinct and readily understandable difference from the term "grade separated crossing".

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[1] DRPT conducted evaluation of existing at-grade crossings to identify physical impacts and preferred alignment resulting from the proposed addition of a single track on either the east or west side of the existing track(s). That evaluation was conducted independently from and prior to this proposed action evaluation.

[2] The Peninsula Subdivision and Buckingham Branch lines, as described in Section 1.2, were eliminated from further consideration as part of the alternatives screening process prior to this evaluation,

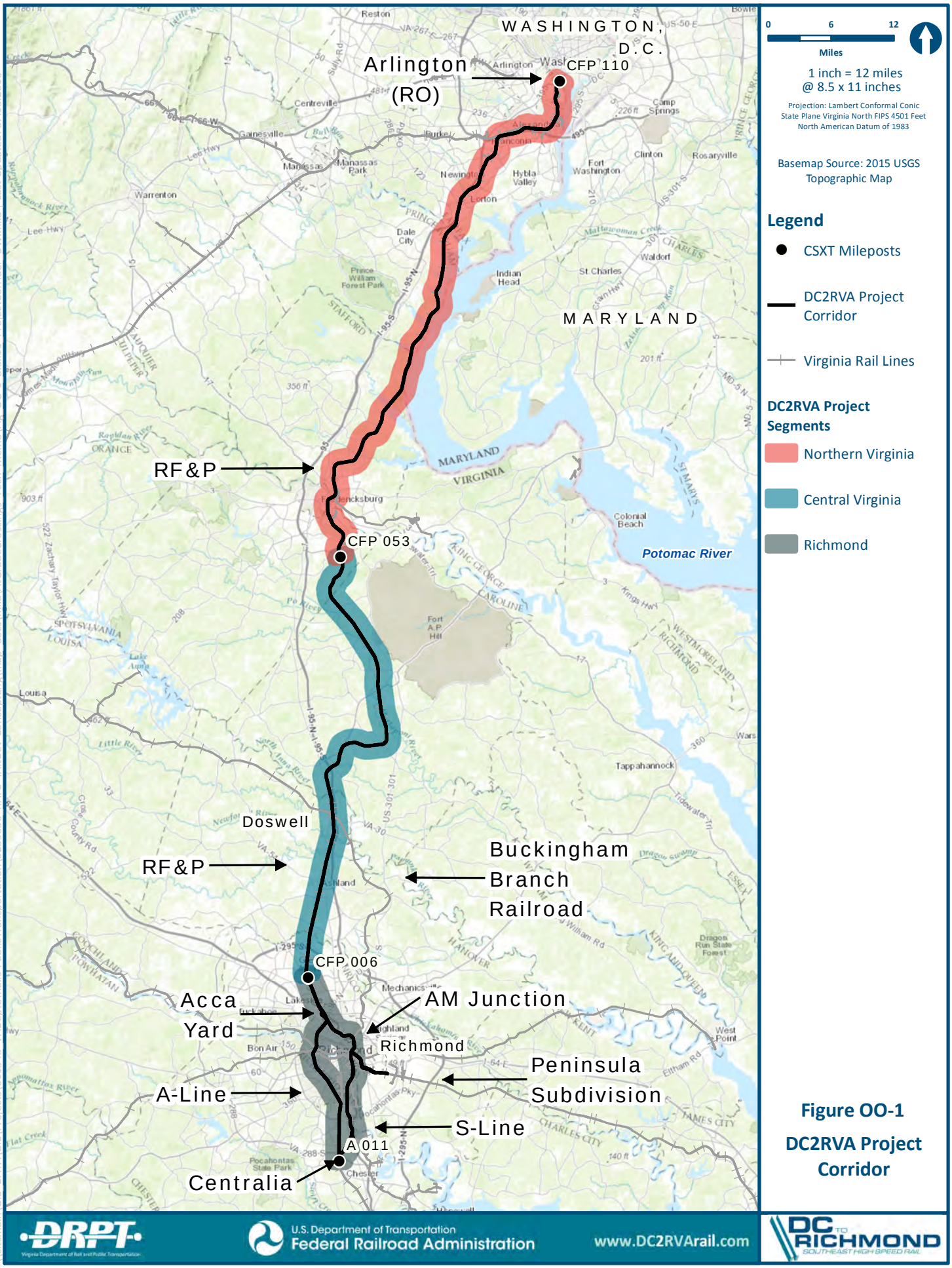


Figure OO-1

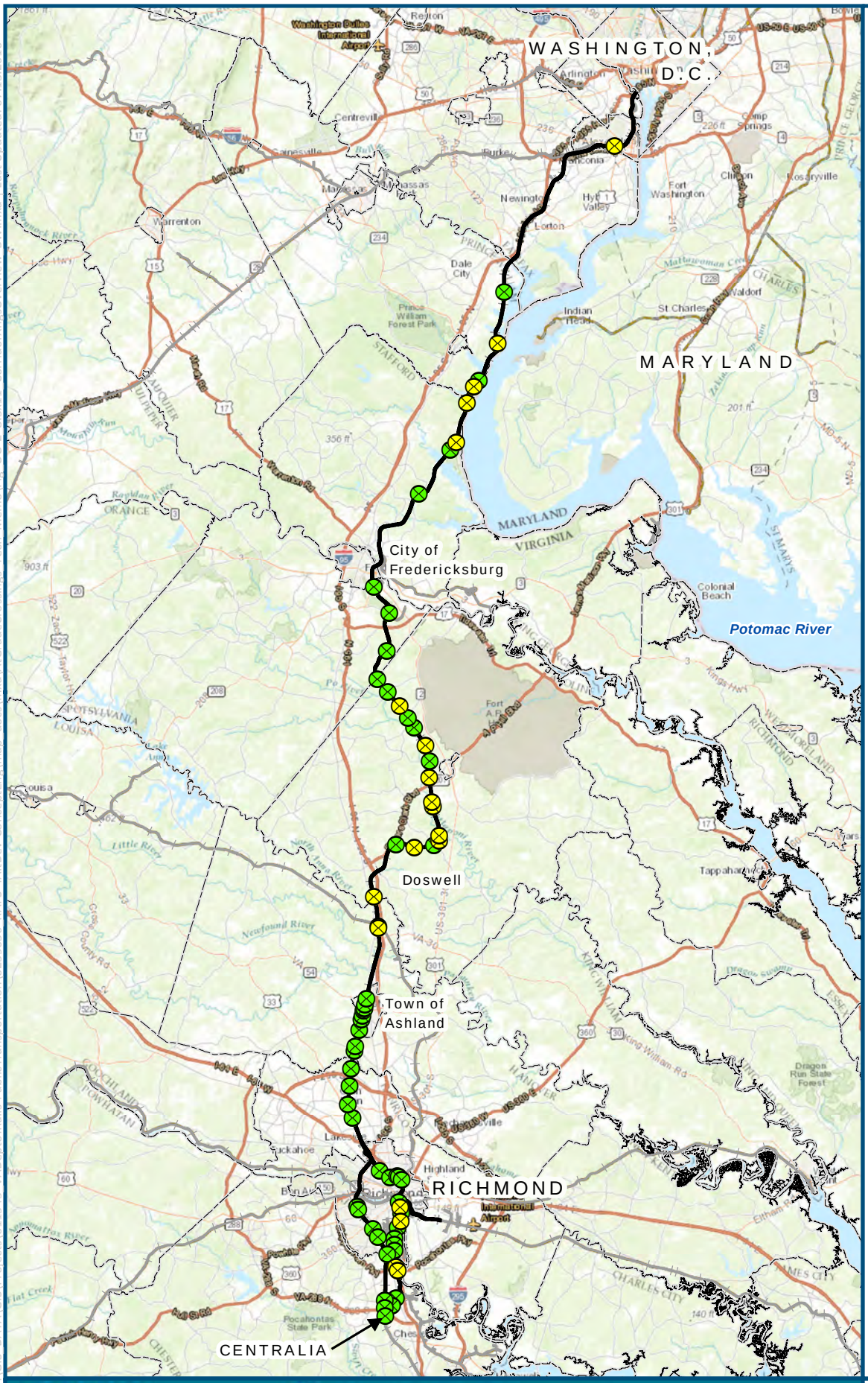
DC2RVA Project Corridor

2. EXISTING AT-GRADE CROSSINGS

Section 2 summarizes the 50 public and 19 private existing roadway-rail at-grade crossings in the DC2RVA corridor, the locations of which are shown in **Figure OO-2**. Additionally, the 5 public and 5 private existing at-grade crossings that are part of the DC2RVA Fredericksburg Bypass alignment are summarized separately in Section 2.3.

A more detailed summary of existing conditions at these crossings are provided as part of the following attachments to this technical memorandum:

- Attachment A-2 for Public At-Grade Crossings
- Attachment B for Private At-Grade Crossings
- Attachment C for Fredericksburg Bypass, Public and Private At-Grade Crossings



0 6 12

Miles

1 inch = 12 miles
@ 8.5 x 11 inches

Projection: Lambert Conformal Conic
State Plane Virginia North FIPS 4501 Feet
North American Datum of 1983

Basemap & Data Sources:
2015 USGS Topographic Map;
2015 World Transportation

Legend

Crossing Type

- At Grade, Public
- At Grade, Private
- DC2RVA Project Corridor
- Virginia Rail Lines
- County/City Boundaries

Figure OO-2

Public & Private At-Grade Crossings Overview

DRPT Virginia Department of Rail and Public Transportation

U.S. Department of Transportation Federal Railroad Administration

www.DC2RVArail.com

DC TO RICHMOND SOUTHEAST HIGH SPEED RAIL

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2.1 PUBLIC AT-GRADE CROSSINGS

Public at-grade crossings are defined as roadway-rail crossings that are located on roadways that are open to use by the public and are maintained by a public authority.

There are 50 public at-grade crossings that operate within the DC2RVA corridor, located in the following jurisdictions (listed north to south):

- Prince William County: 2 public at-grade crossings
- Stafford County: 2 public at-grade crossings
- Fredericksburg City: 1 public at-grade crossing
- Spotsylvania County: 2 public at-grade crossings
- Caroline County: 7 public at-grade crossings
- Hanover County: 11 public at-grade crossings
- Henrico County: 4 public at-grade crossings
- Richmond: 16 public at-grade crossings
- Chesterfield County: 5 public at-grade crossings

These public at-grade roadway crossings range from urban, median-separated, multi-lane facilities that carry more than 15,000 vehicles daily to rural, un-striped crossings with 100 daily vehicles (representative examples shown in **Figure OO-3**).

FIGURE OO-3: EXAMPLES OF PUBLIC AT-GRADE CROSSINGS IN THE DC2RVA CORRIDOR

A summary of characteristics for each public at-grade crossing is provided in **Table OO-1**. Full details of each crossing are provided in **Attachment A-2**, including location maps, photos, and descriptive text of the crossing and surrounding area. Note that six crossings in the DC2RVA corridor have been permanently closed and/or removed from public use and are therefore not included in the DC2RVA inventory or analyses.

All public roadway-rail crossings are required to have warning/control devices, just as roadway intersections are required to have stop signs or traffic signals. These warning/control devices are specified in the *Manual of Uniform Control Devices* (MUTCD), and include both

passive and active types. "Passive" warning devices are the basic devices used at all roadway-rail crossings; they include the crossbuck (the X-shaped signs that identify a crossing), signage, and roadway approach pavement markings. "Active" control devices are activated by the passage of a train over detection circuit in the track and are intended to physically warn and/or impede vehicles from the tracks when a train is approaching or occupying the crossing. Typical active traffic control devices include flashing light signals, bells, automatic gates, and highway traffic signals.

In the DC2RVA corridor, the majority of public at-grade two-lane crossings have active flashing signal lights with automatic gates on the roadway approach lanes (termed a two-quadrant gate system). An automatic gate serves as a physical barrier across the roadway travel lanes when a train is approaching or occupying a crossing. However, when automatic gates are located on the approach lanes only, vehicles are able to cross the centerline pavement marking and navigate around an activated gate with little difficulty.

The larger multi-lane roadway crossings in the DC2RVA corridor typically have active control devices that include either four-quadrant gates or median separation.

- Four-quadrant gates are a system of automatic flashing light signals and automatic gates in which the gates extend across both the approach and the departure sides of roadway. By inhibiting nearly all traffic movements over the crossing when the gates are activated by an approaching train, four-quadrant gates provide an additional measure of safety.
- Median separation and/or treatment, which includes barrier wall systems, wide raised medians, and mountable raised curb systems with vertical median separators, can be used with a two-quadrant gate system to impede vehicles from traversing a crossing when the automatic gate is activated by disallowing vehicles from using the roadway lane serving traffic flowing in the opposite direction. The barrier provided by the median treatment also provides an additional measure of safety as compared to the two-quadrant gate system.

TABLE OO-1. SUMMARY OF PUBLIC AT-GRADE CROSSINGS

Juris-diction	Crossing Name	Crossing Number	Rail Line	Functional Classification	AADT *2015*	# Lanes	Warning Device
Prince William County	Featherstone Road	860600A	RF&P	Major Collector	10,150	2	Four Quad Gates
	Potomac Avenue	860605J	RF&P	Local	7,105	2	Flashing Signal w/ Gates
Stafford County	Brent Point Road	860581X	RF&P	Local	538	2	Flashing Signal w/ Gates
	Mount Hope Church Road	860578P	RF&P	Local	213	2	Flashing Signal w/ Gates
Fredericks-burg City	Landsdowne Road	860558D	RF&P	Major Collector	8,729	2	Flashing Signal w/ Gates
Spotsylvania County	Mine Road	860557W	RF&P	Major Collector	5,177	2	Flashing Signal w/ Gates
	Summit Crossing Road	860548X	RF&P	Local	406	2	Flashing Signal w/ Gates
Caroline County	Claiborne Crossing Road	860547R	RF&P	Local	477	2	Flashing Signal w/ Gates
	Stonewall	860545C	RF&P	Major Collector	1,929	2	Flashing Signal

TABLE OO-1. SUMMARY OF PUBLIC AT-GRADE CROSSINGS

Juris-diction	Crossing Name	Crossing Number	Rail Line	Functional Classification	AADT *2015*	# Lanes	Warning Device
	Jackson Road						w/ Gates
	Woodford Road	860542G	RF&P	Local	386	2	Flashing Signal w/ Gates
	Woodslane Road	860541A	RF&P	Local	102	2	Flashing Signal w/ Gates
	Paige Road	860539Y	RF&P	Minor Collector	477	2	Flashing Signal w/ Gates
	Penola Road	860527E	RF&P	Local	426	2	Flashing Signal w/ Gates
	Colemans Mill Road	860525R	RF&P	Local	447	2	Flashing Signal w/ Gates
Hanover County	Doswell Road	860520G	RF&P	Local	315	2	Flashing Signal w/ Gates
	W Vaughan Road / Henry Street	860513W	RF&P	Local	1,320	2	Flashing Signal w/ Gates
	W Patrick Street	860512P	RF&P	Minor Collector	302	2	Flashing Signal w/ Gates
	College Avenue / Henry Clay Street	860462N	RF&P	Major Collector	1,320	2	Flashing Signal w/ Gates
	England Street / Thompson Street	860459F	RF&P	Minor Arterial	14,210	3	Flashing Signal w/ Gates
	Myrtle Street	860454W	RF&P	Major Collector	1,827	2	Flashing Signal w/ Gates
	E Francis Street	860450U	RF&P	Local	1,421	2	Flashing Signal w/ Gates
	Ashcake Road	860448T	RF&P	Minor Arterial	7,714	2	Flashing Signal w/ Gates
	Gwathmey Church Road	860447L	RF&P	Minor Collector	162	2	Flashing Signal w/ Gates
	Elmont Road	860445X	RF&P	Major Collector	2,132	2	Flashing Signal w/ Gates
	Cedar Lane	860443J	RF&P	Major Collector	1,929	2	Flashing Signal w/ Gates
Henrico County	Mill Road	860441V	RF&P	Major Collector	2,741	2	Flashing Signal w/ Gates
	Mountain Road	860438M	RF&P	Minor Arterial	5,278	2	Four Quad Gates
	Hungary Road	860437F	RF&P	Minor Arterial	16,240	4	Flashing Signal w/ Gates and Median Separation
	Hermitage Road	860435S	RF&P	Major Collector	4,263	2	Flashing Signal w/ Gates
Richmond	Jahnke Road	623663D	A-LINE	Minor Arterial	12,180	2	Flashing Signal w/ Gates
	Bassett Avenue	623664K	A-LINE	Local	1,393	2	Flashing Signal

TABLE OO-1. SUMMARY OF PUBLIC AT-GRADE CROSSINGS

Juris-diction	Crossing Name	Crossing Number	Rail Line	Functional Classification	AADT *2015*	# Lanes	Warning Device
							w/ Gates
	Broad Rock Boulevard	623668M	A-LINE	Other Principal Arterial	19,285	4	Flashing Signal w/ Gates and Median Separation
	Terminal Avenue	623670N	A-LINE	Major Collector	680	2	Flashing Signal w/ Gates
	Walmsley Boulevard	623672C	A-LINE	Minor Arterial	4,974	2	Flashing Signal w/ Gates
Chesterfield County	Kingsland Road	623678T	A-LINE	Major Collector	2,132	2	Flashing Signal w/ Gates
	Thurston Road	623679A	A-LINE	Local	457	2	Flashing Signal w/ Gates
	Old Lane	623680U	A & S LINES	Major Collector	4,872	2	Flashing Signal w/ Gates
Richmond	Hermitage Road	623518E	S-LINE	Minor Arterial	10,150	4	Flashing Signal w/ Gates and Median Separation
	Brook Road	623522U	S-LINE	Minor Arterial	8,222	4	Flashing Signal w/ Gates and Median Separation
	St James Street	623525P	S-LINE	Local	995	2	Flashing Signal w/ Gates
	N 2nd Street / Valley Road	623527D	S-LINE	Local	2,132	2	Flashing Signal w/ Gates
	Hospital Street / N 7th Street	623530L	S-LINE	Minor Arterial	5,786	2	Flashing Signal w/ Gates
	Maury Street	623539X	S-LINE	Local	2,576	2	Flashing Signal w/ Gates
	Goodes Street	623543M	S-LINE	Local	203	2	Flashing Signal w/ Gates
	E Commerce Road	623545B	S-LINE	Minor Arterial	4,263	2	Flashing Signal w/ Gates
	Ruffin Road	623547P	S-LINE	Major Collector	1,827	2	Flashing Signal w/ Gates
	Bells Road	623548W	S-LINE	Minor Arterial	8,932	4	Flashing Signal w/ Gates and Median Separation
	Dale Avenue / Trenton Avenue	623549D	S-LINE	Local	274	2	Flashing Signal w/ Gates
Chesterfield County	Kingsland Road	623559J	S-LINE	Major Collector	2,030	2	Flashing Signal w/ Gates
	Brinkley Road	623660H	S-LINE	Local	1,827	2	Flashing Signal w/ Gates

Notes: "Flashing Signal w/ Gates" are two-quadrant gates.

2.2 PRIVATE AT-GRADE CROSSINGS

Private at-grade crossings are defined as roadway-rail crossings located on roadways that are not intended for use by the public nor maintained by a public authority.

There are 19 private at-grade crossings that operate within the DC2RVA corridor, located in the following jurisdictions (listed north to south):

- Alexandria City: 1 private at-grade crossing
- Prince William County: 2 private at-grade crossings
- Stafford County: 2 private at-grade crossings
- Caroline County: 7 private at-grade crossings
- Hanover County: 1 private at-grade crossing
- Richmond: 2 private at-grade crossings
- Chesterfield County: 2 private at-grade crossings

These private at-grade roadway crossings typically serve as driveways to residences, access between farm or undeveloped land tracts on both sides of the railroad, or provide access to industrial properties (representative examples shown in **Figure OO-4)**. Additionally, crossings located within military properties are considered private crossings.

FIGURE OO-4: EXAMPLES OF PRIVATE AT-GRADE CROSSINGS IN THE DC2RVA CORRIDOR

The private at-grade crossings within the DC2RVA corridor are typical of private crossings in general, located on narrow or un-paved roadways with minimal warning devices. The majority of residential, farm, and industrial private crossings provide sole access to the property (i.e., there are no alternate routes to access the property across the railroad tracks). In general, the private crossings with active control devices (i.e., automatic gates) are those serving industrial areas; residential and farm crossings typically have signage as the sole passive warning device. Private crossings can be controlled by a barrier gate, which is a moveable gate (manual or automatic) that is kept in the controlled position (i.e., blocking the travel lanes) and opening only on demand; however, none of the private crossings in the mainline DC2RVA corridor currently use barrier gates.

A summary of characteristics for each private at-grade crossing is provided in **Table OO-2**. Full details of each crossing are provided in **Attachment B**, including location maps, photos, and descriptive text of the crossing and surrounding area.

TABLE OO-2. SUMMARY OF PRIVATE AT-GRADE CROSSINGS

Jurisdiction	Crossing Name	Crossing #	Rail Line	Warning Device	Crossing Type	Paved	# Lanes
Alexandria City	Unnamed Private Crossing	None	RF&P	None	Railroad Exclusive Access	No	1
Prince William County	Cherry Hill Road Private Crossing	860601G	RF&P	Flashing Signal w/ Gates	Commercial	Yes	2
	Henderson Road / Epperson Avenue	860609L	RF&P	Flashing Signal w/ Gates	Military	Yes	2
Stafford County	Flemming Street	860586G	RF&P	Flashing Signal w/ Gates	Military	Yes	2
	Lees Private Crossing	860582E	RF&P	Passive *(Ropes by Owner)*	Residential	No	1
Caroline County	Jones Private Crossing	860543N	RF&P	None	Farm	No	1
	Rixey Road Private Crossing	860540T	RF&P	None	Residential	No	1
	Roes Private Crossing	860538S	RF&P	None	Farm	No	1
	Unnamed Private Crossing	860531U	RF&P	None	Residential	Yes	1
	Unnamed Private Crossing	860530M	RF&P	None	Residential	Yes	1
	Unnamed Private Crossing	860529T	RF&P	None	Farm	No	1
	Unnamed Private Crossing	860528L	RF&P	None	Farm	No	1
	Georges Private Crossing	860526X	RF&P	None	Farm	No	1
	Chandlers Private Crossing	860521N	RF&P	None	Farm	No	1
Hanover County	Excelsior Mill Private Crossing	860519M	RF&P	None	Residential	No	1
Richmond	4th Street Extension Private Crossing	623541Y	S-LINE	Flashing Signal w/ Gates	Industrial	Yes	2
	Federal Paper Private Crossing	623544U	S-LINE	None	Industrial	No	1
Chesterfield County	Texaco Road Private Crossing	623552L	S-LINE	Passive	Industrial	Yes	2
	Station Road Private Crossing	623554A	S-LINE	Passive	Industrial	Yes	1

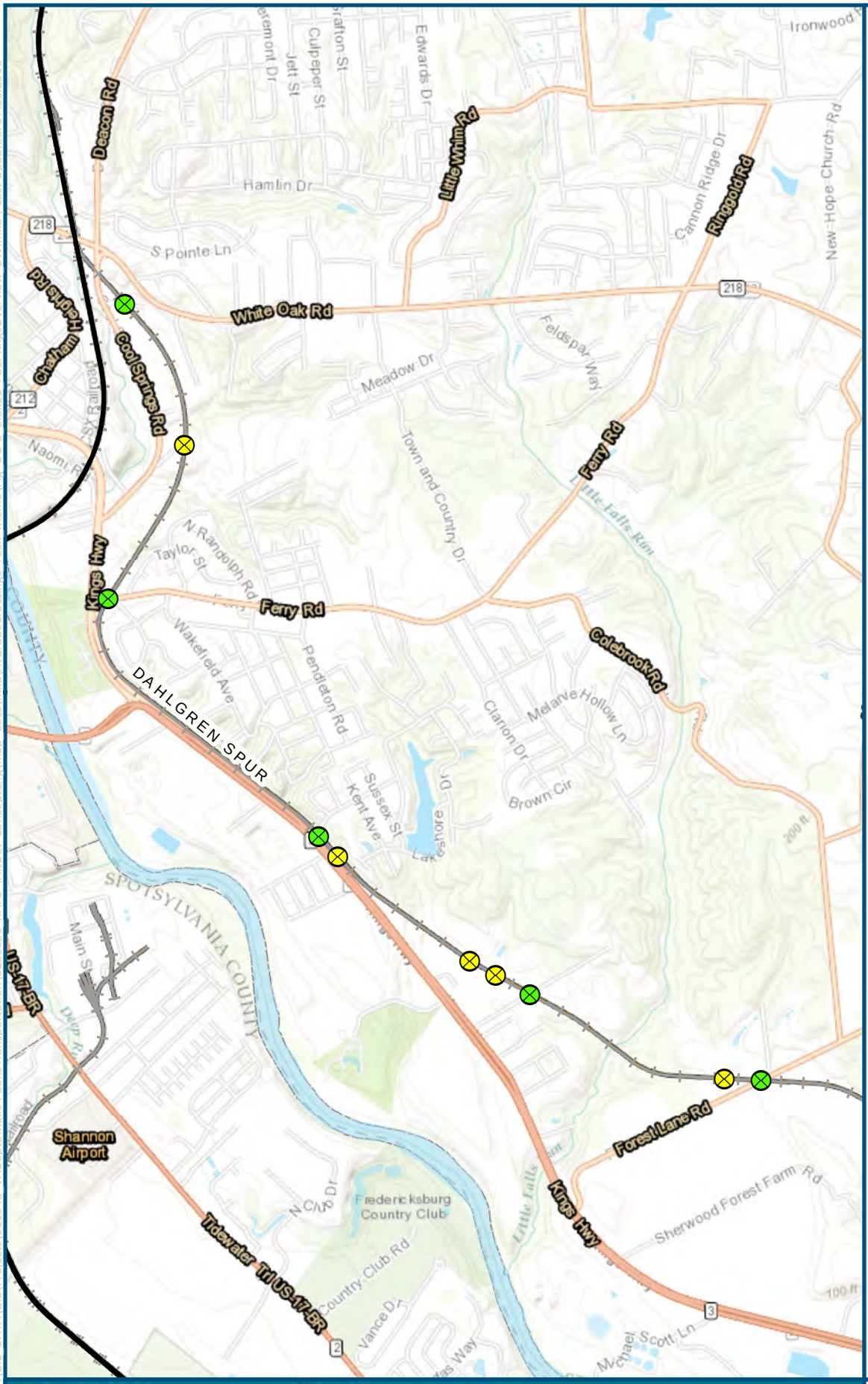
2.3 AT-GRADE CROSSINGS, BYPASS ALIGNMENTS

There are two bypass alignments under consideration as part of this project: the Ashland Bypass Build Alternative and the Fredericksburg Bypass Build Alternative. Details of these alignments are provided in the *Alternatives Technical Report*. The Ashland Bypass diverges from the main line around the Town of Ashland; there are no existing at-grade crossings as the extents of this alignment would be new track. However, the Fredericksburg Bypass, which diverges from the main line around the City of Fredericksburg, partially uses an existing rail line that has five public and five private existing at-grade crossings, the locations of which are shown in **Figure OO-5**.

A summary of characteristics for each Fredericksburg Bypass at-grade crossing is provided in **Table OO-3**. Full details of each crossing are provided in **Attachment C**, including location maps, photos, and descriptive text of the crossing and surrounding area.

TABLE OO-3. SUMMARY OF AT-GRADE CROSSINGS, FREDERICKSBURG BYPASS

County	Type	Crossing Name	Crossing #	Functional Classification	AADT *2014*	# Lanes	Paved	Warning Device
Stafford County	Public	Debruen Ln	860345T	Local	--	2	Yes	Flashing Signal w/ Gates
		Ferry Rd	860348N	Major Collector	9,000	2	Yes	Flashing Signal w/ Gates
		Federal Dr	860349V	Local	1,300	2	Yes	Flashing Signal w/ Gates
		Little Falls Rd	860353K	Local	150	2	Yes	Flashing Signal
		Forest Lane Rd	860357M	Local	1,400	2	Yes	Flashing Signal
	Private	Hot Top Rd (Private)	None	*n/a*	*n/a*	1	No	Locking Gate (Passive with Stop Signs)
		Driveway (Private)	None	*n/a*	*n/a*	1	Yes	Passive (Stop Signs)
		Cleek Ln (Driveway, Private)	860352D	*n/a*	*n/a*	1	No	None
		Driveway (Private)	None	*n/a*	*n/a*	1	No	None
		Driveway (Private)	860356F	*n/a*	*n/a*	1	No	Passive (Stop Signs)



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1 inch = 0.5 mile
@ 8.5 x 11 inches

Projection: Lambert Conformal Conic
State Plane Virginia North FIPS 4501 Feet
North American Datum of 1983

Basemap & Data Sources:
2015 USGS Topographic Map;
2015 Esri World Transportation

Legend

Crossing Type

- Public
- Private
- DC2RVA Project Corridor
- Virginia Rail Lines
- County/City Boundaries

Figure OO-5

Fredericksburg Bypass Public & Private At-Grade Crossings Overview

DRPT Virginia Department of Rail and Public Transportation

U.S. Department of Transportation Federal Railroad Administration

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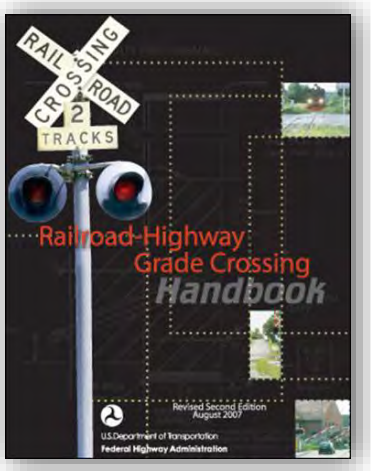
3. PROCESS & ASSUMPTIONS

Section 3 summarizes the process that was developed and the associated assumptions that were used in the evaluation of the at-grade crossings in the DC2RVA corridor, which included four steps:

1) Define the objective of the evaluation process and potential proposed actions. *See Section 3.1 and 3.2.*
2) Apply Federal guidance criteria for crossing elimination, as applicable. *See Section 3.3.*
3) Analyze site-specific conditions for each at-grade crossing. *See Section 3.4.*
4) Develop and apply decision-making logic to identify proposed action(s) at each at-grade crossing. *See Section 3.5.*

The FHWA's *Railroad-Highway Grade Crossing Handbook – Revised Second Edition* ("the handbook") provides a single reference document on best practices as well as adopted standards relative to roadway-rail at-grade crossings that have proven effective and are accepted nationwide. The handbook provides general information on highway-rail crossings; characteristics of the crossing environment and users; and the physical and operational improvements for roadway-rail at-grade crossings to enhance the safety and operation of both roadway and rail traffic through the crossings. The process developed for this DC2RVA at-grade crossing evaluation aligns with the guidelines presented in the handbook.



3.1 AT-GRADE CROSSING EVALUATION OBJECTIVE

This at-grade crossing evaluation is being performed in support of the alternatives development process for the DC2RVA project. The objective of this evaluation is to identify a primary proposed action for each at-grade crossing as part of the Build Alternative. The proposed actions will be identified by developing and applying a standardized process that is documented and consistent for all crossings, regardless of size, type, or location. The process will consider all applicable Federal guidance criteria, and will be based on site-specific data that is available at the time that the analysis was completed.

It is important to note that the primary proposed actions resulting from this evaluation are intended to represent the initial preferred action to be considered and moved forward in the overall alternatives development process. Final actions will be determined based on detailed engineering analyses and design considerations as well as coordination with VDOT, local governments, communities, and other stakeholders, which may result in modification to the primary proposed actions that are described herein.

3.2 PROPOSED ACTIONS, DEFINED

The DC2RVA corridor will be an "Emerging High Speed Rail" corridor, which, per the FRA, is defined as having "top speeds of 90-110 mph on primarily shared track…with advanced crossing protection or separation"[3]. Accordingly, as part of the Build Alternative for the DC2RVA project, every at-grade crossing must be grade separated, closed, or have appropriate crossing treatment that is connected into the train detection circuitry and physically impedes vehicles from accessing the tracks when a train is approaching or occupying the crossing. The handbook correspondingly states that "it is desirable that all crossings located on high-speed rail corridors either be closed, grade separated, or equipped with automatic gates".

Based on the Emerging HSR definition and per FRA guidance, the following proposed actions are defined for use in the DC2RVA existing at-grade crossing evaluation *(note that example images shown below are representative of typical application; they are included for illustrative purposes only)*:

Closure. Per the handbook, "closure of a highway-rail grade crossing to highway traffic should always be considered as an alternative." Benefits include reduction in collisions, vehicle and rail delay, and rail maintenance costs. Considerations include elimination of redundant crossings, convenience / travel cost of vehicles using an adjacent crossing, and impacts to adjacent crossings and connecting roadway network due to diversion of vehicles.

Grade Separation. Per the handbook, "the decision to grade separate at highway-rail crossings is primarily a matter of economics" as a long-term investment. Benefits include reduction in collisions, vehicle and rail delay, and rail maintenance costs.

Four Quadrant Gates. A system of gates (entrance and exit gates on all roadway approaches) designed to provide full closure of the crossing when a train is approaching or occupying the crossing, thus elimination the opportunity for vehicles to navigate around a single lowered gate. Design can include detection inside the gates to ensure that vehicles do not get "trapped" inside lowered gates.

[3] Vision for High-Speed Rail in America, High-Speed Rail Strategic Plan, FRA, April 2009. https://www.fra.dot.gov/eLib/Details/L02833

Median Treatment. A system of physical improvements designed to impede the movement of vehicles into the opposing traffic lane and around the single lowered gate (two quadrant gate) when a train is approaching or occupying the crossing. Treatments include barrier wall systems, wide raised medians, and mountable raised curb systems with vertical median separators. Considerations include cost-benefit (median treatments are generally less expensive to install than four quadrant gate systems) and presence / distance of nearby intersections and driveways that may limit the effective median length. Note that for the DC2RVA evaluation, a 60-foot minimum median distance from the gate arm to the closest driveway or intersection was used.

Locking Gate (*private crossings only*). This term refers to a barrier gate that is a moveable gate that is in engaged (i.e., closed) and only opens on demand. For the DC2RVA project, locking gates are only applicable to private crossings and must be tied into the track circuitry. The locking gate could be manual (requiring property owners to exit their vehicle to manually interact with the gate) or more automated (such as key card access to open and close the gate), the details of which will be determined during final design.

Site Improvements. Site improvements (geometric and/or safety improvements) may be necessary as part of or in addition to the above proposed actions, to improve overall crossing safety (roadway or railroad), such as improving sight distances or crossing geometry.

No Action. Considered at crossings where the existing crossing treatment is sufficient to the proposed actions described above.

Note that grade separation must be provided for any new roadway-rail crossings that would be created by the DC2RVA project (i.e., for Build Alternatives along new track alignment). This could result in closure and/or consolidation of public or private roadways across the rail alignment, based on design considerations.

3.3 FEDERAL GUIDANCE CRITERIA, CROSSING ELIMINATION

The FHWA handbook provides guidance criteria from the Technical Working Group (TWG) established by the US DOT that is led by representatives from the FHWA, FRA, FTA, and National Highway Traffic Safety Administration. The guidance is not intended to be mandatory, but is intended to set the precedent for best practices in developing and implementing policies, rules, and regulations between highway agencies, railroad companies, and governmental agencies.

Specifically, "*Chapter V Selection of Alternatives, Part A Technical Working Group Guidance on Traffic Control Devices Selection Criteria and Procedure*" outlines analysis methodologies for consideration of traffic control devices or other measures at every public roadway-rail at-grade crossing. Section 6 of the guidance provides 11 conditions, as shown in **Table OO-4**, for which public at-grade crossings "should be considered for ***grade separation or otherwise eliminated***" if any one or more of the set thresholds are met or exceeded. Note that this crossing elimination analysis is appropriate for existing public at-grade crossings on the main rail line (i.e., private crossings as well as crossings along the Fredericksburg Bypass rail spur alignment).

A review of the existing public at-grade crossings determined that Conditions i) through vi) are not currently met, nor expected to be met, within the DC2RVA project corridor. Conditions vii) through xi) were determined to be potentially applicable, and were therefore included in a crossing elimination screening analysis that was conducted as one step of this overall at-grade crossing evaluation. A variety of detailed roadway and railroad input data, as well as train operational data, was required to complete the analysis. The FHWA conditions were analyzed for existing year (2015), the project opening year (2025), and the project forecast year (2045). However, the decision was made to base the proposed action evaluation on existing and opening year conditions only as the proposed action would be in effect by 2025, and 2045 analyses reflect projects and/or conditions that are outside the purview of the DC2RVA proposed action; any public at-grade crossings that may exceed the FHWA condition thresholds by 2045 will be noted in the at-grade crossing evaluation.

Refer to **Attachment A-1** for the Crossing Elimination Screen Analysis methodology report and results, as summarized below:

- 5 crossings meet or exceed FHWA condition thresholds in 2015
- 21 crossings meet or exceed FHWA condition thresholds by 2025

Accordingly, these crossing locations will be considered for grade separation and/or closure as part of the at-grade crossing evaluation process. As previously mentioned, however, the triggering of these thresholds is not intended to be prescriptive and the proposed action will be based on a variety of considerations and local crossing conditions.

TABLE OO-4: FHWA CONDITIONS, CONSIDERATION FOR CROSSING ELIMINATION

FHWA Condition	Applicability to DC2RVA At-Grade Crossings
i. The road is a part of the designated Interstate Highway System.	Not applicable - None of the at-grade crossings include a road that is part of the Interstate Highway System.
ii. The road is otherwise designed to have full controlled access.	Not applicable - None of the at-grade crossings are fully access controlled.
iii. The posted road speed equals or exceeds 70 mph.	Not applicable - The posted highway speed at all at-grade crossings does not equal or exceed 70 mph.
iv. Annual average daily traffic (AADT) exceeds 100,000 in urban areas or 50,000 in rural areas.	Not applicable - The AADT at the at-grade crossings does not exceed these limits.
v. Maximum authorized train speed exceeds 110 mph.	Not applicable - The maximum authorized speed for the Project is 90 mph and does not exceed 110 mph at any of the at-grade crossings.
vi. An average of 150 or more trains per day or 300 million gross tons per year.	Not applicable - The average number of trains per day at the at-grade crossings does not exceed these limits.
vii. An average of 75 or more passenger trains per day in urban areas or 30 or more passenger trains per day in rural areas.	Potentially applicable.
viii. Crossing exposure (the product of the number of trains per day and AADT) exceeds 1 million in urban areas or 250,000 in rural areas; or	Potentially applicable.
ix. Passenger train crossing exposure (the product of the number of passenger trains per day and AADT) exceeds 800,000 in urban areas or 200,000 in rural areas.	Potentially applicable.
x. The expected accident frequency for active devices with gates, as calculated by the USDOT Accident Prediction Formula including five-year accident history, exceeds 0.5.	Potentially applicable.
xi. Vehicle delay exceeds 40 vehicle hours per day.	Potentially applicable.

3.4 SITE-SPECIFIC CONDITIONS AT INDIVIDUAL CROSSINGS

The following site-specific conditions were documented at each existing public at-grade crossing location. These characteristics were identified as the aspects of the roadway, railroad, and/or surrounding area (defined as a 1,000 foot radius around the crossing) that potentially physically or operationally affect the design and control of the type of the crossing to be proposed. Private crossings were documented using a similar approach to the level appropriate of the decisions to be made.

- **Traffic Data and Traffic Operations**. Including crossing roadway classification and number of lanes; daily volumes; adjacent or intersecting driveways and streets (including distance from crossing); and presence of pedestrian and bicycle crossings.
- **Train Data and Rail Operations**. Including daily volumes; number of tracks.
- **Safety / Geometric Deficiencies**. Including roadway and/or railroad deficiencies that affect safety, such as: sight distance; crossing angle; minimum widths, clearances, or striping/signage; or horizontal and vertical alignment.
- **Major Environmental Impacts**. Including: parks / recreation areas; schools; high priority cultural and/or historic areas; wetlands; military installations; and wetlands.
- **Engineering Considerations**. Feasibility issues, such as horizontal and vertical alignment, if grade separation of crossing was considered.
- **Adjacent Property Uses**. Including type and intensity/density of land uses on each side of crossing.
- **Preliminary Cost-Benefit**. For locations where grade separation was considered.
- **Accessibility**. Including summary of area/uses that the crossing roadway serves, and if the crossing provides sole access (i.e., no feasible alternate route to property(ies)).
- **Connectivity to Adjacent Crossings**. Including distances to closest upstream (to the north) and downstream (to the south) crossings.
- **Crossing Safety Treatment Considerations.** Including proximity to intersection driveways and/or roadways, if median separation or four quadrant gates were considered.
- **Special Uses at Crossing**. Including use and/or access to the crossing by emergency vehicles; school buses; and public transit.

Documentation was based on project site visits, aerial and/or street-view photography, and VDOT and FRA online databases. The level of detail documented for the site-specific conditions was intended to support identification of feasibility considerations for each proposed action at the crossing location.

The detailed documentation of these site-specific conditions are provided as part of the following attachments to this technical memorandum:

- Attachment A-2 for Public At-Grade Crossings
- Attachment B for Private At-Grade Crossings
- Attachment C for Fredericksburg Bypass, Public and Private At-Grade Crossings

3.5 IDENTIFICATION OF PROPOSED ACTIONS AT INDIVIDUAL CROSSINGS

Decisions regarding whether an existing at-grade crossing should be eliminated (grade separated or closed) or improved through the installation of traffic control devices or site and/or surface improvements depend upon a number of factors including the FHWA crossing elimination guidance criteria as well as safety, operational, and cost considerations. To ensure that the decision-making process to identify a proposed action at each existing at-grade crossing in the DC2RVA corridor was consistent and unbiased, decision-making logic diagrams were developed to provide a general analytical structure with which to identify a proposed action. Separate decision-making diagrams were developed for public and private crossings and are included in **Attachment A-3** and **Attachment B**, respectively. The logic process for private crossings followed a similar decision-making path but was more dependent on type of crossing (i.e., what type of property the crossing serves). These charts were developed to illustrate and summarize the general logic that was used in identifying proposed actions for improvements; this logic was used to guide the process and was not intended to be rigidly prescriptive.

Table OO-5 summarizes the decision-making process for proposed improvements at public at-grade crossings and **Table OO-6** summarizes the decision-making process for private at-grade crossing proposed improvements. As shown in these tables, there are multiple "paths" to a potential proposed action, using a variety of data.

For example, for a public at-grade crossing that does not have four quadrant gates and that has at least one FHWA condition threshold met or exceeded, grade separation and closure would both be considered; however, those two actions could be dismissed (based, for example, on engineering feasibility or cost-benefit considerations); median treatments or four quadrant gates would then be considered.

Within the proposed actions considered, the following assumptions were used:

- "Median Treatment" is defined as either raised medians (new or extension of existing raised medians, with or without addition of median tubes) or median separator treatment. Note that median treatment is considered before four quadrant gate treatment for this evaluation based on prioritization of lower overall cost.
- For a crossing closure, a new reasonable diversion route is defined as construction of 1 mile or less of a new connecting roadway. If closure is determined to be not feasible based on roadway connectivity considerations (i.e., requiring construction of over 1 mile of connecting roads), rerouting traffic to a new connecting roadway is also considered not feasible.
- For some crossings, a secondary proposed action is shown. The secondary action is proposed in the event that the initial proposed action is determined to be infeasible.
- The "No Action" proposal does not preclude any modifications / improvements that may be necessary to accommodate the installation of the 3rd track (such as relocation of gates).

As previously stated in the beginning of Section 3, it is important to note that the primary proposed actions resulting from this evaluation may be modified based on analyses performed at a greater level of detail or considerations identified over the course of the environmental analyses. The actions described in this document represent proposed actions to be considered

and moved forward in the overall alternatives development process; final actions will be determined based on detailed engineering analyses and design considerations as well as coordination with VDOT, local governments, communities, and other stakeholders.

TABLE OO-5: SUMMARY OF DECISION-MAKING DIAGRAM, PUBLIC CROSSINGS

Condition	Proposed Action(s) Considered
If any 1 of the 11 FHWA condition thresholds are met or exceeded in 2015 or 2025	• **Grade Separation** • **Closure**
If an adjacent crossing is located within 1 rail mile	• **Closure**
If there are rail or roadway safety or geometric deficiencies to be mitigated	• **Geometric Safety Improvement** • **Grade Separation** • **Closure**
If the existing condition is gates (not four quadrant)	• **Median Treatment** • **Four Quadrant Gate**
If there are existing median treatment or four quadrant gates	• **No Action**

TABLE OO-6: SUMMARY OF DECISION-MAKING DIAGRAM, PRIVATE CROSSINGS

Condition	Proposed Action(s) Considered
If a farm / residence or industrial crossing has feasible alternate routes	• **Closure**
If a crossing is commercial / used by the public	• **Median Treatment** • **Four Quadrant Gate**
If a residence / farm crossing provides sole access	• **Locking Gate**
If an industrial crossing provides sole access	• **Four Quadrant Gate** • **Locking Gate**
If the crossing is on a military property	• **Four Quadrant Gate**
If the crossing is exclusively railroad access	• **No Action**

4. EVALUATION RESULTS: PROPOSED ACTIONS

Section 4 provides a summary of the proposed actions resulting from the at-grade crossing evaluation:

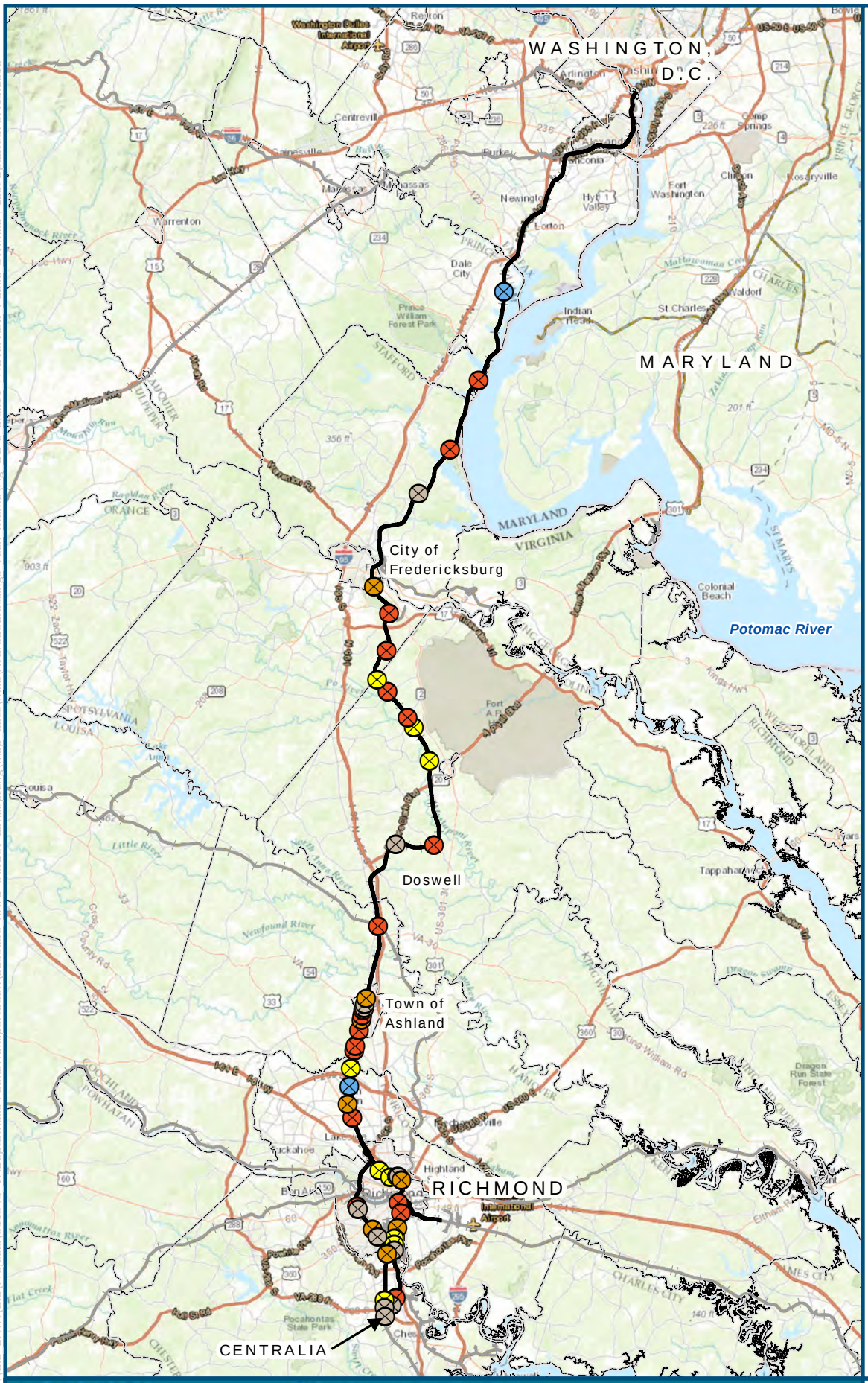
- Proposed Actions at Public Crossings: Section 4.1 and its subsections. Refer to **Attachment A-3** for documentation of the decision-making process and resulting proposed actions for public at-grade crossings.
- Proposed Actions at Private Crossings: Section 4.2 and its subsections. Refer to **Attachment B** for documentation of the decision-making process and resulting proposed actions for private at-grade crossings.
- Proposed Actions at Fredericksburg Bypass Crossings: Section 4.3 and its subsections. Refer to **Attachment C** for documentation of the decision-making process and resulting proposed actions for crossings along the existing rail line of the proposed Fredericksburg Bypass (both public and private crossings).

4.1 PROPOSED ACTIONS: PUBLIC CROSSINGS

The at-grade crossing evaluation resulted in the following proposed actions at the 50 existing at-grade public crossings in the DC2RVA corridor:

- **Grade Separate**: 8 Crossings
- **Closure**: 12 Crossings
- **Median Treatment**: 9 Crossings
- **Four Quad Gates**: 19 Crossings
- **No Action**: 2 Crossings

The locations of these proposed actions are shown in **Figure OO-6**, and are each described in more detail in the following subsections.



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Miles

1 inch = 12 miles
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Projection: Lambert Conformal Conic
State Plane Virginia North FIPS 4501 Feet
North American Datum of 1983

Basemap & Data Sources:
2015 USGS Topographic Map;
2015 World Transportation

Legend

Proposed Action

- Closure
- Four Quad Gates
- Grade Separate
- Median Treatment
- No Action

- DC2RVA Project Corridor
- Virginia Rail Lines
- County/City Boundaries

Figure OO-6

Public At-Grade Crossings: Proposed Actions Overview

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4.1.1. Public Crossing Proposed Actions: Grade Separate

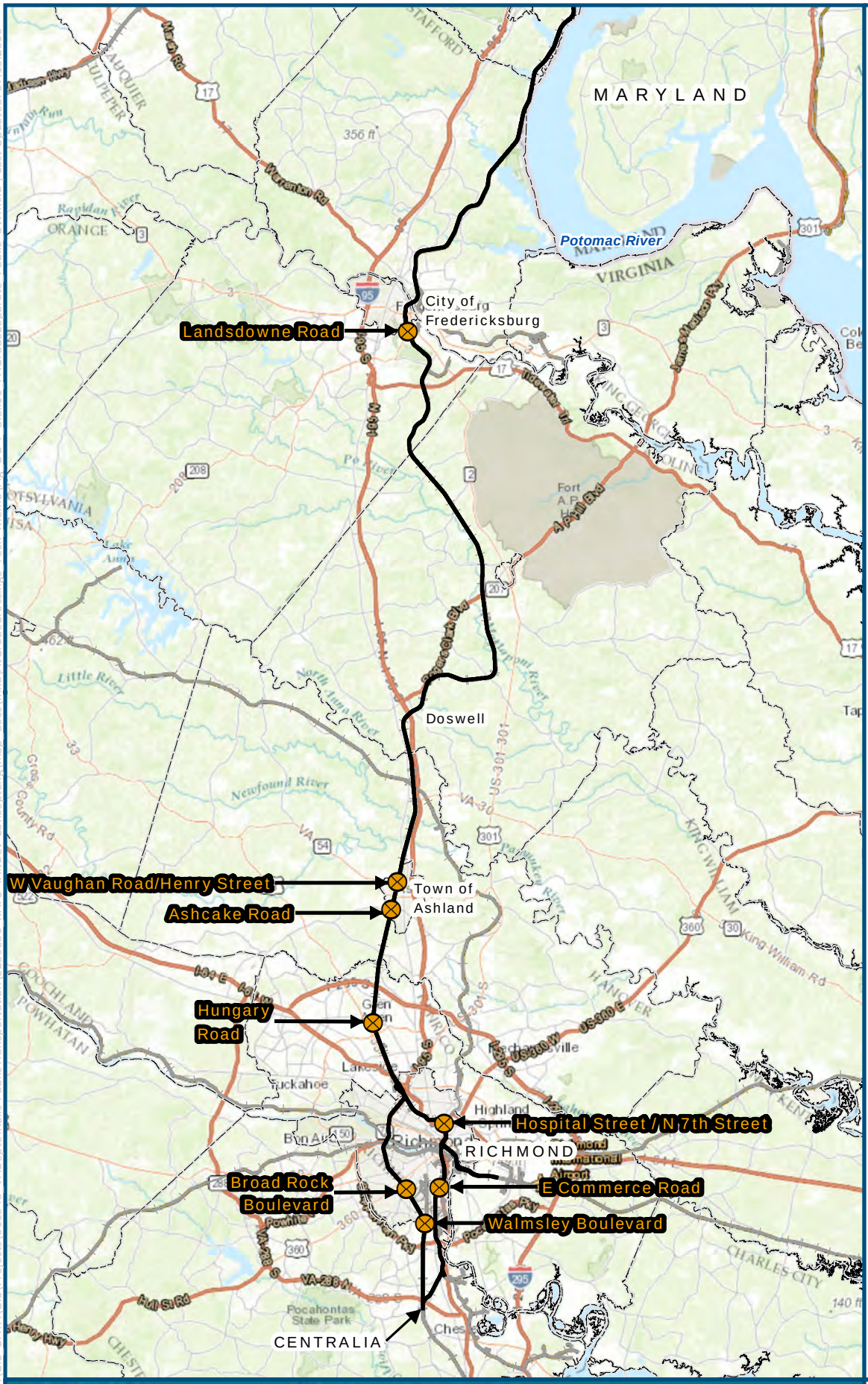
There are 8 existing public at-grade crossings in the DC2RVA corridor that are proposed to be grade separated, as shown in **Figure OO-7** and described in more detail below.

The following summarizes the locations of the 8 crossings that are proposed to be grade separated:

- Fredericksburg City: 1 crossing
- Hanover County: 2 crossings
- Henrico County: 1 crossing
- Richmond: 4 crossings (two located on the A-line; two located on the S-line)

The justification for the proposed grade separation at these locations include the following:

- 4 locations are proposed due to exceeding FHWA condition thresholds
- 3 locations are proposed due to mitigating safety / geometric deficiencies
- 1 location is required based on considerations related to industrial rail siding (such as roadways being blocked for long periods by sitting trains)



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Miles

1 inch = 9 miles
@ 8.5 x 11 inches

Projection: Lambert Conformal Conic
State Plane Virginia North FIPS 4501 Feet
North American Datum of 1983

Basemap & Data Sources:
2015 USGS Topographic Map;
2015 World Transportation

Legend

Proposed Action

- Grade Separate
- DC2RVA Project Corridor
- Virginia Rail Lines
- County/City Boundaries

Figure OO-7

Public At-Grade Crossings: Proposed Grade Separate Locations

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The key factors supporting the decision-making process at each of the 8 crossings that are proposed to be grade separated are summarized below:

Landsdowne Road (Crossing Number 860558D), Fredericksburg City:

- Exceeds three FHWA condition thresholds in 2015 and 2025.
    - Closure determined not feasible due to connectivity to network as a major collector roadway with more than 10,000 daily vehicles by 2025 and lack of adjacent crossings within 1 mile.
    - Grade separation determined feasible (no major geometrics issues identified, and mitigatable impacts to existing businesses).

W Vaughn Road / Henry Street (Crossing Number 860513W), Hanover County:

- Exceeds one FHWA condition thresholds in 2025.
    - Closure determined not feasible due to connectivity to Town of Ashland network as the northern-most crossings of the railroad.
    - Grade separation determined feasible:
        - Benefit to having a grade separated crossing on the north side of the town, including location of the only fire station in town on crossing roadway (east of crossing).
        - Further design considerations: School access, Henry Street access, water treatment access, and County-owned park.

Ashcake Road (Crossing Number 860448T), Hanover County:

- Grade separation determined feasible:
    - Mitigates safety / geometric deficiencies of proximity of parallel roadway intersection within a few feet of high speed / high volume Ashcake Road.
    - Benefit to having a grade separated crossing for the southern-most crossing that serves the Town of Ashland.
    - Further design considerations: Frontage roads to maintain access to residences and/or side streets; pump station location.

Hungary Road (Crossing Number 860437F), Henrico County:

- Exceeds one FHWA condition thresholds in 2015 and 2025.
    - Closure determined not feasible due to connectivity to network as a minor arterial roadway with over 18,000 daily vehicles by 2025.
    - Grade separation determined feasible:
        - Emergency response considerations to consider grade separation, per VDOT.
        - Further design considerations: proximity to historic property; proximity to recreation area; maintaining access to side street(s).

Broad Rock Boulevard (Crossing Number 623668M), Richmond:

- Exceeds one FHWA condition thresholds in 2015 and 2025.
    - Closure determined not feasible due to connectivity to network as a principal arterial with more than 22,000 daily vehicles by 2025.
    - Grade separation determined feasible:
        - Further design considerations: accommodation of existing major intersection with E Belt Boulevard (located directly north of crossing); proximity to McGuire Veterans Hospital complex; expected impacts to businesses located immediately adjacent to existing crossing.

Walmsley Boulevard (Crossing Number 623672C), Richmond:

- Major safety / geometric deficiency: existing roadway hump (signed 5 mph) over tracks will be exacerbated by 3rd track of the DC2RVA project
    - Geometric improvements determined not preferred (curve cannot be eliminated)
    - Grade separation determined feasible.

Hospital Street / N 7th Street (Crossing Number 623530L), Richmond:

- Major safety / geometric deficiency: limited sight distance due to railroad track curve and proximity of N 7th Street intersection to crossing location:
    - Four quadrant gates with intersection realignment of N 7th Street to the west determined feasible but not preferred because of the existing track curve.
    - Grade separation determined feasible:
        - Further design considerations: realignment of N 7th Street intersection to the west of existing location; potential use of retaining wall to minimize impacts to existing buildings.

E Commerce Road (Crossing Number 623545B), Richmond:

- 3rd track of DC2RVA project includes an approximately 10,000 foot siding to the industrial area located adjacent to this crossing, which will result in stopped trains through this crossing:
    - Closure determined not feasible due to connectivity of the crossing as the industrial area's primary northern-most crossing.
    - Grade separation determined feasible and required.

4.1.2. Public Crossing Proposed Action: Closure

There are 12 existing public at-grade crossings in the DC2RVA corridor that are proposed to be closed, as shown in **Figure OO-8** and described in more detail below. The following summarizes the locations of the 12 crossings that are proposed to be closed:

- Stafford County: 1 crossing
- Caroline County: 1 crossing
- Hanover County: 2 crossings
- Richmond: 5 crossings (two located on the A-line; three located on the S-line)
- Chesterfield County: 3 crossings

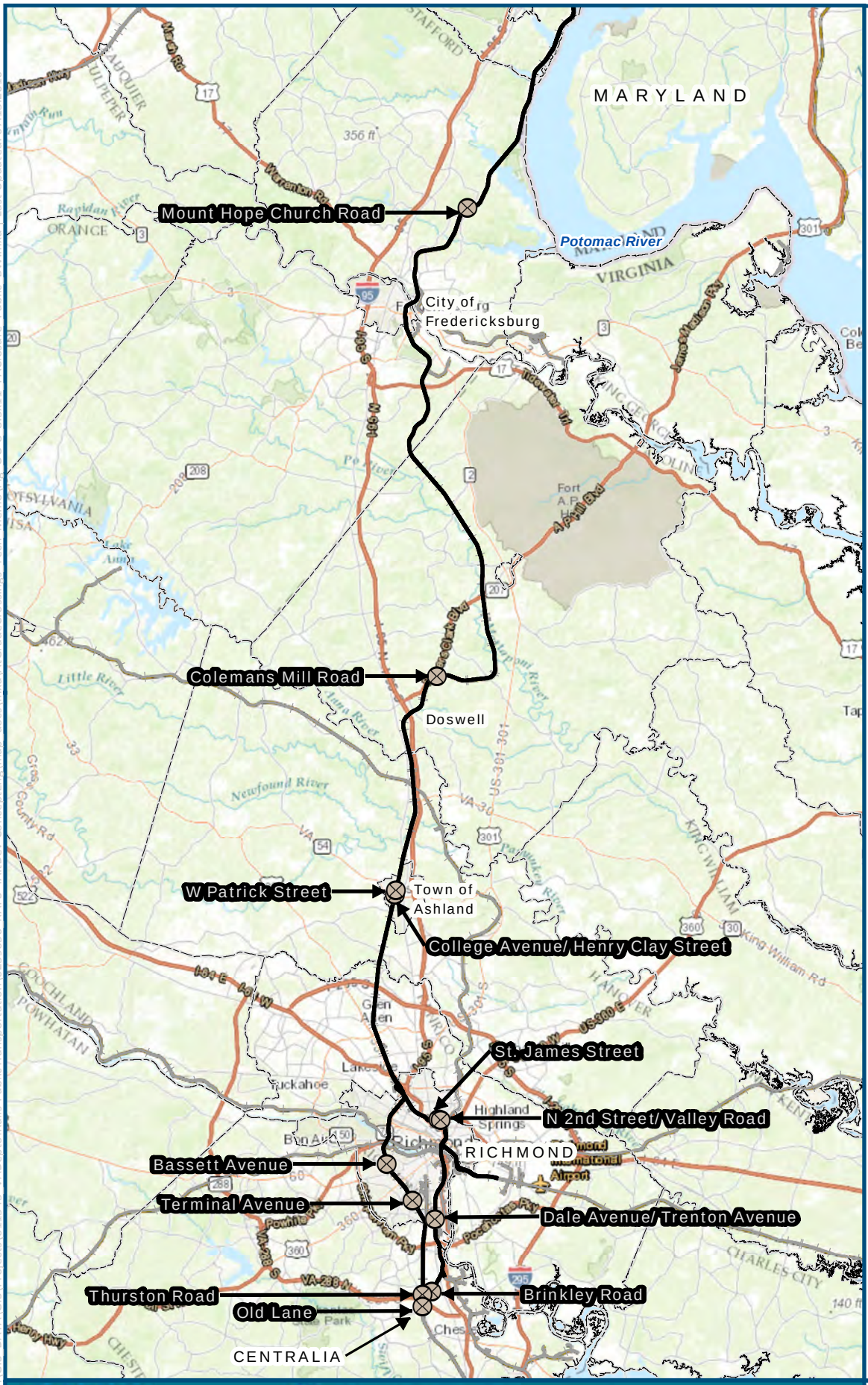
The justification for the proposed closures at these locations include the following:

- 3 locations are proposed due to exceeding FHWA condition thresholds
- 10 locations are proposed due to having adjacent crossings located within 1 rail mile that have reasonable alternate routes for vehicles
- 2 locations are proposed due to mitigating safety / geometric deficiencies
- 2 locations are required as part of the 3rd track and station improvements of the DC2RVA project

The key factors supporting the decision-making process at each of the 12 crossings that are proposed to be closed are summarized in **Table OO-7** below:

TABLE OO-7. SUMMARY OF PROPOSED CLOSURES, PUBLIC CROSSINGS

Crossing Name	Crossing Number	Location	Closure Justification
Mount Hope Church Road	860578P	Stafford County	Exceeds FHWA condition threshold(s) Located within 1 rail mile of adjacent crossing *Requires construction of new connection roadway*
Colemans Mill Road	860525R	Caroline County	Exceeds FHWA condition threshold(s) Major safety / geometric deficiency (track curve)
W Patrick Street	860512P	Hanover County	Required as part of DC2RVA 3rd Track improvement
College Avenue / Henry Clay Street	860462N		Required as part of DC2RVA station improvement
Bassett Avenue	623664K	Richmond	Located within 1 rail mile of adjacent crossings
Terminal Avenue	623670N		Located within 1 rail mile of adjacent crossings
Thurston Road	623679A	Chesterfield County	Located within 1 rail mile of adjacent crossing
Old Lane	623680U		Exceeds FHWA condition threshold(s) Located within 1 rail mile of adjacent crossing
St James Street	623525P	Richmond	Located within 1 rail mile of adjacent crossing
N 2nd Street / Valley Road	623527D		Located within 1 rail mile of adjacent crossing Major safety / geometric deficiency (track curve)
Dale Avenue / Trenton Avenue	623549D		Located within 1 rail mile of adjacent crossing
Brinkley Road	623660H	Chesterfield County	Located within 1 rail mile of adjacent crossing



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1 inch = 9 miles
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Projection: Lambert Conformal Conic
State Plane Virginia North FIPS 4501 Feet
North American Datum of 1983

Basemap & Data Sources:
2015 USGS Topographic Map;
2015 World Transportation

Legend

Proposed Action

- Closure
- DC2RVA Project Corridor
- Virginia Rail Lines
- County/City Boundaries

Figure OO-8

Public At-Grade Crossings: Proposed Closure Locations

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4.1.3. Public Crossing Proposed Action: Median Treatment

There are 9 existing public at-grade crossings in the DC2RVA corridor that are proposed for median treatment crossing improvements, as shown in **Figure OO-9** and described in more detail below. The following summarizes the locations of the 9 crossings that are proposed to have median treatment:

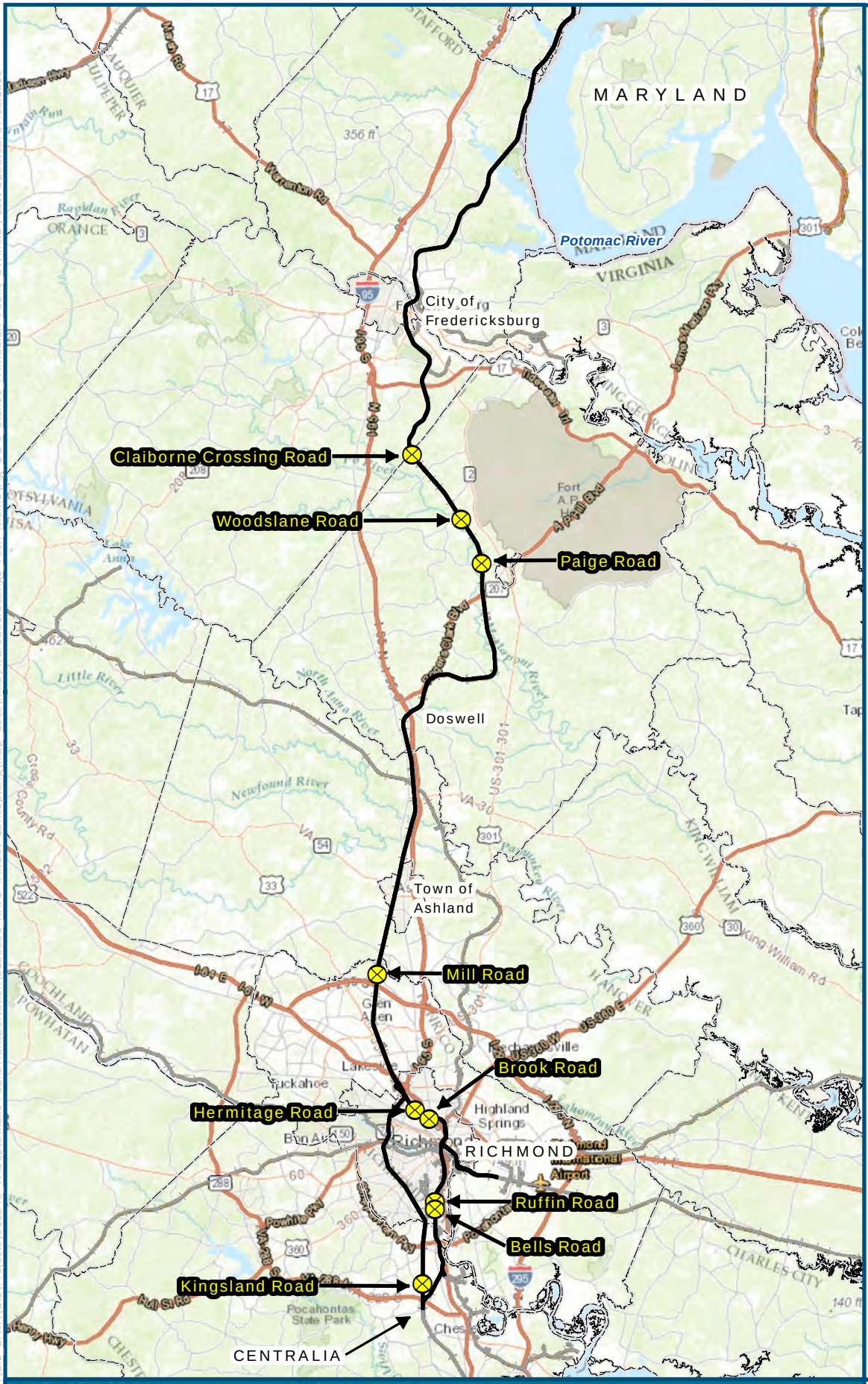
- Caroline County: 3 crossings
- Henrico County: 1 crossings
- Chesterfield County: 1 crossing
- Richmond: 4 crossings (all located on the S-line)

As part of the decision-making process as described in Section 3.5, if grade separation or closure did not need to be considered or was determined to be not feasible, median treatment was considered first as a proposed action before four quadrant gates based on preliminary cost-benefit considerations. Three of these 9 locations did exceed FHWA condition threshold(s); however, grade separation was determined to be not feasible at these locations based on cost-benefit considerations (such as low volumes served on the roadway) and were also determined to be not feasible for closure because there are no adjacent crossings within 1 rail mile. Of these crossings that did have an adjacent crossing within 1 rail mile, closure was determined to be not feasible due to roadway network connectivity considerations and/or traffic volumes served.

The key factors supporting the decision-making process at each of the 9 crossings that are proposed for median treatment crossing improvements are summarized in **Table OO-8**.

TABLE OO-8. SUMMARY OF PROPOSED MEDIAN TREATMENTS, PUBLIC CROSSINGS

Crossing Name	Crossing Number	Location	Median Treatment Justification
Claiborne Crossing Road	860547R	Caroline County	Exceeds FHWA condition threshold(s): *Grade separation not feasible (cost-benefit)* *Closure not feasible (no adjacent crossings within 1 mile)*
Woodslane Road	860541A		Exceeds FHWA condition threshold(s): *Grade separation not feasible (cost-benefit)* *Closure not feasible (no adjacent crossings within 1 mile)*
Paige Road	860539Y		Exceeds FHWA condition threshold(s): *Grade separation not feasible (cost-benefit)* *Closure not feasible (lack of adjacent equivalent crossing)*
Mill Road	860441V	Henrico County	Adjacent crossing located within 1 mile: *Closure not feasible (connectivity to network)*
Kingsland Road	623678T	Chesterfield County	Adjacent crossing located within 1 mile: *Closure not feasible (connectivity to network)*
Hermitage Road	623518E	Richmond	Adjacent crossing located within 1 mile: *Closure not feasible (connectivity to network / volumes)*
Brook Road	623522U		Adjacent crossing located within 1 mile: *Closure not feasible (connectivity to network / volumes)*
Ruffin Road	623547P		Adjacent crossing located within 1 mile: *Closure not feasible (connectivity to network and access to community center)*
Bells Road	623548W		Adjacent crossing located within 1 mile: *Closure not feasible (connectivity to network / volumes)*



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Miles

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Projection: Lambert Conformal Conic
State Plane Virginia North FIPS 4501 Feet
North American Datum of 1983

Basemap & Data Sources:
2015 USGS Topographic Map;
2015 World Transportation

Legend

Proposed Action

- Median Treatment
- DC2RVA Project Corridor
- Virginia Rail Lines
- County/City Boundaries

Figure OO-9
Public At-Grade Crossings: Proposed Median Treatment Locations

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4.1.4. Public Crossing Proposed Action: Four Quadrant Gate

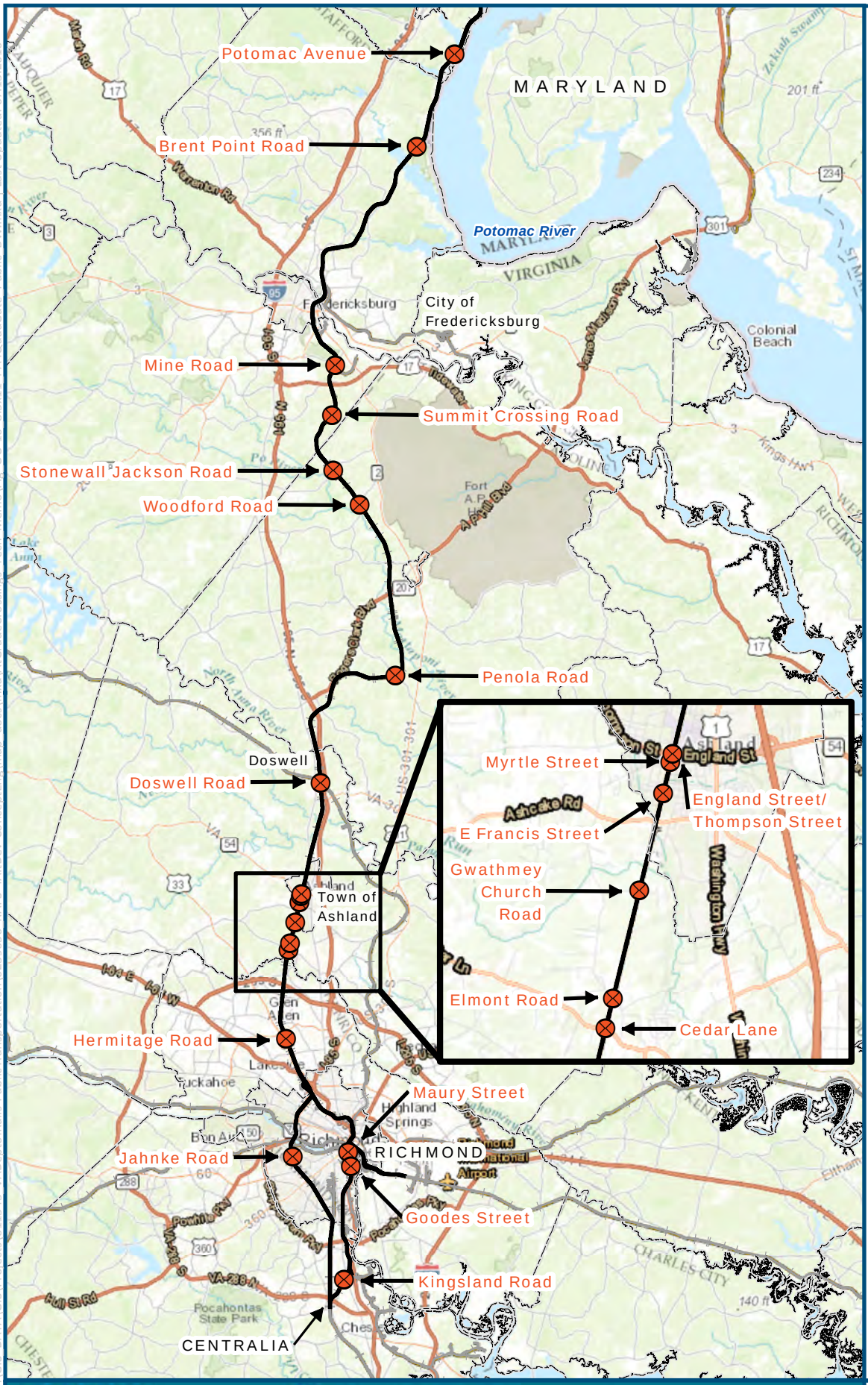
There are 20 existing public at-grade crossings in the DC2RVA corridor that are proposed for four quadrant gate crossing improvements, as shown in **Figure OO-10** and described in more detail below. The following summarizes the locations of the 20 crossings that are proposed to have median treatment:

- Prince William County: 1 crossing
- Stafford County: 1 crossing
- Spotsylvania County: 2 crossings
- Caroline County: 3 crossings
- Hanover County: 8 crossings
- Henrico County: 1 crossings
- Richmond: 3 crossings (one located on the A-line, two located on the S-line)
- Chesterfield County: 1 crossing

As part of the decision-making process (described in Section 3.5), if grade separation or closure did not need to be considered or was determined not to be feasible, median treatment was considered first as a proposed action before four quadrant gates as part of the preliminary cost-benefit considerations. However, if median treatment was determined to be not feasible due to, for example, proximity of existing roadways or access points, four quadrant gates were considered.

Eleven of the 20 locations did exceed FHWA condition threshold(s); however, the locations were determined not feasible for grade separation due to cost-benefit considerations or community impacts. Additionally, the locations were determined to be not feasible for closure due to lack of adjacent crossings within 1 rail mile and/or due to importance of connectivity to the overall roadway network and/or the fact that the roadway in question provides the sole access to property(ies).

The key factors supporting the decision-making process at each of the 20 crossings that are proposed for median treatment crossing improvements are summarized in **Table OO-9**.



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State Plane Virginia North FIPS 4501 Feet
North American Datum of 1983

Basemap & Data Sources:
2015 USGS Topographic Map;
2015 World Transportation

Legend

Proposed Action

- Four Quad Gates
- DC2RVA Project Corridor
- Virginia Rail Lines
- County/City Boundaries

Figure OO-10

Public At-Grade Crossings: Proposed Four Quad Gate Locations

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TABLE OO-9. SUMMARY OF PROPOSED FOUR QUADRANT GATES, PUBLIC CROSSINGS

Crossing Name	Crossing Number	Location	Four Quadrant Gate Justification
Potomac Avenue	860605J	Prince William County	Median treatment not feasible *(access point proximity)*
Brent Point Road	860581X	Stafford County	Exceeds FHWA condition threshold(s): *Grade separation not feasible (cost-benefit)* *Closure not feasible (roadway provides sole access)* Median treatment not feasible *(access point proximity)* Intersection realignment required *(sight distance)*
Mine Road	860557W	Spotsylvania County	Median treatment not feasible *(access point proximity)*
Summit Crossing Road	860548X		Exceeds FHWA condition threshold(s): *Grade separation not feasible (cost-benefit)* *Closure not feasible (no adjacent crossings within 1 mile)* Median treatment not feasible *(access point proximity)*
Stonewall Jackson Road	860545C	Caroline County	Exceeds FHWA condition threshold(s): *Grade separation not feasible (environmental impacts)* *Closure not feasible (no adjacent crossings within 1 mile)* Median treatment not feasible *(access point proximity)*
Woodford Road	860542G		Exceeds FHWA condition threshold(s): *Grade separation not feasible (cost-benefit)* *Closure not feasible (lack of adjacent equivalent crossing)* Median treatment not feasible *(access point proximity)*
Penola Road	860527E		Exceeds FHWA condition threshold(s): *Grade separation not feasible (cost-benefit)* *Closure not feasible (no adjacent crossings within 1 mile)* Median treatment not feasible *(access point proximity)*
Doswell Road	860520G	Hanover County	Exceeds FHWA condition threshold(s): *Grade separation not feasible (environmental impacts, proximity to rail crossing)* *Closure not feasible (no adjacent crossings within 1 mile)* Median treatment not feasible *(access point proximity)*
W Patrick Street	860512P		Adjacent crossing located within 1 mile: *Closure not feasible (connectivity to campus network)* Median treatment not feasible *(access point proximity)*
England Street / Thompson Street	860459F		Exceeds FHWA condition threshold(s): *Grade separation not feasible (community impacts)* *Closure not feasible (connectivity to network)* Median treatment not feasible *(access point proximity)* Safety improvements required *(pedestrian)*
Myrtle Street	860454W		Adjacent crossing located within 1 mile: *Closure not feasible (connectivity to network)* Median treatment not feasible *(access point proximity)*
E Francis Street	860450U		Exceeds FHWA condition threshold(s): *Grade separation not feasible (cost-benefit)* *Closure not feasible (no adjacent crossings within 1 mile)* Median treatment not feasible *(access point proximity)*
Gwathmey Church Road	860447L		Exceeds FHWA condition threshold(s): *Grade separation not feasible (cost-benefit)* *Closure not feasible (roadway provides sole access)* Median treatment not feasible *(access point proximity)*

TABLE OO-9. SUMMARY OF PROPOSED FOUR QUADRANT GATES, PUBLIC CROSSINGS

Crossing Name	Crossing Number	Location	Four Quadrant Gate Justification
Elmont Road	860445X	Hanover County	Exceeds FHWA condition threshold(s): *Grade separation not feasible (cost-benefit)* *Closure not feasible (connectivity to network)* Median treatment not feasible *(access point proximity)*
Cedar Lane	860443J		Exceeds FHWA condition threshold(s): *Grade separation not feasible (property impacts)* *Closure not feasible (connectivity to network)* Median treatment not feasible *(access point proximity)*
Hermitage Road	860435S	Henrico County	Adjacent crossing located within 1 mile: *Closure not feasible (connectivity to network)* Median treatment not feasible *(access point proximity)*
Jahnke Road	623663D	Richmond	Adjacent crossing located within 1 mile: *Closure not feasible (connectivity to network)* Median treatment not feasible *(access point proximity)*
Maury Street	623539X		Median treatment not feasible *(access point proximity)*
Goodes Street	623543M		Median treatment not feasible *(geometrics)* Requires roadway realignment *(away from flood gates)*
Kingsland Road	623559J	Chesterfield County	Median treatment not feasible *(geometrics)*

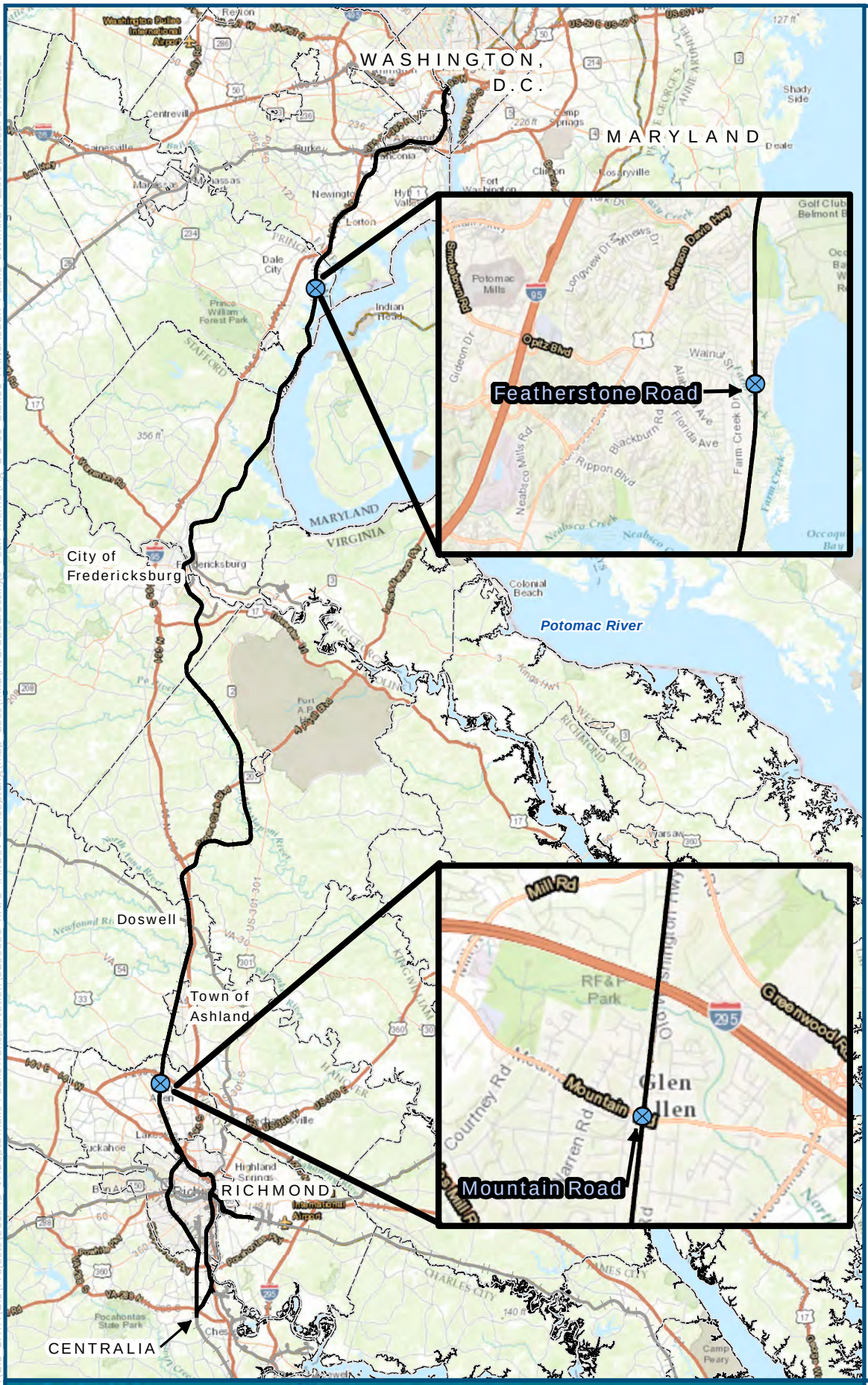
4.1.5. Public Crossing Proposed Action: No Action

There are 2 existing public at-grade crossings in the DC2RVA corridor that are proposed for no improvements, as shown in **Figure OO-11** and described in more detail below.

- **Featherstone Road** (Crossing Number 860600A), Prince William County
- **Mountain Road** (Crossing Number 860438M), Henrico County

The above two crossings have the following characteristics, which led to the proposed No Action:

- No FHWA condition thresholds are met or exceeded in 2015 or 2025.
- No feasible alternative adjacent crossings are located within 1 rail mile.
- No major safety or geometric deficiencies are identified that would require mitigation.
- The existing crossing treatment is four quadrant gates that satisfactorily meet the DC2RVA project requirements.



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Miles

1 inch = 12 miles
@ 8.5 x 11 inches

Projection: Lambert Conformal Conic
State Plane Virginia North FIPS 4501 Feet
North American Datum of 1983

Basemap & Data Sources:
2015 USGS Topographic Map;
2015 World Transportation

Legend

Proposed Action

- No Action
- DC2RVA Project Corridor
- Virginia Rail Lines
- County/City Boundaries

Figure OO-11

Public At-Grade Crossings: Proposed No Action Locations

DRPT Virginia Department of Rail and Public Transportation

U.S. Department of Transportation Federal Railroad Administration

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4.2 PROPOSED ACTIONS: PRIVATE CROSSINGS

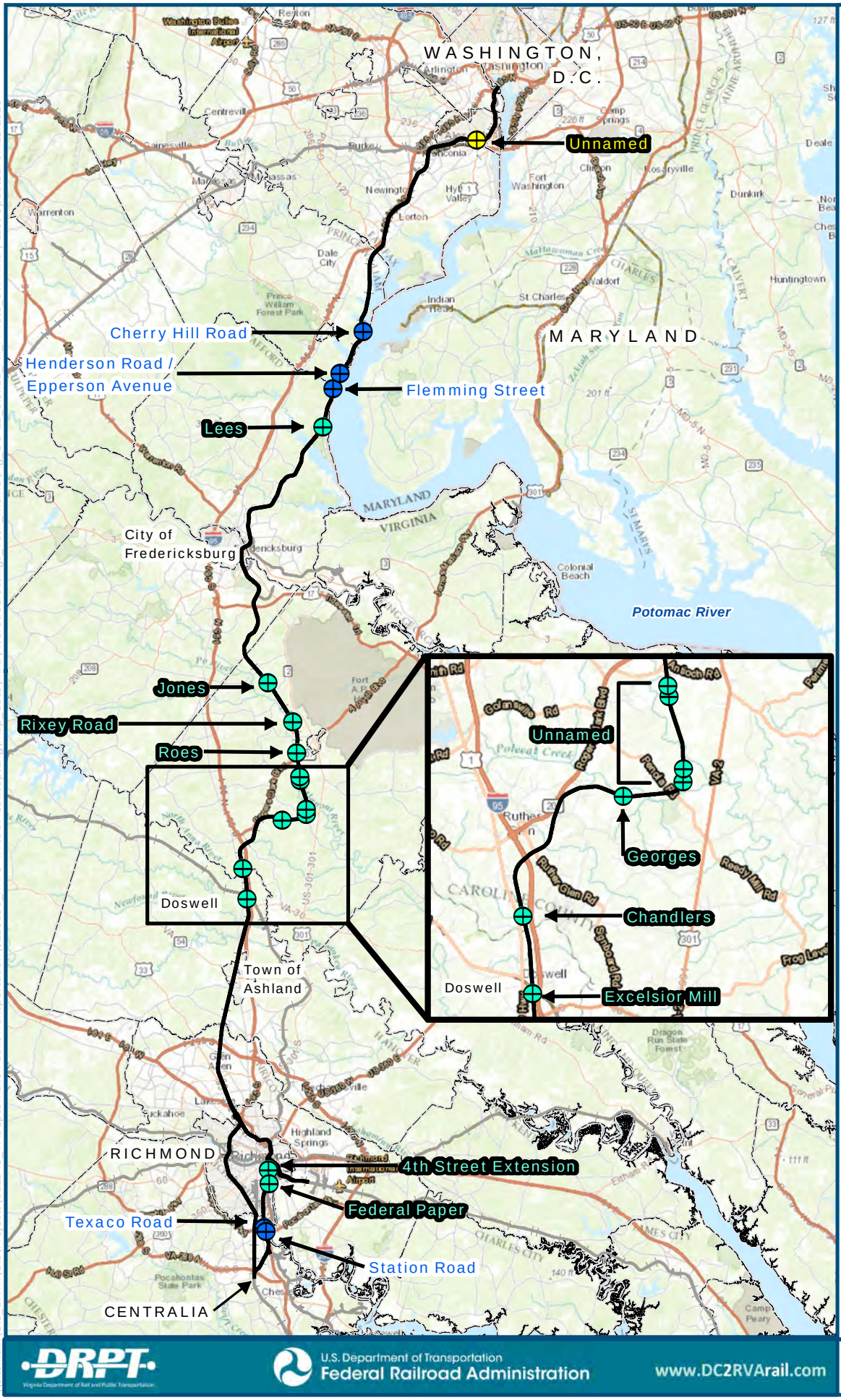
The proposed actions for the 19 existing private at-grade crossings in the DC2RVA corridor are shown in **Figure OO-12** and described in more detail below. The following summarizes the types of proposed actions for the 19 crossings:

- **Four Quad Gate**: 5 crossings
    - All Commercial, Military, and/or Industrial
- **Locking Gate**: 13 crossings
    - All Residential and/or Farm Properties
- **No Action**: 1 crossing
    - Railroad Exclusive Access

As part of the decision-making process as described in Section 3.5, the proposed actions for private at-grade crossings are primarily based on the type of crossing, as well as consideration of whether the crossing roadway provides sole access to the property and there are no feasible or cost-effective alternative access routes for the type of vehicles using the crossings. These key factors supporting the decision-making process at each of the 19 private crossings are summarized in **Table OO-10**.

TABLE OO-10. SUMMARY OF PROPOSED ACTIONS, PRIVATE CROSSINGS

Jurisdiction	Crossing Name	Crossing Number	Crossing Type	Sole Access	Proposed Action
Alexandria City	Unnamed Private Crossing	None	Railroad Exclusive Access	Yes	**No Action**
Prince William County	Cherry Hill Road Private Crossing	860601G	Commercial	Yes	**Four Quadrant Gate**
	Henderson Road / Epperson Avenue	860609L	Military	No	**Four Quadrant Gate**
Stafford County	Flemming Street	860586G	Military	No	**Four Quadrant Gate**
	Lees Private Crossing	860582E	Residential	Yes	**Locking Gate**
Caroline County	Jones Private Crossing	860543N	Farm	No	**Locking Gate**
	Rixey Road Private Crossing	860540T	Residential	Yes	**Locking Gate**
	Roes Private Crossing	860538S	Farm	No	**Locking Gate**
	Unnamed Private Crossing	860531U	Residential	Yes	**Locking Gate**
	Unnamed Private Crossing	860530M	Residential	Yes	**Locking Gate**
	Unnamed Private Crossing	860529T	Farm	Yes	**Locking Gate**
	Unnamed Private Crossing	860528L	Farm	Yes	**Locking Gate**
	Georges Private Crossing	860526X	Farm	Yes	**Locking Gate**
	Chandlers Private Crossing	860521N	Farm	Yes	**Locking Gate**
Hanover County	Excelsior Mill Private Crossing	860519M	Residential	Yes	**Locking Gate**
Richmond	4th Street Extension Private Crossing	623541Y	Industrial	Yes	**Locking Gate**
	Federal Paper Private Crossing	623544U	Industrial	No	**Locking Gate**
Chesterfield County	Texaco Road Private Crossing	623552L	Industrial	No	**Four Quadrant Gate**
	Station Road Private Crossing	623554A	Industrial	Yes	**Four Quadrant Gate**



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Miles

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Projection: Lambert Conformal Conic
State Plane Virginia North FIPS 4501 Feet
North American Datum of 1983

Basemap & Data Sources:
2015 USGS Topographic Map;
2015 World Transportation

Legend

Proposed Action

- Four Quad Gate
- Locking Gate
- No Action
- DC2RVA Project Corridor
- Virginia Rail Lines
- County/City Boundaries

Figure OO-12

Private At-Grade Crossings: Proposed Actions

DRPT Virginia Department of Rail and Public Transportation

U.S. Department of Transportation
Federal Railroad Administration

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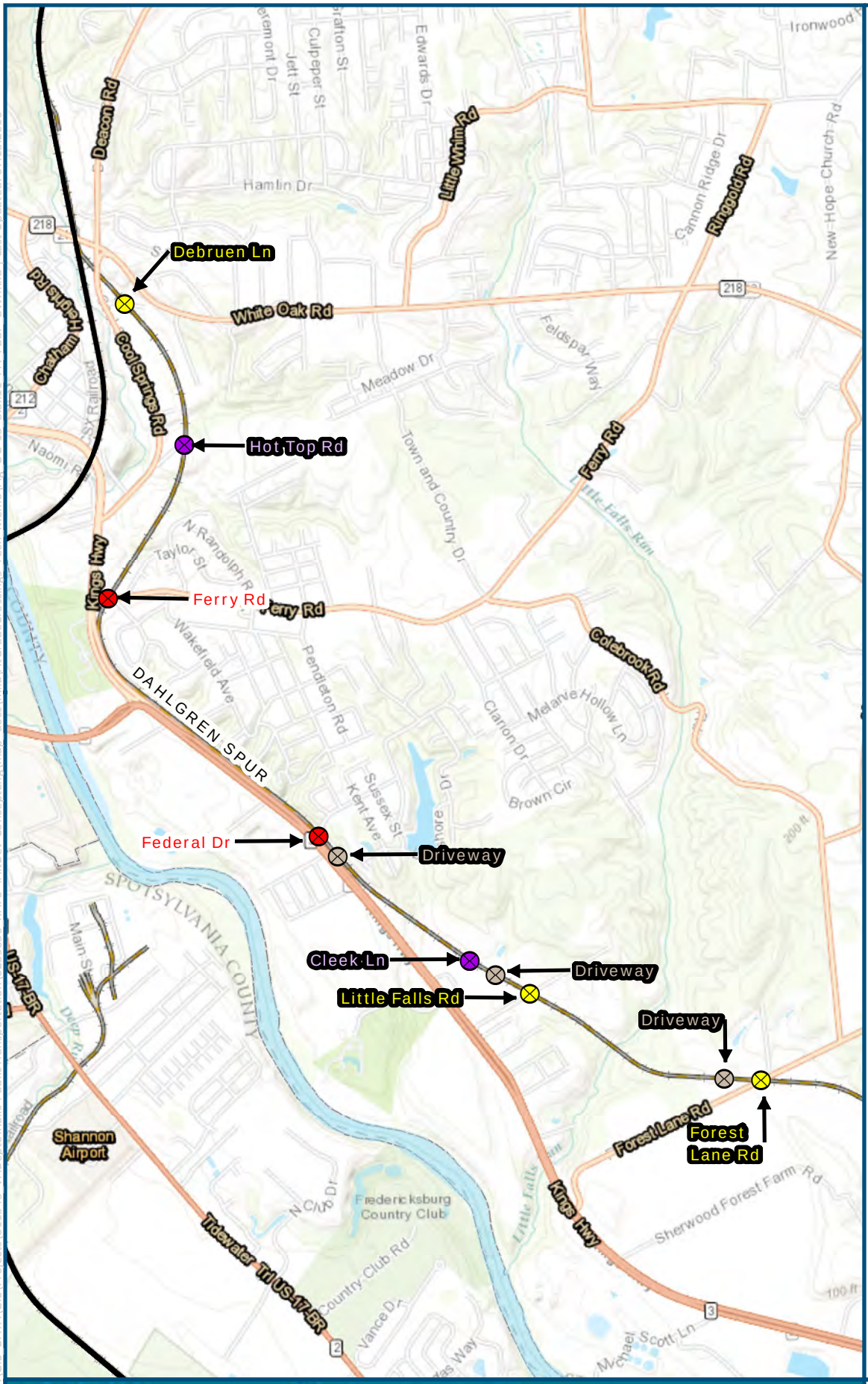
4.3 PROPOSED ACTIONS: FREDERICKSBURG BYPASS CROSSINGS

The proposed actions for the 5 existing public and 5 existing private at-grade crossings for the proposed Fredericksburg Bypass are shown in **Figure OO-13** and summarized in **Table OO-11** below. The decision-making process for the Fredericksburg Bypass crossings followed the same process as for the main line public and private existing at-grade crossings.

TABLE OO-11. SUMMARY OF PROPOSED ACTIONS, FREDERICKSBURG BYPASS

County	Type	Crossing Name	Crossing #	Sole Access	Proposed Action
Stafford County	Public	Debruen Ln	860345T	Yes	**Median Separators**
		Ferry Rd	860348N	No	**Four Quad Gate with intersection / roadway realignment**
		Federal Dr	860349V	No	**Four Quad Gate**
		Little Falls Rd	860353K	Yes	**Gates w/ Median Separators**
		Forest Lane Rd	860357M	Yes	**Gates w/ Median Separators**
	Private	Hot Top Rd (Private)	None	Yes	**Locking Gate *(update to DC2RVA standard, i.e. tied into track circuit)***
		Driveway (Private)	None	No	**Closure**
		Cleek Ln (Driveway, Private)	860352D	Yes	**Locking Gate**
		Driveway (Private)	None	Yes	***Assumed not to be an official FRA crossing; Remove ability to cross tracks at this location***
		Driveway (Private)	860356F	Yes	**Closure, with new driveway connection**



ATTACHMENTS

ATTACHMENT A. Public At-Grade Crossings:

A-1. Crossing Elimination Screening Analysis, Methodology Memorandum & Results

A-2. Summary of Considerations for Treatments at Individual Grade Crossings: Public At-Grade Crossings

A-3. Proposed Actions at Individual Grade Crossings: Public At-Grade Crossings

ATTACHMENT B. Summary of Considerations and Proposed Actions at Individual Grade Crossings: Private At-Grade Crossings

ATTACHMENT C. Summary of Considerations and Proposed Actions at Individual Grade Crossings: Fredericksburg Bypass, Public and Private At-Grade Crossings

Appendix OO

At-Grade Crossing Evaluation Technical Memorandum

Appendix OO

At-Grade Crossing Evaluation Technical Memorandum

ATTACHMENT A. PUBLIC AT-GRADE CROSSINGS

A-1. Crossing Elimination Screening Analysis, Methodology Memorandum & Results

A-2. Summary of Considerations for Treatments at Individual Grade Crossings: Public At-Grade Crossings

A-3. Proposed Actions at Individual Grade Crossings: Public At-Grade Crossings

February 2016

DC TO RICHMOND
SOUTHEAST HIGH SPEED RAIL

Preliminary Crossing Elimination Screening Analysis – DC2RVA At-Grade Public Crossings

Methodology Memorandum

FINAL

DRPT
Virginia Department of Rail and Public Transportation

U.S. Department of Transportation
Federal Railroad Administration

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PRELIMINARY CROSSING ELIMINATION SCREENING ANALYSIS – DC2RVA AT-GRADE PUBLIC CROSSINGS

The Federal Railroad Administration (FRA) and Virginia Department of Rail and Public Transportation (DRPT) propose passenger rail service and rail infrastructure improvements in the north-south travel corridor between Washington, D.C. and Richmond, VA. These passenger rail service and rail infrastructure improvements are collectively known as the Washington, D.C. to Richmond Southeast High Speed Rail project (DC2RVA). The Project will deliver higher speed passenger rail service, increase passenger and freight rail capacity, and improve passenger rail service frequency and reliability in the corridor shared by growing volumes of passenger, commuter, and freight rail traffic, thereby providing a competitive option for travelers going between Washington, D.C. and Richmond and those traveling to and from adjacent connecting corridors. The Project is part of the larger Southeast High Speed Rail (SEHSR) corridor, which extends from Washington, D.C. through Richmond, VA, and from Richmond continues east to Hampton Roads (Norfolk), VA and south to Raleigh, NC, and Charlotte, NC, and then continues west to Atlanta and south to Florida. The Project connects to the National Railroad Passenger Corporation (Amtrak) Northeast Corridor (NEC) at Union Station in Washington, D.C.

The purpose of the SEHSR program, as stated in the 2002 Tier I Environmental Impact Statement (EIS) completed for the full SEHSR corridor, is to provide a competitive transportation choice to travelers within the Washington, D.C. to Charlotte travel corridor. The purpose of the current Washington, D.C. to Richmond Southeast High Speed Rail project described here is to fulfill the purpose of the SEHSR Tier I EIS within this segment of the larger SEHSR corridor. The Project, by increasing rail capacity and improving travel times between Washington, D.C. and Richmond, will improve passenger train performance and reliability in the corridor, enabling intercity passenger rail to be a competitive transportation choice for travelers between Washington, D.C. and Richmond and beyond.

1. HIGHWAY-RAIL GRADE CROSSINGS

The highway-rail grade crossing is unique in that it constitutes the intersection of two transportation modes, which differ in both the physical characteristics of their traveled ways and their operations. Crossings are divided into categories: public crossings are those on highways under the jurisdiction of and maintained by a public authority and open to the traveling public, whereas private crossings are those on roadways privately owned and utilized only by the landowner or licensee. Physically, the crossings are either at-grade or grade-separated (either rail overpass or highway overpass). Only public, at-grade highway-railroad crossings are the subject of this preliminary screening analysis.

The *Railroad-Highway Grade Crossing Handbook* (Revised Second Edition August 2007) by the United States Department of Transportation (U.S. DOT) Federal Highway Administration (FHWA) provides a single reference document on prevalent and best practices as well as adopted

standards relative to highway-rail grade crossings. The guidelines presented in this handbook, which include physical and operational conditions to enhance safety and operations, have proven effective and are generally accepted nationwide. Specifically, "Chapter V Selection of Alternatives, Part A Technical Working Group Guidance on Traffic Control Devices Selection Criteria and Procedure" outlines analysis methodologies for consideration at every public highway-rail grade crossing. "Section 6 Grade Separation" provides the following 11 criteria for which highway-rail grade crossings **should be considered for separation or otherwise eliminated if any one or more conditions are met**:

i. The highway is a part of the designated Interstate Highway System. → *None of the 68 at-grade Project Area crossings include a highway that is part of the Interstate Highway System.*

ii. The highway is otherwise designed to have full controlled access. → *None of the 68 at-grade Project Area crossings are fully access controlled.*

iii. The posted highway speed equals or exceeds 113 km/hr (70 mph). → *The posted highway speed at all 68 at-grade Project Area crossings does not exceed 70mph.*

iv. Annual average daily traffic (AADT) exceeds 100,000 in urban areas or 50,000 in rural areas. → *The AADT at the 68 at-grade Project Area crossings does not exceed these limits.*

v. Maximum authorized train speed exceeds 177 km/hr (110 mph). → *The maximum timetable speed does not exceed 110 miles per hour at any of the 68 at-grade Project Area crossings.*

vi. An average of 150 or more trains per day or 300 million gross tons per year. → *The average number of trains per day at any of the 68 at-grade Project Area crossings does not exceed these limits.*

vii. An average of 75 or more passenger trains per day in urban areas or 30 or more passenger trains per day in rural areas.

viii. Crossing exposure (the product of the number of trains per day and AADT) exceeds 1 million in urban areas or 250,000 in rural areas; or

ix. Passenger train crossing exposure (the product of the number of passenger trains per day and AADT) exceeds 800,000 in urban areas or 200,000 in rural areas.

x. The expected accident frequency for active devices with gates, as calculated by the U.S. DOT Accident Prediction Formula including five-year accident history, exceeds 0.5.

xi. Vehicle delay exceeds 40 vehicle hours per day.

Accordingly, it was determined that the preliminary screening analysis to evaluate the potential for crossing elimination -- i.e., grade separation or crossing closures – would be based on criteria vii through xi for each Project Area at-grade crossing site-specific conditions.

Note that the urban / rural designation of each crossing location was determined based on objective identification of physical roadway and land use characteristics within a circle of 1,000-foot radius centered on the highway-rail crossing. These criteria were based on descriptive characteristics described in the *Railroad-Highway Grade Crossing Handbook* of urban crossings and include: signalized roadway intersections; intersection driveways and access points; business

establishments and signage; significant lane interaction (such as turn lanes or add / drop lanes); on-street parking; roadway/crossing illumination; and density of development around the crossing (refer to Section 7 of this report for full data source and assumption details).

2. CRITERIA VII: PASSENGER TRAINS PER DAY

The number of passenger trains per day is based on a single input: the total number of daily passenger trains at each crossing. For the DC2RVA Project Area, this includes both intercity passenger service throughout the corridor, as well as Virginia Railway Express (VRE) passenger trains in the northern portion of the corridor. Therefore, both a larger number of daily intercity trains and a larger number of daily VRE trains will result in a larger daily number of passenger trains.

3. CRITERIA VIII: CROSSING EXPOSURE (TOTAL TRAINS)

As defined in the *Railroad-Highway Grade Crossing Handbook*, the crossing exposure is based on the following input factors at each crossing:

- Number of trains per day
- Annual average daily traffic

The calculation is a simple multiplication; therefore, both a larger number of daily trains and a larger number of daily vehicles will result in a larger crossing exposure.

4. CRITERIA IX: PASSENGER TRAIN CROSSING EXPOSURE

As defined in the *Railroad-Highway Grade Crossing Handbook,* the crossing exposure is based on the following input factors at each crossing:

- Number of total passenger trains per day
- Annual average daily traffic

The calculation is a simple multiplication; therefore, both a larger number of daily passenger trains and a larger number of daily vehicles will result in a larger passenger train crossing exposure.

5. CRITERIA X. EXPECTED ACCIDENT FREQUENCY

The expected accident frequency was calculated based on the U.S. DOT Accident Prediction Model. The model is intended to predict, in absolute terms, the likelihood of a collision occurring over a given period of time given conditions at the crossing, and can be used to identify potential high-accident locations for further review. The U.S. DOT collision prediction formula combines three independent calculations to produce a collision prediction value, and incorporates crossing-specific characteristics, historical collision history, and current collision trends.

The expected accident frequency is based on the following input factors at each crossing:

- Type of warning device. There are three main categories of warning devices:
  - Gates
  - Flashing lights

  - Passive (includes stop signs, other signage, and no signs or signals)
- Annual average daily traffic.
- Number of trains per day.
- Number of tracks.
- Number of trains in daylight.
- Highway characteristics based on number of lanes, if paved, and functional classification.
- Maximum speed of train.
- Number of reported accidents, over five years. This is defined as a collision between a train and a highway user. The Federal Railroad Administration (FRA) has redefined a reportable highway-rail grade crossing collision; under new guidelines, any impact "between railroad on-track equipment and an automobile, bus, truck, motorcycle, bicycle, farm vehicle, pedestrian or other highway user at a rail-highway crossing" must be reported.

The formulas additionally utilize several constant factors, provided per U.S. DOT and FHWA criteria. The expected accident frequency provides a comparative estimate of the number of collisions per year; therefore, a lower number is more desirable.

6. CRITERIA XI. DAILY VEHICLE DELAY

The total vehicle delay per day is an amount of time that vehicles spend queuing at an at-grade crossing over the course of a day (24 hours). The daily vehicle delay is based on the following input factors:

- Average individual delay per vehicle per day
- Annual average daily traffic

The first factor above was calculated using Adolf May's *Traffic Flow Fundamentals*, which is the traffic flow theory upon which most of the Transportation Research Board's *Highway Capacity Manual* (HCM) equations are based. Input factors to calculate the average individual delay per vehicle per crossing are:

- **Arrival rate**. This represents how many vehicles (AADT) are arriving at the crossing per lane.
- **Service rate**. This is a constant factor, based on highway characteristics, that represents how many vehicles a highway can functionally handle, per lane.
- **Activation time**. This represents the length of time it takes for the train to complete the crossing, and is based on the length of the train and the speed of the train.
- **Cycle time**. The represents the amount of time between crossings each day and is directly based on the number of trains per day.

The total daily delay calculation is a straightforward multiplication. More trains and longer and/or slower moving trains result in more crossing closure time, and more motor vehicles on

the crossing road means that there is more total vehicle delay. Any combination of more trains, slower trains, and more motor vehicles would result in increases in resulting daily vehicle delay.

Given that the DC2RVA Project rail lines carry a combination of both passenger and freight trains, which have distinct speed and length characteristics, the delay calculation was separated into two calculations for each crossing – one for passenger trains and one for freight trains – so as to not over- or under-estimate total delay. Separate train lengths and speeds were estimated for each line for average passenger and freight trains, in addition to separate number of trains per day for passenger and freight trains. It is important to note that the train speeds used were operating speeds based on model output, and not the maximum timetable speed. The calculated passenger daily delay and the calculated freight daily delay were then added together to provide a single total daily delay at each crossing against which to compare to the 40 hour per day threshold.

Because trains could arrive at any time and the equation provides estimates of daily vehicle delays, the analysis does not separately calculate delays for particular peak or off-peak hours. While the total vehicle delay may be higher when traffic volumes are higher, it would also be lower when traffic volumes are lower. Over the course of the day, it is assumed for purposes of this high level analysis that this would average out.

7. DATA SOURCES & ASSUMPTIONS – PRELIMINARY SCREENING ANALYSIS, NOVEMBER 2015

There are a total of 241 highway-rail crossings within the DC2RVA corridor; of those, there are 68 public, at-grade crossings (i.e., the subject crossings of this preliminary screening analysis). The identification of crossing location, crossing number, and type of crossing was sourced directly from the U.S. DOT FRA GIS Web Application (http://fragis.fra.dot.gov/, accessed November 2015), and verified and/or supplemented as necessary with the U.S. DOT Crossing Inventory Form (Form FRA F 6180.71) (accessed via https://safetydata.fra.dot.gov/OfficeofSafety/PublicSite/Crossing/Crossing.aspx, November 2015) and aerial photography and/or field data.

ROADWAY INPUT DATA

To conduct the public at-grade crossing screening analysis, roadway data from multiple sources was used for each crossing. The data sources and any subsequent processing of data or assumptions that was used for this preliminary analysis is listed below.

Source: FRA Highway-Rail Crossing Inventory by State

(https://safetydata.fra.dot.gov/OfficeofSafety/publicsite/downloaddbf.aspx, CSV file type downloaded for the State of Virginia on 21 October 2015)

The following input data was used, identified automatically by matching the Crossing Number of each DC2RVA public at-grade crossing to the source data:

- Railroad Milepost
- Annual Average Daily Traffic (Secondary source, see Source: Virginia Department of Transportation Below)
- FHWA Highway Classification
- Maximum Timetable Speed

Source: FRA Public Highway-Rail Crossings Accident Prediction System

(http://safetydata.fra.dot.gov/webaps/default.aspx, PDF file type of accident prediction report downloaded for the DC2RVA counties and independent cities in March 2015)

The following input data was used, identified automatically by matching the Crossing Number of each DC2RVA public at-grade crossing to the source data:

- Paved / Unpaved Crossing Condition
- Number of Collisions, over a 5-year period
- Warning Device at Crossing
- Number of Traffic Lanes at Crossing
- Number of Main Tracks at Crossing

If any crossings were not included in the source data, the required data was verified and/or supplemented as necessary with aerial photography and/or field data and, for the case of the number of collisions, the average of the nearest upstream and downstream representative crossings.

Source: Virginia Department of Transportation (VDOT) 2014 Daily Traffic Volume Estimates Jurisdiction Reports

(http://www.virginiadot.org/info/2014_traffic_data_by_jurisdiction.asp, PDF file format of 2014 traffic data downloaded for the DC2RVA counties and cities in November 2015)

The following input data was used, identified manually by locating the crossing within the VDOT "from" and "to" limits for the appropriate crossing roadway:

- AADT

If any crossings were not included in the source data, the FRA Highway-Rail Crossing Inventory by State AADT was used as a secondary source.

Other roadway input data processing / assumptions:

- Future year AADT was calculated using an assumed linear (non-compounding) growth rate of 1.5% per year.
- The number of traffic lanes for future years was assumed to be equal to the existing year input data.
- The warning device was assumed to be four-quadrant gates at every crossing for all future years.
- The number of main tracks was assumed to be 3 tracks for all future years.
- A "Rural" or "Urban" designation is needed for each crossing location to determine the appropriate threshold to apply to the calculation result (if applicable). The *Railroad-Highway Grade Crossing Handbook* provides descriptive criteria for urban crossing locations, which include higher development density and more / closer proximity of signalized intersections, driveways / access points, lane interaction, and on-street parking compared to rural crossing locations. Additionally, the presence of signed/striped pedestrian crossings was used as a criteria. For each crossing, aerial imagery and/or field data was used to determine the presence of these urban criteria

and objectively assign a "rural" or "urban" designation based on the total number of criteria present.

TRAIN OPERATIONS INPUT DATA

To conduct the public at-grade crossing preliminary screening analysis, rail operations input data as listed below was needed for each crossing for Intercity Passenger trains, VRE Passenger trains, and Freight trains separately, by rail line:

- Train length
- Train speed
- Total number of trains per day

The input data for train speed and total number of daily trains for the preliminary screening analysis is based on the DC2RVA rail operations RTC modeling analysis conducted to date and professional judgment based on projected freight and passenger rail improvements. Future year train speeds were based on the existing year input data and adjusted as necessary based on professional engineering judgment to account for higher future maximum authorized speeds. Note that the increase in the number of total trains per day between 2025 and 2045 reflects an increase in the number of Passenger VRE and Freight trains only, as the total number of project-related Passenger Intercity trains will not change between the opening year (2025) and design year (2045).

Crossing Number	Crossing Name	Location	RR Milepost	Rail Line	Urban / Rural	Triggered Crossings *(Any Criteria)*			Crossing Exposure (CE) Total Trains			RURAL Threshold: CE > 250,000			URBAN Threshold: CE > 1,000,000			Accident Frequency			Accident Frequency > 0.5			Vehicle Delay AVG (Hours)			Vehicle Delay AVG > 40 hours per day		
						2015	2025	2045	2015	2025	2045	2015	2025	2045	2015	2025	2045	2015	2025	2045	2015	2025	2045	2015	2025	2045	2015	2025	2045
623680U	Old Lane	Chesterfield County	10.74	A-LINE	Rural	--	X	X	165,648	324,336	513,336	No	YES	YES	--	--	--	0.0347	0.0460	0.0493	No	No	No	5.27	8.57	18.24	No	No	No
623679A	Thurston Road	Chesterfield County	10.01	A-LINE	Rural	--	--	--	15,538	30,450	48,180	No	No	No	--	--	--	0.0207	0.0298	0.0327	No	No	No	0.44	0.71	1.46	No	No	No
623678T	Kingsland Road	Chesterfield County	9.38	A-LINE	Rural	--	--	--	72,488	141,926	224,621	No	No	No	--	--	--	0.0294	0.0401	0.0434	No	No	No	2.15	3.46	7.19	No	No	No
623672C	Walmsley Boulevard	Richmond	5.52	A-LINE	Urban	--	--	--	169,116	331,122	524,067	--	--	--	No	No	No	0.0414	0.0462	0.0495	No	No	No	5.16	8.33	17.45	No	No	No
623670N	Terminal Avenue	Richmond	3.87	A-LINE	Urban	--	--	--	23,154	45,298	71,686	--	--	--	No	No	No	0.0594	0.0766	0.0822	No	No	No	0.67	1.07	2.20	No	No	No
623668M	Broad Rock Boulevard	Richmond	3.08	A-LINE	Urban	--	X	X	655,690	1,283,830	2,031,955	--	--	--	No	YES	YES	0.2225	0.2602	0.2701	No	No	No	21.62	35.37	76.23	No	No	YES
623664K	Bassett Avenue	Richmond	1.00	A-LINE	Urban	--	--	--	47,362	92,742	146,730	--	--	--	No	No	No	0.0268	0.0372	0.0404	No	No	No	1.40	2.24	4.64	No	No	No
623663D	Jahnke Road	Richmond	0.68	A-LINE	Urban	--	--	X	414,120	810,840	1,283,340	--	--	--	No	No	YES	0.0411	0.0526	0.0558	No	No	No	14.28	23.56	51.70	No	No	YES
860435S	Hermitage Road	Henrico County	5.45	RF&P	Urban	--	--	--	179,046	322,938	498,393	--	--	--	No	No	No	0.0353	0.0460	0.0491	No	No	No	11.06	17.82	37.75	No	No	No
860437F	Hungary Road	Henrico County	6.60	RF&P	Urban	X	X	X	682,080	1,230,240	1,898,640	--	--	--	No	YES	YES	0.0494	0.0600	0.0627	No	No	No	46.76	76.78	169.22	YES	YES	YES
860438M	Mountain Road	Henrico County	8.10	RF&P	Urban	--	--	X	221,676	399,828	617,058	--	--	--	No	No	No	0.0367	0.0475	0.0506	No	No	No	14.06	22.76	48.66	No	No	YES
860441V	Mill Road	Henrico County	9.65	RF&P	Urban	--	--	--	115,122	207,636	320,436	--	--	--	No	No	No	0.0323	0.0428	0.0460	No	No	No	6.98	11.21	23.59	No	No	No
860443J	Cedar Lane	Hanover County	11.15	RF&P	Rural	--	X	X	81,018	146,124	225,504	No	No	No	--	--	--	0.0301	0.0403	0.0434	No	No	No	1.47	2.35	4.75	No	No	No
860445X	Elmont Road	Hanover County	11.55	RF&P	Rural	--	X	X	89,544	161,502	249,237	No	No	No	--	--	--	0.0307	0.0410	0.0441	No	No	No	1.64	2.61	5.28	No	No	No
860447L	Gwathmey Church Road	Hanover County	12.95	RF&P	Rural	--	X	X	6,846	12,342	19,035	No	No	No	--	--	--	0.0169	0.0244	0.0269	No	No	No	0.12	0.19	0.38	No	No	No
860448T	Ashcake Road	Hanover County	13.85	RF&P	Urban	--	--	--	323,988	584,364	901,854	--	--	--	No	No	No	0.0394	0.0503	0.0533	No	No	No	6.36	10.27	21.29	No	No	No
860450U	E Francis Street	Hanover County	14.20	RF&P	Rural	--	X	X	59,682	107,646	166,131	No	No	No	--	--	--	0.0282	0.0382	0.0412	No	No	No	1.08	1.73	3.48	No	No	No
860454W	Myrtle Street	Hanover County	14.64	RF&P	Urban	--	--	--	76,734	138,402	213,597	--	--	--	No	No	No	0.0719	0.0904	0.0959	No	No	No	1.41	2.25	4.56	No	No	No
860459F	England Street / Thompson Street	Hanover County	14.72	RF&P	Urban	--	X	X	596,820	1,076,460	1,661,310	--	--	--	No	YES	YES	0.0461	0.0569	0.0598	No	No	No	12.08	19.60	41.07	No	No	YES
860462N	College Avenue / Henry Clay Street	Hanover County	14.85	RF&P	Urban	--	--	--	55,440	99,990	154,305	--	--	--	No	No	No	0.0277	0.0377	0.0407	No	No	No	1.00	1.60	3.22	No	No	No
860512P	W Patrick Street	Hanover County	15.16	RF&P	Urban	--	--	--	12,726	22,968	35,397	--	--	--	No	No	No	0.0197	0.0280	0.0307	No	No	No	0.22	0.35	0.71	No	No	No
860513W	W Vaughan Road / Henry Street	Hanover County	15.62	RF&P	Rural	--	X	X	55,440	99,990	154,305	No	No	No	--	--	--	0.0277	0.0377	0.0407	No	No	No	1.00	1.60	3.22	No	No	No
860520G	Doswell Road	Hanover County	21.87	RF&P	Rural	--	X	X	13,230	23,892	36,855	No	No	No	--	--	--	0.0199	0.0283	0.0310	No	No	No	0.19	0.30	0.59	No	No	No
860525R	Colemans Mill Road	Caroline County	29.72	RF&P	Rural	--	X	X	18,774	33,858	52,245	No	No	No	--	--	--	0.0216	0.0304	0.0333	No	No	No	0.26	0.42	0.84	No	No	No
860527E	Penola Road	Caroline County	33.00	RF&P	Rural	--	X	X	17,934	32,340	49,896	No	No	No	--	--	--	0.0214	0.0302	0.0330	No	No	No	0.22	0.36	0.71	No	No	No
860539Y	Paige Road	Caroline County	40.43	RF&P	Rural	--	X	X	20,076	36,168	55,809	No	No	No	--	--	--	0.0220	0.0309	0.0337	No	No	No	0.20	0.31	0.61	No	No	No
860541A	Woodslane Road	Caroline County	43.50	RF&P	Rural	--	X	X	4,284	7,722	11,907	No	No	No	--	--	--	0.0149	0.0219	0.0242	No	No	No	0.04	0.07	0.13	No	No	No
860542G	Woodford Road	Caroline County	44.50	RF&P	Rural	--	X	X	16,212	29,238	45,117	No	No	No	--	--	--	0.0209	0.0295	0.0323	No	No	No	0.16	0.25	0.49	No	No	No
860545C	Stonewall Jackson Road	Caroline County	47.24	RF&P	Rural	--	X	X	81,018	146,124	225,504	No	No	No	--	--	--	0.0301	0.0403	0.0434	No	No	No	0.82	1.31	2.59	No	No	No
860547R	Claiborne Crossing Road	Caroline County	48.63	RF&P	Rural	--	X	X	20,076	36,168	55,809	No	No	No	--	--	--	0.0220	0.0309	0.0337	No	No	No	0.20	0.31	0.61	No	No	No
860548X	Summit Crossing Road	Spotsylvania County	51.41	RF&P	Rural	X	X	X	22,736	38,212	74,422	No	No	No	--	--	--	0.0226	0.0312	0.0356	No	No	No	0.41	0.65	1.39	No	No	No
860557W	Mine Road	Spotsylvania County	54.77	RF&P	Urban	--	--	X	289,912	487,244	948,944	--	--	--	No	No	No	0.0452	0.0490	0.0537	No	No	No	5.89	9.55	21.11	No	No	No
860558D	Landsdowne Road	Fredericksburg City	57.57	RF&P	Rural	X	X	X	488,824	821,558	1,600,073	YES	YES	YES	--	--	--	0.0490	0.0527	0.0573	No	No	No	10.96	18.07	41.56	No	No	YES
860578P	Mount Hope Church Road	Stafford County	67.57	RF&P	Rural	X	X	X	11,984	20,090	39,116	No	No	No	--	--	--	0.0194	0.0272	0.0314	No	No	No	0.15	0.24	0.51	No	No	No
860581X	Brent Point Road	Stafford County	72.34	RF&P	Rural	X	X	X	30,128	50,676	98,679	No	No	No	--	--	--	0.0242	0.0331	0.0376	No	No	No	0.28	0.45	0.94	No	No	No
860605J	Potomac Avenue	Prince William County	78.83	RF&P	Urban	--	--	X	397,880	668,710	1,302,385	--	--	--	No	No	YES	0.0919	0.1107	0.1190	No	No	No	4.66	7.73	17.42	No	No	No
860600A	Featherstone Road	Prince William County	86.85	RF&P	Urban	--	--	X	568,400	955,300	1,860,550	--	--	--	No	No	YES	0.0434	0.0537	0.0583	No	No	No	7.41	12.33	28.85	No	No	No
623660H	Brinkley Road	Chesterfield County	9.83	S-LINE	Rural	--	--	--	38,367	92,268	116,028	No	No	No	--	--	--	0.0205	0.0371	0.0387	No	No	No	0.90	1.35	1.86	No	No	No
623559J	Kingsland Road	Chesterfield County	9.16	S-LINE	Urban	--	--	--	42,630	102,520	128,920	--	--	--	No	No	No	0.0210	0.0379	0.0395	No	No	No	0.99	1.49	2.04	No	No	No
623549D	Dale Avenue / Trenton Avenue	Richmond	4.97	S-LINE	Rural	--	--	--	5,775	13,860	17,424	No	No	No	--	--	--	0.0385	0.0251	0.0264	No	No	No	0.13	0.19	0.26	No	No	No
623548W	Bells Road	Richmond	4.43	S-LINE	Urban	--	--	--	187,572	451,088	567,248	--	--	--	No	No	No	0.0402	0.0531	0.0547	No	No	No	4.46	6.72	9.25	No	No	No
623547P	Ruffin Road	Richmond	3.95	S-LINE	Urban	--	--	--	38,367	92,268	116,028	--	--	--	No	No	No	0.0255	0.0371	0.0387	No	No	No	0.90	1.35	1.86	No	No	No
623545B	E Commerce Road	Richmond	2.99	S-LINE	Urban	--	--	--	89,523	215,292	270,732	--	--	--	No	No	No	0.0307	0.0431	0.0447	No	No	No	2.28	3.47	4.88	No	No	No
623543M	Goodes Street	Richmond	1.66	S-LINE	Rural	--	--	--	4,263	10,252	12,892	No	No	No	--	--	--	0.0362	0.0234	0.0246	No	No	No	0.10	0.14	0.19	No	No	No
623539X	Maury Street	Richmond	0.77	S-LINE	Urban	--	--	--	54,117	130,108	163,636	--	--	--	No	No	No	0.0298	0.0395	0.0411	No	No	No	1.30	1.96	2.71	No	No	No
623530L	Hospital Street / N 7th Street	Richmond	1.23	S-LINE	Urban	--	--	--	121,506	345,332	434,252	--	--	--	No	No	No	0.0773	0.1021	0.1051	No	No	No	12.71	16.73	24.22	No	No	No
623527D	N 2nd Street / Valley Road	Richmond	1.55	S-LINE	Urban	--	--	--	44,772	127,244	160,004	--	--	--	No	No	No	0.0322	0.0394	0.0410	No	No	No	4.33	5.63	7.93	No	No	No
623525P	St James Street	Richmond	1.69	S-LINE	Urban	--	--	--	20,895	59,384	74,672	--	--	--	No	No	No	0.0222	0.0341	0.0357	No	No	No	1.94	2.50	3.48	No	No	No
623522U	Brook Road	Richmond	2.30	S-LINE	Urban	--	--	--	172,662	490,724	617,084	--	--	--	No	No	No	0.0396	0.0537	0.0553	No	No	No	16.66	21.64	30.46	No	No	No
623518E	Hermitage Road	Richmond	3.45	S-LINE	Urban	--	--	--	213,150	605,800	761,800	--	--	--	No	No	No	0.0411	0.0552	0.0568	No	No	No	20.89	27.20	38.47	No	No	No
224286R	Beulah Road	Henrico County	76.87	ENINSULASU	Rural	--	--	--	38,367	46,134	58,014	No	No	No	--	--	--	0.0255	0.0324	0.0340	No	No	No	8.31	10.16	14.36	No	No	No
224289L	Charles City Road	Henrico County	78.40	ENINSULASU	Rural	--	--	--	53,298	64,086	80,586	No	No	No	--	--	--	0.0275	0.0346	0.0362	No	No	No	11.50	14.03	19.81	No	No	No
224298K	Miller Road	Henrico County	78.99	ENINSULASU	Rural	--	--	--	24,402	29,326	36,872	No	No	No	--	--	--	0.0284	0.0295	0.0310	No	No	No	5.20	6.34	8.92	No	No	No
224964X	Hospital Street	Richmond	85.77	BBRR	Urban	--	--	--	34,716	39,846	50,106	--	--	--	No	No	No	0.0200	0.0315	0.0330	No	No	No	2.37	2.90	4.13	No	No	No
224967T	Dill Road	Henrico County	87.58	BBRR	Urban	--	--	--	29,844	34,254	43,074	--	--	--	No	No	No	0.0193	0.0305	0.0320	No	No	No	2.01	2.46	3.48	No	No	No
224970B	Richmond Henrico Turnpike	Henrico County	90.19	BBRR	Rural	--	--	--	53,592	61,512	77,352	No	No	No	--	--	--	0.0222	0.0344	0.0359	No	No	No	3.86	4.76	6.91	No	No	No
228389E	Industrial Park Road	Hanover County	90.96	BBRR	Rural	--	--	--	4,872	5,592	7,032	No	No	No	--	--	--	0.0121	0.0202	0.0214	No	No	No	0.31	0.38	0.52	No	No	No
224976S	Cool Spring Road	Hanover County	94.24	BBRR	Urban	--	--	--	17,664	20,274	25,494	--	--	--	No	No	No	0.0231	0.0293	0.0308	No	No	No	1.16	1.40	1.97	No	No	No
224979M	New Ashcake Road	Hanover County	96.95	BBRR	Rural	--	--	--	49,332	56,622	71,202	No	No	No	--	--	--	0.0218	0.0338	0.0353	No	No	No	3.81	4.76	7.09	No	No	No
224980G	Wyndale Drive	Hanover County	97.50	BBRR	Rural	--	--	--	366	420	528	No	No	No	--	--	--	0.0138	0.0103	0.0110	No	No	No	0.02	0.03	0.04	No	No	No
224981N	Stumpy Road	Hanover County	98.54	BBRR	Rural	--	--	--	7,308	8,388	10,548	No	No	No	--	--	--	0.0134	0.0223	0.0235	No	No	No	0.47	0.57	0.80	No	No	No
224984J	Peaks Road	Hanover County	99.32	BBRR	Rural	--	--	--	13,398	15,378	19,338	No	No	No	--	--	--	0.0158	0.0257	0.0270	No	No	No	0.88	1.07	1.51	No	No	No
224985R	Cadys Mill Road	Hanover County	99.67	BBRR	Rural	--	--	--	1,524	1,752	2,202	No	No	No	--	--	--	0.0087	0.0151	0.0160	No	No	No	0.10	0.12	0.16	No	No	No
224986X	Cadys Mill Road	Hanover County	101.48	BBRR	Rural	--	--	--	1,524	1,752	2,202	No	No	No	--	--	--	0.0087	0.0151	0.0160	No	No	No	0.10	0.12	0.16	No	No	No
224991U	E Patrick Henry Road	Hanover County	103.51	BBRR	Rural	--	--	--	22,536	25,866	32,526	No	No	No	--	--	--	0.0180	0.0288	0.0302	No	No	No	1.49	1.81	2.56	No	No	No
224992B	Hickory Hill Road	Hanover County	105.34	BBRR	Rural	--	--	--	1,284	1,470	1,848	No	No	No	--	--	--	0.0083	0.0144	0.0153	No	No	No	0.08	0.10	0.13	No	No	No
224998S	Kings Dominion Boulevard	Hanover County	110.68	BBRR	Urban	--	--	--	79,170	90,870	114,270	--	--	--	No	No	No	0.0303	0.0441	0.0457	No	No	No	5.37	6.56	9.31	No	No	No
225003U	Doswell Road	Hanover County	111.93	BBRR	Rural	--	--	--	1,890	2,172	2,730	No	No	No	--	--	--	0.0093	0.0160	0.0169	No	No	No	0.12	0.14	0.20	No	No	No
					Totals:	5	21	26				1	2	2	0	3	6				0	0	0				1	1	6

Crossing Number	Crossing Name	Location	RR Milepost	Rail Line	Urban / Rural	Passenger Trains Per Day			RURAL Threshold: Trains > 30			URBAN Threshold: Trains > 75			Passenger Crossing Exposure (PCE)			RURAL Threshold: PCE > 200,000			URBAN Threshold: PCE > 800,000		
						2015	2025	2045	2015	2025	2045	2015	2025	2045	2015	2025	2045	2015	2025	2045	2015	2025	2045
623680U	Old Lane	Chesterfield County	10.74	A-LINE	Rural	12	30	30	No	No	No	--	--	--	58,464	167,760	210,960	No	No	YES	--	--	--
623679A	Thurston Road	Chesterfield County	10.01	A-LINE	Rural	12	30	30	No	No	No	--	--	--	5,484	15,750	19,800	No	No	No	--	--	--
623678T	Kingsland Road	Chesterfield County	9.38	A-LINE	Rural	12	30	30	No	No	No	--	--	--	25,584	73,410	92,310	No	No	No	--	--	--
623672C	Walmsley Boulevard	Richmond	5.52	A-LINE	Urban	12	30	30	--	--	--	No	No	No	59,688	171,270	215,370	--	--	--	No	No	No
623670N	Terminal Avenue	Richmond	3.87	A-LINE	Urban	12	30	30	--	--	--	No	No	No	8,172	23,430	29,460	--	--	--	No	No	No
623668M	Broad Rock Boulevard	Richmond	3.08	A-LINE	Urban	12	30	30	--	--	--	No	No	No	231,420	664,050	835,050	--	--	--	No	No	YES
623664K	Bassett Avenue	Richmond	1.00	A-LINE	Urban	12	30	30	--	--	--	No	No	No	16,716	47,970	60,300	--	--	--	No	No	No
623663D	Jahnke Road	Richmond	0.68	A-LINE	Urban	12	30	30	--	--	--	No	No	No	146,160	419,400	527,400	--	--	--	No	No	No
860435S	Hermitage Road	Henrico County	5.45	RF&P	Urban	20	38	38	--	--	--	No	No	No	85,260	185,934	233,814	--	--	--	No	No	No
860437F	Hungary Road	Henrico County	6.60	RF&P	Urban	20	38	38	--	--	--	No	No	No	324,800	708,320	890,720	--	--	--	No	No	YES
860438M	Mountain Road	Henrico County	8.10	RF&P	Urban	20	38	38	--	--	--	No	No	No	105,560	230,204	289,484	--	--	--	No	No	No
860441V	Mill Road	Henrico County	9.65	RF&P	Urban	20	38	38	--	--	--	No	No	No	54,820	119,548	150,328	--	--	--	No	No	No
860443J	Cedar Lane	Hanover County	11.15	RF&P	Rural	20	38	38	No	YES	YES	--	--	--	38,580	84,132	105,792	No	No	No	--	--	--
860445X	Elmont Road	Hanover County	11.55	RF&P	Rural	20	38	38	No	YES	YES	--	--	--	42,640	92,986	116,926	No	No	No	--	--	--
860447L	Gwathmey Church Road	Hanover County	12.95	RF&P	Rural	20	38	38	No	YES	YES	--	--	--	3,260	7,106	8,930	No	No	No	--	--	--
860448T	Ashcake Road	Hanover County	13.85	RF&P	Urban	20	38	38	--	--	--	No	No	No	154,280	336,452	423,092	--	--	--	No	No	No
860450U	E Francis Street	Hanover County	14.20	RF&P	Rural	20	38	38	No	YES	YES	--	--	--	28,420	61,978	77,938	No	No	No	--	--	--
860454W	Myrtle Street	Hanover County	14.64	RF&P	Urban	20	38	38	--	--	--	No	No	No	36,540	79,686	100,206	--	--	--	No	No	No
860459F	England Street / Thompson Street	Hanover County	14.72	RF&P	Urban	20	38	38	--	--	--	No	No	No	284,200	619,780	779,380	--	--	--	No	No	No
860462N	College Avenue / Henry Clay Street	Hanover County	14.85	RF&P	Urban	20	38	38	--	--	--	No	No	No	26,400	57,570	72,390	--	--	--	No	No	No
860512P	W Patrick Street	Hanover County	15.16	RF&P	Urban	20	38	38	--	--	--	No	No	No	6,060	13,224	16,606	--	--	--	No	No	No
860513W	W Vaughan Road / Henry Street	Hanover County	15.62	RF&P	Rural	20	38	38	No	YES	YES	--	--	--	26,400	57,570	72,390	No	No	No	--	--	--
860520G	Doswell Road	Hanover County	21.87	RF&P	Rural	20	38	38	No	YES	YES	--	--	--	6,300	13,756	17,290	No	No	No	--	--	--
860525R	Colemans Mill Road	Caroline County	29.72	RF&P	Rural	20	38	38	No	YES	YES	--	--	--	8,940	19,494	24,510	No	No	No	--	--	--
860527E	Penola Road	Caroline County	33.00	RF&P	Rural	20	38	38	No	YES	YES	--	--	--	8,540	18,620	23,408	No	No	No	--	--	--
860539Y	Paige Road	Caroline County	40.43	RF&P	Rural	20	38	38	No	YES	YES	--	--	--	9,560	20,824	26,182	No	No	No	--	--	--
860541A	Woodslane Road	Caroline County	43.50	RF&P	Rural	20	38	38	No	YES	YES	--	--	--	2,040	4,446	5,586	No	No	No	--	--	--
860542G	Woodford Road	Caroline County	44.50	RF&P	Rural	20	38	38	No	YES	YES	--	--	--	7,720	16,834	21,166	No	No	No	--	--	--
860545C	Stonewall Jackson Road	Caroline County	47.24	RF&P	Rural	20	38	38	No	YES	YES	--	--	--	38,580	84,132	105,792	No	No	No	--	--	--
860547R	Claiborne Crossing Road	Caroline County	48.63	RF&P	Rural	20	38	38	No	YES	YES	--	--	--	9,560	20,824	26,182	No	No	No	--	--	--
860548X	Summit Crossing Road	Spotsylvania County	51.41	RF&P	Rural	34	54	84	YES	YES	YES	--	--	--	13,804	25,164	49,224	No	No	No	--	--	--
860557W	Mine Road	Spotsylvania County	54.77	RF&P	Urban	34	54	84	--	--	--	No	No	YES	176,018	320,868	627,648	--	--	--	No	No	No
860558D	Landsdowne Road	Fredericksburg City	57.57	RF&P	Rural	34	54	84	YES	YES	YES	--	--	--	296,786	541,026	1,058,316	YES	YES	YES	--	--	--
860578P	Mount Hope Church Road	Stafford County	67.57	RF&P	Rural	34	54	84	YES	YES	YES	--	--	--	7,276	13,230	25,872	No	No	No	--	--	--
860581X	Brent Point Road	Stafford County	72.34	RF&P	Rural	34	54	84	YES	YES	YES	--	--	--	18,292	33,372	65,268	No	No	No	--	--	--
860605J	Potomac Avenue	Prince William County	78.83	RF&P	Urban	34	54	84	--	--	--	No	No	YES	241,570	440,370	861,420	--	--	--	No	No	YES
860600A	Featherstone Road	Prince William County	86.85	RF&P	Urban	34	54	84	--	--	--	No	No	YES	345,100	629,100	1,230,600	--	--	--	No	No	YES
623660H	Brinkley Road	Chesterfield County	9.83	S-LINE	Rural	5	28	28	No	No	No	--	--	--	9,135	58,716	73,836	No	No	No	--	--	--
623559J	Kingsland Road	Chesterfield County	9.16	S-LINE	Urban	5	28	28	--	--	--	No	No	No	10,150	65,240	82,040	--	--	--	No	No	No
623549D	Dale Avenue / Trenton Avenue	Richmond	4.97	S-LINE	Rural	5	28	28	No	No	No	--	--	--	1,375	8,820	11,088	No	No	No	--	--	--
623548W	Bells Road	Richmond	4.43	S-LINE	Urban	5	28	28	--	--	--	No	No	No	44,660	287,056	360,976	--	--	--	No	No	No
623547P	Ruffin Road	Richmond	3.95	S-LINE	Urban	5	28	28	--	--	--	No	No	No	9,135	58,716	73,836	--	--	--	No	No	No
623545B	E Commerce Road	Richmond	2.99	S-LINE	Urban	5	28	28	--	--	--	No	No	No	21,315	137,004	172,284	--	--	--	No	No	No
623543M	Goodes Street	Richmond	1.66	S-LINE	Rural	5	28	28	No	No	No	--	--	--	1,015	6,524	8,204	No	No	No	--	--	--
623539X	Maury Street	Richmond	0.77	S-LINE	Urban	5	28	28	--	--	--	No	No	No	12,885	82,796	104,132	--	--	--	No	No	No
623530L	Hospital Street / N 7th Street	Richmond	1.23	S-LINE	Urban	5	36	36	--	--	--	No	No	No	28,930	239,076	300,636	--	--	--	No	No	No
623527D	N 2nd Street / Valley Road	Richmond	1.55	S-LINE	Urban	5	36	36	--	--	--	No	No	No	10,660	88,092	110,772	--	--	--	No	No	No
623525P	St James Street	Richmond	1.69	S-LINE	Urban	5	36	36	--	--	--	No	No	No	4,975	41,112	51,696	--	--	--	No	No	No
623522U	Brook Road	Richmond	2.30	S-LINE	Urban	5	36	36	--	--	--	No	No	No	41,110	339,732	427,212	--	--	--	No	No	No
623518E	Hermitage Road	Richmond	3.45	S-LINE	Urban	5	36	36	--	--	--	No	No	No	50,750	419,400	527,400	--	--	--	No	No	No
224286R	Beulah Road	Henrico County	76.87	ENINSULASU	Rural	5	6	6	No	No	No	--	--	--	9,135	12,582	15,822	No	No	No	--	--	--
224289L	Charles City Road	Henrico County	78.40	ENINSULASU	Rural	5	6	6	No	No	No	--	--	--	12,690	17,478	21,978	No	No	No	--	--	--
224298K	Miller Road	Henrico County	78.99	ENINSULASU	Rural	5	6	6	No	No	No	--	--	--	5,810	7,998	10,056	No	No	No	--	--	--
224964X	Hospital Street	Richmond	85.77	BBRR	Urban	0	0	0	--	--	--	No	No	No	0	0	0	--	--	--	No	No	No
224967T	Dill Road	Henrico County	87.58	BBRR	Urban	0	0	0	--	--	--	No	No	No	0	0	0	--	--	--	No	No	No
224970B	Richmond Henrico Turnpike	Henrico County	90.19	BBRR	Rural	0	0	0	No	No	No	--	--	--	0	0	0	No	No	No	--	--	--
228389E	Industrial Park Road	Hanover County	90.96	BBRR	Rural	0	0	0	No	No	No	--	--	--	0	0	0	No	No	No	--	--	--
224976S	Cool Spring Road	Hanover County	94.24	BBRR	Urban	0	0	0	--	--	--	No	No	No	0	0	0	--	--	--	No	No	No
224979M	New Ashcake Road	Hanover County	96.95	BBRR	Rural	0	0	0	No	No	No	--	--	--	0	0	0	No	No	No	--	--	--
224980G	Wyndale Drive	Hanover County	97.50	BBRR	Rural	0	0	0	No	No	No	--	--	--	0	0	0	No	No	No	--	--	--
224981N	Stumpy Road	Hanover County	98.54	BBRR	Rural	0	0	0	No	No	No	--	--	--	0	0	0	No	No	No	--	--	--
224984J	Peaks Road	Hanover County	99.32	BBRR	Rural	0	0	0	No	No	No	--	--	--	0	0	0	No	No	No	--	--	--
224985R	Cadys Mill Road	Hanover County	99.67	BBRR	Rural	0	0	0	No	No	No	--	--	--	0	0	0	No	No	No	--	--	--
224986X	Cadys Mill Road	Hanover County	101.48	BBRR	Rural	0	0	0	No	No	No	--	--	--	0	0	0	No	No	No	--	--	--
224991U	E Patrick Henry Road	Hanover County	103.51	BBRR	Rural	0	0	0	No	No	No	--	--	--	0	0	0	No	No	No	--	--	--
224992B	Hickory Hill Road	Hanover County	105.34	BBRR	Rural	0	0	0	No	No	No	--	--	--	0	0	0	No	No	No	--	--	--
224998S	Kings Dominion Boulevard	Hanover County	110.68	BBRR	Urban	0	0	0	--	--	--	No	No	No	0	0	0	--	--	--	No	No	No
225003U	Doswell Road	Hanover County	111.93	BBRR	Rural	0	0	0	No	No	No	--	--	--	0	0	0	No	No	No	--	--	--
					Totals:				4	17	17	0	0	3				1	1	2	0	0	4

May 1, 2016

DC TO RICHMOND
SOUTHEAST HIGH SPEED RAIL

Summary of Considerations for Treatments at Individual Grade Crossings

Public At-Grade Crossings

DRPT
Virginia Department of Rail and Public Transportation

U.S. Department of Transportation
Federal Railroad Administration

The DC2RVA emerging high-speed rail corridor must be a sealed corridor – all crossings must be grade separated or have appropriate crossing treatments that do not allow vehicles to cross the tracks when the warning device gates are activated.

This document is intended to provide a single-page summary that identifies preliminary feasibility considerations for potential grade separation; elimination / consolidation; and/or crossing safety treatments of existing at-grade existing crossings. In addition, there may be other improvements including but not limited to constructing a connecting roadway to an adjacent crossing or intersection improvements that are included as part of the overall improvement.

The remainder of this document contains a summary table of this analysis, followed by the single-page data sheets for each crossing, in the following order:

- RFP Line: Crossings listed North to South
- A Line: Crossings listed North to South
- S Line: Crossings listed North to South
- Buckingham-Branch Line: *Crossings not included as this line is not part of the Build Alternatives that are carried forward at this time.*
- Peninsula Sub Line: *Crossings not included as this line is not part of the Build Alternatives that are carried forward at this time.*

With regard to direction, "UPSTREAM" refers to north / toward Washington, D.C. and "downstream" refers to south / toward Richmond.

With regard to the daily number of bus trips using the crossing, the volume shown is total trips (not number of buses). For example, a volume of "2" indicates a single bus using the crossing twice per day. Bus trip crossings data was provided for VDOT based on crossing roadway, but is preliminary and may not represent the crossing link in all cases.

In general, roadway volumes were described as the following:

- Very high volume (> 20 k) roadway = Daily volumes greater than 20,000 vehicles
- High volume (> 10 k) roadway = Daily volumes greater than 10,000 vehicles
- High volume (> 5k) roadway = Daily volumes greater than 5,000 vehicles
- Mid volume roadway = Daily volumes between 1,000 and 5,000 vehicles
- Low volume roadway = Daily volumes less than 1,000 vehicles
- Very low volume roadway = Daily volumes less than 100 vehicles.

Notes on FHWA Screening Analysis for Grade Separation and/or Closure:

The *Railroad-Highway Grade Crossing Handbook* (Revised Second Edition August 2007) by the United States Department of Transportation (U.S. DOT) Federal Highway Administration (FHWA) provides a single reference document that outlines analysis methodologies for consideration at every public highway-rail grade crossing. "Section 6 Grade Separation" provides the following 11 criteria for which highway-rail grade crossings should be considered for separation or otherwise eliminated if any one or more conditions are met:

i. The highway is a part of the designated Interstate Highway System. → *None of the 68 at-grade Project Area crossings include a highway that is part of the Interstate Highway System.*

ii. The highway is otherwise designed to have full controlled access. → *None of the 68 at-grade Project Area crossings are fully access controlled.*

iii. The posted highway speed equals or exceeds 113 km/hr (70 mph). → *The posted highway speed at all 68 at-grade Project Area crossings does not exceed 70mph.*

iv. Annual average daily traffic (AADT) exceeds 100,000 in urban areas or 50,000 in rural areas. → *The AADT at the 68 at-grade Project Area crossings does not exceed these limits.*

v. Maximum authorized train speed exceeds 177 km/hr (110 mph). → *The maximum timetable speed does not exceed 110 miles per hour at any of the 68 at-grade Project Area crossings.*

vi. An average of 150 or more trains per day or 300 million gross tons per year. → *The average number of trains per day at any of the 68 at-grade Project Area crossings does not exceed these limits.*

vii. An average of 75 or more passenger trains per day in urban areas or 30 or more passenger trains per day in rural areas.

viii. Crossing exposure (the product of the number of trains per day and AADT) exceeds 1 million in urban areas or 250,000 in rural areas; or

ix. Passenger train crossing exposure (the product of the number of passenger trains per day and AADT) exceeds 800,000 in urban areas or 200,000 in rural areas.

x. The expected accident frequency for active devices with gates, as calculated by the U.S. DOT Accident Prediction Formula including five-year accident history, exceeds 0.5.

xi. Vehicle delay exceeds 40 vehicle hours per day.

Accordingly, it was determined that the preliminary screening analysis to evaluate the potential for grade separation would be based on criteria vii through xi for each Project Area at-grade crossing site-specific conditions – the results of this analysis are included on the following pages.

Notes for Considerations for Crossing Closures:

Typically crossing closures are considered by FHWA, FRA and most DOT's if any combination of the following conditions are present (in addition to FHWA criteria):

- *Adjacent crossing <= 1 mile down track*
- *< 1,000 ADT/AADT on the subject crossing*
- *>2 trains/day on the subject crossing*
- *The crossing is humped*
- *The crossing has restricted sight distance*
- *The subject crossing ends < 5 blocks in either direction from track*
- *The Crossing is private with alternate viable access to a public crossing that is treated or grade separated*
- *The crossing has more than 2 tracks*
- *Reasonable alternative access is available from the is crossing to an adjacent crossing in either direction*
- *The crossing does not provide direct routes for emergency response (next to the station)*
- *The crossing is not a US or State primary route (usually defined with a 2 digit or 3 digit route number)*

Notes for Considerations for Median Separators:

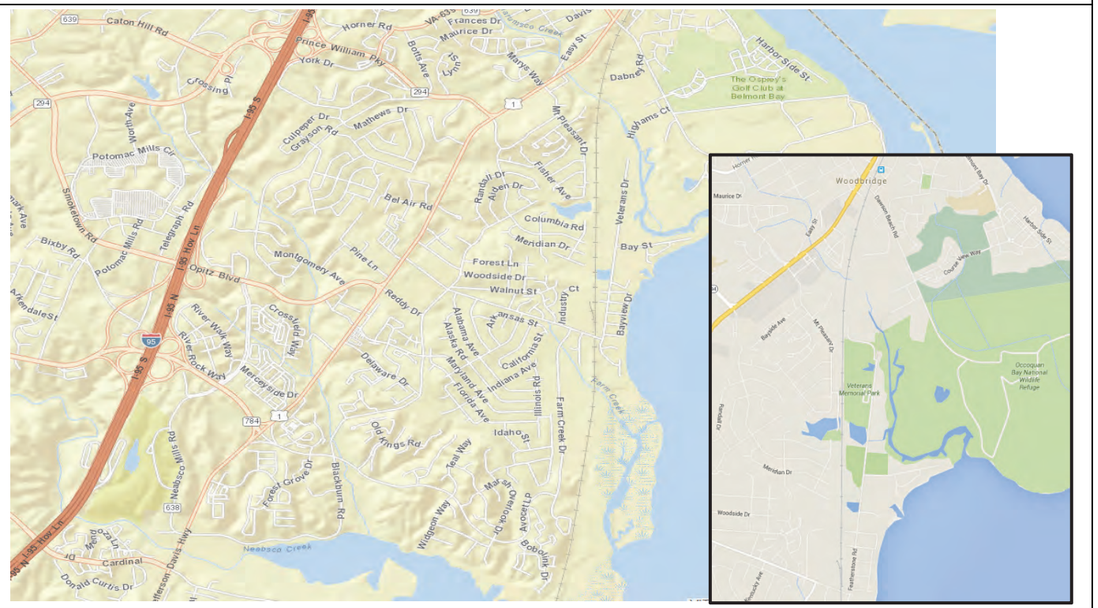
Median separators should be used if you can achieve 100 feet of median separators from the gate without impacting an adjacent road or driveway. Requires standard width roads with striping. Turning radii of large vehicles should also be a consideration.

Crossing Number	Crossing Name *(North to South, by Rail Line)*	Location	RR Milepost	Rail Line	AADT			Total # of Daily Trains			Urban / Rural	Triggered Crossings *(Any Criteria)*			FHWA TRIGGERED CRITERIA				
					2015	2025	2045	2015	2025	2045		2015	2025	2045	CE	Accident Freq	Veh Delay	Pass Trains	PCE
860600A	Featherstone Road	Prince William County	86.85	RF&P	10,150	11,650	14,650	56	82	124	Urban	--	--	X	X	--	--	X	X
860605J	Potomac Avenue	Prince William County	78.83	RF&P	7,105	8,155	10,255	56	82	124	Urban	--	--	X	X	--	--	X	X
860581X	Brent Point Road	Stafford County	72.34	RF&P	538	618	777	56	82	124	Rural	X	X	X	--	--	--	X	--
860578P	Mount Hope Church Road	Stafford County	67.57	RF&P	214	245	308	56	82	124	Rural	X	X	X	--	--	--	X	--
860558D	Landsdowne Road	Fredericksburg City	57.57	RF&P	8,729	10,019	12,599	58	84	126	Rural	X	X	X	X	--	X	X	X
860557W	Mine Road	Spotsylvania County	54.77	RF&P	5,177	5,942	7,472	58	84	126	Urban	--	--	X	--	--	--	X	--
860548X	Summit Crossing Road	Spotsylvania County	51.41	RF&P	406	466	586	58	84	126	Rural	X	X	X	--	--	--	X	--
860547R	Claiborne Crossing Road	Caroline County	48.63	RF&P	478	548	689	41	65	79	Rural	--	X	X	--	--	--	X	--
860545C	Stonewall Jackson Road	Caroline County	47.24	RF&P	1,929	2,214	2,784	41	65	79	Rural	--	X	X	--	--	--	X	--
860542G	Woodford Road	Caroline County	44.50	RF&P	386	443	557	41	65	79	Rural	--	X	X	--	--	--	X	--
860541A	Woodslane Road	Caroline County	43.50	RF&P	102	117	147	41	65	79	Rural	--	X	X	--	--	--	X	--
860539Y	Paige Road	Caroline County	40.43	RF&P	478	548	689	41	65	79	Rural	--	X	X	--	--	--	X	--
860527E	Penola Road	Caroline County	33.00	RF&P	427	490	616	41	65	79	Rural	--	X	X	--	--	--	X	--
860525R	Colemans Mill Road	Caroline County	29.72	RF&P	447	513	645	41	65	79	Rural	--	X	X	--	--	--	X	--
860520G	Doswell Road	Hanover County	21.87	RF&P	315	362	455	41	65	79	Rural	--	X	X	--	--	--	X	--
860513W	W Vaughan Road / Henry Street	Hanover County	15.62	RF&P	1,320	1,515	1,905	40	64	78	Rural	--	X	X	--	--	--	X	--
860512P	W Patrick Street	Hanover County	15.16	RF&P	303	348	437	40	64	78	Urban	--	--	--	--	--	--	--	--
860462N	College Avenue / Henry Clay Street	Hanover County	14.85	RF&P	1,320	1,515	1,905	40	64	78	Urban	--	--	--	--	--	--	--	--
860459F	England Street / Thompson Street	Hanover County	14.72	RF&P	14,210	16,310	20,510	40	64	78	Urban	--	X	X	X	--	X	--	--
860454W	Myrtle Street	Hanover County	14.64	RF&P	1,827	2,097	2,637	40	64	78	Urban	--	--	--	--	--	--	--	--
860450U	E Francis Street	Hanover County	14.20	RF&P	1,421	1,631	2,051	40	64	78	Rural	--	X	X	--	--	--	X	--
860448T	Ashcake Road	Hanover County	13.85	RF&P	7,714	8,854	11,134	40	64	78	Urban	--	--	--	--	--	--	--	--
860447L	Gwathmey Church Road	Hanover County	12.95	RF&P	163	187	235	40	64	78	Rural	--	X	X	--	--	--	X	--
860445X	Elmont Road	Hanover County	11.55	RF&P	2,132	2,447	3,077	40	64	78	Rural	--	X	X	--	--	--	X	--
860443J	Cedar Lane	Hanover County	11.15	RF&P	1,929	2,214	2,784	40	64	78	Rural	--	X	X	--	--	--	X	--
860441V	Mill Road	Henrico County	9.65	RF&P	2,741	3,146	3,956	40	64	78	Urban	--	--	--	--	--	--	--	--
860438M	Mountain Road	Henrico County	8.10	RF&P	5,278	6,058	7,618	40	64	78	Urban	--	--	X	--	--	X	--	--
860437F	Hungary Road	Henrico County	6.60	RF&P	16,240	18,640	23,440	40	64	78	Urban	X	X	X	X	--	X	--	X
860435S	Hermitage Road	Henrico County	5.45	RF&P	4,263	4,893	6,153	40	64	78	Urban	--	--	--	--	--	--	--	--
623663D	Jahnke Road	Richmond	0.68	A-LINE	12,180	13,980	17,580	34	50	64	Urban	--	--	X	X	--	X	--	--
623664K	Bassett Avenue	Richmond	1.00	A-LINE	1,393	1,599	2,010	34	50	64	Urban	--	--	--	--	--	--	--	--
623668M	Broad Rock Boulevard	Richmond	3.08	A-LINE	19,285	22,135	27,835	34	50	64	Urban	--	X	X	X	--	X	--	X
623670N	Terminal Avenue	Richmond	3.87	A-LINE	681	781	982	34	50	64	Urban	--	--	--	--	--	--	--	--
623672C	Walmsley Boulevard	Richmond	5.52	A-LINE	4,974	5,709	7,179	34	50	64	Urban	--	--	--	--	--	--	--	--
623678T	Kingsland Road	Chesterfield County	9.38	A-LINE	2,132	2,447	3,077	34	50	64	Rural	--	--	--	--	--	--	--	--
623679A	Thurston Road	Chesterfield County	10.01	A-LINE	457	525	660	34	50	64	Rural	--	--	--	--	--	--	--	--
623680U	Old Lane	Chesterfield County	10.74	A-LINE / S-LINE	4,872	5,592	7,032	34	50	64	Rural	--	X	X	X	--	--	--	X
623518E	Hermitage Road	Richmond	3.45	S-LINE	10,150	11,650	14,650	21	35	46	Urban	--	--	--	--	--	--	--	--
623522U	Brook Road	Richmond	2.30	S-LINE	8,222	9,437	11,867	21	35	46	Urban	--	--	--	--	--	--	--	--
623525P	St James Street	Richmond	1.69	S-LINE	995	1,142	1,436	21	35	46	Urban	--	--	--	--	--	--	--	--
623527D	N 2nd Street / Valley Road	Richmond	1.55	S-LINE	2,132	2,447	3,077	21	35	46	Urban	--	--	--	--	--	--	--	--
623530L	Hospital Street / N 7th Street	Richmond	1.23	S-LINE	5,786	6,641	8,351	21	35	46	Urban	--	--	--	--	--	--	--	--
623539X	Maury Street	Richmond	0.77	S-LINE	2,577	2,957	3,719	21	35	46	Urban	--	--	--	--	--	--	--	--
623543M	Goodes Street	Richmond	1.66	S-LINE	203	233	293	21	35	46	Rural	--	--	--	--	--	--	--	--
623545B	E Commerce Road	Richmond	2.99	S-LINE	4,263	4,893	6,153	21	35	46	Urban	--	--	--	--	--	--	--	--
623547P	Ruffin Road	Richmond	3.95	S-LINE	1,827	2,097	2,637	21	35	46	Urban	--	--	--	--	--	--	--	--
623548W	Bells Road	Richmond	4.43	S-LINE	8,932	10,252	12,892	21	35	46	Urban	--	--	--	--	--	--	--	--
623549D	Dale Avenue / Trenton Avenue	Richmond	4.97	S-LINE	275	315	396	21	35	46	Rural	--	--	--	--	--	--	--	--
623559J	Kingsland Road	Chesterfield County	9.16	S-LINE	2,030	2,330	2,930	21	35	46	Urban	--	--	--	--	--	--	--	--
623660H	Brinkley Road	Chesterfield County	9.83	S-LINE	1,827	2,097	2,637	21	35	46	Rural	--	--	--	--	--	--	--	--
											TOTALS:	*5*	*21*	*26*	*8*	*0*	*6*	*20*	*6*

Crossing Name: FEATHERSTONE ROAD **Line / Crossing Number: RF&P / 860600A**
Jurisdiction: Prince William County **Current Warning Device: Four Quad Gates**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
10,150	11,650	14,650	56	82	124

General Description of Crossing: Major collector roadway, 2 lanes at crossing with turn lanes before/after. Urban area – dense residential to the east, businesses to the west. Provides access to Route 1 to the west. Provides sole access to residential community to the east.



Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	Exceeds 3 thresholds in 2045 (CE, # Passenger Trains, PCE).
Traffic / Operations	High volume roadway (> 10k) daily. Numerous turn lanes and private access points (both residential and business) in immediate vicinity of crossing. T intersection directly east of crossing.
General Description of Major Environmental	Crossing within 1,000 ft of bay coast. Featherstone National Wildlife Refuge to the south of residence community. Occoquan Bay National Wildlife Refuge and Veterans Memorial Park to the north of residence community.
Safety/Geometric Deficiencies	Emergency access considerations (crossing is sole access to residences).
Engineering	New grade separation structure is not feasible due to close proximity to Occoquan Bay. T grade separation structure would impact numerous residences and the businesses (west side of crossing).
Existing Property	High density residential within ~100ft of crossing to the east. Large industrial / commercial properties, access within ~500 feet of crossing to the west.
Cost-Benefit (Preliminary)	Cost-benefit considerations – feasibility is at a cost of taking numerous residences and affecting access to both residences and businesses.

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	Dawson Beach Rd – grade separated, 3 rail miles upstream. Existing unpaved roadway connection (private) with structure, next to Veterans Memorial Park (ballfields) and Occoquan Bay National Wildlife Refuge. ~3 mile roadway detour between crossings. No crossings downstream to south (peninsula).
Accessibility	Crossing provides sole access to large residential community and marina between the rail line and the coast.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Four Quad Gates is existing condition.

Total Bus Trips Using Crossing (Daily):	46	**Crossing Used by Public Transit? (Yes / No)**	No

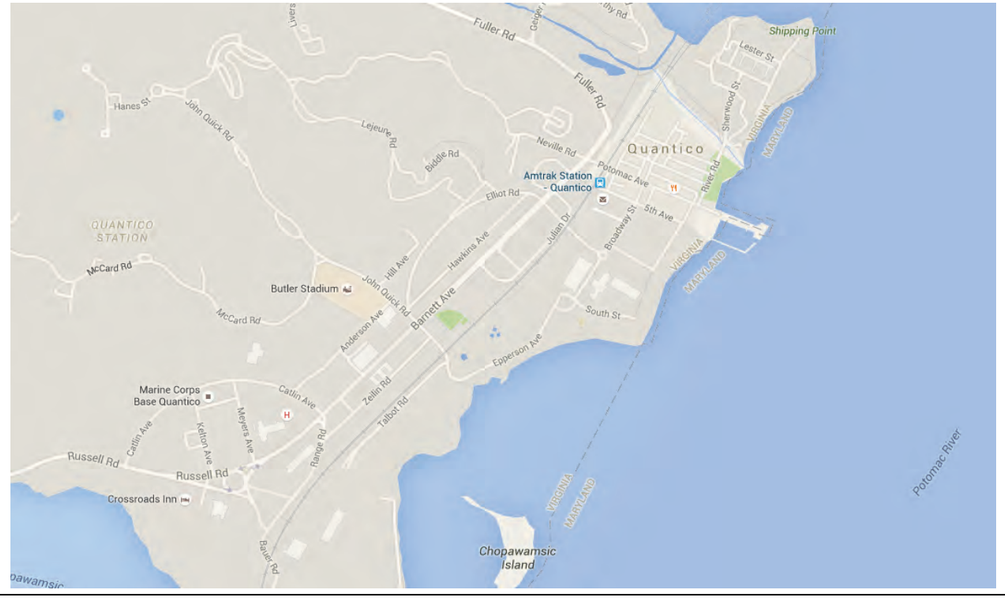
Summary of Considerations for Decision-Making

Grade Separate	Proximity to many residences and proximity to Occoquan Bay.
Eliminate / Consolidate	High volumes and emergency access. Crossing is currently sole access to community.
Add Quad Gates	*(Four Quad Gates is existing condition)*
Add Median Separator	Proximity of driveway access along crossing road.
Other	Improvements to Veterans Dr through to Highams Ct could provide connection to Dawson Beach Rd crossing (grade separated), as an alternate grade-separated route. *Note that improvement may have environmental impacts on Occoquan Bay National Wildlife Refuge and/or Veterans Memorial Park.*

Crossing Name: POTOMAC AVENUE **Line / Crossing Number: RF&P / 860605J**
Jurisdiction: Prince William County **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
7,105	8,155	10,255	56	82	124

General Description of Crossing: Local roadway, 2 lanes. Urban area – downtown Quantico, directly adjacent to the VRE/Amtrak Station. To the east, the roadway has on-street parking and store fronts. To the west, it connects to residential military housing. Fuller Rd (intersection to the west of crossing) is public access and connects directly to Rt 1 and I-95.



Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	Exceeds 3 thresholds in 2045 (CE, # Passenger Trains, PCE).
Traffic / Operations	High volume roadway (> 10k) daily by 2045. Turning lanes and intersections within ~100 ft on both sides of crossing. Pedestrian crosswalks and on-street parking within ~100 ft on east side of crossing.
General Description of Major Environmental	Marine Corps Base Quantico surrounds downtown Quantico, and is within ~100 ft of west side of crossing – including Town of Quantico Historic District. Potomac River on east side of downtown area.
Safety/Geometric Deficiencies	Pedestrians cross track.
Engineering	Structure at this location would likely cause permanent / non-mitigatable impacts to the character and operations of existing downtown Quantico. Many access considerations – intersections on both sides of crossing, and grid structure of roads / parking to businesses on downtown side of crossing – that would be up on structure and/or need to be rerouted, if even possible.
Existing Property	Dense buildings and infrastructure on east side of crossing. Train station /parking and commercial / military on west side of crossing.
Cost-Benefit (Preliminary)	Cost-benefit considerations as grade separation structure would be at the cost of taking downtown businesses and access – substantial community impacts may outweigh benefits.

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	No public upstream or downstream crossings on the Quantico peninsula.
Accessibility	Sole public access crossing to downtown Quantico.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Addition of Four Quad Gates could improve existing safety.
Location is not feasible for median separators due to high vehicle volumes and proximity to adjacent driveway / parking lot / street access.

Total Bus Trips Using Crossing (Daily):	0	**Crossing Used by Public Transit? (Yes / No)**	Yes

Summary of Considerations for Decision-Making

Grade Separate	Substantial impacts on Town of Quantico (existing properties and Historic District).
Eliminate / Consolidate	Sole public access to downtown Quantico and Quantico station.
Add Quad Gates	Could improve existing safety treatment with additional pedestrian crossing protection.
Add Median Separators	Proximity of driveway access along crossing road.
Other	Crossing improvement may be part of Arkendale to Powell's Creek Project (VRE), Quad gates are proposed in the No-Build alternative.

Crossing Name: BRENT POINT ROAD **Line / Crossing Number: RF&P / 860581X**
Jurisdiction: Stafford County **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
538	618	777	56	82	124

General Description of Crossing: Local roadway, 2 lanes. Rural area – undeveloped land on both sides of crossing. Brent Point Rd to the east provides sole access into the widewater peninsula area. To the west, it connects into the winding rural roadway network that provides access to residences east of US Rt 1. Arkendale Road parallels the tracks on the north/west.

Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	Exceeds 1 threshold in 2015, 2025, and 2045 (# Passenger Trains).
Traffic / Operations	Low volume roadway daily for 2015, 2025, and 2045. Three-legged intersection of Brent Point Rd and Arkendale Rd within ~25 ft on west side of crossing. Arkendale Rd parallels the west side of the track and runs north.
General Description of Major Environmental	Widewater State Park within ~200 ft of east/south side of crossing. Wetlands in proximity on all sides of crossing.
Safety/Geometric Deficiencies	Site distance considerations at intersection of Brent Point Rd and Arkendale Rd.
Engineering	Feasible.
Existing Property	No houses or businesses within proximity on either side of crossing.
Cost-Benefit (Preliminary)	Cost-benefit considerations (low volume, local roadway in rural area).

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	--
Accessibility	Sole access into Widewater peninsula area and residences.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Location is not feasible for median separators -- limited site distance at crossing with current intersection geometrics.
Four Quad Gates could improve the existing safety treatment.

Total Bus Trips Using Crossing (Daily):	0	**Crossing Used by Public Transit? (Yes / No)**	No

Summary of Considerations for Decision-Making

Grade Separate	Cost-benefit considerations (low volume roadway).
Eliminate / Consolidate	Sole access to residences on the peninsula.
Add Quad Gates	Could improve existing safety treatment.
Add Median Separators	Proximity of driveway access along crossing road.
Other	Could improve intersection (safety / geometrics / site distance) of Brent Point Rd and Arkendale Rd. Realigning intersection could make 658 to 633 the through movement, with the western leg of Brent Point Rd to align as a T.

Crossing Name: MOUNT HOPE CHURCH ROAD **Line / Crossing Number: RF&P / 860578P**
Jurisdiction: Stafford County **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
214	245	308	56	82	124

General Description of Crossing: Local roadway, 2 lanes. Rural area. Mount Hope Church Road is approximately 1 mile long, beginning at the T intersection on the east side of the crossing with Brooke Rd (Rt 608). It provides sole access to a residential area on the west side of the crossing. VRE Brooke Rd Station is located directly upstream of crossing.

Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	Exceeds 1 threshold in 2015, 2025, and 2045 (# Passenger Trains).
Traffic / Operations	Low volume roadway daily for 2015, 2025, and 2045.
General Description of Major Environmental	Potential streams / wetland areas on both sides of tracks north of crossing.
Safety/Geometric Deficiencies	Minimal striping on crossing roadway. Proximity to driveway access (east side).
Engineering	Feasible.
Existing Property	Several residences located adjacent to both sides of crossing (closest is within ~100 ft).
Cost-Benefit (Preliminary)	Cost-benefit considerations (low volume, local roadway in rural area).

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	Andrew Chapel Rd / Brooke Rd (Rt 608) crossing (grade separated) is directly upstream: ~1/2 mile (rail) and 2/3 mile (driving along Brooke Rd). Eskimo Hill Rd, grade-separated ~1 mile downstream, but no connecting western route.
Accessibility	Provides sole access to residential area.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Location is not feasible for median separators due to proximity to existing driveway access (east) and narrow width of roadway.

Total Bus Trips Using Crossing (Daily):	12	**Crossing Used by Public Transit? (Yes / No)**	No

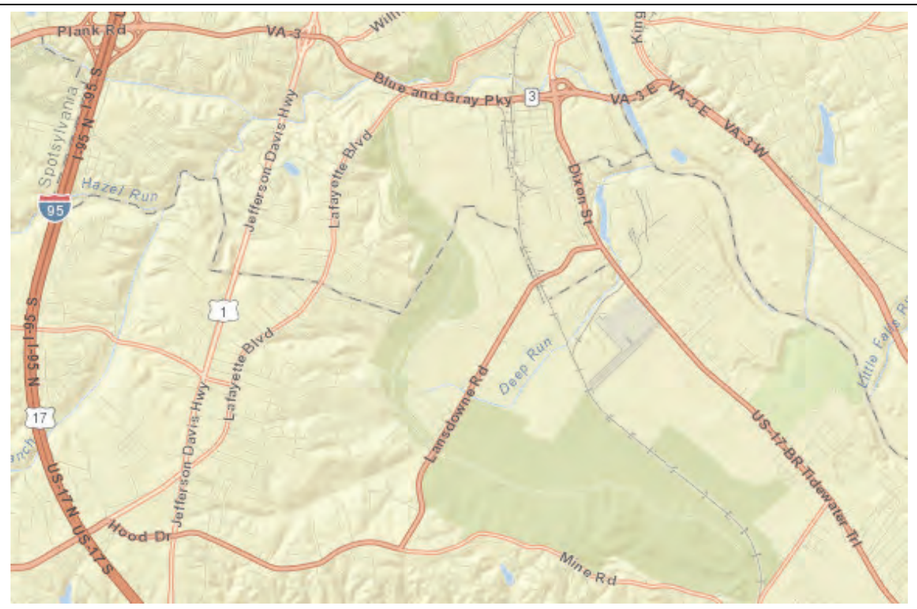
Summary of Considerations for Decision-Making

Grade Separate	Cost-benefit considerations (low volume roadway).
Eliminate / Consolidate	Could eliminate this crossing / consolidate it with the existing grade-separated crossing at Brooke Rd, via a new connector road (see OTHER below)
Add Quad Gates	Could improve existing safety treatment.
Add Median Separators	Proximity of driveway access along crossing road.
Other	Could construct connecting road adjacent and parallel to railroad tracks between Mount Hope Church Rd and Andrew Chapel Rd (Rt 629). *Note that improvement may have environmental impacts on existing streams / wetlands.*

Crossing Name: LANDSDOWNE ROAD **Line / Crossing Number: RF&P / 860558D**
Jurisdiction: Fredericksburg City **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
8,729	10,019	12,599	58	84	126

General Description of Crossing: Major collector roadway, 2 lanes. Rural area – businesses (no residences) in immediate vicinity of crossing. Landsdowne Road runs between Mine Rd/Hood Dr (west) and US 17 (east), thereby serving traffic to I-95 and US Rt 3, respectively.



Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	Exceeds 3 thresholds in 2015 and 2025 (CE, # Passenger Trains, PCE) and 4 thresholds in 2045 (additionally Veh Delay).
Traffic / Operations	High volume roadway (>10k) daily in 2025 and 2045. High percentage truck traffic (access to industrial area).
General Description of Major Environmental	None identified.
Safety/Geometric Deficiencies	None identified.
Engineering	Feasible. Could consider new grade separation structure immediately south side of existing roadway to minimize existing business impacts and MOT considerations.
Existing Property	Commercial businesses (warehouses) in all quadrants of crossing. No residences.
Cost-Benefit (Preliminary)	None identified. High volume, major collector roadway with no residences; structure could likely be built with minimal property impacts.

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	- Blue & Gray Pkwy (Rt 3), grade separated crossing just over1 mile (rail) upstream, no convenient alternate driving routes to the west. - Mine Rd, at-grade crossing ~3 miles (rail) downstream.
Accessibility	High volume through roadway.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Location is not feasible for median separators due to high volumes and proximity of existing driveway access (west).
Four Quad Gates could improve existing safety treatment.

Total Bus Trips Using Crossing (Daily):	8	**Crossing Used by Public Transit? (Yes / No)**	No

Summary of Considerations for Decision-Making

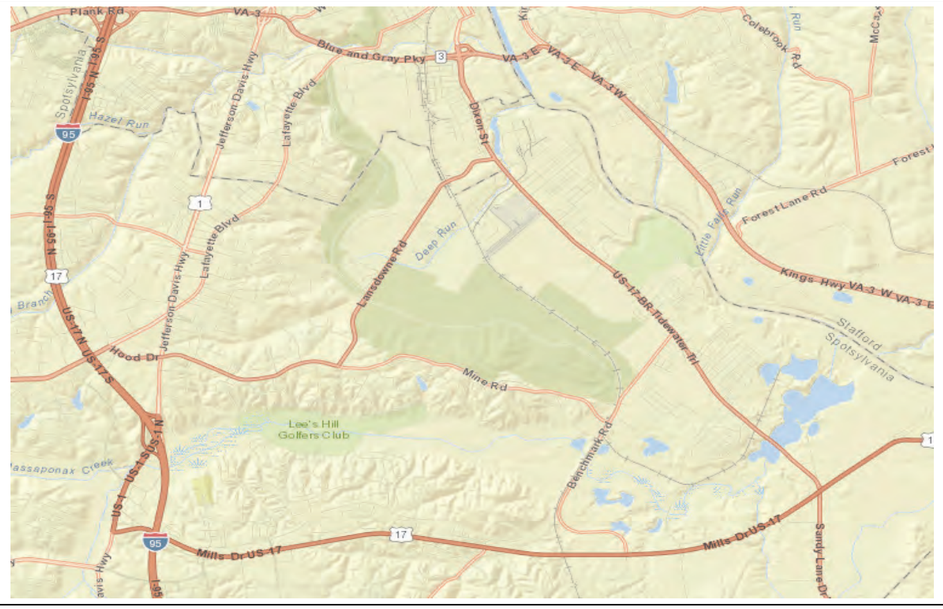
Grade Separate	Structure could be built with minimal property impacts.
Eliminate / Consolidate	High volume / connecting roadway to the system to consider elimination. No convenient alternate crossings nearby.
Add Quad Gates	Could improve existing safety treatment.
Add Median Separators	Proximity of driveway access along crossing roadway.
Other	

Crossing Name: MINE ROAD **Line / Crossing Number: RF&P / 860557W**

Jurisdiction: Spotsylvania County **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
5,177	5,942	7,472	58	84	126

General Description of Crossing: Major collector roadway, 2 lanes. Urban area -- residences and commercial buildings and access points on both sides of crossing. To the west, Mine Rd intersects Route 1 within ~0.5 mile of interchange with I-95. To the east, Benchmark Rd (T-intersection with Mine Rd) connects Tidewater Trail (Rt 2) with US Route 17.



Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	Exceeds 1 threshold in 2045 (# Passenger Trains).
Traffic / Operations	High volume roadway (> 5k) daily in 2015, 2025, and 2045.
General Description of Major Environmental	None identified.
Safety/Geometric Deficiencies	None identified.
Engineering	Not feasible due to proximity to residences.
Existing Property	Residential community to the east (elevation is higher than the railroad tracks and parallel roadway). Large commercial / industrial to the west/south, with several access points that would be impacted. Undeveloped in west/north.
Cost-Benefit (Preliminary)	Spur to the south of the crossing must be maintained and therefore would need another structure built to cross over it

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	- Landsdowne Rd, at-grade crossing ~3 miles (rail) upstream. - Mills Dr / US Route 17, grade separated crossing ~1.5 miles downstream, no connecting roadways on west side.
Accessibility	High volume connecting roadway.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Location not feasible for median separators due to T intersection geometrics.
Four Quad Gates could improve existing safety treatment.

Total Bus Trips Using Crossing (Daily):	4	**Crossing Used by Public Transit? (Yes / No)**	No

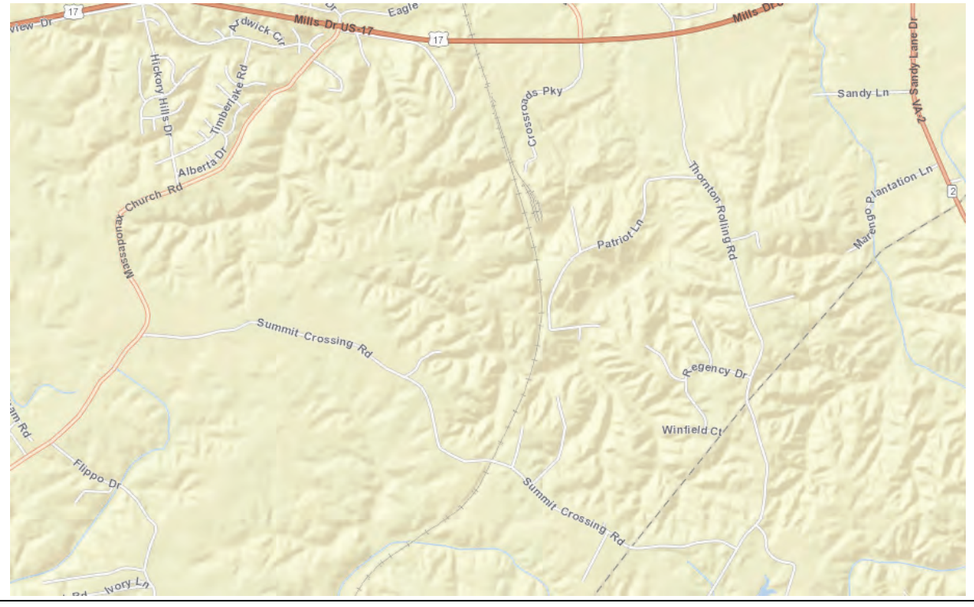
Summary of Considerations for Decision-Making

Grade Separate	Proximity to residences and proximity to active spur.
Eliminate / Consolidate	High volume / connecting roadway to the system.
Add Quad Gates	Could improve existing safety treatment.
Add Median Separators	Proximity of driveway access along crossing road.
Other	

Crossing Name: SUMMIT CROSSING ROAD **Line / Crossing Number: RF&P / 860548X**
Jurisdiction: Spotsylvania County **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
406	466	586	58	84	126

General Description of Crossing: Local roadway, 2 lanes. Rural area – largely undeveloped on both sides of crossing, with a few residential / farm properties. Summit Crossing Rd is ~3 miles in length and connects Massaponax Church Rd (west of crossing) too Thorton Rolling Rd (east of crossing).



Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	Exceeds 1 threshold in 2015, 2025, and 2045 (# Passenger Trains).
Traffic / Operations	Low volume roadway through 2045.
General Description of Major Environmental	None identified.
Safety/Geometric Deficiencies	Minimal striping on Summit Crossing Rd. Narrow roadway widths on Summit Crossing Rd. Dirt road access, running parallel to tracks, within ~25 ft of crossing on both sides.
Engineering	Feasible.
Existing Property	Several residences/farm properties in north-east and south-west. Otherwise largely undeveloped area.
Cost-Benefit (Preliminary)	Cost-benefit considerations (low volume, local roadway in rural area).

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	- Mills Dr / US Route 17, grade separated ~3 miles (rail) and ~5 miles (roadway) upstream. - Clairborne Crossing Rd, at-grade ~3 miles (rail) and ~5 miles (roadway) downstream
Accessibility	Low volume connecting roadway.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Median separator treatment not possible since unpaved roads need to be maintained.
Four Quad Gates could improve existing safety treatment.

Total Bus Trips Using Crossing (Daily):	14	**Crossing Used by Public Transit? (Yes / No)**	No

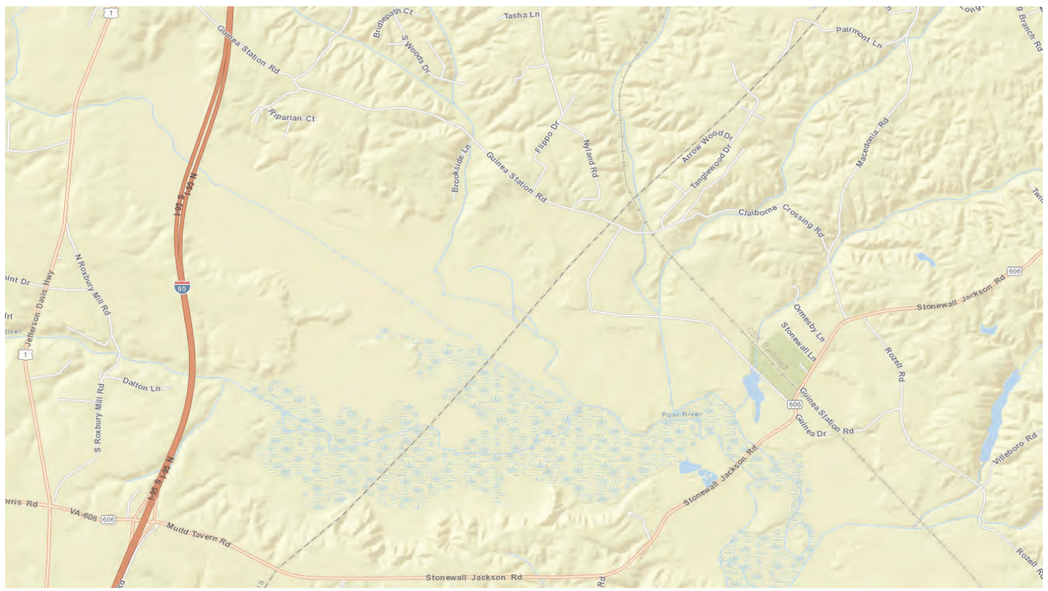
Summary of Considerations for Decision-Making

Grade Separate	Cost-benefit considerations (low volume roadway).
Eliminate / Consolidate	Closest crossing is over 1 mile away.
Add Quad Gates	Could improve existing safety treatment.
Add Median Separators	Not enough space on either side of crossing.
Other	Could consider constructing new alternate access road to the east of crossing, to provide more direct connection parallel to tracks to connect to Crossroads Parkway, which intersects US 17 at a signalized intersection.

Crossing Name: CLAIRBORNE CROSSING ROAD **Line / Crossing Number: RF&P / 860547R**
Jurisdiction: Caroline County **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
478	548	689	41	65	79

General Description of Crossing: Local roadway, 2 lanes. Rural area – mostly undeveloped with sparse residential properties. West of crossing, Summit Crossing Rd becomes Guinea Station Rd, underpasses I-95, and connects to Rt 1. East of crossing, ends in T-intersection with Macedonia Rd, which connects to Stonewall Jackson Rd.



Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	Exceeds 1 threshold in 2025 and 2045 (# Passenger Trains).
Traffic / Operations	Low volume roadway through 2045
General Description of Major Environmental	None identified.
Safety/Geometric Deficiencies	Minimal striping along crossing roadway, possibly reduced width.
Engineering	Feasible.
Existing Property	Minimal residential properties and access along crossing roadway.
Cost-Benefit (Preliminary)	Cost-benefit considerations (low volume, local roadway in rural area).

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	- Summit Crossing Rd, at-grade ~3 miles (rail) and ~5 miles (roadway) upstream. - Stonewall Jackson Rd, at-grade ~1.5 miles (rail) and ~2 miles (roadway) downstream
Accessibility	Low volume through roadway.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Location feasible for median separation treatment – private driveway access is 60 ft from tracks which is enough for median separator.
Four Quad Gates could improve existing safety treatment.

Total Bus Trips Using Crossing (Daily):	4	**Crossing Used by Public Transit? (Yes / No)**	No

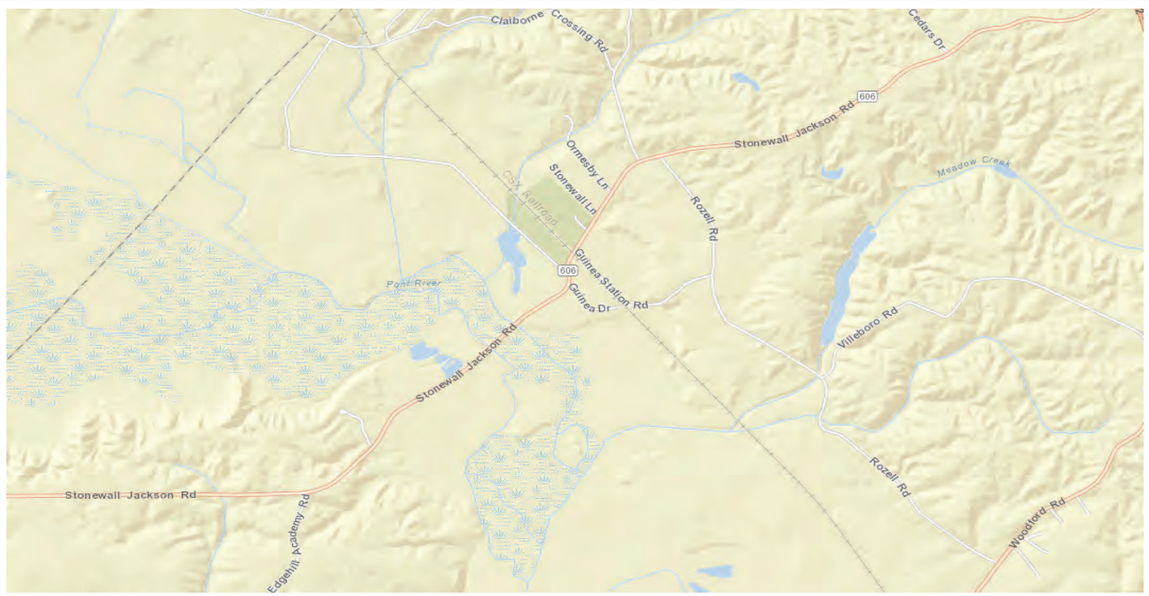
Summary of Considerations for Decision-Making

Grade Separate	Cost-benefit considerations (low volume roadway in a rural area).
Eliminate / Consolidate	Closest crossing is over 1 mile away.
Add Quad Gates	Could improve existing safety treatment.
Add Median Separators	Driveway is 60ft from track which is enough for median separation
Other	

Crossing Name: STONEWALL JACKSON ROAD **Line / Crossing Number: RF&P / 860545C**
Jurisdiction: Caroline County **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
1,929	2,214	2,784	41	65	79

General Description of Crossing: Major collector roadway, 2 lanes. Rural area – mostly undeveloped / farmland with sparse residences. Jackson Shrine / associated park is in north-east quadrant of crossing. Stonewall Jackson Rd interchanges with both I-95 and Rt 1 to the east. To the west, it terminates at Rt 2 / Fredericksburg Turnpike.



Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	Exceeds 1 threshold in 2025 and 2045 (# Passenger Trains).
Traffic / Operations	Mid-volume roadway through 2045. Guinea Station Rd intersects with crossing roadway on both sides of crossing within ~500 ft.
General Description of Major Environmental	Fredericksburg and Spotsylvania National Military Park / Jackson Shrine directly adjacent to and accessing crossing roadway in north/east.
Safety/Geometric Deficiencies	Proximity to intersection roadway/driveway access points on both sides of crossing roadway, east / north side.
Engineering	Not feasible due to proximity to Stonewall Jackson Shrine (National Park Services)
Existing Property	West side of crossing, existing farm and some residential (~5) and access within 1,000 ft of crossing. East side of crossing, 1 existing farm/residential property. Otherwise, undeveloped and/or parkland.
Cost-Benefit (Preliminary)	Potential cost-benefit considerations (mid-volume roadway in rural area), roadway is classified as a major collector.

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	- Clairborne Crossing Rd, at-grade ~1.5 miles (rail) and ~2 miles (roadway) upstream - Woodford Rd, at-grade ~3 miles (rail) and ~4 miles (roadway) downstream, but no practical western connection.
Accessibility	Major collector through roadway.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Location is not feasible for median separator treatment due to proximity to park access roadway and Guinea Station Rd intersection, east / north side of crossing.
Four Quad Gates could improve existing safety treatment.

Total Bus Trips Using Crossing (Daily):	4	**Crossing Used by Public Transit? (Yes / No)**	No

Summary of Considerations for Decision-Making

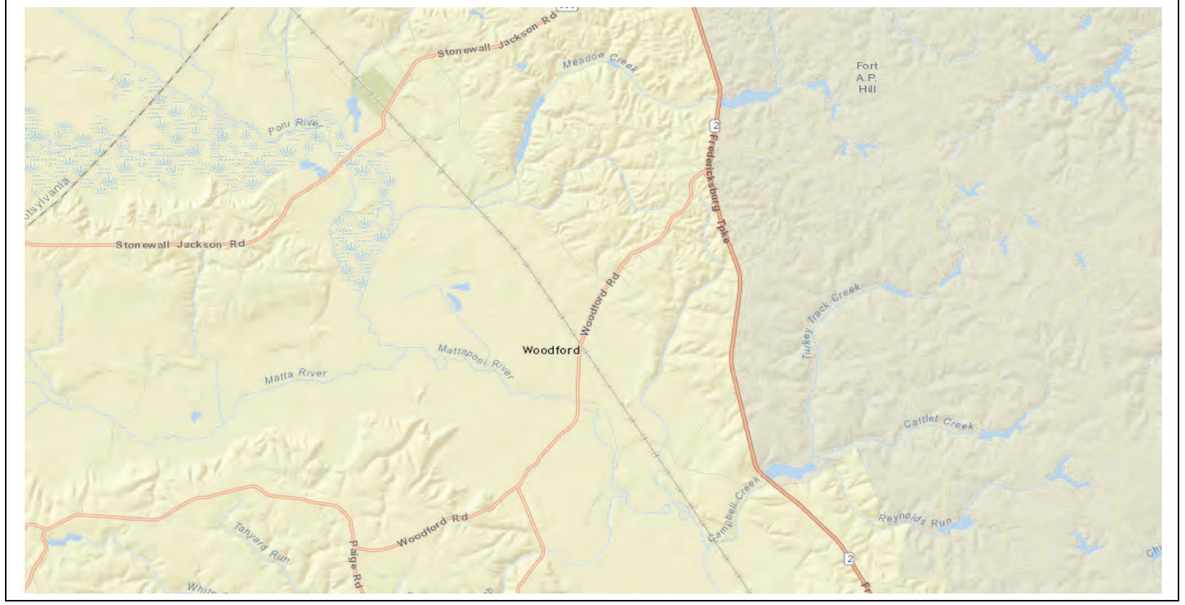
Grade Separate	Proximity to Stonewall Jackson Shrine
Eliminate / Consolidate	Classification as major collector roadway
Add Quad Gates	Could improve existing safety treatment.
Add Median Separators	Proximity of driveway access along crossing road.
Other	

Crossing Name: WOODFORD ROAD
Jurisdiction: Caroline County

Line / Crossing Number: RF&P / 860542G
Current Warning Device: Gates (Non-Quad)

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
386	443	557	41	65	79

General Description of Crossing: Local roadway, 2 lanes. Rural area – mainly undeveloped / farmland in vicinity, with sparse residential. Woodford Rd is approximately 5 miles long, and connects Paige Rd (which connects to Rt 1) to the east, to Rt 2 / Fredericksburg Turnpike to the west.



Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	Exceeds 1 threshold in 2025 and 2045 (# Passenger Trains).
Traffic / Operations	Low volume roadway through 2045. Intersections with private driveways within ~100ft of crossing on both sides of crossing.
General Description of Major Environmental	Potential wetlands in undeveloped area east of crossing.
Safety/Geometric Deficiencies	Minimal striping on crossing roadway Proximity to private driveway / access road.
Engineering	Feasible.
Existing Property	Mainly undeveloped / farmland in vicinity. 1-3 residential / farm properties on each side of crossing.
Cost-Benefit (Preliminary)	Cost-benefit considerations (low volume, local roadway in rural area).

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	- Stonewall Jackson Rd, at-grade ~3 miles (rail) and ~4 miles (roadway) upstream, but west connection is not practical. - Woodslane Rd, at-grade ~1 mile (rail) and ~1-5 miles (roadway) downstream, but much more minor crossing (lower volume roadway).
Accessibility	Rural through roadway with no nearby equivalent alternatives.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Location is not feasible for median separation treatment due to proximity of private driveway access within 100 ft, both sides of crossing.
Four Quad Gates could improve existing safety treatment.

Total Bus Trips Using Crossing (Daily):	40	**Crossing Used by Public Transit? (Yes / No)**	No

Summary of Considerations for Decision-Making

Grade Separate	Cost-benefit considerations (low volume, rural roadway).
Eliminate / Consolidate	Lack of equivalent crossing alternate routes (other than adjacent more local roadways).
Add Quad Gates	Could improve existing safety treatment.
Add Median Separators	Proximity of driveway access along crossing road.
Other	

Crossing Name: WOODSLANE ROAD **Line / Crossing Number: RF&P / 860541A**
Jurisdiction: Caroline County **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
102	117	147	41	65	79

General Description of Crossing: Local roadway, 2 lanes. Rural area. Woodslane Rd (Rt 609) is just over 2 miles in length and runs from Woodford Rd (west of crossing) to Fredericksburg Turnpike / Rt 2 (east of crossing), providing access to residences / farm properties along its length.

Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	Exceeds 1 threshold in 2025 and 2045 (# Passenger Trains).
Traffic / Operations	Very low volume roadway ~ 100 daily in 2015 and < 200 daily by 2045. Private driveways within ~300 feet, both sides of crossing.
General Description of Major Environmental	Potential wetlands / streams in undeveloped areas of crossing.
Safety/Geometric Deficiencies	Limited striping on crossing roadway. Crossing located on roadway curve (limited site distance).
Engineering	Feasible, but would need to straighten existing alignment (to the south).
Existing Property	Undeveloped south of crossing. Rural farmland north of crossing (~1-2 properties on each side east and west).
Cost-Benefit (Preliminary)	Cost-benefit considerations (low volume, local roadway in rural area).

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	- Woodford Rd, at grade just over 1 mile (rail) and 1-5 miles (roadway) upstream. - Paige Rd, at grade ~3 miles (rail) and 5 miles (roadway) downstream.
Accessibility	Rural through roadway providing access to farms / residences between two more major roadways.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Location feasible for median separator treatment – no paved access points within 100 ft of either side of crossing; however, there is an unpaved access within ~50 ft, east side, to farm fields, which can be closed since there is another access to this property. May require widening existing roadway.
Four Quad Gates could improve existing safety treatment.

Total Bus Trips Using Crossing (Daily):	4	**Crossing Used by Public Transit? (Yes / No)**	No

Summary of Considerations for Decision-Making

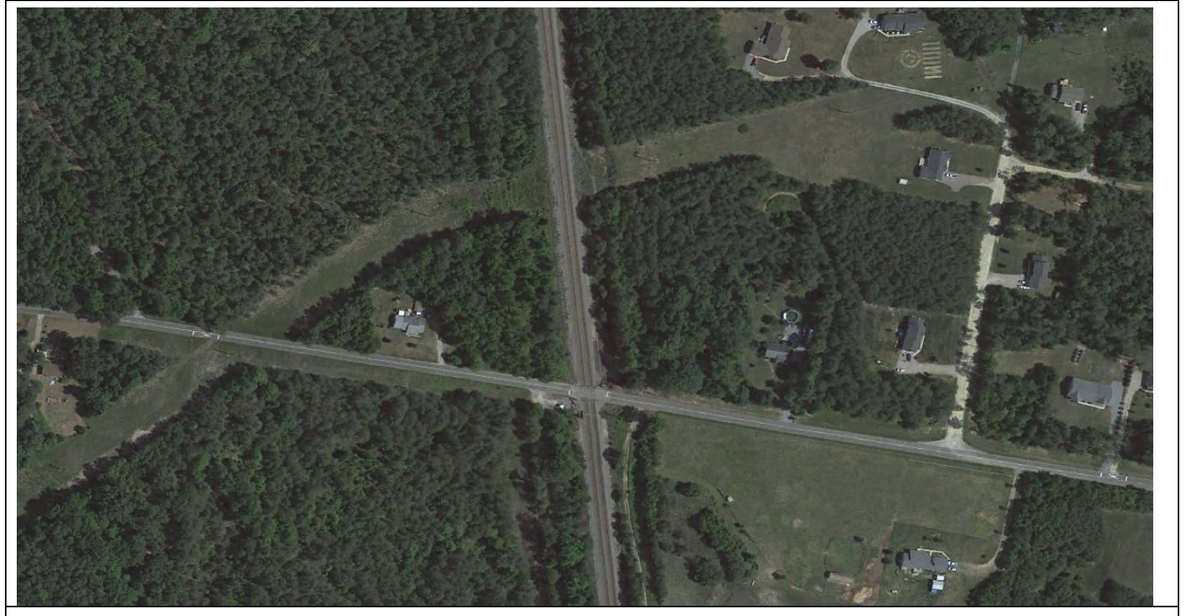
Grade Separate	Cost-benefit considerations (low volume, rural roadway).
Eliminate / Consolidate	Detour routes to alternate crossing are up to 5 miles away on east side.
Add Quad Gates	
Add Median Separators	No paved access points within 100 ft either side of crossing; could close unpaved driveway east of crossing since there is another access to the property
Other	

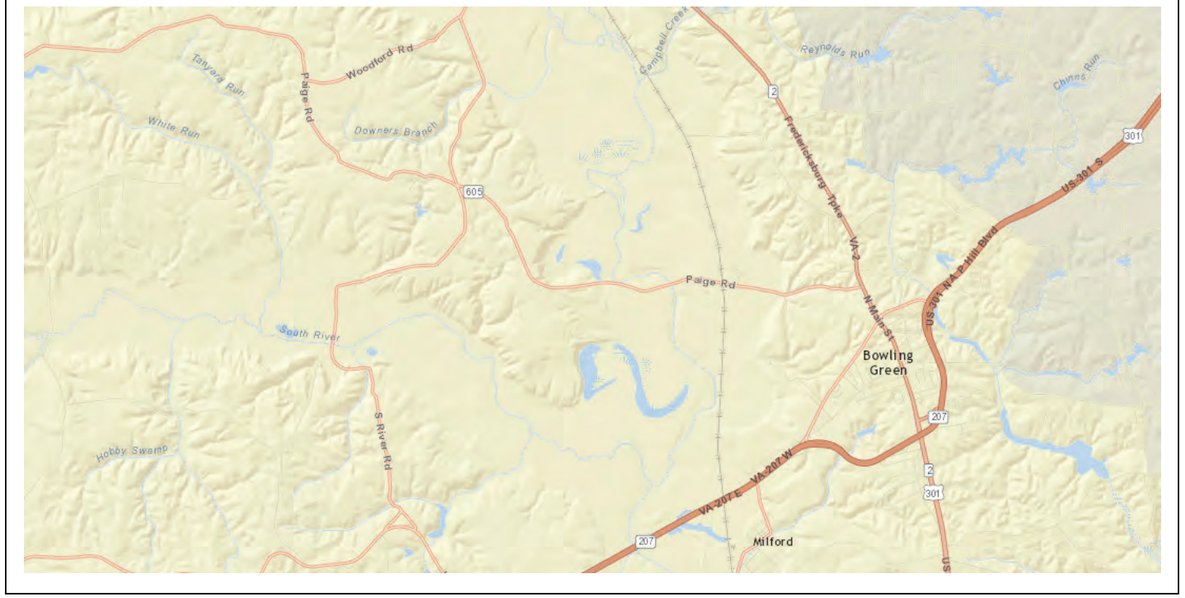
Crossing Name: PAIGE ROAD **Line / Crossing Number: RF&P / 860539Y**

Jurisdiction: Caroline County **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
478	548	689	41	65	79

General Description of Crossing: Minor collector roadway, 2 lanes. Rural area – mainly undeveloped. Paige Rd terminates at Fredericksburg Turnpike / Rt 2, approximately 1 mile east of the crossing. West of the crossing, Paige Rd terminates at US Rt 1.





Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	Exceeds 1 threshold in 2025 and 2045 (# Passenger Trains).
Traffic / Operations	Low volume roadway through 2045.
General Description of Major Environmental	Potential wetlands / streams in undeveloped areas of crossing.
Safety/Geometric Deficiencies	No observed site distance issues at crossing – crossing roadway is straight, and perpendicular to crossing.
Engineering	Feasible.
Existing Property	Mostly undeveloped, but houses are mostly within ~100 feet of roadway. 1 residential property, west side. 4-5 residential properties, east side.
Cost-Benefit (Preliminary)	Cost-benefit considerations (low volume, minor roadway in rural area).

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	- Woodslane Rd, at-grade ~3 miles (rail) and 5-6 miles (roadway) upstream, but much more rural roadway than crossing roadway. - Rt 207, grade separated ~2 miles (rail) and 4 miles (roadway, east only, west connectivity not practical) downstream.
Accessibility	Paige Rd is the largest road crossing the tracks within the vicinity of this crossing.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Private driveways within ~300 feet of crossing, both sides. No paved access points within 100 ft of crossing (unpaved farm access is, however, with 100ft of crossing) –median separator treatment could be implemented at this location.
Four Quad Gates could improve existing safety treatment.

Total Bus Trips Using Crossing (Daily):	0	**Crossing Used by Public Transit? (Yes / No)**	No

Summary of Considerations for Decision-Making

Grade Separate	Cost-benefit considerations (low volume, rural roadway).
Eliminate / Consolidate	Lack of connectivity to adjacent crossings.
Add Quad Gates	
Add Median Separators	Could implement at this location since there are no private driveways or paved access points within 100 ft of crossing
Other	

Crossing Name: PENOLA ROAD **Line / Crossing Number: RF&P / 860527E**
Jurisdiction: Caroline County **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
427	490	616	41	65	79

General Description of Crossing: Local roadway, 2 lanes. Rural area – mostly undeveloped with a cluster of houses along the intersecting roadway at the crossing. Penola Rd terminates at Rogers Clark Blvd north/west of the crossing. East of the crossing, Penola Rd connects to US Rt 301.

Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	Exceeds 1 threshold in 2025 and 2045 (# Passenger Trains).
Traffic / Operations	Low volume roadway through 2045. Polecat Lane (residential roadway access) is within ~50 ft of north / west side of crossing.
General Description of Major Environmental	Potential streams and/or wetlands in undeveloped areas.
Safety/Geometric Deficiencies	Limited striping on crossing roadway.
Engineering	Feasible.
Existing Property	Undeveloped, no structures south / east of crossing. Residential cluster (> 10 properties) along Polecat Ln in direct proximity to crossing.
Cost-Benefit (Preliminary)	Cost-benefit considerations (low volume, local roadway in rural area).

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	- Colonial Rd, grade separated ~5 miles (rail) and ~10 miles (roadway) upstream. - Colemans Mill, at-grade ~3 miles (rail) and ~6-8 miles (roadway) downstream.
Accessibility	Low volume through roadway serving residential areas.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Not feasible for median separator treatment – crossing roadway intersects with Polecat Lane within ~100 feet of north side of crossing.
Four Quad Gates could improve existing intersection treatment.

Total Bus Trips Using Crossing (Daily):	4	**Crossing Used by Public Transit? (Yes / No)**	No

Summary of Considerations for Decision-Making

Grade Separate	Cost-benefit considerations.
Eliminate / Consolidate	Lack of connectivity to adjacent crossings.
Add Quad Gates	Could improve existing safety treatment.
Add Median Separators	Proximity of intersecting roadway to crossing.
Other	

Crossing Name: COLEMANS MILL ROAD **Line / Crossing Number: RF&P / 860525R**
Jurisdiction: Caroline County **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
447	513	645	41	65	79

General Description of Crossing: Local roadway, 2 lanes. Rural area – mainly undeveloped on both sides of crossing. Colemans Mill Rd is approximately 1 mile in length and provides access between Dry Bridge Rd and Rogers Clark Blvd, which themselves intersect just over a mile south of this at-grade crossing.

Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	Exceeds 1 threshold in 2025 and 2045 (# Passenger Trains).
Traffic / Operations	Low volume roadway through 2045.
General Description of Major Environmental	Stream along north/west side of crossing.
Safety/Geometric Deficiencies	Minimal striping along crossing roadway. Curved track, sight distance issue.
Engineering	Feasible.
Existing Property	South/east side of crossing undeveloped. North/west side of crossing has a couple residence / farm properties.
Cost-Benefit (Preliminary)	Potential cost-benefit considerations (low volume, local roadway in rural area), but improvements would have minor property impacts.

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	- Penola Rd, at-grade ~3 miles (rail) and over 5 miles (roadway) upstream. - Dry Bridge Rd, grade-separated ~1 mile (rail) and ~2 miles (roadway) downstream.
Accessibility	Colemans Mill Rd, Dry Bridge Rd and Rogers Clark Blvd provide a connected eastern-side access.

Feasibility Considerations Related to Rail Crossing Safety Treatments

No paved access points within 100 ft of crossing – location feasible for median separator treatment. May require roadway widening to accommodate improvement – additionally could straighten roadway to increase sight distance.
Four Quad Gates could improve existing safety treatment.

Total Bus Trips Using Crossing (Daily):	8	**Crossing Used by Public Transit? (Yes / No)**	No

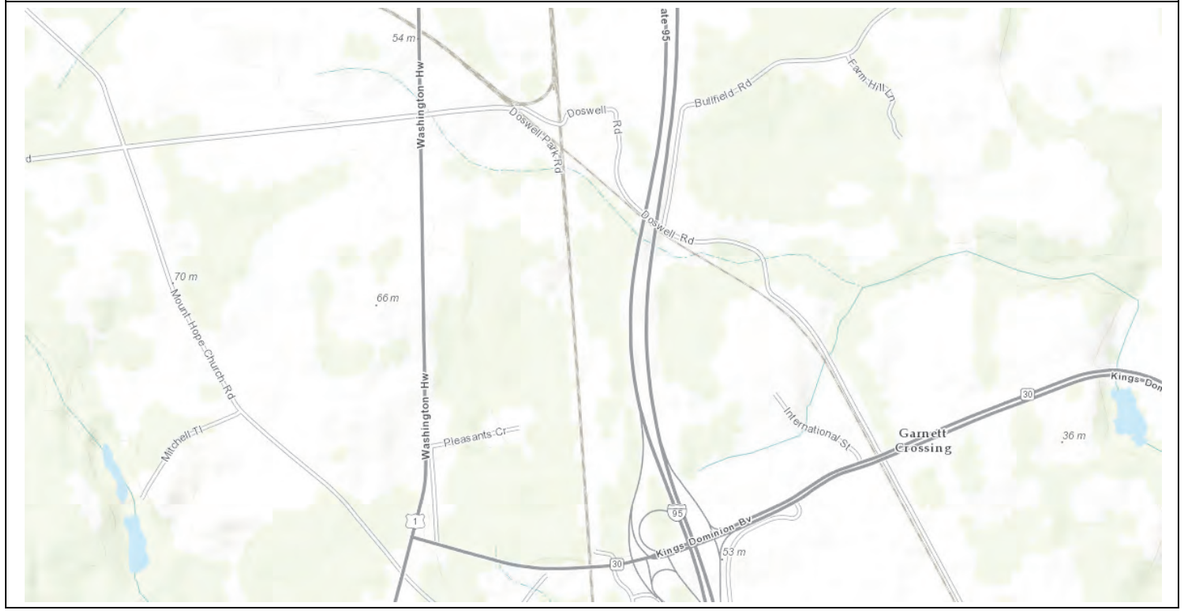
Summary of Considerations for Decision-Making

Grade Separate	Cost-benefit considerations (low volume roadway in a rural area).
Eliminate / Consolidate	Could eliminate this crossing / consolidate with Dry Bridge Rd (existing grade separated, to the south). Existing traffic could use grade-separated Dry Bridge Rd to provide similar accessibility and connectivity as existing.
Add Quad Gates	
Add Median Separators	Could implement at this location since there are no paved access points within 100 ft of crossing, may require roadway improvements.
Other	

Crossing Name: DOSWELL ROAD **Line / Crossing Number: RF&P / 860520G**
Jurisdiction: Hanover County **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
315	362	455	41	65	79

General Description of Crossing: Local roadway, 2 lanes. Rural area. This is a public roadway that provides access through the middle of the railroad crossing, and provides sole access on the west side of I-95 to the residential / commercial area on the east side of the tracks.



Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	Exceeds 1 threshold in 2025 and 2045 (# Passenger Trains).
Traffic / Operations	Low volume roadway through 2045. Ill-defined traffic channelization and access through rail yard. Higher percentage truck traffic (access to industrial area).
General Description of Major Environmental	Doswell Rd is the northern limit of the Doswell Historic District.
Safety/Geometric Deficiencies	Public roadway through railroad intersection with limited striping. Accessibility along western side of crossing functions more like a parking lot than a roadway.
Engineering	Feasible, but structure would likely need to span all existing tracks, which would increase the impacts.
Existing Property	Railyard with structure within Y-crossing of tracks. Residential properties to the west of crossing.
Cost-Benefit (Preliminary)	Cost-benefit considerations (low volume, local roadway in rural area).

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	- I-95, grade separated ~5 miles (rail) and 8 miles (roadway) upstream. - Kings Dominion Blvd, grade separated just over1 mile (rail) and 2 miles (roadway) downstream.
Accessibility	Crossing provides sole access on west side of I-95 to area.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Location not feasible for median separators – numerous access points within 100 feet of crossing, both sides.
Four Quad Gates could improve existing safety treatment.

Total Bus Trips Using Crossing (Daily):	4	**Crossing Used by Public Transit? (Yes / No)**	No

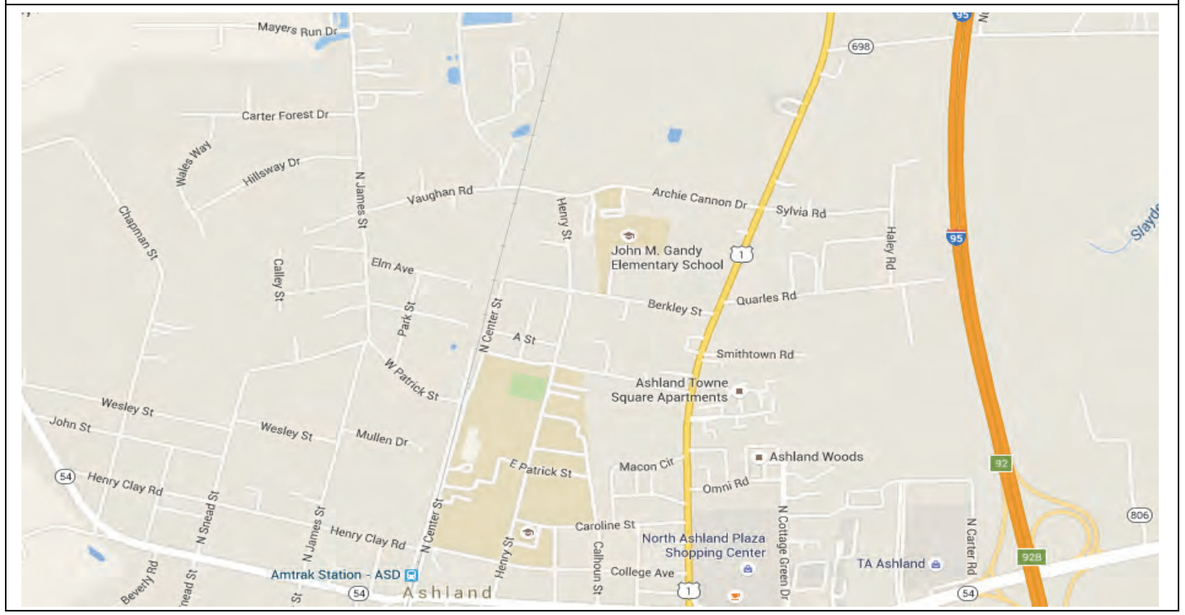
Summary of Considerations for Decision-Making

Grade Separate	Cost considerations (low volume, rural roadway) and length of structure required to span both sets of tracks.
Eliminate / Consolidate	Not feasible due to nearby historic / industrial districts
Add Quad Gates	Could improve existing safety treatment.
Add Median Separators	Proximity of driveway access along crossing road.
Other	

Crossing Name: W VAUGHN ROAD / HENRY STREET **Line / Crossing Number: RF&P / 860513W**
Jurisdiction: Hanover County **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
1,320	1,515	1,905	40	64	78

General Description of Crossing: Local roadway, 2 lanes. Rural area. W Vaughn Rd / Henry street is less than 1 mile long and is the northernmost east-west crossing of the tracks on the north side of the Town of Ashland. To the west, it connects to N James St and to the east, it connects to Rt 1. Fire station, school, and water treatment facility in proximity of crossing.



Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	Exceeds 1 threshold in 2025 and 2045 (# Passenger Trains).
Traffic / Operations	Mid volume through 2045. New roadway intersection to undeveloped area (potential new development) on west side of crossing. Henry St intersection within ~500 ft of east side of crossings.
General Description of Major Environmental	School (John M Gandy ES) drop-off and entrance within 1,000 ft on east side of crossing. The new, and only, fire station in town is on the east side of the tracks and there are currently no grade-separated tracks to allow for crossing during emergencies or while trains are stopped on the tracks for long periods of time.
Safety/Geometric Deficiencies	Proximity to school.
Engineering	Feasible. Grade separated structure along north of existing alignment could minimize access impacts to school / MOT considerations.
Existing Property	South/west and north/east quadrants are mainly undeveloped / farmland. Sewage treatment facility in north/west. Residences / school in south/east.
Cost-Benefit (Preliminary)	Potential cost-benefit considerations (lower volume, local roadway in rural area), but in Town of Ashland so could be well utilized and be an addition to the existing network. Further benefit consideration as this separation would be in conjunction with adjacent closures as part of a consolidated plan in Ashland.

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	- Rt 1, grade separated ~2 miles (rail) and 3-4 miles (roadway) upstream of crossing. - W Patrick St, at-grade, 0.5 miles (rail and roadway) downstream in downtown Ashland.
Accessibility	Through street. Northernmost east-west crossing in the Town of Ashland grid.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Location not feasible for median separators due to proximity of driveway access to water treatment facility (west side).
Four Quad Gates could improve existing safety treatment.

Total Bus Trips Using Crossing (Daily):	16	**Crossing Used by Public Transit? (Yes / No)**	No

Summary of Considerations for Decision-Making

Grade Separate	Feasible. Structure could be built with minimal impacts.
Eliminate / Consolidate	Proximity to school and connectivity as the northernmost east-west crossing in the Town of Ashland.
Add Quad Gates	Could improve existing safety treatment.
Add Median Separators	Proximity of driveway access along crossing road.
Other	

Crossing Name: W PATRICK STREET **Line / Crossing Number: RF&P / 860512P**
Jurisdiction: Hanover County **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
303	348	437	40	64	78

General Description of Crossing: Minor collector roadway, 2 lanes. Urban area (downtown Ashland). W Patrick Street provides access to and through Randolph Macon College's sports complex area. N Center Street runs parallel to both sides of railroad tracks, and intersects with a surface parking lot directly at the crossing.

Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	Does not exceed any thresholds.
Traffic / Operations	Low volume roadway through 2045. N Center Street operates as a parallel one-way pair on both sides of tracks. Crossing intersects into a surface parking lot.
General Description of Major Environmental	Ashland Historic District. Blincoe Field / sports complex of Randolph Macon College (NHRP-listed).
Safety/Geometric Deficiencies	Minimal striping along crossing roadway. Intersection operations along N Center St.
Engineering	Not feasible without significant impacts to the college.
Existing Property	Randolph Macon College surrounds the crossing, which is located in their sports complex area.
Cost-Benefit (Preliminary)	Cost-benefit considerations – low volume roadway, and significant community impacts.

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	- W Vaughn St, at-grade ~0.5 mile (rail) and ~.75 miles (roadway) upstream. College Ave / Henry Clad Rd, at-grade ~0.3 miles (rail) and ~0.5 miles (roadway) downstream.
Accessibility	Through street used to access college sports complex area.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Location not feasible for median separator treatment due to proximity of intersecting access points, both sides.
Four Quad Gates could improve existing safety treatment.

Total Bus Trips Using Crossing (Daily):	4	**Crossing Used by Public Transit? (Yes / No)**	No

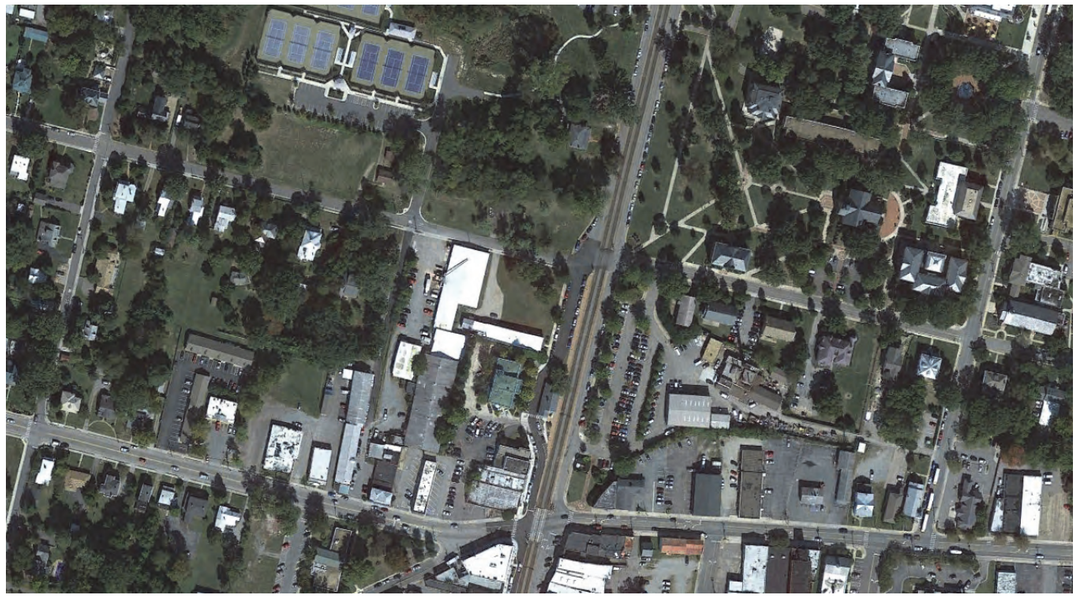
Summary of Considerations for Decision-Making

Grade Separate	Impacts to college / community.
Eliminate / Consolidate	If there is a 3rd track through Ashland as part of the DC2RVA project, this crossing would be eliminated, and Center St would be realigned to maintain access to the parking lot.
Add Quad Gates	If there is not a 3rd track through Ashland as part of the DC2RVA project, could improve existing safety treatment.
Add Median Separators	Proximity of driveway access along crossing road.
Other	

Crossing Name: COLLEGE AVE / HENRY CLAY RD **Line / Crossing Number: RF&P / 860462N**
Jurisdiction: Hanover County **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
1,320	1,515	1,905	40	64	78

General Description of Crossing: Major collector, 2 lanes. Urban area (downtown Ashland). College Ave / Henry Clay Rd is just over a mile in length and provides connection between Thompson St (west) to US Rt 1 (east), through Randolph Macon College.



Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	Does not exceed any thresholds.
Traffic / Operations	Mid-volume roadway through 2045. N Center Street operates as a parallel one-way pair on both sides of tracks.
General Description of Major Environmental	Ashland Historic District.
Safety/Geometric Deficiencies	Minimal striping along crossing roadway. Intersection operations along N Center St. Roadway parallel parking in proximity to crossing.
Engineering	Not feasible without significant impacts to the college and downtown community.
Existing Property	College on north side of crossing, including sports complex and dense campus buildings. Dense residential / commercial on south side of crossing.
Cost-Benefit (Preliminary)	Cost-benefit considerations due to mid-volume roadway with significant community impacts.

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	- W Patrick St, at-grade ~0.3 miles (rail) and ~0.5 miles (roadway) upstream. - England St / Thompson St, at-grade ~.1 miles (rail) and ~0.3 miles (roadway) downstream.
Accessibility	Through street used to access college and residential areas.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Location not feasible for median separator treatment due to proximity of intersecting access points, both sides.
Four Quad Gates could improve existing safety treatment.

Total Bus Trips Using Crossing (Daily):	0	**Crossing Used by Public Transit? (Yes / No)**	No

Summary of Considerations for Decision-Making

Grade Separate	Impacts to college / community.
Eliminate / Consolidate	As part of this project, this crossing could be closed due to platform improvements at this station. Traffic could utilize the existing grid roadway network in downtown Ashland for access.
Add Quad Gates	Could improve existing safety treatment.
Add Median Separators	Proximity of driveway access along crossing road.
Other	

Crossing Name: ENGLAND ST / THOMPSON ST **Line / Crossing Number: RF&P / 860459F**
Jurisdiction: Hanover County **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
14,210	16,310	20,510	40	64	78

General Description of Crossing: Minor arterial roadway, 3 lanes. Urban area – the main roadway through downtown Ashland. England Street / Thompson Street has dedicate turn lanes, on-street parking, and is part of a 7-legged intersection at the crossing. Ashland train station in north/west quadrant of crossing.

Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	Exceeds 1 threshold in 2025 and 2045 (CE).
Traffic / Operations	Very high volume roadway (>20k) daily by 2045. Part of a 7-legged intersection at crossing.
General Description of Major Environmental	Ashland Historic District.
Safety/Geometric Deficiencies	High pedestrian crossing area. School bus crossing location. Intersection operations and geometrics.
Engineering	Not feasible without significant impacts to the downtown community.
Existing Property	Dense commercial / residential on all sides of crossing. Ashland train station in north/west quadrant of crossing.
Cost-Benefit (Preliminary)	Cost-benefit considerations due to significant community impacts.

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	- College Ave / Henry Clay Rd, at-grade ~.1 miles (rail) and ~0.3 miles (roadway) upstream. - Myrtle St, at-grade ~.1 miles (rail) and ~.3 miles (roadway) downstream.
Accessibility	Minor arterial roadway that is the main street through downtown Ashland.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Location not feasible for median separator treatment due to intersection geometrics / safety.
Four Quad Gates could increase crossing safety, but could need to consider all existing movements, as well as protection of pedestrians.

Total Bus Trips Using Crossing (Daily):	4	**Crossing Used by Public Transit? (Yes / No)**	No

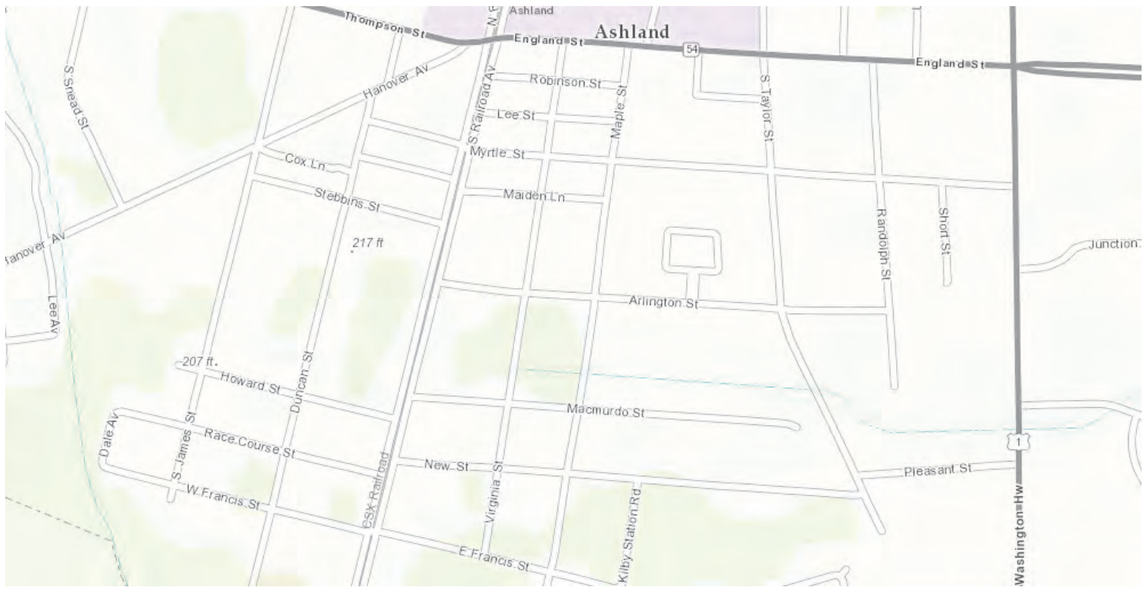
Summary of Considerations for Decision-Making

Grade Separate	Impacts to community.
Eliminate / Consolidate	Importance of roadway to the network.
Add Quad Gates	Could improve existing safety treatment while considering all roadways and pedestrian protection as part of the treatment.
Add Median Separators	Proximity of driveway access along crossing road.
Other	

Crossing Name: MYRTLE STREET **Line / Crossing Number: RF&P / 860454W**
Jurisdiction: Hanover County **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
1,827	2,097	2,637	40	64	78

General Description of Crossing: Major collector roadway, 2 lanes. Urban area (downtown Ashland). Myrtle Street is just over ½ mile in length and connects Hanover Rd (to the west) to Us Rt 1 (to the east), through dense residential community.



Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	Does not exceed any thresholds.
Traffic / Operations	Mid-volume roadway through 2045. Center St (parallel to tracks) is one-way on west side of tracks.
General Description of Major Environmental	Ashland Historic District (east side of crossing)
Safety/Geometric Deficiencies	Pedestrian crossing area. Intersection operations and geometrics. Proximity of surface parking to crossing.
Engineering	Not feasible without significant impacts to the downtown community.
Existing Property	Dense residential / commercial on all sides of crossing.
Cost-Benefit (Preliminary)	Cost-benefit considerations due to mid-volume roadway with significant community impacts.

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	- England St / Thompson St, at-grade ~.1 miles (rail) and ~.3 miles (roadway) upstream. - E Francis St, at-grade ~.5 miles (rail and roadway) downstream.
Accessibility	Through street used to access residential areas and connects directly to US Rt 1 to the east.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Location not feasible for median separator treatment due to intersection geometrics / safety.
Four Quad Gates could improve existing safety treatment.

Total Bus Trips Using Crossing (Daily):	4	**Crossing Used by Public Transit? (Yes / No)**	No

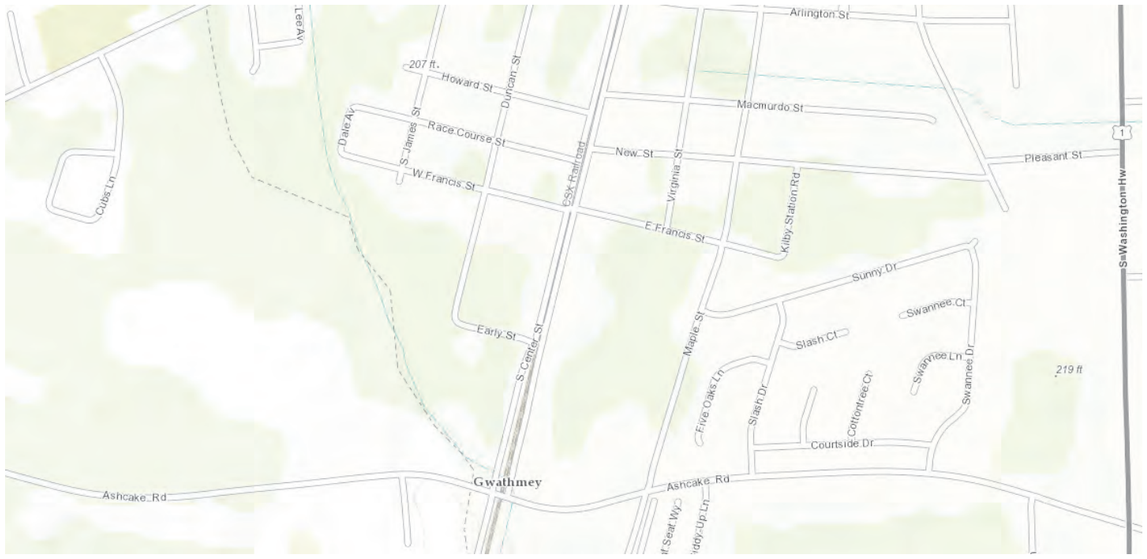
Summary of Considerations for Decision-Making

Grade Separate	Impacts to community.
Eliminate / Consolidate	Important for circulation through town.
Add Quad Gates	Could improve existing safety treatment.
Add Median Separators	Proximity of driveway access along crossing road.
Other	

Crossing Name: E FRANCIS STREET **Line / Crossing Number: RF&P / 860450U**
Jurisdiction: Hanover County **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
1,421	1,631	2,051	40	64	78

General Description of Crossing: Local roadway, 2 lanes. Rural area (southern limit of Ashland). E Francis Street is approximately ½ mile in length and provides the southern-most east-west roadway connection to the residential grid street network in Ashland.



Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	Exceeds 1 threshold in 2025 and 2045 (# Passenger Trains).
Traffic / Operations	Mid-volume roadway through 2045. Center St (parallel to tracks) is one-way on west side of tracks.
General Description of Major Environmental	Ashland Historic District on both sides of tracks.
Safety/Geometric Deficiencies	Intersection operations and geometrics.
Engineering	Not feasible without significant impacts to the downtown community.
Existing Property	Dense residential properties and access on all sides of tracks.
Cost-Benefit (Preliminary)	Cost-benefit considerations due to mid-volume roadway with significant community impacts.

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	- Myrtle St, at-grade ~.5 miles (rail and roadway) upstream. - Ashcake Rd, at-grade ~.3 miles (rail) and ~0.5 miles (roadway) downstream.
Accessibility	Short through roadway that provides access to residential properties.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Location not feasible for median separator treatment due to intersection geometrics / safety.
Four Quad Gates could improve existing safety treatment.

Total Bus Trips Using Crossing (Daily):	18	**Crossing Used by Public Transit? (Yes / No)**	No

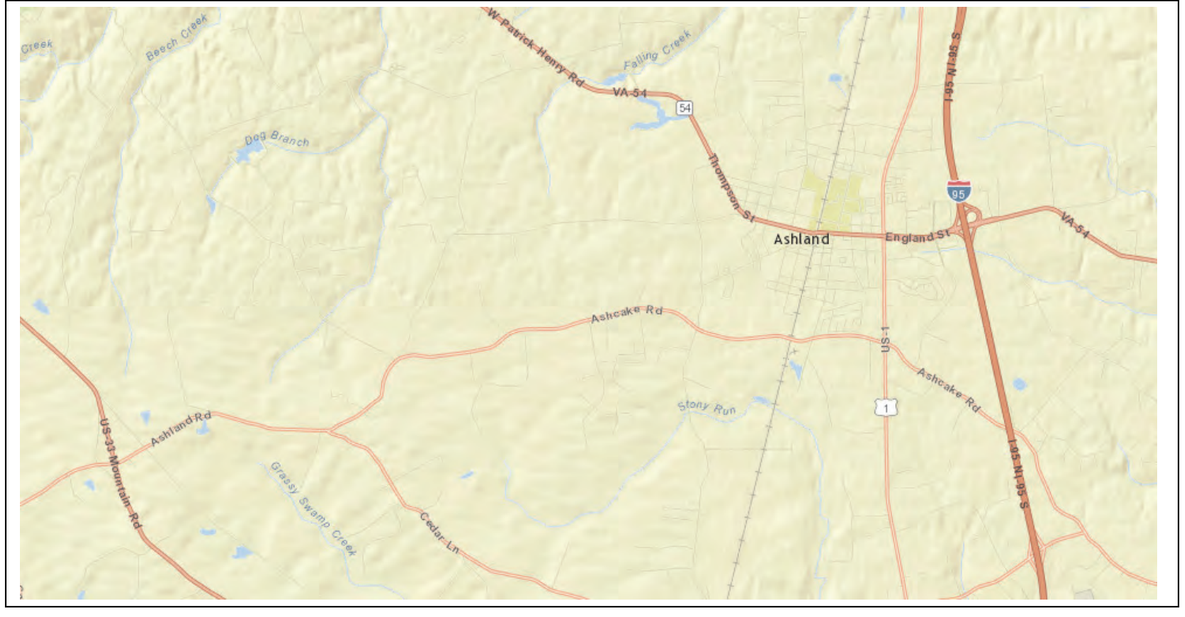
Summary of Considerations for Decision-Making

Grade Separate	Impacts to community.
Eliminate / Consolidate	Important for circulation through town.
Add Quad Gates	Could improve existing safety treatment.
Add Median Separators	Proximity of driveway access along crossing road.
Other	

Crossing Name: ASHCAKE ROAD **Line / Crossing Number: RF&P / 860448T**
Jurisdiction: Hanover County **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
7,714	8,854	11,134	40	64	78

General Description of Crossing: Minor arterial roadway, 2 lanes. Urban area – crossing is located just south of the Town of Ashland, and connects to the town via two local roadways that run parallel to the railroad tracks and intersect at the crossing. To the east, Ashcake Rd connects to US Rt 1 and beyond. To the west, it connects to US Rt 33 and beyond.



Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	Does not exceed any thresholds.
Traffic / Operations	High volume roadway (> 10k) by 2045. S Center Street (west side, north and south of crossing) and S Railroad Ave (east side, north of crossing only) parallel the railroad tracks and intersect Ashcake Rd within a few feet of the crossing.
General Description of Major Environmental	Potential for wetlands in undeveloped areas in proximity to crossing. Carter Park in north / east quadrant.
Safety/Geometric Deficiencies	Intersection operations in proximity to the crossing – especially given high volumes
Engineering	Feasible, but complicated by existing intersection configuration of parallel roadways. Moving crossing to the south could alleviate some of the impact to the houses on the northeast side, but would still cause issues to the business, school, and new housing development on the southeast side as well as potential impacts to the pond on the southwest side.
Existing Property	Numerous residences in north/east (~15). Undeveloped in north/west. Pond / a few outlying residences in south/west. Industrial / commercial in south/east.
Cost-Benefit (Preliminary)	None identified. High volume, minor arterial roadway in urban area. Further benefit as this separation could be in conjunction with adjacent closures as part of a consolidated plan in Town of Ashland.

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	- E Francis St, at-grade ~0.5 miles (rail and roadway) upstream in Town of Ashland. - Gwathmey Church Rd, at-grade ~1 mile (rail and roadway) downstream – a minor local crossing with no connectivity.
Accessibility	High volume, through roadway that serves the network as a minor arterial roadway.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Location not feasible for median separator treatment due to intersection geometrics / safety.
Four Quad Gates could improve existing safety treatment.

Total Bus Trips Using Crossing (Daily):	60	**Crossing Used by Public Transit? (Yes / No)**	No

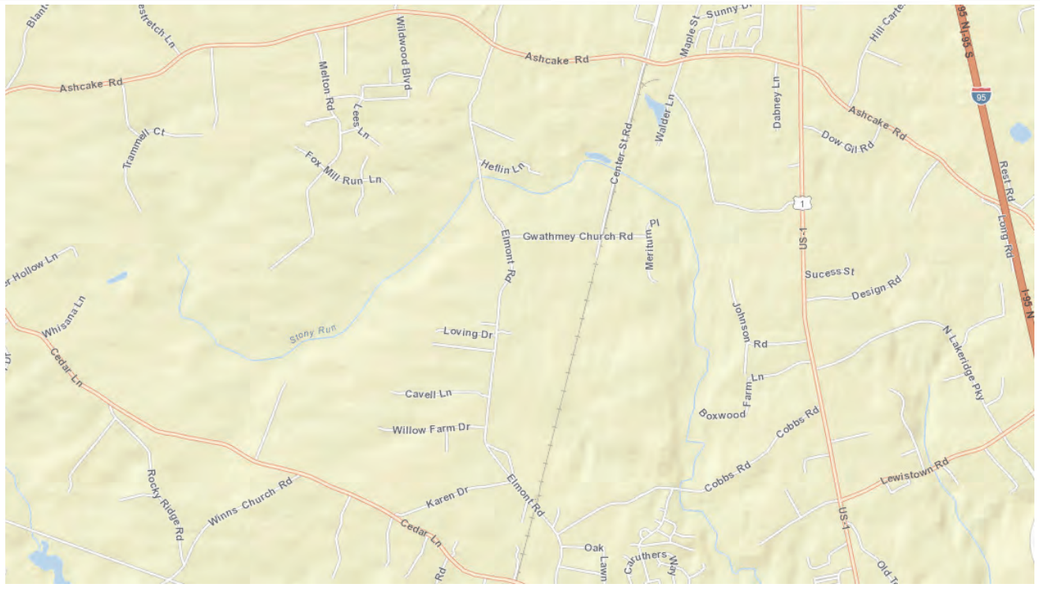
Summary of Considerations for Decision-Making

Grade Separate	Feasible. Structure could be built with minimal impacts.
Eliminate / Consolidate	High volume roadway, connectivity to network as a minor arterial roadway, and lack of alternate equivalent crossing routes.
Add Quad Gates	Could improve existing safety treatment.
Add Median Separators	Proximity of driveway access along crossing road.
Other	

Crossing Name: GWATHMEY CHURCH ROAD **Line / Crossing Number: RF&P / 860447L**
Jurisdiction: Hanover County **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
163	187	235	40	64	78

General Description of Crossing: Minor collector roadway, 2 lanes. Rural area. Gwathmey Church Rd is approximately ½ mile in length and provides the sole access to the residential community on the east side of the tracks. To the west, it connects to Elmont Rd.



Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	Exceeds 1 threshold in 2025 and 2045 (# Passenger Trains).
Traffic / Operations	Low volume roadway through 2045. Center Street Rd, north of crossing, runs parallel to tracks and terminates in a 3-legged intersection at the crossing.
General Description of Major Environmental	None identified.
Safety/Geometric Deficiencies	Intersection operations with crossing and Center Street Rd. Minimal striping on crossing roadway.
Engineering	Feasible but could require elevating or reconfiguring existing intersection with Center Street Rd.
Existing Property	Dense residential on west side of crossing, houses within ~ 50 ft of roadway. Undeveloped and some residential (larger properties) east side of crossing.
Cost-Benefit (Preliminary)	Cost-benefit considerations (low volume, minor roadway in rural area).

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	- Ashcake Rd, at-grade ~1 miles (rail) and ~4 miles (roadway, east side only) upstream. - Elmont Rd, at-grade ~1.5 miles (rail) and ~2 miles (roadway, east side only) downstream.
Accessibility	Crossing provides sole access to residences on east side of crossing.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Location not feasible for median separator treatment due to intersection geometrics / safety.
Four Quad Gates could improve existing safety treatment.

Total Bus Trips Using Crossing (Daily):	0	**Crossing Used by Public Transit? (Yes / No)**	No

Summary of Considerations for Decision-Making

Grade Separate	Cost benefit considerations.
Eliminate / Consolidate	Sole access to residential community.
Add Quad Gates	Could improve existing safety treatment and improvements to parallel roadways may be necessary.
Add Median Separators	Proximity of driveway access along crossing road.
Other	

Crossing Name: ELMONT ROAD **Line / Crossing Number: RF&P / 860445X**
Jurisdiction: Hanover County **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
2,132	2,447	3,077	40	64	78

General Description of Crossing: Major collector roadway, 2 lanes. Rural area. Elmont Rd begins at Cedar Lane within ½ mile of the crossing, to the east. To the west, Elmont Rd runs north towards Ashcake Rd and beyond (whereas Cedar Lane runs more due west to Ashland Rd).

Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	Exceeds 1 threshold in 2025 and 2045 (# Passenger Trains).
Traffic / Operations	Mid-volume roadway through 2045.
General Description of Major Environmental	Potential wetlands and/or streams in undeveloped areas.
Safety/Geometric Deficiencies	Private driveway and commercial (business) driveway within <50 ft of crossing, west side.
Engineering	Feasible.
Existing Property	Buildings (both residential and commercial) within < 100 ft of crossing on both sides of tracks. Undeveloped with residential driveway access, both sides of crossing.
Cost-Benefit (Preliminary)	Potential cost-benefit considerations, a mid-volume major collector roadway in a rural area.

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	- Gwathmey Church Rd, at-grade ~1.5 miles (rail) and ~2 miles (roadway, west side only) upstream. - Cedar Lane, at-grade ~0.5 miles (rail) and ~ 1-1.5 miles (roadway) downstream.
Accessibility	Major collector roadway that serves as the primary connector to the network north / west of the crossing.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Location not feasible for median separation due to commercial parking lot access within 100 feet of crossing, east side.
Four Quad Gates could improve existing safety.

Total Bus Trips Using Crossing (Daily):	0	**Crossing Used by Public Transit? (Yes / No)**	No

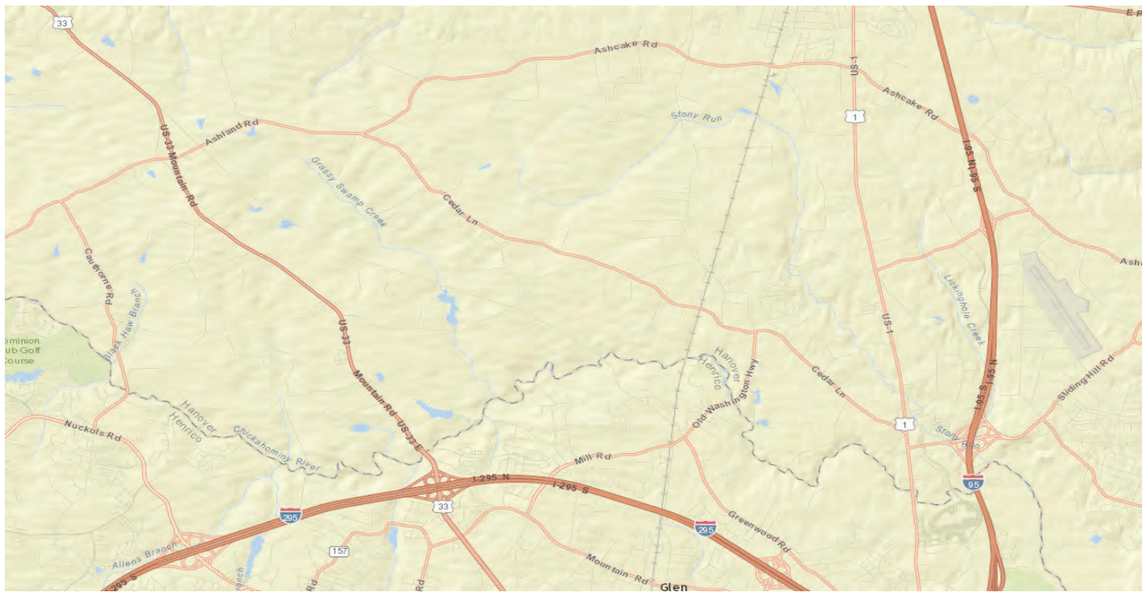
Summary of Considerations for Decision-Making

Grade Separate	Cost-benefit considerations.
Eliminate / Consolidate	Connectivity to network as a major collector roadway
Add Quad Gates	Could improve existing safety treatment.
Add Median Separators	Proximity of driveway access along crossing road.
Other	

Crossing Name: CEDAR LANE **Line / Crossing Number: RF&P / 860443J**
Jurisdiction: Hanover County **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
1,929	2,214	2,784	40	64	78

General Description of Crossing: Major collector roadway, 2 lanes. Rural area – undeveloped areas and larger residential properties. To the east, Cedar Lane terminates at US Rt 1 in proximity to the interchange with I-95 at Sliding Hill. To the west, it terminates at Ashland Rd.



Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	Exceeds 1 threshold in 2025 and 2045 (# Passenger Trains).
Traffic / Operations	Mid-volume roadway through 2045.
General Description of Major Environmental	Potential wetlands / streams in undeveloped areas. Pond in north/east.
Safety/Geometric Deficiencies	Existing driveway access proximity to crossing.
Engineering	Not feasible due to proximity to potential petroleum contamination and substantial property impacts.
Existing Property	Large residential properties and/or driveway access that will be impacted on both sides of crossing.
Cost-Benefit (Preliminary)	Potential cost-benefit considerations, a mid-volume major collector roadway in a rural area. Additional benefit consideration should be given to the proximity of crossing with Elmont Ave – both mid-volume crossings in rural areas that exceed at least 1 FHWA criteria. Grade separating at least one of these could benefit both crossings as well as the overall network. Priority of separating one would be given to Cedar Lane due to greater connectivity.

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	- Elmont Rd, at-grade ~0.5 miles (rail) and 1.5 miles (roadway) upstream, which is another major collector roadway that serves a different area than Cedar Lane. - Greenwood Rd, grade separated ~1 mile (rail) and 2-4 miles (roadway) downstream.
Accessibility	Major collector roadway that serves as the primary connector to the network west of the crossing.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Location not feasible for median separator treatment – Kenmont Lane (driveway access) within 100 feet of crossing, west side. Four Quad Gates could improve existing safety treatment.

Total Bus Trips Using Crossing (Daily):	4	**Crossing Used by Public Transit? (Yes / No)**	No

Summary of Considerations for Decision-Making

Grade Separate	Proximity to potential petroleum contamination and substantial property impacts.
Eliminate / Consolidate	Connectivity to network as a major collector roadway and lack of equivalent connecting roadways.
Add Quad Gates	Could improve existing safety treatment.
Add Median Separators	Proximity of driveway access along crossing road.
Other	

Crossing Name: MILL ROAD **Line / Crossing Number: RF&P / 860441V**
Jurisdiction: Henrico County **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
2,741	3,146	3,956	40	64	78

General Description of Crossing: Major collector roadway, 2 lanes. Urban area. Mill Rd is approximately 2 miles in length, and connects Mountain Rd to the south (west of crossing) with Greenwood Rd, the intersection with which is located immediately east of the crossing.

Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	Does not exceed any thresholds.
Traffic / Operations	Mid-volume roadway through 2045. Mill Rd terminates at a T-intersection within ~100 ft of crossing, east side. Intersection with Greenwood Rd is within 2k ft of crossing, east side.
General Description of Major Environmental	Hunton Community Center property is located within ~100 feet, east side of crossing. Potential wetlands and/or streams in undeveloped areas.
Safety/Geometric Deficiencies	Intersection operations within proximity to crossing.
Engineering	Feasibility challenges based on existing intersection geometrics on east side of crossing with intersections with Old Washington Hwy and Greenwood Rd, in proximity to the community center.
Existing Property	Community center property, east side. Undeveloped with sparse residential, north / west side.
Cost-Benefit (Preliminary)	Potential cost-benefit considerations, a mid-volume major collector roadway.

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	- Greenwood Rd, grade separated ~0.25 miles (rail) and ~0.5 miles (roadway, east side only) upstream. - Mountain Rd, at grade, ~1.5 miles (rail) and ~1.5-3 miles (roadway) downstream.
Accessibility	Through roadway, connecting mainly residential community north/east of I-295 to residential community south/west of it.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Location feasible for median separator treatment if the gravel road in the NE corner parcel is shifted to the east.
Four Quad Gates could improve existing safety treatment.

Total Bus Trips Using Crossing (Daily):	0	**Crossing Used by Public Transit? (Yes / No)**	No

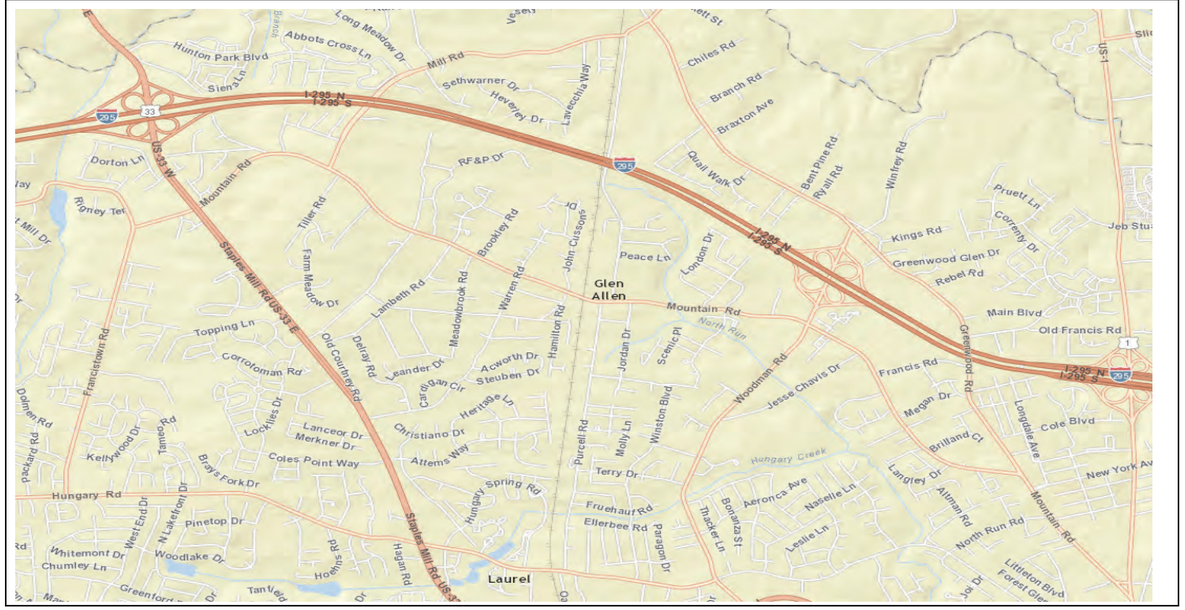
Summary of Considerations for Decision-Making

Grade Separate	Existing geometrics of roadway network and impacts to community center.
Eliminate / Consolidate	Not feasible due to connectivity issues.
Add Quad Gates	Could improve existing safety treatment.
Add Median Separators	Feasible, if gravel road in the NE corner parcel is relocated.
Other	

Crossing Name: MOUNTAIN ROAD **Line / Crossing Number: RF&P / 860438M**
Jurisdiction: Henrico County **Current Warning Device: Four Quad Gates**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
5,278	6,058	7,618	40	64	78

General Description of Crossing: Minor arterial roadway, 2 lanes. Urban area. Mountain Rd roughly parallels I-295 and intersects with at least three north-south roadways that interchange with the interstate (US Rt 33, Woodman Rd, and US Rt 1), and serves the largely and densely residential area that is Glen Allen.



Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	Exceeds 1 threshold in 2045 (Veh Delay).
Traffic / Operations	High volume (> 5k) roadway through 2045. Intersections with north-south roads within ~500 ft on both sides of the crossing. Center turn lane on west side of crossing.
General Description of Major Environmental	None identified.
Safety/Geometric Deficiencies	Four quad gates existing condition.
Engineering	Not feasible due to property impacts
Existing Property	Commercial and undeveloped on west side of crossing. Industrial / commercial in north/east. Residential primary in south/east.
Cost-Benefit (Preliminary)	None identified (high volume, minor arterial roadway in an urban area).

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	- I-295, grade separated ~1 mile (rail) and over 2 miles (roadway) upstream. - Mill Rd, at-grade ~1.5 miles (rail) and 2 miles (roadway) upstream. - Hungary Rd, at-grade ~1.5 miles (rail) and 2-3 miles (roadway) downstream.
Accessibility	Minor arterial roadway that serves traffic throughout Glen Allen from I-295 and beyond.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Four Quad Gates is existing condition.

Total Bus Trips Using Crossing (Daily):	8	**Crossing Used by Public Transit? (Yes / No)**	No

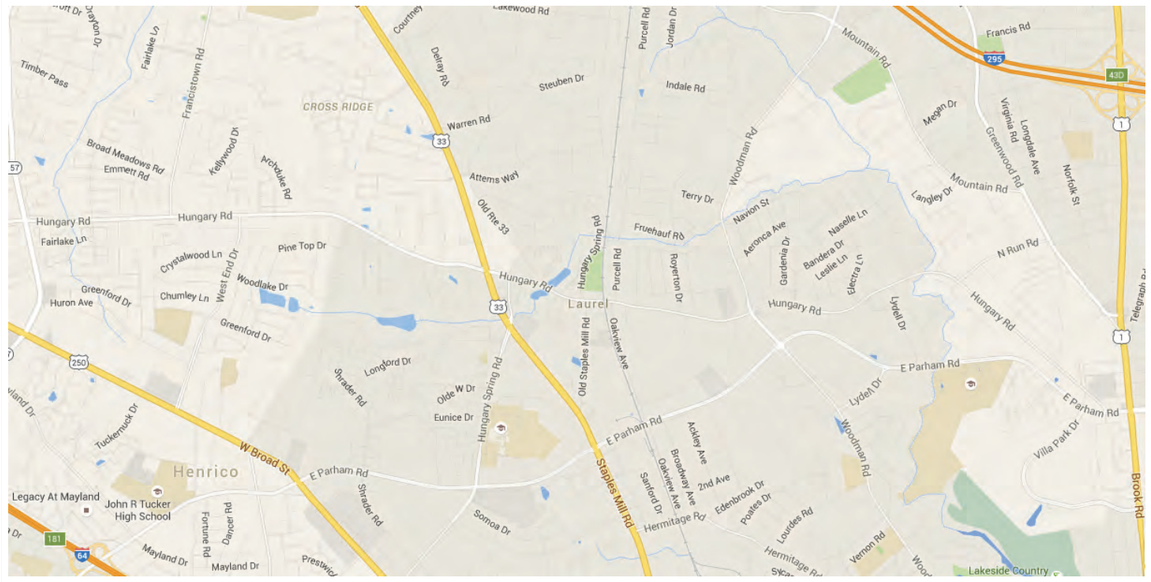
Summary of Considerations for Decision-Making

Grade Separate	Many property impacts.
Eliminate / Consolidate	Connectivity to network as a minor arterial roadway that parallels I-295.
Add Quad Gates	Existing condition, could have to relocate existing quad gates.
Add Median Separators	
Other	

Crossing Name: HUNGARY ROAD **Line / Crossing Number: RF&P / 860437F**
Jurisdiction: Henrico County **Current Warning Device: Gates (Non-Quad)***

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
16,240	18,640	23,440	40	64	78

General Description of Crossing: Minor arterial roadway, 4 lanes. Urban area – it is the main roadway serving the Laurel area with dense residential development. ½ mile to the west of the crossing, Hungary Rd intersects US Rt 33 / Staples Mill Rd. Existing crossing treatment is medians with gates.



Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	Exceeds 1 threshold in 2015 (Veh Delay). Exceeds 2 thresholds in 2025 (additional CE). Exceeds 3 thresholds in 2045 (additional PCE).
Traffic / Operations	Very high volume (> 20k) roadway by 2045. 4 lanes of traffic, with driveways within ~200 ft on both sides of crossing. ***Current Gate Warning Device is Gates with Median Separation.**
General Description of Major Environmental	Laurel Recreation area abuts the west side of the railroad ~500 feet north of Hungary Rd (accessed via Hungary Spring Rd, which is a loop roadway with two intersections to Hungary Rd).
Safety/Geometric Deficiencies	Proximity of driveways / intersections to crossing.
Engineering	Feasible. Structure along existing alignment, or slight realignment to the south. Look into connection to existing intersections (~6 within 1,000 ft radius) as well as possible historic property in southwest quadrant..
Existing Property	Residential properties and access, with some commercial, on both sides of crossing. VDOT comments that stopped trains block both Hungary Rd and Mountain Rd at the same time so it could be beneficial to grade separate one (Hungary Rd gets more traffic)
Cost-Benefit (Preliminary)	Cost-benefit considerations as structure would be at the expense of taking several houses and a business potentially located in a historic property. Impacts may outweigh benefits. High volume, minor arterial roadway in an urban area.

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	- Mountain Rd, at-grade ~1.5 miles (rail) and 2-3 miles (roadway) upstream. - E Parham Rd, grade separated, ~0.5 miles (rail) and 1 mile (roadway) downstream.
Accessibility	Minor arterial, 4-lane roadway with high accessibility and connectivity to the network.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Median tubes could be installed on the existing 100 ft long concrete medians.
Four Quad Gates could improve existing safety treatment.

Total Bus Trips Using Crossing (Daily):	6	**Crossing Used by Public Transit? (Yes / No)**	No

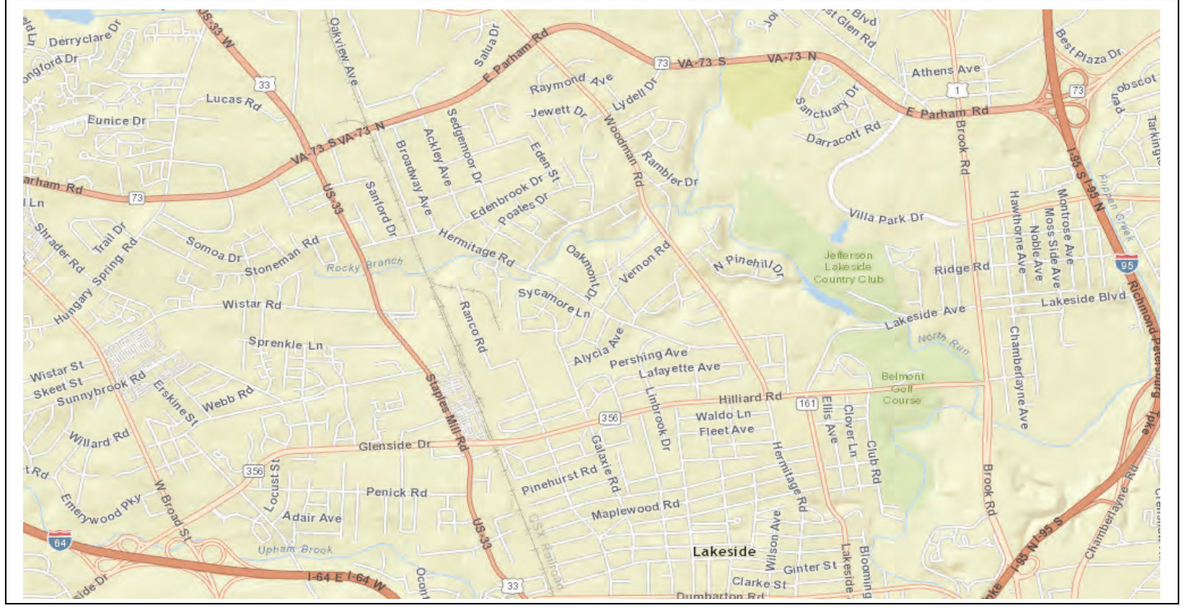
Summary of Considerations for Decision-Making

Grade Separate	Feasible with several takings but could be beneficial.
Eliminate / Consolidate	Connectivity to network as a high volume, minor arterial roadway.
Add Quad Gates	100 foot medians are already in place and could need to be shifted slightly away from the proposed tracks if grade separation is not achievable.
Add Median Separators	Median tubes could be installed on existing medians.
Other	

Crossing Name: HERMITAGE ROAD **Line / Crossing Number: RF&P / 860435S**
Jurisdiction: Henrico County **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
4,263	4,893	6,153	40	64	78

General Description of Crossing: Major collector roadway, 2 lanes. Urban area – located between commercial / industrial that is adjacent to US Rt 33, and residential area. Approximately 1,000 ft to the west of the crossing, Hermitage Rd intersects (and terminates) at US Rt 33 / Staples Mill Rd. To the east, Hermitage Rd terminates at Woodman Rd.



Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	Does not exceed any thresholds.
Traffic / Operations	Mid-volume roadway through 2025. High volume (> 5k) roadway by 2045. Industrial access roadway within ~500 ft of crossing, west side. Oakway Ave (residential roadway) within ~200 of crossing, east side. Broadway Ave (residential roadway) within ~500 ft of crossing, east side.
General Description of Major Environmental	None identified.
Safety/Geometric Deficiencies	Intersections in proximity to crossing.
Engineering	Not feasible due to residential / industrial impacts.
Existing Property	Industrial / commercial on west side, and south / east side of crossing. Industrial / commercial immediately adjacent to roadway, transitions to residential properties on north / east side of crossing.
Cost-Benefit (Preliminary)	None identified. Major collector roadway in urban area.

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	- E Parham Rd. grade separated ~0.5 mile (rail) and 1 mile (roadway) upstream. - Hillard Rd, grade separated ~1 mile (rail) and 2-3 miles (roadway) downstream.
Accessibility	Major collector roadway providing through access to large, dense residential area.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Location is notfeasible for median separator treatment due to proximity of roadway / driveway access within 100 ft of crossing, both sides.
Four Quad Gates could improve existing safety treatment.

Total Bus Trips Using Crossing (Daily):	74	**Crossing Used by Public Transit? (Yes / No)**	No

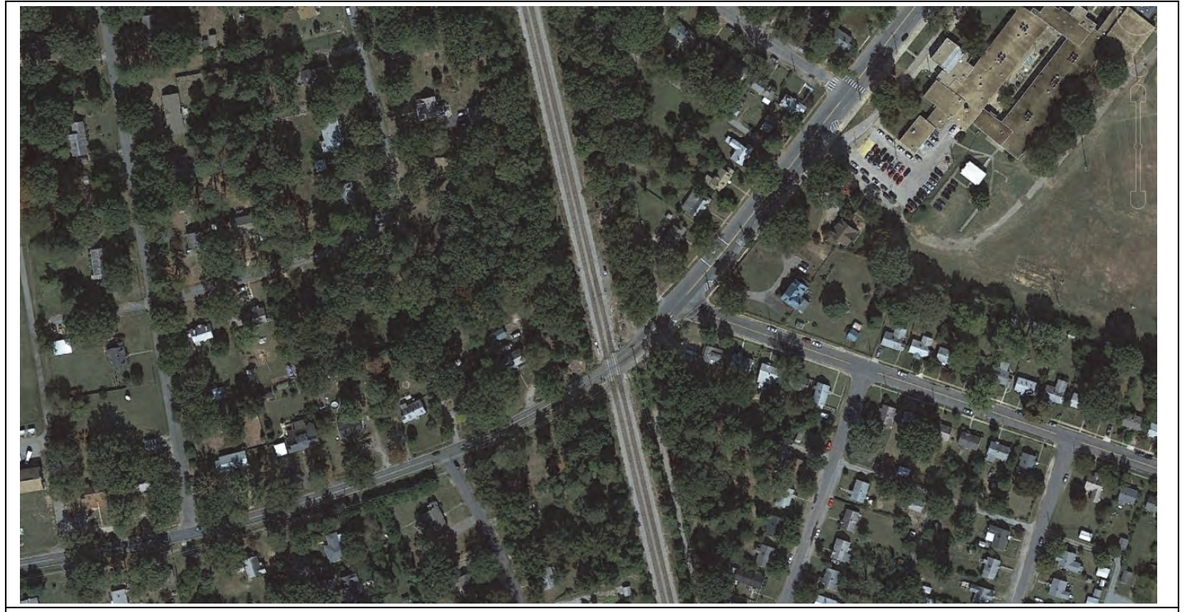
Summary of Considerations for Decision-Making

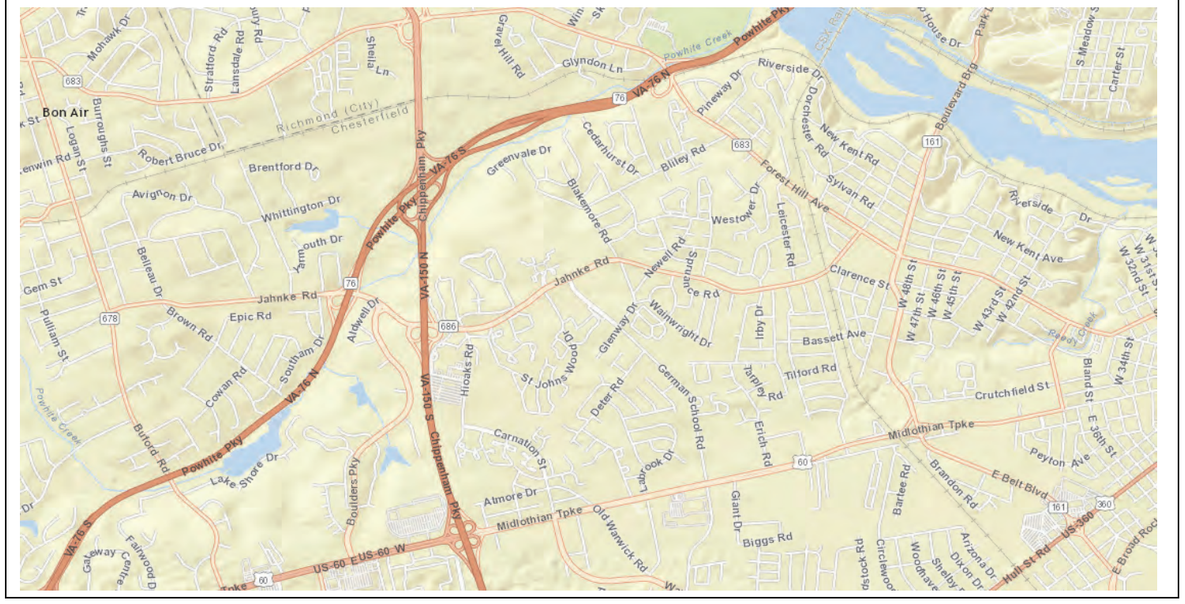
Grade Separate	Residential / industrial impacts.
Eliminate / Consolidate	Volumes and connectivity as a major collector roadway.
Add Quad Gates	Could improve existing safety treatment.
Add Median Separators	Proximity of driveway access along crossing road and loading dock location of facility in northwest quadrant.
Other	

Crossing Name: JAHNKE ROAD **Line / Crossing Number: A LINE / 623663D**
Jurisdiction: Richmond **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
12,180	13,980	17,580	34	50	64

General Description of Crossing: Minor arterial roadway, 2 lanes. Urban area – dense residential in vicinity of crossing, as well as an elementary school. To the west, Jahnke Rd interchanges with both the Powhite Pkwy and the Chippenham Pkwy. To the east, it terminates at Forest Hill Ave (which also interchanges with the Powhite Pkwy).





Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	Exceeds 1 threshold in 2045 (CE).
Traffic / Operations	High volume (> 10k) roadway through 2045. Clarence St (residential roadway) within ~300 ft of crossing, east side. Boroughbridge Rd (residential roadway) within ~500 ft of crossing, west side.
General Description of Major Environmental	Area on west of crossing (to railroad tracks) is part of the Cedarhurst Neighborhood Historic District. Westover Hills Elementary School is located within ~500 ft crossing, east side.
Safety/Geometric Deficiencies	School in proximity to crossing. Intersection operations in proximity to crossing (east side).
Engineering	Not feasible due to several residential impacts.
Existing Property	Dense residential properties in close proximity to roadway on both sides of crossing. School property in north/east.
Cost-Benefit (Preliminary)	No cost-benefit considerations observed. High volume, minor arterial roadway serving an urban area. Will likely have associated high residential impacts.

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	- Forest Hill Ave, grade separated ~0.5 mile (rail) and ~1 mile (roadway) upstream. - Bassett Ave, at grade ~0.5 mile (rail) and ~1 mile (roadway) downstream
Accessibility	High volume through roadway.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Location not feasible for median separator treatment due to volumes and proximity to intersections within 100 ft, as well as curvature of roadway.
Four Quad Gates could improve existing safety treatment.

Total Bus Trips Using Crossing (Daily):	14	**Crossing Used by Public Transit? (Yes / No)**	Yes

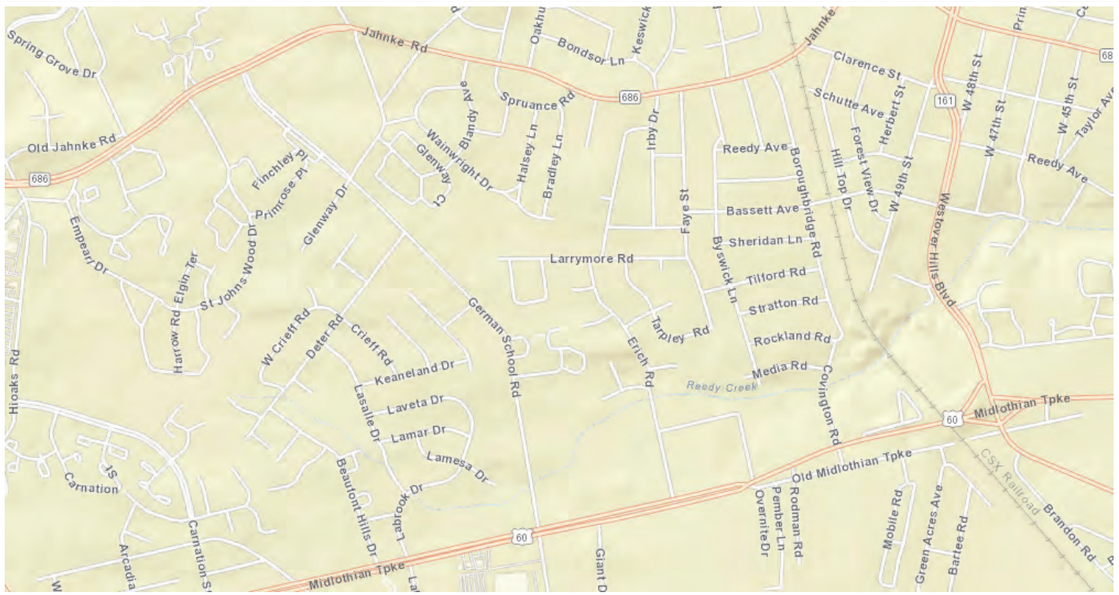
Summary of Considerations for Decision-Making

Grade Separate	Residential impacts.
Eliminate / Consolidate	High volume, minor arterial connectivity to network.
Add Quad Gates	Could improve existing safety treatment.
Add Median Separators	Curvature of the road.
Other	

Crossing Name: BASSETT AVENUE **Line / Crossing Number: A LINE / 623664K**
Jurisdiction: Richmond **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
1,393	1,599	2,010	34	50	64

General Description of Crossing: Local roadway, 2 lanes. Urban area. Bassett Avenue just over ½ mile total length and is part of the grid network of streets serving this residential area. To the east, it intersection Westover Hills Rd and beyond. It terminates at Faye St approximately 1,500 ft east of the crossing.



Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	Does not exceed any thresholds.
Traffic / Operations	Mid volume roadway through 2045. Intersections within ~250 ft of both sides of crossing.
General Description of Major Environmental	None identified.
Safety/Geometric Deficiencies	Minimal striping along crossing roadway.
Engineering	Feasible.
Existing Property	Dense residential properties on all sides of crossing.
Cost-Benefit (Preliminary)	Cost-benefit considerations (low volume, minor roadway), with high residential impacts.

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	- Jahnke Rd, at grade ~~0.5 mile (rail) and ~1 mile (roadway) upstream - Midlothian Turnpike, grade separated ~.5 mile (rail) and ~1 mile (roadway) downstream.
Accessibility	A short through-street serving a residential area.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Location feasible for median separation treatment, with potential improvements to roadway width.
Four Quad Gates could improve existing safety treatment.

Total Bus Trips Using Crossing (Daily):	4	**Crossing Used by Public Transit? (Yes / No)**	No

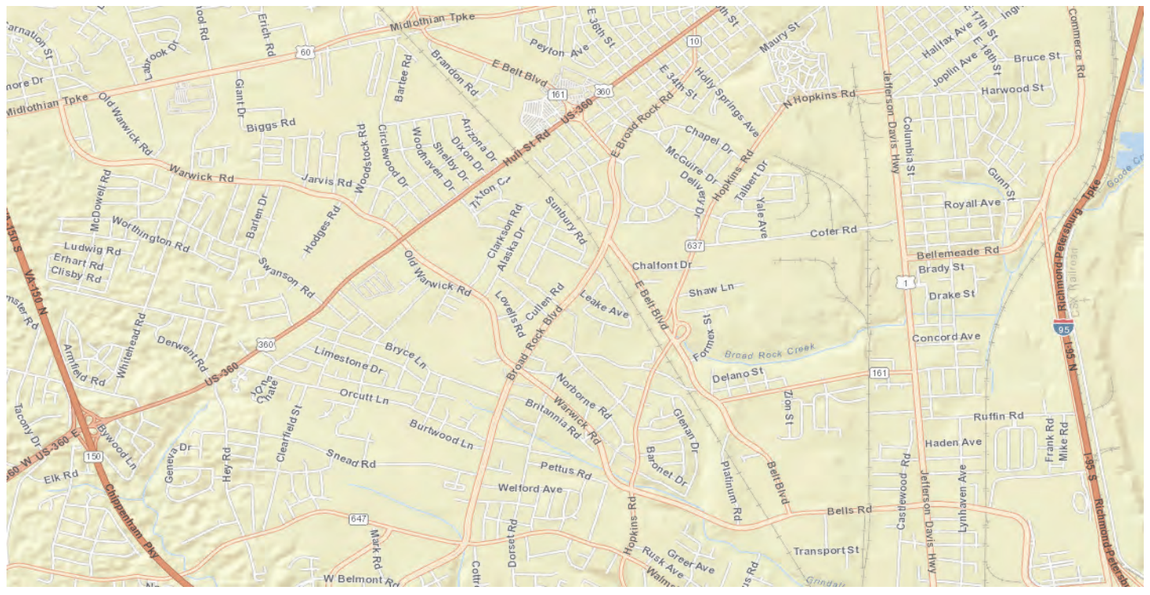
Summary of Considerations for Decision-Making

Grade Separate	Cost-benefit considerations.
Eliminate / Consolidate	Could eliminate this crossing / consolidate with Midlothian Turnpike (existing grade separated) to the south, and Jahnke Rd (proposed grade separated) to the north. On the west side, traffic can utilize Boroughbridge Rd to connect to both Jahnke Rd and Midlothian Turnpike crossings. On the east side, traffic can utilize Westover Hills Blvd to connect to both Jahnke Rd and Midlothian Turnpike crossings.
Add Quad Gates	Could improve existing safety treatment.
Add Median Separators	Feasible.
Other	

Crossing Name: BROAD ROCK BOULEVARD **Line / Crossing Number: A LINE / 623668M**
Jurisdiction: Richmond **Current Warning Device: Gates (Non-Quad)***

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
19,285	22,135	27,835	34	50	64

General Description of Crossing: Other principal arterial roadway, 4 lanes, median separated. Urban area – high density development along roadway, including veterans' hospital. Major intersection with Belt Blvd just east of crossing. Broad Rock Blvd connects to Hull Street Rd to the north/east, and to the west, interchanges with Chippenham Pkwy.



Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	Exceeds 1 threshold in 2025 (CE). Exceeds 2 thresholds in 2045 (additional Veh Delay).
Traffic / Operations	Very high volume (> 20k) through 2045. (Highest at grade crossing volumes in entire corridor). Major intersection with Belt Blvd within ~500 ft of crossing, east side. ***Current Gate Warning Device is Gates with Median Separation.**
General Description of Major Environmental	McGuire Veterans Hospital complex in north / east. School playground fields / access within 1,000 ft on west / south side.
Safety/Geometric Deficiencies	Sidewalks leading up to tracks, both sides (pedestrian crossing). Historical accidents / fatalities.
Engineering	Feasible, but could require a grade separated interchange to accommodate all existing movements with intersection at Belt Blvd (another median-separated, 4-lane roadway). Operations at intersection of Belt Blvd could be part of improvement --- grade separated interchange may be needed as well as buying out the auto shop in northeast quadrant.
Existing Property	High density residential on both sides of crossing.
Cost-Benefit (Preliminary)	None identified. This is the highest volume at-grade crossing in the project corridor.

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	- Hull St, grade separated ~0.5 mile (rail) and 1-2 miles (roadway) upstream. - Hopkins Rd, grade separated ~0.5 mile (rail) and 1 mile (roadway) downstream.
Accessibility	Principal arterial roadway with through access and connectivity.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Location not feasible for median separators (median-separated, 4-lane roadway with access points within 100 ft of crossing). Four Quad Gates would provide minimal safety improvement as the existing wide median is just as much a deterrent to gate violators as the addition of exit gates would be.

Total Bus Trips Using Crossing (Daily):	8	**Crossing Used by Public Transit? (Yes / No)**	Yes

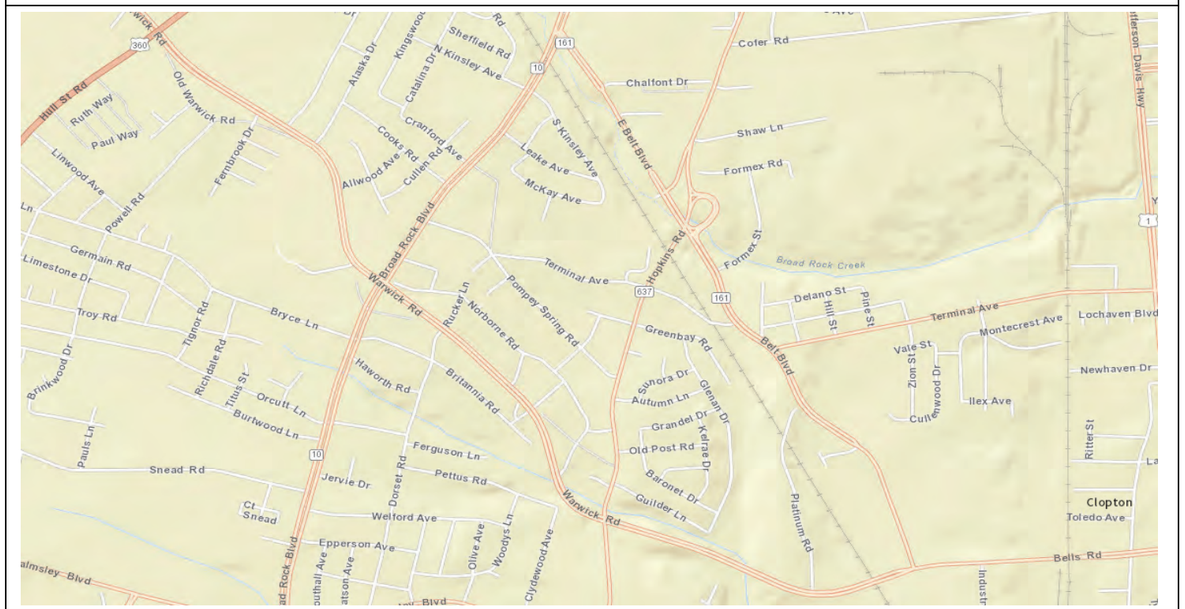
Summary of Considerations for Decision-Making

Grade Separate	Feasible, but could require a grade separated interchange; necessary for safety
Eliminate / Consolidate	High volume roadway and connectivity of this principal arterial roadway to the overall network.
Add Quad Gates	Existence of split gates and existing median.
Add Median Separators	Existence of split gates and existing median.
Other	

Crossing Name: TERMINAL AVENUE **Line / Crossing Number: A LINE / 623670N**
Jurisdiction: Richmond **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
681	781	982	34	58	73

General Description of Crossing: Local roadway, 2 lanes that provides access to 4 residences. Urban area. Terminal Avenue is just over ½ mile in total length, and is an unclassified local roadway between Hopkins Rd (west of crossing) to E Belt Blvd (east of crossing).



Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	Does not exceed any thresholds.
Traffic / Operations	Low volume roadway through 2045. Intersection with E Belt Blvd ~250 ft to the east of crossing. Intersection with Hopkins Rd ~1k ft to the west of crossing.
General Description of Major Environmental	Potential wetlands / streams in undeveloped areas.
Safety/Geometric Deficiencies	Minimal striping along crossing roadway. Parallel parking on crossing roadway. Proximity of major intersection with E Belt Blvd (east).
Engineering	Not feasible without including intersection of E Belt Blvd (which is a major, 4-lane, divided roadway) on structure.
Existing Property	Residential properties and undeveloped on all sides of crossing.
Cost-Benefit (Preliminary)	Cost-benefit considerations – low volume local access road to 4 houses. Any option besides closure with active access to existing connection to Hopkins Road would likely exceed cost-benefit.

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	- Hopkins Rd, grade separated ~.2 miles (rail) and ~.5 miles (roadway) upstream. - Warwick Rd / Bells Rd, grade separated ~.75 miles (rail) and ~1.5 miles (roadway) downstream).
Accessibility	Low volume local roadway that connects E Belt Blvd and Hopkins Rd, which themselves interchange approximately 1k ft north of the crossing.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Location not feasible for median separators due to proximity to driveway access within 100 ft (east side).
Four Quad Gates could improve existing safety treatment.

Total Bus Trips Using Crossing (Daily):	80	**Crossing Used by Public Transit? (Yes / No)**	No

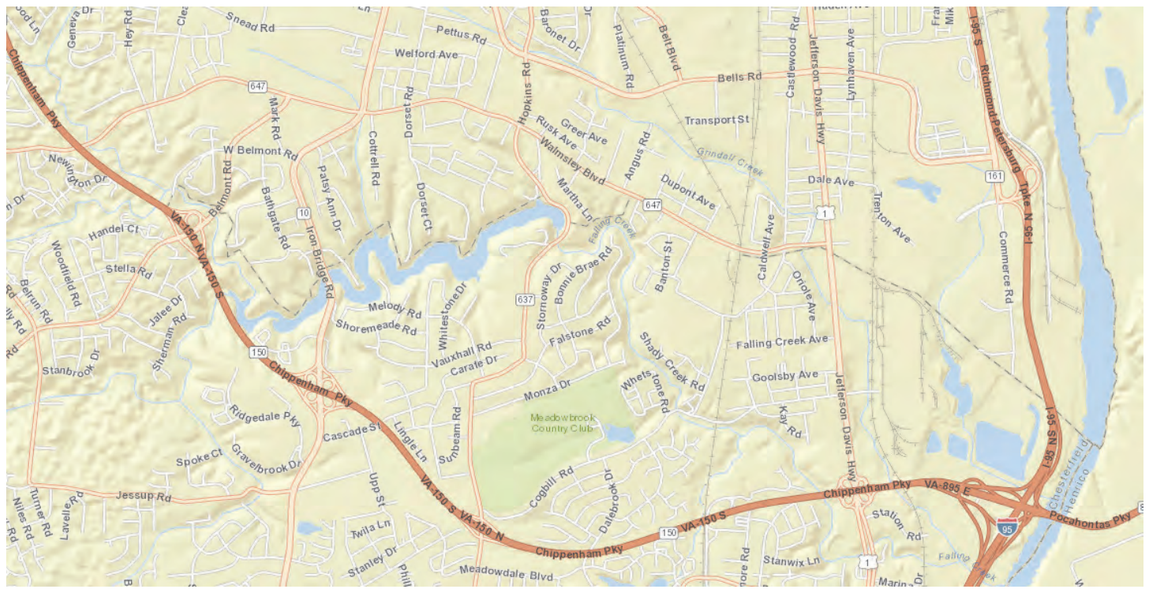
Summary of Considerations for Decision-Making

Grade Separate	Proximity to 4-lane, divided E Belt Blvd.
Eliminate / Consolidate	Could eliminate this crossing / open gated access to Hopkins Rd with installation of signal heads to existing traffic signal to provide access to two grade separations on Hopkins Rd (north) and Warwick Rd / Bells Rd (south). Traffic could utilize existing roadways to access these crossings.
Add Quad Gates	Could improve existing safety treatment.
Add Median Separators	Proximity of driveway access along crossing road.
Other	

Crossing Name: WALMSLEY BOULEVARD **Line / Crossing Number: A LINE / 623672C**
Jurisdiction: Richmond **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
4,974	5,709	7,179	34	50	64

General Description of Crossing: Minor arterial roadway, 2 lanes. Urban area – dense residential properties east of crossing truck distribution center west of crossing. Walmsley Blvd terminates at US Rt 1 approximately ½ mile east of the crossing.



Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	Does not exceed any thresholds.
Traffic / Operations	High volume (> 5 k) roadway through 2045. Intersection with Caldwell Ave (east side) and industrial driveway access (west side) within ~700 ft of crossing. High percentage truck traffic (access to industrial area).
General Description of Major Environmental	None identified.
Safety/Geometric Deficiencies	Large bump over track (5mph speed limit sign). Four tracks to be built – 3 superelevated and 1 industrial, bump will worsen.
Engineering	Feasible. New grade separation structure with realignment to the north to straighten curve. All alternatives likely have significant residential impacts (east side).
Existing Property	Commercial/industrial and undeveloped on west side of crossing. Dense residential in close proximity to roadway on east side of crossing.
Cost-Benefit (Preliminary)	No cost-benefit considerations observed. High volume, minor arterial roadway serving an urban area.

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	- Warwick Rd, grade separated ~1 mile (rail) and 2 miles (roadway) upstream. - Castlewood Rd, grade separated ~0.5 mile (rail) and 1 mile (roadway) downstream.
Accessibility	Through minor arterial roadway.

Feasibility Considerations Related to Rail Crossing Safety Treatments

No access points within 100 ft of either side of crossing – location is a potential candidate for median separator treatment.
Four Quad Gates could improve existing safety treatment.

Total Bus Trips Using Crossing (Daily):	12	**Crossing Used by Public Transit? (Yes / No)**	No

Summary of Considerations for Decision-Making

Grade Separate	Feasible with impacts that do not outweigh the benefits.
Eliminate / Consolidate	High volume, minor arterial roadway connectivity to the network.
Add Quad Gates	
Add Median Separators	Feasible and could improve existing safety.
Other	Adjusting geometry of track / roadway could improve the geometric deficiency.

Crossing Name: KINGSLAND ROAD **Line / Crossing Number: A LINE / 623678T**
Jurisdiction: Chesterfield County **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
2,132	2,447	3,077	34	50	64

General Description of Crossing: Major collector roadway, 2 lanes. Rural area. Kingsland Road is approximately 4 miles in total length and crosses both the A and S Lines. In this vicinity of this crossing, it provides east-west access through and to residences.

Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	Does not exceed any thresholds.
Traffic / Operations	Mid-volume roadway through 2045. Firethorne Lane intersection (residential area) within ~350 ft, east side of crossing. Private driveway access within ~25 ft, west side of crossing.
General Description of Major Environmental	None identified.
Safety/Geometric Deficiencies	Driveway proximity to crossing.
Engineering	Not feasible due to wetland/residential impacts and the potential impact to single point of access to two small subdivisions within 300 feet of the crossing (either property takes and/or new frontage road access).
Existing Property	Dense residential communities, east side of crossing. Undeveloped / larger residential properties, west side of crossing.
Cost-Benefit (Preliminary)	Cost benefit considerations – rural area, less than 5k cars daily. Additionally, the cost and impacts to residences may exceed the benefit of grade separation. Additional benefit since the downstream crossing is proposed to be eliminated and this crossing will be the alternate crossing route for that traffic.

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	- S Beulah Rd, grade separated ~2 miles (rail) and ~4 miles (roadway) upstream. - Thurston Rd, at grade ~.5 miles (rail) and ~1.5 miles (roadway) downstream.
Accessibility	Through roadway providing access to residences / residential communities.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Location is feasible for median separation with the relocation of a residential driveway within 100 ft, west side.
Four Quad Gates could improve existing safety treatment.

Total Bus Trips Using Crossing (Daily):	8	**Crossing Used by Public Transit? (Yes / No)**	No

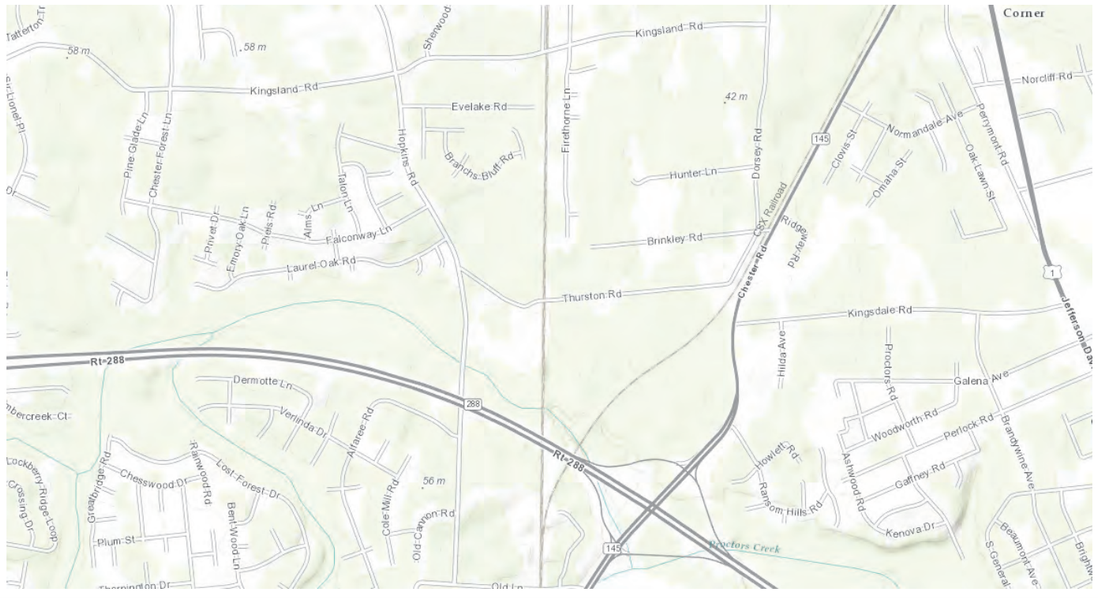
Summary of Considerations for Decision-Making

Grade Separate	Wetland/residential impacts.
Eliminate / Consolidate	Lack of connectivity to adjacent crossings.
Add Quad Gates	Median separators can be installed with relocation of one residential driveway in the northwest quadrant.
Add Median Separators	Feasible with the relocation of residential driveway in the northwest quadrant.
Other	

Crossing Name: THURSTON ROAD **Line / Crossing Number: A LINE / 623679A**
Jurisdiction: Chesterfield County **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
457	525	660	34	50	64

General Description of Crossing: Local roadway, 2 lanes. Rural area. Thurston Road is approximately ½ mile in length and connects to Hopkins Rd to the west and Dorsey Rd to the east. It provides access to residential properties along its length.



Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	Does not exceed any thresholds.
Traffic / Operations	Low volume roadway through 2045.
General Description of Major Environmental	None identified.
Safety/Geometric Deficiencies	Minimal striping along crossing roadway. Limited sight distance at crossing.
Engineering	Feasible.
Existing Property	Mainly undeveloped with sparse residential and associated farmland on all sides of crossing.
Cost-Benefit (Preliminary)	Cost-benefit considerations (low volume, local roadway in rural area).

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	- Kingsland Rd, at-grade ~.5 miles (rail) and ~1.5 miles (roadway) upstream. - Old Ln, at-grade ~0.5 miles (rail) and ~1.5 miles (roadway) downstream.
Accessibility	Through roadway providing local access.

Feasibility Considerations Related to Rail Crossing Safety Treatments

No paved access points within 100 ft of crossing on either side – feasible for median separation.
Four Quad Gates could improve existing safety treatment.

Total Bus Trips Using Crossing (Daily):	16	**Crossing Used by Public Transit? (Yes / No)**	No

Summary of Considerations for Decision-Making

Grade Separate	Cost-benefit considerations.
Eliminate / Consolidate	Could eliminate this crossing / consolidate with Kingsland Road. Traffic could utilize existing roadway network for access to Kingsland Rd – To the west, Hopkins Rd and to the east, Dorsey Rd.
Add Quad Gates	
Add Median Separators	No paved access points within 100 ft of crossing on either side.
Other	

Crossing Name: OLD LANE **Line / Crossing Number: A & S LINES / 623680U**
Jurisdiction: Chesterfield County **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
4,872	5,592	7,032	34	58	73

General Description of Crossing: Major collector roadway, 2 lanes. Rural. Old Lane is less than ½ mile in length and provides connectivity between Hopkins Rd (west) to Chester Rd (east). The area is mainly undeveloped with large commercial / industrial properties adjacent to Chester Rd.

Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	1 threshold exceeded in 2025 (CE) and 2 thresholds exceeded in 2045 (additional PCE).
Traffic / Operations	High volume (> 5k) roadway in 2025 and 2045. Dedicated turn lanes to/from industrial area, immediately east of crossing (driveway ~250 ft of crossing). Intersection with Chester Rd within ~550 ft of crossing, east side.
General Description of Major Environmental	None identified.
Safety/Geometric Deficiencies	Intersection operations (turn lanes) in proximity to crossing.
Engineering	Feasible, but new grade separation structure would require elevating the intersection with Chester Rd (which is a 4-lane, median-separated roadway).
Existing Property	Undeveloped / sparse residential, west side of crossing. Large commercial / industrial properties, east side of crossing.
Cost-Benefit (Preliminary)	Cost-benefit considerations – rural area and proximity of intersection with Chester Rd.

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	- Thurston Rd, at-grade ~0.5 miles (rail) and ~1.5 miles (roadway) upstream. - Centralia Rd, at-grade ~.3 miles (rail) and ~.75 miles (roadway) downstream. → *This crossing to be grade separated as part of the R2R project.*
Accessibility	Through connecting roadway between two larger roadways.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Not feasible for median separator treatment due turning lane into commercial / industrial area within 100 ft of crossing, east side.
Four Quad Gates could improve existing safety treatment.

Total Bus Trips Using Crossing (Daily):	2	**Crossing Used by Public Transit? (Yes / No)**	No

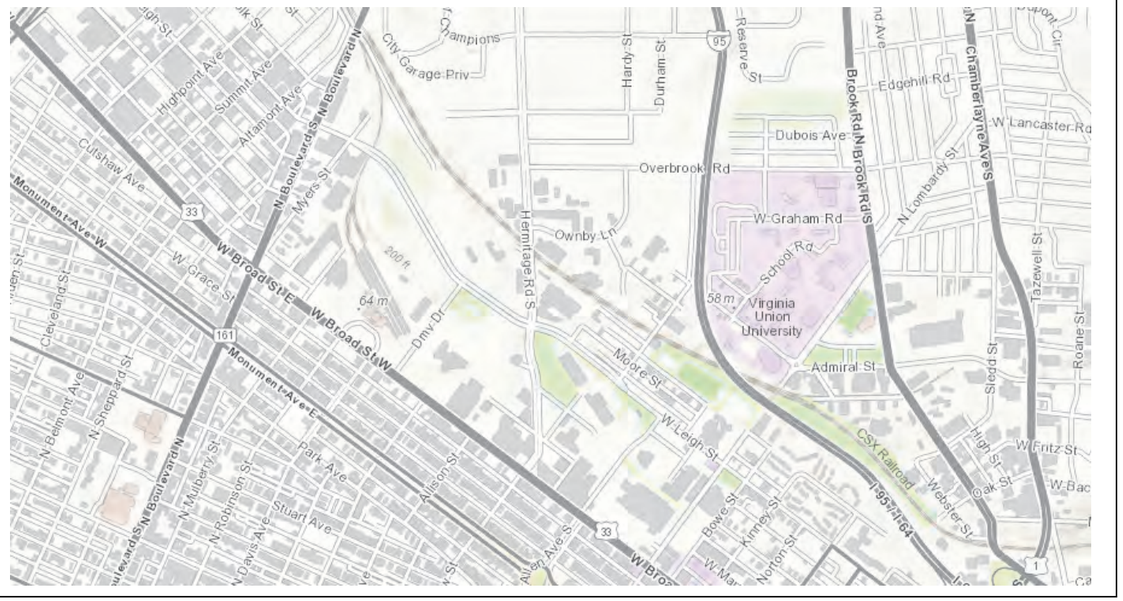
Summary of Considerations for Decision-Making

Grade Separate	Cost-benefit considerations.
Eliminate / Consolidate	Could eliminate this crossing / consolidate with Centralia Rd crossing to the south (could be grade separated as part of the R2R project). Traffic could utilize existing roadway network for access to Centralia Rd – To the east, Chester Road and to the west, Hopkins Rd.
Add Quad Gates	Could improve existing safety treatment.
Add Median Separators	Proximity of driveway access along crossing road.
Other	

Crossing Name: HERMITAGE ROAD **Line / Crossing Number: S LINE / 623518E**
Jurisdiction: Richmond **Current Warning Device: Gates (Non-Quad)***

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
10,150	11,650	14,650	21	52	52

General Description of Crossing: Minor arterial roadway, 4 lanes – divided/median separated. Urban – dense residential and commercial. Hermitage Road is the primary north-south roadway that connects downtown Richmond (to the south) to this commercial / sports area.



Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	No thresholds exceeded.
Traffic / Operations	High volume (>10k) roadway through 2045. Intersection with W Leigh St within ~750 ft south / west of crossing. Ownby Ln intersection within ~250 ft north / east of crossing. ***Current Warning Device is Gate with Median Separation**
General Description of Major Environmental	Potential historic and/or current historic building(s) in vicinity.
Safety/Geometric Deficiencies	Proximity of surface parking access to crossing, south side. Sidewalks on both sides of roadway, both sides of crossing – pedestrian crossing. Length of existing raised medians does not preclude median crossing by vehicles.
Engineering	Feasible, but major intersection(s) within proximity to crossing presents a potential engineering challenge. New grade separation structure could need to accommodate existing intersection operations with W Leigh St (another 4-lane median-separated roadway). Potential closure of intersection with Ownby Ln (alternate access to properties provided via existing Overbrook Rd).
Existing Property	High density residential and commercial on all sides of crossing.
Cost-Benefit (Preliminary)	None identified – high volume, urban roadway.

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	- North Boulevard, grade separated ~.5 miles (rail) and ~1 mile (roadway) upstream. Recently has been rehabilitated. - N Lombardy St, grade separated ~.5 miles (rail) and ~1 mile (roadway) downstream.
Accessibility	High volume minor arterial roadway providing through access.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Location not feasible for median separation treatment due to existing medians.
Four Quad Gates could improve existing safety treatment.
Existing median adjacent to tracks are very short, which could preclude alternate crossing safety treatments (such as split gates with median separation).

Total Bus Trips Using Crossing (Daily):	1	**Crossing Used by Public Transit? (Yes / No)**	No

Summary of Considerations for Decision-Making

Grade Separate	Not needed since Boulevard bridge rehabilitation.
Eliminate / Consolidate	Connectivity to network as a minor arterial roadway.
Add Quad Gates	Not feasible due to crossing geometry.
Add Median Separator	Existing medians, but are short – current length presents potential safety issue.
Other	

Crossing Name: BROOK ROAD **Line / Crossing Number: S LI NE / 623522U**
Jurisdiction: Richmond **Current Warning Device: Gates (Non-Quad)***

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
8,222	9,437	11,867	21	52	52

General Description of Crossing: Minor arterial roadway, 4 lanes – divided/median separated. Urban area – mainly dense commercial / industrial, in direct proximity to I-64 and US Rt 1 interchange.

Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	No thresholds exceeded.
Traffic / Operations	High volume (> 10k) roadway by 2045. The Chamberlayne Ave / US Rt 1 grade separated crossing is only 372′ to the east and includes an on-ramp on the track side as well as a high tension power line tower. ***Current Gate Warning Device is Gates with Median Separation.**
General Description of Major Environmental	None identified.
Safety/Geometric Deficiencies	With the restrictive curve speed here (30 mph track speed), from a safety standpoint, there will not be a noticeable impact here as trains will continue to go their current speeds even with the other improvements on the corridor.
Engineering	Not feasible due to elevation profile issues and location.
Existing Property	I-64 / US Rt 1 interchange south / west of crossing. Mainly dense commercial / industrial properties north / east of crossing.
Cost-Benefit (Preliminary)	None identified – high volume roadway in an urban area.

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	- N Lombardy St, grade separated ~.5 miles (rail) and ~1 miles (roadway) upstream. - Rte 301 / Rte 1 NB / Chamberlayne Ave / N Belvidere St, grade separated ~.1 miles (rail) and ~.2 miles (roadway) downstream.
Accessibility	High volume minor arterial roadway providing through movement to Chamberlyne Parkway.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Location not feasible (with current cross section) for median separator due proximity of access points within 100 ft of crossing, both sides.
Four Quad Gates could improve existing safety treatment.

Total Bus Trips Using Crossing (Daily):	6	**Crossing Used by Public Transit? (Yes / No)**	No

Summary of Considerations for Decision-Making

Grade Separate	Not feasible due to elevation profile issues and location.
Eliminate / Consolidate	Connectivity to network as a minor arterial roadway.
Add Quad Gates	Existing medians on both approaches to the crossing.
Add Median Separator	Median tubes for additional safety and short median added to north side.
Other	

Crossing Name: ST JAMES STREET
Jurisdiction: Richmond

Line / Crossing Number: S LINE / 623525P
Current Warning Device: Gates (Non-Quad)

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
995	1,142	1,436	21	52	52

General Description of Crossing: Local roadway, 2 lanes. Urban areas to north and south, while crossing is mainly undeveloped with dense residential to south and north. St James Street is a north-south roadway that connects to residential grid networks on both sides of the crossing.

Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	No thresholds exceeded.
Traffic / Operations	Mid volume roadway through 2045.
General Description of Major Environmental	Potential wetlands in undeveloped areas. Cemetery on north side within 1k ft of crossing.
Safety/Geometric Deficiencies	None identified
Engineering	Feasible.
Existing Property	Undeveloped north / west. Commercial / industrial large property north / east. Dense residential properties on the south side of crossing.
Cost-Benefit (Preliminary)	Cost-benefit considerations – low volume, local roadway.

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	- Rte 301 / Rte 1 NB / Chamberlayne Ave / N Belvidere St and Chamberlyne Pkwy crossings, grade separated ~.5 miles (rail) and ~1-2 miles (roadway) upstream. - N 1st Street, grade separated ~.1 miles (rail) and ~.5 miles (roadway) downstream.
Accessibility	Mid volume through local roadway.

Feasibility Considerations Related to Rail Crossing Safety Treatments

No access points within 100 ft of crossing on either side – feasible for median separation treatment.
Four Quad Gates could improve existing safety treatment.

Total Bus Trips Using Crossing (Daily):	31	**Crossing Used by Public Transit? (Yes / No)**	No

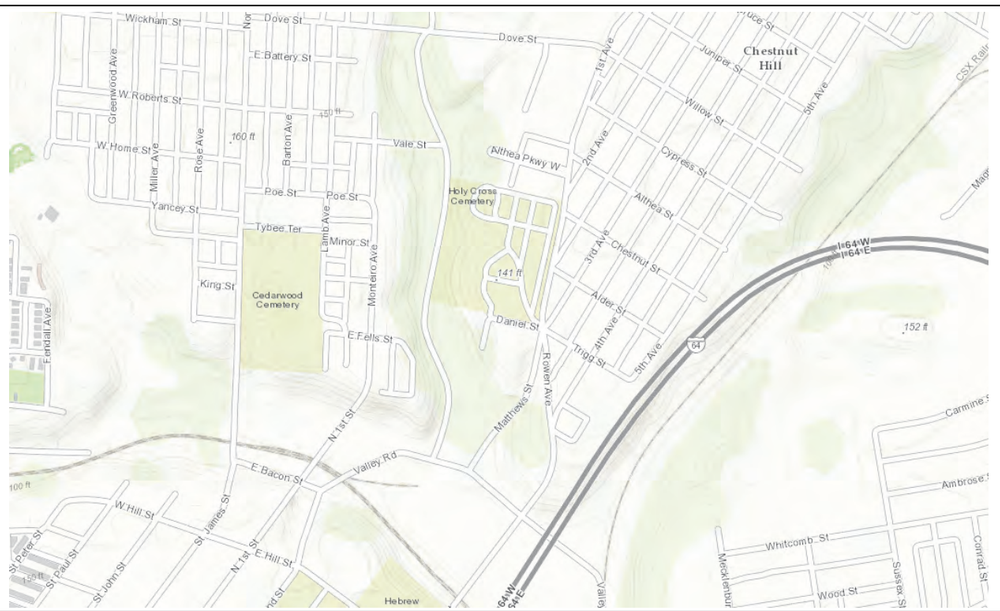
Summary of Considerations for Decision-Making

Grade Separate	Cost-benefit considerations and close proximity to existing 1st Street grade separated crossing.
Eliminate / Consolidate	Could eliminate this crossing / consolidate with existing grade-separated crossing at N 1st Street. Traffic could utilize existing roadway grid network north and south of the crossing to access N 1st Street.
Add Quad Gates	
Add Median Separator	No access points within 100ft of crossing.
Other	

Crossing Name: N 2ND STREET / VALLEY ROAD **Line / Crossing Number: S LINE / 623527D**
Jurisdiction: Richmond **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
2,132	2,447	3,077	21	52	52

General Description of Crossing: Local roadway, 2 lanes. Urban – dense residential areas on both sides of crossing, but commercial / industrial at crossing location between the two adjacent grade separated crossings of N 1st Street and N 5th Road.



Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	No thresholds exceeded.
Traffic / Operations	Mid-volume roadway through 2045. Serves industrial area – high percentage of truck traffic.
General Description of Major Environmental	Cemeteries on both sides of crossing within ~1k feet. Potential wetlands in undeveloped areas.
Safety/Geometric Deficiencies	Minimal striping on crossing roadway. Limited roadway sight distance at crossing due to curve.
Engineering	Feasible, with impacts to residential and existing industrial.
Existing Property	Industrial /commercial area located directly north of the crossing. Dense residential within ~1k ft south of the crossing.
Cost-Benefit (Preliminary)	Cost-benefit considerations as a mid-volume roadway directly adjacent to two existing grade-separated crossings.

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	- N 1st St, grade separated ~.1 mile (rail) and ~0.5-1 mile (roadway) upstream. - N 5th Street, grade separated ~.2 miles (rail) and ~2 miles (roadway) downstream.
Accessibility	Local roadway serving traffic through a commercial / industrial area to residential areas on both sides of crossing.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Location not feasible for median separator due proximity of access points within 100 ft of crossing, both sides.
Four Quad Gates could improve existing safety treatment.

Total Bus Trips Using Crossing (Daily):	12	**Crossing Used by Public Transit? (Yes / No)**	No

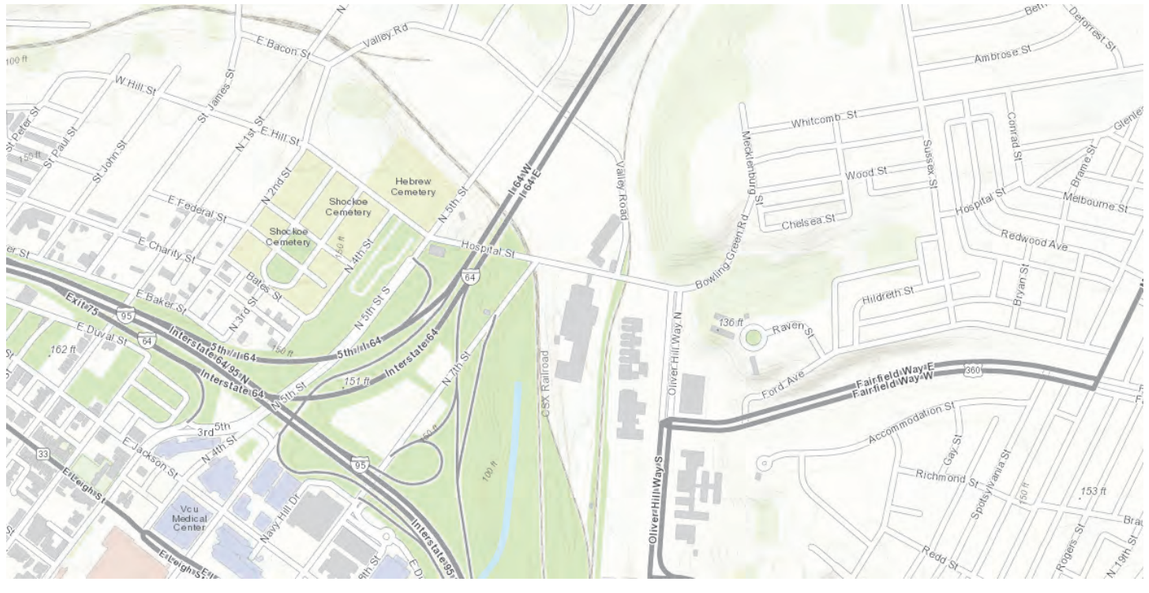
Summary of Considerations for Decision-Making

Grade Separate	Cost-benefit considerations and proximity / connectivity to two grade separated crossings.
Eliminate / Consolidate	Could eliminate this crossing / consolidate with adjacent grade separated crossings at N 1st St and N 5th St. Industrial access maintained via existing Valley Rd to Hospital St crossing Traffic could utilize existing street grid network north and south of crossing to access either of the existing grade separated crossing.
Add Quad Gates	Could improve existing safety treatment.
Add Median Separator	Proximity of driveway access along crossing road.
Other	Potential alternative access on north side of crossing could provide more direct access to industrial/commercial area.

Crossing Name: HOSPITAL STREET / N 7TH STREET **Line / Crossing Number: S LINE / 623530L**
Jurisdiction: Richmond **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
5,786	6,641	8,351	21	52	52

General Description of Crossing: Minor arterial roadway, 2 lanes. Urban – large commercial / industrial properties at crossing, though Hospital street connects to residential areas. I-64 overpass Hospital Street within approximately 300 ft of crossing.



Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	No thresholds exceeded.
Traffic / Operations	High volume (> 5k) roadway through 2045. N 7th Street forms a 3-legged intersection at the exact railway crossing.
General Description of Major Environmental	Likelihood of hazardous materials issues associated with existing property at crossing. Cemeteries within ~1k ft on west side of crossing.
Safety/Geometric Deficiencies	Minimal striping on crossing roadway. Intersection operations with N 7th Street and commercial / industrial access within a few feet of crossing. Crossing located on a restricted speed curve for the track.
Engineering	Feasible with potential engineering challenges – new grade separation structure would require shifting existing truck gate to the north end of the yard, and shift the driveway for the Shockoe Commerce Centre to the east.
Existing Property	Large commercial / industrial east of crossing. I-64 overpass directly west of crossing. Hazmat facility nearby.
Cost-Benefit (Preliminary)	None identified if feasible – high volume minor arterial roadway.

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	- N 5th Street, grade separated ~.2 miles (rail) and ~2 miles (roadway) upstream. - Rt 33 / Leigh St, grade separated ~.5 miles (rail) and ~2 miles (roadway) upstream.
Accessibility	Higher volume minor arterial roadway providing east-west through connectivity to residential areas on either side of the interstate highways.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Location is not feasible for median separation due to proximity of multiple access points within 100 ft of crossing.
Four Quad Gates could improve existing safety treatment – could need to consider realigning 7th Street away from the crossing to improve geometrics and be able to do quad gates.

Total Bus Trips Using Crossing (Daily):	0	**Crossing Used by Public Transit? (Yes / No)**	No

Summary of Considerations for Decision-Making

Grade Separate	Feasible with potential engineering challenges.
Eliminate / Consolidate	Volumes and connectivity as a minor arterial roadway and lack of alternate equivalent crossing roadways.
Add Quad Gates	Could improve existing safety treatment, if 7th street is realigned to the west.
Add Median Separator	Proximity of driveway access along crossing road.
Other	As part of quad gates, would require fixing geometry to include potential shift of 7th Street intersection (would need to check traffic operations).

Crossing Name: MAURY STREET **Line / Crossing Number: S LINE / 623539X**
Jurisdiction: Richmond **Current Warning Device: Flashing Lights**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
2,577	2,957	3,719	21	44	44

General Description of Crossing: Local roadway, 2 lanes. Urban. Maury Street provides sole access to an industrial area that is located on the east side of I-95, which Maury Street underpasses directly east of the crossing.

Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	No thresholds exceeded.
Traffic / Operations	Mid-volume roadway through 2045. High percentage truck traffic (access to industrial area). I-95 located east of crossing, but not directly accessible via Maury Street.
General Description of Major Environmental	Manchester Warehouse & Industrial Historic District is located along Maury St, west of crossing.
Safety/Geometric Deficiencies	None identified.
Engineering	Feasible.
Existing Property	Large industrial / warehouse properties west side of crossing and south / east side of crossing. Open fields north / east side of crossing.
Cost-Benefit (Preliminary)	Cost benefit considerations – mid-volume roadway that primarily serves industrial access.

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	- None upstream on same side of river. - I-95 Maury Street Ramp, grade separated immediately adjacent, but does not access the Maury Rd surface street network
Accessibility	Crossing provides sole access into an industrial area on the east side of I-95.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Median separators not feasible due use of roadway network by larger vehicles (larger turning radius, etc).
Four Quad Gates could improve existing safety treatment.

Total Bus Trips Using Crossing (Daily):	76	**Crossing Used by Public Transit? (Yes / No)**	No

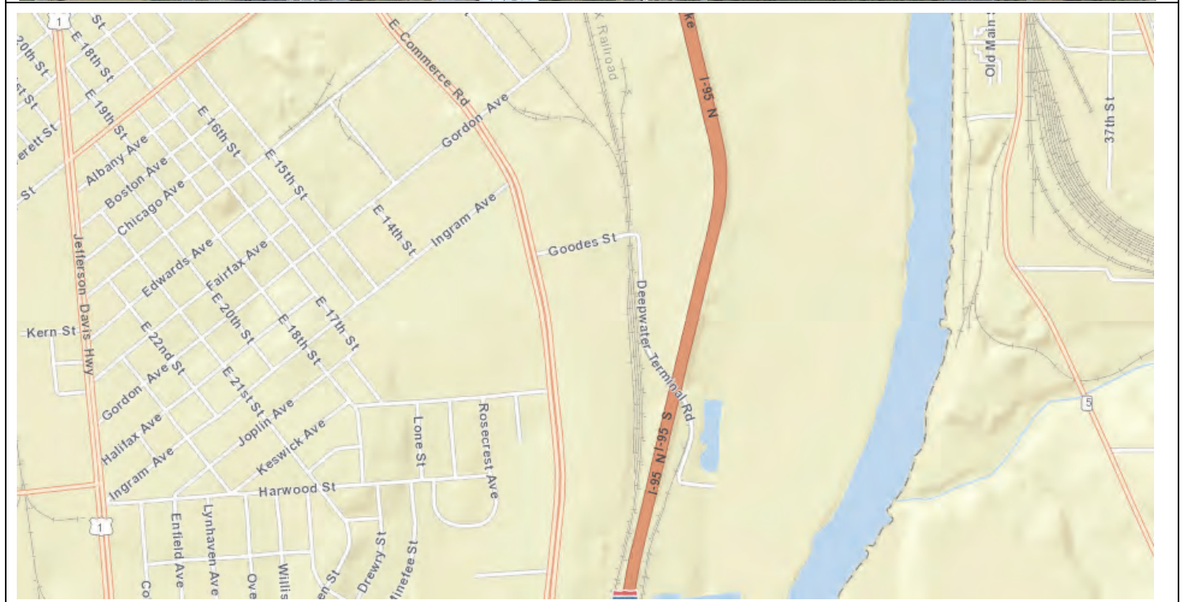
Summary of Considerations for Decision-Making

Grade Separate	Cost-benefit considerations.
Eliminate / Consolidate	Sole access to industrial area.
Add Quad Gates	Could improve existing safety treatment.
Add Median Separator	Use of roadway network by large vehicles.
Other	Grade separation could be implemented as a part of R2R.

Crossing Name: GOODES STREET **Line / Crossing Number: S LINE / 623543M**
Jurisdiction: Richmond **Current Warning Device: None**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
203	233	293	21	44	44

General Description of Crossing: Local roadway, 2 lanes. Rural. Goodes Street provides the sole access from Commerce Road to a commercial / industrial area located on the east side of I-95 (Goodes Street underpass I-95 east of crossing).



Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	No thresholds exceeded.
Traffic / Operations	Low volume roadway through 2045. High percentage truck traffic (access to commercial / industrial area). I-95 located east of crossing, but not directly accessible via Goodes Street. Goodes Street has a 90-degree bend within ~50 ft of crossing, east side.
General Description of Major Environmental	Potential wetlands in undeveloped areas.
Safety/Geometric Deficiencies	Minimal striping on crossing roadway.
Engineering	Feasible, with access impacts to industrial / commercial area west of crossing.
Existing Property	Undeveloped on east side of crossing. Large industrial / commercial properties on west side of crossing.
Cost-Benefit (Preliminary)	Cost benefit considerations – low volume roadway that primarily serves industrial access.

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	- I-95 Maury Street Ramp, grade separated immediately upstream, but does not access the Maury Rd surface street network - E Commerce Street, at-grade ~1 mile (rail) and ~1.5 miles (roadway, west side only) downstream.
Accessibility	Crossing provides sole access into a commercial / industrial area on the east side of I-95.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Location not feasible for median separator treatment due to crossing geometrics.
Four Quad Gates could improve existing safety treatment (with realignment of existing roadway).

Total Bus Trips Using Crossing (Daily):	32	**Crossing Used by Public Transit? (Yes / No)**	No

Summary of Considerations for Decision-Making

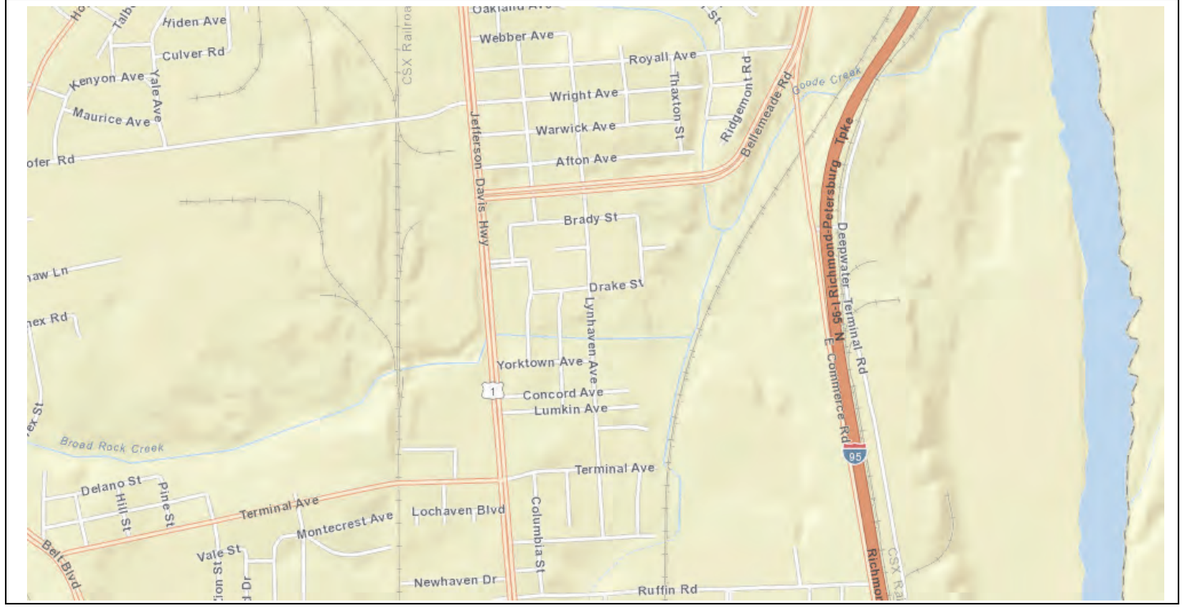
Grade Separate	Cost-benefit considerations.
Eliminate / Consolidate	Sole access to commercial / industrial area.
Add Quad Gates	Could improve existing safety treatment with the realignment of road to the south due to proximity of flood gates.
Add Median Separator	Use of roadway network by large vehicles and intersection geometrics.
Other	Grade separation could be implemented as a part of R2R.

Crossing Name: E COMMERCE ROAD
Jurisdiction: Richmond

Line / Crossing Number: S LINE / 623545B
Current Warning Device: Gates (Non-Quad)

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
4,263	4,893	6,153	21	44	44

General Description of Crossing: Minor arterial roadway, 2 lanes, with significant skew at crossing. Urban. E Commerce Road is the primary access point to the north side of the large industrial region that is located just south of this crossing.



Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	No thresholds exceeded.
Traffic / Operations	High volume (>5k) roadway by 2045. I-95 located directly east of crossing roadway, but no direct access.
General Description of Major Environmental	Potential stream / wetlands in undeveloped area.
Safety/Geometric Deficiencies	Minimal striping along crossing roadway, significant skew.
Engineering	Feasible. New grade separation structure could require consideration of existing industrial / commercial driveways.
Existing Property	Undeveloped and mixed industrial / commercial in immediate vicinity of crossing.
Cost-Benefit (Preliminary)	Maintenance of existing 3 track crossing surface with significant skew will be problematic long term for both VDOT and CSX, so grade separation is advisable.

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	- Goodes St, at-grade ~1 mile (rail) and ~1.5 miles (roadway, west side only) upstream. - Ruffin Rd, at-grade ~1 mile (rail) and 1.5 miles (roadway) downstream.
Accessibility	Primary access point to north side of large industrial region.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Four Quad Gates not feasible with existing roadway skew.
Location is feasible for median separation treatment.

Total Bus Trips Using Crossing (Daily):	16	**Crossing Used by Public Transit? (Yes / No)**	No

Summary of Considerations for Decision-Making

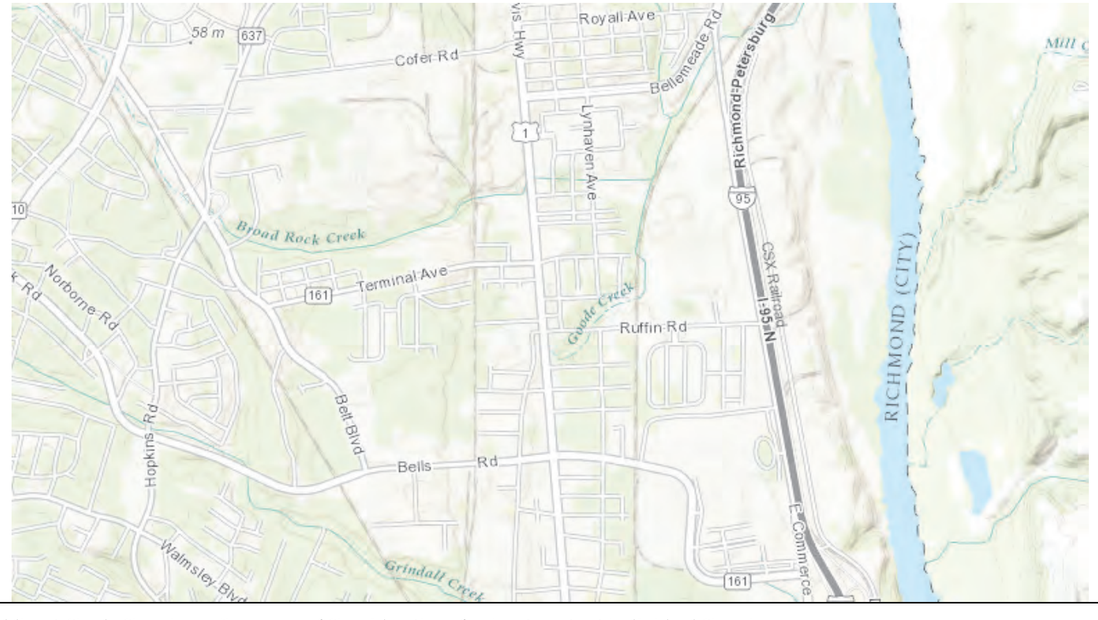
Grade Separate	Feasible, high volume and minimal impacts.
Eliminate / Consolidate	Northern-most access to areas north of the industrial area.
Add Quad Gates	Skewed crossing would significantly increase track circuit and clearance distance.
Add Median Separator	Feasible for median separation treatment.
Other	

Crossing Name: RUFFIN ROAD
Jurisdiction: Richmond

Line / Crossing Number: S LINE / 623547P
Current Warning Device: Gates (Non-Quad)

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
1,827	2,097	2,637	21	44	44

General Description of Crossing: Major collector roadway, 2 lanes. Urban – dense residential communities and industry. It is approximately ½ mile in total length, and connects Commerce Rd to the east and US Rt 1 to the west. Community center is located on east side of crossing. Public transit utilizes the crossing. Parallel parking along the crossing roadway.



Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	No thresholds exceeded.
Traffic / Operations	Mid-volume roadway through 2045.
General Description of Major Environmental	Recreational fields on north side of roadway, east side of crossing.
Safety/Geometric Deficiencies	Parallel parking along crossing roadway.
Engineering	Feasible.
Existing Property	Dense residential on west side of crossing. Industrial / commercial on north / west side of crossing. Mixed commercial / residential on south / west side.
Cost-Benefit (Preliminary)	Cost-benefit considerations – mid-volume roadway, and both upstream and downstream crossings are proposed to be grade separated as part of this project.

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	- E Commerce St, at-grade ~1 mile (rail) and 1.5 miles (roadway) upstream. - Bells Rd, at-grade ~.5 miles (rail) and 1-2 miles (roadway) downstream.
Accessibility	Major collector roadway, through crossing.

Feasibility Considerations Related to Rail Crossing Safety Treatments

No paved access points within 100 ft of crossing on either side – feasible for median separator treatment.
Four Quad Gates could improve existing safety treatment.

Total Bus Trips Using Crossing (Daily):	8	**Crossing Used by Public Transit? (Yes / No)**	Yes

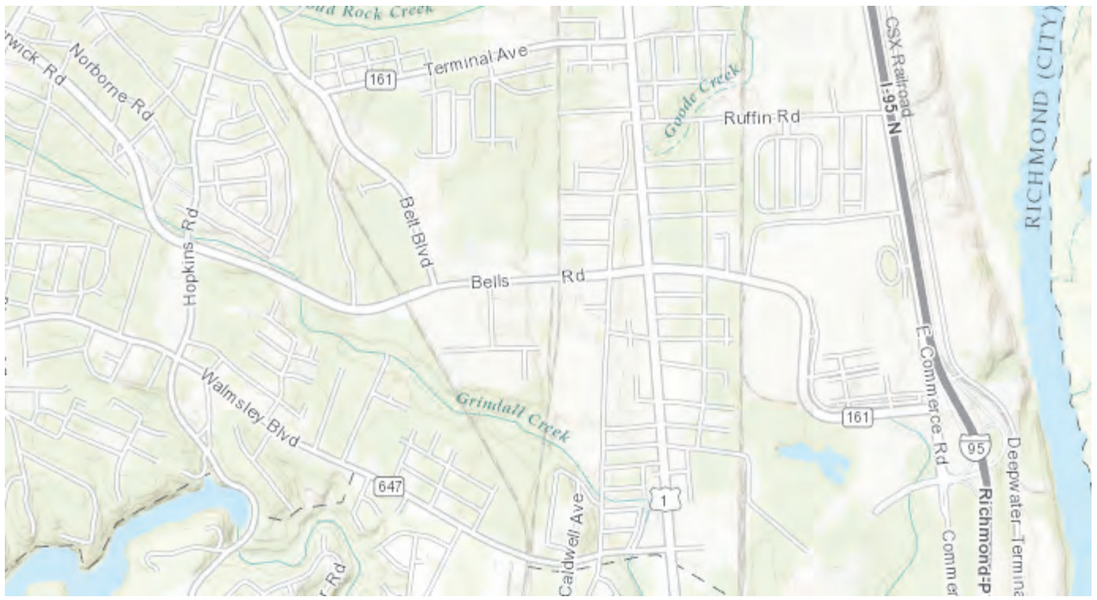
Summary of Considerations for Decision-Making

Grade Separate	Cost-benefit considerations.
Eliminate / Consolidate	Not feasible due to public transit use, proximity to community center.
Add Quad Gates	Could improve existing safety conditions.
Add Median Separator	Feasible. Could reduce the length of crossing circuit approaches and the volume of false activations.
Other	Grade separation, roadway underpass, could be implemented as a part of R2R.

Crossing Name: BELLS ROAD **Line / Crossing Number: S LINE / 623548W**
Jurisdiction: Richmond **Current Warning Device: Gates (Non-Quad)***

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
8,932	10,252	12,892	21	44	44

General Description of Crossing: Minor arterial roadway, 4 lanes. Urban – high density residential to the west of the crossing, and along Bells Rd, industrial / commercial area to the east of the crossing. Bells Rd is median separated (raised grassed medians, broken by turning lanes). It connects Commerce Rd to the east and US Rt 1 and beyond to the west.



Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	No thresholds exceeded.
Traffic / Operations	High volume (> 10k) roadway by 2025. High truck volumes serving industrial area. ***Current Warning Device is Gates with Median Separation.**
General Description of Major Environmental	None identified.
Safety/Geometric Deficiencies	None identified.
Engineering	Feasible.
Existing Property	High density residential on west side of crossing. Industrial / commercial on east side of crossing.
Cost-Benefit (Preliminary)	None identified (high volume minor arterial roadway in an urban area).

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	- Ruffin Rd, at-grade ~.5 miles (rail) and 1-2 miles (roadway) upstream. - Dale Ave, at-grade ~.5 miles (rail) and ~1 mile (roadway, west side) or ~1.5 miles (roadway, east side via Trenton Ave) downstream.
Accessibility	Through roadway – minor arterial roadway with good connectivity to network.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Location not feasible for additional median separator treatment due to existing median and industrial access on east side of crossing.
Extending the existing 12 ft medians could increase the existing safety treatment – need to adjust the entrance to Phillip Morris to the east.

Total Bus Trips Using Crossing (Daily):	0	**Crossing Used by Public Transit? (Yes / No)**	No

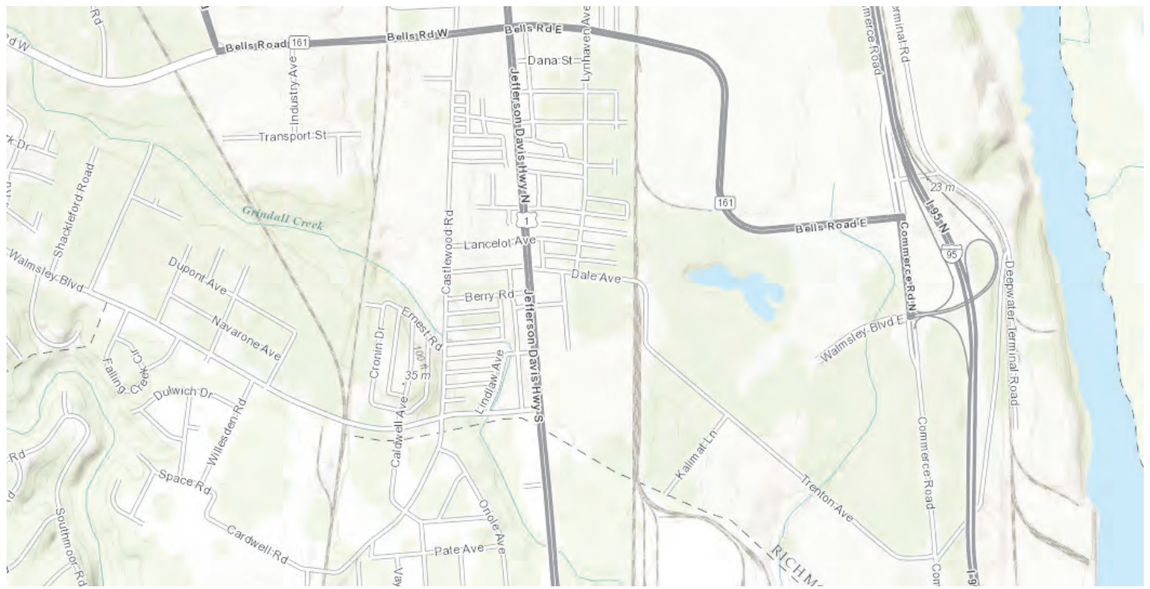
Summary of Considerations for Decision-Making

Grade Separate	Cost-benefit considerations.
Eliminate / Consolidate	Importance / connectivity to network as a high volume minor arterial roadway.
Add Quad Gates	
Add Median Separator	Extend existing 12 ft medians and adjust entrance to Phillip Morris to the east
Other	

Crossing Name: DALE AVENUE / TRENTON AVENUE **Line / Crossing Number: S LINE / 623549D**
Jurisdiction: Richmond **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
275	315	396	21	44	44

General Description of Crossing: Local roadway, 2 lanes. Rural. Dale Avenue is used as a short cut connector roadway by local vehicles. Directly east of crossing, Dale Ave has a 90-degree turn and becomes Trenton Ave and provides access to the industrial / commercial area that connects to Commerce Rd.



Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	No thresholds exceeded.
Traffic / Operations	Low volume roadway through 2045.
General Description of Major Environmental	Potential wetlands in undeveloped areas.
Safety/Geometric Deficiencies	Minimal striping on crossing roadway. Very limited sight distance / pavement width at crossing.
Engineering	Feasible.
Existing Property	Undeveloped / no structures on east side of crossing. Residential in north / west quadrant. Undeveloped / no structures in south / west quadrant.
Cost-Benefit (Preliminary)	Cost-benefit considerations – low volume, local, rural roadway.

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	- Bells Rd, at-grade ~.5 miles (rail) and ~1 mile (roadway, west side) or ~1.5 miles (roadway, east side via Trenton Ave) upstream. - Cogbill Rd, grade separated ~1 mile (rail) and ~1.5 miles (roadway, west side only) downstream.
Accessibility	Low connectivity to network – roadway is a short connector roadway.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Location is not feasible for median separation due to geometrics / turning radius of roadway across crossing.
Four Quad Gates could increase the existing safety treatment.

Total Bus Trips Using Crossing (Daily):	1	**Crossing Used by Public Transit? (Yes / No)**	No

Summary of Considerations for Decision-Making

Grade Separate	Cost-benefit considerations.
Eliminate / Consolidate	Could eliminate this crossing / consolidate with Bells Road crossing (proposed to be grade separated) to the north. Traffic could utilize existing roadway network to access Bells Road crossing. To the west, Castlewood Road provides access to Bells Rd. Traffic access the commercial / industrial area on Trenton Ave could utilize Commerce Rd from the Bells Rd crossing.
Add Quad Gates	Could improve existing safety treatment.
Add Median Separator	Roadway geometrics.
Other	Closure could be implemented as a part of R2R.

Crossing Name: KINGSLAND ROAD **Line / Crossing Number: S LINE / 623559J**
Jurisdiction: Chesterfield County **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
2,030	2,330	2,930	21	44	44

General Description of Crossing: Major collector roadway, 2 lanes. Urban. Kingsland Road is approximately 4 miles in total length and crosses both the A and S Lines. In this vicinity of this crossing, it provides east-west access through residential area to connect traffic to US Rt 1 less than ½ mile east of crossing.

Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	No thresholds exceeded.
Traffic / Operations	Mid-volume roadway through 2045. Kingsland Road terminates in a T-intersection (with Chester Rd) within ~100 ft of crossing, east side.
General Description of Major Environmental	Potential wetlands in undeveloped areas.
Safety/Geometric Deficiencies	Limited site distance / intersection operations at crossing.
Engineering	Feasible, but a new grade separation structure could require elevating the existing intersection with Chester Rd and realignment of Perrymont Rd.
Existing Property	Mixed residential / undeveloped (no structures) in vicinity of crossing. US Rt 1 is less than ½ mile to the east of the crossing.
Cost-Benefit (Preliminary)	Cost-benefit considerations – mid-volume roadway.

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	- Rt 1, grade separated ~.3 miles (rail) and ~.5 miles (roadway, west side only) upstream. - Brinkley Rd, at-grade ~.7 miles (rail) and ~1 mile (roadway) downstream.
Accessibility	Through roadway that connects residential areas to Rt 1.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Location not feasible for median separator treatment (with existing cross section) due to T-intersection in proximity to crossing.
Four Quad Gates could improve the safety treatment of the crossing.

Total Bus Trips Using Crossing (Daily):	16	**Crossing Used by Public Transit? (Yes / No)**	No

Summary of Considerations for Decision-Making

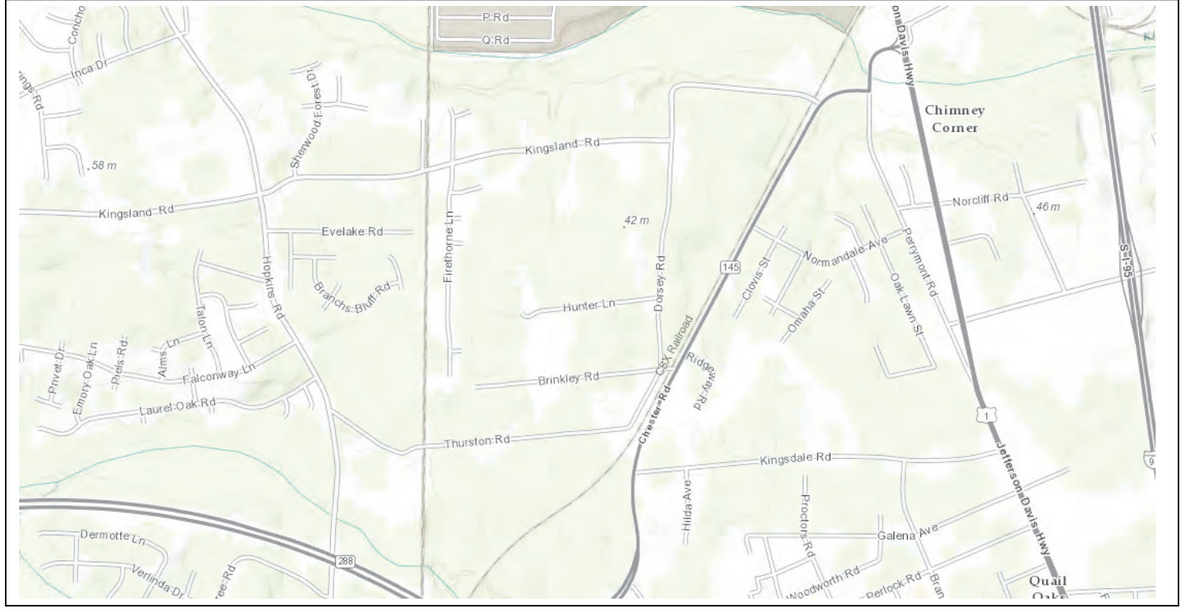
Grade Separate	Cost-benefit considerations.
Eliminate / Consolidate	Connectivity to network as a mid-volume major collector roadway with lack of adjacent crossings.
Add Quad Gates	Could improve existing safety treatment.
Add Median Separator	Proximity to T-intersection.
Other	R2R project could close Kingsland Rd / Brinkley Rd, realign Chester Rd and add a new grade separated crossing.

Crossing Name: BRINKLEY ROAD
Jurisdiction: Chesterfield County

Line / Crossing Number: S LINE / 623660H
Current Warning Device: Gates (Non-Quad)

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
1,827	2,097	2,637	21	44	44

General Description of Crossing: Local roadway, 2 lanes. Rural. Brinkley Road dead-ends, to the west, in a residential area. The Brinkley Road crossing provides connection from Thurston Rd / Dorsey Rd, the intersection with which is located within 150 ft west of crossing. East of crossing, Brinkley Rd T-intersects Chester Rd within 50 ft of crossing.



Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	No thresholds exceeded.
Traffic / Operations	Mid-volume roadway through 2045. Intersections with north-south roadways directly on either side of crossing.
General Description of Major Environmental	None identified.
Safety/Geometric Deficiencies	Minimal striping on crossing roadway. Intersection operations in close proximity to crossing with north-south roadways on both sides – with limited sight distance.
Engineering	Feasible, but a new grade separation structure would require elevating the existing intersection with Chester Rd (east side) and Dorsey Rd (west side).
Existing Property	Undeveloped / low density residential in vicinity of crossing.
Cost-Benefit (Preliminary)	Cost-benefit considerations (mid-volume, rural roadway).

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	- Kingsland Rd, at-grade ~.7 miles (rail) and ~1 mile (roadway) upstream. - Old Ln, at-grade ~1 mile (rail) and ~1.5 miles (roadway, west side only) downstream.
Accessibility	Provides local residential traffic access between Dorsey Rd and Chester Rd, both of which connect to alternate railroad crossing roadways.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Location not feasible for median separator treatment due to intersections in proximity to crossing on both sides and narrow width of roadway.
Four Quad Gates could improve the safety treatment of the crossing – would require improvements to the roadway intersections with Dorsey Rd and Chester Rd.

Total Bus Trips Using Crossing (Daily):	2	**Crossing Used by Public Transit? (Yes / No)**	No

Summary of Considerations for Decision-Making

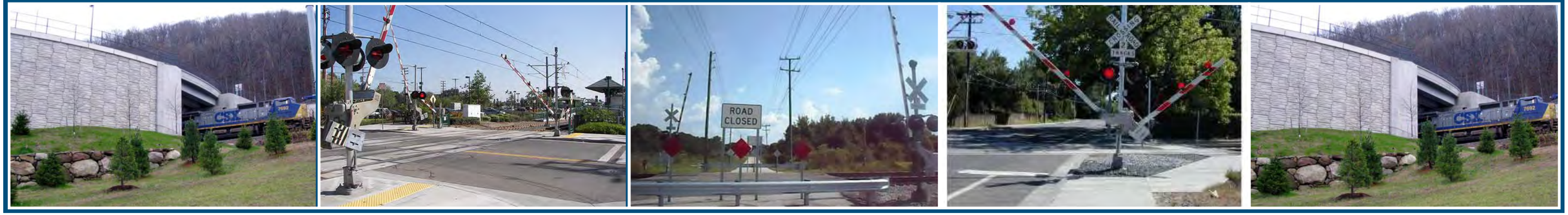
Grade Separate	Cost benefit considerations.
Eliminate / Consolidate	Could eliminate this crossing / consolidate with improvements at Kingsland Rd crossing (north). Traffic could utilize the existing parallel roadways (Dorsey Rd on the west side of the railroad and Chester Rd on the east side of the railroad) to access the crossing at Kingsland Rd.
Add Quad Gates	Could improve existing safety treatment.
Add Median Separator	Intersection geometrics.
Other	

May 1, 2016

DC TO RICHMOND
SOUTHEAST HIGH SPEED RAIL

Proposed Actions at Individual Grade Crossings

Public At-Grade Crossings



DRPT
Virginia Department of Rail and Public Transportation

U.S. Department of Transportation
Federal Railroad Administration

The purpose of this document is provide record of the screening process and resulting proposed actions for the public at-grade crossings.

The DC2RVA emerging high-speed rail corridor must be a sealed corridor – defined as all crossings must be grade separated or have appropriate crossing treatments that do not allow vehicles to cross the tracks when the warning device gates are activated. Accordingly, the proposed action for each DC2RVA existing public at-grade crossing is one of the following:

- Grade Separate
- Closure / Consolidation
- Four Quad Gates
- Median Treatment
- Other Treatment
- No Action

"Median Treatment" is defined as either raised medians (new or extension of existing raised medians, with or without addition of median tubes) or median separator treatment. Note that median treatment is considered before four quad gate treatment based on their lower overall costs.

For a crossing closure, a new reasonable diversion route is defined as construction of 1 mile or less of a new connecting roadway. If closure is determined not feasible based on roadway connectivity considerations (i.e., requiring construction of over 1 mile of connecting roads), rerouting traffic to a new connecting roadway is also considered not feasible.

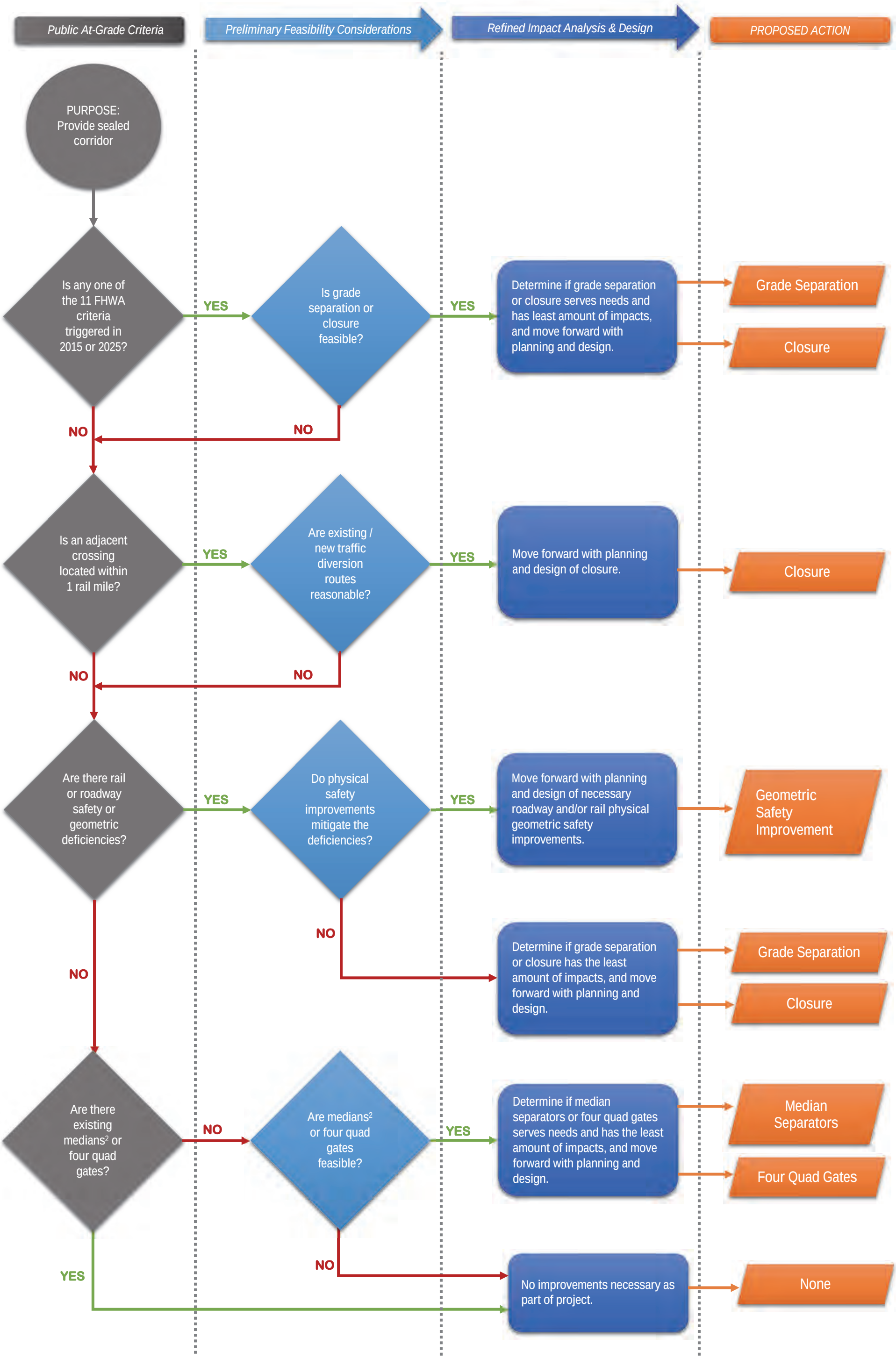
For some crossing, a secondary proposed action is shown. The secondary action is proposed in the event that the initial proposed action is determined to be infeasible.

Note that No Action does not preclude any modifications / improvements that may be necessary to accommodate the installation of the 3rd track (such as relocation of gates, etc).

A flow-chart that depicts the screening criteria and subsequent process is presented on the next page (page 2). This chart was prepared to illustrate and summarize the general logic that was used in identifying proposed actions for improvements at public grade crossings, as described further in the text of this report. This logic is being used to guide the process and is not intended to be rigidly prescriptive.

The proposed actions resulting from this analysis represent the most likely scenario at this time and are thus being used for purposes of assessing potential environmental impacts; final actions will be determined based on detailed engineering analyses, design considerations, and coordination with local governments, communities, and other stakeholders.

The remainder of this document begins with a summary table of the proposed action for each public at-grade crossing, followed by a half-page for each crossing that summarizes the steps through the flow-chart logic to get to the final proposed action.



1: A new reasonable diversion route is defined as construction of 1 mile or less of a connecting roadway.

2: Medians are defined as either raised medians or median separator treatments.

This chart was prepared to illustrate and summarize the general logic that was used in identifying proposed actions for improvements at public grade crossings, as described further in the text of this report. This logic is being used to guide the process and is not intended to be rigidly prescriptive. The proposed actions resulting from this analysis represent the most likely scenario at this time and are thus being used for purposes of assessing potential environmental impacts; final actions will be determined based on detailed engineering analyses, design considerations, and coordination with local governments, communities, and other stakeholders.

Crossing Number	Crossing Name *(North to South, by Rail Line)*	Location	Rail Line	AADT			Total # of Daily Trains			Triggered Crossings *(Any Criteria)*			PROPOSED ACTION:					
				2015	2025	2045	2015	2025	2045	2015	2025	2045	GRADE SEPARATE	CLOSURE	FOUR QUAD GATES	MEDIAN TREATMENT	NO ACTION	OTHER
860600A	Featherstone Road	Prince William County	RF&P	10,150	11,650	14,650	56	82	124	--	--	X			*(existing)*		X	
860605J	Potomac Avenue	Prince William County	RF&P	7,105	8,155	10,255	56	82	124	--	--	X			X			
860581X	Brent Point Road	Stafford County	RF&P	538	618	777	56	82	124	X	X	X			X			X
860578P	Mount Hope Church Road	Stafford County	RF&P	214	245	308	56	82	124	X	X	X		X				X
860558D	Landsdowne Road	Fredericksburg City	RF&P	8,729	10,019	12,599	58	84	126	X	X	X	X					
860557W	Mine Road	Spotsylvania County	RF&P	5,177	5,942	7,472	58	84	126	--	--	X			X			
860548X	Summit Crossing Road	Spotsylvania County	RF&P	406	466	586	58	84	126	X	X	X			X			
860547R	Claiborne Crossing Road	Caroline County	RF&P	478	548	689	41	65	79	--	X	X				X		
860545C	Stonewall Jackson Road	Caroline County	RF&P	1,929	2,214	2,784	41	65	79	--	X	X			X			
860542G	Woodford Road	Caroline County	RF&P	386	443	557	41	65	79	--	X	X			X			
860541A	Woodslane Road	Caroline County	RF&P	102	117	147	41	65	79	--	X	X				X		
860539Y	Paige Road	Caroline County	RF&P	478	548	689	41	65	79	--	X	X				X		
860527E	Penola Road	Caroline County	RF&P	427	490	616	41	65	79	--	X	X			X			
860525R	Colemans Mill Road	Caroline County	RF&P	447	513	645	41	65	79	--	X	X		X				
860520G	Doswell Road	Hanover County	RF&P	315	362	455	41	65	79	--	X	X			X			X
860513W	W Vaughan Road / Henry Street	Hanover County	RF&P	1,320	1,515	1,905	40	64	78	--	X	X	X					
860512P	W Patrick Street	Hanover County	RF&P	303	348	437	40	64	78	--	--	--		*(Closed w / 3rd Track)*	X			
860462N	College Avenue / Henry Clay Street	Hanover County	RF&P	1,320	1,515	1,905	40	64	78	--	--	--	*(Crossing Closed as part of DC2RVA Station Improvements)*					
860459F	England Street / Thompson Street	Hanover County	RF&P	14,210	16,310	20,510	40	64	78	--	X	X			X			X
860454W	Myrtle Street	Hanover County	RF&P	1,827	2,097	2,637	40	64	78	--	--	--			X			
860450U	E Francis Street	Hanover County	RF&P	1,421	1,631	2,051	40	64	78	--	X	X			X			
860448T	Ashcake Road	Hanover County	RF&P	7,714	8,854	11,134	40	64	78	--	--	--	X					
860447L	Gwathmey Church Road	Hanover County	RF&P	163	187	235	40	64	78	--	X	X			X			
860445X	Elmont Road	Hanover County	RF&P	2,132	2,447	3,077	40	64	78	--	X	X			X			
860443J	Cedar Lane	Hanover County	RF&P	1,929	2,214	2,784	40	64	78	--	X	X			X			
860441V	Mill Road	Henrico County	RF&P	2,741	3,146	3,956	40	64	78	--	--	--				X		
860438M	Mountain Road	Henrico County	RF&P	5,278	6,058	7,618	40	64	78	--	--	X			*(existing)*		X	
860437F	Hungary Road	Henrico County	RF&P	16,240	18,640	23,440	40	64	78	X	X	X	X					
860435S	Hermitage Road	Henrico County	RF&P	4,263	4,893	6,153	40	64	78	--	--	--			X			
623663D	Jahnke Road	Richmond	A-LINE	12,180	13,980	17,580	34	50	64	--	--	X			X			
623664K	Bassett Avenue	Richmond	A-LINE	1,393	1,599	2,010	34	50	64	--	--	--		X				
623668M	Broad Rock Boulevard	Richmond	A-LINE	19,285	22,135	27,835	34	50	64	--	X	X	X					
623670N	Terminal Avenue	Richmond	A-LINE	681	781	982	34	50	64	--	--	--		X				X
623672C	Walmsley Boulevard	Richmond	A-LINE	4,974	5,709	7,179	34	50	64	--	--	--	X					
623678T	Kingsland Road	Chesterfield County	A-LINE	2,132	2,447	3,077	34	50	64	--	--	--				X		
623679A	Thurston Road	Chesterfield County	A-LINE	457	525	660	34	50	64	--	--	--		X				
623680U	Old Lane	Chesterfield County	A-LINE / S-LINE	4,872	5,592	7,032	34	50	64	--	X	X		X				
623518E	Hermitage Road	Richmond	S-LINE	10,150	11,650	14,650	21	35	46	--	--	--				X		
623522U	Brook Road	Richmond	S-LINE	8,222	9,437	11,867	21	35	46	--	--	--				X		
623525P	St James Street	Richmond	S-LINE	995	1,142	1,436	21	35	46	--	--	--		X				X
623527D	N 2nd Street / Valley Road	Richmond	S-LINE	2,132	2,447	3,077	21	35	46	--	--	--		X				
623530L	Hospital Street / N 7th Street	Richmond	S-LINE	5,786	6,641	8,351	21	35	46	--	--	--	X					X
623539X	Maury Street	Richmond	S-LINE	2,577	2,957	3,719	21	35	46	--	--	--			X			
623543M	Goodes Street	Richmond	S-LINE	203	233	293	21	35	46	--	--	--			X			X
623545B	E Commerce Road	Richmond	S-LINE	4,263	4,893	6,153	21	35	46	--	--	--	X					
623547P	Ruffin Road	Richmond	S-LINE	1,827	2,097	2,637	21	35	46	--	--	--				X		
623548W	Bells Road	Richmond	S-LINE	8,932	10,252	12,892	21	35	46	--	--	--				X		
623549D	Dale Avenue / Trenton Avenue	Richmond	S-LINE	275	315	396	21	35	46	--	--	--		X				
623559J	Kingsland Road	Chesterfield County	S-LINE	2,030	2,330	2,930	21	35	46	--	--	--			X			
623660H	Brinkley Road	Chesterfield County	S-LINE	1,827	2,097	2,637	21	35	46	--	--	--		X				
									TOTALS:	*5*	*21*	*26*	*8*	*10 / 12*	*20*	*9*	*2*	*6*

Crossing Name: FEATHERSTONE ROAD — **Line / Crossing Number: RF&P / 860600A**

Jurisdiction: Prince William County — **Current Warning Device: Four Quad Gates**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
10,150	11,650	14,650	56	82	124

General Description of Crossing: Major collector roadway, 2 lanes at crossing with turn lanes before/after, with T intersection of roadway directly east of crossing. Urban area (dense residential to the east, businesses to the west) within ~500 feet of crossing. Provides access to Route 1 to the west. Provides sole access to residential community to the east.

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**No**	*[Triggered in 2045]*
Adjacent Crossing within 1 rail mile?	**No**	*Crossing provides sole access*
Major Safety / Geometric Deficiencies?	**No**	
Existing Four Quad, Medians, or Median Separators?	**Yes**	*Four Quad Gates existing condition*

PROPOSED ACTION:	**NO ACTION**

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are not triggered
- No adjacent crossings located within 1 rail mile; closure not feasible
- No major safety or geometric deficiencies identified; no mitigation necessary
- Existing crossing treatment is Four Quad Gates; no further treatment necessary

Crossing Name: POTOMAC AVENUE — **Line / Crossing Number: RF&P / 860605J**

Jurisdiction: Prince William County — **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
7,105	8,155	10,255	56	82	124

General Description of Crossing: Local roadway, 2 lanes. Urban area – downtown Quantico, directly adjacent to the VRE/Amtrak Station. To the east, the roadway has on-street parking and store fronts. To the west, it connects to residential military housing. Fuller Rd (intersection to the west of crossing) is public access and connects directly to Rt 1 and I-95.

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**No**	*[Triggered in 2045]*
Adjacent Crossing within 1 rail mile?	**No**	*Sole public access to downtown Quantico*
Major Safety / Geometric Deficiencies?	**No**	
Existing Four Quad, Medians, or Median Separators?	**No**	

PROPOSED ACTION:	**FOUR QUAD GATES *(if not installed as part of Arkendale to Powell's Creek project)*, with pedestrian crossing protection**

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are not triggered
- No adjacent crossings located within 1 rail mile; closure not feasible
- No major safety or geometric deficiencies identified; no mitigation necessary
- Existing crossing treatment is gates (non-quad):
  - Median Treatment determined not feasible due to proximity of parking lot and driveway / street access on both sides of crossing
  - Addition of Four Quad Gates determined FEASIBLE

Proposed Action Design Considerations:

- Pedestrian crossing protection needs to be considered as part of Four Quad Gate design improvement.
- Note that this location is part of the Arkendale to Powell's Creek Project, which includes improvements to this crossing.

Crossing Name: BRENT POINT ROAD **Line / Crossing Number: RF&P / 860581X**
Jurisdiction: Stafford County **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	2025	2045	2015	2025	2045
538	618	777	56	82	124

General Description of Crossing: Local roadway, 2 lanes. Rural area (undeveloped). Provides sole access into the widewater peninsula area (east). To the west, it connects into the rural roadway network that provides access to residences east of US Rt 1. Three-legged intersection with Arkendale Rd within ~25 ft of crossing, west side.

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**Yes**	
Adjacent Crossing within 1 rail mile?	**No**	*Provides sole access to the east of crossing*
Major Safety / Geometric Deficiencies?	**Yes**	*Brent Point Rd / Arkendale Rd intersection*
Existing Four Quad, Medians, or Median Separators?	**No**	

PROPOSED ACTION: **FOUR QUAD GATES, with intersection realignment at Brent Point Rd / Arkendale Rd**

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are triggered:
  - Grade separation determined not feasible due to cost-benefit considerations (low volume, local roadway in a rural area)
  - Closure determined not feasible because roadway provides sole access and no alternate crossings or connecting roadways available
- No adjacent crossings located within 1 rail mile; closure not feasible
- Major safety or geometric deficiencies identified: Sight distance of existing intersection alignment / proximity to crossing. Mitigation:
  - Design improvements of at-grade crossing
- Existing treatment is gates (non-quad):
  - Median Treatment determined not feasible due to existing intersection geometrics and driveway access to parking area immediate east of crossing
  - Four Quad Gates determined FEASIBLE

Proposed Action Design Considerations:

- Realignment of Brent Point Rd and Arkendale Rd intersection needs to be part of improvement for safety

Crossing Name: MOUNT HOPE CHURCH ROAD **Line / Crossing Number: RF&P / 860578P**
Jurisdiction: Stafford County **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	2025	2045	2015	2025	2045
214	245	308	56	82	124

General Description of Crossing: Local roadway, 2 lanes. Rural area. Mount Hope Church Road is approximately 1 mile long, beginning at the T intersection on the east side of the crossing with Brooke Rd (Rt 608). It provides sole access to a residential area on the west side of the crossing. VRE Brooke Rd Station is located directly upstream of crossing.

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**Yes**	
Adjacent Crossing within 1 rail mile?	**Yes**	*Andrew Chapel Rd / Brook Rd is ~1/2 mile to the north (grade separated)*
Major Safety / Geometric Deficiencies?	**No**	
Existing Four Quad, Medians, or Median Separators?	**No**	

PROPOSED ACTION: **CLOSURE** *(Secondary: Four Quad Gates)*

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are triggered:
  - Grade separation determined not feasible due to cost-benefit considerations (low volume, local roadway in a rural area)
  - Closure determined FEASIBLE
- Adjacent crossing is located within 1 rail mile; closure determined FEASIBLE
- No major safety or geometric deficiencies identified; no mitigation necessary
- Existing treatment is gates (non-quad):
  - Median Treatment determined not feasible due proximity of existing driveway access and narrow width of roadway
  - Four Quad Gates determined FEASIBLE

Proposed Action Design Considerations:

- Crossing provides sole access to residences to the west; therefore, closure requires construction of a connecting roadway:
  - Construct new connecting roadway to access Andrew Chapel Rd / Brooke Rd to the north
    - Existing roadway underpass
    - Provides direct access to Brooke Rd station

Crossing Name: LANDSDOWNE ROAD
Jurisdiction: Fredericksburg City

Line / Crossing Number: RF&P / 860558D
Current Warning Device: Gates (Non-Quad)

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
8,729	10,019	12,599	58	84	126

General Description of Crossing: Major collector roadway, 2 lanes. Rural area – businesses (no residences) adjacent to crossing. Landsdowne Road runs between Mine Rd/Hood Dr (west) and US 17 (east), thereby serving traffic to I-95 and US Rt 3, respectively. High percentage of truck traffic (access to industrial area).

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**Yes**	
Adjacent Crossing within 1 rail mile?	**No**	
Major Safety / Geometric Deficiencies?	**No**	
Existing Four Quad, Medians, or Median Separators?	**No**	

PROPOSED ACTION:	**GRADE SEPARATION** *(Secondary: Four Quad Gates)*

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are triggered:
  - Grade separation determined FEASIBLE
  - Closure determined not feasible due to high vehicle volumes and connectivity to roadway network, as well as lack of adjacent alternate crossings
- No adjacent crossings located within 1 rail mile; closure not feasible
- No major safety or geometric deficiencies identified; no mitigation necessary
- Existing crossing treatment is gates (non-quad):
  - Median Treatment determined not feasible due to proximity of existing industrial driveway
  - Four Quad Gates determined FEASIBLE

Proposed Action Design Considerations:

- Feasible / few complications preliminarily identified from a geometrics standpoint
- NE corner parcel will be impacted (potential property take or wall to mitigate)
- NW corner parcel parking / access will be impacted

Crossing Name: MINE ROAD
Jurisdiction: Spotsylvania County

Line / Crossing Number: RF&P / 860557W
Current Warning Device: Gates (Non-Quad)

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
5,177	5,942	7,472	58	84	126

General Description of Crossing: Major collector roadway, 2 lanes. Urban area -- residences and commercial buildings and access points on both sides of crossing. To the west, Mine Rd intersects Route 1 within ~0.5 mile of interchange with I-95. To the east, Benchmark Rd (T-intersection with Mine Rd) connects Tidewater Trail (Rt 2) with US Route 17.

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**No**	*[Triggered in 2045.]*
Adjacent Crossing within 1 rail mile?	**No**	
Major Safety / Geometric Deficiencies?	**No**	
Existing Four Quad, Medians, or Median Separators?	**No**	

PROPOSED ACTION:	**FOUR QUAD GATES**

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are not triggered
- No adjacent crossings located within 1 rail mile; closure not feasible
- No major safety or geometric deficiencies identified; no mitigation necessary
- Existing crossing treatment is gates (non-quad):
  - Median Treatment determined not feasible due to existing intersection geometrics (T-intersection directly west of crossing) and proximity of industrial driveway access (large vehicles)
  - Four Quad Gates determined FEASIBLE

Proposed Action Design Considerations:

- Intersection geometrics of T-intersection with Benchmark Rd directly east of crossing will provide limited storage / queuing ability on crossing roadway (i.e., cars will stack on Benchmark Rd during a crossing)

Crossing Name: SUMMIT CROSSING ROAD **Line / Crossing Number: RF&P / 860548X**
Jurisdiction: Spotsylvania County **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	2025	2045	2015	2025	2045
406	466	586	58	84	126

General Description of Crossing: Local roadway, 2 lanes. Rural area – largely undeveloped on both sides of crossing, with a few residential / farm properties. Summit Crossing Rd is ~3 miles in length and connects Massaponax Church Rd (west of crossing) to Thorton Rolling Rd (east of crossing).

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**Yes**	
Adjacent Crossing within 1 rail mile?	**No**	
Major Safety / Geometric Deficiencies?	**No**	
Existing Four Quad, Medians, or Median Separators?	**No**	

PROPOSED ACTION: **FOUR QUAD GATES**

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are triggered
  - Grade separation determined not feasible due to cost-benefit considerations (low volume, local roadway in a rural area)
  - Closure determined not feasible due to lack of adjacent alternate crossings
- No adjacent crossings located within 1 rail mile; closure not feasible
- No major safety or geometric deficiencies identified; no mitigation necessary
- Existing crossing treatment is gates (non-quad):
  - Median Treatment determined not feasible due to proximity of unpaved access roads that run parallel to railroad tracks (access needs to be maintained)
  - Four Quad Gates determined FEASIBLE

Proposed Action Design Considerations:

- Minimal striping and narrow roadway widths existing on crossing roadway (may require improvements as part of design)

Crossing Name: CLAIBORNE CROSSING ROAD **Line / Crossing Number: RF&P / 860547R**
Jurisdiction: Caroline County **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	2025	2045	2015	2025	2045
478	548	689	41	65	79

General Description of Crossing: Local roadway, 2 lanes. Rural area – mostly undeveloped with sparse residential properties. West of crossing, Summit Crossing Rd becomes Guinea Station Rd, underpasses I-95, and connects to Rt 1. East of crossing, ends in T-intersection with Macedonia Rd, which connects to Stonewall Jackson Rd.

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**Yes**	
Adjacent Crossing within 1 rail mile?	**No**	
Major Safety / Geometric Deficiencies?	**No**	
Existing Four Quad, Medians, or Median Separators?	**No**	

PROPOSED ACTION: **MEDIAN SEPARATORS**

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are triggered
  - Grade separation determined not feasible due to cost-benefit considerations (low volume, local roadway in a rural area)
  - Closure determined not feasible due to lack of adjacent alternate crossings
- No adjacent crossings located within 1 rail mile; closure not feasible
- No major safety or geometric deficiencies identified; no mitigation necessary
- Existing crossing treatment is gates (non-quad):
  - Median separators determined FEASIBLE
  - Four Quad Gates determined feasible and secondary to median treatment

Proposed Action Design Considerations:

- At least 60′ clearance to nearest driveway, can maintain access with median separator design
- Minimal striping and narrow roadway widths existing on crossing roadway (may require improvements as part of design)

Crossing Name: STONEWALL JACKSON ROAD **Line / Crossing Number: RF&P / 860545C**
Jurisdiction: Caroline County **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	2025	2045	2015	2025	2045
1,929	2,214	2,784	41	65	79

General Description of Crossing: Major collector roadway, 2 lanes. Rural area – undeveloped / farmland with sparse residences. Stonewall Jackson Shrine is in north-east quadrant. Stonewall Jackson Rd interchanges with I-95 and Rt 1 to the east. To the west, it terminates at Fredericksburg Turnpike. Guinea Station Rd intersects within ~500 ft of crossing.

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**Yes**	
Adjacent Crossing within 1 rail mile?	**No**	
Major Safety / Geometric Deficiencies?	**No**	
Existing Four Quad, Medians, or Median Separators?	**No**	

PROPOSED ACTION: **FOUR QUAD GATES**

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are triggered
  - Grade separation determined not feasible due to proximity of National Park Service property, proximity of intersecting roadways, and potential cost-benefit considerations (low volume, local roadway in a rural area)
  - Closure determined not feasible due to connectivity to roadway network as a major collector roadway, as well as lack of adjacent alternate crossings
- No adjacent crossings located within 1 rail mile; closure not feasible
- No major safety or geometric deficiencies identified; no mitigation necessary
- Existing crossing treatment is gates (non-quad):
  - Median Treatment determined not feasible due to proximity of existing park access and intersections with Guinea Station Rd
  - Four Quad Gates determined FEASIBLE

Proposed Action Design Considerations:

- Minimize potential impacts to NPS property

Crossing Name: WOODFORD ROAD **Line / Crossing Number: RF&P / 860542G**
Jurisdiction: Caroline County **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	2025	2045	2015	2025	2045
386	443	557	41	65	79

General Description of Crossing: Local roadway, 2 lanes. Rural area – undeveloped / farmland in vicinity, with sparse residential. Woodford Rd is approximately 5 miles long, and connects Paige Rd (which connects to Rt 1) to the east, to Rt 2 / Fredericksburg Turnpike to the west. Intersections with private driveways within ~100 ft of crossing.

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**Yes**	
Adjacent Crossing within 1 rail mile?	**No**	
Major Safety / Geometric Deficiencies?	**No**	
Existing Four Quad, Medians, or Median Separators?	**No**	

PROPOSED ACTION: **FOUR QUAD GATES**

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are triggered
  - Grade separation determined not feasible due to cost-benefit considerations (low volume, local roadway in a rural area)
  - Closure determined not feasible due to lack of adjacent equivalent alternate crossings (Woodford Rd is the largest roadway crossing within over a mile of this crossing)
- No adjacent crossings located within 1 rail mile; closure not feasible
- No major safety or geometric deficiencies identified; no mitigation necessary
- Existing crossing treatment is gates (non-quad):
  - Median Treatment determined not feasible due to proximity of private access within ~100 ft on both sides of crossing
  - Four Quad Gates determined FEASIBLE

Proposed Action Design Considerations:

- Minimal striping and narrow roadway widths existing on crossing roadway (may require improvements as part of design)

Crossing Name: WOODSLANE ROAD | **Line / Crossing Number: RF&P / 860541A**

Jurisdiction: Caroline County | **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
102	117	147	41	65	79

General Description of Crossing: Local roadway, 2 lanes. Rural area – undeveloped / farmland with sparse residences. Woodslane Rd (Rt 609) is just over 2 miles in length and runs from Woodford Rd (west of crossing) to Fredericksburg Turnpike / Rt 2 (east of crossing), providing access to residences / farm properties along its length.

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**Yes**	
Adjacent Crossing within 1 rail mile?	**No**	
Major Safety / Geometric Deficiencies?	**No**	
Existing Four Quad, Medians, or Median Separators?	**No**	

PROPOSED ACTION:	MEDIAN SEPARATORS

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are triggered
  - Grade separation determined not feasible due to cost-benefit considerations (low volume, local roadway in a rural area)
  - Closure determined not feasible due to lack of adjacent alternate crossings
- No adjacent crossings located within 1 rail mile; closure not feasible
- No major safety or geometric deficiencies identified; no mitigation necessary
- Existing crossing treatment is gates (non-quad):
  - Median Separators determined FEASIBLE
  - Four Quad Gates determined feasible and secondary to median treatment

Proposed Action Design Considerations:

- No paved access points within 100 ft of either side of crossing; however, there is an unpaved access within ~50 ft, east side, to farm fields, which can be closed and relocated within the same property
- Minimal striping and narrow roadway widths existing on crossing roadway (may require improvements as part of design)

Crossing Name: PAIGE ROAD | **Line / Crossing Number: RF&P / 860539Y**

Jurisdiction: Caroline County | **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
478	548	689	41	65	79

General Description of Crossing: Minor collector roadway, 2 lanes. Rural area – mainly undeveloped. Paige Rd terminates at Fredericksburg Turnpike / Rt 2, approximately 1 mile east of the crossing. West of the crossing, Paige Rd terminates at US Rt 1.

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**Yes**	
Adjacent Crossing within 1 rail mile?	**No**	
Major Safety / Geometric Deficiencies?	**No**	
Existing Four Quad, Medians, or Median Separators?	**No**	

PROPOSED ACTION:	MEDIAN SEPARATORS

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are triggered
  - Grade separation determined not feasible due to cost-benefit considerations (low volume, minor roadway in a rural area)
  - Closure determined not feasible due to lack of adjacent equivalent alternate crossings (Paige Rd is the largest roadway crossing within over a mile of this crossing)
- No adjacent crossings located within 1 rail mile; closure not feasible
- No major safety or geometric deficiencies identified; no mitigation necessary
- Existing crossing treatment is gates (non-quad):
  - Median Separators determined FEASIBLE
  - Four Quad Gates determined feasible and secondary to median treatment

Proposed Action Design Considerations:

- Feasible, as crossing roadway is straight and perpendicular to the crossing
- Dirt road access (parallel to tracks) could be maintained with potential slight relocation to provide at least 60′ of median separator treatment

Crossing Name: PENOLA ROAD | **Line / Crossing Number: RF&P / 860527E**
Jurisdiction: Caroline County | **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
427	490	616	41	65	79

General Description of Crossing: Local roadway, 2 lanes. Rural area – mostly undeveloped with a cluster of houses along the intersecting roadway at the crossing. Penola Rd terminates at Rogers Clark Blvd north/west of the crossing. East of the crossing, Penola Rd connects to US Rt 301. Polecat Ln (residential access) intersection is within ~50 ft of crossing.

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**Yes**	
Adjacent Crossing within 1 rail mile?	**No**	
Major Safety / Geometric Deficiencies?	**No**	
Existing Four Quad, Medians, or Median Separators?	**No**	

PROPOSED ACTION:	**FOUR QUAD GATES**

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are triggered
  - Grade separation determined not feasible due to cost-benefit considerations (low volume, local roadway in a rural area)
  - Closure determined not feasible due to lack of adjacent alternate crossings
- No adjacent crossings located within 1 rail mile; closure not feasible
- No major safety or geometric deficiencies identified; no mitigation necessary
- Existing crossing treatment is gates (non-quad):
  - Median Treatment determined not feasible due to proximity of Polecat Ln
  - Four Quad Gates determined FEASIBLE

Proposed Action Design Considerations:

- Minimal striping and narrow roadway widths existing on crossing roadway (may require improvements as part of design)

Crossing Name: COLEMANS MILL ROAD | **Line / Crossing Number: RF&P / 860525R**
Jurisdiction: Caroline County | **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
447	513	645	41	65	79

General Description of Crossing: Local roadway, 2 lanes. Rural area – mainly undeveloped on both sides of crossing. Colemans Mill Rd is approximately 1 mile in length and provides access between Dry Bridge Rd and Rogers Clark Blvd, which themselves intersect just over a mile south of this at-grade crossing.

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**Yes**	
Adjacent Crossing within 1 rail mile?	**Yes**	*Dry Bridge Rd to the south (roadway overpass)*
Major Safety / Geometric Deficiencies?	**Yes**	*Curved track*
Existing Four Quad, Medians, or Median Separators?	**No**	

PROPOSED ACTION:	**CLOSURE** *(Secondary: Median Separators with realignment of roadway)*

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are triggered
  - Grade separation determined not feasible due to cost-benefit considerations (low volume, local roadway in a rural area)
  - Closure determined FEASIBLE
- Adjacent crossing is located within 1 rail mile; closure determined FEASIBLE
- Major safety or geometric deficiencies identified: Curved track (sight distance at existing at-grade crossing)
  - Mitigation: Closure, or straightening of track if at-grade crossing is maintained
- Existing crossing treatment is gates (non-quad):
  - Median Treatment determined feasible
  - Four Quad Gates determined feasible and secondary to median treatment
  - Any at-grade treatment may require improvements as part of design for existing minimal striping and narrow roadway widths.

Proposed Action Design Considerations:

- Eliminate this crossing / consolidate with Dry Bridge Rd (existing grade separated, to the south)
  - Existing traffic could use grade-separated Dry Bridge Rd to provide similar accessibility and connectivity as existing traffic
  - Existing intersection of Dry Bridge Rd and Rogers Clark Blvd may need to be improved as part of design

Crossing Name: DOSWELL ROAD
Jurisdiction: Hanover County

Line / Crossing Number: RF&P / 860520G
Current Warning Device: Gates (Non-Quad)

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
315	362	455	41	65	79

General Description of Crossing: Local roadway, 2 lanes. Rural area. Provides access through the middle of the railroad crossing, with residential / commercial area on the east side of the tracks. Accessibility along western side of crossing functions more like a parking lot than a roadway. Doswell Historic District in proximity to crossing.

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**Yes**	
Adjacent Crossing within 1 rail mile?	**No**	
Major Safety / Geometric Deficiencies?	**Yes**	*Undefined roadway / track accessibility, west side of crossing*
Existing Four Quad, Medians, or Median Separators?	**No**	

PROPOSED ACTION:	**FOUR QUAD GATES, with safety improvements of roadway**

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are triggered
  - Grade separation determined not feasible due to proximity of adjacent rail line to the west (i.e., length of structure required to span both tracks), impacts to historic / industrial districts, and cost-benefit considerations (low volume, local roadway in a rural area)
  - Closure determined not feasible due to lack of adjacent alternate crossings
- No adjacent crossings located within 1 rail mile; closure not feasible
- Major safety or geometric deficiencies identified: lack of roadway definition / parking lot access to tracks on west side of crossing. Mitigation:
  - Defining roadway west of at-grade crossing
- Existing crossing treatment is gates (non-quad):
  - Median Treatment determined not feasible due to proximity of access points on both sides of crossing
  - Four Quad Gates determined FEASIBLE

Proposed Action Design Considerations:

- Improvements to increase safety of roadway crossing on west side must be part of the design

Crossing Name: W VAUGHN ROAD / HENRY STREET
Jurisdiction: Hanover County

Line / Crossing Number: RF&P / 860513W
Current Warning Device: Gates (Non-Quad)

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
1,320	1,515	1,905	40	64	78

General Description of Crossing: Local roadway, 2 lanes. W Vaughn Rd / Henry St is less than 1 mile long and is the northernmost east-west crossing of the tracks on the north side of the Town of Ashland. To the west, it connects to N James St and to the east, it connects to Rt 1. Fire station, school, and water treatment facility in proximity of crossing.

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**Yes**	
Adjacent Crossing within 1 rail mile?	**Yes**	*W Patrick St, College Ave, and England St, south of crossing in Town of Ashland, all existing at-grade*
Major Safety / Geometric Deficiencies?	**No**	
Existing Four Quad, Medians, or Median Separators?	**No**	

PROPOSED ACTION:	**GRADE SEPARATE** *(Secondary: Four Quad Gates)*

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are triggered
  - Grade separation determined FEASIBLE. Benefit to having a grade separated crossing on the north side of Town of Ashland. The new, and only, fire station in town is on the east side of the tracks and there are currently no grade-separated tracks to allow for crossing during emergencies or while trains are stopped on the tracks for long periods of time.
  - Closure determined not feasible due to connectivity to network as the northern-most east-west crossing in the Town of Ashland
- Adjacent crossings are located within 1 rail mile:
  - Closure of W Vaughn Rd determined not feasible because of importance of connectivity to overall roadway network
- No major safety or geometric deficiencies identified; no mitigation necessary
- Existing crossing treatment is gates (non-quad):
  - Median Treatment determined not feasible due to proximity of access to water treatment facility
  - Four Quad Gates determined feasible

Proposed Action Design Considerations:

- Maintain required access to school and fire station access

Crossing Name: W PATRICK STREET **Line / Crossing Number: RF&P / 860512P**
Jurisdiction: Hanover County **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	2025	2045	2015	2025	2045
303	348	437	40	64	78

General Description of Crossing: Minor collector roadway, 2 lanes. Urban area (downtown Ashland). W Patrick Street provides access to and through Randolph Macon College's sports complex area. N Center Street runs parallel to both sides of railroad tracks, and intersects with a surface parking lot directly at the crossing.

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**No**	
Adjacent Crossing within 1 rail mile?	**Yes**	*W Vaughn St (north of crossing) and College Ave and England St (south of crossing), all existing at-grade*
Major Safety / Geometric Deficiencies?	**No**	
Existing Four Quad, Medians, or Median Separators?	**No**	

PROPOSED ACTION: ***If crossing is not closed as part of the 3rd Track alignment option through Town of Ashland:*** **FOUR QUAD GATES**

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are not triggered
- Adjacent crossings located within 1 rail mile:
  - Closure determined not feasible due to the importance of the crossing providing internal access through the college campus, including connection to and through the major sports complex area
- No major safety or geometric deficiencies identified; no mitigation necessary
- Existing crossing treatment is gates (non-quad):
  - Median Treatment determined not feasible due to proximity of existing access points and geometrics of Center St (that runs parallel to the railroad tracks), both sides of crossing
  - Four Quad Gates determined FEASIBLE

Proposed Action Design Considerations:

- **Note: This crossing would be closed as part of the 3rd Track alignment through the Town of Ashland as part of the DC2RVA project (with realignment of Center St to maintain access to the parking lot on the east side of the crossing); traffic that currently uses this crossing can utilize the existing Ashland grid street system after closure. Four Quad Gates are the proposed action IF that alignment option does not move forward.**

Crossing Name: COLLEGE AVE / HENRY CLAY RD **Line / Crossing Number: RF&P / 860462N**
Jurisdiction: Hanover County **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	2025	2045	2015	2025	2045
1,320	1,515	1,905	40	64	78

General Description of Crossing: Major collector, 2 lanes. Urban area (downtown Ashland). College Ave / Henry Clay Rd is just over a mile in length and provides connection between Thompson St (west) to US Rt 1 (east), through Randolph Macon College.

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**No**	
Adjacent Crossing within 1 rail mile?	**Yes**	*W Vaughn St and Collect Ave (north of crossing) and England St (south of crossing), all existing at-grade*
Major Safety / Geometric Deficiencies?	**No**	
Existing Four Quad, Medians, or Median Separators?	**No**	

PROPOSED ACTION: ***CROSSING ELIMINATED AS PART OF THE STATION IMPROVEMENTS OF THE DC2RVA PROJECT***

Process / Justification / Future Considerations:

- **This crossing is eliminated as part of station design improvements of the DC2RVA project (specifically, the increased platform length). Traffic that currently uses this crossing can utilize the existing Ashland grid street system after closure.**

Crossing Name: ENGLAND ST / THOMPSON ST **Line / Crossing Number: RF&P / 860459F**
Jurisdiction: Hanover County **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	2025	2045	2015	2025	2045
14,210	16,310	20,510	40	64	78

General Description of Crossing: Minor arterial roadway, 3 lanes. Urban area – the main roadway through downtown Ashland. England Street / Thompson Street has dedicate turn lanes, on-street parking, and is part of a 7-legged intersection at the crossing. Ashland train station in north/west quadrant of crossing. Major pedestrian crossing.

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**Yes**	
Adjacent Crossing within 1 rail mile?	**Yes**	*All Town of Ashland crossings are within 1 mile*
Major Safety / Geometric Deficiencies?	**Yes**	*7-legged unsignalized intersection, major pedestrian crossing*
Existing Four Quad, Medians, or Median Separators?	**No**	

PROPOSED ACTION: **FOUR QUAD GATES, with safety improvements**

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are triggered:
  - Grade separation determined not feasible due to significant community impacts
  - Closure determined not feasible due to connectivity of road as the main roadway through downtown Ashland
- Adjacent crossings are located within 1 rail mile:
  - Closure determined not feasible due to connectivity of road as the main roadway through downtown Ashland
- Major safety or geometric deficiencies identified: Intersection geometrics / pedestrian safety. Mitigation:
  - Design improvements of at-grade crossing to include pedestrian protection and safety of all movements
- Existing crossing treatment is gates (non-quad):
  - Median Treatment determined not feasible due to existing intersection geometrics / safety
  - Four Quad Gates determined FEASIBLE

Proposed Action Design Considerations:

- Design needs to accommodate safety of all users (vehicle and pedestrian) and mitigate existing safety and/or geometric deficiencies

Crossing Name: MYRTLE STREET **Line / Crossing Number: RF&P / 860454W**
Jurisdiction: Hanover County **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	2025	2045	2015	2025	2045
1,827	2,097	2,637	40	64	78

General Description of Crossing: Major collector roadway, 2 lanes. Urban area (downtown Ashland). Myrtle Street is just over ½ mile in length and connects Hanover Rd (to the west) to US Rt 1 (to the east), through dense residential community with direct access to business district. Pedestrian crossing area, and access to surface parking lots.

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**No**	
Adjacent Crossing within 1 rail mile?	**Yes**	*England St (north of crossing) and E Francis St and Ashcake Rd (south of crossing), all existing at-grade*
Major Safety / Geometric Deficiencies?	**No**	
Existing Four Quad, Medians, or Median Separators?	**No**	

PROPOSED ACTION: **FOUR QUAD GATES**

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are not triggered
- Adjacent crossings are located within 1 rail mile
  - Closure determined not feasible due to importance of roadway as a major collector roadway with access to / through the Town of Ashland business district
- No major safety or geometric deficiencies identified; no mitigation necessary
- Existing crossing treatment is gates (non-quad):
  - Median Treatment determined not feasible due to proximity of existing industrial driveway
  - Four Quad Gates determined FEASIBLE

Proposed Action Design Considerations:

- No special design considerations identified

Crossing Name: E FRANCIS STREET | **Line / Crossing Number: RF&P / 860450U**
Jurisdiction: Hanover County | **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	2025	2045	2015	2025	2045
1,421	1,631	2,051	40	64	78

General Description of Crossing: Local roadway, 2 lanes. Rural area (southern limit of Ashland). E Francis Street is approximately ½ mile in length and provides the southern-most east-west roadway connection to the residential grid street network in Ashland. Center St (parallel to tracks) is one-way on west side of tracks.

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**Yes**	
Adjacent Crossing within 1 rail mile?	**Yes**	*England St and E Francis St (north of crossing) and Ashcake Rd (south of crossing), all existing at-grade*
Major Safety / Geometric Deficiencies?	**No**	
Existing Four Quad, Medians, or Median Separators?	**No**	

PROPOSED ACTION: **FOUR QUAD GATES**

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are triggered:
  - Grade separation determined not feasible due to cost-benefit considerations (local roadway through a rural, mainly residential area)
  - Closure determined not feasible due to lack of connectivity of alternate roadways to network (Center St is one-way on the west side of the crossing)
- Adjacent crossings are located within 1 rail mile:
  - Closure determined not feasible due to lack of connectivity of alternate roadways to network (Center St is one-way on the west side of the crossing)
- No major safety or geometric deficiencies identified; no mitigation necessary
- Existing crossing treatment is gates (non-quad):
  - Median Treatment determined not feasible due to proximity of Center St intersection to crossing on both sides
  - Four Quad Gates determined FEASIBLE

Proposed Action Design Considerations:

- Minimal striping and narrow roadway widths existing on crossing roadway (may require improvements as part of design)

Crossing Name: ASHCAKE ROAD | **Line / Crossing Number: RF&P / 860448T**
Jurisdiction: Hanover County | **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	2025	2045	2015	2025	2045
7,714	8,854	11,134	40	64	78

General Description of Crossing: Minor arterial roadway, 2 lanes. Urban area – crossing is located just south of the Town of Ashland, and connects to the town via two local roadways that run parallel to the railroad tracks and intersect at the crossing. To the east, Ashcake Rd connects to US Rt 1 and beyond. To the west, it connects to US Rt 33 and beyond.

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**No**	
Adjacent Crossing within 1 rail mile?	**Yes**	
Major Safety / Geometric Deficiencies?	**Yes**	*Proximity of Center St intersections within a few feet of crossing*
Existing Four Quad, Medians, or Median Separators?	**No**	

PROPOSED ACTION: **GRADE SEPARATION** *(Secondary: Four Quad Gates)*

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are not triggered
- Adjacent crossings are located within 1 rail mile:
  - Closure determined not feasible due to importance of crossing as a minor arterial roadway and the primary east-west crossing south of the Town of Ashland. Additionally, alternate crossings are smaller roadways that could not accommodate the diverted traffic without major improvements.
- Major safety or geometric deficiencies identified: Proximity of Center St intersections within a few feet of the crossing, on both sides of crossing, with higher speeds and volumes of a minor arterial roadway, with nearby roadway curves
  - Mitigation: Grade separation or safety design improvements if at-grade intersection is maintained
  - GRADE SEPARATION is recommended, given the higher speeds and volumes of a minor arterial roadway. Further benefit to grade separation as this is the primary east-west crossing south of the Town of Ashland.
- Existing crossing treatment is gates (non-quad):
  - Median Treatment determined not feasible due to proximity of intersecting roadways.
  - Four Quad Gates determined feasible but secondary to grade separation

Proposed Action Design Considerations:

- Grade separation may require frontage access roadway to maintain access to side streets. Note that Center St (east side) may be impacted by 3rd Track alignment option.

Crossing Name: GWATHMEY CHURCH ROAD **Line / Crossing Number: RF&P / 860447L**
Jurisdiction: Hanover County **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	2025	2045	2015	2025	2045
163	187	235	40	64	78

General Description of Crossing: Minor collector roadway, 2 lanes. Rural area. Gwathmey Church Rd is approximately ½ mile in length and provides the sole access to the residential community on the east side of the tracks. To the west, it connects to Elmont Rd. Center St Rd runs parallel to tracks to the north and terminates at the crossing.

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**Yes**	
Adjacent Crossing within 1 rail mile?	**Yes**	*Ashcake Rd north of crossing*
Major Safety / Geometric Deficiencies?	**No**	
Existing Four Quad, Medians, or Median Separators?	**No**	

PROPOSED ACTION:	FOUR QUAD GATES

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are triggered:
  - Grade separation determined not feasible due to cost-benefit considerations (low volume, local roadway through a rural area)
  - Closure determined not feasible as crossing provides sole access to residential community and historic trail on the east side of the crossing
- Adjacent crossings located within 1 rail mile:
  - Closure determined not feasible as crossing provides sole access, as described above
  - Closure with construction of a new connecting roadway (less than 1 mile) to Ashcake Rd determined not feasible due to impacts to existing properties and intersection geometrics at Ashcake Rd
- No major safety or geometric deficiencies identified; no mitigation necessary
- Existing crossing treatment is gates (non-quad):
  - Median Treatment determined not feasible due to proximity of Center Street Rd intersection
  - Four Quad Gates determined FEASIBLE

Proposed Action Design Considerations:

- Minimal striping and narrow roadway widths existing on crossing roadway (may require improvements as part of design)

Crossing Name: ELMONT ROAD **Line / Crossing Number: RF&P / 860445X**
Jurisdiction: Hanover County **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	2025	2045	2015	2025	2045
2,132	2,447	3,077	40	64	78

General Description of Crossing: Major collector roadway, 2 lanes. Rural area. Elmont Rd begins at Cedar Lane within ½ mile of the crossing, to the east. To the west, Elmont Rd runs north towards Ashcake Rd and beyond (whereas Cedar Lane runs more due west to Ashland Rd). Private driveway and commercial driveway within <50 ft of crossing, west side.

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**Yes**	
Adjacent Crossing within 1 rail mile?	**Yes**	*Cedar Ln south of crossing*
Major Safety / Geometric Deficiencies?	**No**	
Existing Four Quad, Medians, or Median Separators?	**No**	

PROPOSED ACTION:	FOUR QUAD GATES

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are triggered:
  - Grade separation determined not feasible due to impacts to numerous residences/businesses and potential cost-benefit considerations (mid-volume roadway in a rural area)
  - Closure determined not feasible due to roadway connectivity to network as a major collector
- Adjacent crossing located within 1 rail mile:
  - Closure determined not feasible due to roadway connectivity to network as a major collector
- No major safety or geometric deficiencies identified; no mitigation necessary
- Existing crossing treatment is gates (non-quad):
  - Median Treatment determined not feasible due to proximity of residence and business driveway access
  - Four Quad Gates determined FEASIBLE

Proposed Action Design Considerations:

- No special design considerations identified

Crossing Name: CEDAR LANE
Jurisdiction: Hanover County

Line / Crossing Number: RF&P / 860443J
Current Warning Device: Gates (Non-Quad)

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
1,929	2,214	2,784	40	64	78

General Description of Crossing: Major collector roadway, 2 lanes. Rural area – undeveloped areas and larger residential properties. To the east, Cedar Lane terminates at US Rt 1 in proximity to the interchange with I-95 at Sliding Hill. To the west, it terminates at Ashland Rd.

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**Yes**	
Adjacent Crossing within 1 rail mile?	**Yes**	*Elmont Rd north of crossing*
Major Safety / Geometric Deficiencies?	**No**	
Existing Four Quad, Medians, or Median Separators?	**No**	

PROPOSED ACTION:	**FOUR QUAD GATES**

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are triggered:
  - Grade separation determined not feasible due to substantial property impacts
  - Closure determined not feasible due to roadway connectivity to network as a major collector
- Adjacent crossing located within 1 rail mile:
  - Closure determined not feasible due to roadway connectivity to network as a major collector
- No major safety or geometric deficiencies identified; no mitigation necessary
- Existing crossing treatment is gates (non-quad):
  - Median Treatment determined not feasible due to proximity of existing driveway / residential roadways
  - Four Quad Gates determined FEASIBLE

Proposed Action Design Considerations:

- No special design considerations identified

Crossing Name: MILL ROAD
Jurisdiction: Henrico County

Line / Crossing Number: RF&P / 860441V
Current Warning Device: Gates (Non-Quad)

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
2,741	3,146	3,956	40	64	78

General Description of Crossing: Major collector roadway, 2 lanes. Urban area. Mill Rd is approximately 2 miles in length, and connects Mountain Rd to the south (west of crossing) with Greenwood Rd, the intersection with which is located immediately east of the crossing. Hunton Community Center is located within ~100 ft of crossing, east side.

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**No**	
Adjacent Crossing within 1 rail mile?	**Yes**	*Greenwood Rd (grade separated), north of crossing*
Major Safety / Geometric Deficiencies?	**No**	
Existing Four Quad, Medians, or Median Separators?	**No**	

PROPOSED ACTION:	**MEDIAN SEPARATORS**

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are not triggered
- Adjacent crossing is located within 1 rail mile:
  - Closure determined not feasible due to roadway connectivity to network as a major collector roadway, as well as the lack of the alternate roadway network to accommodate the roadway volumes (especially west side, local streets)
- No major safety or geometric deficiencies identified; no mitigation necessary
- Existing crossing treatment is gates (non-quad):
  - Median Separators determined FEASIBLE
  - Four Quad Gates determined feasible but secondary to median treatment

Proposed Action Design Considerations:

- Median separators will require relocation of existing gravel driveway (north-east side of crossing) away from crossing within same property (shifted to the east)

Crossing Name: MOUNTAIN ROAD — **Line / Crossing Number: RF&P / 860438M**

Jurisdiction: Henrico County — **Current Warning Device: Four Quad Gates**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
5,278	6,058	7,618	40	64	78

General Description of Crossing: Minor arterial roadway, 2 lanes. Urban area. Mountain Rd generally parallels I-295 and intersects with at least three north-south roadways that interchange with the interstate (US Rt 33, Woodman Rd, and US Rt 1), and serves the largely and densely residential area that is Glen Allen.

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**No**	*[Triggered in 2045]*
Adjacent Crossing within 1 rail mile?	**Yes**	*I-295 (roadway overpass), north of crossing*
Major Safety / Geometric Deficiencies?	**No**	
Existing Four Quad, Medians, or Median Separators?	**Yes**	

PROPOSED ACTION: **NO ACTION**

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are not triggered
- Adjacent crossing is located within 1 rail mile; however, the I-295 adjacent crossing does not provide roadway access within the same proximity as the railroad crossing, and Mountain Rd is an important minor arterial roadway to the overall network. Closure determined not feasible
- No major safety or geometric deficiencies identified; no mitigation necessary
- Existing crossing treatment is Four Quad Gates; no further treatment necessary

Crossing Name: HUNGARY ROAD — **Line / Crossing Number: RF&P / 860437F**

Jurisdiction: Henrico County — **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
16,240	18,640	23,440	40	64	78

General Description of Crossing: Minor arterial roadway, 4 lanes with driveways within ~200 ft on both sides of crossing. Urban area – it is the main roadway serving the Laurel area with dense residential development. To the west, Hungary Rd intersects US Rt 33 / Staples Mill Rd. VDOT comments that stopped trains block both Hungary Rd and Mountain Rd.

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**Yes**	
Adjacent Crossing within 1 rail mile?	**Yes**	*E Parham Rd (roadway overpass), south of crossing*
Major Safety / Geometric Deficiencies?	**No**	
Existing Four Quad, Medians, or Median Separators?	**Yes**	*Raised medians (~100 ft long) with gates*

PROPOSED ACTION: **GRADE SEPARATION** ***(Secondary: Install vertical median tubes along existing raised medians)***

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are triggered:
  - Grade separation determined FEASIBLE
  - Closure determined not feasible due to roadway connectivity to network as minor arterial roadway with significant daily volumes
- Adjacent crossing is located within 1 rail mile:
  - Closure determined not feasible due to roadway connectivity to network as minor arterial roadway with significant daily volumes
- No major safety or geometric deficiencies identified; no mitigation necessary
- Existing crossing treatment is medians with gates:
  - Feasible further treatment includes installation of vertical median tubes along existing raised medians to improve safety

Proposed Action Design Considerations:

- If grade separation is determined not feasible in the future due to impacts, install vertical median tubes along existing raised medians

Crossing Name: HERMITAGE ROAD | **Line / Crossing Number: RF&P / 860435S**

Jurisdiction: Henrico County | **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
4,263	4,893	6,153	40	64	78

General Description of Crossing: Major collector roadway, 2 lanes. Urban area – located between commercial / industrial that is adjacent to US Rt 33, and residential area. Approximately 1,000 ft to the west of the crossing, Hermitage Rd intersects (and terminates) at US Rt 33 / Staples Mill Rd. To the east, Hermitage Rd terminates at Woodman Rd.

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**No**	
Adjacent Crossing within 1 rail mile?	**Yes**	*Hilliard Rd (roadway overpass), south of crossing*
Major Safety / Geometric Deficiencies?	**No**	
Existing Four Quad, Medians, or Median Separators?	**No**	

PROPOSED ACTION:	**FOUR QUAD GATES**

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are not triggered.
- Adjacent crossing is located within 1 rail mile:
  - Closure determined not feasible due to connectivity to network as a major collector roadway
- No major safety or geometric deficiencies identified; no mitigation necessary
- Existing crossing treatment is gates (non-quad):
  - Median Treatment determined not feasible due to proximity of existing industrial access (including loading dock location) and adjacent roadway intersections
  - Four Quad Gates determined FEASIBLE
- *Additional Site-Specific Consideration of Grade Separation per VDOT Input:* Grade separation determined not feasible due to substantial residential and industrial impacts

Proposed Action Design Considerations:

- No special design considerations identified

Crossing Name: JAHNKE ROAD | **Line / Crossing Number: A LINE / 623663D**

Jurisdiction: Richmond | **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
12,180	13,980	17,580	34	50	64

General Description of Crossing: Minor arterial roadway, 2 lanes. Urban area – dense residential, with an elementary school in proximity to the crossing. To the west, Jahnke Rd interchanges with both the Powhite Pkwy and the Chippenham Pkwy. To the east, it terminates at Forest Hill Ave (which also interchanges with the Powhite Pkwy).

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**No**	*[Triggered in 2045]*
Adjacent Crossing within 1 rail mile?	**Yes**	*Bassett Ave (at-grade), south of crossing*
Major Safety / Geometric Deficiencies?	**No**	
Existing Four Quad, Medians, or Median Separators?	**No**	

PROPOSED ACTION:	**FOUR QUAD GATES**

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are not triggered
- Adjacent crossing is located within 1 rail mile:
  - Closure determined not feasible due to connectivity to network as a minor arterial roadway with significant daily volumes, and use of roadway by public transit
- No major safety or geometric deficiencies identified; no mitigation necessary
- Existing crossing treatment is gates (non-quad):
  - Median Treatment determined not feasible due to curvature of roadway and proximity to existing roadway intersections
  - Four Quad Gates determined FEASIBLE

Proposed Action Design Considerations:

- No special design considerations identified

Crossing Name: BASSETT AVENUE **Line / Crossing Number: A LINE / 623664K**
Jurisdiction: Richmond **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	2025	2045	2015	2025	2045
1,393	1,599	2,010	34	50	64

General Description of Crossing: Local roadway, 2 lanes. Urban area. Bassett Avenue just over ½ mile total length and is part of the grid network of streets serving this residential area. To the east, it intersection Westover Hills Rd and beyond. It terminates at Faye St approximately 1,500 ft east of the crossing.

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**No**	
Adjacent Crossing within 1 rail mile?	**Yes**	*Jahnke Rd (at-grade), north of crossing* *Midlothian Trnpk (roadway overpass), south of crossing*
Major Safety / Geometric Deficiencies?	**No**	
Existing Four Quad, Medians, or Median Separators?	**No**	

PROPOSED ACTION: **CLOSURE**
(Secondary: Median Separators, with roadway improvements)

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are not triggered
- Adjacent crossings are located within 1 rail mile:
  - Closure determined FEASIBLE.
- No major safety or geometric deficiencies identified; no mitigation necessary
- Existing crossing treatment is gates (non-quad):
  - Median Treatment determined feasible but secondary
  - Four Quad Gates determined feasible but secondary

Proposed Action Design Considerations:

- Existing roadway network provides good connectivity to rail crossings within 1 mile both north and south of existing crossing that existing traffic can utilized after closure. Minor roadway improvements along these routes may be required to accommodate additional traffic from closure

Crossing Name: BROAD ROCK BOULEVARD **Line / Crossing Number: A LINE / 623668M**
Jurisdiction: Richmond **Current Warning Device: Split Gates w/ Median**

AADT			Total Number of Daily Trains		
2015	2025	2045	2015	2025	2045
19,285	22,135	27,835	34	50	64

General Description of Crossing: Other principal arterial roadway, 4 lanes, median separated. Urban area – high density development along roadway, including veterans' hospital. Major intersection with Belt Blvd just east of crossing. Broad Rock Blvd connects to Hull Street Rd to the north/east, and to the west, interchanges with Chippenham Pkwy.

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**Yes**	*Additionally, most recent crash (fatal) in July 2015*
Adjacent Crossing within 1 rail mile?	**Yes**	*Hull St (roadway overpass), north of crossing* *Hopkins Rd (roadway overpass), south of crossing*
Major Safety / Geometric Deficiencies?	**No**	
Existing Four Quad, Medians, or Median Separators?	**Yes**	*Roadway is grass median-separated*

PROPOSED ACTION: **GRADE SEPARATE**
(Secondary: No Action)

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are triggered:
  - Grade separation determined FEASIBLE
  - Closure determined not feasible due to roadway connectivity to network as a principal arterial roadway with significant daily volumes
- Adjacent crossings are located within 1 rail mile:
  - Closure determined not feasible due to roadway connectivity to network as a principal arterial roadway with significant daily volumes
- No major safety or geometric deficiencies identified; no mitigation necessary
- Existing crossing treatment is gates across a grass median-separated highway; no further treatment necessary.

Proposed Action Design Considerations:

- Grade separation design needs to accommodate existing intersection with E Belt Blvd, likely through elevating the intersection. Feasible with impacts to businesses, but should avoid impacts to veteran's hospital facilities.

Crossing Name: TERMINAL AVENUE — **Line / Crossing Number: A LINE / 623670N**
Jurisdiction: Richmond — **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	2025	2045	2015	2025	2045
681	781	982	34	58	73

General Description of Crossing: Local roadway, 2 lanes that provides access to 4 residences. Urban area. Terminal Avenue is just over ½ mile in total length, and is an unclassified local roadway between Hopkins Rd (west of crossing) to E Belt Blvd (east of crossing). Access to Hopkins Rd is currently restricted / closed.

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**No**	
Adjacent Crossing within 1 rail mile?	**Yes**	*Hopkins Rd (roadway overpass), north of crossing* *Bells Rd (roadway overpass), south of crossing*
Major Safety / Geometric Deficiencies?	**No**	
Existing Four Quad, Medians, or Median Separators?	**No**	

PROPOSED ACTION:	**CLOSURE, with improvements to re-open signalized intersection of Terminal Ave and Hopkins Rd**

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are not triggered
- Adjacent crossing located within 1 rail mile:
  - Closure considered FEASIBLE
- No major safety or geometric deficiencies identified; no mitigation necessary
- Existing crossing treatment is gates (non-quad):
  - Median Treatment determined not feasible due to proximity to driveways
  - Four Quad Gates determined feasible but secondary to closure

Proposed Action Design Considerations:

- Crossing closure is feasible by re-opening the currently closed intersection of Terminal Ave and Hopkins Rd to provide access to houses that are located on the west side of the crossing.
  - Intersection is currently signalized, and may require installation of signal heads for Terminal Ave
  - Existing roadway network provides good connectivity to rail crossings within 1 mile both north and south of existing crossing

Crossing Name: WALMSLEY BOULEVARD — **Line / Crossing Number: A LINE / 623672C**
Jurisdiction: Richmond — **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	2025	2045	2015	2025	2045
4,974	5,709	7,179	34	50	64

General Description of Crossing: Minor arterial roadway, 2 lanes. Urban area – dense residential properties east of crossing and truck distribution center west of crossing. Walmsley Blvd terminates at US Rt 1 approximately ½ mile east of the crossing. High percentage of truck traffic (access to industrial area). Additional industrial spur track at crossing.

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**No**	
Adjacent Crossing within 1 rail mile?	**Yes**	*Bels Rd (roadway overpass), north of crossing* *Castlewood Rd (at-grade), south of crossing*
Major Safety / Geometric Deficiencies?	**Yes**	*Existing roadway hump over tracks; will be exacerbated by DC2RVA 3rd track*
Existing Four Quad, Medians, or Median Separators?	**No**	

PROPOSED ACTION:	**GRADE SEPARATE** ***(Secondary: Four Quad Gates with roadway / railway approach improvements)***

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are not triggered
- Adjacent crossings are located within 1 rail mile
  - Closure considered not feasible due to connectivity of roadway to the overall network as a minor arterial roadway
- Major safety or geometric deficiencies identified: Existing crossing is signed as a 5mph crossing due to large "hump" over tracks; will be exacerbated by the DC2RVA 3rd track (3 tracks super-elevated to the west, with 1 industrial spur track lower and continuing straight)
  - Mitigation: Grade separation or adjust geometry of track and/or roadway approach if at-grade crossing remains. Grade separation determined FEASIBLE. Railway approach improvements (such as aligning super-elevation of tracks to roadway) determined feasible but not a long-term solution.
- Existing crossing treatment is gates (non-quad):
  - Median Treatment determined not feasible due to existing roadway / track geometrics
  - Four Quad Gates determined FEASIBLE.

Proposed Action Design Considerations:

- Grade separation preferred.

Crossing Name: KINGSLAND ROAD
Jurisdiction: Chesterfield County

Line / Crossing Number: A LINE / 623678T
Current Warning Device: Gates (Non-Quad)

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
2,132	2,447	3,077	34	50	64

General Description of Crossing: Major collector roadway, 2 lanes. Rural area. Kingsland Road is approximately 4 miles in total length and crosses both the A and S Lines. In this vicinity of this crossing, it provides east-west access through and to residences.

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**No**	
Adjacent Crossing within 1 rail mile?	**Yes**	*Thurston Rd (at-grade), south of crossing*
Major Safety / Geometric Deficiencies?	**No**	
Existing Four Quad, Medians, or Median Separators?	**No**	

PROPOSED ACTION: **MEDIAN SEPARATORS**

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are not triggered
- Adjacent crossing is located within 1 rail mile:
  - Closure determined not feasible due to connectivity to roadway network as a major collector roadway, as well as that the adjacent crossing is a minor local residential street crossing that could not accommodate the traffic
- No major safety or geometric deficiencies identified; no mitigation necessary
- Existing crossing treatment is gates (non-quad):
  - Median separators determined FEASIBLE
  - Four Quad Gates determined feasible but secondary to median treatment

Proposed Action Design Considerations:

- The existing residential driveway that is in proximity to the crossing will be relocated on the property as part of the 3rd track work

Crossing Name: THURSTON ROAD
Jurisdiction: Chesterfield County

Line / Crossing Number: A LINE / 623679A
Current Warning Device: Gates (Non-Quad)

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
457	525	660	34	50	64

General Description of Crossing: Local roadway, 2 lanes. Rural area. Thurston Road is approximately ½ mile in length and connects to Hopkins Rd to the west and Dorsey Rd to the east. It provides access to residential properties along its length.

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**No**	
Adjacent Crossing within 1 rail mile?	**Yes**	*Kingsland Rd (at-grade), north of crossing*
Major Safety / Geometric Deficiencies?	**No**	
Existing Four Quad, Medians, or Median Separators?	**No**	

PROPOSED ACTION: **CLOSURE** *(Secondary: Median Separators)*

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are not triggered
- Adjacent crossing is located within 1 rail mile:
  - Closure is determined FEASIBLE
- No major safety or geometric deficiencies identified; no mitigation necessary
- Existing crossing treatment is gates (non-quad):
  - Median separators determined feasible but secondary to closure
  - Four Quad Gates determined feasible but secondary to median treatment

Proposed Action Design Considerations:

- Existing roadway network provides good connectivity to rail crossing within 1 mile north of existing crossing

Crossing Name: OLD LANE — **Line / Crossing Number: A & S LINES / 623680U**

Jurisdiction: Chesterfield County — **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	2025	2045	2015	2025	2045
4,872	5,592	7,032	34	58	73

General Description of Crossing: Major collector roadway, 2 lanes. Rural. Old Lane is less than ½ mile in length and provides connectivity between Hopkins Rd (west) to Chester Rd (east). The area is mainly undeveloped with large commercial / industrial properties adjacent to Chester Rd.

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**Yes**	
Adjacent Crossing within 1 rail mile?	**Yes**	*Centralia Rd (to be grade separated as part of Raleigh to Richmond Project), south of crossing*
Major Safety / Geometric Deficiencies?	**No**	
Existing Four Quad, Medians, or Median Separators?	**No**	

PROPOSED ACTION: **CLOSURE** *(Secondary: Four Quad Gates)*

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are triggered:
  - Grade separation determined not feasible due to cost-benefit considerations (rural area) and impacts due to proximity of crossing to intersection with Chester Rd
  - Closure determined FEASBILE
- Adjacent crossing is located within 1 rail mile
  - Closure determined FEASIBLE
- No major safety or geometric deficiencies identified; no mitigation necessary
- Existing crossing treatment is gates (non-quad):
  - Median Treatment determined not feasible due to proximity of industrial access
  - Four Quad Gates determined feasible but secondary to closure

Proposed Action Design Considerations:

- Existing roadway network provides good connectivity to rail crossing within 1 mile north of existing crossing

Crossing Name: HERMITAGE ROAD — **Line / Crossing Number: S LINE / 623518E**

Jurisdiction: Richmond — **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	2025	2045	2015	2025	2045
10,150	11,650	14,650	21	52	52

General Description of Crossing: Minor arterial roadway, 4 lanes – divided/median separated. Urban – dense residential and commercial. Hermitage Road is the primary north-south roadway that connects downtown Richmond (to the south) to this commercial / sports area. Pedestrian crossing (sidewalks on both sides of crossing).

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**No**	
Adjacent Crossing within 1 rail mile?	**Yes**	*North Blvd (roadway overpass), north of crossing*
Major Safety / Geometric Deficiencies?	**No**	
Existing Four Quad, Medians, or Median Separators?	**Yes**	*Roadway has short raised medians*

PROPOSED ACTION: **ADDITIONAL MEDIAN TREATMENT**

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are not triggered
- Adjacent crossing is located within 1 rail mile:
  - Closure determined not feasible due to connectivity to roadway network as minor arterial roadway with significant daily volumes
- No major safety or geometric deficiencies identified; no mitigation necessary
- Existing crossing treatment is raised medians with gates:
  - Further treatment to increase safety potentially includes extension of raised medians to preclude vehicles and pedestrians from attempting to cross the median, and/or addition of median tubes

Proposed Action Design Considerations:

- Additional median treatment to extend existing raised medians and/or addition of median tubes

Crossing Name: BROOK ROAD
Jurisdiction: Richmond

Line / Crossing Number: S LINE / 623522U
Current Warning Device: Gates (Non-Quad)

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
8,222	9,437	11,867	21	52	52

General Description of Crossing: Minor arterial roadway, 4 lanes – divided/median separated. Urban area – mainly dense commercial / industrial, in direct proximity to I-64 and US Rt 1 interchange. Crossing is located on a restrictive railroad track curve that will continue to future (slow moving trains).

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**No**	
Adjacent Crossing within 1 rail mile?	**Yes**	*N Lombardy St (roadway overpass), north of crossing* *Chamberlayne Ave (roadway overpass), south of crossing*
Major Safety / Geometric Deficiencies?	**No**	
Existing Four Quad, Medians, or Median Separators?	**Yes**	*Roadway has short raised medians*

PROPOSED ACTION:	**ADDITIONAL MEDIAN TREATMENT**

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are not triggered
- Adjacent crossings are located within 1 rail mile:
  - Closure determined not feasible due to connectivity to roadway network as minor arterial roadway with significant daily volumes
- No major safety or geometric deficiencies identified; no mitigation necessary
- Existing crossing treatment is raised medians with gates:
  - Further treatment to increase safety potentially includes extension of raised medians to preclude vehicles from attempting to cross the median, and/or addition of median tubes

Proposed Action Design Considerations:

- Additional median treatment to extend existing raised medians and/or addition of median tubes

Crossing Name: ST JAMES STREET
Jurisdiction: Richmond

Line / Crossing Number: S LINE / 623525P
Current Warning Device: Gates (Non-Quad)

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
995	1,142	1,436	21	52	52

General Description of Crossing: Local roadway, 2 lanes. Urban areas to north and south, while crossing is mainly undeveloped with dense residential to south and north. St James Street is a north-south roadway that connects to residential grid networks on both sides of the crossing. School and cemetery located on north side of crossing.

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**No**	
Adjacent Crossing within 1 rail mile?	**Yes**	*Chamberlayne Ave (roadway overpass), north of crossing* *N 1st St (roadway overpass), south of crossing*
Major Safety / Geometric Deficiencies?	**No**	
Existing Four Quad, Medians, or Median Separators?	**No**	

PROPOSED ACTION:	**CLOSURE, WITH PEDESTRIAN BRIDGE** ***(Secondary: Median Separator)***

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are not triggered
- Adjacent crossings are located within 1 rail mile:
  - Closure determined FEASIBLE
- No major safety or geometric deficiencies identified; no mitigation necessary
- Existing crossing treatment is gates (non-quad):
  - Median separators determined feasible (no existing access points within proximity) but secondary to closure
  - Four Quad Gates determined feasible but secondary to median treatment

Proposed Action Design Considerations:

- Existing roadway network provides good connectivity to rail crossing within 1 mile of existing crossing that existing traffic can utilize after closure
- Community uses roadway as major pedestrian crossing of tracks → Mitigate with construction of pedestrian crossing as part of roadway closure

Crossing Name: N 2ND STREET / VALLEY ROAD **Line / Crossing Number: S LINE / 623527D**
Jurisdiction: Richmond **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	2025	2045	2015	2025	2045
2,132	2,447	3,077	21	52	52

General Description of Crossing: Local roadway, 2 lanes. Urban – dense residential areas on both sides of crossing, but commercial / industrial at crossing location between the two adjacent grade separated crossings of N 1st Street and N 5th Road. Crossing is located on a railroad track curve. High percentage truck traffic (industrial access).

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**No**	
Adjacent Crossing within 1 rail mile?	**Yes**	*N 1st St (roadway overpass), north of crossing* *N 5th St (roadway overpass) and Hospital St (at-grade), south of crossing*
Major Safety / Geometric Deficiencies?	**Yes**	*Limited sight distance at crossing due to curvature of track and roadway*
Existing Four Quad, Medians, or Median Separators?	**No**	

PROPOSED ACTION: **CLOSURE**
(Secondary: Four Quad Gates, with roadway realignment for safety)

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are not triggered
- Adjacent crossings are located within 1 rail mile:
  - Closure determined FEASIBLE
- Major safety or geometric deficiencies identified: Limited sight distance at crossing due to curvature of track and roadway. Mitigation:
  - Grade separation determined not feasible due to cost-benefit considerations (low volume roadway) and existing geometrics / impacts
  - Closure determined FEASIBLE
  - Roadway geometric improvements determined feasible with impacts
- Existing crossing treatment is gates (non-quad):
  - Median Treatment determined not feasible due to proximity of existing industrial access
  - Four Quad Gates determined feasible but secondary to closure due to safety mitigation

Proposed Action Design Considerations:

- Existing roadway network provides good connectivity to rail crossing within 1 mile of existing crossing that existing traffic can utilize after closure
  - Industrial access maintained via existing Valley Rd to Hospital St crossing

Crossing Name: HOSPITAL STREET / N 7TH STREET **Line / Crossing Number: S LINE / 623530L**
Jurisdiction: Richmond **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	2025	2045	2015	2025	2045
5,786	6,641	8,351	21	52	52

General Description of Crossing: Minor arterial roadway, 2 lanes. Urban – large commercial / industrial properties at crossing, though Hospital street connects to residential areas. I-64 overpass Hospital Street within approximately 300 ft of crossing. Hazmat facility located within direct proximity of crossing. Crossing is located on a railroad track curve.

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**No**	
Adjacent Crossing within 1 rail mile?	**Yes**	*N 5th St (roadway overpass), north of crossing* *Rt 33 / Leigh St (roadway overpass), south of crossing*
Major Safety / Geometric Deficiencies?	**Yes**	*Limited sight distance at crossing due to curvature of track.* *Intersection of Hospital St and N 7th St literally on top of tracks*
Existing Four Quad, Medians, or Median Separators?	**No**	

PROPOSED ACTION: **GRADE SEPARATE WITH INTERSECTION REALIGNMENT**
(Secondary: Four Quad Gates, with intersection realignment)

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are not triggered
- Adjacent crossings are located within 1 rail mile;
  - Closure determined not feasible due to connectivity to network as a minor arterial roadway and primary industrial area access
- Major safety or geometric deficiencies identified: Limited sight distance due to railroad track curve, and intersection location at crossing. Mitigation:
  - Safety geometric modifications determined to be FEASIBLE – addition of Four Quad Gate, with relocation of N 7th St intersection
  - Grade separation determined to be FEASIBLE, would require relocation of N 7th St intersection
  - Closure determined not feasible (see reasons above)
- Existing crossing treatment is gates (non-quad):
  - Median Treatment determined not feasible due to proximity of industrial access
  - Four Quad Gates determined FEASIBLE, would require safety improvements (see above)

Proposed Action Design Considerations:

- Grade separation is preferred for safety and part of overall network connectivity in this area.

Crossing Name: MAURY STREET | **Line / Crossing Number: S LINE / 623539X**

Jurisdiction: Richmond | **Current Warning Device: Flashing Lights**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
2,577	2,957	3,719	21	44	44

General Description of Crossing: Local roadway, 2 lanes. Urban. Maury Street provides sole access to an industrial area that is located on the east side of I-95, which Maury Street underpasses directly east of the crossing. High percentage truck traffic (industrial access). Manchester Warehouse & Industrial Historic District is located along Maury St, west of crossing.

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**No**	
Adjacent Crossing within 1 rail mile?	**No**	*I-95 Maury St ramp (grade separated) located immediately adjacent to crossing but does not provide access to surface street network for traffic*
Major Safety / Geometric Deficiencies?	**No**	
Existing Four Quad, Medians, or Median Separators?	**No**	

PROPOSED ACTION:	**FOUR QUAD GATES**

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are not triggered
- No adjacent crossings located within 1 rail mile; closure not feasible
- No major safety or geometric deficiencies identified; no mitigation necessary
- Existing crossing treatment is gates (non-quad):
    - Median Treatment determined not feasible due to use of crossing by large vehicles (larger turning radii)
    - Four Quad Gates determined FEASIBLE

Proposed Action Design Considerations:

- No special design considerations identified

Crossing Name: GOODES STREET | **Line / Crossing Number: S LINE / 623543M**

Jurisdiction: Richmond | **Current Warning Device: None**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
203	233	293	21	44	44

General Description of Crossing: Local roadway, 2 lanes. Rural. Goodes Street provides the sole access from Commerce Road to a commercial / industrial area located on the east side of I-95 (Goodes Street underpass I-95 east of crossing).

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**No**	
Adjacent Crossing within 1 rail mile?	**Yes**	*E Commerce St (at grade), south of crossing*
Major Safety / Geometric Deficiencies?	**Yes**	*Flood gate proximity, east side of crossing*
Existing Four Quad, Medians, or Median Separators?	**No**	

PROPOSED ACTION:	**FOUR QUAD GATES, with roadway realignment**

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are not triggered
- Adjacent crossing is located within 1 rail mile:
    - Closure determined not feasible because crossing provides sole access to property owner's area on the east side of the crossing
- Major safety or geometric deficiencies identified: Flood gate location impacts roadway operation. Mitigation:
    - Realignment of roadway determined to be FEASIBLE
- Existing crossing treatment is gates (non-quad):
    - Median Treatment determined not feasible due use of roadway by large vehicles and roadway curvature
    - Four Quad Gates determined FEASIBLE (with safety improvements)

Proposed Action Design Considerations:

- Design of four quad gates to include roadway realignment to improve existing conflict with flood gates

Crossing Name: E COMMERCE ROAD **Line / Crossing Number: S LINE / 623545B**

Jurisdiction: Richmond **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	2025	2045	2015	2025	2045
4,263	4,893	6,153	21	44	44

General Description of Crossing: Minor arterial roadway, 2 lanes, with significant skew at crossing. Urban. E Commerce Road is the primary access point to the north side of the large industrial region that is located just south of this crossing.

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**No**	
Adjacent Crossing within 1 rail mile?	**Yes**	*Ruffin Rd (at-grade), south of crossing*
Major Safety / Geometric Deficiencies?	**No**	
Existing Four Quad, Medians, or Median Separators?	**No**	

PROPOSED ACTION:	**GRADE SEPARATE** ***(required as part of siding to industrial area)***

Process / Justification / Future Considerations:

- **The DC2RVA 3rd track improvement includes a ~ 10,000 ft siding to the industrial area that will affect this crossing (i.e., stopped trains will be on tracks across this crossing). As the crossing is the primary access point to the large industrial area and cannot be closed, this crossing must be grade separated to accommodate the siding.**

Crossing Name: RUFFIN ROAD **Line / Crossing Number: S LINE / 623547P**

Jurisdiction: Richmond **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	2025	2045	2015	2025	2045
1,827	2,097	2,637	21	44	44

General Description of Crossing: Major collector roadway, 2 lanes. Urban – dense residential communities and industry. It is approximately ½ mile in total length, and connects Commerce Rd to the east and US Rt 1 to the west. Community center is located on east side of crossing. Public transit utilizes the crossing. Parallel parking along the crossing roadway.

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**No**	
Adjacent Crossing within 1 rail mile?	**Yes**	*E Commerce St (at-grade), north of crossing* *Bells Rd (at-grade), south of crossing*
Major Safety / Geometric Deficiencies?	**No**	
Existing Four Quad, Medians, or Median Separators?	**No**	

PROPOSED ACTION:	**MEDIAN SEPARATORS**

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are not triggered
- Adjacent crossings are located within 1 rail mile:
  - Closure determined not feasible due to connectivity to the roadway network as a major collector roadway, and primary access to large community center recreational area
- No major safety or geometric deficiencies identified; no mitigation necessary
- Existing crossing treatment is gates (non-quad):
  - Median separators determined FEASIBLE
  - Four Quad Gates determined feasible but secondary to median treatment

Proposed Action Design Considerations:

- The DC2RVA siding into the industrial area will terminate just north of this crossing. Use of median separators compared to four quad gates will reduce the length of the crossing circuit approaches and the volume of false activations.

Crossing Name: BELLS ROAD **Line / Crossing Number: S LINE / 623548W**
Jurisdiction: Richmond **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	2025	2045	2015	2025	2045
8,932	10,252	12,892	21	44	44

General Description of Crossing: Minor arterial roadway, 4 lanes. Urban – high density residential to the west of the crossing, and along Bells Rd, industrial / commercial area to the east of the crossing. Bells Rd is median separated (raised grassed medians, broken by turning lanes). It connects Commerce Rd to the east and US Rt 1 and beyond to the west.

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**No**	
Adjacent Crossing within 1 rail mile?	**Yes**	*Ruffin Rd (at-grade), north of crossing* *Dale Ave (at-grade), south of crossing*
Major Safety / Geometric Deficiencies?	**No**	
Existing Four Quad, Medians, or Median Separators?	**Yes**	*Raised medians with gates.*

PROPOSED ACTION:	**ADDITIONAL MEDIAN TREATMENT**

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are not triggered
- Adjacent crossings are located within 1 rail mile:
  - Closure determined not feasible due to connectivity to network as a minor arterial roadway with significant daily volumes
- No major safety or geometric deficiencies identified; no mitigation necessary
- Existing crossing treatment is raised medians with gates:
  - Further treatment includes extension of raised medians (east side of crossing) to preclude vehicles from crossing the median.

Proposed Action Design Considerations:

- Additional median treatment to extend existing raised medians will require slight relocation of existing driveway access to Phillip Morris (north side of roadway, east side of crossing), slightly more to the east within their existing property to access the same existing gated entrance

Crossing Name: DALE AVENUE / TRENTON AVENUE **Line / Crossing Number: S LINE / 623549D**
Jurisdiction: Richmond **Current Warning Device: None**

AADT			Total Number of Daily Trains		
2015	2025	2045	2015	2025	2045
275	315	396	21	44	44

General Description of Crossing: Local roadway, 2 lanes. Rural. Dale Avenue is used as a short cut connector roadway by local vehicles. Directly east of crossing, Dale Ave has a 90-degree turn and becomes Trenton Ave and provides access to the industrial / commercial area that connects to Commerce Rd.

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**No**	
Adjacent Crossing within 1 rail mile?	**Yes**	*Bells Rd (at-grade), north of crossing* *Cogbill Rd (roadway overpass), south of crossing*
Major Safety / Geometric Deficiencies?	**No**	
Existing Four Quad, Medians, or Median Separators?	**No**	

PROPOSED ACTION:	**CLOSURE** ***(Secondary: Locking Gate, Dupont industrial area needs to maintain emergency access)***

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are not triggered
- Adjacent crossings are located within 1 rail mile:
  - Closure determined FEASIBLE
- No major safety or geometric deficiencies identified; no mitigation necessary
- Existing crossing treatment is gates (non-quad):
  - Median Treatment determined not feasible due to roadway curvature
  - Four Quad Gates determined feasible but secondary to closure – should be locking gate, if emergency access maintenance is needed.

Proposed Action Design Considerations:

- Existing roadway network provides good connectivity to rail crossing within 1 mile of existing crossing that existing traffic can utilize after closure

Crossing Name: KINGSLAND ROAD — **Line / Crossing Number: S LINE / 623559J**

Jurisdiction: Chesterfield County — **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	2025	2045	2015	2025	2045
2,030	2,330	2,930	21	44	44

General Description of Crossing: Major collector roadway, 2 lanes. Urban. Kingsland Road is approximately 4 miles in total length and crosses both the A and S Lines. In this vicinity of this crossing, it provides east-west access through residential area to connect traffic to US Rt 1 less than ½ mile east of crossing.

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**No**	
Adjacent Crossing within 1 rail mile?	**Yes**	*Rt 1 (roadway overpass), north of crossing* *Brinkley Rd (at-grade), south of crossing*
Major Safety / Geometric Deficiencies?	**No**	
Existing Four Quad, Medians, or Median Separators?	**No**	

PROPOSED ACTION: **FOUR QUAD GATES**

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are not triggered
- Adjacent crossings are located within 1 rail mile:
  - Closure determined not feasible due to connectivity to roadway network as a major collector that provides primary crossing to and through dense residential areas
- No major safety or geometric deficiencies identified; no mitigation necessary
- Existing crossing treatment is gates (non-quad):
  - Median Treatment determined not feasible due to proximity of T-intersection
  - Four Quad Gates determined FEASIBLE

Proposed Action Design Considerations:

- Minimal striping and narrow roadway widths existing on crossing roadway (may require improvements as part of design)

Crossing Name: BRINKLEY ROAD — **Line / Crossing Number: S LINE / 623660H**

Jurisdiction: Chesterfield County — **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	2025	2045	2015	2025	2045
1,827	2,097	2,637	21	44	44

General Description of Crossing: Local roadway, 2 lanes. Rural. Brinkley Road dead-ends, to the west, in a residential area. The Brinkley Road crossing provides connection from Thurston Rd / Dorsey Rd, the intersection with which is located within 150 ft west of crossing. East of crossing, Brinkley Rd T-intersects Chester Rd within 50 ft of crossing.

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**No**	
Adjacent Crossing within 1 rail mile?	**Yes**	*Kingsland Rd (at-grade), north of overpass* *Old Ln (at-grade), south of overpass*
Major Safety / Geometric Deficiencies?	**No**	
Existing Four Quad, Medians, or Median Separators?	**No**	

PROPOSED ACTION: **CLOSURE** *(Secondary: Four Quad Gates)*

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are not triggered
- Adjacent crossings are located within 1 rail mile:
  - Closure is determined FEASIBLE
- No major safety or geometric deficiencies identified; no mitigation necessary
- Existing crossing treatment is gates (non-quad):
  - Median Treatment determined not feasible due to proximity of existing industrial driveway
  - Four Quad Gates determined feasible but secondary to closure

Proposed Action Design Considerations:

- Existing roadway network provides good connectivity to rail crossing within 1 mile of existing crossing via parallel roadways to railroad tracks on both sides of crossing, that existing traffic can utilize after closure

Appendix OO

At-Grade Crossing Evaluation Technical Memorandum

ATTACHMENT B.

Summary of Considerations and Proposed Actions at Individual Grade Crossings:

Private At-Grade Crossings

March 10, 2016

DC TO RICHMOND
SOUTHEAST HIGH SPEED RAIL

Summary of Considerations and Proposed Actions at Individual Grade Crossings

Private At-Grade Crossings


DRPT
Virginia Department of Rail and Public Transportation

U.S. Department of Transportation
Federal Railroad Administration

The purpose of this document is provide a record of the screening process and resulting proposed actions for the private at-grade crossings.

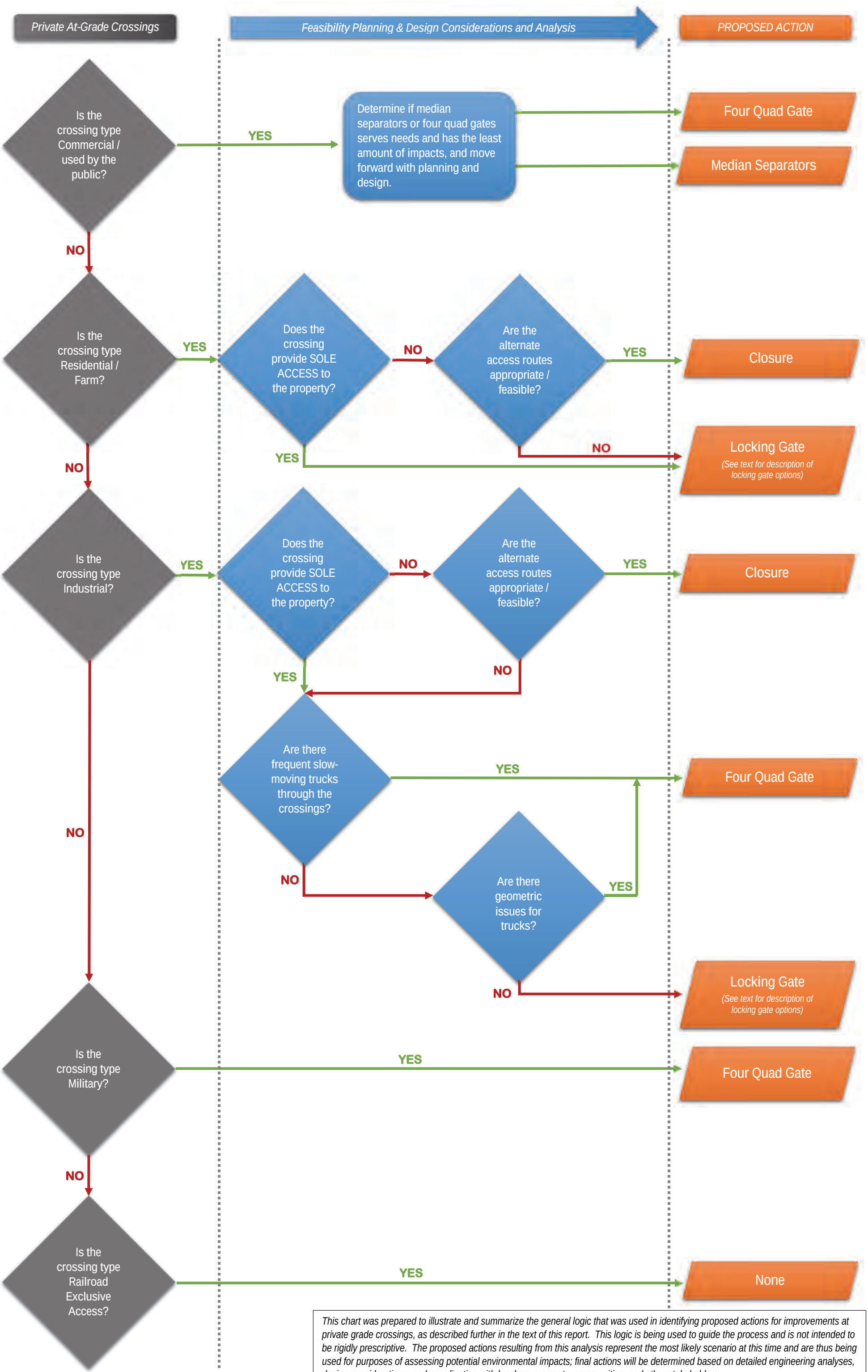
The DC2RVA emerging high-speed rail corridor must be a sealed corridor; this means that all crossings must be grade separated or have appropriate crossing treatments that do not allow vehicles to cross the tracks when train crossings are active. Accordingly, the proposed action for each DC2RVA private crossing is one of the following:

- Closure
- Locking Gate (users need to have a key or code to open the gates, gates would not open when a train is on approach)
- Four Quad Gates
- Median Separators
- No Action (applicable too Railroad Exclusive Access crossings only)

A flow-chart that depicts the screening criteria and subsequent process is presented on the next page (page 2). This chart was prepared to illustrate and summarize the general logic that was used in identifying proposed actions for improvements at private grade crossings, as described further in the text of this report. This logic is being used to guide the process and is not intended to be rigidly prescriptive.

The proposed actions resulting from this analysis represent the most likely scenario at this time and are thus being used for purposes of assessing potential environmental impacts; final actions will be determined based on detailed engineering analyses, design considerations, and coordination with local governments, communities, and other stakeholders.

The remainder of this document begins with a summary table of the proposed action for each private at-grade crossing, followed by a one-page summary for each crossing that steps through the flow-chart logic to get to the final proposed action.



This chart was prepared to illustrate and summarize the general logic that was used in identifying proposed actions for improvements at private grade crossings, as described further in the text of this report. This logic is being used to guide the process and is not intended to be rigidly prescriptive. The proposed actions resulting from this analysis represent the most likely scenario at this time and are thus being used for purposes of assessing potential environmental impacts; final actions will be determined based on detailed engineering analyses, design considerations, and coordination with local governments, communities, and other stakeholders.

CROSSING NUMBER	Crossing Roadway Name *Listed North to South, by Rail Line*	Location	Rail Line	Existing Warning Device	Crossing Type	Sole Access? (Yes / No)	PROPOSED ACTION
Unknown09	Unnamed Private Crossing	Alexandria City	RF&P	None	Railroad Exclusive Access	Yes	No Action
860601G	Cherry Hill Road	Prince William County	RF&P	Flashing Signal w/ Gates	Commercial	Yes	Four Quad Gate
860609L	Henderson Road / Epperson Avenue	Prince William County	RF&P	Flashing Signal w/ Gates	Military	No	Four Quad Gate
860586G	Flemming Street	Stafford County	RF&P	Flashing Signal w/ Gates	Military	No	Four Quad Gate
860582E	Lees Private Crossing	Stafford County	RF&P	Passive (Ropes)	Residential	Yes	Locking Gate
860543N	Jones Private Crossing	Caroline County	RF&P	None	Farm	No	Locking Gate
860540T	Rixey Road	Caroline County	RF&P	None	Residential	Yes	Locking Gate
860538S	Roes Private Crossing	Caroline County	RF&P	None	Farm	No	Locking Gate
860531U	Unnamed Private Crossing	Caroline County	RF&P	None	Residential	Yes	Locking Gate
860530M	Unnamed Private Crossing	Caroline County	RF&P	None	Residential	Yes	Locking Gate
860529T	Unnamed Private Crossing	Caroline County	RF&P	None	Farm	Yes	Locking Gate
860528L	Unnamed Private Crossing	Caroline County	RF&P	None	Farm	Yes	Locking Gate
860526X	Georges Private Crossing	Caroline County	RF&P	None	Farm	Yes	Locking Gate
860521N	Chandlers Private Crossing	Caroline County	RF&P	None	Farm	Yes	Locking Gate
860519M	Excelsior Mill Private Crossing	Hanover County	RF&P	None	Residential	Yes	Locking Gate
623541Y	4th Street Extension Private Crossing	Richmond	S-LINE	Flashing Signal w/ Gates	Industrial	Yes	Locking Gate
623544U	Federal Paper Private Crossing	Richmond	S-LINE	None	Industrial	No	Locking Gate
623552L	Texaco Road Private Crossing	Chesterfield County	S-LINE	Passive	Industrial	No	Four Quad Gate
623554A	Station Road Private Crossing	Chesterfield County	S-LINE	Passive	Industrial	Yes	Four Quad Gate

Crossing Name / Number: Unnamed Private Crossing / Unknown09
Line: RF&P Jurisdiction: Alexandria City

Observations:

Warning Device	None
Sole Access	Yes
Crossing Type	Railroad Exclusive Access
# Lanes	2
Rdwy Paved?	No
General Description	– Unpaved roadway that crosses CSX tracks only – Appears to be within railroad ROW – Roadway connects to Business Center Drive – No residences served by crossing – No businesses served by crossing

PROPOSED ACTION:	**No Action**

Process / Justification:

- Railroad exclusive access (within ROW and under purview of CSX); no further treatment required

Crossing Name / Number: Cherry Hill Road / 860601G
Line: RF&P Jurisdiction: Prince William County

Observations:

Warning Device	Flashing signal with gates
Sole Access	Yes, roadway dead-ends on east side of crossing
Crossing Type	Commercial / Residential
# Lanes	2
Rdwy Paved?	Yes
General Notes	– Marina access with popular restaurant – Serves 1-2 residential properties – Connecting unpaved road serves industrial area to the south (not pictured) – Limited striping, pavement width, and site distance at crossing

PROPOSED ACTION:	**Four Quad Gate**

Process / Justification:

- Commercial / residential crossing
  - Designed for marina access
  - Used by the public

- Median separator not feasible due to intersection geometrics (proximity of T-intersection)

Crossing Name / Number: Henderson Rd / Epperson Ave / 860609L
Line: RF&P Jurisdiction: Prince William County / Quantico

Observations:

Warning Device	Flashing signal with gates
Sole Access	No, though connection to southern adjacent crossing appears to be blockaded / restricted. Connection to northern crossing through dense residential.
Crossing Type	Military
# Lanes	2
Rdwy Paved?	Yes
General Notes	– Crossing just over ½ mile south of public Quantico crossing (Potomac Ave) – Provides access to industrial (water treatment) at crossing; high density residential north of crossing; and airfield area (restricted access) south of crossing. – Close proximity to buildings.

PROPOSED ACTION:	**Four Quad Gate**

Process / Justification:

- Military crossing

Crossing Name / Number: Flemming Street / 860586G
Line: RF&P Jurisdiction: Stafford County / Quantico

Observations:

Warning Device	Flashing signal with gates
Sole Access	No
Crossing Type	Military
# Lanes	2
Rdwy Paved?	Yes
General Notes	– Only crossing of tracks in this area of Quantico (south of waterway/airport) – Access to upstream grade-separated crossing provided via Bauer Rd (east side of tracks) – Industrial area on east side of tracks – High density residential or office on west side of tracks – Close proximity to water

PROPOSED ACTION:	**Four Quad Gate**

Process / Justification:

- Military crossing

Crossing Name / Number: Lees Private Crossing / 860582E
Line: RF&P Jurisdiction: Stafford County

Observations:

Warning Device	Passive (Owner installed ropes)
Sole Access	Yes, east side
Crossing Type	Residential
# Lanes	1
Rdwy Paved?	No
General Notes	– Driveway to 1 property. – Driveway connects to Arkendale Rd. – Limited width, no striping (unpaved), good site distance at crossing

PROPOSED ACTION:	**Locking Gate**

Process / Justification:

- Residential crossing

- Provides sole access to property

Crossing Name / Number: Jones Private Crossing / 860543N
Line: RF&P Jurisdiction: Caroline County

Observations:

Warning Device	None
Sole Access	No – Unpaved road continues on west side of tracks to connect to Woodford Road (proposed eliminated as part of this project.
Crossing Type	Farm
# Lanes	1
Rdwy Paved?	No
General Notes	– Single property farm access between fields and/or undeveloped areas – Connects to Rozell Rd / 609 on east side of tracks – Dead end roads on west side of tracks

PROPOSED ACTION:	**Locking Gate**

Process / Justification:

- Farm crossing

- While it is not the sole access point for the property, the alternate access route is not feasible (too long and/or not appropriate for farm equipment)

Crossing Name / Number: Rixey Road / 860540T
Line: RF&P Jurisdiction: Caroline County

Observations:

Warning Device	None
Sole Access	Yes, west side.
Crossing Type	Residential
# Lanes	1
Rdwy Paved?	No
General Notes	– Driveway to single property (house and fields) on west side of crossing

PROPOSED ACTION:	**Locking Gate**

Process / Justification:

- Residential crossing

- Provides sole access to property

Crossing Name / Number: Roes Private Crossing / 860538S
Line: RF&P Jurisdiction: Caroline County

Observations:

Warning Device	None
Sole Access	No – unpaved connection on both sides of crossing to main roadway
Crossing Type	Farm / Residential
# Lanes	1
Rdwy Paved?	No
General Notes	– Connects to Rogers Clark Blvd on both sides of crossing (median separated high speed road) – Residential on east side of crossing

PROPOSED ACTION:	**Locking Gate**

Process / Justification:

- Farm / Residential crossing

- While it is not the sole access point for the property, the alternate access route is not feasible – the connecting roadway (Rogers Clark Blvd) is high-speed, median separated without cross-overs and not appropriate for farm equipment

Crossing Name / Number: Unnamed Private Crossing / 860531U
Line: RF&P Jurisdiction: Caroline County

Observations:

Warning Device	None
Sole Access	Yes, west side
Crossing Type	Residential / Farm
# Lanes	1
Rdwy Paved?	Yes
General Notes	– Driveway to 1-2 residences and farm fields – Connects to Industrial Drive on east side of crossing

PROPOSED ACTION:	**Locking Gate**

Process / Justification:

- Residential / Farm crossing
- Provides sole access to property

Crossing Name / Number: Unnamed Private Crossing / 860530M
Line: RF&P Jurisdiction: Caroline County

Observations:

Warning Device	None
Sole Access	Yes, west side
Crossing Type	Residential
# Lanes	1
Rdwy Paved?	Yes
General Notes	– Connects to end of Industrial Drive (east side of crossing) – Connects to 1-2 residences, south-west side of crossing – Active spur

PROPOSED ACTION:	**Locking Gate**

Process / Justification:

- Residential crossing

- Provides sole access to property

Crossing Name / Number: Unnamed Private Crossing / 860529T
Line: RF&P Jurisdiction: Caroline County

Observations:

Warning Device	None
Sole Access	Yes
Crossing Type	Farm
# Lanes	1
Rdwy Paved?	No
General Notes	– Access between fields – Connects to unpaved track system throughout fields – No nearby residences or structures. Closest structure is ~1/2 mile on the south-west of crossing. – No residences served by crossing

PROPOSED ACTION:	**Locking Gate**

Process / Justification:

- Farm crossing

- Provides sole access to property

Crossing Name / Number: Unnamed Private Crossing / 860528L
Line: RF&P Jurisdiction: Caroline County

Observations:

Warning Device	None
Sole Access	Yes
Crossing Type	Farm
# Lanes	1
Rdwy Paved?	No
General Notes	– Access between fields – Connects to unpaved track system throughout fields – No nearby residences or structures. Closest structure is ~1/2 mile on the west of crossing. – No residences served by crossing

PROPOSED ACTION:	**Locking Gate**

Process / Justification:

- Farm crossing

- Provides sole access to property

Crossing Name / Number: Georges Private Crossing / 860526X
Line: RF&P Jurisdiction: Caroline County

Observations:

Warning Device	None
Sole Access	Yes
Crossing Type	Farm / Residential
# Lanes	1
Rdwy Paved?	No
General Notes	– Access between field / undeveloped areas – May be a residence / RV north-east of crossing that is served by crossing – Connects to unpaved track system throughout undeveloped area – Closest structure is ~1,500 feet south of crossing

PROPOSED ACTION:	**Locking Gate**

Process / Justification:

- Farm / Residential crossing

- Provides sole access to property

Crossing Name / Number: **Chandlers Private Crossing / 860521N**
Line: RF&P Jurisdiction: Caroline County

Observations:

Warning Device	None
Sole Access	Yes, east side
Crossing Type	Farm
# Lanes	1
Rdwy Paved?	No
General Notes	– Access to undeveloped areas (forested, not open fields) and track network on east side of crossing. – Cleared area may be used for RV parking? No permanent residence structure present on aerial imagery. – This crossing may be impacted by the future potential Carmel Church improvements (area of land bounded by 95 and railroad tracks).

PROPOSED ACTION:	**Locking Gate**

Process / Justification:

- Farm crossing

- Provides sole access to property

Note that proposed action is for existing conditions (Does not assume any improvements to Carmel Church project).

Crossing Name / Number: Excelsior Mill / 860519M
Line: RF&P Jurisdiction: Hanover County

Observations:

Warning Device	None
Sole Access	Yes, east side
Crossing Type	Residential
# Lanes	1
Rdwy Paved?	No
General Notes	– Driveway to one residential property on east side of crossing – Connects to Doswell Park Rd on west side of crossing

PROPOSED ACTION:	**Locking Gate**

Process / Justification:

- Residential crossing

- Provides sole access to property

Crossing Name / Number: 4th Street Extension / 623541Y
Line: S-Line Jurisdiction: Richmond

Observations:

Warning Device	Flashing signal with gates
Sole Access	Yes (assuming private underpass not currently functioning, see below).
Crossing Type	Industrial
# Lanes	2
Rdwy Paved?	Yes
General Notes	– Driveway access to industrial area – Private underpass (deficient, poor drainage, small) located ~500 ft south of crossing, provides access to same area.

PROPOSED ACTION:	**Locking Gate**

Process / Justification:

- Industrial crossing
- Provides sole access to property
- No slow moving trucks
- No geometric issues

Crossing Name / Number: Federal Paper Private Crossing / 623544U
Line: S-Line Jurisdiction: Richmond

Observations:

Warning Device	None
Sole Access	No
Crossing Type	Industrial
# Lanes	1
Rdwy Paved?	No
General Notes	– Unpaved crossing connecting industrial area – Unpaved tracks continue to quarry area (north of crossing) to crossing there

PROPOSED ACTION:	**Locking Gate**

Process / Justification:

- Industrial crossing

- While it is not the sole access point for the property, the alternate access route is not feasible (too long and/or not appropriate)

Crossing Name / Number: Texaco Rd / 623552L
Line: S-Line Jurisdiction: Chesterfield County

Observations:

Warning Device	Passive *(assumed, inconclusive in aerial)*
Sole Access	No – but connecting roadway circuitous route through industrial area to the north (so may not be feasible)
Crossing Type	Industrial
# Lanes	2
Rdwy Paved?	Yes
General Notes	– Southern-most crossing into large industrial area – Crossing connects to US Route 1 on the west – R2R project shows this crossing as "closed"

PROPOSED ACTION:	**Four Quad Gate**

Process / Justification:

- Industrial crossing
- While it is not the sole access point for the property, the alternate access route is not feasible (too long and/or not appropriate)
- Slow moving trucks (tanker trucks)
- Geometric issues (sag curve)

Crossing Name / Number: Station Rd / 623554A

Line: S-Line Jurisdiction: Chesterfield County

Observations:

Warning Device	Passive *(assumed, inconclusive in aerial)*
Sole Access	Yes, east side
Crossing Type	Industrial
# Lanes	1
Rdwy Paved?	Yes
General Notes	– Driveway to residence (1) and industrial area – Connects to Station Road, west side of crossing

PROPOSED ACTION:	**Four Quad Gate**

Process / Justification:

- Industrial crossing
- Provides sole access to property
- Slow moving trucks

Appendix OO

At-Grade Crossing Evaluation Technical Memorandum

ATTACHMENT C.

Summary of Considerations and Proposed Actions at Individual Grade Crossings:

Fredericksburg Bypass, Public and Private At-Grade Crossings

May 5, 2016

DC TO RICHMOND
SOUTHEAST HIGH SPEED RAIL

Summary of Considerations & Proposed Actions

At-Grade Crossings, Fredericksburg Bypass

FINAL

DRPT
Virginia Department of Rail and Public Transportation

U.S. Department of Transportation
Federal Railroad Administration

This document provides the summary of considerations and resulting proposed actions for the existing at-grade public and private crossings for the DC2RVA Fredericksburg Bypass alignment. This proposed alignment partially utilizes an existing rail spur that has five public and 5 private at-grade crossings.

The process for the DC2RVA Fredericksburg Bypass alignment decision-making is intended to follow the same process of the mainline corridor analysis (refer to that documentation for full details). The most notable difference is the consideration of the 11 FHWA Guidance Criteria for grade separation and closure of public at-grade crossings; this analysis was not performed for the Fredericksburg Bypass alignment as it is a rail spur and does not carry daily trains to warrant the analysis (i.e., no thresholds would be exceeded using existing data).

The remainder of this document presents a summary table of all Fredericksburg Bypass crossings (both public and private, ordered from north to south respectively), followed by data sheets for each individual crossing that mimic those of the mainline analysis. The order is this document is as follows:

- Summary of Considerations for Treatments, Public At-Grade Crossings
- Proposed Actions, Public At-Grade Crossings
- Summary of Considerations and Proposed Actions, Private At-Grade Crossings

Crossing #	At-Grade Crossing Roadway	Type	Warning Device	# Lanes	Paved?	Functional Classification	AADT (2014)	Location	PROPOSED ACTION
PUBLIC CROSSINGS									
860345T	**Debruen Ln**	Public	Flashing Signal w/ Gates	2	Yes	Local	--	Stafford County	**Median Separators**
860348N	**Ferry Rd**	Public	Flashing Signal w/ Gates	2	Yes	Major Collector	9,000	Stafford County	**Four Quad Gate with intersection / roadway realignment**
860349V	**Federal Dr**	Public	Flashing Signal w/ Gates	2	Yes	Local	1,300	Stafford County	**Four Quad Gate**
860353K	**Little Falls Rd**	Public	Flashing Signal	2	Yes	Local	150	Stafford County	**Gates w/ Median Separators**
860357M	**Forest Lane Rd**	Public	Flashing Signal	2	Yes	Local	1,400	Stafford County	**Gates w/ Median Separators**
PRIVATE CROSSINGS									
FBBP01	**Hot Top Rd**	Private	Locking Gate (Passive with Stop Signs)	1	No	--	--	Stafford County	**Locking Gate** ***(update to DC2RVA standard, i.e. tied into track circuit)***
FBBP02	**Driveway (Private)**	Private	Passive (Stop Signs)	1	Yes	--	--	Stafford County	**Closure**
860352D	**Cleek Ln (Driveway, Private)**	Private	None	1	No	--	--	Stafford County	**Locking Gate**
FBBP03	**Driveway (Private)**	Private	None	1	No	--	--	Stafford County	***Assumed not to be an official FRA crossing; Remove ability to cross tracks at this location***
860356F	**Driveway (Private)**	Private	Passive (Stop Signs)	1	No	--	--	Stafford County	**Closure, with new driveway connection** *Secondary: Locking Gate*

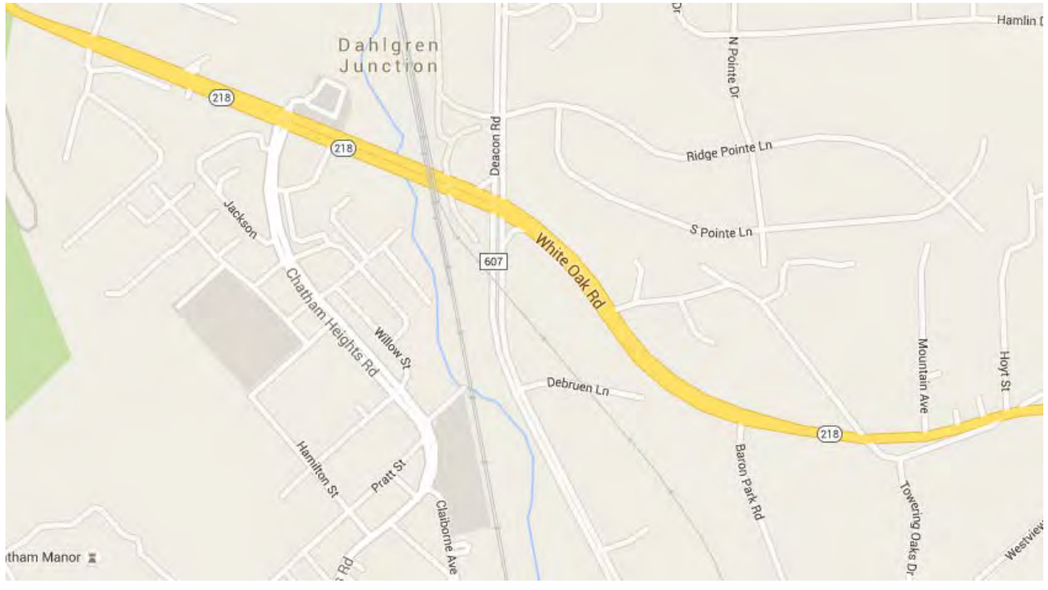
SUMMARY OF CONSIDERATIONS FOR TREATMENTS AT INDIVIDUAL CROSSINGS

PUBLIC AT-GRADE CROSSINGS: FREDERICKSBURG BYPASS

Crossing Name: DEBRUEN LANE **Line / Crossing Number: RF&P / 860345T**
Jurisdiction: Stafford County **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	2025	2045	2015	2025	2045
-	-	-	-	-	-

General Description of Crossing: Local roadway, 2 lanes at crossing. Debruen Ln is approximately 800 feet in total length. To the west of the crossing, it provides residential access and intersects Cool Springs Rd within ~350 feet. To the east of the crossing, it provides sole access to a residence and commercial properties.



Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	N/A
Traffic / Operations	Low volume road (volume unknown per VDOT). Unsignalized intersection with Cool Springs Road ~350 feet west of crossing.
General Description of Major Environmental	None identified.
Safety/Geometric Deficiencies	Minimal striping on east side of crossing. Proximity of residential driveway / parking, west side of crossing.
Engineering	Grade separation of roadway over railroad not feasible without impact to Cool Spring Rd.
Existing Property	2 residences, west side of crossing. 1 house and commercial, east side of crossing.
Cost-Benefit (Preliminary)	Cost-benefit considerations – low volume roadway.

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	White Oak Road (existing roadway overpass) is located less than 1 mile upstream.
Accessibility	Provides sole access to 1 residence on east side of crossing. Commercial buildings on the east side of the crossing may have back access via Baron Park Road. If closed, would require new connection and potential improvements to Baron Park Road. Vehicles would then have to utilize the existing at-grade, unsignalized intersection of Baron Park Rd / White Oak Rd – may not be appropriate due to large volume of truck traffic and median-separated White Oak Rd.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Location not feasible for median separator treatment due to proximity of driveways and use by large vehicles (turning radii). Four Quad Gates could improve existing safety treatment.

Total Bus Trips Using Crossing (Daily):	0	**Crossing Used by Public Transit? (Yes / No)**	No

Summary of Considerations for Decision-Making

Grade Separate	Cost-benefit considerations. Proximity of Cool Springs Road.
Eliminate / Consolidate	Feasible, with new connection to Baron Park Road.
Add Quad Gates	Feasible.
Add Median Separator	Proximity of residential driveway.
Other	

Crossing Name: FERRY ROAD
Jurisdiction: Stafford County

Line / Crossing Number: RF&P / 860348N
Current Warning Device: Gates (Non-Quad)

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
9,000	-	-	-	-	-

General Description of Crossing: Major collector roadway, 2 lanes. Ferry Rd terminates at Kings Hwy intersection (less than 300 ft west of crossing, major signalized intersection). East of crossing, Ferry Rd provides access to residential neighborhoods.

Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	N/A
Traffic / Operations	High volume roadway. Signalized intersection with Kings Hwy <300 ft west of crossing. Unsignalized intersection with Mount Vernon Ave (parallel separated one-way pair) <10 ft east of crossing.
General Description of Major Environmental	George Washington's Ferry Farm adjacent to Kings Hwy.
Safety/Geometric Deficiencies	Proximity of Mount Vernon Ave intersections to crossing.
Engineering	Grade separation of roadway over railroad not feasible without impact to Kings Hwy.
Existing Property	Residential east of crossing. Commercial west of crossing.
Cost-Benefit (Preliminary)	--

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	No other public roadway crossings within 1 mile.
Accessibility	Ferry Rd is the main major east-west crossing in the area.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Median treatment feasible, should be able to get enough clearance to intersections / driveways on both sides of crossing.
Four Quad gates would improve existing safety treatment.

Total Bus Trips Using Crossing (Daily):	--	**Crossing Used by Public Transit? (Yes / No)**	No

Summary of Considerations for Decision-Making

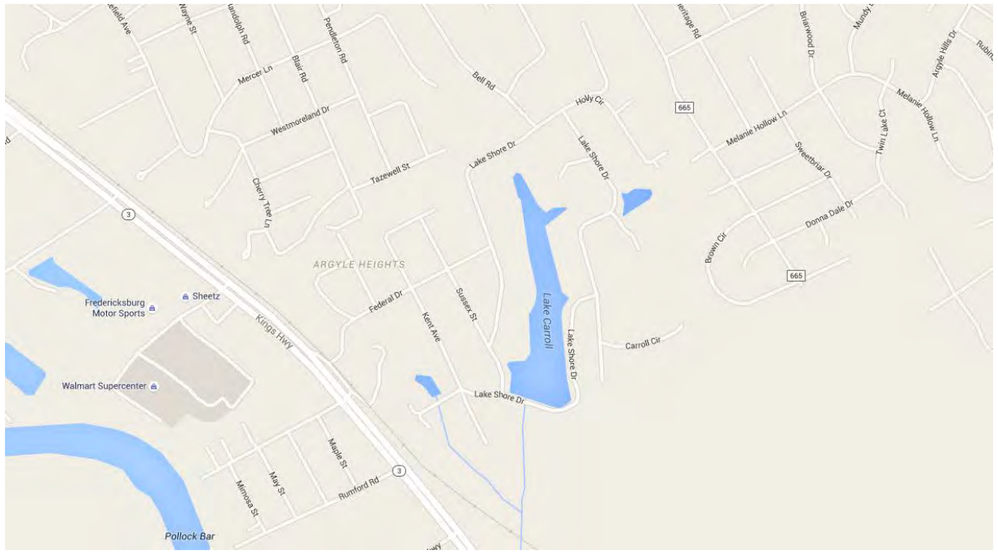
Grade Separate	Proximity of Kings Hwy.
Eliminate / Consolidate	Major collector roadway crossing (high volume roadway).
Add Quad Gates	Feasible, would require roadway realignment for safety (See OTHER below).
Add Median Separator	Proximity of intersections / driveways on both sides of crossing, but feasible.
Other	Realignment of Mount Vernon Ave.

Crossing Name: FEDERAL DRIVE
Jurisdiction: Stafford County

Line / Crossing Number: RF&P / 860349V
Current Warning Device: Gates (Non-Quad)

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
1,300	-	-	-	-	-

General Description of Crossing: Local roadway, 2 lanes. Federal Dr provides the main south-western entrance to a large residential area east of the crossing. Federal Dr terminates at Kings Hwy immediately west of the crossing. Federal Dr operates as a one-way on- and off-ramp to northbound Kings Hwy.



Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	N/A
Traffic / Operations	Mid-volume local roadway. Federal Dr runs parallel to tracks west of crossing, with one-way operations to access northbound Kings Hwy.
General Description of Major Environmental	None identified.
Safety/Geometric Deficiencies	Geometrics / sight distance of T-intersection of Federal Dr at crossing. Minimal striping and roadway width.
Engineering	Grade separation of roadway over railroad not feasible without impact to Kings Hwy.
Existing Property	Residences east of crossing.
Cost-Benefit (Preliminary)	--

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	No other public roadway crossings within 1 mile.
Accessibility	Federal Dr provides the main south-western entrance to a large residential area east of crossing.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Median treatment not feasible due to geometrics (T-intersection with one-way operations).
Four Quad gate would improve safety, but would require realignment of Federal Dr to accommodate the proposed DC2RVA proposed track.

Total Bus Trips Using Crossing (Daily):	--	**Crossing Used by Public Transit? (Yes / No)**	No

Summary of Considerations for Decision-Making

Grade Separate	Proximity of Kings Hwy.
Eliminate / Consolidate	Major access point to large residential area; lack of adjacent crossings.
Add Quad Gates	Feasible; would require intersection realignment for proposed track.
Add Median Separator	Not feasible due to geometrics / operations.
Other	Realignment of Federal Dr to accommodate proposed DC2RVA track.

Crossing Name: LITTLE FALLS ROAD **Line / Crossing Number: RF&P / 860353K**
Jurisdiction: Stafford County **Current Warning Device: Flashing Signal**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
150	-	-	-	-	-

General Description of Crossing: 2 lane local roadway in rural area. Little Falls Rd is ~ 0.5 miles is total length and provides sole access to residential / farm area east of the crossing. It terminates at Kings Hwy ~1,300 feet west of the crossing.

Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	N/A
Traffic / Operations	Low volume local roadway. Kings Hwy intersection ~1,200 ft west of crossing. Residential driveways within ~150 ft on both sides of crossing.
General Description of Major Environmental	None identified.
Safety/Geometric Deficiencies	Minimal striping / lane width on crossing roadway.
Engineering	Grade separation of roadway over railroad could be feasible.
Existing Property	Residential / farm properties on both sides of crossing.
Cost-Benefit (Preliminary)	Cost-benefit considerations – low volume, local roadway in rural area.

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	No other public roadway crossings within 1 mile.
Accessibility	Provides sole access to the residences / farms east of the crossing.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Median separator treatment could be feasible – driveways over 150 feet from crossings.
Four Quad gates could improve existing safety treatment.

Total Bus Trips Using Crossing (Daily):	-	**Crossing Used by Public Transit? (Yes / No)**	No

Summary of Considerations for Decision-Making

Grade Separate	Cost-benefit considerations.
Eliminate / Consolidate	Sole access to east of crossing.
Add Quad Gates	Feasible.
Add Median Separator	Feasible.
Other	

Crossing Name: FOREST LANE ROAD **Line / Crossing Number: RF&P / 860357M**
Jurisdiction: Stafford County **Current Warning Device: Flashing Signal**

AADT			Total Number of Daily Trains		
2015	2025	2045	2015	2025	2045
1,400	-	-	-	-	-

General Description of Crossing: 2 lane local roadway in rural area. Forest Lane Rd is the primary connector into a large farm / residential area, east of the crossing. It terminates at Kings Hwy approximately 1 mile west of the crossing.

Feasibility Considerations Related to Grade Separation

FHWA Grade Separation Criteria	N/A
Traffic / Operations	Mid-volume local roadway. Big Oak Lane intersection ~150 ft east of crossing
General Description of Major Environmental	None identified.
Safety/Geometric Deficiencies	Proximity of Big Oak Lane intersection.
Engineering	Grade separation of roadway over railroad could be feasible.
Existing Property	Farm / residences on both sides of crossing.
Cost-Benefit (Preliminary)	Cost-benefit considerations – local roadway in a rural area.

Feasibility Considerations Related to Elimination / Consolidation

Connectivity to Adjacent Crossings	No other public roadway crossings within 1 mile.
Accessibility	Forest Lane Rd is the main roadway that provides access to a large farm / residential area to the east of the crossing, which has limited accessibility.

Feasibility Considerations Related to Rail Crossing Safety Treatments

Median separator treatment is feasible – no driveways / intersecting roadways within more than 100 feet.
Four Quad gates could improve existing safety.

Total Bus Trips Using Crossing (Daily):		**Crossing Used by Public Transit? (Yes / No)**	No

Summary of Considerations for Decision-Making

Grade Separate	Cost-benefit considerations.
Eliminate / Consolidate	Lack of adjacent crossings.
Add Quad Gates	Feasible.
Add Median Separator	Feasible.
Other	

PROPOSED ACTIONS AT INDIVIDUAL GRADE CROSSINGS

PUBLIC AT-GRADE CROSSINGS – FREDERICKSBURG BYPASS

Crossing Name: DEBRUEN LANE | **Line / Crossing Number: RF&P / 860345T**
Jurisdiction: Stafford County | **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	2025	2045	2015	2025	2045
-	-	-	-	-	-

General Description of Crossing: Local roadway, 2 lanes at crossing, urban area. Debruen Ln is approximately 800 feet in total length. To the west of the crossing, it provides residential access and intersects Cool Springs Rd within ~350 feet. To the east of the crossing, it provides sole access to a residence and commercial properties.

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**-**	*N/A*
Adjacent Crossing within 1 rail mile?	**Yes**	*Crossing provides sole access*
Major Safety / Geometric Deficiencies?	**No**	
Existing Four Quad, Medians, or Median Separators?	**No**	

PROPOSED ACTION: **MEDIAN SEPARATORS**

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are not triggered
- Adjacent crossing is located within 1 rail mile (White Oak Road, existing roadway overpass):
  - Closure would require construction of new connection (and potential improvements) to Baron Park Rd. Detoured vehicles would then utilize existing unsignalized at-grade intersection of Baron Park Rd and White Oak Rd to overpass railroad. Determined not preferred (AS CROSSING SAFETY TREATMENT(S) ARE FEASIBLE, SEE BELOW) due to use of crossing by large vehicles (commercial access), would have to cross high-speed, median-separated White Oak Rd.
- No major safety or geometric deficiencies identified; no mitigation necessary
- Existing crossing treatment is gates (non-quad):
  - Median Separators determined FEASIBLE
  - Addition of Four Quad Gates determined feasible but secondary to Median Separators

Proposed Action Design Considerations:

- Minimal striping on crossing roadway, east side (may require improvements as part of design)

Crossing Name: FERRY ROAD | **Line / Crossing Number: RF&P / 860348N**
Jurisdiction: Stafford County | **Current Warning Device: Gates (Non-Quad)**

AADT			Total Number of Daily Trains		
2015	2025	2045	2015	2025	2045
9,000	-	-	-	-	-

General Description of Crossing: Major collector roadway, 2 lanes, urban area. Ferry Rd terminates at Kings Hwy intersection (less than 300 ft west of crossing, major signalized intersection). East of crossing, Ferry Rd provides access to residential neighborhoods.

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**-**	*N/A*
Adjacent Crossing within 1 rail mile?	**No**	
Major Safety / Geometric Deficiencies?	**Yes**	*Proximity of Mount Vernon Avenue intersections to crossing*
Existing Four Quad, Medians, or Median Separators?	**No**	

PROPOSED ACTION: **FOUR QUAD GATE, with intersection / roadway realignment**

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are not triggered
- No adjacent crossings located within 1 rail mile; closure not feasible
- Major safety or geometric deficiencies identified: Proximity of Mount Vernon Avenue intersection to crossing
  - Mitigation: Realignment of intersection as part of improvement
- Existing crossing treatment is gates (non-quad):
  - Median Treatment determined not feasible due to proximity of parking lot / driveway / street access on both sides of crossing
  - Addition of Four Quad Gates determined FEASIBLE

Proposed Action Design Considerations:

- Realignment of Mount Vernon Avenue and its intersection with crossing roadway
  - Combine one-way parallel roads of Mount Vernon Ave to a single two-way roadway intersection
  - Relocate intersection with crossing roadway further from crossing

Crossing Name: FEDERAL DRIVE
Jurisdiction: Stafford County

Line / Crossing Number: RF&P / 860349V
Current Warning Device: Gates (Non-Quad)

AADT			Total Number of Daily Trains		
2015	2025	2045	2015	2025	2045
1,300	-	-	-	-	-

General Description of Crossing: Local roadway, 2 lanes. Federal Dr provides the main south-western entrance to a large residential area east of the crossing. Federal Dr terminates at Kings Hwy immediately west of the crossing. Federal Dr operates as a one-way on- and off-ramp to northbound Kings Hwy.

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**-**	*N/A*
Adjacent Crossing within 1 rail mile?	**No**	
Major Safety / Geometric Deficiencies?	**No**	
Existing Four Quad, Medians, or Median Separators?	**No**	

PROPOSED ACTION: FOUR QUAD GATE

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are not triggered
- No adjacent crossings located within 1 rail mile; closure not feasible
- No major safety or geometric deficiencies identified; no mitigation necessary
- Existing crossing treatment is gates (non-quad):
    - Median Treatment determined not feasible due to existing geometrics / operations of Federal Drive
    - Addition of Four Quad Gates determined FEASIBLE

Proposed Action Design Considerations:

- Realignment of Federal Drive / Federal Drive crossing is required to accommodate the proposed DC2RVA trackwork

Crossing Name: LITTLE FALLS ROAD
Jurisdiction: Stafford County

Line / Crossing Number: RF&P / 860353K
Current Warning Device: Flashing Signal

AADT			Total Number of Daily Trains		
2015	2025	2045	2015	2025	2045
150	-	-	-	-	-

General Description of Crossing: 2 lane local roadway in rural area. Little Falls Rd is ~ 0.5 miles is total length and provides sole access to residential / farm area east of the crossing. It terminates at Kings Hwy ~1,300 feet west of the crossing.

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**-**	*N/A*
Adjacent Crossing within 1 rail mile?	**No**	
Major Safety / Geometric Deficiencies?	**No**	
Existing Four Quad, Medians, or Median Separators?	**No**	

PROPOSED ACTION: GATES W/ MEDIAN SEPARATORS

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are not triggered
- No adjacent crossings located within 1 rail mile; closure not feasible
- No major safety or geometric deficiencies identified; no mitigation necessary
- Existing crossing treatment is gates (non-quad):
    - Median separator treatment determined FEASIBLE
    - Addition of Four Quad Gates determined feasible, but secondary to median separator treatment

Proposed Action Design Considerations:

- Addition of automatic gates required to close corridor
- Minimal striping and narrow roadway widths existing on crossing roadway (may require improvements as part of design)

Crossing Name: FOREST LANE ROAD **Line / Crossing Number: RF&P / 860357M**
Jurisdiction: Stafford County **Current Warning Device: Flashing Signal**

AADT			Total Number of Daily Trains		
2015	**2025**	**2045**	**2015**	**2025**	**2045**
1,400	-	-	-	-	-

General Description of Crossing: 2 lane local roadway in rural area. Forest Lane Rd is the primary connector into a large farm / residential area, east of the crossing. It terminates at Kings Hwy approximately 1 mile west of the crossing.

Criteria:	Yes / No	*Notes:*
FHWA Triggered in 2015 or 2025?	**-**	*N/A*
Adjacent Crossing within 1 rail mile?	**No**	
Major Safety / Geometric Deficiencies?	**No**	
Existing Four Quad, Medians, or Median Separators?	**No**	

PROPOSED ACTION:	**GATES W/ MEDIAN SEPARATORS**

Process / Justification / Future Considerations:

- FHWA threshold(s) for grade separation or closure are not triggered
- No adjacent crossings located within 1 rail mile; closure not feasible
- No major safety or geometric deficiencies identified; no mitigation necessary
- Existing crossing treatment is gates (non-quad):
  - Median separator treatment determined FEASIBLE
  - Addition of Four Quad Gates determined feasible, but secondary to median separator treatment

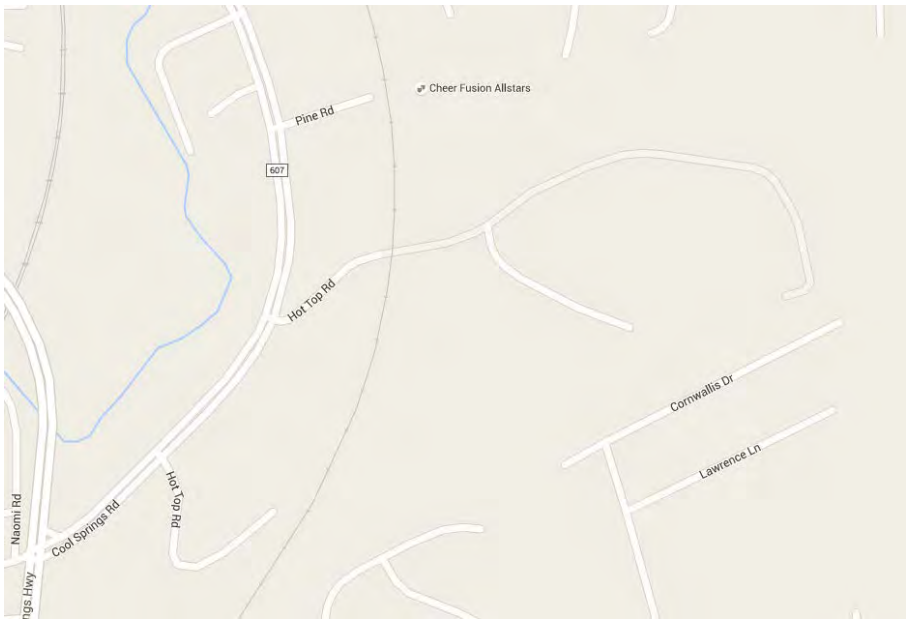
Proposed Action Design Considerations:

- Addition of automatic gates required to close corridor
- Minimal striping and narrow roadway widths existing on crossing roadway (may require improvements as part of design)

SUMMARY OF CONSIDERATIONS AND PROPOSED ACTIONS AT INDIVIDUAL GRADE CROSSINGS

PRIVATE AT-GRADE CROSSINGS: FREDERICKSBURG BYPASS

Crossing Name / Number: Hot Top Road / Unknown FBBP01
Line: RF&P Jurisdiction: Stafford County



Observations:

Warning Device	Locking Gate (Passive with Stop Signs)
Sole Access	Yes
Crossing Type	Farm / Residential
# Lanes	1
Rdwy Paved?	No
General Description	– Hot Top Road is gated on west side of crossing – Intersection with Cool Springs Road ~500 feet west of crossing – Access to large field

PROPOSED ACTION:	**LOCKING GATE** ***(DC2RVA Standard of tied to track circuit)***

Process / Justification:

- Farm / Open field crossing

- Provides sole access to property

- No alternate access routes determined appropriate or feasible

Crossing Name / Number: Unnamed Private Crossing / Unknown FBBP02
Line: RF&P Jurisdiction: Stafford County

Observations:

Warning Device	Passive (Stop Signs)
Sole Access	No
Crossing Type	Residential
# Lanes	1
Rdwy Paved?	Yes
General Description	– Connects to Federal Drive – Driveway access to 1 residence – Driveway also connects to Federal Drive across from Windsor Circle – Crossing needs to be eliminated to accommodate realignment of Federal Drive due to DC2RVA 3rd track.

PROPOSED ACTION:	**CLOSURE**

Process / Justification:

- Provides access to residential property

- Property has alternate access to Federal Drive via existing driveway (i.e., closure does not result in change of access for property owner)

Crossing Name / Number: Cleek Lane / 860352D
Line: RF&P Jurisdiction: Stafford County

Observations:

Warning Device	None
Sole Access	Yes
Crossing Type	Residential
# Lanes	1
Rdwy Paved?	No
General Description	– Unpaved crossing – Driveway (sole access) to 1 residence – Additionally, driveway section immediately adjacent to north side of crossing (south of residential property) is a different property owner that owns the undeveloped land (forested) on the north side of the tracks (assume use for farm / forest / ag purposes)

PROPOSED ACTION:	**LOCKING GATE**

Process / Justification:

- Serves one residential property

- Provides sole access to 1 residence and property (no structures) of another property owner

- Alternate access route (via a new connector road to Little Falls Rd) determined not feasible as it is assumed that farm/ag equipment may use the crossing by the undeveloped land property owner – this detour would then result in use of the high speed, median separated Kings Hwy by farm / ag equipment, which is not preferred for safety reasons

Crossing Name / Number: Unnamed Private Crossing / Unknown FBBP03
Line: RF&P Jurisdiction: Stafford County

Observations:

Warning Device	None
Sole Access	Yes
Crossing Type	Farm / Open Land
# Lanes	1
Rdwy Paved?	No
General Description	– Unknown if this is an official crossing per FRA – Unpaved road and crossing – Accesses large wooded area, possibly sole access for property owner – Does not provide sole access to any structures – Access to property can be provided by the existing driveway section immediately adjacent to north side of the adjacent Cleek Lane crossing that is the same property owner of the large undeveloped land on both the north and south sides of this crossing

PROPOSED ACTION:	***Assumed not to be an official FRA crossing; Remove ability to traverse tracks at this location***

Process / Justification:

- Based on FRA online database resources available, assumed not to be an official FRA crossing; therefore, the DC2RVA project should remove the ability for vehicles to traverse the tracks at this location.

- Access to property can be provided on property owner's existing property adjacent to Cleek Ln crossing, with utilizing the railroad ROW if necessary.

Crossing Name / Number: **Unnamed Private Crossing / 860356F**
Line: RF&P Jurisdiction: Stafford County

Observations:

Warning Device	Passive (Stop Signs)
Sole Access	Yes
Crossing Type	Residential / Farm
# Lanes	1
Rdwy Paved?	No
General Description	– Gravel driveway crossing – Provides sole access – Access to residence and fields, farm structures – Adjacent property driveway (called Big Oaks Lane) serves multiple property owners and connects to Forest Lane Rd, immediate adjacent to the crossing → potential for new connection

PROPOSED ACTION:	**CLOSURE, with new connector road** ***Secondary: Locking Gate***

Process / Justification:

- Provides sole access to a residential / farm property

- Alternate access determined FEASIBLE with construction (less than 1k feet) of a new access road, that would run parallel to the railroad / ROW and connect to Big Oaks Lane immediate adjacent to public crossing