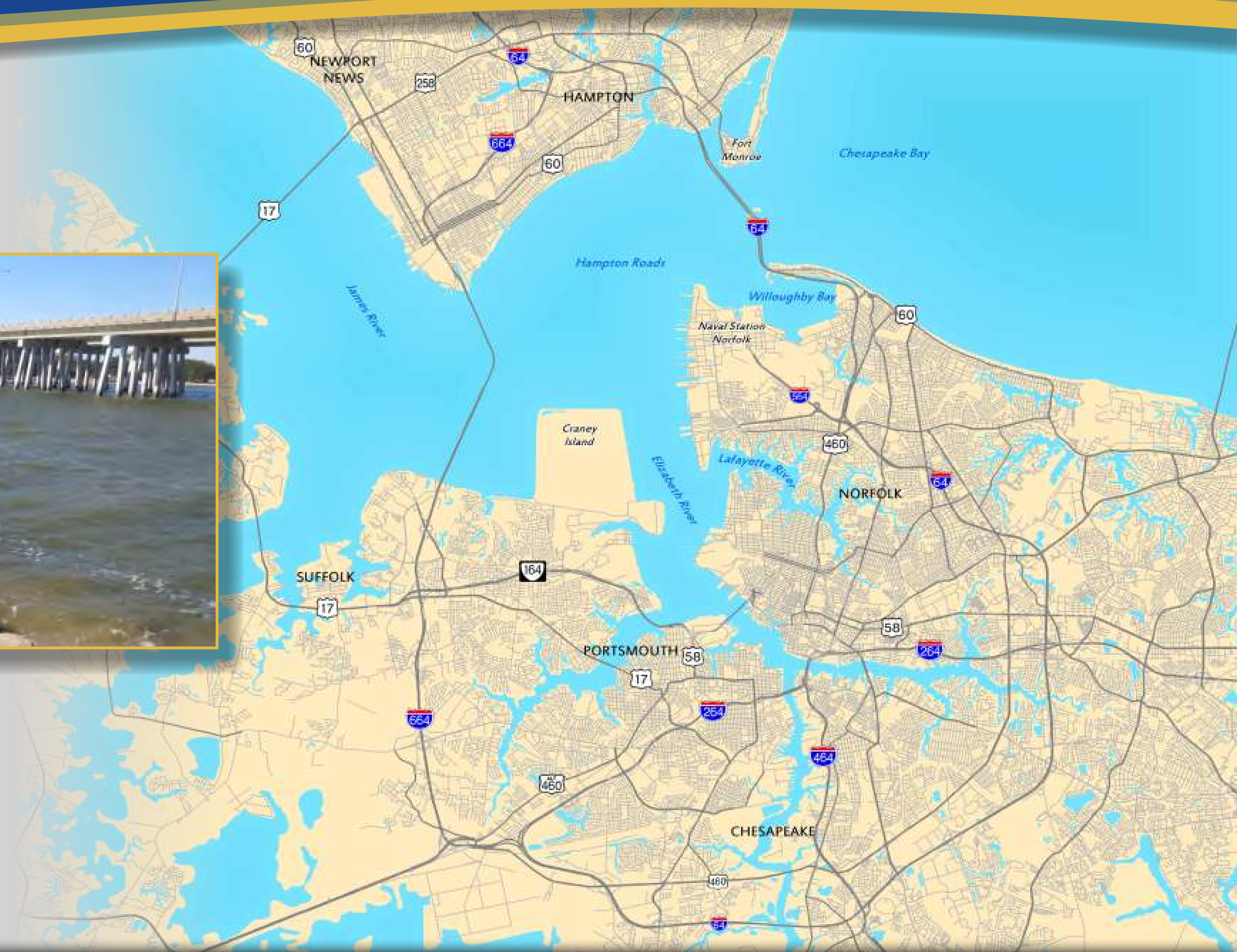
HRCS SEIS
Hampton Roads Crossing Study SEIS

Traffic and Transportation Technical Report

Prepared in Support of the Supplemental Environmental Impact Statement



VDOT Virginia Department of Transportation

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1. INTRODUCTION

1.1 PROJECT DESCRIPTION

The Virginia Department of Transportation (VDOT), in cooperation with the Federal Highway Administration (FHWA) as the lead federal agency, is preparing a Supplemental Environmental Impact Statement (SEIS) for the Hampton Roads Crossing Study (HRCS). The Study is located in the cities of Chesapeake, Hampton, Newport News, Norfolk, Portsmouth, and Suffolk, Virginia. The SEIS re-evaluates the findings of the 2001 HRCS Final Environmental Impact Statement (FEIS) and Record of Decision (ROD). The three alternatives retained for analysis in the 2001 FEIS, as well as input received from the public during initial scoping for the SEIS, were used to establish the Study Area Corridors shown in **Figure 1-1**. The purpose and need of the SEIS is summarized below.

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, FHWA is preparing an SEIS because of the time that has lapsed since the 2001 FEIS and new information indicating significant environmental impacts not previously considered. The SEIS, prepared in accordance with the implementing regulations of NEPA (23 CFR §771.130), is intended to aid in ensuring sound decision-making moving forward by providing a comparative understanding of the potential effects of the various options.

The purpose of this *HRCS Traffic and Transportation Technical Report* is to document the data collection, traffic forecasting, and analysis efforts performed to assess potential operational improvements for the Study Area Corridors. Information in this report, described below, will support discussions presented in the SEIS:

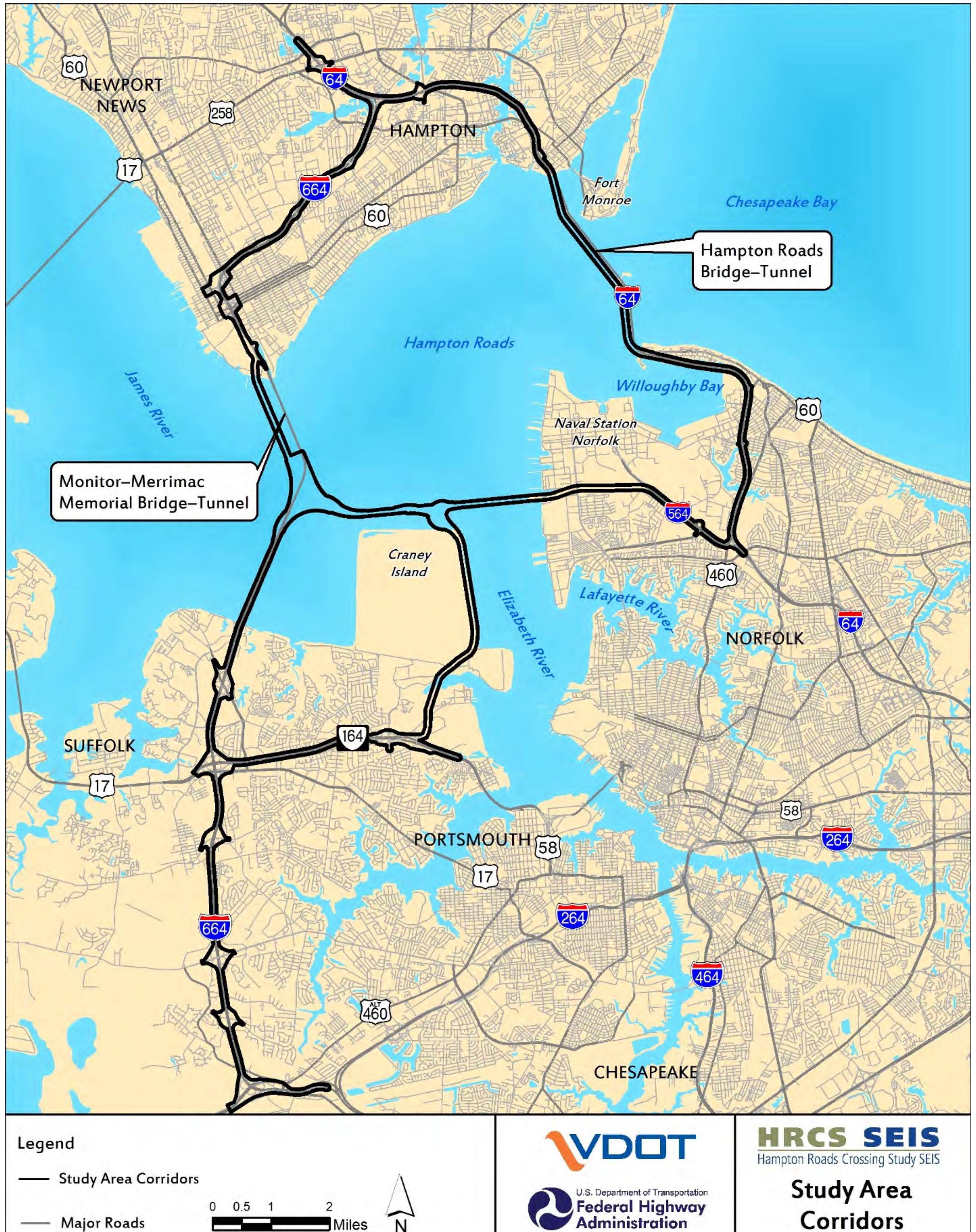
- **Section 1** provides an overview of the study.
- **Section 2** outlines the methods used to assess traffic operations.
- **Section 3** describes existing conditions including an inventory of multimodal transportation infrastructure, as well as peak hour and daily traffic volumes, crash trends, vehicle speeds, and traffic operations along the Study Area Corridors.
- **Sections 4** provides an overview of alternatives considered for the study.
- **Section 5** outlines potential impacts to traffic operations in the design year (2040) associated with each of the alternatives retained for analysis in the SEIS.
- **Section 6** outlines potential impacts to traffic operations in the opening year (2028) associated with each of the alternatives retained for analysis in the SEIS.
- **Section 7** describes the potential toll diversion impacts of tolls and/or HOT lanes implemented in conjunction with each of the alternatives retained for analysis in the SEIS.
- **Section 8** presents an updated analysis of the potential impacts to traffic operations in the design year (2040) associated with the No Build and Preferred Alternatives, based on the updated HRTPO travel demand model, which was released after the publication of the DSEIS.

1.1.1 Purpose and Need

The purpose of the HRCS SEIS is to relieve congestion at the I-64 Hampton Roads Bridge-Tunnel (HRBT) in a manner that improves accessibility, transit, emergency evacuation, and military and goods movement along the primary transportation corridors in the Hampton Roads region, including the I-64, I-664, I-564, and VA 164 corridors. The HRCS will address the following needs (in the order of presentation in Chapter 1 of the Draft SEIS):

- Accommodate travel demand – capacity is inadequate on the Study Area Corridors, contributing to congestion at the HRBT;
- Improve transit access – the lack of transit access across the Hampton Roads waterway;
- Increase regional accessibility – limited number of water crossings and inadequate highway capacity and severe congestion decrease accessibility;
- Address geometric deficiencies – insufficient vertical and horizontal clearance at the HRBT contribute to congestion;
- Enhance emergency evacuation capability – increase capacity for emergency evacuation, particularly at the HRBT;
- Improve strategic military connectivity – congestion impedes military movement missions; and,
- Increase access to port facilities – inadequate access to interstate highway travel in the Study Area Corridors impacts regional commerce.

Figure 1-1: HRCS Study Area Corridors



1.1.2 Alternatives

Five alternatives, including the No-Build Alternative, are under consideration for the Draft SEIS and are assessed in this Technical Report. The proposed limits of the four Build Alternatives are shown on **Figure 1-2**. Each Technical Report and Memorandum prepared in support of the Draft SEIS assesses existing conditions and environmental impacts along the Study Area Corridors (**Figure 1-1**) for each alternative. Each alternative is comprised of various roadway alignments, used to describe the alternatives and proposed improvements, shown on **Figure 1-3**.

1.1.2.1 The No-Build Alternative

This alternative includes continued routine maintenance and repairs of existing transportation infrastructure within the Study Area Corridors, but there would be no major improvements.

1.1.2.2 Alternative A

Alternative A begins at the I-64/I-664 interchange in Hampton and creates a consistent six-lane facility by widening I-64 to the I-564 interchange in Norfolk. A parallel bridge-tunnel would be constructed west of the existing I-64 HRBT. During the public review of the HRBT DEIS, there was a clear lack of public or political support for the level of impacts associated with any of the build alternatives. Specifically, potential impacts to the historic district at Hampton University, Hampton National Cemetery, and the high number of displacements were key issues identified by the public, elected officials, and University and Veterans Affairs officials. Given this public opposition, a Preferred Alternative was not identified and the study did not advance. On August 20, 2015, FHWA rescinded its Notice of Intent to prepare the HRBT DEIS, citing public and agency comments and concerns over the magnitude of potential environmental impacts to a variety of resources, such as impacts to historic resources as well as communities and neighborhoods. Consequently, VDOT and FHWA have committed that improvements proposed in the HRCS SEIS to the I-64 corridor would be largely confined to existing right-of-way. To meet this commitment, Alternative A considers a six-lane facility. Alternative A lane configurations are summarized in **Table 1-1**.

Table 1-1: Alternative A Lane Configurations

Roadway Alignments	Existing Lanes	Proposed Lanes
I-64 (Hampton)	4-6	6
I-64 (HRBT and Norfolk)	4	6

1.1.2.3 Alternative B

Alternative B includes all of the improvements included under Alternative A, and the existing I-564 corridor that extends from its intersection with I-64 west towards the Elizabeth River. I-564 would be extended to connect to a new bridge-tunnel across the Elizabeth River (I-564 Connector). A new roadway (VA 164 Connector) would extend south from the I-564 Connector, along the east side of the Craney Island Dredged Material Management Area (CIDMMA), and connect to existing VA 164. VA 164 would be widened from this intersection west to I-664. Alternative B lane configurations are summarized in **Table 1-2**.

Figure 1-2: Build Alternatives

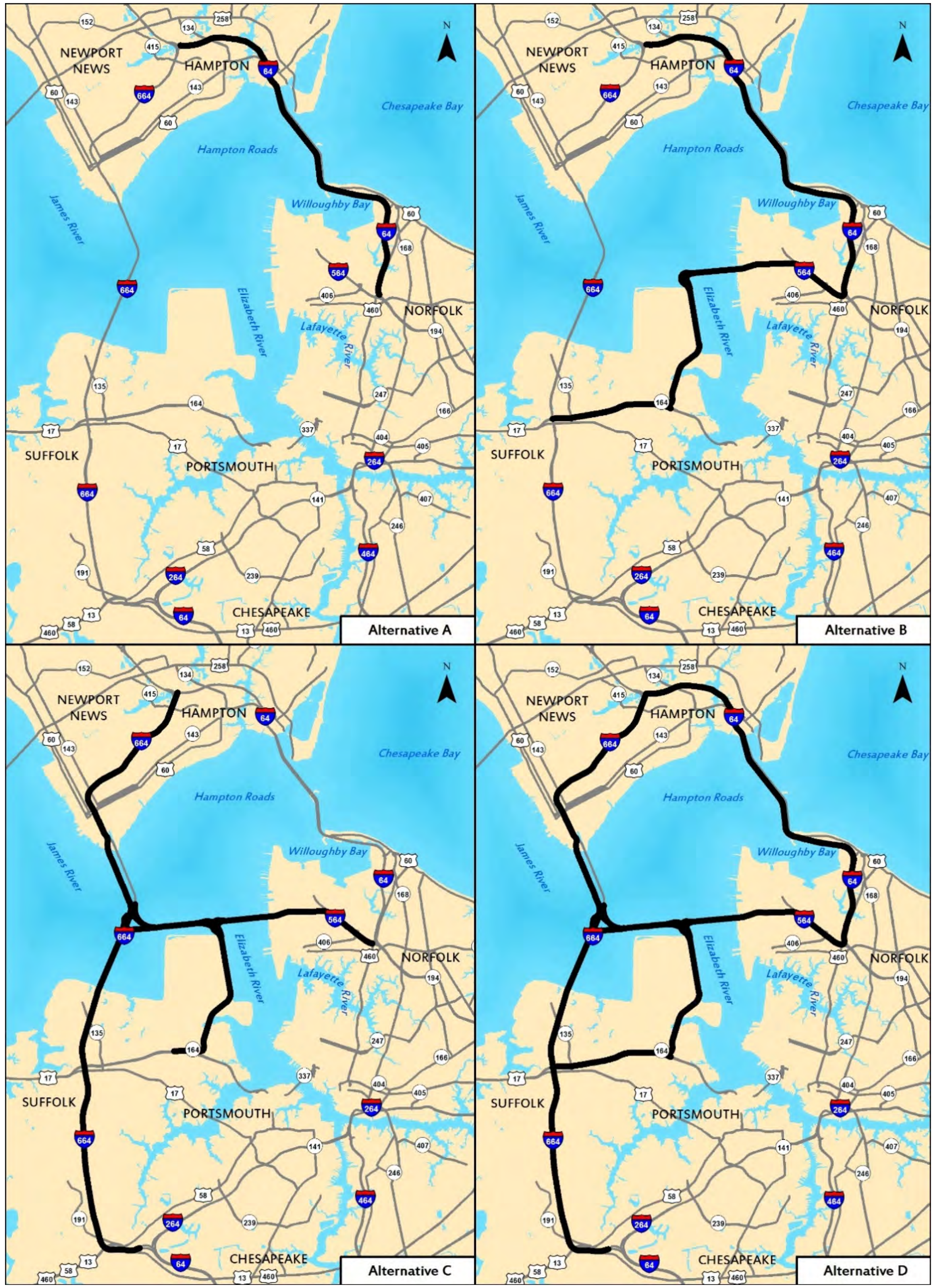


Figure 1-3: Roadway Alignments

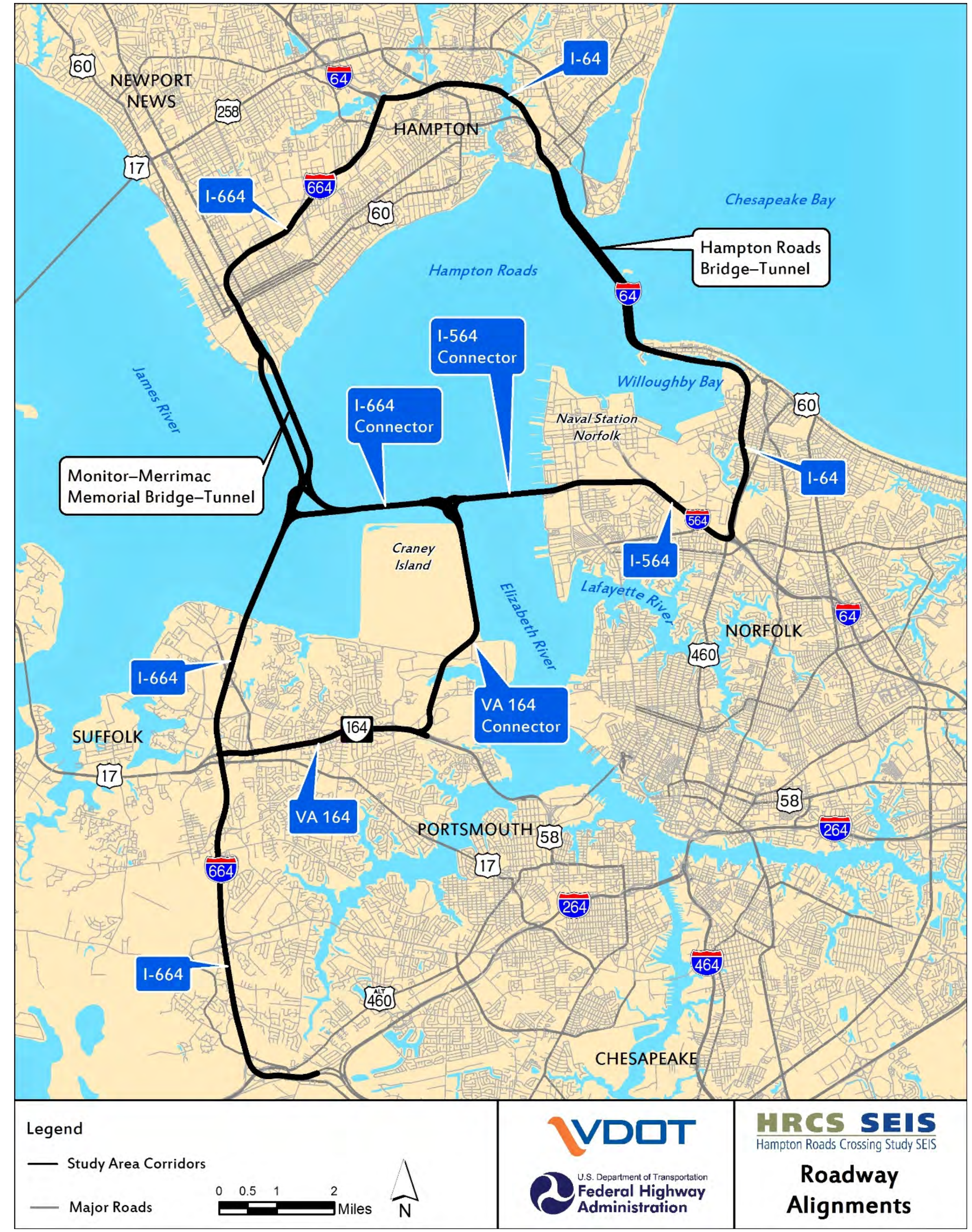


Table 1-2: Alternative B Lane Configurations

Roadway Alignments	Existing Lanes	Proposed Lanes
I-64 (Hampton)	4-6	6
I-64 (HRBT and Norfolk)	4	6
I-564	6	6
I-564 Connector	none	4
VA 164 Connector	none	4
VA 164	4	6

Note: The I-564 Intermodal Connector (IC) project is a separate project from HRCS that lies between the I-564 Connector and I-564. It would be constructed regardless of whether the HRCS improvements are made and therefore is included under the No-Build Alternative and is not listed with other proposed improvements.

1.1.2.4 Alternative C

Alternative C includes the same improvements along I-564, the I-564 Connector, and the VA 164 Connector that are considered in Alternative B. This alternative would not propose improvements to I-64 or VA 164 beyond the VA 164 Connector. Alternative C includes dedicated transit facilities in specific locations. DRPT completed a study in November 2015 that recommended high frequency bus rapid transit (BRT) service in a fixed guideway or in a shared high occupancy vehicle (HOV) or high occupancy toll (HOT) lanes (DRPT, 2015). Based on that recommendation, for the purposes of this Draft SEIS, transit assumes Bus Rapid Transit (BRT). In the Final SEIS, transit could be redefined or these lanes may be used as managed lanes. Alternative C converts one existing HOV lane in each direction on I-564 in Norfolk to transit only. The I-564 Connector and the I-664 Connector would be constructed with transit only lanes. This alternative also includes widening along I-664 beginning at I-664/I-64 in Hampton and continuing south to the I-264 interchange in Chesapeake. One new transit lane is included along I-664 between I-664/I-64 in Hampton and the new interchange with the I-664 Connector. Alternative C lane configurations are summarized in **Table 1-3**.

Table 1-3: Alternative C Lane Configurations

Roadway Alignments	Existing Lanes	Proposed Lanes
I-664 (from I-64 to the proposed I-664 Connector)	4-6	8 + 2 Transit Only
I-664 (from the proposed I-664 Connector to VA 164)	4	8
I-664 (from VA 164 to I-264)	4	6
I-564	6	4 + 2 Transit Only
I-564 Connector	none	4 + 2 Transit Only
VA 164 Connector	none	4
I-664 Connector	none	4 + 2 Transit Only

Note: The I-564 IC project is a separate project from HRCS that lies between the I-564 Connector and I-564. It would be constructed regardless of whether the HRCS improvements are made and therefore is included under the No-Build Alternative and is not listed with other proposed improvements.

1.1.2.5 Alternative D

Alternative D is a combination of the sections that comprise Alternatives B and C. Alternative D lane configurations are summarized in **Table 1-4**.

Table 1-4: Alternative D Lane Configurations

Roadway Alignments	Existing Lanes	Proposed Lanes
I-64 (Hampton)	4-6	6
I-64 (HRBT and Norfolk)	4	6
I-664 (from I-64 to VA 164)	4-6	8
I-664 (from VA 164 to I-264)	4	6
I-664 Connector	None	4
I-564	6	6
I-564 Connector	none	4
VA 164 Connector	none	4
VA 164	4	6

Note: The I-564 IC project is a separate project from HRCS that lies between the I-564 Connector and I-564. It would be constructed regardless of whether the HRCS improvements are made and therefore is included under the No-Build Alternative and is not listed with other proposed improvements.

1.1.3 Operationally Independent Sections

Given the magnitude and scope of the alternatives, it is expected that a Preferred Alternative would be constructed in stages or operationally independent sections (OIS). An OIS is a portion of an alternative that could be built and function as a viable transportation facility even if other portions of the alternative are not advanced. The OIS are comprised of various roadway alignments and were developed by identifying sections of roadway improvements that if constructed, could function independently.

For traffic forecasting and analysis purposes, however, each alternative was considered in its entirety. Traffic pattern and volume changes that occur when capacity is added in one location of the network affect volumes elsewhere, and it would not be possible to isolate traffic impacts to the OIS alone. The relevant operational impacts will be presented in this technical report for each alternative.

2. METHODOLOGY

The traffic analysis study area extends along the mainline roadway segments, and includes interchange ramps and signalized and unsignalized intersections within the interchanges at ramp termini for all Study Area Corridors. Travel forecasting and analysis efforts undertaken to support the SEIS process include data collection, development of balanced peak hour and daily volume forecasts, and capacity analyses for the peak hour, as described in the following subsections.

The traffic study was initiated in June 2015. The study relied on traffic data collected in the spring and fall of 2015, as well as the 2034 Hampton Roads Long Range Transportation Plan (LRTP) and the 2034 Hampton Roads travel demand model. Both 2034 travel demand model and 2034 LRTP were the latest adopted regional planning tools and documents at the time of the study initiation. Outputs of the 2034 travel demand model were grown to 2040 values as described in **Section 2.4**. Analyses for the Preferred Alternative will be updated using the adopted 2040 travel demand model if it becomes available in time for use in the Final SEIS.

2.1 DATA COLLECTION

An extensive data collection effort was undertaken in June, September, and October 2015 to establish baseline traffic conditions for the study area. Automatic ramp counts and manual intersection turning movement counts were conducted, and data from VDOT's permanent count stations were reviewed for the Study Area Corridors.

Ramp and mainline vehicle classification counts were conducted for a minimum of 48 consecutive hours on non-holiday Tuesdays, Wednesdays, and Thursdays, during typical school and non-holiday periods. Ramp and mainline counts were performed using tube and video count equipment. All turning movement counts were conducted on a typical, non-holiday Tuesday, Wednesday, or Thursday when schools were in session, from 6:00 AM – 10:00 AM and from 3:00 PM – 7:00 PM. Turning movement counts were performed manually and using video count equipment.

Ramp and mainline vehicle classification counts were conducted around key study area interchanges (I-64 and I-664; I-64 and I-564; I-664 and VA 164; and I-664 and I-264) between June 2 and June 18, 2015. All other counts were conducted between September 22 and October 22, 2015, with the exception of supplemental vehicle classification counts on Hampton Boulevard in Norfolk that were conducted January 20 and January 21, 2016. **Table 2-1** provides the locations of the mainline and ramp vehicle classification counts conducted for the study. **Table 2-2** provides the locations of the intersection turning movement counts.

Table 2-1: Mainline and Ramp Count Locations

Exit	Mainline/Ramp Movement			
	From		To	
	I-64 Interchanges			
264	I-664	WB	I-64	EB
264	I-664	WB	I-64	WB
264	I-64	EB	I-664	EB
264	I-64	WB	I-664	EB
Mainline	I-64	EB	Exit 264	
Mainline	I-64	WB	Exit 264	
265	I-64	EB	LaSalle Ave	SB
265	LaSalle Ave	SB	I-64	EB
265	Armistead Ave		I-64	WB
265	I-64	WB	Armistead Ave/LaSalle Ave	SB
265	LaSalle Ave	NB	I-64	EB
265	I-64	WB	Armistead Ave	NB
265	I-64	EB	Rip Rap Rd	
267	I-64	EB	Settlers Landing Rd	
267	Settlers Landing Rd		I-64	EB
267	Settlers Landing Rd		I-64	WB
267	I-64	WB	Settlers Landing Rd	
268	I-64	EB	Mallory St	
268	Mallory St		I-64	EB
268	Mallory St		I-64	WB
268	I-64	WB	Mallory St	
273	I-64	WB	4th View St	
273	4th View St		I-64	WB
273	I-64	EB	4th View St	
273	4th View St		I-64	EB
274	I-64	WB	Bay Ave	WB
274	Bay Ave	EB	I-64	EB
276	US 460/Granby St		I-64	WB
276	Patrol Rd		I-64	EB
276	I-64	EB	I-564	WB
276	I-64	EB	US 460	SB
276	US 460	NB	I-564	WB
276	I-564	EB	I-64	WB
276	I-64	WB	I-564	WB
276	I-564	EB	I-64	EB
276	I-564	EB	Little Creek Rd	
Mainline	I-64	HOV	Exit 276	
276	I-64	WB	US 460	NB
N/A	Terminal Blvd		US 460	
N/A	I-564	EB	I-64/US 460	WB
N/A	Terminal Blvd		I-564/US 460	EB
Mainline	I-64	WB	Exit 276	
Mainline	I-64	EB	Exit 276	
N/A	Terminal Blvd		I-564	EB
N/A	I-564	WB	Terminal Blvd	
N/A	I-564	WB	Bainbridge Ave	
N/A	Bainbridge Ave		I-564	WB
N/A	I-564	EB	Bainbridge Ave	
N/A	Bainbridge Ave		I-564	EB
	I-664 Interchanges			
2	I-664	WB	Powhatan Pkwy	
2	Powhatan Pkwy		I-664	EB
2	Powhatan Pkwy		I-664	WB
2	I-664	EB	Powhatan Pkwy	
3	I-664	WB	Aberdeen Rd	

Exit	Mainline/Ramp Movement			
	From		To	
3	Aberdeen Rd		I-664	EB
3	Aberdeen Rd		I-664	WB
3	I-664	EB	Aberdeen Rd	
4	Roanoke Ave		I-664	EB
4	I-664	WB	Roanoke Ave	
4	I-664	EB	Chestnut Ave	
4	Chestnut Ave		I-664	WB
5	Huntington Ave and 34th St		I-664	EB
5	I-664	EB	Warwick Blvd	NB
5	Jefferson Ave	SB	I-664	EB
5	I-664	WB	35th St	
5	Huntington Ave and 34th St		Jefferson Ave	
5	I-664	WB	Jefferson Ave	
5	Huntington Ave and 34th St		I-664	WB
5	Jefferson Ave	SB	Huntington Ave and Warwick Blvd	
5	I-664	EB	Huntington Ave and Warwick Blvd	
6	23rd St/MLK Jr. Way	EB	I-664	EB
6	26th St/US 60	WB	I-664	EB
6	I-664	WB	25th St	EB
6	26th St/US 60	WB	Huntington Ave and 26th St	WB
6	I-664	EB	Huntington Ave and 26th St	WB
6	I-664	EB	27th St	EB
6	23rd St/MLK Jr. Way	EB	I-664	WB
6	I-664	WB	Huntington Ave and 26th St	WB
6	26th St/US 60	WB	I-664	WB
6	28th St	EB	Jefferson Ave and 27th St	
7	Terminal Ave		I-664	EB
7	I-664	EB	Terminal Ave	
7	I-664	WB	Terminal Ave	
7	Terminal Ave		I-664	WB
8	College Dr	SB	I-664	EB
8	I-664	EB	College Dr	SB
8	College Dr	SB	I-664	WB
8	I-664	WB	College Dr	SB
8	College Dr	NB	I-664	EB
8	I-664	EB	College Dr	NB
8	College Dr	NB	I-664	WB
8	I-664	WB	College Dr	NB
9	I-664	EB	US 17/Bridge Rd	WB
9	VA164	WB	I-664	EB
9	VA164	WB	I-664	WB
9	I-664	WB	VA164	WB
9	US 17/Bridge Rd		VA164	EB
9	I-664	EB	VA164	EB
9	VA164	EB	I-664	WB

Exit	Mainline/Ramp Movement			
	From		To	
9	US 17/Bridge Rd	WB	I-664	EB
9	US 17/Bridge Rd		I-664	EB
9	I-664	WB	VA164	EB
9	I-664	WB	US 17/Bridge Rd	EB
Mainline	College Dr	SB	South of I-664	
Mainline	College Dr	NB	South of I-664	
10	I-664	EB	Pughsville Rd	
10	I-664	EB	Pughsville Rd	WB
10	Pughsville Rd	WB	I-664	EB
10	Pughsville Rd	EB	I-664	EB
Mainline	Pughsville Rd	WB	West of I-664	
Mainline	Pughsville Rd	EB	West of I-664	
10	Pughsville Rd	WB	I-664	WB
10	Pughsville Rd	EB	I-664	WB
10	I-664	WB	Pughsville Rd	EB
10	I-664	WB	Pughsville Rd	
11	I-664	EB	Portsmouth Blvd	WB
11	Portsmouth Blvd	WB	I-664	EB
11	I-664	EB	Portsmouth Blvd	EB
11	Portsmouth Blvd	EB	I-664	EB
11	Portsmouth Blvd	WB	I-664	WB
11	I-664	WB	Portsmouth Blvd	WB
11	Portsmouth Blvd	EB	I-664	WB
11	I-664	WB	Portsmouth Blvd	EB
Mainline	Portsmouth Blvd	WB	East of I-664	
Mainline	Portsmouth Blvd	EB	East of I-664	
12	I-664	EB	Dock Landing Rd	
12	I-664	EB	Dock Landing Rd	WB
12	Dock Landing Rd	WB	I-664	EB
12	Dock Landing Rd		I-664	EB
12	Dock Landing Rd		I-664	WB
12	Dock Landing Rd	EB	I-664	WB
12	I-664	WB	Dock Landing Rd	EB
12	I-664	WB	Dock Landing Rd	
Mainline	Dock Landing Rd	WB	East of I-664	
Mainline	Dock Landing Rd	EB	East of I-664	
13	I-664	EB	US 58/Military Hwy	WB
13	US 58/Military Hwy	WB	I-664	EB
13	I-664	EB	US 58/Military Hwy	EB
13	US 58/Military Hwy	EB	I-664	EB
13	US 58/Military Hwy	WB	I-664	WB
13	US 58/Military Hwy	EB	I-664	WB
13	I-664	WB	US 58/Military Hwy	WB
13	I-664	WB	US 58/Military Hwy	EB
14	I-664	EB	US 460/Military Hwy/Schaefer Ave	

Exit	Mainline/Ramp Movement			
	From		To	
14	I-664	EB	I-64	EB
14	I-664	WB	I-64	EB
14	I-64	WB	I-664	WB
14	I-64	WB	I-664	EB
VA 164 Interchanges				
N/A	VA 164	WB	College Dr	NB
N/A	VA 164	WB	College Dr	
N/A	College Dr		VA 164	EB
N/A	Towne Point Rd		VA 164	WB
N/A	VA 164	EB	Towne Point Rd	
N/A	VA 164	WB	Towne Point Rd	
N/A	Towne Point Rd		VA 164	EB
N/A	Cedar Ln		VA 164	WB
N/A	VA 164	EB	Cedar Ln	
N/A	VA 164	WB	Cedar Ln	SB
N/A	Cedar Ln	SB	VA 164	EB
N/A	Cedar Ln	NB	VA 164	EB
N/A	Virginia International Gateway Blvd		VA 164	WB
N/A	VA 164	EB	Virginia International Gateway Blvd	
N/A	VA 164	WB	Virginia International Gateway Blvd	
N/A	Virginia International Gateway Blvd		VA 164	EB
N/A	Norfolk Rd		VA 164	EB
N/A	VA 164	EB	Norfolk Rd	
N/A	Norfolk Rd		VA 164	WB
N/A	VA 164	WB	Norfolk Rd	
N/A	Lee Ave and Harper Ave		VA 164	EB
N/A	VA 164	WB	Railroad Ave	
N/A	MLK Fwy Tunnel		VA 164	EB
N/A	VA 164	EB	Railroad Ave	
N/A	Railroad Ave		MLK Fwy Tunnel	
N/A	Railroad Ave		VA 164	WB
N/A	MLK Fwy Tunnel		Railroad Ave and VA 164	EB
N/A	VA 164	EB	MLK Fwy Tunnel	
N/A	MLK Fwy Tunnel		VA 164	WB
N/A	VA 164	WB	MLK Fwy Tunnel	
N/A	VA 164	EB	London Blvd	WB
N/A	London Blvd	WB	VA 164	WB
N/A	London Blvd	EB	VA 164	WB
Hampton Blvd				
Mainline	Hampton Blvd	SB	Between Seabee Rd and 90th St	
Mainline	Hampton Blvd	NB	Between Seabee Rd and 90th St	

Table 2-2: Intersection Turning Movement Count Locations

Exit	Location		
I-64 Interchanges			
265	Armistead Ave	at	I-64 WB On-Ramp
265	Armistead Ave	at	LaSalle Ave
265	I-64 EB Off-Ramp	at	Rip Rap Rd
267	I-64 EB Off-Ramp	at	Settlers Landing Rd/Tyler St
267	Settlers Landing Rd	at	I-64 EB On-Ramp
267	Settlers Landing Rd	at	I-64 WB Ramps
268	I-64 EB Off-Ramp	at	Mallory St
268	Mallory St	at	I-64 WB Ramps
273	4th View St	at	I-64 WB Ramps
273	4th View St	at	I-64 EB Ramps
276	US 460/Granby St	at	I-64 WB On-Ramp
N/A	Bainbridge Ave	at	I-564 Ramps
I-664 Interchanges			
2	Powhatan Pkwy	at	I-664 WB Ramps
2	Powhatan Pkwy	at	I-664 EB Ramps
3	Aberdeen Rd	at	I-664 WB Ramps
3	Aberdeen Rd	at	I-664 EB Ramps
4	Roanoke Ave	at	41st St/I-664 EB On-Ramp
4	I-664 WB Off-Ramp	at	Roanoke Ave
4	Roanoke Ave	at	39th St
4	41st St/I-664 EB Off-Ramp	at	Chestnut Ave
4	Chestnut Ave	at	I-664 WB On-Ramp
4	Chestnut Ave	at	39th St
5	Huntington Ave	at	34th St
5	Huntington Ave	at	35th St
5	Jefferson Ave	at	35th St
5	Jefferson Ave	at	36th St
6	Huntington Ave	at	23rd St/MLK Jr. Way
6	Huntington Ave	at	26th St
6	Huntington Ave	at	28th St
6	Jefferson Ave	at	25th St/MLK Jr. Way
6	Jefferson Ave	at	26th St
6	Jefferson Ave	at	27th St
7	Terminal Ave	at	I-664 WB Ramps
13	Jolliff Rd	at	Airline Blvd
13	S Military Hwy	at	W Military Hwy
13	I-664 EB Ramps	at	US 13/US 460 Business
VA 164 Interchanges			
N/A	College Dr	at	VA 164 EB On-Ramp
N/A	College Dr	at	US 17/Bridge Rd
N/A	Towne Point Rd	at	VA 164 WB Ramps
N/A	Towne Point Rd	at	VA 164 EB Ramps
N/A	VA 164 EB Off-Ramp	at	Cedar Ln

Exit	Location		
N/A	Cedar Ln	at	Coast Guard Blvd/VA 164 WB On-Ramp
N/A	Virginia International Gateway Blvd	at	Wild Duck Ln
N/A	Virginia International Gateway Blvd	at	VA 164 WB Ramps
N/A	Virginia International Gateway Blvd	at	VA 164 EB Ramps
N/A	Norfolk Rd	at	VA 164 EB Ramps
N/A	Norfolk Rd	at	VA 164 WB Ramps
N/A	Lee Ave	at	Woodrow St/Harper Ave
N/A	Lee Ave	at	Cleveland St/Railroad Ave
N/A	VA 164 EB Off-Ramp	at	Railroad Ave
N/A	Railroad Ave	at	VA 164 WB Ramps

Count data were obtained from VDOT permanent count stations for the HRBT and Monitor-Merrimac Memorial Bridge-Tunnel (MMMBT) for all of 2011 and 2014, as well as June 2015. The 2014 data were compared with 2011 data to evaluate growth in daily traffic and to assess whether peak spreading has occurred over the past years.

Count data were obtained from other VDOT permanent count stations along the Study Area Corridors for April and August 2014, as well as June 2015. The ramp, mainline, and intersection turning movement counts and data from VDOT's permanent count stations were analyzed to determine heavy vehicle percentages used in the capacity analyses.

INRIX data were used to develop speed profiles of I-64 and I-664 over the course of an average day to help identify recurring areas of congestion and quantify the level of congestion. The 2015 data were compared with 2011 data to evaluate whether congestion has increased over the past years.

Finally, crash data from VDOT's GIS database for the Study Area Corridors were obtained to identify crash trends and crash hotspots, and to compare with crash rates on similar facilities within the state.

2.2 DEVELOPMENT OF BALANCED EXISTING TRAFFIC VOLUMES

To support the traffic analysis of alternatives for the HRCS SEIS, peak hour and weekday Average Daily Traffic (ADT) volumes were developed for each alternative to provide a comprehensive assessment of operations during both the highest volume peak hour conditions and over the course of a typical weekday.

2.2.1 Peak Hour Volumes

Raw traffic counts were reviewed to identify the peak hour at each data collection location (mainline segments, ramps, intersections, and VDOT mainline permanent count stations). In locations where the data were collected over multiple days, peak hour data were averaged for data collected on a Tuesday, Wednesday, or Thursday. After reviewing the peak hours for the individual data collection locations, common peak hours for major sections within the study area were selected. The hourly traffic volumes and heavy vehicle percentages for the common peak hour were then extracted from the raw count data at each location. The identified peak hours are identified in **Table 2-3.**

Table 2-3: Study Area Peak Hours

Roadway Alignments	AM Peak Hour	PM Peak Hour
I-64	7:15 AM – 8:15 AM	3:30 PM – 4:30 PM
I-564	6:45 AM – 7:45 AM	3:30 PM – 4:30 PM
I-664 (from I-64 to VA 164)	7:00 AM – 8:00 AM	4:00 PM – 5:00 PM
I-664 (from VA 164 to I-264)	7:30 AM – 8:30 AM	4:30 PM – 5:30 PM
VA 164	7:00 AM – 8:00 AM	4:00 PM – 5:00 PM

Peak hour volumes were manually adjusted for balance between interchanges and intersections by holding the volumes at the major interchanges in the study area (I-64 and I-664; I-64 and I-564; I-664 and VA 164; and I-664 and I-264) constant, then proportionally adding and subtracting ramp volumes between the major interchanges.

The balanced 2015 peak hour volumes are provided in **Figure 2-1.**

2.2.2 Daily Volumes

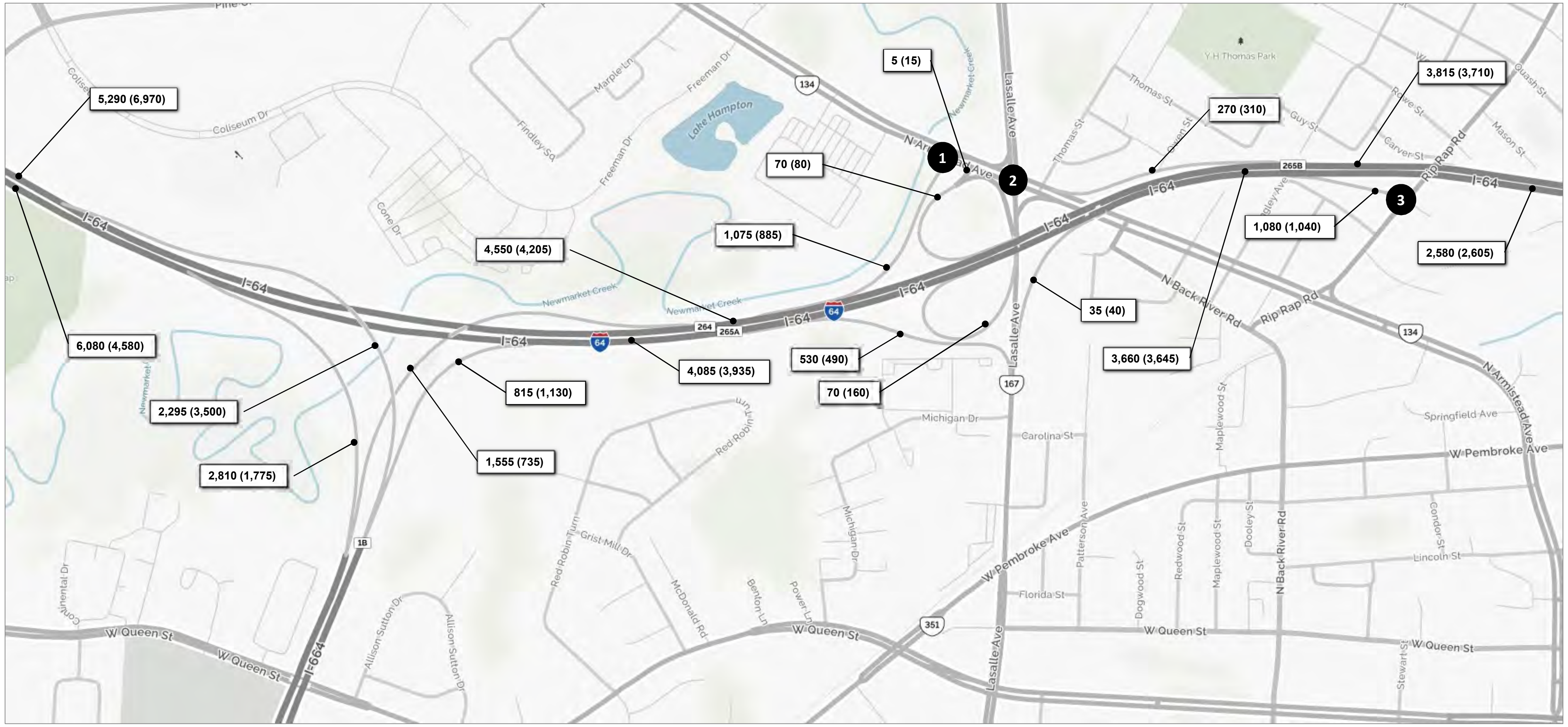
Development of the daily volumes followed the same approach as the development of peak hour volumes, with the exception that daily volumes were modified to account for seasonal variations. Traffic volumes for the entire year 2014 on the HRBT and MMMBT were reviewed to determine the month-to-month variation, as well as the daily variations within each month. First, the monthly totals were computed for 2014. Then, the percentage variation for each month compared to the annual average volume was computed. The computed percentage was applied to the counts conducted in June 2015 to normalize the data. The computed percentages indicate that counts conducted in October and September did not need to be seasonally adjusted, as counts conducted during those months represent typical annual conditions.

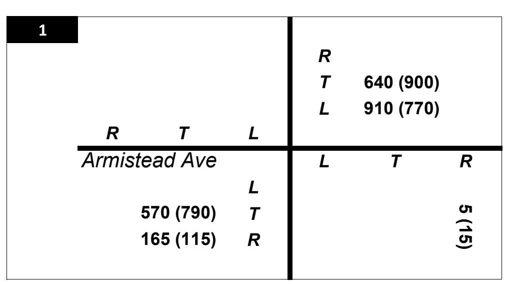
The balanced daily volumes represent average weekday conditions, although higher weekend and seasonal volumes have been observed on the HRBT.

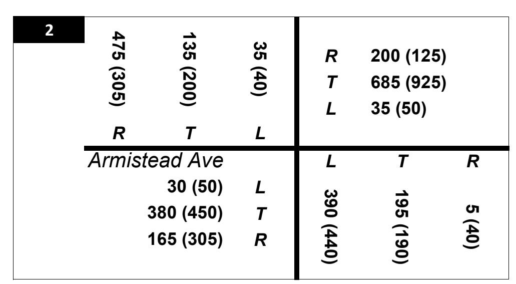
At some locations only peak hour data were collected. To estimate daily volumes from these peak hour data, k-factors (ratio of peak period versus daily traffic volume) were computed by dividing AM and PM peak hour volumes by the seasonally adjusted daily volume at nearby locations where both peak and daily data were available. The computed k-factors at these nearby locations were then used at locations where only peak hour counts were conducted to estimate a daily volume. Balancing procedures identical to those followed for the peak hour volumes were used to balance the daily volumes.

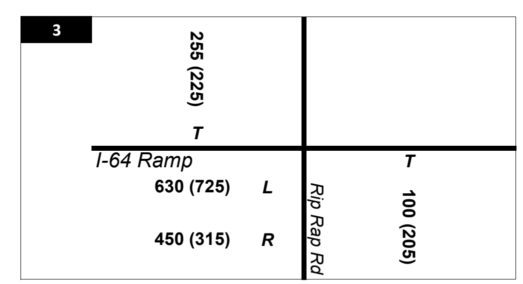
Two key reasonableness checks were performed on the final balanced peak hour and daily volumes. First, k-factors were re-computed using the balanced daily and peak hour volumes. These factors were then reviewed to ensure that there were no ramps or intersections where the ratio of peak-to-daily volume is beyond typical values, and that k-factors reflect existing traffic patterns, in particular near military facilities (such as I-564) where highly directional traffic volumes entering and departing the facility tend to coincide with work shifts. Second, the daily volumes were compared to the latest available (2014) traffic data published by VDOT to ensure 2015 volumes are consistent with the established 2014 volumes.

The balanced 2015 weekday daily volumes are provided in **Figure 2-2.**









Legend

x,xxx (x,xxx) AM (PM) Peak Hour Volume

VDOT Virginia Department of Transportation

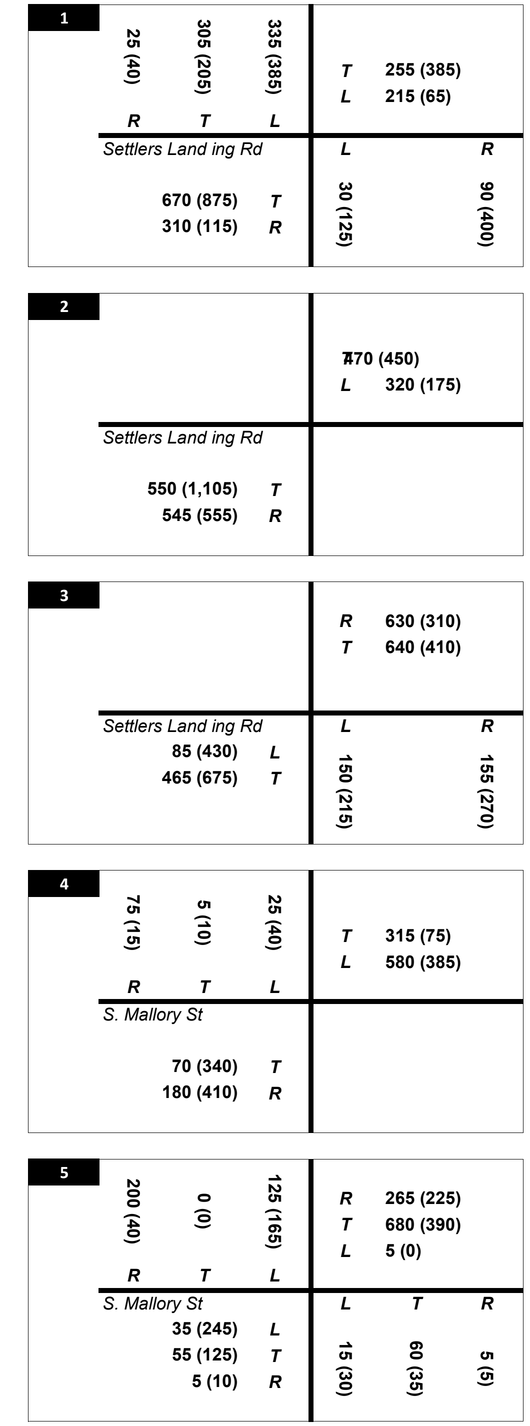
U.S. Department of Transportation Federal Highway Administration

HRCS SEIS
Hampton Roads Crossing Study SEIS

2015 Existing Peak Hour Volumes I-64 Corridor

April 2017

Figure 2-1.1



Legend

x,xxx (x,xxx) AM (PM) Peak Hour Volume

VDOT Virginia Department of Transportation

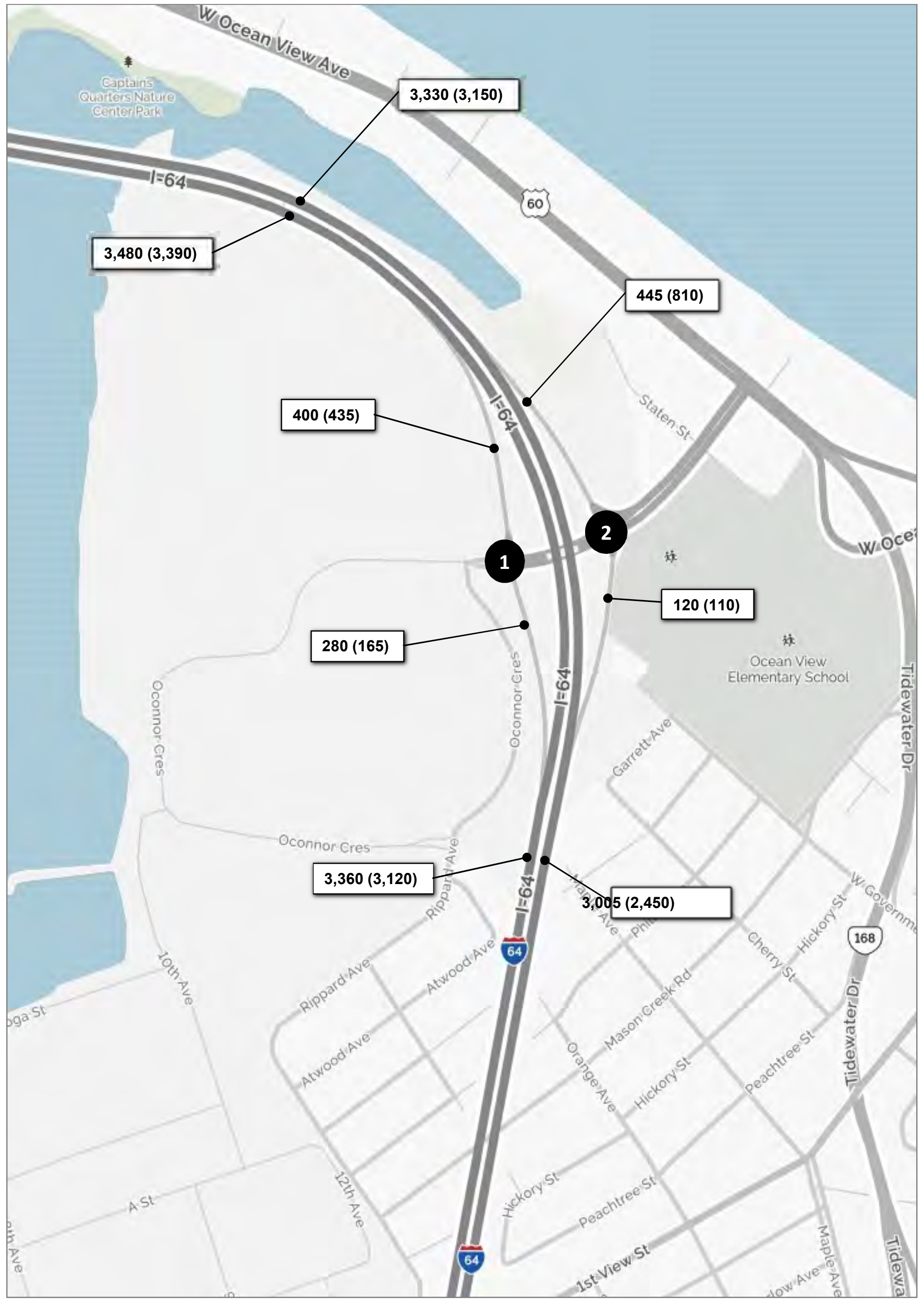
U.S. Department of Transportation Federal Highway Administration

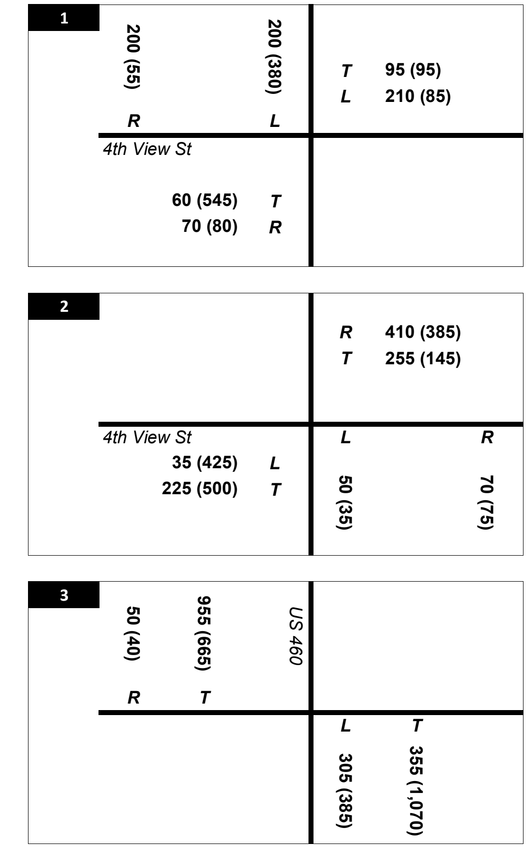
HRCS SEIS
Hampton Roads Crossing Study SEIS

2015 Existing Peak Hour Volumes I-64 Corridor

April 2017

Figure 2-1.2





Legend

x,xxx (x,xxx) AM (PM) Peak Hour Volume

VDOT Virginia Department of Transportation

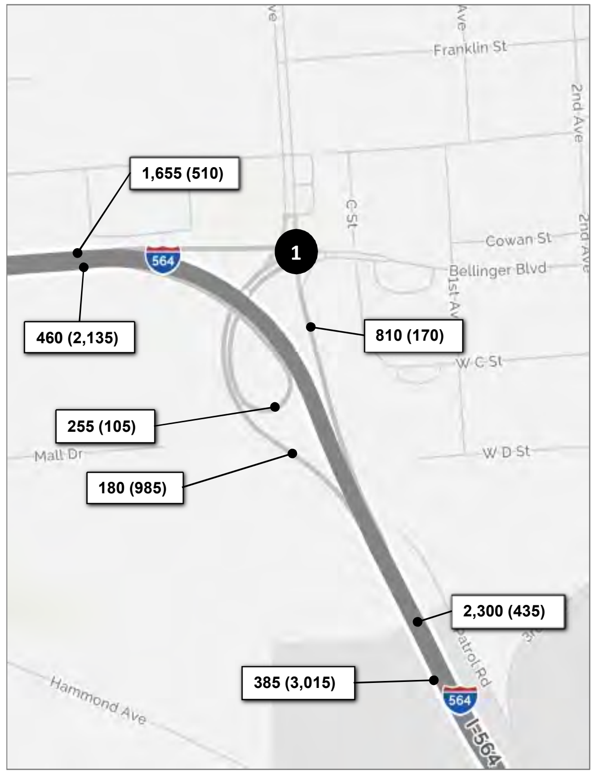
U.S. Department of Transportation Federal Highway Administration

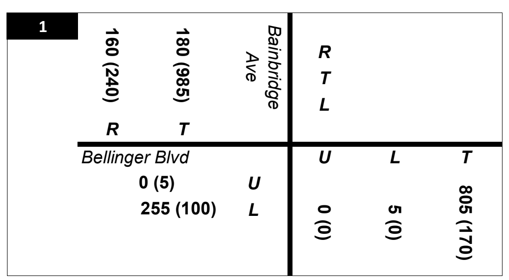
HRCS SEIS
Hampton Roads Crossing Study SEIS

2015 Existing Peak Hour Volumes I-64 Corridor

April 2017

Figure 2-1.3





Legend

x,xxx (x,xxx) AM (PM) Peak Hour Volume

VDOT Virginia Department of Transportation

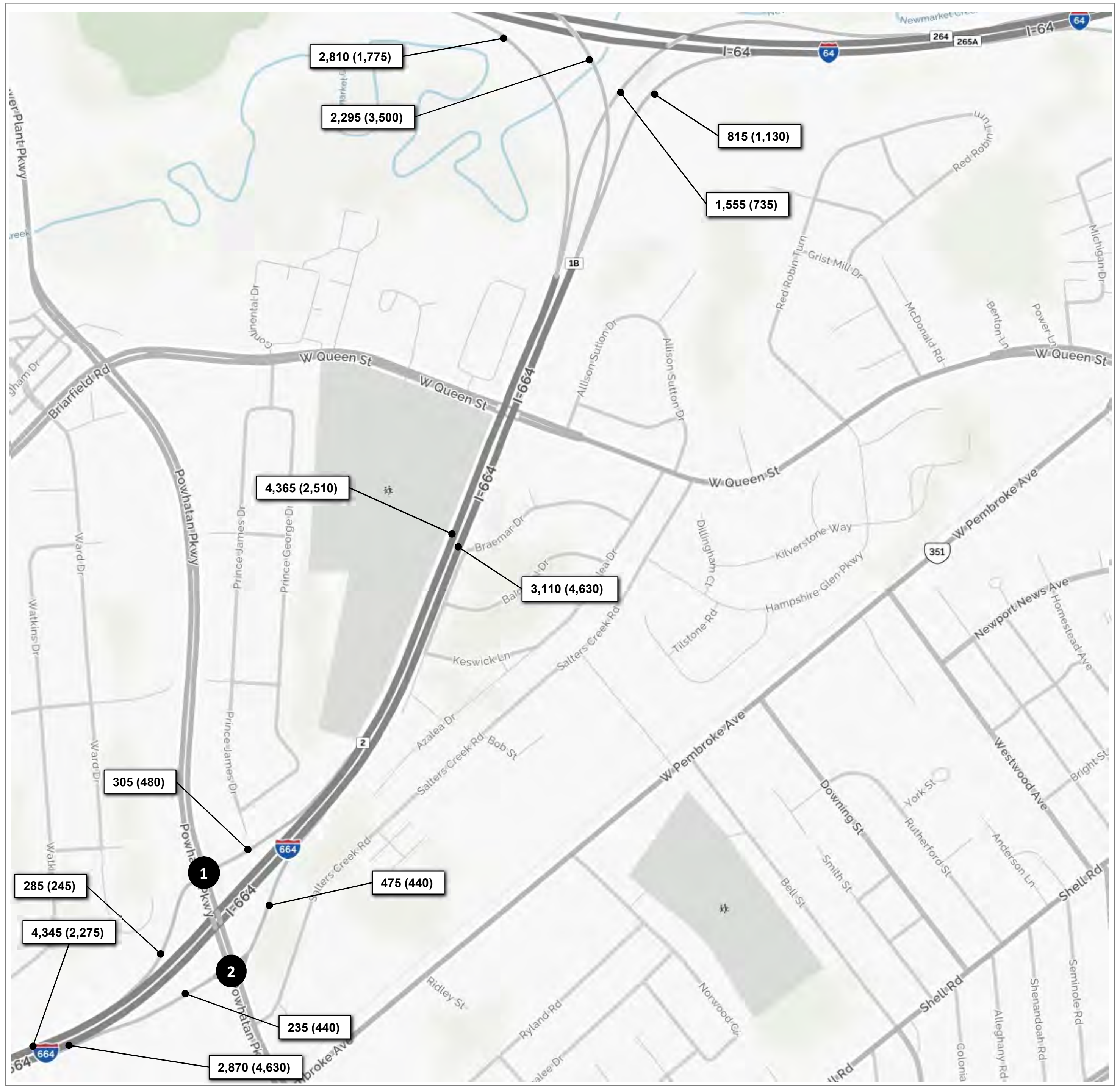
U.S. Department of Transportation Federal Highway Administration

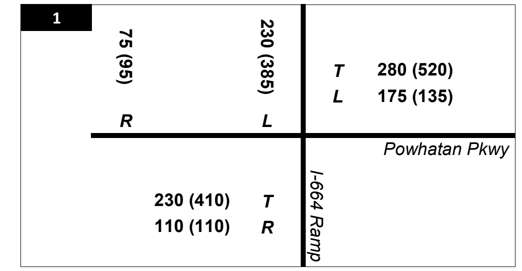
HRCS SEIS
Hampton Roads Crossing Study SEIS

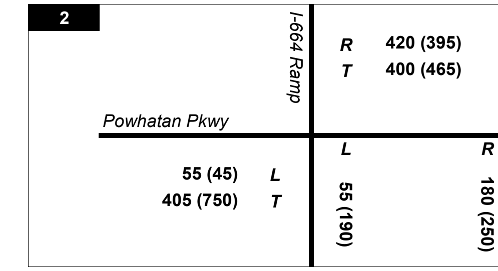
2015 Existing Peak Hour Volumes I-64 Corridor

April 2017

Figure 2-1.4







Legend

x,xxx (x,xxx) AM (PM) Peak Hour Volume

VDOT Virginia Department of Transportation

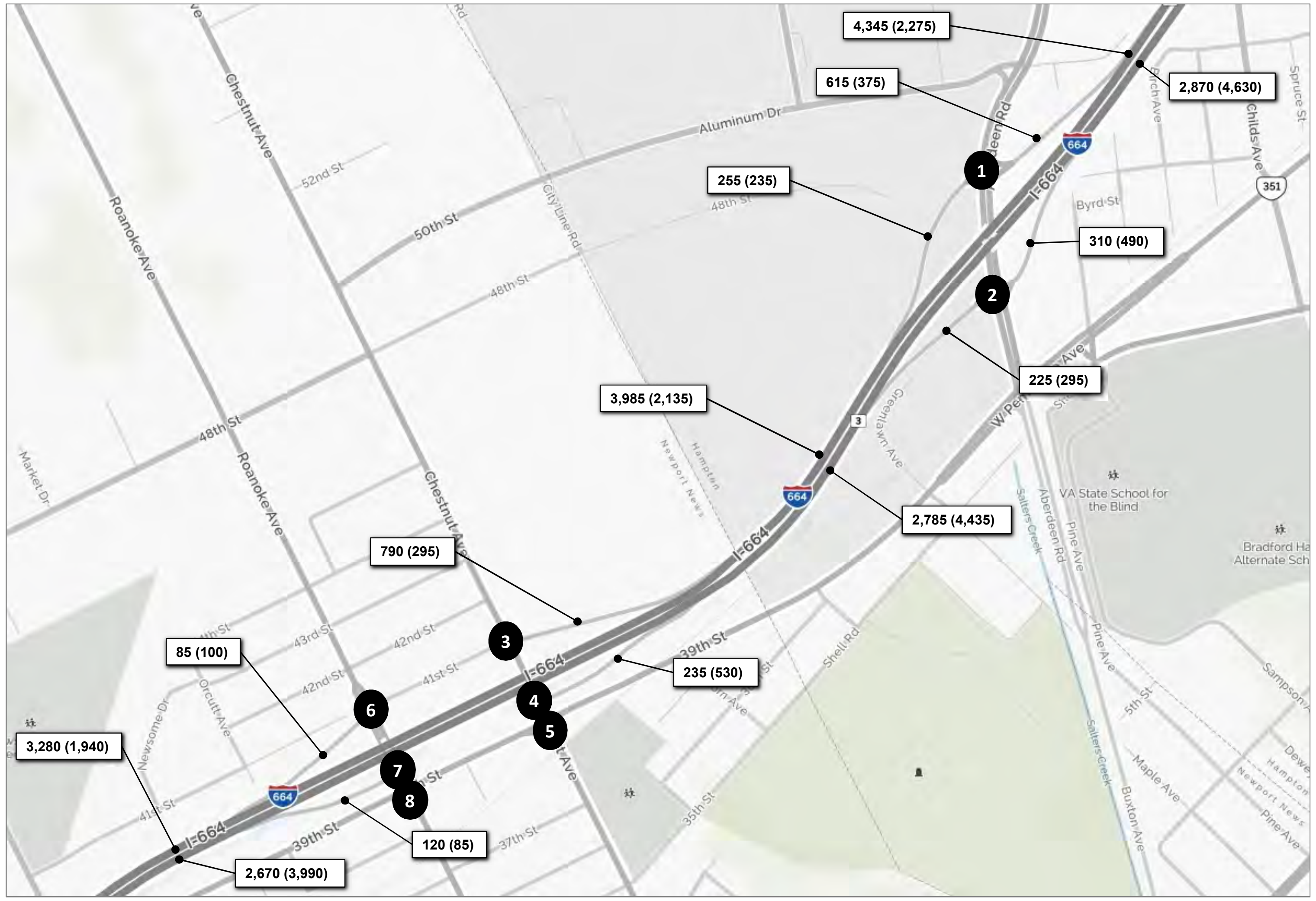
U.S. Department of Transportation Federal Highway Administration

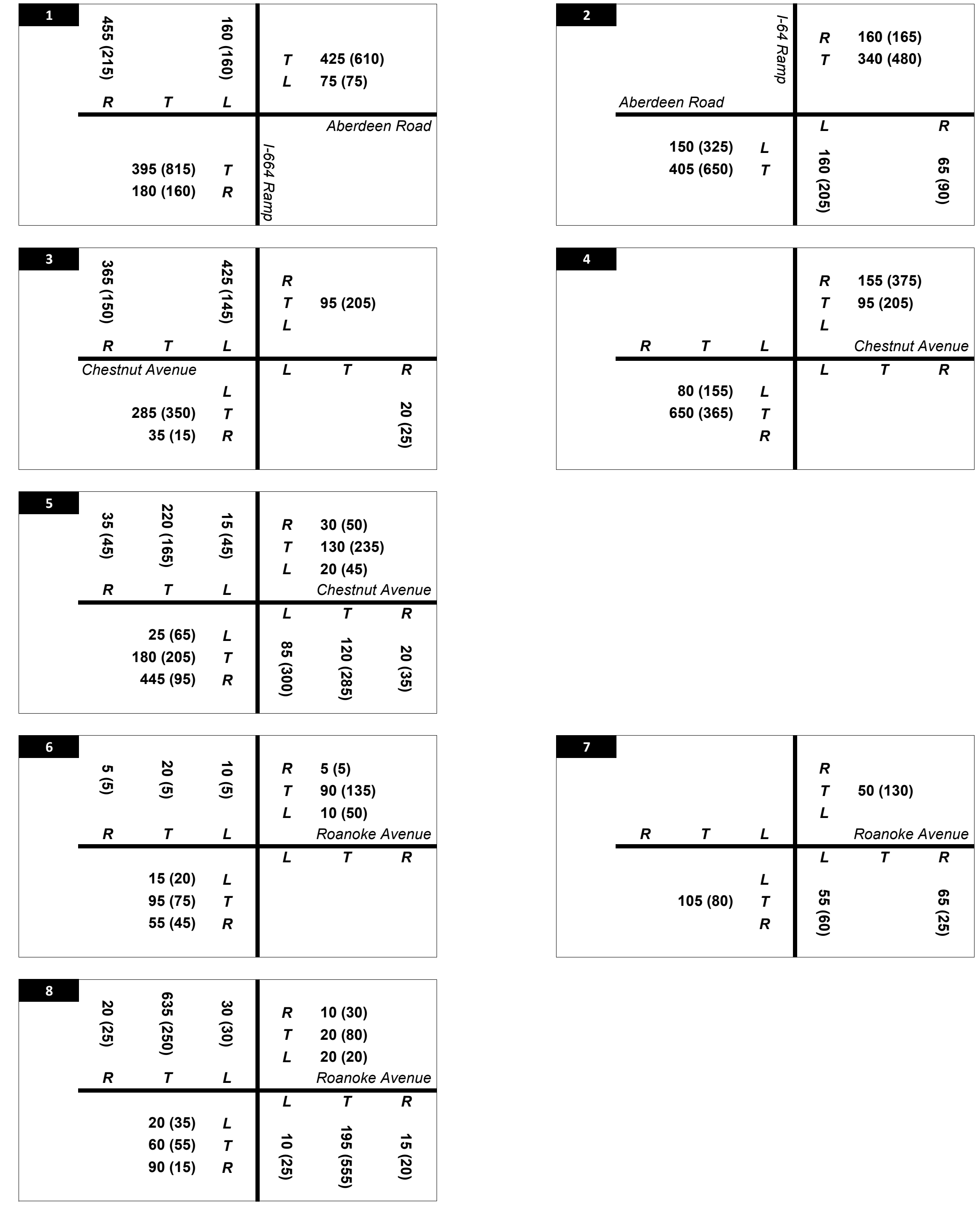
HRCS SEIS Hampton Roads Crossing Study SEIS

2015 Existing Peak Hour Volumes I-664 Corridor

April 2017

Figure 2-1.5





Legend

x,xxx (x,xxx) AM (PM) Peak Hour Volume

VDOT Virginia Department of Transportation

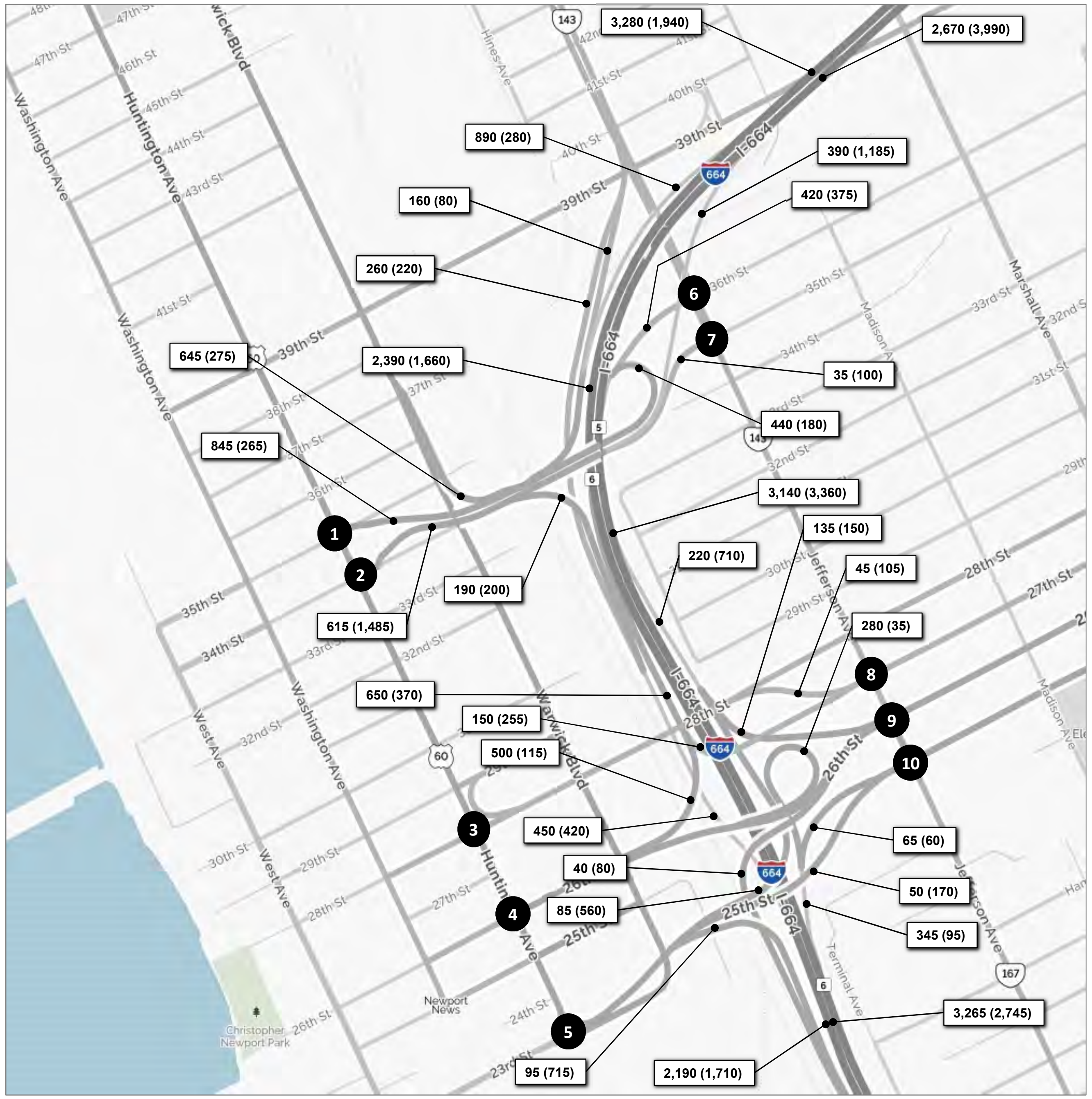
U.S. Department of Transportation Federal Highway Administration

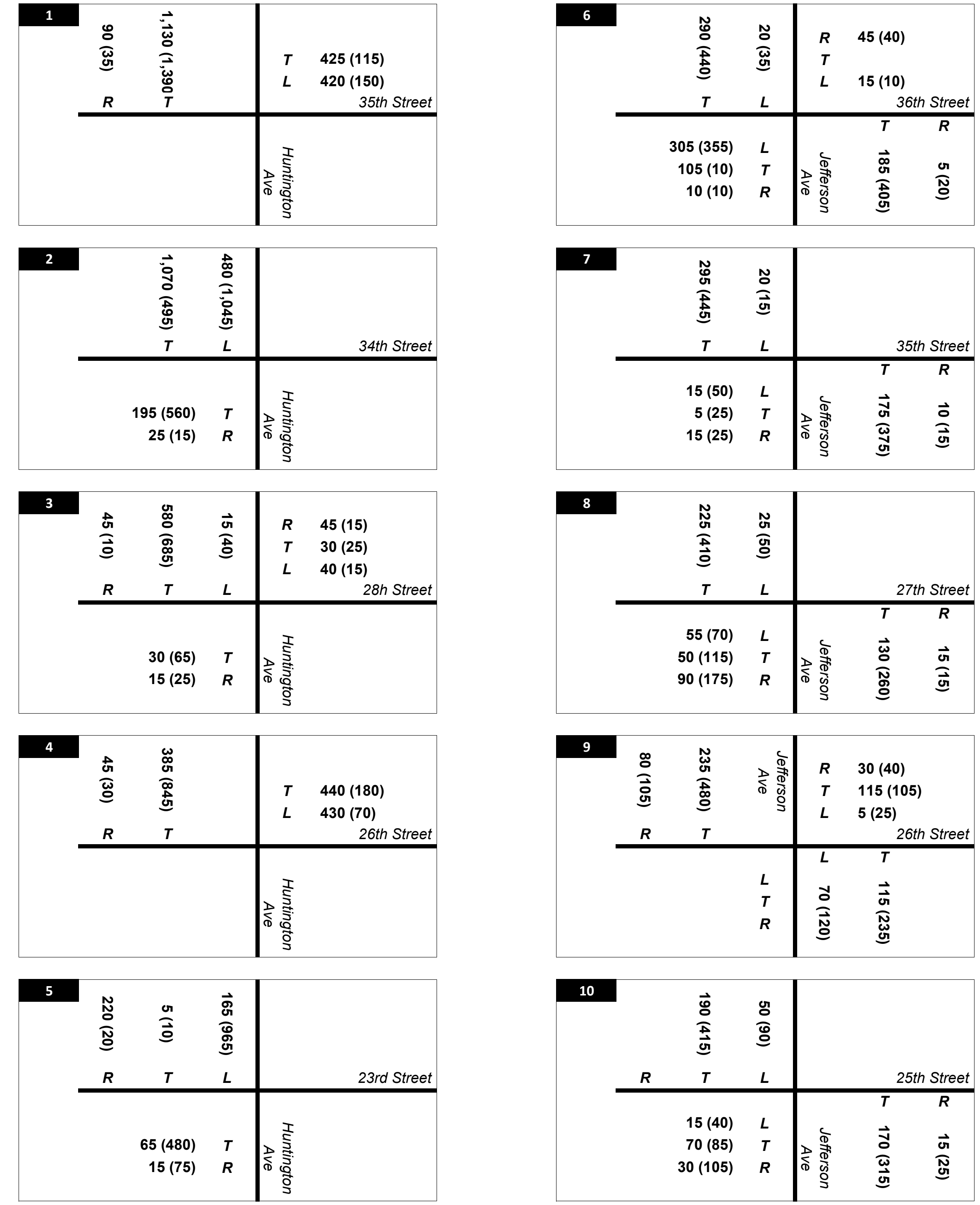
HRCS SEIS
Hampton Roads Crossing Study SEIS

2015 Existing Peak Hour Volumes I-664 Corridor

April 2017

Figure 2-1.6





Legend

x,xxx (x,xxx) AM (PM) Peak Hour Volume

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

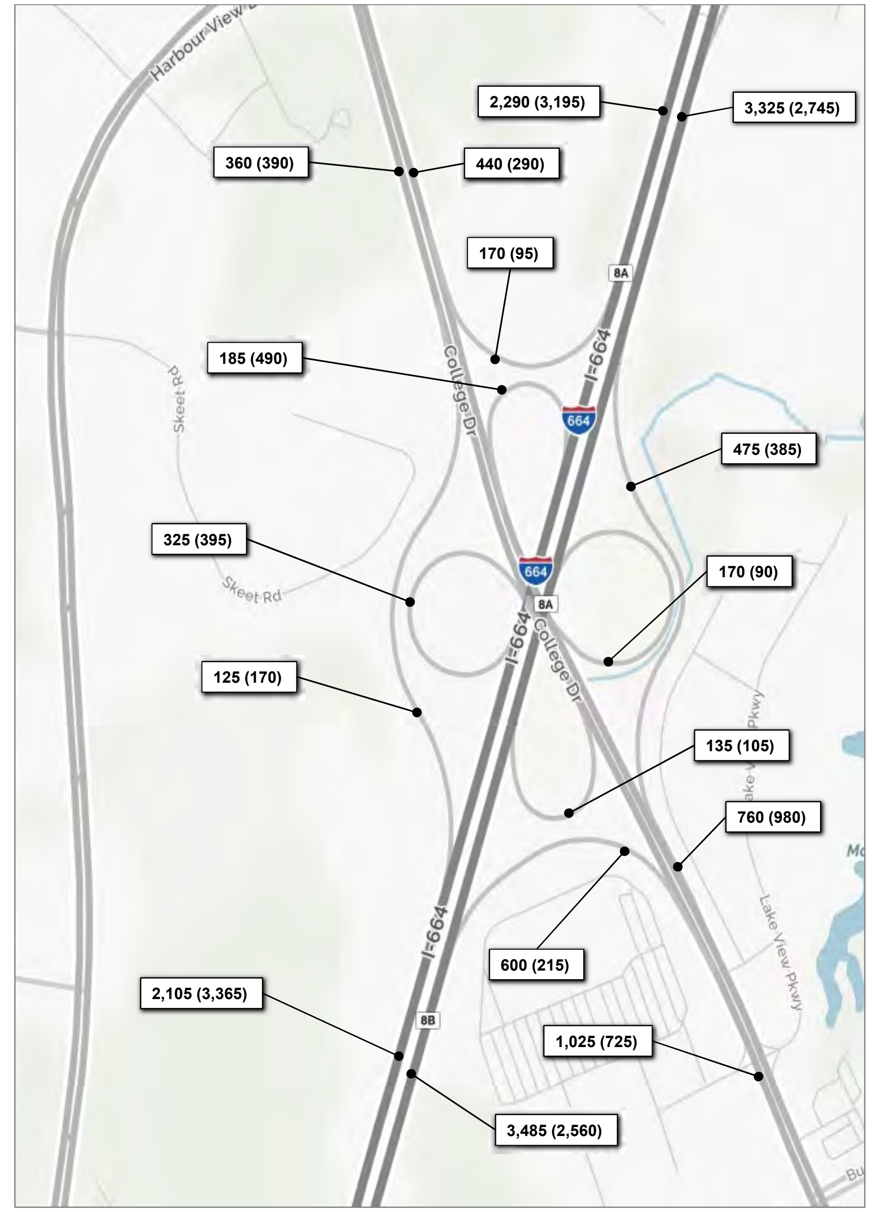
HRCS SEIS

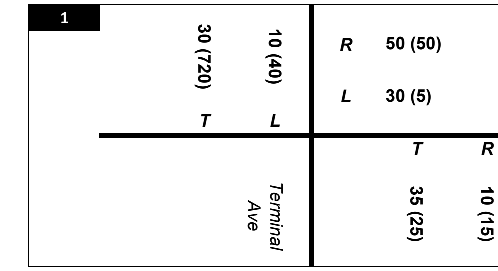
Hampton Roads Crossing Study SEIS

2015 Existing Peak Hour Volumes I-664 Corridor

April 2017

Figure 2-1.7





Legend

x,xxx (x,xxx) AM (PM) Peak Hour Volume

VDOT Virginia Department of Transportation

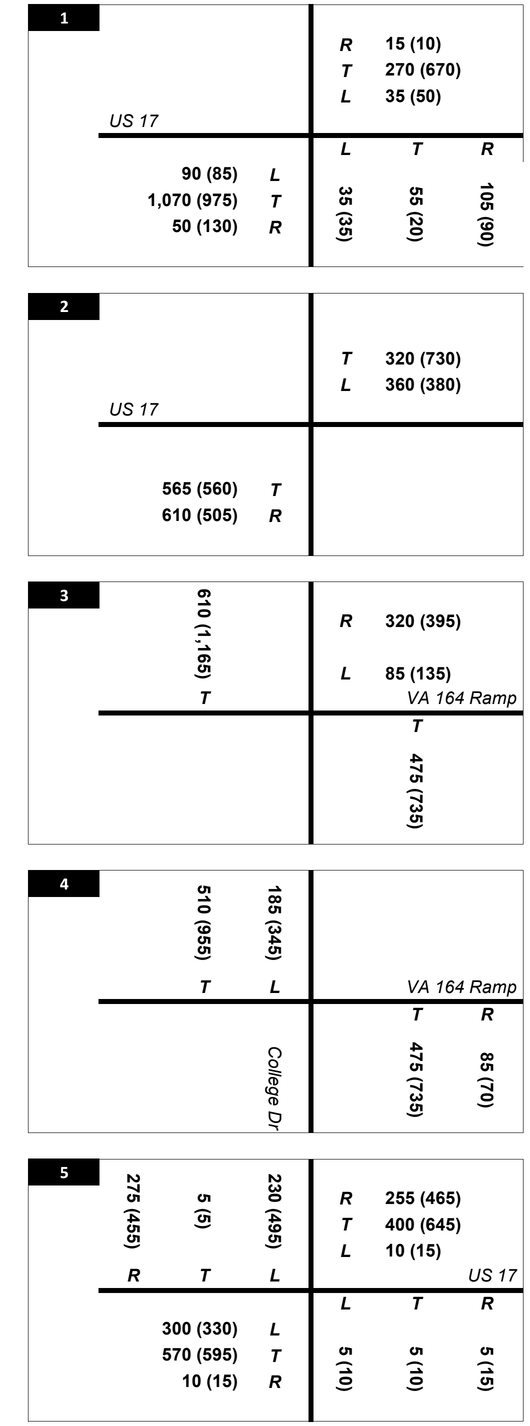
U.S. Department of Transportation Federal Highway Administration

HRCS SEIS
Hampton Roads Crossing Study SEIS

2015 Existing Peak Hour Volumes I-664 Corridor

April 2017

Figure 2-1.8



Legend

x,xxx (x,xxx) AM (PM) Peak Hour Volume

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS Hampton Roads Crossing Study SEIS

2015 Existing Peak Hour Volumes I-664 Corridor

April 2017

Figure 2-1.9

Legend

x,xxx (x,xxx) AM (PM) Peak Hour Volume

VDOT Virginia Department of Transportation

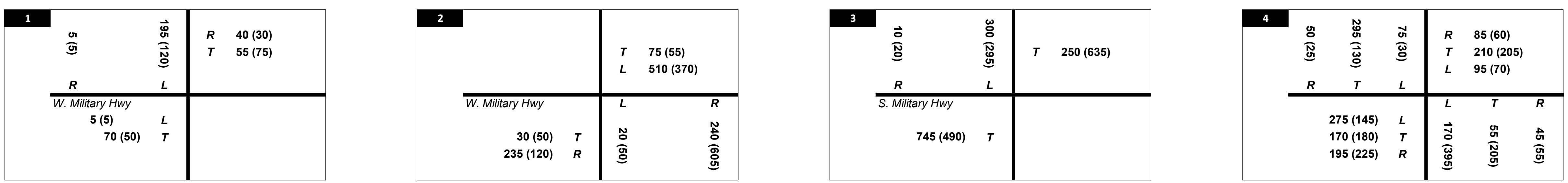
U.S. Department of Transportation Federal Highway Administration

HRCS SEIS
Hampton Roads Crossing Study SEIS

2015 Existing Peak Hour Volumes I-664 Corridor

April 2017

Figure 2-1.10



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x,xxx (x,xxx) AM (PM) Peak Hour Volume

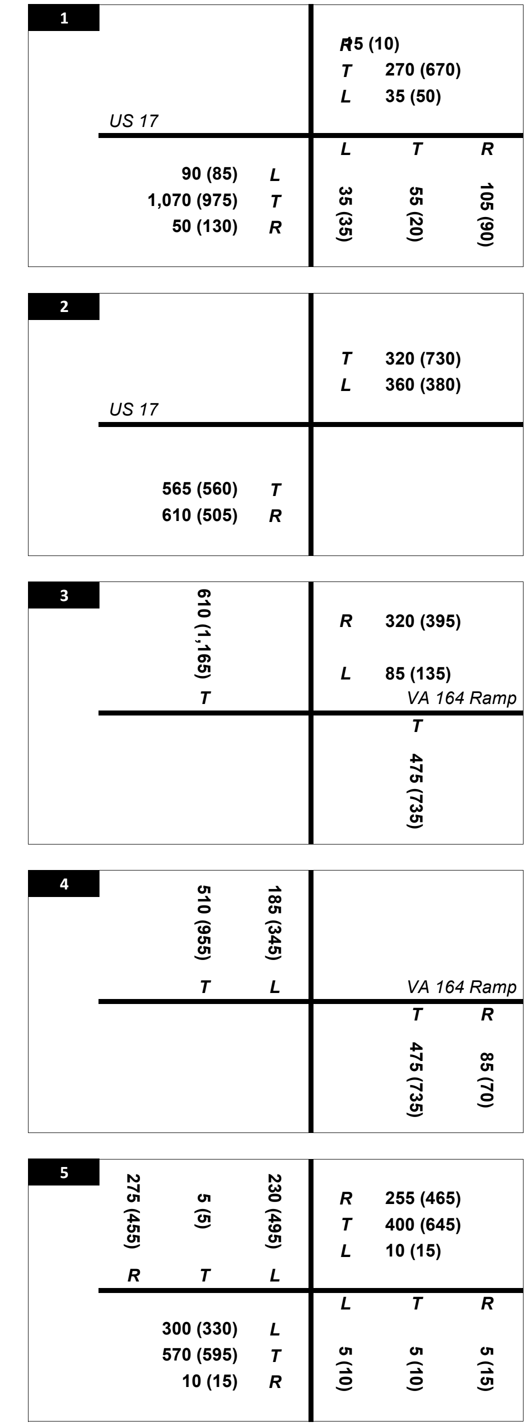
VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS Hampton Roads Crossing Study SEIS

2015 Existing Peak Hour Volumes I-664 Corridor

April 2017 | Figure 2-1.11



Legend

x,xxx (x,xxx) AM (PM) Peak Hour Volume

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS
Hampton Roads Crossing Study SEIS

2015 Existing Peak Hour Volumes VA 164 Corridor

April 2017

Figure 2-1.12

Legend

x,xxx (x,xxx) AM (PM) Peak Hour Volume

VDOT Virginia Department of Transportation

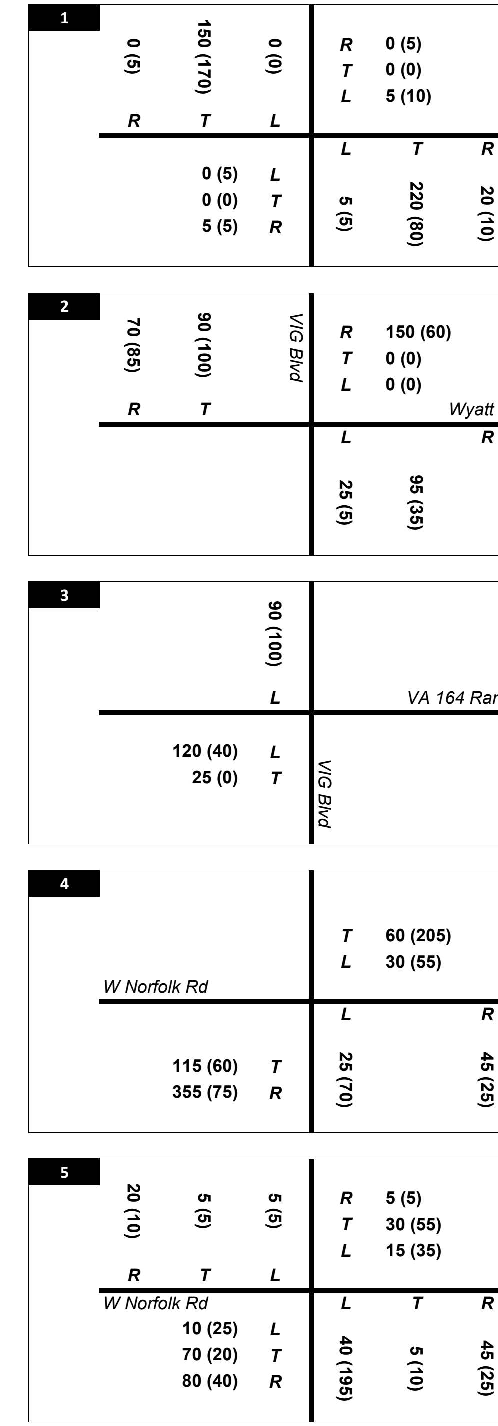
U.S. Department of Transportation Federal Highway Administration

HRCS SEIS Hampton Roads Crossing Study SEIS

2015 Existing Peak Hour Volumes VA 164 Corridor

April 2017

Figure 2-1.13



Legend

x,xxx (x,xxx) AM (PM) Peak Hour Volume

VDOT Virginia Department of Transportation

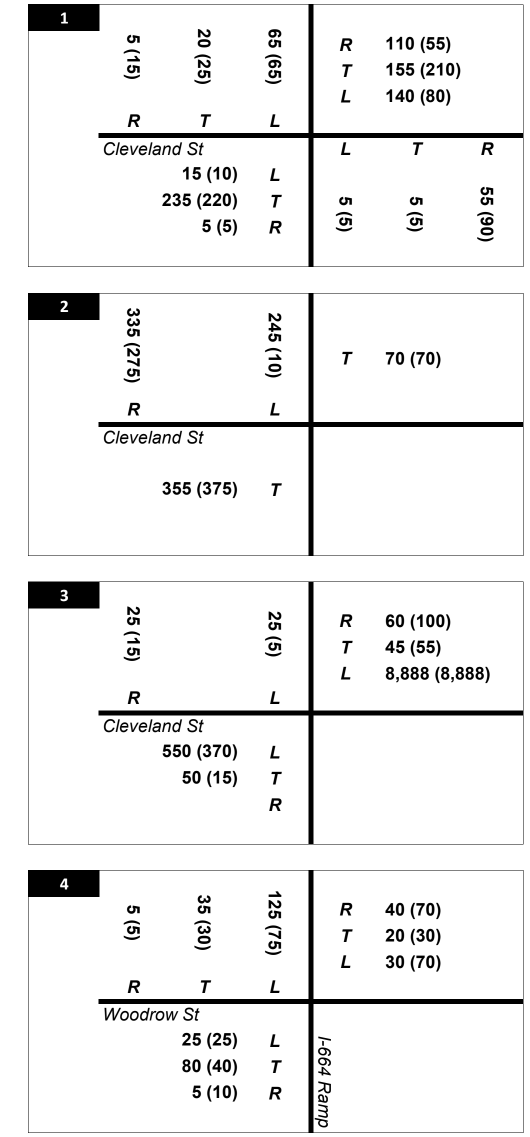
U.S. Department of Transportation Federal Highway Administration

HRCS SEIS
Hampton Roads Crossing Study SEIS

2015 Existing Peak Hour Volumes VA 164 Corridor

April 2017

Figure 2-1.14



Legend

x,xxx (x,xxx) AM (PM) Peak Hour Volume

VDOT Virginia Department of Transportation

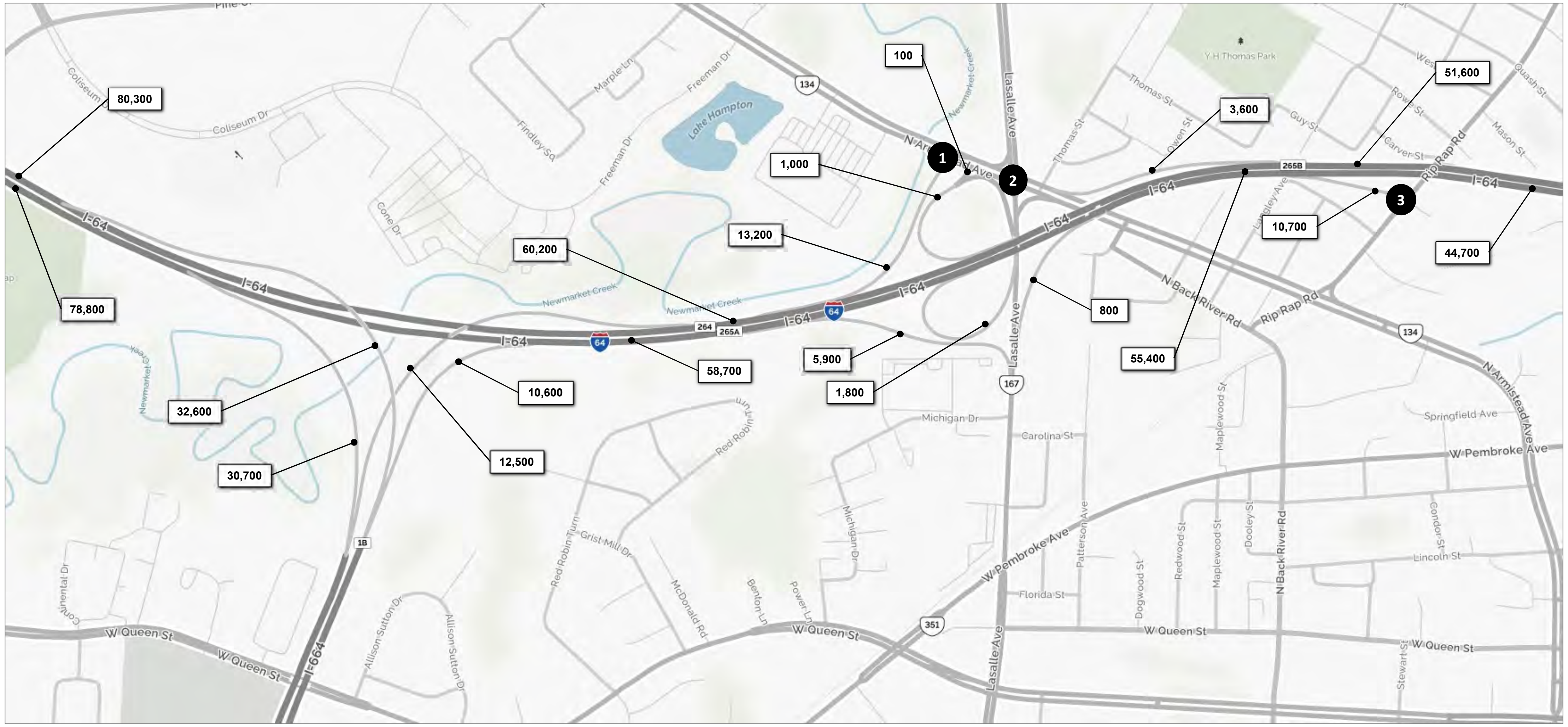
U.S. Department of Transportation Federal Highway Administration

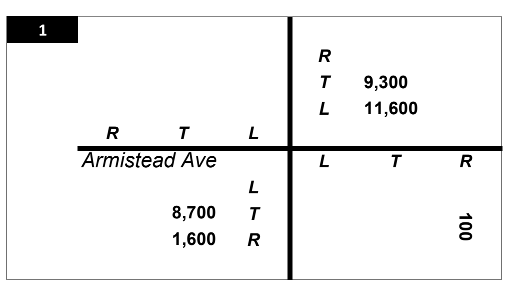
HRCS SEIS Hampton Roads Crossing Study SEIS

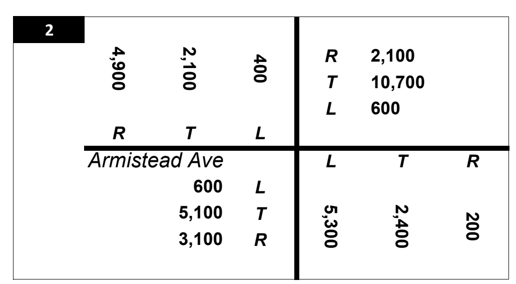
2015 Existing Peak Hour Volumes VA 164 Corridor

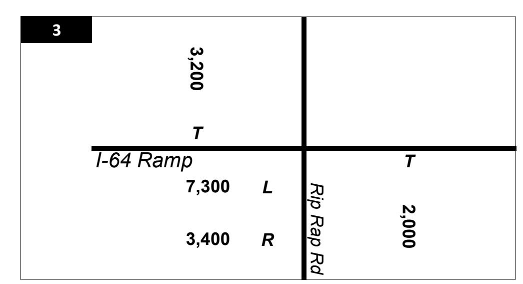
April 2017

Figure 2-1.15









Legend

xx,xxx Weekday Daily Volume

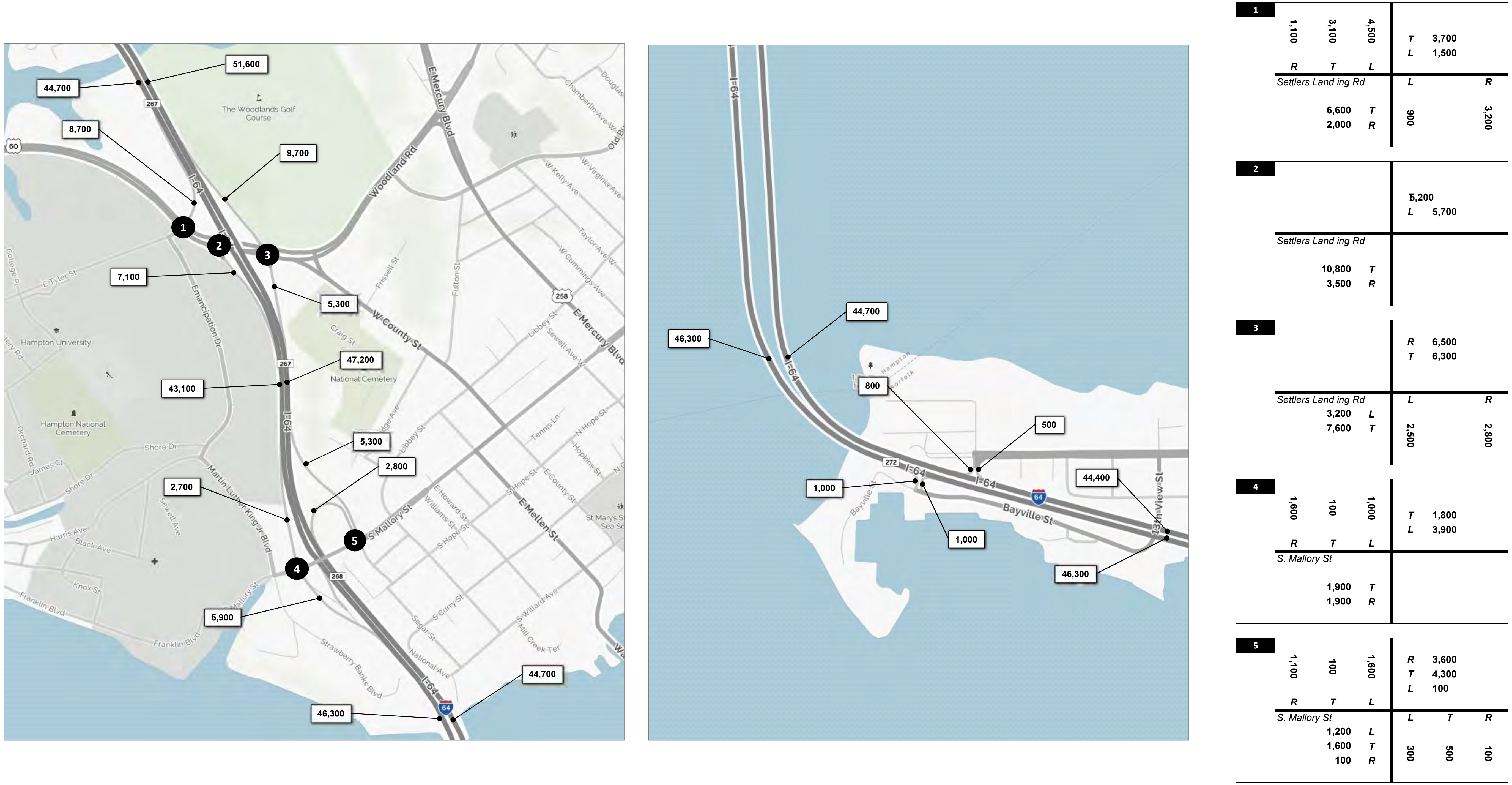
VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS
Hampton Roads Crossing Study SEIS

2015 Existing
Weekday Daily Volumes
I-64 Corridor

April 2017 | Figure 2-2.1



Legend

xx,xxx Weekday Daily Volume

VDOT Virginia Department of Transportation

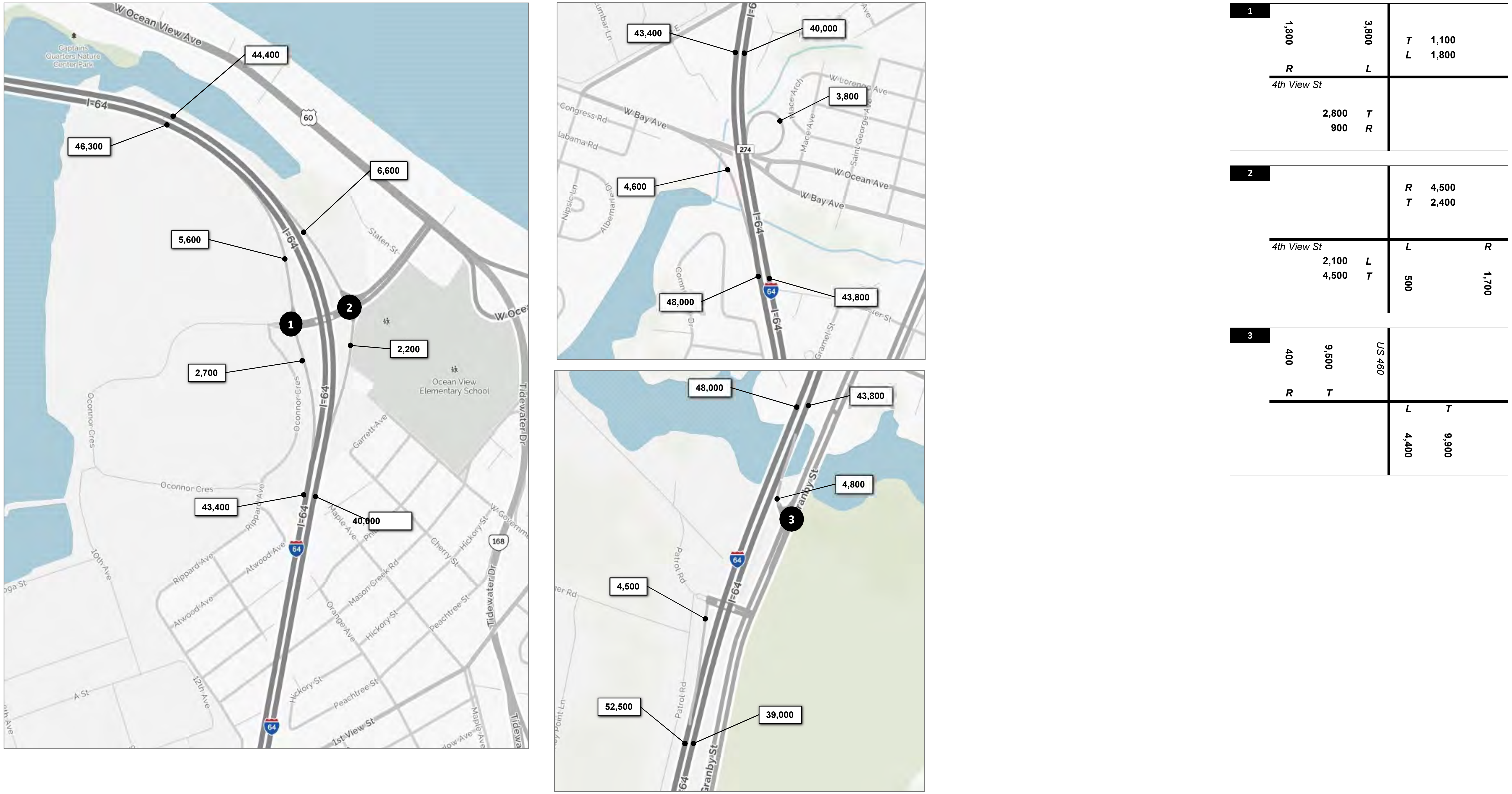
U.S. Department of Transportation Federal Highway Administration

HRCS SEIS Hampton Roads Crossing Study SEIS

2015 Existing Weekday Daily Volumes I-64 Corridor

April 2017

Figure 2-2.2



Legend

xx,xxx Weekday Daily Volume

VDOT Virginia Department of Transportation

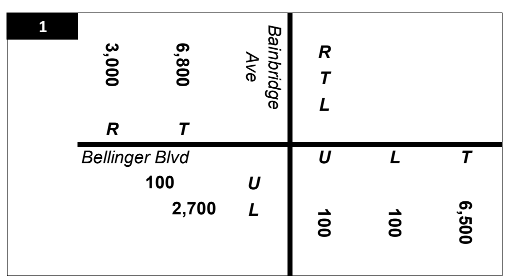
U.S. Department of Transportation Federal Highway Administration

HRCS SEIS
Hampton Roads Crossing Study SEIS

2015 Existing Weekday Daily Volumes I-64 Corridor

April 2017

Figure 2-2.3



Legend

xx,xxx — Weekday Daily Volume

VDOT Virginia Department of Transportation

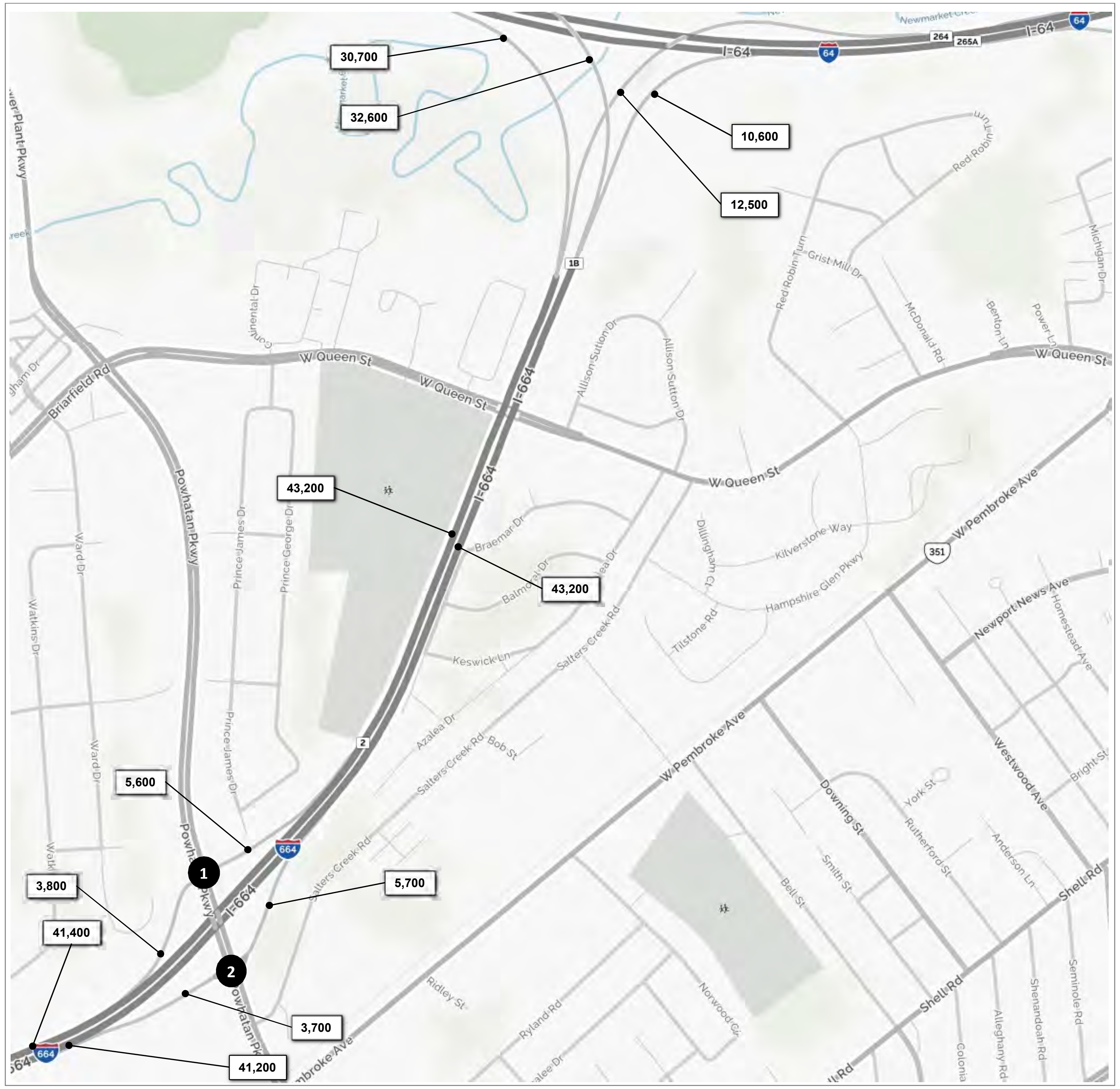
U.S. Department of Transportation Federal Highway Administration

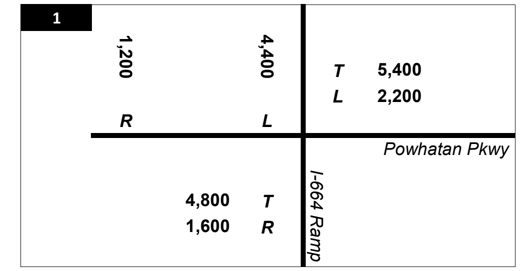
HRCS SEIS
Hampton Roads Crossing Study SEIS

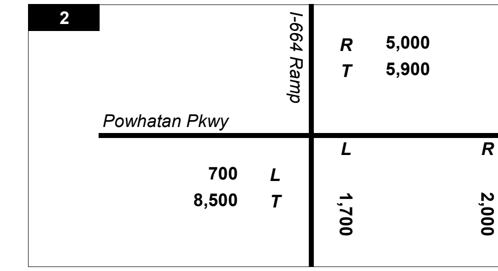
2015 Existing Weekday Daily Volumes I-64 Corridor

April 2017

Figure 2-2.4







Legend

xx,xxx Weekday Daily Volume

VDOT Virginia Department of Transportation

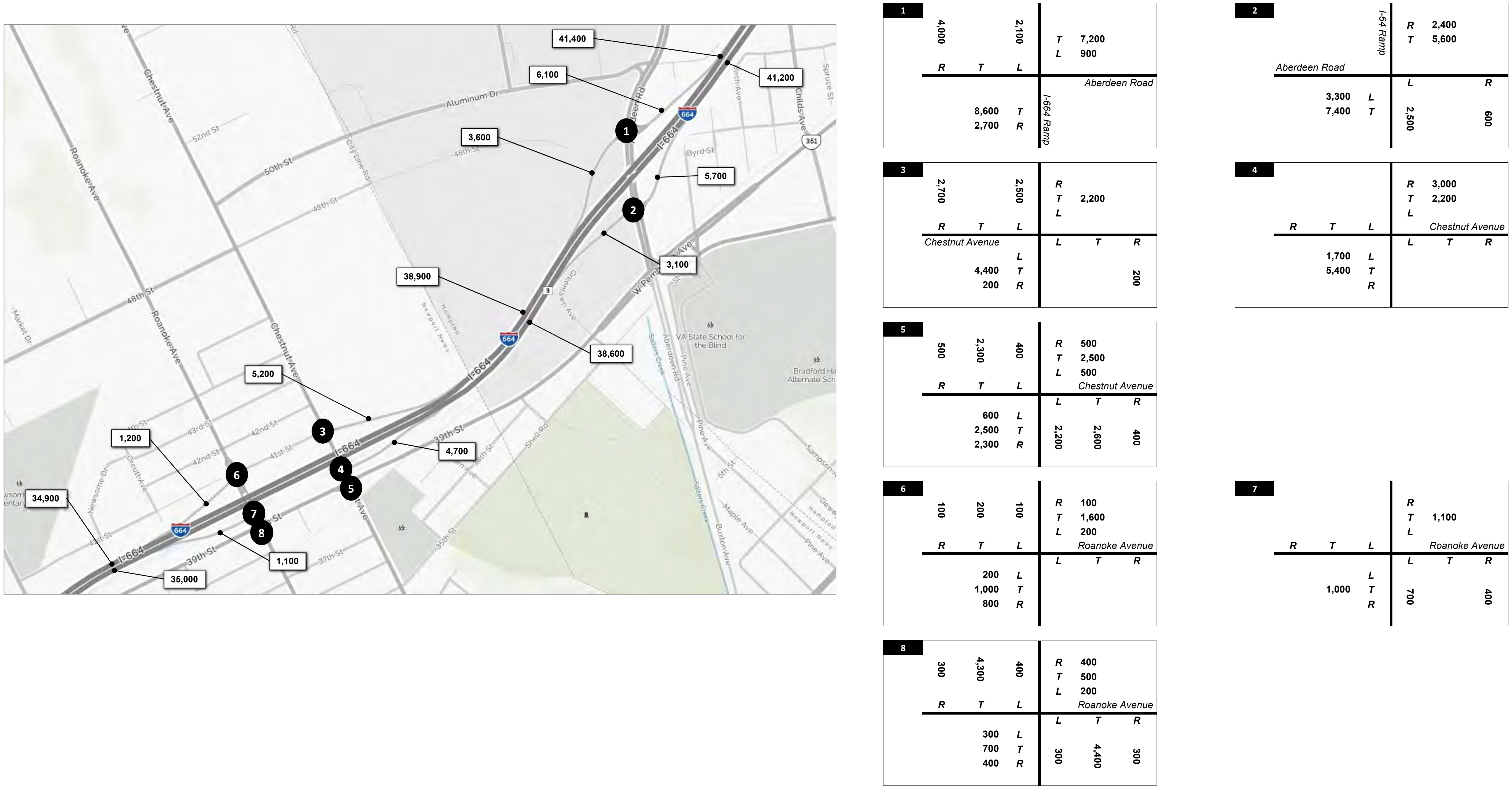
U.S. Department of Transportation Federal Highway Administration

HRCS SEIS
Hampton Roads Crossing Study SEIS

2015 Existing Weekday Daily Volumes I-664 Corridor

April 2017

Figure 2-2.5



Legend

xx,xxx Weekday Daily Volume

VDOT
Virginia Department of Transportation

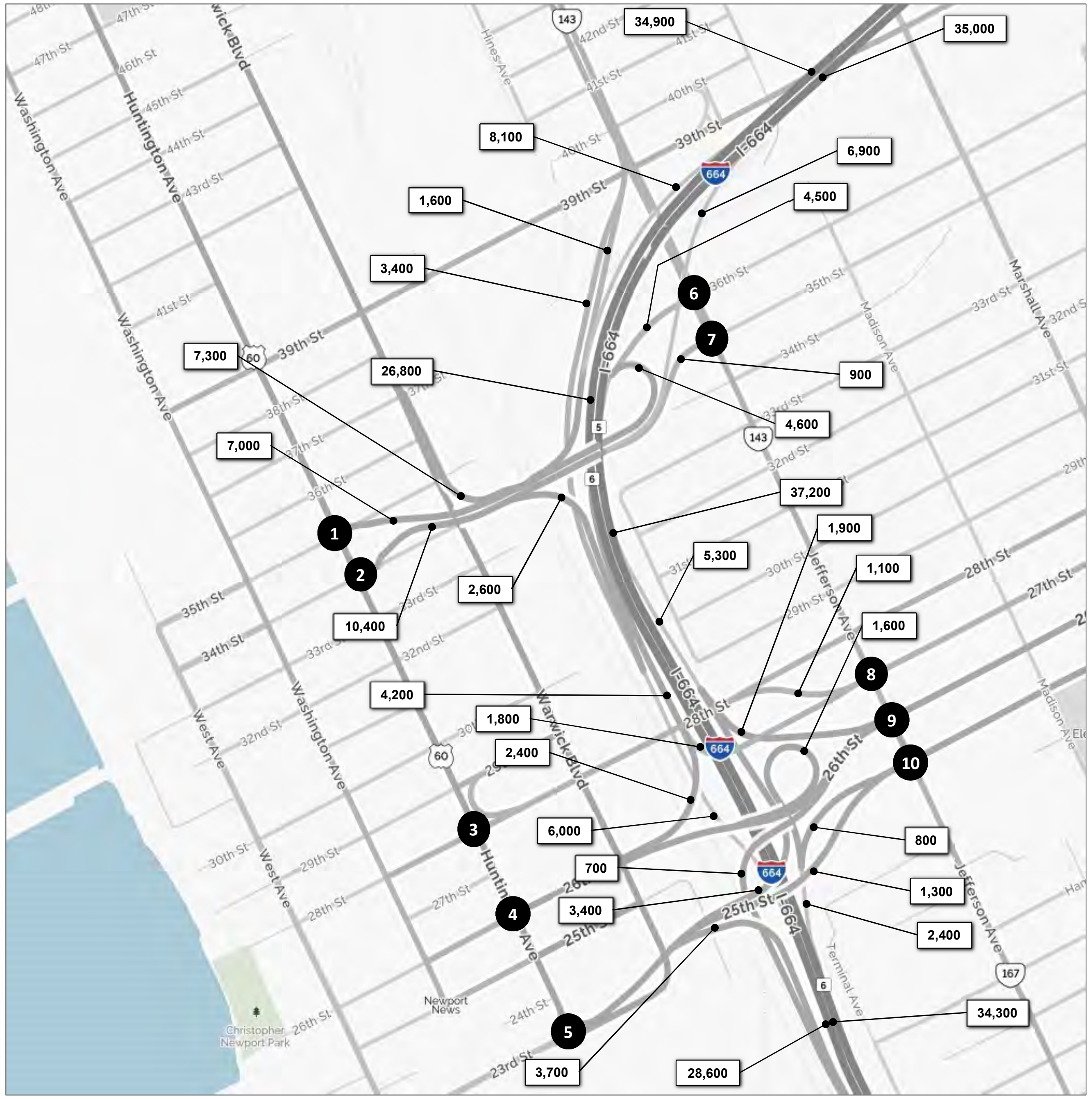
U.S. Department of Transportation
Federal Highway Administration

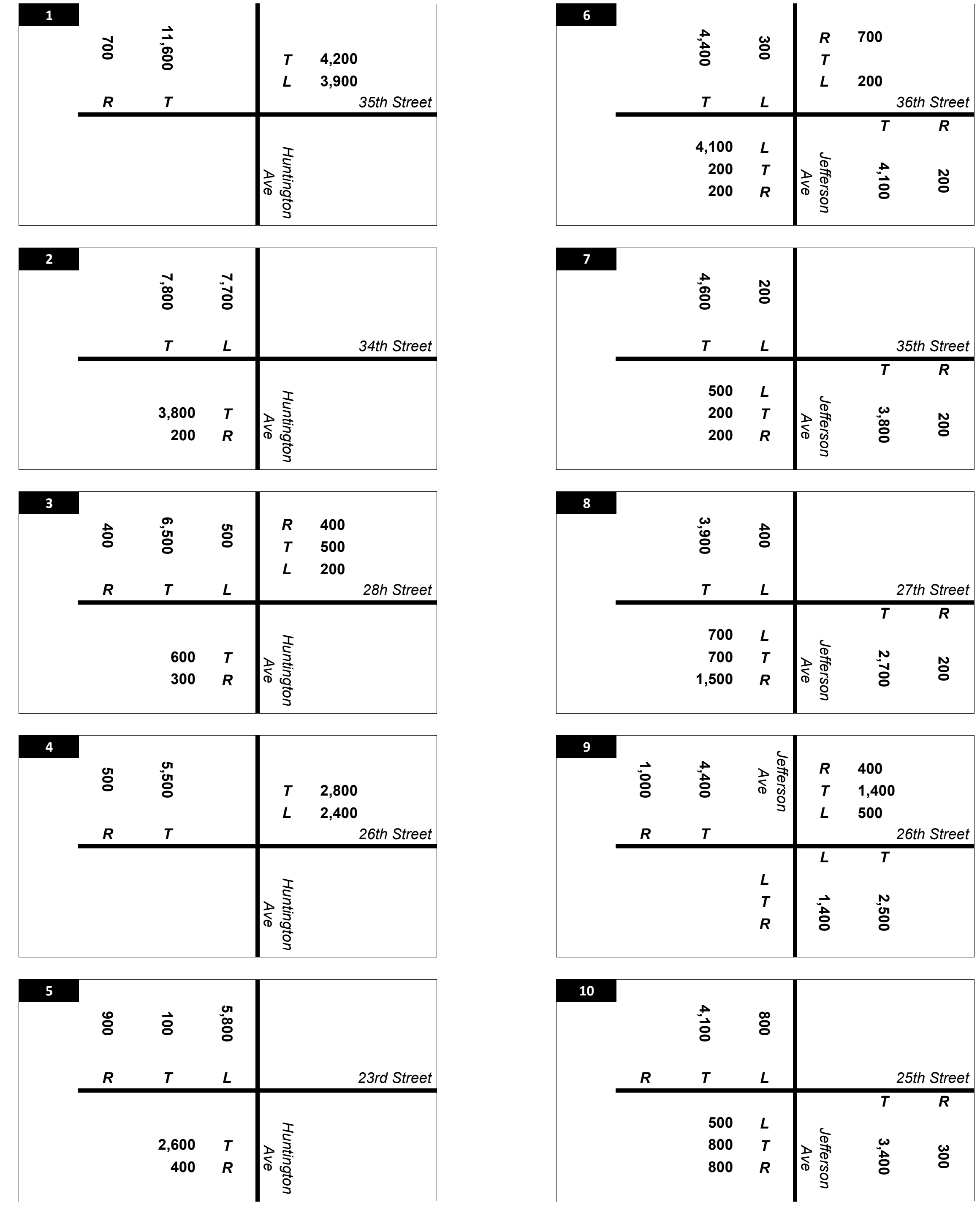
HRCS SEIS
Hampton Roads Crossing Study SEIS

2015 Existing Weekday Daily Volumes I-664 Corridor

April 2017

Figure 2-2.6





Legend

xx,xxx Weekday Daily Volume

VDOT Virginia Department of Transportation

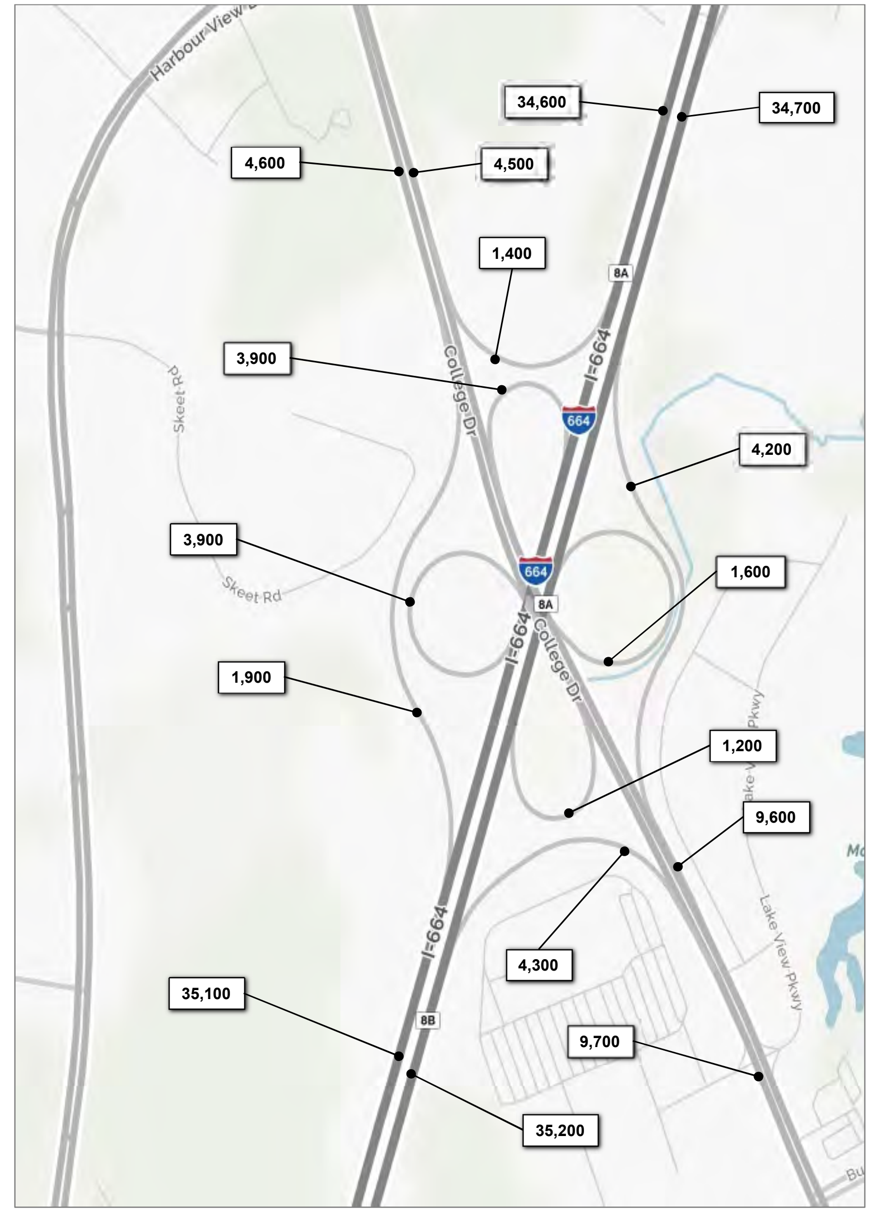
U.S. Department of Transportation Federal Highway Administration

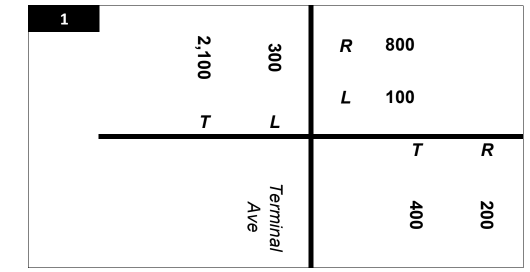
HRCS SEIS Hampton Roads Crossing Study SEIS

2015 Existing Weekday Daily Volumes I-664 Corridor

April 2017

Figure 2-2.7





Legend

xx,xxx Weekday Daily Volume

VDOT Virginia Department of Transportation

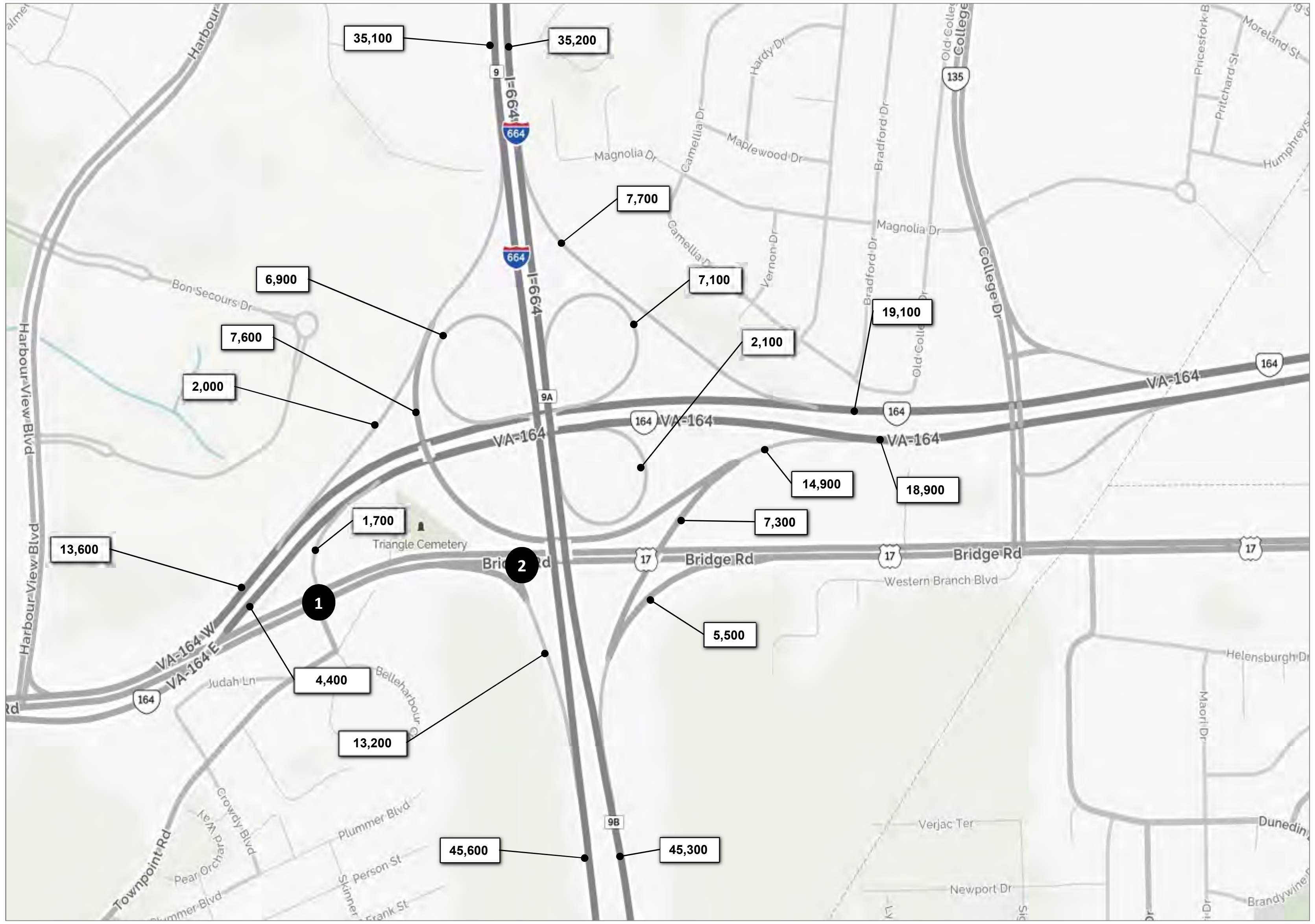
U.S. Department of Transportation Federal Highway Administration

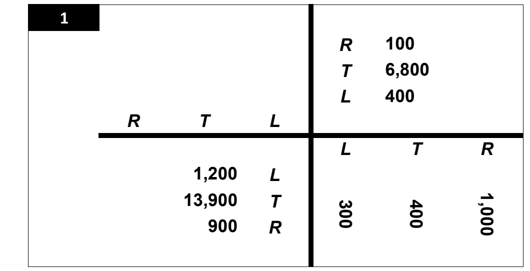
HRCS SEIS
Hampton Roads Crossing Study SEIS

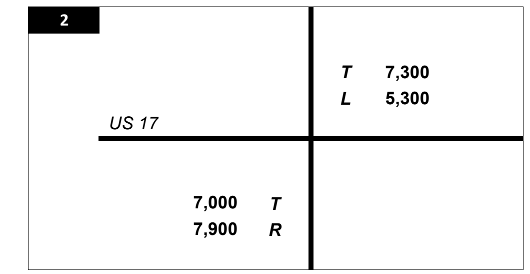
2015 Existing Weekday Daily Volumes I-664 Corridor

April 2017

Figure 2-2.8







Legend

xx,xxx — Weekday Daily Volume

HRCS SEIS
Hampton Roads Crossing Study SEIS

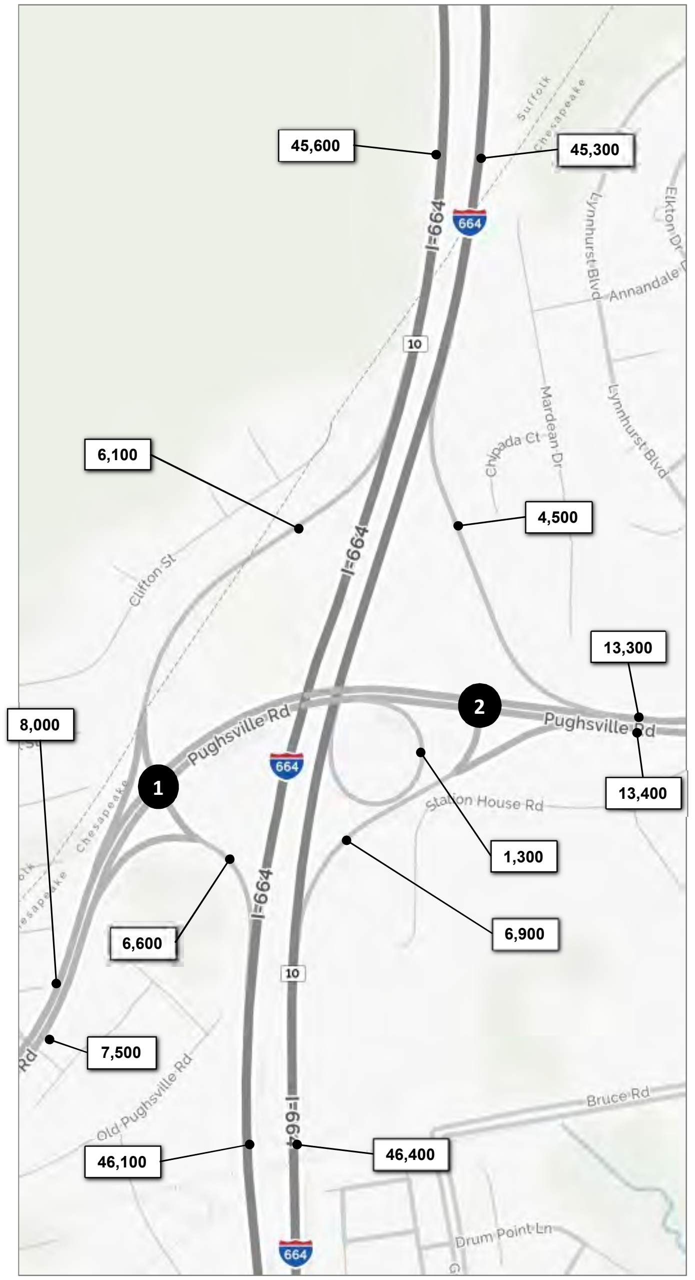
VDOT
Virginia Department of Transportation

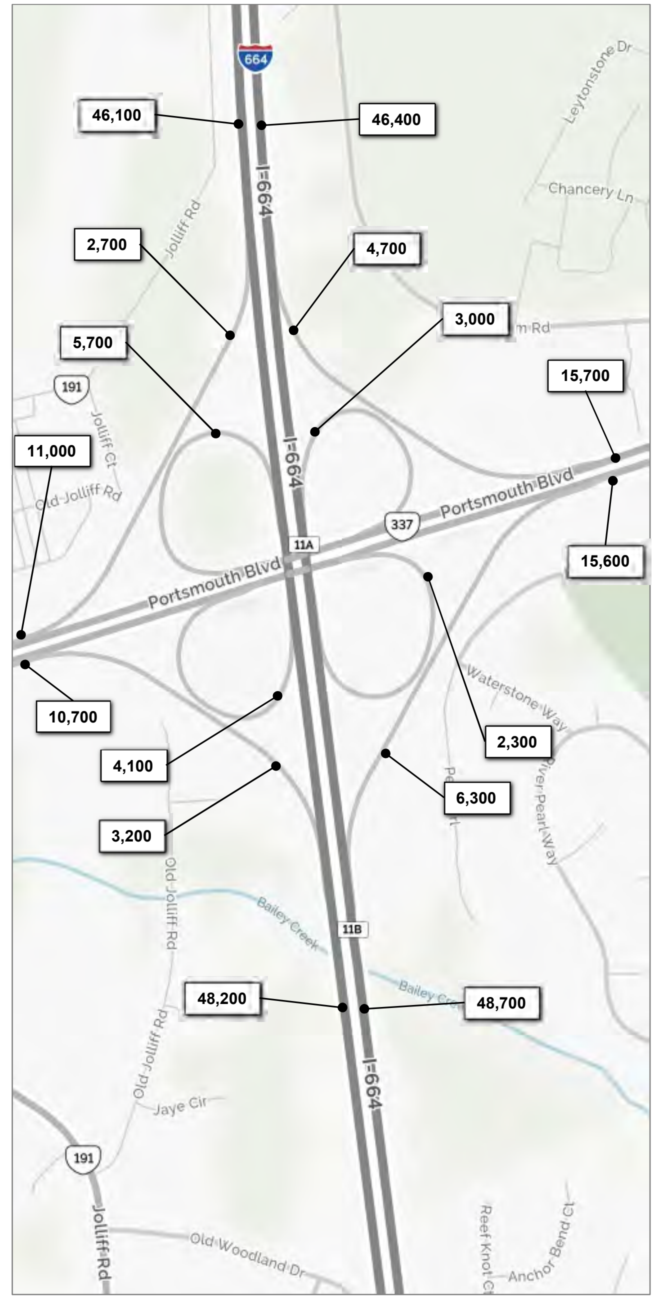
U.S. Department of Transportation
Federal Highway Administration

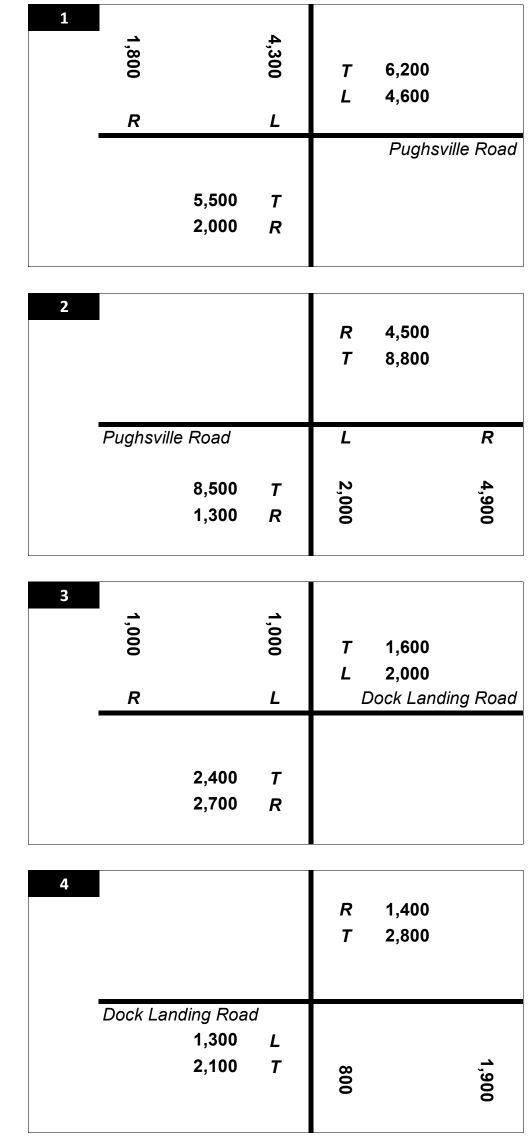
2015 Existing Weekday Daily Volumes I-664 Corridor

April 2017

Figure 2-2.9







Legend

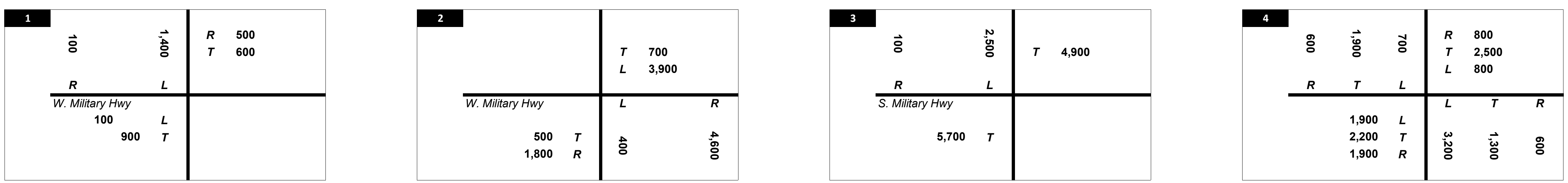
xx,xxx Weekday Daily Volume

HRCS SEIS
Hampton Roads Crossing Study SEIS

2015 Existing
Weekday Daily Volumes
I-664 Corridor

April 2017

Figure 2-2.10



Legend

xx,xxx Weekday Daily Volume

VDOT Virginia Department of Transportation

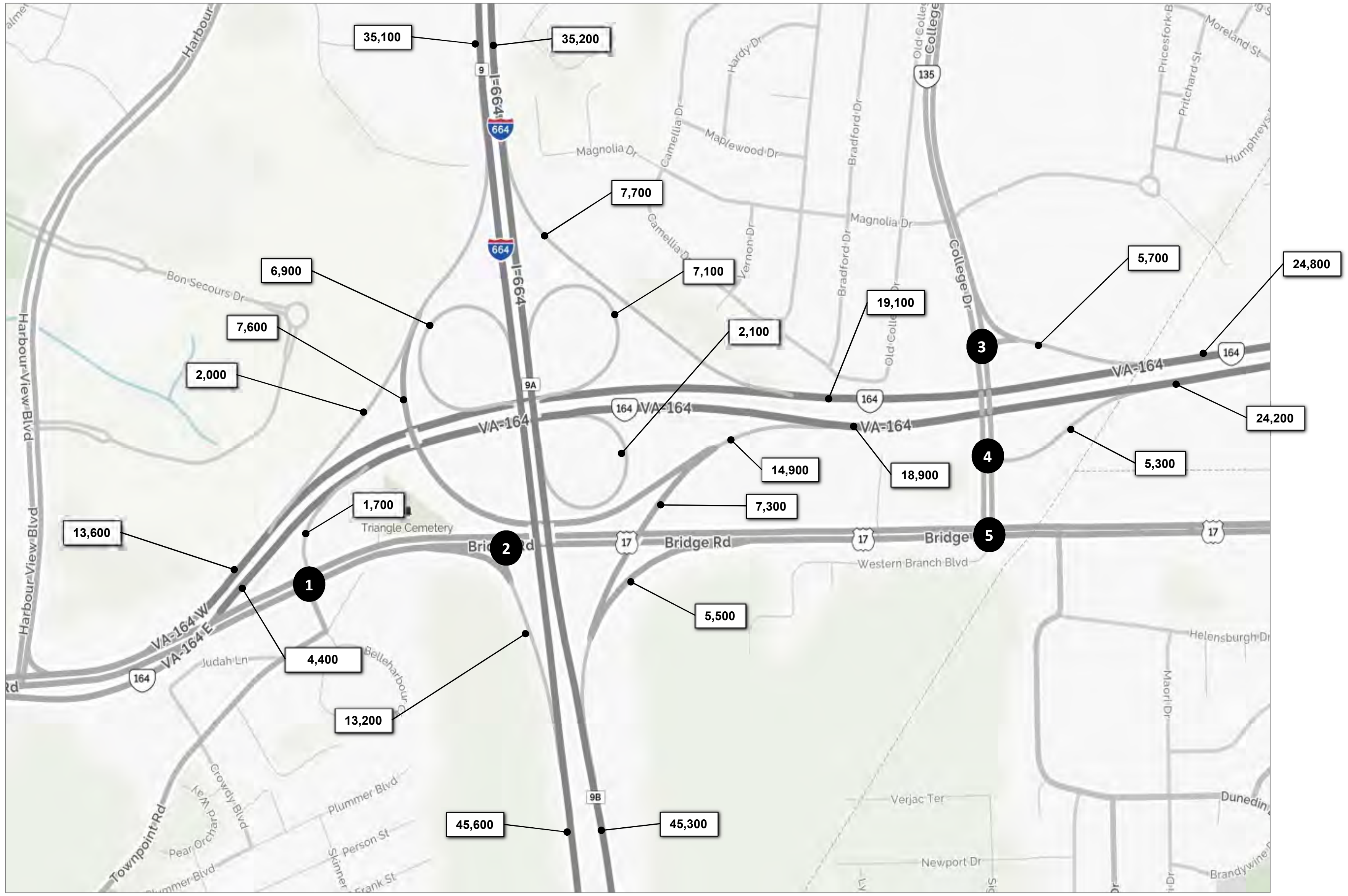
U.S. Department of Transportation Federal Highway Administration

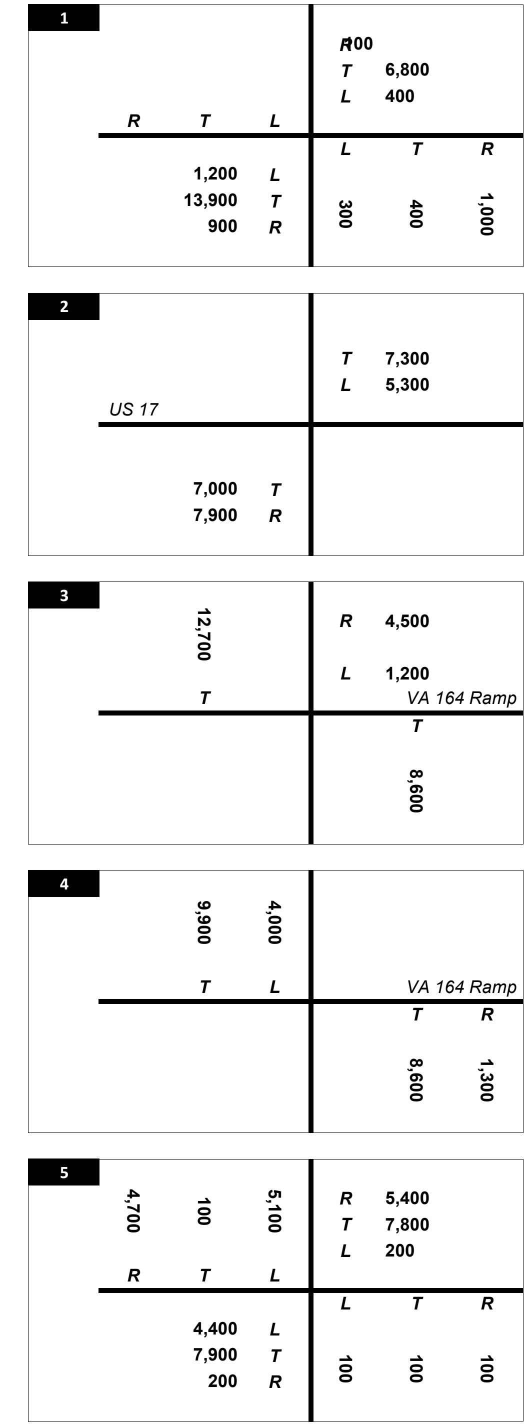
HRCS SEIS Hampton Roads Crossing Study SEIS

2015 Existing Weekday Daily Volumes I-664 Corridor

April 2017

Figure 2-2.11





Legend

xx,xxx — Weekday Daily Volume

VDOT
Virginia Department of Transportation

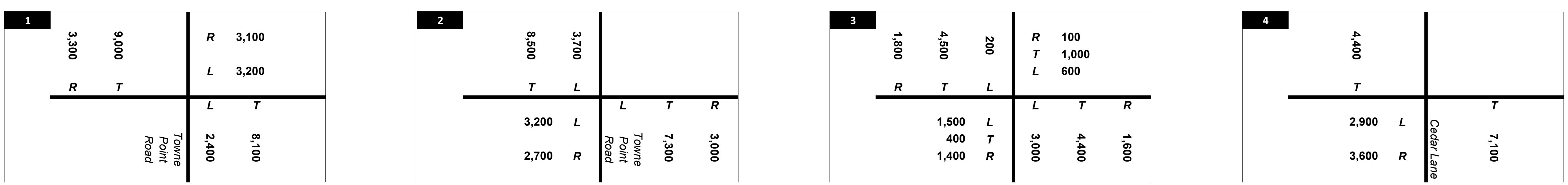
U.S. Department of Transportation
Federal Highway Administration

HRCS SEIS
Hampton Roads Crossing Study SEIS

2015 Existing Weekday Daily Volumes VA 164 Corridor

April 2017

Figure 2-2.12



Legend

xx,xxx Weekday Daily Volume

VDOT Virginia Department of Transportation

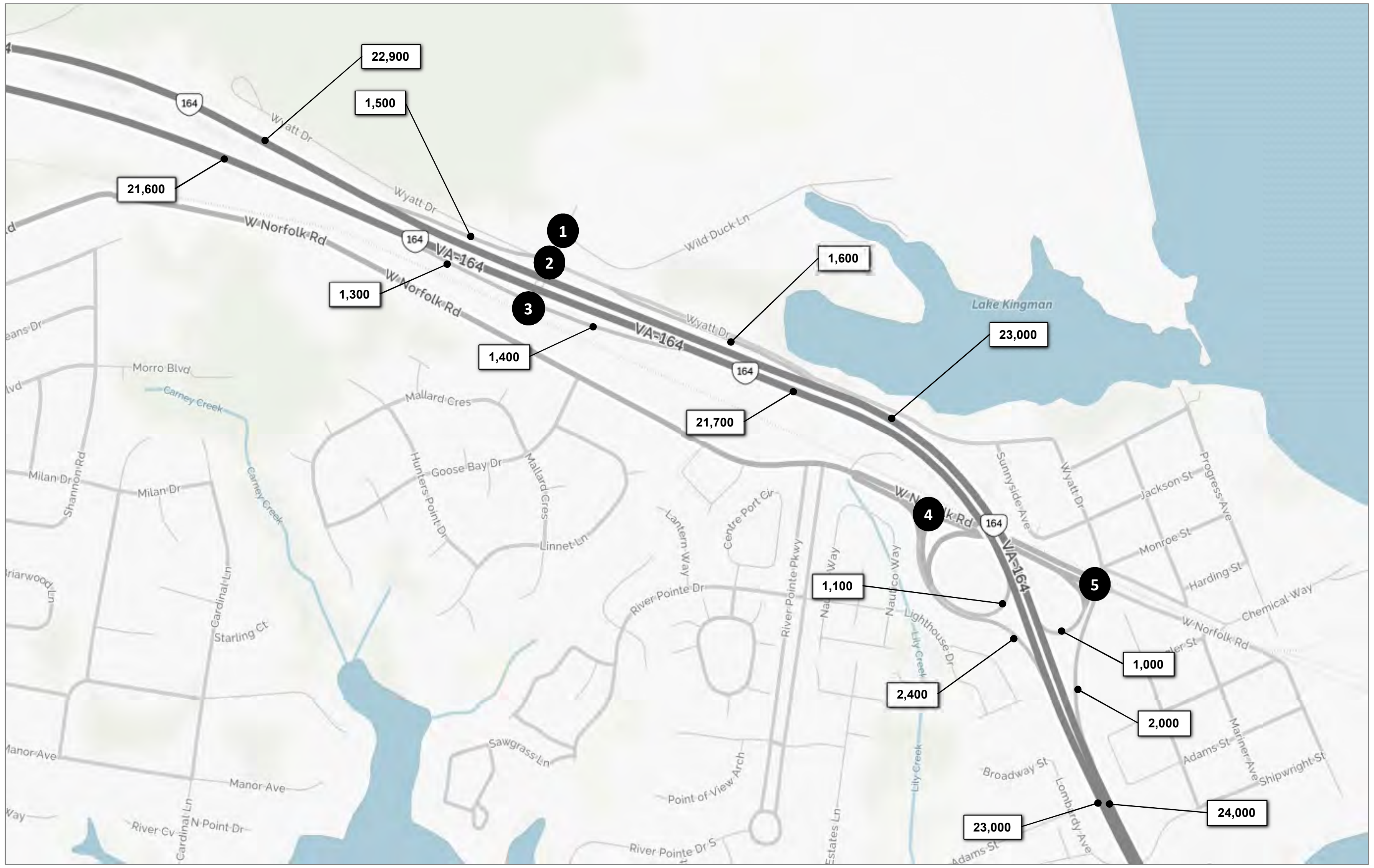
U.S. Department of Transportation Federal Highway Administration

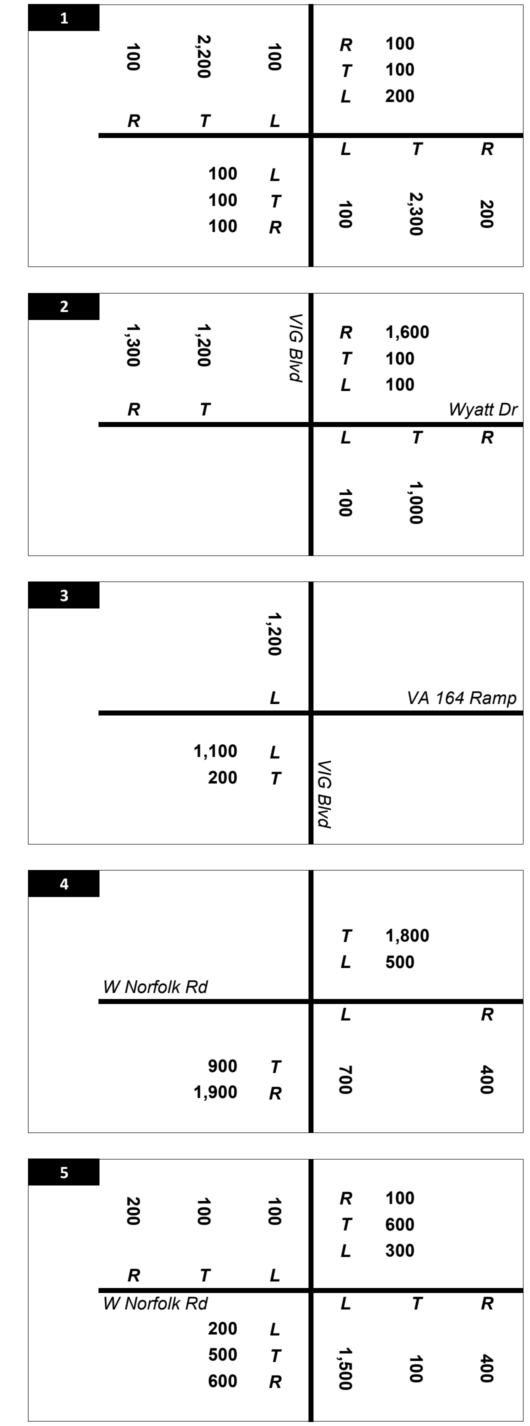
HRCS SEIS Hampton Roads Crossing Study SEIS

2015 Existing Weekday Daily Volumes VA 164 Corridor

April 2017

Figure 2-2.13





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xx,xxx Weekday Daily Volume

VDOT Virginia Department of Transportation

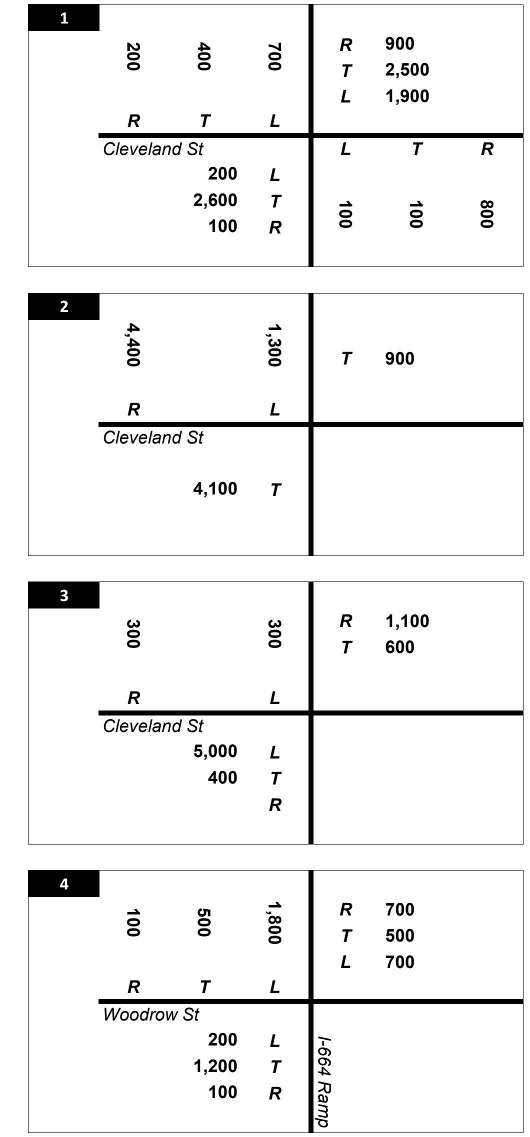
U.S. Department of Transportation Federal Highway Administration

HRCS SEIS Hampton Roads Crossing Study SEIS

2015 Existing Weekday Daily Volumes VA 164 Corridor

April 2017

Figure 2-2.14



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xx,xxx Weekday Daily Volume

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS Hampton Roads Crossing Study SEIS

2015 Existing Weekday Daily Volumes VA 164 Corridor

April 2017

Figure 2-2.15

2.3 CAPACITY ANALYSES

Capacity analyses along mainlines of the Study Area Corridors were conducted for weekday AM and PM peak hour conditions under Existing, 2028 No-Build, 2028 Build Alternative, 2040 No-Build, and 2040 Build Alternative scenarios using the latest version of the Highway Capacity Software (HCS 2010 Version 6.70), which was developed based on the methodologies presented in the 2010 Highway Capacity Manual (TRB, 2010). The Freeway Facilities module was used to conduct the mainline capacity analyses.

The I-64, I-564, I-664, VA 164 corridors and proposed new alignments crossing the Elizabeth River were each divided into segments, representing either a mainline basic freeway segment, a weaving segment, or a ramp junction (merge or diverge segment). Segments along each corridor were then evaluated to determine the AM and PM peak hour Level of Service (LOS) based on existing (2015) and future (2040) volumes developed for this study. Capacities for the HRBT and MMMBT were assumed to be 1,600 vehicles per hour per lane, consistent with assumptions for the bridge-tunnels developed by the HRTPO.

Level of Service is a letter-grade description of the quality of traffic flow, ranging from A (best) to F (worst). LOS A represents free-flow conditions where vehicles can travel unimpeded, and where incidents can generally be absorbed. LOS E represents operations near the roadway's capacity, with very unstable flow in which even minor incidents lead to significant queueing. LOS F represents a breakdown in traffic flow with demand exceeding capacity. However, it should be noted that in an urban environment, such as the one that surrounds the Study Area Corridors, LOS is not considered the best indicator of improvements to the network, as it does not capture measurable improvements made within a given letter grade. FHWA has acknowledged this issue in recent revisions to its guidance, which removes previous LOS requirements for interstate improvements. Therefore, additional measures of effectiveness including estimated travel time, speed, and delay, as well as daily Vehicle Hours Traveled (VHT) and daily Vehicle Miles Traveled (VMT) were developed.

Capacity analyses at intersections within the interchanges were conducted for weekday AM and PM peak hour conditions under Existing, 2028 No-Build, 2028 Build Alternative, 2040 No-Build, and 2040 Build Alternative scenarios using the latest version of Synchro with SimTraffic (Version 9.1), which implements the methodologies presented in the 2010 Highway Capacity Manual. Intersections were evaluated to determine the AM and PM peak hour delay (in seconds) and LOS based on existing (2015) and future (2028 and 2040) volumes developed for this study.

2.4 FORECASTING PROCESS

2.4.1 Hampton Roads Transportation Planning Organization Travel Demand Model

Year 2028 and 2040 travel demand forecasts were developed for both No-Build conditions and all Build Alternatives using the latest adopted regional Travel Demand Forecast Model maintained by the Hampton Roads Transportation Planning Organization (HRTPO). A travel demand forecast model is a set of computer-based mathematical relationships that attempts to capture the interaction of travel activities and choices made by a population in a specific region given a proposed network (e.g., highway, transit, etc.) and demographic or land use inputs (e.g., population, employment, etc.). The main inputs to a travel demand model are:

- Demographic and economic changes in the region, specifically the location of employment and housing; and,
- Characteristics of the region's transportation system, including proposed changes in the transportation facilities and operating policies.

Travel demand models have been used in Virginia for the past three decades for all NEPA studies that involve traffic forecasting and air quality evaluation, including the 2001 Third Crossing EIS, 2011 HRBT DEIS, 2012 I-64 Peninsula EIS, and US 460 EIS. Use of travel demand models ensures a consistent analysis approach to all NEPA studies in Virginia.

The current HRTPO model is an advanced four-step forecasting model to support air quality analysis and project planning in the Hampton Roads region. The HRTPO model generally follows the Virginia Transportation Modeling Policies and Procedures Manual, as documented in the 2013 Hampton Roads Model Methodology Report (HRTPO, 2013) and 2014 Hampton Roads Model Release Notes (HRTPO, 2014). The HRTPO travel demand model was calibrated for the 2009 base year against trip distribution and mode choice data contained in the National Household Transportation Survey. Additional validation tests were performed to ensure that final model output was within reasonable tolerance of observed ground data and produced reasonable outputs when future-year transportation system assumptions were changed (such as the inclusion of new roadway facilities). The HRTPO model employs a conventional gravity model to estimate trip distribution.

The HRTPO model has a 2009 base year and a 2034 horizon year, which is the latest year for which the HRTPO has adopted regional land use forecasts.

The HRTPO model was provided by VDOT for use in the HRCS project in July 2015. The HRTPO model was considered validated for use in the HRCS and used as the baseline travel demand model. The HRTPO model was used without modifications to any of the components of the four-step model process. Similarly, no changes were made to any land use or socioeconomic inputs or other model constants for either the 2009 base year or the 2034 No-Build and Build scenarios. In accordance with accepted model practice, the same land use data were used as inputs for both No-Build and Build conditions.

However, the HRTPO model included several projects that are not anticipated to be place by 2040. These projects were removed from all future-scenario model runs. One project which *is* anticipated to be in place by 2040 but was not coded in the HRTPO model was added. Details on these projects are provided below:

- Eliminated the US 460/US 58/US 13 Connector project;
- Removed tolls from all existing and proposed river crossings except for the Midtown Tunnel (US 58) and the Downtown Tunnel (I-264); and,
- Added third General Purpose lane to I-64 between I-264 (Bowers Hill interchange) and I-464, and one HOV lane in each direction. The HOV lane ties into the existing HOV system east of I-464, and has the same peak hour occupancy restrictions as the existing system.

In addition, the facility type for the proposed new crossings (VA 164 Connector, I-564 Connector, and I-664 Connector; used in Alternatives B-D) was set to "freeway" for their entire length (some VA 164 Connector segments north of VA 164 were originally coded as "collector" in the 2034 HRTPO model). The new crossings were not included in the No-Build or Alternative A model runs.

The 2034 HRTPO model was used to develop 2034 traffic forecasts which were then extrapolated to Year 2040 forecasts. The growth rates used to extrapolate 2034 daily volumes to 2040 daily volumes were based on the annual linear growth rate that was calculated from the model from 2015 to 2034. These growth rates, which range from 1 to 1.2 percent per year, were applied to all Study Area Corridor roadways, including new links across the Elizabeth River.

Shortly before the publication of the HRCS Draft SEIS, HRTPO adopted its 2040 Long Range Transportation Plan (LRTP). The timing of this action did not allow the 2040 model to be incorporated into the analysis to support the

Draft SEIS. The 2040 LRTP model, however, will be used to analyze the Preferred Alternative in the Final SEIS, should one be identified.

Interim year 2028 travel demand forecasts were also developed using the HRTPO model, using the planned 2028 transportation network. In consultation with HRTPO, the 2028 land use data were interpolated between the adopted 2009 and 2034 models. The 2028 network excluded the anticipated widening of the I-64 south side between the Bowers Hill Interchange and I-464, including widening of the High Rise Bridge.

2.4.2 Post-Processing

Post-processing refers to analyses performed after execution of the travel demand forecast model run. Post-processing activities are applied to the travel demand forecast model results to compensate for the limitations of the model. The model used for the study produced raw daily link volumes. In order to develop daily and hourly volumes for the peak travel periods, the link-level model outputs were refined for the segments of interest along the Study Area Corridors and the arterial approaches. The freeway system included all mainline links, collector/distributor roads, and ramps. The arterial links included the approaches to each interchange within each Study Area Corridor.

Highway post-processing involves three stages:

- Refinement of the raw link volumes, which is done with the direct output from the model for the ADT volumes;
- Calculation of the turning movements; and,
- Derivation of the peak hour link volumes.

For this study, all post-processing activities for refining the highway link ADT volumes and developing turning movement volumes involved procedures outlined in National Cooperative Highway Research Program (NCHRP) Report 255 Highway Traffic Data for Urbanized Area Project Planning and Design (Pedersen et al., 1982) and NCHRP Report 765 Analytical Travel Forecasting Approaches for Project-Level Planning and Design (Horowitz et al., 2014). These technical reports provide a set of procedures for refining “raw” link volumes output directly from the model.

Iterative proportional fitting (IPF) methods outlined in NCHRP 765 and TRR 1287 Model of Turning Movement Propensity (Furth, 1990) were used to estimate 2040 daily turning movement volumes at interchanges and intersections. The existing 2015 daily ramp and turning movement volumes were used as the seed for the IPF procedure, and the 2040 link volumes were used as the target inflows and outflows. The IPF routine iteratively adjusted the existing turning movement volumes to balance the turns given the forecasted approach inbound and outbound link volumes.

The 2040 daily link and turning movement volumes were manually adjusted as necessary to achieve volume balance between interchanges and intersections by holding volumes at the major interchanges in the study area (I-64 and I-664; I-64 and I-564; I-664 and VA 164; and I-664 and I-264) constant, then proportionally adding and subtracting ramp volumes between these interchanges. Final 2040 daily forecasts were checked for reasonableness against previous forecasts including the 2012 HRBT EIS and the 2014 High Rise Bridge Environmental Assessment, which extended to the Bowers Hill interchange (FHWA, 2012; FHWA 2014).

Peak hour traffic projections are required for design and analysis purposes. To compute peak hour volumes, the ratios between peak hour and daily traffic volumes (k-factor) for 2015 conditions were computed by dividing the AM and PM peak hour volumes by the corresponding daily volume for each mainline and ramp segment and each intersection turning movement. These k-factors were then applied to the 2040 daily volumes to develop unbalanced 2040 peak hour volumes.

The unbalanced 2040 peak hour link and turning movement volumes were manually adjusted as necessary to achieve volume balance between interchanges and intersections by holding volumes at the major interchanges in the study area constant, similar to the manual balancing of 2040 daily forecasts.

Raw model output for the 2028 opening year was post-processed in the same manner as the 2034 output, with the exception that it was not necessary to extrapolate the daily volumes beyond the model horizon year, as the HRTPO model by design produces 2028 output, based on the roadway network that is expected to be in place in 2028.

2.5 TOLL AND MANAGED LANE FORECASTS

Each of the Build Alternatives could accommodate tolls. The alternatives evaluation has incorporated a preliminary assessment of how tolls could potentially result in traffic diversion to other river crossings. The toll assessment has not determined final future traffic volume projections; has not recommended toll rates; and is not appropriate for toll revenue estimation. Moreover, the preliminary toll diversion results were not analyzed for environmental impact; however, the physical limits of disturbance for each alternative take into account the potential for future tolling, where appropriate. The determination of whether tolls would be implemented as part of any of the alternatives would take place after alternative selection, if appropriate.

Three separate toll diversion scenarios have been considered for the Build Alternatives: no tolls, Elizabeth River tolls, and High Occupancy Toll (HOT) lanes. The no toll scenario is the baseline for alternatives development and is being used to identify environmental impacts and perform the traffic analyses discussed later in this technical report. Under the Elizabeth River toll scenario, tolls would apply to all traffic traveling on the new crossing of the Elizabeth River in Alternatives B, C, or D. The HOT Lane scenario assumes that in addition to the Elizabeth River tolls, any new travel lanes proposed under the Build Alternatives would be HOT lanes. It is assumed that any tolls would be collected electronically by overhead gantry.

3. EXISTING CONDITIONS

Transportation facilities in the Hampton Roads region comprise all modes of surface, air and marine transportation. Hampton Roads is one of the deepest harbors on the US East Coast, sheltering the largest naval base in the world and the sixth largest containerized cargo complex in the United States.

As a result of the abundance of water, the importance of the harbor, and the presence of the military, the region abounds with bridges, tunnels, rail lines, and airport facilities. Norfolk Southern (NS) and CSX Transportation (CSX), the Class I freight railroads which serve the region, have a large commercial base due to the presence of the harbor and the shipping industry. The region is also served by intercity passenger rail service provided by Amtrak as well as a regional transit system. The region contains two international airports and three general aviation airports.

Environmental consequences to transportation facilities are described in Chapter 3 of the Draft SEIS.

3.1 LIMITED ACCESS HIGHWAYS

Limited access highways which comprise the Study Area Corridors are summarized in **Table 3-1** and shown in **Figure 1-1**. They include I-64, I-664, I-564, and VA 164. These highways serve a critical transportation function for commuters, interstate and intrastate freight movement, national defense, emergency evacuation, and commercial activities. I-64 crosses Hampton Roads via the HRBT and I-664 crosses via the MMMBT. Both of these crossings are critical links in the regional transportation network connecting Southside and the Peninsula.

Table 3-1: Limited Access Highways

Highway	Functional Classification	Description
I-64	Interstate	I-64 extends from 1.7 miles west of the I-664 interchange in Hampton to approximately 0.5 miles south of the I-564 interchange in Norfolk, a distance of approximately 14 miles, including the 3.5-mile long HRBT.
I-564	Interstate	I-564 is the primary access between NAVSTA Norfolk, NSA Hampton Roads, and the NIT on the west and I-64 on the east, a distance of approximately 3 miles.
I-664	Interstate	I-664 is 20.8 miles in length, beginning at Interchange 1 in Hampton and ending at Interchange 13 in Chesapeake.
VA 164	Other Freeway or Expressway	The Western Freeway extends for 3.4 miles east-west through Portsmouth and Suffolk from Virginia International Gateway Boulevard to I-664.

3.2 CONNECTING STATE ROUTES AND LOCALS ROADS

State routes and local roads which link to the limited access roadways of the Study Area Corridors are summarized in **Table 3-2** and shown in **Figure 1-1**.

Table 3-2: Connecting State Routes and Locals Roads

Numerical Designation	Functional Classification	Roadway Name	Connecting Interstate	Interchange/Exit Number	Locality
US 258	Other Principal Arterial	Mercury Boulevard	I-64	263A/B	Hampton
SR 167/SR 134	Minor Arterial	LaSalle Avenue/ Armistead Avenue, Rip Rap Road	I-64	265	Hampton
US 60/SR 143	Minor Arterial	Settlers Landing Road	I-64	267	Hampton
SR 169	Minor Arterial	South Mallory Street	I-64	268	Hampton
US 60	Minor Arterial	4th View Street	I-64	273	Norfolk
SR 1070	Major Collector	1st View Street	I-64	Underpass	Norfolk
SR 907	Minor Arterial	Bay Avenue	I-64	274	Norfolk
US 460	Other Principal Arterial	Granby Street	I-64	276/276A	Norfolk
SR 165	Other Principal Arterial	Little Creek Road	I-64	276/276C	Norfolk
SR 337	Other Principal Arterial	Admiral Taussig Boulevard	I-564	Future Exit	Norfolk
SR 406	Other Principal Arterial	International Terminal Boulevard	I-564	Terminal Boulevard	Norfolk
SR 415	Minor Arterial	Power Plant Parkway	I-664	2	Hampton
SR 905	Minor Arterial	Aberdeen Road	I-664	3	Hampton
SR 945/SR 1020	Major Collector	Chestnut Avenue/Roanoke Avenue	I-664	4	Newport News
SR 143	Other Principal Arterial	Jefferson Avenue	I-664	5	Newport News
US 60	Other Principal Arterial	Warwick Boulevard/26th Street	I-664	6	Newport News
---	Ramps	Terminal Avenue	I-664	7	Newport News
SR 135	Minor Arterial	College Drive	I-664	8A/B	Suffolk
SR 133	Major Collector	New Town Point Road	I-664	Overpass	Suffolk
US 17/VA164	Other Freeway/Expressway	Western Freeway/Western Branch Boulevard	I-664	9A/B	Suffolk
SR 947	Minor Arterial	Pughsville Road/Taylor Road	I-664	10	Chesapeake
SR 337	Minor Arterial	Portsmouth Boulevard	I-664	11A/B	Chesapeake
SR 1036	Major Collector	Dock Landing Road	I-664	12	Chesapeake
US 58	Minor Arterial	Airline Boulevard/West Military Highway	I-664	13A/B	Chesapeake
US 13	Minor Arterial	South Military Highway	I-664	13A/B & 14	Chesapeake
SR 905	Major Collector	Cedar Lane	SR164	Cedar Lane	Portsmouth
SR 947	Major Collector	Town Point Road	SR164	Town Point Road	Portsmouth

Source: Virginia Department of Transportation, 2014.

3.3 MAJOR BRIDGES AND TUNNELS

The HRBT is a four-lane facility with two, two-lane tunnels under the Hampton Roads channel shipping lanes, two man-made tunnel portal islands, and concrete twin trestle bridges on the approaches in both directions. The HRBT first opened in 1957 with the second tunnel added in 1976.

The MMMBT opened in 1992 and is a four-lane facility comprised of two, two-lane tunnels with 14'6" vertical clearance. It has two man-made portal islands with two concrete twin trestle bridges on the south approach and a four-lane concrete trestle bridge on the north approach.

3.4 TRANSIT ROUTES AND FACILITIES

Public transportation in the region is provided by Hampton Roads Transit (HRT). HRT serves six cities: Chesapeake, Hampton, Newport News, Norfolk, Portsmouth and Virginia Beach. HRT operates a total of 56 local fixed bus routes, eight regional express commuter bus routes, seven major employer shuttles (e.g. Newport News Shipyard) as well as seasonal routes at the Virginia Beach oceanfront. In Fiscal Year 2015, HRT provided a total of 14.2 million unlinked passenger trips on its fixed route buses which includes the local bus routes, regional commuter express routes, and employer shuttles. Within its fixed route service area, HRT also provides complementary paratransit bus service in compliance with the Americans with Disabilities Act. HRT reported a total of 324,000 trips on its paratransit buses in fiscal year 2015.

In addition to fixed route and paratransit bus service, HRT operates "the Tide," a light-rail system which extends 7.4 miles from the Eastern Virginia Medical Center complex east through downtown Norfolk to Newtown Road at the border of Virginia Beach. HRT also operates a ferry route on the Elizabeth River between Norfolk and Portsmouth. The Tide and Elizabeth River ferry service do not currently operate within the Study Area Corridors.

The City of Suffolk does not have a contractual agreement with HRT, and therefore operates its own transit system called Suffolk Transit. Suffolk Transit operates six routes within the City, as well as complementary paratransit service in compliance with the Americans with Disabilities Act. The bus routes operate Monday through Friday on one hour headways.

3.4.1 Metro Area Express (MAX) Routes

The HRT Metro Area Express bus service ("the MAX") is a commuter express bus service which uses the Study Area Corridors to provide regional express bus service between the Peninsula and Southside. Service is provided to Park and Ride facilities throughout the region, connecting commuters to major employment destinations, such as Naval Station (NAVSTA) Norfolk and Northrop Grumman in Newport News. **Table 3-3** summarizes the MAX routes which use the Study Area Corridors, and **Figure 3-1** illustrates the route patterns. The MAX is the only public transit option that connects the Peninsula and Southside.

Table 3-3: Metro Area Express (MAX) Routes

Route Number	Locality Connection	Route Termini	Study Area Corridors Overlap
918/919	Virginia Beach – Norfolk	Silver Leaf Park & Ride to Lafayette River Annex	I-564
922	Chesapeake – Norfolk	Greenbrier Mall to Naval Station Norfolk	I-564
961	Norfolk – Newport News	Downtown Norfolk to Newport News Transit Center	I-64, HRBT, and I-664
965	Newport News - Norfolk	Patrick Henry Mall to Naval Station Norfolk	I-64, HRBT, and I-564
967	Norfolk – Newport News	Military Highway Light Rail Station to Newport News Transit Center	I-664 and MMMBT

Source: Hampton Roads Transit, 2016.

3.4.2 Local Bus Routes

Local HRT bus routes intersect the Study Area Corridors in Hampton, Norfolk, Portsmouth, and Newport News via minor arterial roadways and/or major and minor collectors to serve local destinations. These local bus routes do not generally utilize I-64, I-664, I-564 or VA 164. One HRT commuter service bus uses I-664 and I-64 to connect Newport News with Williamsburg. In addition to the routes, the Wards Corner Bus Transfer Station is located near the intersection of Granby Street and Admiral Taussig Boulevard in Norfolk adjacent to the interchange of I-64 and I-564.

Suffolk Transit uses I-664 for approximately 4 miles along the "Gold Route," extending from the Bowers Hill area northbound to Pughsville Road. The "Blue Route" travels along the Hampton Roads Parkway and crosses over I-664 in North Suffolk.

Figure 3-1: HRT MAX Routes

3.5 PORT FACILITIES

The Hampton Roads waterbody acts as one large harbor with multiple docking and mooring locations for military, commercial, ship yards, and recreational watercraft. Two designated shipping lanes pass through the harbor and are federally maintained by the US Army Corps of Engineers (USACE): the Newport News Channel and the Norfolk Harbor Reach Channel which are shown in **Figure 3-2**. The existing depths of the channels are a minimum of 50 feet; however, the Port of Virginia has gained approval to dredge the channels to 55 feet depths. The deeper channels will allow the port facilities to accommodate the largest container ships that pass through the Panama Canal, referred to as Super Post Panamax ships. The harbor and shipping lanes allow commercial shipping lines to access major commercial ports in the region located in Newport News, Norfolk, and Portsmouth. These port facilities are substantial generators of traffic on area roadways resulting from employee work trips and long and short-haul truck traffic on and adjacent to the Study Area Corridors. All of the commercial ports are accessible by roadway, water, and rail, to varying degrees.

The Port of Virginia is a public organization overseen by the Virginia Port Authority to market and operate port facilities in the Commonwealth of Virginia. In the Hampton Roads region, the Port of Virginia operates four deep-water marine terminals and an upriver barge terminal. These facilities are summarized in **Table 3-4** and shown in **Figure 3-2**. Outside of the Hampton Roads region, the Port of Virginia also operates the Port of Richmond and Virginia Inland Port located in Warren County. Collectively, Port of Virginia facilities processed 19.7 million tons of cargo in 2015, with an estimated value of $60 billion.

There are three privately-owned port facilities in Hampton Roads that store and transload coal to bulk carrier ships. Kinder Morgan and Dominion Terminal Associates operate port facilities southeast and adjacent to the Newport News Marine Terminal (NNMT) which is owned and operated by the Port of Virginia. Coal is transported to these facilities by CSX where it can be loaded onto ships. Roadway access to these facilities is provided via I-664. NS operates the Lamberts Point Coal Terminal in Norfolk which is located on the Elizabeth River. Lamberts Point Terminal is accessed by US 460 via I-64/I-564.

Newport News Shipbuilding (NNS) is the United States sole designer, builder and refueler of nuclear powered aircraft carriers and one of only two shipyards in the country which designs and builds nuclear powered submarines. NNS is largest industrial employer in Virginia, employing more than 20,000 people.

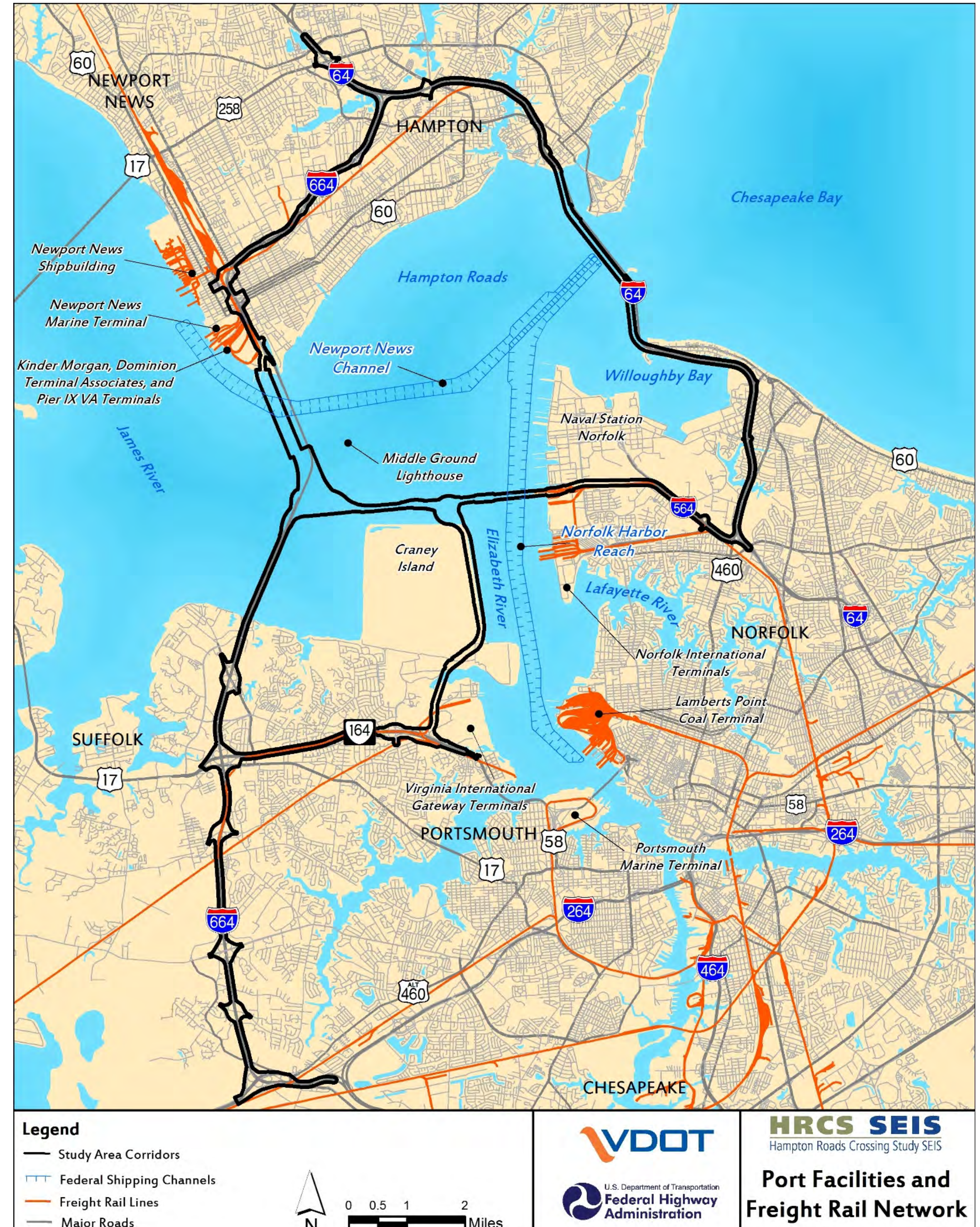
The Craney Island Marine Terminal is a facility under development by the Port of Virginia with a scheduled completion year of 2028. The terminal will be an automated container terminal with the capability to handle up to 50 percent of its container volume by rail. The existing Commonwealth Railway Line (shortline railroad) will be extended from VA 164 to Craney Island. Extension of the rail line will provide access to the terminal for both NS and CSX, and allow for double-stack intermodal rail service. The terminal will be designed to serve Super Post Panamax class ships and will also have direct access to the interstate highway system.

In addition to commercial and military activities, the harbor provides a safe port and anchorage destination for ships and boats to shelter during storms, and an open area for recreational use. To access the harbor, ships must pass over the HRBT, and to access the western reaches of the James River, they must pass over the MMMBT. Smaller rivers and creeks that feed into Hampton Roads act as harbors as well, including the Hampton River, the Elizabeth River, and the Lower James River.

Table 3-4: Existing Commercial Port Facilities

Port Facility	Owner	Locality	Access	Description
Newport News Shipbuilding (NNS)	Huntington Ingalls Industries	Newport News	Road: I-664 Rail: CSX Marine: Newport News Channel	Shipyard which builds and refuels nuclear powered aircraft carriers and submarines.
Newport News Marine Terminal (NNMT)	Port of Virginia	Newport News	Road: I-664 Rail: CSX Marine: Newport News Channel	165-acre general cargo terminal supporting Roll-On/Roll-Off, break-bulk, and warehouse operations. Gated entrance.
Norfolk International Terminals (NIT)	Port of Virginia	Norfolk	Road: Hampton Blvd/I-564 Rail: NS Marine: Norfolk Harbor Reach Channel	567-acre container terminal with six 50' deep berths and 14 Super Post Panamax ship-to-shore cranes. Current operations rely primarily on straddle carriers. Gated entrance.
Virginia International Gateway (VIG)	Port of Virginia	Portsmouth	Road: Hampton Blvd/I-564 Rail: CSX and NS Marine: Norfolk Harbor Reach Channel	231-acre container terminal with three 50' deep berths and 8 Super Post Panamax ship-to-shore cranes.
Portsmouth Marine Terminal (PMT)	Port of Virginia	Portsmouth	Road: VA 164/US 58 Rail: CSX, NS and NBPL Marine: Norfolk Harbor Reach Channel	285-acre mixed use terminal with two 43' deep berths and 6 Post Panamax ship-to-shore cranes currently allocated to container operations. Primarily an over-the-road truck terminal.
Pier IX VA Terminal	Kinder Morgan	Newport News	Road: 18th Street Rail: CSX Marine: Newport News Channel	Three-dock marine terminal for the purpose of coal shipping and ground storage with a capacity of 1.4 million tons.
Dominion Coal Shipping and Ground Storage Facility	Dominion Terminal Associates	Newport News	Road: 18th Street Rail: CSX Marine: Newport News Channel	Coal shipping and ground storage facility with a storage capacity of 1.7 million tons.
Lamberts Point Coal Terminal	Norfolk Southern	Norfolk	Road: US 460/I-64 Rail: NS Marine: Norfolk Harbor Reach Channel	NS-served and operated transshipment coal terminal located on the Elizabeth River.

Figure 3-2: Port Facilities and Freight Rail Network



Military vessels use the harbor to access NAVSTA Norfolk, the Naval Supply Center, the Coast Guard base, and Navy Shipyard in Portsmouth. These military installations are shown in **Figure 3-2**. The *Ports for National Defense Program* is a program established by the Department of Defense (DoD) to identify and asses the adequacy and responsiveness of defense-important infrastructure at ports that support DoD deployments. The Program identifies the Port of Virginia facilities as a designated strategic seaport.

3.6 FREIGHT RAILROAD NETWORK

With the regional importance and location of the Port of Virginia, the freight rail network is critical to the local economy and goods movement. The Hampton Roads region is served by two Class I freight railroad operators and three Class III shortline railroads. These railroads serve the port facilities and other businesses along the routes. Goods and natural resources are brought by rail to Hampton Roads to be exported, and imports are distributed nationwide via rail lines that service the marine terminals in Hampton Roads. The freight rail network within and adjacent to the Study Area Corridors is shown in **Figure 3-2** and summarized in **Table 3-5**.

Table 3-5: Freight Railroad Network

Freight Rail Corridor	Owner(s)	Termini	Description
Peninsula Subdivision	CSX	Richmond-Newport News	74-mile Class I freight rail corridor serving the NNMT.
Portsmouth Subdivision	CSX	Portsmouth-Weldon, North Carolina	68-mile Class I freight rail corridor serving the PMT.
Norfolk District	NS	Norfolk-Crewe, Virginia	134-mile Class I freight rail corridor serving Lamberts Point Coal Terminal.
Sewalls Point District	NS	Norfolk	9.4-mile Class I freight rail corridor serving the NIT.
Norfolk and Portsmouth Belt Line Railroad (NPBL)	CSX/NS	Norfolk-Portsmouth	26-mile Class III terminal switching railroad through Norfolk, Portsmouth and Chesapeake. Jointly-owned by CSX and NS.
Commonwealth Railway (CWRY)	Genesee & Wyoming	Portsmouth-Suffolk	19-mile Class III shortline railroad serving the VIG.
Bay Coast Railroad (BCR)	Bay Coast Railroad	Norfolk-Pocomoke City, Maryland	68-mile shortline railroad and 26-mile car float (ferry) operation from Cape Charles, Maryland to Little Creek (Norfolk). Interchanges with NS and NPBL railroads in Norfolk.

Sources: Genesee & Wyoming; Norfolk and Portsmouth Belt Line Railroad; Virginia Railroad Association; CSX Transportation; Norfolk Southern Corporation.

The primary interstate and intrastate rail corridors in the Hampton Roads region are the Peninsula and Portsmouth Subdivisions which are owned and operated by CSX; and the Norfolk District which is owned and operated by NS in Southside. The shortline railroads which operate in the Hampton Roads region complement and facilitate long-haul freight movements carried by NS and CSX outside the region and state. These railroad corridors cross and parallel the Study Area Corridors as shown in **Figure 3-2**.

3.7 INTERCITY PASSENGER RAIL SERVICE (AMTRAK)

Intercity passenger rail service in the Hampton Roads region is provided by the National Railroad Passenger Corporation (Amtrak). Amtrak operates its Northeast Regional route with service to Norfolk and Newport News. The Northeast Regional route provides service north to Washington, DC; New York City; and Boston, Massachusetts. Amtrak provides two daily round trips from the Newport News train station and one daily round trip from the Norfolk train station. Amtrak uses the CSX Peninsula Subdivision to serve the Newport News train station on Warwick Boulevard, and the NS Norfolk District rail corridor to serve Norfolk train station on Park Avenue. Amtrak also provides a connecting bus shuttle from Norfolk to Newport News for those passengers who want to board at the Newport News Station. Amtrak routes and stations are shown in **Figure 3-3** and summarized in **Table 3-6**.

Table 3-6: Amtrak Routes

Route Name	Station	Daily Round Trips	Annual Ridership (2015)	Description
Northeast Regional	Newport News	2	348,581	Daily roundtrips to Washington, DC/Northeast Corridor terminating in Boston, MA (12-14 hour travel time). Route travels the CSX Peninsula Subdivision.
Northeast Regional	Norfolk	1	153,857	Daily roundtrip to Washington, DC/Northeast Corridor terminating in New York City (8 hour travel time). Connecting bus shuttle to Newport News Amtrak station.

Source: Amtrak, 2016.

Figure 3-3: Amtrak Routes and Airports

3.8 AIRPORTS

The Hampton Roads region is served by two commercial airports and three general aviation airports. These airports are summarized in **Table 3-7** and shown in **Figure 3-3**. Norfolk International Airport is the largest airport in the region serving an estimated 4 million passenger trips annually and 68 million pounds of air cargo. The Norfolk Airport Authority reports that the airport directly employs 1,700 people, and indirectly generates as many as 12,500 jobs for the region. The Peninsula Airport Commission reports that Newport News/Williamsburg International Airport served 524,518 passenger trips in 2014. Taken together, the airports are substantial generators of roadway traffic in the region resulting from employee work trips and travelers using the airports.

Table 3-7: Commercial and General Aviation Airports

Airport Name	Owner	Location	Description
Norfolk International Airport (ORF)	Norfolk Airport Authority	Norview Avenue Norfolk, VA 23518	Public small hub commercial airport
Newport News/ Williamsburg International Airport (PHF)	Peninsula Airport Commission	900 Bland Blvd Newport News, VA 23602	Public non hub commercial airport
Hampton Roads Executive Airport (PVG)	Virginia Aviation Associates	5172 West Military Highway Chesapeake, VA 23321	Private high-capacity general aviation airport
Chesapeake Regional Airport (CPK)	Chesapeake Airport Authority	2800 Airport Drive Chesapeake, VA 23323	Public regional general aviation airport
Suffolk Executive Airport (SFQ)	City of Suffolk	1200 Gene Bolton Drive Suffolk, VA 23434	Public regional general aviation airport

Source: Federal Aviation Administration, 2014.

3.9 EMERGENCY EVACUATION ROUTES

As described in the Purpose and Need (Chapter 1 of the SEIS), one need for the project is to enhance emergency evacuation capabilities of the region. In the event of a hurricane, the Virginia Department of Emergency Management (VDEM) has designated evacuation routes for the region which are summarized in **Table 3-8** and shown in **Figure 3-4**. These evacuation routes include the Study Area Corridors of I-64 and I-664.

The HRBT and MMMBT may be overtopped by water during extreme storm events. The Study Area Corridor tunnels are equipped with storm doors which can be shut to prevent flooding. While this preserves the tunnel structures, it would close off a vital route for evacuees and/or emergency personnel. Another impediment to evacuation is that the Hampton Roads region is low lying, and US 17, US 460, and US 58 are prone to flooding, further exacerbating evacuation conditions even after evacuees make it past the available water crossings.

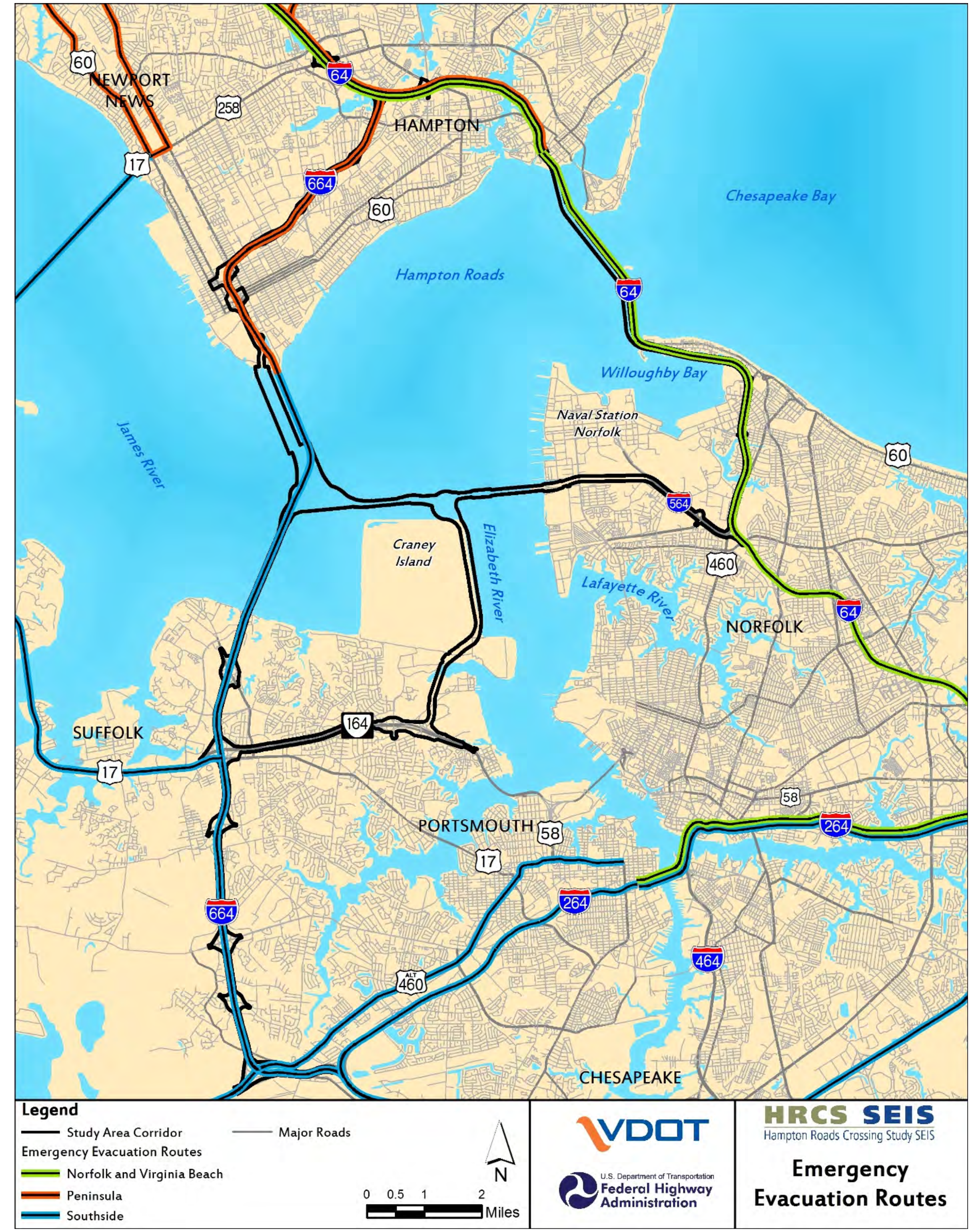
Norfolk and Virginia Beach residents located north of I-264 are directed to use I-64 and the HRBT in the event of an evacuation. However, because of increased regional population, limited water crossings for large area evacuations, and peak congestion during typical daily use already occurring on designated emergency routes, the ability to effectively evacuate the population is hampered. The study routes and HRBT and MMMBT crossings are known bottlenecks during daily traffic and would be more so during evacuations.

Table 3-8: Emergency Evacuation Routes

Route Name	Designated Jurisdictions	Description
Peninsula	Hampton Newport News	Evacuation route for Peninsula jurisdictions using the following routes: • I-64 • I-664 North • US Route 17 North • US Route 60 West • SR 143
Southside	Suffolk Chesapeake Portsmouth Virginia Beach	Evacuation route for Southside jurisdictions using the following routes: • I-64 and I-264 • I-664 MMMBT • US Route 17 North • US Route 58 West • US Route 460 West • SR 10 West
Norfolk and Virginia Beach	Norfolk Virginia Beach	Evacuation of Southside jurisdictions via I-64 operating with reversed eastbound lanes (westbound).

Source: Virginia Department of Emergency Management

Figure 3-4: Emergency Evacuation Routes



3.10 BICYCLE AND PEDESTRIAN NETWORK

There are no bicycle or pedestrian facilities on the Study Area Corridors nor do any bicycle or pedestrian facilities link Southside and the Peninsula. State law generally does not permit bicyclists to ride on interstate and certain controlled access highways, unless the operation is limited to bicycle or pedestrian facilities that are barrier separated from the roadway and automobile traffic.

3.11 EXISTING TRAFFIC VOLUMES

Existing 2015 peak hour volumes and Average Daily Traffic volumes were provided in **Figure 2-1** and **Figure 2-2**. The balanced daily volumes represent average weekday conditions, although higher weekend and seasonal volumes have been observed on the HRBT.

3.12 CRASH ANALYSIS

Crash data for the years 2012 – 2014 were analyzed for the following roadway sections:

- I-64 from I-664 to I-564 (milepost 264.64 to 277.25)
- I-664 from I-64 to I-264 (milepost 0.00 to 20.68)
- I-564 from SR 337 to I-64 (milepost 0.00 to 3.00)
- VA 164 from I-664 to US 58 (milepost 0.85 to 7.04)

Crash data were analyzed by quarter-mile segments and referenced to major landmarks along each segment (tunnel portals, major interchanges, etc.). Crash data were tabulated by crash type, severity, pavement condition and time of day. Crash rates (calculated per 100 Million Vehicle Miles Traveled) were calculated for each quarter-mile segment. The analysis summaries for each section are presented in **Figures 3-5 through 3-12**.

In general, the highest crash rates (in crashes per 100 Million Vehicle Miles Traveled) occur on eastbound and westbound I-64, with rates of 152 and 135 crashes per 100 Million Vehicle Miles Traveled, respectively. These rates are significantly higher than those experienced elsewhere within the study area. Likewise, rear-end and property damage only crashes are most prevalent along I-64; the share of rear-end crashes on other facilities is lower, while the share of injury crashes is higher. Details on the crash analyses are provided below.

3.12.1 Eastbound I-64 Crash Analysis

A total of 930 crashes were reported along eastbound I-64 during the study period. As shown in **Figure 3-5**, crashes are primarily rear-end crashes (71%), with fixed-object (16%) and sideswipe crashes (7%) being the next most frequent.

Along eastbound I-64, there is a pronounced increase in the number of crashes at mile point 268.75, which corresponds to the entry point of the elevated structure of the HRBT, where the number of lanes is reduced from three to two. A total of five (5) fatal crashes were reported along the entire segment, which is the highest number of all segments that were analyzed. Two-hundred sixty-five (265) crashes (28%) resulted in injuries, while the remaining 660 (71%) crashes resulted in property damage only.

Approximately 47 percent of all crashes occurred during the peak periods between 6 AM – 9 AM and 3 PM – 6 PM. More than 80 percent of all crashes occurred on dry pavement.

The average crash rate along eastbound I-64 is 152 crashes per 100 Million Vehicle Miles Traveled; there are five quarter-mile segments along eastbound I-64 that experience a crash rate more than double the average crash rate. The critical segments are for the most part located on the approaches to the HRBT.

3.12.2 Westbound I-64 Crash Analysis

A total of 800 crashes were reported along westbound I-64 during the study period. As shown in **Figure 3-6**, crashes are primarily rear-end crashes (74%), with fixed-object (15%) and sideswipe crashes (7%) being the next most frequent.

Although there are some areas along westbound I-64 where there is an increase in crash frequency, the magnitudes of the increases are less pronounced than along eastbound I-64. Areas where there is an increase in crash frequencies along westbound I-64 are near Bayville Street, just upstream from the entry point to the elevated structure of the HRBT (mile point 272.75) and mile point 271.25, which corresponds to the westbound tunnel portal. There was one (1) fatal crash reported along this segment. Two-hundred seventeen (217) crashes (27%) resulted in injuries, while the remaining 582 (73%) crashes resulted in property damage only.

Approximately 31 percent of all crashes occurred during the peak periods between 6 AM – 9 AM and 3 PM – 6 PM, but the time period that experienced the highest number of crashes was 12 PM – 3 PM (187 crashes, or 23% of all crashes). More than 80 percent of all crashes occurred on dry pavement.

The average crash rate along westbound I-64 is 135 crashes per 100 Million Vehicle Miles Traveled; there are six quarter-mile segments along westbound I-64 that experience a crash rate more than double the average crash rate. The critical segments are for the most part located on the approaches to the HRBT.

3.12.3 Eastbound I-664 Crash Analysis

A total of 531 crashes were reported along eastbound I-664 during the study period. As shown in **Figure 3-7**, crashes are primarily rear-end crashes (54%), with fixed-object (24%) and sideswipe crashes (11%) being the next most frequent.

Crashes along eastbound I-664 are concentrated on the approaches to the MMMBT and throughout the MMMBT elevated structure and tunnel. All nine (9) critical quarter-mile segments where the average crash rate is more than double the crash rate for the entire eastbound I-664 study area are within this area of the MMMBT. There were three (3) fatal crashes reported along this segment. One-hundred fifty-three (153) crashes (29%) resulted in injuries, while the remaining 375 (71%) crashes resulted in property damage only.

Approximately 52 percent of all crashes occurred during the peak periods between 6 AM – 9 AM and 3 PM – 6 PM. Close to 80 percent of all crashes occurred on dry pavement.

The average crash rate along eastbound I-664 is 71 crashes per 100 Million Vehicle Miles Traveled; as mentioned above, there are nine quarter-mile segments along eastbound I-664 that experience a crash rate more than double the average crash rate.

3.12.4 Westbound I-664 Crash Analysis

A total of 588 crashes were reported along westbound I-664 during the study period. As shown in **Figure 3-8**, crashes are primarily rear-end crashes (56%), with fixed-object (25%) and sideswipe crashes (11%) being the next most frequent.

Unlike crashes along eastbound I-664, there are two quarter-mile segments areas along westbound I-664 that experienced a significantly higher number of crashes between 2012 and 2014 relative to the rest of the section. These segments are located at mile points 6.0 and 9.0, which correspond to the entry and exit points of the MMMBT. There were three (3) fatal crashes reported along this segment. One-hundred seventy-three (173) crashes (29%) resulted in injuries, while the remaining 412 (70%) crashes resulted in property damage only.

Approximately 44 percent of all crashes occurred during the peak periods between 6 AM – 9 AM and 3 PM – 6 PM. Close to 80 percent of all crashes occurred on dry pavement.

The average crash rate along westbound I-664 is 71 crashes per 100 Million Vehicle Miles Traveled; as mentioned above, there are two quarter-mile segments along westbound I-664 that experience a crash rate more than double the average crash rate.

3.12.5 Eastbound I-564 Crash Analysis

A total of 65 crashes were reported along the 3-mile section of eastbound I-564 during the study period. As shown in **Figure 3-9**, crashes are primarily rear-end crashes (45%), with fixed-object (26%) and sideswipe crashes (12%) being the next most frequent. Rear-end crashes on I-564 comprise the lowest share of crashes of all Study Area Corridors, which may indicate a lower degree of congestion compared to other facilities for which crash analyses were performed.

Crashes are concentrated near the I-64 interchange. There were no fatal crashes reported along this segment. Sixteen (16) crashes (25%) resulted in injuries, while the remaining 49 (75%) crashes resulted in property damage only.

Approximately 45 percent of all crashes occurred during the afternoon peak period between 3 PM and 6 PM. This reflects the heavy directionality of traffic volumes leaving the Navy base in the afternoon. Approximately 65 percent of all crashes occurred on dry pavement.

Due to the short distance of this section of I-564, average crash rates were not computed.

3.12.6 Westbound I-564 Crash Analysis

A total of 71 crashes were reported along the 3-mile section of westbound I-564 during the study period. As shown in **Figure 3-10**, crashes are primarily rear-end crashes (61%), with fixed-object (17%) and sideswipe crashes (13%) being the next most frequent.

Crashes are concentrated near the I-64 interchange. There were no fatal crashes reported along this segment. Twenty-four (24) crashes (34%) resulted in injuries, while the remaining 47 (66%) crashes resulted in property damage only.

Approximately 46 percent of all crashes occurred during the morning peak period between 6 AM and 9 AM. This reflects the heavy directionality of traffic volumes entering the Navy base in the morning (and leaving it in the afternoon). Approximately 70 percent of all crashes occurred on dry pavement.

Due to the short distance of this section of I-564, average crash rates were not computed.

3.12.7 Eastbound VA 164 Crash Analysis

A total of 73 crashes were reported along the 7-mile section of eastbound VA 164 during the study period. As shown in **Figure 3-11**, crashes are primarily rear-end crashes (42%), with fixed-object (21%) and sideswipe crashes (21%) being the next most frequent.

Along eastbound VA 164, there is a pronounced increase in the number of crashes between mile points 5.0 and 6.25, which corresponds to the area between the Terminal Road, West Norfolk Road, and US 58 (Pinners Point) interchanges, which are key access points to the Port of Virginia. There were no fatal crashes; 29 crashes (40%) resulted in injuries, while the remaining 44 (60%) crashes resulted in property damage only. Crashes along both eastbound and westbound VA 164 involve a larger percentage of injuries than crashes along all other Study Area Corridors, which may indicate higher travel speeds and possibly the involvement of larger vehicles (trucks).

Approximately 48 percent of all crashes occurred during the peak periods between 6 AM – 9 AM and 3 PM – 6 PM. Approximately 65 percent of all crashes occurred on dry pavement.

The average crash rate along eastbound VA 164 is 22 crashes per 100 Million Vehicle Miles Traveled; there are five quarter-mile segments along eastbound VA 164 that experience a crash rate more than double the average crash rate. The critical segments are for the most part located near the US 58 (Pinners Point) interchange.

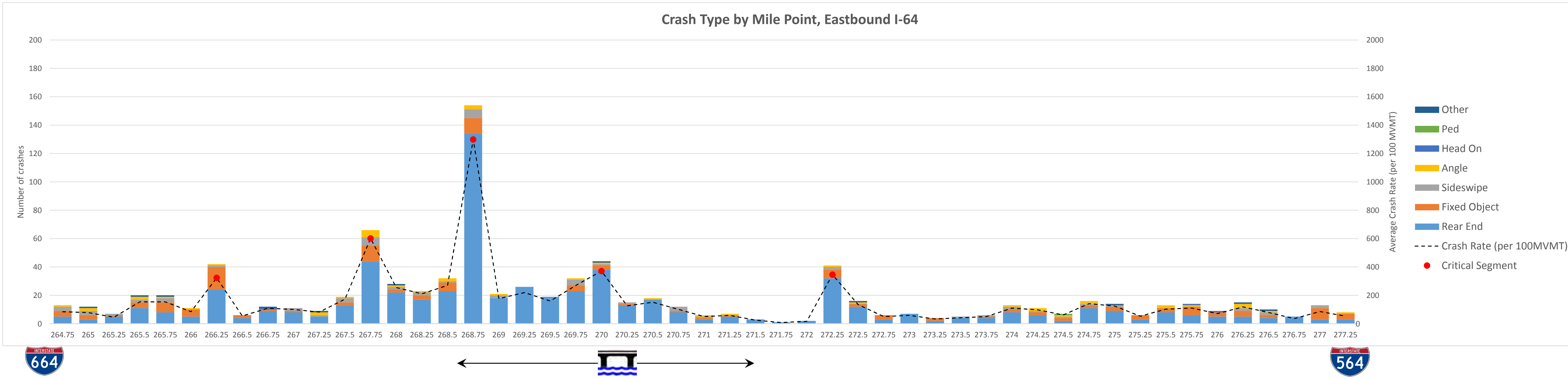
3.12.8 Westbound VA 164 Crash Analysis

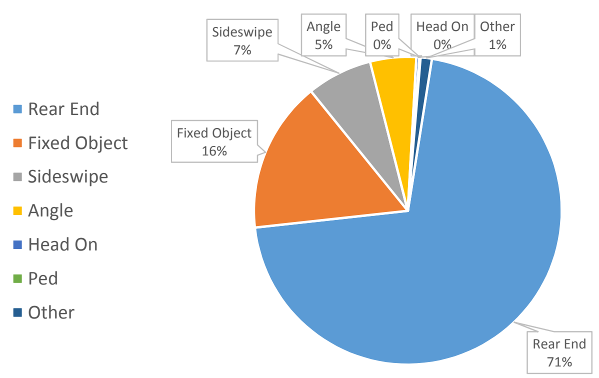
A total of 55 crashes were reported along westbound VA 164 during the study period. As shown in **Figure 3-12**, crashes are primarily rear-end crashes (38%), with fixed-object (27%) and sideswipe crashes (11%) being the next most frequent.

Westbound VA 164 experiences a comparatively large increase in crashes at mile point 5.75, which is near the West Norfolk Road interchange, and approaching the I-664 interchange. There were no fatal crashes reported along this segment. Twenty-seven (27) crashes (49%) resulted in injuries, while the remaining 28 (51%) crashes resulted in property damage only. This is the highest percentage of injury crashes of all roadways being analyzed.

Crashes are distributed relatively evenly throughout the day. Approximately 33 percent of all crashes occurred during the peak periods between 6 AM – 9 AM and 3 PM – 6 PM, but the time period that experienced the highest number of crashes was 12 PM – 3 PM (10 crashes, or 18% of all crashes). Approximately 65 percent of all crashes occurred on dry pavement.

The average crash rate along westbound VA 164 is 16 crashes per 100 Million Vehicle Miles Traveled; there are seven quarter-mile segments along westbound VA 164 that experience a crash rate more than double the average crash rate. The critical segments coincide with the locations where the highest number of crashes occur.





Severity By Crash Type				
	Fatal	Injury	PDO	Total
Rear End	1	187	470	658
Fixed Object	3	37	108	148
Sideswipe		20	44	64
Angle		17	28	45
Head On			3	3
Ped	1			1
Other		4	7	11
Grand Total	5	265	660	930

Time of Day by Crash Type									
	0AM TO 3AM	3AM TO 6AM	6AM TO 9AM	9AM TO 12PM	12PM TO 3PM	3PM TO 6PM	6PM TO 9PM	9PM TO 12AM	Total
Rear End	8	11	122	63	113	221	69	51	658
Fixed Object	25	17	29	17	14	18	15	13	148
Sideswipe	3		10	9	9	17	10	6	64
Angle	6	4	9	4	3	7	8	4	45
Head On		1			1		1		3
Ped	1								1
Other	2	1	2			2	1	3	11
Grand Total	45	34	172	93	140	265	104	77	930

Severity by Pavement Condition				
	Fatal	Injury	PDO	Total
Dry	5	222	534	761
Slush			1	1
Wet		40	112	152
Snowy		1	2	3
Icy			8	8
Other			1	1
Water		2	2	4
Grand Total	5	265	660	930

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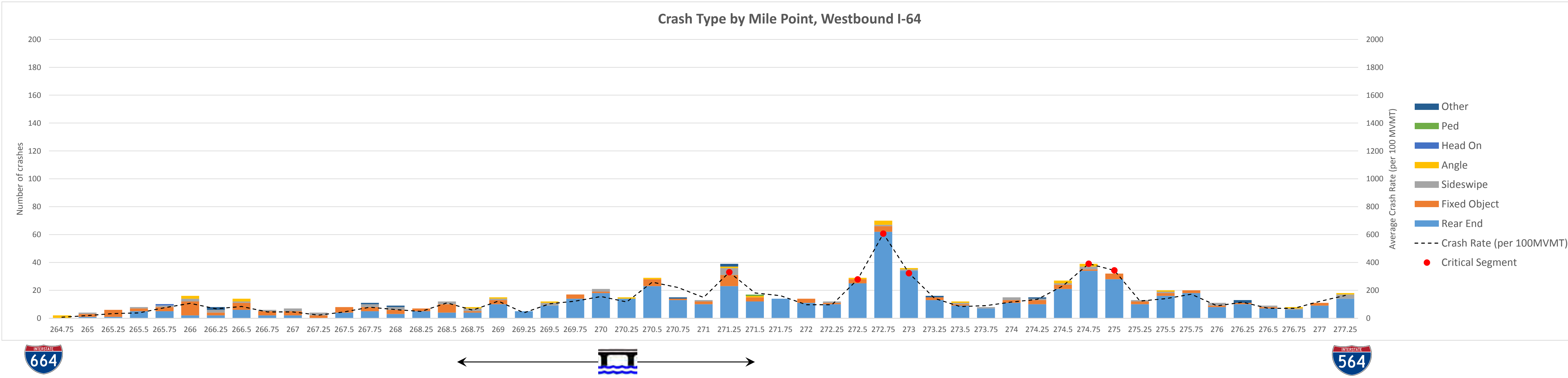
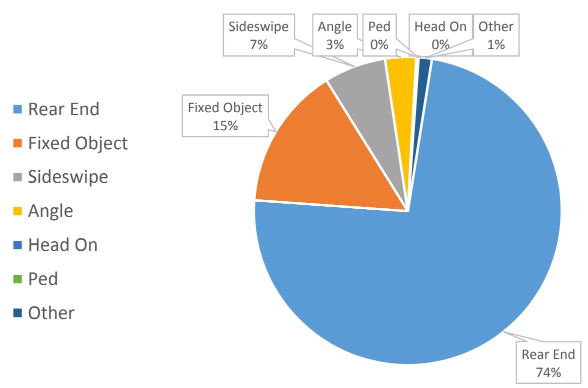
Crash Summary
2012 - 2014
Eastbound I-64

April 2017

Figure 3-5





Severity By Crash Type

	Fatal	Injury	PDO	Total
Rear End		153	436	589
Fixed Object	1	33	86	120
Sideswipe		17	35	52
Angle		7	19	26
Head On		1		1
Ped		1		1
Other		5	6	11
Grand Total	1	217	582	800

Time of Day by Crash Type

	0AM TO 3AM	3AM TO 6AM	6AM TO 9AM	9AM TO 12PM	12PM TO 3PM	3PM TO 6PM	6PM TO 9PM	9PM TO 12AM	Total
Rear End	11	11	54	126	160	141	59	27	589
Fixed Object	17	20	19	16	10	12	10	16	120
Sideswipe	4	5	6	6	12	11	3	5	52
Angle		1	4	11	4	3	2	1	26
Head On	1								1
Ped	1								1
Other	2		1	4	1		2	1	11
Grand Total	36	37	84	163	187	167	76	50	800

Severity by Pavement Condition

	Fatal	Injury	PDO	Total
Dry	1	186	486	673
Wet		31	88	119
Snowy			1	1
Icy			5	5
Water			2	2
Grand Total	1	217	582	800

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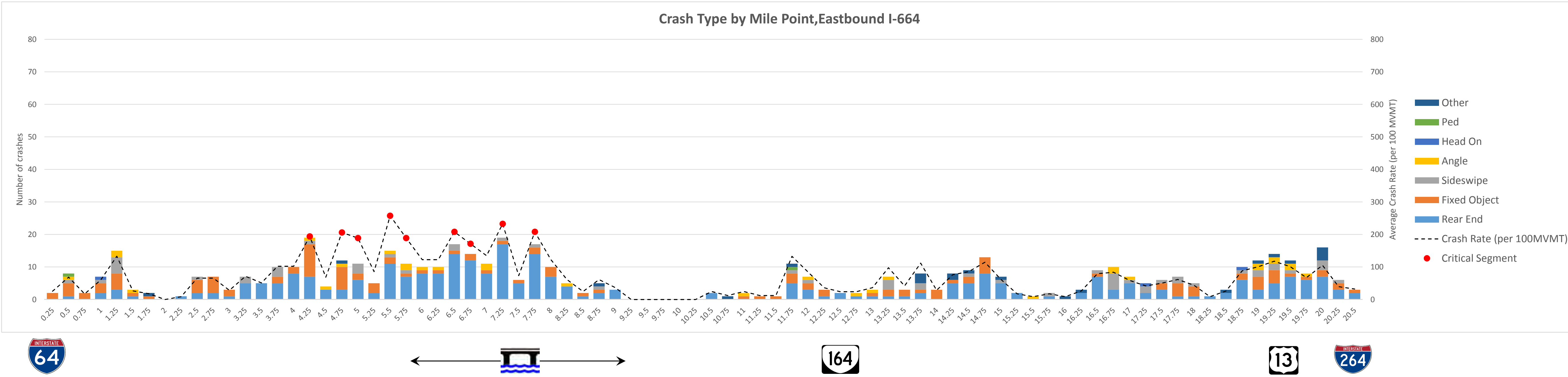
Crash Summary

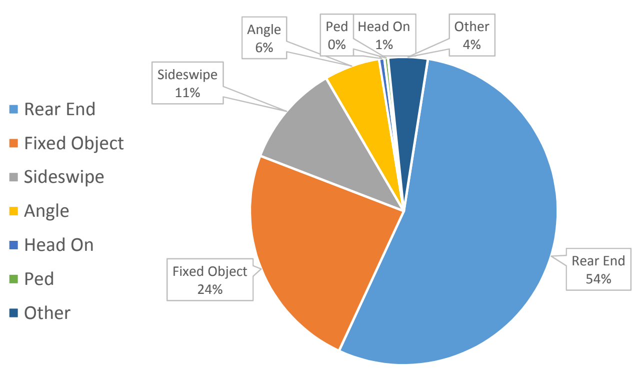
2012 - 2014

Westbound I-64

April 2017

Figure 3-6





Severity By Crash Type				
	Fatal	Injury	PDO	Total
Rear End	2	80	207	289
Fixed Object	1	41	85	127
Sideswipe		15	42	57
Angle		6	25	31
Head On		2	1	3
Ped		2		2
Other		7	15	22
Grand Total	3	153	375	531

Time of Day by Crash Type									
	0AM TO 3AM	3AM TO 6AM	6AM TO 9AM	9AM TO 12PM	12PM TO 3PM	3PM TO 6PM	6PM TO 9PM	9PM TO 12AM	Total
Rear End	7	6	70	14	47	119	14	12	289
Fixed Object	13	12	23	17	13	25	15	9	127
Sideswipe	2	4	8	8	12	8	9	6	57
Angle	2	3	4	2	5	12	3		31
Head On	1	2							3
Ped			1				1		2
Other	4	1	5	1	5		3	3	22
Grand Total	29	28	111	42	82	164	45	30	531

Severity by Pavement Condition				
	Fatal	Injury	PDO	Total
Dry	3	126	289	418
Wet		25	75	100
Snowy			4	4
Icy		1	5	6
Fluids			2	2
Water		1		1
Grand Total	3	153	375	531

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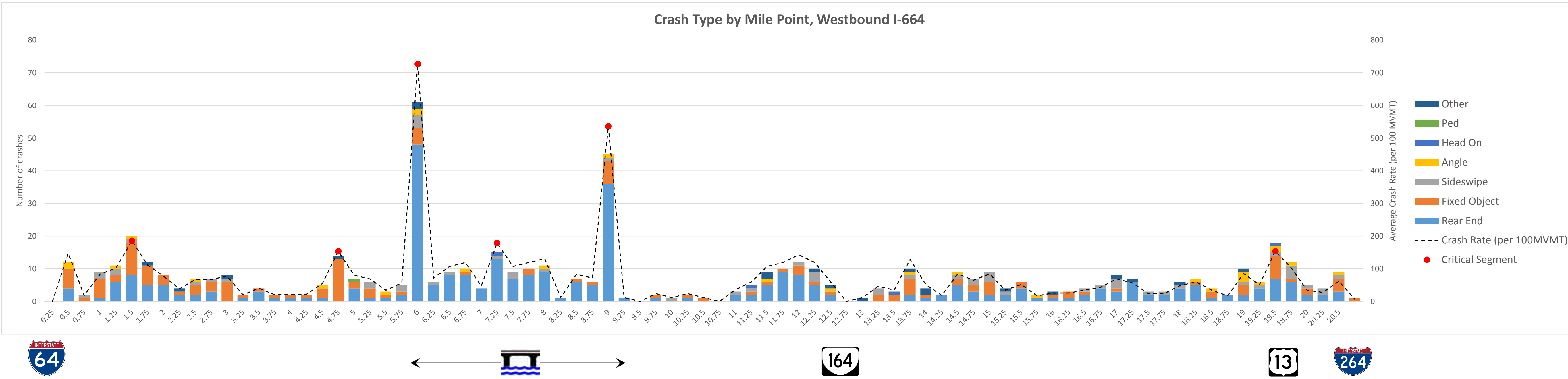
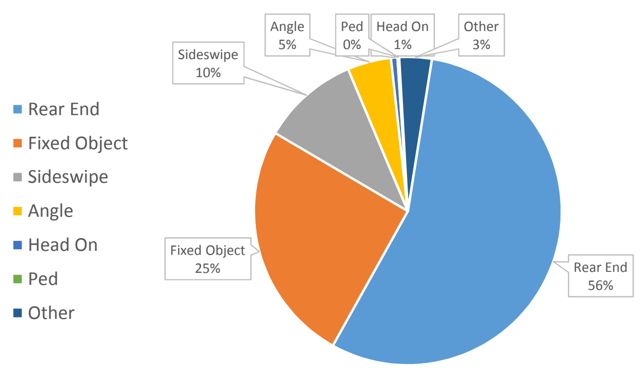
Crash Summary
2012 - 2014
Eastbound I-664

April 2017

Figure 3-7





Severity By Crash Type				
	Fatal	Injury	PDO	Total
Rear End	2	97	228	327
Fixed Object	1	44	104	149
Sideswipe		15	45	60
Angle		9	18	27
Head On		1	3	4
Ped		1		1
Other		6	14	20
Grand Total	3	173	412	588

Time of Day by Crash Type									
	0AM TO 3AM	3AM TO 6AM	6AM TO 9AM	9AM TO 12PM	12PM TO 3PM	3PM TO 6PM	6PM TO 9PM	9PM TO 12AM	Total
Rear End	5	11	58	30	67	107	31	18	327
Fixed Object	21	13	25	16	14	25	22	13	149
Sideswipe		2	10	5	18	11	8	6	60
Angle		4	4	3	5	8	2	1	27
Head On				1		1	1	1	4
Ped					1				1
Other	3	2	4	1	1	5	2	2	20
Grand Total	29	32	101	56	106	157	66	41	588

Severity by Pavement Condition				
	Fatal	Injury	PDO	Total
Dry	2	141	318	461
Wet		28	78	106
Snowy		1	4	5
Icy		1	7	8
Fluids		1	1	2
Other	1		1	2
Water		1	3	4
Grand Total	3	173	412	588

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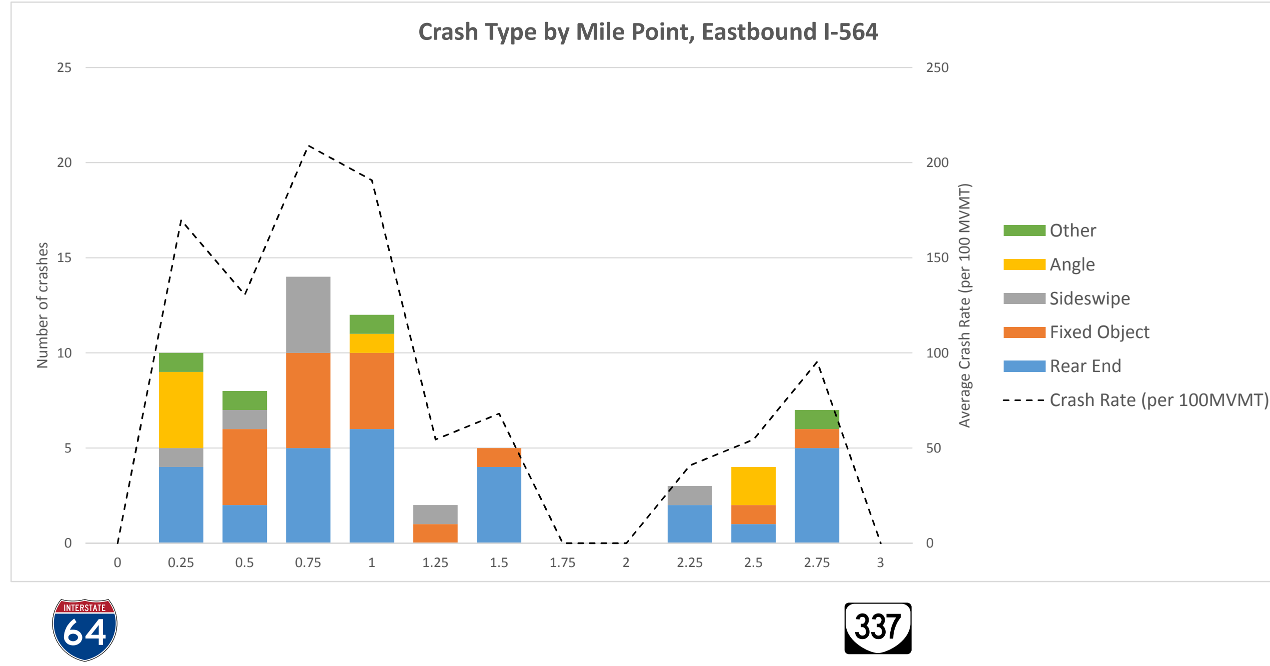
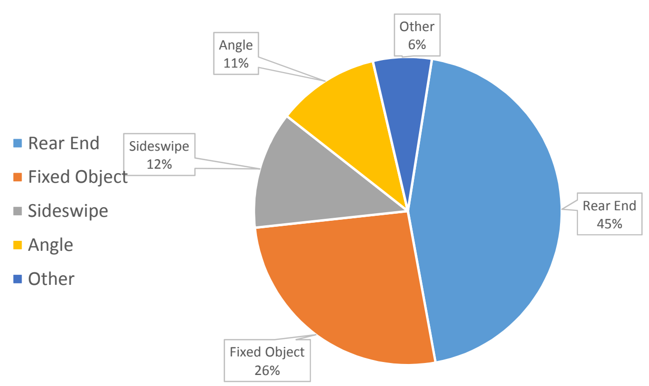
HRCS SEIS
Hampton Roads Crossing Study SEIS

Crash Summary
2012 - 2014
Westbound I-664

April 2017 | Figure 3-8





Severity By Crash Type

	Fatal	Injury	PDO	Total
Rear End		10	19	29
Fixed Object		1	16	17
Sideswipe		1	7	8
Angle		3	4	7
Other		1	3	4
Grand Total		16	49	65

Time of Day by Crash Type

	0AM TO 3AM	3AM TO 6AM	6AM TO 9AM	9AM TO 12PM	12PM TO 3PM	3PM TO 6PM	6PM TO 9PM	9PM TO 12AM	Total
Rear End		3	2	1	2	18	2	1	29
Fixed Object	1	2	1	2	5	4	1	1	17
Sideswipe		1	2	1	1	2	1		8
Angle		1			1	4	1		7
Other		1				1	2		4
Grand Total	1	8	5	4	9	29	7	2	65

Severity by Pavement Condition

	Fatal	Injury	PDO	Total
Dry		13	30	43
Wet		3	14	17
Snowy			1	1
Icy			3	3
Water			1	1
Grand Total		16	49	65

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS Hampton Roads Crossing Study SEIS

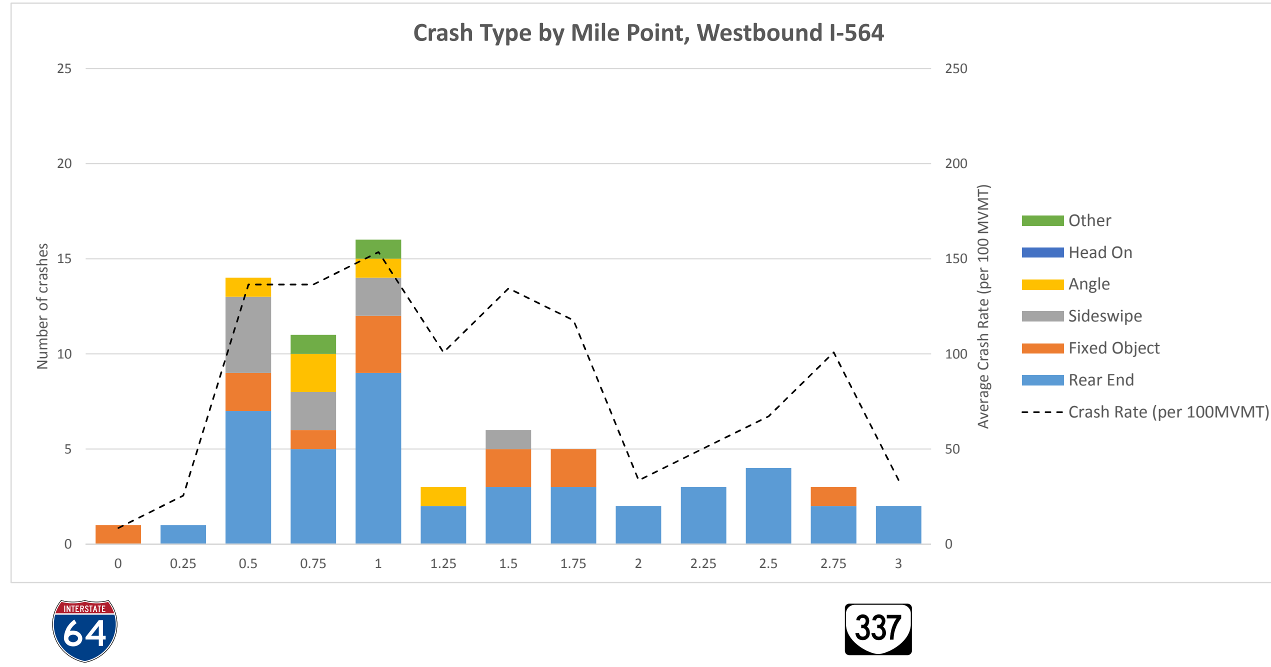
Crash Summary

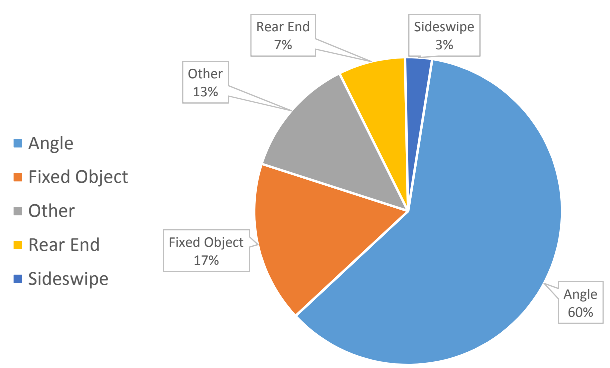
2012 - 2014

Eastbound I-564

April 2017

Figure 3-9





Severity By Crash Type

	Fatal	Injury	PDO	Total
Angle		15	28	43
Fixed Object		4	8	12
Other		2	7	9
Rear End		2	3	5
Sideswipe		1	1	2
Grand Total		24	47	71

Time of Day by Crash Type

	0AM TO 3AM	3AM TO 6AM	6AM TO 9AM	9AM TO 12PM	12PM TO 3PM	3PM TO 6PM	6PM TO 9PM	9PM TO 12AM	Total
Rear End		11	24	2	2	1	1	2	43
Fixed Object	1	3	1	1	4	1		1	12
Sideswipe			5	2		1	1		9
Angle			2	1		1	1		5
Other	1		1						2
Grand Total	2	14	33	6	6	4	3	3	71

Severity by Pavement Condition

	Fatal	Injury	PDO	Total
Dry		19	33	52
Wet		4	11	15
Icy		1	1	2
Fluids			1	1
Water			1	1
Grand Total		24	47	71

VDOT Virginia Department of Transportation

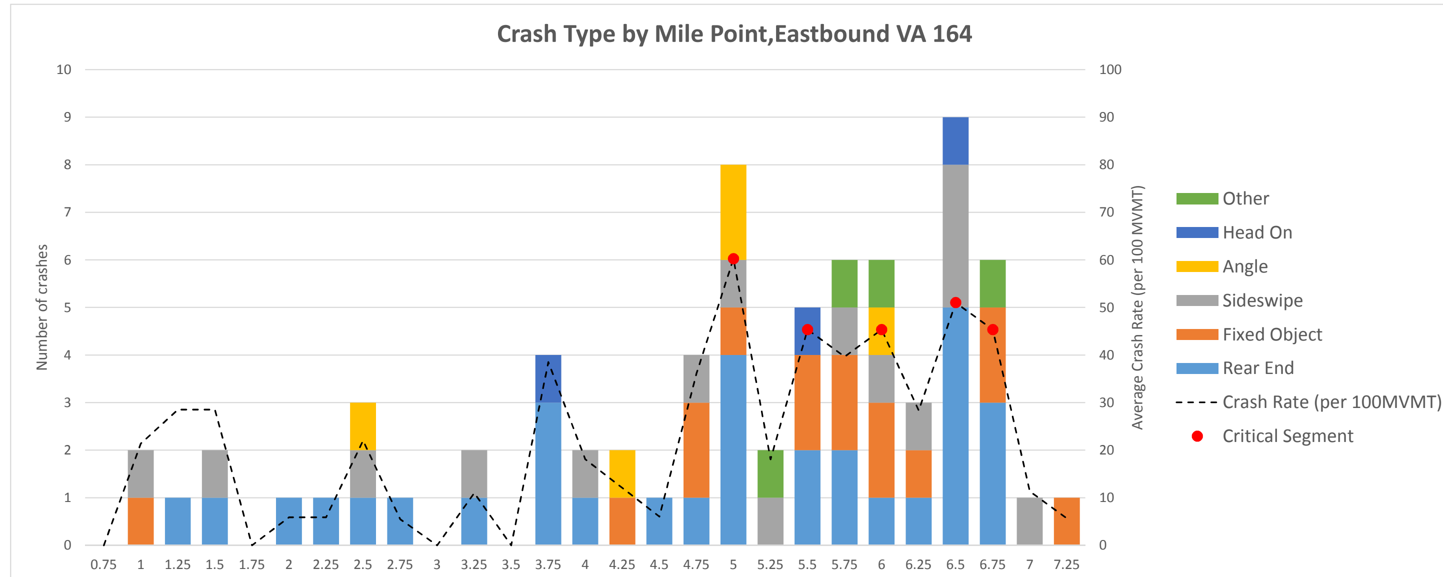
U.S. Department of Transportation Federal Highway Administration

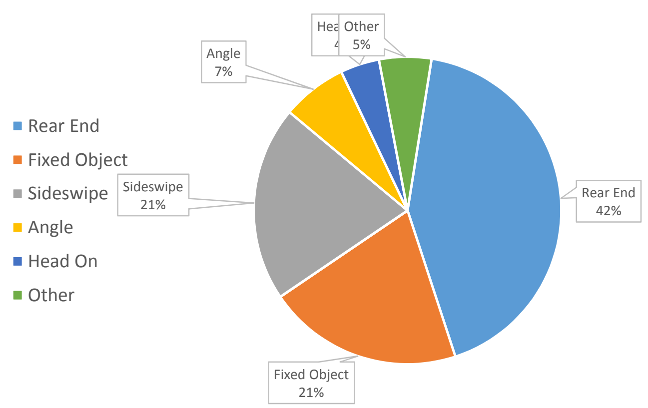
HRCS SEIS
Hampton Roads Crossing Study SEIS

Crash Summary
2012 - 2014
Westbound I-564

April 2017

Figure 3-10





Severity By Crash Type				
	Fatal	Injury	PDO	Total
Rear End		14	17	31
Fixed Object		5	10	15
Sideswipe		7	8	15
Angle		2	3	5
Head On			3	3
Other		1	3	4
Grand Total		29	44	73

Time of Day by Crash Type									
	0AM TO 3AM	3AM TO 6AM	6AM TO 9AM	9AM TO 12PM	12PM TO 3PM	3PM TO 6PM	6PM TO 9PM	9PM TO 12AM	Total
Rear End		3	13	4	4	5		2	31
Fixed Object		2	3	1	1	5	3		15
Sideswipe		2	6	2	2	1	1	1	15
Angle		1		1	1		2		5
Head On		1				1		1	3
Other				1	2	1			4
Grand Total		9	22	9	10	13	6	4	73

Severity by Pavement Condition				
	Fatal	Injury	PDO	Total
Dry		22	26	48
Wet		6	16	22
Snowy			1	1
Icy		1	1	2
Grand Total		29	44	73

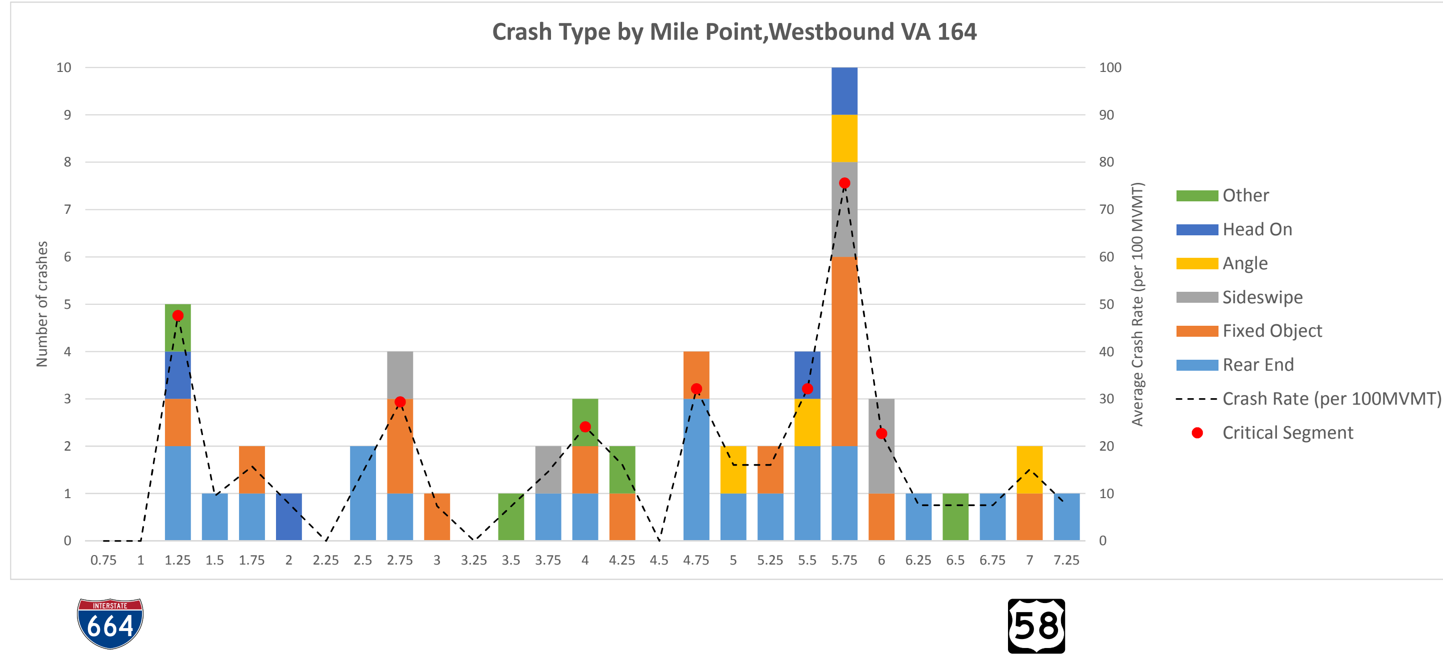
VDOT Virginia Department of Transportation

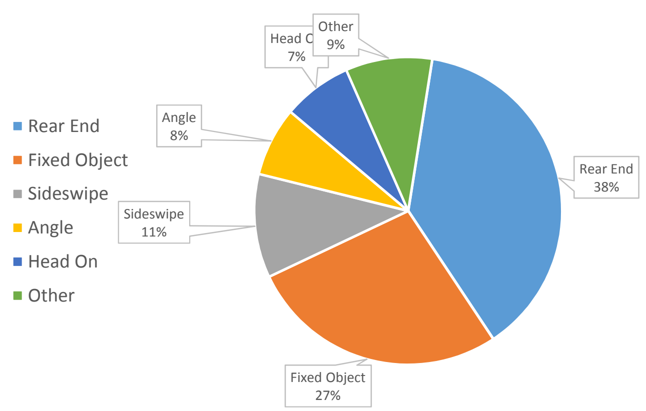
U.S. Department of Transportation Federal Highway Administration

HRCS SEIS
Hampton Roads Crossing Study SEIS

Crash Summary 2012 - 2014 Eastbound VA 164

April 2017 | Figure 3-11





Severity By Crash Type

	Fatal	Injury	PDO	Total
Rear End		12	9	21
Fixed Object		8	7	15
Sideswipe		2	4	6
Angle		2	2	4
Head On		2	2	4
Other		1	4	5
Grand Total		27	28	55

Time of Day by Crash Type

	0AM TO 3AM	3AM TO 6AM	6AM TO 9AM	9AM TO 12PM	12PM TO 3PM	3PM TO 6PM	6PM TO 9PM	9PM TO 12AM	Total
Rear End	2	1	4	1	4	5	4		21
Fixed Object	4	2	2	1	2	2		2	15
Sideswipe		1	1	1	1	2			6
Angle		1	1		1		1		4
Head On	1				1		2		4
Other		1		2	1	1			5
Grand Total	7	6	8	5	10	10	7	2	55

Severity by Pavement Condition

	Fatal	Injury	PDO	Total
1. Dry		19	18	37
2. Wet		7	9	16
4. Icy		1	1	2
Grand Total		27	28	55

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HRCS SEIS Hampton Roads Crossing Study SEIS

Crash Summary

2012 - 2014

Westbound VA 164

April 2017

Figure 3-12

3.13 ASSESSMENT OF VEHICLE SPEEDS

As part of the HCRS SEIS, INRIX speed data for the I-64 and I-664 corridors within the study area were analyzed. INRIX provides average speed data for individual segments (generally between consecutive ramp terminals) in 15-minute increments. Corridor data from March 2011 – June 2011 and March 2015 – June 2015 were analyzed. Data from two different years were analyzed to assess whether typical weekday travel speeds have decreased since the HBRT study was performed in 2011. Speeds for each segment and each 15-minute period were averaged and cross-tabulated by mile point and time period. The results are shown as speed contour plots in **Figure 3-13** and **Figure 3-14**. These figures show the average speed on Tuesdays, Wednesdays and Thursdays along the I-64 and I-664 corridors between 5:00 AM and 9:00 PM. In these figures, the mile points are shown on the vertical axis, and time of day is shown along the horizontal axis. The color gradations indicate average speed, with green being the highest and red being the lowest speed.

As shown in **Figure 3-13**, along eastbound I-64, the 2011 and 2015 data show that two pronounced periods with slow traffic occur. Speeds begin to decrease approximately near mile point 266 and do not begin to increase until mile point 270. In 2015, during the AM peak period, speeds through the HRBT fall below 40 Miles Per Hour (MPH) as early as 6:30 AM and remain below 40 MPH until 10:00 AM. During the PM peak, speeds fall below 40 MPH as early as 3:00 PM and remain below 40 MPH until 6:45 PM. Speeds are below 40 MPH for as many as 9 hours between the times of 5:00 AM and 9:00 PM, and below 20 MPH for as many as 4.5 hours during the day.

Comparing the 2011 and 2015 speeds, the periods of low speeds (red and yellow areas) span a longer period of time in 2015 during the AM period and in particular during the PM period. In addition, PM speeds in 2015 are significantly lower (darker red) for a longer period of time compared to 2011, indicating that congestion has increased significantly between 2011 and 2015.

Likewise, westbound I-64 experiences the lowest speeds during the PM peak, although speeds on the HRBT are low throughout the day. Speeds fall below 40 MPH as early as 6:30 AM and remain below 40 MPH for most of the day (through 7:30 PM). Speeds are below 40 MPH for as many as 12 hours between the times of 5:00 AM and 9:00 PM, and below 20 MPH for as many as 2.5 hours.

Comparing the 2011 and 2015 data in **Figure 3-13**, it is clear that severe congestion is occurring over a longer distance and in 2015 consistently starts as far south/east as the I-564 interchange.

Figure 3-14 shows the speed profile for I-664 between I-64 and I-264. In 2015, speeds at the southern terminus of the study segment fall below 40 MPH by 3:30 PM and remain below 40 MPH until 5:45 PM. More significantly, whereas in 2011 congestion along eastbound I-664 occurred over an approximately one-mile segment, in 2015 the congested area has almost tripled in length. Along westbound I-664, minor congestion is occurring just north of the I-264 interchange.

Appendix P contains photographs that illustrate the level of congestion along I-64 during the peak periods.

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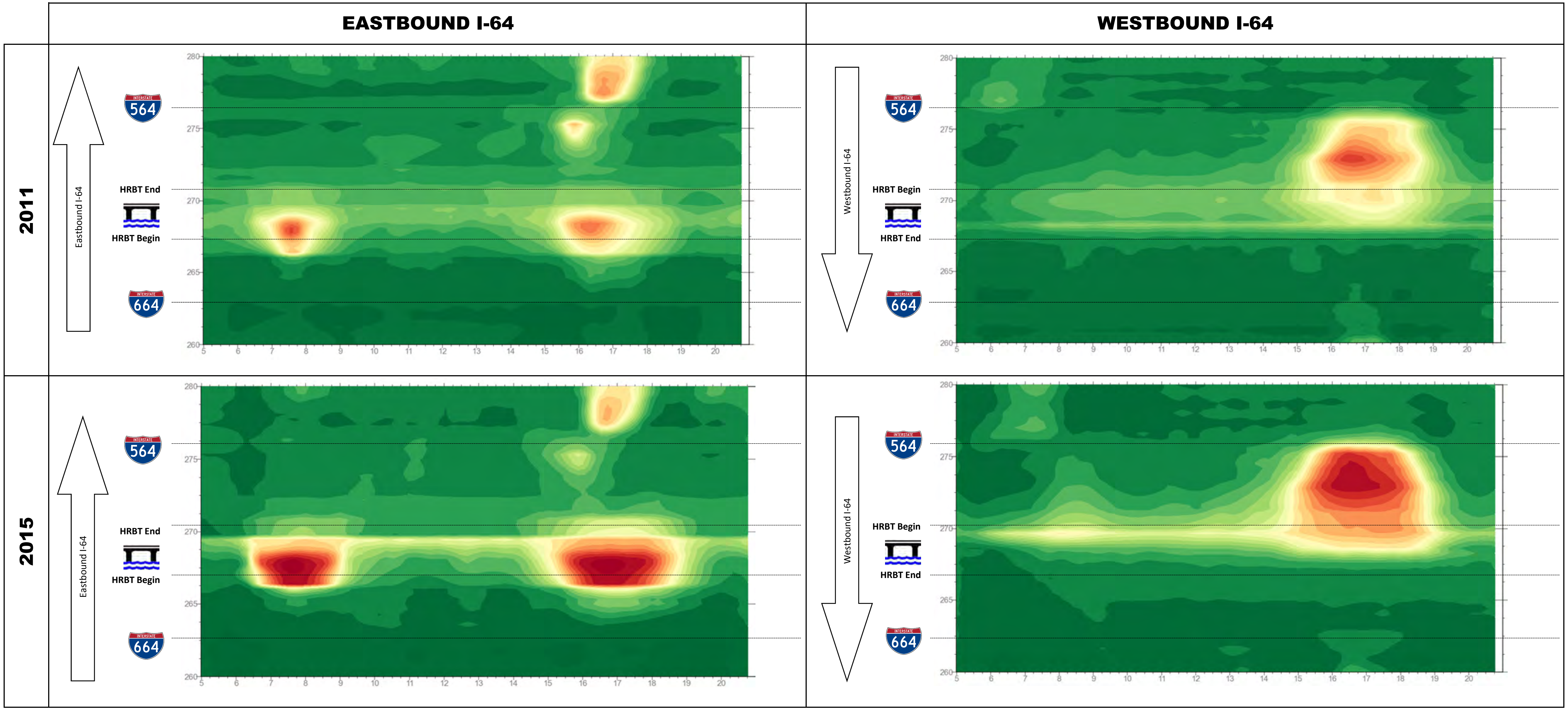

Observations

Compared to 2011, in 2015 the duration of the congested number of hours has increased in both directions, as well as the extent and severity of the congestion.
The increase in the number of hour of congestion is reflected in the earlier start and later ending of the yellow and red bubbles (they are wider).
The increase in the extent of congestion is indicated by the longer distance (milepoint interval) in over which congestion occurs.
The increase in the severity of congestion is indicated by the significantly lower average speeds seen during the worst of the congestion.

Note

Speed profiles are based on INRIX data obtained for Tuesdays, Wednesdays and Thursdays from March - June in 2011 and 2015.

Speed (MPH)

60
54
48
42
36
30
24
18
12

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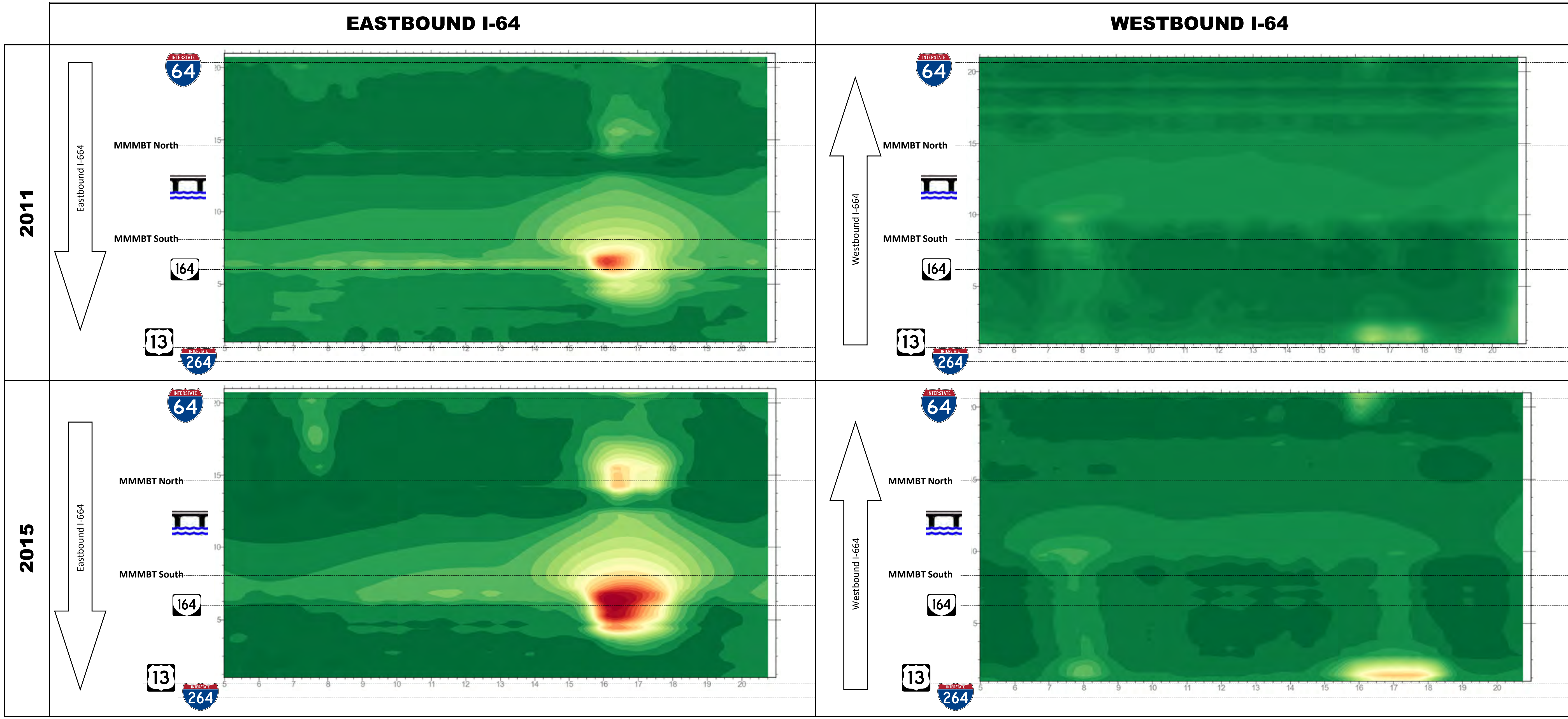
U.S. Department of Transportation Federal Highway Administration

HRCS SEIS
Hampton Roads Crossing Study SEIS

Comparison of 2011 and 2015 Speed Profiles - I-64 Corridor

April 2017

Figure 3-13



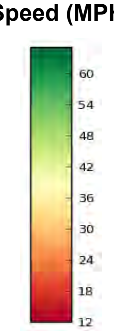
Observations

Compared to 2011, in 2015 the duration of the congested number of hours has increased in both directions, as well as the extent and severity of the congestion.
The increase in the number of hour of congestion is reflected in the earlier start and later ending of the yellow and red bubbles (they are wider).
The increase in the extent of congestion is indicated by the longer distance (milepoint interval) in over which congestion occurs.
The increase in the severity of congestion is indicated by the significantly lower average speeds seen during the worst of the congestion.

Note

Speed profiles are based on INRIX data obtained for Tuesdays, Wednesdays and Thursdays from March - June in 2011 and 2015.

Speed (MPH)



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U.S. Department of Transportation Federal Highway Administration

HRCS SEIS
Hampton Roads Crossing Study SEIS

Comparison of 2011 and 2015 Speed Profiles - I-664 Corridor

April 2017

Figure 3-14

3.14 CAPACITY ANALYSIS

The 2015 peak hour volumes shown in **Figure 2-1** were analyzed using the methodologies outlined in **Section 2.3**. The results of these mainline and intersection capacity analyses are provided in **Figure 3-15.**

As shown in **Figure 3-15**, the capacity analyses confirm the existing areas that experience congestion and poor traffic operations.

Along I-64, LOS F operations occur in both directions during the AM and PM peak hours on the HRBT. Traffic volumes reach capacity (LOS E) in isolated locations along the Study Area Corridor, including the weaving segment in both directions west of LaSalle Avenue, and westbound I-64 near Bay Avenue and Granby Street.

Along I-664, poor operations occur during the AM peak hour in the westbound direction of the MMMBT as well as through the Bowers Hill interchange area. During the PM peak hour, LOS F operations occur on the MMMBT in the eastbound direction, and again through the Bowers Hill interchange in both the eastbound and westbound directions.

Generally acceptable operating conditions prevail on VA 164 during both peak hours; along I-564, near-capacity conditions (LOS E) are experienced during the PM peak hour in the westbound direction. Along I-564, poor operating conditions occur during the PM peak hour in the eastbound direction approaching the off-ramps to Little Creek Road.

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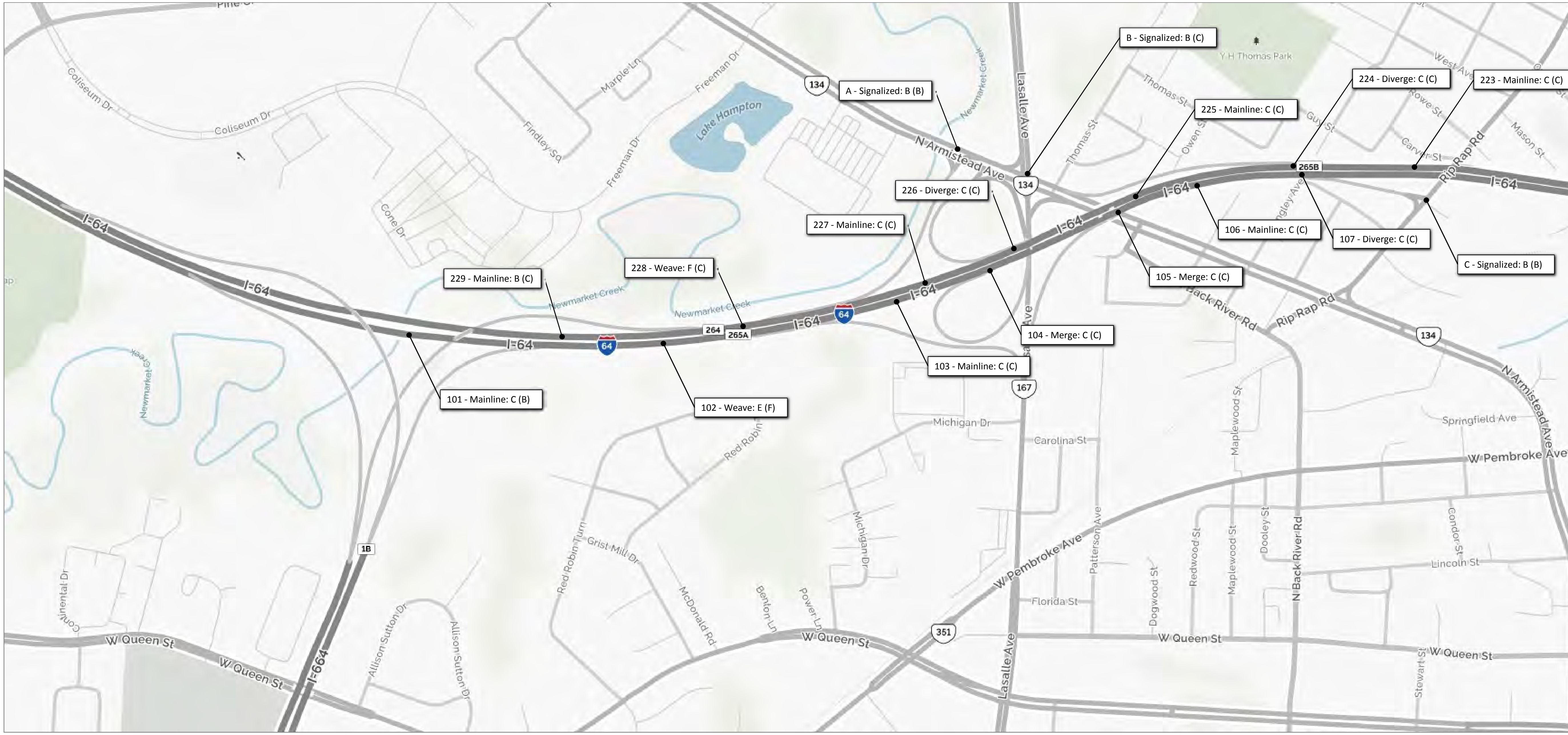

Legend

X (X) AM (PM) Level of Service

Numbered items correspond to freeway segments, evaluated using HCS

100 series	I-64 Eastbound
200 series	I-64 Westbound
300 series	I-564 Eastbound
400 series	I-564 Westbound

Lettered items correspond to intersections, evaluated using Synchro

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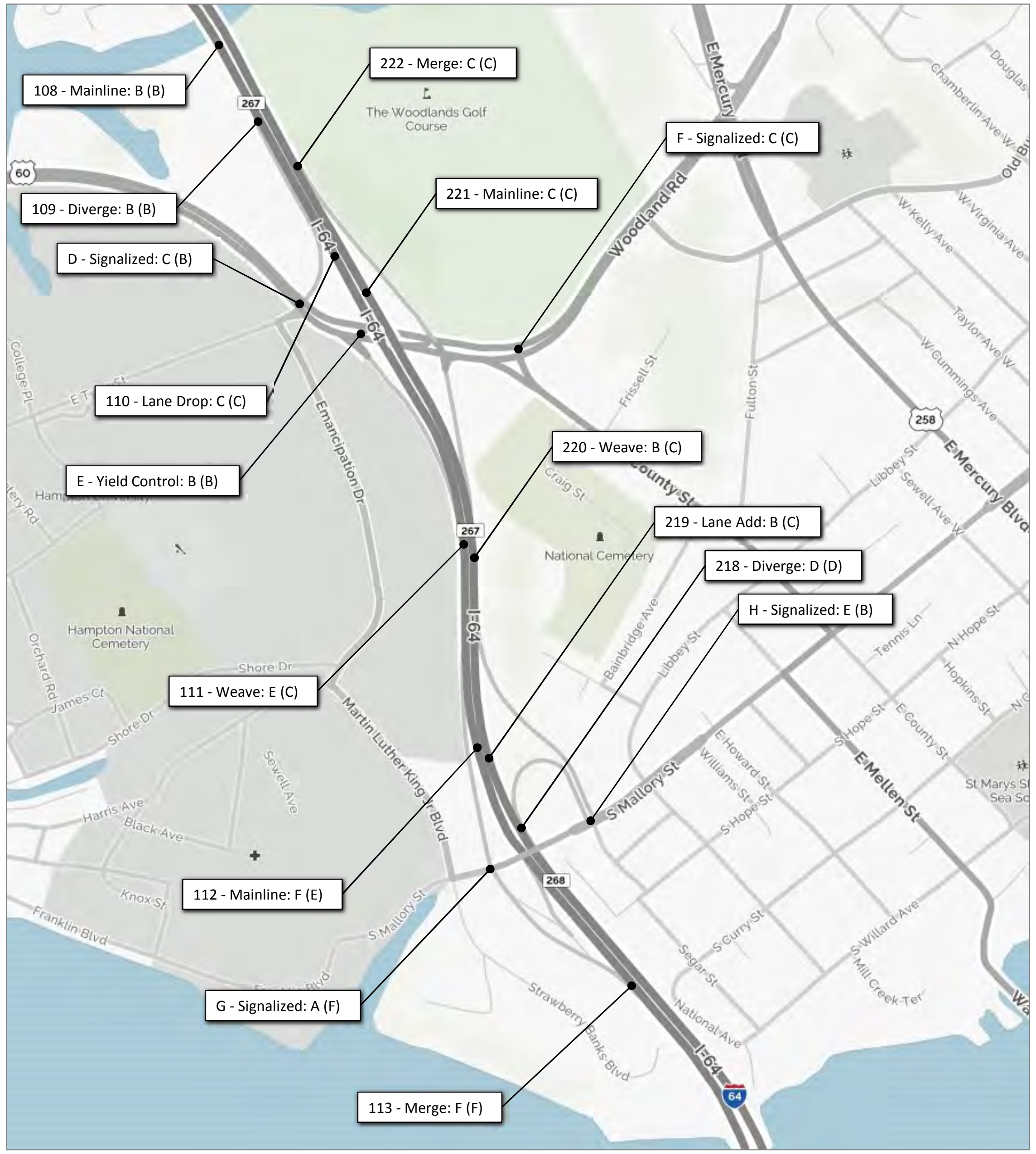
U.S. Department of Transportation Federal Highway Administration

HRCS SEIS
Hampton Roads Crossing Study SEIS

2015 Existing
Level of Service
I-64 Corridor

April 2017

Figure 3-15.1



Legend

X (X) AM (PM) Level of Service

Numbered items correspond to freeway segments, evaluated using HCS

100 series	I-64 Eastbound
200 series	I-64 Westbound
300 series	I-564 Eastbound
400 series	I-564 Westbound

Lettered items correspond to intersections, evaluated using Synchro

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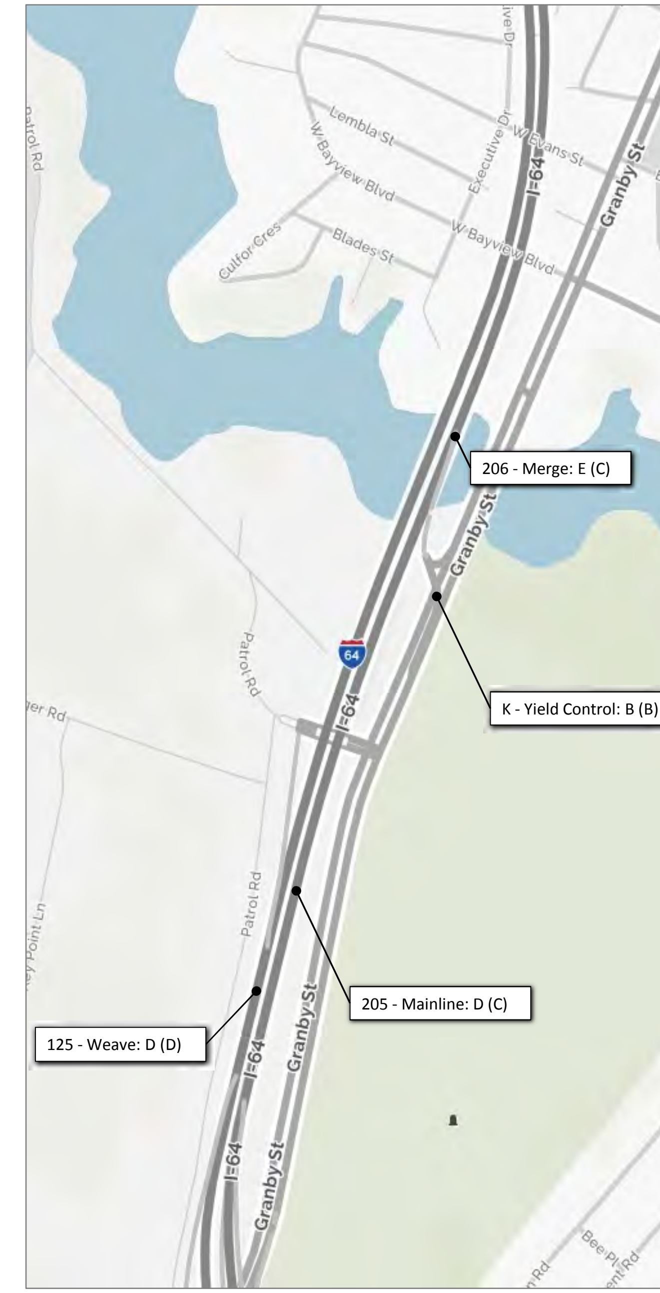
U.S. Department of Transportation Federal Highway Administration

HRCS SEIS Hampton Roads Crossing Study SEIS

2015 Existing Level of Service I-64 Corridor

April 2017

Figure 3-15.2



Legend

X (X)	AM (PM) Level of Service

Numbered items correspond to freeway segments, evaluated using HCS

100 series	I-64 Eastbound
200 series	I-64 Westbound
300 series	I-564 Eastbound
400 series	I-564 Westbound

Lettered items correspond to intersections, evaluated using Synchro

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS
Hampton Roads Crossing Study SEIS

2015 Existing Level of Service I-64 Corridor

April 2017

Figure 3-15.3

Legend

X (X) AM (PM) Level of Service

Numbered items correspond to freeway segments, evaluated using HCS

100 series	I-64 Eastbound
200 series	I-64 Westbound
300 series	I-564 Eastbound
400 series	I-564 Westbound

Lettered items correspond to intersections, evaluated using Synchro

VDOT Virginia Department of Transportation

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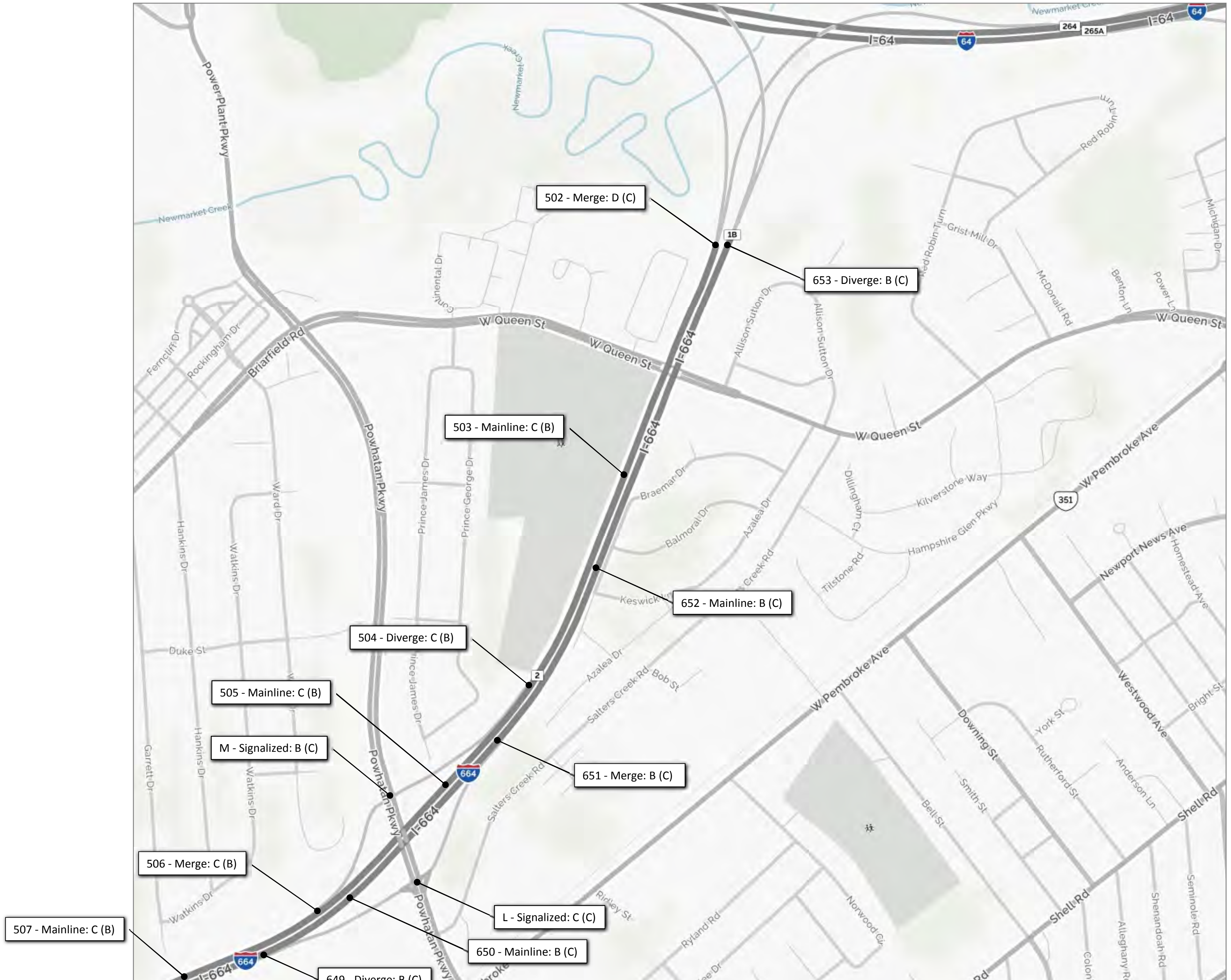
HRCS SEIS
Hampton Roads Crossing Study SEIS

2015 Existing Level of Service I-64 Corridor

April 2017

Figure 3-15.4



Legend

X (X) — AM (PM) Level of Service

Numbered items correspond to freeway segments, evaluated using HCS

500 series — I-664 Eastbound/Southbound
600 series — I-664 Westbound/Northbound

Lettered items correspond to intersections, evaluated using Synchro

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS
Hampton Roads Crossing Study SEIS

2015 Existing Level of Service I-664 Corridor

April 2017

Figure 3-15.5

Legend

X (X) AM (PM) Level of Service

Numbered items correspond to freeway segments, evaluated using HCS

500 series I-664 Eastbound/Southbound
600 series I-664 Westbound/Northbound

Lettered items correspond to intersections, evaluated using Synchro

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS
Hampton Roads Crossing Study SEIS

2015 Existing Level of Service I-664 Corridor

April 2017

Figure 3-15.6

Legend

X (X) AM (PM) Level of Service

Numbered items correspond to freeway segments, evaluated using HCS

500 series I-664 Eastbound/Southbound
600 series I-664 Westbound/Northbound

Lettered items correspond to intersections, evaluated using Synchro

VDOT
Virginia Department of Transportation

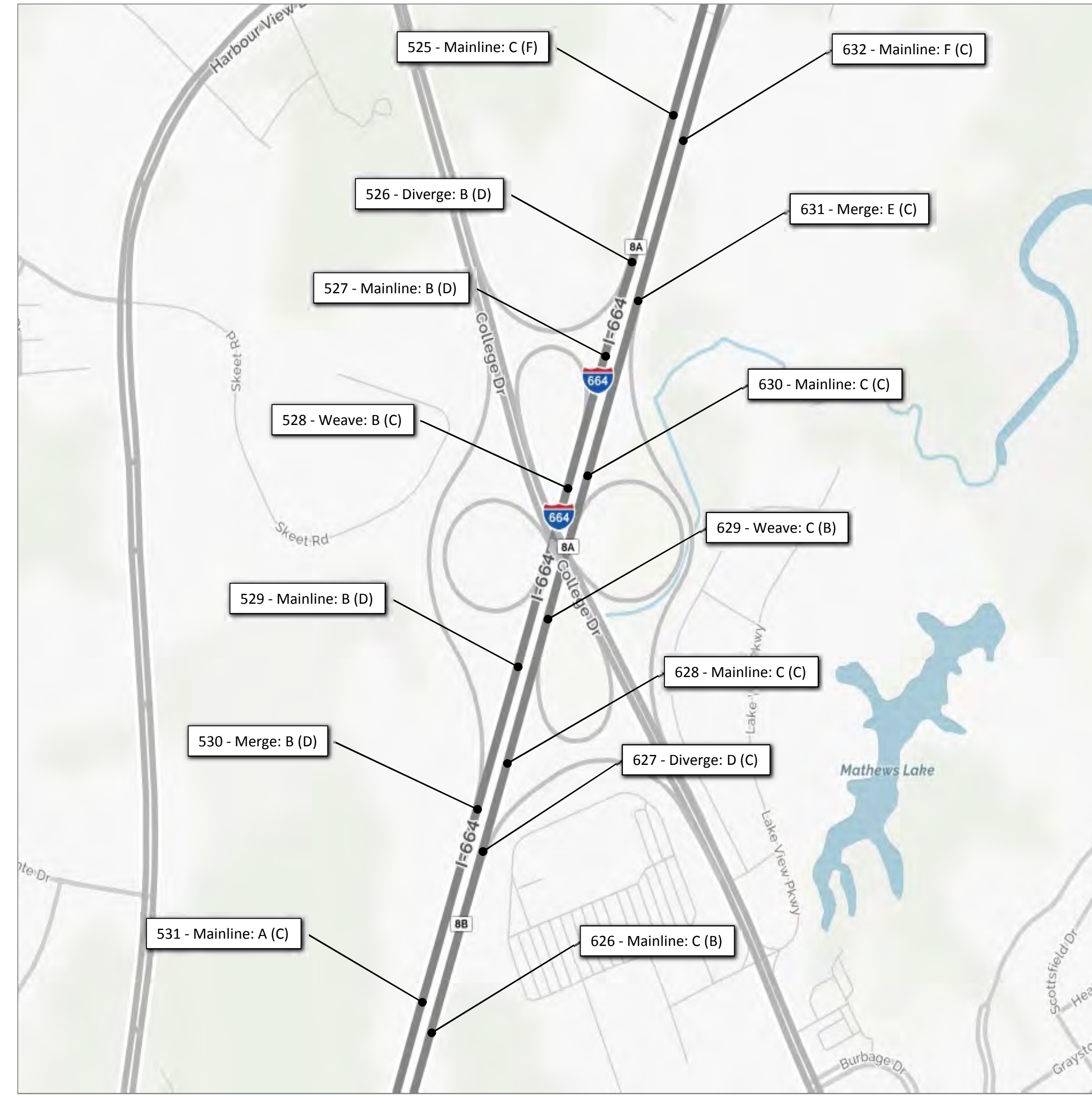
U.S. Department of Transportation
Federal Highway Administration

HRCS SEIS
Hampton Roads Crossing Study SEIS

2015 Existing Level of Service I-664 Corridor

April 2017

Figure 3-15.7



Legend

X (X) AM (PM) Level of Service

Numbered items correspond to freeway segments, evaluated using HCS

500 series I-664 Eastbound/Southbound
600 series I-664 Westbound/Northbound

Lettered items correspond to intersections, evaluated using Synchro

VDOT Virginia Department of Transportation

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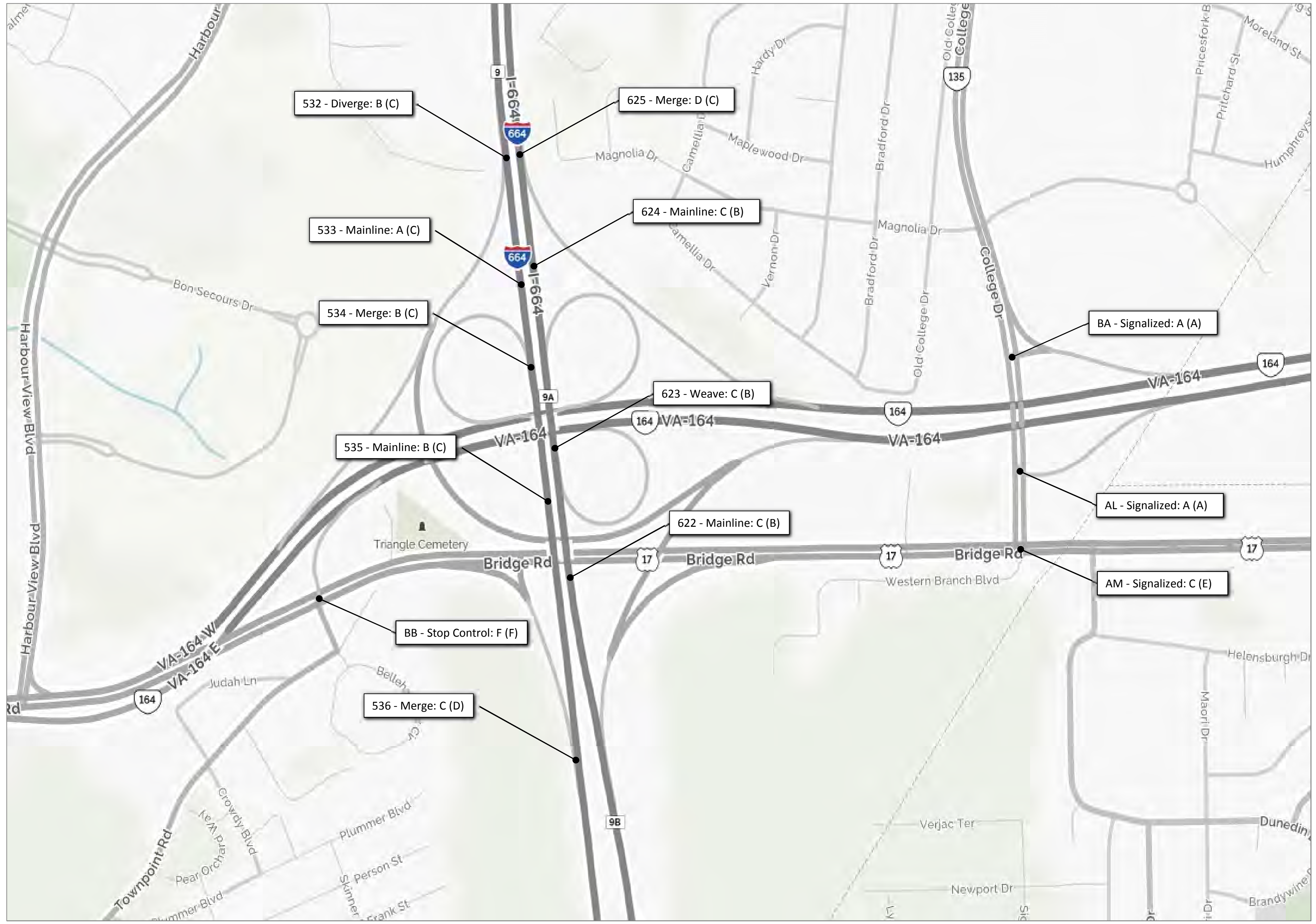
HRCS SEIS
Hampton Roads Crossing Study SEIS

2015 Existing Level of Service I-664 Corridor

April 2017

Figure 3-15.8



Legend

X (X)	AM (PM) Level of Service

Numbered items correspond to freeway segments, evaluated using HCS

500 series	I-664 Eastbound/Southbound
600 series	I-664 Westbound/Northbound

Lettered items correspond to intersections, evaluated using Synchro

VDOT Virginia Department of Transportation

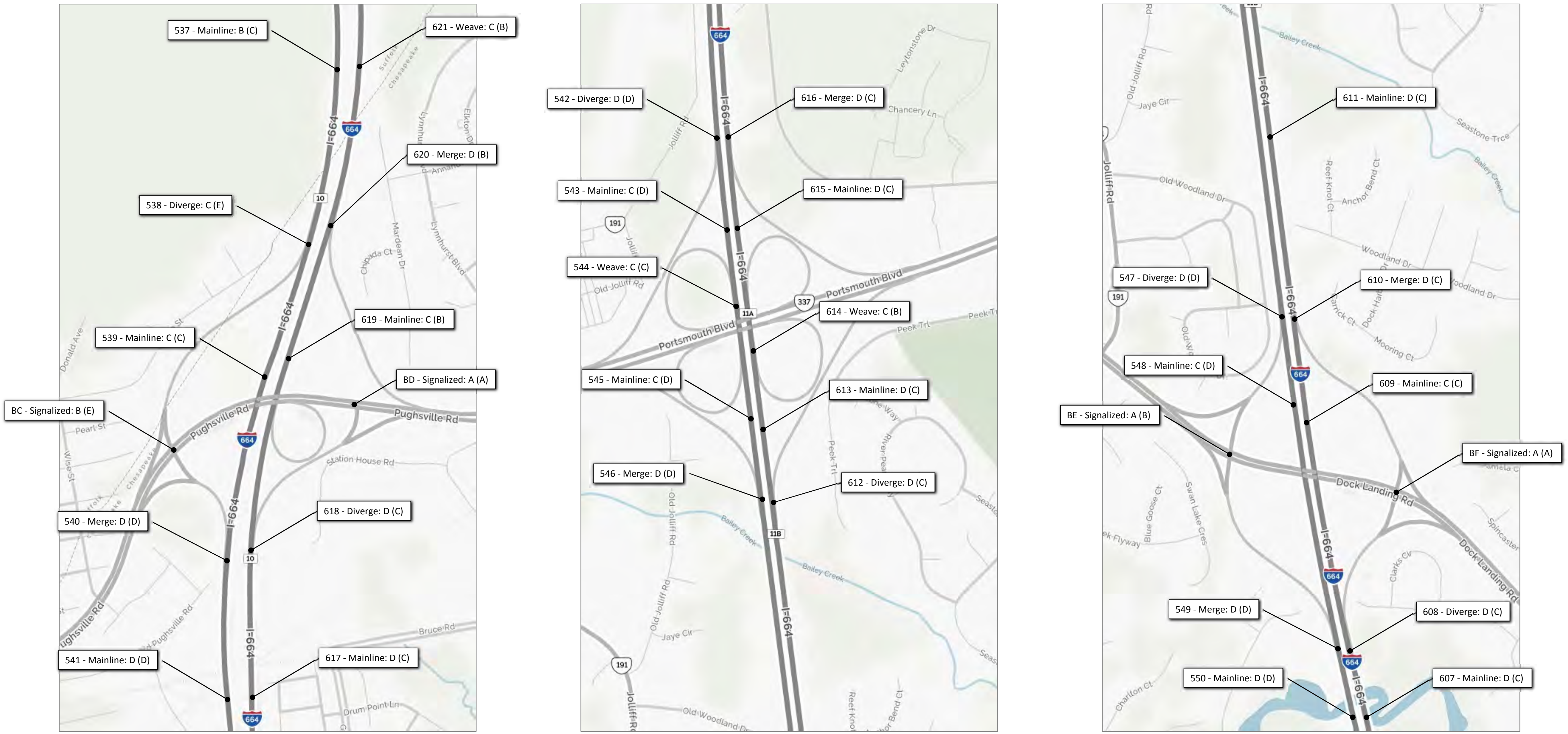
U.S. Department of Transportation Federal Highway Administration

HRCS SEIS
Hampton Roads Crossing Study SEIS

2015 Existing Level of Service I-664 Corridor

April 2017

Figure 3-15.9



Legend

X (X)	AM (PM) Level of Service

Numbered items correspond to freeway segments, evaluated using HCS

500 series	I-664 Eastbound/Southbound
600 series	I-664 Westbound/Northbound

Lettered items correspond to intersections, evaluated using Synchro

VDOT Virginia Department of Transportation

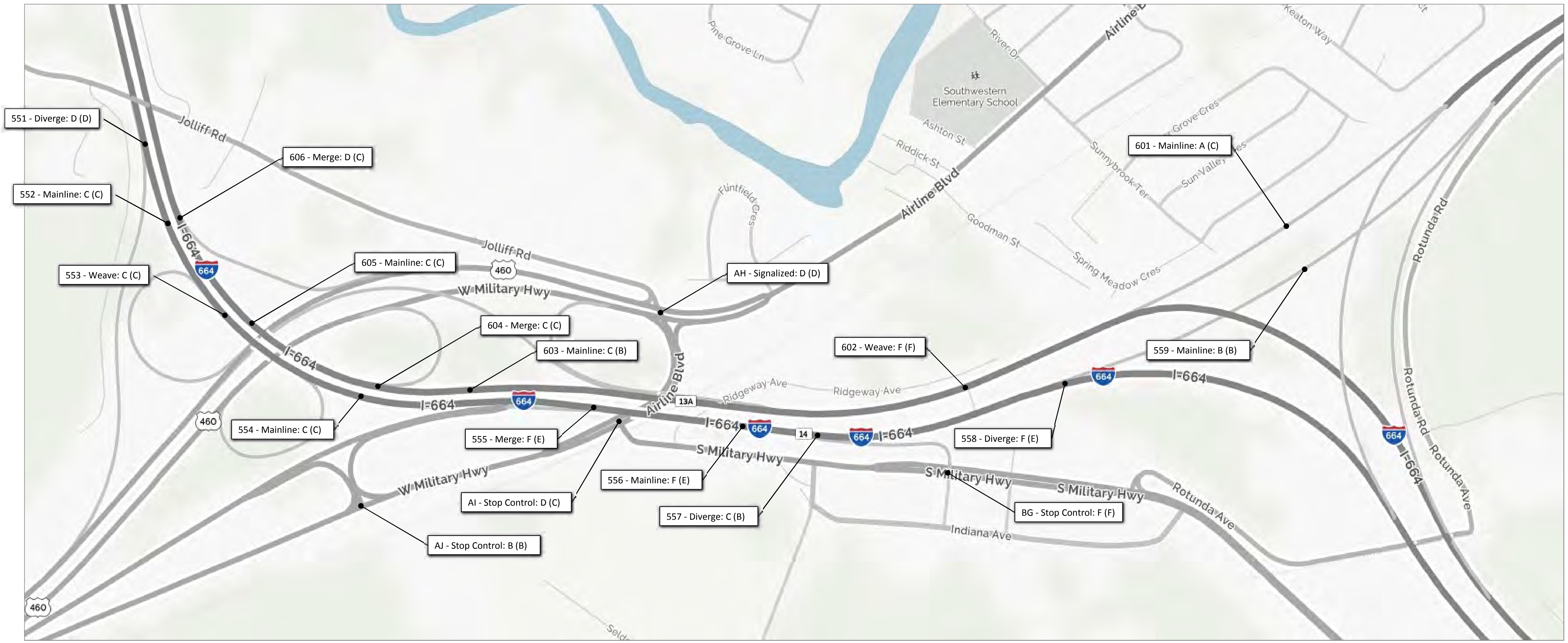
U.S. Department of Transportation Federal Highway Administration

HRCS SEIS
Hampton Roads Crossing Study SEIS

2015 Existing Level of Service I-664 Corridor

April 2017

Figure 3-15.10



Legend

X (X) AM (PM) Level of Service

Numbered items correspond to freeway segments, evaluated using HCS

500 series I-664 Eastbound/Southbound
600 series I-664 Westbound/Northbound

Lettered items correspond to intersections, evaluated using Synchro

VDOT Virginia Department of Transportation

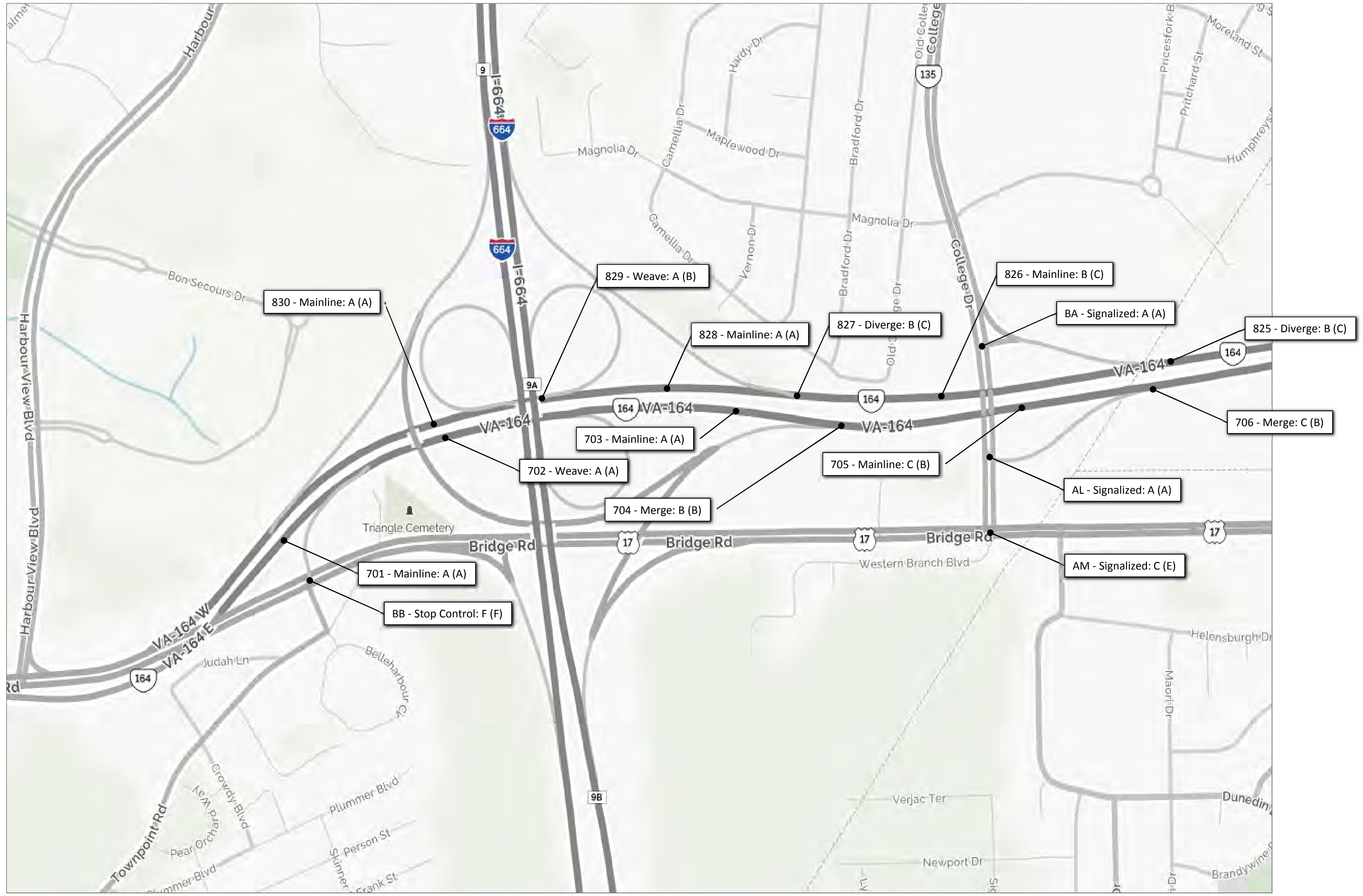
U.S. Department of Transportation Federal Highway Administration

HRCS SEIS
Hampton Roads Crossing Study SEIS

2015 Existing Level of Service I-664 Corridor

April 2017

Figure 3-15.11



Legend

X (X) AM (PM) Level of Service

Numbered items correspond to freeway segments, evaluated using HCS

700 series VA 164 Eastbound
800 series VA 164 Westbound

Lettered items correspond to intersections, evaluated using Synchro

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS
Hampton Roads Crossing Study SEIS

2015 Existing
Level of Service
VA 164 Corridor

April 2017

Figure 3-15.12

Legend

X (X)	AM (PM) Level of Service

Numbered items correspond to freeway segments, evaluated using HCS

700 series	VA 164 Eastbound
800 series	VA 164 Westbound

Lettered items correspond to intersections, evaluated using Synchro

HRCS SEIS
Hampton Roads Crossing Study SEIS

2015 Existing Level of Service VA 164 Corridor

April 2017

Figure 3-15.13

Legend

X (X) AM (PM) Level of Service

Numbered items correspond to freeway segments, evaluated using HCS

700 series VA 164 Eastbound
800 series VA 164 Westbound

Lettered items correspond to intersections, evaluated using Synchro

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS
Hampton Roads Crossing Study SEIS

2015 Existing Level of Service VA 164 Corridor

April 2017

Figure 3-15.14

Legend

X (X) AM (PM) Level of Service

Numbered items correspond to freeway segments, evaluated using HCS

700 series VA 164 Eastbound
800 series VA 164 Westbound

Lettered items correspond to intersections, evaluated using Synchro

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS Hampton Roads Crossing Study SEIS

2015 Existing Level of Service VA 164 Corridor

April 2017

Figure 3-15.15

4. ALTERNATIVES CONSIDERED

A detailed discussion on alternatives development, alternatives considered and alternatives not carried forward is included in the Chapter 2 of the Draft SEIS. Chapter 2 of the Draft SEIS is incorporated by reference in the *HRCS Traffic and Transportation Technical Report*.

5. DESIGN YEAR 2040 FORECASTS AND ANALYSES

As discussed in **Section 2.4**, traffic forecasts were developed using the Hampton Roads TPO travel demand model. The model output was post-processed to obtain design year 2040 daily and peak hour volumes. These peak hour volumes were analyzed to obtain peak hour Level of Service (LOS) and estimated end-to-end travel time for each Study Area Corridor. The results of these analyses are summarized in **Section 5.1**; detailed analysis results are provided in **Sections 5.3 through 5.7**.

In addition, upon request from some of the stakeholder agencies, raw model output (for the horizon year 2034) was aggregated to provide additional insight in the operational benefits of each alternative. This information is presented in **Section 5.2**.

5.1 SUMMARY

A summary of daily traffic volumes on key roadway links within the study area under each of the alternatives is provided in **Table 5-1**. A comparison of daily traffic volumes on the HRBT and MMMBT for 2015 and 2040 conditions for each alternative is provided in **Figure 5-1**. A summary of projected LOS is provided in **Table 5-2**. A summary of estimated travel times along key Study Area Corridors between major interchanges is provided in **Table 5-3**. It should be noted that the travel time estimates were developed from planning-level capacity analysis output and are intended only to indicate relative changes in travel time between alternatives. Additional and/or different segments could be reported in the Final SEIS depending on the Preferred Alternative.

Table 5-1: 2040 Daily Traffic Volumes at Key Roadway Segments

Roadway Segment	2015	2040 No-Build	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D
HRBT	91,000	112,200	137,700	133,400	103,600	124,200
MMMBT, north of I-664C	69,300	90,700	89,200	83,100	127,700	114,900
MMMBT, south of I-664C	69,300	90,700	89,200	83,100	122,100	120,700
VA 164*	49,000	65,600	64,000	78,400	54,000	55,700
VA 164C	-	-	-	51,800	29,400	31,000
I-564C	-	-	-	51,800	89,600	86,400
I-664C	-	-	-	-	70,800	65,800

** Between the Towne Point Road and College Drive Interchanges*

Figure 5-1: 2040 Projected Daily Traffic Volumes at the HRBT and MMMBT

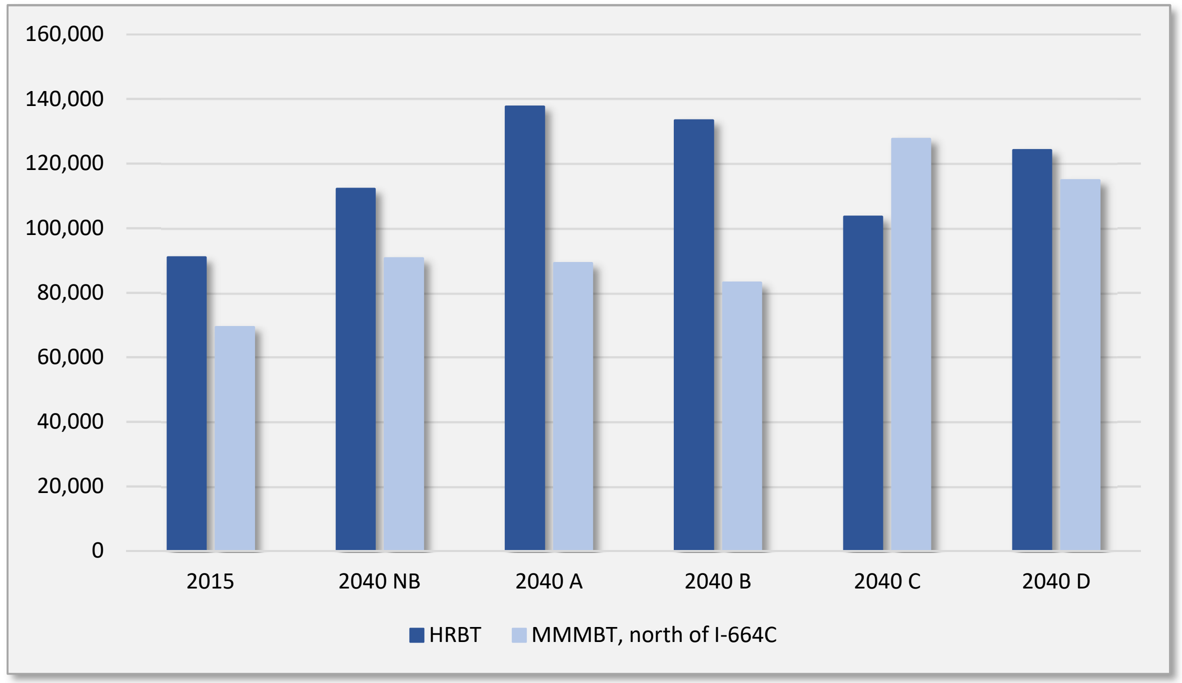


Table 5-2: 2040 Projected LOS at Key Roadway Segments

Roadway Segment	AM Peak											
	Eastbound						Westbound					
	Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D	Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D
HRBT	F	F	F	F	F	E	F	F	F	F	F	E
MMMBT	C	C	C	C	A	A	F	F	F	F	B	B
VA 164	C	D	D	C	C	B	B	C	C	B	B	B
VA 164C	-	-	-	C	A	A	-	-	-	B	A	A
I-564C	-	-	-	C	C	C	-	-	-	B	C	C
I-664C	-	-	-	-	C	C	-	-	-	-	C	B
Roadway Segment	**PM Peak**											
	Eastbound						**Westbound**					
	Existing	**2040 NB**	**2040 Alt A**	**2040 Alt B**	**2040 Alt C**	**2040 Alt D**	**Existing**	**2040 NB**	**2040 Alt A**	**2040 Alt B**	**2040 Alt C**	**2040 Alt D**
HRBT	F	F	F	F	F	E	F	F	F	D	F	D
MMMBT	F	F	F	F	B	B	C	F	F	F	A	A
VA 164	C	C	C	C	C	B	C	D	D	C	C	B
VA 164C	-	-	-	B	A	A	-	-	-	C	A	A
I-564C	-	-	-	B	C	C	-	-	-	C	D	C
I-664C	-	-	-	-	C	C	-	-	-	-	C	C

Figure 5-2 shows the mainline volume for each roadway segment along the Study Area Corridors for the Existing, 2040 No-Build, and 2040 Build Alternatives.

Figure 5-3 presents a summary of the projected mainline LOS. This summary is provided in the same format as the volume exhibit in **Figure 5-2**, and shows the projected mainline LOS as well as the projected LOS for each merge, diverge, and weaving area along all Study Area Corridors for each alternative. Mainline average travel speeds, which are the basis for summaries in **Table 5-3**, are presented in **Figure 5-4**.

Table 5-4 presents the intersection LOS for all ramp terminal intersections for the Existing, 2040 No-Build, and 2040 Build Alternatives.

Table 5-3: 2040 Estimated End-to-End Travel Times by Study Area Corridor

Segment	Direction	AM Peak Travel Time (minutes/vehicle)					
		Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D
I-64	Eastbound	18.3	20.2	18.8	18.6	18.7	17.1
	Westbound	17.3	20.3	17.3	17.2	18.0	15.9
I-664 (I-64 to VA 164)	Eastbound	15.1	15.0	15.0	14.9	13.9	13.8
	Westbound	16.3	19.5	18.4	18.8	14.4	14.4
I-664 (VA 164 to I-264)	Eastbound	7.7	7.9	7.8	7.8	7.6	7.6
	Westbound	7.9	8.1	8.1	8.1	7.8	7.8
VA 164	Eastbound	6.4	6.5	6.5	6.4	6.4	6.4
	Westbound	6.1	6.1	6.1	6.1	6.2	6.1
I-564; I-664 and I-564 Connectors	Eastbound	-	-	-	-	7.9	7.9
	Westbound	-	-	-	-	8.6	8.5
I-564; I-564 and VA 164 Connectors	Eastbound	-	-	-	10.5	10.4	10.3
	Westbound	-	-	-	10.2	9.9	9.8
Segment	**Direction**	**PM Peak Travel Time (minutes/vehicle)**					
		Existing	**2040 NB**	**2040 Alt A**	**2040 Alt B**	**2040 Alt C**	**2040 Alt D**
I-64	Eastbound	17.7	20.7	18.5	18.3	18.3	17.0
	Westbound	16.6	19.0	16.6	14.6	18.0	14.5
I-664 (I-64 to VA 164)	Eastbound	17.7	20.6	19.8	19.6	13.8	13.8
	Westbound	14.6	14.8	14.7	14.7	16.0	15.5
I-664 (VA 164 to I-264)	Eastbound	7.7	7.9	7.8	7.8	7.6	7.6
	Westbound	7.8	7.9	7.9	7.9	7.8	7.8
VA 164	Eastbound	6.4	6.4	6.4	6.3	6.3	6.3
	Westbound	6.1	6.2	6.1	6.2	6.2	6.2
I-564; I-664 and I-564 Connectors	Eastbound	-	-	-	-	9.3	9.3
	Westbound	-	-	-	-	8.1	8.1
I-564; I-564 and VA 164 Connectors	Eastbound	-	-	-	11.0	11.7	11.7
	Westbound	-	-	-	9.9	9.4	9.4

I-64 AM PEAK VOLUMES ALTERNATIVES COMPARISON

EASTBOUND

Cross Street	Length (not to scale)		Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D
I-664 NB	1810		3,270	4,200	4,570	4,490	3,910	4,270
	3150		4,085	5,060	5,425	5,335	4,755	5,055
LaSalle Avenue SB	455		3,555	4,510	5,010	4,805	4,260	4,645
LaSalle Avenue NB	1080	(merge)	3,625	4,610	5,130	4,920	4,360	4,765
	200	(merge)						
	1300		3,660	4,645	5,165	4,955	4,395	4,800
	200	(diverge)						
Rip Rap Rd	6790		2,580	3,475	3,880	3,785	3,180	3,545
	1500	(diverge)						
Tyler St / Settlers Landing Rd	1435	(lane drop)	1,915	2,650	3,240	3,080	2,405	2,835
	1900		2,780	3,530	4,350	4,150	3,205	3,875
S. Mallory St	1640		2,675	3,385	4,200	4,000	3,055	3,720
	1500	(merge)						
HRBT	16950		3,440	4,175	4,815	4,765	3,635	4,315
	1500	(diverge)						
Bayville St	200		3,410	4,135	4,775	4,725	3,595	4,275
	1500	(merge)						
	5770		3,480	4,205	4,845	4,795	3,665	4,345
	1500	(diverge)						
4th View St	2320		3,080	3,685	4,275	4,230	3,175	3,815
	1500	(merge)						
W. Bay Ave	3445		3,360	3,985	4,580	4,565	3,445	4,190
	1500	(merge)						
Patrol Rd	3740		3,660	4,290	4,875	4,865	3,700	4,425
	1730		4,020	4,650	5,240	5,225	4,060	4,785
I-564 / US 460			2,825	3,405	4,110	3,980	3,105	3,695
	1055	(diverge)						
I-564	1440	I-64 HOV	2,825	3,405	4,110	3,980	3,105	3,695
	1250	(merge)	3,710	4,350	5,440	5,445	4,880	5,445

WESTBOUND

Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D		Length (not to scale)	Cross Street
2,995	4,030	4,310	4,315	3,505	3,855		1140	I-664 SB
4,550	5,655	5,920	5,915	5,105	5,345		2360	
3,475	4,155	4,540	4,415	3,605	3,965		405	Armistead Ave EB/La Salle Ave
						(diverge)	1500	
3,545	4,260	4,675	4,545	3,715	4,100		645	Armistead Ave WB
						(diverge)	1500	
3,815	4,660	5,160	5,005	4,110	4,560		5685	
						(merge)	1500	
3,100	3,810	4,465	4,200	3,140	3,760		1310	Settlers Landing Rd
3,405	4,210	4,895	4,650	3,575	4,180		1835	
3,045	3,835	4,545	4,290	3,250	3,825	(lane add)	605	S. Mallory St
						(diverge)	1500	
3,370	4,250	4,975	4,690	3,605	4,255		18460	HRBT
						(merge)	1500	
3,320	4,185	4,910	4,625	3,540	4,190		190	W. Ocean View Ave
						(diverge)	1500	
3,330	4,195	4,920	4,635	3,550	4,200		5410	
						(merge)	1500	
2,885	3,670	4,345	4,035	3,080	3,710		2275	4th View St
						(diverge)	1500	
3,005	3,825	4,500	4,205	3,225	3,885		2590	W. Bay Ave
						(diverge)	1500	
3,465	4,390	5,045	4,715	3,795	4,420		1430	
						(merge)	1500	
3,110	4,030	4,520	4,185	3,405	3,975		1840	Granby St
						(merge)	1500	
2,370	2,965	3,525	3,150	2,465	2,995	I-64 HOV	1510	I-564 / US 460
						(diverge)	1500	
2,720	3,315	3,935	3,575	2,960	3,425		525	

I-64 PM PEAK VOLUMES ALTERNATIVES COMPARISON

EASTBOUND

Cross Street	Length (not to scale)		Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D
I-664 NB	1810		2,805	3,785	4,025	4,030	3,335	3,760
	3150		3,935	4,985	5,215	5,205	4,510	4,850
LaSalle Avenue SB	455		3,445	4,480	4,845	4,715	4,055	4,475
LaSalle Avenue NB	1080	(merge)	3,605	4,710	5,125	4,980	4,285	4,755
	200	(merge)						
	1300		3,645	4,750	5,170	5,020	4,325	4,795
	200	(diverge)						
Rip Rap Rd	6790		2,605	3,625	3,960	3,895	3,150	3,630
	1500	(diverge)						
Tyler St / Settlers Landing Rd	1435	(lane drop)	1,975	2,805	3,360	3,230	2,400	2,955
	1900		2,705	3,550	4,400	4,170	3,095	3,940
S. Mallory St	1640		2,640	3,450	4,285	4,060	2,980	3,825
	1500	(merge)						
HRBT	16950		3,445	4,285	4,970	4,865	3,575	4,475
	1500	(diverge)						
Bayville St	200		3,340	4,150	4,835	4,730	3,440	4,360
	1500	(merge)						
	5770		3,390	4,200	4,885	4,780	3,490	4,425
	1500	(diverge)						
4th View St	2320		2,955	3,630	4,260	4,160	2,960	3,840
	1500	(merge)						
W. Bay Ave	3445		3,120	3,810	4,430	4,345	3,115	4,080
	1500	(merge)						
Patrol Rd	3740		4,000	4,710	5,290	5,225	3,860	4,770
	1730		4,605	5,315	5,895	5,830	4,465	5,375
I-564 / US 460			3,915	4,655	5,265	5,160	3,970	4,780
	1055	(diverge)						
I-564	1440	I-64 HOV	2,760	3,345	3,730	3,645	2,740	3,330
	1250	(merge)	5,550	6,320	6,660	6,990	6,755	7,265

WESTBOUND

Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D		Length (not to scale)	Cross Street
3,470	4,370	4,695	4,700	4,065	4,470		1140	I-664 SB
4,205	5,145	5,460	5,460	4,825	5,180		2360	
3,320	3,925	4,345	4,240	3,605	4,045		405	Armistead Ave EB/La Salle Ave
						(diverge)	1500	
3,400	4,040	4,490	4,380	3,725	4,190		645	Armistead Ave WB
						(diverge)	1500	
3,710	4,500	5,025	4,910	4,180	4,695		5685	
						(merge)	1500	
2,970	3,520	4,140	3,965	3,150	3,700		1310	Settlers Landing Rd
3,455	4,150	4,825	4,685	3,840	4,350		1835	
2,950	3,615	4,365	4,180	3,365	3,875	(lane add)	605	S. Mallory St
						(diverge)	1500	
3,155	3,915	4,710	4,485	3,630	4,200		18460	HRBT
						(merge)	1500	
3,110	3,860	4,655	4,430	3,575	4,135		190	W. Ocean View Ave
						(diverge)	1500	
3,150	3,910	4,705	4,480	3,625	4,185		5410	
						(merge)	1500	
2,340	3,020	3,695	3,485	2,805	3,335		2275	4th View St
						(diverge)	1500	
2,450	3,160	3,825	3,640	2,935	3,490		2590	W. Bay Ave
						(diverge)	1500	
2,545	3,275	3,935	3,745	3,030	3,580		1430	
						(merge)	1500	
2,120	2,840	3,310	3,120	2,590	3,015		1840	Granby St
						(merge)	1500	
1,625	2,130	2,730	2,455	2,050	2,420	I-64 HOV	1510	I-564 / US 460
						(diverge)	1500	
1,985	2,490	3,150	2,890	2,560	2,860		525	

Notes
Peak hour mainline volumes
2015 volumes based on 2015 traffic count data

VDOT Virginia Department of Transportation
U.S. Department of Transportation Federal Highway Administration

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I-64 Alternatives Comparison Peak Hour Volumes

April 2017 | Figure 5-2.1

I-564 AM PEAK VOLUMES ALTERNATIVES COMPARISON

			EASTBOUND						WESTBOUND								
Cross Street	Length (not to scale)		Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D	Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D		Length (not to scale)	Cross Street
Bainbridge Ave/Bellinger Blvd	670		205	180	460	100	55	110	1,370	1,365	1,315	765	1,025	1,110		525	Bainbridge Ave/Bellinger Blvd
	1500	(merge)													(diverge)	1500	
Intermodal Connector (2040 NB and Build Alternatives)	3000			345	610	180	195	245		2,165	2,000	1,440	1,675	1,760		4675	Intermodal Connector (2040 NB and Build Alternatives)
	1500	(merge)	385												(diverge)	1500	
	1650			795	1,060	1,175	1,500	1,515	2,180								
	1500	(diverge)								2,855	2,690	3,475	3,990	4,005		1465	
Terminal Blvd	2530		285	575	880	955	1,385	1,380									Terminal Blvd
	350	(merge)							3,640	4,275	4,050	4,845	5,245	5,195		2995	
	700		970	1,050	1,435	1,610	1,920	1,900	3,040	3,305	3,300	3,930	4,470	4,430	(merge)	950	I-64 EB
	350	(diverge)							2,695	2,980	2,915	3,455	3,975	3,940		2260	US 460 NB
W Little Creek Rd	1450		885	945	1,330	1,465	1,775	1,750									

I-564 PM PEAK VOLUMES ALTERNATIVES COMPARISON

			EASTBOUND						WESTBOUND								
Cross Street	Length (not to scale)		Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D	Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D		Length (not to scale)	Cross Street
Bainbridge Ave/Bellinger Blvd	670		2,030	1,805	1,935	1,330	1,905	1,980	265	105	110	55	35	135		525	Bainbridge Ave/Bellinger Blvd
	1500	(merge)													(diverge)	1500	
Intermodal Connector (2040 NB and Build Alternatives)	3000			2,705	2,755	2,145	2,690	2,750		270	255	195	170	270		4675	Intermodal Connector (2040 NB and Build Alternatives)
	1500	(merge)	3,015												(diverge)	1500	
	1650			3,790	3,840	4,433	5,655	5,632	435								
	1500	(diverge)								645	630	980	1,085	1,105		1465	
Terminal Blvd	2530		2,370	3,175	3,240	3,588	4,900	4,767									Terminal Blvd
	350	(merge)							1,230	1,415	1,370	1,725	1,765	1,750		2995	
	700		3,945	4,315	4,510	5,088	6,120	5,957	900	955	1,015	1,295	1,400	1,390	(merge)	950	I-64 EB
	350	(diverge)							730	795	825	1,060	1,155	1,150		2260	US 460 NB
W Little Creek Rd	1450		3,675	3,980	4,175	4,623	5,645	5,472									

Notes

Peak hour mainline volumes

2015 volumes based on 2015 traffic count data

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS Hampton Roads Crossing Study SEIS

I-564 Alternatives Comparison Peak Hour Volumes

April 2017

Figure 5-2.2

I-664 AM PEAK VOLUMES ALTERNATIVES COMPARISON

Cross Street	Length (not to scale)	EASTBOUND Existing	EASTBOUND 2040 NB	EASTBOUND 2040 Alt A	EASTBOUND 2040 Alt B	EASTBOUND 2040 Alt C	EASTBOUND 2040 Alt D	WESTBOUND Existing	WESTBOUND 2040 NB	WESTBOUND 2040 Alt A	WESTBOUND 2040 Alt B	WESTBOUND 2040 Alt C	WESTBOUND 2040 Alt D	Length (not to scale)	Cross Street
I-64	1320	1,555	1,625	1,610	1,600	1,600	1,490	2,295	3,015	2,785	2,770	3,190	3,150	1085	I-64
	1500 (merge)													(diverge) 1500	
	1000	4,365	5,345	5,090	5,065	5,585	5,280	3,110	3,875	3,640	3,615	4,035	3,935	1425	
	1500 (diverge)													(merge) 1500	
Power Plant Pkwy/Powhatan Pkwy	1660	4,060	5,030	4,785	4,760	5,270	4,970	2,635	3,390	3,165	3,150	3,585	3,495	1945	Power Plant Pkwy/Powhatan Pkwy
	1500 (merge)													(diverge) 1500	
	1785	4,345	5,375	5,140	5,095	5,645	5,350	2,870	3,680	3,460	3,440	3,885	3,800	1965	
	1500 (diverge)													(merge) 1500	
Aberdeen Rd	1505	3,730	4,575	4,365	4,315	4,830	4,570	2,560	3,300	3,095	3,075	3,520	3,460	1300	Aberdeen Rd
	3040	3,985	4,945	4,725	4,665	5,260	4,960	2,785	3,625	3,410	3,380	3,865	3,775	2775	
Chestnut Ave/Roanoke Ave	2230	3,195	4,025	3,930	3,775	4,505	4,200	2,550	3,325	3,145	3,105	3,620	3,540	2020	Chestnut Ave/Roanoke Ave
	1500 (merge)													(diverge) 1500	
	300	3,280	4,175	4,050	3,890	4,680	4,330	2,670	3,505	3,325	3,275	3,880	3,700	450	
	1500 (diverge)													(merge) 1500	
35th St	1105	2,390	3,155	3,015	2,850	3,700	3,385	2,280	3,105	2,900	2,850	3,470	3,300	1565	35th St/36th St
	1500 (diverge)														
26th St	2090	1,740	2,200	2,055	1,930	2,695	2,455	3,140	4,040	3,880	3,765	4,685	4,495	945	
35th St								2,920	3,745	3,600	3,490	4,320	4,170	2410	US 60
US 60	1475 (merge)	2,190	2,755	2,560	2,455	3,265	3,035								
	1100 (merge)													(diverge) 1500	
	410	2,325	2,975	2,770	2,630	3,570	3,335	3,265	4,225	4,120	3,965	5,020	4,870	360	
	1100 (diverge)													(merge) 1500	
Terminal Ave	585	2,240	2,870	2,725	2,545	3,525	3,290	3,245	4,160	4,105	3,945	5,005	4,855	1690	Terminal Ave
Terminal Ave	1005 (lane drop)														
	1500 (merge)													(diverge) 1500	
MMMBT						3,580	3,345					5,095	4,945		MMMBT
I-664 Connector (Build Alternatives C and D)	26460	2,290	2,960	2,760	2,595	2,285	2,365	3,325	4,310	4,175	4,025	3,900	4,045	27835	I-664 Connector (Build Alternatives C and D)
MMMBT						3,305	3,300					4,990	5,040		MMMBT
	1500 (diverge)													(merge) 1500	
College Dr NB	220	2,120	2,720	2,500	2,350	2,955	2,970	2,850	3,650	3,470	3,385	4,265	4,310	640	College Dr NB
	1820	2,305	2,980	2,775	2,610	3,230	3,245	3,020	3,930	3,740	3,665	4,545	4,590	1695	
College Dr SB	630	1,980	2,555	2,295	2,175	2,730	2,745	2,885	3,735	3,535	3,470	4,310	4,355	500	College Dr SB
	1500 (merge)													(diverge) 1500	
MATCHLINE A	1600	2,105	2,755	2,490	2,375	2,945	2,960	3,485	4,590	4,435	4,330	5,055	5,095	1310	MATCHLINE A

I-664 AM PEAK VOLUMES ALTERNATIVES COMPARISON (CONTINUED)

Cross Street	Length (not to scale)	EASTBOUND Existing	EASTBOUND 2040 NB	EASTBOUND 2040 Alt A	EASTBOUND 2040 Alt B	EASTBOUND 2040 Alt C	EASTBOUND 2040 Alt D	WESTBOUND Existing	WESTBOUND 2040 NB	WESTBOUND 2040 Alt A	WESTBOUND 2040 Alt B	WESTBOUND 2040 Alt C	WESTBOUND 2040 Alt D	Length (not to scale)	Cross Street
MATCHLINE A	1600	2,105	2,755	2,490	2,375	2,945	2,960	3,485	4,590	4,435	4,330	5,055	5,095	1310	MATCHLINE A
	1500 (diverge)													(merge) 1500	
VA 164	1235	1,380	1,875	1,675	1,390	2,125	2,100	2,795	3,780	3,670	3,400	4,500	4,495	1140	VA 164 WB
	1500 (merge)							3,260	4,370	4,360	4,075	5,190	5,185	1715	
US 17	740	1,885	2,510	2,295	2,110	2,585	2,555	2,955	3,885	3,885	3,625	4,425	4,405	510	US 17/VA 164 EB
	1500 (merge)														
	700	2,855	3,705	3,615	3,445	3,955	3,915	3,720	4,855	4,860	4,710	5,270	5,230	1715	
	1500 (diverge)														
								3,315	4,285	4,280	4,130	4,690	4,650	(merge) 1500	Pughsville Rd WB
Pughsville Rd	2525	2,370	2,995	2,870	2,725	3,170	3,120	3,205	4,100	4,105	3,940	4,485	4,445	1000	Pughsville Rd EB
	1500 (merge)													(diverge) 1500	
	5140	3,150	4,020	3,890	3,720	4,195	4,135	3,710	4,725	4,755	4,555	5,120	5,065	5350	
	1500 (diverge)													(merge) 1500	
Portsmouth Blvd WB	600	2,870	3,615	3,490	3,315	3,770	3,710	3,465	4,385	4,425	4,220	4,770	4,715	520	Portsmouth Blvd WB
	1700	3,160	4,010	3,875	3,700	4,140	4,075	3,615	4,595	4,645	4,440	4,980	4,925	1680	
Portsmouth Blvd EB	480	2,935	3,695	3,565	3,390	3,815	3,750	3,455	4,365	4,415	4,210	4,730	4,680	575	Portsmouth Blvd EB
	1500 (merge)	3,225	4,110	3,975	3,805	4,230	4,165							(diverge) 1500	
								3,795	4,825	4,880	4,670	5,160	5,110	200	
	1500 (diverge)													(merge) 1500	
Dock Landing Rd	2550	3,100	3,855	3,705	3,535	3,920	3,855	3,380	4,245	4,290	4,075	4,545	4,495	2555	Dock Landing Rd
	1500 (merge)													(diverge) 1500	
	725	3,525	4,385	4,225	4,040	4,385	4,320	3,530	4,495	4,560	4,335	4,770	4,710	1180	
	1500 (diverge)													(merge) 1500	
US 58 SB	480	2,870	3,515	3,320	3,105	3,365	3,305	3,255	3,975	4,060	3,835	4,185	4,140	410	US 58 SB
	2045	2,900	3,555	3,360	3,145	3,395	3,335							(merge) 1500	
US 58 NB	1260	2,670	3,225	3,030	2,820	3,020	2,965	2,550	3,010	3,070	2,850	3,170	3,125	1225	US 58 NB
	490 (merge)														
	1020	5,120	6,215	6,025	5,745	5,890	5,795	4,095	4,780	4,840	4,525	4,605	4,565	4675	
	490 (diverge)														
S Military Hwy	1500 (diverge)	4,810	5,595	5,425	5,155	5,250	5,185								
I-64 SB	3435	1,870	2,300	1,980	1,870	1,880	1,860	1,195	1,295	1,205	1,195	1,180	1,160	2135	I-64 NB

Notes

Peak hour mainline volumes

2015 volumes based on 2015 traffic count data

HRCS SEIS

Hampton Roads Crossing Study SEIS

I-664 Alternatives Comparison AM Peak Hour Volumes

April 2017

Figure 5-2.3

I-664 PM PEAK VOLUMES ALTERNATIVES COMPARISON

Cross Street	Length (not to scale)	EASTBOUND						WESTBOUND						Length (not to scale)	Cross Street
		Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D	Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D		
I-64	1320	735	775	765	760	760	710	3,500	4,470	4,255	4,235	4,880	4,620	1085	I-64
	1500 (merge)													(diverge) 1500	
	1000	2,510	3,165	2,960	2,945	3,275	3,100	4,630	5,670	5,445	5,410	6,055	5,710	1425	
	1500 (diverge)													(merge) 1500	
Power Plant Pkwy/Powhatan Pkwy	1660	2,030	2,665	2,465	2,465	2,775	2,595	4,190	5,225	5,005	4,980	5,605	5,255	1945	Power Plant Pkwy/Powhatan Pkwy
	1500 (merge)													(diverge) 1500	
	1785	2,275	2,960	2,780	2,750	3,100	2,925	4,630	5,745	5,560	5,525	6,180	5,825	1965	
	1500 (diverge)													(merge) 1500	
Aberdeen Rd	1505	1,900	2,490	2,330	2,295	2,605	2,445	4,140	5,120	4,955	4,945	5,480	5,140	1300	Aberdeen Rd
	3040	2,135	2,810	2,665	2,615	2,990	2,790	4,435	5,520	5,365	5,345	5,890	5,515	2775	
Chestnut Ave/Roanoke Ave	2230	1,840	2,445	2,365	2,285	2,675	2,470	3,905	4,855	4,775	4,755	5,280	4,925	2020	Chestnut Ave/Roanoke Ave
	1500 (merge)													(diverge) 1500	
	300	1,940	2,600	2,515	2,435	2,975	2,640	3,990	4,975	4,900	4,875	5,465	5,070	450	
	1500 (diverge)													(merge) 1500	
35th St	1105	1,660	2,275	2,185	2,105	2,650	2,315	2,805	3,770	3,660	3,635	4,265	3,835	1565	35th St/36th St
	1500 (diverge)														
26th St	2090	1,290	1,745	1,675	1,585	2,075	1,785	3,360	4,360	4,305	4,240	5,020	4,565	945	
35th St								2,650	3,365	3,290	3,260	3,915	3,500	2410	US 60
US 60	1475 (merge)	1,710	2,265	2,170	2,075	2,670	2,385								
	1100 (merge)													(diverge) 1500	
	410	2,505	3,265	3,440	3,150	4,200	3,880	2,745	3,495	3,450	3,395	4,125	3,705	360	
	1100 (diverge)													(merge) 1500	
Terminal Ave	585	2,480	3,235	3,425	3,125	4,185	3,865	2,690	3,430	3,400	3,340	4,075	3,655	1690	Terminal Ave
Terminal Ave	1005 (lane drop)														
	1500 (merge)													(diverge) 1500	
MMMBT						4,640	4,320					4,125	3,705		MMMBT
I-664 Connector (Build Alternatives C and D)	26460	3,195	4,150	3,940	3,840	3,370	3,235	2,745	3,530	3,450	3,395	2,795	2,780	27835	I-664 Connector (Build Alternatives C and D)
MMMBT						4,475	4,555					3,920	3,860		MMMBT
	1500 (diverge)													(merge) 1500	
College Dr NB	220	3,100	4,015	3,795	3,705	4,250	4,340	2,360	2,995	2,875	2,875	3,285	3,220	640	College Dr NB
	1820	3,590	4,710	4,530	4,405	4,985	5,070	2,450	3,145	3,020	3,025	3,435	3,370	1695	
College Dr SB	630	3,195	4,165	3,960	3,875	4,335	4,435	2,345	2,995	2,860	2,875	3,250	3,185	500	College Dr SB
	1500 (merge)													(diverge) 1500	
MATCHLINE A	1600	3,365	4,435	4,225	4,145	4,615	4,715	2,560	3,300	3,180	3,185	3,570	3,505	1310	MATCHLINE A

I-664 PM PEAK VOLUMES ALTERNATIVES COMPARISON (CONTINUED)

Cross Street	Length (not to scale)	EASTBOUND						WESTBOUND						Length (not to scale)	Cross Street
		Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D	Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D		
MATCHLINE A	1600	3,365	4,435	4,225	4,145	4,615	4,715	2,560	3,300	3,180	3,185	3,570	3,505	1310	MATCHLINE A
	1500 (diverge)	3,365	4,435	4,225	4,145	4,615	4,715	2,560	3,300	3,180	3,185	3,570	3,505	(merge) 1500	
VA 164	1235	2,275	3,050	2,915	2,655	3,300	3,350	1,680	2,275	2,210	2,005	2,740	2,615	1140	VA 164 WB
	1500 (merge)	2,785	3,695	3,540	3,385	3,765	3,810	2,195	2,940	2,975	2,750	3,515	3,390	1715	
US 17	740	2,785	3,695	3,540	3,385	3,765	3,810	2,100	2,790	2,825	2,610	3,275	3,145	510	US 17/VA 164 EB
	1500 (merge)	3,670	4,790	4,735	4,600	5,105	5,140								
	700	3,670	4,790	4,735	4,600	5,105	5,140	2,820	3,710	3,730	3,610	4,110	3,965	1715	
	1500 (diverge)	3,670	4,790	4,735	4,600	5,105	5,140								
								2,525	3,290	3,305	3,185	3,685	3,540	(merge) 1500	Pughsville Rd WB
Pughsville Rd	2525	2,930	3,710	3,655	3,540	3,950	3,975								
								2,440	3,150	3,170	3,040	3,530	3,385	1000	Pughsville Rd EB
	1500 (merge)	3,310	4,205	4,135	4,020	4,465	4,485	3,125	4,010	3,995	3,865	4,400	4,235	(diverge) 1500	
	5140	3,310	4,205	4,135	4,020	4,465	4,485	3,125	4,010	3,995	3,865	4,400	4,235	5350	
	1500 (diverge)	3,310	4,205	4,135	4,020	4,465	4,485	3,125	4,010	3,995	3,865	4,400	4,235	(merge) 1500	
Portsmouth Blvd WB	600	3,095	3,895	3,825	3,710	4,140	4,160	2,840	3,610	3,605	3,470	3,990	3,825	520	Portsmouth Blvd WB
	1700	3,505	4,455	4,375	4,255	4,660	4,675	3,110	3,990	3,975	3,845	4,360	4,195	1680	
Portsmouth Blvd EB	480	3,195	4,020	3,970	3,845	4,210	4,225	2,935	3,740	3,725	3,595	4,085	3,930	575	Portsmouth Blvd EB
	1500 (merge)							3,450	4,440	4,385	4,280	4,725	4,570	(diverge) 1500	
		3,370	4,270	4,215	4,095	4,470	4,485	3,450	4,440	4,385	4,280	4,725	4,570	200	
	1500 (diverge)							3,450	4,440	4,385	4,280	4,725	4,570	(merge) 1500	
Dock Landing Rd	2550	3,155	3,865	3,810	3,680	3,970	3,985	3,275	4,195	4,135	4,025	4,465	4,310	2555	Dock Landing Rd
	1500 (merge)	3,325	4,075	4,005	3,880	4,175	4,190	3,550	4,630	4,550	4,450	4,865	4,695	(diverge) 1500	
	725	3,325	4,075	4,005	3,880	4,175	4,190	3,550	4,630	4,550	4,450	4,865	4,695	1180	
	1500 (diverge)	3,325	4,075	4,005	3,880	4,175	4,190	3,550	4,630	4,550	4,450	4,865	4,695	(merge) 1500	
US 58 SB	480	2,575	3,080	2,985	2,830	3,005	3,030	3,265	4,095	4,035	3,935	4,260	4,105	410	US 58 SB
	2045	2,600	3,115	3,020	2,865	3,030	3,055	3,265	4,095	4,035	3,935	4,260	4,105	(merge) 1500	
US 58 NB	1260	2,415	2,850	2,775	2,620	2,725	2,760	2,675	3,290	3,210	3,115	3,415	3,260	1225	US 58 NB
	490 (merge)	3,890	4,640	4,550	4,370	4,470	4,480								
	1020	3,890	4,640	4,550	4,370	4,470	4,480	5,185	6,170	5,980	5,820	5,750	5,605	4675	
	490 (diverge)	3,890	4,640	4,550	4,370	4,470	4,480								
S Military Hwy	1500 (diverge)	3,575	4,075	4,025	3,845	3,845	3,885								
I-64 SB	3435	1,350	1,565	1,385	1,350	1,275	1,350	2,210	2,640	2,315	2,285	2,280	2,160	2135	I-64 NB

Notes

Peak hour mainline volumes

2015 volumes based on 2015 traffic count data

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS Hampton Roads Crossing Study SEIS

I-664 Alternatives Comparison PM Peak Hour Volumes

April 2017

Figure 5-2.4

VA 164 AM PEAK VOLUMES ALTERNATIVES COMPARISON

Cross Street	Length (not to scale)		EASTBOUND						WESTBOUND							Length (not to scale)	Cross Street
			Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D	Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D			
US 17/Bridge Rd	2600		1,140	1,710	1,720	2,070	2,030	2,060	725	965	1,080	1,115	1,065	1,070		1670	I-664 SB
	2680		1,300	1,900	1,890	2,240	2,220	2,250	1,230	1,600	1,700	1,835	1,525	1,525		1610	
I-664	1460		995	1,415	1,415	1,790	1,455	1,470	765	1,010	1,010	1,160	835	835		970	I-664 NB
	1500	(merge)													(diverge)	1500	
College Dr	585		2,095	2,750	2,685	3,325	2,505	2,550	1,455	1,820	1,775	2,090	1,390	1,435		1025	College Dr
	1500	(merge)													(diverge)	1500	
	1290		2,365	3,115	3,040	3,705	2,835	2,890	1,860	2,350	2,290	2,650	1,865	1,935		1270	
	1500	(diverge)													(merge)	1500	
Towne Point Rd	2000		2,100	2,780	2,705	3,355	2,505	2,550	1,345	1,690	1,605	2,010	1,295	1,355		1970	Towne Point Rd
	1500	(merge)													(diverge)	1500	
	1400		2,690	3,455	3,340	4,055	3,080	3,135	1,570	1,965	1,845	2,285	1,535	1,595		1315	
	1500	(diverge)													(merge)	1500	
Cedar Ln SB (Existing and 2040 NB)	1135		1,915	2,385	2,280				1,095	1,305	1,220	1,610	965	1,010		1140	Cedar Ln
	1500	(merge)				3,045	2,220	2,240							(diverge)	1500	
Cedar Ln NB (Existing and 2040 NB)	110		2,115	2,630	2,570							1,925	1,305	1,355			
	1000	(merge)							1,365	1,640	1,515	835	805	805		1300	Craney Island Connector (Build Alternatives)
Craney Island Connector (Build Alternatives)	500		2,190	2,765	2,710												
	1000	(diverge)													(merge)	1000	
Virginia International Gateway Blvd (Existing and 2040 NB)	2245		2,045	2,590	2,565	2,020	1,705	1,710	1,270	1,545	1,435	800	755	755		2330	Virginia International Gateway Blvd
	1025	(merge)													(diverge)	1225	
Craney Island Connector (Build Alternatives)	475		2,160	2,710	2,710				1,415	1,725	1,615	1,955	1,350	1,405		275	
	1025	(diverge)				2,825	2,705	2,715							(merge)	1225	
W. Norfolk Rd	625		2,090	2,610	2,610	2,610	2,610	2,610	1,315	1,605	1,485	1,565	1,235	1,300		810	W Norfolk Rd
	1500	(merge)													(diverge)	1500	
																1710	
	1245		2,475	3,170	3,160	3,005	2,960	2,885									
									1,405	1,740	1,650	1,675	1,345	1,395	(lane drop)	415	
	2330	(lane add)														1585	
	1500	(lane drop)													(merge)	1500	
(diverge)	1375	US 58 EB	1,725	2,340	2,370	2,255	2,430	2,440	710	920	865	980	810	950	(merge)	1050	US 58 SB
Lee Ave/Railroad Ave	1500	US 58 WB	1,275	1,845	1,875	1,695	1,870	1,870	505	670	615	730	560	700		1765	Railroad Ave/US 58 NB
Lee Ave / Harper Ave	1500	(merge)	1,585	2,205	2,230	2,005	2,165	2,135	1,325	1,530	1,470	1,565	1,270	1,335		3150	
	1830		1,655	2,310	2,335	2,110	2,270	2,240	730	935	875	970	675	740		500	London Blvd

VA 164 PM PEAK VOLUMES ALTERNATIVES COMPARISON

Cross Street	Length (not to scale)		EASTBOUND						WESTBOUND							Length (not to scale)	Cross Street
			Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D	Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D			
US 17/Bridge Rd	2600		595	885	900	1,125	1,105	1,120	1,230	1,690	1,785	1,955	1,795	1,805		1670	I-664 SB
	2680		710	1,025	1,020	1,245	1,240	1,255	1,740	2,335	2,410	2,685	2,260	2,265		1610	
I-664	1460		615	875	870	1,105	1,000	1,010	1,225	1,670	1,645	1,940	1,485	1,490		970	I-664 NB
	1500	(merge)													(diverge)	1500	
College Dr	585		1,735	2,225	2,140	2,650	1,975	2,030	2,105	2,695	2,615	3,120	2,315	2,380		1025	College Dr
	1500	(merge)													(diverge)	1500	
	1290		2,150	2,790	2,700	3,240	2,500	2,570	2,635	3,390	3,270	3,860	2,930	3,025		1270	
	1500	(diverge)													(merge)	1500	
Towne Point Rd	2000		1,575	2,050	1,960	2,475	1,780	1,830	2,280	2,965	2,825	3,445	2,550	2,640		1970	Towne Point Rd
	1500	(merge)													(diverge)	1500	
	1400		1,935	2,450	2,340	2,885	2,130	2,185	2,915	3,670	3,490	4,240	3,220	3,310		1315	
	1500	(diverge)													(merge)	1500	
Cedar Ln SB (Existing and 2040 NB)	1135		1,425	1,765	1,660				2,425	3,020	2,850	3,575	2,615	2,690		1140	Cedar Ln
	1500	(merge)				2,190	1,560	1,580							(diverge)	1500	
Cedar Ln NB (Existing and 2040 NB)	110		1,550	1,920	1,845							3,925	2,985	3,065			
	1000	(merge)							2,745	3,380	3,190	2,750	2,355	2,445		1300	Craney Island Connector (Build Alternatives)
Craney Island Connector (Build Alternatives)	500		1,610	2,025	1,955												
	1000	(diverge)													(merge)	1000	
Virginia International Gateway Blvd (Existing and 2040 NB)	2245		1,570	1,975	1,915	1,435	1,085	1,100	2,655	3,270	3,095	2,670	2,270	2,355		2330	Virginia International Gateway Blvd
	1025	(merge)													(diverge)	1225	
Craney Island Connector (Build Alternatives)	475		1,670	2,105	2,045				2,710	3,335	3,160	3,490	2,770	2,805		275	
	1025	(diverge)				2,590	1,960	1,960							(merge)	1225	
W. Norfolk Rd	625		1,575	1,975	1,915	2,245	1,850	1,845	2,630	3,235	3,050	3,205	2,665	2,695		810	W Norfolk Rd
	1500	(merge)													(diverge)	1500	
																1710	
	1245		1,705	2,170	2,115	2,380	2,005	1,975									
									2,860	3,565	3,380	3,445	2,890	2,870	(lane drop)	415	
	2330	(lane add)														1585	
	1500	(lane drop)													(merge)	1500	
(diverge)	1375	US 58 EB	920	1,300	1,285	1,595	1,455	1,510	1,735	2,250	2,120	2,320	2,030	2,150	(merge)	1050	US 58 SB
Lee Ave/Railroad Ave	1500	US 58 WB	720	1,080	1,065	1,345	1,205	1,260	1,430	1,875	1,745	1,945	1,655	1,775		1765	Railroad Ave/US 58 NB
Lee Ave / Harper Ave	1500	(merge)	1,065	1,480	1,460	1,690	1,535	1,550	1,925	2,385	2,255	2,445	2,080	2,155		3150	
	1830		1,175	1,635	1,615	1,845	1,690	1,705	460	920	790	980	615	690		500	London Blvd

Notes

Peak hour mainline volumes
2015 volumes based on 2015 traffic count data

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS
Hampton Roads Crossing Study SEIS

VA 164 Alternatives Comparison Peak Hour Volumes

April 2017 | Figure 5-2.5

JAMES RIVER CONNECTORS AM PEAK VOLUMES ALTERNATIVE B

Cross Street	Length (not to scale)		WESTBOUND 2040 Alt B	EASTBOUND 2040 Alt B		Length (not to scale)	Cross Street
	3675		2,035	995		3615	
	1500	(diverge)			(merge)	1500	
Hampton Blvd	2850		1,070	755		2970	Hampton Blvd
	1500	(merge)			(diverge)	1500	
	16540		1,650	2,155		17390	
	1500	(diverge)			(merge)	1500	
Future Craney Island Access	2700		1,545	2,040		2000	Future Craney Island Access
	1500	(merge)			(diverge)	1500	
	5350		1,565	2,085		5050	
					(merge)	1500	
				1,165	VA 164 EB	1100	

JAMES RIVER CONNECTORS AM PEAK VOLUMES ALTERNATIVES C & D

Cross Street	Length (not to scale)		WESTBOUND 2040 Alt C	WESTBOUND 2040 Alt D	EASTBOUND 2040 Alt C	EASTBOUND 2040 Alt D		Length (not to scale)	Cross Street
	3675		2,315	2,245	1,305	1,270		3615	
	1500	(diverge)					(merge)	1500	
Hampton Blvd	2850		1,545	1,495	925	885		2970	Hampton Blvd
	1500	(merge)					(diverge)	1500	
	5450		2,440	2,400	2,560	2,505		5730	
	1500	(diverge)					(merge)	1500	
Craney Island Connector	4135		1,775	1,565	1,900	1,565		3660	Craney Island Connector
	1500	(merge)					(diverge)	1500	
	6300		2,215	1,835	2,385	1,975		5285	

Craney Island Connector

Cross Street	Length (not to scale)		SOUTHBOUND 2040 Alt C	SOUTHBOUND 2040 Alt D	NORTHBOUND 2040 Alt C	NORTHBOUND 2040 Alt D		Length (not to scale)	Cross Street
	7095		1,150	1,245	1,100	1,210		9410	
	1500	(diverge)					(merge)	1500	
Future Craney Island Access	2700		1,015	1,090	1,025	1,115		2000	Future Craney Island Access
	1500	(merge)					(diverge)	1500	
	5350		1,050	1,100	1,045	1,130		5050	
							(merge)	1500	
					605	675	VA 164 EB	1100	

JAMES RIVER CONNECTORS PM PEAK VOLUMES ALTERNATIVE B

Cross Street	Length (not to scale)		WESTBOUND 2040 Alt B	EASTBOUND 2040 Alt B		Length (not to scale)	Cross Street
	3675		785	2,280		3615	
	1500	(diverge)			(merge)	1500	
Hampton Blvd	2850		560	1,050		2970	Hampton Blvd
	1500	(merge)			(diverge)	1500	
	16540		2,145	1,680		17390	
	1500	(diverge)			(merge)	1500	
Future Craney Island Access	2700		2,045	1,595		2000	Future Craney Island Access
	1500	(merge)			(diverge)	1500	
	5350		2,070	1,600		5050	
					(merge)	1500	
				865	VA 164 EB	1100	

JAMES RIVER CONNECTORS PM PEAK VOLUMES ALTERNATIVES C & D

Cross Street	Length (not to scale)		WESTBOUND 2040 Alt C	WESTBOUND 2040 Alt D	EASTBOUND 2040 Alt C	EASTBOUND 2040 Alt D		Length (not to scale)	Cross Street
	3675		915	835	2,965	2,880		3615	
	1500	(diverge)					(merge)	1500	
Hampton Blvd	2850		770	695	1,735	1,630		2970	Hampton Blvd
	1500	(merge)					(diverge)	1500	
	5450		2,815	2,735	2,645	2,525		5730	
	1500	(diverge)					(merge)	1500	
Craney Island Connector	4135		2,120	1,925	1,875	1,775		3660	Craney Island Connector
	1500	(merge)					(diverge)	1500	
	6300		2,435	2,245	2,395	2,165		5285	

Craney Island Connector

Cross Street	Length (not to scale)		SOUTHBOUND 2040 Alt C	SOUTHBOUND 2040 Alt D	NORTHBOUND 2040 Alt C	NORTHBOUND 2040 Alt D		Length (not to scale)	Cross Street
	7095		1,215	1,200	1,085	1,070		9410	
	1500	(diverge)					(merge)	1500	
Future Craney Island Access	2700		1,160	1,125	985	960		2000	Future Craney Island Access
	1500	(merge)					(diverge)	1500	
	5350		1,175	1,140	1,025	980		5050	
							(merge)	1500	
					570	520	VA 164 EB	1100	

Notes

Peak hour mainline volumes

2015 volumes based on 2015 traffic count data

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS Hampton Roads Crossing Study SEIS

Elizabeth River Crossing Alternatives Comparison Peak Hour Volumes

April 2017

Figure 5-2.6

I-64 AM PEAK LOS ALTERNATIVES COMPARISON

EASTBOUND

Cross Street	Length (not to scale)		Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D
I-664 NB	1810		C	D	D	D	C	D
	3150		E	F	F	F	E	F
LaSalle Avenue SB	455		C	D	D	D	D	D
LaSalle Avenue NB	1080	(merge)	C	D	E	D	D	D
	200	(merge)	C	D	E	D	D	D
	1300		C	D	E	D	D	D
	200	(diverge)	C	D	D	D	D	D
Rip Rap Rd	6790		B	C	C	C	C	C
	1500	(diverge)	B	C	C	C	C	C
Tyler St / Settlers Landing Rd	1435	(lane drop)	C	E	C	C	C	B
	1900		E	F	D	D	F	D
S. Mallory St	1640		F	F	D	C	F	C
	1500	(merge)	F	F	F	E	F	D
HRBT	16950		F	F	F	F	F	E
	1500	(diverge)	D	D	D	D	D	C
Bayville St	200		D	D	D	D	D	D
	1500	(merge)	D	D	D	D	D	D
	5770		D	D	D	D	D	D
	1500	(diverge)	D	D	D	D	D	D
4th View St	2320		D	C	C	C	C	C
	1500	(merge)	D	D	D	D	D	C
W. Bay Ave	3445		D	D	D	D	D	D
	1500	(merge)	D	D	D	D	D	D
Patrol Rd	3740		D	D	D	D	D	D
	1730		D	D	F	F	C	E
I-564 / US 460	1055	(diverge)	C	D	F	F	D	F
I-564	1440	I-64 HOV	C	C	F	F	C	F
	1250	(merge)	E	E	F	F	F	F

WESTBOUND

Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D		(not to scale) Length (not to scale)	Cross Street
B	C	C	C	B	C		1140	I-664 SB
F	F	F	F	F	F		2360	
C	C	D	F	C	C		405	Armistead Ave EB/La Salle Ave
C	C	D	F	C	C	(diverge)	1500	
C	C	D	D	C	C		645	Armistead Ave WB
C	C	D	D	C	D	(diverge)	1500	
C	C	D	D	C	D		5685	
C	C	D	D	C	D	(merge)	1500	
C	C	D	D	B	C		1310	Settlers Landing Rd
B	B	D	D	B	C		1835	
B	B	D	D	B	C	(lane add)	605	S. Mallory St
D	D	D	D	D	C	(diverge)	1500	
F	F	F	F	F	E		18460	HRBT
F	F	F	D	F	D	(merge)	1500	
F	F	E	D	F	D		190	W. Ocean View Ave
F	F	D	D	F	C	(diverge)	1500	
D	F	D	D	E	D		5410	
D	F	D	D	E	C	(merge)	1500	
D	F	D	C	D	C		2275	4th View St
D	F	D	C	D	C	(diverge)	1500	
D	E	D	D	D	C		2590	W. Bay Ave
E	F	D	D	E	D	(diverge)	1500	
D	E	D	D	E	D		1430	
E	E	D	D	E	D	(merge)	1500	
D	E	D	D	D	C		1840	Granby St
D	E	F	E	D	E	(merge)	1500	
C	D	F	D	C	D	I-64 HOV	1510	I-564 / US 460
C	D	E	E	D	E	(diverge)	1500	
D	D	E	E	D	D		525	

I-64 PM PEAK LOS ALTERNATIVES COMPARISON

EASTBOUND

Cross Street	Length (not to scale)		Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D
I-664 NB	1810		B	C	C	C	C	C
	3150		F	F	F	F	F	F
LaSalle Avenue SB	455		C	D	D	D	C	D
LaSalle Avenue NB	1080	(merge)	C	D	D	D	D	D
	200	(merge)	C	D	E	D	D	D
	1300		C	D	E	D	D	D
	200	(diverge)	C	D	D	D	D	D
Rip Rap Rd	6790		B	C	C	C	C	C
	1500	(diverge)	B	C	C	C	C	C
Tyler St / Settlers Landing Rd	1435	(lane drop)	C	E	C	C	C	C
	1900		C	F	D	D	E	C
S. Mallory St	1640		E	F	D	C	F	C
	1500	(merge)	F	F	F	F	F	D
HRBT	16950		F	F	F	F	F	E
	1500	(diverge)	D	D	D	D	D	D
Bayville St	200		D	D	D	D	D	D
	1500	(merge)	D	D	D	D	D	D
	5770		D	D	D	D	D	D
	1500	(diverge)	D	D	D	D	D	D
4th View St	2320		C	C	C	C	C	C
	1500	(merge)	D	D	D	D	C	C
W. Bay Ave	3445		D	D	D	D	C	C
	1500	(merge)	E	F	D	D	E	D
Patrol Rd	3740		D	F	E	E	D	D
	1730		D	D	F	F	C	F
I-564 / US 460	1055	(diverge)	E	F	F	F	E	F
I-564	1440	I-64 HOV	C	C	D	D	C	D
	1250	(merge)	F	F	F	F	F	F

WESTBOUND

Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D		(not to scale) Length (not to scale)	Cross Street
C	C	D	D	C	D		1140	I-664 SB
C	D	E	E	D	E		2360	
C	C	D	D	C	C		405	Armistead Ave EB/La Salle Ave
C	C	D	D	C	D	(diverge)	1500	
C	C	D	D	C	D		645	Armistead Ave WB
C	C	D	D	C	D	(diverge)	1500	
C	C	D	D	C	D		5685	
C	C	D	D	C	D	(merge)	1500	
C	C	D	C	B	C		1310	Settlers Landing Rd
C	C	D	D	C	C		1835	
C	C	D	D	C	C	(lane add)	605	S. Mallory St
D	D	D	D	D	D	(diverge)	1500	
F	F	F	D	F	D		18460	HRBT
D	F	D	D	F	D	(merge)	1500	
D	F	D	D	F	D		190	W. Ocean View Ave
D	F	D	D	F	C	(diverge)	1500	
D	F	D	D	F	C		5410	
D	F	D	D	E	C	(merge)	1500	
C	E	C	C	D	C		2275	4th View St
C	D	C	C	D	C	(diverge)	1500	
C	D	C	C	D	C		2590	W. Bay Ave
C	D	C	C	D	C	(diverge)	1500	
C	D	C	C	D	C		1430	
C	D	C	C	D	C	(merge)	1500	
C	D	C	C	C	C		1840	Granby St
C	D	D	D	C	D	(merge)	1500	
B	C	C	C	C	C	I-64 HOV	1510	I-564 / US 460
C	C	D	D	C	D	(diverge)	1500	
C	C	D	D	C	D		525	

Legend

Basic Segment Density (pc/mi/ln)	LOS	Merge, Diverge, Weave Density (pc/mi/ln)	LOS
≤11	A	≤10	A
>11-18	B	>10-20	B
>18-26	C	>20-28	C
>26-35	D	>28-35	D
>35-45	E	>35	E
>45; Demand exceeds capacity	F	Demand exceeds capacity	F

Notes

Level of Service (LOS) evaluated using HCS Freeway Facilities module

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS
Hampton Roads Crossing Study SEIS

I-64 Alternatives Comparison Level of Service

April 2017

Figure 5-3.1

I-564 AM PEAK LOS ALTERNATIVES COMPARISON

EASTBOUND

Cross Street	Length (not to scale)		Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D
Bainbridge Ave/Bellinger Blvd	670		A	A	A	A	A	A
	1500	(merge)	A	A	A	A	A	A
Intermodal Connector (2040 NB and Build Alternatives)	3000			A	A	A	A	A
	1500	(merge)	A	A	A	A	A	A
	1650			A	A	A	A	A
	1500	(diverge)	A	A	A	A	B	A
Terminal Blvd	2530		A	A	A	A	B	A
	350	(merge)	A	A	B	B	B	B
	700		A	B	B	B	C	C
	350	(diverge)	B	B	B	B	B	B
W Little Creek Rd	1450		A	A	B	B	B	B

WESTBOUND

Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D		Length (not to scale)	Cross Street
B	B	B	A	A	A		525	Bainbridge Ave/Bellinger Blvd
C	C	C	B	B	B	(diverge)	1500	
	B	B	A	B	B		4675	Intermodal Connector (2040 NB and Build Alternatives)
	B	B	C	E	C	(diverge)	1500	
B	B	B	B	C	C		1465	Terminal Blvd
B	C	C	D	D	C		2995	
D	D	D	E	F	F	(merge)	950	I-64 EB
C	D	D	D	F	F		2260	US 460 NB

I-564 PM PEAK LOS ALTERNATIVES COMPARISON

EASTBOUND

Cross Street	Length (not to scale)		Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D
Bainbridge Ave/Bellinger Blvd	670		C	B	B	B	B	C
	1500	(merge)	D	B	B	B	C	B
Intermodal Connector (2040 NB and Build Alternatives)	3000			B	B	B	C	B
	1500	(merge)	C	B	B	C	F	C
	1650			B	B	C	F	C
	1500	(diverge)	B	C	C	D	F	E
Terminal Blvd	2530		B	C	C	C	F	F
	350	(merge)	C	D	D	F	F	F
	700		E	F	F	F	F	F
	350	(diverge)	E	E	F	F	F	F
W Little Creek Rd	1450		D	E	E	F	F	F

WESTBOUND

Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D		Length (not to scale)	Cross Street
A	A	A	A	A	A		525	Bainbridge Ave/Bellinger Blvd
A	A	A	A	A	A	(diverge)	1500	
	A	A	A	A	A		4675	Intermodal Connector (2040 NB and Build Alternatives)
	A	A	A	B	A	(diverge)	1500	
A	A	A	A	A	A		1465	Terminal Blvd
A	A	A	A	A	A		2995	
A	A	B	B	B	B	(merge)	950	I-64 EB
A	A	A	A	A	A		2260	US 460 NB

Legend

Basic Segment Density (pc/mi/ln)	LOS	Merge, Diverge, Weave Density (pc/mi/ln)	LOS
≤11	A	≤10	A
>11-18	B	>10-20	B
>18-26	C	>20-28	C
>26-35	D	>28-35	D
>35-45	E	>35	E
>45; Demand exceeds capacity	F	Demand exceeds capacity	F

Notes

Level of Service (LOS) evaluated using HCS Freeway Facilities module

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS Hampton Roads Crossing Study SEIS

I-564 Alternatives Comparison Level Of Service

April 2017

Figure 5-3.2

I-664 AM PEAK LOS ALTERNATIVES COMPARISON

Cross Street	Length (not to scale)	EASTBOUND Existing	EB 2040 NB	EB 2040 Alt A	EB 2040 Alt B	EB 2040 Alt C	EB 2040 Alt D	WESTBOUND Existing	WB 2040 NB	WB 2040 Alt A	WB 2040 Alt B	WB 2040 Alt C	WB 2040 Alt D	Length (not to scale)	Cross Street
I-64	1320	B	B	B	B	B	B	C	C	C	C	D	D	1085	I-64
	1500 (merge)	D	F	F	F	F	F	B	B	B	B	A	A	(diverge) 1500	
	1000	C	C	C	C	B	B	B	C	C	C	B	B	1425	
	1500 (diverge)	C	D	D	D	B	B	B	B	B	B	B	B	(merge) 1500	
Power Plant Pkwy/Powhatan Pkwy	1660	C	C	C	C	B	B	B	B	B	B	B	B	1945	Power Plant Pkwy/Powhatan Pkwy
	1500 (merge)	C	B	B	B	B	B	B	B	B	B	B	B	(diverge) 1500	
	1785	C	C	C	C	B	B	B	B	B	B	B	B	1965	
	1500 (diverge)	C	C	C	C	B	B	B	B	B	B	B	B	(merge) 1500	
Aberdeen Rd	1505	C	C	C	C	B	B	B	B	B	B	B	B	1300	Aberdeen Rd
	3040	C	C	C	C	B	B	B	B	B	B	B	B	2775	
Chestnut Ave/Roanoke Ave	2230	B	B	B	B	B	B	B	B	B	B	B	B	2020	Chestnut Ave/Roanoke Ave
	1500 (merge)	B	B	B	B	A	A	B	B	B	B	B	B	(diverge) 1500	
	300	B	C	C	C	B	B	C	C	C	C	B	B	450	
	1500 (diverge)	B	C	C	C	B	B	C	B	B	B	A	A	(merge) 1500	
35th St	1105	B	B	B	B	B	A	C	C	C	C	B	B	1565	35th St/36th St
	1500 (diverge)	B	A	A	A	A	A								
26th St	2090	B	B	B	B	A	A	C	C	C	C	C	C	945	
35th St								C	C	C	C	C	B	2410	US 60
US 60	1475 (merge)	B	B	B	B	B	B								
	1100 (merge)	B	B	B	B	B	A	D	C	C	C	B	B	(diverge) 1500	
	410	C	C	C	C	B	B	D	D	D	D	C	C	360	
	1100 (diverge)	B	B	B	B	B	B	D	C	C	C	B	B	(merge) 1500	
Terminal Ave	585	B	B	B	B	B	B	D	D	D	D	C	C	1690	Terminal Ave
Terminal Ave	1005 (lane drop)	B	C	C	C	B	B								
	1500 (merge)	B	B	B	B	A	A	D	C	C	C	B	B	(diverge) 1500	
MMMBT	26460	C	C	C	C	B	B	F	F	F	F	C	C	27835	MMMBT
						B	B					C	B		
I-664 Connector (Build Alternatives C and D)						A	A					B	B		I-664 Connector (Build Alternatives C and D)
						B	B					C	C		
MMMBT						B	B					C	C		MMMBT
	1500 (diverge)	B	B	B	B	B	B	E	F	F	F	B	B	(merge) 1500	
College Dr NB	220	B	C	C	B	A	B	C	F	F	F	B	B	640	College Dr NB
	1820	B	B	B	B	B	B	C	F	F	F	B	B	1695	
College Dr SB	630	B	C	B	B	A	A	C	F	C	C	B	B	500	College Dr SB
	1500 (merge)	B	B	B	B	A	A	D	F	F	C	B	B	(diverge) 1500	
MATCHLINE A	1600	A	B	B	B	B	B	C	E	C	C	C	C	1310	MATCHLINE A

I-664 AM PEAK LOS ALTERNATIVES COMPARISON (CONTINUED)

Cross Street	Length (not to scale)	EASTBOUND Existing	EB 2040 NB	EB 2040 Alt A	EB 2040 Alt B	EB 2040 Alt C	EB 2040 Alt D	WESTBOUND Existing	WB 2040 NB	WB 2040 Alt A	WB 2040 Alt B	WB 2040 Alt C	WB 2040 Alt D	Length (not to scale)	Cross Street
MATCHLINE A	1600	A	B	B	B	B	B	C	E	C	C	C	C	1310	MATCHLINE A
	1500 (diverge)	B	A	A	A	A	A	D	F	F	C	C	C	(merge) 1500	
VA 164	1235	A	B	B	A	A	A	C	D	D	D	C	C	1140	VA 164 WB
	1500 (merge)	B	B	B	B	B	B	C	E	D	D	C	C	1715	
US 17	740	B	C	B	B	B	B	C	D	D	D	C	C	510	US 17/VA 164 EB
	1500 (merge)	C	C	C	C	B	B	C	D	D	D	C	C	1715	
	700	B	C	C	C	B	B								
	1500 (diverge)	C	C	C	B	B	B								
Pughsville Rd	2525	C	C	C	C	B	B	D	D	D	D	C	C	(merge) 1500	Pughsville Rd WB
								C	D	D	D	C	C	1000	Pughsville Rd EB
	1500 (merge)	D	C	C	C	B	B	D	F	F	F	C	C	(diverge) 1500	
	5140	D	D	D	D	C	C	D	F	F	F	C	C	5350	
	1500 (diverge)	D	D	D	D	C	C	D	F	F	F	C	C	(merge) 1500	
Portsmouth Blvd WB	600	C	D	D	D	C	C	D	F	F	D	C	C	520	Portsmouth Blvd WB
	1700	C	D	D	D	C	C	C	D	D	D	C	C	1680	
Portsmouth Blvd EB	480	C	D	D	D	C	C	D	F	F	D	C	C	575	Portsmouth Blvd EB
	1500 (merge)	D	D	D	C	B	B	D	F	F	F	C	C	(diverge) 1500	
								D	F	F	F	D	D	200	
	1500 (diverge)	D	D	D	D	C	C	D	F	F	F	C	C	(merge) 1500	
Dock Landing Rd	2550	C	D	D	D	C	C	C	D	D	D	C	C	2555	Dock Landing Rd
	1500 (merge)	D	D	D	D	C	C	D	F	F	F	B	B	(diverge) 1500	
	725	D	E	E	D	C	C	D	F	F	F	C	C	1180	
	1500 (diverge)	D	E	E	D	C	C	D	F	F	F	C	C	(merge) 1500	
US 58 SB	480	C	D	D	C	C	C	C	D	D	D	C	C	410	US 58 SB
	2045	C	D	C	C	C	C	C	C	C	C	C	C	(merge) 1500	
US 58 NB	1260	C	D	C	C	B	B	C	C	C	C	B	B	1225	US 58 NB
	490 (merge)	F	F	F	F	C	C	F	F	F	F	F	F	4675	
	1020	F	F	F	F	D	D								
	490 (diverge)	C	C	C	C	C	C								
S Military Hwy	1500 (diverge)	F	C	C	C	C	C								
I-64 SB	3435	B	B	B	B	B	B	A	B	A	A	A	A	2135	I-64 NB

Legend

Basic Segment Density (pc/mi/ln)	LOS	Merge, Diverge, Weave Density (pc/mi/ln)	LOS
≤11	A	≤10	A
>11-18	B	>10-20	B
>18-26	C	>20-28	C
>26-35	D	>28-35	D
>35-45	E	>35	E
>45; Demand exceeds capacity	F	Demand exceeds capacity	F

Notes

Level of Service (LOS) evaluated using HCS Freeway Facilities module

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS
Hampton Roads Crossing Study SEIS

I-664 Alternatives Comparison AM Peak Hour Level of Service

April 2017

Figure 5-3.3

I-664 PM PEAK LOS ALTERNATIVES COMPARISON

EASTBOUND

Cross Street	Length (not to scale)		Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D
I-64	1320		A	A	A	A	A	A
	1500	(merge)	C	B	B	B	C	B
	1000		B	B	B	B	B	B
	1500	(diverge)	B	C	C	C	B	B
Power Plant Pkwy/Powhatan Pkwy	1660		B	B	B	B	B	B
	1500	(merge)	B	B	B	B	B	B
	1785		B	B	B	B	B	B
	1500	(diverge)	B	B	B	B	B	B
Aberdeen Rd	1505		B	B	B	B	B	A
	3040		B	B	B	B	B	B
Chestnut Ave/Roanoke Ave	2230		A	B	B	B	B	A
	1500	(merge)	B	B	B	B	B	A
	300		B	B	B	B	B	B
	1500	(diverge)	B	B	B	B	B	B
35th St	1105		A	B	B	B	B	A
	1500	(diverge)	A	A	A	A	A	A
26th St / 35th St	2090		B	B	B	B	A	A
US 60	1475	(merge)	B	D	C	B	B	B
	1100	(merge)	C	F	E	D	B	B
	410		C	F	F	E	C	B
	1100	(diverge)	B	F	F	F	B	B
Terminal Ave	585		B	F	F	F	C	B
Terminal Ave	1005	(lane drop)	C	F	F	F	B	B
	1500	(merge)	D	F	F	F	B	B
MMMBT / I-664 Connector (Build Alternatives C and D) / MMMBT	26460		F	F	F	F	C / C / B / B / C	C / C / B / C / C
	1500	(diverge)	D	C	C	C	B	B
College Dr NB	220		D	D	D	D	C	C
	1820		C	D	D	D	C	C
College Dr SB	630		D	D	D	D	C	C
	1500	(merge)	D	C	C	C	B	B
MATCHLINE A	1600		C	C	C	C	C	C

WESTBOUND

Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D		Length (not to scale)	Cross Street
D	F	E	E	F	F		1085	I-64
C	C	B	B	F	C	(diverge)	1500	
C	D	D	D	B	C		1425	
C	D	C	C	C	B	(merge)	1500	
C	D	D	D	C	C		1945	Power Plant Pkwy/Powhatan Pkwy
C	C	C	C	C	C	(diverge)	1500	
C	D	D	D	C	C		1965	
C	C	C	C	B	B	(merge)	1500	
C	D	D	D	C	C		1300	Aberdeen Rd
C	C	C	C	C	C		2775	
C	C	C	C	C	C		2020	Chestnut Ave/Roanoke Ave
C	C	C	C	B	B	(diverge)	1500	
E	F	F	F	C	C		450	
E	F	F	F	B	B	(merge)	1500	
C	D	D	D	B	B		1565	35th St/36th St
C	D	D	D	C	C		945	
C	C	C	C	B	B		2410	US 60
C	C	C	C	B	B	(diverge)	1500	
C	D	D	D	B	B		360	
C	C	C	C	B	B	(merge)	1500	
C	D	C	C	B	B		1690	Terminal Ave
C	C	C	C	B	A	(diverge)	1500	
C	F	F	F	B / B / A / B / B	B / B / A / B / B		27835	MMMBT / I-664 Connector (Build Alternatives C and D) / MMMBT
C	C	C	C	B	B	(merge)	1500	
C	C	C	C	B	B		640	College Dr NB
B	B	B	B	B	B		1695	
C	C	C	C	B	B		500	College Dr SB
C	B	B	B	A	A	(diverge)	1500	
B	B	B	B	B	B		1310	MATCHLINE A

I-664 PM PEAK LOS ALTERNATIVES COMPARISON (CONTINUED)

EASTBOUND

Cross Street	Length (not to scale)		Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D
MATCHLINE A	1600		C	C	C	C	C	C
	1500	(diverge)	C	B	B	B	A	B
VA 164	1235		C	C	C	C	C	C
	1500	(merge)	C	C	C	B	B	B
US 17	740		C	D	D	D	C	C
	1500	(merge)	D	F	F	F	C	C
	700		C	C	C	C	C	C
	1500	(diverge)	E	F	F	F	C	C
Pughsville Rd	2525		C	D	D	D	C	C
	1500	(merge)	D	C	C	C	B	B
	5140		D	D	D	D	C	C
	1500	(diverge)	D	D	D	D	C	C
Portsmouth Blvd WB	600		D	D	D	D	C	C
	1700		C	D	D	D	C	C
Portsmouth Blvd EB	480		D	D	D	D	C	C
	1500	(merge)	D	D	D	D	C	C
	1500	(diverge)	D	D	D	D	C	C
Dock Landing Rd	2550		D	D	D	D	C	C
	1500	(merge)	D	C	C	C	B	B
	725		D	D	D	D	C	C
	1500	(diverge)	D	D	D	D	C	C
US 58 SB	480		C	C	C	C	B	B
	2045		C	C	C	C	B	B
US 58 NB	1260		C	C	C	C	B	B
	490	(merge)	E	F	F	D	C	C
	1020		E	E	E	E	D	D
	490	(diverge)	B	B	B	B	C	C
S Military Hwy	1500	(diverge)	E	B	B	B	B	B
I-64 SB	3435		B	B	B	B	A	B

WESTBOUND

Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D		Length (not to scale)	Cross Street
B	B	B	B	B	B		1310	MATCHLINE A
C	B	B	B	B	B	(merge)	1500	
B	B	B	B	B	B		1140	VA 164 WB
B	B	B	B	B	B		1715	
B	C	C	B	B	B		510	US 17/VA 164 EB
B	B	B	B	B	B		1715	
B	C	C	C	B	B	(merge)	1500	Pughsville Rd WB
B	C	C	C	B	B		1000	Pughsville Rd EB
C	C	C	C	B	B	(diverge)	1500	
C	C	C	C	C	C		5350	
C	C	C	C	B	B	(merge)	1500	
C	C	C	C	B	B		520	Portsmouth Blvd WB
B	C	C	C	B	B		1680	
C	C	C	C	B	B		575	Portsmouth Blvd EB
C	C	C	C	B	B	(diverge)	1500	
C	D	D	D	C	C		200	
C	C	C	C	B	B	(merge)	1500	
C	C	C	C	C	B		2555	Dock Landing Rd
C	F	F	C	B	B	(diverge)	1500	
C	F	F	D	C	C		1180	
C	F	F	C	B	B	(merge)	1500	
C	C	C	C	B	B		410	US 58 SB
C	B	B	B	B	B	(merge)	1500	
B	B	B	B	B	B		1225	US 58 NB
F	F	F	F	F	F		4675	
C	C	C	C	C	C		2135	I-64 NB

Legend

Basic Segment Density (pc/mi/ln)	LOS	Merge, Diverge, Weave Density (pc/mi/ln)	LOS
≤11	A	≤10	A
>11-18	B	>10-20	B
>18-26	C	>20-28	C
>26-35	D	>28-35	D
>35-45	E	>35	E
>45; Demand exceeds capacity	F	Demand exceeds capacity	F

Notes

Level of Service (LOS) evaluated using HCS Freeway Facilities module

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS
Hampton Roads Crossing Study SEIS

I-664 Alternatives Comparison PM Peak Hour Level of Service

April 2017

Figure 5-3.4

VA 164 AM PEAK LOS ALTERNATIVES COMPARISON

Cross Street	Length (not to scale)		EASTBOUND						WESTBOUND							Length (not to scale)	Cross Street
			Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D	Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D			
US 17/Bridge Rd	2600		A	B	B	B	B	B	A	A	A	A	A	A		1670	I-664 SB
	2680		A	B	B	B	B	B	A	B	B	B	B	B		1610	
I-664	1460		A	B	B	B	B	B	A	A	A	A	A	A		970	I-664 NB
	1500	(merge)	B	C	C	C	B	B	B	B	B	B	A	A	(diverge)	1500	
College Dr	585		C	C	C	C	C	B	B	B	B	B	B	A		1025	College Dr
	1500	(merge)	C	D	D	B	C	B	B	B	B	B	B	B	(diverge)	1500	
	1290		C	D	D	C	C	B	B	C	C	B	B	B		1270	
	1500	(diverge)	C	D	D	C	C	B	B	B	B	B	B	B	(merge)	1500	
Towne Point Rd	2000		C	C	C	C	C	B	B	B	B	B	B	A		1970	Towne Point Rd
	1500	(merge)	C	D	D	C	C	B	B	B	B	B	B	A	(diverge)	1500	
	1400		C	D	D	C	D	C	B	B	B	B	B	A		1315	
	1500	(diverge)	C	E	D	C	C	B	B	B	B	B	B	B	(merge)	1500	
Cedar Ln SB (Existing and 2040 NB)	1135		B	C	C	C	C	B	A	B	A	A	A	A		1140	Cedar Ln
	1500	(merge)	C	C	C				B	B	B	B	A	A	(diverge)	1500	
Cedar Ln NB (Existing and 2040 NB)	110		C	C	C				B	B	B	B	A	A			
	1000	(merge)	C	C	C							A	A	A		1300	Craney Island Connector (Build Alternatives)
Craney Island Connector (Build Alternatives)	500		C	D	D	C	C	B									
	1000	(diverge)	C	D	D				B	B	B	A	A	A	(merge)	1000	
Virginia International Gateway Blvd (Existing and 2040 NB)	2245		B	C	C	B	B	B	B	B	B	A	A	A		2330	Virginia International Gateway Blvd
	1025	(merge)	C	C	C				B	B	B	B	B	B	(diverge)	1225	
Craney Island Connector (Build Alternatives)	475		C	D	D				B	C	B	C	B	B		275	
	1025	(diverge)	C	D	D	B	B	B	B	B	B	B	A	A	(merge)	1225	
W. Norfolk Rd	625		C	C	C	C	C	C	B	B	B	B	B	B		810	W Norfolk Rd
	1500	(merge)	C	D	D	C	C	C	B	B	B	B	B	B	(diverge)	1500	
	1245		C	D	D	D	C	C	B	B	B	B	B	B		1710	
									B	B	B	B	B	B	(lane drop)	415	
	2330	(lane add)	B	C	C	C	C	C	A	B	A	A	A	A		1585	
	1500	(lane drop)	C	D	D	B	B	B	B	A	A	A	A	A	(merge)	1500	
(diverge)	1375	US 58 EB	B	C	C	B	C	C	A	A	A	A	A	A	(merge)	1050	US 58 SB
Lee Ave/Railroad Ave Lee Ave / Harper Ave	1500	US 58 WB	B	B	B	B	B	B	A	A	A	A	A	A		1765	Railroad Ave/US 58 NB
	1500	(merge)	B	C	C	B	B	B	A	B	B	B	A	A		3150	
	1830		A	B	B	B	B	B	A	A	A	A	A	A		500	London Blvd

VA 164 PM PEAK LOS ALTERNATIVES COMPARISON

Cross Street	Length (not to scale)		EASTBOUND						WESTBOUND							Length (not to scale)	Cross Street
			Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D	Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D			
US 17/Bridge Rd	2600		A	A	A	A	A	A	A	B	B	B	B	B		1670	I-664 SB
	2680		A	A	A	A	A	A	B	B	B	B	B	B		1610	
I-664	1460		A	A	A	A	A	A	A	B	B	B	B	B		970	I-664 NB
	1500	(merge)	B	B	B	C	B	B	C	B	B	B	B	B	(diverge)	1500	
College Dr	585		B	C	C	B	B	B	C	C	C	B	C	B		1025	College Dr
	1500	(merge)	B	C	C	B	B	B	C	C	C	C	C	B	(diverge)	1500	
	1290		C	C	C	C	C	B	C	D	D	C	C	B		1270	
	1500	(diverge)	C	D	D	C	C	B	C	C	C	C	C	B	(merge)	1500	
Towne Point Rd	2000		B	B	B	B	B	A	C	C	C	C	C	B		1970	Towne Point Rd
	1500	(merge)	B	C	C	B	B	B	D	D	D	C	C	B	(diverge)	1500	
	1400		B	C	C	B	C	B	C	D	D	C	D	C		1315	
	1500	(diverge)	B	C	C	B	B	B	C	D	D	C	C	B	(merge)	1500	
Cedar Ln SB (Existing and 2040 NB)	1135		B	B	B	B	B	A	C	D	C	C	C	B		1140	Cedar Ln
	1500	(merge)	B	B	B				D	C	C	E	C	C	(diverge)	1500	
Cedar Ln NB (Existing and 2040 NB)	110		B	B	B				C	D	D	D	C	C			
	1000	(merge)	B	B	B							C	C	C		1300	Craney Island Connector (Build Alternatives)
Craney Island Connector (Build Alternatives)	500		B	C	C	B	B	B									
	1000	(diverge)	B	C	C				C	C	C	C	B	B	(merge)	1000	
Virginia International Gateway Blvd (Existing and 2040 NB)	2245		B	B	B	B	A	A	C	D	D	C	C	C		2330	Virginia International Gateway Blvd
	1025	(merge)	B	B	B				C	D	D	D	C	C	(diverge)	1225	
Craney Island Connector (Build Alternatives)	475		B	C	C				D	D	D	E	D	D		275	
	1025	(diverge)	B	C	C	B	B	B	C	C	C	C	C	C	(merge)	1225	
W. Norfolk Rd	625		B	C	B	C	B	B	C	D	D	D	C	C		810	W Norfolk Rd
	1500	(merge)	B	C	B	C	B	B	D	D	D	D	C	C	(diverge)	1500	
	1245		B	C	C	C	B	B	D	D	D	D	D	D		1710	
									D	D	D	D	D	D	(lane drop)	415	
	2330	(lane add)	A	B	B	B	B	B	B	C	C	C	B	B		1585	
	1500	(lane drop)	B	C	C	C	A	C	D	C	C	C	B	B	(merge)	1500	
(diverge)	1375	US 58 EB	A	B	B	B	B	B	B	B	B	B	B	B	(merge)	1050	US 58 SB
Lee Ave/Railroad Ave Lee Ave / Harper Ave	1500	US 58 WB	A	A	A	B	B	B	B	B	B	B	B	B		1765	Railroad Ave/US 58 NB
	1500	(merge)	B	B	B	B	A	B	B	B	B	B	B	B		3150	
	1830		A	A	A	B	A	A	A	A	A	A	A	A		500	London Blvd

Legend

Basic Segment Density (pc/mi/ln)	LOS	Merge, Diverge, Weave Density (pc/mi/ln)	LOS
≤11	A	≤10	A
>11-18	B	>10-20	B
>18-26	C	>20-28	C
>26-35	D	>28-35	D
>35-45	E	>35	E
>45; Demand exceeds capacity	F	Demand exceeds capacity	F

Notes

Level of Service (LOS) evaluated using HCS Freeway Facilities module

VDOT
Virginia Department of Transportation

U.S. Department of Transportation
Federal Highway Administration

HRCS SEIS
Hampton Roads Crossing Study SEIS

VA 164 Alternatives Comparison Level Of Service

April 2017

Figure 5-3.5

JAMES RIVER CONNECTORS AM PEAK LOS ALTERNATIVE B

Cross Street	Length (not to scale)		WESTBOUND 2040 Alt B	EASTBOUND 2040 Alt B		Length (not to scale)	Cross Street
	3675		C	A		3615	
	1500	(diverge)	C	A	(merge)	1500	
Hampton Blvd	2850		A	A		2970	Hampton Blvd
	1500	(merge)	B	C	(diverge)	1500	
	16540		B	C		17390	
	1500	(diverge)	B	C	(merge)	1500	
Future Craney Island Access	2700		B	C		2000	Future Craney Island Access
	1500	(merge)	B	C	(diverge)	1500	
	5350		B	C		5050	
				C	(merge)	1500	
				A	VA 164 EB	1100	

JAMES RIVER CONNECTORS PM PEAK LOS ALTERNATIVE B

Cross Street	Length (not to scale)		WESTBOUND 2040 Alt B	EASTBOUND 2040 Alt B		Length (not to scale)	Cross Street
	3675		A	C		3615	
	1500	(diverge)	A	C	(merge)	1500	
Hampton Blvd	2850		A	A		2970	Hampton Blvd
	1500	(merge)	C	B	(diverge)	1500	
	16540		C	B		17390	
	1500	(diverge)	C	B	(merge)	1500	
Future Craney Island Access	2700		C	B		2000	Future Craney Island Access
	1500	(merge)	C	B	(diverge)	1500	
	5350		C	B		5050	
				B	(merge)	1500	
				A	VA 164 EB	1100	

JAMES RIVER CONNECTORS AM PEAK LOS ALTERNATIVES C & D

Cross Street	Length (not to scale)		WESTBOUND 2040 Alt C	WESTBOUND 2040 Alt D	EASTBOUND 2040 Alt C	EASTBOUND 2040 Alt D		Length (not to scale)	Cross Street
	3675		C	C	B	B		3615	
	1500	(diverge)	C	C	B	B	(merge)	1500	
Hampton Blvd	2850		B	B	A	A		2970	Hampton Blvd
	1500	(merge)	C	C	C	C	(diverge)	1500	
	5450		C	C	C	C		5730	
	1500	(diverge)	C	C	C	C	(merge)	1500	
Craney Island Connector	4135		B	B	B	B		3660	Craney Island Connector
	1500	(merge)	C	B	C	C	(diverge)	1500	
	6300		C	B	C	C		5285	

Craney Island Connector

Cross Street	Length (not to scale)		SOUTHBOUND 2040 Alt C	SOUTHBOUND 2040 Alt D	NORTHBOUND 2040 Alt C	NORTHBOUND 2040 Alt D		Length (not to scale)	Cross Street
	7095		A	B	A	B		9410	
	1500	(diverge)	B	B	B	B	(merge)	1500	
Future Craney Island Access	2700		A	A	A	A		2000	Future Craney Island Access
	1500	(merge)	B	B	A	B	(diverge)	1500	
	5350		A	A	A	A		5050	
					B	B	(merge)	1500	
					A	A	VA 164 EB	1100	

JAMES RIVER CONNECTORS PM PEAK LOS ALTERNATIVES C & D

Cross Street	Length (not to scale)		WESTBOUND 2040 Alt C	WESTBOUND 2040 Alt D	EASTBOUND 2040 Alt C	EASTBOUND 2040 Alt D		Length (not to scale)	Cross Street
	3675		A	A	D	D		3615	
	1500	(diverge)	A	A	D	D	(merge)	1500	
Hampton Blvd	2850		A	A	B	B		2970	Hampton Blvd
	1500	(merge)	C	C	C	C	(diverge)	1500	
	5450		D	C	C	C		5730	
	1500	(diverge)	D	D	C	C	(merge)	1500	
Craney Island Connector	4135		C	C	B	B		3660	Craney Island Connector
	1500	(merge)	C	C	C	C	(diverge)	1500	
	6300		C	C	C	C		5285	

Craney Island Connector

Cross Street	Length (not to scale)		SOUTHBOUND 2040 Alt C	SOUTHBOUND 2040 Alt D	NORTHBOUND 2040 Alt C	NORTHBOUND 2040 Alt D		Length (not to scale)	Cross Street
	7095		B	B	A	A		9410	
	1500	(diverge)	B	B	B	B	(merge)	1500	
Future Craney Island Access	2700		A	A	A	A		2000	Future Craney Island Access
	1500	(merge)	B	B	A	A	(diverge)	1500	
	5350		A	A	A	A		5050	
					B	A	(merge)	1500	
					A	A	VA 164 EB	1100	

Legend

Basic Segment Density (pc/mi/ln)	LOS
≤11	A
>11-18	B
>18-26	C
>26-35	D
>35-45	E
>45; Demand exceeds capacity	F

Merge, Diverge, Weave Density (pc/mi/ln)	LOS
≤10	A
>10-20	B
>20-28	C
>28-35	D
>35	E
Demand exceeds capacity	F

Notes

Level of Service (LOS) evaluated using HCS Freeway Facilities module

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS
Hampton Roads Crossing Study SEIS

Elizabeth River Crossing Alternatives Comparison Peak Hour Level of Service

April 2017

Figure 5-3.6

I-64 AM PEAK LOS ALTERNATIVES COMPARISON

EASTBOUND

Cross Street	Length (not to scale)		Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D
I-664 NB	1810		54.6	54.0	54.4	54.0	54.1	54.4
	3150		40.3	38.8	38.5	38.0	40.2	39.7
LaSalle Avenue SB	455		54.2	54.1	54.1	54.1	54.2	54.2
LaSalle Avenue NB	1080	(merge)	51.1	50.3	49.8	50.0	50.5	50.2
	200	(merge)	51.0	50.1	49.0	49.5	50.3	49.7
	1300		51.0	50.1	49.0	49.5	50.3	49.7
	200	(diverge)	51.6	51.5	51.3	51.5	51.5	51.4
Rip Rap Rd	6790		55.0	55.0	55.0	55.0	55.0	55.0
	1500	(diverge)	51.8	49.1	52.2	52.1	51.9	52.1
Tyler St / Settlers Landing Rd	1435	(lane drop)	54.7	26.6	54.7	54.7	54.7	54.7
	1900		23.6	11.2	40.8	41.2	18.3	41.7
S. Mallory St	1640		22.2	14.2	54.2	54.2	19.0	54.2
	1500	(merge)	22.3	21.0	32.5	38.7	21.7	51.0
HRBT	16950		34.7	34.7	34.7	34.7	34.7	39.3
	1500	(diverge)	50.2	50.2	52.6	52.6	50.2	52.8
Bayville St	200		53.8	53.8	54.4	54.4	53.8	54.4
	1500	(merge)	50.1	50.1	50.3	50.3	50.1	50.6
	5770		55.0	55.0	55.0	55.0	55.0	55.0
	1500	(diverge)	49.8	49.7	52.1	52.1	49.7	52.3
4th View St	2320		54.8	54.8	54.9	54.9	54.8	54.9
	1500	(merge)	50.6	50.6	50.9	50.8	50.7	51.1
W. Bay Ave	3445		54.9	54.9	54.9	54.9	54.9	54.9
	1500	(merge)	50.1	50.1	50.5	50.4	50.2	50.7
Patrol Rd	3740		54.9	54.9	44.1	48.5	54.9	54.9
	1730		39.9	39.6	15.5	16.4	41.1	25.9
I-564 / US 460	1055	(diverge)	50.3	50.3	25.3	25.7	50.3	27.7
I-564	1440	I-64 HOV	54.4	54.4	23.6	23.8	54.4	24.4
	1250	(merge)	50.6	50.4	48.1	48.1	48.1	48.1

WESTBOUND

Cross Street	(not to scale) Length (not to scale)		Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D
I-664 SB	1140		53.8	53.7	53.6	53.5	53.7	53.7
	2360		34.7	32.3	31.0	29.5	32.5	32.1
Armistead Ave EB/La Salle Ave	405		54.2	53.9	49.4	17.8	53.9	54.0
	1500	(diverge)	51.2	50.1	50.5	29.7	50.1	50.5
Armistead Ave WB	645		54.6	54.6	54.5	54.5	54.6	54.5
	1500	(diverge)	52.7	52.5	52.1	52.1	52.5	52.3
	5685		55.0	55.0	55.0	55.0	55.0	55.0
	1500	(merge)	51.4	51.4	50.3	50.3	51.4	50.7
Settlers Landing Rd	1310		54.3	54.2	54.1	54.1	54.2	54.1
	1835		45.9	45.1	43.2	43.0	45.2	43.8
S. Mallory St	605	(lane add)	54.1	54.1	54.5	54.5	54.1	54.5
	1500	(diverge)	49.9	49.8	52.3	52.3	49.9	52.4
HRBT	18460		34.6	34.6	34.6	34.6	34.6	39.8
	1500	(merge)	23.3	20.9	27.4	51.3	21.8	50.8
W. Ocean View Ave	190		27.6	20.9	44.9	54.4	23.2	54.4
	1500	(diverge)	34.3	21.6	54.6	52.7	25.3	52.8
	5410		53.9	24.2	55.0	55.0	38.6	55.0
	1500	(merge)	50.2	29.1	50.6	50.7	49.9	51.1
4th View St	2275		54.8	26.6	54.9	54.9	54.8	54.9
	1500	(diverge)	50.1	33.9	52.6	52.7	50.1	52.7
W. Bay Ave	2590		54.8	40.7	54.9	54.9	54.8	54.9
	1500	(diverge)	49.7	47.4	52.1	52.2	49.6	52.2
	1430		54.5	49.7	54.6	54.6	54.5	54.6
	1500	(merge)	49.8	47.2	50.3	50.5	49.2	50.8
Granby St	1840		54.7	53.4	54.5	54.6	54.7	54.6
	1500	(merge)	50.7	48.9	48.0	48.7	50.2	49.5
I-564 / US 460	1510	I-64 HOV	54.6	54.6	30.2	54.5	54.5	54.5
	1500	(diverge)	49.9	49.9	49.1	49.8	49.7	49.8
	525		53.0	52.7	52.7	52.6	52.8	52.8

I-64 PM PEAK LOS ALTERNATIVES COMPARISON

EASTBOUND

Cross Street	Length (not to scale)		Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D
I-664 NB	1810		54.1	54.1	54.1	54.1	54.2	54.2
	3150		38.2	36.4	36.1	35.7	38.4	37.6
LaSalle Avenue SB	455		54.1	54.0	54.0	54.0	54.1	54.1
LaSalle Avenue NB	1080	(merge)	51.1	50.3	49.9	50.0	50.7	50.3
	200	(merge)	51.1	50.0	49.2	49.6	50.5	49.9
	1300		51.1	50.0	49.2	49.6	50.5	49.9
	200	(diverge)	51.7	51.5	51.4	51.5	51.5	51.5
Rip Rap Rd	6790		55.0	55.0	55.0	55.0	55.0	55.0
	1500	(diverge)	51.9	53.2	52.3	52.2	51.9	52.2
Tyler St / Settlers Landing Rd	1435	(lane drop)	54.7	29.2	54.7	54.7	54.7	54.7
	1900		44.4	10.0	41.5	42.3	26.0	42.2
S. Mallory St	1640		29.7	12.3	52.5	54.3	21.1	54.3
	1500	(merge)	21.2	18.6	24.8	32.7	20.1	50.9
HRBT	16950		35.1	35.1	35.1	35.1	35.1	38.4
	1500	(diverge)	50.2	50.1	52.5	52.5	50.1	52.6
Bayville St	200		53.8	53.8	54.4	54.4	53.8	54.4
	1500	(merge)	50.2	50.2	50.3	50.3	50.2	50.6
	5770		55.0	55.0	55.0	55.0	55.0	55.0
	1500	(diverge)	49.8	49.6	52.1	52.1	49.7	52.2
4th View St	2320		54.8	54.8	54.9	54.9	54.8	54.9
	1500	(merge)	50.9	50.9	51.0	51.0	51.0	51.2
W. Bay Ave	3445		54.9	54.9	54.9	54.9	54.9	54.9
	1500	(merge)	49.3	49.3	50.2	50.2	49.8	50.5
Patrol Rd	3740		54.7	54.7	41.4	42.6	54.9	54.9
	1730		41.2	41.4	14.4	14.7	42.4	19.4
I-564 / US 460	1055	(diverge)	48.9	48.7	48.5	48.5	48.8	48.6
I-564	1440	I-64 HOV	54.2	54.2	54.1	54.1	54.2	54.1
	1250	(merge)	48.1	48.1	48.1	48.1	48.1	48.1

WESTBOUND

Cross Street	(not to scale) Length (not to scale)		Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D
I-664 SB	1140		54.1	53.9	53.9	53.9	54.0	53.9
	2360		39.4	37.0	36.3	36.1	37.3	37.1
Armistead Ave EB/La Salle Ave	405		54.3	54.1	54.2	53.6	54.1	53.7
	1500	(diverge)	51.7	50.8	51.2	48.6	50.8	48.8
Armistead Ave WB	645		54.6	54.5	54.5	54.4	54.6	54.4
	1500	(diverge)	52.6	52.4	52.1	51.5	52.5	51.6
	5685		55.0	55.0	55.0	55.0	55.0	55.0
	1500	(merge)	51.4	51.3	50.3	50.3	51.3	50.6
Settlers Landing Rd	1310		54.1	54.0	53.9	53.9	54.0	54.0
	1835		43.6	42.4	40.8	40.8	42.5	41.8
S. Mallory St	605	(lane add)	54.1	54.1	54.5	54.2	54.1	54.2
	1500	(diverge)	50.0	49.9	52.4	50.6	50.0	50.6
HRBT	18460		34.7	34.7	34.7	52.6	34.7	52.9
	1500	(merge)	44.8	23.8	49.5	50.6	24.2	50.8
W. Ocean View Ave	190		53.8	24.0	54.4	53.9	25.2	54.0
	1500	(diverge)	50.2	25.5	52.6	50.9	27.2	50.9
	5410		55.0	28.9	55.0	55.0	34.8	55.0
	1500	(merge)	50.5	34.9	50.7	50.9	50.1	51.2
4th View St	2275		54.8	30.7	54.9	54.9	54.8	54.9
	1500	(diverge)	50.1	44.3	52.8	52.2	50.1	52.2
W. Bay Ave	2590		54.8	54.7	54.9	54.9	54.8	54.9
	1500	(diverge)	50.2	50.1	52.8	50.9	50.2	51.0
	1430		54.6	54.5	54.6	54.7	54.6	54.7
	1500	(merge)	50.9	50.1	51.2	51.4	50.5	51.5
Granby St	1840		54.8	54.7	54.7	54.7	54.7	54.8
	1500	(merge)	51.4	51.0	50.9	51.2	51.2	51.3
I-564 / US 460	1510	I-64 HOV	54.6	54.6	54.5	54.5	54.5	54.5
	1500	(diverge)	49.9	49.9	49.8	48.9	49.7	48.9
	525		53.0	53.0	53.0	55.0	53.0	55.0

Legend

Speed (mph)
>45
35-45
25-35
≤25

Notes

Speeds evaluated using HCS Freeway Facilities module

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS
Hampton Roads Crossing Study SEIS

I-64 Alternatives Comparison Speed

April 2017

Figure 5-4.1

I-564 AM PEAK LOS ALTERNATIVES COMPARISON

EASTBOUND

Cross Street	Length (not to scale)		Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D
Bainbridge Ave/Bellinger Blvd	670		55.0	55.0	55.0	55.0	55.0	55.0
	1500	(merge)	52.3	52.3	52.3	52.3	52.3	52.3
Intermodal Connector (2040 NB and Build Alternatives)	3000		55.0	54.9	54.9	54.9	54.9	54.9
	1500	(merge)		52.8	52.9	52.4	52.2	52.3
	1650			54.8	54.8	54.8	54.8	54.8
	1500	(diverge)	53.3	53.1	53.4	52.9	51.8	53.0
Terminal Blvd	2530		54.9	54.9	54.9	54.9	54.9	54.9
	350	(merge)	51.5	51.9	52.0	51.9	50.9	52.1
	700		47.6	47.6	47.6	47.6	47.6	47.6
	350	(diverge)	47.6	47.6	47.6	47.6	47.6	47.6
W Little Creek Rd	1450		53.7	53.7	53.7	53.7	53.7	53.7

WESTBOUND

Cross Street	Length (not to scale)		Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D
Bainbridge Ave/Bellinger Blvd	525		53.6	53.6	53.6	53.6	53.9	53.9
	1500	(diverge)	47.6	47.7	47.8	47.8	49.5	49.5
Intermodal Connector (2040 NB and Build Alternatives)	4675		55.0	55.0	55.0	55.0	54.9	55.0
	1500	(diverge)		50.8	51.1	50.2	47.5	49.6
	1465			54.4	54.5	54.4	54.4	54.5
Terminal Blvd	2995		38.2	33.9	36.3	33.1	34.3	35.5
I-64 EB	950	(merge)	50.2	49.9	49.9	48.4	47.0	47.0
US 460 NB	2260		55.0	55.0	55.0	55.0	34.8	36.5

I-564 PM PEAK LOS ALTERNATIVES COMPARISON

EASTBOUND

Cross Street	Length (not to scale)		Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D
Bainbridge Ave/Bellinger Blvd	670		55.0	55.0	55.0	55.0	55.0	55.0
	1500	(merge)	51.3	51.6	51.6	51.9	51.6	51.6
Intermodal Connector (2040 NB and Build Alternatives)	3000		55.0	54.9	54.9	54.9	54.8	54.9
	1500	(merge)		52.0	51.9	51.4	47.7	50.2
	1650			54.8	54.8	54.7	25.1	54.6
	1500	(diverge)	53.3	53.2	51.9	50.4	35.2	50.0
Terminal Blvd	2530		54.9	54.9	54.9	46.4	22.3	18.6
	350	(merge)	50.6	50.6	50.5	19.8	46.7	17.5
	700		47.4	47.4	44.6	19.8	46.7	17.5
	350	(diverge)	47.4	47.4	44.6	38.7	49.7	38.5
W Little Creek Rd	1450		53.7	53.7	52.6	51.2	53.2	51.2

WESTBOUND

Cross Street	Length (not to scale)		Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D
Bainbridge Ave/Bellinger Blvd	525		53.7	53.7	53.7	53.7	53.7	53.7
	1500	(diverge)	48.4	48.4	48.4	48.4	48.4	48.4
Intermodal Connector (2040 NB and Build Alternatives)	4675		55.0	55.0	55.0	55.0	55.0	55.0
	1500	(diverge)		50.6	50.7	50.3	49.2	49.8
	1465			54.8	54.8	54.7	54.7	54.7
Terminal Blvd	2995		47.0	46.0	46.4	45.1	45.3	45.6
I-64 EB	950	(merge)	51.3	51.3	51.3	51.3	51.2	51.2
US 460 NB	2260		55.0	55.0	55.0	55.0	55.0	55.0

Legend

Speed (mph)
>45
35-45
25-35
≤25

Notes

Speeds evaluated using HCS Freeway Facilities module

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS Hampton Roads Crossing Study SEIS

I-564 Alternatives Comparison Speed

April 2017

Figure 5-4.2

I-664 AM PEAK LOS ALTERNATIVES COMPARISON

EASTBOUND

Cross Street	Length (not to scale)		Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D
I-64	1320		54.3	54.3	54.3	54.3	54.3	54.3
	1500	(merge)	54.2	54.0	54.0	54.0	54.0	54.4
	1000		59.2	59.2	59.2	59.2	59.2	59.3
	1500	(diverge)	52.9	51.6	52.0	52.0	58.9	58.9
Power Plant Pkwy/Powhatan Pkwy	1660		59.5	59.4	59.4	59.4	59.9	59.9
	1500	(merge)	55.4	55.3	55.3	55.3	56.6	56.6
	1785		59.7	59.7	59.7	59.7	59.8	59.8
	1500	(diverge)	55.8	55.4	55.5	55.5	57.4	57.5
Aberdeen Rd	1505		59.6	59.6	59.6	59.6	59.8	59.8
	3040		48.3	46.7	47.4	47.0	48.0	48.2
Chestnut Ave/Roanoke Ave	2230		59.8	59.8	59.8	59.8	59.8	59.8
	1500	(merge)	56.3	56.1	56.1	56.2	57.1	57.2
	300		54.8	54.7	54.7	54.6	56.7	56.7
	1500	(diverge)	54.8	54.7	54.7	54.6	56.7	56.7
35th St	1105		59.4	59.4	59.4	59.3	59.6	59.6
	1500	(diverge)	56.8	55.8	55.8	55.8	57.5	57.6
26th St / 35th St	2090		59.8	59.8	59.8	59.8	59.9	59.9
US 60	1475	(merge)	54.6	54.4	54.5	54.5	57.0	57.0
	1100	(merge)	55.8	55.6	55.7	55.7	57.3	57.3
	410		55.8	55.6	55.7	55.7	57.3	57.3
	1100	(diverge)	56.4	56.4	56.5	56.4	59.2	59.2
Terminal Ave	585		59.1	59.1	59.1	59.1	59.8	59.8
Terminal Ave	1005	(lane drop)	59.7	59.7	59.8	59.7	59.9	59.9
	1500	(merge)	55.1	54.8	54.9	55.0	57.3	57.4
MMMBT	26460		50.7	52.2	51.7	53.0	57.4	57.3
							55.0	56.1
I-664 Connector (Build Alternatives C and D)							60.0	60.0
							56.6	56.7
MMMBT							60.0	60.0
	1500	(diverge)	53.2	53.1	53.0	53.1	58.6	58.6
College Dr NB	220		58.3	58.3	58.3	58.3	59.6	59.7
	1820		52.4	50.5	50.2	50.8	51.1	51.1
College Dr SB	630		59.0	58.7	58.7	58.7	58.8	58.8
	1500	(merge)	56.1	55.9	56.0	56.1	57.7	57.7
MATCHLINE A	1600		59.7	59.7	59.7	59.7	59.8	59.8

WESTBOUND

Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D		Length (not to scale)	Cross Street
55.0	55.0	55.0	55.0	55.0	55.0		1085	I-64
56.6	56.4	56.5	56.5	58.9	59.1	(diverge)	1500	
59.6	59.6	59.6	59.6	59.7	59.7		1425	
55.9	55.7	55.8	55.8	56.5	56.5	(merge)	1500	
59.8	59.8	59.8	59.8	59.9	59.9		1945	Power Plant Pkwy/Powhatan Pkwy
56.3	56.3	56.3	56.3	58.9	58.9	(diverge)	1500	
59.8	59.8	59.8	59.8	59.8	59.8		1965	
56.3	56.1	56.2	56.2	56.7	56.8	(merge)	1500	
59.7	59.7	59.7	59.7	59.7	59.7		1300	Aberdeen Rd
53.1	51.7	52.1	52.1	51.7	52.1		2775	
59.8	59.8	59.8	59.8	59.9	60.0		2020	Chestnut Ave/Roanoke Ave
56.5	56.4	56.4	56.4	59.0	59.3	(diverge)	1500	
55.4	55.2	55.2	55.2	57.1	57.2		450	
55.4	55.2	55.2	55.2	57.1	57.2	(merge)	1500	
58.3	58.2	58.2	58.2	57.9	58.0		1565	35th St/36th St
47.1	46.1	45.9	46.3	44.0	44.6		945	
59.7	59.7	59.7	59.7	59.9	59.9		2410	US 60
52.9	52.7	52.6	52.7	57.8	57.8	(diverge)	1500	
52.9	52.7	52.6	52.7	55.7	55.8		360	
53.4	53.3	53.3	53.3	55.7	55.8	(merge)	1500	
59.5	59.5	59.5	59.5	59.9	59.9		1690	Terminal Ave
53.3	53.2	53.3	53.3	58.9	59.0	(diverge)	1500	
45.1	40.3	45.0	41.3	60.0	60.0		27835	MMMBT
				55.7	55.9			
				60.0	60.0			I-664 Connector (Build Alternatives C and D)
				56.9	57.1			
				53.4	53.1			MMMBT
41.8	23.6	17.8	17.9	56.2	56.2	(merge)	1500	
58.8	17.9	14.1	14.9	58.7	58.7		640	College Dr NB
52.0	12.8	13.3	14.7	51.2	51.2		1695	
58.5	26.8	58.4	58.4	59.6	59.6		500	College Dr SB
52.5	37.6	52.0	52.1	57.7	57.7	(diverge)	1500	
59.4	29.1	59.2	59.2	59.5	59.5		1310	MATCHLINE A

I-664 AM PEAK LOS ALTERNATIVES COMPARISON (CONTINUED)

EASTBOUND

Cross Street	Length (not to scale)		Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D
MATCHLINE A	1600		59.7	59.7	59.7	59.7	59.8	59.8
	1500	(diverge)	56.2	56.0	56.1	55.1	58.2	58.1
VA 164	1235		59.6	59.6	59.6	59.5	59.8	59.8
	1500	(merge)	55.2	54.9	55.0	55.1	54.6	54.6
US 17	740		59.2	59.2	59.2	59.2	59.1	59.1
	1500	(merge)	58.9	57.4	54.2	54.5	55.8	55.9
	700		59.8	59.6	59.0	59.1	59.3	59.3
	1500	(diverge)	52.6	52.3	52.2	52.2	53.9	53.9
Pughsville Rd	2525		59.7	59.7	59.7	59.7	59.8	59.8
	1500	(merge)	54.3	52.6	52.8	53.1	55.4	55.4
	5140		60.0	58.0	58.3	58.9	60.0	60.0
	1500	(diverge)	53.0	52.8	52.8	52.8	56.1	56.1
Portsmouth Blvd WB	600		58.7	58.7	58.7	58.7	59.3	59.3
	1700		50.3	47.4	47.6	47.8	49.0	49.1
Portsmouth Blvd EB	480		58.3	57.8	57.9	57.9	58.1	58.1
	1500	(merge)	54.1	52.0	52.2	52.8	55.3	55.4
	1500	(diverge)	53.3	53.0	53.0	53.0	56.3	56.3
Dock Landing Rd	2550		59.7	58.6	59.2	59.6	59.9	59.9
	1500	(merge)	53.5	50.7	51.3	52.0	55.1	55.1
	725		58.9	54.5	55.7	57.1	59.2	59.2
	1500	(diverge)	52.3	52.0	51.9	51.9	54.9	54.9
US 58 SB	480		58.5	58.4	58.4	58.4	59.0	59.0
	2045		52.3	50.3	50.5	50.8	51.6	51.7
US 58 NB	1260		59.5	59.3	59.3	59.4	59.4	59.4
	490	(merge)	50.3	50.4	50.4	50.4	53.3	53.5
	1020		50.3	50.4	50.4	50.4	53.3	53.5
	490	(diverge)	57.1	57.2	57.2	57.2	57.8	57.9
S Military Hwy	1500	(diverge)	48.6	49.7	49.1	49.8	50.3	50.4
I-64 SB	3435		59.8	59.8	59.8	59.8	59.8	59.8

WESTBOUND

Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D		Length (not to scale)	Cross Street
59.4	29.1	59.2	59.2	59.5	59.5		1310	MATCHLINE A
54.3	53.8	52.0	52.0	55.2	55.1	(merge)	1500	
58.9	55.8	58.5	58.5	58.4	58.4		1140	VA 164 WB
48.7	32.5	44.9	45.2	43.8	43.7		1715	
59.7	59.4	59.6	59.6	59.7	59.7		510	US 17/VA 164 EB
47.9	45.0	45.0	44.6	46.2	46.3		1715	
53.1	51.2	51.5	51.5	54.5	54.5	(merge)	1500	Pughsville Rd WB
59.0	59.0	59.0	59.0	59.4	59.4		1000	Pughsville Rd EB
52.6	52.4	52.4	52.4	55.7	55.7	(diverge)	1500	
59.6	55.4	55.4	55.4	60.0	60.0		5350	
53.3	51.0	51.0	51.0	54.8	54.9	(merge)	1500	
58.6	57.7	58.1	58.1	58.4	58.4		520	Portsmouth Blvd WB
51.6	49.5	49.4	49.4	50.6	50.7		1680	
58.7	58.1	58.5	58.5	59.2	59.2		575	Portsmouth Blvd EB
52.9	52.7	52.7	52.7	55.8	55.8	(diverge)	1500	
52.9	50.5	50.5	50.5	54.5	54.5		200	
52.8	50.5	50.5	50.5	54.5	54.5	(merge)	1500	
59.7	59.3	59.3	59.3	59.9	59.9		2555	Dock Landing Rd
53.2	53.0	53.0	53.0	56.4	56.4	(diverge)	1500	
59.2	58.1	58.4	58.4	59.4	59.4		1180	
53.3	51.9	52.1	52.1	55.0	55.0	(merge)	1500	
58.7	58.6	58.6	58.6	58.6	58.7		410	US 58 SB
54.1	53.6	53.7	53.7	53.6	53.8	(merge)	1500	
59.9	59.9	59.9	59.9	59.9	59.9		1225	US 58 NB
54.0	53.2	53.3	53.4	53.3	53.3		4675	
59.9	59.8	59.8	59.8	59.8	59.9		2135	I-64 NB

Legend

Speed (mph)
>45
35-45
25-35
≤25

Notes

Speeds evaluated using HCS Freeway Facilities module

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS
Hampton Roads Crossing Study SEIS

I-664 Alternatives Comparison AM Peak Hour Speed

April 2017 | Figure 5-4.3

I-664 PM PEAK LOS ALTERNATIVES COMPARISON

EASTBOUND

Cross Street	Length (not to scale)		Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D
I-64	1320		54.3	54.3	54.3	54.3	55.0	55.0
	1500	(merge)	56.0	55.7	55.6	55.6	55.0	55.3
	1000		59.5	59.4	59.4	59.4	59.3	59.4
	1500	(diverge)	53.6	52.9	53.1	53.2	58.2	58.2
Power Plant Pkwy/Powhatan Pkwy	1660		59.5	59.4	59.5	59.5	59.9	59.9
	1500	(merge)	56.3	56.1	56.1	56.1	57.0	57.1
	1785		59.7	59.7	59.7	59.7	59.8	59.8
	1500	(diverge)	55.7	55.7	55.8	55.8	58.1	58.1
Aberdeen Rd	1505		59.6	59.6	59.6	59.6	59.8	59.8
	3040		53.0	51.4	51.8	51.7	52.0	52.4
Chestnut Ave/Roanoke Ave	2230		59.9	59.9	59.9	59.9	59.9	59.9
	1500	(merge)	56.9	56.6	56.6	56.6	57.2	57.3
	300		55.8	55.9	55.9	55.9	57.2	57.3
	1500	(diverge)	55.8	55.9	55.9	55.9	58.0	57.9
35th St	1105		59.5	59.5	59.5	59.5	59.1	59.1
	1500	(diverge)	57.7	57.3	57.4	57.3	58.8	58.7
26th St / 35th St	2090		59.9	54.8	59.9	59.9	59.9	59.9
US 60	1475	(merge)	54.7	30.8	43.0	56.5	56.9	57.0
	1100	(merge)	55.5	29.9	37.4	45.6	56.6	56.7
	410		55.5	17.3	22.0	26.9	56.6	56.7
	1100	(diverge)	55.5	13.1	16.4	17.7	57.4	57.6
Terminal Ave	585		58.8	10.5	12.9	12.8	58.5	58.5
Terminal Ave	1005	(lane drop)	59.7	15.5	19.6	18.2	59.6	59.6
	1500	(merge)	49.9	23.9	24.1	24.2	56.2	56.4
MMMBT	26460		35.2	35.2	35.2	35.2	57.8	58.0
							56.4	56.8
I-664 Connector (Build Alternatives C and D)							60.0	60.0
							56.0	55.9
MMMBT							60.0	60.0
	1500	(diverge)	53.3	53.2	53.2	53.2	58.2	58.2
College Dr NB	220		58.3	58.3	58.3	58.3	59.5	59.5
	1820		47.9	45.5	45.1	45.6	45.6	45.6
College Dr SB	630		58.3	58.0	58.0	58.0	58.0	58.0
	1500	(merge)	54.5	54.0	53.9	54.0	56.6	56.6
MATCHLINE A	1600		59.6	59.5	59.5	59.5	59.7	59.7

WESTBOUND

Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D		Length (not to scale)	Cross Street
55.0	52.6	53.6	53.6	50.2	50.4		1085	I-64
55.6	55.1	55.2	55.2	27.5	54.0	(diverge)	1500	
59.5	59.4	59.4	59.4	59.6	59.6		1425	
54.8	53.6	53.9	53.9	55.2	55.5	(merge)	1500	
59.8	59.7	59.7	59.7	59.9	59.9		1945	Power Plant Pkwy/Powhatan Pkwy
56.0	55.7	55.7	55.7	57.7	57.8	(diverge)	1500	
59.7	59.4	59.5	59.5	59.7	59.7		1965	
55.1	54.0	54.1	54.1	55.3	55.6	(merge)	1500	
59.6	59.5	59.5	59.5	59.5	59.6		1300	Aberdeen Rd
49.4	46.9	47.3	47.4	47.6	48.3		2775	
59.7	59.8	59.8	59.8	59.9	59.9		2020	Chestnut Ave/Roanoke Ave
55.6	55.8	55.7	55.7	58.6	58.8	(diverge)	1500	
53.2	49.7	49.4	49.4	56.2	56.4		450	
53.2	49.7	49.4	49.4	56.2	56.4	(merge)	1500	
58.2	48.2	57.8	57.9	57.8	57.9		1565	35th St/36th St
46.5	43.6	43.3	43.7	43.2	44.1		945	
59.7	59.7	59.7	59.7	60.0	60.0		2410	US 60
53.3	53.2	53.2	53.2	59.1	59.2	(diverge)	1500	
53.3	53.2	53.2	53.2	56.4	56.7		360	
54.2	53.4	53.5	53.5	56.4	56.7	(merge)	1500	
59.5	59.5	59.5	59.5	60.0	60.0		1690	Terminal Ave
53.4	53.3	53.4	53.4	59.5	59.6	(diverge)	1500	
58.3	58.7	58.7	58.4	60.0	60.0		27835	MMMBT
				56.2	56.6			
				60.0	60.0			I-664 Connector (Build Alternatives C and D)
				56.2	56.3			
				58.6	58.6			MMMBT
55.0	54.2	54.3	54.3	56.9	57.0	(merge)	1500	
59.2	58.9	58.9	58.9	59.1	59.1		640	College Dr NB
54.6	52.8	52.9	52.8	54.2	54.2		1695	
58.6	58.6	58.6	58.6	59.8	59.8		500	College Dr SB
53.1	53.0	52.9	53.0	58.8	58.8	(diverge)	1500	
59.6	59.5	59.5	59.5	59.6	59.6		1310	MATCHLINE A

I-664 PM PEAK LOS ALTERNATIVES COMPARISON (CONTINUED)

EASTBOUND

Cross Street	Length (not to scale)		Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D
MATCHLINE A	1600		59.6	59.5	59.5	59.5	59.7	59.7
	1500	(diverge)	55.9	55.1	55.3	54.9	59.1	58.9
VA 164	1235		59.6	59.5	59.5	59.4	59.9	59.9
	1500	(merge)	54.4	53.9	53.9	54.1	55.3	55.3
US 17	740		59.1	59.0	59.0	59.0	59.2	59.2
	1500	(merge)	56.7	54.0	51.1	51.1	54.2	54.1
	700		59.4	59.0	58.5	58.5	59.0	59.0
	1500	(diverge)	52.3	51.7	51.7	51.7	53.9	53.9
Pughsville Rd	2525		59.7	59.7	59.7	59.7	59.8	59.8
	1500	(merge)	53.8	52.5	52.5	52.7	55.0	55.0
	5140		59.9	58.0	58.0	58.3	60.0	60.0
	1500	(diverge)	53.1	53.0	53.0	53.0	56.2	56.2
Portsmouth Blvd WB	600		58.7	58.7	58.7	58.7	59.3	59.3
	1700		48.1	45.0	45.4	45.4	46.5	46.5
Portsmouth Blvd EB	480		58.0	57.4	57.5	57.5	57.7	57.7
	1500	(merge)	53.6	52.0	52.0	52.2	54.9	54.9
	1500	(diverge)	53.1	52.8	52.8	52.8	54.9	54.9
Dock Landing Rd	2550		59.7	59.2	59.2	59.4	59.8	59.8
	1500	(merge)	53.7	52.6	52.6	52.8	55.3	55.2
	725		59.0	58.3	58.3	58.6	59.2	59.2
	1500	(diverge)	52.2	51.8	51.8	51.7	56.6	56.7
US 58 SB	480		58.4	58.4	58.3	58.3	59.3	59.3
	2045		52.9	51.5	51.7	51.8	53.6	53.6
US 58 NB	1260		59.5	59.4	59.4	59.4	59.6	59.6
	490	(merge)	53.2	50.9	50.9	51.6	55.6	55.6
	1020		53.2	50.9	50.9	51.6	55.6	55.6
	490	(diverge)	58.0	57.3	57.3	57.5	54.9	55.0
S Military Hwy	1500	(diverge)	49.7	52.6	52.0	52.4	54.3	54.5
I-64 SB	3435		59.8	59.9	59.9	59.9	59.9	59.9

WESTBOUND

Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D		Length (not to scale)	Cross Street
59.6	59.5	59.5	59.5	59.6	59.6		1310	MATCHLINE A
55.7	55.2	55.2	55.2	56.5	56.5	(merge)	1500	
59.2	58.9	58.9	58.9	58.8	58.8		1140	VA 164 WB
51.5	49.2	48.5	48.8	48.3	48.3		1715	
59.8	59.7	59.7	59.7	59.7	59.7		510	US 17/VA 164 EB
50.5	48.5	48.5	48.4	48.8	49.0		1715	
54.1	53.8	53.8	53.8	55.5	55.6	(merge)	1500	Pughsville Rd WB
59.0	59.0	59.0	59.0	59.4	59.4		1000	Pughsville Rd EB
52.3	52.0	52.1	52.1	55.2	55.2	(diverge)	1500	
60.0	60.0	60.0	60.0	60.0	60.0		5350	
54.7	54.1	54.1	54.2	55.7	55.8	(merge)	1500	
58.6	58.3	58.3	58.3	58.4	58.4		520	Portsmouth Blvd WB
52.0	49.6	49.7	49.7	50.3	50.4		1680	
58.6	58.6	58.6	58.6	59.2	59.2		575	Portsmouth Blvd EB
52.6	52.3	52.4	52.4	55.7	55.7	(diverge)	1500	
52.6	52.3	52.4	52.4	55.3	55.3		200	
54.1	53.4	53.4	53.4	55.3	55.3	(merge)	1500	
59.7	59.7	59.7	59.7	59.9	59.9		2555	Dock Landing Rd
53.0	52.8	52.8	52.8	56.1	56.1	(diverge)	1500	
59.3	59.2	59.3	59.3	59.5	59.5		1180	
54.1	53.4	53.5	53.5	55.3	55.4	(merge)	1500	
58.9	58.8	58.8	58.8	58.8	58.8		410	US 58 SB
54.6	54.4	54.4	54.4	54.3	54.5	(merge)	1500	
59.9	59.9	59.9	59.9	59.9	59.9		1225	US 58 NB
53.6	52.8	52.7	52.7	52.6	52.9		4675	
59.8	59.7	59.8	59.8	59.8	59.8		2135	I-64 NB

Legend

Speed (mph)
>45
35-45
25-35
≤25

Notes

Speeds evaluated using HCS Freeway Facilities module

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS
Hampton Roads Crossing Study SEIS

I-664 Alternatives Comparison PM Peak Hour Speed

April 2017

Figure 5-4.4

VA 164 AM PEAK LOS ALTERNATIVES COMPARISON

Cross Street	Length (not to scale)		EASTBOUND						WESTBOUND							Length (not to scale)	Cross Street
			Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D	Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D			
US 17/Bridge Rd	2600		60.0	60.0	60.0	60.0	60.0	60.0	59.4	59.2	59.2	59.1	59.3	59.3		1670	I-664 SB
	2680		58.9	56.8	57.0	52.0	54.8	50.1	51.8	48.9	48.1	47.3	50.0	50.1		1610	
I-664	1460		64.8	64.7	64.7	59.7	64.6	59.7	63.3	63.3	63.3	63.5	63.3	63.6		970	I-664 NB
	1500	(merge)	56.1	55.5	55.6	54.6	55.7	55.7	52.3	52.1	52.2	54.0	52.5	54.4	(diverge)	1500	
College Dr	585		59.3	59.2	59.2	59.0	59.2	59.2	58.9	58.9	58.9	59.2	58.9	59.2		1025	College Dr
	1500	(merge)	54.6	53.6	53.8	55.4	54.1	56.0	51.6	51.4	51.5	54.2	51.5	53.9	(diverge)	1500	
	1290		59.4	59.3	59.4	59.5	59.4	59.6	59.4	59.4	59.4	59.6	59.4	59.6		1270	
	1500	(diverge)	49.5	49.4	49.4	53.5	49.4	53.3	54.6	54.3	54.4	55.9	54.6	56.1	(merge)	1500	
Towne Point Rd	2000		59.4	59.4	59.4	59.6	59.4	59.6	59.4	59.4	59.4	59.6	59.4	59.5		1970	Towne Point Rd
	1500	(merge)	53.8	52.4	52.7	54.7	53.2	55.4	49.6	49.5	49.6	52.7	49.6	52.5	(diverge)	1500	
	1400		59.4	59.3	59.3	59.5	59.4	59.6	59.4	59.4	59.4	59.6	59.4	59.6		1315	
	1500	(diverge)	51.0	50.6	50.6	53.9	50.9	53.8	54.5	54.3	54.4	55.8	54.5	55.9	(merge)	1500	
Cedar Ln SB (Existing and 2040 NB)	1135		58.9	58.9	58.9	58.7	58.0	58.6	58.8	58.8	58.8	58.5	58.8	58.8		1140	Cedar Ln
	1500	(merge)	54.7	54.2	54.3				49.5	49.4	49.5	46.9	49.4	49.6	(diverge)	1500	
												55.2	59.1	55.4			
Cedar Ln NB (Existing and 2040 NB)	110		58.6	58.4	58.4				59.3	59.2	59.3	58.8	58.8	58.8		1300	Craney Island Connector (Build Alternatives)
	1000	(merge)	54.4	53.8	53.9	51.5	49.1	52.3									
Craney Island Connector (Build Alternatives)	500		49.7	49.6	49.7												
	1000	(diverge)	49.7	49.6	49.7				55.3	55.2	55.2	55.4	55.4	55.4	(merge)	1000	
Virginia International Gateway Blvd (Existing and 2040 NB)	2245		58.9	58.9	58.9	60.0	60.0	60.0	58.7	58.7	58.7	59.8	59.6	59.8		2330	Virginia International Gateway Blvd
	1025	(merge)	54.8	54.3	54.3				49.7	49.6	49.6	49.8	48.9	51.0	(diverge)	1225	
Craney Island Connector (Build Alternatives)	475		49.8	49.8	49.8				49.7	49.6	49.6	54.7	48.9	54.9		275	
	1025	(diverge)	49.8	49.8	49.8	49.0	48.9	48.8	54.9	54.8	54.9	54.7	55.0	54.9	(merge)	1225	
W. Norfolk Rd	625		55.8	55.8	55.8	57.9	57.9	57.9	58.4	58.4	58.4	58.4	58.4	58.4		810	W Norfolk Rd
	1500	(merge)	54.7	53.8	53.8	54.1	54.1	54.2	49.8	49.7	49.7	49.8	49.8	49.8	(diverge)	1500	
	1245		59.4	59.3	59.3	59.4	59.4	59.4	55.0	55.0	55.0	55.0	55.0	55.0		1710	
									55.0	55.0	55.0	55.0	55.0	55.0	(lane drop)	415	
	2330	(lane add)	55.0	55.0	55.0	55.0	55.0	55.0	54.8	54.8	54.8	54.8	54.8	54.8		1585	
	1500	(lane drop)	50.2	50.1	50.2	50.2	50.5	50.6	52.2	52.1	52.1	52.1	52.2	52.2	(merge)	1500	
(diverge) US 58 EB	1375		48.9	48.8	48.8	48.7	48.7	48.7	51.6	51.5	51.5	51.5	51.5	51.5	(merge)	1050	US 58 SB
Lee Ave/Railroad Ave; US 58 WB	1500		54.4	54.4	54.4	54.4	54.4	54.4	54.9	54.8	54.8	54.8	54.9	54.8		1765	Railroad Ave/US 58 NB
Lee Ave / Harper Ave	1500	(merge)	52.3	52.1	52.1	52.2	52.1	52.1	47.1	46.4	46.6	46.2	47.2	46.9		3150	
	1830		49.7	48.6	48.6	48.9	48.7	48.7	55.0	55.0	55.0	55.0	55.0	55.0		500	London Blvd

VA 164 PM PEAK LOS ALTERNATIVES COMPARISON

Cross Street	Length (not to scale)		EASTBOUND						WESTBOUND							Length (not to scale)	Cross Street
			Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D	Existing	2040 NB	2040 Alt A	2040 Alt B	2040 Alt C	2040 Alt D			
US 17/Bridge Rd	2600		60.0	60.0	60.0	60.0	60.0	60.0	59.9	59.5	59.5	59.1	59.6	59.2		1670	I-664 SB
	2680		61.5	60.6	60.7	55.7	59.6	54.8	55.9	53.2	52.8	47.5	53.6	49.2		1610	
I-664	1460		64.9	64.8	64.9	59.9	64.8	59.8	64.9	63.2	63.2	59.2	63.3	59.2		970	I-664 NB
	1500	(merge)	56.2	56.0	56.0	55.6	56.1	56.1	52.0	51.8	51.9	54.1	52.1	54.4	(diverge)	1500	
College Dr	585		59.3	59.3	59.3	59.2	59.3	59.3	58.9	58.9	58.9	59.3	58.9	59.3		1025	College Dr
	1500	(merge)	54.8	54.2	54.3	55.8	54.5	56.2	51.4	51.2	51.2	54.6	51.3	54.6	(diverge)	1500	
	1290		59.5	59.4	59.4	59.6	59.4	59.6	59.4	59.2	59.3	59.5	59.3	59.5		1270	
	1500	(diverge)	49.0	48.8	48.8	52.1	48.8	51.7	54.1	52.9	53.2	55.1	53.7	55.7	(merge)	1500	
Towne Point Rd	2000		59.4	59.3	59.3	59.5	59.3	59.5	59.3	59.3	59.3	59.5	59.3	59.5		1970	Towne Point Rd
	1500	(merge)	54.4	54.1	54.2	55.7	54.3	56.1	48.9	48.8	48.9	52.5	48.9	52.4	(diverge)	1500	
	1400		59.5	59.4	59.4	59.6	59.5	59.6	59.3	58.7	59.2	59.4	59.3	59.5		1315	
	1500	(diverge)	51.5	51.2	51.2	54.3	51.4	54.1	53.5	51.9	52.4	54.6	53.0	55.3	(merge)	1500	
Cedar Ln SB (Existing and 2040 NB)	1135		59.0	59.0	59.0	58.8	58.1	58.7	58.8	58.7	58.8	58.5	58.7	58.8		1140	Cedar Ln
	1500	(merge)	55.0	54.8	54.8				49.4	49.4	49.4	47.0	49.4	50.0	(diverge)	1500	
												52.0	54.2	54.1			
Cedar Ln NB (Existing and 2040 NB)	110		58.6	58.6	58.6				59.1	59.0	59.0	58.5	58.6	58.6		1300	Craney Island Connector (Build Alternatives)
	1000	(merge)	54.7	54.5	54.5	51.6	49.2	51.9									
Craney Island Connector (Build Alternatives)	500		49.9	49.8	49.9												
	1000	(diverge)	49.9	49.8	49.9				54.4	53.4	53.8	54.4	54.8	54.7	(merge)	1000	
Virginia International Gateway Blvd (Existing and 2040 NB)	2245		58.9	58.9	58.9	60.0	60.0	60.0	58.8	58.8	58.8	59.6	59.6	59.6		2330	Virginia International Gateway Blvd
	1025	(merge)	55.1	54.9	54.9				49.8	49.8	49.8	48.6	49.1	49.2	(diverge)	1225	
Craney Island Connector (Build Alternatives)	475		49.8	49.7	49.7				49.8	49.8	49.8	48.6	49.1	49.2		275	
	1025	(diverge)	49.8	49.7	49.7	47.4	50.5	50.6	54.1	53.2	53.5	52.8	54.1	54.0	(merge)	1225	
W. Norfolk Rd	625		55.8	55.8	55.8	57.6	58.2	58.2	58.4	58.4	58.4	58.4	58.4	58.4		810	W Norfolk Rd
	1500	(merge)	55.2	55.0	55.0	54.8	55.1	55.1	49.6	49.4	49.4	49.6	49.6	49.7	(diverge)	1500	
	1245		59.5	59.5	59.5	59.4	59.5	59.5	55.0	55.0	55.0	55.0	55.0	55.0		1710	
									54.9	54.9	54.9	54.9	54.9	54.9	(lane drop)	415	
	2330	(lane add)	55.0	55.0	55.0	55.0	55.0	55.0	54.7	54.6	54.7	54.6	54.7	54.7		1585	
	1500	(lane drop)	50.2	50.1	50.1	50.2	50.5	50.6	51.5	50.5	50.8	50.7	51.4	51.5	(merge)	1500	
(diverge) US 58 EB	1375		49.2	49.1	49.1	49.1	49.1	49.1	51.4	51.2	51.2	51.1	51.3	51.2	(merge)	1050	US 58 SB
Lee Ave/Railroad Ave; US 58 WB	1500		54.4	54.4	54.4	54.4	54.4	54.4	54.8	54.8	54.8	54.8	54.8	54.8		1765	Railroad Ave/US 58 NB
Lee Ave / Harper Ave	1500	(merge)	52.4	52.3	52.4	52.3	52.3	52.3	45.4	43.5	44.0	43.3	44.6	44.3		3150	
	1830		48.4	47.5	47.5	47.3	47.5	47.5	55.0	55.0	55.0	55.0	55.0	55.0		500	London Blvd

Legend

Speed (mph)
>45
35-45
25-35
≤25

Notes

Speeds evaluated using HCS Freeway Facilities module

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS
Hampton Roads Crossing Study SEIS

VA 164 Alternatives Comparison Speed

April 2017

Figure 5-4.5

JAMES RIVER CONNECTORS AM PEAK LOS ALTERNATIVE B

Cross Street	Length (not to scale)		WESTBOUND 2040 Alt B	EASTBOUND 2040 Alt B		Length (not to scale)	Cross Street
	3675		55.0	54.9		3615	
	1500	(diverge)	49.1	51.7	(merge)	1500	
Hampton Blvd	2850		54.8	54.8		2970	Hampton Blvd
	1500	(merge)	51.3	48.6	(diverge)	1500	
	16540		55.0	55.0		17390	
	1500	(diverge)	50.1	50.9	(merge)	1500	
Future Craney Island Access	2700		54.8	54.7		2000	Future Craney Island Access
	1500	(merge)	51.1	50.2	(diverge)	1500	
				55.0		5050	
	5350		54.9	50.6	(merge)	1500	
				55.0	VA 164 EB	1100	

JAMES RIVER CONNECTORS AM PEAK LOS ALTERNATIVES C & D

Cross Street	Length (not to scale)		WESTBOUND 2040 Alt C	WESTBOUND 2040 Alt D	EASTBOUND 2040 Alt C	EASTBOUND 2040 Alt D		Length (not to scale)	Cross Street
	3675		55.0	55.0	54.9	54.9		3615	
	1500	(diverge)	49.4	49.4	51.7	51.7	(merge)	1500	
Hampton Blvd	2850		54.8	54.8	54.8	54.8		2970	Hampton Blvd
	1500	(merge)	51.0	51.0	48.3	48.4	(diverge)	1500	
	5450		55.0	55.0	55.0	55.0		5730	
	1500	(diverge)	49.5	49.3	50.9	50.9	(merge)	1500	
Craney Island Connector	4135		55.0	54.9	54.9	54.9		3660	Craney Island Connector
	1500	(merge)	51.1	51.2	49.7	49.8	(diverge)	1500	
	6300		55.0	55.0	55.0	55.0		5285	

Craney Island Connector

Cross Street	Length (not to scale)		SOUTHBOUND 2040 Alt C	SOUTHBOUND 2040 Alt D	NORTHBOUND 2040 Alt C	NORTHBOUND 2040 Alt D		Length (not to scale)	Cross Street
	7095		55.0	55.0	55.0	55.0		9410	
	1500	(diverge)	50.1	50.1	51.2	51.2	(merge)	1500	
Future Craney Island Access	2700		54.8	54.8	54.7	54.7		2000	Future Craney Island Access
	1500	(merge)	51.3	51.2	50.3	50.3	(diverge)	1500	
					55.0	55.0		5050	
	5350		54.9	55.0	50.9	50.9	(merge)	1500	
					55.0	55.0	VA 164 EB	1100	

JAMES RIVER CONNECTORS PM PEAK LOS ALTERNATIVE B

Cross Street	Length (not to scale)		WESTBOUND 2040 Alt B	EASTBOUND 2040 Alt B		Length (not to scale)	Cross Street
	3675		55.0	54.9		3615	
	1500	(diverge)	50.0	51.4	(merge)	1500	
Hampton Blvd	2850		54.9	54.9		2970	Hampton Blvd
	1500	(merge)	51.1	49.5	(diverge)	1500	
	16540		55.0	55.0		17390	
	1500	(diverge)	50.1	51.1	(merge)	1500	
Future Craney Island Access	2700		54.8	54.7		2000	Future Craney Island Access
	1500	(merge)	51.0	50.3	(diverge)	1500	
				55.0		5050	
	5350		55.0	50.8	(merge)	1500	
				55.0	VA 164 EB	1100	

JAMES RIVER CONNECTORS PM PEAK LOS ALTERNATIVES C & D

Cross Street	Length (not to scale)		WESTBOUND 2040 Alt C	WESTBOUND 2040 Alt D	EASTBOUND 2040 Alt C	EASTBOUND 2040 Alt D		Length (not to scale)	Cross Street
	3675		55.0	55.0	54.9	54.9		3615	
	1500	(diverge)	50.1	50.1	50.9	50.9	(merge)	1500	
Hampton Blvd	2850		54.9	54.9	54.8	54.8		2970	Hampton Blvd
	1500	(merge)	50.7	50.8	49.2	49.2	(diverge)	1500	
	5450		55.0	55.0	55.0	55.0		5730	
	1500	(diverge)	49.5	49.3	50.8	50.9	(merge)	1500	
Craney Island Connector	4135		55.0	54.9	54.9	54.9		3660	Craney Island Connector
	1500	(merge)	51.0	51.1	49.6	49.8	(diverge)	1500	
	6300		55.0	55.0	55.0	55.0		5285	

Craney Island Connector

Cross Street	Length (not to scale)		SOUTHBOUND 2040 Alt C	SOUTHBOUND 2040 Alt D	NORTHBOUND 2040 Alt C	NORTHBOUND 2040 Alt D		Length (not to scale)	Cross Street
	7095		55.0	55.0	55.0	55.0		9410	
	1500	(diverge)	50.2	50.2	51.2	51.2	(merge)	1500	
Future Craney Island Access	2700		54.8	54.8	54.7	54.7		2000	Future Craney Island Access
	1500	(merge)	51.2	51.2	50.2	50.3	(diverge)	1500	
					55.0	55.0		5050	
	5350		55.0	55.0	50.9	50.9	(merge)	1500	
					55.0	55.0	VA 164 EB	1100	

Legend

Speed (mph)
>45
35-45
25-35
≤25

Notes

Speeds evaluated using HCS Freeway Facilities module

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS
Hampton Roads Crossing Study SEIS

Elizabeth River Crossing Alternatives Comparison Speed

April 2017 | Figure 5-4.6

Table 5-4: 2040 Intersection Capacity Analyses Results

Intersection	Control Type	Existing				2040 No-Build				2040 Alternative A				2040 Alternative B				2040 Alternative C				2040 Alternative D			
		AM		PM		AM		PM		AM		PM		AM		PM		AM		PM		AM		PM	
		Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
I-64 Interchanges																									
VA-134 at I-64 WB On Ramp*	Signalized	17.9	B	19.1	B	21.5	C	22.9	C	20.8	C	23.9	C	22.3	C	24.6	C	21.9	C	24.1	C	20.4	C	24.0	C
LaSalle Ave at Armistead Ave*	Signalized	19.7	B	23.8	C	22.3	C	27.2	C	22.6	C	26.9	C	22.7	C	27.5	C	21.8	C	26.4	C	22.3	C	26.8	C
I-64 EB Off Ramp at Rip Rap Rd	Signalized	15.3	B	17.5	B	16.6	B	18.2	B	20.2	C	24.3	C	17.0	B	19.4	B	17.8	B	20.7	C	18.6	B	21.0	C
Settlers Landing Rd at E Tyler St	Signalized	24.5	C	17.4	B	31.3	C	26.9	C	31.1	C	25.2	C	33.7	C	27.9	C	29.0	C	23.6	C	32.7	C	26.8	C
Settlers Landing Rd at I-64 SB On Ramp	Yield Control***	11.5	B	13.9	B	14.7	B	27.4	D	12.5	B	17.7	C	13.0	B	17.4	C	11.5	B	16.1	C	12.3	B	16.5	C
Settlers Landing Rd at I-64 NB On Ramp	Signalized	21.3	C	23.2	C	36.2	D	72.1	E	34.6	C	79.0	E	34.5	C	72.7	E	57.1	E	87.0	F	37.4	D	96.4	F
I-64 SB Ramps at S Mallory St	Signalized	8.4	A	98.6	F	10.7	B	125.7	F	10.3	B	63.4	E	11.4	B	118.0	F	11.0	B	58.0	E	11.2	B	67.5	E
I-64 NB Ramps at S Mallory St	Signalized	72.2	E	19.9	B	104.5	F	31.9	C	56.8	E	28.0	C	76.0	E	30.0	C	45.0	D	22.5	C	77.0	E	32.2	C
I-64 SB Ramps at 4th View St	Stop Control**	7.5	A	14.1	B	9.3	A	172.1	F	14.0	B	422.2	F	21.2	C	441.2	F	7.8	A	68.8	F	29.5	D	446.4	F
I-64 NB Ramps at 4th View St	Stop Control**	11.9	B	95.6	F	13.5	B	220.6	F	13.6	B	310.3	F	14.4	B	360.2	F	12.7	B	116.4	F	14.4	B	229.3	F
US 460 at I-64 NB On Ramp	Yield Control***	15.7	B	12.8	B	15.9	C	13.0	B	30.2	D	20.8	C	27.3	D	19.4	C	18.4	C	13.9	B	21.3	C	17.4	C
I-564 Interchanges																									
I-564 at Bainbridge Ave	Signalized	13.9	B	37.6	D	12.0	B	30.3	C	11.5	B	23.6	C	13.5	B	24.3	C	12.7	B	19.8	B	12.7	B	18.8	B
I-564 at Hampton Blvd****	Signalized	-	-	-	-	-	-	-	-	-	-	-	-	15.6	B	15.3	B	24.5	C	20.6	C	27.1	C	20.0	C
I-664 Interchanges																									
PowhatanPkwy at I-664 North Ramp	Signalized	24.8	C	27.3	C	14.4	B	20.5	C	15.1	B	21.6	C	15.0	B	21.4	C	15.2	B	24.0	C	15.2	B	23.2	C
Powhatan Pkwy at I-664 South Ramp	Signalized	14.2	B	20.3	C	25.1	C	26.7	C	24.8	C	27.3	C	24.6	C	26.5	C	24.5	C	27.3	C	24.6	C	27.6	C
Aberdeen Rd at I-664 North Ramp	Signalized	14.9	B	7.7	A	11.8	B	20.2	C	12.2	B	20.2	C	11.9	B	18.8	B	12.5	B	25.6	C	12.2	B	24.8	C
Aberdeen Rd at I-664 South Ramp	Signalized	10.2	B	12.8	B	26.6	C	7.7	A	26.9	C	7.3	A	26.8	C	7.3	A	26.2	C	7.8	A	26.4	C	9.8	A
Chestnut Ave at I-664 South Off Ramp	Signalized	0.2	A	0.2	A	0.3	A	0.2	A	0.3	A	0.2	A	0.3	A	0.2	A	0.6	A	0.2	A	0.6	A	0.2	A
Chestnut Ave at I-664 North On Ramp	Signalized	3.1	A	13.6	B	4.3	A	18.5	B	3.4	A	15.4	B	3.8	A	16.3	B	3.5	A	18.0	B	3.3	A	17.7	B
Chestnut Ave at 39th St	Signalized	22.1	C	16.9	B	16.4	B	16.7	B	16.2	B	16.4	B	18.3	B	16.2	B	16.2	B	16.3	B	15.8	B	16.0	B
Roanoke Ave at I-664 South On-Ramp	Stop Control**	9.9	A	10.3	B	10.6	B	11.0	B	10.0	B	10.2	B	10.2	B	10.8	B	10.6	B	12.7	B	10.4	B	11.4	B
Roanoke Ave at I-664 North Off-Ramp	Signalized	17.2	B	11.7	B	14.4	B	18.9	B	13.5	B	19.3	B	14.2	B	19.2	B	13.0	B	19.6	B	14.7	B	19.7	B
Roanoke Ave at 39th St	Signalized	10.6	B	8.4	A	22.8	C	17.8	B	21.8	C	17.5	B	22.2	C	19.2	B	22.7	C	19.7	B	21.8	C	18.3	B
Jefferson Ave at 36th St	Signalized	21.2	C	19.5	B	20.6	C	16.7	B	20.7	C	18.0	B	20.3	C	17.1	B	22.2	C	19.6	B	21.8	C	19.0	B
Jefferson Ave at 35th St	Signalized	3.6	A	7.0	A	9.2	A	8.5	A	9.4	A	10.9	B	9.3	A	9.0	A	9.4	A	11.1	B	9.6	A	11.0	B
Jefferson Ave at 27th St	Signalized	10.8	B	13.5	B	10.8	B	13.1	B	10.9	B	12.8	B	11.2	B	13.2	B	10.8	B	13.2	B	10.4	B	12.6	B
Jefferson Ave at 26th St	Signalized	9.8	A	10.5	B	10.5	B	10.8	B	11.0	B	11.1	B	8.6	A	9.1	A	10.7	B	12.4	B	10.5	B	12.6	B
Jefferson Ave at MLK JR At 25th St	Signalized	9.6	A	11.4	B	11.3	B	13.5	B	11.8	B	14.4	B	10.9	B	13.5	B	13.2	B	15.8	B	13.1	B	15.5	B
Huntington Ave at 35th St	Signalized	17.9	B	12.9	B	18.5	B	12.8	B	18.7	B	13.9	B	19.2	B	13.3	B	20.2	C	13.9	B	19.7	B	13.8	B
Huntington Ave at 34th St	Signalized	18.9	B	21.5	C	21.8	C	23.1	C	22.1	C	24.3	C	21.7	C	24.1	C	22.5	C	23.7	C	22.4	C	23.9	C
Huntington Ave at 28th St	Signalized	8.7	A	9.6	A	12.5	B	12.2	B	12.3	B	10.9	B	12.4	B	11.0	B	12.3	B	10.9	B	12.3	B	10.8	B
Huntington Ave at 26th St	Signalized	23.5	C	20.1	C	20.2	C	22.6	C	21.2	C	23.8	C	21.4	C	23.6	C	21.6	C	24.5	C	21.6	C	24.4	C
Huntington Ave at MLK JR At 25th St	Stop Control**	9.3	A	10.2	A	10.4	B	10.4	B	10.1	B	11.4	B	10.4	B	10.4	B	10.3	B	12.3	B	10.1	B	12.7	B
Terminal Ave at WB I-664 Off Ramp	Stop Control**	9.1	A	9.6	A	9.8	A	10.8	B	9.3	A	10.2	B	9.4	A	11.1	B	9.6	A	10.0	B	9.6	A	10.0	B
US 17 at Townpoint Rd	Stop Control**	164.0	F	85.0	F	831.5	F	595.4	F	830.9	F	552.2	F	671.3	F	432.8	F	870.0	F	517.9	F	912.2	F	552.1	F
Ramp to I-664 South On US 17	Yield Control***	11.2	B	11.7	B	18.5	C	21.3	C	17.4	C	20.2	C	16.6	C	19.2	C	9.2	C	8.1	C	17.8	C	21.0	C
I-664 SB Ramps at Pughsville Rd	Signalized	17.5	B	57.4	E	33.0	C	35.2	D	31.9	C	33.8	C	30.2	C	32.9	C	33.2	C	35.4	D	32.3	C	35.2	D
I-664 NB Off-Ramp at Pughsville Rd	Signalized	5.3	A	8.5	A	6.1	A	10.3	B	6.4	A	10.2	B	6.4	A	10.4	B	6.3	A	10.7	B	6.3	A	10.7	B

Intersection	Control Type	Existing				2040 No-Build				2040 Alternative A				2040 Alternative B				2040 Alternative C				2040 Alternative D			
		AM		PM		AM		PM		AM		PM		AM		PM		AM		PM		AM		PM	
		Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
I-664 SB Ramps at Dock Landing Rd	Signalized	7.4	A	11.6	B	13.1	B	14.1	B	13.2	B	14.1	B	13.4	B	14.3	B	13.7	B	15.4	B	13.7	B	15.4	B
I-664 NB Ramps at Dock Landing Rd	Signalized	9.6	A	8.6	A	13.4	B	13.8	B	13.3	B	15.6	B	12.9	B	13.8	B	11.9	B	14.7	B	11.7	B	14.6	B
W Military Hwy (US 13/58)/Airline Blvd at US 460 Alt/Joliff Rd	Signalized	40.8	D	43.9	D	79.3	E	61.5	E	90.9	F	89.6	F	91.6	F	85.7	F	90.0	F	90.5	F	91.1	F	90.4	F
W Military Hwy (US 460) at US 58/I-664 EB Ramps	Stop Control**	15.2	B	10.8	B	135.6	F	19.3	C	95.1	F	36.1	E	264.3	F	38.5	E	27.6	D	23.3	C	25.5	D	22.9	C
S Military Hwy (US 460) at S Military Hwy (US 13/460)	Stop Control**	43.4	D	26.1	C	325.0	F	198.5	F	164.1	F	502.6	F	625.0	F	689.7	F	127.3	F	454.8	F	141.6	F	437.5	F
I-664 EB Off-Ramp/Schaefer Ave at S Military Hwy (US 460)	Stop Control**	83.3	F	357.3	F	636.6	F	1376.0	F	311.7	F	776.9	F	480.4	F	991.1	F	316.9	F	824.9	F	290.8	F	781.4	F
VA 164 Interchanges																									
VA 164 WB Off-Ramp at College Dr	Signalized	5.5	A	6.2	A	6.0	A	9.5	A	5.7	A	8.7	A	6.2	A	10.1	B	5.5	A	8.1	A	5.6	A	8.5	A
VA 164 EB On-Ramp at College Dr	Signalized	5.2	A	6.0	A	6.0	A	8.9	A	6.1	A	9.1	A	6.1	A	9.3	A	5.8	A	8.3	A	5.8	A	8.6	A
US 17 at College Dr	Signalized	26.3	C	62.5	E	54.3	D	151.5	F	72.5	E	182.5	F	64.9	E	172.8	F	68.0	E	181.6	F	68.4	E	179.8	F
VA 164 WB Ramps at Towne Point Rd*	Signalized	18.9	B	18.9	B	22.3	C	21.0	C	20.4	C	20.6	C	23.2	C	22.6	C	21.7	C	20.7	C	19.8	B	20.7	C
VA 164 EB Ramps at Towne Point Rd*	Signalized	19.6	B	30.6	C	25.5	C	63.8	E	25.1	C	64.0	E	34.9	C	69.1	E	19.7	B	56.0	E	20.3	C	61.2	E
VA 164 WB Ramps at Cedar Ln	Signalized	12.4	B	17.5	B	16.7	B	20.0	C	14.3	B	19.5	B	13.3	B	43.9	D	13.3	B	36.5	D	13.5	B	36.7	D
VA 164 EB Ramps at Cedar Ln	Signalized	11.2	B	5.6	A	17.2	B	6.5	A	17.2	B	6.5	A	39.8	D	6.9	A	42.2	D	5.2	A	49.8	D	5.3	A
VA 164 WB Ramps at Virginia International Gateway Blvd	Stop Control**	10.6	B	9.8	A	11.7	B	10.1	B	11.5	B	10.0	B	10.9	B	9.8	A	10.5	B	9.7	A	10.4	B	9.7	A
Virginia International Gateway Blvd at Wild Duck Ln	Stop Control**	11.7	B	10.5	B	16.1	C	11.4	B	16.0	C	11.1	B	15.4	C	11.1	B	11.7	B	10.9	B	11.6	B	10.8	B
VA 164 EB Ramps at Virginia International Gateway Blvd	Signalized	2.1	A	2.2	A	1.8	A	2.1	A	1.9	A	2.2	A	1.4	A	1.9	A	1.4	A	1.8	A	1.4	A	1.8	A
VA 164 WB Ramps at W Norfolk Rd	Stop Control**	10.2	B	12.9	B	12.7	B	22.4	C	12.5	B	23.5	C	13.4	B	28.7	D	11.7	B	16.3	C	11.2	B	15.2	C
VA 164 EB Ramps at W Norfolk Rd	Stop Control**	10.7	B	12.4	B	11.9	B	16.6	C	13.3	B	18.1	C	18.6	C	45.4	E	12.0	B	14.5	B	11.5	B	13.3	B
RailRd Ave at Lee Ave*	Signalized	22.3	C	23.5	C	27.4	C	23.3	C	27.0	C	24.3	C	25.2	C	24.1	C	23.1	C	23.7	C	21.2	C	23.4	C
RailRd Ave at VA 164 EB Off-Ramp*	Signalized	98.8	F	12.9	B	47.5	D	14.6	B	48.5	D	13.0	B	68.8	E	14.9	B	49.4	D	14.6	B	50.1	D	14.7	B
RailRd Ave at US 58 NB/VA 164 WB Ramps	Signalized	17.5	B	17.0	B	18.5	B	18.0	B	18.2	B	16.2	B	18.2	B	16.1	B	17.2	B	16.2	B	17.2	B	16.4	B
Lee Ave at Woodrow St/Harper Ave	Signalized	6.0	A	5.1	A	6.1	A	5.9	A	6.1	A	5.8	A	6.1	A	5.8	A	6.1	A	5.8	A	6.1	A	5.8	A

5.2 KEY STUDY AREA SEGMENT IMPACTS

To evaluate how the alternatives could improve traffic operations along the Study Area Corridors, VDOT and FHWA worked with the Cooperating and Participating Agencies to identify four "hot spots" along the Study Area Corridors that currently experience high levels of congestion. As these areas experience high levels of congestion now, it can be anticipated that they also would be the most highly congested areas along the Study Area Corridors in the future. The agencies identified data available from the travel demand model that could be used to compare the alternatives. These four sections are presented below along with summary tables and figures that show how different alternatives could improve operations in these hot spots. The four key study area segments are listed below, and shown in **Figure 5-5**:

- Hampton Roads Bridge-Tunnel (HRBT) – Segments F, G and H
- I-564 – Segment I
- I-664 - Monitor Merrimac Memorial Bridge-Tunnel (MMMBT) – Segments C, D and E
- I-664 - Bowers Hill – Segment A

The impacts on these segments are discussed in **Sections 5.2.1 through 5.2.4**. The complete travel demand output from which the data for the above four segments was extracted is provided in **Appendix K**.

Figure 5-5: Forecast Segments

5.2.1 HRBT

Table 5-5 shows the travel demand model output for the section of I-64 between I-664 and I-564, which includes the HRBT bottleneck. Several performance measures are provided that indicate projected travel demand on the facility (daily vehicles miles traveled) and the level of congestion (travel time delay and daily vehicle hours traveled).

Table 5-5 indicates that under No-Build conditions, both VMT and VHT are projected to increase, along with significant increases in delay, in particular in the westbound direction. Compared to the No-Build alternative, delays are projected to decline under all alternatives, with the largest reductions projected under Alternative D. Additionally, the improvements in travel time and reductions in delay are illustrated in **Figures 5-6 through 5-8**.

Table 5-5: I-64 HRBT PM Peak Travel Time Comparison

Performance Measure		Existing (2015)	No-Build (2034)	Alternative A (2034)	Alternative B (2034)	Alternative C (2034)	Alternative D (2034)
PM Peak Travel Time (minutes)	EB	20	26	18	18	19	15
	WB	25	45	32	31	30	23
Speed (congested speed MPH)	EB	36	28	40	41	38	49
	WB	29	16	23	24	24	32
Delay (minutes)	EB	7	13	5	5	6	2
	WB	12	33	19	18	18	10
Daily VHT		32,234	49,300	47,800	46,100	34,700	35,200
Daily VMT		1,099,600	1,313,900	1,673,800	1,654,900	1,209,800	1,506,000

Figure 5-6: I-64 HRBT PM Peak Traffic Travel Time Comparison

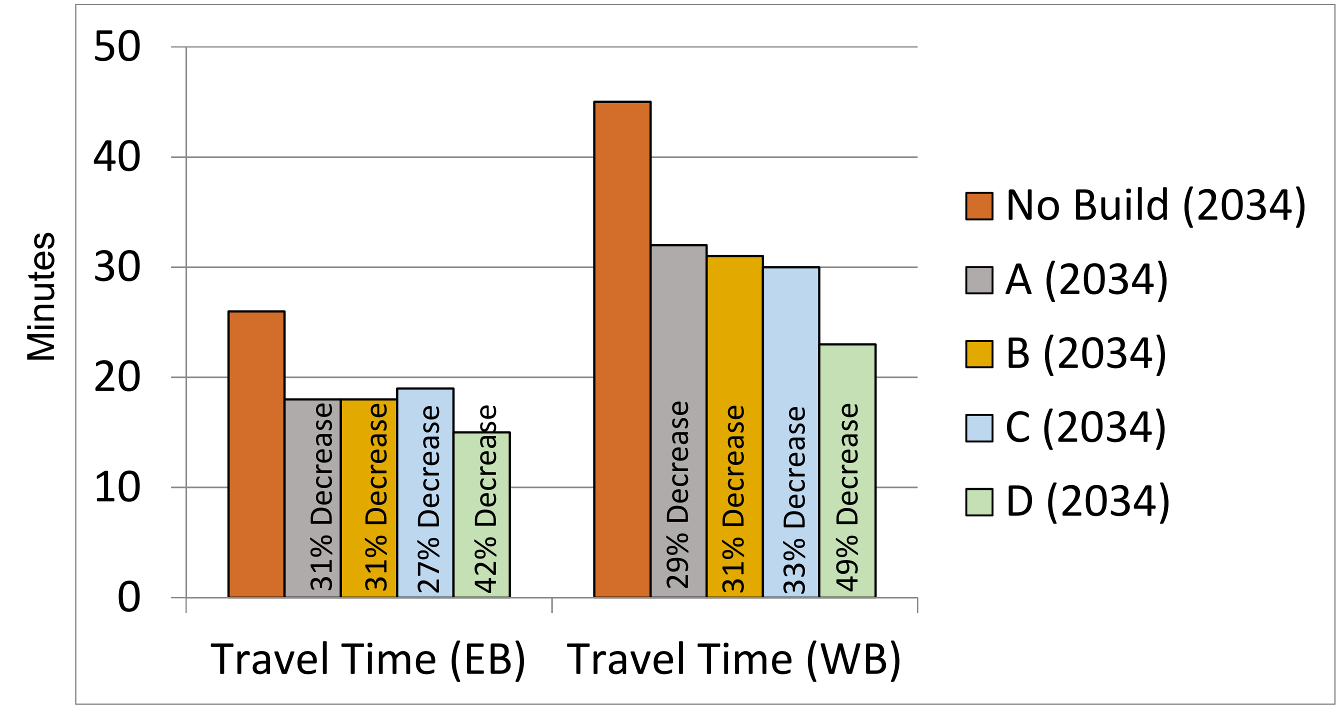


Figure 5-7: I-64 HRBT 2034 PM Peak Hour Travel Time for No-Build Conditions

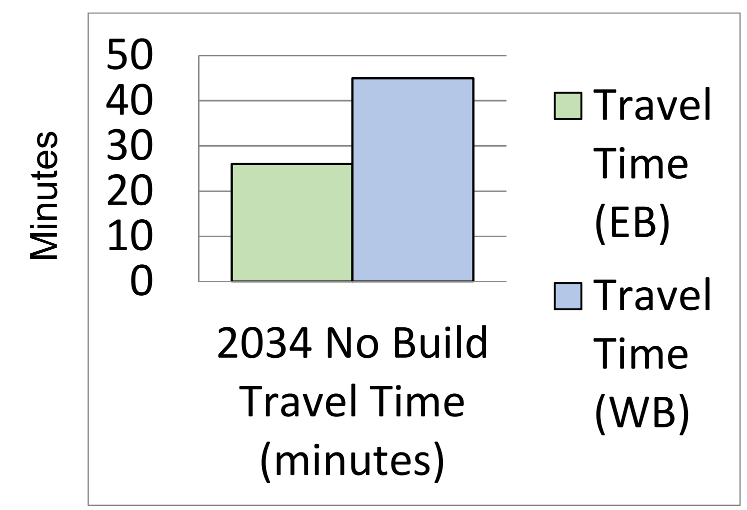


Figure 5-8: 2034 PM Peak Hour Travel Time Savings along I-64 HRBT compared to No-Build Conditions

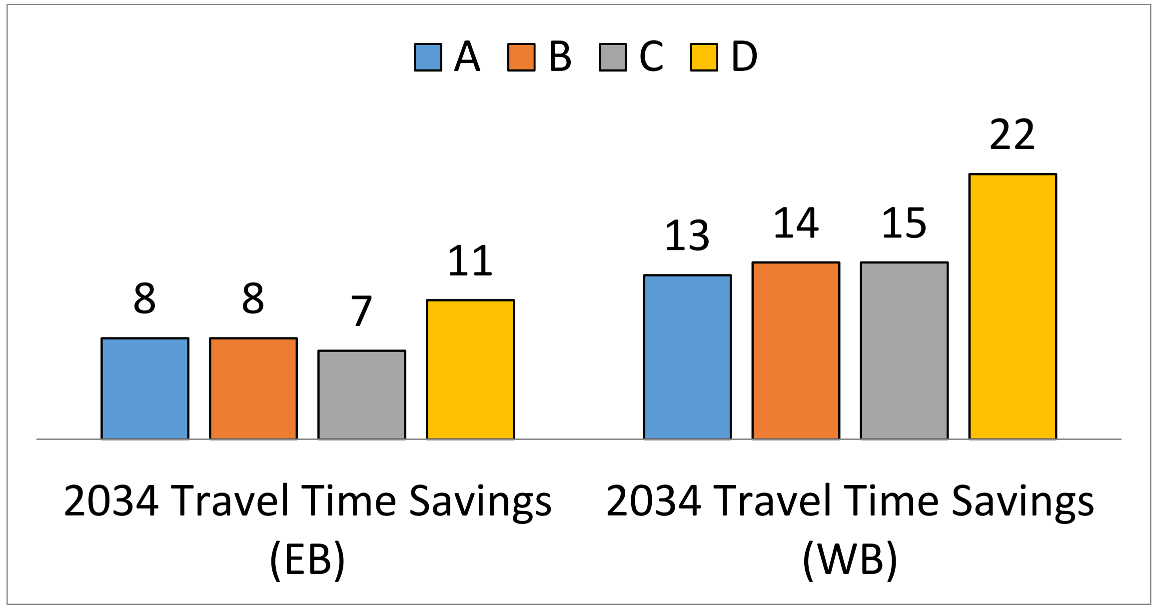
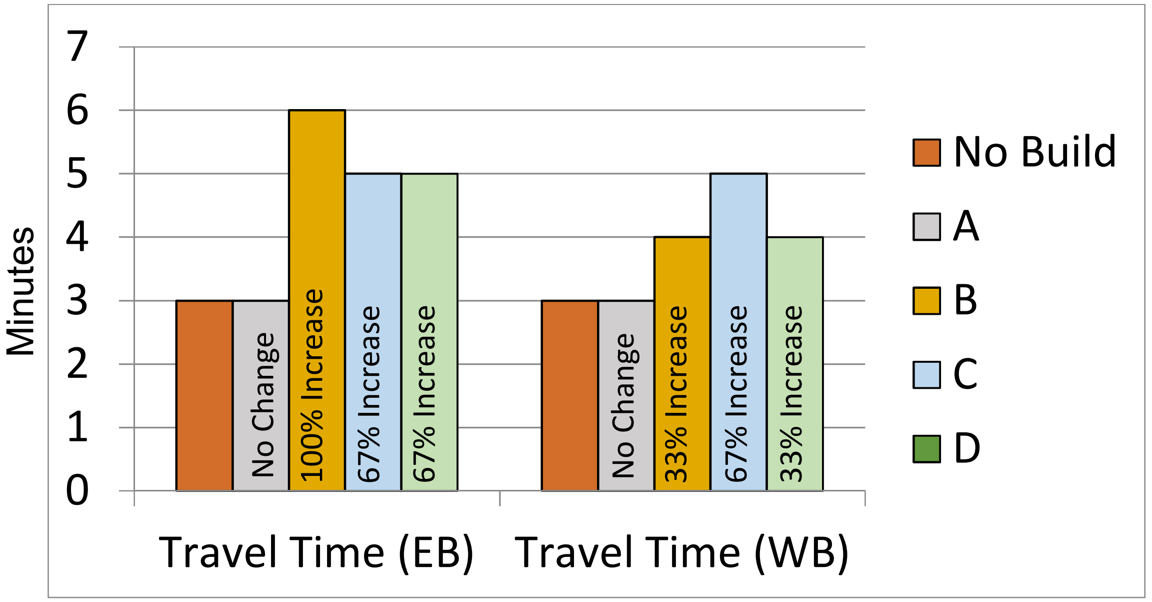


Figure 5-9: I-564 AM Peak Traffic Travel Time Comparison



5.2.2 I-564

Table 5-6 shows the travel demand model output for the section of I-564 and the Intermodal Connector between I-64 and the proposed NIT/Navy interchange.

Table 5-6 indicates that under No-Build and Alternative A conditions, both VMT and VHT are projected to increase, compared to existing conditions, although delays are projected to remain minimal. However, with the construction of the I-564 Connector, VA 164 Connector and I-664 Connector under Alternatives B, C and D, VMT as well as VHT is projected to increase considerably, because I-564 will carry traffic that will cross the Elizabeth River. Along with these traffic volume increases, travel times are projected to increase, but because this section of I-564 comprises a relatively short segment, delay is not projected to increases more than two minutes under Alternative D. Additionally, changes in travel time and delay are illustrated in **Figures 5-9 through 5-11**.

Figure 5-10: I-564 2034 AM Peak Hour Travel Time for No-Build Conditions

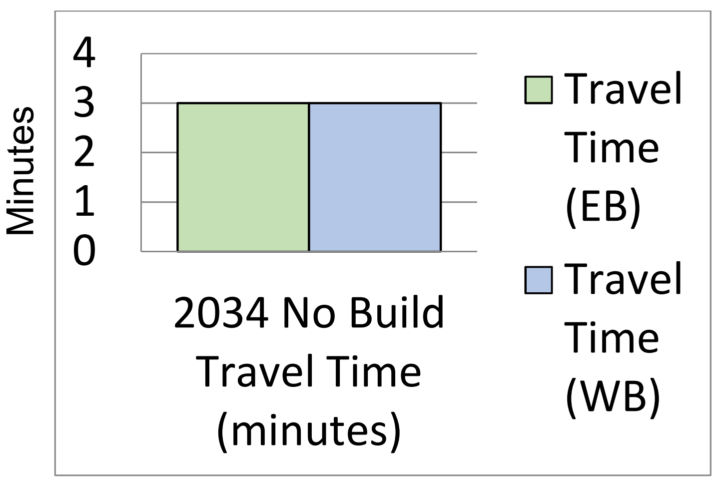
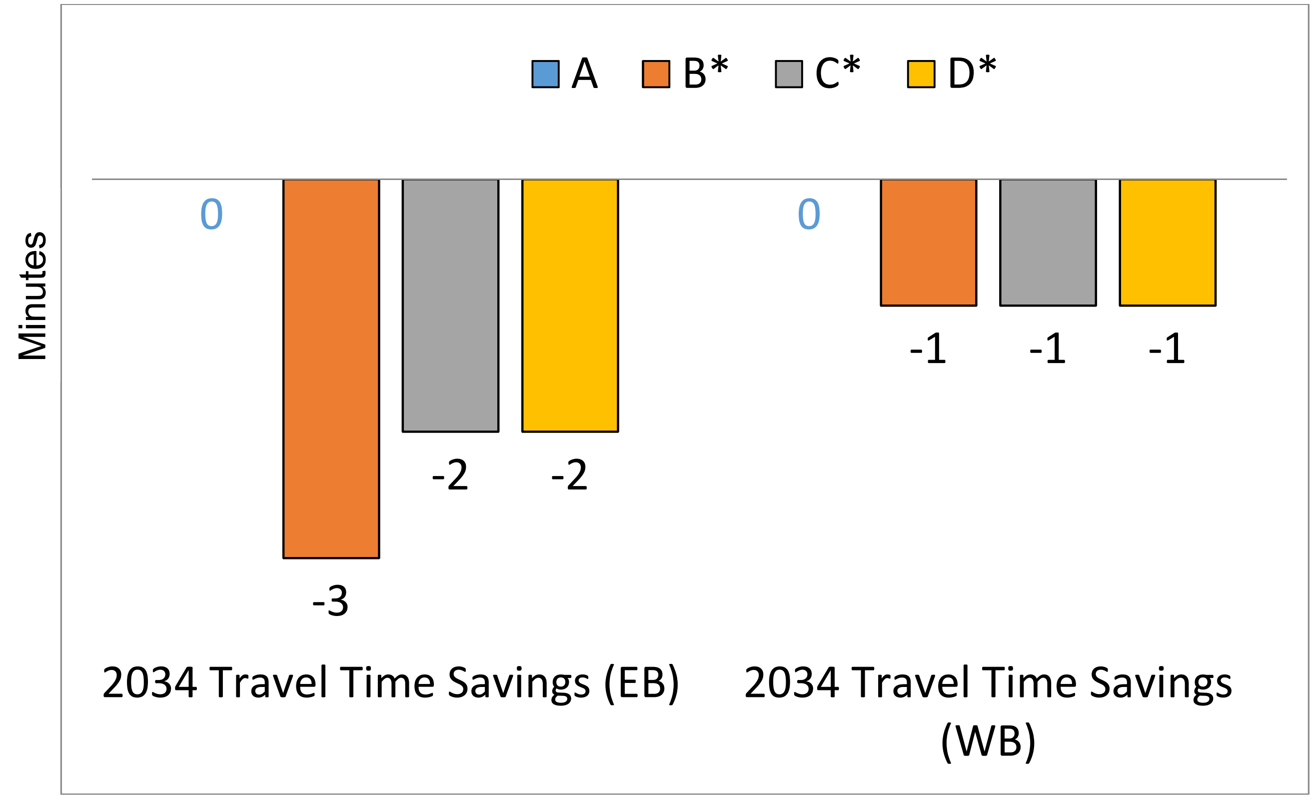


Table 5-6: I-564 AM Peak Travel Time Comparison

Performance Measure		Existing (2015)	No-Build (2034)	Alternative A (2034)	Alternative B (2034)	Alternative C (2034)	Alternative D (2034)
AM Peak Travel Time (minutes)	EB	2	3	3	6	5	5
	WB	2	3	3	4	4	4
Speed (congested speed MPH)	EB	56	58	60	26	30	32
	WB	47	50	52	39	38	38
Delay (minutes)	EB	0	0	0	2	2	2
	WB	0.3	0	0	0	1	1
Daily VHT		1,024	1,200	1,200	2,900	5,800	5,400
Daily VMT		51,200	67,500	68,600	103,500	209,500	202,500

Figure 5-11: 2034 AM Peak Hour Travel Time Savings along I-564 compared to No-Build Conditions



Note: Alternatives B, C, D include new location connections to VA 164 and/or I-664; the alternatives see in increase in travel time along I-564. There is no change in travel time under Alternative A

5.2.3 MMMBT

Table 5-7 shows the travel demand model output for the section of I-664 between I-64 and College Drive, which includes the MMMBT bottleneck.

Table 5-7 indicates that under No-Build conditions, both VMT and VHT are projected to increase, along with significant increases in delay, in particular in the eastbound direction. Compared to the No-Build alternative, delays are projected to decline under all alternatives, with the largest reductions projected under Alternatives C and D. Additionally, improvements in travel time and reductions in delay are illustrated in **Figures 5-12 through 5-14**.

Table 5-7: I-664 MMMBT PM Peak Travel Time Comparison

Performance Measure		Existing (2015)	No-Build (2034)	Alternative A (2034)	Alternative B (2034)	Alternative C (2034)	Alternative D (2034)
PM Peak Travel Time (minutes)	EB	12	21	18	17	12	12
	WB	19	22	17	17	13	12
Speed (congested speed MPH)	EB	58	33	39	41	55	56
	WB	37	31	41	40	52	56
Delay (minutes)	EB	0	10	6	5	1	1
	WB	7	11	5	6	2	1
Daily VHT		18,551	26,100	21,300	20,900	26,300	23,400
Daily VMT		838,200	1,087,800	1,018,300	1,006,900	1,475,500	1,352,800

Figure 5-12: I-664 MMMBT PM Peak Traffic Travel Time Comparison

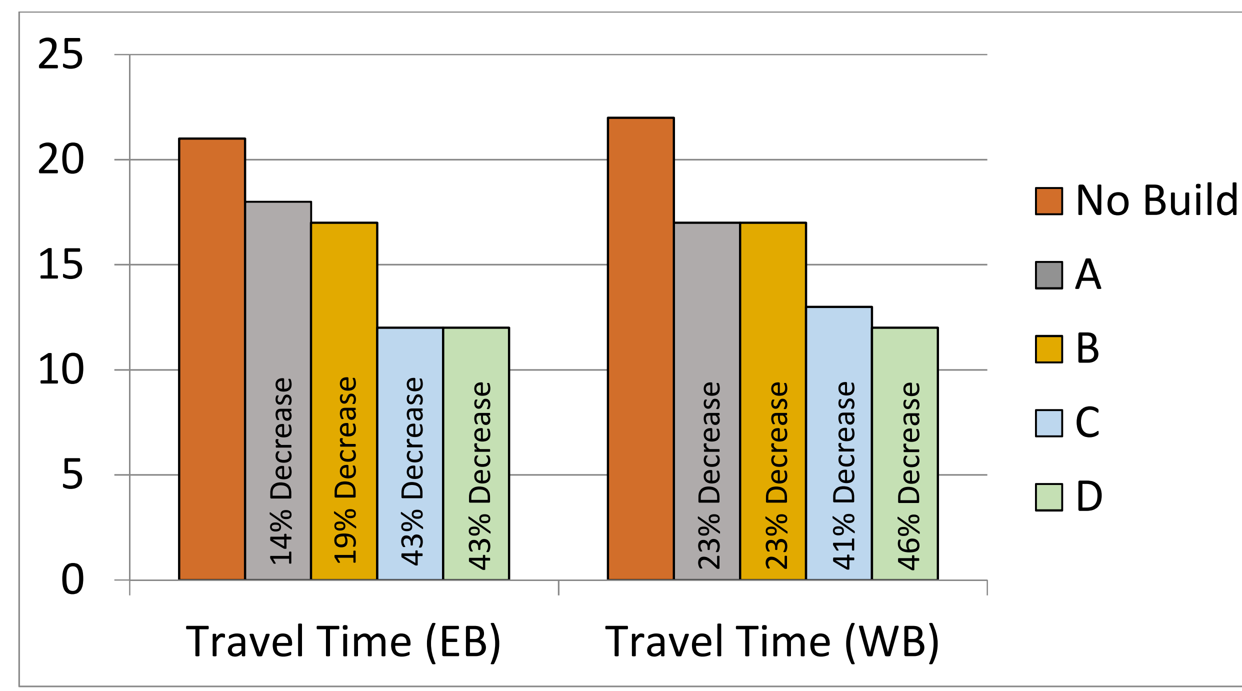


Figure 5-13: I-664 MMMBT 2034 PM Peak Hour Travel Time for No-Build Conditions

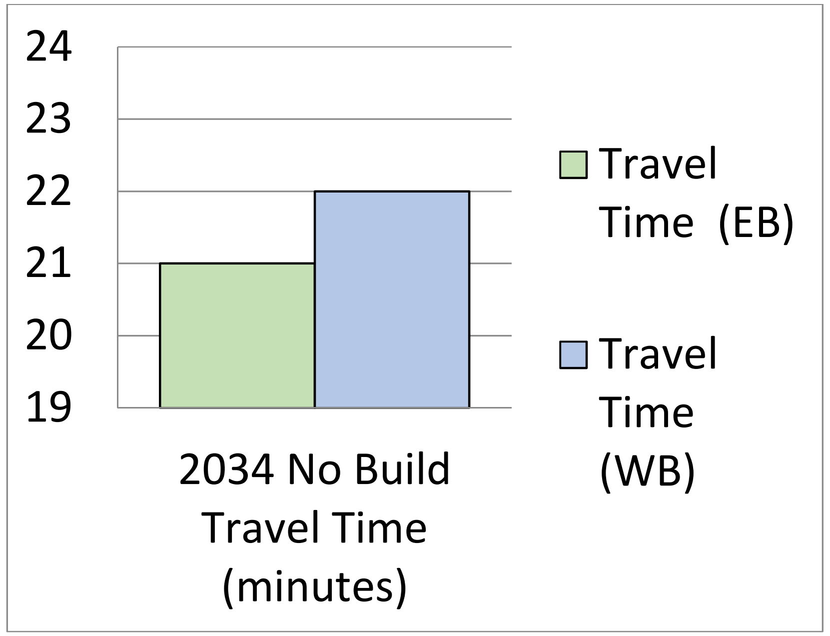
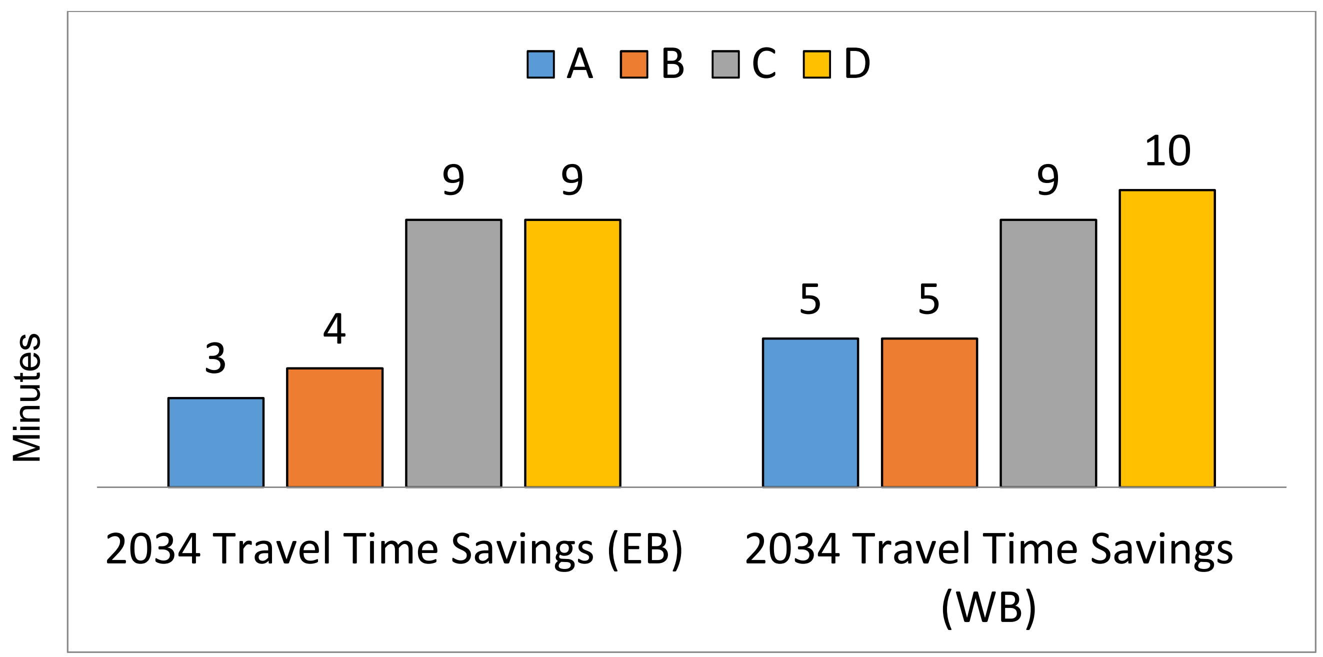


Figure 5-14: 2034 PM Peak Hour Travel Time Savings along I-664 MMMBT compared to No-Build Conditions



5.2.4 I-664 Bowers Hill

Table 5-8 shows the travel demand model output for the section of I-664 between VA 164 and I-264, which includes the Bowers Hill bottleneck.

Table 5-8 indicates that under No-Build conditions, both VMT and VHT are projected to increase, along with a minor increase in delay in the westbound direction. Compared to the No-Build alternative, delays are projected to decline under Alternatives C and D in the eastbound direction, and under Alternatives B, C and D in the westbound direction. In fact, under Alternatives C and D, delays are projected to be minimal with speeds at or near free-flow conditions during the PM peak period. Additionally, improvements in travel time and reductions in delay are illustrated in **Figures 5-15 through 5-17**.

Table 5-8: I-664 Bowers Hill PM Peak Travel Time Comparison

Performance Measure		Existing (2015)	No-Build (2034)	Alternative A (2034)	Alternative B (2034)	Alternative C (2034)	Alternative D (2034)
PM Peak Travel Time (minutes)	EB	8	8	8	8	7	7
	WB	8	10	9	9	7	7
Speed (congested speed MPH)	EB	50	54	56	52	59	59
	WB	51	43	44	46	57	59
Delay (minutes)	EB	1	1	1	1	0	0
	WB	1	3	3	2	0	0
Daily VHT		12,330	13,300	12,400	12,500	13,500	12,800
Daily VMT		622,030	706,300	678,300	683,300	825,600	796,500

Figure 5-15: I-664 Bowers Hill PM Peak Traffic Travel Time Comparison

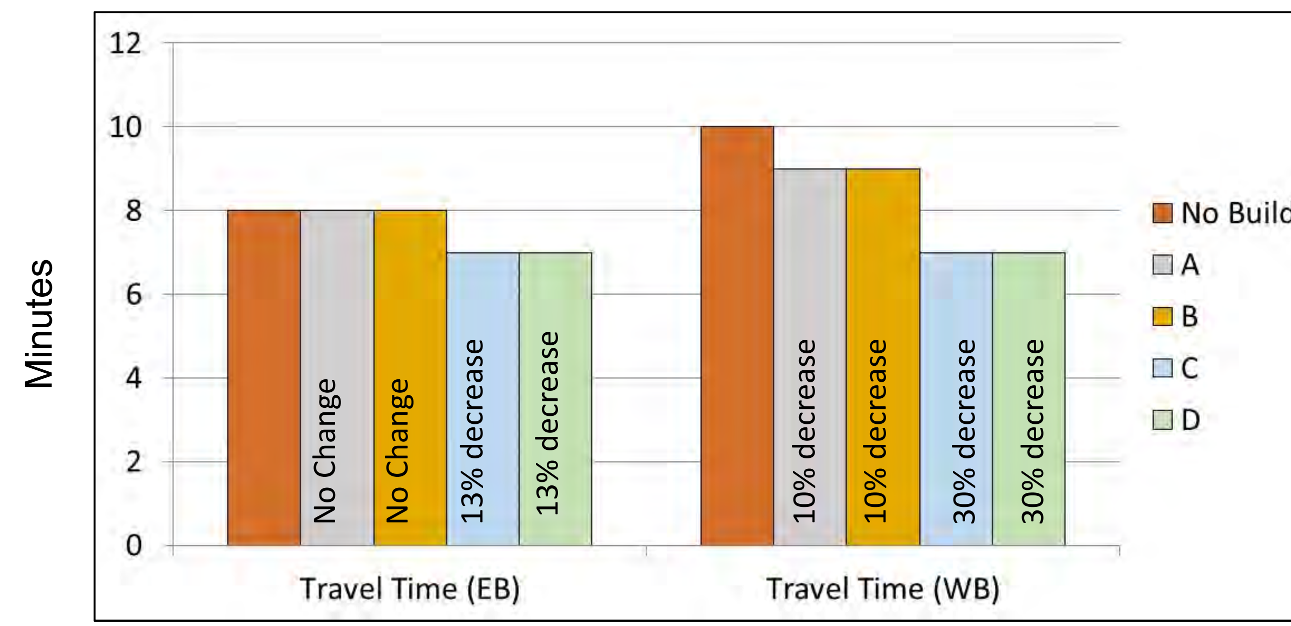


Figure 5-16: I-664 Bowers Hill 2034 PM Peak Hour Travel Time by Direction (No-Build)

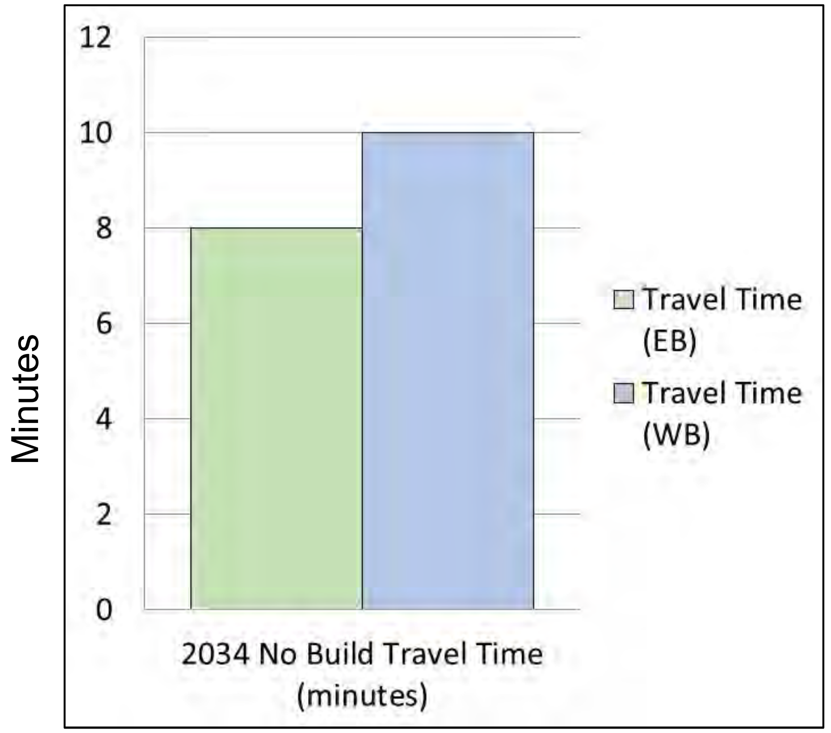
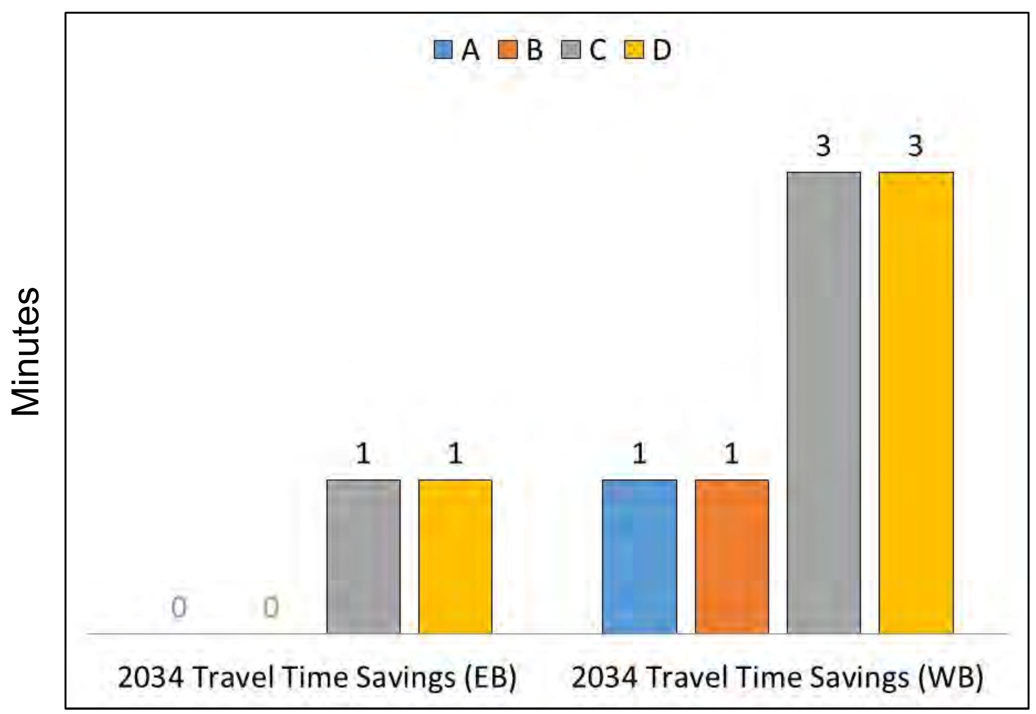


Figure 5-17: 2034 PM Peak Hour Travel Time Savings along I-664 Bowers Hill Compared to No-Build Conditions



5.2.5 Distribution of Naval Station Norfolk Trips

A major traffic generator within Norfolk is the Naval Station Norfolk, for which I-564 is the primary access route. Construction of additional Elizabeth River crossings could provide alternate access routes and provide relief to existing, over-saturated facilities. **Table 5-9** below indicates the percentage of trips that would be expected to use the HRBT, MMMBT, I-564, I-564C, I-664C and VA 164C under each of the alternatives.

Table 5-9: Distribution of Naval Station Norfolk Trips

	No-Build	Alternative A	Alternative B	Alternative C	Alternative D
I-64 (HRBT)	8%	10%	9%	2%	3%
I-664 (MMMBT)	0.1%	0.1%	1%	8%	8%
I-564 (Segment I)	35%	35%	31%	23%	25%
I-564 C (Segment J)			14%	25%	25%
I-664C (Segment K)				17%	17%
VA 164C (Segment L)			14%	8%	8%

Additional information on the distribution of trips related to the Naval base and various port facilities is provided in **Appendix L**. **Appendix M** contains material prepared by the HRTPO depicting the source of trips using the Hampton Roads crossings under each alternative.

5.3 2040 NO-BUILD ALTERNATIVE

As described in **Section 1.1.2.1**, the No-Build Alternative does not assume any improvements or capacity enhancements along any of the Study Area Corridors. All projects that are contained in the region's Long Range Transportation Plan are assumed to be in place. In consultation with VDOT, the following roadway network modification were made as part of the 2040 No-Build forecast:

- Eliminated the US 460/US 58/US 13 Connector project;
- Removed tolls from all existing and proposed river crossings except for the Midtown Tunnel (US 58) and the Downtown Tunnel (I-264);and,
- Added third General Purpose lane to I-64 between I-264 (Bowers Hill interchange) and I-464, and one HOV lane in each direction. The HOV lane ties into the existing HOV system east of I-464, and has the same peak hour occupancy restrictions as the existing system

These roadway network modifications were retained for all 2040 modeling scenarios.

The 2040 No-Build forecast shows continuing growth in regional traffic volumes throughout the region. Daily traffic volumes on the HRBT are projected to increase 23 percent compared to 2015 volumes (from 91,000 to 112,200 vehicles per day), while daily traffic volumes on the MMMBT and VA 164 are projected to grow by 31 and 34 percent, respectively (from 69,300 to 90,700 and 49,000 to 65,600 vehicles per day, respectively).

Detailed daily volumes for 2040 No-Build conditions, including daily turning movement volumes at the ramp terminal intersections, are provided in **Appendix A** in **Figures A.1-1 through A.1-15**.

Along with the daily volumes, AM and PM peak hour volumes increase correspondingly on the Study Area Corridor roadways. A summary of the 2040 No-Build mainline peak hour volumes is provided in **Figure 5-2**. Detailed AM and PM peak hour volumes for the 2040 No-Build Alternative, including turning movement volumes at the ramp terminal intersections, are provided in **Appendix A** in **Figures A.2-1 through A.2-15**.

Table 5-4 presents the intersection LOS for all ramp terminal intersections.

Detailed LOS exhibits for the No-Build Alternative are provided in **Appendix A** in **Figures A.3-1 through A.3-15**.

5.3.1 Operational Analysis

Capacity analyses of the 2040 No-Build peak hour volumes, shown in **Figure 5-3**, indicate increasingly poor operating conditions along I-64 and I-664, with a number of additional segments projected to operate at LOS F, which represents a breakdown in traffic flow with volumes exceeding capacity. In particular, I-64 approaching the HRBT is projected to experience LOS F beginning at interchanges that are further upstream compared to 2015 conditions. Similarly, I-664 westbound approaching the MMMBT during the AM peak hour and I-664 eastbound during the PM peak hour is projected to experience LOS F beginning at interchanges that are further upstream of the bridge-tunnel compared to 2015 conditions.

Traffic operations along VA 164 are projected to be worse than under existing conditions but remain generally acceptable (LOS D or better). Along I-564, acceptable operating conditions of LOS D or better are projected in the non-peak directions (eastbound during the AM peak hour, westbound during the PM peak hour). During the PM peak hour, LOS F operating conditions are projected along eastbound I-564 between the Terminal Boulevard on-ramp and the I-64/I-564 interchange.

Table 5-10 summarizes the No-Build LOS by Study Area Corridor for key roadway segments.

Table 5-10: 2040 No-Build LOS at Key Roadway Segments

Roadway Segment	AM Peak			
	Eastbound		Westbound	
	Existing	2040 NB	Existing	2040 NB
HRBT	F	F	F	F
MMMBT	C	C	F	F
VA 164	C	D	B	C
VA 164C	-	-	-	-
I-564C	-	-	-	-
I-664C	-	-	-	-
Roadway Segment	**PM Peak**			
	Eastbound		**Westbound**	
	Existing	**2040 NB**	**Existing**	**2040 NB**
HRBT	F	F	F	F
MMMBT	F	F	C	F
VA 164	C	C	C	D
VA 164C	-	-	-	-
I-564C	-	-	-	-
I-664C	-	-	-	-

Note: VA 164C, I-564C, and I-664C do not exist under this alternative. The same table is being presented for all alternatives for comparison purposes.

5.3.2 Travel Time

In addition to worsening LOS due to highly congested conditions, the end-to-end travel times along Study Area Corridors are generally projected to increase in the future along I-64 and I-664. Along VA 164, travel times would be similar to existing conditions. **Table 5-11** summarizes the average existing and No-Build travel times in minutes per vehicle by Study Area Corridor.

It should be noted that these estimates were developed from planning-level capacity analysis output and are intended only to indicate relative changes in travel time between alternatives. Additional and/or different segments could be reported in the Final SEIS depending on the Preferred Alternative.

Table 5-11: 2040 No-Build Estimated End-to-End Travel Time by Study Area Corridor

Segment	Direction	AM Peak Travel Time (minutes/vehicle)	
		Existing	2040 NB
I-64	Eastbound	18.3	20.2
	Westbound	17.3	20.3
I-664 (I-64 to VA 164)	Eastbound	15.1	15.0
	Westbound	16.3	19.5
I-664 (VA 164 to I-264)	Eastbound	7.7	7.9
	Westbound	7.9	8.1
VA 164	Eastbound	6.4	6.5
	Westbound	6.1	6.1
I-564; I-664 and I-564 Connectors	Eastbound	-	-
	Westbound	-	-
I-564; I-564 and VA 164 Connectors	Eastbound	-	-
	Westbound	-	-
Segment	**Direction**	**PM Peak Travel Time (minutes/vehicle)**	
		Existing	**2040 NB**
I-64	Eastbound	17.7	20.7
	Westbound	16.6	19.0
I-664 (I-64 to VA 164)	Eastbound	17.7	20.6
	Westbound	14.6	14.8
I-664 (VA 164 to I-264)	Eastbound	7.7	7.9
	Westbound	7.8	7.9
VA 164	Eastbound	6.4	6.4
	Westbound	6.1	6.2
I-564; I-664 and I-564 Connectors	Eastbound	-	-
	Westbound	-	-
I-564; I-564 and VA 164 Connectors	Eastbound	-	-
	Westbound	-	-

Note: VA 164C, I-564C, and I-664C do not exist under this alternative. The same table is being presented for all alternatives for comparison purposes. Estimates are based on HCS Facilities analysis results.

5.4 2040 ALTERNATIVE A

As described in **Section 1.1.2.2**, Alternative A involves widening I-64 to three lanes in each direction from South Mallory Street to the I-64/I-564 interchange and construction of a new bridge-tunnel on the HRBT. The new lanes were coded into the HRTPO travel demand model, and the raw model output was processed as described in **Section 2.4**. The resulting daily traffic volumes on the key roadways are summarized in **Table 5-1**.

The 2040 Alternative A traffic forecast shows that the widening of I-64 between South Mallory Street and I-564 would result in a considerable shift of traffic volumes to the HRBT, along with a slight decrease in daily volume on the MMMBT compared to No-Build conditions. Projected daily traffic volumes on the HRBT would increase 23 percent compared to 2040 No-Build volumes (from 112,200 to 137,700 vehicles per day). Volumes would decrease approximately two percent both on the MMMBT and on VA 164 (from 90,700 to 89,200 and from 65,600 to 64,000 vehicles per day, respectively), but would be greater than 2015 volumes.

Detailed daily volumes for 2040 Alternative A conditions, including daily turning movement volumes at the ramp terminal intersections, are provided in **Appendix B** in **Figures B.1-1 through B.1-15**.

Detailed AM and PM peak hour volumes for Alternative A conditions, including turning movement volumes at the ramp terminal intersections, are provided in **Appendix B** in **Figures B.2-1 through B.2-15**.

Table 5-4 presents the intersection LOS for all ramp terminal intersections.

Detailed LOS exhibits for Alternative A are provided in **Appendix B** in **Figures B.3-1 through B.3-15**.

5.4.1 Operational Analysis

Capacity analyses of the 2040 Alternative A peak hour volumes, provided in **Figure 5-3**, show that operations along I-64 west of the HRBT are generally projected to be worse than 2040 No-Build conditions, with some segments approaching capacity (LOS E). East of the HRBT, where additional capacity would be provided by widening the existing four-lane section to six lanes, operations are generally projected to improve compared to No-Build conditions, from LOS E and LOS F to LOS D or better, except east of the ramp to I-564/Granby Street.

Along I-664 and VA 164, where no capacity would be added, operations are generally projected to be comparable to 2040 No-Build conditions.

Along I-564, acceptable operating conditions of LOS D or better are projected in the non-peak directions (eastbound during the AM peak hour, westbound during the PM peak hour). During the PM peak hour, LOS F operating conditions are projected between the Terminal Boulevard on-ramp and the I-64/I-564 interchange, similar to the 2040 No-Build conditions.

Table 5-12 summarizes the Alternative A LOS by Study Area Corridor.

Table 5-12: 2040 Alternative A Projected LOS at Key Roadway Segments

Roadway Segment	AM Peak					
	Eastbound			Westbound		
	Existing	2040 NB	2040 Alt A	Existing	2040 NB	2040 Alt A
HRBT	F	F	F	F	F	F
MMMBT	C	C	C	F	F	F
VA 164	C	D	D	B	C	C
VA 164C	-	-	-	-	-	-
I-564C	-	-	-	-	-	-
I-664C	-	-	-	-	-	-
Roadway Segment	**PM Peak**					
	Eastbound			**Westbound**		
	Existing	**2040 NB**	**2040 Alt A**	**Existing**	**2040 NB**	**2040 Alt A**
HRBT	F	F	F	F	F	F
MMMBT	F	F	F	C	F	F
VA 164	C	C	C	C	D	D
VA 164C	-	-	-	-	-	-
I-564C	-	-	-	-	-	-
I-664C	-	-	-	-	-	-

Note: VA 164C, I-564C, and I-664C do not exist under this alternative. The same table is being presented for all alternatives for comparison purposes.

5.4.2 Travel Time

Compared to 2040 No-Build conditions, end-to-end travel times along I-64 are projected to improve under Alternative A. The travel times along I-664 and VA 164 would be approximately the same under No-Build conditions and Alternative A conditions, with some slight improvements to the westbound I-664 travel time north of VA 164 during the AM peak and eastbound during the PM peak. **Table 5-13** summarizes the average travel times in minutes per vehicle by Study Area Corridor for Alternative A.

It should be noted that these estimates were developed from planning-level capacity analysis output and are intended only to indicate relative changes in travel time between alternatives. Additional and/or different segments could be reported in the Final SEIS depending on the Preferred Alternative.

Table 5-13: 2040 Alternative A Estimated End-to-End Travel Time by Study Area Corridor

Segment	Direction	AM Peak Travel Time (minutes/vehicle)		
		Existing	2040 NB	2040 Alt A
I-64	Eastbound	18.3	20.2	18.8
	Westbound	17.3	20.3	17.3
I-664 (I-64 to VA 164)	Eastbound	15.1	15.0	15.0
	Westbound	16.3	19.5	18.4
I-664 (VA 164 to I-264)	Eastbound	7.7	7.9	7.8
	Westbound	7.9	8.1	8.1
VA 164	Eastbound	6.4	6.5	6.5
	Westbound	6.1	6.1	6.1
I-564; I-664 and I-564 Connectors	Eastbound	-	-	-
	Westbound	-	-	-
I-564; I-564 and VA 164 Connectors	Eastbound	-	-	-
	Westbound	-	-	-
Segment	**Direction**	**PM Peak Travel Time (minutes/vehicle)**		
		Existing	**2040 NB**	**2040 Alt A**
I-64	Eastbound	17.7	20.7	18.5
	Westbound	16.6	19.0	16.6
I-664 (I-64 to VA 164)	Eastbound	17.7	20.6	19.8
	Westbound	14.6	14.8	14.7
I-664 (VA 164 to I-264)	Eastbound	7.7	7.9	7.8
	Westbound	7.8	7.9	7.9
VA 164	Eastbound	6.4	6.4	6.4
	Westbound	6.1	6.2	6.1
I-564; I-664 and I-564 Connectors	Eastbound	-	-	-
	Westbound	-	-	-
I-564; I-564 and VA 164 Connectors	Eastbound	-	-	-
	Westbound	-	-	-

Note: VA 164C, I-564C, and I-664C do not exist under this alternative. The same table is being presented for all alternatives for comparison purposes. Estimates are based on HCS Facilities analysis results.

5.5 2040 ALTERNATIVE B

As described in **Section 1.1.2.3**, Alternative B involves widening I-64 to three lanes in each direction from South Mallory Street to the I-64/I-564 interchange and construction of a new bridge-tunnel on the HRBT; construction of the I-564 and VA 164 connectors; and widening VA 164 between the proposed VA 164/VA 164 Connector interchange and the VA 164/I-664 interchange from four to six lanes.

This alternative also assumes completion of the interchange (currently under construction) at I-564 and the Norfolk International Terminal (NIT) and Naval Station Norfolk. Under the Alternative B forecast, this interchange would not only provide access to the Port and Navy facilities but also to other destinations along Hampton Boulevard. The Alternative B forecast does not assume that traffic using this interchange is restricted to Port or Navy traffic only and assumes full access to and from areas to the west. However, as the study advances and stakeholder input is received, it may be necessary to consider access limitations on this interchange. Forecasts would be revised accordingly.

The new lanes were coded into the HRTPO travel demand model; and, the raw model output was processed as described in **Section 2.4**. The resulting daily traffic volumes on the key roadways are summarized in **Table 5-1**.

As shown in **Table 5-1**, compared to 2040 No-Build conditions, the capacity expansions under Alternative B would result in an increase in daily traffic volume on the HRBT, and a decrease in traffic on the MMMBT. Projected daily traffic volumes on the HRBT would increase 19 percent compared to 2040 No-Build volumes (to 133,400). Volumes on the MMMBT would decrease eight percent (to 83,100) and increase 20 percent on VA 164 (to 78,400).

The increase in traffic on the HRBT is smaller than that under Alternative A; likewise, the decrease in traffic on the MMMBT is larger than under Alternative A. Traffic volumes on VA 164 would increase substantially compared to Alternative A, due to the additional capacity provided in the Study Area Corridor.

There is substantial traffic demand on the I-564 and VA 164 Connectors, indicating that this new connection serves a need for improved connectivity between the southwestern Hampton Roads region and the Naval and port facilities in the Norfolk area.

Detailed daily volumes for Alternative B conditions, including daily turning movement volumes at the ramp terminal intersections, are provided in **Appendix C** in **Figures C.1-1 through C.1-15**.

Detailed AM and PM peak hour volumes for Alternative B conditions, including turning movement volumes at the ramp terminal intersections, are provided in **Appendix C** in **Figures C.2-1 through C.2-16**.

Table 5-4 presents the intersection LOS for all ramp terminal intersections.

Detailed LOS exhibits are provided in **Appendix C** in **Figures C.3-1 through C.3-16**.

5.5.1 Operational Analysis

Capacity analyses of the 2040 Alternative B peak hour volumes, provided in **Figure 5-3**, show that operations along I-64 would improve slightly compared to No-Build and Alternative A conditions, with fewer segments approaching or exceeding capacity (LOS E or LOS F), but the HRBT and some other segments east of the ramp to I-564/Granby Street would continue to operate at LOS F. The HRBT is projected to operate at LOS D in the westbound direction during the PM peak only, but LOS F in the westbound direction during the AM peak hour and in the eastbound direction during both the AM and the PM peak hour.

Along I-664, where no capacity would be added, operations are generally projected to be comparable to 2040 No-Build conditions and Alternative A conditions.

Along VA 164 where capacity is added, operations are generally projected to be comparable to existing conditions and LOS D or better, with the exception of westbound VA 164 during the PM peak hour, where four segments between the West Norfolk Road interchange and the Cedar Lane interchange would be approaching capacity (LOS E).

Along I-564, acceptable operating conditions of LOS D or better are projected in the non-peak directions (eastbound during the AM peak hour, westbound during the PM peak hour). During the PM peak hour, LOS F operating conditions are projected between the Terminal Boulevard on-ramp and the I-64/I-564 interchange.

Table 5-14 summarizes the Alternative B LOS by Study Area Corridor.

Table 5-14: 2040 Alternative B Projected LOS at Key Roadway Segments

Roadway Segment	AM Peak					
	Eastbound			Westbound		
	Existing	2040 NB	2040 Alt B	Existing	2040 NB	2040 Alt B
HRBT	F	F	F	F	F	F
MMMBT	C	C	C	F	F	F
VA 164	C	D	C	B	C	B
VA 164C	-	-	C	-	-	B
I-564C	-	-	C	-	-	B
I-664C	-	-	-	-	-	-
Roadway Segment	**PM Peak**					
	Eastbound			**Westbound**		
	Existing	**2040 NB**	**2040 Alt B**	**Existing**	**2040 NB**	**2040 Alt B**
HRBT	F	F	F	F	F	D
MMMBT	F	F	F	C	F	F
VA 164	C	C	C	C	D	C
VA 164C	-	-	B	-	-	C
I-564C	-	-	B	-	-	C
I-664C	-	-	-	-	-	-

Note: I-664C does not exist under this alternative. The same table is being presented for all alternatives for comparison purposes.

5.5.2 Travel Time

Compared to 2040 No-Build conditions, end-to-end travel times along I-64 and I-664 are projected to improve under Alternative B. The reduction in travel times for I-64 would be greater under Alternative B than under Alternative A, particularly in the westbound direction during the PM peak hour. The travel times along I-664, both north and south of VA 164 would be approximately the same under No-Build conditions and Alternative B conditions. The travel times along VA 164 would be approximately the same under No-Build conditions and Alternative B conditions. **Table 5-15** summarizes the average travel times in minutes per vehicle by Study Area Corridor for Alternative B.

It should be noted that these estimates were developed from planning-level capacity analysis output and are intended only to indicate relative changes in travel time between alternatives. Additional and/or different segments could be reported in the Final SEIS depending on the Preferred Alternative.

Table 5-15: 2040 Alternative B Estimated End-to-End Travel Time by Study Area Corridor

Segment	Direction	AM Peak Travel Time (minutes/vehicle)		
		Existing	2040 NB	2040 Alt B
I-64	Eastbound	18.3	20.2	18.6
	Westbound	17.3	20.3	17.2
I-664 (I-64 to VA 164)	Eastbound	15.1	15.0	14.9
	Westbound	16.3	19.5	18.8
I-664 (VA 164 to I-264)	Eastbound	7.7	7.9	7.8
	Westbound	7.9	8.1	8.1
VA 164	Eastbound	6.4	6.5	6.4
	Westbound	6.1	6.1	6.1
I-564; I-664 and I-564 Connectors	Eastbound	-	-	-
	Westbound	-	-	-
I-564; I-564 and VA 164 Connectors	Eastbound	-	-	10.5
	Westbound	-	-	10.2
Segment	**Direction**	**PM Peak Travel Time (minutes/vehicle)**		
		Existing	**2040 NB**	**2040 Alt B**
I-64	Eastbound	17.7	20.7	18.3
	Westbound	16.6	19.0	14.6
I-664 (I-64 to VA 164)	Eastbound	17.7	20.6	19.6
	Westbound	14.6	14.8	14.7
I-664 (VA 164 to I-264)	Eastbound	7.7	7.9	7.8
	Westbound	7.8	7.9	7.9
VA 164	Eastbound	6.4	6.4	6.3
	Westbound	6.1	6.2	6.2
I-564; I-664 and I-564 Connectors	Eastbound	-	-	-
	Westbound	-	-	-
I-564; I-564 and VA 164 Connectors	Eastbound	-	-	11.0
	Westbound	-	-	9.9

Note: I-664C does not exist under this alternative. The same table is being presented for all alternatives for comparison purposes. Estimates are based on HCS Facilities analysis results.

5.6 2040 ALTERNATIVE C

As described in **Section 1.1.2.4**, Alternative C involves widening I-664 to four lanes in each direction from the I-64 interchange to the VA 164 interchange and construction of a new bridge-tunnel on the MMMBT; widening I-664 to three lanes in each direction from the VA 164 interchange to the I-64/I-264 interchange; and construction of the I-564, I-664 and VA 164 connectors. Although this alternative also includes transit-only lanes along the I-564 and I-664 connectors, as well as I-664 north of the MMMBT, for traffic forecasting and analysis purposes, these transit-only lanes were not considered, because the November 2015 DRPT assessment of future transit ridership indicated minimal impact on the number of vehicle trips within the study area.

This alternative also assumes completion of the interchange (currently under construction) at I-564 and the Norfolk International Terminal (NIT) and Naval Station Norfolk. Under the Alternative C forecast, this interchange would not only provide access to the Port and Navy facilities but also to other destinations along Hampton Boulevard. The Alternative C forecast does not assume that traffic using this interchange is restricted to Port or Navy traffic only and assumes full access to and from areas to the west. However, as the study advances and stakeholder input is received, it may be necessary to consider access limitations on this interchange. Forecasts would be revised accordingly.

The new lanes were coded into the HRTPO travel demand model; and, the raw model output was processed as described in **Section 2.4**. The resulting daily traffic volumes on the key roadways are summarized in **Table 5-1**.

As shown in **Table 5-1**, the capacity expansions under Alternative C would result in an opposite shift in traffic patterns compared to the traffic pattern changes in Alternatives A and B. With the added capacity on the MMMBT, compared to 2040 No-Build conditions, daily traffic volumes are projected to decrease eight percent on the HRBT (to 103,600) and increase 41 percent on the MMMBT (to 127,700). Traffic volumes on VA 164 are projected to decrease approximately 18 percent compared to No-Build conditions. Projected traffic volumes on VA 164 are lower than the increases under Alternatives A and B, with the I-664 Connector absorbing some of the traffic volume instead.

Detailed daily volumes for Alternative C conditions, including daily turning movement volumes at the ramp terminal intersections, are provided in **Appendix D** in **Figures D.1-1 through D.1-16**.

Detailed AM and PM peak hour volumes for Alternative C conditions, including turning movement volumes at the ramp terminal intersections, are provided in **Appendix D** in **Figures D.2-1 through D.2-16**.

Table 5-4 presents the intersection LOS for all ramp terminal intersections.

Detailed LOS exhibits are provided in **Appendix D** in **Figures D.3-1 through D.3-16**.

5.6.1 Operational Analysis

Capacity analyses of the 2040 Alternative C peak hour volumes show that operations along I-64 would be worse than those under Alternative A and B, but generally slightly better than under 2040 No-Build conditions, with five fewer segments during each peak hour in which volume exceeds capacity (LOS F).

The additional capacity along I-664 is generally expected to result in acceptable operating conditions of LOS D or better along the I-664 Study Area Corridor, including the MMMBT. However, without additional improvements, increased peak hour volumes are projected to result in LOS F operations along westbound I-664 during the PM peak hour, approaching I-64. The section of I-664 through the Bowers Hill interchange would continue to operate at LOS E or LOS F in both directions during both the AM and the PM peak hour.

Traffic operations along VA 164 would be acceptable; even without widening of this Study Area Corridor, the shift in volume to the I-664 Connector would result in LOS D or better along VA 164.

Along I-564, acceptable operating conditions of LOS D or better are projected in the non-peak directions (eastbound during the AM peak hour, westbound during the PM peak hour). Under Alternative C, westbound I-564 would operate at LOS F through the I-64/I-564 interchange during the AM peak hour, compared to LOS D under 2040 No-Build conditions. During the PM peak hour, LOS F operations are projected between the Intermodal Connector on-ramp and the I-64/I-564 interchange.

Table 5-16 summarizes the Alternative C LOS by Study Area Corridor.

Table 5-16: 2040 Alternative C Projected LOS at Key Roadway Segments

Roadway Segment	AM Peak					
	Eastbound			Westbound		
	Existing	2040 NB	2040 Alt C	Existing	2040 NB	2040 Alt C
HRBT	F	F	F	F	F	F
MMMBT	C	C	A	F	F	B
VA 164	C	D	C	B	C	B
VA 164C	-	-	A	-	-	A
I-564C	-	-	C	-	-	C
I-664C	-	-	C	-	-	C
Roadway Segment	**PM Peak**					
	Eastbound			**Westbound**		
	Existing	**2040 NB**	**2040 Alt C**	**Existing**	**2040 NB**	**2040 Alt C**
HRBT	F	F	F	F	F	F
MMMBT	F	F	B	C	F	A
VA 164	C	C	C	C	D	C
VA 164C	-	-	A	-	-	A
I-564C	-	-	C	-	-	D
I-664C	-	-	C	-	-	C

5.6.2 Travel Time

Compared to 2040 No-Build conditions, end-to-end travel times along I-64 and I-664 are generally projected to improve under Alternative C. The reduction in travel times for I-64 would be less under Alternative C than under Alternative A or B, and remain greater than existing conditions. Travel time along I-664 from VA 164 to I-664, in the westbound direction, would be greater under Alternative C compared to 2040 No-Build conditions, due to the shift in traffic volumes from the HRBT to the I-664 Connector and MMMBT. The eastbound travel times during both peaks and the westbound travel time in the AM peak along I-664 would be reduced by Alternative C improvements. The travel times along VA 164 would be approximately the same under No-Build conditions and Alternative C conditions. The end-to-end travel times along I-564, the I-564 Connector, and VA 164 connector would be similar between Alternative B and Alternative C. **Table 5-17** summarizes the average travel times in minutes per vehicle by Study Area Corridor for Alternative C.

It should be noted that these estimates were developed from planning-level capacity analysis output and are intended only to indicate relative changes in travel time between alternatives. Additional and/or different segments could be reported in the Final SEIS depending on the Preferred Alternative.

Table 5-17: 2040 Alternative C Estimated End-to-End Travel Time by Study Area Corridor

Segment	Direction	AM Peak Travel Time (minutes/vehicle)		
		Existing	2040 NB	2040 Alt C
I-64	Eastbound	18.3	20.2	18.7
	Westbound	17.3	20.3	18.0
I-664 (I-64 to VA 164)	Eastbound	15.1	15.0	13.9
	Westbound	16.3	19.5	14.4
I-664 (VA 164 to I-264)	Eastbound	7.7	7.9	7.6
	Westbound	7.9	8.1	7.8
VA 164	Eastbound	6.4	6.5	6.4
	Westbound	6.1	6.1	6.2
I-564; I-664 and I-564 Connectors	Eastbound	-	-	7.9
	Westbound	-	-	8.6
I-564; I-564 and VA 164 Connectors	Eastbound	-	-	10.4
	Westbound	-	-	9.9
Segment	**Direction**	**PM Peak Travel Time (minutes/vehicle)**		
		Existing	**2040 NB**	**2040 Alt C**
I-64	Eastbound	17.7	20.7	18.3
	Westbound	16.6	19.0	18.0
I-664 (I-64 to VA 164)	Eastbound	17.7	20.6	13.8
	Westbound	14.6	14.8	16.0
I-664 (VA 164 to I-264)	Eastbound	7.7	7.9	7.6
	Westbound	7.8	7.9	7.8
VA 164	Eastbound	6.4	6.4	6.3
	Westbound	6.1	6.2	6.2
I-564; I-664 and I-564 Connectors	Eastbound	-	-	9.3
	Westbound	-	-	8.1
I-564; I-564 and VA 164 Connectors	Eastbound	-	-	11.7
	Westbound	-	-	9.4

Estimates are based on HCS Facilities analysis results.

5.7 2040 ALTERNATIVE D

As described in **Section 1.1.2.5**, Alternative D involves widening I-64 to three lanes in each direction from South Mallory Street to the I-64/I-564 interchange and construction of a new bridge-tunnel on the HRBT; widening I-664 to four lanes in each direction from the I-64 interchange to the VA 164 interchange and construction of a new bridge-tunnel on the MMMBT; widening I-664 to three lanes in each direction from the VA 164 interchange to the I-64/I-264 interchange; widening VA 164 to three lanes in each direction between the proposed VA 164/VA 164 Connector interchange and the VA 164/I-664 interchange; and construction of the I-564, I-664 and VA 164 connectors.

This alternative also assumes completion of the interchange (currently under construction) at I-564 and the Norfolk International Terminal (NIT) and Naval Station Norfolk. Under the Alternative D forecast, this interchange would not only provide access to the Port and Navy facilities but also to other destinations along Hampton Boulevard. The Alternative D forecast does not assume that traffic using this interchange is restricted to Port or Navy traffic only and assumes full access to and from areas to the west. However, as the study advances and stakeholder input is received, it may be necessary to consider access limitations on this interchange. Forecasts would be revised accordingly.

The new lanes were coded into the HRTPO travel demand model; and, the raw model output was processed as described in **Section 2.4**. The resulting daily traffic volumes on the key roadways are summarized in **Table 5-1**.

As shown in **Table 5-1**, the capacity expansions under Alternative D would result in the highest combined volumes on the HRBT and MMMBT. Daily traffic volumes are projected to increase 11 percent on the HRBT and 27 percent on the MMMBT compared to 2040 No-Build conditions, to 124,200 and 114,900, respectively. Traffic volumes on VA 164 are projected to decrease approximately 14 percent compared to No-Build conditions, less than the decrease under Alternative C, but increase approximately 14 percent compared to existing conditions. The projected increase along VA 164 is lower than the increases under Alternatives A and B and 2040 No-Build Conditions, with the I-664 Connector absorbing some of this traffic volume increase, despite the additional capacity provided on VA 164 under Alternative D.

Detailed daily volumes for Alternative D conditions, including daily turning movement volumes at the ramp terminal intersections, are provided in **Appendix E** in **Figures E.1-1 through E.1-16**.

Detailed AM and PM peak hour volumes for Alternative D conditions, including turning movement volumes at the ramp terminal intersections, are provided in **Appendix E** in **Figures E.2-1 through E.2-16**.

Table 5-4 presents the intersection LOS for all ramp terminal intersections.

Detailed LOS exhibits are provided in **Appendix E** in **Figures E.3-1 through E.3-16**.

5.7.1 Operational Analysis

Capacity analyses of the 2040 Alternative D peak hour volumes, provided in **Figure 5-3**, show that operations along I-64 are generally projected to be acceptable (LOS D or better), except east of the ramp to I-564/Granby Street. Volumes on the HRBT would approach capacity (LOS E) under this alternative in all but the westbound PM peak hour, when acceptable LOS D operations are projected. However, Alternative D is the only alternative that does not project LOS F operations on the HRBT. Similar to 2040 No-Build conditions, LOS F operations are projected between the I-664 interchange and LaSalle Avenue during the AM peak hour in both directions.

Operating conditions along I-664 under Alternative D would be comparable to Alternative C and improved compared to No-Build conditions. The additional capacity along I-664 generally would result in acceptable operating conditions throughout this Study Area Corridor, including the MMMBT. However, without additional improvements, increased peak hour volumes are projected to result in LOS F operations along westbound I-664 during the PM peak hour, approaching I-64. The section of I-664 through the Bowers Hill interchange would continue to operate at LOS E or F in both directions during both the AM and the PM peak hour.

Traffic operations along VA 164 are projected to be acceptable; the shift in volume to the I-664 Connector would result in LOS D or better along VA 164.

Along I-564, acceptable operating conditions of LOS D or better are projected in the non-peak directions (eastbound during AM peak, westbound during PM peak). Under Alternative D, westbound I-564 would operate at LOS F through the I-64/I-564 interchange during the AM peak hour, compared to LOS D under 2040 No-Build conditions. During the PM peak hour, failing LOS is projected between the Intermodal Connector on-ramp and the I-64/I-564 interchange.

Table 5-18 summarizes the Alternative D LOS by Study Area Corridor.

Table 5-18: 2040 Alternative D Projected LOS at Key Roadway Segments

Roadway Segment	AM Peak					
	Eastbound			Westbound		
	Existing	2040 NB	2040 Alt D	Existing	2040 NB	2040 Alt D
HRBT	F	F	E	F	F	E
MMMBT	C	C	A	F	F	B
VA 164	C	D	B	B	C	B
VA 164C	-	-	A	-	-	A
I-564C	-	-	C	-	-	C
I-664C	-	-	C	-	-	B
Roadway Segment	**PM Peak**					
	Eastbound			**Westbound**		
	Existing	**2040 NB**	**2040 Alt D**	**Existing**	**2040 NB**	**2040 Alt D**
HRBT	F	F	E	F	F	D
MMMBT	F	F	B	C	F	A
VA 164	C	C	B	C	D	B
VA 164C	-	-	A	-	-	A
I-564C	-	-	C	-	-	C
I-664C	-	-	C	-	-	C

5.7.2 Travel Time

Compared to 2040 No-Build conditions, end-to-end travel times along I-64 and I-664 are projected to improve the most under Alternative D. The reduction in travel times for I-64 would be greatest under Alternative D and travel times are projected to be less than the existing conditions. Travel time along I-664 from VA 164 to I-664, in the westbound direction, would be greater under Alternative D compared to 2040 No-Build conditions, but less than the travel time under Alternative C conditions. Travel times along I-664 in the westbound direction during the AM peak and the eastbound direction during the PM peak are projected to be similar under Alternative C and Alternative D and less than the travel times under 2040 No-Build conditions. The travel times along VA 164 would be approximately the same under No-Build conditions and Alternative D conditions. The end-to-end travel times along I-564, the I-564 Connector, and VA 164 connector would be similar between Alternative B, Alternative C, and Alternative D. The travel times along I-564, the I-564 Connector, and the I-664 Connector would be similar between Alternative C and Alternative D. **Table 5-19** summarizes the average travel times in minutes per vehicle by Study Area Corridor for Alternative D.

It should be noted that these estimates were developed from planning-level capacity analysis output and are intended only to indicate relative changes in travel time between alternatives. Additional and/or different segments could be reported in the Final SEIS depending on the Preferred Alternative.

Table 5-19: 2040 Alternative D Estimated End-to-End Travel Time by Study Area Corridor

Segment	Direction	AM Peak Travel Time (minutes/vehicle)		
		Existing	2040 NB	2040 Alt D
I-64	Eastbound	18.3	20.2	17.1
	Westbound	17.3	20.3	15.9
I-664 (I-64 to VA 164)	Eastbound	15.1	15.0	13.8
	Westbound	16.3	19.5	14.4
I-664 (VA 164 to I-264)	Eastbound	7.7	7.9	7.6
	Westbound	7.9	8.1	7.8
VA 164	Eastbound	6.4	6.5	6.4
	Westbound	6.1	6.1	6.1
I-564; I-664 and I-564 Connectors	Eastbound	-	-	7.9
	Westbound	-	-	8.5
I-564; I-564 and VA 164 Connectors	Eastbound	-	-	10.3
	Westbound	-	-	9.8
Segment	**Direction**	**PM Peak Travel Time (minutes/vehicle)**		
		Existing	**2040 NB**	**2040 Alt D**
I-64	Eastbound	17.7	20.7	17.0
	Westbound	16.6	19.0	14.5
I-664 (I-64 to VA 164)	Eastbound	17.7	20.6	13.8
	Westbound	14.6	14.8	15.5
I-664 (VA 164 to I-264)	Eastbound	7.7	7.9	7.6
	Westbound	7.8	7.9	7.8
VA 164	Eastbound	6.4	6.4	6.3
	Westbound	6.1	6.2	6.2
I-564; I-664 and I-564 Connectors	Eastbound	-	-	9.3
	Westbound	-	-	8.1
I-564; I-564 and VA 164 Connectors	Eastbound	-	-	11.7
	Westbound	-	-	9.4

Estimates are based on HCS Facilities analysis results.

6. OPENING YEAR 2028 FORECASTS AND ANALYSES

6.1 SUMMARY

A summary of daily traffic volumes on key roadway links within the study area is provided in **Table 6-1**. A comparison of daily traffic volumes on the HRBT and MMMBT for 2015 and 2028 conditions is provided in **Figure 6-1**.

Table 6-1: 2028 Daily Traffic Volumes at Key Roadway Segments

Roadway Segment	2015	2028 No-Build	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D
HRBT	91,000	102,600	119,100	114,900	91,900	106,500
MMMBT, north of I-664C	69,300	81,200	79,600	74,000	108,400	97,400
MMMBT, south of I-664C	69,300	81,200	79,600	74,000	105,200	103,800
VA 164*	49,000	59,400	57,700	68,700	49,300	49,700
VA 164C	-	-	-	43,800	24,800	26,200
I-564C	-	-	-	43,800	75,000	72,600
I-664C	-	-	-	-	58,600	54,600

** Between the Towne Point Road and College Drive Interchanges*

Figure 6-1: 2028 Projected Daily Traffic Volumes at the HRBT and MMMBT

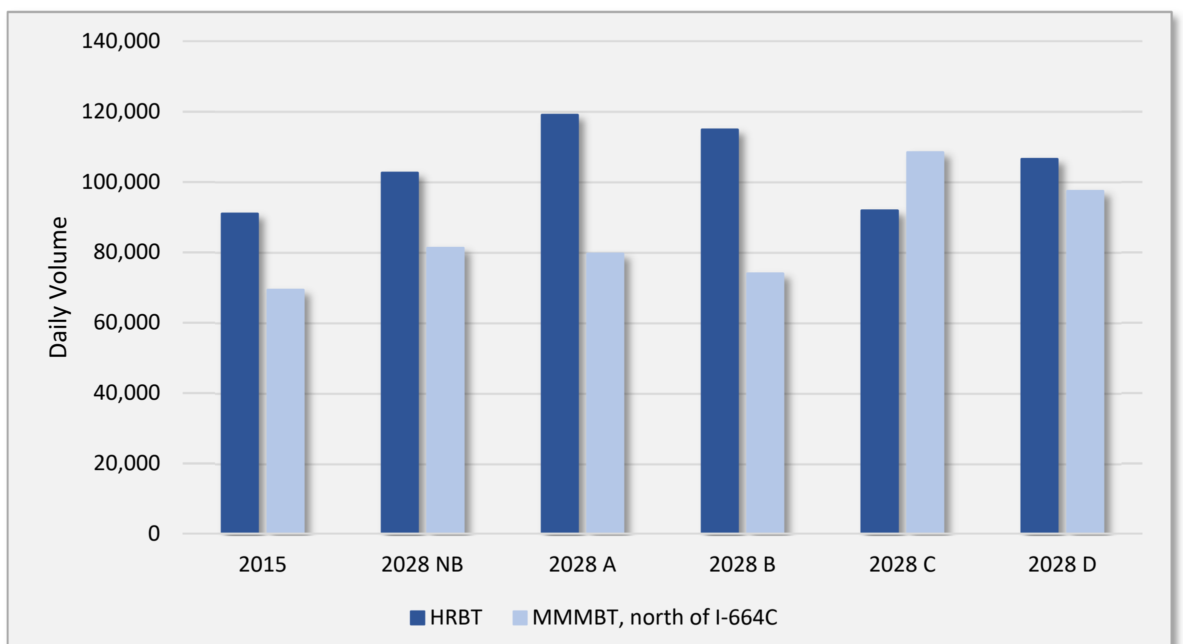


Figure 6-2 shows the mainline volume for each roadway segment along the Study Area Corridors for the Existing, 2028 No-Build, and 2028 Build Alternatives.

Figure 6-3 presents a summary of the projected mainline LOS. This summary is provided in the same format as the volume exhibit in **Figure 6-2**, and shows the projected mainline LOS as well as the projected LOS for each merge, diverge, and weaving area along all Study Area Corridors for each alternative. Mainline average travel speeds are presented in **Figure 6-4**.

Table 6-2 presents the intersection LOS for all ramp terminal intersections for the Existing, 2028 No-Build, and 2028 Build Alternatives.

Detailed daily volumes for 2028 No-Build conditions, including daily turning movement volumes at the ramp terminal intersections, are provided in **Appendix F** in **Figures F.1-1 through F.1-15**.

Detailed AM and PM peak hour volumes for 2028 No-Build conditions, including turning movement volumes at the ramp terminal intersections, are provided in **Appendix F** in **Figures F.2-1 through F.2-15**.

Detailed LOS exhibits for the 2028 No-Build Alternative are provided in **Appendix F** in **Figures F.3-1 through F.3-15**.

Detailed daily volumes for 2028 Alternative A conditions, including daily turning movement volumes at the ramp terminal intersections, are provided in **Appendix G** in **Figures G.1-1 through G.1-15**.

Detailed AM and PM peak hour volumes for 2028 Alternative A conditions, including turning movement volumes at the ramp terminal intersections, are provided in **Appendix G** in **Figures G.2-1 through G.2-15**.

Detailed LOS exhibits for 2028 Alternative A are provided in **Appendix G** in **Figures G.3-1 through G.3-15**.

Detailed daily volumes for 2028 Alternative B conditions, including daily turning movement volumes at the ramp terminal intersections, are provided in **Appendix H** in **Figures H.1-1 through H.1-16**.

Detailed AM and PM peak hour volumes for 2028 Alternative B conditions, including turning movement volumes at the ramp terminal intersections, are provided in **Appendix H** in **Figures H.2-1 through H.2-16**.

Detailed LOS exhibits for 2028 Alternative B are provided in **Appendix H** in **Figures H.3-1 through H.3-16**.

Detailed daily volumes for 2028 Alternative C conditions, including daily turning movement volumes at the ramp terminal intersections, are provided in **Appendix I** in **Figures I.1-1 through I.1-16**.

Detailed AM and PM peak hour volumes for 2028 Alternative C conditions, including turning movement volumes at the ramp terminal intersections, are provided in **Appendix I** in **Figures I.2-1 through I.2-16**.

Detailed LOS exhibits for 2028 Alternative C are provided in **Appendix I** in **Figures I.3-1 through I.3-16**.

Detailed daily volumes for 2028 Alternative D conditions, including daily turning movement volumes at the ramp terminal intersections, are provided in **Appendix J** in **Figures J.1-1 through J.1-16**.

Detailed AM and PM peak hour volumes for 2028 Alternative D conditions, including turning movement volumes at the ramp terminal intersections, are provided in **Appendix J** in **Figures J.2-1 through J.2-16**.

Detailed LOS exhibits for 2028 Alternative D are provided in **Appendix J** in **Figures J.3-1 through J.3-16**.

Table 6-2: 2028 Intersection Capacity Analysis Results

Intersection	Control Type	Existing				2028 No-Build				2028 Alternative A				2028 Alternative B				2028 Alternative C				2028 Alternative D			
		AM		PM		AM		PM		AM		PM		AM		PM		AM		PM		AM		PM	
		Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
I-64 Interchanges																									
VA-134 at I-64 WB On Ramp*	Signalized	17.9	B	19.1	B	18.5	B	20.5	C	20.1	C	22.2	C	22.3	C	24.1	C	20.7	C	22.0	C	18.6	B	20.8	C
LaSalle Ave at Armistead Ave*	Signalized	19.7	B	23.8	C	21.5	C	26.9	C	21.7	C	26.7	C	22.0	C	27.2	C	21.2	C	25.6	C	21.4	C	26.4	C
I-64 EB Off Ramp at Rip Rap Rd	Signalized	15.3	B	17.5	B	20.1	C	26.4	C	20.3	C	23.6	C	17.8	B	21.0	C	18.2	B	21.4	C	20.1	C	22.7	C
Settlers Landing Rd at E Tyler St	Signalized	24.5	C	17.4	B	32.3	C	25.9	C	29.9	C	25.6	C	30.7	C	25.5	C	29.9	C	26.1	C	30.4	C	24.3	C
Settlers Landing Rd at I-64 SB On Ramp	Yield Control***	11.5	B	13.9	B	13.9	B	22.9	C	11.7	B	15.2	C	12.1	B	15.4	C	10.1	B	13.1	B	11.5	B	14.7	B
Settlers Landing Rd at I-64 NB On Ramp	Signalized	21.3	C	23.2	C	26.9	C	46.6	D	33.6	C	76.0	E	38.9	D	82.2	F	59.9	E	80.7	F	35.5	D	77.4	E
I-64 SB Ramps at S Mallory St	Signalized	8.4	A	98.6	F	11.3	B	123.5	F	12.3	B	19.6	B	10.9	B	108.7	F	10.3	B	52.3	D	11.3	B	93.7	F
I-64 NB Ramps at S Mallory St	Signalized	72.2	E	19.9	B	79.7	E	26.2	C	23.2	C	19.3	B	61.6	E	23.9	C	26.0	C	17.4	B	26.7	C	20.1	C
I-64 SB Ramps at 4th View St	Stop Control**	7.5	A	14.1	B	8.6	A	155.7	F	18.1	C	284.4	F	16.4	C	218.6	F	8.5	A	15.7	C	10.8	B	66.1	F
I-64 NB Ramps at 4th View St	Stop Control**	11.9	B	95.6	F	13.1	B	183.3	F	13.9	B	177.3	F	14.5	B	237.3	F	13.0	B	87.5	F	14.1	B	108.5	F
US 460 at I-64 NB On Ramp	Yield Control***	15.7	B	12.8	B	19.5	C	14.6	B	23.9	C	18.2	C	20.6	C	16.2	C	16.8	C	13.2	B	17.9	C	15.1	C
I-564 Interchanges																									
I-564 at Bainbridge Ave	Signalized	13.9	B	37.6	D	12.1	B	27.6	C	11.5	B	23.6	C	13.3	B	20.9	C	12.8	B	18.5	B	11.1	B	20.3	C
I-564 at Hampton Blvd****	Signalized	-	-	-	-	-	-	-	-	-	-	-	-	14.8	B	15.3	B	17.3	B	18.1	B	18.9	B	17.1	B
I-664 Interchanges																									
PowhatanPkwy at I-664 North Ramp	Signalized	24.8	C	27.3	C	13.4	B	19.5	B	14.0	B	20.2	C	14.1	B	20.3	C	14.4	B	21.4	C	14.7	B	21.5	C
Powhatan Pkwy at I-664 South Ramp	Signalized	14.2	B	20.3	C	24.8	C	26.6	C	24.1	C	26.2	C	24.2	C	26.3	C	24.2	C	26.6	C	24.4	C	27.0	C
Aberdeen Rd at I-664 North Ramp	Signalized	14.9	B	7.7	A	11.5	B	16.5	B	11.8	B	16.8	B	11.6	B	16.2	B	11.7	B	16.5	B	11.9	B	18.3	B
Aberdeen Rd at I-664 South Ramp	Signalized	10.2	B	12.8	B	25.4	C	9.9	A	25.3	C	9.7	A	25.1	C	9.9	A	24.2	C	10.0	B	24.6	C	12.7	B
Chestnut Ave at I-664 South Off Ramp	Signalized	0.2	A	0.2	A	0.3	A	0.2	A	0.3	A	0.2	A	0.3	A	0.2	A	0.6	A	0.2	A	0.6	A	0.2	A
Chestnut Ave at I-664 North On Ramp	Signalized	3.1	A	13.6	B	4.2	A	17.1	B	3.5	A	14.7	B	3.9	A	17.0	B	6.5	A	17.9	B	6.3	A	16.5	B
Chestnut Ave at 39th St	Signalized	22.1	C	16.9	B	15.8	B	16.2	B	15.7	B	15.6	B	16.3	B	15.6	B	15.5	B	16.1	B	15.5	B	15.7	B
Roanoke Ave at I-664 South On-Ramp	Stop Control**	9.9	A	10.3	B	10.6	B	11.1	B	9.9	A	10.3	B	10.2	B	10.9	B	10.5	B	12.2	B	10.3	B	11.3	B
Roanoke Ave at I-664 North Off-Ramp	Signalized	17.2	B	11.7	B	14.4	B	19.1	B	13.2	B	19.2	B	14.3	B	19.2	B	13.2	B	19.6	B	14.7	B	19.7	B
Roanoke Ave at 39th St	Signalized	10.6	B	8.4	A	22.8	C	17.5	B	20.4	C	17.1	B	21.9	C	18.6	B	25.7	C	18.7	B	25.1	C	18.1	B
Jefferson Ave at 36th St	Signalized	21.2	C	19.5	B	20.6	C	17.8	B	20.8	C	18.2	B	20.4	C	17.7	B	21.7	C	19.0	B	21.6	C	19.8	B
Jefferson Ave at 35th St	Signalized	3.6	A	7.0	A	9.6	A	10.2	B	9.5	A	11.1	B	9.7	A	11.1	B	10.0	A	11.4	B	10.0	B	11.5	B
Jefferson Ave at 27th St	Signalized	10.8	B	13.5	B	10.8	B	13.0	B	11.0	B	13.1	B	10.8	B	13.1	B	11.2	B	13.5	B	10.6	B	13.0	B
Jefferson Ave at 26th St	Signalized	9.8	A	10.5	B	11.5	B	10.7	B	9.7	A	10.2	B	8.7	A	9.0	A	11.9	B	12.2	B	12.5	B	12.2	B
Jefferson Ave at MLK JR At 25th St	Signalized	9.6	A	11.4	B	11.4	B	13.2	B	11.7	B	14.2	B	11.0	B	13.6	B	12.8	B	15.0	B	13.0	B	15.1	B
Huntington Ave at 35th St	Signalized	17.9	B	12.9	B	17.8	B	11.9	B	17.8	B	13.2	B	18.5	B	12.8	B	19.0	B	13.2	B	18.6	B	13.3	B
Huntington Ave at 34th St	Signalized	18.9	B	21.5	C	21.6	C	22.5	C	21.1	C	23.3	C	21.4	C	22.7	C	21.6	C	22.7	C	21.7	C	23.2	C
Huntington Ave at 28th St	Signalized	8.7	A	9.6	A	12.5	B	12.3	B	12.3	B	10.9	B	12.4	B	11.0	B	12.3	B	10.9	B	12.2	B	10.8	B
Huntington Ave at 26th St	Signalized	23.5	C	20.1	C	19.1	B	21.3	C	20.3	C	23.0	C	20.1	C	22.3	C	20.7	C	22.6	C	20.1	C	22.7	C
Huntington Ave at MLK JR At 25th St	Stop Control**	9.3	A	10.2	A	9.8	A	10.5	B	9.9	A	10.7	B	9.8	A	10.5	B	9.5	A	12.4	B	10.0	A	11.2	B
Terminal Ave at WB I-664 Off Ramp	Stop Control**	9.1	A	9.6	A	9.7	A	10.8	B	9.4	A	11.3	B	9.4	A	11.1	B	9.6	A	10.0	B	9.6	A	10.0	B
US 17 at Townpoint Rd	Stop Control**	164.0	F	85.0	F	680.5	F	472.2	F	620.7	F	387.7	F	597.7	F	367.8	F	397.5	F	196.3	F	575.5	F	332.2	F
Ramp to I-664 South On US 17	Yield Control***	11.2	B	11.7	B	14.8	B	16.5	C	15.3	C	16.8	C	16.0	C	18.0	C	13.1	B	14.0	B	14.3	B	15.8	C
I-664 SB Ramps at Pughsville Rd	Signalized	17.5	B	57.4	E	25.6	C	30.7	C	29.6	C	32.2	C	21.8	C	24.9	C	26.1	C	32.2	C	26.8	C	32.8	C
I-664 NB Off-Ramp at Pughsville Rd	Signalized	5.3	A	8.5	A	5.5	A	9.1	A	6.0	A	9.2	A	5.9	A	9.4	A	5.9	A	10.0	A	5.6	A	9.5	A

Intersection	Control Type	Existing				2028 No-Build				2028 Alternative A				2028 Alternative B				2028 Alternative C				2028 Alternative D			
		AM		PM		AM		PM		AM		PM		AM		PM		AM		PM		AM		PM	
		Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
I-664 SB Ramps at Dock Landing Rd	Signalized	7.4	A	11.6	B	11.8	B	13.6	B	11.7	B	13.2	B	12.0	B	13.3	B	13.0	B	13.9	B	12.9	B	13.9	B
I-664 NB Ramps at Dock Landing Rd	Signalized	9.6	A	8.6	A	12.1	B	13.9	B	12.2	B	15.0	B	12.3	B	14.0	B	11.0	B	14.3	B	11.0	B	14.3	B
W Military Hwy (US 13/58)/Airline Blvd at US 460 Alt/Joliff Rd	Signalized	40.8	D	43.9	D	54.5	D	44.2	D	61.9	E	54.9	D	64.9	E	56.4	E	64.5	E	60.5	E	60.8	E	56.1	E
W Military Hwy (US 460) at US 58/I-664 EB Ramps	Stop Control**	15.2	B	10.8	B	35.5	E	15.1	C	40.0	E	24.8	C	123.2	F	22.9	C	17.3	C	16.7	C	19.1	C	17.9	C
S Military Hwy (US 460) at S Military Hwy (US 13/460)	Stop Control**	43.4	D	26.1	C	103.0	F	74.9	F	104.2	F	344.8	F	321.3	F	373.5	F	73.8	F	214.2	F	104.0	F	287.8	F
I-664 EB Off-Ramp/Schaefer Ave at S Military Hwy (US 460)	Stop Control**	83.3	F	357.3	F	362.3	F	795.5	F	113.8	F	311.7	F	340.7	F	745.1	F	195.6	F	603.3	F	186.8	F	367.1	F
VA 164 Interchanges																									
VA 164 WB Off-Ramp at College Dr	Signalized	5.5	A	6.2	A	6.3	A	9.7	A	6.0	A	8.6	A	6.2	A	9.9	A	5.6	A	6.8	A	5.7	A	7.7	A
VA 164 EB On-Ramp at College Dr	Signalized	5.2	A	6.0	A	5.9	A	8.2	A	5.9	A	8.2	A	5.9	A	8.3	A	5.4	A	7.2	A	5.5	A	7.5	A
US 17 at College Dr	Signalized	26.3	C	62.5	E	49.4	D	146.9	F	59.0	E	167.3	F	57.6	E	161.9	F	39.2	D	124.6	F	51.8	D	156.4	F
VA 164 WB Ramps at Towne Point Rd*	Signalized	18.9	B	18.9	B	21.9	C	19.9	B	20.4	C	19.9	B	22.0	C	21.5	C	19.5	B	20.2	C	19.1	B	20.1	C
VA 164 EB Ramps at Towne Point Rd*	Signalized	19.6	B	30.6	C	20.7	C	47.4	D	20.4	C	51.7	D	23.9	C	53.8	D	17.1	B	37.8	D	17.8	B	45.3	D
VA 164 WB Ramps at Cedar Ln	Signalized	12.4	B	17.5	B	16.1	B	19.4	B	13.9	B	18.7	B	13.8	B	48.4	D	13.2	B	32.2	C	13.2	B	35.4	D
VA 164 EB Ramps at Cedar Ln	Signalized	11.2	B	5.6	A	16.1	B	6.4	A	16.3	B	6.6	A	55.0	D	6.6	A	23.5	C	4.7	A	25.3	C	4.9	A
VA 164 WB Ramps at Virginia International Gateway Blvd	Stop Control**	10.6	B	9.8	A	11.0	B	9.9	A	11.6	B	10.0	B	10.9	B	9.8	A	10.6	B	9.8	A	10.5	B	9.7	A
Virginia International Gateway Blvd at Wild Duck Ln	Stop Control**	11.7	B	10.5	B	14.4	B	10.9	B	15.3	C	10.8	B	14.6	B	10.7	B	11.6	B	10.5	B	11.5	B	10.4	B
VA 164 EB Ramps at Virginia International Gateway Blvd	Signalized	2.1	A	2.2	A	1.9	A	2.2	A	1.9	A	2.2	A	1.4	A	1.8	A	1.4	A	1.8	A	1.4	A	1.8	A
VA 164 WB Ramps at W Norfolk Rd	Stop Control**	10.2	B	12.9	B	10.9	B	16.8	C	12.6	B	20.2	C	12.5	B	23.9	C	11.3	B	14.8	B	11.2	B	13.4	B
VA 164 EB Ramps at W Norfolk Rd	Stop Control**	10.7	B	12.4	B	11.6	B	15.4	C	12.5	B	16.3	C	16.1	C	30.2	D	11.2	B	13.4	B	11.1	B	12.9	B
RailRd Ave at Lee Ave*	Signalized	22.3	C	23.5	C	28.9	C	23.0	C	29.7	C	24.4	C	25.5	C	24.1	C	23.4	C	23.8	C	22.0	C	23.6	C
RailRd Ave at VA 164 EB Off-Ramp*	Signalized	98.8	F	12.9	B	42.9	D	14.2	B	37.7	D	12.8	B	64.3	E	14.3	B	40.2	D	14.1	B	42.8	D	14.4	B
RailRd Ave at US 58 NB/VA 164 WB Ramps	Signalized	17.5	B	17.0	B	18.6	B	18.3	B	18.2	B	16.2	B	18.3	B	16.1	B	17.2	B	16.2	B	17.5	B	16.3	B
Lee Ave at Woodrow St/Harper Ave	Signalized	6.0	A	5.1	A	6.2	A	6.2	A	6.3	A	6.1	A	6.4	A	6.5	A	6.7	A	7.2	A	6.7	A	6.9	A

I-64 AM PEAK VOLUMES ALTERNATIVES COMPARISON

EASTBOUND

Cross Street	Length (not to scale)		Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D
I-664 NB	1810		3,270	3,905	4,270	4,095	3,575	4,090
	3150		4,085	4,730	5,100	4,910	4,370	4,845
LaSalle Avenue SB	455		3,555	4,220	4,710	4,380	3,920	4,455
LaSalle Avenue NB	1080	(merge)	3,625	4,325	4,835	4,500	4,025	4,575
	200	(merge)						
	1300		3,660	4,360	4,870	4,535	4,060	4,610
	200	(diverge)						
Rip Rap Rd	6790		2,580	3,060	3,570	3,320	2,800	3,310
	1500	(diverge)						
Tyler St / Settlers Landing Rd	1435	(lane drop)	1,915	2,345	2,930	2,600	2,065	2,615
	1900		2,780	3,210	4,000	3,585	2,765	3,590
S. Mallory St	1640		2,675	3,065	3,860	3,445	2,620	3,430
	1500	(merge)						
HRBT	16950		3,440	3,850	4,030	4,210	3,210	3,655
	1500	(diverge)						
Bayville St	200		3,410	3,810	3,990	4,170	3,170	3,615
	1500	(merge)						
	5770		3,480	3,880	4,060	4,240	3,240	3,685
	1500	(diverge)						
4th View St	2320		3,080	3,355	3,565	3,765	2,850	3,280
	1500	(merge)						
W. Bay Ave	3445		3,360	3,645	3,945	4,155	3,210	3,675
	1500	(merge)						
Patrol Rd	3740		3,660	3,945	4,225	4,455	3,450	3,910
	1730		4,020	4,305	4,590	4,815	3,810	4,270
I-564 / US 460			2,825	3,035	3,555	3,680	2,880	3,260
	1055	(diverge)						
I-564	1440	I-64 HOV	2,825	3,035	3,555	3,680	2,880	3,260
	1250	(merge)	3,710	4,010	4,855	5,125	4,505	4,990

WESTBOUND

Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D		Length (not to scale)	Cross Street
2,995	3,575	4,020	3,900	3,305	3,505		1140	I-664 SB
4,550	5,130	5,570	5,455	4,805	4,920		2360	
3,475	3,880	4,190	3,955	3,305	3,615		405	Armistead Ave EB/La Salle Ave
						(diverge)	1500	
3,545	4,010	4,335	4,090	3,420	3,760		645	Armistead Ave WB
						(diverge)	1500	
3,815	4,435	4,760	4,505	3,775	4,160		5685	
						(merge)	1500	
3,100	3,650	4,075	3,730	2,905	3,415		1310	Settlers Landing Rd
3,405	3,955	4,495	4,180	3,340	3,815		1835	
3,045	3,580	4,110	3,815	3,010	3,435	(lane add)	605	S. Mallory St
						(diverge)	1500	
3,370	3,960	4,440	4,165	3,275	3,865		18460	HRBT
						(merge)	1500	
3,320	3,895	4,375	4,110	3,210	3,800		190	W. Ocean View Ave
						(diverge)	1500	
3,330	3,905	4,385	4,125	3,220	3,810		5410	
						(merge)	1500	
2,885	3,400	3,945	3,660	2,840	3,465		2275	4th View St
						(diverge)	1500	
3,005	3,530	4,120	3,850	3,025	3,680		2590	W. Bay Ave
						(diverge)	1500	
3,465	4,050	4,640	4,360	3,575	4,215		1430	
						(merge)	1500	
3,110	3,630	4,140	3,895	3,210	3,795		1840	Granby St
						(merge)	1500	
2,370	2,630	3,195	2,905	2,350	2,850	I-64 HOV	1510	I-564 US 460
						(diverge)	1500	
2,720	3,065	3,560	3,290	2,775	3,230		525	

I-64 PM PEAK VOLUMES ALTERNATIVES COMPARISON

EASTBOUND

Cross Street	Length (not to scale)		Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D
I-664 NB	1810		2,805	3,460	3,770	3,695	3,050	3,350
	3150		3,935	4,605	4,925	4,830	4,150	4,400
LaSalle Avenue SB	455		3,445	4,115	4,580	4,340	3,735	4,040
LaSalle Avenue NB	1080	(merge)	3,605	4,350	4,865	4,610	3,970	4,320
	200	(merge)						
	1300		3,645	4,390	4,910	4,650	4,010	4,360
	200	(diverge)						
Rip Rap Rd	6790		2,605	3,100	3,685	3,475	2,800	3,150
	1500	(diverge)						
Tyler St / Settlers Landing Rd	1435	(lane drop)	1,975	2,400	3,090	2,790	2,095	2,490
	1900		2,705	3,130	4,095	3,645	2,730	3,415
S. Mallory St	1640		2,640	3,025	4,010	3,555	2,645	3,325
	1500	(merge)						
HRBT	16950		3,445	3,830	4,395	4,360	3,265	3,845
	1500	(diverge)						
Bayville St	200		3,340	3,695	4,260	4,225	3,130	3,730
	1500	(merge)						
	5770		3,390	3,745	4,310	4,275	3,180	3,795
	1500	(diverge)						
4th View St	2320		2,955	3,170	3,765	3,760	2,780	3,350
	1500	(merge)						
W. Bay Ave	3445		3,120	3,335	3,980	3,985	2,990	3,610
	1500	(merge)						
Patrol Rd	3740		4,000	4,215	4,800	4,865	3,700	4,300
	1730		4,605	4,820	5,405	5,470	4,305	4,905
I-564 / US 460			3,915	4,150	4,820	4,850	3,810	4,345
	1055	(diverge)						
I-564	1440	I-64 HOV	2,760	2,980	3,395	3,455	2,655	3,035
	1250	(merge)	5,550	6,055	6,235	6,745	6,205	6,905

WESTBOUND

Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D		Length (not to scale)	Cross Street
3,470	3,960	4,355	4,260	3,715	4,065		1140	I-664 SB
4,205	4,700	5,095	4,995	4,430	4,740		2360	
3,320	3,690	3,980	3,775	3,220	3,670		405	Armistead Ave EB/La Salle Ave
						(diverge)	1500	
3,400	3,830	4,135	3,920	3,350	3,825		645	Armistead Ave WB
						(diverge)	1500	
3,710	4,320	4,605	4,395	3,760	4,260		5685	
						(merge)	1500	
2,970	3,385	3,720	3,465	2,860	3,340		1310	Settlers Landing Rd
3,455	3,870	4,390	4,185	3,560	3,960		1835	
2,950	3,350	3,865	3,660	3,055	3,340	(lane add)	605	S. Mallory St
						(diverge)	1500	
3,155	3,625	4,115	3,895	3,225	3,595		18460	HRBT
						(merge)	1500	
3,110	3,570	4,060	3,845	3,170	3,530		190	W. Ocean View Ave
						(diverge)	1500	
3,150	3,620	4,110	3,900	3,220	3,580		5410	
						(merge)	1500	
2,340	2,730	3,340	3,070	2,570	2,960		2275	4th View St
						(diverge)	1500	
2,450	2,845	3,495	3,245	2,750	3,145		2590	W. Bay Ave
						(diverge)	1500	
2,545	2,950	3,600	3,350	2,840	3,235		1430	
						(merge)	1500	
2,120	2,465	2,995	2,790	2,420	2,700		1840	Granby St
						(merge)	1500	
1,625	1,775	2,470	2,300	1,955	2,180	I-64 HOV	1510	I-564 US 460
						(diverge)	1500	
1,985	2,225	2,845	2,700	2,390	2,570		525	

Notes
Peak hour mainline volumes
2015 volumes based on 2015 traffic count data

VDOT
Virginia Department of Transportation

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I-64 Alternatives Comparison
2028 Peak Hour Volumes

April 2017	Figure 6-2.1

I-564 AM PEAK VOLUMES ALTERNATIVES COMPARISON

EASTBOUND

Cross Street	Length (not to scale)		Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D
Bainbridge Ave/Bellinger Blvd	670		205	125	475	140	30	280
	1500	(merge)						
Intermodal Connector (2028 NB and Build Alternatives)	3000			280	625	275	165	415
	1500	(merge)	385					
	1650			705	1,065	1,175	1,370	1,500
	1500	(diverge)						
Terminal Blvd	2530		285	470	885	960	1,255	1,375
	350	(merge)						
	700		970	1,080	1,405	1,580	1,760	1,870
	350	(diverge)						
W Little Creek Rd	1450		885	975	1,300	1,445	1,625	1,730

WESTBOUND

Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D		Length (not to scale)	Cross Street
1,370	1,560	1,315	1,025	845	1,210		525	Bainbridge Ave/Bellinger Blvd
						(diverge)	1500	
	2,300	2,000	1,675	1,510	1,860		4675	Intermodal Connector (2028 NB and Build Alternatives)
						(diverge)	1500	
2,180	2,950	2,660	3,375	3,595	3,760		1465	Terminal Blvd
3,640	4,175	3,845	4,500	4,770	4,855		2995	
3,040	3,175	3,190	3,695	4,050	4,175	(merge)	950	I-64 EB
2,695	2,780	2,770	3,210	3,550	3,685		2260	US 460 NB

I-564 PM PEAK VOLUMES ALTERNATIVES COMPARISON

EASTBOUND

Cross Street	Length (not to scale)		Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D
Bainbridge Ave/Bellinger Blvd	670		2,030	1,795	1,915	1,520	1,815	2,320
	1500	(merge)						
Intermodal Connector (2028 NB and Build Alternatives)	3000			2,655	2,750	2,295	2,585	3,100
	1500	(merge)	3,015					
	1650			3,680	3,795	4,355	5,010	5,485
	1500	(diverge)						
Terminal Blvd	2530		2,370	2,970	3,210	3,545	4,270	4,665
	350	(merge)						
	700		3,945	4,415	4,400	4,965	5,425	5,790
	350	(diverge)						
W Little Creek Rd	1450		3,675	4,080	4,065	4,530	4,990	5,345

WESTBOUND

Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D		Length (not to scale)	Cross Street
265	220	145	155	35	175		525	Bainbridge Ave/Bellinger Blvd
						(diverge)	1500	
	375	290	290	175	310		4675	Intermodal Connector (2028 NB and Build Alternatives)
						(diverge)	1500	
435	725	655	1,000	1,010	1,070		1465	Terminal Blvd
1,230	1,390	1,295	1,610	1,650	1,665		2995	
900	915	985	1,230	1,310	1,345	(merge)	950	I-64 EB
730	720	775	990	1,060	1,105		2260	US 460 NB

Notes

Peak hour mainline volumes

2015 volumes based on 2015 traffic count data

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

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I-564 Alternatives Comparison 2028 Peak Hour Volumes

April 2017 | Figure 6-2.2

I-664 AM PEAK VOLUMES ALTERNATIVES COMPARISON

Cross Street	Length (not to scale)	EASTBOUND						WESTBOUND						Length (not to scale)	Cross Street
		Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D	Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D		
I-64	1320	1,555	1,555	1,550	1,555	1,500	1,415	2,295	2,685	2,510	2,505	2,780	2,825	1085	I-64
	1500 (merge)													(diverge) 1500	
	1000	4,365	4,920	4,685	4,690	4,970	4,805	3,110	3,510	3,340	3,320	3,575	3,580	1425	
	1500 (diverge)													(merge) 1500	
Power Plant Pkwy/Powhatan Pkwy	1660	4,060	4,600	4,395	4,400	4,665	4,495	2,635	3,020	2,875	2,850	3,140	3,150	1945	Power Plant Pkwy/Powhatan Pkwy
	1500 (merge)													(diverge) 1500	
	1785	4,345	4,910	4,720	4,735	4,990	4,825	2,870	3,270	3,140	3,120	3,420	3,445	1965	
	1500 (diverge)													(merge) 1500	
Aberdeen Rd	1505	3,730	4,205	4,030	4,060	4,265	4,125	2,560	2,935	2,795	2,785	3,105	3,135	1300	Aberdeen Rd
	3040	3,985	4,520	4,370	4,390	4,625	4,485	2,785	3,245	3,080	3,070	3,415	3,445	2775	
Chestnut Ave/Roanoke Ave	2230	3,195	3,665	3,590	3,565	3,890	3,760	2,550	2,970	2,830	2,810	3,190	3,225	2020	Chestnut Ave/Roanoke Ave
	1500 (merge)													(diverge) 1500	
	300	3,280	3,820	3,715	3,690	4,050	3,880	2,670	3,150	3,005	2,975	3,435	3,385	450	
	1500 (diverge)													(merge) 1500	
35th St	1105	2,390	2,875	2,735	2,720	3,125	2,990	2,280	2,750	2,585	2,550	3,035	2,990	1565	35th St/36th St
	1500 (diverge)														
26th St	2090	1,740	1,975	1,805	1,825	2,250	2,140	3,140	3,650	3,510	3,410	4,140	4,155	945	
35th St								2,920	3,365	3,240	3,140	3,800	3,840	2410	US 60
US 60	1475 (merge)	2,190	2,530	2,270	2,330	2,745	2,680								
	1100 (merge)													(diverge) 1500	
	410	2,325	2,750	2,465	2,505	3,020	2,950	3,265	3,825	3,760	3,555	4,380	4,425	360	
	1100 (diverge)													(merge) 1500	
Terminal Ave	585	2,240	2,665	2,420	2,420	2,975	2,905	3,245	3,765	3,745	3,535	4,365	4,410	1690	Terminal Ave
Terminal Ave	1005 (lane drop)														
	1500 (merge)													(diverge) 1500	
MMMBT						3,030	2,960					4,455	4,500		MMMBT
I-664 Connector (Build Alternatives C and D)	26460	2,290	2,735	2,455	2,470	1,980	1,970	3,325	3,845	3,810	3,615	3,435	3,675	27835	I-664 Connector (Build Alternatives C and D)
MMMBT						2,820	2,975					4,560	4,625		MMMBT
	1500 (diverge)													(merge) 1500	
College Dr NB	220	2,120	2,490	2,210	2,230	2,520	2,695	2,850	3,225	3,125	3,020	3,920	3,915	640	College Dr NB
	1820	2,305	2,735	2,465	2,485	2,740	2,935	3,020	3,465	3,370	3,265	4,130	4,165	1695	
College Dr SB	630	1,980	2,310	2,015	2,080	2,290	2,450	2,885	3,280	3,185	3,080	3,930	3,965	500	College Dr SB
	1500 (merge)													(diverge) 1500	
MATCHLINE A	1600	2,105	2,480	2,200	2,260	2,460	2,645	3,485	4,085	3,995	3,875	4,485	4,585	1310	MATCHLINE A

I-664 AM PEAK VOLUMES ALTERNATIVES COMPARISON (CONTINUED)

Cross Street	Length (not to scale)	EASTBOUND						WESTBOUND						Length (not to scale)	Cross Street
		Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D	Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D		
MATCHLINE A	1600	2,105	2,480	2,200	2,260	2,460	2,645	3,485	4,085	3,995	3,875	4,485	4,585	1310	MATCHLINE A
	1500 (diverge)													(merge) 1500	
VA 164	1235	1,380	1,670	1,450	1,360	1,730	1,900	2,795	3,340	3,295	3,035	3,975	4,065	1140	VA 164 WB
	1500 (merge)							3,260	3,955	3,930	3,680	4,570	4,705	1715	
US 17	740	1,885	2,245	2,010	2,030	2,155	2,305	2,955	3,520	3,485	3,255	3,975	4,090	510	US 17/VA 164 EB
	1500 (merge)														
	700	2,855	3,430	3,195	3,265	3,350	3,530	3,720	4,400	4,370	4,265	4,735	4,840	1715	
	1500 (diverge)														
								3,315	3,845	3,820	3,715	4,180	4,280	(merge) 1500	Pughsville Rd WB
Pughsville Rd	2525	2,370	2,760	2,515	2,655	2,640	2,820	3,205	3,685	3,660	3,555	4,015	4,110	1000	Pughsville Rd EB
	1500 (merge)													(diverge) 1500	
	5140	3,150	3,685	3,510	3,580	3,570	3,765	3,710	4,235	4,245	4,120	4,570	4,640	5350	
	1500 (diverge)													(merge) 1500	
Portsmouth Blvd WB	600	2,870	3,315	3,150	3,220	3,170	3,365	3,465	3,930	3,945	3,820	4,245	4,310	520	Portsmouth Blvd WB
	1700	3,160	3,660	3,495	3,560	3,495	3,690	3,615	4,120	4,145	4,020	4,435	4,490	1680	
Portsmouth Blvd EB	480	2,935	3,375	3,215	3,290	3,195	3,385	3,455	3,900	3,930	3,800	4,205	4,260	575	Portsmouth Blvd EB
	1500 (merge)	3,225	3,745	3,585	3,670	3,570	3,760							(diverge) 1500	
								3,795	4,305	4,350	4,210	4,590	4,630	200	
	1500 (diverge)													(merge) 1500	
Dock Landing Rd	2550	3,100	3,520	3,360	3,455	3,325	3,515	3,380	3,800	3,835	3,675	4,010	4,060	2555	Dock Landing Rd
	1500 (merge)													(diverge) 1500	
	725	3,525	3,960	3,800	3,900	3,725	3,915	3,530	4,020	4,075	3,910	4,200	4,250	1180	
	1500 (diverge)													(merge) 1500	
US 58 SB	480	2,870	3,155	2,955	2,995	2,785	2,990	3,255	3,605	3,670	3,495	3,735	3,795	410	US 58 SB
	2045	2,900	3,195	2,990	3,025	2,815	3,015							(merge) 1500	
US 58 NB	1260	2,670	2,885	2,665	2,705	2,490	2,685	2,550	2,725	2,780	2,605	2,780	2,850	1225	US 58 NB
	490 (merge)														
	1020	5,120	5,590	5,285	5,400	5,040	5,305	4,095	4,300	4,350	4,160	4,115	4,145	4675	
	490 (diverge)														
S Military Hwy	1500 (diverge)	4,810	5,075	4,790	4,905	4,505	4,720								
I-64 SB	3435	1,870	1,955	1,740	1,870	1,530	1,760	1,195	1,195	1,075	1,195	1,030	1,150	2135	I-64 NB

Notes

Peak hour mainline volumes

2015 volumes based on 2015 traffic count data

VDOT Virginia Department of Transportation

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I-664 Alternatives Comparison 2028 AM Peak Hour Volumes

April 2017

Figure 6-2.3

I-664 PM PEAK VOLUMES ALTERNATIVES COMPARISON

			EASTBOUND						WESTBOUND								
Cross Street	Length (not to scale)		Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D	Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D		Length (not to scale)	**Cross Street**
I-64	1320		735	740	740	735	715	675	3,500	4,110	3,840	3,830	4,250	4,130		1085	I-64
	1500	(merge)													(diverge)	1500	
	1000		2,510	2,860	2,715	2,710	2,900	2,810	4,630	5,255	4,995	4,965	5,350	5,180		1425	
	1500	(diverge)													(merge)	1500	
Power Plant Pkwy/Powhatan Pkwy	1660		2,030	2,370	2,250	2,230	2,410	2,315	4,190	4,820	4,575	4,535	4,905	4,735		1945	Power Plant Pkwy/Powhatan Pkwy
	1500	(merge)													(diverge)	1500	
	1785		2,275	2,640	2,535	2,505	2,685	2,605	4,630	5,300	5,085	5,045	5,395	5,250		1965	
	1500	(diverge)													(merge)	1500	
Aberdeen Rd	1505		1,900	2,230	2,110	2,090	2,245	2,170	4,140	4,765	4,550	4,525	4,770	4,625		1300	Aberdeen Rd
	3040		2,135	2,530	2,410	2,385	2,575	2,500	4,435	5,155	4,930	4,900	5,095	4,985		2775	
Chestnut Ave/Roanoke Ave	2230		1,840	2,210	2,115	2,075	2,265	2,200	3,905	4,550	4,390	4,350	4,510	4,420		2020	Chestnut Ave/Roanoke Ave
	1500	(merge)													(diverge)	1500	
	300		1,940	2,395	2,265	2,225	2,545	2,370	3,990	4,670	4,525	4,480	4,670	4,565		450	
	1500	(diverge)													(merge)	1500	
35th St	1105		1,660	2,110	1,955	1,915	2,235	2,065	2,805	3,465	3,300	3,260	3,470	3,350		1565	35th St/36th St
	1500	(diverge)															
26th St	2090		1,290	1,610	1,435	1,380	1,690	1,545	3,360	4,040	3,910	3,840	4,145	4,080		945	
35th St									2,650	3,070	2,960	2,920	3,135	3,080		2410	US 60
US 60	1475	(merge)	1,710	2,145	1,895	1,840	2,215	2,110									
	1100	(merge)													(diverge)	1500	
	410		2,505	3,125	3,075	2,865	3,530	3,400	2,745	3,200	3,110	3,050	3,315	3,260		360	
	1100	(diverge)													(merge)	1500	
Terminal Ave	585		2,480	3,100	3,060	2,840	3,515	3,385	2,690	3,140	3,060	2,995	3,265	3,210		1690	Terminal Ave
Terminal Ave	1005	(lane drop)															
	1500	(merge)													(diverge)	1500	
MMMBT							3,970	3,840					3,315	3,260			MMMBT
I-664 Connector (Build Alternatives C and D)	26460		3,195	3,730	3,575	3,555	3,020	2,760	2,745	3,195	3,105	3,050	2,320	2,255		27835	I-664 Connector (Build Alternatives C and D)
MMMBT							4,140	3,900					3,445	3,365			MMMBT
	1500	(diverge)													(merge)	1500	
College Dr NB	220		3,100	3,600	3,430	3,425	3,950	3,720	2,360	2,690	2,545	2,565	2,875	2,745		640	College Dr NB
	1820		3,590	4,260	4,090	4,060	4,540	4,365	2,450	2,815	2,675	2,695	2,985	2,875		1695	
College Dr SB	630		3,195	3,750	3,530	3,570	3,965	3,750	2,345	2,670	2,530	2,550	2,830	2,720		500	College Dr SB
	1500	(merge)													(diverge)	1500	
MATCHLINE A	1600		3,365	3,990	3,765	3,800	4,185	4,005	2,560	2,960	2,820	2,835	3,085	2,995		1310	MATCHLINE A

I-664 PM PEAK VOLUMES ALTERNATIVES COMPARISON (CONTINUED)

			EASTBOUND						WESTBOUND								
Cross Street	Length (not to scale)		Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D	Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D		Length (not to scale)	**Cross Street**
MATCHLINE A	1600		3,365	3,990	3,765	3,800	4,185	4,005	2,560	2,960	2,820	2,835	3,085	2,995		1310	MATCHLINE A
	1500	(diverge)	3,365	3,990	3,765	3,800	4,185	4,005	2,560	2,960	2,820	2,835	3,085	2,995	(merge)	1500	
VA 164	1235		2,275	2,710	2,550	2,425	3,105	2,895	1,680	2,015	1,930	1,770	2,310	2,210		1140	VA 164 WB
	1500	(merge)	2,785	3,295	3,120	3,105	3,535	3,305	2,195	2,705	2,630	2,480	2,975	2,930		1715	
US 17	740		2,785	3,295	3,120	3,105	3,535	3,305	2,100	2,570	2,490	2,350	2,785	2,735		510	US 17/VA 164 EB
	1500	(merge)	3,670	4,370	4,200	4,230	4,715	4,515									
	700		3,670	4,370	4,200	4,230	4,715	4,515	2,820	3,400	3,310	3,275	3,535	3,475		1715	
	1500	(diverge)	3,670	4,370	4,200	4,230	4,715	4,515									
									2,525	2,995	2,905	2,875	3,130	3,065	(merge)	1500	Pughsville Rd WB
Pughsville Rd	2525		2,930	3,345	3,180	3,335	3,635	3,435									
									2,440	2,875	2,785	2,760	3,005	2,935		1000	Pughsville Rd EB
	1500	(merge)	3,310	3,790	3,650	3,770	4,100	3,905	3,125	3,630	3,520	3,525	3,770	3,660	(diverge)	1500	
	5140		3,310	3,790	3,650	3,770	4,100	3,905	3,125	3,630	3,520	3,525	3,770	3,660		5350	
	1500	(diverge)	3,310	3,790	3,650	3,770	4,100	3,905	3,125	3,630	3,520	3,525	3,770	3,660	(merge)	1500	
Portsmouth Blvd WB	600		3,095	3,505	3,380	3,495	3,795	3,595	2,840	3,275	3,170	3,175	3,390	3,270		520	Portsmouth Blvd WB
	1700		3,505	3,995	3,875	3,975	4,255	4,055	3,110	3,615	3,500	3,520	3,720	3,585		1680	
Portsmouth Blvd EB	480		3,195	3,605	3,515	3,610	3,840	3,635	2,935	3,380	3,270	3,285	3,470	3,335		575	Portsmouth Blvd EB
	1500	(merge)							3,450	3,995	3,860	3,895	4,040	3,890	(diverge)	1500	
			3,370	3,830	3,745	3,835	4,080	3,875	3,450	3,995	3,860	3,895	4,040	3,890		200	
	1500	(diverge)							3,450	3,995	3,860	3,895	4,040	3,890	(merge)	1500	
Dock Landing Rd	2550		3,155	3,470	3,400	3,495	3,690	3,485	3,275	3,785	3,645	3,675	3,795	3,650		2555	Dock Landing Rd
	1500	(merge)	3,325	3,645	3,585	3,680	3,870	3,665	3,550	4,175	4,015	4,065	4,140	3,995	(diverge)	1500	
	725		3,325	3,645	3,585	3,680	3,870	3,665	3,550	4,175	4,015	4,065	4,140	3,995		1180	
	1500	(diverge)	3,325	3,645	3,585	3,680	3,870	3,665	3,550	4,175	4,015	4,065	4,140	3,995	(merge)	1500	
US 58 SB	480		2,575	2,725	2,640	2,665	2,795	2,605	3,265	3,750	3,595	3,640	3,660	3,525		410	US 58 SB
	2045		2,600	2,760	2,670	2,690	2,820	2,625	3,265	3,750	3,595	3,640	3,660	3,525	(merge)	1500	
US 58 NB	1260		2,415	2,510	2,430	2,450	2,555	2,355	2,675	3,020	2,850	2,895	2,865	2,735		1225	US 58 NB
	490	(merge)	3,890	4,130	3,980	4,065	4,110	3,950									
	1020		3,890	4,130	3,980	4,065	4,110	3,950	5,185	5,590	5,295	5,415	5,035	4,840		4675	
	490	(diverge)	3,890	4,130	3,980	4,065	4,110	3,950									
S Military Hwy	1500	(diverge)	3,575	3,675	3,545	3,635	3,595	3,445									
I-64 SB	3435		1,350	1,365	1,210	1,350	1,325	1,190	2,210	2,295	2,000	2,265	2,000	1,805		2135	I-64 NB

Notes
Peak hour mainline volumes
2015 volumes based on 2015 traffic count data

Virginia Department of Transportation

U.S. Department of Transportation
Federal Highway Administration

HRCS SEIS
Hampton Roads Crossing Study SEIS

I-664 Alternatives Comparison
2028 PM Peak Hour Volumes

April 2017 | Figure 6-2.4

VA 164 AM PEAK VOLUMES ALTERNATIVES COMPARISON

Cross Street	Length (not to scale)		EASTBOUND						WESTBOUND							Length (not to scale)	Cross Street
			Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D	Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D			
US 17/Bridge Rd	2600		1,140	1,650	1,685	1,710	1,690	1,720	725	970	990	1,015	925	970		1670	I-664 SB
	2680		1,300	1,840	1,855	1,880	1,880	1,910	1,230	1,545	1,550	1,685	1,350	1,375		1610	
I-664	1460		995	1,405	1,410	1,455	1,285	1,295	765	930	915	1,040	755	735		970	I-664 NB
	1500	(merge)													(diverge)	1500	
College Dr	585		2,095	2,625	2,565	2,860	2,245	2,260	1,455	1,675	1,615	1,880	1,265	1,255		1025	College Dr
	1500	(merge)													(diverge)	1500	
	1290		2,365	2,980	2,920	3,235	2,550	2,585	1,860	2,190	2,110	2,420	1,705	1,720		1270	
	1500	(diverge)													(merge)	1500	
Towne Point Rd	2000		2,100	2,665	2,600	2,915	2,260	2,275	1,345	1,590	1,485	1,850	1,190	1,195		1970	Towne Point Rd
	1500	(merge)													(diverge)	1500	
	1400		2,690	3,280	3,180	3,570	2,810	2,815	1,570	1,850	1,720	2,120	1,420	1,420		1315	
	1500	(diverge)													(merge)	1500	
Cedar Ln SB (Existing and 2028 NB)	1135		1,915	2,250	2,155				1,095	1,205	1,100	1,455	895	890		1140	Cedar Ln
	1500	(merge)				2,650	2,010	2,010				1,780	1,220	1,235	(diverge)	1500	
Cedar Ln NB (Existing and 2028 NB)	110		2,115	2,480	2,425												
	1000	(merge)							1,365	1,515	1,390	805	780	685		1300	Craney Island Connector (Build Alternatives)
Craney Island Connector (Build Alternatives)	500		2,190	2,615	2,560												
	1000	(diverge)													(merge)	1000	
Virginia International Gateway Blvd (Existing and 2028 NB)	2245		2,045	2,470	2,415	1,775	1,560	1,485	1,270	1,435	1,315	770	735	650		2330	Virginia International Gateway Blvd
	1025	(merge)													(diverge)	1225	
Craney Island Connector (Build Alternatives)	475		2,160	2,565	2,535				1,415	1,580	1,505	1,800	1,285	1,375		275	
	1025	(diverge)				2,635	2,530	2,480							(merge)	1225	
W. Norfolk Rd	625		2,090	2,465	2,430	2,445	2,440	2,390	1,315	1,460	1,390	1,460	1,180	1,280		810	W Norfolk Rd
	1500	(merge)													(diverge)	1500	
																1710	
	1245		2,475	2,970	2,900	2,840	2,755	2,645									
									1,405	1,585	1,545	1,570	1,275	1,365	(lane drop)	415	
	2330	(lane add)														1585	
	1500	(lane drop)													(merge)	1500	
(diverge)	1375	US 58 EB	1,725	2,200	2,150	2,090	2,225	2,210	710	820	820	875	745	930	(merge)	1050	US 58 SB
Lee Ave/Railroad Ave Lee Ave / Harper Ave	1500	US 58 WB	1,275	1,750	1,690	1,575	1,710	1,660	505	585	570	625	495	680		1765	Railroad Ave/US 58 NB
	1500	(merge)	1,585	2,100	2,025	1,885	1,985	1,910	1,325	1,425	1,410	1,445	1,150	1,280		3150	
	1830		1,655	2,185	2,115	1,970	2,055	1,985	730	830	815	850	555	685		500	London Blvd

VA 164 PM PEAK VOLUMES ALTERNATIVES COMPARISON

Cross Street	Length (not to scale)		EASTBOUND						WESTBOUND							Length (not to scale)	Cross Street
			Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D	Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D			
US 17/Bridge Rd	2600		595	865	890	905	950	960	1,230	1,660	1,630	1,720	1,560	1,615		1670	I-664 SB
	2680		710	1,005	1,010	1,025	1,085	1,095	1,740	2,245	2,200	2,400	1,990	2,025		1610	
I-664	1460		615	870	870	895	895	900	1,225	1,555	1,500	1,690	1,325	1,305		970	I-664 NB
	1500	(merge)													(diverge)	1500	
College Dr	585		1,735	2,105	2,030	2,305	1,780	1,795	2,105	2,500	2,390	2,755	2,100	2,090		1025	College Dr
	1500	(merge)													(diverge)	1500	
	1290		2,150	2,655	2,575	2,880	2,265	2,310	2,635	3,185	3,025	3,475	2,670	2,700		1270	
	1500	(diverge)													(merge)	1500	
Towne Point Rd	2000		1,575	1,965	1,875	2,170	1,635	1,640	2,280	2,790	2,610	3,105	2,315	2,340		1970	Towne Point Rd
	1500	(merge)													(diverge)	1500	
	1400		1,935	2,330	2,225	2,560	1,980	1,980	2,915	3,445	3,245	3,875	2,960	2,960		1315	
	1500	(diverge)													(merge)	1500	
Cedar Ln SB (Existing and 2028 NB)	1135		1,425	1,665	1,565				2,425	2,815	2,620	3,225	2,395	2,390		1140	Cedar Ln
	1500	(merge)				1,890	1,460	1,440				3,595	2,730	2,755	(diverge)	1500	
Cedar Ln NB (Existing and 2028 NB)	110		1,550	1,810	1,735												
	1000	(merge)							2,745	3,165	2,950	2,580	2,205	2,135		1300	Craney Island Connector (Build Alternatives)
Craney Island Connector (Build Alternatives)	500		1,610	1,915	1,840												
	1000	(diverge)													(merge)	1000	
Virginia International Gateway Blvd (Existing and 2028 NB)	2245		1,570	1,875	1,800	1,285	1,040	960	2,655	3,075	2,860	2,515	2,135	2,065		2330	Virginia International Gateway Blvd
	1025	(merge)													(diverge)	1225	
Craney Island Connector (Build Alternatives)	475		1,670	1,985	1,910				2,710	3,130	2,930	3,250	2,605	2,585		275	
	1025	(diverge)				2,390	1,825	1,815							(merge)	1225	
W. Norfolk Rd	625		1,575	1,855	1,775	2,075	1,720	1,710	2,630	3,035	2,830	3,005	2,505	2,490		810	W Norfolk Rd
	1500	(merge)													(diverge)	1500	
																1710	
	1245		1,705	2,030	1,945	2,200	1,860	1,830									
									2,860	3,350	3,130	3,255	2,710	2,650	(lane drop)	415	
	2330	(lane add)														1585	
	1500	(lane drop)													(merge)	1500	
(diverge)	1375	US 58 EB	920	1,225	1,160	1,415	1,310	1,375	1,735	2,115	1,960	2,130	1,860	1,945	(merge)	1050	US 58 SB
Lee Ave/Railroad Ave Lee Ave / Harper Ave	1500	US 58 WB	720	1,025	955	1,185	1,080	1,130	1,430	1,765	1,585	1,755	1,485	1,570		1765	Railroad Ave/US 58 NB
	1500	(merge)	1,065	1,410	1,325	1,530	1,385	1,410	1,925	2,270	2,090	2,250	1,885	1,930		3150	
	1830		1,175	1,545	1,470	1,670	1,510	1,550	460	805	625	785	420	465		500	London Blvd

Notes

Peak hour mainline volumes

2015 volumes based on 2015 traffic count data

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS

Hampton Roads Crossing Study SEIS

VA 164 Alternatives Comparison
2028 Peak Hour Volumes

April 2017

Figure 6-2.5

JAMES RIVER CONNECTORS AM PEAK VOLUMES ALTERNATIVE B

Cross Street	Length (not to scale)		WESTBOUND	EASTBOUND		Length (not to scale)	Cross Street
			2028 Alt B	2028 Alt B			
	3675		1,700	900		3615	
	1500	(diverge)			(merge)	1500	
Hampton Blvd	2850		870	630		2970	Hampton Blvd
	1500	(merge)			(diverge)	1500	
	16540		1,325	1,765		17390	
	1500	(diverge)			(merge)	1500	
Future Craney Island Access	2700		1,300	1,715		2000	Future Craney Island Access
	1500	(merge)			(diverge)	1500	
	5350		1,390	1,860		5050	
					(merge)	1500	
				1,080	VA 164 EB	1100	

JAMES RIVER CONNECTORS PM PEAK VOLUMES ALTERNATIVE B

Cross Street	Length (not to scale)		WESTBOUND	EASTBOUND		Length (not to scale)	Cross Street
			2028 Alt B	2028 Alt B			
	3675		710	2,060		3615	
	1500	(diverge)			(merge)	1500	
Hampton Blvd	2850		500	860		2970	Hampton Blvd
	1500	(merge)			(diverge)	1500	
	16540		1,750	1,370		17390	
	1500	(diverge)			(merge)	1500	
Future Craney Island Access	2700		1,695	1,345		2000	Future Craney Island Access
	1500	(merge)			(diverge)	1500	
	5350		1,790	1,400		5050	
					(merge)	1500	
				815	VA 164 EB	1100	

JAMES RIVER CONNECTORS AM PEAK VOLUMES ALTERNATIVES C & D

Cross Street	Length (not to scale)		WESTBOUND		EASTBOUND			Length (not to scale)	Cross Street
			2028 Alt C	2028 Alt D	2028 Alt C	2028 Alt D			
	3675		2,085	1,900	1,205	1,085		3615	
	1500	(diverge)					(merge)	1500	
Hampton Blvd	2850		1,395	1,255	940	725		2970	Hampton Blvd
	1500	(merge)					(diverge)	1500	
	5450		2,225	2,090	2,375	2,150		5730	
	1500	(diverge)					(merge)	1500	
Craney Island Connector	4135		1,535	1,410	1,750	1,365		3660	Craney Island Connector
	1500	(merge)					(diverge)	1500	
	6300		1,860	1,830	2,175	1,940		5285	

Craney Island Connector

Cross Street	Length (not to scale)		SOUTHBOUND		NORTHBOUND			Length (not to scale)	Cross Street
			2028 Alt C	2028 Alt D	2028 Alt C	2028 Alt D			
	7095		1,115	1,255	950	1,205		9410	
	1500	(diverge)					(merge)	1500	
Future Craney Island Access	2700		975	1,110	880	1,160		2000	Future Craney Island Access
	1500	(merge)					(diverge)	1500	
	5350		1,010	1,170	900	1,195		5050	
							(merge)	1500	
					525	740	VA 164 EB	1100	

JAMES RIVER CONNECTORS PM PEAK VOLUMES ALTERNATIVES C & D

Cross Street	Length (not to scale)		WESTBOUND		EASTBOUND			Length (not to scale)	Cross Street
			2028 Alt C	2028 Alt D	2028 Alt C	2028 Alt D			
	3675		835	760	2,425	2,385		3615	
	1500	(diverge)					(merge)	1500	
Hampton Blvd	2850		705	630	1,530	1,430		2970	Hampton Blvd
	1500	(merge)					(diverge)	1500	
	5450		2,430	2,365	2,320	2,280		5730	
	1500	(diverge)					(merge)	1500	
Craney Island Connector	4135		1,835	1,730	1,620	1,640		3660	Craney Island Connector
	1500	(merge)					(diverge)	1500	
	6300		2,115	2,145	2,075	2,190		5285	

Craney Island Connector

Cross Street	Length (not to scale)		SOUTHBOUND		NORTHBOUND			Length (not to scale)	Cross Street
			2028 Alt C	2028 Alt D	2028 Alt C	2028 Alt D			
	7095		1,050	1,185	980	1,055		9410	
	1500	(diverge)					(merge)	1500	
Future Craney Island Access	2700		995	1,155	880	965		2000	Future Craney Island Access
	1500	(merge)					(diverge)	1500	
	5350		1,010	1,195	920	1,045		5050	
							(merge)	1500	
					520	585	VA 164 EB	1100	

Notes
Peak hour mainline volumes
2015 volumes based on 2015 traffic count data

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS Hampton Roads Crossing Study SEIS

Elizabeth River Crossing Alternatives Comparison 2028 Peak Hour Volumes

April 2017

Figure 6-2.6

I-64 AM PEAK LOS ALTERNATIVES COMPARISON

EASTBOUND

Cross Street	Length (not to scale)		Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D
I-664 NB	1810		C	C	D	C	C	C
	3150		E	E	F	F	E	E
LaSalle Avenue SB	455		C	D	D	D	C	D
LaSalle Avenue NB	1080	(merge)	C	D	D	D	C	D
	200	(merge)	C	D	D	D	C	D
	1300		C	D	D	D	D	D
	200	(diverge)	C	D	D	D	C	D
Rip Rap Rd	6790		B	C	C	C	B	C
	1500	(diverge)	B	C	C	C	B	C
Tyler St / Settlers Landing Rd	1435	(lane drop)	C	D	C	B	C	B
	1900		E	F	D	C	C	C
S. Mallory St	1640		F	F	C	C	C	C
	1500	(merge)	F	F	C	C	F	C
HRBT	16950		F	F	D	E	F	D
	1500	(diverge)	D	D	C	C	D	C
Bayville St	200		D	D	C	C	D	C
	1500	(merge)	D	D	C	D	D	C
	5770		D	D	C	D	D	C
	1500	(diverge)	D	D	C	C	D	C
4th View St	2320		D	C	C	C	C	C
	1500	(merge)	D	D	C	C	D	C
W. Bay Ave	3445		D	D	C	C	D	C
	1500	(merge)	D	D	D	D	D	C
Patrol Rd	3740		D	D	D	D	D	C
	1730		D	D	D	F	D	C
I-564 / US 460	1055	(diverge)	C	C	F	F	D	D
I-564	1440	I-64 HOV	C	C	F	F	D	D
	1250	(merge)	E	E	F	F	F	F

WESTBOUND

Cross Street	(not to scale) Length (not to scale)		Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D
I-664 SB	1140		B	C	C	C	B	C
	2360		F	F	F	F	F	F
Armistead Ave EB/La Salle Ave	405		C	C	F	F	C	C
	1500	(diverge)	C	C	D	C	C	C
Armistead Ave WB	645		C	C	D	C	C	C
	1500	(diverge)	C	C	D	D	C	C
	5685		C	C	D	D	C	C
	1500	(merge)	C	C	D	D	C	C
Settlers Landing Rd	1310		C	C	C	C	B	C
	1835		B	B	D	C	B	C
S. Mallory St	605	(lane add)	B	B	C	C	C	C
	1500	(diverge)	D	D	D	C	D	C
HRBT	18460		F	F	E	D	F	D
	1500	(merge)	F	F	D	C	F	C
W. Ocean View Ave	190		F	F	D	C	E	C
	1500	(diverge)	F	F	D	C	D	C
	5410		D	F	D	C	D	C
	1500	(merge)	D	F	D	C	D	C
4th View St	2275		D	E	C	C	D	C
	1500	(diverge)	D	D	C	C	D	C
W. Bay Ave	2590		D	D	C	C	D	C
	1500	(diverge)	E	E	D	D	E	C
	1430		D	E	D	D	D	D
	1500	(merge)	E	E	D	D	E	D
Granby St	1840		D	D	C	C	D	C
	1500	(merge)	D	E	E	E	D	E
I-564 / I-64 HOV	1510		C	C	D	D	C	D
US 460	1500	(diverge)	C	D	E	D	D	D
	525		D	D	D	D	D	D

I-64 PM PEAK LOS ALTERNATIVES COMPARISON

EASTBOUND

Cross Street	Length (not to scale)		Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D
I-664 NB	1810		B	C	C	C	C	C
	3150		F	F	F	F	E	F
LaSalle Avenue SB	455		C	C	D	D	C	C
LaSalle Avenue NB	1080	(merge)	C	D	D	D	C	D
	200	(merge)	C	D	D	D	C	D
	1300		C	D	D	D	D	D
	200	(diverge)	C	D	D	D	C	D
Rip Rap Rd	6790		B	C	C	C	B	C
	1500	(diverge)	B	C	C	C	B	C
Tyler St / Settlers Landing Rd	1435	(lane drop)	C	C	C	B	C	B
	1900		C	F	C	C	C	C
S. Mallory St	1640		E	F	C	C	C	C
	1500	(merge)	F	F	D	D	F	C
HRBT	16950		F	F	E	E	F	D
	1500	(diverge)	D	D	C	C	D	C
Bayville St	200		D	D	D	C	D	C
	1500	(merge)	D	D	D	D	D	C
	5770		D	D	D	D	D	C
	1500	(diverge)	D	D	C	C	D	C
4th View St	2320		C	C	C	C	C	C
	1500	(merge)	D	C	C	C	D	C
W. Bay Ave	3445		D	C	C	C	D	C
	1500	(merge)	E	E	D	D	E	D
Patrol Rd	3740		D	D	D	D	D	D
	1730		D	C	F	F	C	C
I-564 / US 460	1055	(diverge)	E	E	F	F	E	E
I-564	1440	I-64 HOV	C	C	D	D	C	D
	1250	(merge)	F	F	F	F	F	F

WESTBOUND

Cross Street	(not to scale) Length (not to scale)		Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D
I-664 SB	1140		C	C	D	D	C	C
	2360		C	D	D	D	D	D
Armistead Ave EB/La Salle Ave	405		C	C	C	C	C	C
	1500	(diverge)	C	C	D	C	C	C
Armistead Ave WB	645		C	C	C	C	C	C
	1500	(diverge)	C	C	D	D	C	C
	5685		C	C	D	D	C	D
	1500	(merge)	C	C	D	D	C	D
Settlers Landing Rd	1310		C	C	C	C	B	C
	1835		C	C	C	C	C	C
S. Mallory St	605	(lane add)	C	C	C	C	C	C
	1500	(diverge)	D	D	C	C	D	C
HRBT	18460		F	F	D	C	F	C
	1500	(merge)	D	F	C	C	F	C
W. Ocean View Ave	190		D	F	C	C	D	C
	1500	(diverge)	D	F	C	C	D	C
	5410		D	F	C	C	D	C
	1500	(merge)	D	D	C	C	D	C
4th View St	2275		C	C	C	C	C	C
	1500	(diverge)	C	D	C	C	D	C
W. Bay Ave	2590		C	D	C	C	C	C
	1500	(diverge)	C	D	C	C	D	C
	1430		C	D	C	C	D	C
	1500	(merge)	C	D	C	C	D	C
Granby St	1840		C	C	C	B	C	B
	1500	(merge)	C	C	D	C	C	C
I-564 / I-64 HOV	1510		B	B	C	C	C	C
US 460	1500	(diverge)	C	C	D	D	C	C
	525		C	C	D	C	C	C

Legend

Basic Segment Density (pc/mi/ln)	LOS	Merge, Diverge, Weave Density (pc/mi/ln)	LOS
≤11	A	≤10	A
>11-18	B	>10-20	B
>18-26	C	>20-28	C
>26-35	D	>28-35	D
>35-45	E	>35	E
>45; Demand exceeds capacity	F	Demand exceeds capacity	F

Notes

Level of Service (LOS) evaluated using HCS Freeway Facilities module

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS Hampton Roads Crossing Study SEIS

I-64 Alternatives Comparison 2028 Level of Service

April 2017

Figure 6-3.1

I-564 AM PEAK LOS ALTERNATIVES COMPARISON

EASTBOUND

Cross Street	Length (not to scale)		Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D
Bainbridge Ave/Bellinger Blvd	670		A	A	A	A	A	A
	1500	(merge)	A	A	A	A	A	A
Intermodal Connector (2028 NB and Build Alternatives)	3000			A	A	A	A	A
	1500	(merge)	A	A	A	A	A	A
	1650			A	A	A	A	A
	1500	(diverge)	A	A	A	A	A	A
Terminal Blvd	2530		A	A	A	A	B	A
	350	(merge)	A	A	B	B	B	B
	700		A	B	B	B	C	C
	350	(diverge)	B	B	B	B	B	B
W Little Creek Rd	1450		A	A	B	B	B	B

WESTBOUND

Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D		Length (not to scale)	Cross Street
B	B	B	A	A	B		525	Bainbridge Ave/Bellinger Blvd
C	C	C	B	B	C	(diverge)	1500	
	B	B	A	B	B		4675	Intermodal Connector (2028 NB and Build Alternatives)
B	C	B	C	E	C	(diverge)	1500	
	B	B	B	C	B		1465	Terminal Blvd
B	C	C	C	E	C		2995	
D	D	D	E	E	E	(merge)	950	I-64 EB
C	D	D	D	D	E		2260	US 460 NB

I-564 PM PEAK LOS ALTERNATIVES COMPARISON

EASTBOUND

Cross Street	Length (not to scale)		Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D
Bainbridge Ave/Bellinger Blvd	670		C	B	B	B	B	C
	1500	(merge)	D	B	B	B	C	C
Intermodal Connector (2028 NB and Build Alternatives)	3000			B	B	B	C	C
	1500	(merge)	C	B	B	C	F	C
	1650			B	B	C	F	C
	1500	(diverge)	B	B	C	D	F	F
Terminal Blvd	2530		B	B	C	C	F	F
	350	(merge)	C	D	D	F	F	F
	700		E	F	F	F	F	F
	350	(diverge)	E	E	E	F	F	F
W Little Creek Rd	1450		D	E	E	F	F	F

WESTBOUND

Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D		Length (not to scale)	Cross Street
A	A	A	A	A	A		525	Bainbridge Ave/Bellinger Blvd
A	A	A	A	A	A	(diverge)	1500	
	A	A	A	A	A		4675	Intermodal Connector (2028 NB and Build Alternatives)
A	A	A	A	B	A	(diverge)	1500	
	A	A	A	A	A		1465	Terminal Blvd
A	A	A	A	A	A		2995	
A	A	A	B	B	B	(merge)	950	I-64 EB
A	A	A	A	A	A		2260	US 460 NB

Legend

Basic Segment Density (pc/mi/ln)	LOS	Merge, Diverge, Weave Density (pc/mi/ln)	LOS
≤11	A	≤10	A
>11-18	B	>10-20	B
>18-26	C	>20-28	C
>26-35	D	>28-35	D
>35-45	E	>35	E
>45; Demand exceeds capacity	F	Demand exceeds capacity	F

Notes

Level of Service (LOS) evaluated using HCS Freeway Facilities module

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS
Hampton Roads Crossing Study SEIS

I-564 Alternatives Comparison 2028 Level Of Service

April 2017

Figure 6-3.2

I-664 AM PEAK LOS ALTERNATIVES COMPARISON

EASTBOUND

Cross Street	Length (not to scale)		Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D
I-64	1320		B	B	B	B	B	B
	1500	(merge)	D	F	F	F	F	F
	1000		C	C	C	C	B	B
	1500	(diverge)	C	D	D	D	B	B
Power Plant Pkwy/Powhatan Pkwy	1660		C	C	C	C	B	B
	1500	(merge)	C	B	B	B	B	B
	1785		C	C	C	C	B	B
	1500	(diverge)	C	C	C	C	B	B
Aberdeen Rd	1505		C	C	C	C	B	B
	3040		C	C	C	C	B	B
Chestnut Ave/Roanoke Ave	2230		B	B	B	B	B	B
	1500	(merge)	B	B	B	B	A	A
	300		B	C	C	C	B	B
	1500	(diverge)	B	C	C	C	B	B
35th St	1105		B	B	B	B	A	A
	1500	(diverge)	B	A	A	A	A	A
26th St / 35th St	2090		B	B	B	B	A	A
US 60	1475	(merge)	B	B	B	B	B	B
	1100	(merge)	B	B	B	B	A	A
	410		C	C	C	C	B	A
	1100	(diverge)	B	B	B	B	B	B
Terminal Ave	585		B	B	B	B	A	A
Terminal Ave	1005	(lane drop)	B	C	C	C	A	A
	1500	(merge)	B	B	B	B	A	A
MMMBT	26460		C	C	C	C	B	B
							B	B
I-664 Connector (Build Alternatives C and D)							A	A
							B	B
MMMBT							A	B
	1500	(diverge)	B	B	B	B	A	A
College Dr NB	220		B	C	B	B	A	A
	1820		B	B	B	B	B	B
College Dr SB	630		B	B	B	B	A	A
	1500	(merge)	B	B	B	B	A	A
MATCHLINE A	1600		A	B	B	B	A	A

WESTBOUND

Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D		Length (not to scale)	Cross Street
C	C	C	C	D	D		1085	I-64
B	B	B	B	A	A	(diverge)	1500	
B	C	B	C	B	B		1425	
B	B	B	B	B	B	(merge)	1500	
B	B	B	B	B	B		1945	Power Plant Pkwy/Powhatan Pkwy
B	B	B	B	B	B	(diverge)	1500	
B	B	B	B	B	B		1965	
B	B	B	B	A	A	(merge)	1500	
B	B	B	B	B	B		1300	Aberdeen Rd
B	B	B	B	B	B		2775	
B	B	B	B	B	B		2020	Chestnut Ave/Roanoke Ave
B	B	B	B	B	B	(diverge)	1500	
C	C	C	C	B	B		450	
C	B	B	B	A	A	(merge)	1500	
C	C	C	C	B	B		1565	35th St/36th St
C	C	C	C	C	C		945	
C	C	C	C	B	B		2410	US 60
D	C	C	C	B	B	(diverge)	1500	
D	D	D	D	C	C		360	
D	C	C	C	B	B	(merge)	1500	
D	D	D	D	C	C		1690	Terminal Ave
D	C	C	C	B	B	(diverge)	1500	
F	F	F	F	C	C		27835	MMMBT
				B	B			
				B	B			I-664 Connector (Build Alternatives C and D)
				C	C			
				C	C			MMMBT
E	F	F	F	B	B	(merge)	1500	
C	F	F	F	B	B		640	College Dr NB
C	F	E	D	B	B		1695	
C	D	D	D	B	B		500	College Dr SB
D	C	C	C	A	B	(diverge)	1500	
C	C	C	C	C	C		1310	MATCHLINE A

I-664 AM PEAK LOS ALTERNATIVES COMPARISON (CONTINUED)

EASTBOUND

Cross Street	Length (not to scale)		Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D
MATCHLINE A	1600		A	B	B	B	A	A
	1500	(diverge)	B	A	A	A	A	A
VA 164	1235		A	B	B	A	A	A
	1500	(merge)	B	B	B	B	B	B
US 17	740		B	B	B	B	B	B
	1500	(merge)	C	C	B	C	B	B
	700		B	C	B	C	B	B
	1500	(diverge)	C	B	B	B	B	B
Pughsville Rd	2525		C	C	C	C	B	B
	1500	(merge)	D	C	C	C	B	B
	5140		D	D	D	D	C	C
	1500	(diverge)	D	D	C	D	B	C
Portsmouth Blvd WB	600		C	D	D	D	B	C
	1700		C	C	C	C	B	C
Portsmouth Blvd EB	480		C	D	D	D	B	C
	1500	(merge)	D	C	C	C	B	B
	1500	(diverge)	D	D	D	D	B	C
Dock Landing Rd	2550		C	D	D	D	C	C
	1500	(merge)	D	C	C	C	B	B
	725		D	D	D	D	C	C
	1500	(diverge)	D	D	D	D	C	C
US 58 SB	480		C	D	C	C	B	B
	2045		C	C	C	C	B	B
US 58 NB	1260		C	C	C	C	B	B
	490	(merge)	F	F	F	F	C	C
	1020		F	F	F	F	D	D
	490	(diverge)	C	B	B	B	B	C
S Military Hwy	1500	(diverge)	F	C	C	B	B	B
I-64 SB	3435		B	B	B	B	B	B

WESTBOUND

Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D		Length (not to scale)	Cross Street
C	C	C	C	C	C		1310	MATCHLINE A
D	C	C	C	B	B	(merge)	1500	
C	D	D	C	C	C		1140	VA 164 WB
C	D	C	C	C	C		1715	
C	D	D	D	C	C		510	US 17/VA 164 EB
C	D	D	D	C	C		1715	
D	D	D	D	C	C	(merge)	1500	Pughsville Rd WB
C	D	D	D	C	C		1000	Pughsville Rd EB
D	D	D	D	C	C	(diverge)	1500	
D	D	D	D	C	C		5350	
D	D	D	D	C	C	(merge)	1500	
D	D	D	D	C	C		520	Portsmouth Blvd WB
C	C	C	C	C	C		1680	
D	D	D	D	C	C		575	Portsmouth Blvd EB
D	D	F	D	C	C	(diverge)	1500	
D	E	F	E	C	C		200	
D	D	F	D	C	C	(merge)	1500	
C	D	D	D	C	C		2555	Dock Landing Rd
D	C	C	C	B	B	(diverge)	1500	
D	D	D	D	C	C		1180	
D	D	D	D	B	C	(merge)	1500	
C	D	D	D	C	C		410	US 58 SB
C	C	C	C	B	C	(merge)	1500	
C	C	C	C	B	B		1225	US 58 NB
F	F	F	F	F	F		4675	
A	A	A	A	A	A		2135	I-64 NB

Legend

Basic Segment Density (pc/mi/ln)	LOS	Merge, Diverge, Weave Density (pc/mi/ln)	LOS
≤11	A	≤10	A
>11-18	B	>10-20	B
>18-26	C	>20-28	C
>26-35	D	>28-35	D
>35-45	E	>35	E
>45; Demand exceeds capacity	F	Demand exceeds capacity	F

Notes

Level of Service (LOS) evaluated using HCS Freeway Facilities module

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS
Hampton Roads Crossing Study SEIS

I-664 Alternatives Comparison 2028 AM Peak Hour Level of Service

April 2017 | Figure 6-3.3

I-664 PM PEAK LOS ALTERNATIVES COMPARISON

EASTBOUND

Cross Street	Length (not to scale)		Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D
I-64	1320		A	A	A	A	A	A
	1500	(merge)	C	B	B	B	B	B
	1000		B	B	B	B	B	B
	1500	(diverge)	B	C	B	B	B	B
Power Plant Pkwy/Powhatan Pkwy	1660		B	B	B	B	A	A
	1500	(merge)	B	B	B	B	B	B
	1785		B	B	B	B	B	B
	1500	(diverge)	B	B	B	B	B	B
Aberdeen Rd	1505		B	B	B	B	A	A
	3040		B	B	B	B	B	A
Chestnut Ave/Roanoke Ave	2230		A	B	B	B	A	A
	1500	(merge)	B	B	A	A	A	A
	300		B	B	B	B	B	A
	1500	(diverge)	B	B	B	B	B	B
35th St	1105		A	B	B	A	A	A
	1500	(diverge)	A	A	A	A	A	A
26th St / 35th St	2090		B	B	B	B	A	A
US 60	1475	(merge)	B	B	B	B	B	B
	1100	(merge)	C	D	B	B	B	B
	410		C	D	D	D	B	B
	1100	(diverge)	B	E	D	C	B	B
Terminal Ave	585		B	F	F	F	B	B
Terminal Ave	1005	(lane drop)	C	F	F	F	B	B
	1500	(merge)	D	F	F	F	B	B
MMMBT	26460		F	F	F	F	B	B
							B	B
I-664 Connector (Build Alternatives C and D)							B	B
							B	B
MMMBT							B	B
	1500	(diverge)	D	C	C	C	B	B
College Dr NB	220		D	D	D	D	B	B
	1820		C	D	D	C	B	B
College Dr SB	630		D	D	D	D	B	B
	1500	(merge)	D	C	C	C	B	A
MATCHLINE A	1600		C	C	C	C	B	B

WESTBOUND

Cross Street	Length (not to scale)		Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D
I-64	1085		D	E	D	D	E	E
	1500	(diverge)	C	B	B	B	B	B
	1425		C	D	D	D	C	C
	1500	(merge)	C	C	C	C	B	B
Power Plant Pkwy/Powhatan Pkwy	1945		C	C	C	C	C	C
	1500	(diverge)	C	C	C	C	C	C
	1965		C	D	D	D	C	C
	1500	(merge)	C	C	C	C	B	B
Aberdeen Rd	1300		C	C	C	C	C	C
	2775		C	C	C	C	C	C
Chestnut Ave/Roanoke Ave	2020		C	C	C	C	C	C
	1500	(diverge)	C	C	C	C	B	B
	450		E	E	E	E	C	C
	1500	(merge)	E	F	D	D	B	B
35th St/36th St	1565		C	D	D	D	B	B
	945		C	D	D	D	B	B
US 60	2410		C	C	C	C	B	B
	1500	(diverge)	C	C	C	C	A	A
	360		C	D	D	D	B	B
	1500	(merge)	C	C	C	C	A	A
Terminal Ave	1690		C	C	C	C	B	B
	1500	(diverge)	C	C	C	C	A	A
MMMBT	27835		C	C	C	C	B	B
							B	B
I-664 Connector (Build Alternatives C and D)							A	A
							B	B
MMMBT							B	B
	1500	(merge)	C	B	B	B	A	A
College Dr NB	640		C	C	C	C	B	A
	1695		B	B	B	B	B	B
College Dr SB	500		C	C	C	C	A	A
	1500	(diverge)	C	B	B	B	A	A
MATCHLINE A	1310		B	B	B	B	B	B

I-664 PM PEAK LOS ALTERNATIVES COMPARISON (CONTINUED)

EASTBOUND

Cross Street	Length (not to scale)		Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D
MATCHLINE A	1600		C	C	C	C	B	B
	1500	(diverge)	C	B	A	B	A	A
VA 164	1235		C	C	C	C	B	B
	1500	(merge)	C	B	B	B	B	B
US 17	740		C	C	C	C	C	C
	1500	(merge)	D	C	C	C	C	C
	700		C	C	C	C	C	C
	1500	(diverge)	E	C	C	C	C	C
Pughsville Rd	2525		C	D	C	D	C	C
	1500	(merge)	D	C	C	C	B	B
	5140		D	D	D	D	C	C
	1500	(diverge)	D	D	D	D	C	C
Portsmouth Blvd WB	600		D	D	D	D	C	C
	1700		C	D	D	D	C	C
Portsmouth Blvd EB	480		D	D	D	D	C	C
	1500	(merge)	D	C	C	D	B	B
	1500	(diverge)	D	D	D	D	C	C
Dock Landing Rd	2550		D	D	D	D	C	C
	1500	(merge)	D	C	C	C	B	B
	725		D	D	D	D	C	C
	1500	(diverge)	D	D	D	D	C	C
US 58 SB	480		C	C	C	C	B	B
	2045		C	C	C	C	B	B
US 58 NB	1260		C	C	C	C	B	B
	490	(merge)	E	C	C	C	B	B
	1020		E	E	E	E	C	C
	490	(diverge)	B	B	B	B	B	B
S Military Hwy	1500	(diverge)	E	B	B	B	B	B
I-64 SB	3435		B	B	A	B	B	A

WESTBOUND

Cross Street	Length (not to scale)		Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D
MATCHLINE A	1310		B	B	B	B	B	B
	1500	(merge)	C	B	B	B	B	B
VA 164 WB	1140		B	B	B	B	B	B
	1715		B	B	B	B	B	B
US 17/VA 164 EB	510		B	B	B	B	B	B
	1715		B	B	B	B	B	B
Pughsville Rd WB	1500	(merge)	B	C	C	C	B	B
Pughsville Rd EB	1000		B	C	C	C	B	B
	1500	(diverge)	C	C	C	C	B	B
	5350		C	C	C	C	B	B
	1500	(merge)	C	C	C	C	B	B
Portsmouth Blvd WB	520		C	C	C	C	B	B
	1680		B	C	C	C	B	B
Portsmouth Blvd EB	575		C	C	C	C	B	B
	1500	(diverge)	C	C	C	C	B	B
	200		C	D	D	D	C	C
	1500	(merge)	C	C	C	C	B	B
Dock Landing Rd	2555		C	C	C	C	B	B
	1500	(diverge)	C	B	B	B	B	B
	1180		C	C	C	C	C	C
	1500	(merge)	C	C	C	C	B	B
US 58 SB	410		C	C	C	C	B	B
	1500	(merge)	C	B	B	B	B	B
US 58 NB	1225		B	B	B	B	B	A
	4675		F	F	F	F	F	F
I-64 NB	2135		C	C	B	C	B	B

Legend

Basic Segment Density (pc/mi/ln)	LOS	Merge, Diverge, Weave Density (pc/mi/ln)	LOS
≤11	A	≤10	A
>11-18	B	>10-20	B
>18-26	C	>20-28	C
>26-35	D	>28-35	D
>35-45	E	>35	E
>45; Demand exceeds capacity	F	Demand exceeds capacity	F

Notes

Level of Service (LOS) evaluated using HCS Freeway Facilities module

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS

Hampton Roads Crossing Study SEIS

I-664 Alternatives Comparison 2028 PM Peak Hour Level of Service

April 2017

Figure 6-3.4

VA 164 AM PEAK LOS ALTERNATIVES COMPARISON

Cross Street	Length (not to scale)		EASTBOUND						WESTBOUND							Length (not to scale)	Cross Street
			Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D	Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D			
US 17/Bridge Rd	2600		A	B	B	B	B	B	A	A	A	A	A	A		1670	I-664 SB
	2680		A	B	B	B	B	B	A	B	B	B	A	A		1610	
I-664	1460		A	B	B	B	A	B	A	A	A	A	A	A		970	I-664 NB
	1500	(merge)	B	C	C	B	B	B	B	B	B	A	A	A	(diverge)	1500	
College Dr	585		C	C	C	B	C	B	B	B	B	A	B	A		1025	College Dr
	1500	(merge)	C	D	D	B	B	B	B	B	B	B	B	A	(diverge)	1500	
	1290		C	D	C	C	C	B	B	C	C	B	B	A		1270	
	1500	(diverge)	C	D	D	B	C	B	B	B	B	B	B	B	(merge)	1500	
Towne Point Rd	2000		C	C	C	B	C	B	B	B	B	A	A	A		1970	Towne Point Rd
	1500	(merge)	C	D	D	C	C	B	B	B	B	B	B	A	(diverge)	1500	
	1400		C	D	D	C	C	B	B	B	B	B	B	A		1315	
	1500	(diverge)	C	D	D	C	C	B	B	B	B	B	B	A	(merge)	1500	
Cedar Ln SB (Existing and 2028 NB)	1135		B	C	C				A	A	A	A	A	A		1140	Cedar Ln
	1500	(merge)	C	C	C	B	C	B	B	B	A	B	A	A	(diverge)	1500	
												B	A	A			
Cedar Ln NB (Existing and 2028 NB)	110		C	C	C												Craney Island Connector (Build Alternatives)
	1000	(merge)	C	C	C				B	B	B	A	A	A		1300	
						B	B	B									
Craney Island Connector (Build Alternatives)	500		C	D	D												
	1000	(diverge)	C	C	C				B	B	B	A	A	A	(merge)	1000	
Virginia International Gateway Blvd (Existing and 2028 NB)	2245		B	C	C	B	B	B	B	B	B	A	A	A		2330	Virginia International Gateway Blvd
	1025	(merge)	C	C	C				B	B	B	B	B	B	(diverge)	1225	
Craney Island Connector (Build Alternatives)	475		C	D	D				B	B	B	B	B	B		275	
	1025	(diverge)	C	C	C	B	B	B	B	B	B	B	A	A	(merge)	1225	
W. Norfolk Rd	625		C	C	C	C	C	C	B	B	B	B	A	B		810	W Norfolk Rd
	1500	(merge)	C	D	C	C	C	C	B	B	B	B	B	B	(diverge)	1500	
	1245		C	C	C	C	C	C	B	B	B	B	B	B		1710	
									B	B	B	B	B	B	(lane drop)	415	
	2330	(lane add)	B	C	C	B	B	B	A	A	A	A	A	A		1585	
	1500	(lane drop)	C	D	D	B	B	B	B	A	A	A	A	A	(merge)	1500	
(diverge)	1375	US 58 EB	B	C	C	B	B	B	A	A	A	A	A	A	(merge)	1050	US 58 SB
Lee Ave/Railroad Ave Lee Ave / Harper Ave	1500	US 58 WB	B	B	B	B	B	B	A	A	A	A	A	A		1765	Railroad Ave/US 58 NB
	1500	(merge)	B	C	B	B	B	B	A	B	B	B	A	A		3150	
	1830		A	B	B	B	B	B	A	A	A	A	A	A		500	London Blvd

VA 164 PM PEAK LOS ALTERNATIVES COMPARISON

Cross Street	Length (not to scale)		EASTBOUND						WESTBOUND							Length (not to scale)	Cross Street
			Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D	Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D			
US 17/Bridge Rd	2600		A	A	A	A	A	A	A	B	B	B	B	B		1670	I-664 SB
	2680		A	A	A	A	A	A	B	B	B	B	B	B		1610	
I-664	1460		A	A	A	A	A	A	A	B	B	B	A	B		970	I-664 NB
	1500	(merge)	B	B	B	C	B	B	C	B	B	B	B	B	(diverge)	1500	
College Dr	585		B	C	B	B	B	A	C	C	C	B	C	B		1025	College Dr
	1500	(merge)	B	C	C	B	C	B	C	C	C	B	C	B	(diverge)	1500	
	1290		C	C	C	B	C	B	C	D	C	C	C	B		1270	
	1500	(diverge)	C	C	C	B	C	B	C	C	C	B	C	B	(merge)	1500	
Towne Point Rd	2000		B	B	B	B	B	A	C	C	C	B	C	B		1970	Towne Point Rd
	1500	(merge)	B	C	C	B	B	B	D	D	C	C	C	B	(diverge)	1500	
	1400		B	C	C	B	B	B	C	D	D	C	C	B		1315	
	1500	(diverge)	B	C	C	B	B	B	C	D	C	C	C	B	(merge)	1500	
Cedar Ln SB (Existing and 2028 NB)	1135		B	B	B				C	C	C	C	C	B		1140	Cedar Ln
	1500	(merge)	B	B	B	B	B	A	D	C	C	D	C	C	(diverge)	1500	
												C	C	C			
Cedar Ln NB (Existing and 2028 NB)	110		B	B	B												Craney Island Connector (Build Alternatives)
	1000	(merge)	B	B	B				C	D	C	C	C	C		1300	
						B	B	A									
Craney Island Connector (Build Alternatives)	500		B	C	C												
	1000	(diverge)	B	B	B				C	C	C	B	B	B	(merge)	1000	
Virginia International Gateway Blvd (Existing and 2028 NB)	2245		B	B	B	A	A	A	C	D	C	C	C	B		2330	Virginia International Gateway Blvd
	1025	(merge)	B	B	B				C	D	D	D	C	C	(diverge)	1225	
Craney Island Connector (Build Alternatives)	475		B	C	C				D	D	D	D	D	D		275	
	1025	(diverge)	B	C	B	B	B	B	C	C	C	C	B	B	(merge)	1225	
W. Norfolk Rd	625		B	B	B	C	B	B	C	D	C	D	C	C		810	W Norfolk Rd
	1500	(merge)	B	B	B	C	B	B	D	D	C	D	C	C	(diverge)	1500	
	1245		B	B	B	C	B	B	D	D	D	D	C	C		1710	
									D	D	D	D	C	C	(lane drop)	415	
	2330	(lane add)	A	B	B	B	B	B	B	C	C	C	B	B		1585	
	1500	(lane drop)	B	C	C	C	B	B	D	C	C	C	B	B	(merge)	1500	
(diverge)	1375	US 58 EB	A	B	B	B	B	B	B	B	B	B	B	B	(merge)	1050	US 58 SB
Lee Ave/Railroad Ave Lee Ave / Harper Ave	1500	US 58 WB	A	A	A	B	A	A	B	B	B	B	B	B		1765	Railroad Ave/US 58 NB
	1500	(merge)	B	B	B	B	B	B	B	B	B	B	B	B		3150	
	1830		A	A	A	A	A	A	A	A	A	A	A	A		500	London Blvd

Legend

Basic Segment Density (pc/mi/ln)	LOS	Merge, Diverge, Weave Density (pc/mi/ln)	LOS
≤11	A	≤10	A
>11-18	B	>10-20	B
>18-26	C	>20-28	C
>26-35	D	>28-35	D
>35-45	E	>35	E
>45; Demand exceeds capacity	F	Demand exceeds capacity	F

Notes

Level of Service (LOS) evaluated using HCS Freeway Facilities module

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

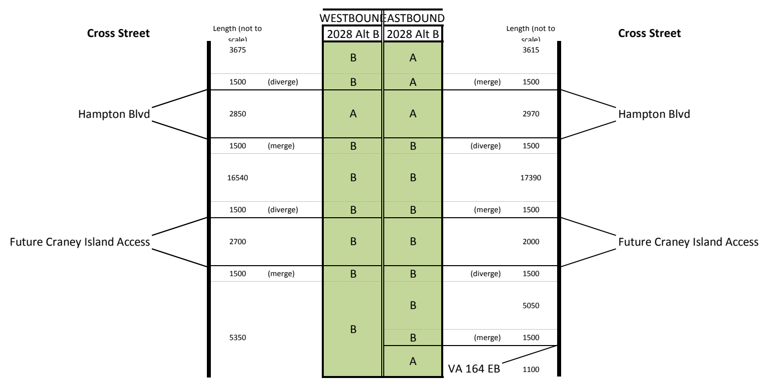
HRCS SEIS
Hampton Roads Crossing Study SEIS

VA 164 Alternatives Comparison 2028 Level Of Service

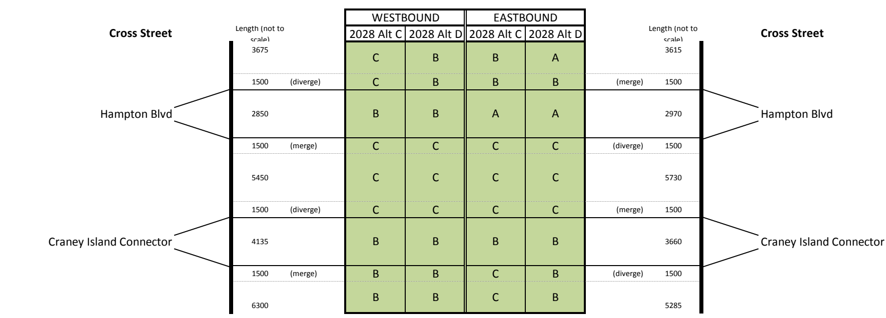
April 2017

Figure 6-3.5

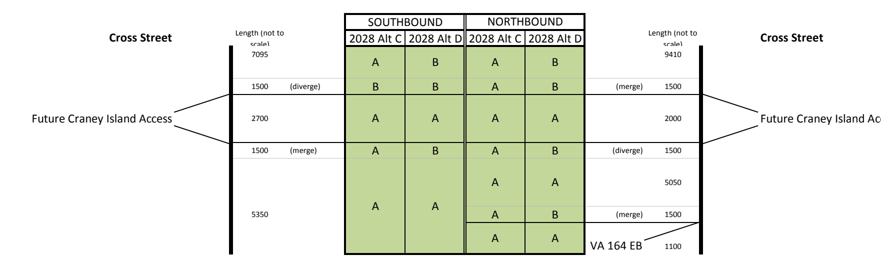
JAMES RIVER CONNECTORS AM PEAK LOS ALTERNATIVE B



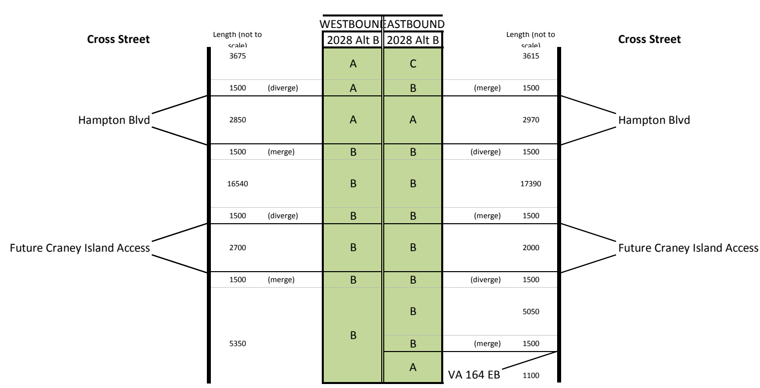
JAMES RIVER CONNECTORS AM PEAK LOS ALTERNATIVES C & D



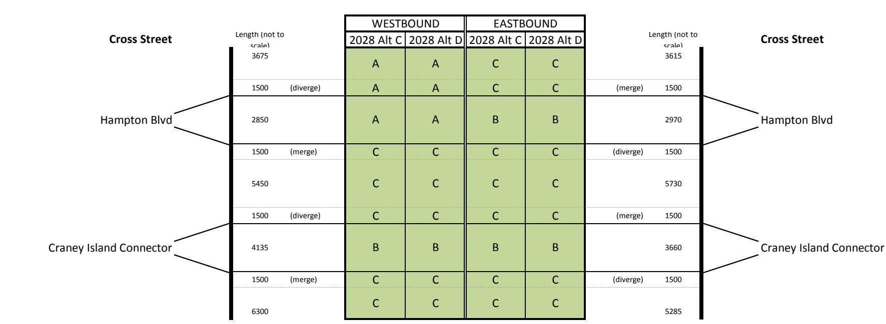
Craney Island Connector



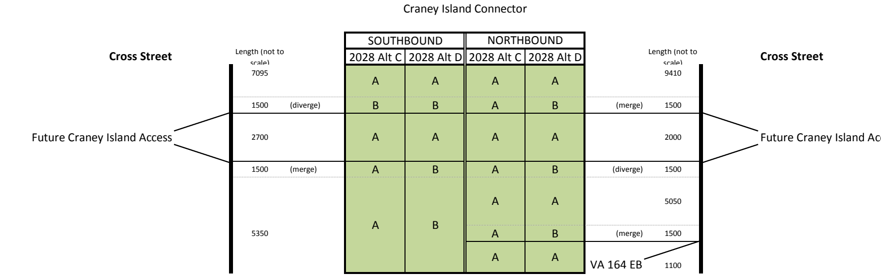
JAMES RIVER CONNECTORS PM PEAK LOS ALTERNATIVE B



JAMES RIVER CONNECTORS PM PEAK LOS ALTERNATIVES C & D



Craney Island Connector



Legend

Basic Segment Density (pc/mi/ln)	LOS	Merge, Diverge, Weave Density (pc/mi/ln)	LOS
≤11	A	≤10	A
>11-18	B	>10-20	B
>18-26	C	>20-28	C
>26-35	D	>28-35	D
>35-45	E	>35	E
>45; Demand exceeds capacity	F	Demand exceeds capacity	F

Notes

Level of Service (LOS) evaluated using HCS Freeway Facilities module

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS
Hampton Roads Crossing Study SEIS

Elizabeth River Crossing Alternatives Comparison 2028 Peak Hour Level of Service

April 2017 | Figure 6-3.6

I-64 AM PEAK LOS ALTERNATIVES COMPARISON

EASTBOUND

Cross Street	Length (not to scale)		Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D
I-664 NB	1810		54.6	54.0	54.4	54.4	54.2	54.4
	3150		40.3	39.8	39.9	38.9	41.2	40.9
LaSalle Avenue SB	455		54.2	54.2	54.2	54.1	54.3	54.2
LaSalle Avenue NB	1080	(merge)	51.1	50.5	50.0	50.4	50.8	50.3
	200	(merge)	51.0	50.2	49.5	50.1	50.6	49.9
	1300		51.0	50.2	49.5	50.1	50.6	49.9
	200	(diverge)	51.6	51.4	51.3	51.5	51.4	51.4
Rip Rap Rd	6790		55.0	55.0	55.0	55.0	55.0	55.0
	1500	(diverge)	51.8	52.0	52.2	52.1	51.8	52.1
Tyler St / Settlers Landing Rd	1435	(lane drop)	54.7	43.3	54.7	54.7	54.7	54.7
	1900		23.6	13.0	41.5	42.4	43.7	42.4
S. Mallory St	1640		22.2	15.4	54.2	54.3	54.4	54.3
	1500	(merge)	22.3	21.3	51.1	51.1	31.6	51.4
HRBT	16950		34.7	34.7	42.0	40.4	34.7	45.1
	1500	(diverge)	50.2	50.2	52.9	52.8	50.2	52.9
Bayville St	200		53.8	53.8	54.5	54.4	53.8	54.5
	1500	(merge)	50.1	50.1	50.8	50.7	50.1	51.1
	5770		55.0	55.0	55.0	55.0	55.0	55.0
	1500	(diverge)	49.8	49.7	52.4	52.3	49.8	52.5
4th View St	2320		54.8	54.8	54.9	54.9	54.8	54.9
	1500	(merge)	50.6	50.7	51.3	51.1	50.6	51.5
W. Bay Ave	3445		54.9	54.9	54.9	54.9	54.9	54.9
	1500	(merge)	50.1	50.1	50.9	50.7	50.1	51.2
Patrol Rd	3740		54.9	54.9	54.9	54.9	54.9	54.9
	1730		39.9	39.6	35.6	24.7	41.1	45.2
I-564 / US 460	1055	(diverge)	50.3	50.3	31.1	29.5	50.3	50.3
I-564	1440	I-64 HOV	54.4	54.4	25.3	26.9	54.4	54.4
	1250	(merge)	50.6	50.5	48.1	48.1	48.1	48.1

WESTBOUND

Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D		(not to scale) Length (not to scale)	Cross Street
53.8	53.8	53.6	53.6	53.7	53.7		1140	I-664 SB
34.7	33.9	31.5	31.2	32.9	33.3		2360	
54.2	54.1	28.1	25.0	53.9	54.1		405	Armistead Ave EB/La Salle Ave
51.2	50.7	50.5	50.2	50.0	50.6	(diverge)	1500	
54.6	54.6	54.5	54.5	54.6	54.6		645	Armistead Ave WB
52.7	52.5	52.3	52.3	52.6	52.4	(diverge)	1500	
55.0	55.0	55.0	55.0	55.0	55.0		5685	
51.4	51.4	50.5	50.7	51.4	51.0	(merge)	1500	
54.3	54.3	54.1	54.1	54.2	54.2		1310	Settlers Landing Rd
45.9	45.8	43.3	43.6	45.2	44.2		1835	
54.1	54.1	54.5	54.5	54.1	54.5	(lane add)	605	S. Mallory St
49.9	49.8	52.4	52.5	50.0	52.5	(diverge)	1500	
34.6	34.6	37.7	40.7	34.6	43.4		18460	HRBT
23.3	21.2	50.6	50.9	25.5	51.1	(merge)	1500	
27.6	21.6	54.4	54.4	35.2	54.5		190	W. Ocean View Ave
34.3	22.5	52.8	52.8	49.6	52.9	(diverge)	1500	
53.9	27.1	55.0	55.0	55.0	55.0		5410	
50.2	36.1	50.9	51.1	50.3	51.3	(merge)	1500	
54.8	39.8	54.9	54.9	54.8	54.9		2275	4th View St
50.1	54.2	52.7	52.7	50.1	52.7	(diverge)	1500	
54.8	54.8	54.9	54.9	54.8	54.9		2590	W. Bay Ave
49.7	49.7	52.2	52.3	49.6	52.3	(diverge)	1500	
54.5	53.3	54.6	54.6	54.5	54.6		1430	
49.8	48.5	50.6	50.8	49.6	51.0	(merge)	1500	
54.7	54.7	54.6	54.6	54.7	54.7		1840	Granby St
50.7	49.9	49.0	49.7	50.5	50.0	(merge)	1500	
54.6	54.5	54.6	54.5	54.5	54.5	I-64 HOV	1510	I-564 / US 460
49.9	49.8	49.8	49.8	49.8	49.8	(diverge)	1500	
53.0	52.9	52.7	52.7	52.9	52.9		525	

I-64 PM PEAK LOS ALTERNATIVES COMPARISON

EASTBOUND

Cross Street	Length (not to scale)		Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D
I-664 NB	1810		54.1	54.1	54.2	54.2	54.2	54.2
	3150		38.2	37.7	37.3	36.6	39.3	38.8
LaSalle Avenue SB	455		54.1	54.1	54.0	54.0	54.2	54.1
LaSalle Avenue NB	1080	(merge)	51.1	50.6	50.1	50.4	50.9	50.6
	200	(merge)	51.1	50.3	49.6	50.0	50.7	50.4
	1300		51.1	50.3	49.6	50.0	50.7	50.4
	200	(diverge)	51.7	51.4	51.4	51.5	51.5	51.5
Rip Rap Rd	6790		55.0	55.0	55.0	55.0	55.0	55.0
	1500	(diverge)	51.9	52.0	52.3	52.2	51.9	52.1
Tyler St / Settlers Landing Rd	1435	(lane drop)	54.7	54.7	54.7	54.7	54.7	54.7
	1900		44.4	17.1	42.2	43.5	44.6	43.4
S. Mallory St	1640		29.7	14.4	54.3	54.3	54.4	54.3
	1500	(merge)	21.2	19.2	50.9	51.0	30.5	51.4
HRBT	16950		35.1	35.1	39.2	39.6	35.2	44.2
	1500	(diverge)	50.2	50.1	52.7	52.7	50.1	52.8
Bayville St	200		53.8	53.8	54.4	54.4	53.8	54.5
	1500	(merge)	50.2	50.2	50.7	50.7	50.3	51.1
	5770		55.0	55.0	55.0	55.0	55.0	55.0
	1500	(diverge)	49.8	49.6	52.3	52.3	49.8	52.5
4th View St	2320		54.8	54.8	54.9	54.9	54.8	54.9
	1500	(merge)	50.9	50.9	51.3	51.3	50.9	51.5
W. Bay Ave	3445		54.9	54.9	54.9	54.9	54.9	54.9
	1500	(merge)	49.3	49.6	50.6	50.5	49.7	51.0
Patrol Rd	3740		54.7	54.9	54.9	45.2	54.9	54.9
	1730		41.2	41.5	18.3	19.6	42.3	41.9
I-564 / US 460	1055	(diverge)	48.9	48.9	48.6	48.6	48.9	48.7
I-564	1440	I-64 HOV	54.2	54.2	54.2	54.2	54.2	54.2
	1250	(merge)	48.1	48.1	48.0	48.1	48.1	48.1

WESTBOUND

Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D		(not to scale) Length (not to scale)	Cross Street
54.1	54.0	54.0	53.9	54.0	54.0		1140	I-664 SB
39.4	38.4	37.2	36.8	37.6	38.2		2360	
54.3	54.2	53.7	53.6	54.1	53.7		405	Armistead Ave EB/La Salle Ave
51.7	51.3	48.8	48.4	50.8	48.9	(diverge)	1500	
54.6	54.5	54.4	54.4	54.6	54.4		645	Armistead Ave WB
52.6	52.4	51.6	51.7	52.5	51.8	(diverge)	1500	
55.0	55.0	55.0	55.0	55.0	55.0		5685	
51.4	51.3	50.6	50.8	51.4	51.0	(merge)	1500	
54.1	54.1	53.9	53.9	54.0	54.0		1310	Settlers Landing Rd
43.6	43.5	41.4	41.3	42.2	41.7		1835	
54.1	54.1	54.2	54.2	54.1	54.2	(lane add)	605	S. Mallory St
50.0	50.0	50.7	50.8	50.1	50.7	(diverge)	1500	
34.7	34.7	52.9	53.1	34.7	53.3		18460	HRBT
44.8	24.2	50.9	51.1	30.3	51.3	(merge)	1500	
53.8	25.2	54.0	54.0	47.3	54.0		190	W. Ocean View Ave
50.2	27.3	50.9	51.0	55.0	51.0	(diverge)	1500	
55.0	35.1	55.0	55.0	55.0	55.0		5410	
50.5	50.9	51.2	51.4	50.4	51.6	(merge)	1500	
54.8	54.8	54.9	54.9	54.8	54.9		2275	4th View St
50.1	50.1	52.2	52.2	50.1	52.2	(diverge)	1500	
54.8	54.8	54.9	54.9	54.8	54.9		2590	W. Bay Ave
50.2	50.2	51.0	51.0	50.2	51.0	(diverge)	1500	
54.6	54.6	54.7	54.7	54.6	54.7		1430	
50.9	50.6	51.5	51.6	50.7	51.7	(merge)	1500	
54.8	54.7	54.8	54.8	54.8	54.8		1840	Granby St
51.4	51.3	51.3	51.5	51.3	51.6	(merge)	1500	
54.6	54.5	54.5	54.5	54.5	54.5	I-64 HOV	1510	I-564 / US 460
49.9	49.8	49.0	49.0	49.8	49.0	(diverge)	1500	
53.0	53.0	55.0	55.0	53.0	55.0		525	

Legend

Speed (mph)
>45
35-45
25-35
≤25

Notes

Speeds evaluated using HCS Freeway Facilities module

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS
Hampton Roads Crossing Study SEIS

I-64 Alternatives Comparison 2028 Speed

April 2017 | Figure 6-4.1

I-564 AM PEAK LOS ALTERNATIVES COMPARISON

EASTBOUND

Cross Street	Length (not to scale)		Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D
Bainbridge Ave/Bellinger Blvd	670		55.0	55.0	55.0	55.0	55.0	55.0
	1500	(merge)	52.3	52.3	52.3	52.3	52.3	52.3
Intermodal Connector (2028 NB and Build Alternatives)	3000			54.9	54.9	54.9	54.9	54.9
	1500	(merge)	55.0	52.7	52.9	52.5	52.2	52.5
	1650			54.8	54.8	54.8	54.8	54.8
	1500	(diverge)	53.3	53.0	53.4	53.0	51.8	53.2
Terminal Blvd	2530		54.9	54.9	54.9	54.9	54.9	54.9
	350	(merge)	51.5	51.7	52.0	51.9	50.9	52.1
	700		47.6	47.6	47.6	47.6	47.6	47.6
	350	(diverge)	47.6	47.6	47.6	47.6	47.6	47.6
W Little Creek Rd	1450		53.7	53.7	53.7	53.7	53.7	53.7

WESTBOUND

Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D		Length (not to scale)	Cross Street
53.6	53.6	53.6	53.6	53.6	53.6		525	Bainbridge Ave/Bellinger Blvd
47.6	47.7	47.8	47.8	47.8	47.8	(diverge)	1500	
	55.0	55.0	55.0	55.0	55.0		4675	Intermodal Connector (2028 NB and Build Alternatives)
	50.9	51.3	51.0	47.7	49.5	(diverge)	1500	
55.0	54.4	54.5	54.5	54.5	54.5		1465	
38.2	34.4	37.9	35.5	34.7	36.2		2995	Terminal Blvd
50.2	50.1	50.1	49.1	48.0	47.6	(merge)	950	I-64 EB
55.0	55.0	55.0	55.0	54.9	54.6		2260	US 460 NB

I-564 PM PEAK LOS ALTERNATIVES COMPARISON

EASTBOUND

Cross Street	Length (not to scale)		Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D
Bainbridge Ave/Bellinger Blvd	670		55.0	55.0	55.0	55.0	55.0	55.0
	1500	(merge)	51.3	51.7	51.6	51.9	51.7	51.2
Intermodal Connector (2028 NB and Build Alternatives)	3000			54.9	54.9	54.9	54.9	54.9
	1500	(merge)	55.0	52.1	52.0	51.4	49.6	50.2
	1650			54.8	54.8	54.7	28.4	50.6
	1500	(diverge)	53.3	53.9	53.3	50.7	37.1	35.4
Terminal Blvd	2530		54.9	55.0	54.9	47.2	22.5	15.2
	350	(merge)	50.6	50.2	50.5	19.3	46.7	17.3
	700		47.4	47.4	47.4	19.3	46.7	17.3
	350	(diverge)	47.4	47.4	47.4	38.7	49.8	38.4
W Little Creek Rd	1450		53.7	53.2	53.3	51.2	53.2	51.1

WESTBOUND

Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D		Length (not to scale)	Cross Street
53.7	53.7	53.7	53.7	53.7	53.7		525	Bainbridge Ave/Bellinger Blvd
48.4	48.4	48.4	48.4	48.4	48.4	(diverge)	1500	
	55.0	55.0	55.0	55.0	55.0		4675	Intermodal Connector (2028 NB and Build Alternatives)
	50.8	50.8	50.9	49.3	50.1	(diverge)	1500	
55.0	54.8	54.8	54.8	54.8	54.8		1465	
47.0	45.9	46.8	45.8	45.8	46.1		2995	Terminal Blvd
51.3	51.3	51.3	51.3	51.3	51.2	(merge)	950	I-64 EB
55.0	55.0	55.0	55.0	55.0	55.0		2260	US 460 NB

Legend

Speed (mph)
- >45
- 35-45
- 25-35
- ≤25

Notes

Speeds evaluated using HCS Freeway Facilities module

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS Hampton Roads Crossing Study SEIS

I-564 Alternatives Comparison 2028 Speed

April 2017

Figure 6-4.2

I-664 AM PEAK LOS ALTERNATIVES COMPARISON

EASTBOUND

Cross Street	Length (not to scale)		Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D
I-64	1320		54.3	54.3	54.3	54.3	54.3	54.3
	1500	(merge)	54.2	54.2	54.2	54.2	54.4	54.5
	1000		59.2	59.2	59.2	59.2	59.3	59.3
	1500	(diverge)	52.9	52.1	52.4	52.4	58.9	58.9
Power Plant Pkwy/Powhatan Pkwy	1660		59.5	59.4	59.4	59.4	59.9	59.9
	1500	(merge)	55.4	55.4	55.4	55.4	56.6	56.7
	1785		59.7	59.7	59.7	59.7	59.8	59.8
	1500	(diverge)	55.8	55.6	55.6	55.7	57.6	57.7
Aberdeen Rd	1505		59.6	59.6	59.6	59.6	59.8	59.8
	3040		48.3	47.5	47.8	47.5	48.6	48.8
Chestnut Ave/Roanoke Ave	2230		59.8	59.8	59.8	59.8	59.8	59.8
	1500	(merge)	56.3	56.2	56.1	56.2	57.2	57.3
	300		54.8	54.8	54.8	54.7	56.7	56.8
	1500	(diverge)	54.8	54.8	54.8	54.7	56.7	56.8
35th St	1105		59.4	59.4	59.4	59.4	59.6	59.6
	1500	(diverge)	56.8	56.0	55.8	55.9	57.8	57.8
26th St / 35th St	2090		59.8	59.8	59.8	59.8	59.9	59.9
US 60	1475	(merge)	54.6	54.5	54.6	54.6	57.1	57.1
	1100	(merge)	55.8	55.6	55.7	55.7	57.4	57.4
	410		55.8	55.6	55.7	55.7	57.4	57.4
	1100	(diverge)	56.4	56.5	56.5	56.4	59.2	59.2
Terminal Ave	585		59.1	59.1	59.1	59.1	59.8	59.8
Terminal Ave	1005	(lane drop)	59.7	59.8	59.8	59.7	59.9	59.9
	1500	(merge)	55.1	54.9	55.0	55.0	57.5	57.5
MMMBT	26460		50.7	50.3	50.7	50.6	57.3	57.1
							55.7	55.9
I-664 Connector (Build Alternatives C and D)							60.0	60.0
							56.8	56.7
MMMBT							60.0	60.0
	1500	(diverge)	53.2	53.1	53.1	53.1	58.6	58.8
College Dr NB	220		58.3	58.3	58.3	58.3	59.7	59.7
	1820		52.4	50.7	50.7	51.1	52.2	51.6
College Dr SB	630		59.0	58.7	58.7	58.8	58.9	58.8
	1500	(merge)	56.1	56.0	56.1	56.1	57.8	57.8
MATCHLINE A	1600		59.7	59.7	59.7	59.7	59.8	59.8

WESTBOUND

Cross Street	Length (not to scale)		Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D
I-64	1085		55.0	55.0	55.0	55.0	55.0	55.0
	1500	(diverge)	56.6	56.5	56.5	56.6	59.1	59.2
	1425		59.6	59.6	59.6	59.6	59.7	59.7
	1500	(merge)	55.9	55.8	55.9	55.8	56.7	56.7
Power Plant Pkwy/Powhatan Pkwy	1945		59.8	59.8	59.8	59.8	59.9	59.9
	1500	(diverge)	56.3	56.3	56.3	56.3	59.0	58.9
	1965		59.8	59.8	59.8	59.8	59.8	59.8
	1500	(merge)	56.3	56.2	56.3	56.2	57.0	57.0
Aberdeen Rd	1300		59.7	59.7	59.7	59.7	59.7	59.7
	2775		53.1	52.1	52.5	52.3	52.4	52.5
Chestnut Ave/Roanoke Ave	2020		59.8	59.8	59.8	59.8	59.9	60.0
	1500	(diverge)	56.5	56.4	56.4	56.4	59.1	59.3
	450		55.4	55.2	55.3	55.2	57.3	57.3
	1500	(merge)	55.4	55.2	55.3	55.2	57.3	57.3
35th St/36th St	1565		58.3	58.2	58.2	58.3	58.1	58.1
	945		47.1	46.3	46.3	46.7	45.4	45.2
US 60	2410		59.7	59.7	59.7	59.7	59.9	59.9
	1500	(diverge)	52.9	52.7	52.6	52.8	58.2	58.1
	360		52.9	52.7	52.6	52.8	56.1	56.1
	1500	(merge)	53.4	53.3	53.3	53.3	56.1	56.1
Terminal Ave	1690		59.5	59.5	59.5	59.5	59.9	59.9
	1500	(diverge)	53.3	53.3	53.4	53.3	59.1	59.1
MMMBT	27835		45.1	39.2	42.6	41.1	60.0	60.0
							56.1	56.1
I-664 Connector (Build Alternatives C and D)							60.0	60.0
							56.7	57.3
MMMBT							53.4	52.8
	1500	(merge)	41.8	18.4	18.8	19.6	56.5	56.4
College Dr NB	640		58.8	16.5	17.4	21.7	58.9	58.8
	1695		52.0	20.0	23.9	30.7	52.5	52.0
College Dr SB	500		58.5	58.4	58.4	58.5	59.7	59.6
	1500	(diverge)	52.5	52.2	52.1	52.2	58.2	58.1
MATCHLINE A	1310		59.4	59.3	59.3	59.3	59.5	59.5

I-664 AM PEAK LOS ALTERNATIVES COMPARISON (CONTINUED)

EASTBOUND

Cross Street	Length (not to scale)		Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D
MATCHLINE A	1600		59.7	59.7	59.7	59.7	59.8	59.8
	1500	(diverge)	56.2	56.1	56.2	55.5	58.2	58.4
VA 164	1235		59.6	59.6	59.6	59.5	59.8	59.8
	1500	(merge)	55.2	55.0	55.1	55.1	55.1	55.0
US 17	740		59.2	59.2	59.2	59.2	59.2	59.2
	1500	(merge)	58.9	54.5	54.8	54.7	56.3	56.2
	700		59.8	59.1	59.1	59.1	59.4	59.4
	1500	(diverge)	52.6	52.3	52.3	52.4	54.1	54.1
Pughsville Rd	2525		59.7	59.7	59.7	59.7	59.8	59.8
	1500	(merge)	54.3	53.3	53.7	53.4	55.9	55.7
	5140		60.0	59.2	59.7	59.4	60.0	60.0
	1500	(diverge)	53.0	52.9	52.9	52.9	56.1	56.1
Portsmouth Blvd WB	600		58.7	58.7	58.7	58.7	59.3	59.3
	1700		50.3	48.5	48.8	48.7	50.3	50.0
Portsmouth Blvd EB	480		58.3	58.0	58.1	58.1	58.3	58.3
	1500	(merge)	54.1	53.0	53.3	53.0	55.8	55.7
	1500	(diverge)	53.3	53.1	53.1	53.1	56.4	56.4
Dock Landing Rd	2550		59.7	59.7	59.7	59.7	59.9	59.9
	1500	(merge)	53.5	52.3	52.7	52.5	55.7	55.5
	725		58.9	57.6	58.3	58.0	59.3	59.3
	1500	(diverge)	52.3	52.1	52.0	51.9	54.9	55.0
US 58 SB	480		58.5	58.4	58.4	58.4	59.0	59.0
	2045		52.3	51.0	51.1	51.1	52.7	52.4
US 58 NB	1260		59.5	59.4	59.4	59.4	59.5	59.5
	490	(merge)	50.3	50.3	50.3	50.3	54.8	54.3
	1020		50.3	50.3	50.3	50.3	54.8	54.3
	490	(diverge)	57.1	57.2	57.1	57.1	58.2	58.0
S Military Hwy	1500	(diverge)	48.6	50.6	50.9	50.9	51.1	51.5
I-64 SB	3435		59.8	59.8	59.8	59.8	59.8	59.8

WESTBOUND

Cross Street	Length (not to scale)		Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D
MATCHLINE A	1310		59.4	59.3	59.3	59.3	59.5	59.5
	1500	(merge)	54.3	52.7	53.2	53.2	55.6	55.5
VA 164 WB	1140		58.9	58.6	58.6	58.6	58.6	58.5
	1715		48.7	45.9	45.9	45.9	45.9	45.3
US 17/VA 164 EB	510		59.7	59.7	59.7	59.7	59.7	59.7
	1715		47.9	45.8	46.1	45.5	47.1	46.9
Pughsville Rd WB	1500	(merge)	53.1	52.0	52.3	52.2	54.8	54.7
Pughsville Rd EB	1000		59.0	59.0	59.0	59.0	59.5	59.5
	1500	(diverge)	52.6	52.5	52.5	52.5	55.8	55.9
	5350		59.6	57.4	57.8	57.8	60.0	60.0
	1500	(merge)	53.3	52.0	52.2	52.2	55.2	55.0
Portsmouth Blvd WB	520		58.6	58.3	58.3	58.3	58.5	58.5
	1680		51.6	50.1	50.2	50.0	51.3	51.3
Portsmouth Blvd EB	575		58.7	58.7	58.7	58.7	59.2	59.3
	1500	(diverge)	52.9	52.8	52.8	52.8	56.0	56.0
	200		52.9	51.5	51.7	51.5	54.9	54.8
	1500	(merge)	52.8	51.5	51.7	51.5	54.9	54.8
Dock Landing Rd	2555		59.7	59.7	59.7	59.7	59.9	59.9
	1500	(diverge)	53.2	53.1	53.1	53.1	56.5	56.5
	1180		59.2	59.2	59.2	59.2	59.5	59.4
	1500	(merge)	53.3	52.6	52.8	52.6	55.3	55.2
US 58 SB	410		58.7	58.7	58.7	58.7	58.8	58.8
	1500	(merge)	54.1	53.8	53.8	53.8	54.6	54.5
US 58 NB	1225		59.9	59.9	59.9	59.9	59.9	59.9
	4675		54.0	53.6	53.6	53.8	53.7	53.7
I-64 NB	2135		59.9	59.8	59.9	59.9	59.9	59.9

Legend

Speed (mph)
>45
35-45
25-35
≤25

Notes

Speeds evaluated using HCS Freeway Facilities module

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS Hampton Roads Crossing Study SEIS

I-664 Alternatives Comparison 2028 AM Peak Hour Speed

April 2017

Figure 6-4.3

I-664 PM PEAK LOS ALTERNATIVES COMPARISON

EASTBOUND

Cross Street	Length (not to scale)		Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D
I-64	1320		54.3	54.3	54.3	54.3	55.0	55.0
	1500	(merge)	56.0	55.7	55.9	55.9	55.6	55.7
	1000		59.5	59.4	59.5	59.5	59.4	59.4
	1500	(diverge)	53.6	53.2	53.4	53.4	58.1	58.1
Power Plant Pkwy/Powhatan Pkwy	1660		59.5	59.5	59.5	59.5	59.9	59.9
	1500	(merge)	56.3	56.1	56.2	56.2	57.1	57.1
	1785		59.7	59.7	59.7	59.7	59.8	59.8
	1500	(diverge)	55.7	55.8	55.7	55.8	58.2	58.1
Aberdeen Rd	1505		59.6	59.6	59.6	59.6	59.8	59.8
	3040		53.0	51.9	52.2	52.2	52.7	52.8
Chestnut Ave/Roanoke Ave	2230		59.9	59.9	59.9	59.9	59.9	59.9
	1500	(merge)	56.9	56.6	56.7	56.7	57.3	57.4
	300		55.8	56.0	55.9	55.9	57.3	57.4
	1500	(diverge)	55.8	56.0	55.9	55.9	57.9	57.9
35th St	1105		59.5	59.5	59.5	59.5	59.1	59.2
	1500	(diverge)	57.7	57.4	57.2	57.1	58.6	58.5
26th St / 35th St	2090		59.9	59.9	59.8	59.8	59.9	59.9
US 60	1475	(merge)	54.7	54.5	54.6	54.6	57.1	57.0
	1100	(merge)	55.5	57.1	54.8	55.1	56.9	56.9
	410		55.5	36.3	54.8	55.1	56.9	56.9
	1100	(diverge)	55.5	21.1	35.1	40.8	57.7	57.8
Terminal Ave	585		58.8	14.0	17.7	17.9	58.6	58.6
Terminal Ave	1005	(lane drop)	59.7	19.5	22.4	20.8	59.6	59.6
	1500	(merge)	49.9	24.4	24.9	25.0	56.6	56.7
MMMBT	26460		35.2	35.2	35.2	35.3	58.3	58.4
							57.1	56.6
I-664 Connector (Build Alternatives C and D)							60.0	60.0
							56.2	56.3
MMMBT							60.0	60.0
	1500	(diverge)	53.3	53.3	53.2	53.3	58.4	58.5
College Dr NB	220		58.3	58.3	58.3	58.3	59.6	59.6
	1820		47.9	46.0	45.7	46.3	47.3	46.9
College Dr SB	630		58.3	58.1	58.0	58.1	58.3	58.2
	1500	(merge)	54.5	54.1	54.4	54.3	56.9	57.0
MATCHLINE A	1600		59.6	59.5	59.5	59.5	59.7	59.8

WESTBOUND

Cross Street	Length (not to scale)		Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D
I-64	1085		55.0	54.0	54.8	54.8	52.9	53.3
	1500	(diverge)	55.6	55.3	55.4	55.4	58.1	58.2
	1425		59.5	59.4	59.5	59.5	59.6	59.6
	1500	(merge)	54.8	54.1	54.4	54.4	55.7	55.8
Power Plant Pkwy/Powhatan Pkwy	1945		59.8	59.7	59.7	59.7	59.9	59.9
	1500	(diverge)	56.0	55.8	55.8	55.8	58.1	58.1
	1965		59.7	59.7	59.7	59.7	59.8	59.8
	1500	(merge)	55.1	54.3	54.5	54.6	55.9	56.0
Aberdeen Rd	1300		59.6	59.5	59.6	59.6	59.6	59.6
	2775		49.4	47.5	48.1	48.2	49.0	49.0
Chestnut Ave/Roanoke Ave	2020		59.7	59.8	59.8	59.8	59.9	59.9
	1500	(diverge)	55.6	55.8	55.7	55.7	59.0	59.0
	450		53.2	50.2	50.9	51.2	56.7	56.7
	1500	(merge)	53.2	50.2	50.9	51.2	56.7	56.7
35th St/36th St	1565		58.2	57.9	57.9	58.0	58.0	58.0
	945		46.5	44.2	44.2	44.6	45.0	44.8
US 60	2410		59.7	59.7	59.7	59.7	60.0	60.0
	1500	(diverge)	53.3	53.2	53.2	53.2	59.2	59.2
	360		53.3	53.2	53.2	53.2	56.9	56.9
	1500	(merge)	54.2	53.8	53.9	53.9	56.9	56.9
Terminal Ave	1690		59.5	59.5	59.5	59.5	60.0	60.0
	1500	(diverge)	53.4	53.4	53.4	53.4	59.6	59.6
MMMBT	27835		58.3	58.1	57.8	58.0	60.0	60.0
							56.6	56.6
I-664 Connector (Build Alternatives C and D)							60.0	60.0
							55.9	55.9
MMMBT							58.4	58.3
	1500	(merge)	55.0	54.5	54.6	54.6	57.1	57.1
College Dr NB	640		59.2	59.0	59.0	59.0	59.3	59.2
	1695		54.6	53.5	53.5	53.5	55.1	55.0
College Dr SB	500		58.6	58.6	58.6	58.6	59.8	59.8
	1500	(diverge)	53.1	53.0	53.0	53.0	58.9	58.8
MATCHLINE A	1310		59.6	59.5	59.5	59.5	59.7	59.7

I-664 PM PEAK LOS ALTERNATIVES COMPARISON (CONTINUED)

EASTBOUND

Cross Street	Length (not to scale)		Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D
MATCHLINE A	1600		59.6	59.5	59.5	59.5	59.7	59.8
	1500	(diverge)	55.9	55.4	55.6	55.1	59.6	59.6
VA 164	1235		59.6	59.5	59.5	59.5	60.0	60.0
	1500	(merge)	54.4	54.1	54.3	54.3	55.6	55.7
US 17	740		59.1	59.0	59.1	59.1	59.3	59.3
	1500	(merge)	56.7	52.2	52.5	52.2	54.9	55.2
	700		59.4	58.7	58.7	58.7	59.1	59.2
	1500	(diverge)	52.3	51.8	51.8	52.0	54.2	54.0
Pughsville Rd	2525		59.7	59.7	59.7	59.7	59.8	59.8
	1500	(merge)	53.8	53.2	53.4	53.1	55.4	55.5
	5140		59.9	59.2	59.4	58.9	60.0	60.0
	1500	(diverge)	53.1	53.0	53.0	53.0	56.3	56.3
Portsmouth Blvd WB	600		58.7	58.7	58.7	58.7	59.3	59.3
	1700		48.1	46.3	46.6	46.5	47.7	47.9
Portsmouth Blvd EB	480		58.0	57.7	57.7	57.7	57.9	57.9
	1500	(merge)	53.6	53.0	53.0	52.6	55.3	55.5
	1500	(diverge)	53.1	52.9	52.9	52.9	55.1	55.1
Dock Landing Rd	2550		59.7	59.7	59.7	59.7	59.8	59.8
	1500	(merge)	53.7	53.3	53.3	53.2	55.5	55.7
	725		59.0	58.9	58.9	58.9	59.3	59.3
	1500	(diverge)	52.2	51.9	51.9	51.8	56.8	56.8
US 58 SB	480		58.4	58.4	58.4	58.3	59.4	59.4
	2045		52.9	52.0	52.1	52.1	54.1	54.4
US 58 NB	1260		59.5	59.5	59.5	59.5	59.6	59.6
	490	(merge)	53.2	52.7	53.2	53.0	56.0	56.2
	1020		53.2	52.7	53.2	53.0	56.0	56.2
	490	(diverge)	58.0	57.9	58.0	57.9	55.3	55.3
S Military Hwy	1500	(diverge)	49.7	52.9	52.6	53.0	55.1	54.9
I-64 SB	3435		59.8	59.9	59.9	59.9	59.9	59.9

WESTBOUND

Cross Street	Length (not to scale)		Existing	2028 NB	2028 Alt A	2028 Alt B	2028 Alt C	2028 Alt D
MATCHLINE A	1310		59.6	59.5	59.5	59.5	59.7	59.7
	1500	(merge)	55.7	55.4	55.5	55.5	56.7	56.7
VA 164 WB	1140		59.2	58.9	58.9	58.9	59.0	58.9
	1715		51.5	49.4	49.3	49.3	49.8	49.4
US 17/VA 164 EB	510		59.8	59.7	59.7	59.7	59.7	59.8
	1715		50.5	49.1	49.2	49.0	49.6	49.7
Pughsville Rd WB	1500	(merge)	54.1	53.9	53.9	54.0	55.7	55.7
Pughsville Rd EB	1000		59.0	59.0	59.0	59.0	59.4	59.4
	1500	(diverge)	52.3	52.2	52.3	52.2	55.3	55.3
	5350		60.0	60.0	60.0	60.0	60.0	60.0
	1500	(merge)	54.7	54.4	54.4	54.4	56.0	56.0
Portsmouth Blvd WB	520		58.6	58.4	58.4	58.4	58.5	58.5
	1680		52.0	50.3	50.5	50.3	51.2	51.4
Portsmouth Blvd EB	575		58.6	58.6	58.6	58.6	59.2	59.2
	1500	(diverge)	52.6	52.5	52.5	52.5	55.8	55.8
	200		52.6	52.5	52.5	52.5	55.5	55.6
	1500	(merge)	54.1	53.7	53.7	53.7	55.5	55.6
Dock Landing Rd	2555		59.7	59.7	59.7	59.7	59.9	59.9
	1500	(diverge)	53.0	52.8	52.9	52.8	56.2	56.2
	1180		59.3	59.3	59.3	59.3	59.5	59.5
	1500	(merge)	54.1	53.6	53.7	53.6	55.6	55.6
US 58 SB	410		58.9	58.8	58.8	58.8	58.9	58.9
	1500	(merge)	54.6	54.4	54.5	54.4	55.0	55.1
US 58 NB	1225		59.9	59.9	59.9	59.9	59.9	59.9
	4675		53.6	52.9	53.0	53.1	53.2	53.3
I-64 NB	2135		59.8	59.8	59.8	59.8	59.8	59.8

Legend

Speed (mph)
>45
35-45
25-35
≤25

Notes

Speeds evaluated using HCS Freeway Facilities module

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS
Hampton Roads Crossing Study SEIS

I-664 Alternatives Comparison 2028 PM Peak Hour Speed

April 2017 | Figure 6-4.4

VA 164 AM PEAK LOS ALTERNATIVES COMPARISON

Cross Street	Length (not to scale)		EASTBOUND Existing	EASTBOUND 2028 NB	EASTBOUND 2028 Alt A	EASTBOUND 2028 Alt B	EASTBOUND 2028 Alt C	EASTBOUND 2028 Alt D	WESTBOUND Existing	WESTBOUND 2028 NB	WESTBOUND 2028 Alt A	WESTBOUND 2028 Alt B	WESTBOUND 2028 Alt C	WESTBOUND 2028 Alt D		Length (not to scale)	Cross Street
US 17/Bridge Rd	2600		60.0	60.0	60.0	60.0	60.0	60.0	59.4	59.3	59.3	59.2	59.4	59.4		1670	I-664 SB
	2680		58.9	57.2	57.3	52.6	56.2	51.4	51.8	49.4	49.3	48.1	51.5	51.2		1610	
I-664	1460		64.8	64.7	64.7	59.7	64.7	59.7	63.3	63.3	63.3	63.5	63.3	63.6		970	I-664 NB
	1500	(merge)	56.1	55.6	55.7	55.4	56.0	55.9	52.3	52.2	52.3	54.1	52.6	54.5	(diverge)	1500	
College Dr	585		59.3	59.2	59.2	59.1	59.3	59.3	58.9	58.9	58.9	59.2	58.9	59.2		1025	College Dr
	1500	(merge)	54.6	53.9	54.0	55.7	54.4	56.2	51.6	51.5	51.5	54.2	51.6	53.9	(diverge)	1500	
	1290		59.4	59.4	59.4	59.6	59.4	59.6	59.4	59.4	59.4	59.6	59.4	59.6		1270	
	1500	(diverge)	49.5	49.4	49.4	53.5	49.5	53.2	54.6	54.4	54.5	56.0	54.7	56.2	(merge)	1500	
Towne Point Rd	2000		59.4	59.4	59.4	59.6	59.4	59.6	59.4	59.4	59.4	59.6	59.4	59.5		1970	Towne Point Rd
	1500	(merge)	53.8	52.8	53.0	55.1	53.6	55.7	49.6	49.5	49.6	52.6	49.6	52.5	(diverge)	1500	
	1400		59.4	59.3	59.3	59.5	59.4	59.6	59.4	59.4	59.4	59.6	59.4	59.6		1315	
	1500	(diverge)	51.0	50.6	50.6	53.9	51.0	53.8	54.5	54.4	54.4	55.8	54.5	55.9	(merge)	1500	
Cedar Ln SB (Existing and 2028 NB)	1135		58.9	58.9	58.9				58.8	58.8	58.8	58.5	58.8	58.8		1140	Cedar Ln
	1500	(merge)	54.7	54.4	54.4	58.7	58.1	58.7	49.5	49.4	49.5	47.5	49.4	49.6	(diverge)	1500	
												55.2	59.1	55.4			
Cedar Ln NB (Existing and 2028 NB)	110		58.6	58.5	58.5												Craney Island Connector (Build Alternatives)
	1000	(merge)	54.4	54.0	54.0				59.3	59.3	59.3	58.8	58.8	58.8		1300	
						51.6	49.2	52.2									
	500		49.7	49.7	49.7												
Craney Island Connector (Build Alternatives)	1000	(diverge)	49.7	49.7	49.7				55.3	55.2	55.2	55.4	55.4	55.4	(merge)	1000	
Virginia International Gateway Blvd (Existing and 2028 NB)	2245		58.9	58.9	58.9	60.0	60.0	60.0	58.7	58.7	58.7	59.8	59.6	59.8		2330	Virginia International Gateway Blvd
	1025	(merge)	54.8	54.5	54.5				49.7	49.7	49.6	50.1	49.0	50.6	(diverge)	1225	
Craney Island Connector (Build Alternatives)	475		49.8	49.8	49.8				49.7	49.7	49.6	54.8	49.0	54.9		275	
	1025	(diverge)	49.8	49.8	49.8	49.2	49.3	49.3	54.9	54.9	54.9	54.8	55.0	54.9	(merge)	1225	
W. Norfolk Rd	625		55.8	55.8	55.8	58.0	58.0	58.0	58.4	58.4	58.4	58.4	58.4	58.4		810	W Norfolk Rd
	1500	(merge)	54.7	54.1	54.2	54.3	54.4	54.5	49.8	49.8	49.7	49.8	49.8	49.8	(diverge)	1500	
									55.0	55.0	55.0	55.0	55.0	55.0		1710	
	1245		59.4	59.4	59.4	59.4	59.4	59.4									
									55.0	55.0	55.0	55.0	55.0	55.0	(lane drop)	415	
	2330	(lane add)	55.0	55.0	55.0	55.0	55.0	55.0	54.8	54.8	54.8	54.8	54.8	54.8		1585	
	1500	(lane drop)	50.2	50.2	50.2	50.2	50.5	50.6	52.2	52.1	52.1	52.1	52.2	52.2	(merge)	1500	
(diverge)	1375	US 58 EB	48.9	48.9	48.8	48.8	48.8	48.7	51.6	51.5	51.5	51.5	51.6	51.5	(merge)	1050	US 58 SB
Lee Ave/Railroad Ave	1500	US 58 WB	54.4	54.4	54.4	54.4	54.4	54.4	54.9	54.8	54.8	54.8	54.9	54.9		1765	Railroad Ave/US 58 NB
Lee Ave / Harper Ave	1500	(merge)	52.3	52.2	52.2	52.2	52.2	52.2	47.1	46.7	46.8	46.6	47.5	47.1		3150	
	1830		49.7	48.9	49.0	49.2	49.2	49.3	55.0	55.0	55.0	55.0	55.0	55.0		500	London Blvd

VA 164 PM PEAK LOS ALTERNATIVES COMPARISON

Cross Street	Length (not to scale)		EASTBOUND Existing	EASTBOUND 2028 NB	EASTBOUND 2028 Alt A	EASTBOUND 2028 Alt B	EASTBOUND 2028 Alt C	EASTBOUND 2028 Alt D	WESTBOUND Existing	WESTBOUND 2028 NB	WESTBOUND 2028 Alt A	WESTBOUND 2028 Alt B	WESTBOUND 2028 Alt C	WESTBOUND 2028 Alt D		Length (not to scale)	Cross Street
US 17/Bridge Rd	2600		60.0	60.0	60.0	60.0	60.0	60.0	59.9	59.5	59.6	59.2	59.6	59.3		1670	I-664 SB
	2680		61.5	60.7	60.8	56.1	60.2	55.3	55.9	53.5	53.6	48.4	54.6	50.0		1610	
I-664	1460		64.9	64.8	64.9	59.9	64.8	59.8	64.9	63.2	63.2	59.2	63.3	59.3		970	I-664 NB
	1500	(merge)	56.2	56.1	56.1	55.9	56.2	56.2	52.0	51.9	52.0	54.2	52.2	54.5	(diverge)	1500	
College Dr	585		59.3	59.3	59.3	59.2	59.3	59.3	58.9	58.9	58.9	59.3	58.9	59.3		1025	College Dr
	1500	(merge)	54.8	54.4	54.5	56.0	54.7	56.3	51.4	51.2	51.3	54.6	51.4	54.5	(diverge)	1500	
	1290		59.5	59.4	59.4	59.6	59.4	59.6	59.4	59.3	59.3	59.5	59.4	59.6		1270	
	1500	(diverge)	49.0	48.8	48.8	52.0	48.9	51.7	54.1	53.3	53.6	55.4	54.0	55.9	(merge)	1500	
Towne Point Rd	2000		59.4	59.3	59.3	59.5	59.4	59.5	59.3	59.3	59.3	59.5	59.3	59.5		1970	Towne Point Rd
	1500	(merge)	54.4	54.2	54.2	55.9	54.4	56.1	48.9	48.9	48.9	52.4	48.9	52.4	(diverge)	1500	
	1400		59.5	59.4	59.5	59.6	59.5	59.6	59.3	59.2	59.3	59.5	59.3	59.5		1315	
	1500	(diverge)	51.5	51.2	51.2	54.2	51.4	54.2	53.5	52.5	53.0	54.9	53.4	55.5	(merge)	1500	
Cedar Ln SB (Existing and 2028 NB)	1135		59.0	59.0	59.0				58.8	58.7	58.8	58.6	58.8	58.8		1140	Cedar Ln
	1500	(merge)	55.0	54.8	54.9	58.7	58.2	58.7	49.4	49.4	49.4	47.8	49.4	49.8	(diverge)	1500	
												53.0	54.5	54.5			
Cedar Ln NB (Existing and 2028 NB)	110		58.6	58.6	58.6												Craney Island Connector (Build Alternatives)
	1000	(merge)	54.7	54.5	54.6				59.1	59.0	59.1	58.6	58.7	58.7		1300	
						51.8	49.2	51.8									
	500		49.9	49.9	49.9												
Craney Island Connector (Build Alternatives)	1000	(diverge)	49.9	49.9	49.9				54.4	53.8	54.2	54.6	54.9	54.9	(merge)	1000	
Virginia International Gateway Blvd (Existing and 2028 NB)	2245		58.9	58.9	58.9	60.0	60.0	60.0	58.8	58.8	58.8	59.6	59.6	59.6		2330	Virginia International Gateway Blvd
	1025	(merge)	55.1	54.9	55.0				49.8	49.8	49.8	48.7	49.2	49.1	(diverge)	1225	
Craney Island Connector (Build Alternatives)	475		49.8	49.7	49.7				49.8	49.8	49.8	48.7	49.2	49.1		275	
	1025	(diverge)	49.8	49.7	49.7	48.1	51.2	50.9	54.1	53.6	53.9	53.3	54.2	54.3	(merge)	1225	
W. Norfolk Rd	625		55.8	55.8	55.8	57.7	58.3	58.3	58.4	58.4	58.4	58.4	58.4	58.4		810	W Norfolk Rd
	1500	(merge)	55.2	55.0	55.1	54.9	55.1	55.2	49.6	49.4	49.5	49.5	49.6	49.7	(diverge)	1500	
									55.0	55.0	55.0	55.0	55.0	55.0		1710	
	1245		59.5	59.5	59.5	59.5	59.5	59.5									
									54.9	54.9	54.9	54.9	54.9	54.9	(lane drop)	415	
	2330	(lane add)	55.0	55.0	55.0	55.0	55.0	55.0	54.7	54.7	54.7	54.7	54.7	54.7		1585	
	1500	(lane drop)	50.2	50.2	50.2	50.2	50.5	50.6	51.5	50.9	51.2	51.0	51.6	51.6	(merge)	1500	
(diverge)	1375	US 58 EB	49.2	49.2	49.2	49.1	49.1	49.1	51.4	51.2	51.3	51.2	51.3	51.3	(merge)	1050	US 58 SB
Lee Ave/Railroad Ave	1500	US 58 WB	54.4	54.4	54.4	54.4	54.4	54.4	54.8	54.8	54.8	54.8	54.8	54.8		1765	Railroad Ave/US 58 NB
Lee Ave / Harper Ave	1500	(merge)	52.4	52.4	52.4	52.3	52.4	52.4	45.4	44.0	44.7	44.0	45.4	45.2		3150	
	1830		48.4	47.8	47.8	47.6	47.9	47.8	55.0	55.0	55.0	55.0	55.0	55.0		500	London Blvd

Legend

Speed (mph)
>45
35-45
25-35
≤25

Notes

Speeds evaluated using HCS Freeway Facilities module

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS
Hampton Roads Crossing Study SEIS

VA 164 Alternatives Comparison 2028 Speed

April 2017

Figure 6-4.5

JAMES RIVER CONNECTORS AM PEAK LOS ALTERNATIVE B

Cross Street	Length (not to scale)		WESTBOUND 2028 Alt B	EASTBOUND 2028 Alt B		Length (not to scale)	Cross Street
	3675		55.0	54.9		3615	
	1500	(diverge)	49.3	51.7	(merge)	1500	
Hampton Blvd	2850		54.8	54.8		2970	Hampton Blvd
	1500	(merge)	51.4	48.9	(diverge)	1500	
	16540		55.0	55.0		17390	
	1500	(diverge)	50.2	51.1	(merge)	1500	
Future Craney Island Access	2700		54.8	54.7		2000	Future Craney Island Access
	1500	(merge)	51.2	50.1	(diverge)	1500	
				55.0		5050	
	5350		55.0	50.7	(merge)	1500	
				55.0	VA 164 EB	1100	

JAMES RIVER CONNECTORS PM PEAK LOS ALTERNATIVE B

Cross Street	Length (not to scale)		WESTBOUND 2028 Alt B	EASTBOUND 2028 Alt B		Length (not to scale)	Cross Street
	3675		55.0	54.9		3615	
	1500	(diverge)	50.0	51.5	(merge)	1500	
Hampton Blvd	2850		54.9	54.9		2970	Hampton Blvd
	1500	(merge)	51.3	49.7	(diverge)	1500	
	16540		55.0	55.0		17390	
	1500	(diverge)	50.2	51.2	(merge)	1500	
Future Craney Island Access	2700		54.8	54.7		2000	Future Craney Island Access
	1500	(merge)	51.1	50.2	(diverge)	1500	
				55.0		5050	
	5350		55.0	50.8	(merge)	1500	
				55.0	VA 164 EB	1100	

JAMES RIVER CONNECTORS AM PEAK LOS ALTERNATIVES C & D

Cross Street	Length (not to scale)		WESTBOUND 2028 Alt C	WESTBOUND 2028 Alt D	EASTBOUND 2028 Alt C	EASTBOUND 2028 Alt D		Length (not to scale)	Cross Street
	3675		55.0	55.0	54.9	54.9		3615	
	1500	(diverge)	49.5	49.5	51.7	51.7	(merge)	1500	
Hampton Blvd	2850		54.8	54.8	54.8	54.8		2970	Hampton Blvd
	1500	(merge)	51.1	51.1	48.6	48.6	(diverge)	1500	
	5450		55.0	55.0	55.0	55.0		5730	
	1500	(diverge)	49.4	49.5	51.0	51.1	(merge)	1500	
Craney Island Connector	4135		54.9	54.9	54.9	54.9		3660	Craney Island Connector
	1500	(merge)	51.2	51.3	49.8	49.6	(diverge)	1500	
	6300		55.0	55.0	55.0	55.0		5285	

Craney Island Connector

Cross Street	Length (not to scale)		SOUTHBOUND 2028 Alt C	SOUTHBOUND 2028 Alt D	NORTHBOUND 2028 Alt C	NORTHBOUND 2028 Alt D		Length (not to scale)	Cross Street
	7095		55.0	55.0	55.0	55.0		9410	
	1500	(diverge)	50.1	50.1	51.3	51.2	(merge)	1500	
Future Craney Island Access	2700		54.8	54.8	54.7	54.7		2000	Future Craney Island Access
	1500	(merge)	51.3	51.2	50.3	50.2	(diverge)	1500	
					55.0	55.0		5050	
	5350		55.0	55.0	50.9	50.9	(merge)	1500	
					55.0	55.0	VA 164 EB	1100	

JAMES RIVER CONNECTORS PM PEAK LOS ALTERNATIVES C & D

Cross Street	Length (not to scale)		WESTBOUND 2028 Alt C	WESTBOUND 2028 Alt D	EASTBOUND 2028 Alt C	EASTBOUND 2028 Alt D		Length (not to scale)	Cross Street
	3675		55.0	55.0	54.9	54.9		3615	
	1500	(diverge)	50.1	50.1	51.3	51.3	(merge)	1500	
Hampton Blvd	2850		54.9	54.9	54.8	54.8		2970	Hampton Blvd
	1500	(merge)	51.0	51.0	49.3	49.3	(diverge)	1500	
	5450		55.0	55.0	55.0	55.0		5730	
	1500	(diverge)	49.6	49.5	51.0	51.1	(merge)	1500	
Craney Island Connector	4135		54.9	54.9	54.9	54.9		3660	Craney Island Connector
	1500	(merge)	51.1	51.1	49.7	49.6	(diverge)	1500	
	6300		55.0	55.0	55.0	55.0		5285	

Craney Island Connector

Cross Street	Length (not to scale)		SOUTHBOUND 2028 Alt C	SOUTHBOUND 2028 Alt D	NORTHBOUND 2028 Alt C	NORTHBOUND 2028 Alt D		Length (not to scale)	Cross Street
	7095		55.0	55.0	55.0	55.0		9410	
	1500	(diverge)	50.2	50.2	51.3	51.3	(merge)	1500	
Future Craney Island Access	2700		54.8	54.8	54.7	54.7		2000	Future Craney Island Access
	1500	(merge)	51.3	51.2	50.2	50.2	(diverge)	1500	
					55.0	55.0		5050	
	5350		55.0	55.0	50.9	50.9	(merge)	1500	
					55.0	55.0	VA 164 EB	1100	

Legend

Speed (mph)
>45
35-45
25-35
≤25

Notes

Speeds evaluated using HCS Freeway Facilities module

Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS
Hampton Roads Crossing Study SEIS

Elizabeth River Crossing Alternatives Comparison 2028 Speed

April 2017

Figure 6-4.6

7. IMPLICATIONS OF IMPLEMENTING TOLLS AND/OR HOT LANES

As discussed in **Section 1**, each of the Build Alternatives could accommodate tolls. The toll diversion scenarios considered for the study include: no tolls, Elizabeth River tolls only, and High Occupancy Toll (HOT) Lanes. The no toll scenario is the baseline for alternatives development. The traffic impacts of the no toll alternatives were discussed in **Section 5**. With the Elizabeth River toll scenario, tolls would apply to all traffic traveling on the new crossing of the Elizabeth River in Alternatives B, C, or D. The HOT Lane scenario assumes that in addition to Elizabeth River tolls, all other new travel lanes proposed under the Build Alternatives would be HOT lanes. It is assumed that any tolls, regardless of the specific scenario, would be collected electronically using overhead gantries.

It should be noted that the preliminary toll assessment discussed herein does not include final, post-processed future traffic volume projections; has not recommended toll rates; and is not appropriate for toll revenue estimation. The determination of whether tolls would be implemented as part of any of the Build Alternatives would take place after alternative selection, as appropriate. The only intent of providing the raw model output in this report is to show approximate potential shifts in traffic patterns that could be expected with the implantation of a toll on any of the Study Area Corridor roadway segments.

The modeled toll rates (both for the fixed toll and mileage-based toll) are based on initial project financing scenarios developed by HRTAC.

7.1 TRAVEL DEMAND MODEL MODIFICATIONS

The HRTPO travel demand model includes a toll component that provides the ability to code a fixed toll or mileage-based toll on any link in the model. The HRTPO model also differentiates between different vehicle classes, including Single Occupant Vehicle (SOV); High Occupancy Vehicles with 2, or 3 or more occupants (HOV2, HOV3+); and trucks. Tolls are already coded on a number of facilities in the Hampton Roads region. The model's toll component was used without modification.

Under the Elizabeth River toll-only scenario, a fixed toll of $1 was coded on the I-564, I-664 and VA 164 connectors. However, because vehicles would always need to travel on at least two of these connectors to cross the Elizabeth River, the effective toll on the crossing is $2.

For the HOT lanes scenario, single-lane parallel links were coded into the HRTPO travel demand model along I-64, I-664 and VA 164. The travel demand network was coded so that the HOT lane could be accessed at every interchange, and that traffic could exit the HOT lane/mainline facility at every interchange as well. This is a simplified assumption that may not be feasible due to short interchange spacing in certain areas. This assumption would be further refined in future tolls studies.

Under the HOT lane scenarios, where the additional lanes would constitute HOT lanes rather than General Purpose (i.e., non-tolled) lanes, the lane configurations shown in **Table 7-1** through **Table 7-4** were coded into the HRTPO travel demand model.

Table 7-1: Alternative A HOT Travel Demand Model Lane Configurations

Roadway Alignments	Existing Lanes	Proposed Lanes
I-64 (Hampton)	6	6
I-64 (HRBT and Norfolk)	4	4 + 2 HOT

Table 7-2: Alternative B HOT Travel Demand Model Lane Configurations

Roadway Alignments	Existing Lanes	Proposed Lanes
I-64 (Hampton)	6	6
I-64 (HRBT and Norfolk)	4	4 + 2 HOT
I-564	6	6
I-564 Connector	none	4, fixed $1 toll
VA 164 Connector	none	4, fixed $1 toll
VA 164	4	4 + 2 HOT

Table 7-3: Alternative C HOT Travel Demand Model Lane Configurations

Roadway Alignments	Existing Lanes	Proposed Lanes
I-664 (from I-64 to the proposed I-664 Connector)	4-6	6 + 2 HOT
I-664 (from the proposed I-664 Connector to VA 164)	4	6 + 2 HOT
I-664 (from VA 164 to I-264)	4	4 + 2 HOT
I-564	6	4
I-564 Connector	none	4, fixed $1 toll
VA 164 Connector	none	4, fixed $1 toll
I-664 Connector	none	4, fixed $1 toll

Table 7-4: Alternative D HOT Travel Demand Model Lane Configurations

Roadway Alignments	Existing Lanes	Proposed Lanes
I-64 (Hampton)	6	6
I-64 (HRBT and Norfolk)	4	4 + 2 HOT
I-664 (from I-64 to VA 164)	4-6	6 + 2 HOT
I-664 (from VA 164 to I-264)	4	4 + 2 HOT
I-664 Connector	None	4, fixed $1 toll
I-564	6	6
I-564 Connector	none	4, fixed $1 toll
VA 164 Connector	none	4, fixed $1 toll
VA 164	4	4 + 2 HOT

The toll rates (dollars per mile) shown in **Table 7-5** were assumed for the HOT lane scenarios. Single occupancy vehicles and HOV2 vehicles would be charged a toll; HOV3+ vehicles would travel free in the HOT lanes. It should be noted that although the HOT lanes assume a mileage-based toll, the model is not capable of dynamically adjusting toll rates to maintain a pre-specified speed or LOS in the HOT lane(s).

Table 7-5: Modeled HOT Toll Rates (in dollars per mile)

Passenger Car		Commercial Vehicles (3+ axles)	
Peak	Off Peak	Peak	Off Peak
0.33	0.15	1.32	0.45

7.2 FIXED TOLLS PRELIMINARY RESULTS (SCENARIO 1)

The raw daily link volume model output for the Scenario 1 alternatives is provided in **Table 7-6**. There is no model run for Alternative A, because this alternative does not include any new Elizabeth River crossings.

The Alternative B results indicate that volumes on the HRBT and MMMBT would increase slightly compared to the no-toll alternative, as tolls on the new Elizabeth River connectors improve the attractiveness of the HRBT and MMMBT to drivers. A slight shift in traffic to the James River Bridge is indicated as well. Volumes on the I-564 and VA 164 Connectors would decline substantially, indicating that the additional cost of a toll may not outweigh travel time savings provided by these new connections.

Under Alternatives C and D, traffic volumes on the MMMBT show a slight decline compared to the no-toll alternative, while traffic volumes on the HRBT would increase. This pattern occurs even with the relatively larger capacity increase on the MMMBT compared to the HRBT in Alternative C. This indicates that the HRBT is the preferred means of crossing Hampton Roads, in particular when the trip between the Peninsula and the Norfolk area remains toll-free on the HRBT, compared to a trip that would involve traveling the MMMBT and the (tolled) I-664 and I-564 connectors.

Traffic volumes on the VA 164 Connector would likely see the largest decline with the implementation of a toll, indicating that travelers using the VA 164 Connector would find alternate, lower cost routes to and from the Norfolk area from areas to the south.

Table 7-6: Toll Scenario 1 Output

	I-64	I-664	US 17	I-664 Connector	I-564 Connector	164 Connector
Alternative B (No tolls)	**153,300**	**94,200**	**48,000**		**63,900**	**63,900**
Alternative B Toll Diversion Scenario 1	155,200	95,200	49,300		20,800	20,800
Volume Difference	1,900	1,000	1,300		-43,100	-43,100
Percent Difference	1%	1%	3%		-67%	-67%
Alternative C (No tolls)	**110,200**	**150,300**	**45,800**	**87,800**	**111,100**	**36,300**
Alternative C Toll Diversion Scenario 1	113,200	143,600	46,000	63,200	65,700	3,200
Volume Difference	3,000	-6,700	200	-24,600	-45,400	-33,100
Percent Difference	3%	-4%	0%	-28%	-41%	-91%
Alternative D (No tolls)	**137,900**	**133,900**	**45,800**	**81,700**	**107,300**	**38,500**
Alternative D Toll Diversion Scenario 1	145,700	124,000	46,700	51,700	53,900	3,000
Volume Difference	7,800	-9,900	900	-30,000	-53,400	-35,500
Percent Difference	6%	-7%	2%	-37%	-50%	-92%

Caution: Raw model output is shown. This information is provided to indicate approximate potential shifts in traffic patterns only.

7.3 HOT LANE PRELIMINARY RESULTS (SCENARIO 2)

The raw daily link volume model output for the Scenario 2 alternatives is provided in **Table 7-7**. This table provides the daily link volumes for both the General Purpose (i.e., non-tolled) lanes as well as the HOT lanes for each alternative.

Under Alternative A, implementation of HOT lanes on the HRBT indicates a slight overall reduction in traffic volumes on the HRBT, with some of the traffic shifting to the MMMBT.

Under Alternative B, the volume reduction on the HRBT would be slightly larger, with almost all of the volume shift being absorbed by the MMMBT. Traffic volumes on the I-564 and VA 164 connectors would be essentially unchanged from the volumes under Scenario 1.

Compared to the HOT lane volumes on the HRBT under Alternatives A and B, HOT lane volumes on the MMMBT would be substantially less under both Alternative C and D. This is likely due to the longer distance that drivers choosing to take the MMMBT would need to travel between the Peninsula and Norfolk and the higher toll cost they would incur. It is also an indication that congestion on the MMMBT is projected to be lower, in particular under Alternative C where the toll scenario assumed that four General Purpose Lanes would remain, and the fifth lane would be converted from a transit-only lane to a HOT lane. When congestion in the General Purposes lanes is relatively low, there is little incentive for drivers to pay for a trip using the HOT lanes. Finally, because at this preliminary stage it was assumed that the HOT lanes could be accessed and exited at every interchange within the study area, the model may assign traffic to HOT lanes to bypass isolated locations of network congestion.

Table 7-7: Toll Scenario 2 Output

	I-64	I-664	US 17	I-664 Connector	I-564 Connector	164 Connector
Alternative A (No tolls)	**156,300**	**95,300**	**49,900**			
General Purpose Lanes	*113,600*	*99,100*	*49,000*			
HOT Lanes	*36,800*	*0*	*0*			
Alternative A - Toll Diversion Scenario 2	150,400	99,100	49,000			
Volume Difference	-5,900	3,800	-900			
Percent Difference	-4%	4%	-2%			
Alternative B (No tolls)	**153,300**	**94,200**	**48,000**		**63,900**	**63,900**
General Purpose Lanes	*113,900*	*99,300*	*48,500*		*21,400*	*21,400*
HOT Lanes	*31,400*	*0*	*0*		*0*	*0*
Alternative B - Toll Diversion Scenario 2	145,300	99,300	48,500		21,400	21,400
Volume Difference	-8,000	5,100	500		-42,500	-42,500
Percent Difference	-5%	5%	1%		-67%	-67%
Alternative C (No tolls)	**110,200**	**150,300**	**45,800**	**87,800**	**111,100**	**36,300**
General Purpose Lanes	*115,900*	*129,700*	*46,500*	*36,000*	*43,300*	*8,100*
HOT Lanes	*0*	*5,700*	*0*	*0*	*0*	*0*
Alternative C - Toll Diversion Scenario 2	115,900	135,400	46,500	36,000	43,300	8,100
Volume Difference	5,700	-14,900	700	-51,800	-67,800	-28,200
Percent Difference	5%	-10%	2%	-59%	-61%	-78%
Alternative D (No tolls)	**137,900**	**133,900**	**45,800**	**81,700**	**107,300**	**38,500**
General Purpose Lanes	*113,700*	*119,500*	*46,900*	*30,100*	*37,800*	*8,400*
HOT Lanes	*26,400*	*3,600*	*0*	*0*	*0*	*0*
Alternative D - Toll Diversion Scenario 2	140,100	123,100	46,900	30,100	37,800	8,400
Volume Difference	2,200	-10,800	1,100	-51,600	-69,500	-30,100
Percent Difference	2%	-8%	2%	-63%	-65%	-78%

Caution: Raw model output is shown. This information is provided to indicate approximate potential shifts in traffic patterns only.

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8. UPDATED YEAR 2040 FORECASTS AND ANALYSES

After completion of the Draft SEIS, the Hampton Roads Transportation Planning Organization (HRTPO) released an update of the regional travel demand model on August 8, 2016. This model update incorporates the latest adopted land use forecasts for a new horizon year (2040) as well as the transportation improvement projects for the latest adopted long range transportation plan. The updated HRTPO socio-economic forecasts project a 2% lower total population, and a 4% increase in total employment within the Hampton Roads region compared to the 2034 forecast. The change in total employment includes a 32 percent increase in retail employment, and a 4 percent decrease in non-retail employment.

For the Final SEIS, forecasts for the No Build scenario and Preferred Alternative were updated using the updated HRTPO socio economic data and transportation network improvements. The hot-spot corridor analyses were updated based on the new travel demand model. Results are provided below.

As discussed in **Section 2.4**, traffic forecasts were developed using the Hampton Roads TPO travel demand model. The model output was post-processed to obtain design year 2040 daily and peak hour volumes. These peak hour volumes were analyzed to obtain peak hour Level of Service (LOS) and estimated end-to-end travel time for each Study Area Corridor. The results of these analyses are summarized in **Section 5.1**; detailed analysis results are provided in **Sections 5.3 and 8.4**.

Model output (for the horizon year 2040) was aggregated to provide additional insight in the operational benefits of the Preferred Alternative. This information is presented in **Section 5.2**.

8.1 SUMMARY

A summary of daily traffic volumes on key roadway links within the study area under each of the alternatives is provided in **Table 5-1**. A comparison of daily traffic volumes on the HRBT and MMMBT for 2015 and 2040 conditions for each alternative is provided in **Figure 5-1**. A summary of projected LOS is provided in **Table 5-2**. A summary of estimated travel times along key Study Area Corridors between major interchanges is provided in **Table 5-3**. It should be noted that the travel time estimates were developed from planning-level capacity analysis output and are intended only to indicate relative changes in travel time between alternatives. Additional and/or different segments could be reported in the Final SEIS depending on the Preferred Alternative.

Table 8-1: 2040 Daily Traffic Volumes at Key Roadway Segments

Roadway Segment	2015	2040 No-Build (Updated)	2040 Preferred Alternative
HRBT	91,000	101,500	129,800
MMMBT	69,300	85,600	82,800
VA 164*	49,000	66,500	64,300

** Between the Towne Point Road and College Drive Interchanges*

Figure 8-1: 2040 Projected Daily Traffic Volumes at the HRBT and MMMBT

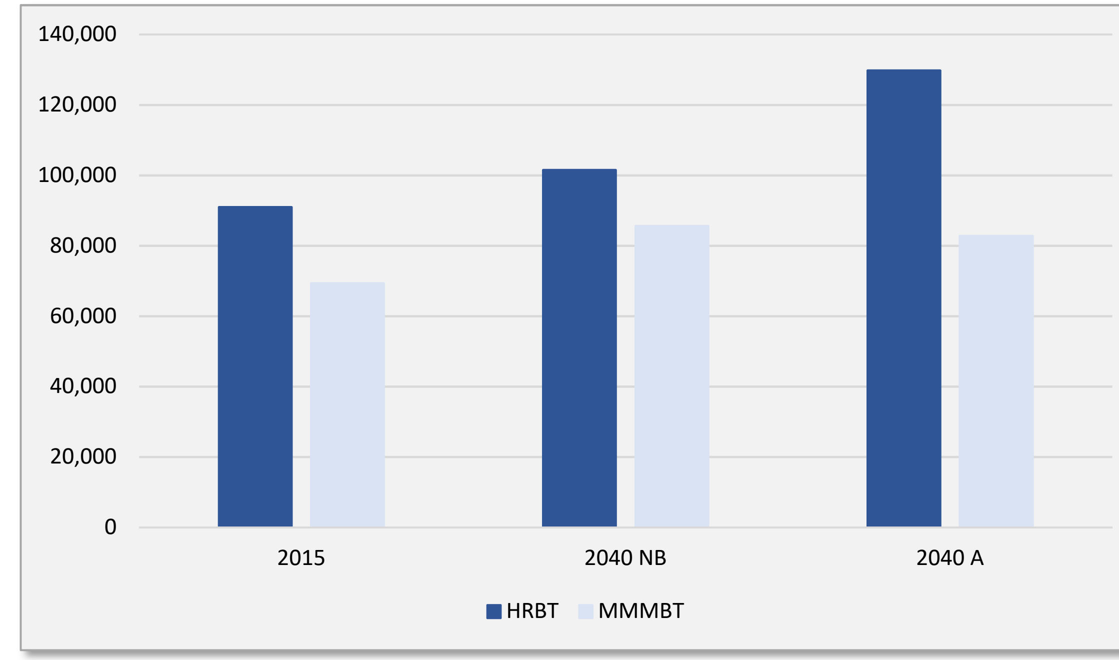

Table 8-2: 2040 Projected LOS at Key Roadway Segments

Roadway Segment	AM Peak					
	Eastbound			Westbound		
	Existing	2040 No-Build (Updated)	2040 Preferred Alternative	Existing	2040 No-Build (Updated)	2040 Preferred Alternative
HRBT	F	F	F	F	F	F
MMMBT	C	D	C	F	E	D
VA 164	C	D	D	B	C	C
Roadway Segment	**PM Peak**					
	Eastbound			**Westbound**		
	Existing	**2040 No-Build (Updated)**	**2040 Preferred Alternative**	**Existing**	**2040 No-Build (Updated)**	**2040 Preferred Alternative**
HRBT	F	F	F	F	F	D
MMMBT	F	F	F	C	C	C
VA 164	C	C	C	C	D	D

Figure 8-2 shows the mainline volume for each roadway segment along the Study Area Corridors for the Existing, 2040 No-Build, and 2040 Build Alternatives.

Figure 8-3 presents a summary of the projected mainline LOS. This summary is provided in the same format as the volume exhibit in **Figure 8-2**, and shows the projected mainline LOS as well as the projected LOS for each merge, diverge, and weaving area along all Study Area Corridors for each alternative. Mainline average travel speeds, which are the basis for summaries in **Table 8-3**, are presented in **Figure 8-4**.

Table 8-4 presents the intersection LOS for all ramp terminal intersections for the Existing, 2040 No-Build Alternative, and 2040 Preferred Alternative.

Table 8-3: 2040 Estimated End-to-End Travel Times by Study Area Corridor

Segment	Direction	AM Peak Travel Time (minutes/vehicle)		
		Existing	2040 No-Build (Updated)	2040 Preferred Alternative
I-64	Eastbound	18.3	19.8	18.4
	Westbound	17.3	20.1	17.0
I-664 (I-64 to VA 164)	Eastbound	15.1	15.4	15.2
	Westbound	16.3	17.9	17.4
I-664 (VA 164 to I-264)	Eastbound	7.7	7.7	7.7
	Westbound	7.9	7.9	7.9
VA 164	Eastbound	6.4	6.5	6.5
	Westbound	6.1	6.1	6.1
Segment	**Direction**	**PM Peak Travel Time (minutes/vehicle)**		
		Existing	**2040 No-Build (Updated)**	**2040 Preferred Alternative**
I-64	Eastbound	17.7	20.2	18.0
	Westbound	16.6	18.3	14.6
I-664 (I-64 to VA 164)	Eastbound	17.7	19.9	19.6
	Westbound	14.6	14.7	14.7
I-664 (VA 164 to I-264)	Eastbound	7.7	7.7	7.7
	Westbound	7.8	8.0	7.9
VA 164	Eastbound	6.4	6.4	6.4
	Westbound	6.1	6.2	6.1

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I-64 AM PEAK VOLUMES ALTERNATIVES COMPARISON

Cross Street	Length (not to scale)		EASTBOUND Existing	EASTBOUND 2040 NB Updated	EASTBOUND 2040 Preferred Alternative	WESTBOUND Existing	WESTBOUND 2040 NB Updated	WESTBOUND 2040 Preferred Alternative		Length (not to scale)	Cross Street
I-664 NB	1810		3,270	4,060	4,475	2,995	3,910	4,225		1140	I-664 SB
	3150		4,085	4,875	5,285	4,550	5,465	5,665		2360	
LaSalle Avenue SB	455		3,555	4,325	4,930	3,475	4,100	4,320		405	Armistead Ave EB/La Salle Ave
LaSalle Avenue NB	1080	(merge)	3,625	4,425	5,060				(diverge)	1500	
	200	(merge)				3,545	4,205	4,455		645	Armistead Ave WB
	1300		3,660	4,460	5,095				(diverge)	1500	
	200	(diverge)				3,815	4,605	4,930		5685	
Rip Rap Rd	6790		2,580	3,300	3,810						
	1500	(diverge)							(merge)	1500	
Tyler St / Settlers Landing Rd	1435	(lane drop)	1,915	2,510	3,210	3,100	3,800	4,355		1310	Settlers Landing Rd
	1900		2,780	3,405	4,450	3,405	4,125	4,840		1835	
S. Mallory St	1640		2,675	3,270	4,265	3,045	3,715	4,445	(lane add)	605	S. Mallory St
	1500	(merge)							(diverge)	1500	
HRBT	16950		3,440	4,035	4,695	3,370	4,095	4,820		18460	HRBT
	1500	(diverge)							(merge)	1500	
Bayville St	200		3,410	3,995	4,655	3,320	4,030	4,755		190	W. Ocean View Ave
	1500	(merge)							(diverge)	1500	
	5770		3,480	4,065	4,725	3,330	4,040	4,770		5410	
	1500	(diverge)							(merge)	1500	
4th View St	2320		3,080	3,530	4,150	2,885	3,520	4,220		2275	4th View St
	1500	(merge)							(diverge)	1500	
W. Bay Ave	3445		3,360	3,810	4,405	3,005	3,650	4,400		2590	W. Bay Ave
	1500	(merge)							(diverge)	1500	
						3,465	4,160	4,935		1430	
Patrol Rd	3740		3,660	4,110	4,680				(merge)	1500	
						3,110	3,805	4,455		1840	Granby St
	1730		4,020	4,470	5,045				(merge)	1500	
I-564 / US 460			2,825	3,225	3,935				I-64 HOV		I-564
	1055	(diverge)				2,370	2,825	3,500		1510	US 460
I-564	1440	I-64 HOV	2,825	3,225	3,935				(diverge)	1500	
	1250	(merge)	3,710	4,170	5,230	2,720	3,175	3,865		525	

I-64 PM PEAK VOLUMES ALTERNATIVES COMPARISON

Cross Street	Length (not to scale)		EASTBOUND Existing	EASTBOUND 2040 NB Updated	EASTBOUND 2040 Preferred Alternative	WESTBOUND Existing	WESTBOUND 2040 NB Updated	WESTBOUND 2040 Preferred Alternative		Length (not to scale)	Cross Street
I-664 NB	1810		2,805	3,665	3,945	3,470	4,225	4,595		1140	I-664 SB
	3150		3,935	4,795	5,030	4,205	4,960	5,335		2360	
LaSalle Avenue SB	455		3,445	4,290	4,715	3,320	3,850	4,220		405	Armistead Ave EB/La Salle Ave
LaSalle Avenue NB	1080	(merge)	3,605	4,520	5,005				(diverge)	1500	
	200	(merge)				3,400	3,965	4,365		645	Armistead Ave WB
	1300		3,645	4,560	5,050				(diverge)	1500	
	200	(diverge)				3,710	4,425	4,890		5685	
Rip Rap Rd	6790		2,605	3,445	3,840						
	1500	(diverge)							(merge)	1500	
Tyler St / Settlers Landing Rd	1435	(lane drop)	1,975	2,670	3,290	2,970	3,475	4,085		1310	Settlers Landing Rd
	1900		2,705	3,435	4,465	3,455	3,985	4,790		1835	
S. Mallory St	1640		2,640	3,350	4,325	2,950	3,385	4,235	(lane add)	605	S. Mallory St
	1500	(merge)							(diverge)	1500	
HRBT	16950		3,445	4,155	4,830	3,155	3,660	4,500		18460	HRBT
	1500	(diverge)							(merge)	1500	
Bayville St	200		3,340	4,020	4,695	3,110	3,605	4,445		190	W. Ocean View Ave
	1500	(merge)							(diverge)	1500	
	5770		3,390	4,070	4,745	3,150	3,655	4,495		5410	
	1500	(diverge)							(merge)	1500	
4th View St	2320		2,955	3,495	4,120	2,340	2,715	3,550		2275	4th View St
	1500	(merge)							(diverge)	1500	
W. Bay Ave	3445		3,120	3,660	4,265	2,450	2,830	3,690		2590	W. Bay Ave
	1500	(merge)							(diverge)	1500	
						2,545	2,935	3,820		1430	
Patrol Rd	3740		4,000	4,540	5,065				(merge)	1500	
						2,120	2,565	3,245		1840	Granby St
	1730		4,605	5,145	5,670				(merge)	1500	
I-564 / US 460			3,915	4,485	5,035				I-64 HOV		I-564
	1055	(diverge)				1,625	1,935	2,745		1510	US 460
I-564	1440	I-64 HOV	2,760	3,330	3,585				(diverge)	1500	
	1250	(merge)	5,550	6,305	6,395	1,985	2,295	3,120		525	

Notes

Peak hour mainline volumes

2015 volumes based on 2015 traffic count data

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS Hampton Roads Crossing Study SEIS

I-64 Alternatives Comparison Peak Hour Volumes

April 2017

Figure 8-2.1

I-564 AM PEAK VOLUMES ALTERNATIVES COMPARISON

Cross Street	Length (not to scale)		EASTBOUND Existing	EASTBOUND 2040 NB Updated	EASTBOUND 2040 Preferred Alternative	WESTBOUND Existing	WESTBOUND 2040 NB Updated	WESTBOUND 2040 Preferred Alternative		Length (not to scale)	Cross Street
Bainbridge Ave/Bellinger Blvd	670		205	25	400	1,370	1,320	1,105		525	Bainbridge Ave/Bellinger Blvd
	1500	(merge)							(diverge)	1500	
Intermodal Connector (2040 NB and Preferred Alternatives)	3000			190	550		2,120	1,790		4675	Intermodal Connector (2040 NB and Preferred Alternatives)
	1500	(merge)	385						(diverge)	1500	
	1650			795	1,015	2,180					
	1500	(diverge)					2,890	2,505		1465	
Terminal Blvd	2530		285	575	840						Terminal Blvd
	350	(merge)				3,640	4,275	3,840		2995	
	700		970	1,050	1,400	3,040	3,305	3,160	(merge)	950	I-64 EB
	350	(diverge)				2,695	2,980	2,765		2260	US 460 NB
W Little Creek Rd	1450		885	1,050	1,400						

I-564 PM PEAK VOLUMES ALTERNATIVES COMPARISON

Cross Street	Length (not to scale)		EASTBOUND Existing	EASTBOUND 2040 NB Updated	EASTBOUND 2040 Preferred Alternative	WESTBOUND Existing	WESTBOUND 2040 NB Updated	WESTBOUND 2040 Preferred Alternative		Length (not to scale)	Cross Street
Bainbridge Ave/Bellinger Blvd	670		2,030	1,455	1,935	265	80	40		525	Bainbridge Ave/Bellinger Blvd
	1500	(merge)							(diverge)	1500	
Intermodal Connector (2040 NB and Preferred Alternatives)	3000			2,355	2,755		245	185		4675	Intermodal Connector (2040 NB and Preferred Alternatives)
	1500	(merge)	3,015						(diverge)	1500	
	1650			3,790	3,840	435					
	1500	(diverge)					665	570		1465	
Terminal Blvd	2530		2,370	3,175	3,240						Terminal Blvd
	350	(merge)				1,230	1,415	1,295		2995	
	700		3,945	4,315	4,510	900	955	975	(merge)	950	I-64 EB
	350	(diverge)				730	795	780		2260	US 460 NB
W Little Creek Rd	1450		3,675	3,310	4,175						

Notes
Peak hour mainline volumes
2015 volumes based on 2015 traffic count data

VDOT Virginia Department of Transportation
U.S. Department of Transportation Federal Highway Administration

HRCS SEIS
Hampton Roads Crossing Study SEIS

I-564 Alternatives Comparison Peak Hour Volumes

April 2017

Figure 8-2.2

I-664 AM PEAK VOLUMES ALTERNATIVES COMPARISON

Cross Street	Length (not to scale)	EASTBOUND Existing	EASTBOUND 2040 NB Updated	EASTBOUND 2040 Preferred Alternative	WESTBOUND Existing	WESTBOUND 2040 NB Updated	WESTBOUND 2040 Preferred Alternative	Length (not to scale)	Cross Street
I-64	1320	1,555	1,555	1,440	2,295	2,865	2,625	1085	I-64
	1500 (merge)							(diverge) 1500	
	1000	4,365	5,100	4,775	3,110	3,680	3,435	1425	
	1500 (diverge)							(merge) 1500	
Power Plant Pkwy/Powhatan Pkwy	1660	4,060	4,790	4,490	2,635	3,205	2,985	1945	Power Plant Pkwy/Powhatan Pkwy
	1500 (merge)							(diverge) 1500	
	1785	4,345	5,090	4,805	2,870	3,475	3,250	1965	
	1500 (diverge)							(merge) 1500	
Aberdeen Rd	1505	3,730	4,450	4,190	2,560	3,160	2,940	1300	Aberdeen Rd
	3040	3,985	4,795	4,470	2,785	3,445	3,195	2775	
Chestnut Ave/Roanoke Ave	2230	3,195	3,965	3,730	2,550	3,175	2,955	2020	Chestnut Ave/Roanoke Ave
	1500 (merge)							(diverge) 1500	
	300	3,280	4,125	3,850	2,670	3,370	3,130	450	
	1500 (diverge)							(merge) 1500	
35th St	1105	2,390	3,230	2,950	2,280	2,980	2,765	1565	35th St/36th St
	1500 (diverge)								
26th St	2090	1,740	2,335	2,035	3,140	3,970	3,715	945	
35th St					2,920	3,685	3,450	2410	US 60
US 60	1475 (merge)	2,190	2,890	2,500					
	1100 (merge)							(diverge) 1500	
	410	2,325	3,120	2,710	3,265	4,160	3,960	360	
	1100 (diverge)							(merge) 1500	
Terminal Ave	585	2,240	3,035	2,665	3,245	4,100	3,940	1690	Terminal Ave
Terminal Ave	1005 (lane drop)								
	1500 (merge)							(diverge) 1500	
MMMBT	26460	2,290	3,105	2,700	3,325	4,180	4,005	27835	MMMBT
	1500 (diverge)							(merge) 1500	
College Dr NB	220	2,120	2,815	2,390	2,850	3,525	3,310	640	College Dr NB
	1820	2,305	3,080	2,660	3,020	3,845	3,630	1695	
College Dr SB	630	1,980	2,655	2,190	2,885	3,620	3,415	500	College Dr SB
	1500 (merge)							(diverge) 1500	
MATCHLINE A	1600	2,105	2,890	2,420	3,485	4,485	4,300	1310	MATCHLINE A

I-664 AM PEAK VOLUMES ALTERNATIVES COMPARISON (CONTINUED)

Cross Street	Length (not to scale)	EASTBOUND Existing	EASTBOUND 2040 NB Updated	EASTBOUND 2040 Preferred Alternative	WESTBOUND Existing	WESTBOUND 2040 NB Updated	WESTBOUND 2040 Preferred Alternative	Length (not to scale)	Cross Street
MATCHLINE A	1600	2,105	2,890	2,420	3,485	4,485	4,300	1310	MATCHLINE A
	1500 (diverge)							(merge) 1500	
VA 164	1235	1,380	1,865	1,555	2,795	3,620	3,490	1140	VA 164 WB
	1500 (merge)				3,260	4,235	4,140	1715	
US 17	740	1,885	2,470	2,140	2,955	3,785	3,710	510	US 17/VA 164 EB
	1500 (merge)								
	700	2,855	3,680	3,375	3,720	4,715	4,645	4090	
	1500 (diverge)								
					3,315	4,135	4,070	(merge) 1500	Pughsville Rd WB
Pughsville Rd	2525	2,370	2,970	2,620	3,205	3,950	3,885	1000	Pughsville Rd EB
	1500 (merge)							(diverge) 1500	
	5140	3,150	3,980	3,600	3,710	4,555	4,505	5350	
	1500 (diverge)							(merge) 1500	
Portsmouth Blvd WB	600	2,870	3,580	3,200	3,465	4,230	4,190	520	Portsmouth Blvd WB
	1700	3,160	3,970	3,585	3,615	4,445	4,415	1680	
Portsmouth Blvd EB	480	2,935	3,670	3,290	3,455	4,215	4,185	575	Portsmouth Blvd EB
	1500 (merge)	3,225	4,090	3,705				(diverge) 1500	
					3,795	4,670	4,650	200	
	1500 (diverge)							(merge) 1500	
Dock Landing Rd	2550	3,100	3,840	3,450	3,380	4,130	4,100	2555	Dock Landing Rd
	1500 (merge)							(diverge) 1500	
	725	3,525	4,360	3,970	3,530	4,385	4,375	1180	
	1500 (diverge)							(merge) 1500	
US 58 SB	480	2,870	3,705	3,320	3,255	3,865	3,885	410	US 58 SB
	2045	2,900	3,790	3,385				(merge) 1500	
US 58 NB	1260	2,670	3,485	3,080	2,550	2,960	2,950	1225	US 58 NB
	490 (merge)								
	1020	5,120	6,465	6,015	4,095	4,910	4,860	4675	
	490 (diverge)								
S Military Hwy	1500 (diverge)	4,810	5,865	5,425					
I-64 SB	3435	1,870	2,455	2,135	1,195	1,400	1,400	2135	I-64 NB

Notes
Peak hour mainline volumes
2015 volumes based on 2015 traffic count data

VDOT
Virginia Department of Transportation

U.S. Department of Transportation
Federal Highway Administration

HRCS SEIS
Hampton Roads Crossing Study SEIS

I-664 Alternatives Comparison AM Peak Hour Volumes

April 2017

Figure 8-2.3

I-664 PM PEAK VOLUMES ALTERNATIVES COMPARISON

Cross Street	Length (not to scale)	EASTBOUND Existing	EASTBOUND 2040 NB Updated	EASTBOUND 2040 Preferred Alternative	WESTBOUND Existing	WESTBOUND 2040 NB Updated	WESTBOUND 2040 Preferred Alternative	Length (not to scale)	Cross Street
I-64	1320	735	735	740	3,500	4,245	4,015	1085	I-64
	1500 (merge)							(diverge) 1500	
	1000	2,510	3,015	2,825	4,630	5,375	5,100	1425	
	1500 (diverge)							(merge) 1500	
Power Plant Pkwy/Powhatan Pkwy	1660	2,030	2,525	2,365	4,190	4,935	4,685	1945	Power Plant Pkwy/Powhatan Pkwy
	1500 (merge)							(diverge) 1500	
	1785	2,275	2,785	2,645	4,630	5,410	5,185	1965	
	1500 (diverge)							(merge) 1500	
Aberdeen Rd	1505	1,900	2,400	2,275	4,140	4,915	4,690	1300	Aberdeen Rd
	3040	2,135	2,700	2,545	4,435	5,265	5,025	2775	
Chestnut Ave/Roanoke Ave	2230	1,840	2,370	2,270	3,905	4,665	4,490	2020	Chestnut Ave/Roanoke Ave
	1500 (merge)							(diverge) 1500	
	300	1,940	2,565	2,420	3,990	4,790	4,615	450	
	1500 (diverge)							(merge) 1500	
35th St	1105	1,660	2,280	2,135	2,805	3,605	3,565	1565	35th St/36th St
	1500 (diverge)								
26th St	2090	1,290	1,775	1,640	3,360	4,245	4,215	945	
35th St					2,650	3,265	3,220	2410	US 60
US 60	1475 (merge)	1,710	2,295	2,095					
	1100 (merge)							(diverge) 1500	
	410	2,505	3,365	3,350	2,745	3,395	3,370	360	
	1100 (diverge)							(merge) 1500	
Terminal Ave	585	2,480	3,340	3,335	2,690	3,335	3,315	1690	Terminal Ave
Terminal Ave	1005 (lane drop)								
	1500 (merge)							(diverge) 1500	
MMMBT	26460	3,195	3,970	3,850	2,745	3,390	3,360	27835	MMMBT
	1500 (diverge)							(merge) 1500	
College Dr NB	220	3,100	3,805	3,675	2,360	2,860	2,790	640	College Dr NB
	1820	3,590	4,510	4,400	2,450	3,030	2,960	1695	
College Dr SB	630	3,195	3,965	3,840	2,345	2,855	2,790	500	College Dr SB
	1500 (merge)							(diverge) 1500	
MATCHLINE A	1600	3,365	4,285	4,155	2,560	3,165	3,105	1310	MATCHLINE A

I-664 PM PEAK VOLUMES ALTERNATIVES COMPARISON (CONTINUED)

Cross Street	Length (not to scale)	EASTBOUND Existing	EASTBOUND 2040 NB Updated	EASTBOUND 2040 Preferred Alternative	WESTBOUND Existing	WESTBOUND 2040 NB Updated	WESTBOUND 2040 Preferred Alternative	Length (not to scale)	Cross Street
MATCHLINE A	1600	3,365	4,285	4,155	2,560	3,165	3,105	1310	MATCHLINE A
	1500 (diverge)	3,365	4,285	4,155	2,560	3,165	3,105	(merge) 1500	
VA 164	1235	2,275	2,870	2,795	1,680	2,070	2,080	1140	VA 164 WB
	1500 (merge)	2,785	3,480	3,385	2,195	2,760	2,800	1715	
US 17	740	2,785	3,480	3,385	2,100	2,620	2,665	510	US 17/VA 164 EB
	1500 (merge)	3,670	4,585	4,515					
	700	3,670	4,585	4,515	2,820	3,500	3,540	4090	
	1500 (diverge)	3,670	4,585	4,515					
					2,525	3,075	3,115	(merge) 1500	Pughsville Rd WB
Pughsville Rd	2525	2,930	3,505	3,425	2,440	2,935	2,975	1000	Pughsville Rd EB
	1500 (merge)	3,310	3,990	3,885	3,125	3,775	3,770	(diverge) 1500	
	5140	3,310	3,990	3,885	3,125	3,775	3,770	5350	
	1500 (diverge)	3,310	3,990	3,885	3,125	3,775	3,770	(merge) 1500	
Portsmouth Blvd WB	600	3,095	3,680	3,580	2,840	3,395	3,405	520	Portsmouth Blvd WB
	1700	3,505	4,235	4,130	3,110	3,780	3,780	1680	
Portsmouth Blvd EB	480	3,195	3,820	3,745	2,935	3,530	3,530	575	Portsmouth Blvd EB
	1500 (merge)				3,450	4,225	4,190	(diverge) 1500	
		3,370	4,075	3,995	3,450	4,225	4,190	200	
	1500 (diverge)				3,450	4,225	4,190	(merge) 1500	
Dock Landing Rd	2550	3,155	3,680	3,610	3,275	3,995	3,955	2555	Dock Landing Rd
	1500 (merge)	3,325	3,885	3,805	3,550	4,430	4,370	(diverge) 1500	
	725	3,325	3,885	3,805	3,550	4,430	4,370	1180	
	1500 (diverge)	3,325	3,885	3,805	3,550	4,430	4,370	(merge) 1500	
US 58 SB	480	2,575	3,135	3,080	3,265	3,895	3,860	410	US 58 SB
	2045	2,600	3,205	3,135	3,265	3,895	3,860	(merge) 1500	
US 58 NB	1260	2,415	2,960	2,910	2,675	3,140	3,080	1225	US 58 NB
	490 (merge)	3,890	4,745	4,645					
	1020	3,890	4,745	4,645	5,185	6,305	6,070	4675	
	490 (diverge)	3,890	4,745	4,645					
S Military Hwy	1500 (diverge)	3,575	4,200	4,130					
I-64 SB	3435	1,350	1,600	1,580	2,210	2,750	2,565	2135	I-64 NB

Notes

Peak hour mainline volumes

2015 volumes based on 2015 traffic count data

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS Hampton Roads Crossing Study SEIS

I-664 Alternatives Comparison PM Peak Hour Volumes

April 2017

Figure 8-2.4

VA 164 AM PEAK VOLUMES ALTERNATIVES COMPARISON

Cross Street	Length (not to scale)		EASTBOUND Existing	EASTBOUND 2040 NB Updated	EASTBOUND 2040 Preferred Alternative	WESTBOUND Existing	WESTBOUND 2040 NB Updated	WESTBOUND 2040 Preferred Alternative		Length (not to scale)	Cross Street
US 17/Bridge Rd	2600		1,140	1,665	1,730	725	990	1,035		1670	I-664 SB
	2680		1,300	1,855	1,900	1,230	1,595	1,620		1610	
I-664	1460		995	1,405	1,470	765	980	970		970	I-664 NB
	1500	(merge)							(diverge)	1500	
College Dr	585		2,095	2,865	2,755	1,455	1,845	1,780		1025	College Dr
	1500	(merge)							(diverge)	1500	
	1290		2,365	3,240	3,130	1,860	2,400	2,325		1270	
	1500	(diverge)							(merge)	1500	
Towne Point Rd	2000		2,100	2,895	2,795	1,345	1,790	1,700		1970	Towne Point Rd
	1500	(merge)							(diverge)	1500	
	1400		2,690	3,530	3,385	1,570	2,060	1,930		1315	
	1500	(diverge)							(merge)	1500	
Cedar Ln SB	1135		1,915	2,630	2,375	1,095	1,535	1,320		1140	Cedar Ln
	1500	(merge)							(diverge)	1500	
Cedar Ln NB	110		2,115	2,910	2,675						
	1000	(merge)				1,365	1,925	1,615		1300	
	500		2,190	3,045	2,815						
	1000	(diverge)							(merge)	1000	
Virginia International Gateway Blvd	2245		2,045	2,850	2,670	1,270	1,820	1,540		2330	Virginia International Gateway Blvd
	1025	(merge)							(diverge)	1225	
	475		2,160	2,940	2,790	1,415	1,965	1,695		275	
	1025	(diverge)							(merge)	1225	
W. Norfolk Rd	625		2,090	2,840	2,690	1,315	1,845	1,565		810	W Norfolk Rd
	1500	(merge)							(diverge)	1500	
	1245		2,475	3,400	3,250					1710	
						1,405	1,980	1,730	(lane drop)	415	
	2330	(lane add)								1585	
	1500	(lane drop)							(merge)	1500	
(diverge)	1375	US 58 EB	1,725	2,575	2,485	710	1,170	975	(merge)	1050	US 58 SB
Lee Ave/Railroad Ave	1500	US 58 WB	1,275	2,115	2,035	505	940	725		1765	Railroad Ave/US 58 NB
Lee Ave / Harper Ave	1500	(merge)	1,585	2,485	2,395	1,325	1,815	1,580		3150	
	1830		1,655	2,600	2,500	730	1,220	985		500	London Blvd

VA 164 PM PEAK VOLUMES ALTERNATIVES COMPARISON

Cross Street	Length (not to scale)		EASTBOUND Existing	EASTBOUND 2040 NB Updated	EASTBOUND 2040 Preferred Alternative	WESTBOUND Existing	WESTBOUND 2040 NB Updated	WESTBOUND 2040 Preferred Alternative		Length (not to scale)	Cross Street
US 17/Bridge Rd	2600		595	870	920	1,230	1,720	1,725		1670	I-664 SB
	2680		710	1,010	1,040	1,740	2,330	2,315		1610	
I-664	1460		615	870	905	1,225	1,640	1,595		970	I-664 NB
	1500	(merge)							(diverge)	1500	
College Dr	585		1,735	2,260	2,205	2,105	2,735	2,620		1025	College Dr
	1500	(merge)							(diverge)	1500	
	1290		2,150	2,845	2,790	2,635	3,470	3,320		1270	
	1500	(diverge)							(merge)	1500	
Towne Point Rd	2000		1,575	2,095	2,055	2,280	3,070	2,905		1970	Towne Point Rd
	1500	(merge)							(diverge)	1500	
	1400		1,935	2,480	2,415	2,915	3,740	3,520		1315	
	1500	(diverge)							(merge)	1500	
Cedar Ln SB	1135		1,425	1,925	1,790	2,425	3,150	2,885		1140	Cedar Ln
	1500	(merge)							(diverge)	1500	
Cedar Ln NB	110		1,550	2,105	1,980						
	1000	(merge)				2,745	3,625	3,235		1300	
	500		1,610	2,210	2,090						
	1000	(diverge)							(merge)	1000	
Virginia International Gateway Blvd	2245		1,570	2,155	2,050	2,655	3,505	3,145		2330	Virginia International Gateway Blvd
	1025	(merge)							(diverge)	1225	
	475		1,670	2,255	2,160	2,710	3,560	3,205		275	
	1025	(diverge)							(merge)	1225	
W. Norfolk Rd	625		1,575	2,125	2,030	2,630	3,460	3,095		810	W Norfolk Rd
	1500	(merge)							(diverge)	1500	
	1245		1,705	2,320	2,235					1710	
						2,860	3,800	3,425	(lane drop)	415	
	2330	(lane add)								1585	
	1500	(lane drop)							(merge)	1500	
(diverge)	1375	US 58 EB	920	1,460	1,435	1,735	2,490	2,210	(merge)	1050	US 58 SB
Lee Ave/Railroad Ave	1500	US 58 WB	720	1,255	1,235	1,430	2,150	1,835		1765	Railroad Ave/US 58 NB
Lee Ave / Harper Ave	1500	(merge)	1,065	1,660	1,635	1,925	2,670	2,340		3150	
	1830		1,175	1,810	1,790	460	1,205	875		500	London Blvd

Notes

Peak hour mainline volumes

2015 volumes based on 2015 traffic count data

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS Hampton Roads Crossing Study SEIS

VA 164 Alternatives Comparison Peak Hour Volumes

April 2017

Figure 8-2.5

I-64 AM PEAK LOS ALTERNATIVES COMPARISON

Eastbound

Cross Street	Length (not to scale)		Existing	2040 NB Updated	2040 Preferred Alternative
I-664 NB	1810		C	C	D
	3150		E	E	F
LaSalle Avenue SB	455		C	D	D
LaSalle Avenue NB	1080	(merge)	C	D	D
	200	(merge)	C	D	E
	1300		C	D	E
	200	(diverge)	C	D	D
Rip Rap Rd	6790		B	C	C
	1500	(diverge)	B	C	C
Tyler St / Settlers Landing Rd	1435	(lane drop)	C	D	C
	1900		E	F	D
S. Mallory St	1640		F	F	D
	1500	(merge)	F	F	D
HRBT	16950		F	F	F
	1500	(diverge)	D	D	D
Bayville St	200		D	D	D
	1500	(merge)	D	D	D
	5770		D	D	D
	1500	(diverge)	D	D	D
4th View St	2320		D	C	C
	1500	(merge)	D	D	D
W. Bay Ave	3445		D	D	D
	1500	(merge)	D	D	D
Patrol Rd	3740		D	D	D
	1730		D	E	F
I-564 / US 460	1055	(diverge)	C	C	F
I-564 / I-64 HOV	1440		C	C	F
	1250	(merge)	E	E	F

Westbound

Existing	2040 NB Updated	2040 Preferred Alternative		Length (not to scale)	Cross Street
B	C	C		1140	I-664 SB
F	E	F		2360	
C	C	D		405	Armistead Ave EB/La Salle Ave
C	C	D	(diverge)	1500	
C	C	D		645	Armistead Ave WB
C	C	D	(diverge)	1500	
C	C	D		5685	
C	C	D	(merge)	1500	
C	C	D		1310	Settlers Landing Rd
B	E	D		1835	
B	B	D	(lane add)	605	S. Mallory St
D	D	D	(diverge)	1500	
F	F	F		18460	HRBT
F	F	E	(merge)	1500	
F	F	D		190	W. Ocean View Ave
F	F	D	(diverge)	1500	
D	F	D		5410	
D	F	D	(merge)	1500	
D	F	C		2275	4th View St
D	F	D	(diverge)	1500	
D	E	D		2590	W. Bay Ave
E	E	D	(diverge)	1500	
D	E	D		1430	
E	E	D	(merge)	1500	
D	E	D		1840	Granby St
D	E	F	(merge)	1500	
C	D	F		1510	I-64 HOV / I-564 / US 460
C	D	E	(diverge)	1500	
D	D	E		525	

(not to scale)

I-64 PM PEAK LOS ALTERNATIVES COMPARISON

Eastbound

Cross Street	Length (not to scale)		Existing	2040 NB Updated	Preferred Alternative
I-664 NB	1810		B	C	C
	3150		F	E	F
LaSalle Avenue SB	455		C	D	D
LaSalle Avenue NB	1080	(merge)	C	D	D
	200	(merge)	C	D	D
	1300		C	D	D
	200	(diverge)	C	D	D
Rip Rap Rd	6790		B	C	C
	1500	(diverge)	B	C	C
Tyler St / Settlers Landing Rd	1435	(lane drop)	C	D	C
	1900		C	F	D
S. Mallory St	1640		E	F	D
	1500	(merge)	F	F	E
HRBT	16950		F	F	F
	1500	(diverge)	D	D	D
Bayville St	200		D	D	D
	1500	(merge)	D	D	D
	5770		D	D	D
	1500	(diverge)	D	D	D
4th View St	2320		C	C	C
	1500	(merge)	D	C	C
W. Bay Ave	3445		D	C	C
	1500	(merge)	E	E	D
Patrol Rd	3740		D	D	D
	1730		D	E	F
I-564 / US 460	1055	(diverge)	E	E	F
I-564 / I-64 HOV	1440		C	D	D
	1250	(merge)	F	E	F

Westbound

Existing	2040 NB Updated	Preferred Alternative		Length (not to scale)	2040 Prefe Cross Street
C	C	D		1140	I-664 SB
C	D	E		2360	
C	C	D		405	Armistead Ave EB/La Salle Ave
C	C	D	(diverge)	1500	
C	C	D		645	Armistead Ave WB
C	C	D	(diverge)	1500	
C	C	D		5685	
C	C	D	(merge)	1500	
C	C	C		1310	Settlers Landing Rd
C	D	D		1835	
C	C	D	(lane add)	605	S. Mallory St
D	D	D	(diverge)	1500	
F	F	D		18460	HRBT
D	F	D	(merge)	1500	
D	F	D		190	W. Ocean View Ave
D	F	D	(diverge)	1500	
D	F	D		5410	
D	E	D	(merge)	1500	
C	C	C		2275	4th View St
C	D	C	(diverge)	1500	
C	D	C		2590	W. Bay Ave
C	D	C	(diverge)	1500	
C	D	C		1430	
C	D	C	(merge)	1500	
C	C	C		1840	Granby St
C	C	D	(merge)	1500	
B	C	C		1510	I-64 HOV / I-564 / US 460
C	C	D	(diverge)	1500	
C	C	D		525	

(not to scale)

Legend

Basic Segment Density (pc/mi/ln)	LOS	Merge, Diverge, Weave Density (pc/mi/ln)	LOS
≤11	A	≤10	A
>11-18	B	>10-20	B
>18-26	C	>20-28	C
>26-35	D	>28-35	D
>35-45	E	>35	E
>45; Demand exceeds capacity	F	Demand exceeds capacity	F

Notes

Level of Service (LOS) evaluated using HCS Freeway Facilities module

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS
Hampton Roads Crossing Study SEIS

I-64 Alternatives Comparison Level of Service

April 2017

Figure 8-3.1

I-564 AM PEAK LOS ALTERNATIVES COMPARISON

EASTBOUND

Cross Street	Length (not to scale)		Existing	2040 NB Updated	2040 Preferred Alternative
Bainbridge Ave/Bellinger Blvd	670		A	A	A
	1500	(merge)	A	A	A
Intermodal Connector (2040 NB and Preferred Alternatives)	3000			A	A
	1500	(merge)	A	A	A
	1650			A	A
	1500	(diverge)	A	A	A
Terminal Blvd	2530		A	A	A
	350	(merge)	A	A	A
	700		A	B	B
	350	(diverge)	B	B	B
W Little Creek Rd	1450		A	A	B

WESTBOUND

Existing	2040 NB Updated	2040 Preferred Alternative		Length (not to scale)	Cross Street
B	B	B		525	Bainbridge Ave/Bellinger Blvd
C	C	B	(diverge)	1500	
	B	B		4675	Intermodal Connector (2040 NB and Preferred Alternatives)
	B	B	(diverge)	1500	
B	B	B		1465	Terminal Blvd
B	C	C		2995	
D	D	D	(merge)	950	I-64 EB
C	D	D		2260	US 460 NB

I-564 PM PEAK LOS ALTERNATIVES COMPARISON

EASTBOUND

Cross Street	Length (not to scale)		Existing	2040 NB Updated	Preferred Alternative
Bainbridge Ave/Bellinger Blvd	670		C	B	B
	1500	(merge)	D	C	B
Intermodal Connector (2040 NB and Preferred Alternatives)	3000			B	B
	1500	(merge)	C	C	B
	1650			B	B
	1500	(diverge)	B	C	C
Terminal Blvd	2530		B	C	C
	350	(merge)	C	D	D
	700		E	F	F
	350	(diverge)	E	E	F
W Little Creek Rd	1450		D	D	E

WESTBOUND

Existing	2040 NB Updated	Preferred Alternative		Length (not to scale)	2040 Prefe Cross Street
A	A	A		525	Bainbridge Ave/Bellinger Blvd
A	A	A	(diverge)	1500	
	A	A		4675	Intermodal Connector (2040 NB and Preferred Alternatives)
	A	A	(diverge)	1500	
A	A	A		1465	Terminal Blvd
A	A	A		2995	
A	A	A	(merge)	950	I-64 EB
A	A	A		2260	US 460 NB

Legend

Basic Segment Density (pc/mi/ln)	LOS	Merge, Diverge, Weave Density (pc/mi/ln)	LOS
≤11	A	≤10	A
>11-18	B	>10-20	B
>18-26	C	>20-28	C
>26-35	D	>28-35	D
>35-45	E	>35	E
>45; Demand exceeds capacity	F	Demand exceeds capacity	F

Notes

Level of Service (LOS) evaluated using HCS Freeway Facilities module

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS Hampton Roads Crossing Study SEIS

I-564 Alternatives Comparison Level Of Service

April 2017

Figure 8-3.2

I-664 AM PEAK LOS ALTERNATIVES COMPARISON

EASTBOUND

Cross Street	Length (not to scale)		Existing	2040 NB Updated	2040 Preferred Alternative
I-64	1320		B	B	B
	1500	(merge)	D	D	D
	1000		C	C	C
	1500	(diverge)	C	C	C
Power Plant Pkwy/Powhatan Pkwy	1660		C	C	C
	1500	(merge)	C	C	C
	1785		C	C	C
	1500	(diverge)	C	C	C
Aberdeen Rd	1505		C	C	C
	3040		C	B	B
Chestnut Ave/Roanoke Ave	2230		B	B	B
	1500	(merge)	B	B	B
	300		B	C	C
	1500	(diverge)	B	B	B
35th St	1105		B	B	B
	1500	(diverge)	B	B	B
26th St / 35th St	2090		B	B	B
US 60	1475	(merge)	B	C	B
	1100	(merge)	B	C	C
	410		C	C	C
	1100	(diverge)	B	B	B
Terminal Ave	585		B	B	B
Terminal Ave	1005	(lane drop)	B	C	C
	1500	(merge)	B	C	C
MMMBT	26460		C	D	C
	1500	(diverge)	B	C	C
College Dr NB	220		B	C	B
	1820		B	C	C
College Dr SB	630		B	C	B
	1500	(merge)	B	C	B
MATCHLINE A	1600		A	B	B

WESTBOUND

Existing	2040 NB Updated	2040 Preferred Alternative		Length (not to scale)	Cross Street
C	C	C		1085	I-64
B	C	B	(diverge)	1500	
B	C	B		1425	
B	B	B	(merge)	1500	
B	B	B		1945	Power Plant Pkwy/Powhatan Pkwy
B	B	B	(diverge)	1500	
B	B	B		1965	
B	B	B	(merge)	1500	
B	B	B		1300	Aberdeen Rd
B	B	B		2775	
B	B	B		2020	Chestnut Ave/Roanoke Ave
B	B	B	(diverge)	1500	
C	C	C		450	
C	C	C	(merge)	1500	
C	C	C		1565	35th St/36th St
C	C	C		945	
C	C	C		2410	US 60
D	D	D	(diverge)	1500	
D	D	D		360	
D	D	D	(merge)	1500	
D	D	D		1690	Terminal Ave
D	D	D	(diverge)	1500	
F	E	D		27835	MMMBT
E	F	F	(merge)	1500	
C	F	F		640	College Dr NB
C	F	F		1695	
C	E	D		500	College Dr SB
D	E	E	(diverge)	1500	
C	D	C		1310	MATCHLINE A

I-664 AM PEAK LOS ALTERNATIVES COMPARISON (CONTINUED)

EASTBOUND

Cross Street	Length (not to scale)		Existing	2040 NB Updated	Preferred Alternative
MATCHLINE A	1600		A	B	B
	1500	(diverge)	B	B	B
VA 164	1235		A	B	B
	1500	(merge)	B	C	B
US 17	740		B	C	B
	1500	(merge)	C	D	D
	700		B	C	C
	1500	(diverge)	C	D	D
Pughsville Rd	2525		C	C	C
	1500	(merge)	D	E	D
	5140		D	D	D
	1500	(diverge)	D	E	D
Portsmouth Blvd WB	600		C	D	D
	1700		C	C	C
Portsmouth Blvd EB	480		C	D	D
	1500	(merge)	D	E	D
	1500	(diverge)	D	E	D
Dock Landing Rd	2550		C	D	D
	1500	(merge)	D	E	E
	725		D	E	D
	1500	(diverge)	D	E	E
US 58 SB	480		C	D	D
	2045		C	C	C
US 58 NB	1260		C	D	C
	490	(merge)	F	E	E
	1020		F	F	F
	490	(diverge)	C	C	C
S Military Hwy	1500	(diverge)	F	B	B
I-64 SB	3435		B	B	B

WESTBOUND

Existing	2040 NB Updated	Preferred Alternative		Length (not to scale)	2040 Prefe Cross Street
C	D	C		1310	MATCHLINE A
D	D	E	(merge)	1500	
C	D	D		1140	VA 164 WB
C	C	C		1715	
C	D	D		510	US 17/VA 164 EB
C	C	C		4090	
D	D	D	(merge)	1500	Pughsville Rd WB
C	D	D		1000	Pughsville Rd EB
D	E	E	(diverge)	1500	
D	E	D		5350	
D	E	E	(merge)	1500	
D	D	D		520	Portsmouth Blvd WB
C	C	C		1680	
D	D	D		575	Portsmouth Blvd EB
D	E	E	(diverge)	1500	
D	E	E		200	
D	E	E	(merge)	1500	
C	D	D		2555	Dock Landing Rd
D	D	D	(diverge)	1500	
D	D	D		1180	
D	D	D	(merge)	1500	
C	D	D		410	US 58 SB
C	C	D	(merge)	1500	
C	B	B		1225	US 58 NB
F	B	B		4675	
A	B	B		2135	I-64 NB

Legend

Basic Segment Density (pc/mi/ln)	LOS
≤11	A
>11-18	B
>18-26	C
>26-35	D
>35-45	E
>45; Demand exceeds capacity	F

Merge, Diverge, Weave Density (pc/mi/ln)	LOS
≤10	A
>10-20	B
>20-28	C
>28-35	D
>35	E
Demand exceeds capacity	F

Notes

Level of Service (LOS) evaluated using HCS Freeway Facilities module

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS Hampton Roads Crossing Study SEIS

I-664 Alternatives Comparison AM Peak Hour Level of Service

April 2017

Figure 8-3.3

I-664 PM PEAK LOS ALTERNATIVES COMPARISON

EASTBOUND

Cross Street	Length (not to scale)		Existing	2040 NB Updated	2040 Preferred Alternative
I-64	1320		A	A	A
	1500	(merge)	C	C	C
	1000		B	B	B
	1500	(diverge)	B	B	B
Power Plant Pkwy/Powhatan Pkwy	1660		B	B	B
	1500	(merge)	B	B	B
	1785		B	B	B
	1500	(diverge)	B	B	B
Aberdeen Rd	1505		B	B	B
	3040		B	B	B
Chestnut Ave/Roanoke Ave	2230		A	B	B
	1500	(merge)	B	B	B
	300		B	B	B
	1500	(diverge)	B	B	B
35th St	1105		A	B	B
	1500	(diverge)	A	B	B
26th St / 35th St	2090		B	B	B
US 60	1475	(merge)	B	D	C
	1100	(merge)	C	F	E
	410		C	E	E
	1100	(diverge)	B	F	F
Terminal Ave	585		B	F	F
Terminal Ave	1005	(lane drop)	C	F	F
	1500	(merge)	D	F	F
MMMBT	26460		F	F	F
	1500	(diverge)	D	D	D
College Dr NB	220		D	D	D
	1820		C	C	C
College Dr SB	630		D	D	D
	1500	(merge)	D	D	D
MATCHLINE A	1600		C	C	C

WESTBOUND

Existing	2040 NB Updated	2040 Preferred Alternative		Length (not to scale)	Cross Street
D	E	E		1085	I-64
C	D	D	(diverge)	1500	
C	D	D		1425	
C	D	D	(merge)	1500	
C	D	C		1945	Power Plant Pkwy/Powhatan Pkwy
C	D	D	(diverge)	1500	
C	D	D		1965	
C	D	D	(merge)	1500	
C	D	C		1300	Aberdeen Rd
C	C	C		2775	
C	C	C		2020	Chestnut Ave/Roanoke Ave
C	C	C	(diverge)	1500	
E	F	E		450	
E	E	E	(merge)	1500	
C	D	D		1565	35th St/36th St
C	E	E		945	
C	C	C		2410	US 60
C	D	D	(diverge)	1500	
C	D	D		360	
C	D	D	(merge)	1500	
C	C	C		1690	Terminal Ave
C	D	D	(diverge)	1500	
C	C	C		27835	MMMBT
C	C	C	(merge)	1500	
C	C	C		640	College Dr NB
B	E	E		1695	
C	C	C		500	College Dr SB
C	C	C	(diverge)	1500	
B	B	B		1310	MATCHLINE A

I-664 PM PEAK LOS ALTERNATIVES COMPARISON (CONTINUED)

EASTBOUND

Cross Street	Length (not to scale)		Existing	2040 NB Updated	Preferred Alternative
MATCHLINE A	1600		C	C	C
	1500	(diverge)	C	C	C
VA 164	1235		C	C	C
	1500	(merge)	C	D	D
US 17	740		C	C	C
	1500	(merge)	D	E	E
	700		C	C	C
	1500	(diverge)	E	E	E
Pughsville Rd	2525		C	D	D
	1500	(merge)	D	E	D
	5140		D	D	D
	1500	(diverge)	D	E	D
Portsmouth Blvd WB	600		D	D	D
	1700		C	C	C
Portsmouth Blvd EB	480		D	D	D
	1500	(merge)	D	E	E
	1500	(diverge)	D	E	E
Dock Landing Rd	2550		D	D	D
	1500	(merge)	D	D	D
	725		D	D	D
	1500	(diverge)	D	E	E
US 58 SB	480		C	C	C
	2045		C	C	C
US 58 NB	1260		C	C	C
	490	(merge)	E	E	E
	1020		E	E	E
	490	(diverge)	B	B	B
S Military Hwy	1500	(diverge)	E	B	B
I-64 SB	3435		B	B	B

WESTBOUND

Existing	2040 NB Updated	Preferred Alternative		Length (not to scale)	2040 Prefe Cross Street
B	B	B		1310	MATCHLINE A
C	C	C	(merge)	1500	
B	B	B		1140	VA 164 WB
B	E	E		1715	
B	B	B		510	US 17/VA 164 EB
B	E	E		4090	
B	C	C	(merge)	1500	Pughsville Rd WB
B	C	C		1000	Pughsville Rd EB
C	C	C	(diverge)	1500	
C	C	C		5350	
C	C	C	(merge)	1500	
C	C	C		520	Portsmouth Blvd WB
B	E	E		1680	
C	C	C		575	Portsmouth Blvd EB
C	D	D	(diverge)	1500	
C	D	D		200	
C	C	C	(merge)	1500	
C	C	C		2555	Dock Landing Rd
C	D	D	(diverge)	1500	
C	C	C		1180	
C	D	D	(merge)	1500	
C	C	C		410	US 58 SB
C	C	C	(merge)	1500	
B	B	B		1225	US 58 NB
F	C	C		4675	
C	C	C		2135	I-64 NB

Legend

Basic Segment Density (pc/mi/ln)	LOS	Merge, Diverge, Weave Density (pc/mi/ln)	LOS
≤11	A	≤10	A
>11-18	B	>10-20	B
>18-26	C	>20-28	C
>26-35	D	>28-35	D
>35-45	E	>35	E
>45; Demand exceeds capacity	F	Demand exceeds capacity	F

Notes

Level of Service (LOS) evaluated using HCS Freeway Facilities module

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS Hampton Roads Crossing Study SEIS

I-664 Alternatives Comparison PM Peak Hour Level of Service

April 2017

Figure 8-3.4

VA 164 AM PEAK LOS ALTERNATIVES COMPARISON

Cross Street	Length (not to scale)		EASTBOUND Existing	EASTBOUND 2040 NB Updated	EASTBOUND 2040 Preferred Alternative	WESTBOUND Existing	WESTBOUND 2040 NB	WESTBOUND 2040 Preferred Alternative		Length (not to scale)	Cross Street
US 17/Bridge Rd	2600		A	B	B	A	A	A		1670	I-664 SB
	2680		A	B	B	A	B	B		1610	
I-664	1460		A	B	B	A	A	A		970	I-664 NB
	1500	(merge)	B	C	C	B	B	B	(diverge)	1500	
College Dr	585		C	C	C	B	B	B		1025	College Dr
	1500	(merge)	C	D	D	B	C	C	(diverge)	1500	
	1290		C	D	D	B	C	C		1270	
	1500	(diverge)	C	D	D	B	C	C	(merge)	1500	
Towne Point Rd	2000		C	C	C	B	B	B		1970	Towne Point Rd
	1500	(merge)	C	D	D	B	C	C	(diverge)	1500	
	1400		C	D	D	B	B	B		1315	
	1500	(diverge)	C	E	D	B	B	B	(merge)	1500	
Cedar Ln SB	1135		B	C	C	A	B	B		1140	Cedar Ln
	1500	(merge)	C	D	C	B	C	B	(diverge)	1500	
Cedar Ln NB	110		C	D	C						
	1000	(merge)	C	D	C	B	B	B		1300	
	500		C	D	D						
	1000	(diverge)	C	D	D	B	B	B	(merge)	1000	
Virginia International Gateway Blvd	2245		B	C	C	B	B	B		2330	Virginia International Gateway Blvd
	1025	(merge)	C	C	C	B	C	B	(diverge)	1225	
	475		C	D	D	B	C	B		275	
	1025	(diverge)	C	D	D	B	B	B	(merge)	1225	
W. Norfolk Rd	625		C	D	C	B	B	B		810	W Norfolk Rd
	1500	(merge)	C	D	D	B	C	B	(diverge)	1500	
	1245		C	D	D	B	C	B		1710	
						B	C	B	(lane drop)	415	
	2330	(lane add)	B	C	C	A	B	A		1585	
	1500	(lane drop)	C	D	D	B	B	B	(merge)	1500	
(diverge)	1375	US 58 EB	B	C	C	A	B	A	(merge)	1050	US 58 SB
Lee Ave/Railroad Ave	1500	US 58 WB	B	C	C	A	A	A		1765	Railroad Ave/US 58 NB
Lee Ave / Harper Ave	1500	(merge)	B	C	C	A	B	B		3150	
	1830		A	B	B	A	B	A		500	London Blvd

VA 164 PM PEAK LOS ALTERNATIVES COMPARISON

Cross Street	Length (not to scale)		EASTBOUND Existing	EASTBOUND 2040 NB	EASTBOUND Preferred Alternative	WESTBOUND Existing	WESTBOUND 2040 NB Updated	WESTBOUND Preferred Alternative		Length (not to scale)	2040 Prefe Cross Street
US 17/Bridge Rd	2600		A	A	A	A	B	B		1670	I-664 SB
	2680		A	B	B	B	B	B		1610	
I-664	1460		A	A	A	A	B	B		970	I-664 NB
	1500	(merge)	B	C	B	C	C	C	(diverge)	1500	
College Dr	585		B	C	C	C	C	C		1025	College Dr
	1500	(merge)	B	C	C	C	D	D	(diverge)	1500	
	1290		C	C	C	C	D	D		1270	
	1500	(diverge)	C	D	D	C	D	D	(merge)	1500	
Towne Point Rd	2000		B	C	B	C	D	C		1970	Towne Point Rd
	1500	(merge)	B	C	C	D	E	E	(diverge)	1500	
	1400		B	C	C	C	D	D		1315	
	1500	(diverge)	B	C	C	C	E	D	(merge)	1500	
Cedar Ln SB	1135		B	B	B	C	D	C		1140	Cedar Ln
	1500	(merge)	B	B	B	D	E	D	(diverge)	1500	
Cedar Ln NB	110		B	C	B						
	1000	(merge)	B	C	B	C	D	D		1300	
	500		B	C	C						
	1000	(diverge)	B	C	C	C	D	D	(merge)	1000	
Virginia International Gateway Blvd	2245		B	C	B	C	D	D		2330	Virginia International Gateway Blvd
	1025	(merge)	B	C	C	C	E	D	(diverge)	1225	
	475		B	C	C	D	E	D		275	
	1025	(diverge)	B	C	C	C	D	D	(merge)	1225	
W. Norfolk Rd	625		B	C	C	C	D	D		810	W Norfolk Rd
	1500	(merge)	B	C	C	D	E	E	(diverge)	1500	
	1245		B	C	C	D	E	D		1710	
						D	E	D	(lane drop)	415	
	2330	(lane add)	A	B	B	B	C	C		1585	
	1500	(lane drop)	B	C	C	D	E	D	(merge)	1500	
(diverge)	1375	US 58 EB	A	B	B	B	C	C	(merge)	1050	US 58 SB
Lee Ave/Railroad Ave	1500	US 58 WB	A	B	B	B	C	B		1765	Railroad Ave/US 58 NB
Lee Ave / Harper Ave	1500	(merge)	B	B	B	B	B	B		3150	
	1830		A	A	A	A	B	A		500	London Blvd

Legend

Basic Segment Density (pc/mi/ln)	LOS
≤11	A
>11-18	B
>18-26	C
>26-35	D
>35-45	E
>45; Demand exceeds capacity	F

Merge, Diverge, Weave Density (pc/mi/ln)	LOS
≤10	A
>10-20	B
>20-28	C
>28-35	D
>35	E
Demand exceeds capacity	F

Notes

Level of Service (LOS) evaluated using HCS Freeway Facilities module

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS
Hampton Roads Crossing Study SEIS

VA 164 Alternatives Comparison Level Of Service

April 2017

Figure 8-3.5

I-64 AM PEAK SPEED ALTERNATIVES COMPARISON

EASTBOUND

Cross Street	Length (not to scale)		Existing	2040 NB Updated	2040 Preferred Alternative
I-664 NB	1810		54.6	54.7	54.4
	3150		40.3	37.8	39.4
LaSalle Avenue SB	455		54.2	54.1	54.2
LaSalle Avenue NB	1080	(merge)	51.1	50.4	49.9
	200	(merge)	51.0	50.3	49.1
	1300		51.0	50.3	49.1
	200	(diverge)	51.6	51.5	51.3
Rip Rap Rd	6790		55.0	55.0	55.0
	1500	(diverge)	51.8	55.0	52.2
Tyler St / Settlers Landing Rd	1435	(lane drop)	54.7	41.0	54.7
	1900		23.6	12.3	39.9
S. Mallory St	1640		22.2	14.5	54.1
	1500	(merge)	22.3	21.0	52.6
HRBT	16950		34.7	34.7	34.7
	1500	(diverge)	50.2	50.2	52.6
Bayville St	200		53.8	53.8	54.4
	1500	(merge)	50.1	50.1	50.2
	5770		55.0	55.0	55.0
	1500	(diverge)	49.8	49.7	52.1
4th View St	2320		54.8	54.8	54.9
	1500	(merge)	50.6	50.7	50.9
W. Bay Ave	3445		54.9	54.9	54.9
	1500	(merge)	50.1	50.1	50.5
Patrol Rd	3740		54.9	54.9	50.3
	1730		39.9	37.8	17.0
I-564 / US 460	1055	(diverge)	50.3	50.3	25.6
I-564	1440	I-64 HOV	54.4	54.4	23.8
	1250	(merge)	50.6	50.5	48.1

WESTBOUND

Cross Street	Length (not to scale) (not to scale)		Existing	2040 NB Updated	2040 Preferred Alternative
I-664 SB	1140		53.8	53.6	53.7
	2360		34.7	31.9	32.1
Armistead Ave EB/La Salle Ave	405		54.2	54.0	54.1
	1500	(diverge)	51.2	50.4	50.6
Armistead Ave WB	645		54.6	54.6	54.5
	1500	(diverge)	52.7	52.5	52.2
	5685		55.0	55.0	55.0
	1500	(merge)	51.4	51.3	50.4
Settlers Landing Rd	1310		54.3	53.2	54.0
	1835		45.9	31.9	42.5
S. Mallory St	605	(lane add)	54.1	54.1	54.5
	1500	(diverge)	49.9	49.8	52.3
HRBT	18460		34.6	34.6	34.6
	1500	(merge)	23.3	20.9	36.5
W. Ocean View Ave	190		27.6	21.0	54.4
	1500	(diverge)	34.3	21.6	52.6
	5410		53.9	25.0	55.0
	1500	(merge)	50.2	29.9	50.6
4th View St	2275		54.8	30.1	54.9
	1500	(diverge)	50.1	36.5	52.6
W. Bay Ave	2590		54.8	50.1	54.9
	1500	(diverge)	49.7	49.7	52.1
	1430		54.5	52.5	54.6
	1500	(merge)	49.8	48.1	50.4
Granby St	1840		54.7	54.6	54.5
	1500	(merge)	50.7	49.5	48.0
I-64 HOV / I-564 / US 460	1510		54.6	54.6	37.9
	1500	(diverge)	49.9	49.9	49.8
	525		53.0	52.8	52.8

I-64 PM PEAK SPEED ALTERNATIVES COMPARISON

EASTBOUND

Cross Street	Length (not to scale)		Existing	2040 NB Updated	Preferred Alternative
I-664 NB	1810		54.1	53.8	54.2
	3150		38.2	38.7	37.4
LaSalle Avenue SB	455		54.1	54.1	54.1
LaSalle Avenue NB	1080	(merge)	51.1	50.5	50.0
	200	(merge)	51.1	50.2	49.4
	1300		51.1	50.2	49.4
	200	(diverge)	51.7	51.6	51.4
Rip Rap Rd	6790		55.0	55.0	55.0
	1500	(diverge)	51.9	55.0	52.3
Tyler St / Settlers Landing Rd	1435	(lane drop)	54.7	41.9	54.8
	1900		44.4	11.0	40.5
S. Mallory St	1640		29.7	12.6	54.2
	1500	(merge)	21.2	18.7	36.6
HRBT	16950		35.1	35.1	35.1
	1500	(diverge)	50.2	50.1	52.5
Bayville St	200		53.8	53.8	54.4
	1500	(merge)	50.2	50.2	50.3
	5770		55.0	55.0	55.0
	1500	(diverge)	49.8	49.6	52.1
4th View St	2320		54.8	54.8	54.9
	1500	(merge)	50.9	50.9	51.1
W. Bay Ave	3445		54.9	54.9	54.9
	1500	(merge)	49.3	49.5	50.4
Patrol Rd	3740		54.7	54.8	49.0
	1730		41.2	38.7	15.6
I-564 / US 460	1055	(diverge)	48.9	48.9	48.6
I-564	1440	I-64 HOV	54.2	54.2	54.1
	1250	(merge)	48.1	48.1	48.0

WESTBOUND

2040 Prefe Cross Street	Length (not to scale) (not to scale)		Existing	2040 NB Updated	Preferred Alternative
I-664 SB	1140		54.1	54.0	53.9
	2360		39.4	37.4	36.8
Armistead Ave EB/La Salle Ave	405		54.3	54.2	53.7
	1500	(diverge)	51.7	51.1	48.9
Armistead Ave WB	645		54.6	54.5	54.4
	1500	(diverge)	52.6	52.4	51.5
	5685		55.0	55.0	55.0
	1500	(merge)	51.4	51.2	50.4
Settlers Landing Rd	1310		54.1	53.6	53.9
	1835		43.6	37.4	40.5
S. Mallory St	605	(lane add)	54.1	54.1	54.2
	1500	(diverge)	50.0	50.0	50.6
HRBT	18460		34.7	34.7	52.6
	1500	(merge)	44.8	23.9	50.6
W. Ocean View Ave	190		53.8	24.6	53.9
	1500	(diverge)	50.2	26.0	50.9
	5410		55.0	32.7	55.0
	1500	(merge)	50.5	41.5	50.9
4th View St	2275		54.8	51.5	54.9
	1500	(diverge)	50.1	50.1	52.2
W. Bay Ave	2590		54.8	54.8	54.9
	1500	(diverge)	50.2	50.2	50.9
	1430		54.6	54.6	54.7
	1500	(merge)	50.9	50.6	51.3
Granby St	1840		54.8	54.7	54.7
	1500	(merge)	51.4	51.2	51.0
I-64 HOV / I-564 / US 460	1510		54.6	54.6	54.5
	1500	(diverge)	49.9	49.9	49.0
	525		53.0	53.3	55.0

Legend

Speed (mph)
>45
35-45
25-35
≤25

Notes

Speeds evaluated using HCS Freeway Facilities module

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS
Hampton Roads Crossing Study SEIS

I-64 Alternatives Comparison Speed

April 2017 | Figure 8-4.1

I-564 AM PEAK SPEED ALTERNATIVES COMPARISON

EASTBOUND

Cross Street	Length (not to scale)		Existing	2040 NB Updated	2040 Preferred Alternative
Bainbridge Ave/Bellinger Blvd	670		55.0	55.0	55.0
	1500	(merge)	52.3	52.3	52.3
Intermodal Connector (2040 NB and Preferred Alternatives)	3000		55.0	54.9	54.9
	1500	(merge)		52.6	52.9
	1650			54.8	54.8
	1500	(diverge)	53.3	53.0	53.4
Terminal Blvd	2530		54.9	54.9	54.9
	350	(merge)	51.5	51.9	51.9
	700		47.6	47.7	47.7
	350	(diverge)	47.6	47.7	47.7
W Little Creek Rd	1450		53.7	53.7	53.7

WESTBOUND

Existing	2040 NB Updated	2040 Preferred Alternative		Length (not to scale)	Cross Street
53.6	53.6	53.6		525	Bainbridge Ave/Bellinger Blvd
47.6	47.7	47.8	(diverge)	1500	
55.0	55.0	55.0		4675	Intermodal Connector (2040 NB and Preferred Alternatives)
	50.7	51.0	(diverge)	1500	
	54.4	54.5		1465	Terminal Blvd
38.2	34.1	37.4		2995	
50.2	49.9	50.1	(merge)	950	I-64 EB
55.0	55.0	55.0		2260	US 460 NB

I-564 PM PEAK SPEED ALTERNATIVES COMPARISON

EASTBOUND

Cross Street	Length (not to scale)		Existing	2040 NB Updated	Preferred Alternative
Bainbridge Ave/Bellinger Blvd	670		55.0	55.0	55.0
	1500	(merge)	51.3	51.8	51.6
Intermodal Connector (2040 NB and Preferred Alternatives)	3000		55.0	54.9	54.9
	1500	(merge)		52.0	51.9
	1650			54.8	54.8
	1500	(diverge)	53.3	52.9	51.9
Terminal Blvd	2530		54.9	54.9	54.9
	350	(merge)	50.6	50.6	50.5
	700		47.4	46.6	44.6
	350	(diverge)	47.4	46.6	44.6
W Little Creek Rd	1450		53.7	53.5	52.6

WESTBOUND

Existing	2040 NB Updated	Preferred Alternative		Length (not to scale)	2040 Prefe Cross Street
53.7	53.7	53.7		525	Bainbridge Ave/Bellinger Blvd
48.4	48.4	48.4	(diverge)	1500	
55.0	55.0	55.0		4675	Intermodal Connector (2040 NB and Preferred Alternatives)
	50.5	50.5	(diverge)	1500	
	54.8	54.8		1465	Terminal Blvd
47.0	46.0	46.7		2995	
51.3	51.3	51.3	(merge)	950	I-64 EB
55.0	55.0	55.0		2260	US 460 NB

Legend

Speed (mph)
- >45
- 35-45
- 25-35
- ≤25

Notes

Speeds evaluated using HCS Freeway Facilities module

Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS

Hampton Roads Crossing Study SEIS

I-564 Alternatives Comparison Speed

April 2017

Figure 8-4.2

I-664 AM PEAK SPEED ALTERNATIVES COMPARISON

Cross Street	Length (not to scale)		EASTBOUND Existing	EASTBOUND 2040 NB Updated	EASTBOUND 2040 Preferred Alternative	WESTBOUND Existing	WESTBOUND 2040 NB Updated	WESTBOUND 2040 Preferred Alternative		Length (not to scale)	Cross Street
I-64	1320		54.3	52.6	53.0	55.0	55.0	55.0		1085	I-64
	1500	(merge)	54.2	54.2	54.5	56.6	60.0	60.0	(diverge)	1500	
	1000		59.2	59.2	59.3	59.6	59.6	59.6		1425	
	1500	(diverge)	52.9	51.8	52.1	55.9	55.8	55.9	(merge)	1500	
Power Plant Pkwy/Powhatan Pkwy	1660		59.5	59.4	59.4	59.8	59.8	59.8		1945	Power Plant Pkwy/Powhatan Pkwy
	1500	(merge)	55.4	55.4	55.4	56.3	56.3	56.3	(diverge)	1500	
	1785		59.7	59.7	59.7	59.8	59.8	59.8		1965	
	1500	(diverge)	55.8	55.7	55.8	56.3	56.2	56.3	(merge)	1500	
Aberdeen Rd	1505		59.6	59.6	59.6	59.7	59.7	59.7		1300	Aberdeen Rd
	3040		48.3	52.3	53.0	53.1	51.6	52.3		2775	
Chestnut Ave/Roanoke Ave	2230		59.8	59.9	59.9	59.8	59.8	59.8		2020	Chestnut Ave/Roanoke Ave
	1500	(merge)	56.3	56.1	56.2	56.5	56.4	56.4	(diverge)	1500	
	300		54.8	55.0	54.9	55.4	55.2	55.4		450	
	1500	(diverge)	54.8	55.0	54.9	55.4	55.2	55.4	(merge)	1500	
35th St	1105		59.4	59.4	59.4	58.3	58.7	58.8		1565	35th St/36th St
	1500	(diverge)	56.8	59.9	59.9						
26th St	2090		59.8	60.0	60.0	47.1	50.4	51.1		945	
35th St						59.7	59.7	59.7		2410	US 60
US 60	1475	(merge)	54.6	54.3	54.5						
	1100	(merge)	55.8	55.4	55.7	52.9	52.7	52.6	(diverge)	1500	
	410		55.8	55.4	55.7	52.9	52.7	52.6		360	
	1100	(diverge)	56.4	56.5	56.5	53.4	53.3	53.3	(merge)	1500	
Terminal Ave	585		59.1	59.1	59.1	59.5	59.5	59.5		1690	Terminal Ave
Terminal Ave	1005	(lane drop)	59.7	59.8	59.8						
	1500	(merge)	55.1	54.7	54.9	53.3	53.3	53.4	(diverge)	1500	
MMMBT	26460		50.7	48.0	49.0	45.1	45.9	47.4		27835	MMMBT
	1500	(diverge)	53.2	53.0	53.0	41.8	23.8	18.1	(merge)	1500	
College Dr NB	220		58.3	58.3	58.2	58.8	18.4	15.2		640	College Dr NB
	1820		52.4	50.9	51.7	52.0	14.5	19.6		1695	
College Dr SB	630		59.0	58.8	58.9	58.5	32.6	58.4		500	College Dr SB
	1500	(merge)	56.1	55.8	56.0	52.5	42.9	52.0	(diverge)	1500	
MATCHLINE A	1600		59.7	59.7	59.7	59.4	41.5	59.2		1310	MATCHLINE A

I-664 AM PEAK SPEED ALTERNATIVES COMPARISON (CONTINUED)

Cross Street	Length (not to scale)		EASTBOUND Existing	EASTBOUND 2040 NB Updated	EASTBOUND Preferred Alternative	WESTBOUND Existing	WESTBOUND 2040 NB Updated	WESTBOUND Preferred Alternative		Length (not to scale)	2040 Prefe Cross Street
MATCHLINE A	1600		59.7	59.7	59.7	59.4	41.5	59.2		1310	MATCHLINE A
	1500	(diverge)	56.2	60.0	60.0	54.3	59.9	52.5	(merge)	1500	
VA 164	1235		59.6	60.0	60.0	58.9	59.0	59.1		1140	VA 164 WB
	1500	(merge)	55.2	54.9	55.1	48.7	50.4	51.1		1715	
US 17	740		59.2	59.2	59.2	59.7	59.7	59.8		510	US 17/VA 164 EB
	1500	(merge)	58.9	57.5	54.6	47.9	50.4	51.1		4090	
	700		59.8	59.6	59.1						
	1500	(diverge)	52.6	52.3	52.2						
Pughsville Rd	2525		59.7	59.7	59.7	53.1	52.0	52.0	(merge)	1500	Pughsville Rd WB
						59.0	59.0	59.0		1000	Pughsville Rd EB
	1500	(merge)	54.3	52.6	53.6	52.6	52.4	52.4	(diverge)	1500	
	5140		60.0	58.0	59.6	59.6	56.9	57.3		5350	
	1500	(diverge)	53.0	52.8	52.8	53.3	51.7	52.0	(merge)	1500	
Portsmouth Blvd WB	600		58.7	58.7	58.7	58.6	58.4	58.5		520	Portsmouth Blvd WB
	1700		50.3	50.9	51.7	51.6	50.4	51.1		1680	
Portsmouth Blvd EB	480		58.3	58.4	58.6	58.7	58.6	58.6		575	Portsmouth Blvd EB
	1500	(merge)	54.1	52.0	53.0	52.9	52.7	52.7	(diverge)	1500	
						52.9	51.5	51.2		200	
	1500	(diverge)	53.3	53.1	53.0	52.8	51.5	51.2	(merge)	1500	
Dock Landing Rd	2550		59.7	58.6	59.7	59.7	59.7	59.7		2555	Dock Landing Rd
	1500	(merge)	53.5	50.7	52.3	53.2	53.0	53.0	(diverge)	1500	
	725		58.9	54.6	57.6	59.2	59.0	59.0		1180	
	1500	(diverge)	52.3	52.3	52.3	53.3	52.5	52.5	(merge)	1500	
US 58 SB	480		58.5	58.5	58.5	58.7	58.7	58.7		410	US 58 SB
	2045		52.3	50.9	51.7	54.1	53.9	53.8	(merge)	1500	
US 58 NB	1260		59.5	59.4	59.4	59.9	60.0	60.0		1225	US 58 NB
	490	(merge)	50.3	50.4	50.3	54.0	55.3	55.6		4675	
	1020		50.3	50.4	50.3						
	490	(diverge)	57.1	57.2	57.2						
S Military Hwy	1500	(diverge)	48.6	59.4	59.4						
I-64 SB	3435		59.8	60.0	60.0	59.9	59.8	59.8		2135	I-64 NB

Legend

Speed (mph)
>45
35-45
25-35
≤25

Notes

Speeds evaluated using HCS Freeway Facilities module

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS Hampton Roads Crossing Study SEIS

I-664 Alternatives Comparison AM Peak Hour Speed

April 2017

Figure 8-4.3

I-664 PM PEAK SPEED ALTERNATIVES COMPARISON

Cross Street	Length (not to scale)		EASTBOUND Existing	EASTBOUND 2040 NB Updated	EASTBOUND 2040 Preferred Alternative	WESTBOUND Existing	WESTBOUND 2040 NB Updated	WESTBOUND 2040 Preferred Alternative		Length (not to scale)	Cross Street
I-64	1320		54.3	55.0	55.0	55.0	53.3	54.5		1085	I-64
	1500	(merge)	56.0	55.7	55.7	55.6	59.7	60.0	(diverge)	1500	
	1000		59.5	59.4	59.4	59.5	59.4	59.5		1425	
	1500	(diverge)	53.6	53.0	53.3	54.8	54.1	54.4	(merge)	1500	
Power Plant Pkwy/Powhatan Pkwy	1660		59.5	59.5	59.5	59.8	59.7	59.7		1945	Power Plant Pkwy/Powhatan Pkwy
	1500	(merge)	56.3	56.1	56.1	56.0	55.8	55.8	(diverge)	1500	
	1785		59.7	59.7	59.7	59.7	59.7	59.7		1965	
	1500	(diverge)	55.7	55.9	55.9	55.1	54.2	54.5	(merge)	1500	
Aberdeen Rd	1505		59.6	59.6	59.6	59.6	59.5	59.6		1300	Aberdeen Rd
	3040		53.0	53.5	53.9	49.4	47.5	48.2		2775	
Chestnut Ave/Roanoke Ave	2230		59.9	59.9	59.9	59.7	59.8	59.8		2020	Chestnut Ave/Roanoke Ave
	1500	(merge)	56.9	56.6	56.6	55.6	55.8	55.9	(diverge)	1500	
	300		55.8	56.1	56.0	53.2	49.8	50.9		450	
	1500	(diverge)	55.8	56.1	56.0	53.2	49.8	50.9	(merge)	1500	
35th St	1105		59.5	59.5	59.5	58.2	58.1	58.2		1565	35th St/36th St
	1500	(diverge)	57.7	59.9	59.9						
26th St	2090		59.9	60.0	60.0	46.5	45.7	46.5		945	
35th St						59.7	59.7	59.7		2410	US 60
US 60	1475	(merge)	54.7	34.6	41.4						
	1100	(merge)	55.5	33.1	35.7	53.3	53.2	53.2	(diverge)	1500	
	410		55.5	22.5	24.3	53.3	53.2	53.2		360	
	1100	(diverge)	55.5	15.4	16.4	54.2	53.5	53.6	(merge)	1500	
Terminal Ave	585		58.8	12.1	13.1	59.5	59.5	59.5		1690	Terminal Ave
Terminal Ave	1005	(lane drop)	59.7	18.2	19.7						
	1500	(merge)	49.9	23.9	24.0	53.4	53.4	53.4	(diverge)	1500	
MMMBT	26460		35.2	35.2	35.2	58.3	59.4	59.0		27835	MMMBT
	1500	(diverge)	53.3	53.2	53.2	55.0	54.4	54.4	(merge)	1500	
College Dr NB	220		58.3	58.3	58.3	59.2	57.8	58.0		640	College Dr NB
	1820		47.9	52.3	52.7	54.6	45.7	46.5		1695	
College Dr SB	630		58.3	58.9	59.0	58.6	58.6	58.6		500	College Dr SB
	1500	(merge)	54.5	53.9	53.9	53.1	53.0	53.0	(diverge)	1500	
MATCHLINE A	1600		59.6	59.5	59.5	59.6	59.5	59.5		1310	MATCHLINE A

I-664 PM PEAK SPEED ALTERNATIVES COMPARISON (CONTINUED)

Cross Street	Length (not to scale)		EASTBOUND Existing	EASTBOUND 2040 NB Updated	EASTBOUND Preferred Alternative	WESTBOUND Existing	WESTBOUND 2040 NB Updated	WESTBOUND Preferred Alternative		Length (not to scale)	2040 Prefe Cross Street
MATCHLINE A	1600		59.6	59.5	59.5	59.6	59.5	59.5		1310	MATCHLINE A
	1500	(diverge)	55.9	60.0	60.0	55.7	55.2	55.3	(merge)	1500	
VA 164	1235		59.6	60.0	60.0	59.2	58.6	58.7		1140	VA 164 WB
	1500	(merge)	54.4	54.1	54.1	51.5	45.7	46.5		1715	
US 17	740		59.1	59.0	59.0	59.8	59.7	59.7		510	US 17/VA 164 EB
	1500	(merge)	56.7	54.4	51.7	50.5	45.7	46.5		4090	
	700		59.4	59.1	58.6						
	1500	(diverge)	52.3	51.7	51.7						
Pughsville Rd	2525		59.7	59.7	59.7	54.1	53.9	53.9	(merge)	1500	Pughsville Rd WB
						59.0	59.0	59.0		1000	Pughsville Rd EB
	1500	(merge)	53.8	52.9	53.1	52.3	52.1	52.2	(diverge)	1500	
	5140		59.9	58.6	58.9	60.0	60.0	60.0		5350	
	1500	(diverge)	53.1	53.0	53.0	54.7	54.4	54.4	(merge)	1500	
Portsmouth Blvd WB	600		58.7	58.7	58.7	58.6	57.6	57.7		520	Portsmouth Blvd WB
	1700		48.1	52.3	52.7	52.0	45.7	46.5		1680	
Portsmouth Blvd EB	480		58.0	58.7	58.7	58.6	58.6	58.6		575	Portsmouth Blvd EB
	1500	(merge)	53.6	52.4	52.4	52.6	52.3	52.4	(diverge)	1500	
						52.6	52.3	52.4		200	
	1500	(diverge)	53.1	52.8	52.8	54.1	53.7	53.7	(merge)	1500	
Dock Landing Rd	2550		59.7	59.6	59.6	59.7	59.7	59.7		2555	Dock Landing Rd
	1500	(merge)	53.7	53.0	53.0	53.0	52.8	52.8	(diverge)	1500	
	725		59.0	58.8	58.8	59.3	59.3	59.3		1180	
	1500	(diverge)	52.2	52.2	52.3	54.1	53.6	53.6	(merge)	1500	
US 58 SB	480		58.4	58.4	58.4	58.9	58.8	58.8		410	US 58 SB
	2045		52.9	52.3	52.7	54.6	54.5	54.5	(merge)	1500	
US 58 NB	1260		59.5	59.5	59.5	59.9	59.9	59.9		1225	US 58 NB
	490	(merge)	53.2	50.5	50.5	53.6	53.4	53.7		4675	
	1020		53.2	50.5	50.5						
	490	(diverge)	58.0	57.2	57.2						
S Military Hwy	1500	(diverge)	49.7	59.4	59.4						
I-64 SB	3435		59.8	60.0	60.0	59.8	59.8	59.8		2135	I-64 NB

Legend

Speed (mph)
- >45
- 35-45
- 25-35
- ≤25

Notes

Speeds evaluated using HCS Freeway Facilities module

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS
Hampton Roads Crossing Study SEIS

I-664 Alternatives Comparison PM Peak Hour Speed

April 2017

Figure 8-4.4

VA 164 AM PEAK SPEED ALTERNATIVES COMPARISON

Cross Street	Length (not to scale)		EASTBOUND Existing	EASTBOUND 2040 NB Updated	EASTBOUND 2040 Preferred Alternative	WESTBOUND Existing	WESTBOUND 2040 NB Updated	WESTBOUND 2040 Preferred Alternative		Length (not to scale)	Cross Street
US 17/Bridge Rd	2600		60.0	60.0	60.0	59.4	59.2	59.2		1670	I-664 SB
	2680		58.9	56.8	57.1	51.8	49.0	48.9		1610	
I-664	1460		64.8	64.7	64.7	63.3	63.2	63.3		970	I-664 NB
	1500	(merge)	56.1	55.4	55.5	52.3	52.0	52.1	(diverge)	1500	
College Dr	585		59.3	59.1	59.2	58.9	58.9	58.9		1025	College Dr
	1500	(merge)	54.6	53.4	53.6	51.6	51.4	51.4	(diverge)	1500	
	1290		59.4	59.3	59.3	59.4	59.4	59.4		1270	
	1500	(diverge)	49.5	49.4	49.4	54.6	54.3	54.3	(merge)	1500	
Towne Point Rd	2000		59.4	59.4	59.4	59.4	59.4	59.4		1970	Towne Point Rd
	1500	(merge)	53.8	52.2	52.6	49.6	49.5	49.6	(diverge)	1500	
	1400		59.4	59.0	59.3	59.4	59.4	59.4		1315	
	1500	(diverge)	51.0	50.8	50.7	54.5	54.3	54.3	(merge)	1500	
Cedar Ln SB	1135		58.9	58.9	58.9	58.8	58.7	58.8		1140	Cedar Ln
	1500	(merge)	54.7	53.8	54.2	49.5	49.3	49.5	(diverge)	1500	
Cedar Ln NB	110		58.6	58.3	58.4						
	1000	(merge)	54.4	53.4	53.7	59.3	59.2	59.3		1300	
	500		49.7	49.5	49.7						
	1000	(diverge)	49.7	49.5	49.7	55.3	55.0	55.2	(merge)	1000	
Virginia International Gateway Blvd	2245		58.9	58.9	58.9	58.7	58.7	58.7		2330	Virginia International Gateway Blvd
	1025	(merge)	54.8	54.1	54.2	49.7	49.7	49.6	(diverge)	1225	
	475		49.8	49.8	49.8	49.7	49.7	49.6		275	
	1025	(diverge)	49.8	49.8	49.8	54.9	54.7	54.8	(merge)	1225	
W. Norfolk Rd	625		55.8	55.8	55.8	58.4	58.4	58.4		810	W Norfolk Rd
	1500	(merge)	54.7	53.3	53.6	49.8	49.7	49.7	(diverge)	1500	
	1245		59.4	59.3	59.3	55.0	55.0	55.0		1710	
						55.0	55.0	55.0	(lane drop)	415	
	2330	(lane add)	55.0	55.0	55.0	54.8	54.8	54.8		1585	
	1500	(lane drop)	50.2	50.1	50.2	52.2	52.0	52.1	(merge)	1500	
(diverge) US 58 EB	1375		48.9	48.8	48.9	51.6	51.5	51.5	(merge)	1050	US 58 SB
Lee Ave/Railroad Ave US 58 WB	1500		54.4	54.4	54.4	54.9	54.8	54.8		1765	Railroad Ave/US 58 NB
Lee Ave / Harper Ave	1500	(merge)	52.3	51.9	52.0	47.1	41.7	41.6		3150	
	1830		49.7	48.2	48.4	55.0	55.0	55.0		500	London Blvd

VA 164 PM PEAK SPEED ALTERNATIVES COMPARISON

Cross Street	Length (not to scale)		EASTBOUND Existing	EASTBOUND 2040 NB Updated	EASTBOUND Preferred Alternative	WESTBOUND Existing	WESTBOUND 2040 NB Updated	WESTBOUND Preferred Alternative		Length (not to scale)	2040 Prefe Cross Street
US 17/Bridge Rd	2600		60.0	60.0	60.0	59.9	59.5	59.5		1670	I-664 SB
	2680		61.5	55.9	55.8	55.9	53.3	53.3		1610	
I-664	1460		64.9	64.7	64.7	64.9	63.2	63.2		970	I-664 NB
	1500	(merge)	56.2	56.0	56.0	52.0	51.7	51.8	(diverge)	1500	
College Dr	585		59.3	59.3	59.3	58.9	58.8	58.9		1025	College Dr
	1500	(merge)	54.8	54.2	54.2	51.4	51.1	51.2	(diverge)	1500	
	1290		59.5	59.4	59.4	59.4	59.2	59.3		1270	
	1500	(diverge)	49.0	48.7	48.8	54.1	52.7	53.1	(merge)	1500	
Towne Point Rd	2000		59.4	59.3	59.3	59.3	59.3	59.3		1970	Towne Point Rd
	1500	(merge)	54.4	54.0	54.1	48.9	48.9	49.0	(diverge)	1500	
	1400		59.5	59.4	59.4	59.3	58.3	59.2		1315	
	1500	(diverge)	51.5	51.4	51.3	53.5	51.7	52.3	(merge)	1500	
Cedar Ln SB	1135		59.0	59.0	59.0	58.8	58.7	58.7		1140	Cedar Ln
	1500	(merge)	55.0	54.7	54.8	49.4	49.2	49.4	(diverge)	1500	
Cedar Ln NB	110		58.6	58.6	58.6						
	1000	(merge)	54.7	54.4	54.4	59.1	58.9	59.0		1300	
	500		49.9	49.8	49.9						
	1000	(diverge)	49.9	49.8	49.9	54.4	52.8	53.7	(merge)	1000	
Virginia International Gateway Blvd	2245		58.9	58.9	58.9	58.8	58.8	58.8		2330	Virginia International Gateway Blvd
	1025	(merge)	55.1	54.8	54.8	49.8	49.8	49.8	(diverge)	1225	
	475		49.8	49.7	49.7	49.8	49.8	49.8		275	
	1025	(diverge)	49.8	49.7	49.7	54.1	52.6	53.4	(merge)	1225	
W. Norfolk Rd	625		55.8	55.8	55.8	58.4	58.4	58.4		810	W Norfolk Rd
	1500	(merge)	55.2	54.9	54.9	49.6	49.4	49.4	(diverge)	1500	
	1245		59.5	59.4	59.4	55.0	54.6	55.0		1710	
						54.9	54.6	54.9	(lane drop)	415	
	2330	(lane add)	55.0	55.0	55.0	54.7	54.6	54.7		1585	
	1500	(lane drop)	50.2	50.1	50.2	51.5	50.0	50.8	(merge)	1500	
(diverge) US 58 EB	1375		49.2	49.2	49.2	51.4	51.0	51.2	(merge)	1050	US 58 SB
Lee Ave/Railroad Ave US 58 WB	1500		54.4	54.4	54.4	54.8	54.8	54.8		1765	Railroad Ave/US 58 NB
Lee Ave / Harper Ave	1500	(merge)	52.4	52.3	52.3	45.4	44.3	44.3		3150	
	1830		48.4	47.4	47.4	55.0	55.0	55.0		500	London Blvd

Legend

Speed (mph)
>45
35-45
25-35
≤25

Notes

Speeds evaluated using HCS Freeway Facilities module

VDOT Virginia Department of Transportation

U.S. Department of Transportation Federal Highway Administration

HRCS SEIS
Hampton Roads Crossing Study SEIS

VA 164 Alternatives Comparison Speed

April 2017

Figure 8-4.5

Table 8-4: 2040 Intersection Capacity Analyses Results

Intersection	Control Type	Existing				2040 No-Build (Updated)				2040 Preferred Alternative			
		AM		PM		AM		PM		AM		PM	
		Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
I-64 Interchanges													
VA-134 at I-64 WB On Ramp*	Signalized	17.9	B	19.1	B	20.2	C	22.2	C	19.3	B	21.6	C
LaSalle Avenue at Armistead Avenue*	Signalized	19.7	B	23.8	C	21.4	C	26.3	C	22.2	C	27.1	C
I-64 EB Off Ramp at Rip Rap Road	Signalized	15.3	B	17.5	B	16.6	B	18.0	B	18.8	B	21.9	C
Settlers Landing Rd. at E Tyler St.	Signalized	24.5	C	17.4	B	32.5	C	26.0	C	30.5	C	24.2	C
Settlers Landing Rd. at I-64 SB On Ramp	Yield Control***	11.5	B	13.9	B	13.9	B	23.1	C	12.2	B	15.6	C
Settlers Landing Rd. at I-64 NB On Ramp	Signalized	21.3	C	23.2	C	28.8	C	50.2	D	34.0	C	71.0	E
I-64 SB Ramps at S Mallory St.	Signalized	8.4	A	98.6	F	10.5	B	120.1	F	12.1	B	34.8	C
I-64 NB Ramps at S Mallory St.	Signalized	72.2	E	19.9	B	84.1	F	29.0	C	33.2	C	22.4	C
I-64 SB Ramps at 4th View St	Stop Control**	7.5	A	14.1	B	8.6	A	190.1	F	9.7	A	323.1	F
I-64 NB Ramps at 4th View St	Stop Control**	11.9	B	95.6	F	13.3	B	260.2	F	13.7	B	304.8	F
US 460 at I-64 NB On Ramp	Yield Control***	15.7	B	12.8	B	15.8	C	11.9	B	23.8	C	17.5	C
I-564 Interchanges													
I-564 at Bainbridge Ave	Signalized	13.9	B	37.6	D	12.0	B	30.3	C	11.5	B	23.6	C
I-664 Interchanges													
Powhatan Parkway at I-664 North Ramp	Signalized	24.8	C	27.3	C	11.4	B	16.2	B	14.0	B	16.9	B
Powhatan Parkway at I-664 South Ramp	Signalized	14.2	B	20.3	C	20.6	C	22.9	C	23.9	C	22.3	C
Aberdeen Road at I-664 North Ramp	Signalized	14.9	B	7.7	A	9.1	A	11.4	B	9.3	A	11.5	B
Aberdeen Road at I-664 South Ramp	Signalized	10.2	B	12.8	B	22.5	C	8.8	A	22.3	C	8.4	A
Chestnut Avenue at I-664 South Off Ramp	Signalized	0.2	A	0.2	A	0.3	A	0.2	A	0.3	A	0.2	A
Chestnut Avenue at I-664 North On Ramp	Signalized	3.1	A	13.6	B	4.3	A	17.4	B	4.1	A	15.0	B
Chestnut Avenue at 39th Street	Signalized	22.1	C	16.9	B	13.6	B	16.2	B	12.8	B	15.5	B
Roanoke Avenue at I-664 South On-Ramp	Stop Control**	9.9	A	10.3	B	10.6	B	11.0	B	9.9	A	10.1	B
Roanoke Avenue at I-664 North Off-Ramp	Signalized	17.2	B	11.7	B	14.6	B	19.7	B	12.9	B	19.0	B
Roanoke Avenue at 39th Street	Signalized	10.6	B	8.4	A	19.3	B	19.3	B	18.0	B	17.2	B
Jefferson Avenue at 36th Street	Signalized	21.2	C	19.5	B	21.0	C	17.4	B	20.9	C	18.4	B
Jefferson Avenue at 35th Street	Signalized	3.6	A	7.0	A	9.3	A	8.4	A	9.4	A	10.9	B
Jefferson Avenue at 27th Street	Signalized	10.8	B	13.5	B	11.0	B	13.4	B	11.2	B	13.1	B
Jefferson Avenue at 26th Street	Signalized	9.8	A	10.5	B	11.3	B	11.0	B	9.6	A	10.5	B
Jefferson Avenue at MLK JR At 25th Street	Signalized	9.6	A	11.4	B	11.8	B	13.9	B	11.9	B	14.4	B
Huntington Avenue at 35th Street	Signalized	17.9	B	12.9	B	18.6	B	13.0	B	19.0	B	14.3	B
Huntington Avenue at 34th Street	Signalized	18.9	B	21.5	C	22.4	C	22.8	C	22.4	C	23.4	C
Huntington Avenue at 28th Street	Signalized	8.7	A	9.6	A	12.8	B	12.7	B	12.7	B	11.3	B
Huntington Avenue at 26th Street	Signalized	23.5	C	20.1	C	20.5	C	22.9	C	21.9	C	24.8	C
Huntington Avenue at MLK JR At 25th Street	Stop Control**	9.3	A	10.2	A	10.4	B	10.5	B	10.4	B	10.4	B
Terminal Avenue at WB I-664 Off Ramp	Stop Control**	9.1	A	9.6	A	10.1	B	10.8	B	9.3	A	10.4	B
US 17 at Townpoint Rd	Stop Control**	164.0	F	85.0	F	735.4	F	499.0	F	729.0	F	459.0	F
Ramp to I-664 South On US 17	Yield Control***	11.2	B	11.7	B	17.2	C	19.6	C	17.4	C	19.9	C
I-664 SB Ramps at Pughsville Rd	Signalized	17.5	B	57.4	E	31.4	C	35.1	D	29.8	C	34.3	C
I-664 NB Off-Ramp at Pughsville Rd	Signalized	5.3	A	8.5	A	6.2	A	10.6	B	6.5	A	10.6	B
I-664 SB Ramps at Dock Landing Rd	Signalized	7.4	A	11.6	B	12.9	B	14.0	B	12.8	B	13.8	B

Intersection	Control Type	Existing				2040 No-Build (Updated)				2040 Preferred Alternative			
		AM		PM		AM		PM		AM		PM	
		Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
I-664 NB Ramps at Dock Landing Rd	Signalized	9.6	A	8.6	A	13.3	B	13.7	B	13.2	B	15.5	B
W Military Hwy (US 13/58)/Airline Blvd at US 460 Alt/Joliff Rd	Signalized	40.8	D	43.9	D	101.7	F	81.1	F	117.5	F	129.8	F
W Military Hwy (US 460) at US 58/I-664 EB Ramps	Stop Control**	15.2	B	10.8	B	152.9	F	20.5	C	139.0	F	51.0	F
S Military Hwy (US 460) at S Military Hwy (US 13/460)	Stop Control**	43.4	D	26.1	C	51.8	F	412.1	F	337.0	F	934.0	F
I-664 EB Off-Ramp/Schaefer Ave at S Military Hwy (US 460)	Stop Control**	83.3	F	357.3	F	759.7	F	1447.0	F	370.0	F	957.0	F
VA 164 Interchanges													
VA 164 WB Off-Ramp at College Dr	Signalized	5.5	A	6.2	A	6.1	A	10.1	B	5.9	A	9.2	A
VA 164 EB On-Ramp at College Dr	Signalized	5.2	A	6.0	A	6.1	A	9.3	A	6.1	A	9.4	A
US 17 at College Dr	Signalized	26.3	C	62.5	E	52.6	D	148.9	F	63.0	E	168.5	F
VA 164 WB Ramps at Towne Point Rd*	Signalized	18.9	B	18.9	B	21.3	C	20.0	C	19.5	B	19.8	B
VA 164 EB Ramps at Towne Point Rd*	Signalized	19.6	B	30.6	C	25.9	C	62.7	E	23.9	C	61.0	E
VA 164 WB Ramps at Cedar Ln	Signalized	12.4	B	17.5	B	22.7	C	31.2	C	14.0	B	20.5	C
VA 164 EB Ramps at Cedar Ln	Signalized	11.2	B	5.6	A	14.4	B	6.2	A	16.8	B	6.6	A
VA 164 WB Ramps at Virginia International Gateway Blvd	Stop Control**	10.6	B	9.8	A	11.9	B	10.2	B	11.5	B	10.0	B
Virginia International Gateway Blvd at Wild Duck Ln	Stop Control**	11.7	B	10.5	B	15.4	C	11.4	B	14.8	B	10.8	B
VA 164 EB Ramps at Virginia International Gateway Blvd	Signalized	2.1	A	2.2	A	1.8	A	10.2	B	1.8	A	2.3	A
VA 164 WB Ramps at W Norfolk Rd	Stop Control**	10.2	B	12.9	B	11.1	B	19.5	C	12.5	B	23.5	C
VA 164 EB Ramps at W Norfolk Rd	Stop Control**	10.7	B	12.4	B	11.9	B	16.8	C	13.3	B	18.1	C
Railroad Ave at Lee Ave*	Signalized	22.3	C	23.5	C	30.3	C	23.3	C	32.3	C	24.5	C
Railroad Ave at VA 164 EB Off-Ramp*	Signalized	98.8	F	12.9	B	37.8	D	14.4	B	34.9	C	12.3	B
Railroad Ave at US 58 NB/VA 164 WB Ramps	Signalized	17.5	B	17.0	B	18.0	B	17.3	B	18.0	B	16.1	B
Lee Ave at Woodrow St/Harper Ave	Signalized	6.0	A	5.1	A	5.6	A	5.2	A	6.1	A	5.9	A

8.2 KEY STUDY AREA SEGMENT IMPACTS

To evaluate how the alternatives could improve traffic operations along the Study Area Corridors, VDOT and FHWA worked with the Cooperating and Participating Agencies to identify four "hot spots" along the Study Area Corridors that currently experience high levels of congestion. As these areas experience high levels of congestion now, it can be anticipated that they also would be the most highly congested areas along the Study Area Corridors in the future. The agencies identified data available from the travel demand model that could be used to compare the alternatives. These four sections are presented below along with summary tables and figures that show how different alternatives could improve operations in these hot spots. The four key study area segments are listed below, and shown in **Figure 5-5**:

- Hampton Roads Bridge-Tunnel (HRBT) – Segments F, G and H
- I-564 – Segment I
- I-664 - Monitor Merrimac Memorial Bridge-Tunnel (MMMBT) – Segments C, D and E
- I-664 - Bowers Hill – Segment A

The impacts on these segments are discussed in **Sections 8.2.1 through 8.2.4**. The complete travel demand output from which the data for the above four segments was extracted is provided in **Appendix K**.

8.2.1 HRBT

Table 8-5 shows the travel demand model output for the section of I-64 between I-664 and I-564, which includes the HRBT bottleneck. Several performance measures are provided that indicate projected travel demand on the facility (daily vehicles miles traveled) and the level of congestion (travel time delay and daily vehicle hours traveled).

Table 8-6 indicates that under No-Build conditions, both VMT and VHT are projected to increase, along with significant increases in delay, in particular in the westbound direction. Compared to the No-Build Alternative, delays are projected to decline under the Preferred Alternative, despite an increase in VMT. Additionally, the improvements in travel time and reductions in delay are illustrated in **Figures 8-5 through 8-7**.

Table 8-5: I-64 HRBT PM Peak Travel Time Comparison – between I-664 and I-564

Performance Measure		Existing (2015)	No-Build Updated (2040)	Preferred Alternative (2040)
PM Peak Travel Time (minutes)	EB	20	25	18
	WB	25	50	37
PM Peak Speed (congested speed MPH)	EB	36	28	39
	WB	29	14	18
PM Peak Delay (minutes)	EB	7	14	6
	WB	12	39	0
Daily VHT		32,234	56,100	53,980
Daily VMT		1,099,600	1,349,800	1,717,400
Daily Delay		11,000	27,100	25,100

Figure 8-5: I-64 HRBT PM Peak Traffic Travel Time Comparison (Preferred Alternative)

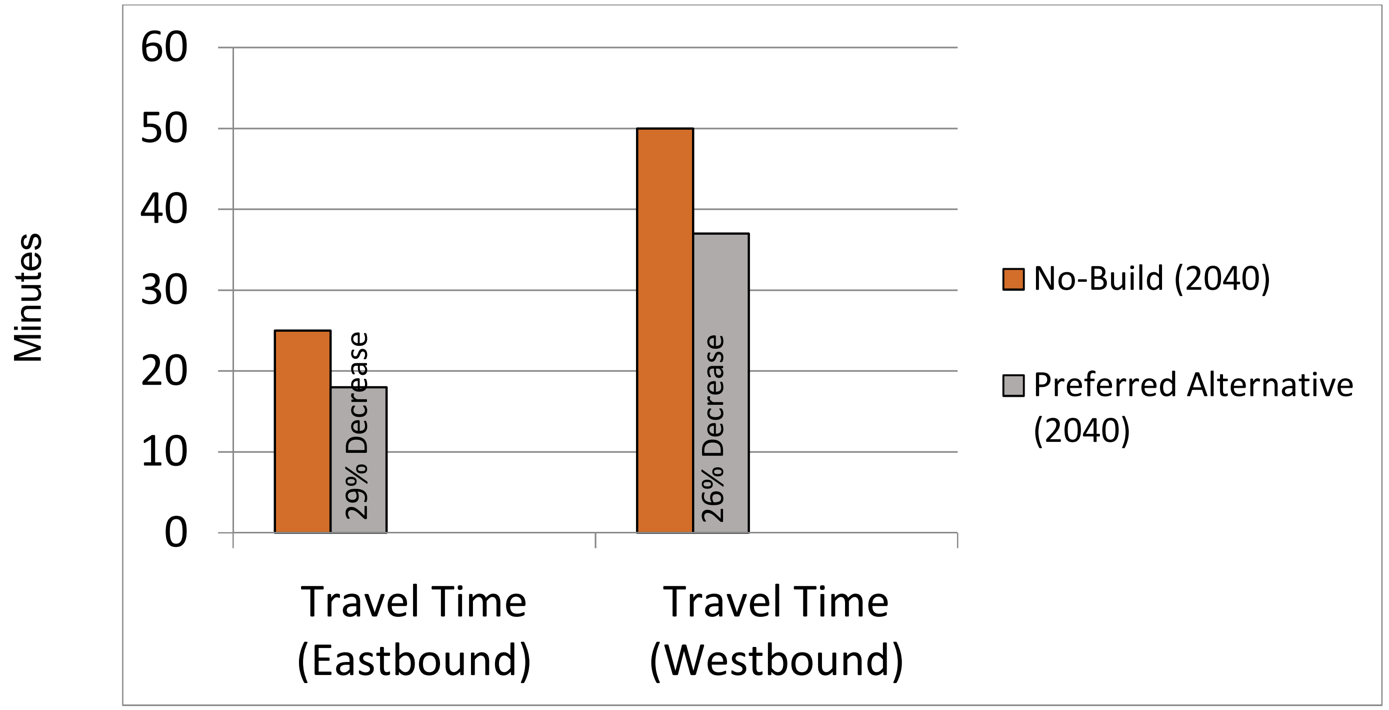


Figure 8-6: I-64 HRBT 2040 PM Peak Hour Travel Time for No-Build Conditions

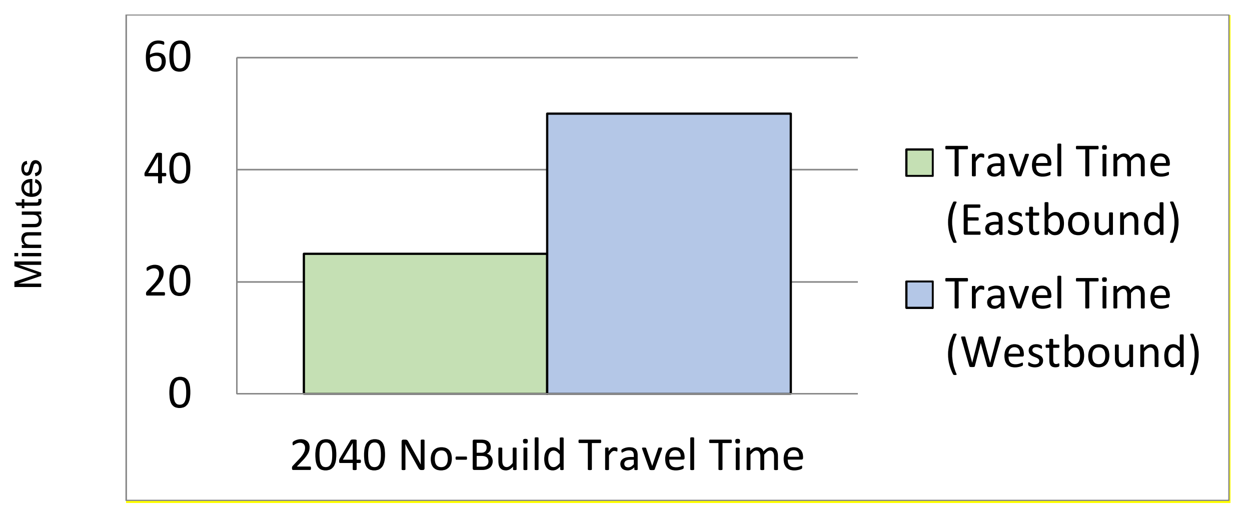
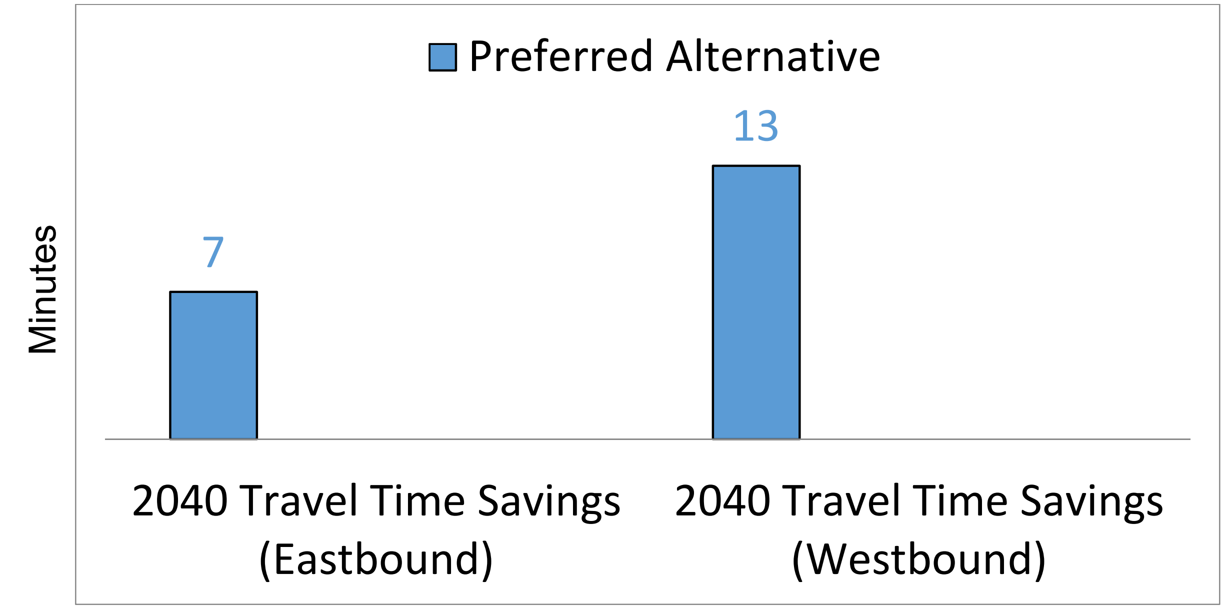


Figure 8-7: 2040 PM Peak Hour Travel Time Savings along I-64 HRBT Compared to No-Build Conditions



8.2.2 I-564

Table 8-6 shows the travel demand model output for the section of I-564 and the Intermodal Connector between I-64 and the proposed NIT/Navy interchange.

Table 8-6 indicates that under No-Build and Preferred Alternative conditions, both VMT and VHT are projected to increase, compared to existing conditions, although delays are projected to remain minimal. Additionally, changes in travel time and delay are illustrated in **Figures 8-8 and 8-9**.

Table 8-6: I-564 AM Peak Travel Time Comparison - between I-64 and the Proposed NIT/Navy Interchange

Performance Measure		Existing (2015)	No-Build Updated (2040)	Preferred Alternative (2040)
AM Peak Travel Time (minutes)	EB	2	2	2
	WB	2	3	3
PM Peak Speed (congested speed MPH)	EB	56	60	60
	WB	47	53	54
PM Peak Delay (minutes)	EB	0	0	0
	WB	0.3	0	0
Daily VHT		1,024	1,200	1,200
Daily VMT		51,200	67,600	69,100
Daily Delay		0	100	100

Figure 8-8: I-564 AM Peak Traffic Travel Time Comparison

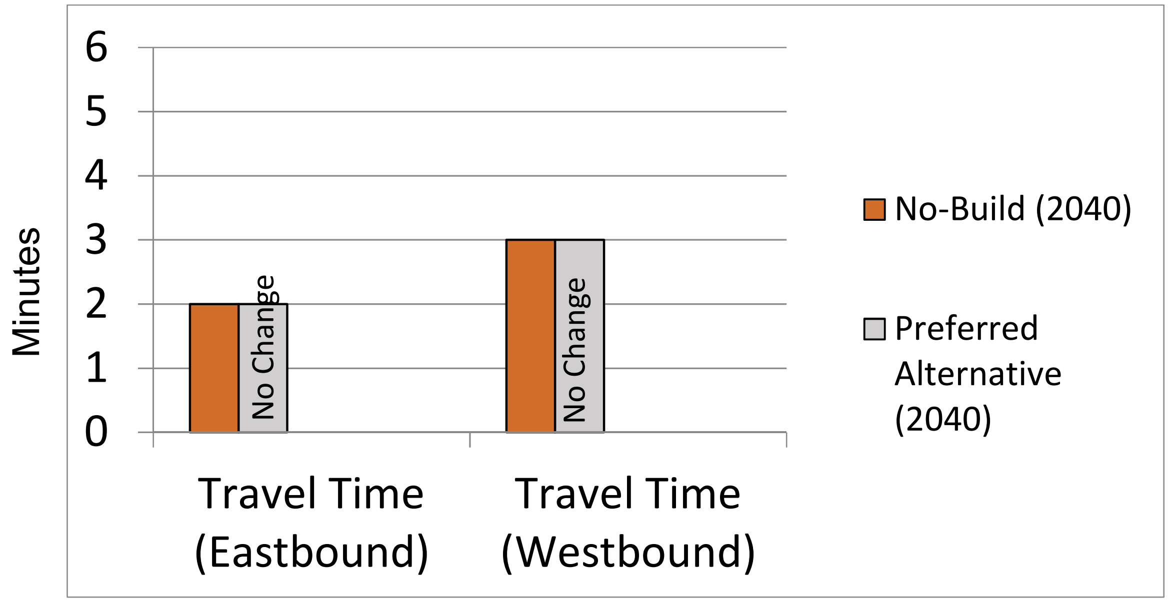
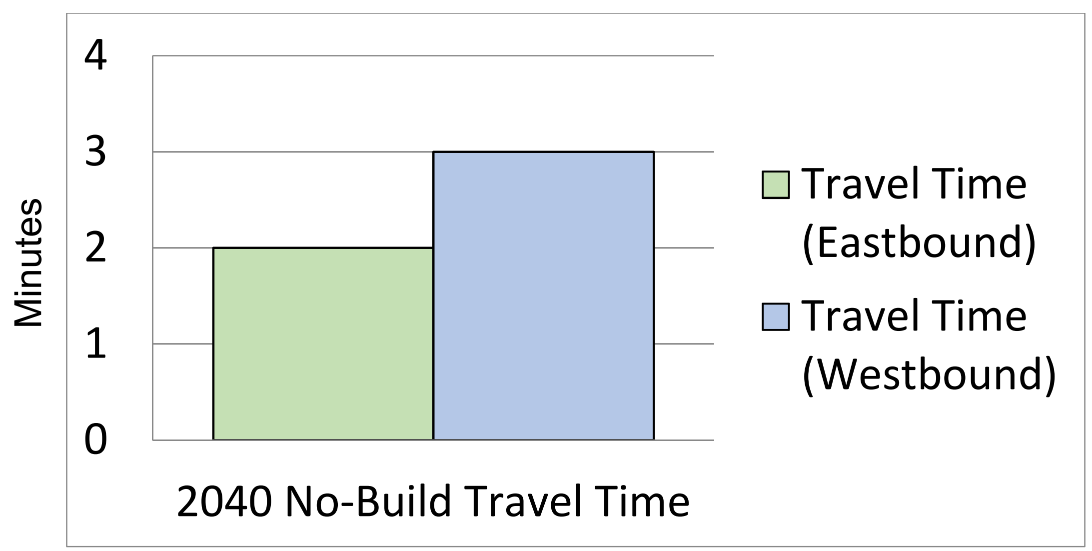


Figure 8-9: I-564 2040 AM Peak Hour Travel Time for No-Build Conditions



8.2.3 MMMBT

Table 8-7 shows the travel demand model output for the section of I-664 between I-64 and College Drive, which includes the MMMBT bottleneck.

Table 8-7 indicates that under No-Build conditions, both VMT and VHT are projected to increase, along with significant increases in delay, in particular in the northbound direction. Under the Preferred Alternative, delays, VMT, and VHT are projected to decrease as traffic would be expected to shift to the HRBT. Additionally, improvements in travel time and reductions in delay are illustrated in **Figures 8-10 through 8-12**.

Table 8-7: I-664 MMMBT PM Peak Travel Time Comparison - between I-64 and College Drive

Performance Measure		Existing (2015)	No-Build Updated (2040)	Preferred Alternative (2040)
PM Peak Travel Time (minutes)	SB	12	15	14
	NB	19	25	19
PM Peak Speed (congested speed MPH)	SB	58	45	47
	NB	37	28	36
PM Peak Delay (minutes)	SB	0	4	4
	NB	7	14	8
Daily VHT		18,551	24,200	20,000
Daily VMT		838,200	1,046,800	975,800
Total Delay		1,600	8,500	4,400

Figure 8-10: I-664 MMMBT PM Peak Traffic Travel Time Comparison

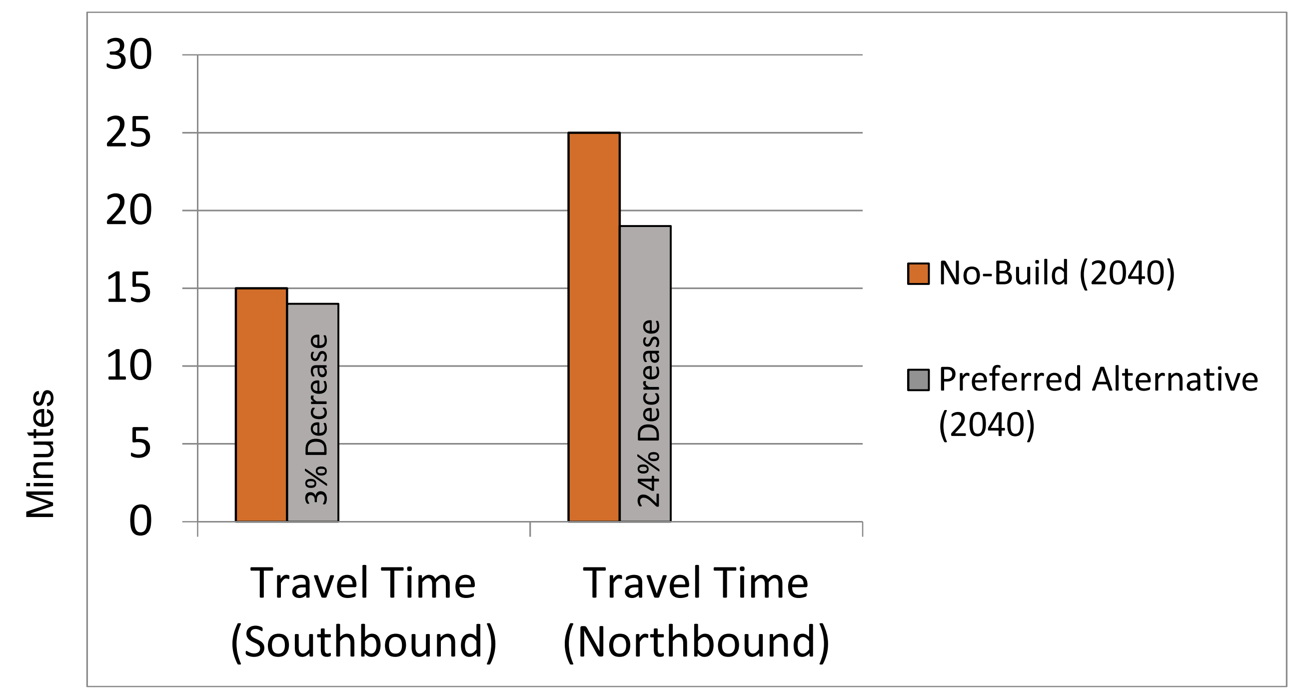


Figure 8-11: I-664 MMMBT 2040 PM Peak Hour Travel Time for No-Build Conditions

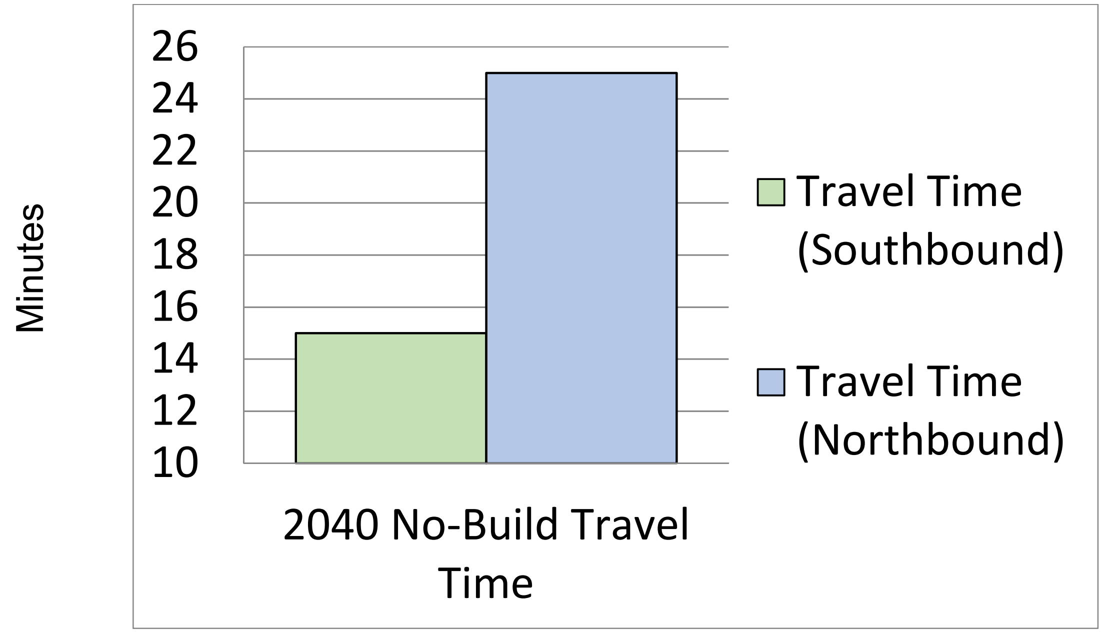
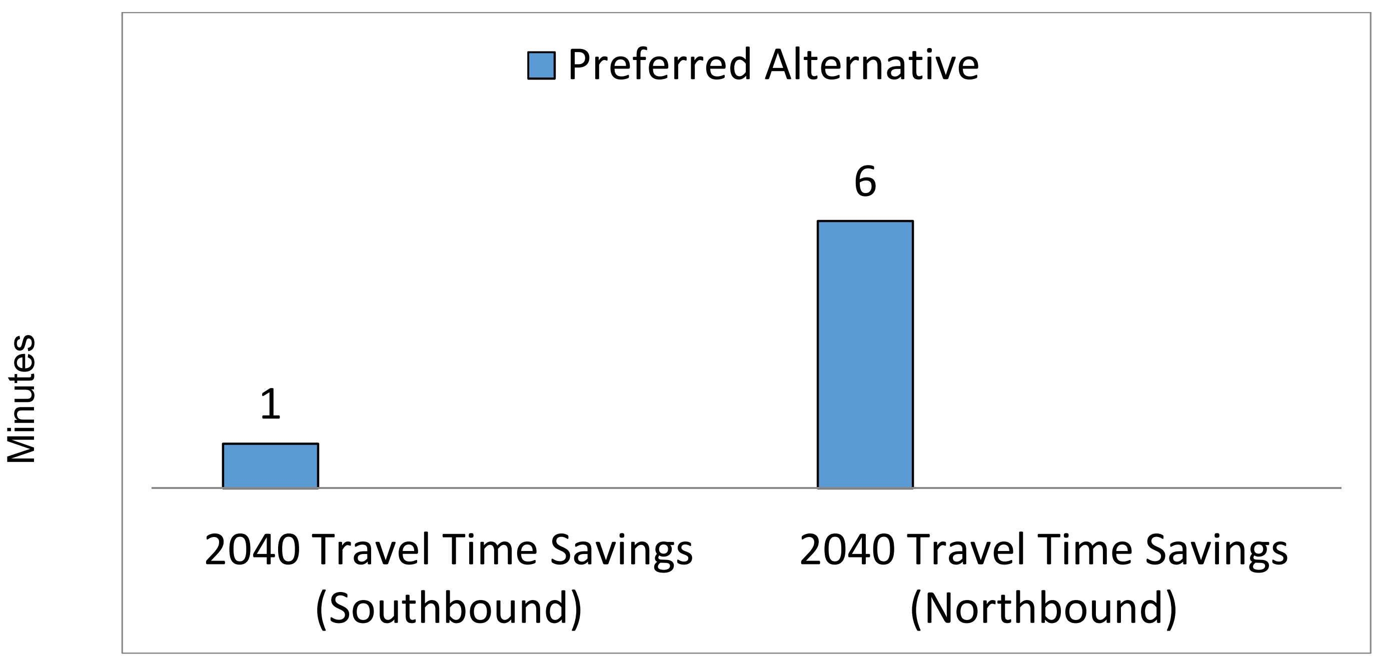


Figure 8-12: 2040 PM Peak Hour Travel Time Savings along I-664 MMMBT Compared to No-Build Conditions



8.2.4 I-664 Bowers Hill

Table 8-8 shows the travel demand model output for the section of I-664 between VA 164 and I-264, which includes the Bowers Hill bottleneck.

Table 8-8 indicates that under No-Build conditions, both VMT and VHT are projected to increase, along with an increase in delay in the southbound direction. Compared to the No-Build alternative, delays are projected to decline slightly in the southbound direction VMT and delays are projected to decrease under the Preferred Alternative, indicating a traffic shift to the HRBT. Additionally, improvements in travel time and reductions in delay are illustrated in **Figures 8-13 through 8-15**.

Table 8-8: I-664 Bowers Hill PM Peak Travel Time Comparison - between VA 164 and I-264

Performance Measure		Existing (2015)	No-Build Updated (2040)	Preferred Alternative (2040)
PM Peak Travel Time (minutes)	SB	8	11	10
	NB	8	7	7
PM Peak Speed (congested speed MPH)	SB	50	58	59
	NB	51	44	47
PM Peak Delay (minutes)	SB	1	1	1
	NB	1	4	3
Daily VHT		12,330	12,700	12,000
Daily VMT		622,030	689,500	669,100
Total Delay		900	3,100	2,400

Figure 8-13: I-664 Bowers Hill PM Peak Traffic Travel Time Comparison

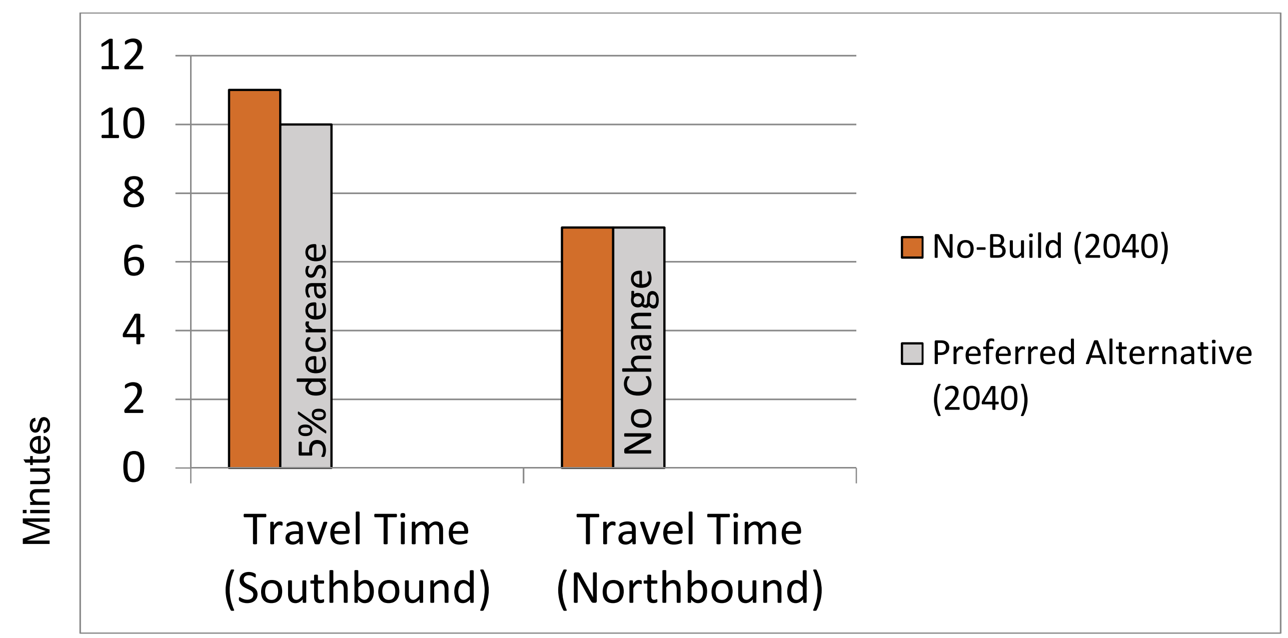


Figure 8-14: I-664 Bowers Hill 2040 PM Peak Hour Travel Time for No Build Conditions

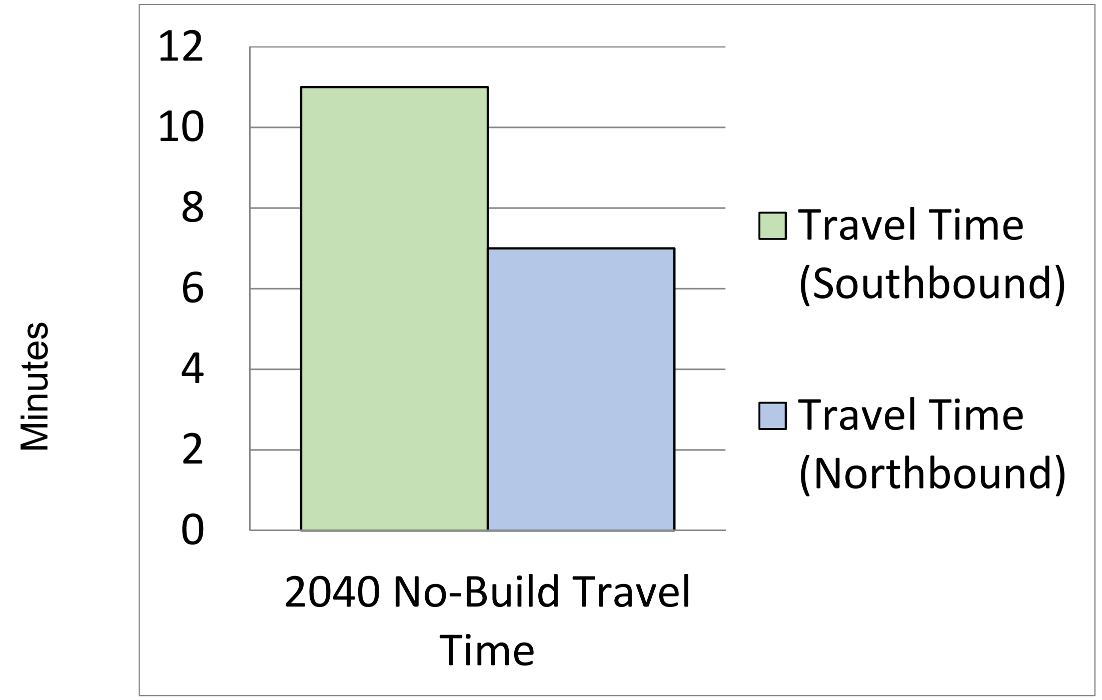
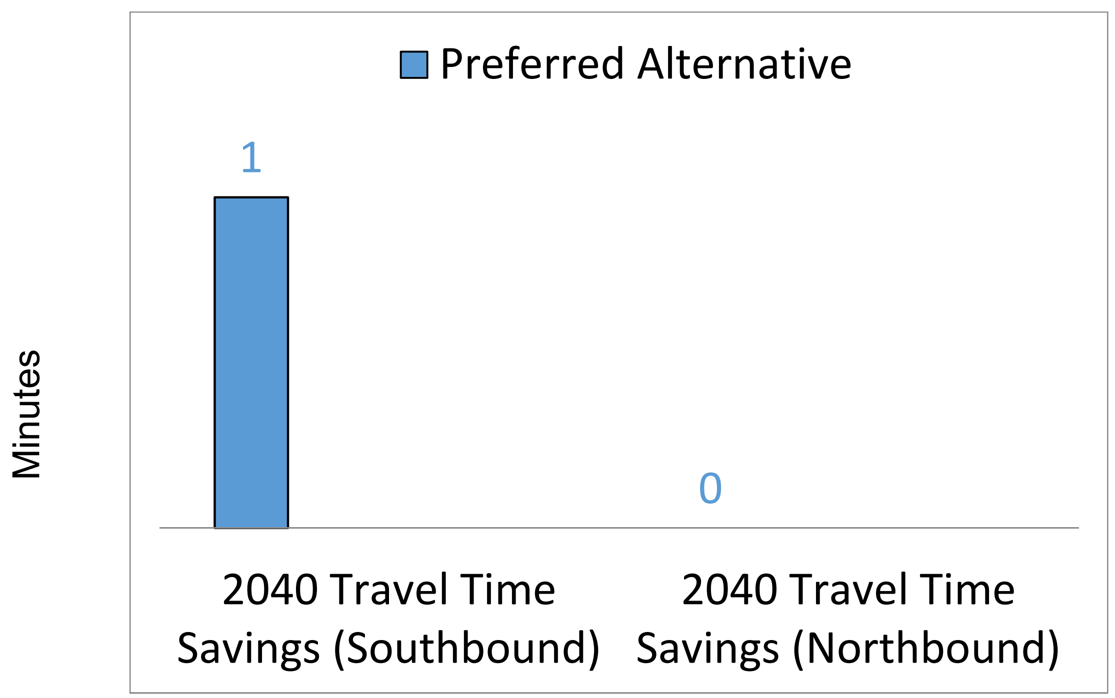


Figure 8-15: 2040 PM Peak Hour Travel Time Savings along I-664 Bowers Hill Compared to No-Build Conditions



8.3 UPDATED 2040 NO-BUILD ALTERNATIVE

As described in **Section 1.1.2.1**, the No-Build Alternative does not assume any improvements or capacity enhancements along any of the Study Area Corridors. All projects that are contained in the region's Long Range Transportation Plan are assumed to be in place. In consultation with VDOT, the following roadway network modification were made as part of the 2040 No-Build forecast:

- Eliminated the US 460/US 58/US 13 Connector project;
- Removed tolls from all existing and proposed river crossings except for the Midtown Tunnel (US 58) and the Downtown Tunnel (I-264); and,
- Added third General Purpose lane to I-64 between I-264 (Bowers Hill interchange) and I-464, and one HOV lane in each direction. The HOV lane ties into the existing HOV system east of I-464, and has the same peak hour occupancy restrictions as the existing system

These roadway network modifications were retained for all 2040 modeling scenarios.

The 2040 No-Build forecast shows continuing growth in regional traffic volumes throughout the region. Daily traffic volumes on the HRBT are projected to increase 12 percent compared to 2015 volumes (from 91,000 to 101,500 vehicles per day), while daily traffic volumes on the MMMBT and VA 164 are projected to grow by 24 and 36 percent, respectively (from 69,300 to 85,600 and 49,000 to 66,500 vehicles per day, respectively).

Detailed daily volumes for 2040 No-Build conditions, including daily turning movement volumes at the ramp terminal intersections, are provided in **Appendix N** in **Figures N.1-1 through N.1-15**.

Along with the daily volumes, AM and PM peak hour volumes increase correspondingly on the Study Area Corridor roadways. A summary of the 2040 No-Build mainline peak hour volumes is provided in **Figure 8-16**. Detailed AM and PM peak hour volumes for the 2040 No-Build Alternative, including turning movement volumes at the ramp terminal intersections, are provided in **Appendix N** in **Figures N.2-1 through N.2-15**.

Table 8-4 presents the intersection LOS for all ramp terminal intersections.

Detailed LOS exhibits for the No-Build Alternative are provided in **Appendix N** in **Figures N.3-1 through N.3-15**.

8.3.1 Operational Analysis

Capacity analyses of the 2040 No-Build peak hour volumes, shown in **Figure 8-3**, indicate increasingly poor operating conditions along I-64 and I-664, with a number of additional segments projected to operate at LOS F, which represents a breakdown in traffic flow with volumes exceeding capacity. In particular, I-64 approaching the HRBT is projected to experience LOS F beginning at interchanges that are further upstream compared to 2015 conditions. Similarly, I-664 westbound approaching the MMMBT during the AM peak hour and I-664 eastbound during the PM peak hour is projected to experience LOS F beginning at interchanges that are further upstream of the bridge-tunnel compared to 2015 conditions.

Traffic operations along VA 164 are projected to be worse than under existing conditions but remain generally acceptable (LOS D or better) during the AM peak hour. During the PM peak hour, westbound VA 164 is projected to approach capacity (LOS E) in a number of segments. Along I-564, acceptable operating conditions of LOS D or better are projected in the non-peak directions (eastbound during the AM peak hour, westbound during the PM peak hour). During the PM peak hour, LOS F operating conditions are projected along eastbound I-564 between the Terminal Boulevard on-ramp and the I-64/I-564 interchange.

Table 8-9 summarizes the No-Build LOS by Study Area Corridor for key roadway segments.

Table 8-9: 2040 No-Build (Updated) LOS at Key Roadway Segments

Roadway Segment	AM Peak			
	Eastbound		Westbound	
	Existing	2040 NB (Updated)	Existing	2040 NB (Updated)
HRBT	F	F	F	F
MMMBT	C	D	F	E
VA 164	C	D	B	C
Roadway Segment	**PM Peak**			
	Eastbound		**Westbound**	
	Existing	**2040 NB (Updated)**	**Existing**	**2040 NB (Updated)**
HRBT	F	F	F	F
MMMBT	F	F	C	F
VA 164	C	C	C	D

8.3.2 Travel Time

In addition to worsening LOS due to highly congested conditions, the end-to-end travel times along Study Area Corridors are generally projected to increase in the future along I-64 and I-664. Along VA 164, travel times would be similar to existing conditions. **Table 8-10** summarizes the average existing and No-Build travel times in minutes per vehicle by Study Area Corridor.

It should be noted that these estimates were developed from planning-level capacity analysis output and are intended only to indicate relative changes in travel time between alternatives.

Table 8-10: 2040 No-Build (Updated) Estimated End-to-End Travel Time by Study Area Corridor

Segment	Direction	AM Peak Travel Time (minutes/vehicle)	
		Existing	2040 NB (Updated)
I-64	Eastbound	18.3	19.8
	Westbound	17.3	20.1
I-664 (I-64 to VA 164)	Eastbound	15.1	15.4
	Westbound	16.3	17.9
I-664 (VA 164 to I-264)	Eastbound	7.7	7.7
	Westbound	7.9	7.9
VA 164	Eastbound	6.4	6.5
	Westbound	6.1	6.1
Segment	**Direction**	**PM Peak Travel Time (minutes/vehicle)**	
		Existing	**2040 NB (Updated)**
I-64	Eastbound	17.7	20.2
	Westbound	16.6	18.3
I-664 (I-64 to VA 164)	Eastbound	17.7	19.9
	Westbound	14.6	14.7
I-664 (VA 164 to I-264)	Eastbound	7.7	7.7
	Westbound	7.8	8.0
VA 164	Eastbound	6.4	6.4
	Westbound	6.1	6.2

8.4 2040 PREFERRED ALTERNATIVE

The Preferred Alternative involves widening I-64 to three lanes in each direction from South Mallory Street to the I-64/I-564 interchange and construction of a new bridge-tunnel on the HRBT. The new lanes were coded into the HRTPO travel demand model, and the raw model output was processed as described in **Section 2.4**. The resulting daily traffic volumes on the key roadways are summarized in **Table 8-1**.

The 2040 Preferred Alternative traffic forecast shows that the widening of I-64 between South Mallory Street and I-564 would result in a considerable shift of traffic volumes to the HRBT, along with a slight decrease in daily volume on the MMMBT compared to No-Build conditions. Projected daily traffic volumes on the HRBT would increase 23 percent compared to 2040 No-Build volumes (from 112,200 to 137,700 vehicles per day). Volumes would decrease approximately two percent both on the MMMBT and on VA 164 (from 90,700 to 89,200 and from 65,600 to 64,000 vehicles per day, respectively), but would be greater than 2015 volumes.

Detailed daily volumes for 2040 Preferred Alternative conditions, including daily turning movement volumes at the ramp terminal intersections, are provided in **Appendix O** in **Figures O.1-1 through O.1-15**.

Detailed AM and PM peak hour volumes for the Preferred Alternative conditions, including turning movement volumes at the ramp terminal intersections, are provided in **Appendix O** in **Figures O.2-1 through O.2-15**.

Table 8-4 presents the intersection LOS for all ramp terminal intersections.

Detailed LOS exhibits for the Preferred Alternative are provided in **Appendix O** in **Figures O.3-1 through O.3-15**.

8.4.1 Operational Analysis

Capacity analyses of the 2040 Preferred Alternative peak hour volumes, provided in **Figure 8-3**, show that operations along I-64 west of the HRBT are generally projected to be worse than 2040 No-Build conditions, with some segments approaching capacity (LOS E). East of the HRBT, where additional capacity would be provided by widening the existing four-lane section to six lanes, operations are generally projected to improve compared to No-Build conditions, from LOS E and LOS F to LOS D or better, except east of the ramp to I-564/Granby Street.

Along I-664 and VA 164, where no capacity would be added, operations are generally projected to be comparable to 2040 No-Build conditions.

Along I-564, acceptable operating conditions of LOS D or better are projected in the non-peak directions (eastbound during the AM peak hour, westbound during the PM peak hour). During the PM peak hour, LOS F operating conditions are projected between the Terminal Boulevard on-ramp and the I-64/I-564 interchange, similar to the 2040 No-Build conditions.

Table 8-11 summarizes the Preferred Alternative LOS by Study Area Corridor.

Table 8-11: 2040 Preferred Alternative Projected LOS at Key Roadway Segments

Roadway Segment	AM Peak					
	Eastbound			Westbound		
	Existing	2040 No-Build (Updated)	2040 Preferred Alternative	Existing	2040 No-Build (Updated)	2040 Preferred Alternative
HRBT	F	F	F	F	F	F
MMMBT	C	D	C	F	E	D
VA 164	C	D	D	B	C	C
Roadway Segment	**PM Peak**					
	Eastbound			**Westbound**		
	Existing	**2040 No-Build (Updated)**	**2040 Preferred Alternative**	**Existing**	**2040 No-Build (Updated)**	**2040 Preferred Alternative**
HRBT	F	F	F	F	F	D
MMMBT	F	F	F	C	C	C
VA 164	C	C	C	C	D	D

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8.4.2 Travel Time

Compared to 2040 No-Build conditions, end-to-end travel times along I-64 are projected to improve under the Preferred Alternative. The travel times along I-664 and VA 164 would be approximately the same under No-Build conditions and Alternative A conditions, with some slight improvements to the westbound I-664 travel time north of VA 164 during the AM peak and eastbound during the PM peak. **Table 5-13** summarizes the average travel times in minutes per vehicle by Study Area Corridor for Alternative A.

It should be noted that these estimates were developed from planning-level capacity analysis output and are intended only to indicate relative changes in travel time between alternatives.

Table 8-12: 2040 Preferred Alternative Estimated End-to-End Travel Time by Study Area Corridor

Segment	Direction	AM Peak Travel Time (minutes/vehicle)		
		Existing	2040 NB (Updated)	2040 Preferred Alternative
I-64	Eastbound	18.3	19.8	18.4
	Westbound	17.3	20.1	17.0
I-664 (I-64 to VA 164)	Eastbound	15.1	15.4	15.2
	Westbound	16.3	17.9	17.4
I-664 (VA 164 to I-264)	Eastbound	7.7	7.7	7.7
	Westbound	7.9	7.9	7.9
VA 164	Eastbound	6.4	6.5	6.5
	Westbound	6.1	6.1	6.1
Segment	**Direction**	**PM Peak Travel Time (minutes/vehicle)**		
		Existing	**2040 NB (Updated)**	**2040 Preferred Alternative**
I-64	Eastbound	17.7	20.2	18.0
	Westbound	16.6	18.3	14.6
I-664 (I-64 to VA 164)	Eastbound	17.7	19.9	19.6
	Westbound	14.6	14.7	14.7
I-664 (VA 164 to I-264)	Eastbound	7.7	7.7	7.7
	Westbound	7.8	8.0	7.9
VA 164	Eastbound	6.4	6.4	6.4
	Westbound	6.1	6.2	6.1

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