Richmond Regional Transportation Planning Organization

AGENDA

RICHMOND REGIONAL TRANSPORTATION PLANNING ORGANIZATION

COMMUNITY TRANSPORTATION ADVISORY COMMITTEE

Thursday, November 19, 2020
12:00 p.m.

Members of the public may observe the meeting via YouTube Live Streaming on the PlanRVA YouTube Channel. Opportunities for sharing comments are described in the Public Participation guide.

WELCOME AND INTRODUCTIONS
(Basham) .....

ROLL CALL & CERTIFICATION OF A QUORUM
(Basham) .....
ACTION REQUESTED

A. ADMINISTRATION

1. **Consideration of Amendments to the Meeting Agenda**
   (Basham) .....

2. **Approval of the September 17, 2020 CTAC Meeting Minutes**
   (Basham) ..... page 2
   ACTION REQUESTED

3. **Open Public Comment Period**
   (Basham/5 minutes).....

4. **CTAC Chairman's Report**
   (Basham/5 minutes).....

5. **RRTPO Updates**
   (Parsons/10 minutes)..... page 8
   a. RRTPO and TAC Meetings Report for September and October
   b. Current Work Efforts

B. NEW BUSINESS

1. **Update on Connected and Autonomous Vehicles**
   (Noah Goodall, Virginia Transportation Research Council/20 minutes).....

2. **ConnectRVA 2045 Update**
(Sulabh Aryal/15 minutes) ..... page 14

3. **Complete Streets Guidance/Toolbox**
(Sara Rozmus/10 minutes) ..... page 15

4. **Greater RVA Transit Vision Plan: Near-Term Strategic Technical Analysis**
(Barbara Jacocks/10minutes) ..... page 16

5. **I-95/RMT/Commerce Corridor Access Study**
(Chet Parsons/20minutes) ..... page 18
The RRTPO Policy Board adopted the I-95/RMT/Commerce Road Corridor Plan at its meeting on Thursday, November 5, 2020. The full report is attached and a summary story map is linked here for your reference.

C. OTHER BUSINESS

1. **CTAC Announcements and Open Comment**
(Basham/5 minutes) .....

2. **Future Meeting Topics**
(Basham/5 minutes) ..... page 56

3. **CTAC Member Comments**
(Basham/5 minutes) .....

4. **Next Meeting: January 21, 2021**
(Basham) .....

D. ADJOURNMENT

KEL/nm
Attachments

pc: Patricia A. Paige, RRTPO Policy Board Chair
Jennifer DeBruhl, DRPT
Richard Duran, FHWA
Martha Heeter, RRPDC
Daniel Koenig, FTA
Liz McAdory, VDOT
Ron Svejkovsky, Tri-Cities MPO
CTAC Interested Parties
Area News Media

Richmond Regional Transportation Planning Organization

Go to Agenda

Opening Statement for Electronic Meetings

Due to the 2020 COVID-19 virus and current guidance regarding physical distancing to reduce the potential for spread, meetings of the Richmond Regional Planning District Commissions have transitioned to a virtual format in accordance with provisions of Virginia Code § 2.2-3708.2 and related legislation approved by the General Assembly of Virginia during the period of the Governor's State of Emergency Declaration for COVID-19.

While we meet in a remote/virtual format, we remain committed to public accessibility and opportunity to participate. Staff provided notice of this meeting to members and the public on November 12, 2020 through electronic posting on the PlanRVA website and email distribution of notice to members, alternates, and known interested parties, including the media.

This meeting will be recorded. Audio and visual recordings of the meeting and materials will be posted on the PlanRVA website within 48 hours of this meeting.

Any member of the public participating as an observer during the meeting today may submit comments or questions at any time prior to or during the meeting via email at rrtpoinput@PlanRVA.org. All comments and questions submitted at this time will be reviewed following the meeting and to the extent practical, responses will be provided or posted on the PlanRVA website.

We ask that members identify themselves first when speaking so we can more accurately record the activities of the meeting. All lines should be muted to minimize additional noise and feedback. You may unmute your line at any time to request acknowledgement from the Chair.

Does anyone have any questions regarding the process for assuring effective facilitation of this meeting or for how members of the public may participate?

By reading this statement, staff certifies that we have followed the approved procedures for appropriate notice of this meeting and the means by which we are convening.

Now, please indicate your presence by saying "HERE" when your name is called during a roll call. Anyone who wishes to identify themselves following the roll call of members will be invited to do so.

<Pause for Roll Call>

Go to Agenda

Richmond Regional Transportation Planning Organization

RICHMOND REGIONAL TRANSPORTATION PLANNING ORGANIZATION
COMMUNITY TRANSPORTATION ADVISORY COMMITTEE (CTAC)

MINUTES OF MEETING
GoToMeeting
September 17, 2020
12:00 p.m.

MEMBERS and ALTERNATES (A) PRESENT:

Charles City County		**Chesterfield County**		**City of Richmond**	
Vacant		Susan Beals	x	Sera Erickson	x
		Herbert A. Richwine	x	William Steele	
		Starrie Jordan (A)		Devon Barnhart (A)	
				Hwan Hill (A)	
Goochland County		**Hanover County**		**Henrico County**	
Robert L. Basham Jr. FY21 Chair	x	H. Charles Rasnick	x	James R. Barrett	x
				Amber B. Lancaster	x
New Kent County		**Powhatan County**		**Town of Ashland**	
Lisa M. Guthrie	x	Thomas A. Fletcher		Upton S. Martin FY21 Vice Chair	x
John P. Moyer (A)		Adam W. Sadler (A)			
Virginia Conservation Network (VCN)		**League of Women Voters (LWV)**		**Chamber RVA**	
Wyatt Gordon	x	Virginia P. Cowles	x	John Easter	x
Frederick S. Fisher (A)	x	Mary Crutchfield (A)		Sam Mayman (A)	
Natl. Assoc. for the Advancement of Colored People (NAACP), Richmond Virginia Branch		**RIC Area Bicycling Assoc. (RABA)**		**VA Assoc. of Railway Patrons (VARP)**	
James J. Minor III		Lloyd Vye		Michael Testerman	
Walter L. Johnson Jr. (A)	x	Champe M. Burnley (A)	x		
Virginia Commonwealth University (VCU)					
John D. Leonard	x				

The RRTPO Community Transportation Advisory Committee (CTAC) meeting was held by electronic communication means as set forth by the April 22, 2020 actions of the General Assembly in response to the continued spread of novel coronavirus, or COVID-19. The technology used for this meeting was a web-hosted service created by GoToMeeting and was open and accessible for participation by members of the

Go to Agenda

public. Voting record tables are included in Appendix A. A recording of this meeting is available on our Plan RVA YouTube Channel.

CALL TO ORDER

The Richmond Regional Transportation Planning Organization (RRTPO) Community Transportation Advisory Committee Chair, Robert L. Basham Jr., presided and called the September 17, 2020 RRTPO CTAC meeting to order at 12:00 p.m.

ATTENDANCE ROLL CALL & CERTIFICATION OF MEETING QUORUM

Nicole Mueller, Program Coordinator, took attendance by roll call. Chet Parsons, RRTPO Secretary, certified that a quorum was present.

A. ADMINISTRATION

1. **Approval of the September 17, 2020 RRTPO CTAC Meeting Agenda**
   On motion of Upton S. Martin, seconded by Lisa M. Guthrie, the RRTPO Community Transportation Advisory Committee unanimously approved the September 17, 2020 meeting agenda as presented (see Appendix A).

2. **Approval of July 16, 2020 RRTPO CTAC Meeting Minutes**
   On motion of Walter L. Johnson, seconded by John D. Leonard, the RRTPO Community Transportation Advisory Committee approved the minutes of the July 16, 2020 meeting as presented with 14 votes in favor and 2 abstentions (see Appendix A).

3. **Public Comment Period – September 17, 2020 Agenda**
   There were no requests to address the RRTPO Community Transportation Advisory Committee.

4. **CTAC Chairman's Report** – Chair Basham had nothing to report.

5. **RRTPO Updates** – Chet Parsons, RRTPO Secretary, reported as follows:

   a. **RRTPO Policy Board and TAC Meetings Report for July and August**
      The following major business and action items from the July 14, 2020 and August 11, 2020 RRTPO Technical Advisory Committee (TAC) meetings and the September 3, 2020 RRTPO Policy Board meetings were included (The RRTPO Policy Board meeting on August 6, 2020 was cancelled.):
      - Election of FY21 RRTPO Technical Advisory Committee (TAC) Officers
      - Public Transportation Work Group
      - SMART SCALE Round 4 Regional Project Selection
      - FY20 Unified Planning Work Program (UPWP) Budget Amendment
      - FY21 – FY26 RSTP/CMAQ Allocations
      - Regional Transit Vision Plan: Near-Term Strategic Technical Analysis
      - Eighth Annual Transportation Forum

      **A copy of the report given by Chet Parsons is available at RRTPO Policy Board and TAC Meetings Report Page 10-15

b. Current Work Efforts – Mr. Parsons highlighted several work efforts including:

- ConnectRVA 2045 Long-Range Transportation Plan
  A Vision, Goals, and Strategies survey went live around mid-August asking participants to share their hopes for ConnectRVA 2045. This survey has been very active, and staff recommends having it shared widely to encourage participation.
- Greater RVA Transit Vision Plan: Near-Term Strategic Technical Analysis
  The RRTPO Policy Board adopted the technical analysis recommendations at their September 3, 2020 board meeting. A summary story map of the analysis, recommendations and next steps can be found here along with the final document.
- Ashland Trolley Line Trail Study
- Regional Bicycle and Pedestrian Plan Update
- Ashland Complete Streets Pilot Project
- Active Transportation Work Group (ATWG)
- Vision Zero Work Group
- American Planning Association-Virginia Chapter Annual Conference
- SMART SCALE Round 4

**A copy of the report given by Chet Parsons is available at Current Work Efforts Page 16-18

B. PRIMARY MEETING TOPICS

1. Accessibility for Individuals with Disabilities/Accessible Transportation
VCU MURP Student and VCU Wilder Fellow at PlanRVA Rebekah Cazares reviewed the principal topic of her Capstone/Professional Plan Project, which is to address accessible transportation, disability-inclusive transportation infrastructure and first mile/last mile conditions in one part (census tract) of the region. She noted that using criteria such as total population and percentage living with a disability, percentage using public transportation, percentage with no car, percentage age 65 and older and percentage minority and in poverty, her analysis had identified four census tracts along the Jefferson Davis Highway corridor that might serve as candidates for detailed study. Ms. Cazares invited the members of CTAC to provide her with feedback on her project design and methodology.

**A copy of the presentation given by Rebekah Cazares, VCU MURP Students, is available at Presentation: Item B.1. Accessible Transportation

2. PlanRVA COVID-19 Pandemic Mobility Impacts Dashboard
Chet Parsons, Director of Transportation, reviewed the features of the COVID-19 Pandemic Transportation Dashboard. The dashboard has been developed and is being maintained by PlanRVA staff to track three key travel indicators: vehicle miles traveled, distance traveled, and daily transit ridership. He pointed out that data on vehicle miles traveled and distance traveled can be analyzed at the individual jurisdictional level and in two-week increments.

**The COVID-19 Pandemic and Mobility dashboard presented by Chet Parsons is available on the PlanRVA website.

PlanRVA
9211 Forest Hill Avenue, Suite 200
Richmond, VA 23235

Go to Agenda

3. **Central Virginia Transportation Authority (CVTA)**
   Chet Parsons, Director of Transportation, reported on activities related to the establishment of the Central Virginia Transportation Authority. He noted that since the initial organization meeting on August 27, work was underway to develop the authority budget, committee structure and membership, bylaws and other related organizational matters. In response to a question, Mr. Parsons noted that PlanRVA was providing staff and administrative support to the Authority and a definitive timetable had not been established for the Authority to assume responsibility for day-to-day management of its business.

   **Agendas and associated meeting materials for the CVTA and its committees can be found on the PlanRVA website.

4. **Federal Transportation Funding Legislation Update**
   Levon Boyagian, Policy Advisor at the Association of Metropolitan Planning Organizations, provided an overview of federal transportation programs. He noted that the federal response to COVID-19 included passage of the CARES Act which was signed into law March 27, 2020 and included $25 billion for transit infrastructure grants, the HEROES Act which was passed by the House on May 15 and included $15.75 billion for transit, and legislation in the Senate that would provide $500 billion in relief funds. Mr. Boyagian provided a comparison of the House and Senate surface transportation bills and noted that the current FAST Act expires September 30, 2020. Concerning the FY21 Federal Budget, Mr. Boyagian noted that Congress and the President are negotiating a continuing resolution in order to avert a government shutdown, but many questions remain, including the length of the continuing resolution and whether it should be combined with COVID-19 relief.

   **A copy of the presentation given by Levon Boyagian, Policy Advisor AMPO, is available at Presentation: Item B.4. Federal Transportation Funding Legislation Update

C. OTHER BUSINESS

1. **CTAC Announcements and Open Public Comment Period**
   There were no requests to address the committee.

2. **Future Meeting Topics** – Chair Robert L. Basham Jr. noted future meeting topics included in the agenda package.

3. **CTAC Member Comments**
   There were no requests to address the Community Transportation Advisory Committee.

4. **Next CTAC Meeting: November 19, 2020**
   Chairman Basham noted the next meeting will be held on November 19, 2020, beginning at 12:00 p.m. in Richmond, Virginia.

D. ADJOURNMENT

On motion of Upton S. Martin, Chairman Basham adjourned the meeting at 1:00 p.m. on September 17, 2020.

KEL/nm

Richmond Regional Transportation Planning Organization

APPENDIX A

RRTPO Community Transportation Advisory Committee (CTAC) – Voting Record Tables

Item A.1. Approval of the September 17, 2020 RRTPO CTAC Meeting Agenda

Jurisdiction/Agency (No. of Votes)	Member/Alternate (A)	Aye	Nay	Abstain	Absent
Chesterfield County (2)	Herbert A. Richwine	x			
	Susan Beals	x			
City of Richmond (2)	Sera Erickson	x			
Goochland County (1)	Robert L. Basham	x			
Hanover County (1)	H. Charles Rasnick	x			
Henrico County (2)	James R. Barrett				technical difficulties
	Amber B. Lancaster	x			
New Kent County (1)	Lisa M. Guthrie	x			
Town of Ashland (1)	Upton S. Martin	x			
VCN (1)	Frederick S. Fisher (A)	x			
LWV (1)	Virginia P. Cowles	x			
Chamber RVA (1)	John Easter	x			
NAACP (1)	Walter L. Johnson (A)	x			
RABA (1)	Champe M. Burnley (A)	x			
VCU (1)	John D. Leonard	x			
TOTAL		14			1

A quorum shall consist of a majority of the Committee's current membership (as per Article VII, Section 4 of the bylaws).

Item A.2. Approval of the July 16, 2020 CTAC Meeting Minutes as Presented

Jurisdiction/Agency (No. of Votes)	Member/Alternate (A)	Aye	Nay	Abstain	Absent
Chesterfield County (2)	Herbert A. Richwine	x			
	Susan Beals	x			
City of Richmond (2)	Sera Erickson	x			
Goochland County (1)	Robert L. Basham	x			
Hanover County (1)	H. Charles Rasnick	x			
Henrico County (2)	James R. Barrett				technical difficulties
	Amber B. Lancaster	x			
New Kent County (1)	Lisa M. Guthrie	x			
Town of Ashland (1)	Upton S. Martin	x			
VCN (1)	Frederick S. Fisher (A)			x	
LWV (1)	Virginia P. Cowles			x	
Chamber RVA (1)	John Easter	x			
NAACP (1)	Walter L. Johnson (A)	x			
RABA (1)	Champe M. Burnley (A)	x			
VCU (1)	John D. Leonard	x			
TOTAL		12		2	1

A quorum shall consist of a majority of the Committee's current membership (as per Article VII, Section 4 of the bylaws).

Go to Agenda

MEMORANDUM

To: RRTPO Community Transportation Advisory Committee (CTAC)

From: Chet Parsons, RRTPO Secretary

Date: November 19, 2020

Subj: RRTPO Policy Board and TAC Meetings Report

The following presents a report on major business and action items from the September 8, 2020 and October 13, 2020 RRTPO Technical Advisory Committee (TAC) meetings and the October 1, 2020 and November 5, 2020 Richmond Regional Transportation Planning Organization (RRTPO) Policy Board meeting.

Prioritization of VTrans Mid-Term Needs

Background: Earlier this year, the Commonwealth Transportation Board (CTB) accepted the 2019 VTrans Mid-term Needs and directed the Office of Intermodal Planning and Investment (OIPI) to prioritize the identified Needs. Based on direction from the CTB, the prioritized 2019 Mid-term Needs may form the basis for VDOT and DRPT's planning and project development efforts as well as policies related to transportation programs and activities.

OIPI will be hosting a series of virtual workshops and online engagement to share the initial prioritization of the 2019 VTrans Mid-term Needs to actively collaborate with local and regional transportation partners to improve our methodology, similar to that done during the 2019 VTrans Regional Workshops.

1. Utilize local and regional knowledge to ensure that methods are accurate and appropriately capture the most pressing transportation needs in each Construction District and the Commonwealth.
2. Gather feedback from local and regional stakeholders on thresholds for prioritization of the identified VTrans Mid-term Needs.
3. Convey the trade-offs that the Commonwealth must consider while investing resources in identifying solutions for VTrans Mid-term Needs.

**A copy of the presentation given by Chris Wichman, Office of Intermodal Planning and Investment, is available at Presentation: Item 6. Prioritization of VTrans Mid-Term Needs - Update

FY22 – FY27 RSTBG/CMAQ Schedule

Background: The FY21 – FY26 project selection and allocation process was significantly delayed due to COVID-19 and the subsequent suspension of SYIP development. Given the delays and after discussion with VDOT, the application cycle was pushed back to October for this next round and shortened to 1 month. The rest of the schedule is expected to follow previous practice, with new allocations finalized by April.

Project were required to submit applications through the electronic form this year. Building on the changes made last year, all application types were

Go to Agenda

consolidated into a single form and were accessed through the same link. Submitting the applications electronically facilitates data management and streamlines the application review process.

Staff prepared guidance regarding suggested supplemental materials for new project applications. This guide was intended to offer more insight for sponsors when preparing the application to ensure submissions provide all necessary information for scoring. The application link was sent to TAC members and eligible applicants via email on Monday, September 28, 2020.

The application window for the FY22 – FY27 RSTBG/CMAQ funding was open from October 1, 2020 to October 30, 2020.

SMART SCALE Round 4 Local Project Endorsements

BACKGROUND: The application window for Round 4 of Smart Scale closed on August 17, 2020. All local and regional applications have been submitted. To support local and regional planning efforts and consistency with the Constrained Long-Range Plan (CLRP), a resolution of support from the MPO is needed for all projects within the MPO study area that are not included in or consistent with the adopted CLRP. This requirement applies to projects submitted by localities and transit agencies. In addition to the consistency requirements, an MPO resolution of support is also required for all locality sponsored projects on a CoSS. This requirement does not apply to transit agencies. Table 2.2 from the Smart Scale Technical Guide which summaries the requirements for MPO support is reproduced below.

Project Type	Regional Entity	Locality	Public Transit Agency
Corridor of Statewide Significance	Yes	Yes, with resolution of support from relevant regional entity	Yes, with resolution of support from relevant regional entity *
Regional Network	Yes	Yes, with resolution of support from relevant MPO*	Yes, with resolution of support from relevant regional entity *
Urban Development Area	No	Yes, with resolution of support from relevant MPO*	No
Safety	No	Yes, with resolution of support from relevant MPO*	No

* Projects within established MPO study areas that are not identified in or consistent with the regionally adopted Constrained Long-Range Plan (CLRP) must include a resolution of support from the respective MPO Policy Board

Go to Agenda

Due to the disruption in meetings caused by the COVID-19 pandemic, the required resolutions of support were not needed for submission of applications on August 17, 2020. The deadline for submission of MPO resolutions of support was October 30, 2020.

On October 1, 2020 the RRTPO Policy Board supported of the presented locality and transit agency projects in the MPO study area for Smart Scale Round 4.

I-95/RMT/Commerce Corridor Access Study
BACKGROUND: This transportation study was commissioned by the Virginia Department of Transportation, in collaboration with PlanRVA and The Port of Virginia, to identify and develop transportation solutions to access and safety challenges in the area surrounding the I-95 Bells Road Interchange and Commerce Road. This effort builds off previous work such as the Commerce Corridor Study Implementation Plan and Technical Report.

This plan incorporated the following steps and positions the RRTPO and its member governments to seek out funds and leverage other projects to advance the recommendations in the I-95/RMT/Commerce Road corridor.

1. Collaborate with key stakeholders;
2. Define existing and future land use activity in the study area;
3. Document transportation safety and operational challenges;
4. Identify short-term and long-term transportation infrastructure improvements to allow industrial corridor to reach its economic potential.

At the November 5, 2020 meeting, the RRTPO Policy Board approved the adoption of the I-95/RMT/Commerce Corridor Access Study.

Port of Virginia Update
** A copy of the presentation provided by Barbara Schoeb Nelson, Vice President at the Port of Virginia, is available at:
Port of Virginia Update, October 13

Complete Streets Guidance/Toolbox
Initiated by the Community Transportation Advisory Committee (CTAC) in 2017, the Complete Streets work effort has evolved from consideration of possible regional policy guidance through research of best practices to their application in the Town of Ashland. Smart Growth America (SGA) and Michael Baker International conducted a series of workshops to actively engage partners and the public during the summer-fall 2019.

This Ashland pilot project provided the foundation for the creation of a tool-box in the form of a readily updatable Story Map of best practices examples and specifications for the region's localities to draw from in working with VDOT, developers, and their own staff to implement a roadway network that is more complete, safer for all users, contributes to stronger economies. This will be regularly updated.

Go to Agenda

** A link of the illustrated story map provided by Barbara Jacocks, Principal Planner at PlanRVA, is available here:
Complete Streets: An Overview of Complete Streets policy and practice in the Richmond Region

MPO Boundaries and Rural Jurisdictions
BACKGROUND: With the advent of the Central Virginia Transportation Authority in 2020, Mr. David Williams, Board of Supervisors (Powhatan), requested that RRTPO staff consider the opportunity to expand the RRTPO boundary to match both the PlanRVA boundary and CVTA boundary – Planning District 15. Chet Parsons held subsequent conversations with Dan Lysy, former Director of Transportation at PlanRVA, and Richard Duran, liaison with FHWA, to gather feedback on the prospect.

In these conversations, there seems to be an opportunity to assess the implications of a boundary change and determine if the positives outweigh the negatives for such a change at this time.

The information shared below was shared with the RRTPO Policy Board at their meeting in October and initiated the request for TAC to consider the action and make a recommendation at the December RRTPO Policy Board meeting. Staff presented the following factors for consideration to the Policy Board:

1. The Metropolitan Planning Area (MPA) boundary can be expanded from time to time to adapt to the growth of the region.
2. The MPA is required to be evaluated following every decennial Census. The next time period for evaluation of the Richmond MPA is roughly 2022.
3. Expansion of the MPA to include all of Charles City, Goochland, New Kent, and Powhatan Counties would present the following considerations:
    a) The TPO boundary would match the boundary of PlanRVA and the CVTA and could increase public awareness and understanding of the TPO as well as general uniformity region-wide.
    b) RSTP/CMAQ funding may be available for projects in wider geographic areas of the four current partially-included jurisdictions.
    c) With a change to the MPA, rural transportation planning assistance from VDOT may become unavailable to assist in planning studies for the four rural jurisdictions (roughly $58,000 annually). This loss would be realized by PlanRVA and would diminish staff budget for assistance to member jurisdictions.

Since the October TAC meeting, staff held individual discussions with each of the four jurisdictions that hold both rural and urban area in the current MPO Study Area. This consideration does NOT include southern Chesterfield County, which shares geographic area between the Richmond and Petersburg urbanized areas. Each of the jurisdictions of Powhatan, Goochland, New Kent, and Charles City Counties supports the expansion of the MPO Study area to include the full geographic area of the counties.

The RRTPO TAC reviewed and recommended approval to update the MPO Planning Boundary Area to include the entirety of Powhatan, Goochland, New Kent, and Charles City Counties at their November 10, 2020 meeting.

CAP/nm

Go to Agenda

Current Work Efforts Update – Item 5.b.

ConnectRVA 2045 Long-Range Transportation Plan

The Vision, Goals, and Strategies survey was closed on October 11, with 949 responses. Staff synthesized the responses and presented them to the LRTP-Advisory Committee (AC) on their October 22 meeting. With public and AC input, staff is working to develop Vision, Goals and Objectives for the plan.

Staff is also working with AC and the Project Champions to develop regionally significant transportation projects within the RRTPO's Metropolitan Planning Area (MPA) Boundary. The product will be a streamlined list of transportation projects which will be called the Universe of Projects. Staff anticipate completing the list by the end of the year.

Ashland Trolley Line Trail Study

The Ashland Trolley Line Trail advisory group is working in concert with the VDOT Ashland to Petersburg Trail Study. The localities along the corridor continue to identify segments of independent utility along the conceptual 14-mile route from Ashland to the City of Richmond. Several of these segments are the subject of funding applications either through the Transportation Alternatives (TA) program or SMART SCALE. Ashland held a ribbon-cutting for their boardwalk section on October 21, 2020. The official name of the Ashland to Petersburg Trail as the "Fall Line" was also announced at the Ashland event by Governor Ralph Northam. Staff continues to work with the National Park Service (NPS), Rivers, Trails, and Conservation Assistance Program to discuss the scope of work for the upcoming FY21. Additional design assistance is being planned with the NPS help to engage the Virginia Chapter of the American Society of Landscape Architects (ASLA) and Virginia Tech through studio projects this school year. These efforts have led to the ongoing development of two story maps for the project; one on the history of the trolley line and a second is a design sketchbook.

Regional Bicycle and Pedestrian Plan Update

The story map of existing infrastructure, bike/ped features and statistics on bike/ped injuries and fatalities in the region continues to be updated and refined. Staff held a fourth steering committee meeting on September 15, 2020 to further review local priorities, future plans, and regional priority corridors as a foundation for depicting a regional network supported by clear goals, objectives and measures of performance that define regional impact and establish a strategy for implementation. The meeting was quite productive, and staff got good feedback on Vision and Guiding Principles from committee members. The next meeting is scheduled for October 29, 2020.

Ashland Complete Streets Pilot Project

Complete streets guidelines, or a "tool-box" of resources, depicted through graphic and photographic examples are being prepared to serve as implementation support for the regional bike/ped plan. These images are intended to show specific locations where good standards have been implemented and where infrastructure improvements could incorporate complete streets elements for better solutions

Go to Agenda

throughout the region. The illustrated story map is available for review and continues to be updated.

Active Transportation Work Group (ATWG)
Staff is working on scheduling the next meeting of the ATWG for November/December. Staff continues to work with Henrico County's Active Transportation Work Group, which is designed to advise the planning for a bicycle and pedestrian chapter of the county comprehensive plan. Henrico canceled the October work group meeting but plans to meet in November.

American Planning Association-Virginia Chapter Annual Conference, Oct 12-16
Themed "We'll Get You Moving" with a focus on multi-modal transportation, the virtual conference was held Oct 12-16. Several staff members attended and will have access to recorded sessions until April 2021. The virtual conference was well-received!

Vision Zero Work Group
The RRTPO Vision Zero Work Group, formed in June 2020, establishes regional goals and gathers support and coordination at the regional level. Additionally, it supports local transportation safety organizations to improve safety around the region. During the October 8, 2020 meeting, the work group discussed the development of a Vision Zero framework for the region. The next RRTPO Vision Zero Work Group meeting will be held on December 10, 2020.

Public Transportation Work Group
This work group met on October 5, 2020 and is working on a framework for establishing regional transit priorities for our region. GRTC staff briefed the group on the development of the draft scope of work and the project tasks required to complete the development of a Regional Public Transportation Plan. A final draft scope will be developed and come back to the work group with a due date for review so GRTC can start the procurement process. The next meeting will be held on November 2, 2020.

RSTBG/CMAQ Work Group
This work group met on October 13, 2020 to discuss the application and project screening process for regional funding. The subcommittee is currently reviewing draft language regarding project screening and will submit requested changes to staff this week. The next meeting of the subcommittee is scheduled for January 11, 2021 to allow coordination with the LRTP schedule as we work to align long-range and short-term project scoring and evaluation.

Go to Agenda

CTAC AGENDA 11/19/20; ITEM B.2.

ConnectRVA 2045 Update

Richmond Regional Transportation Planning Organization

REQUESTED ACTION: This is an information item; no action is requested.

BACKGROUND: ConnectRVA 2045 is the name of the new long-range transportation plan that is currently under development. The long-range transportation plan is the document which sets the vision for the next 20 years of transportation improvements in the region and includes a financially constrained list of projects which are expected to be built over that time period. The Long-Range Transportation Plan – Advisory Committee (LRTP-AC) spearheads the development of the LRTP with autonomy to make decisions guiding the process and outcomes. The ConnectRVA 2045 LRTP is due by September 2021.

Staff last updated CTAC on the progress of the LRTP in May. In this meeting, staff will provide an update of the ongoing tasks specifically, the process of screening and development of the regionally significant transportation projects and the development process for vision, goals and strategies for the plan.

SA

Go to Agenda

CTAC AGENDA 11/19/20; ITEM B.3.

Complete Streets Guidance/Toolbox

Richmond Regional Transportation Planning Organization

REQUESTED ACTION: No action is requested. Staff provides this progress update and requests CTAC review and input on the use of the Complete Streets toolbox to help guide implementation of the Regional Bicycle and Pedestrian Plan (BP Plan) as one means of implementing a multi-modal network that is safer for all users and economically viable for the Richmond region.

BACKGROUND: Initiated by the Community Transportation Advisory Committee (CTAC) in 2017, the Complete Streets work effort has evolved from consideration of possible regional policy guidance through research of best practices to their application in the Town of Ashland. Smart Growth America (SGA) and Michael Baker International conducted a series of workshops to actively engage partners and the public during the summer-fall 2019.

The Ashland pilot project provided the foundation for the creation of a toolbox in the form of a readily updatable story map of best practices examples and specifications for the region's localities to draw from in working with VDOT, developers, and their own staff to implement a roadway network that is more complete, safer for all users, contributes to stronger economies. This will be regularly updated.

CTAC REQUESTED ACTION: No action is requested. Staff provides this progress update on the Complete Streets Toolbox for CTAC review and comment. Staff will continue to provide regular updates throughout the program year in conjunction with the development of the updated BP Plan.

BJ

CTAC AGENDA 11/19/20; ITEM B.4.

GREATER RVA TRANSIT VISION PLAN:
NEAR-TERM STRATEGIC TECHNICAL ANALYSIS

Richmond Regional Transportation Planning Organization

REQUESTED ACTION: Review the Near-Term Regional Transit Vision Plan.

BACKGROUND: The purpose of the study, kicked off in May 2019, was to analyze and recommend which of the high-frequency routes identified in the *Greater RVA Transit Vision Plan* (April 2017) can be implemented in the near-term with the greatest predictability of success. Of the 20 corridors slated by the original study for 20-minute or less service frequency, 12 corridors were selected through the first phase of screening. The initial screening analysis considered activity density, employment and working populations, environmental justice and transit dependent populations, existing GRTC network layout, potential near-term transit supportive development and steering committee feedback.

Findings from the second phase of analysis were reviewed and discussed with the TVP Steering Committee, the CTAC, TAC and TPO Policy Board to move forward. The following five factors were evaluated as part of this screening:

- Access to community facilities,
- Walkability,
- Pedestrian networks,
- Roadway suitability, and
- Ridership potential.

Based on this review, the following five corridors were recommended to move forward with more detailed capital and operating cost estimate development given alternative levels of service, analysis of return on investment and review of potential funding resources:

- Broad Street-Short Pump (Willow Lawn to Bon Secours Short Pump)
- Midlothian Turnpike (Downtown Richmond to Huguenot Road)
- West End South (Downtown Richmond to Regency Square)
- Airport via Route 60 (Downtown Richmond to RIC Airport)
- Route 1 to Ashland (Downtown Richmond to Parham Road)

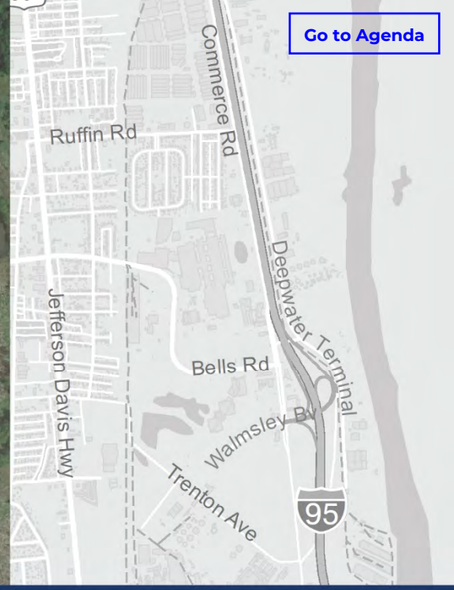
The TVP Steering Committee reviewed the detailed analysis at their meeting on April 3, 2020 shown on the summary sheets for the 12 corridors link:
Greater RVA Transit Vision Plan. The proposed service plan options and detailed cost analysis of the five selected corridors are available at RVA TVP Implementation Feasibility Evaluation [full presentation posted on the PlanRVA website as part of the Transit Vision Plan snapshot]. The GRTC Board was briefed on the implementation

feasibility on June 16, 2020, and it was also reviewed with the RRTPO Community Transportation Advisory Committee (CTAC) on July 16, 2020.

The purpose of the presentation today is to provide the CTAC with an executive level summary through a story map Greater Richmond TVP Story Map of the full scope of the project.

On September 3, 2020 the Richmond Regional Transportation Planning Organization (RRTPO) adopted the proposed plan for the Regional Transit Vision Plan Near-Term Strategic Technical Analysis of five corridor segments considered for enhanced transit in the near-term planning horizon (five to seven years).

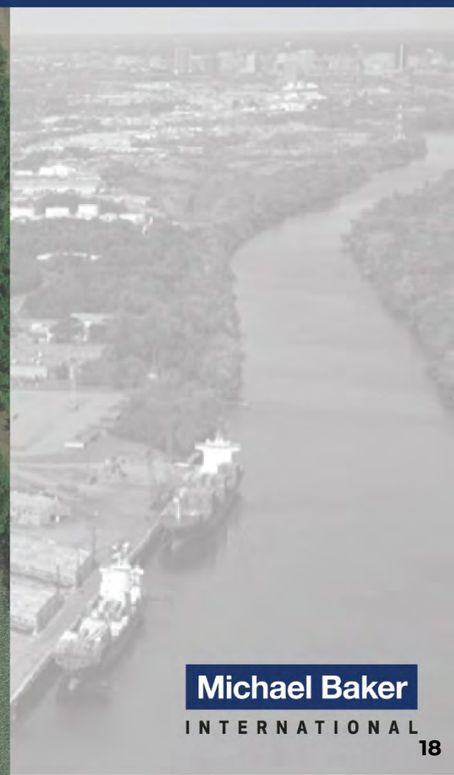
Go to Agenda



I-95/Richmond Marine Terminal/ Commerce Corridor Access Study

Final Report (DRAFT)

10/5/2020



Michael Baker INTERNATIONAL

Contents

Figures

Tables

Appendices

List of Acronyms

AADT	Average Annual Daily Traffic
DDI	Diverging Diamond Interchange
HCM	Highway Capacity Manual
LOS	Level of Service
MOE	Measures of Effectiveness
NEPA	National Environmental Policy Act
QR	Quadrant Roadway Intersection
SPUI	Single Point Urban Interchange
TAZ	Traffic Analysis Zone
TOSAM	Traffic Operations and Safety Manual
TPO	Transportation Planning Organization
TTI	Travel Time Index
VDOT	Virginia Department of Transportation

1. Introduction

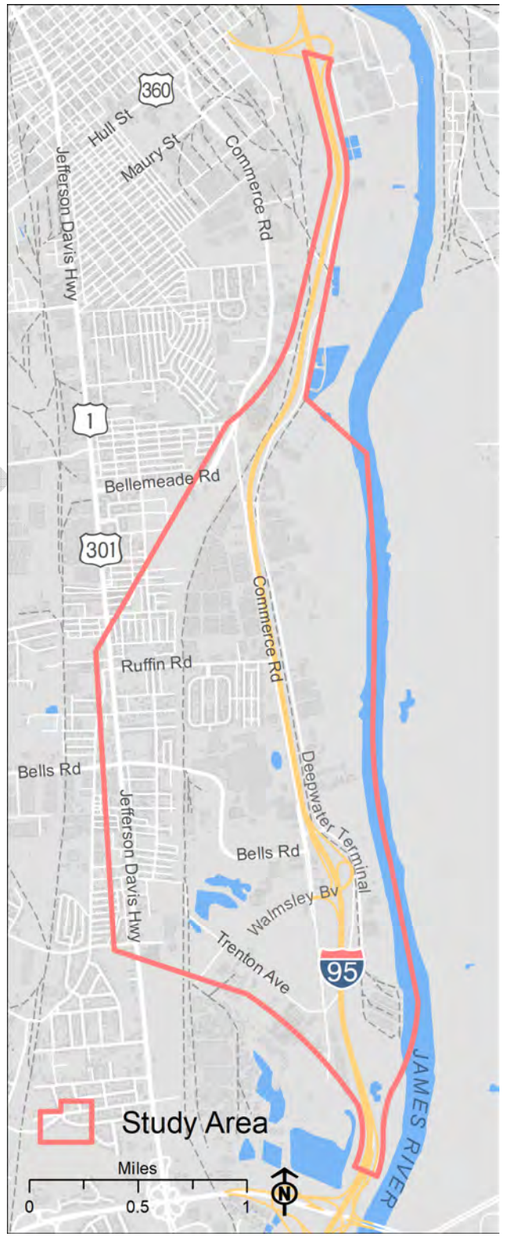
1.1 Background

The purpose of the I-95/Richmond Marine Terminal/Commerce Corridor Access Study is to identify cost-effective short- and long-term improvements to enhance safety and improve access to industrial land uses. This study was commissioned by the Virginia Department of Transportation, in collaboration with PlanRVA and The Port of Virginia, to identify and develop transportation solutions to access and safety challenges in the area surrounding the I-95 Bells Road Interchange and Commerce Road. This effort builds off of previous work such as the Commerce Corridor Study Implementation Plan and Technical Report. In that 2017 effort, a number of recommendations were made at a conceptual level. This 2020 study was intended to provide more project development detail for recommendations H2.4.1, H2.4.2, H2.6, H5.1, H7.2 as well as P1.2 and P1.3 found in the Implementation Plan mentioned above.

1.2 Study Area

The study area is shown in Figure 1. This area, bounded by the color shown in the legend, represents approximately 2,000 acres and consists of both freeway and arterial network. It extends from the south-facing ramps at Exit 73 (Maury Street interchange) on I-95 and the north-facing ramps at Exit 67 (Chippenham Pkwy). The arterial network includes Jefferson Davis Highway between Ruffin Road and Walmsley Boulevard, Commerce Road between Trenton Avenue and Bellemeade Road, Deepwater Terminal and east-west local roads connecting the three. Although this represents a definitive boundary, it is necessary for the study team to look beyond this area for the purpose of considering external influences such as regional land use changes and highway demand.

Figure 1: Study Area



1.3 Stakeholder Engagement

This study was conducted as a collaborative effort with a group of stakeholders identified at the onset of the study. Communication with these stakeholders was paramount in defining the deficiencies and developing meaningful solutions for the corridor. The involvement process began with the July 15th, 2019 project kick-off/scoping meeting and subsequent discussion within the core study team. The stakeholders included are listed below:

- City of Richmond
- County of Chesterfield
- County of Henrico
- The Port of Virginia
- Richmond Regional Transportation Planning Organization (PlanRVA)
- Federal Highway Administration (FHWA)
- Virginia Department of Transportation (VDOT)

This stakeholder group consisted of staff-level representatives from each of the organizations. This group met at key milestones throughout the study to review progress and results. As the consultant member of the study team, Michael Baker International prepared content and facilitated the discussions. These meetings were typically held at the PlanRVA office in Richmond. Table 1 lists the dates and topics of these meetings.

Table 1: Core Study Team Meetings

Meeting Date	Meeting Topic
July 15, 2019	Study Kick-Off/Orientation
August 12, 2019	Existing Conditions (WebEx)
September 16, 2019	Forecasting Methodology
October 28, 2019	2045 No-build vs Existing Conditions
November 18, 2019	Short-term Concepts Overview
December 18, 2019	Short-term Concepts Operational Results (WebEx)
February 3, 2020	Short-term Concepts Recommendations & Long-term Concepts Overview
March 9, 2020	Long-term Concepts Operational Results & Recommendations
May 20, 2020	Project Outreach Strategy (WebEx)

Figure 2: Stakeholder Logos

2. Existing Conditions

2.1 Existing Land Use

As shown in Table 2 below, the existing land use is mostly industrial with over 65% of the total land use in the study area. While the western part of the study area on Jefferson Davis Highway is mostly residential, industrial development is greatest in the eastern part, which includes Commerce Road and Deepwater Terminal Road.

The Richmond Marine Terminal (RMT) shown in Figure 3 and located on the south end of Deepwater Terminal Road, is a major contributor to the development and industrial activity in the area. The facility is owned by the City of Richmond and leased by The Port of Virginia, under an agreement that began in late 2010; the lease was extended by 40-years through an agreement in October 2015. The RMT has warehouse space and a 1,570-foot long wharf and handles containers, temperature-controlled containers, and break-bulk, bulk, and neo-bulk cargo. The facility is a U.S. Customs-designated port of entry, and the full range of customs functions is available to customers. The James River Barge Service, a container-on-barge service from Hampton Roads to Richmond, provides a maritime alternative to I-64 by transporting goods on the James River via barges, removing container traffic from local roads and highways. This service was originally provided three days a week at RMT and today provides five-day a week service. Moving cargo from terminals in Hampton Roads to RMT reduces truck turn times; reduces air polluting emissions; increase customer's service levels and increases economic opportunities. The Richmond Marine Terminal has grown by double digits every year since 2015. This growth is driving the success of the terminal and bringing jobs and economic development to the area.

Figure 3: RMT

Table 2: Existing Study Area Land-Use Summary

Land Use Class	Acres	Percent of Study Area
Commercial	24.8	1.3%
Industrial	1213.5	65.3%
Economic Development	23.9	1.3%
Mixed Use	80.4	4.3%
Residential	339.1	18.3%
Public	175.7	9.5%

2.2 Existing Roadway Conditions

A field review was conducted in October 2019 to observe roadway and intersection configurations; collect travel times, identify deficiencies and areas of concern; identify unique roadway features; and observe traffic operations. This information was then utilized to conduct traffic operational analyses for the study intersections and freeway for typical weekday AM and PM peak hours. The key findings from the field visit are presented below:

- Southbound approach on Commerce Rd at Walmsley Blvd/I-95 ramps intersection - queue spilling out of available turn lanes in the PM peak hour
- Southbound right turn on Commerce Rd at Walmsley Blvd/I-95 ramps intersection – inadequate truck turning radius
- Westbound approach at Walmsley/I-95 ramps intersection – vehicles coming from the I-95 southbound ramp with a destination south of intersection have difficulty weaving over to the left turn lane when queue in that lane extends to 250 ft and more
- Westbound approach on Bells Rd Access Rd at Commerce Rd intersection – queue extends to Deepwater Terminal Rd in the PM peak hour
- Northbound left turn on Jefferson Davis Hwy at Bells Rd intersection - queue spilling out of available turn lane in both peak hours
- Intersection of Commerce Rd and Commerce Rd Access inadequate pavement markings and rough road

The following section provides a brief description of existing roadway characteristics of main facilities in the study area.

Interstate 95 (I-95) is a six-lane divided limited-access highway, functionally classified as an Interstate, with a posted speed limit of 60 mph. According to the 2018 Published VDOT Counts, I-95 carries an average annual daily traffic (AADT) volume of around 53,000 vehicles per day (VPD) between Maury Street and Chippenham Parkway in each direction. Exit 67 (Chippenham) is classified as a system interchange (freeway-to-freeway), while Exits 69 (Bells) and 73 (Maury) are classified as a service interchanges.

Commerce Road is classified as a minor arterial according to VDOT's 2014 Functional Classification map. The section of roadway within the study area is oriented in a north-south direction and is a two-lane undivided roadway for the most part with sections in the vicinity of Bells Road interchange being four-lane divided roadway. The posted speed limit is 35 MPH south of Bells Road Access Road and increases to 45 MPH to the north. The segment between the I-95 ramps and Bells Road carries an AADT of 20,000 VPD per 2018 VDOT Counts, which is three to five times higher than the other segments in the study area.

Deepwater Terminal Road is also classified as a minor arterial and is serving a lot of truck traffic as it is located in a primarily industrial area. It is a two-lane undivided roadway oriented in north-south direction. The posted speed limit is 35 MPH and the 2018 AADT was 1,400 VPD.

Bells Road is a four-lane divided roadway in west-east direction. This minor arterial has around 9,000 VPD according to 2018 VDOT Counts and serves as a primary connector between Jefferson Davis Highway and Commerce Road. The posted speed limit is 35 MPH.

Jefferson Davis Highway is classified as other principal arterial according to VDOT's 2014 Functional Classification map. The section of the roadway within the study area is a six-lane divided roadway oriented in north-south direction. The posted speed limit is 40 MPH and an AADT is estimated to be 11,000 VPD according to 2018 VDOT Counts.

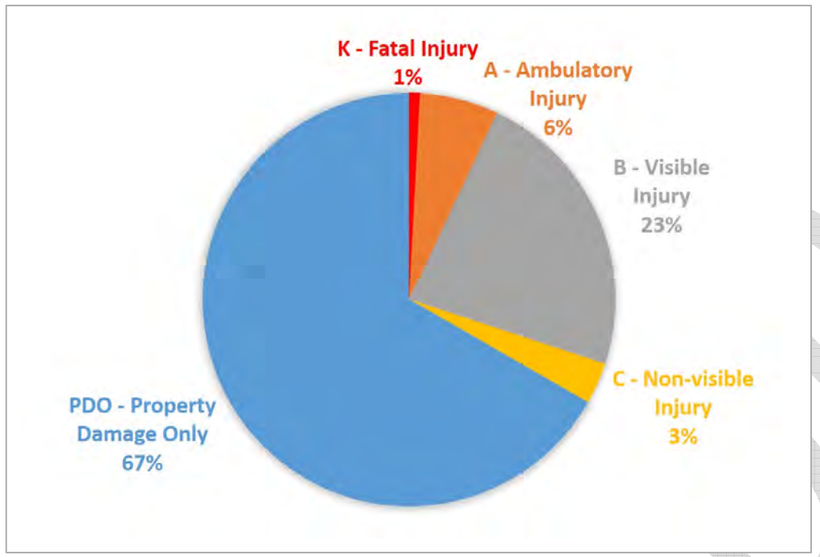
Ruffin Road is a two-lane undivided major collector. It is oriented east-west connecting Jefferson Davis Highway and Commerce Road. The posted speed limit is 25 MPH and a 2018 AADT is around 2,000 VPD. There is a truck restriction on this road except for local deliveries.

2.3 Crash Analysis

An evaluation of corridor safety was conducted based on an analysis of crash summary information. A crash analysis for the study area over the latest six years of available crash data (January 1, 2013 to December 31, 2018) was obtained from VDOT's Roadway Network System. Figure 4 illustrates the crash severity that occurred in the study corridor during this timeframe. Figure 5 illustrates the collision type within the study corridor during the same period. Figure 6 presents the crash densities, location, and severity along the corridor. On the crash density map, locations with more frequent crashes are indicated in darker red areas, while lower frequency locations are lighter red.

As illustrated in Figure 7 the analysis of existing conditions found that the crash rate of I-95 is below the statewide average when compared to other interstates within the Commonwealth. Bells Road crash rate is slightly higher than the statewide average of similar roadway types, while Jefferson Davis Highway and a portion of Commerce Road between Bells Road and I-95 ramps have crash rates that are greater than 100% above the statewide average.

Figure 4: Crash Severity



Key Findings

- In 67% of crashes only property damage occurred with no injuries or fatalities. 1% of crashes resulted in fatal injury.
- The greatest number of crashes were angle collisions, which accounted for 29% of crashes. This is followed closely by rear end collisions, which accounted for 27% of crashes.
- Most off-road collisions, 137 crashes, occurred within the interchange of I-95 at Commerce Road including the ramps
- Rear end crashes are generally higher at signalized intersections compared to unsignalized intersections along the corridor. For example, the signalized intersection at Commerce and Bells Road had 24 crashes, whereas the unsignalized intersection at Commerce and Ruffin Rd has two crashes.
- The crash rate is highest around the I-95 and Commerce interchange, which includes the section of Commerce Road between the interchange ramps and Bells Road. Also, the crash rate is very high on Jefferson Davis Highway at the intersection with Bells Road.

Figure 5: Collision Type

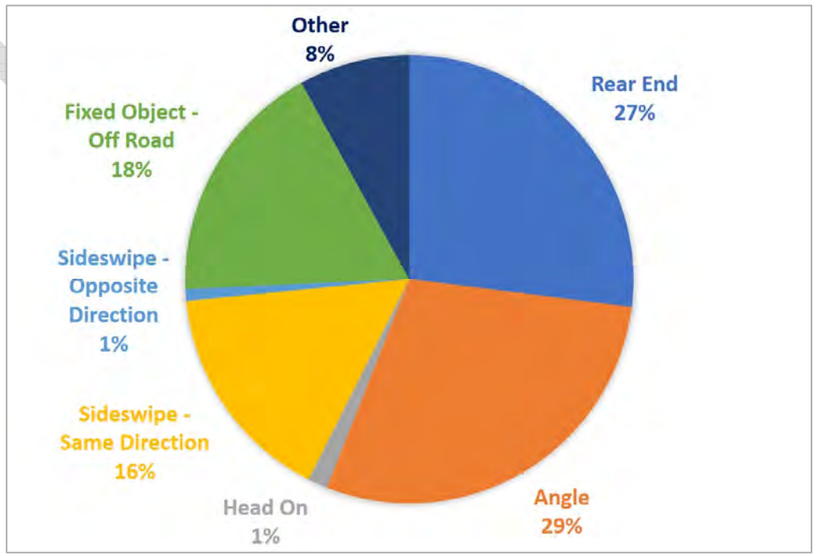
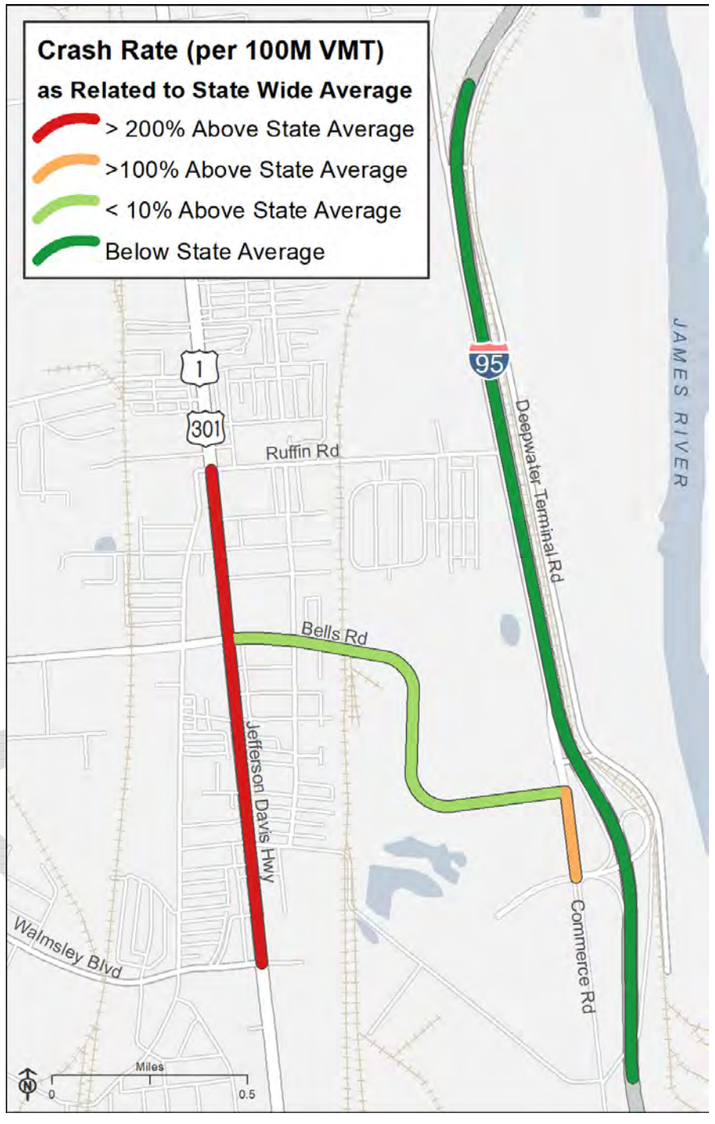


Figure 6: Crash Density, Location, and Severity

Figure 7: Crash Rate vs Statewide Average

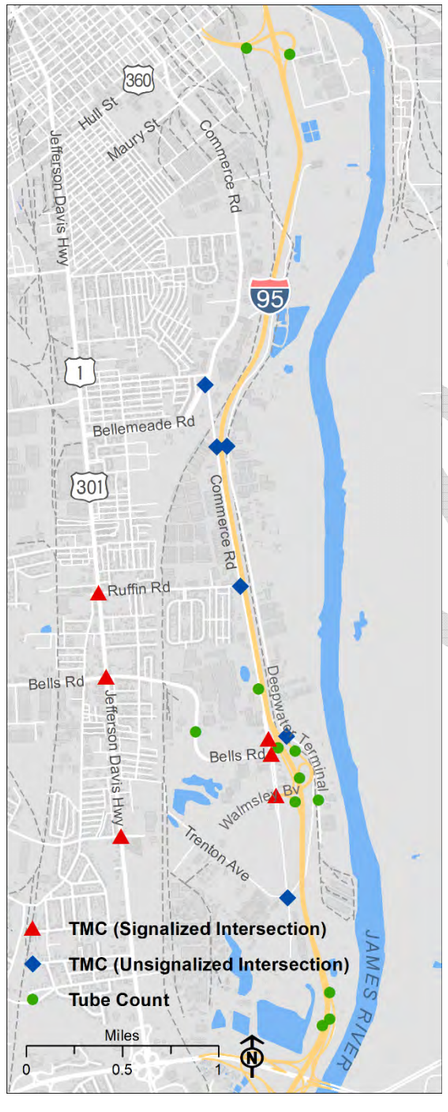


2.4 Existing Traffic Volumes

Existing peak hour traffic volumes were developed using turn movement counts (TMC) and tube counts collected in June 2019 at the locations shown in Figure 9.

Additionally, the I-95 volumes were developed using permanent count station data collected between July 2018 and June 2019. A full list of 2019 volumes by AM and PM peak hour can be found in Appendix X. The AM and PM peak hours are the times with the highest traffic volumes in the study area. The AM and PM peak hour for the analysis were computed to be 7:00-8:00 AM and 3:30-4:30 PM, respectively. Figure 8 contains a graphical depiction of the existing peak hour volumes for intersection in proximity of Bells Road interchange. The volumes for other intersections within the study area are shown in Appendix X. The I-95 volumes are shown in Figure 10.

Figure 9: Count Locations



2.5 Existing Traffic Operations

The peak hour volumes developed in the previous section were analyzed in VISSIM simulation software, which was used as a primary analysis tool. Several measures of effectiveness (MOEs) were reported per Highway Capacity Manual (HCM) methodology for study intersections, which include delay, level of service (LOS) and queuing by approach and lane as appropriate. For the I-95, speed and density were used as MOE's for different freeway segments, respectively. To ensure proper calibration of the models, travel times were also reported and compared to the actual travel times collected during the field visit as well as estimated by Streetlight , which is one of the 'Big Data' sources based on cell-phone data commonly used by transportation professionals to help understand traffic patterns and reduce congestion. Per TOSAM guidelines, for a network analysis which includes both freeways and arterials, simulated traffic volume and simulated travel times should be used for calibration. At least 85% of the travel time routes and network links should meet calibration thresholds. Table 3 shows existing conditions travel times simulated in VISSIM and how they compare to 'actual' travel times estimated by Streetlight or observed during the field visit. As shown in the table, almost all simulated values meet calibration thresholds, which is within ±20% for average observed travel times on freeway and ±30% on arterials. The only route not meeting the minimum threshold is the segment of Bells Road and Commerce Road in the eastbound/southbound direction for the PM peak hour when compared to the Streetlight estimated value. However, the travel time for the same segment compared to the observed value in the field meets the minimum calibration threshold. The actual versus simulated traffic volumes are presented in Appendix X.

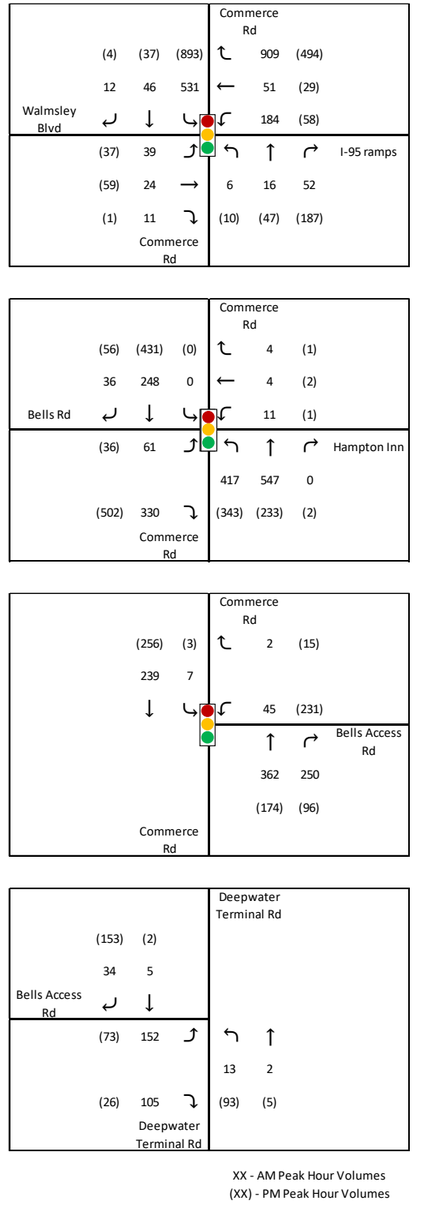
Figure 11 represents the Travel Time Index (TTI) across the study area, where TTI is defined as the ratio of congested travel time to free-flow travel time. For example, a TTI of 1.10 indicates that the peak-period travel time is 10% greater than free-flow travel time.

LOS is a qualitative measure used to relate the quality of traffic operations using letters A through F with A being the best and F being the worst. Table 5 shows HCM Delay LOS Criteria for Signalized and Unsignalized Intersections. The operational analysis results for select study intersections in vicinity of Bells interchange are presented in Table 5, while the results for all other intersections within the study area can be found in Appendix X. As shown in Table 5, Bells Road and Bells Road Access Road intersections on Commerce Road operate at LOS C in both AM and PM peak hour. Even though the intersection of Commerce Road and Walmsley Boulevard/I-95 ramps operates at a very good LOS B in both peak hours, maximum queues for the southbound left turn movement exceed the available storage length. This is consistent with field observations. Northbound right turn maximum queue for the same intersection also slightly exceeds the available storage length. The intersection of Bells Road Access Road and Commerce does not have separate turn lanes in the westbound direction, so the maximum queues in Table 5 do not seem too long. However, Bells Road Access Road is approximately 500 feet long connector between Commerce Road and Deepwater Terminal. Therefore, maximum queue lengths reported for the westbound movement in the PM peak hour indicate the queues extend to Deepwater Terminal Road. The intersection of Bells Road Access Road operates at LOS A in both AM and PM peak. Maximum queues reported are around 100 or less. Some of it may be due to vehicles not being able to turn to Bells Road Access Road due to long queues extending from Commerce Road. The individual movements at all four intersections and for both peak hours range from LOS A to D.

The I-95 existing conditions results are presented in Table 6.

The results indicate in the AM peak the interstate is more congested in the northbound direction, while in the PM peak there is more congestion in the southbound direction. Most of the segments operate at LOS B or C, except for the northbound basic segment between Bells Rd on-ramp and Maury Street off-ramp, which operates at LOS D in the AM, and southbound basic segment between Bells Road on-ramp and Chippenham Parkway off-ramp, which operates at LOS D in the PM.

Figure 8: Existing Peak Hour Volumes - Intersections



XX - AM Peak Hour Volumes
(XX) - PM Peak Hour Volumes

Figure 10: I-95 Lane Schematic and Existing Peak Hour Volumes

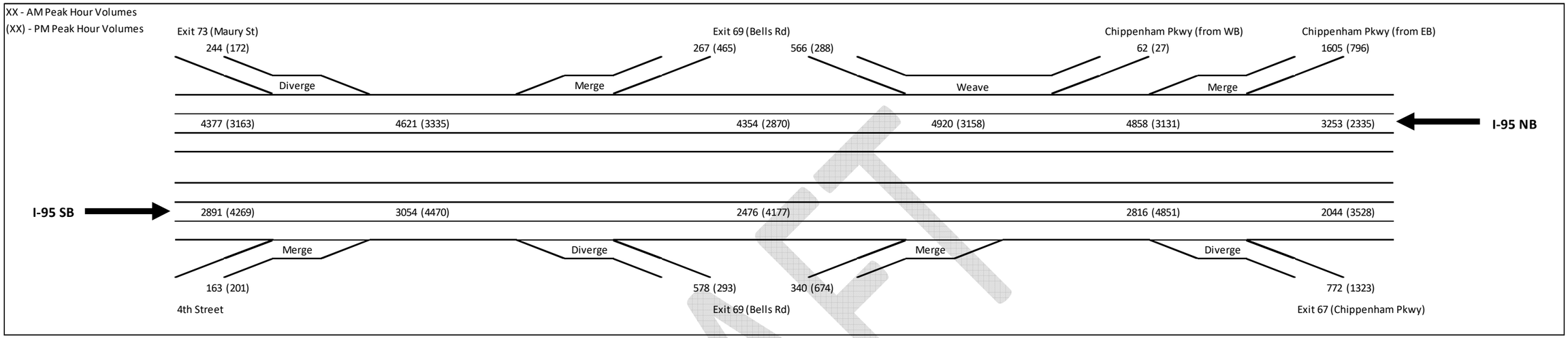


Table 3: Existing Conditions Travel Times (min)

Route	From	To	AM Peak Hour					PM Peak Hour				
			VISSIM Simulated	Streetlight		Field Visit		VISSIM Simulated	Streetlight		Field Visit	
				Estimated Value	% Compared to VISSIM Simulated	Observed	% Compared to VISSIM Simulated		Estimated Value	% Compared to VISSIM Simulated	Observed	% Compared to VISSIM Simulated
I-95 NB	Chippenham Pkwy ramps	1 Mile South of Maury St	3.7	4.5	21.3%	3.4	-7.8%	3.7	3.5	-5.8%	3.3	-9.4%
I-95 SB	1 Mile South of Maury St	Chippenham Pkwy ramps	3.7	3.2	-12.2%	3.2	-12.2%	3.7	3.5	-6.5%	3.9	4.2%
Commerce Rd NB	I-95 ramps	Bellemeade Rd	4.1	4.0	-1.7%	3.3	-19.2%	4.2	4.0	-3.7%	3.9	-5.7%
Commerce Rd SB	Bellemeade Rd	I-95 ramps	4.0	3.3	-17.4%	4.5	12.5%	4.3	5.1	17.9%	4.5	5.1%
Jefferson Davis Hwy NB	Walmsley Blvd	Bellemeade Rd	3.7	3.8	1.7%	4.2	13.8%	3.9	4.4	11.7%	3.4	-13.7%
Jefferson Davis Hwy SB	Bellemeade Rd	Walmsley Blvd	3.6	3.7	1.6%	3.9	6.6%	3.7	4.1	9.1%	3.9	4.2%
Bells Rd WB & Commerce Rd NB	I-95 ramps	Jefferson Davis Hwy	3.3	2.9	-12.4%	2.7	-19.0%	3.6	4.2	15.9%	3.2	-12.0%
Bells Rd EB & Commerce Rd SB	Jefferson Davis Hwy	I-95 ramps	2.7	2.3	-16.2%	2.4	-12.5%	3.1	4.4	42.4%	2.7	-12.7%

Figure 11: Peak Period Travel Time Index

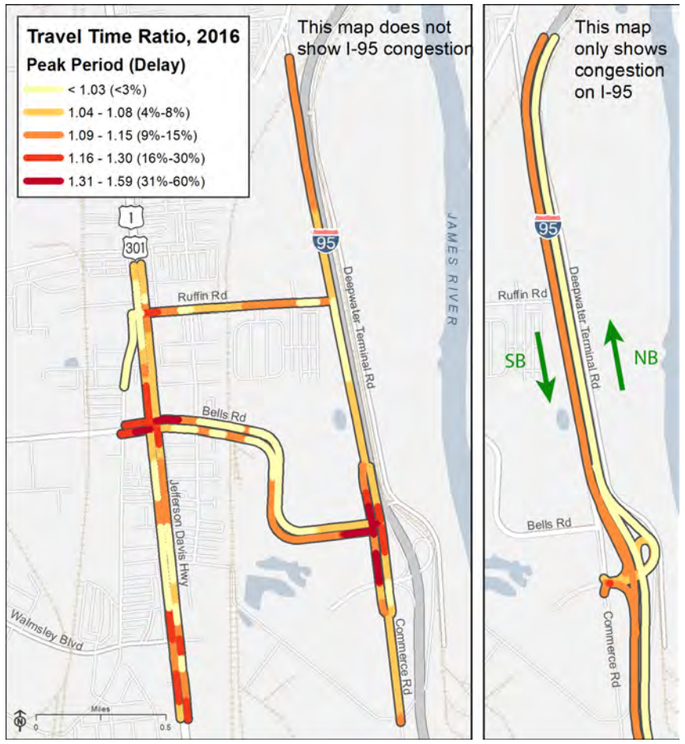


Table 4: HCM Delay LOS Criteria for Signalized and Unsignalized Intersections

LOS	Typical LOS per HCM for Signalized Intersection Delay (s)	Typical LOS per HCM for Unsignalized Intersection Delay (s)
A	≤10	≤10
B	10-20	10-15
C	20-35	15-25
D	35-55	25-35
E	55-80	35-50
F	>80	>50

Table 5: Existing Conditions VISSIM Analysis Results - Intersections

Intersection	Approach	Movement	AM Peak Hour			PM Peak Hour			Available Storage Length (ft)
			Delay (sec)	LOS	Max Queue Length (ft)	Delay (sec)	LOS	Max Queue Length (ft)	
Commerce Rd & Walmsley Blvd/I-95 ramps (Signalized)	**EB**	**EBL**	32.2	C	101	43.6	D	109	150
		EBT	29.0	C	97	41.0	D	133	-
		EBR	4.2	A	113	4.4	A	149	-
	WB	**WBL**	40.8	D	319	48.9	D	177	450
		WBT	36.1	D	235	41.1	D	160	-
		WBR	1.6	A	182	0.8	A	112	-
	NB	**NBL**	43.1	D	37	36.9	D	63	250
		NBT	44.2	D	94	35.1	D	130	-
		NBR	5.8	A	115	11.4	B	246	200
	SB	**SBL**	18.6	B	533	25.0	C	746	410
		SBT	14.4	B	533	16.3	B	746	-
		SBR	4.1	A	391	5.1	A	607	-
	Intersection		**13.2**	**B**	**533**	**18.8**	**B**	**746**	-
Commerce Rd & Bells Rd (Signalized)	**EB**	**EBL**	38.0	D	157	37.7	D	128	-
		EBR	11.3	B	303	22.8	C	510	-
	WB	**WBL**	42.9	D	98	52.5	D	24	-
		WBT	43.4	D	98	50.1	D	25	-
		WBR	7.1	A	29	6.5	A	18	70
	NB	**NBL**	31.0	C	248	46.1	D	351	375
		NBT	16.7	B	282	17.0	B	179	-
		NBR	0.0	A	343	8.7	A	239	-
	SB	**SBT**	38.3	D	304	45.4	D	350	-
		SBR	20.0	B	252	33.1	C	298	-
	Intersection		**23.6**	**C**	**380**	**33.5**	**C**	**510**	-
Commerce Rd & Bells Rd Access Rd (Signalized)	**WB**	**WBL**	36.3	D	156	45.5	D	495	450
		WBR	13.5	B	192	35.1	D	531	450
	NB	**NBT**	27.2	C	410	27.3	C	223	-
		NBR	23.5	C	386	18.6	B	200	-
	SB	**SBL**	39.2	D	28	39.7	D	59	210
		SBT	5.5	A	108	10.3	B	137	-
	Intersection		**20.7**	**C**	**410**	**26.0**	**C**	**531**	-
Bells Rd Access Rd & Deepwater Terminal Rd (Unsignalized)	**EB**	**EBL**	1.8	A	52	3.7	A	107	-
		EBR	1.8	A	18	2.4	A	6	-
	NB	**NBL**	1.0	A	18	10.4	B	92	-
		NBT	0.2	A	0	0.3	A	42	-
	SB	**SBT**	0.5	A	0	1.5	A	22	-
		SBR	0.5	A	0	3.8	A	22	-
	Intersection		**1.6**	**A**	**57**	**5.3**	**A**	**119**	-

Table 6: Existing Conditions VISSIM Analysis Results - I-95

AM Peak Hour			
Freeway Segment	**Speed[1]**	**Density[2]**	**LOS**
I-95 Northbound			
Diverge Segment at the off-ramp to Maury Street	56	20.5	C
Basic Segment between Bells Rd on-ramp and Maury Street off-ramp	58	26.4	D
Merge Segment at the on-ramp from Bells Road	59	19.6	B
Basic Segment between Bells Rd on-and-off-ramps	59	24.6	C
Weaving Segment between Chippenham Parkway Westbound on-ramp and Bells Road off-ramp	59	20.7	C
I-95 Southbound			
Merge Segment at the 4th Street	58	13.2	B
Basic Segment between 4th Street on-ramp Bells Road off-ramp	59	17.2	B
Diverge Segment at the off-ramp to Bells Road	60	12.8	B
Basic Segment between Bells Road on-and-off-ramps	60	13.8	B
Merge Segment at the on-ramp from Bells Road	59	12.0	B
Basic Segment between Bells Road on-ramp and Chippenham Parkway off-ramp	59	15.8	B
Diverge Segment at the off-ramp to Chippenham Parkway	60	11.8	B

PM Peak Hour			
Freeway Segment	**Speed[1]**	**Density[2]**	**LOS**
I-95 Northbound			
Diverge Segment at the off-ramp to Maury Street	57	14.5	B
Basic Segment between Bells Rd on-ramp and Maury Street off-ramp	59	18.7	C
Merge Segment at the on-ramp from Bells Road	60	13.9	B
Basic Segment between Bells Rd on-and-off-ramps	60	15.9	B
Weaving Segment between Chippenham Parkway Westbound on-ramp and Bells Road off-ramp	60	13.1	B
I-95 Southbound			
Merge Segment at the 4th Street	57	19.3	B
Basic Segment between 4th Street on-ramp Bells Road off-ramp	58	25.2	C
Diverge Segment at the off-ramp to Bells Road	59	18.8	B
Basic Segment between Bells Road on-and-off-ramps	59	23.2	C
Merge Segment at the on-ramp from Bells Road	56	21.5	C
Basic Segment between Bells Road on-ramp and Chippenham Parkway off-ramp	58	27.3	D
Diverge Segment at the off-ramp to Chippenham Parkway	59	20.1	C

Source: VISSIM 10 Link Evaluation based on the average of 10 VISSIM model runs.

1 Average simulated speed, expressed in miles per hour.

2 Average simulated density, expressed in vehicle per mile per lane.

LOS	A	B	C	D	E	F
Density (Basic)	≤11	11-18	18-26	26-35	35-45	>45
Density (Merge/Diverge/Weaving)	≤10	10-20	20-28	28-35	35-45	>45

3. Future Conditions

3.1 Development of Growth Rates

As mentioned in the previous sections, The Port facility has experienced significant growth in the past few years. This growth makes the area very attractive for economic development and traffic volumes are anticipated to continue increasing. To get a better understanding of how much growth is expected in the study area, the study team looked at the historic traffic counts and RRTPO Regional Travel Demand Model data. The growth rates were developed based on the findings from the two sources as well as the stakeholder input. The following sections outline the steps taken to develop the future 2045 traffic volumes.

3.1.1 Historic Average Annual Traffic Volumes and Travel Patterns

Historic average annual traffic volumes help establish a trend along the corridor and highlight segments where traffic volume may increase. VDOT collects traffic counts from sensors in or along streets and highways and compiles a blended annual average daily traffic count. From this data, estimates of the number of vehicles that traveled each segment of road can be calculated. Table 7 outlines these historic traffic volumes from 2007 to 2018.

Table 7: VDOT Historic Traffic Counts

Road Segment															
Road Name	Length	From	To	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
I-95 NB	1.12	SCL Richmond	SR 161 Bells Rd	47,000	46,000	47,000	48,000	44,000	45,000	45,000	47,000	50,000	52,000	53,000	53,000
I-95 NB	3.81	SR 161 Bells Rd	Maury St	46,000	45,000	46,000	46,000	43,000	44,000	45,000	46,000	49,000	50,000	52,000	52,000
I-95 SB	1.39	SCL Richmond	SR 161 Bells Rd	43,000	42,000	42,000	48,000	46,000	46,000	46,000	47,000	50,000	52,000	54,000	53,000
I-95 SB	3.86	SR 161 Bells Rd	Maury St	47,000	46,000	46,000	43,000	45,000	46,000	44,000	46,000	50,000	52,000	53,000	53,000
US 1, US 301 (Jefferson Davis Hwy)	2.13	SCL Richmond	Bellemeade Rd	20,000	19,000	20,000	19,000	17,000	15,000	14,000	14,000	15,000	15,000	14,000	11,000
VA 161 (Commerce Rd)	0.21	I-95	Bells Rd	19,000	19,000	18,000	18,000	18,000	19,000	18,000	19,000	22,000	21,000	21,000	20,000
127-7521 (Commerce Rd)	0.88	Bells Rd	Ruffin Rd	5,900	6,000	6,000	6,100	5,900	5,600	5,400	5,600	6,500	6,100	6,000	6,400
127-7521 (Commerce Rd)	1.08	Ruffin Rd	Bellemeade Rd	4,300	4,400	4,300	4,400	4,300	4,200	4,000	4,200	4,000	3,700	3,600	3,900
VA 161 (Bells Rd)	1.17	Commerce Rd	US 1, US 301 Jefferson Davis Hwy	9,200	9,400	9,000	9,100	8,900	8,900	8,500	8,800	9,400	8,800	8,700	8,900
127-8 (Ruffin Rd)	0.75	Jeff Davis Hwy	Commerce Rd	2,200	2,200	2,500	2,600	2,500	1,800	1,700	1,800	1,900	1,800	1,700	2,100
127-7545 (Bellemeade Rd)	0.75	US 1 Jeff Davis Hwy	Commerce Rd	5,800	5,900	5,500	5,500	5,400	5,300	5,100	5,300	5,800	5,400	5,300	6,800

Between 2007 and 2014, traffic counts show very little to no growth along the study area. Some segments even saw the volume drop. This phenomenon coincided with the economic recession. However, since 2015 the study area has mostly seen 1-2% growth.

3.1.2 Socio-Economic Data

The estimated changes in population, households, and employment for the study area were derived from the Regional Travel Demand Model. The estimates are for the traffic analysis zones (TAZs). Figure 12 shows TAZs for which the data was collected. The 2017 and 2045 estimates for population, households and employment are summarized in Table 8. Based on the employment data, the study area is going to see most growth in TAZs centered around Bells Road interchange and on Deepwater Terminal Road, which is as expected since these TAZs are mostly industrial. A discussed in the previous sections of this report, the land use along Jefferson Davis Highway is mostly residential. Therefore, the highest increase in population and households is expected along TAZs on that road.

3.1.3 Annualized Background Growth Rate

The non-compounded annual background growth rate of 1.5% for I-95 and 1% for arterial network was developed using the historic traffic counts, RRTPO Regional Travel Demand Model, and coordination with VDOT and other stakeholders. The trip generation for the study area (discussed in the following section) and this background growth rate was added to the existing traffic volumes to develop the future 2045 traffic volumes.

Figure 12: Study Area TAZs

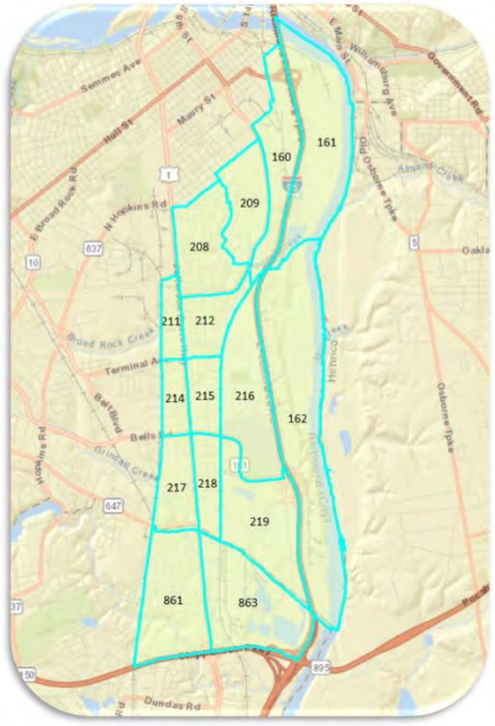


Table 8: Socio-Economic Data for Study Area TAZs

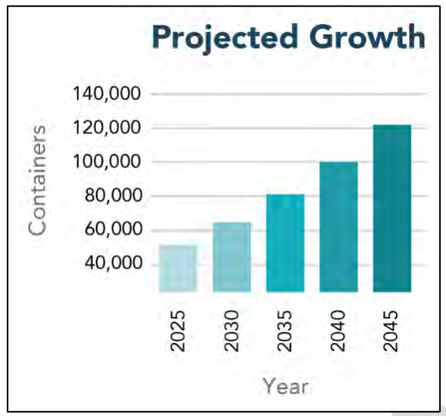
TAZ	Jurisdiction	Total Population					Total Households					Total Employment				
		2017	2045	Increase (2045-2017)	% Change (2045-2017)	Avg Annual % Change	2017	2045	Increase (2045-2017)	% Change (2045-2017)	Avg Annual % Change	2017	2045	Increase (2045-2017)	% Change (2045-2017)	Avg Annual % Change
160	Richmond	2	2	0	0%	0.0%	1	1	0	0%	0.0%	567	572	5	1%	0.0%
161	Richmond	2	2	0	0%	0.0%	0	0	0	0%	0.0%	58	80	22	38%	1.4%
162	Richmond	0	0	0	0%	0.0%	0	0	0	0%	0.0%	638	857	219	34%	1.2%
208	Richmond	2309	2465	156	7%	0.2%	980	1048	68	7%	0.2%	123	124	1	1%	0.0%
209	Richmond	1327	1418	91	7%	0.2%	577	617	40	7%	0.2%	680	686	6	1%	0.0%
211	Richmond	231	247	16	7%	0.2%	101	108	7	7%	0.2%	351	354	3	1%	0.0%
212	Richmond	1009	1622	613	61%	2.2%	438	704	266	61%	2.2%	57	72	15	26%	0.9%
214	Richmond	249	266	17	7%	0.2%	108	115	7	6%	0.2%	183	184	1	1%	0.0%
215	Richmond	903	1120	217	24%	0.9%	392	486	94	24%	0.9%	32	34	2	6%	0.2%
216	Richmond	580	620	40	7%	0.2%	252	269	17	7%	0.2%	2601	2626	25	1%	0.0%
217	Richmond	716	766	50	7%	0.2%	311	333	22	7%	0.3%	420	422	2	0%	0.0%
218	Richmond	489	598	109	22%	0.8%	212	259	47	22%	0.8%	186	202	16	9%	0.3%
219	Richmond	0	0	0	0%	0.0%	0	0	0	0%	0.0%	428	528	100	23%	0.8%
861	Chesterfield	2386	2814	428	18%	0.6%	803	947	144	18%	0.6%	487	491	4	1%	0.0%
863	Chesterfield	0	0	0	0%	0.0%	0	0	0	0%	0.0%	1913	1913	0	0%	0.0%

3.2 Projected Future Growth (2045) and Traffic Volumes

3.2.1 Future Land Use and Approved Development

Future land use was based on the socio-economic data in the travel demand models and stakeholder input. As described earlier, The Port facility is expected to experience growth in the near and long-term. However, other industrial development and re-development is forecast to occur in the study area as well. The growing business at RMT solidified the Panattoni Development Co., an international development firm, decision to build one million square feet in two distribution centers near the Richmond Marine Terminal, and influenced Hourigan Group, a real estate development and construction management company based in Richmond, to commit to developing Deepwater Industrial Park, totaling 1.5-million-square-feet of development. These three sites along with The Port are anticipated to significantly contribute to growth in the study area.

Figure 13:The Projected Growth of the RMT



3.2.2 Trip Generation and Distribution

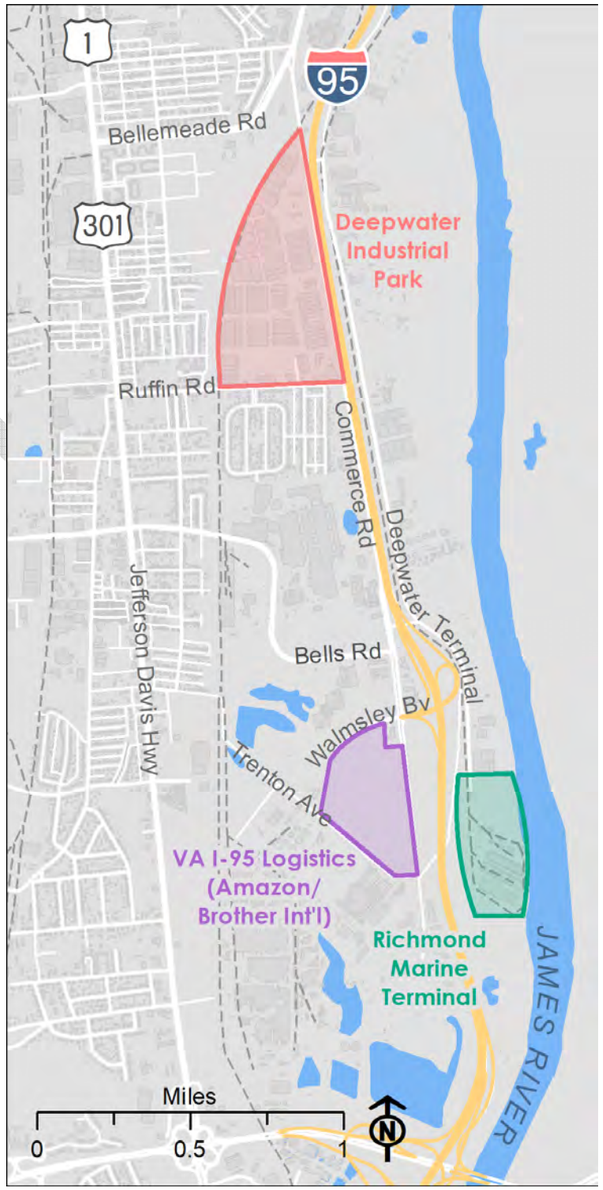
The major trip generators in the study area are shown in Figure 14. For the RMT, average annual non-compounded growth rate of 3.5% was computed from data provided in the RMT Strategic Master Plan. Since the two I-95 Virginia Logistics sites became fully operational in the third quarter of 2019, the counts were collected in the field and a growth rate of 1% was applied to estimate future travel forecast for the year 2045. Brother International counts were collected in October 2019, while the counts for Amazon were collected in November the same year. The count data can be found in Appendix X. For Deepwater Industrial Park site work is still underway. Therefore, the ITE Trip Generation Manual 10th edition for land use code 150 (warehousing) was used to estimate the number of trips in and out of the facility. The estimated values are shown in Table 9 below.

Table 9: Deepwater Industrial Park Trip Generation

Land Use	AM Peak Hour			PM Peak Hour			Daily		
	IN	OUT	Total	IN	OUT	Total	IN	OUT	Total
Deepwater Industrial Park (LU Code 150)	219	65	284	86	231	317	1,342	1,342	2,684

The trips estimated for the above-mentioned redevelopment sites were added to the calculated background growth for the study area and then used in the year 2045 analyses. Traffic was then distributed at the study intersections based on the existing travel patterns derived from Streetlight data and the existing turning movement counts. Engineering judgement was used to make reasonable adjustments to the trip distribution to achieve volume balancing in the network.

Figure 14: Major Trip Generators within the Study Area

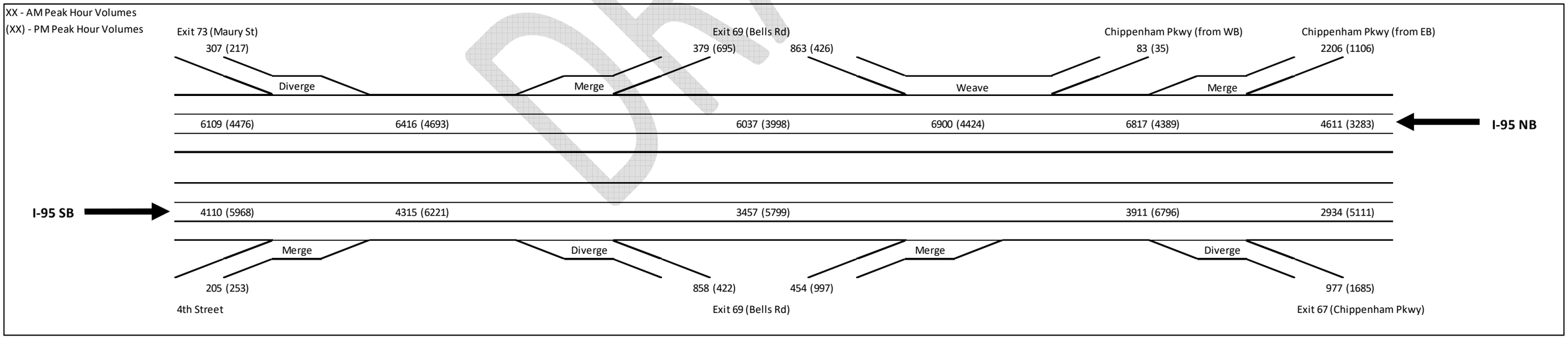


3.2.3 Future (2045) Traffic Volumes

Traffic volumes for the year 2045 were developed based on the trip generation and the background growth rate as discussed in the previous sections. Figure 15 contains a graphical depiction of the existing peak hour volumes for intersections in proximity of Bells Road interchange. The volumes for other intersections within the study area are shown in Appendix X. The I-95 volumes are shown in Figure 16.

Figure 15: Future Peak Hour Volumes - Intersections

Figure 16: I-95 Lane Schematic and Future Peak Hour Volumes



4. Concepts Development

4.1 Overview

The study team took the approach of developing two types of project concepts for the stakeholder group. The first set are projects that could provide a benefit that accomplished the immediate study's goals and would be less costly but may not sustain the benefit. These projects were termed "Short-Term Concepts" by the study team. The second set of projects include interchange modifications and local connectors, which would likely change travel patterns in the study area. These projects were termed "Long-Term Concepts" and seek to accomplish the study goals beyond the horizon year of 2045, but potentially with more significant costs.

4.2 Short-Term Concepts

A total of seven projects were developed as short-term concepts. The locations of these projects are shown in Figure 17. Concepts S1, S3 and S7 were analyzed as stand-alone ideas, while S2, S4, S5 and S6 cannot function properly without being combined with another project and were therefore only analyzed as combined ideas.

Figure 17: Short-term Concept Locations

The following section provides a brief description of short-term concepts.

Concept S1 is located on I-95 in the southbound direction between Bells Rd and Chippenham Parkway interchanges. It would require widening of I-95 in the southbound direction to construct an auxiliary lane approximately 3,800 feet long. This would be consistent with the solution on the northbound side and would help alleviate congestion, especially in the PM peak hour. The major obstacles for this concept are possible Right of Way impacts and bridge widening, which would increase the cost, however in general, the benefit-to-cost ratio for adding auxiliary lanes is typically high, averaging 20:1 for a ten-year life (Source: FHWA). The planning level construction cost estimate is between $15.4 and $25.6 Million. Figure 18 shows a sketch of concept S1.

Concept S2 is converting the outer left lane on Bells Road eastbound approach at Commerce Road intersection to left and right instead of left only. The eastbound right turn greatly exceeds left turn demand. Therefore, converting the outer left lane to left and right would provide additional storage for right turning vehicles. Concept S2 would require adjustments to the signal and pavement markings without any additional construction. Though, due to inadequate turning radius, trucks would have to be restricted to the use of the outer lane. This concept is only analyzed as a combined concept with S3, which is discussed in the following section. The combined **concept S2-S3** is shown in Figure 19. The planning level cost estimate for S2-S3 is between $1.5 to $2.0 Million.

Concept S3 is extending the southbound left turn lane on Commerce Road from Bells Road to Walmsley Boulevard. It is shown in Figure 20. Currently, the left lane has around 400 feet of storage. Extending the lane to Bells Rd intersection would provide an additional 600 feet of storage to help accommodate long queues that exceed the existing storage capacity in the southbound approach at Walmsley Boulevard intersection. There exists space in the median to accomplish the proposed construction, so no additional Right of Way would need to be acquired. However, some stormwater impacts are expected, which would be determined during a future design phase. Also, the existing turn lane to commercial properties along Commerce Road would have to be shifted further inside of the median. Concept S3 would help facilitate concepts 2 and 4. The planning level construction cost-estimate for this concept is between $1.0 and $1.6 Million.

Concept S4 is adding another southbound through lane from Bells Road Access Road to Bells Road. The existing road segment is relatively short, which causes queues to spill back on Commerce and Bells Road Access Road, as well as Deepwater Terminal, especially in the PM peak hour. Adding another lane would provide more storage, which would then reduce queues. There exists space in the median to accomplish the proposed construction, however stormwater system, utility, and signal impacts are expected. This concept is only analyzed as a combined concept with S3, which is discussed in the previous section. The combined **concept S3-S4** is shown in Figure 21. The planning level cost estimate for S3-S4 is between $2.9 to $5.0 Million.

Concept S5 includes relocation of the I-95 southbound on-ramp at Bells Road interchange further south. Most traffic at Walmsley Boulevard and Commerce Road intersection comes from or is destined to I-95. In the AM peak hour, the movement with the most demand is westbound right, while southbound left has the highest volume in the PM peak hour. The existing conditions analysis indicate that the southbound approach is the most congested with queues extending back to Bells Road and beyond. Concept S5 would reduce southbound left turning volume by rerouting traffic destined to I-95 south to through movement at this intersection and left at the new intersection with the relocated on-ramp to I -95 southbound. This would require signal timings to be adjusted and coordinated with the signal at the new intersection of Commerce Road and relocated southbound I-95 on-ramp, should the signal be warranted at that location. To ensure enough storage, southbound double lefts are recommended in this concept. Even though concept S5 could theoretically function as a stand-alone concept, it was only analyzed as a combined concept with S6, which is discussed in the next section. Some of the drawbacks of concept S5 include private property/right-of-way requirement. Also, vertical clearance below power lines would need to be verified during future design phase.

Concept S6 requires rerouting eastbound through and left turn movements to the right on Walmsley Boulevard at Commerce Road intersection. This concept was only analyzed as a combined concept with S5 described previously.

Due to a change in traffic assignment as a result of concept S5 at this intersection, rerouting eastbound through and left movements would improve signal efficiency by allowing less phases and more green time given to the southbound approach. Concept S6 would also reduce conflict points, which would therefore improve safety. The combined **concept S5-S6** is shown in Figure 22. The planning level cost estimate for S5-S6 is between $4.5 to $7.3 Million.

Concept S7 is a reconfiguration of the I-95 southbound off-ramp termini at Bells Road interchange. With the existing lane configuration, vehicles coming from I-95 southbound destined to a location north of Walmsley Boulevard and Commerce Road intersection could stay in either of the two lanes on the off-ramp, while vehicles destined to Walmsley Boulevard or south on Commerce would have to stay in the leftmost lane on the on-ramp and then weave over to a desired through or left turn lane in the westbound approach. As observed during the field review, poor sight distance and high volumes from both I-95 off-ramps in the AM peak hour can make this movement very difficult to accomplish. Concept S7 would eliminate a weave by reconfiguring the I-95 off-ramp termini to a right turn lane only and a through and left only, which would have to yield to I-95 northbound traffic. The yielding point is relocated slightly to the east for better sight distance and to allow for more storage at the westbound through and left lanes. Also, a barrier is recommended between the rightmost lane coming from I-95 southbound and an inside right turning lane for I-95 northbound traffic to ensure no weaving. This concept was analyzed as a stand-alone concept, but it can be combined with other concepts. The sketch of concept S7 is shown in Figure 23 and the planning level cost estimate is between $0.5 and $1.0 Million.

Another short-term idea discussed but removed from consideration is a quadrant roadway concept at Commerce Road/Walmsley Boulevard intersection with the I-95 ramps. Although, this concept often has great benefits such as improved safety and increased operational efficiency, it does not seem feasible for this particular location. The quadrant roadway consists of a main intersection and two secondary intersections, which are typically T-intersections to allow for three phase signals. This is not achievable at the junction with I-95 southbound ramps. Other challenges of implementing the quadrant roadway at this location include possible bridge widening, southbound ramp relocation and acquisition of Right of Way.

Figure 18: Concept S1

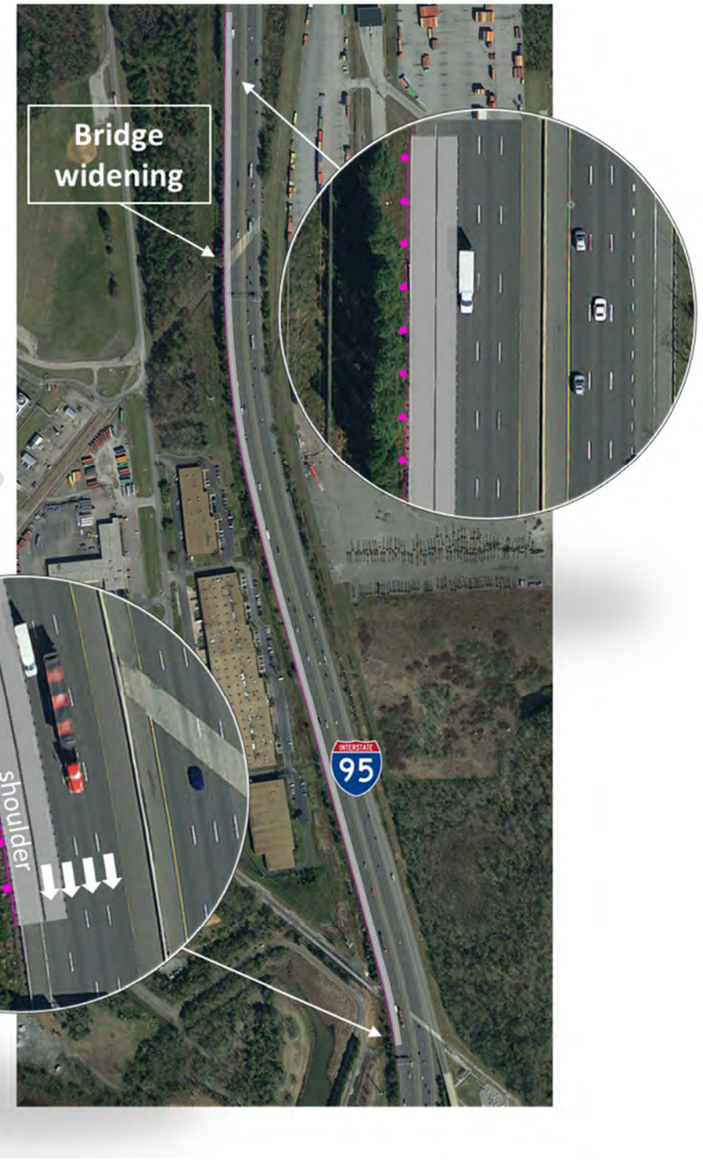


Figure 19: Concept S2-S3

Figure 20: Concept S3

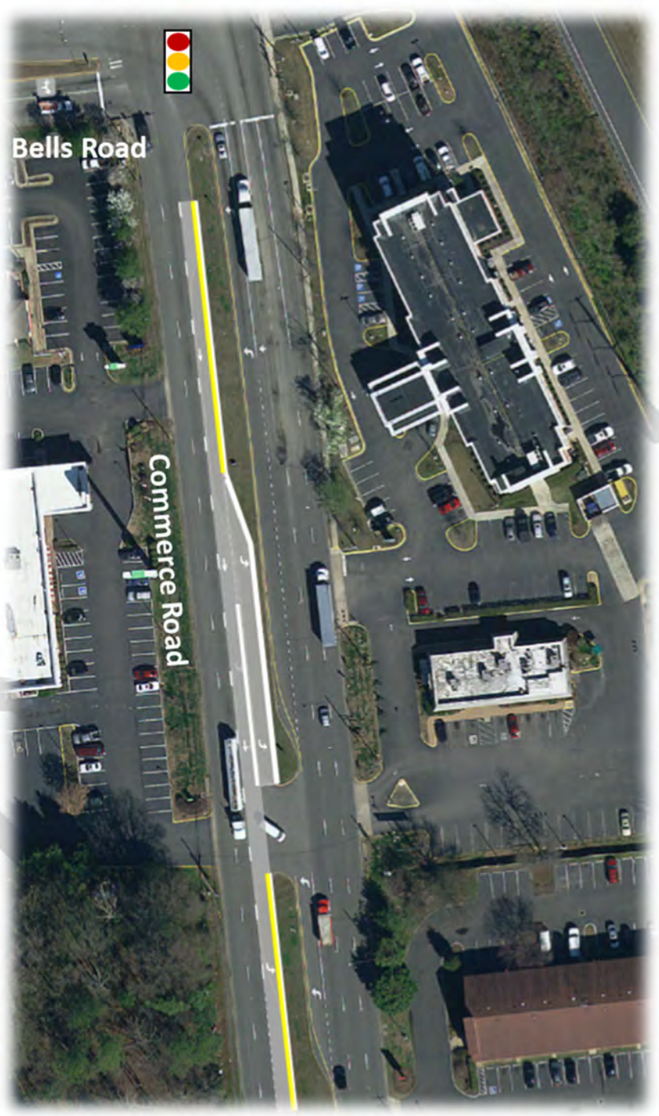


Figure 21: Concept S3-S4

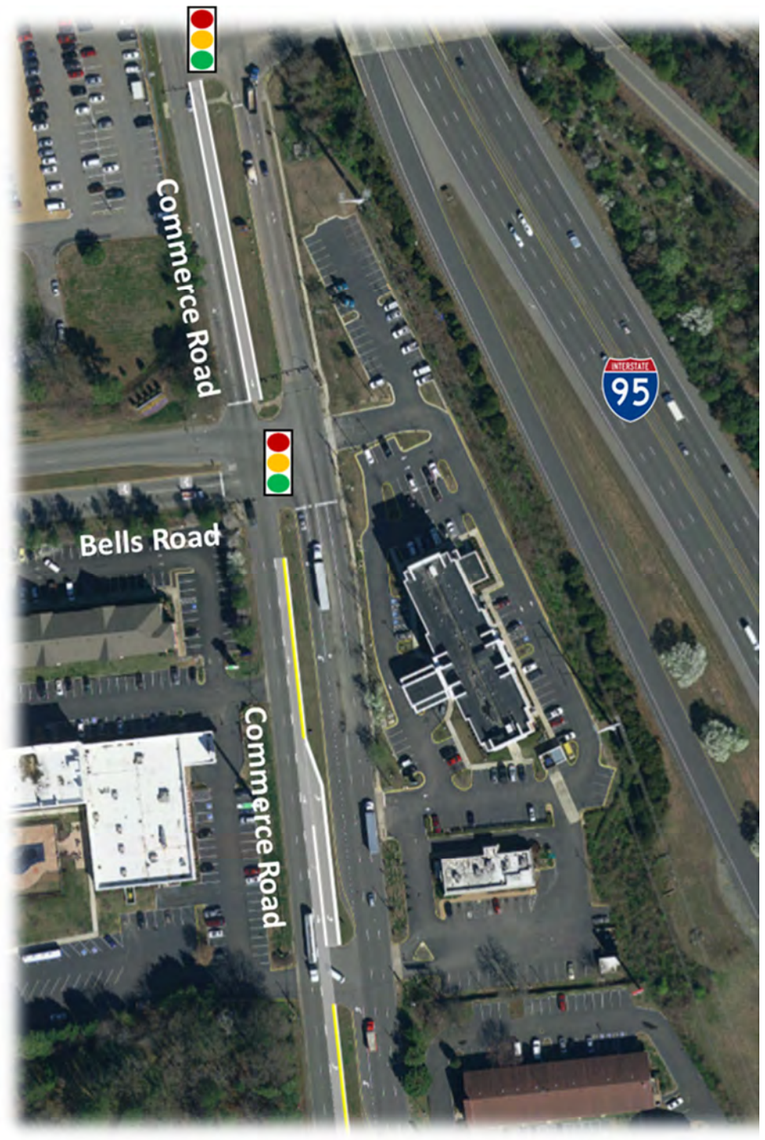


Figure 22: Concept S5-S6

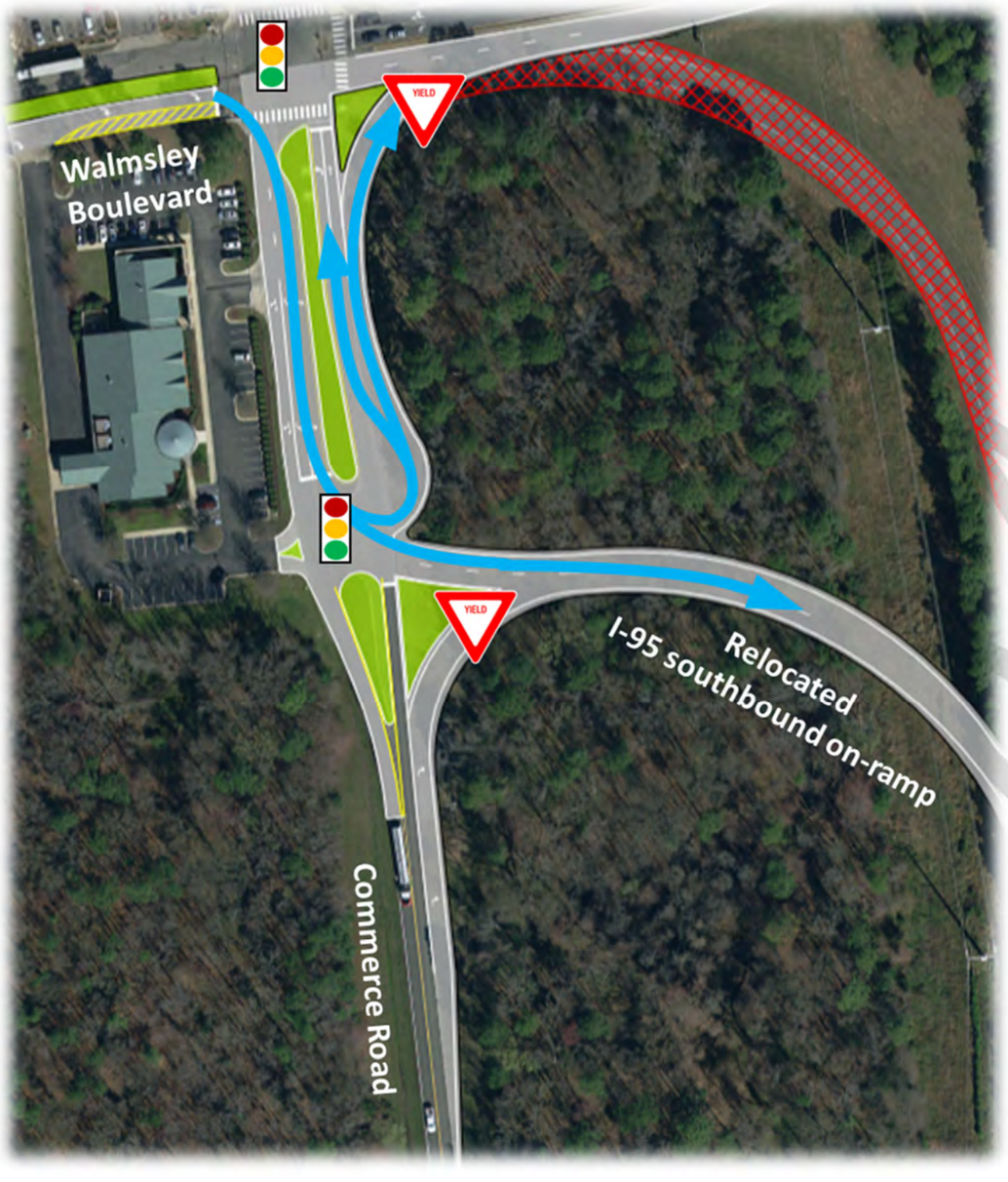
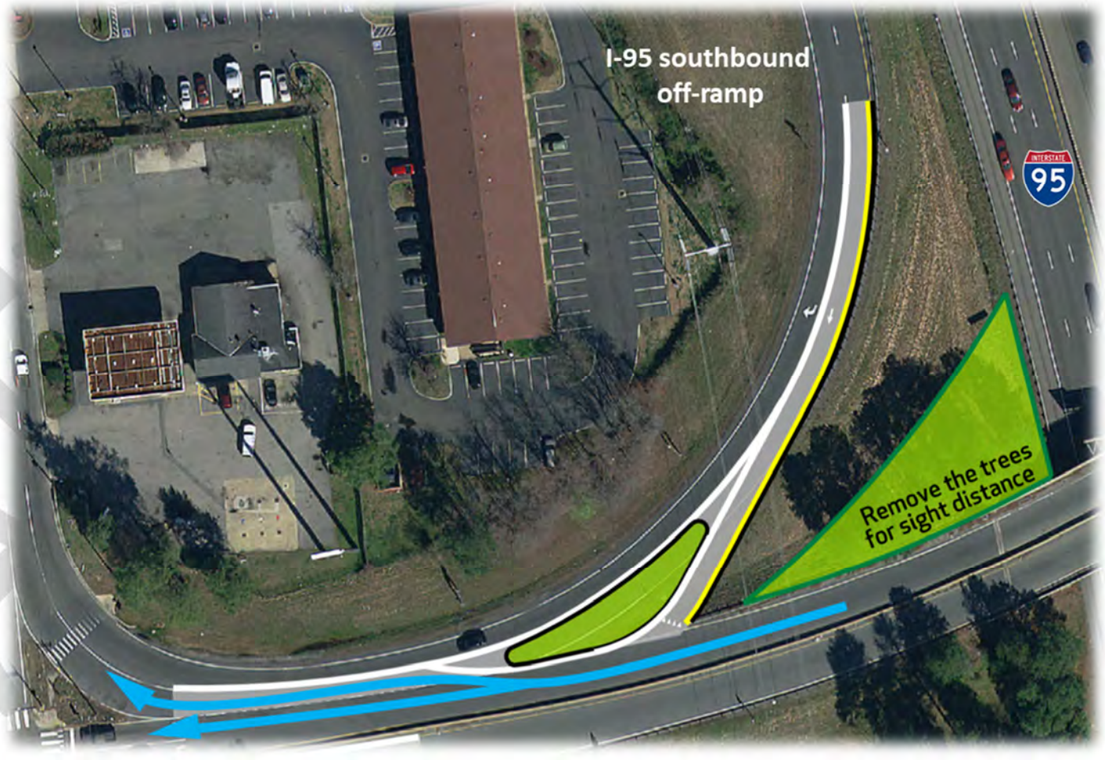


Figure 23: Concept S7



4.3 Long-Term Concepts

The study team developed two types of long-term project concepts. The first set are projects that include modifying the Bells Road interchange or Commerce Road at the Walmsley Boulevard intersection to provide better access to I-95. A total of four such projects were developed, however two were eliminated from further consideration. New interchange ideas, such as DDI, SPUI and a combination of DDI and a roundabout (Divergabout) were also discussed and removed from consideration. The second set of long-term concepts are local connector roads. A total of two such projects were considered.

The following section provides a brief description of long-term concepts.

Concept L1 is a roundabout at Commerce Road and Walmsley Boulevard intersection. This concept also includes a reconfiguration of the I-95 southbound off-ramp termini, or what is mentioned as a short-term concept S7 in the previous sections. It was analyzed as a stand-alone and in combination with another long-term concept. Right of Way, utility and access impacts would have to be determined during future design phase. The planning level construction cost estimate for concept L1 is $10.5 - $12.8 Million. The sketch is shown in Figure 24.

Concept L2 is one of the long-term projects discussed and removed from consideration. It is a roundabout on Deepwater Terminal Road with access to I-95 northbound. The roundabout and Deepwater Terminal Road would have to be raised to meet interchange grade. Adding another northbound off-ramp is also included in this concept. A single-lane roundabout and yield controlled ramp junctions were proposed. Concept L2, shown in Figure 25, would have to be combined with another concept on the west side of I-95 to provide better access to I-95 southbound, such as L1. Following detailed discussion with the stakeholders, this concept was removed from further consideration.

Concept L3 is shown in Figure 26. It is a single-lane roundabout on I-95 northbound ramps with flyovers to Deepwater Terminal Road. The configurations of the termini of these flyover ramps on Deepwater Terminal Road were proposed to be unsignalized. It is important to note that this concept was analyzed as a combined concept with L1 to provide access to I-95 southbound for vehicles traveling from Deepwater Terminal Road. The planning level construction cost estimate for concept L3 excluding L1 is $35.3 - $43.2 Million.

Concept L4 is another long-term project that was discussed and removed from consideration. As shown in Figure 27 this concept is another version of L3. Both concepts include flyover ramps to Deepwater Terminal Road, however a conventional intersection was proposed in concept L4 compared to the roundabout in L3. Relocating northbound off-ramp and shifting the on-ramp was also proposed in this concept. Following detailed discussion with the stakeholders, this concept was removed from further consideration.

Concept LC1 is connecting Walmsley Boulevard from Jefferson Davis Highway to Commerce Road. The approximate location of the connector road proposed is shown in Figure 28. The regional travel demand model was utilized to predict traffic re-routing resulting from this idea and how it may create benefit or collateral requirements within study area roadway network. The planning level construction cost estimate for concept LC1 is $42.8 - $52.3 Million.

Concept LC2 proposes a connection between Commerce Road and The Port by using an existing I-95 underpass. The location of this concept is shown in Figure 29. The tunnel connects to existing 'DuPont property' and it is within VDOT I-95 Right of Way. Some of the challenges include shallow utility pipelines in vicinity that proposed vehicle traffic would have to cross. Another challenge is the existing vertical clearance of 14.2 feet, which would make the proposed crossing a private road only. Furthermore, soil characteristics are unknown in this area. The construction of the crossing could cost $3.0 – $5.0 Million.

Figure 24: Concept L1

Figure 25: Concept L2

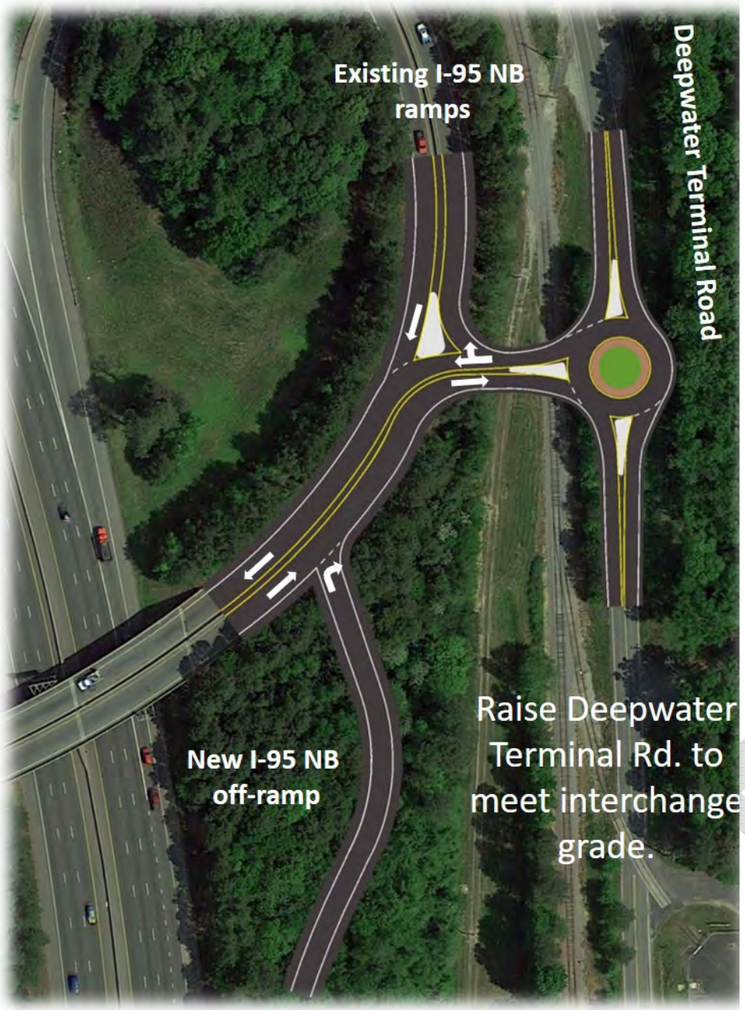


Figure 26: Concept L3

Figure 27: Concept L4

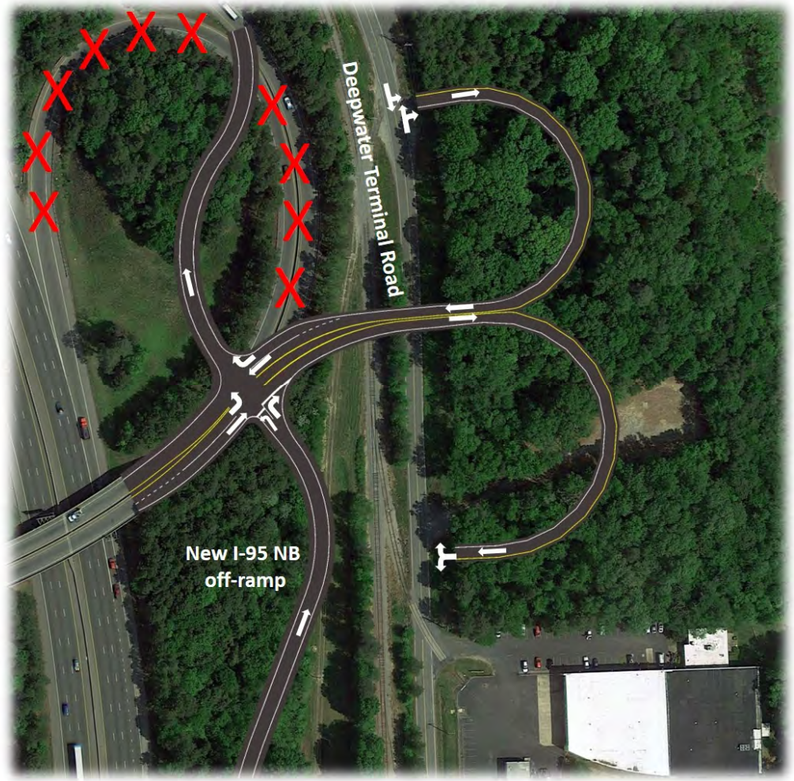


Figure 28: Concept LC1

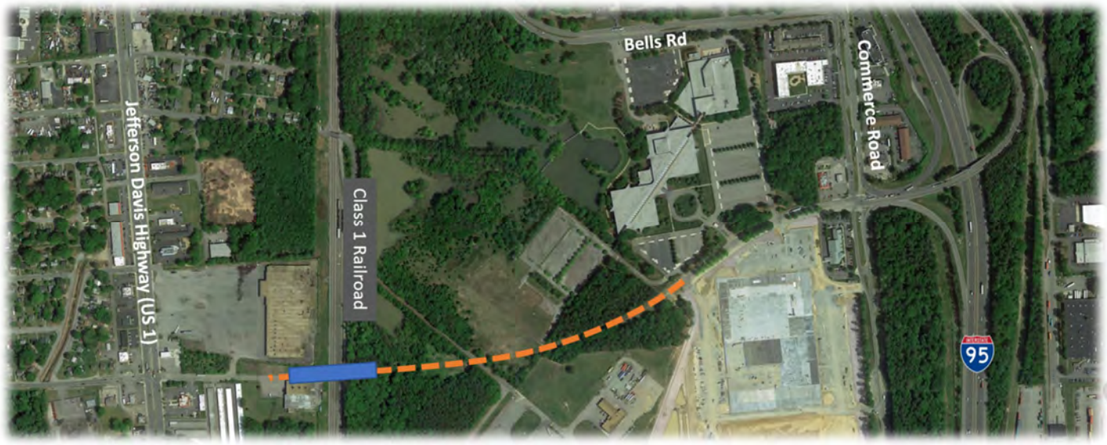


Figure 29: Concept LC2

5. Future Conditions Traffic Operations

5.1 No-Build Conditions

As the name implies, the future no-build models were created to represent future traffic conditions without considered concepts being implemented. These models were used as a baseline for generating and comparing future build scenarios. The following section details the deficiencies of the study area under the 2045 No-Build conditions. Although it is not known when the full build-out of future land use will occur, the operational analysis for the 2045 scenarios includes the future traffic volumes for the full build-out of development to maximize the project life span for the recommended improvements.

Table 10 shows future no-build conditions travel times simulated in VISSIM compared to the existing scenario travel times. As shown in the table, Bells Road westbound and Commerce Road southbound segments between Jefferson Davis Highway and I-95 ramps are expected to experience the longest travel time increase of more than 16 minutes in the PM peak hour. Table 10 also indicates an increase in travel time of around 2 minutes for the following southbound segments: I-95 segment withing the study area and Jefferson Davis Highway segment between Bellemeade Road and Walmsley Boulevard in the PM peak hour, as well as Commerce Road between Bellemeade Road and Walmsley Boulevard in the AM peak hour. The travel times for all other segments shown in Table 10 show increase that of 40% or less, or less than 2 minutes.

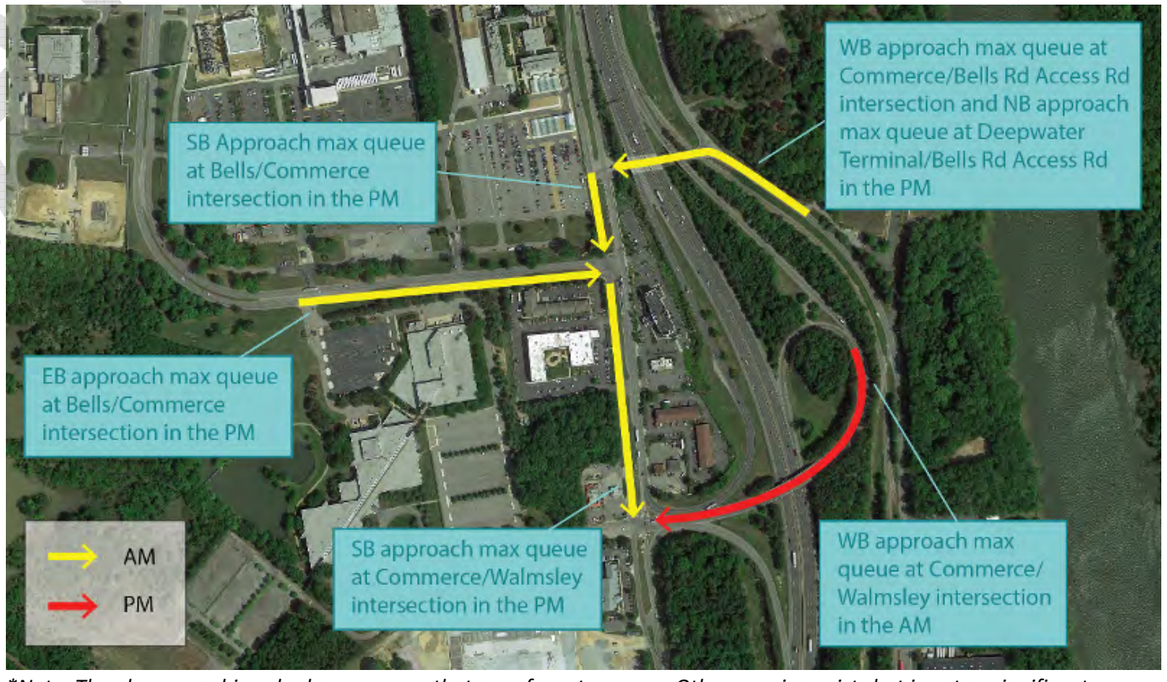
The operational analysis results for select study intersections in vicinity of Bells interchange are presented in Table 11, while the results for all other intersections within the study area can be found in Appendix X. As shown in Table 11 the intersections along Commerce Road operate at LOS B in the AM peak hour and LOS C in the PM peak hour. The intersection of Bells Road Access Road and Deepwater Terminal operates at LOS A in the AM peak hour and LOS B in the PM peak hour. These results are very similar to the existing scenario, however some individual movement experience much longer delays and queues in the no-build scenario compared to individual movement delays and queues in the existing conditions. Queues of most concern are in the westbound direction in the AM and southbound in the PM at Commerce Road and Walmsley Boulevard/I-95 ramps intersection, which extend to more than a thousand feet. Table 11 also indicates queue spillback in the westbound direction at Bells Road Access Road and Commerce Road intersection during the PM peak hour as the maximum queue lengths exceed the available storage length on Bells Road Access Road. The maximum queues reported in the northbound direction on Deepwater Terminal Road at Bells Road Access Road are around 500 feet. As mentioned in the existing conditions operations analysis, this queue on Deepwater is likely due to vehicles not being able to turn to Bells Road Access Road because of long queues extending from Commerce Road. The maximum queues for the no-build scenario were also depicted in Figure 30.

The I-95 future no-build conditions results are presented in Table 12. The results indicate the interstate is more congested in the PM peak hour in both directions. In the AM peak hour, the I-95 northbound segments operate at LOS C or D, while the southbound segment operate at LOS B or C. The segments surrounding Bells Road interchange seem to be most congested during the PM peak hour as they operate at LOS E in the northbound direction of I-95 and LOS F in the southbound.

Table 10: Future No-Build Conditions Travel Times (min)

Route	From	To	Average Travel Time (minutes)					
			Existing AM	No-build AM	% Change	Existing PM	No-build PM	% Change
I-95 NB	I-95 South	I-95 North	3.7	3.8	2.9%	3.7	3.9	6.7%
I-95 SB	I-95 North	I-95 South	3.7	3.7	1.2%	3.7	6.1	63.4%
Commerce Rd NB	I-95 ramps	Bellemeade Rd	4.1	3.9	-3.6%	4.2	3.8	-7.5%
Commerce Rd SB	Bellemeade Rd	I-95 ramps	4.0	6.1	50.7%	4.3	5.8	33.6%
Jefferson Davis Hwy NB	Walmsley Blvd	Bellemeade Rd	3.7	5.2	40.7%	4.0	4.7	18.1%
Jefferson Davis Hwy SB	Bellemeade Rd	Walmsley Blvd	3.6	4.5	24.0%	3.8	6.4	69.7%
Bells Rd WB & Commerce Rd NB	I-95 ramps	Jefferson Davis Hwy	3.3	3.3	0.2%	3.7	3.3	-9.2%
Bells Rd EB & Commerce Rd SB	Jefferson Davis Hwy	I-95 ramps	2.7	3.6	34.9%	3.1	21.0	580.6%

Figure 30: 2045 No-Build Maximum Queue Lengths



**Note: The above graphic only shows queues that are of most concern. Other queuing exists but is not as significant.*

Table 11: Future No-Build Conditions VISSIM Analysis Results - Intersections

Intersection	Approach	Movement	AM Peak Hour			PM Peak Hour			Available Storage Length (ft)
			Delay (sec)	LOS	Max Queue Length (ft)	Delay (sec)	LOS	Max Queue Length (ft)	
Commerce Rd & Walmsley Blvd/I-95 ramps	EB	EBL	32.0	C	142	42.5	D	136	150
		EBT	31.5	C	97	45.0	D	176	-
		EBR	4.1	A	113	4.6	A	191	-
	WB	WBL	49.6	D	1355	68.8	E	269	450
		WBT	45.1	D	1049	42.4	D	226	-
		WBR	7.8	A	1296	1.1	A	155	-
	NB	NBL	45.9	D	48	52.1	D	59	250
		NBT	52.5	D	134	71.0	E	210	-
		NBR	8.6	A	152	32.7	C	418	200
	SB	SBL	21.7	C	934	20.6	C	1166	410
		SBT	15.3	B	934	12.2	B	1166	-
		SBR	6.8	A	795	5.4	A	1027	-
	Intersection		**18.2**	**B**	**1420**	**20.8**	**C**	**1166**	-
Commerce Rd & Bells Rd	EB	EBL	44.2	D	202	49.8	D	146	-
		EBR	11.4	B	403	27.6	C	739	-
	WB	WBL	49.9	D	92	66.5	E	24	-
		WBT	56.3	E	92	59.3	E	25	-
		WBR	8.6	A	29	6.1	A	28	70
	NB	NBL	28.6	C	357	28.2	C	315	375
		NBT	9.1	A	360	3.2	A	143	-
		NBR	0.0	A	420	2.0	A	203	-
	SB	SBT	32.3	C	397	29.3	C	470	-
		SBR	18.1	B	345	24.5	C	417	-
	Intersection		**19.5**	**B**	**504**	**24.8**	**C**	**739**	-
Commerce Rd & Bells Rd Access Rd	WB	WBL	43.8	D	291	38.3	D	548	450
		WBR	23.5	C	328	29.5	C	585	450
	NB	NBT	11.1	B	426	18.9	B	269	-
		NBR	10.9	B	403	11.8	B	245	-
	SB	SBL	43.6	D	109	48.4	D	136	210
		SBT	5.6	A	137	19.7	B	266	-
	Intersection		**11.7**	**B**	**426**	**24.0**	**C**	**585**	-
Bells Rd Access Rd & Deepwater Terminal Rd	EB	EBL	1.8	A	46	1.9	A	83	-
		EBR	2.0	A	28	1.3	A	14	-
	NB	NBL	1.2	A	20	28.7	D	532	-
		NBT	0.5	A	6	14.7	B	486	-
	SB	SBT	0.4	A	0	1.9	A	144	-
		SBR	0.6	A	0	8.6	A	144	-
	Intersection		**1.7**	**A**	**62**	**13.2**	**B**	**532**	-

Table 12: Future No-Build Conditions VISSIM Analysis Results - I-95

AM Peak Hour			
Freeway Segment	**Speed[1]**	**Density[2]**	**LOS**
I-95 Northbound			
Diverge Segment at the off-ramp to Maury Street	56	27.3	C
Basic Segment between Bells Rd on-ramp and Maury Street off-ramp	58	35.0	D
Merge Segment at the on-ramp from Bells Road	57	26.4	C
Basic Segment between Bells Rd on-and-off-ramps	58	32.7	D
Weaving Segment between Chippenham Parkway Westbound on-ramp and Bells Road off-ramp	57	28.4	D
I-95 Southbound			
Merge Segment at the 4th Street	57	18.8	B
Basic Segment between 4th Street on-ramp Bells Road off-ramp	58	24.6	C
Diverge Segment at the off-ramp to Bells Road	59	18.2	B
Basic Segment between Bells Road on-and-off-ramps	59	19.4	C
Merge Segment at the on-ramp from Bells Road	58	17.1	B
Basic Segment between Bells Road on-ramp and Chippenham Parkway off-ramp	59	22.2	C
Diverge Segment at the off-ramp to Chippenham Parkway	59	16.5	B

PM Peak Hour			
Freeway Segment	**Speed[1]**	**Density[2]**	**LOS**
I-95 Northbound			
Diverge Segment at the off-ramp to Maury Street	56	20.9	C
Basic Segment between Bells Rd on-ramp and Maury Street off-ramp	39	44.1	E
Merge Segment at the on-ramp from Bells Road	32	36.7	E
Basic Segment between Bells Rd on-and-off-ramps	34	39.9	E
Weaving Segment between Chippenham Parkway Westbound on-ramp and Bells Road off-ramp	39	28.6	D
I-95 Southbound			
Merge Segment at the 4th Street	53	29.1	D
Basic Segment between 4th Street on-ramp Bells Road off-ramp	42	49.3	F
Diverge Segment at the off-ramp to Bells Road	27	51.1	F
Basic Segment between Bells Road on-and-off-ramps	23	74.1	F
Merge Segment at the on-ramp from Bells Road	23	65.1	F
Basic Segment between Bells Road on-ramp and Chippenham Parkway off-ramp	51	37.0	E
Diverge Segment at the off-ramp to Chippenham Parkway	57	26.0	C

Source: VISSIM 10 Link Evaluation based on the average of 10 VISSIM model runs.

1 Average simulated speed, expressed in miles per hour.

2 Average simulated density, expressed in vehicle per mile per lane.

LOS	A	B	C	D	E	F
Density (Basic)	≤11	11-18	18-26	26-35	35-45	>45
Density (Merge/Diverge/Weaving)	≤10	10-20	20-28	28-35	35-45	>45

5.2 Build Conditions

The build conditions represent future traffic conditions with considered concepts being implemented. VISSIM models were created for short-term and long-term concept ideas described in Chapter 4 of this report. The following section details the operations of the study area under the 2045 build conditions. For a better insight of the operational and safety benefits the construction of these concept ideas would add to the study area, the results were compared to the no-build conditions. MOEs such as travel times, delay, LOS and maximum queues were discussed in comparison. The travel times were collected between the measurement points shown in Figure 31. While only most significant travel time savings were presented in result tables, the complete results can be found in Appendix X. As far as intersection delay, LOS and maximum queues, they were reported in separate tables. For easy comparison, the results for all concept ideas including the no-build scenario were shown side by side. Speed, density and LOS for freeway segments were only reported for concepts S1 and S5-S6 as these are the only concepts that includes a modifiction to I-95 main lanes.

Figure 31: Travel Time Measurement Points for Build vs No-Build Results Comparison

5.2.1 Short-Term

The following section provides operational results of the short-term concepts.

Concept S1

Since this concept is located along I-95 between Bells Road and Chippenham Parkway interchange, it has significant impact on I-95 with little to no influence on the arterial network in the study area. Therefore, other than the travel times, the operational results of only I-95 were discussed for this concept. A full set of results including the study intersections can be found in Appendix X. The PM travel time change in seconds and % change of this concept compared to the no-build scenario are shown in Table 13. The results indicate significant time savings for all measurement points with a destination of I-95 South, or point B. Adding an auxiliary lane in this concept especially improved travel times on I-95 southbound with savings of more than 50 percent. The operational benefits of concept S1 are shown in Table 19 as well. Since this is an improvement for southbound direction of I-95, the northbound direction was not affected and therefore the build vs. no-build results for the northbound direction look very much alike in both peak hours. The results look very similar for the southbound direction in the AM peak hour as well. However, in the PM peak hour, which is very congested in the southbound direction on I-95, concept S1 shows most benefit when compared to the no-build conditions. The LOS improved from F to C, D or E with speed increases of over 30 MPH for some segments. Concept S1 also has substantial safety benefits. Based on the key findings regarding the safety impacts of adding auxiliary lanes, the frequency of traffic conflicts for both weaving segments and ramp influence areas can be significantly reduced by adding auxiliary lanes (FHWA).

Table 13: Concept S1 vs No-Build Travel Times

PM travel time change in seconds and % change compared to 2045 no-build scenario			DESTINATION
			B
			I-95 South
ORIGIN	A	I-95 North	-83.0 sec (-57.4%)
	B	I-95 South	
	C	Commerce South (by Amazon entrance)	-22.8 (-14.7%)
	D	Walmsley (by Brother Int'l car entrance)	-24.2 (-18.0%)
	E	Bells Rd @ Jefferson Davis Hwy	-22.2 (-7.7%)
	F	Commerce North @ Bellemeade Rd	-24.7 (-6.8%)
	G	Deepwater Terminal South (The Port)	-34.0 (-11.5%)

Concept S2-S3

The main idea behind this concept was to add more capacity for the eastbound right-turning vehicles by allowing right turn from the left lane on Bells Road. While it is true this concept adds more 'storage' to the right-turning vehicles on Bells Road, it is also true that vehicles spend more time waiting for the light to turn green, especially if they happen to be in the left lane as no right turn on red is allowed from that lane. This would result in reduced queues, but higher delay as shown in Table 20 and Table 21 for Bells Road and Commerce Road intersection. When it comes to the other three intersections, there was little to no change in results between no-build and build scenario. Also, the travel times shown in Table 13 indicate some travel time savings in the PM, however most less than 5 percent. During the AM peak, there were little to no savings. Table X shows top six O-D pairs with the most change in travel times in concept S2-S3 compared to the travel times during the no-build scenario. The travel times between all other O-D pairs not shown in the table, as well as the AM peak hour can be found in Appendix X.

Table 14: Concept S2-S3 vs No-Build Travel Times

PM travel time change in seconds and % change compared to 2045 no-build scenario			DESTINATION		
			A	B	C
			I-95 North	I-95 South	Commerce South (by Amazon entrance)
ORIGIN	E	Bells Rd @ Jefferson Davis Hwy	-7.9 (-2.8%)	-2.7 (-0.9%)	6.0 (2.5%)
	F	Commerce North @ Bellemeade Rd	-12.5 (-3.5%)	-3.9 (-1.1%)	-20.1 (-6.1%)
	G	Deepwater Terminal South (The Port)	-9.3 (-3.2%)	-2.2 (-0.7%)	-4.5 (-1.8%)

Concept S3

The delay and LOS results displayed in Table 20 for concept S3 indicate little to no difference in comparison with the results for the no-build scenario, at least in the AM peak hour. Though in the PM peak hour, the intersection delay was reduced by approximately 4 seconds at Bells Road and Bells Road Access Road intersections on Commerce Road, as well as the intersection of Deepwater Terminal Road and Bells Road Access Road for which the LOS also improved from B to A. When it comes to maximum queues, as mentioned in the concept overview in Chapter 4, current and future queues on the southbound approach at Commerce Road and Walmsley intersection exceed the existing storage capacity. Table 21 shows that extending the southbound left turn lane from Bells Road to Walmsley Boulevard would reduce the maximum queue by approximately 300 feet in both AM and PM peak hour. This would also help reduce queues at other intersections in proximity of Commerce Road and Walmsley Boulevard. For example, as indicated in Table 21 the maximum queue was reduced by 260 feet or 49 percent in the northbound approach at Bells Road Access Road and Deepwater Terminal Road in the PM peak hour. Also, the eastbound right maximum queue at Bells Road and Commerce Road was reduced by 143 feet or 19 percent in the PM peak hour. As far as travel times, the most significant savings for the PM peak hour are shown in Table 15 below. Concept S3 resulted in some travel times savings for the AM peak hour as well, however not significant. The travel times between all other O-D pairs not shown in the table, as well as the AM peak hour can be found in Appendix X.

Table 15: Concept S3 vs No-Build Travel Times

PM travel time change in seconds and % change compared to 2045 no-build scenario			DESTINATION			
			A	B	C	D
			I-95 North	I-95 South	Commerce South (by Amazon entrance)	Walmsley (by Brother Int'l entrance)
ORIGIN	E	Bells Rd @ Jefferson Davis Hwy	-23.1 (-8.2%)	-13.0 (-4.5%)	-10.3 (-4.3%)	-18.7 (-8.9%)
	F	Commerce North @ Bellemeade Rd	-22.4 (-6.2%)	-15.9 (-4.4%)	-22.4 (-6.8%)	-18.1 (-7.2%)
	G	Deepwater Terminal South (The Port)	-24.5 (-8.6%)	-18.7 (-6.3%)	-13.0 (-5.3%)	-20.6 (-10.1%)

Concept S3-S4

Similar to concepts S2 and S2-S3, this concept delay and LOS results in Table 20 show little to no difference when compared to the no-build results in the AM peak hour. However, in the PM peak hour the intersection LOS was improved from C to B for Bells Road and Bells Road Access Road intersections on Commerce Road, and B to A for the intersection of Deepwater Terminal Road and Bells Road Access Road. When looking at maximum queues for concept S3-S4 in Table 21, the results look very similar to concept S3 analyzed as a stand-alone concept, though adding concept S4 to S3 provides even more benefit. The maximum queue in the northbound approach at Bells Road Access Road and Deepwater Terminal Road was reduced by 282 feet or more than 50 percent in the PM peak hour. The southbound approaches on Commerce Road saw queue reductions of around 25 percent, while the eastbound right turning queue on Bells Road was reduced by 18 percent in the PM peak hour. As far as the change in travel times, the results look somewhat similar to concept S3. However, concept S3-S4 appears to add even more benefit to The Port traffic, which had travel time improvements of more than 10 and even 20 percent in the PM peak hour as shown in Table 16.

Table 16: Concept S3-S4 vs No-Build Travel Times

PM travel time change in seconds and % change compared to 2045 no-build scenario			DESTINATION			
			A	B	C	D
			I-95 North	I-95 South	Commerce South (by Amazon entrance)	Walmsley (by Brother Int'l entrance)
ORIGIN	E	Bells Rd @ Jefferson Davis Hwy	-23.1 (-8.2%)	-12.2 (-4.2%)	-9.6 (-4.1)	-12.3 (-5.9%)
	F	Commerce North @ Bellemeade Rd	-27.3 (-7.6%)	-16.7 (-4.6%)	-16.2 (-5.0)	5.2 (2.1%)
	G	Deepwater Terminal South (The Port)	-35.7 (-12.5%)	-24.1 (-8.1%)	-19.5 (-7.9%)	-43.9 (-21.5%)

Concept S5-S6

Based on the delay and LOS results in Table 20 and maximum queue results in Table 21, concept S5-S6 brings little to no improvement in the AM peak hour. Relocating the I-95 southbound off-ramp further south resulted in some improvement at Commerce Road and Walmsley Boulevard intersection. As shown in Table 20, the overall intersection delay was reduced by about 6 seconds and the LOS changed from C to B in the PM peak hour. The northbound right queue was also reduced by almost 300 feet or 70 percent. However, the benefits of concept S5-S6 were offset by the new intersection on Commerce Road with the relocated I-95 southbound off-ramp. Even though the newly proposed intersection operates at LOS A in the AM and B in the PM with maximum queues of around 200 feet, the benefit of re-routing some movements from Walmsley Boulevard and Commerce Road does not outweigh the cost it would take to relocate the ramp and construct the new intersection. The operational results for the proposed intersection can be found in Appendix X. The travel time results for concept S5-S6 tell the same story. As shown in Table 17, concept S5-S6 resulted in improvements in travel times for some movements and increases for other in the PM peak hour. The AM peak hour results were similar can be found in Appendix X along with the travel time results for all other O-D pairs analyzed for both peak hours. Particularly, eastbound left and through movements were at a disadvantage in this concept as these movements were re-routed to the proposed intersection with the relocated I-95 southbound ramp. As far as the I-95 southbound, concept S5-S6 had little to no impact. The operational results for the interstate in this concept are included in Appendix X.

Table 17: Concept S5-S6 vs No-Build Travel Times

PM travel time change in seconds and % change compared to 2045 no-build scenario			DESTINATION						
			A	B	C	D	E	F	G
			I-95 North	I-95 South	Commerce South (by Amazon entrance)	Walmsley (by Brother Int'l entrance)	Bells Rd @ Jefferson Davis Hwy	Commerce North @ Bellemeade Rd	Deepwater Terminal South (The Port)
ORIGIN	A	I-95 North		-	-24.8 (-14.2%)	-13.8 (-12.7%)	-	-	-
	B	I-95 South	-		-22.7 (-10.1%)	-	-	-	-
	C	Commerce South (by Amazon entrance)	-	-42.2 (-27.3%)		-14.9 (-13.0%)	-28.7 (-9.1%)	-18.4 (-5.3%)	-30.6 (-13.4%)
	D	Walmsley (by Brother Int'l car entrance)	18.4 (15.3%)	-21.5 (-16.0%)	13.9 (21.2%)		42.7 (16.7%)	46.0 (15.9%)	28.8 (16.0%)
	E	Bells Rd @ Jefferson Davis Hwy	-	-	-	-22.7 (-10.8%)		-	-

**Note: The above graphic only shows most significant changes in travel times.*

Concept S7

Compared to all other short-term concepts which show most benefit in the PM peak hour, concept S7 has the most impact on the study area in the AM peak hour. Specifically, concept S7 was created to reduce congestion in the westbound direction at Walmsley Boulevard and Commerce Road. As shown in Table 21, the maximum queues in the no-build scenario as well as all other concepts previously discussed, extend to about 1,300 feet in the AM peak hour. In concept S7 these queues were reduced by about a thousand feet or more than 70%. For a better visual, this was illustrated in Figure 32. If the traffic continues to back up on I-95 northbound off-ramp, the queue could reach the mainline, which would cause serious safety issues. As far as the intersection delay and LOS, Table 20 indicates the most significant delay reduction for the intersection of Walmsley Boulevard and Commerce Road in the AM peak hour, which was reduced by 5 seconds in concept S7 compared to the no-build scenario. The delay and LOS for all other intersections in concept S7 shown in Table 20 look very similar to the no-build scenario. When it comes to travel times, due to substantial queue reduction on the I-95 northbound off-ramp, concept S7 has the most travel time reduction for vehicles coming from I-95 south of Bells Road interchange and traveling to any destination displayed in Table 18. This concept also resulted in some travel time savings for vehicles with the origin north of I-95. The travel times between all other O-D pairs not shown in Table 18, as well as the AM peak hour can be found in Appendix X.

Figure 32: Concept S7 vs No-Build Maximum Queue Comparison

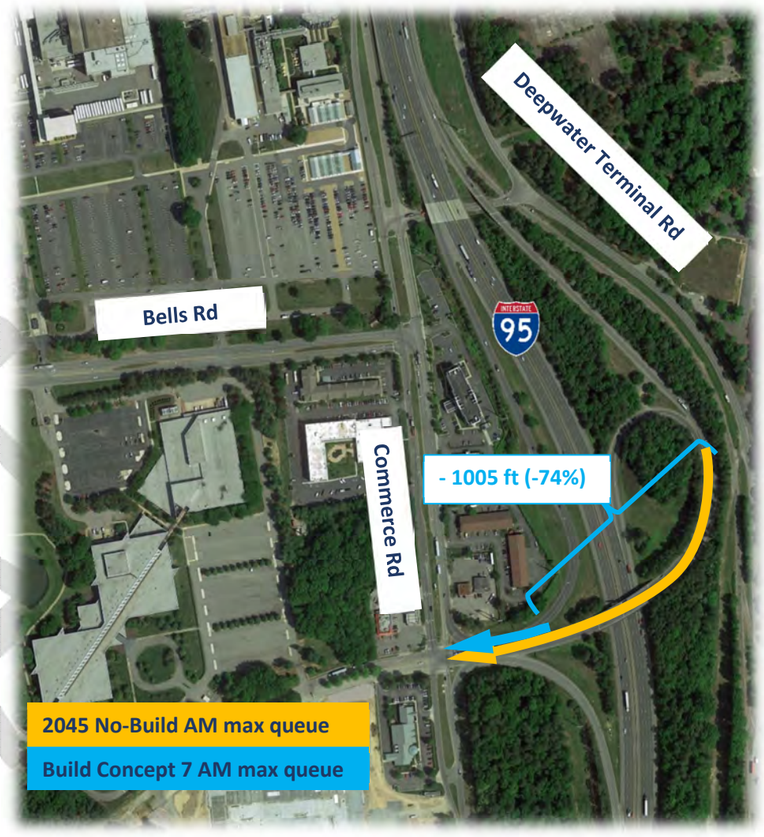


Table 18: Concept S7 vs No-Build Travel Times

AM travel time change in seconds and % change compared to 2045 no-build scenario			DESTINATION				
			C	D	E	F	G
			Commerce South (by Amazon entrance)	Walmsley (by Brother Int'l entrance)	Bells Rd @ Jefferson Davis Hwy	Commerce North @ Bellemeade Rd	Deepwater Terminal South (The Port)
ORIGIN	A	I-95 North	-7.4 (-4.6%)	-7.0 (-6.2%)	-0.8 (-0.3%)	1.6 (0.6%)	-0.4 (-0.3%)
	B	I-95 South	-11.0 (-5.5%)	-19.7 (-12.5%)	-12.5 (-4%)	-12.6 (-3.7%)	-9.9 (-4.6%)

Table 19: 2045 Build vs No-Build Conditions VISSIM Analysis Results - I-95

Freeway Segment		AM Peak Hour						PM Peak Hour					
		No-Build			Build Concept 1			No-Build			Build Concept 1		
No-Build	Build	Speed[1]	Density[2]	LOS	Speed[1]	Density[2]	LOS	Speed[1]	Density[2]	LOS	Speed[1]	Density[2]	LOS
I-95 Northbound													
Diverge Segment at the off-ramp to Maury Street		56	27.3	C	56	27.3	C	56	20.9	C	56	20.9	C
Basic Segment between Bells Rd on-ramp and Maury Street off-ramp		58	35.0	D	58	35.0	D	39	44.1	E	39	44.2	E
Merge Segment at the on-ramp from Bells Road		57	26.4	C	57	26.4	C	32	36.7	E	32	36.8	E
Basic Segment between Bells Rd on-and-off-ramps		58	32.7	D	58	32.7	D	34	39.9	E	34	39.8	E
Weaving Segment between Chippenham Parkway Westbound on-ramp and Bells Road off-ramp		57	28.4	D	57	28.4	D	39	28.6	D	39	28.6	D
I-95 Southbound													
Merge Segment at the 4th Street		57	18.8	B	57	18.8	B	53	29.1	D	56	27.4	C
Basic Segment between 4th Street on-ramp Bells Road off-ramp		58	24.6	C	58	24.6	C	42	49.3	F	57	35.9	E
Diverge Segment at the off-ramp to Bells Road		59	18.2	B	59	18.2	B	27	51.1	F	58	26.4	C
Basic Segment between Bells Road on-and-off-ramps		59	19.4	C	59	19.4	C	23	74.1	F	59	32.5	D
Merge Segment at the on-ramp from Bells Road	Weaving Segment between Bells Road on-ramp and Chippenham Parkway off-ramp	58	17.1	B	59	16.6	B	23	65.1	F	58	28.9	D
Basic Segment between Bells Road on-ramp and Chippenham Parkway off-ramp		59	22.2	C				51	37.0	E			
Diverge Segment at the off-ramp to Chippenham Parkway		59	16.5	B				57	26.0	C			

Source: VISSIM 10 Link Evaluation based on the average of 10 VISSIM model runs.

1 Average simulated speed, expressed in miles per hour.

2 Average simulated density, expressed in vehicle per mile per lane.

LOS	A	B	C	D	E	F
Density (Basic)	≤11	11-18	18-26	26-35	35-45	>45
Density (Merge/Diverge/Weaving)	≤10	10-20	20-28	28-35	35-45	>45

Table 20: 2045 Short-term Build vs No-Build Conditions VISSIM Analysis Results – Intersection Delay (sec) and LOS

Intersection	Approach	Movement	AM Peak Hour Delay (sec) - LOS						PM Peak Hour Delay (sec) - LOS					
			No-Build	Concept S2-S3	Concept S3	Concept S3-S4	Concept S5-S6	Concept S7	No-Build	Concept S2-S3	Concept S3	Concept S3-S4	Concept S5-S6	Concept S7
Commerce Rd & Walmsley Blvd/I-95 ramps	EB	EBL	32.0 - C	31.3 - C	31.9 - C	31.3 - C	N/A	31.9 - C	42.5 - D	42.2 - D	42.3 - D	42.5 - D	N/A	42.0 - D
		EBT	31.5 - C	31.0 - C	30.7 - C	31.2 - C	N/A	31.8 - C	45.0 - D	44.9 - D	45.3 - D	45.1 - D	N/A	45.1 - D
		EBR	4.1 - A	4.0 - A	3.9 - A	4.1 - A	9.9 - A	4.1 - A	4.6 - A	4.6 - A	4.6 - A	4.6 - A	11.1 - B	4.6 - A
	WB	WBL	49.6 - D	49.6 - D	51.1 - D	50.2 - D	49.4 - D	37.6 - D	68.8 - E	69.1 - E	70.2 - E	70.6 - E	41.3 - D	67.0 - E
		WBT	45.1 - D	44.4 - D	46.1 - D	45.6 - D	39.8 - D	30.3 - C	42.4 - D	41.3 - D	41.8 - D	43.6 - D	32.5 - C	39.0 - D
		WBR	7.8 - A	7.8 - A	8.0 - A	7.9 - A	8.8 - A	0.6 - A	1.1 - A	1.1 - A	1.1 - A	1.1 - A	1.0 - A	0.4 - A
	NB	NBL	45.9 - D	45.7 - D	44.9 - D	44.1 - D	9.5 - A	45.5 - D	52.1 - D	53.1 - D	54.0 - D	54.2 - D	14.3 - B	53.1 - D
		NBT	52.5 - D	53.8 - D	53.3 - D	52.6 - D	30.2 - C	54.1 - D	71.0 - E	70.6 - E	69.8 - E	71.0 - E	26.3 - C	70.1 - E
		NBR	8.6 - A	8.2 - A	8.2 - A	8.1 - A	2.9 - A	8.8 - A	32.7 - C	32.6 - C	33.6 - C	34.4 - C	4.6 - A	34.2 - C
	SB	SBL	21.7 - C	21.9 - C	21.6 - C	21.1 - C	23.2 - C	21.6 - C	20.6 - C	20.2 - C	20.4 - C	21.3 - C	16.0 - B	21.0 - C
		SBT	15.3 - B	15.4 - B	14.8 - B	14.0 - B	29.1 - C	16.2 - B	12.2 - B	9.8 - A	11.1 - B	12.4 - B	22.6 - C	11.7 - B
		SBR	6.8 - A	5.6 - A	6.2 - A	6.3 - A	7.4 - A	6.9 - A	5.4 - A	3.0 - A	5.5 - A	5.8 - A	5.8 - A	5.5 - A
	Intersection		**18.2 - B**	**18.2 - B**	**18.4 - B**	**18.1 - B**	**19.7 - B**	**13.2 - B**	**20.8 - C**	**20.5 - C**	**20.8 - C**	**21.4 - C**	**14.6 - B**	**20.8 - C**
Commerce Rd & Bells Rd	EB	EBL	44.2 - D	50.2 - D	43.5 - D	44.1 - D	42.8 - D	44.2 - D	49.8 - D	61.2 - E	49.3 - D	48.3 - D	48.7 - D	49.0 - D
		EBR	11.4 - B	12.8 - B	11.4 - B	10.1 - B	11.6 - B	11.3 - B	27.6 - C	31.1 - C	21.6 - C	19.3 - B	26.2 - C	28.2 - C
	WB	WBL	49.9 - D	51.5 - D	53.4 - D	50.7 - D	54.3 - D	50.7 - D	66.5 - E	53.6 - D	54.6 - D	67.1 - E	60.8 - E	66.3 - E
		WBT	56.3 - E	55.8 - E	59.5 - E	58.1 - E	56.6 - E	53.0 - D	59.3 - E	60.4 - E	58.4 - E	59.2 - E	65.5 - E	59.8 - E
		WBR	8.6 - A	8.8 - A	9.1 - A	9.6 - A	9.0 - A	9.4 - A	6.1 - A	6.2 - A	6.1 - A	6.2 - A	6.4 - A	6.4 - A
	NB	NBL	28.6 - C	33.9 - C	28.4 - C	28.8 - C	28.7 - C	28.7 - C	28.2 - C	31.9 - C	27.9 - C	28.7 - C	28.4 - C	29.0 - C
		NBT	9.1 - A	13.3 - B	9.7 - A	9.5 - A	8.6 - A	10.0 - B	3.2 - A	5.5 - A	3.2 - A	3.4 - A	3.2 - A	3.3 - A
		NBR	0.0 - A	0.0 - A	0.0 - A	0.0 - A	0.0 - A	0.0 - A	2.0 - A	4.0 - A	2.6 - A	4.5 - A	2.8 - A	6.0 - A
	SB	SBT	32.3 - C	35.7 - D	30.1 - C	28.0 - C	34.5 - C	31.3 - C	29.3 - C	30.8 - C	24.9 - C	21.9 - C	26.7 - C	28.2 - C
		SBR	18.1 - B	21.8 - C	17.6 - B	14.4 - B	21.0 - C	18.9 - B	24.5 - C	25.8 - C	21.6 - C	15.5 - B	21.8 - C	23.3 - C
	Intersection		**19.5 - B**	**25.4 - C**	**19.3 - B**	**18.6 - B**	**20.0 - B**	**19.6 - B**	**24.8 - C**	**29.4 - C**	**21.5 - C**	**19.9 - B**	**23.6 - C**	**24.6 - C**
Commerce Rd & Bells Rd Access Rd	WB	WBL	43.8 - D	42.2 - D	41.3 - D	41.0 - D	45.8 - D	43.1 - D	38.3 - D	38.4 - D	33.1 - C	31.9 - C	35.8 - D	37.1 - D
		WBR	23.5 - C	22.4 - C	24.2 - C	23.6 - C	20.4 - C	25.2 - C	29.5 - C	31.3 - C	25.3 - C	24.3 - C	25.1 - C	29.7 - C
	NB	NBT	11.1 - B	11.7 - B	11.2 - B	10.7 - B	10.0 - A	11.8 - B	18.9 - B	18.2 - B	18.2 - B	16.9 - B	17.2 - B	19.0 - B
		NBR	10.9 - B	11.5 - B	10.8 - B	10.1 - B	9.6 - A	11.6 - B	11.8 - B	11.8 - B	11.1 - B	10.5 - B	10.1 - B	12.9 - B
	SB	SBL	43.6 - D	42.3 - D	44.3 - D	45.0 - D	47.0 - D	45.8 - D	48.4 - D	44.0 - D	47.9 - D	44.9 - D	46.1 - D	45.9 - D
		SBT	5.6 - A	5.8 - A	5.1 - A	4.1 - A	6.7 - A	5.4 - A	19.7 - B	19.9 - B	17.8 - B	13.7 - B	18.3 - B	18.7 - B
	Intersection		**11.7 - B**	**12.0 - B**	**11.5 - B**	**10.8 - B**	**11.4 - B**	**12.1 - B**	**24.0 - C**	**24.1 - C**	**21.8 - C**	**19.5 - B**	**22.4 - C**	**23.5 - C**
Bells Rd Access Rd & Deepwater Terminal Rd	EB	EBL	1.8 - A	1.9 - A	1.9 - A	1.8 - A	1.8 - A	1.9 - A	1.9 - A	2.0 - A	2.1 - A	2.0 - A	1.9 - A	2.0 - A
		EBR	2.0 - A	2.1 - A	2.0 - A	2.0 - A	2.0 - A	2.1 - A	1.3 - A	1.3 - A	1.4 - A	1.3 - A	1.3 - A	1.3 - A
	NB	NBL	1.2 - A	1.1 - A	1.3 - A	1.0 - A	0.9 - A	1.0 - A	28.7 - D	30.6 - D	18.9 - C	15.3 - C	28.0 - D	26.6 - D
		NBT	0.5 - A	0.5 - A	0.5 - A	0.4 - A	0.0 - A	0.5 - A	14.7 - B	4.2 - A	5.1 - A	3.3 - A	3.5 - A	5.4 - A
	SB	SBT	0.4 - A	0.4 - A	0.5 - A	0.3 - A	0.3 - A	0.4 - A	1.9 - A	3.4 - A	3.1 - A	2.2 - A	1.3 - A	3.7 - A
		SBR	0.6 - A	0.6 - A	0.6 - A	0.6 - A	0.6 - A	0.6 - A	8.6 - A	6.6 - A	3.8 - A	3.5 - A	5.8 - A	6.3 - A
	Intersection		**1.7 - A**	**1.7 - A**	**1.7 - A**	**1.6 - A**	**1.6 - A**	**1.7 - A**	**13.2 - B**	**13.3 - B**	**8.5 - A**	**7.1 - A**	**12.1 - B**	**11.9 - B**

Table 21: 2045 Short-term Build vs No-Build Conditions VISSIM Analysis Results – Intersection Maximum Queues

Intersection	Approach	Movement	AM Peak Hour Max Queues (ft)						PM Peak Hour Max Queues (ft)					
			No-Build	Concept S2-S3	Concept S3	Concept S3-S4	Concept S5-S6	Concept S7	No-Build	Concept S2-S3	Concept S3	Concept S3-S4	Concept S5-S6	Concept S7
Commerce Rd & Walmsley Blvd/I-95 ramps	EB	EBL	142	142	142	142	N/A	142	136	136	136	136	N/A	136
		EBT	97	97	97	97	N/A	97	176	176	176	176	N/A	178
		EBR	113	113	113	113	130	113	191	191	191	191	140	193
	WB	WBL	1355	1265	1432	1332	1237	349	269	263	256	260	232	243
		WBT	1049	1142	1321	979	1010	294	226	236	204	205	162	180
		WBR	1296	1191	1362	1256	1174	212	155	152	151	144	144	106
	NB	NBL	48	48	50	48	39	46	59	59	59	59	42	59
		NBT	134	136	139	136	163	137	210	243	210	210	182	210
		NBR	152	141	159	153	62	151	418	460	490	499	136	432
	SB	SBL	934	661	652	677	1082	957	1166	832	851	853	1171	1140
		SBT	934	661	652	677	1082	957	1166	832	851	853	1171	1140
		SBR	795	522	513	538	943	818	1027	694	715	715	1033	1002
	Intersection		1420	1293	1442	1351	1422	957	1166	832	853	858	1171	1140
Commerce Rd & Bells Rd	EB	EBL	202	440	197	178	182	181	146	427	138	142	172	133
		EBR	403	254	416	385	373	435	739	531	596	604	762	728
	WB	WBL	92	91	92	99	105	92	24	24	24	24	24	24
		WBT	92	91	92	100	105	93	25	24	25	25	24	25
		WBR	29	29	29	29	26	29	28	28	28	28	27	28
	NB	NBL	357	368	349	350	330	318	315	358	351	343	325	325
		NBT	360	418	442	397	322	385	143	164	142	139	128	158
		NBR	420	478	502	458	383	445	203	224	202	199	188	218
	SB	SBT	397	423	399	244	426	406	470	468	468	353	471	462
		SBR	345	371	347	192	374	354	417	416	416	301	419	410
	Intersection		504	514	528	492	471	513	739	569	606	610	762	728
Commerce Rd & Bells Rd Access Rd	WB	WBL	291	277	288	281	260	280	548	533	528	527	528	539
		WBR	328	314	325	317	296	316	585	569	564	563	564	567
	NB	NBT	426	424	442	440	401	442	269	290	275	281	290	291
		NBR	403	400	418	417	377	418	245	266	251	258	266	267
	SB	SBL	109	103	114	110	102	104	136	128	141	138	151	136
		SBT	137	146	138	124	143	143	266	283	241	232	271	234
	Intersection		426	425	444	440	403	450	585	569	564	563	564	572
Bells Rd Access Rd & Deepwater Terminal Rd	EB	EBL	46	63	72	51	62	63	83	81	92	76	78	96
		EBR	28	25	28	11	39	28	14	12	8	13	31	11
	NB	NBL	20	20	21	22	18	15	532	460	272	249	393	400
		NBT	6	6	0	0	0	0	486	415	226	204	348	355
	SB	SBT	0	0	0	0	0	0	144	95	45	41	59	82
		SBR	0	0	0	0	0	0	144	95	45	41	59	82
	Intersection		62	73	81	55	72	64	532	460	272	249	394	400

5.2.2. Long-Term

As mentioned in Chapter 4, concepts L1 and L3 are the only two long-term concepts carried forward in the analysis. The following section provides operational results of the two.

Concept L1

Reconfiguring the intersection of Commerce Road and Walmsley Boulevard to a roundabout would have great benefits. The travel time results for this concept indicate significant savings in both AM and PM peak hour. The AM results that improved the most compared to the no-build scenario are shown in Table 23, while PM travel times can be found in Appendix X. As shown in Table 22, some travel times were reduced by almost 30 percent in concept L1. As far as the overall intersection delay and LOS shown in Table 23, concept L1 operates at LOS A in both peak hour with overall intersection delays reduced by than 10 seconds per vehicle in both peak hours. Some individual movements were improved from LOS D or E to A. Perhaps, the greatest benefit of concept L1 is showed in Table 24, which shows the maximum queues compared to the no-build scenario. The southbound approach queue was reduced by almost 70 percent or 800 feet in both peak hours, while the westbound approach queues are barely existent with queue reductions of about 90 percent or over a thousand feet. Table 24 indicates some increases in queue lengths as well, especially in the northbound approach, however it could be overlooked as the benefits or this concept greatly outweigh the negatives.

Table 22: Concept L1 vs No-Build Travel Times

AM travel time change in seconds and % change compared to 2045 no-build scenario			DESTINATION						
			A	B	C	D	E	F	G
			I-95 North	I-95 South	Commerce South (by Amazon entrance)	Walmsley (by Brother Int'l entrance)	Bells Rd @ Jefferson Davis Hwy	Commerce North @ Bellemeade Rd	Deepwater Terminal South (The Port)
ORIGIN	A	I-95 North			-43.1 (-26.9%)	-28.6 (-25.5%)	-	-	-
	B	I-95 South	-		-51.2 (-25.5%)	-45.4 (-28.7%)	-	-	-
	C	Commerce South (by Amazon entrance)	-	-		-30.9 (-28.4%)	-37.0 (-12.2%)	-38.8 (-11.7%)	-41.3 (-19.4%)
	D	Walmsley (by Brother Int'l car entrance)	-11.6 (-10.7%)	-20.7 (-22.7%)	-11.7 (-14.6%)		-	-	-
	E	Bells Rd @ Jefferson Davis Hwy	-19.0 (-7.4%)	-16.9 (-7.2%)	-	-		-	-

**Note: The above graphic only shows most significant changes in travel times.*

Table 23: 2045 Long-term Build vs No-Build Conditions VISSIM Analysis Results – Intersection Delay (sec) and LOS

Intersection	Approach	Movement	AM Peak Hour Delay (sec) - LOS		PM Peak Hour Delay (sec) - LOS	
			No-Build	Concept L1	No-Build	Concept L1
Commerce Rd & Walmsley Blvd/I-95 ramps	EB	EBL	32.0 - C	10.5 - B	42.5 - D	22.0 - C
		EBT	31.5 - C	11.7 - B	45.0 - D	18.1 - B
		EBR	4.1 - A	9.2 - A	4.6 - A	15.8 - B
	WB	WBL	49.6 - D	2.6 - A	68.8 - E	3.4 - A
		WBT	45.1 - D	5.6 - A	42.4 - D	6.3 - A
		WBR	7.8 - A	0.5 - A	1.1 - A	0.3 - A
	NB	NBL	45.9 - D	8.3 - A	52.1 - D	50.3 - D
		NBT	52.5 - D	7.0 - A	71.0 - E	47.7 - D
		NBR	8.6 - A	7.3 - A	32.7 - C	50.4 - D
	SB	SBL	21.7 - C	5.5 - A	20.6 - C	4.3 - A
		SBT	15.3 - B	6.0 - A	12.2 - B	4.7 - A
		SBR	6.8 - A	6.0 - A	5.4 - A	3.9 - A
	Intersection		**18.2 - B**	**3.1 - A**	**20.8 - C**	**10.0 - A**

Table 24: 2045 Long-term Build vs No-Build Conditions VISSIM Analysis Results – Intersection Maximum Queues

Intersection	Approach	Movement	AM Peak Hour Max Queues (ft)		PM Peak Hour Max Queues (ft)	
			No-Build	Concept L1	No-Build	Concept L1
Commerce Rd & Walmsley Blvd/I-95 ramps	EB	EBL	142	94	136	132
		EBT	97	94	176	132
		EBR	113	94	191	132
	WB	WBL	1355	97	269	69
		WBT	1049	97	226	69
		WBR	1296	101	155	69
	NB	NBL	48	116	59	533
		NBT	134	116	210	533
		NBR	152	116	418	533
	SB	SBL	934	378	1166	399
		SBT	934	378	1166	399
		SBR	795	378	1027	399
	Intersection		**1420**	**378**	**1166**	**546**

Concept L3

Since this concept involves construction of a proposed roundabout at a location on I-95 northbound ramps along with flyovers connecting to Deepwater Terminal Road, it is not directly comparable to the no-build scenario for the same location. Therefore, concept L3 operational results were displayed graphically in Figure 33 instead of a tabular format. As mentioned in Chapter 4, it is important to note that concept L3 was analyzed in a combination with concept L1. Since the operational results of concept L1 analyzed as a combined concept with L3 show little to no difference when compared to L1 analyzed as a stand-alone concept, the results were not discussed in this section of the report, however they are reported in Appendix X. The operational results for proposed unsignalized intersections on Deepwater Terminal Rd were also reported in Appendix X. As shown in Figure 33, the proposed roundabout operates at LOS A with minimal delay in both peak hours. When it comes to maximum queues, the longest 2045 queue was about 200 feet in the westbound direction in the PM peak hour. All other queues were about a hundred feet or less. As far as the travel time results, this concept had significant travel time savings in both peak hours. As expected, providing a direct connection to I-95 and Commerce Road from Deepwater Terminal Road would result in the most reduction in travel times from Deepwater Terminal Road to any destination mentioned in Table 25. That is true for both peak hours. The travel times between all other O-D pairs not shown in the table can be found in Appendix X.

Figure 33: Concept L3 Operational Results

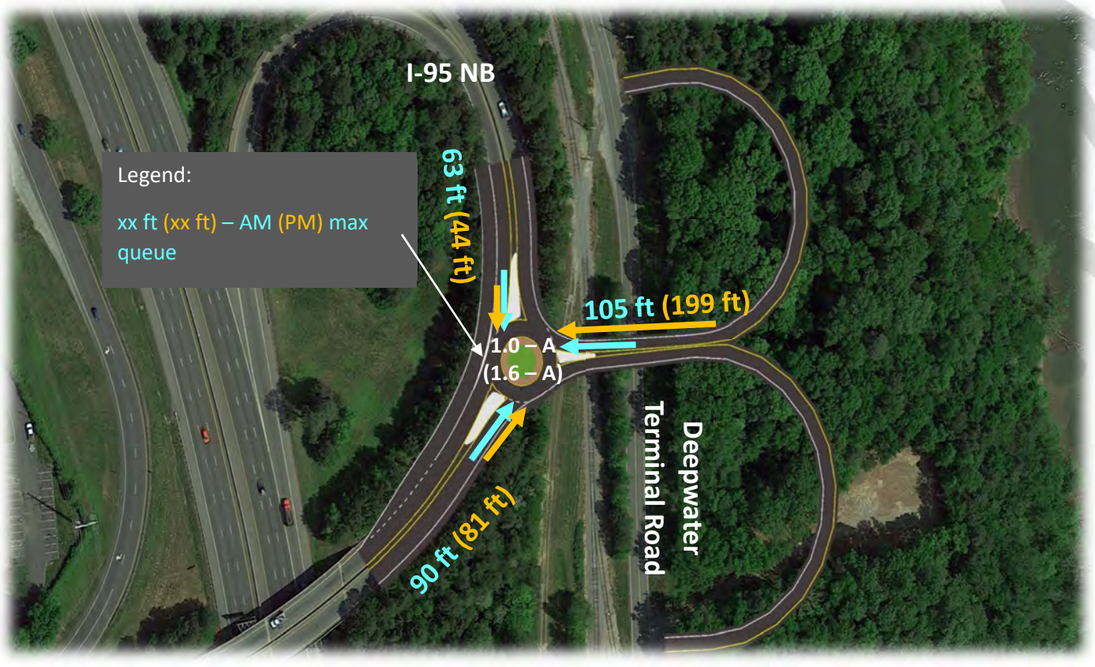


Table 25: Concept L3 vs No-Build Travel Times:

Travel time change in seconds and % change compared to 2045 no-build scenario				DESTINATION			
				A	B	C	D
				I-95 North	I-95 South	Commerce South (by Amazon entrance)	Walmsley (by Brother Int'l entrance)
ORIGIN	G	Deepwater Terminal South (The Port)	AM	-190.3 (-68.4%)	-110.0 (-44.4%)	-96.0 (-42.9%)	-83.6 (-46.9%)
			PM	-203.7 (-71.0%)	-131.7 (-44.5%)	-116.9 (-47.5%)	-111.0 (-54.3%)

Other concepts discussed in this chapter are local connector ideas LC 1 and LC 2. Both ideas were analyzed from a high-level planning perspective and no VISSIM analysis was performed.

Concept LC 1

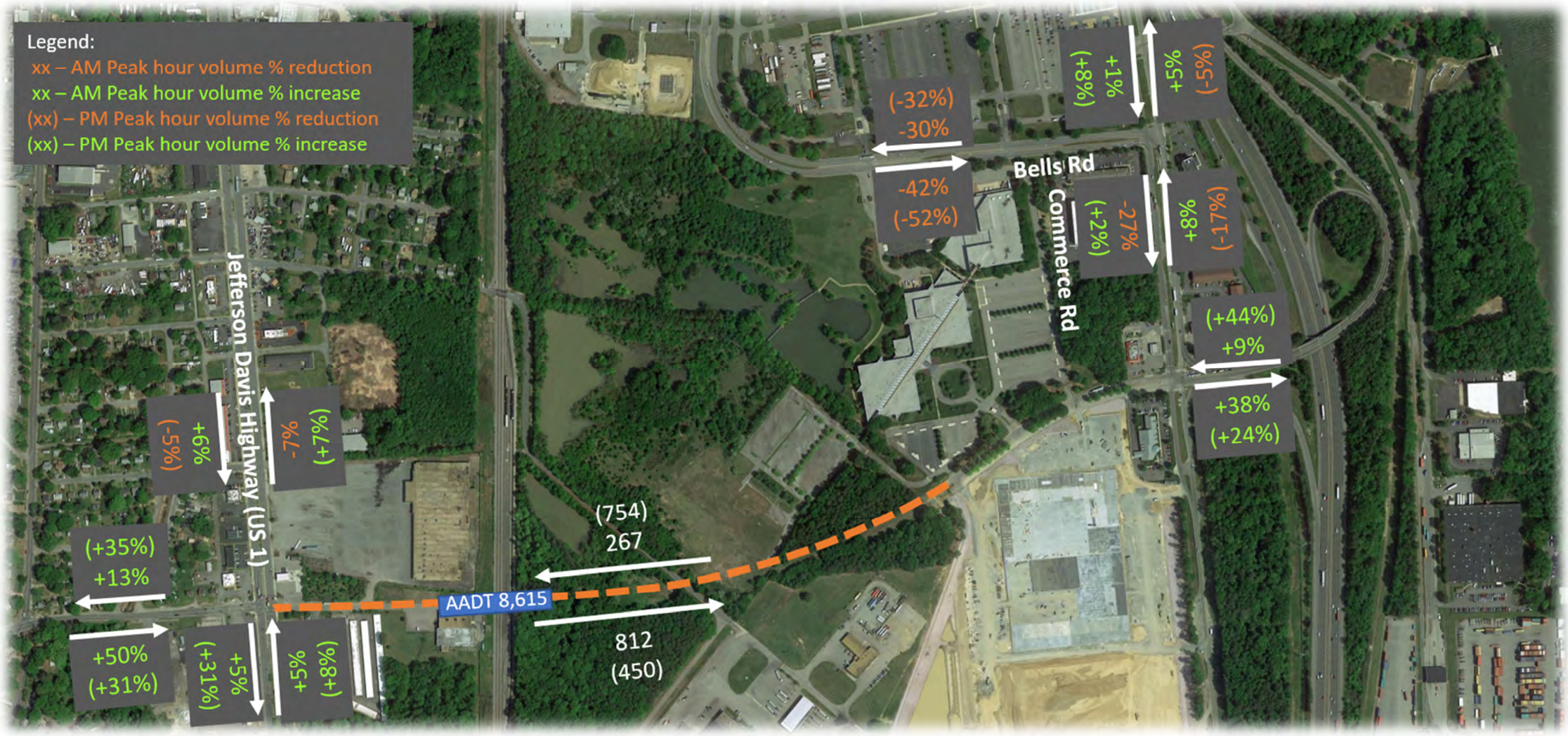
As mentioned in Chapter 4, for concept LC 1 or Walmsley Boulevard Extension, the regional travel demand model was used to predict changes in traffic patterns with the construction of a proposed extension. The estimated traffic re-routing is shown in Figure 26. Based on the numbers shown in the graphic, with Walmsley Extension in place, it is very likely the intersection improvements would be needed at Walmsley Boulevard intersections with Jefferson Davis Highway and Commerce Road and these intersections are expected to see significant increases in traffic volumes. Bells Road, however, would experience less traffic in this concept with another route available for vehicles traveling from Jefferson Davis Highway to Commerce Road/I-95 or vice versa.

Concept LC 2

Concept LC 2 asks the question "Is it feasible and what would be involved in brokering The Port of Virginia vehicle easement in this existing I-95 underpass?" The Port of Virginia easement would theoretically allow cargo containers to be moved back and forth under I-95, utilizing a potential future storage area as an off-hours drop lot on the west side of I-95 along Commerce Road. Most of the challenges of this concept were mentioned in Chapter 4. There also exists an unapproved draft agreement between The Port and DuPont. Before spending dollars on engineering study, it is recommended that The Port approach VDOT about willingness to cooperate and reconnect with DuPont about draft agreement. If the response seems encouraging, an engineering, environmental and real estate study should be conducted to include:

- Utility location services (overhead / underground)
- Conduct environmental studies
- Federal & state permitting (NEPA & R/W access)
- Develop preliminary design plans
- Negotiate shared use / access agreements with Dupont & owners of utilities
- Explore real estate costs for drop lot
- Explore what's involved with permitting The Port of Virginia tractors to travel on public roads (e.g. Commerce)
- Other

Table 26: Concept LC 1 - Walmsley Boulevard Extension 2045 Traffic Re-routing



6. Recommendations, Current Actions & Next Steps

6.1 Core Working Group Recommendations

The evaluation matrix for short-term concepts is shown in Figure 34. The Core Working Group recommends concepts S1, S3, and S7 as the most cost-effective improvements in the short term. Regarding the long-term concepts, The Core Working Group recommends further study of long-term concepts L1 and L3 as good candidates to accomplish the long-term access, safety, and economic goals of the area. The Working Group also supports Local Connector Concept LC 2 for its potential to provide much-needed redundant access to the growing deepwater port asset, offering better freight logistics during off-hours operations.

Figure 34: Short-term Concepts Evaluation Matrix

Concepts	Description	Construction Cost	Utility and ROW Impact	Operational Benefit	
				Interstate	Local
S1	Add I-95 southbound auxiliary lane between Bells Road Interchange and Chippenham Parkway	High: $15.4 - $25.6 Million	Significant	Significant Benefit	No Benefit
S3	Extend southbound left turn lane from Bells Rd to Walmsley	Low: $1.0 - $1.6 Million	Minimal	No Benefit	Significant Benefit
S2-S3	Convert left lane at Bells Rd approach to left and right (S2) Extend southbound left turn lane from Bells Rd to Walmsley (S3)	Low: $1.5 - $2.0 Million	Minimal	No Benefit	Minor Benefit
S3-S4	Extend southbound left turn lane from Bells Rd to Walmsley Blvd (S3) Add another southbound through lane from Bells Rd Access Rd to Bells Rd (S4)	Moderate: $2.9 - $5 Million	Moderate	No Benefit	Significant Benefit
S5-S6	Relocate I-95 SB on-ramp (S5) Re-route through and left movements from Walmsley Blvd (S6)	Moderate: $4.5 - $7.3 Million	Significant	Minor Benefit	Moderate Benefit
S7	Reconfigure termini of southbound off-ramp	Low: $0.5 - $1.0 Million	Minimal	Moderate Benefit	Moderate Benefit

Cost Legend:
Low: < $2.5 Million
Moderate: $2.5 – $8 Million
High: > $8 Million

6.2 Current Actions & Next Steps

All of the information presented above paints the picture of an industrial area that's experiencing growth and plays an important economic part in the region. Without targeted transportation safety and operational improvements, the area will struggle to reach its economic potential through attracting private investment in a highly competitive market along the east coast.

This technical report was developed to present all details and back-up data from the study process. While the short-term recommendations could be candidates for SMART SCALE or other grant programs, the longer-term concepts will require additional study. Specifically, Long-term recommendations L1 and L3 will require an Interchange Modification Request (IMR) in order to fully vet the idea and seek VDOT and FHWA approval. Local Connector Concept LC 2 will require an engineering and legal/real-estate study to further determine feasibility (as described earlier). This I-95/RMT/Commerce Corridor Access Study is now in a draft phase and is currently being shared with the TPO, City officials, and others for feedback before being finalized.

Go to Agenda

CTAC FUTURE MEETING TOPICS*; ITEM C.2.

21 January 2021

- Port of Richmond
- High Speed Passenger Rail
- Performance Measures

18 March 2021

- GRTC
- Trucks and Traffic Safety
- General Assembly Update

20 May 2021

- Telework and Its Implications on Commercial Office Space
- RIC Ground Transportation and Parking
- School Bus Routing

15 July 2021

- VDOT Richmond District Traffic Management Center Tour
- Super Streets
- VTrans Update

Revised

11-10-20

*Draft: This is not a comprehensive list of considerations and is subject to change.