



ROUTE 15

Safety and Operations Study

FROM WHITES FERRY ROAD TO THE MARYLAND STATE LINE

April 2019



Kimley»Horn



Table of Contents

1. Introduction.....	1
Background	1
Vision	2
Study Purpose and Study Area	3
Historic and Rural Character.....	5
2. Study Process	7
Engagement Overview	7
Stakeholder Committee.....	8
Partner Agency Meetings.....	9
Public Involvement.....	10
3. Existing Transportation Conditions	17
Transportation Network.....	17
Study Area Streets.....	17
Loudoun County Countywide Transportation Plan (CTP)	22
Analysis of Existing Transportation Conditions	23
Safety Analysis.....	23
Traffic Operations	25
VISSIM Model Development	29
VISSIM Analysis Results	30
4. Future Conditions Analysis.....	33
Concept Development.....	33
Future No-Build	33
Concept A	33
Concept B.....	34
Design Considerations.....	38
Multimodal Considerations (Transit and Bicycle/Pedestrian)	41
Village of Lucketts	41
Future Traffic Forecasts	45
Future Transportation Network.....	45
Future Traffic Volume Projections.....	45



Traffic Analysis of Future Conditions.....	52
Analysis Methodology	52
VISSIM Models	52
No-Build Traffic Analyses.....	52
2030 No-Build.....	52
2040 No-Build.....	53
Concept A and B Traffic Analyses.....	56
2030 Conditions Traffic Analyses.....	56
2040 Conditions Traffic Analyses.....	56
Additional Considerations	62
Future Conditions Safety Analysis.....	62
Concept A and Concept B Cost Estimates	66
5. Future Process.....	68



List of Figures

Figure 1: Study Area Map.....	4
Figure 2: Study Process	7
Figure 3: Survey Results for Corridor Priorities (up to 3 choices)	12
Figure 4: Corridor Improvement Survey Results	13
Figure 5: Widening Preference Survey Results.....	14
Figure 6: Zip Codes of Public Meeting 3 Survey Participants	15
Figure 7: Concept Preference Chart	16
Figure 8 - Bypass Preference Survey Results.....	16
Figure 9: Existing Lane Designations and Traffic Control.....	21
Figure 10: 2010 Countywide Transportation Plan, Amended March 6, 2018.....	22
Figure 11: Crash Type	24
Figure 12: Existing (2017) Peak Hour and Weekday Daily Traffic Volumes.....	26
Figure 13: Existing (2017) AM Peak Travel Time Summary	27
Figure 14: Existing (2017) PM Peak Travel Time Summary.....	28
Figure 15: Summary of Existing Conditions (2017) VISSIM Results.....	32
Figure 16: No Build	35
Figure 17: Concept A – Safety Improvement Focus.....	36
Figure 18: Concept B - Safety and Capacity Improvement Focus	37
Figure 19: Two-lane, Undivided Typical Sections.....	39
Figure 20: Two-lane, Divided Typical Section with Shared Use Trail	40
Figure 21: Four-lane, Divided Typical Section with Shared Use Trail.....	40
Figure 22: Multimodal Considerations.....	43
Figure 23: Potential Western Lucketts Bypass	44
Figure 24: Potential Eastern Lucketts Bypass.....	44
Figure 25: 2030 No-Build Traffic Volumes.....	46
Figure 26: 2030 Concept A Traffic Volumes.....	47
Figure 27: 2030 Concept B Traffic Volumes	48
Figure 28: 2040 No-Build Traffic Volumes.....	49
Figure 29: 2040 Concept A Traffic Volumes.....	50
Figure 30: 2040 Concept B Traffic Volumes	51
Figure 31: 2030 No-Build Traffic Analysis Results	54
Figure 32: 2040 No-Build Traffic Analysis Results.....	55
Figure 33: 2030 Concept A Traffic Analysis Results	58
Figure 34: 2030 Concept B Traffic Analysis Results.....	59
Figure 35: 2040 Concept A Traffic Analysis Results.....	60
Figure 36: 2040 Concept B Traffic Analysis Results.....	61

Route 15

Safety and Operations Study from Whites Ferry Road to the Maryland State Line



List of Tables

Table 1: Previous US Route 15 Initiatives.....	2
Table 2: US Route 15 Existing Geometry.....	18
Table 3: US Route 15 Crash Summary by Year.....	23
Table 4: Levels of Service Thresholds.....	30
Table 5: Annual Linear Traffic Growth Rates by Scenario	45
Table 6: No-Build Phase Safety Improvements.....	62
Table 7: Mainline Crash Modification Factors	63
Table 8: Intersection Crash Modification Factors.....	63
Table 9: Concept A Crash Analysis.....	65
Table 10: Concept B Crash Analysis.....	65
Table 11: Preliminary Opinion of Probable Costs	67
Table 12: VDOT SMART SCALE Cost Estimate for Concept B.....	68

List of Appendices

Appendix A - Stakeholder Committee Meeting Materials (Agendas and Summaries)
Appendix B - Partner Agency Meeting Summaries
Appendix C - Public Meeting Summaries
Appendix D - Existing Conditions Report
Appendix E – Traffic Forecast Memorandum
Appendix F - Future Conditions Traffic Analysis Results



1. Introduction

This document presents the methodology, public and stakeholder engagement, technical analyses, and concepts developed from the US Route 15 Safety and Operations Study from Whites Ferry Road to the Maryland state line . The study reviewed efforts performed in previous years and built upon the recent findings of the US Route 15 Congestion Report (between Battlefield Parkway and Whites Ferry Road).

The US Route 15 Safety and Operations Study included robust public, stakeholder, and partner agency engagement throughout the process. Three rounds of public meetings and accompanying online surveys were performed at key stages of the process. A Stakeholder Committee was formed by the County Board to help advise County staff and provide a broader reach of public input. Fifteen partner agencies were consulted with to identify issues/concerns and to provide input during the development of concepts. The feedback received from this engagement informed the development of two concepts that incorporated both safety and operational improvements while maintaining the historic and rural character for a context sensitive design. The following sections outline the process, methodologies and findings of these efforts.

BACKGROUND

US Route 15 has been studied numerous times over the past two decades. Table 1 summarizes the studies and outcomes previously completed. In addition to the studies listed below, the US Route 15 Congestion Report was completed in May 2017. The Congestion Report evaluated US Route 15 from Battlefield Parkway to Whites Ferry Road and findings were vetted through a Stakeholder Committee and with the public. The recommendations from that report were presented to the Board of Supervisors (Board) on September 20, 2018 which resulted in approval of the following improvements:

- Widen US Route 15 to four lanes from Battlefield Parkway to Montresor Road
- Install a continuous green-T traffic signal at the US Route 15 and King Street intersection
- Retain and modify the traffic signal at the US Route 15 and Whites Ferry Road intersection to accommodate the US Route 15 widening
- Realign Limestone School Road to the intersection of US Route 15 at Montresor Road
- Construct a roundabout at the intersection of Montresor Road and the realigned Limestone School Road

Route 15

Safety and Operations Study from Whites Ferry Road to the Maryland State Line



The County has secured funding for the Congestion Report improvements and has begun the preliminary engineering for implementation. These improvements were carried through for incorporation in this study.

Table 1: Previous US Route 15 Initiatives

US Route 15 Summary of Previous Studies and Implementation Status

Study	Recommendations	Implemented
1 1998 Route 15 Safety Study — North Segment VDOT	Provide a paved shoulder	Yes
	Remove fixed objects within the clear-zone	Mostly
	Install left-turn lanes	Yes
	Spot improvements (e.g., improve signage, add right-turn lane, etc.)	Yes
	Truck pull-out location	Yes
2 2006 US Route 15 Roadway Safety Improvements — Village of Lucketts Loudoun County	Splitter islands safety improvements	No
	School turn lane improvements	No
	Intersection improvements	No
	Intersection improvements with 662 Extension	No
3 2007 Route 15 Safety Assessment VDOT	0.02 mi. north Rt 655 Whites Ferry Rd to 0.27 mi. south Rt 662 Lucketts Rd	Yes (note: no right-turn lane at Limestone School Road)
	Lucketts: 0.28 mi. south to 0.19 mi. north Lucketts Rd (Recommendations from 2006 County project)	No
	Lucketts to Maryland state line	Guardrail only
4 2014 Route 15 By-Pass Operational Study Town of Leesburg	Battlefield Parkway to Whites Ferry Road intersection improvements	No
5 2014 US Route 15 at Whites Ferry Road/Raspberry Drive Town of Leesburg	Study found that both one and two lane roundabouts would be ineffective in reducing congestion	No
6 2016 US 15 Congestion Relief Analysis — North of Leesburg VDOT	Study recommended two alternatives: - Alternative 4A (dual-lane roundabout at Whites Ferry Rd) - Alternative 6 (widen Route 15 from Battlefield Parkway past Whites Ferry Road)	No
7 2016 Battlefield Parkway/Leesburg Bypass Congestion Relief Analysis Town of Leesburg	Study concluded that the intersection congestion cannot be mitigated unless Route 15 capacity is increased through the Whites Ferry Road intersection	No

VISION

The vision of the Safety and Operations Study was developed by the Stakeholder Committee based on publicly-identified priorities during public meetings held in the summer of 2017. The vision outlines the key elements that guided the proposed improvements to the US Route 15 corridor:

Route 15

Safety and Operations Study from Whites Ferry Road to the Maryland State Line



- The US Route 15 corridor improvements from Leesburg to Maryland will emphasize safety and congestion relief.
- The US Route 15 corridor improvements will provide local access and mobility from community and through traffic.
- The US Route 15 corridor improvements design will highlight Loudoun's natural beauty and maintain the historic rural character.

STUDY PURPOSE AND STUDY AREA

Building upon the previous work completed along the corridor, the Board directed DTIC staff to conduct a study of the safety and operational issues on Route 15 between Whites Ferry Road and the Maryland state line at the May 18, 2017 Business Meeting. The purpose of this study is to provide a comprehensive review of the operations and safety conditions along US Route 15 between Whites Ferry Road and the Maryland state line. This study evaluates improvement concepts to address both needs, while integrating context-sensitive design to help maintain the surrounding rural character. The study assessed both existing and year 2030 and 2040 forecasted traffic conditions to determine the operational performance of the concepts into the future.

Figure 1 shows a study area location map of the Safety and Operations Study.

Route 15

Safety and Operations Study from Whites Ferry Road to the Maryland State Line



Figure 1: Study Area Map



HISTORIC AND RURAL CHARACTER

US Route 15 within the study area is known for its bucolic setting and historic value to the region. The following section summarizes some of the key features that exist along US Route 15, including historic locations and regions, rural character, and land use.

US Route 15 is a part of the Journey Through Hallowed Ground corridor from Gettysburg, PA to Monticello in Charlottesville, VA. The corridor was designated as a National Scenic Byway in 2009 and is lined with presidential homes, civil war battlefields, and historic “Main Street” communities. It is a primary touring route from which visitors can explore a scenic and historically rich landscape. The Journey Through Hallowed Ground Partnership formed to ensure that the roadway receives respect and intentional planning as well as to promote the conservation and enhancement of the corridor’s scenic, historic, archaeological, cultural, natural, and recreational resources. Considering the transportation element of the roadway, the Byway designation aims to promote transportation systems that employ context-sensitive design and protect efficient, safe, and enjoyable travel through the corridor for all modes of travel and types of users, all while maintaining character-defining features.

The study area for US Route 15 is also part of the Mosby Heritage Area which is an 1,800-square-mile region in the northern Piedmont region of Virginia that encompasses Loudoun, Clarke, Fauquier, Warren, and western Prince William counties. The Mosby Heritage Area Association formed to preserve the unique cultural, historical, and geographical resources by increasing awareness and preserving the area for the future. Exhibits 1 through 5 show the rural character of the roadway including the Journey Through Hallowed Ground Map, the Mosby Heritage Area – which encompasses the entire study corridor – and photos of the viewshed along the corridor.

US Route 15 is located between the base of the Catoctin Mountains to the west and the Potomac River to the east and north. The entire corridor is within the Loudoun County Limestone Overlay District. This region features karst geology located roughly one mile on either side of US Route 15 and creates the rolling landscape and terrain along the corridor. The surrounding land use along US Route 15 is primarily agricultural and rural residential with single family homes on large parcels. Throughout the corridor there are many rural businesses which rely on US Route 15 for access and the movement of goods. The agribusiness industry ranges from local farmers markets to antique stores, breweries, and wineries. US Route 15 is also home to many historic locations including the Balls Bluff Battlefield, the Rockland Estate, White’s Ferry, the Selma Estate, Morven Park, and the Village of Lucketts which features antique shops and the historic Lucketts Community Center. The corridor is rooted in deep tradition and history.

Route 15

Safety and Operations Study from Whites Ferry Road to the Maryland State Line



Exhibit 1: Rural Business



Exhibit 2: Northbound US Route 15



Exhibit 4: Ferry Crossing of Potomac River

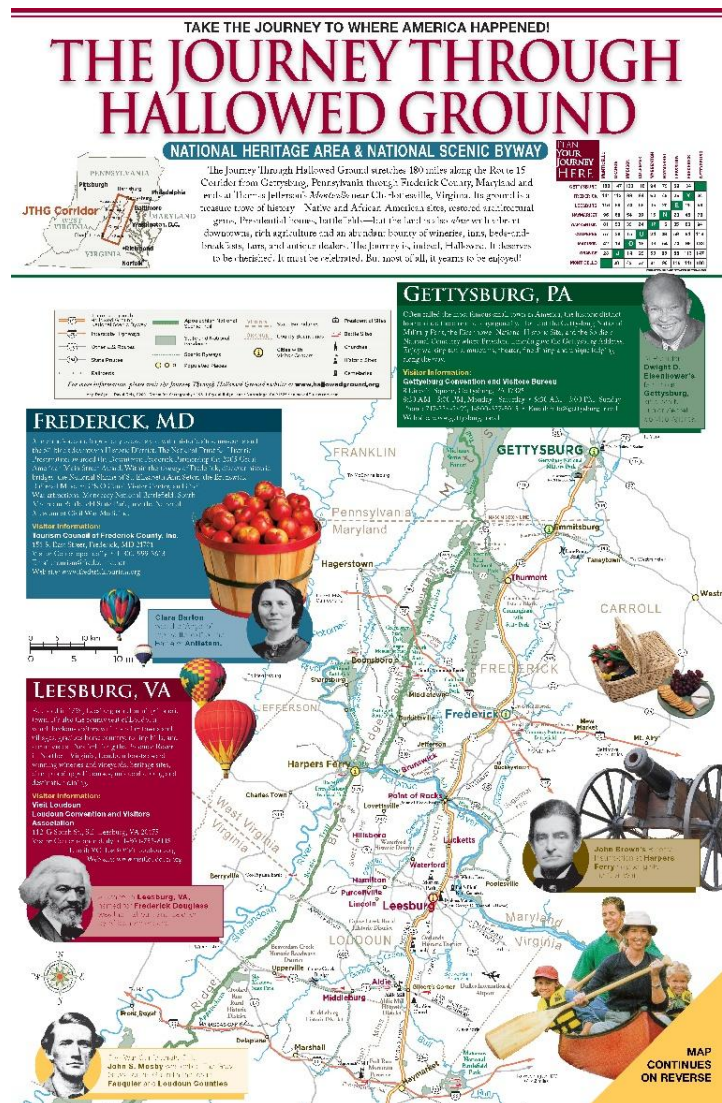


Exhibit 3: Journey Through Hallowed Ground Map



Exhibit 5: Village of Luckett's



2. Study Process

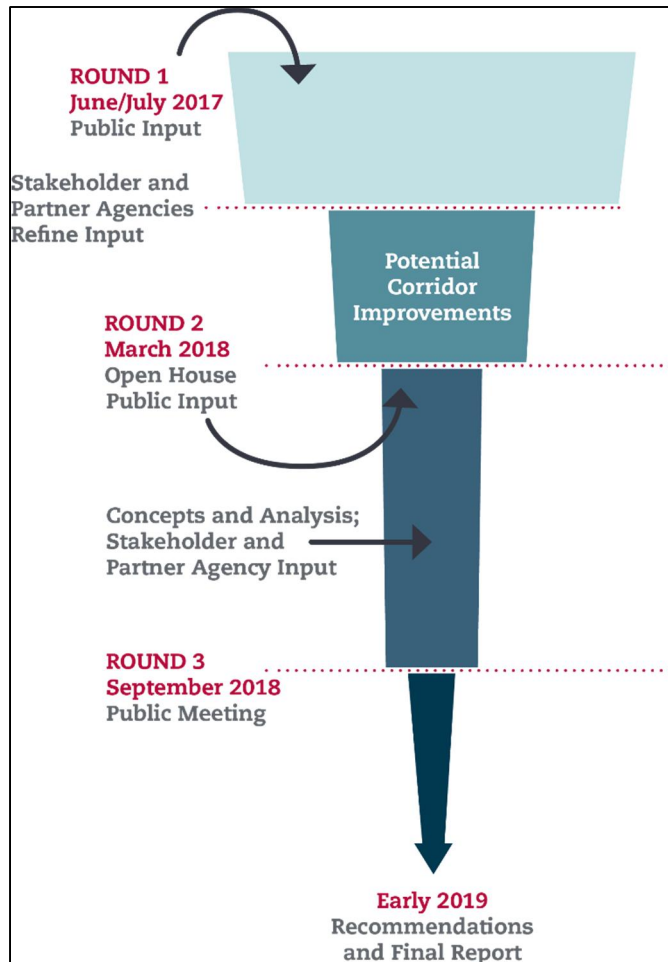


Figure 2: Study Process

The study involved a technical evaluation process that was closely integrated with the engagement of a Stakeholder Committee, public input, and coordination with partner agencies. Figure 2 outlines how the feedback from these engagement activities helped inform the various steps of the technical process and the development and review of improvement concepts.

Existing conditions were established through data collection, evaluated and documented in an existing conditions summary. This was supplemented by public feedback received from the first round of engagement. The results of the existing conditions evaluation helped identify opportunities for improvement and begin development of concepts. These initial concepts were presented at the second round of public engagement to help refine the improvement ideas and suggestions, resulting in the development of two

succinct build concepts to compare against a no-build option. Both concepts and the no-build option were analyzed and reviewed by the Stakeholder Committee and partnering agencies and presented to the public for the third round of engagement. The final findings are summarized in this report and will be presented to the Board of Supervisors in early 2019.

ENGAGEMENT OVERVIEW

The Safety and Operations Study included a robust engagement strategy that was closely coordinated with the technical evaluation process. The following summarizes the Stakeholder Committee, partner agency, and public engagement performed.

Route 15

Safety and Operations Study from Whites Ferry Road to the Maryland State Line



Stakeholder Committee

On August 1, 2017, the Loudoun County Board of Supervisors established a US Route 15 Stakeholder Committee to provide community input on the US Route 15 Corridor Study from Whites Ferry Road to the Maryland state line. The Stakeholder Committee represents resource groups along the corridor including: community and civic groups, homeowner associations (HOA), businesses, and environmental/historic groups.

The stakeholders met seven times over the course of the study between August 2017 and October 2018. The Stakeholder Committee is comprised of the following groups:

- | | |
|--|---------------------------------------|
| 1. Big Springs Farms Community Association | 10. Lucketts Business Collaborative |
| 2. Big Springs Owners Association | 11. Lucketts Ruritans |
| 3. Catoctin Coalition | 12. Morven Park |
| 4. Exeter | 13. Potomac Crossing |
| 5. Glynn Tarra Estates | 14. Raspberry Falls |
| 6. Journey Through Hallowed Ground | 15. Raspberry Falls Hunt & Golf Club |
| 7. Lee's Crossing | 16. Saddlebrook |
| 8. Loudoun County Chamber | 17. Selma Estates |
| 9. Loy Estates | 18. Taylorstown Community Association |
| | 19. Village Green – Elysian Heights |

The Stakeholder Committee signed a charter to fulfill the following responsibilities:

- Serve as an advisory group to professional project staff and partner agencies
- Attend each Stakeholder Committee meeting. In the case of absence, the committee member must designate an alternate to take their place in the meeting
- Encouraged to attend the Public Meetings
- Provide recommendations on US Route 15 improvements based on technical analysis and discussion of public input comments
- Seek feedback from the organization you are representing prior to each Stakeholder Committee meeting
- Advocate for project success

In their first meeting, the Stakeholder Committee developed a vision statement for the study to guide the development of improvements moving forward. The basis for this vision was rooted in the input received from the first round of public engagement. The vision for the corridor is:

Route 15

Safety and Operations Study from Whites Ferry Road to the Maryland State Line



The US Route 15 corridor improvements from Leesburg to Maryland will emphasize safety and congestion relief.

The US Route 15 corridor improvements will provide local access and mobility for the community and through traffic.

The US Route 15 corridor improvements design will highlight Loudoun's natural beauty and maintain the historic rural character.

The Stakeholder Committee provided key input and guidance on the Safety and Operation Study throughout the course of the project. The committee also provided a conduit to the larger community to help shape the concepts and questions asked at each of the public meetings. Group discussions at each of the meetings allowed thoughts, ideas, questions, and concerns to be incorporated into the study analysis and concept development. The meeting agendas, presentations, and summaries from each of the Stakeholder Committee meetings are provided in Appendix A.

Partner Agency Meetings

Throughout the process, 15 different partner agencies were included to coordinate and receive feedback on the existing road conditions and the potential improvement concepts. Eight meetings with partner agencies were held between November 2017 and August 2018. The agencies and groups that participated in these meetings include the following:

1. Virginia Department of Transportation (VDOT)
2. Town of Leesburg
3. Journey Through Hallowed Ground
4. Loudoun County Fire and Rescue Department (LCFR)
5. Loudoun County Parks, Recreation and Community Services (PRCS)
6. Loudoun County Planning and Zoning
7. Loudoun County Public Schools (LCPS)
8. Loudoun County Sheriff's Office (LCSO)
9. Loudoun Economic Development
10. Morven Park
11. Northern Virginia Transportation Authority (NVTA)
12. NOVA Parks
13. Bike Loudoun
14. Frederick County, MD
15. Maryland State Highway Administration (MDSHA)

Route 15

Safety and Operations Study from Whites Ferry Road to the Maryland State Line



From these meetings, the agencies discussed key issues and concerns along the corridor that were incorporated into the concepts on US Route 15. Some of the key input from the partner agency conversations are listed below:

- Fire and Rescue and Emergency Services requested wider shoulders and/or turn lanes to safely move around traffic during emergency calls
- VDOT's highest priority is to improve the roadway for safety and will support capacity improvements deemed appropriate by the County
- Bike Loudoun supported bicycle and pedestrian facilities along US Route 15 and enhanced regional trail connections
- Interest was expressed by MDSHA and Bike Loudoun in bus transit options and commuter parking along the corridor to link MARC in Point of Rocks, MD, to Leesburg and Metrorail stations in Ashburn
- In Maryland, US Route 15 is planned as a four-lane roadway with interchanges (right-of-way is secured for widening); no funding or projects planned for US Route 15 widening or bridge replacement at Point of Rocks across the Potomac River
- LCSO and LCFR noted that the Lucketts bypass concept will move traffic away from the Lucketts Elementary School, which will improve safety
- NOVA Parks, PRCS, and Bike Loudoun saw this study as an opportunity to make Lucketts a bicycle destination
- Both LCSO and LCFR preferred full-paved shoulders to provide the greatest safety and maneuverability for vehicles
- LCSO preferred medians to discourage traffic from crossing over the center of the roadway to avoid head-on collisions

The partner agency meeting summary notes are provided in Appendix B.

Public Involvement

As directed by the Loudoun County Board of Supervisors in the May 18, 2017 Business Meeting, the Loudoun County Department of Transportation and Capital Infrastructure (DTCI) began the public involvement process for the US Route 15 corridor. DTCI had also recently completed the US Route 15 Congestion Report from Battlefield Parkway to Whites Ferry Road and presented the findings to the Board at the May 18, 2017 meeting.

The purpose of the public involvement was to gain input on the following items:

- 1) Congestion Report – provide input on recommendations from the US Route 15 Congestion Report to relieve traffic congestion between Battlefield Parkway and Whites Ferry Road

Route 15

Safety and Operations Study from Whites Ferry Road to the Maryland State Line



- 2) Safety and Operations Study – provide input on safety and operational issues as well as the long-term vision of US Route 15 from Whites Ferry Road to the Maryland state line

Three rounds of public meetings were held throughout the process to collect public feedback as the study progressed. Key findings from each of the public input meetings are summarized as follows, and full documentation is contained in Appendix C.

Round 1 Public Meetings:

The first round of public meetings was held to receive input on the following topics:

Congestion Report (the resulting public feedback from this activity helped inform the Board during their September 20, 2018 meeting and is not described in detail in this study):

- Top Priorities for the Segment: The public was able to indicate their top three priorities from access, safety, congestion, beautification, preservation, and pedestrian/bicycle.
- Widening: The public could indicate their level of support for widening US Route 15.
- Intersection Modifications: The public could indicate their preference for intersection modifications at the US Route 15 and Whites Ferry Road intersection and the US Route 15 and King Street intersection.

Safety and Operations Study:

- Corridor Issues, Opportunities and Defining Features: This activity collected input using color-coded stickers on a map with accompanying notes describing observed issues. The activity also collected input on opportunities for improvements. The six sticker categories were Access, Safety, Congestion, Beautification, Preservation, and Pedestrian/Bicycle.
- Visioning: This activity collected people's ideas and their vision on what they hope to achieve for US Route 15. A comment form was provided to list key words, phrases, or sentences for contribution to the US Route 15 vision.

The public meetings were held at the following dates and times:

- Meeting 1 – Monday June 26th, 2017, 7:00-9:00 PM at the Ida Lee Recreation Center, Leesburg VA
- Meeting 2 – Saturday, July 8th, 2017, 9:00-11:00 AM at the Lucketts Community Center
- Meeting 3 – Saturday, July 15th, 2017, 9:00-11:00 AM at the Lucketts Community Center

Route 15

Safety and Operations Study from Whites Ferry Road to the Maryland State Line



Additionally, an online interactive survey was conducted between July 5, 2017 and July 24, 2017 which had similar questions as the paper survey that was collected during the in-person meetings.

A combined total of 239 members of the public attended the first round of public meetings and more than 2,100 people responded to an online survey responses yielding 2,006 unique survey responses. The online survey was similar to the activities that were at the in-person meetings.

Figure 3 summarizes survey results from the question asking the public to choose their top three priorities for the US Route 15 corridor from Leesburg to the Maryland state line. The results show that congestion relief, safety, and access were the top three priorities for the public to be considered during the study and design process. Note that totals will exceed 100% as respondents were able to choose up to make multiple selections.

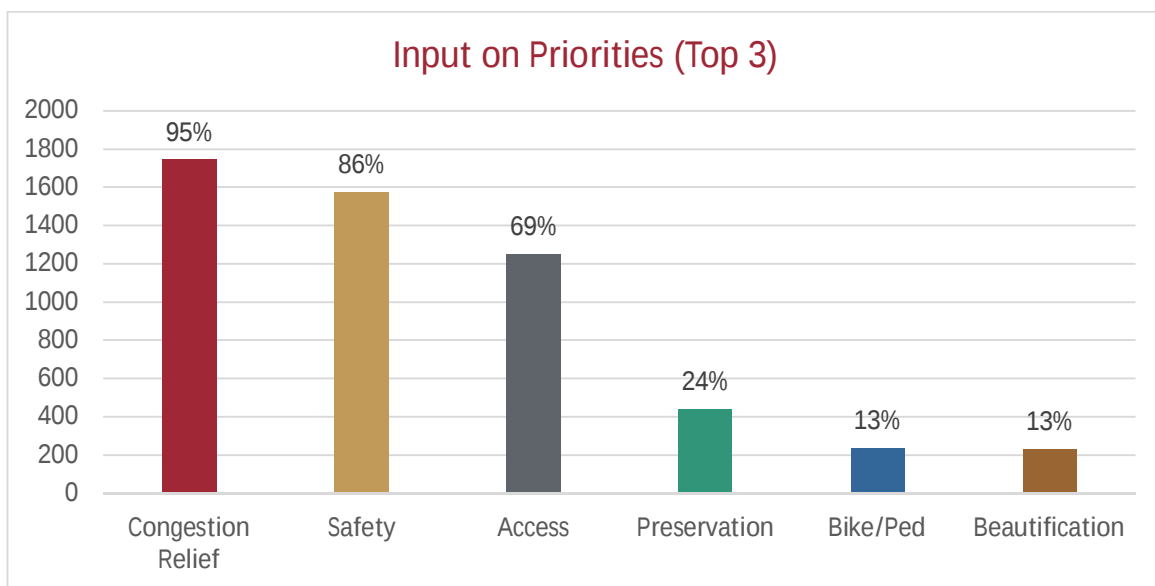


Figure 3: Survey Results for Corridor Priorities (up to 3 choices)

Round 2 Public Meetings:

The second round of public meetings were held to collaborate with the public to identify context-sensitive improvements to relieve congestion and address safety and operations issues along the US Route 15 corridor from Whites Ferry Road to the Maryland state line, and to identify rural design features to be implemented along the corridor.

The following public open house sessions were held:



- Meeting 1—Friday, March 9, 2018, 2:00-9:00 pm in the Ida Lee Recreation Center, Leesburg, VA
- Meeting 2—Saturday, March 10, 2018, 9:00 am-2:00 pm in the Lucketts Community Center

Additionally, an online interactive survey was conducted between March 12, 2018 and March 26, 2018 which had questions similar to the in-person meetings.

There were 247 attendees at the two public meetings. These attendees included elected officials, stakeholders, residents, and bicycle and pedestrian advocates. There were also 671 unique online survey responses yielding 875 unique public input responses between the public meetings and online surveys. The following is a summary of the key findings from the meetings, comment forms, and the online and in-person surveys. In the opening portion of the survey, the question asked: *Do you feel something should be done to improve the US Route 15 corridor from its current condition?* Ninety-seven percent (97%) of the survey respondents answered yes to the question as shown in Figure 4 below, showing that a majority¹ of the respondents would like to see some improvements made to the corridor.

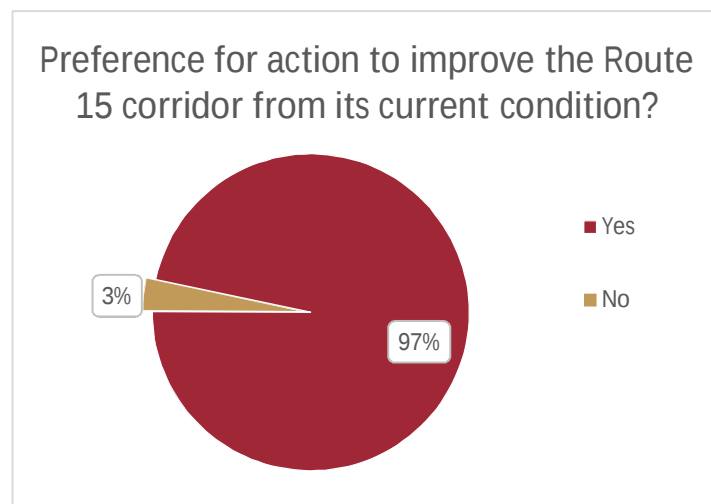


Figure 4: Corridor Improvement Survey Results

Figure 5 shows that the majority of the respondents (53%) wish to widen Route 15 south of Lucketts based on traffic analysis with a Lucketts western bypass. A combined 72% of the respondents wish to widen Route 15 somewhere south of Lucketts based on traffic analysis.

¹ It is noted that "majority", when used in this document, denotes more than half (50%) of the respondents.

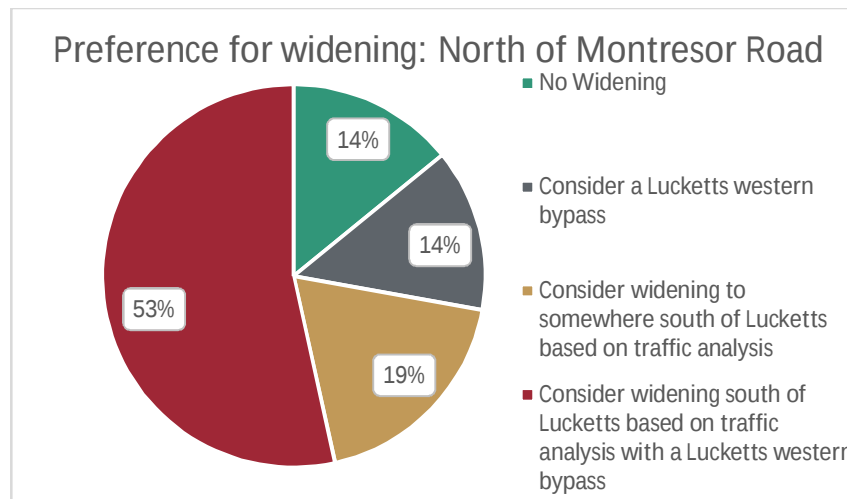


Figure 5: Widening Preference Survey Results

Other questions in the survey showed a clear public preference for rural shoulders as opposed to curb and gutter, the preference for roundabouts throughout the corridor, and the preference to realign roadways such as Limestone School Road and Montresor Road. This input was utilized moving forward to shape the Safety and Operations Study concepts and recommendations for the third round of public meetings.

Round 3 Public Meeting:

The third round of public engagement was held to review and provide direction on context-sensitive improvement concepts developed through an iterative process working with DTCL staff, performing technical analyses, and utilizing input from the first two rounds of public meetings and the Stakeholder Committee.

The public meeting was held in Loudoun County on Wednesday, September 26, 2018 from 7:00 pm-8:30 pm in the Lucketts Community Center. Additionally, an online survey was conducted between September 26, 2018 and October 18, 2018.

There were 102 attendees at the public meeting. These attendees included elected officials, stakeholders, residents, and bicycle and pedestrian facility advocates. More than 1,000 people responded to the online survey yielding a total of 1,089 unique responses between the public meeting and the online survey.

Figure 6 highlights the number of participants by zip code within Loudoun County. More than 50% of respondents provided a 20176 zip code, which contains the US Route 15 study corridor. A similar distribution of responses was also obtained for the second round of public meetings (this map can be found in Appendix C).

Route 15

Safety and Operations Study from Whites Ferry Road to the Maryland State Line

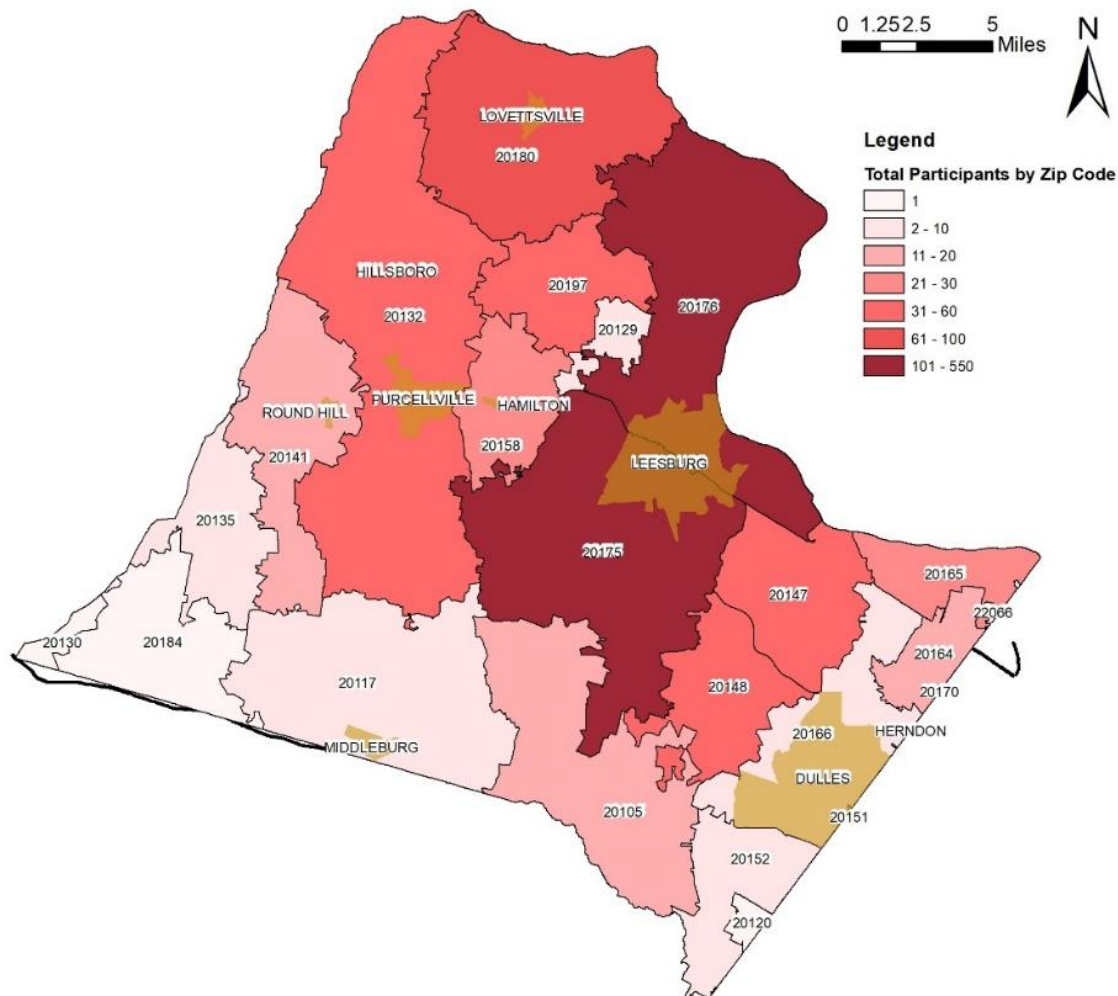


Figure 6: Zip Codes of Public Meeting 3 Survey Participants

In the first question of the survey, the statement instructed: *Please check the box next to the concept you prefer most.* Seventy percent (70%) of the survey respondents selected Concept B, as shown in Figure 7 below, showing that a majority of the respondents would like to see Concept B implemented along the US Route 15 corridor. Sixteen percent (16%) of respondents preferred Concept A, and 12% of respondents preferred the No-Build concept. It should be noted that 2% of respondents wrote in "Other" options which did not reflect any of the choices on the survey. The majority of the "Other" responses were for a "Corridor Long Traffic Calming Concept".

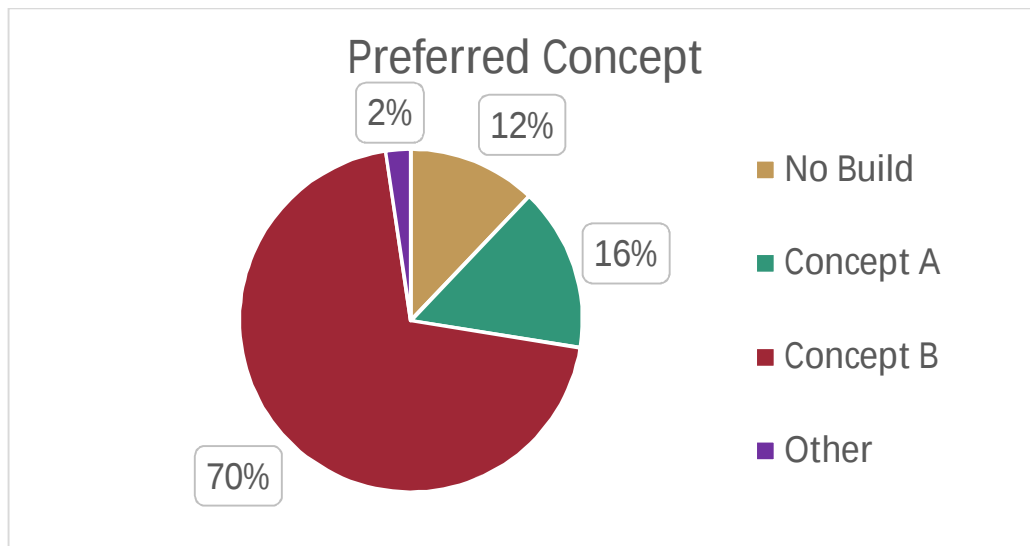
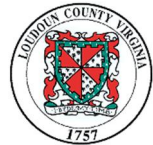


Figure 7: Concept Preference Chart

The second question of the survey instructed: *Please check the box next to the Lucketts bypass option you prefer most.* Figure 8 shows that 49% of the respondents prefer a Western Bypass of Lucketts, 26% prefer an Eastern Bypass of Lucketts, 19% prefer no Bypass of Lucketts, 5% prefer both Bypass locations around Lucketts, and 1% prefer either Bypass location around Lucketts. Based on these results, 81% of public responses would prefer some form of a bypass around the Village of Lucketts.

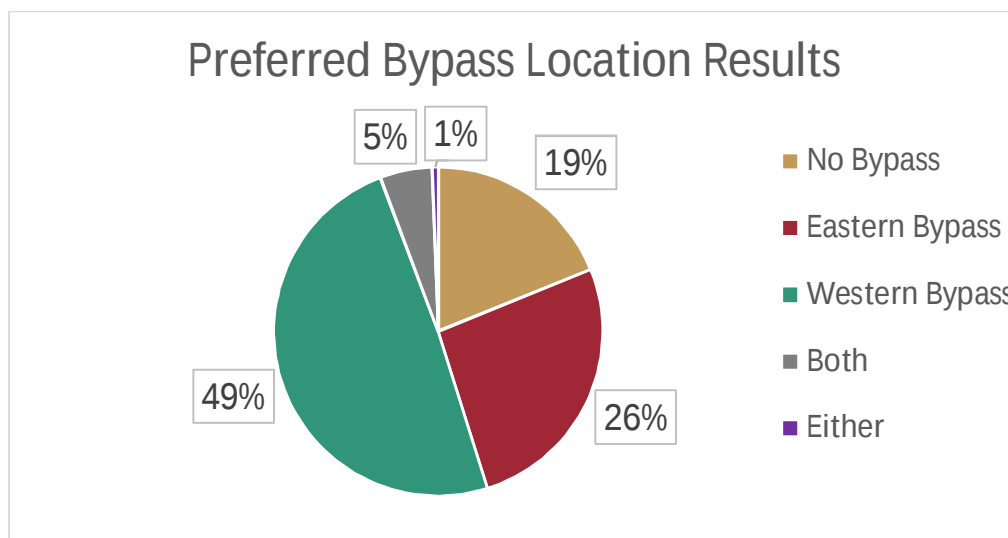


Figure 8 - Bypass Preference Survey Results

All engagement materials can be found at the County's website at www.loudoun.gov/route15.



3. Existing Transportation Conditions

TRANSPORTATION NETWORK

Study Area Streets

US Route 15 (James Monroe Highway)

US Route 15 serves as a principal arterial roadway, and within the study area, provides access to rural businesses, residences, and schools. US Route 15 is a four-lane, divided principal arterial with a posted speed limit of 45 miles per hour within the Town of Leesburg that transitions into a two-lane undivided roadway approximately 1,000 feet north of its intersection with Battlefield Parkway until its intersection with US Route 15 Business (King Street). Within the Village of Lucketts, the posted speed changes to 35 mph, and there is a school speed zone of 25 mph during weekdays around 7:50 a.m. when school starts and around 2:35 p.m. when school lets out. North of the King Street intersection, the two-lane section of US Route 15 has a raised median until just north of its intersection with Raspberry Drive/Whites Ferry Road, where it transitions to an undivided cross-section. North of Lucketts, US Route 15 remains as two lanes as it crosses the Potomac River into Maryland.

EXISTING GEOMETRY

The roadway geometry along US Route 15 changes throughout the study area. Table 2 shows a summary of the roadway geometry.

Route 15

Safety and Operations Study from Whites Ferry Road to the Maryland State Line



Table 2: US Route 15 Existing Geometry²

Segment	# of Lanes	Median	Shoulders	Rumble Strips*	ROW Width
Whites Ferry Road to approximately 550 feet north	2	Y – raised concrete	Y - paved	None	Approximately 120 Feet
550 Feet North of Whites Ferry Road to Approximately 800 Feet South of Rocky Meadow Lane	2	None	Y – 0-2 Feet Paved	Centerline	Approximately 120 Feet
800 feet South of Rocky Meadow Lane to 700 Feet North of Montresor Road	2	None, except paved median near turn lanes	Y – 0-2 Feet Paved	Centerline and edge line near Montresor Road	Approximately 80 Feet
700 Feet North of Montresor Road to Stumptown Road	2	None, except painted, paved median near turn lanes	Y – 0-2 Feet Paved	Centerline and some portions of outside shoulder	Approximately 60 feet
North of Stumptown Road	2	None, except raised median near St. Clair Lane	Y – 0-2 Feet Paved	Centerline	Prescriptive ROW, approximately 60 feet in most locations however narrows down to 26 feet in one location

*Includes new centerline rumble strips installed in Fall 2017 by VDOT

Between Whites Ferry Road and the Maryland state line there are:

- 9 stop-controlled intersections
- 1 signalized intersection
- 90 driveway entrances
- 10 left turn lanes
- 9 right turn lanes

VDOT has also recently installed edge line rumble strips as an interim safety improvement along US Route 15 from the Village of Lucketts to St. Clair Lane.

² Data source: US 15 Corridor Analysis Using the Interactive Highway Safety Design Model (IHSDM), prepared by Parsons Brinckerhoff, March 30, 2009



Intersecting Roadways

Several intersecting roadways serve as local transportation network connections within the study area and include the following:

- Lovettsville Road (Route 672): two-lane, undivided local road with a posted speed limit of 45 mph. Lovettsville Road is as a rural road that provides access to residential communities across Northwestern Loudoun County. At its western terminus, Lovettsville Road intersects Milltown Road and East Broad Way in the Town of Lovettsville.
- Wilt Store Road (Route 664): two-lane, gravel undivided local road with no posted speed. It is mainly utilized to access residential communities and terminates at its intersection with Taylorstown Road.
- Potomac Overlook Lane: private access easement driveway with no posted speed. It provides access to seven homes.
- St. Clair Lane (Route 658): two-lane, undivided local road with a posted speed limit of 45 mph. St. Clair Lane provides access to several residential communities, wineries, farms, and other rural businesses in Northern Loudoun.
- Lucketts Road (Route 662): two-lane, undivided local road with a posted speed limit of 30 mph through the Village of Lucketts that increases to 40 mph outside of village limits. Like St. Clair Lane, Lucketts Road provides access to residential communities, businesses, and other community locations. This road has been reportedly used at times by commuter traffic to avoid congestion along US Route 15.
- Stumptown Road (Route 662): two-lane, undivided local road with a posted speed limit of 30 mph through the Village of Lucketts that increases to 40 mph outside of village limits. At its western terminus, Stumptown Road intersects Loyalty Road in Western Loudoun County, which serves as a route to Waterford and Taylorstown.
- Spinks Ferry Road (Route 657): two-lane, undivided local road with a posted speed limit of 45 mph west of its intersection with Limestone School Road and 35 mph east of the intersection. Spinks Ferry Road primarily serves residential communities and rural businesses located east of US Route 15. Spinks Ferry Road is paved between US Route 15 and Limestone School Road.
- Newvalley Church Road (Route 663): two-lane, undivided local road with a posted speed limit of 40 mph. Newvalley Church Road provides additional access to Stumptown Road and becomes Taylorstown Road at its intersection with Bald Hill Road.
- Montresor Road (Route 661): two-lane, partially paved, undivided local road with a posted speed limit of 25 mph through Stumptown Road, which increases to 35 mph as it approaches the intersection with US Route 15. Montresor Road terminates at Stumptown Road and primarily provides access to residential communities.

Route 15

Safety and Operations Study from Whites Ferry Road to the Maryland State Line



- Limestone School Road (Route 661): two-lane, gravel undivided local road with a posted speed limit of 35 mph. Limestone School Road provides access to wineries and parks and a few residential properties. It terminates at its intersection with Spinks Ferry Road.

Intersections

A list of study intersections along US Route 15 is provided below:

1. US Route 15 and Lovettsville Road
2. US Route 15 and Wilt Store Road/Potomac Overlook Lane
3. US Route 15 and St. Clair Lane
4. US Route 15 and Stumptown Road/Lucketts Road
5. US Route 15 and Lucketts Elementary School (North)
6. US Route 15 and Lucketts Elementary School (South)
7. US Route 15 and Spinks Ferry Road
8. US Route 15 and Newvalley Church Road
9. US Route 15 and Montresor Road
10. US Route 15 and Limestone School Road

Figure 9 illustrates the lane designations and intersection traffic control for each of the study intersections. All intersections are unsignalized, except for the signalized intersection of US Route 15 with Lucketts Road.

Route 15

Safety and Operations Study from Whites Ferry Road to the Maryland State Line

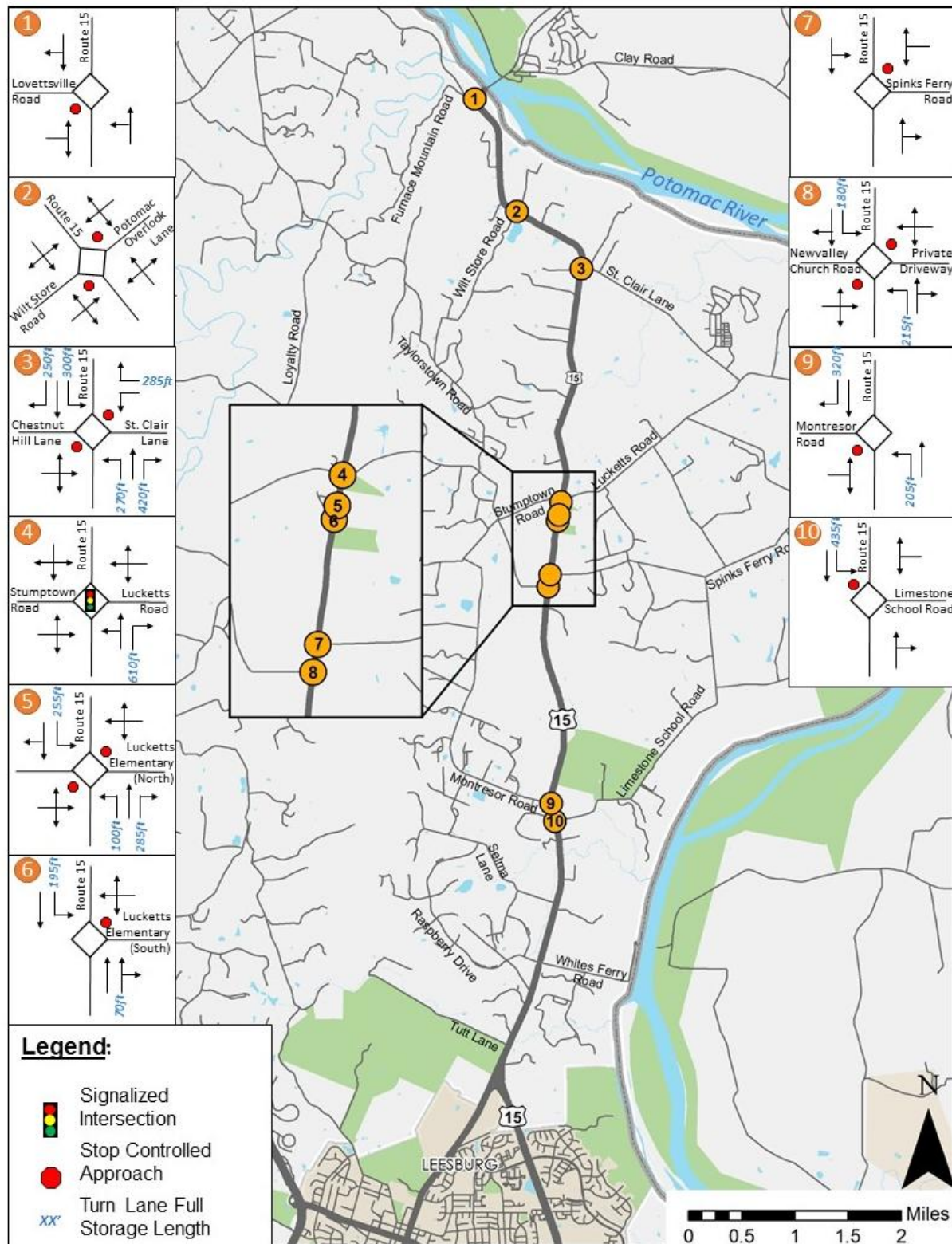


Figure 9: Existing Lane Designations and Traffic Control

Route 15

Safety and Operations Study from Whites Ferry Road to the Maryland State Line



LOUDOUN COUNTY COUNTYWIDE TRANSPORTATION PLAN (CTP)

Following the US Route 15 Congestion Study, a Comprehensive Plan Amendment (CPAM) was initiated and approved on March 6, 2018 to extend the 4-lane section of US Route 15 to Montresor Road. The Loudoun County CTP map was adopted in 2010 and updated through March 6, 2018, as a planning document for the anticipated roadway network needed to accommodate future development and travel demand. US Route 15 is shown from the Town of Leesburg northern limits to Montresor Road as an urban four-lane roadway, transitioning to a rural two-lane roadway north of Montresor Road designated as a Virginia Scenic Byway. There are no planned interchanges at the existing intersections along US Route 15, north of the Town of Leesburg. Figure 10 shows an overview of US Route 15 near the study area from the CTP. It is noted that Loudoun County is currently in the process of updating the CTP through the draft Loudoun 2040 Comprehensive Plan process.

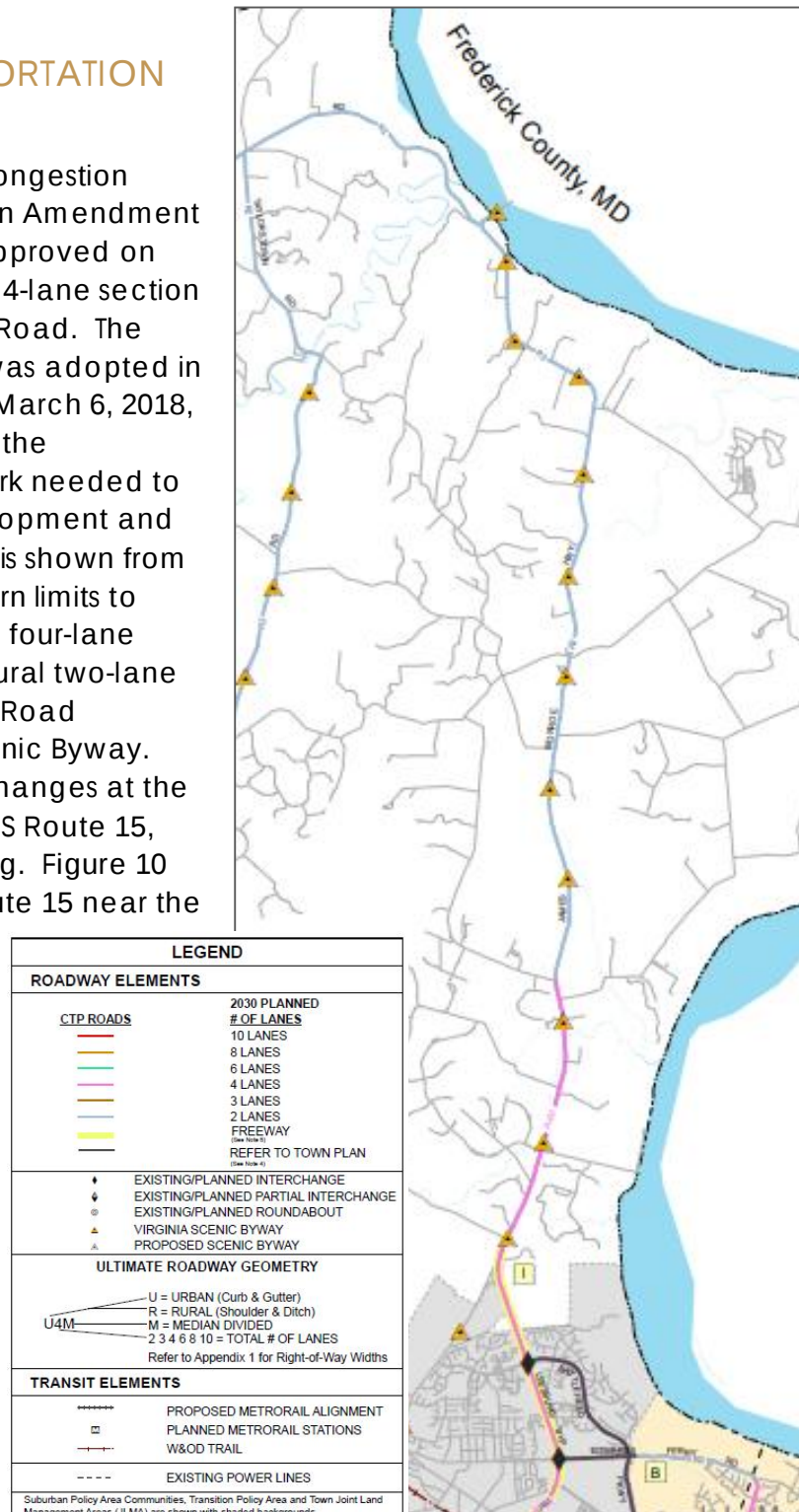


Figure 10: 2010 Countywide Transportation Plan, Amended March 6, 2018



ANALYSIS OF EXISTING TRANSPORTATION CONDITIONS

Safety Analysis

Crash data for US Route 15 from Battlefield Parkway to the Maryland state line (milepost 231.15 to 241.95) was used to evaluate historical corridor safety and identify crash patterns. The crash analysis study area was expanded from the Safety and Operations study area to include the limits of the Congestion Report. The Congestion Report segment (between Battlefield Parkway and Whites Ferry Road) was added in this study for reference only since a safety analysis was not part of the Congestion Report scope. Crash data was obtained from the Virginia Department of Transportation (VDOT) for the latest available five years of crash data at the time of the analysis and the available 2017 crash data (January 1, 2012 to June 30, 2017).

Over the 5.5-year period for which crash data was collected, 531 crashes occurred on US Route 15 in the study corridor. Table 3 summarizes the study area crashes. Of the injury crashes, 16 were categorized as Type A or severely injured. Police reports (FR-300s) were collected for the severe Type A injury and fatal crashes.

Table 3: US Route 15 Crash Summary by Year

Year	2012	2013	2014	2015	2016	2017*	Total
Fatality	1	0	0	1	0	2	4
Injury	20	17	29	23	28	14	131
Property Damage Only (PDO)	51	69	66	83	90	37	396
Total	72	86	95	107	118	53	531

Note: 2017 crash data was only available through June 30, 2017.

Crash Characteristics

Along the corridor, the most common crash types included rear end crashes (58%), deer/other animal crashes (13%), fixed object - off road crashes (10%), and angle crashes (9%). No other crash type comprised more than 3% of the total crashes. Figure 11 summarizes the study area crashes by crash type.

Route 15

Safety and Operations Study from Whites Ferry Road to the Maryland State Line

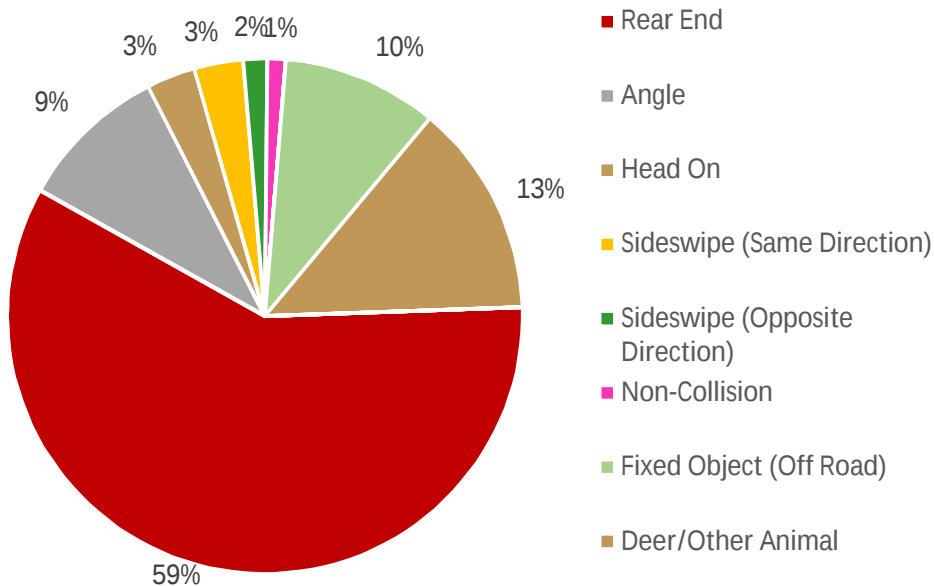


Figure 11: Crash Type

Identified Crash Hot Spot Locations

The crashes were mapped along the corridor in quarter mile increments and the segments with the highest number of crashes were identified. The segment with the highest number of crashes is in proximity to the signalized intersection of US Route 15 with Lucketts Road and Stumptown Road. The most common crash types at this location were rear end (23 crashes), angle (5 crashes), fixed object – off road (5 crashes), and deer/animal (4 crashes).

The second highest number of crashes occurred in proximity to the intersection of Raspberry Drive/Whites Ferry Road and Route 15. This is a signalized intersection with the most common collision types being rear end (21 crashes), fixed object - off road (6 crashes), angle (4 crashes), and deer/animal (4 crashes). Additional high frequency crash locations include:

- Half-mile segment near Maple View Lane and Tutt Lane - rear end and angle crashes were most common
- Battlefield Parkway and US Route 15 - rear end and angle crashes were most common
- Lovettsville Road and US Route 15- rear end and fixed object crashes were most common

The high percentage of rear end crashes along this corridor was likely attributable to the presence of congested signalized intersections. Additional crash analysis details can be found in Appendix D.



Traffic Operations

Data Collection

To conduct an analysis of existing conditions, traffic data was collected from September 11 to 21, 2017 along the study corridor. This data included turning movement counts (TMCs), seven-day continuous counts to collect daily volumes and vehicle classification, corridor travel times, and queuing observations. The specific data collected and full documentation of findings are described in greater detail in the Existing Conditions Report, or Appendix D. This data was used to assess existing conditions along the corridor, and to provide traffic data for traffic simulation model calibration and analysis purposes.

Peak Hour Volumes

The overall AM and PM peak hours of the study area were determined by first reviewing the individual TMC data. Network peak hours for the AM and PM peaks were calculated to determine the hour during which the greatest volume of vehicles was being processed through the study area intersections. The network AM peak hour was determined to be 6:30 a.m. to 7:30 a.m. and the network PM peak hour was determined to be 4:45 p.m. to 5:45 p.m. Figure 12 illustrates the existing traffic volume at the study intersections and weekday daily traffic volumes (average of the Tuesday, Wednesday, and Thursday counts).

Travel Times

Travel times were collected along US Route 15 between Battlefield Parkway and Clay Street in Maryland during the weekday AM and PM peak periods. In the AM peak hour, the northbound average travel time was 15.3 minutes, which translates to a cumulative average speed of approximately 44 mph. In the southbound direction, the average travel time was 28.3 minutes, which translates to a cumulative average speed of approximately 24 mph. The southbound travel time is longer than that of the northbound direction due to the heavier commuter traffic and associated congestion throughout the corridor, especially at the intersections of US Route 15 with Lucketts Road/Stumptown Road, with Montresor Road, and with Whites Ferry Road/Raspberry Drive. Figure 13 shows the AM travel times by segment.

In the PM peak hour, the northbound average travel time was 23.9 minutes, which translates to a cumulative average speed of approximately 28 mph. In the southbound direction, the average travel time was approximately 17 minutes, which translates to a cumulative average speed of approximately 40 mph. The northbound travel time is longer than that of the southbound direction due to commuter traffic and associated congestion along the corridor, especially at the intersections of US Route 15 with King Street, with Whites Ferry Road/Raspberry Drive, with Lucketts Road/Stumptown Road, and with Clay Street (north of study). Figure 14 shows the PM travel times by segment.

Route 15

Safety and Operations Study from Whites Ferry Road to the Maryland State Line

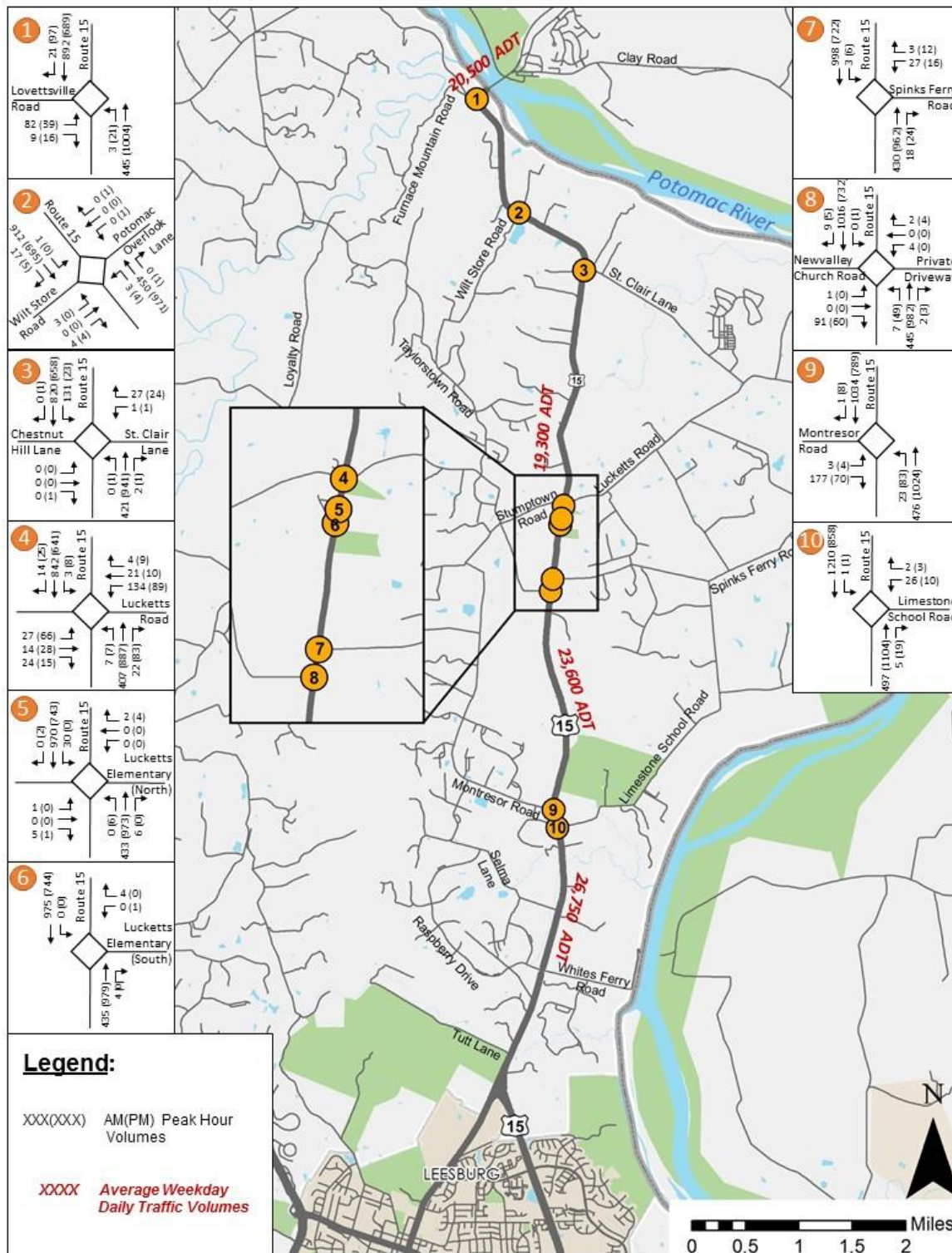


Figure 12: Existing (2017) Peak Hour and Weekday Daily Traffic Volumes

Route 15

Safety and Operations Study from Whites Ferry Road to the Maryland State Line

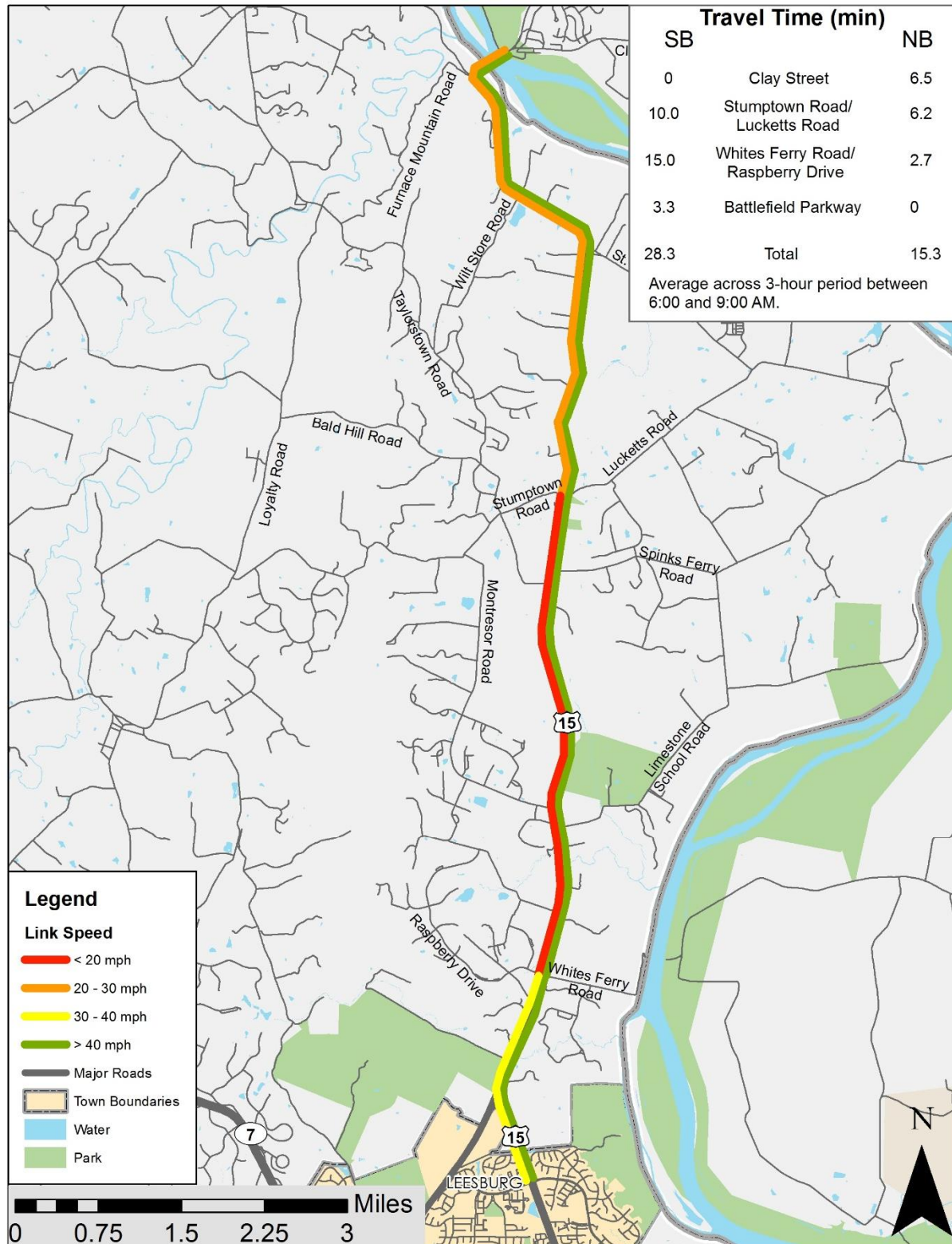


Figure 13: Existing (2017) AM Peak Travel Time Summary

Route 15

Safety and Operations Study from Whites Ferry Road to the Maryland State Line

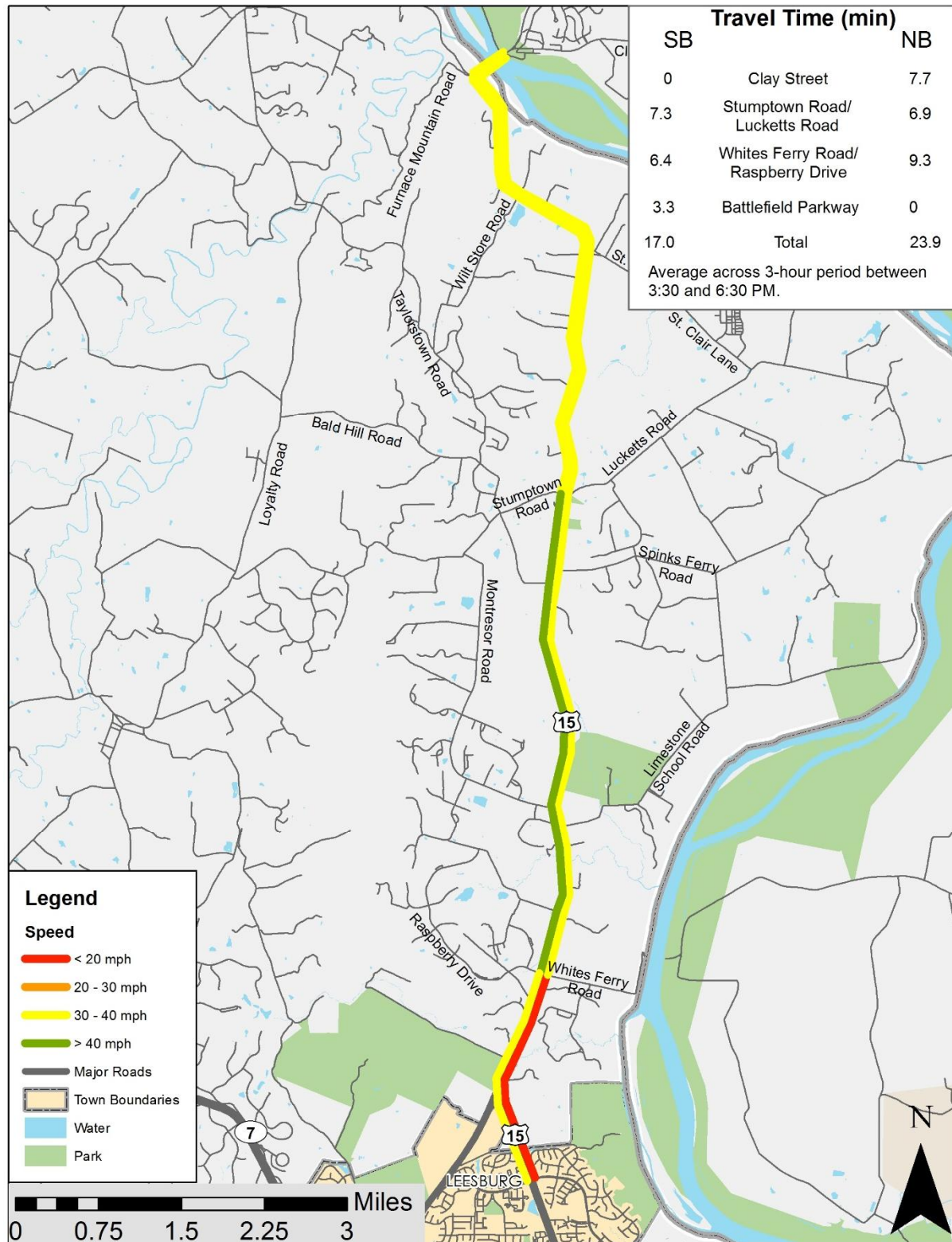


Figure 14: Existing (2017) PM Peak Travel Time Summary



Queuing

During the AM peak period, there is notable southbound queuing at multiple locations of interrupted traffic flow along the corridor. These include the signalized intersections of US Route 15 at Lucketts Road/Stumptown Road and US Route 15 at Whites Ferry/Raspberry Drive, as observed in the US Route 15 Congestion Report. The queue from Whites Ferry spills back to Montresor Road, at which point vehicles on US Route 15 alternate the right of way with the turning vehicles from Montresor Road, creating a longer southbound queue.

In the PM peak period, queuing is prevalent in the northbound direction. North of the bottlenecks at the US Route 15/King Street merge and at the Whites Ferry signal, as noted in the Congestion Report, queuing develops from the signals at Lucketts Road/Stumptown Road and from the signal at Clay Street in Maryland.

VISSIM Model Development

Existing AM and PM peak hour conditions were evaluated using VISSIM 9 traffic modeling software. VISSIM is a microscopic, time-step, and driver behavior-based simulation model that uses the driver behavior model for each vehicle in the system. VISSIM was selected to model the oversaturated conditions on US Route 15, merge and weave sections, and study intersections. This modeling is consistent with the US Route 15 Congestion Report and with the Virginia Department of Transportation (VDOT) Traffic Operational and Safety Analysis Manual (TOSAM), Version 1.0.

The existing model from the previous US Route 15 Congestion Report was modified to include ten additional intersections on US Route 15, north to Clay Street in Maryland, as well as other updates to best represent 2017 existing conditions. The additional intersections were included to more accurately replicate the traffic arrival patterns at the north and south study limits. The base model was developed using existing roadway geometry, traffic signal timings and phasing for all signalized intersections, peak hour traffic volume data for the revised study peak hour, travel time data, and field observations of queue lengths and corridor operations.

Model Calibration

Existing AM and PM VISSIM models were calibrated using 2017 existing balanced peak hour TMCs, travel time data, and queuing and congestion observation data in accordance with VDOT parameters contained in the Traffic Operations Analysis and Safety Analysis Manual (TOSAM) Version 1.0. The VISSIM models were reviewed and approved by VDOT.

Additional details regarding model development and calibration can be found in the existing conditions report and calibration memorandum, included as Appendix D.



VISSIM Analysis Results

The simulation models were each run 10 times with different random seeds for each run. The VDOT Sample Size Determination Tool was used to verify that 10 runs were performed at a 95th percentile confidence level. The measures of effectiveness (MOEs) analyzed to determine the number of runs were link volume and corridor travel time. VISSIM results were generated for the AM and PM peak hours. The following MOEs were used to depict the operational characteristics of the study area network and identify bottleneck locations:

- Arterial mainline:
 - Average travel time (minutes)
 - Average and maximum queue length (feet)
- Arterial intersections (by movement and approach)
 - Average simulation delay (seconds per vehicle)
 - Average and maximum queue length (feet)

The level of service (LOS) thresholds from the VISSIM model for the signalized intersection are shown in Table 4.

Table 4: Levels of Service Thresholds

LOS Scale ³	Average Delay (seconds/vehicle)
A	≤10 (Free Flow)
B	>10 – 20 (Slight Delays)
C	>20 – 35 (Acceptable Delays)
D	>35 – 55 (Occasional Delays)
E	>55 – 80 (Significant Delays)
F	>80 (Excessive Delays)

AM Peak Period Results

Simulation delay and maximum queue length were reported from VISSIM for intersection operational conditions in the study area. The following intersection approaches operate with significant delays (LOS E or worse) during the first or second hour of the AM peak period:

- Eastbound Stumpton Road and westbound Lucketts Road at US Route 15

³ LOS for the VISSIM models is an approximation to the Highway Capacity Manual (HCM) LOS

Route 15

Safety and Operations Study from Whites Ferry Road to the Maryland State Line



- Southbound US Route 15 at Lucketts Road/ Stumptown Road
- Southbound US Route 15 at Spinks Ferry Road (based on downstream queue spill back from Montresor Road)
- Southbound US Route 15 at Montresor Road
- Eastbound Montresor Road at US Route 15
- Westbound Limestone School Road at US Route 15

The following intersection approaches have notable queues:

- Westbound Lucketts Road at US Route 15
- Southbound US Route 15 at Lucketts Road/ Stumptown Road
- Southbound US Route 15 at Lucketts Elementary School (North)
- Southbound US Route 15 at Lucketts Elementary School (South)
- Southbound US Route 15 at Newvalley Church Road
- Southbound US Route 15 at Montresor Road
- Eastbound Montresor Road at US Route 15
- Southbound US Route 15 at Limestone School Road (based on downstream queue spill back from Whites Ferry Road/Raspberry Drive)

A full table of delay and queue results for all study intersections can be found in Appendix D.

PM Peak Period Results

Simulation delay and maximum queue length were reported from VISSIM for intersection operational conditions in the study area. The following intersection approaches operate with significant delays (LOS E or worse) during the first or second hour of the PM peak period:

- Eastbound Lovettsville Road at US Route 15
- Eastbound Stumptown Road and westbound Lucketts Road at US Route 15

The following intersection approaches have notable queues:

- Northbound US Route 15 at Lovettsville Road (based on downstream queue spill back from Clay Street)
- Northbound/Southbound US Route 15 at Lucketts Road/Stumptown Road
- Northbound US Route 15 at Lucketts Elementary School (North) (based on downstream queue spill back from Lucketts Road/Stumptown Road)
- Northbound US Route 15 at Lucketts Elementary School (South) (based on downstream queue spill back from Lucketts Road/Stumptown Road)

A summary of existing condition results is provided in Figure 15 and a full table of delay and queue results for all study intersections can be found in Appendix D.

Route 15

Safety and Operations Study from Whites Ferry Road to the Maryland State Line

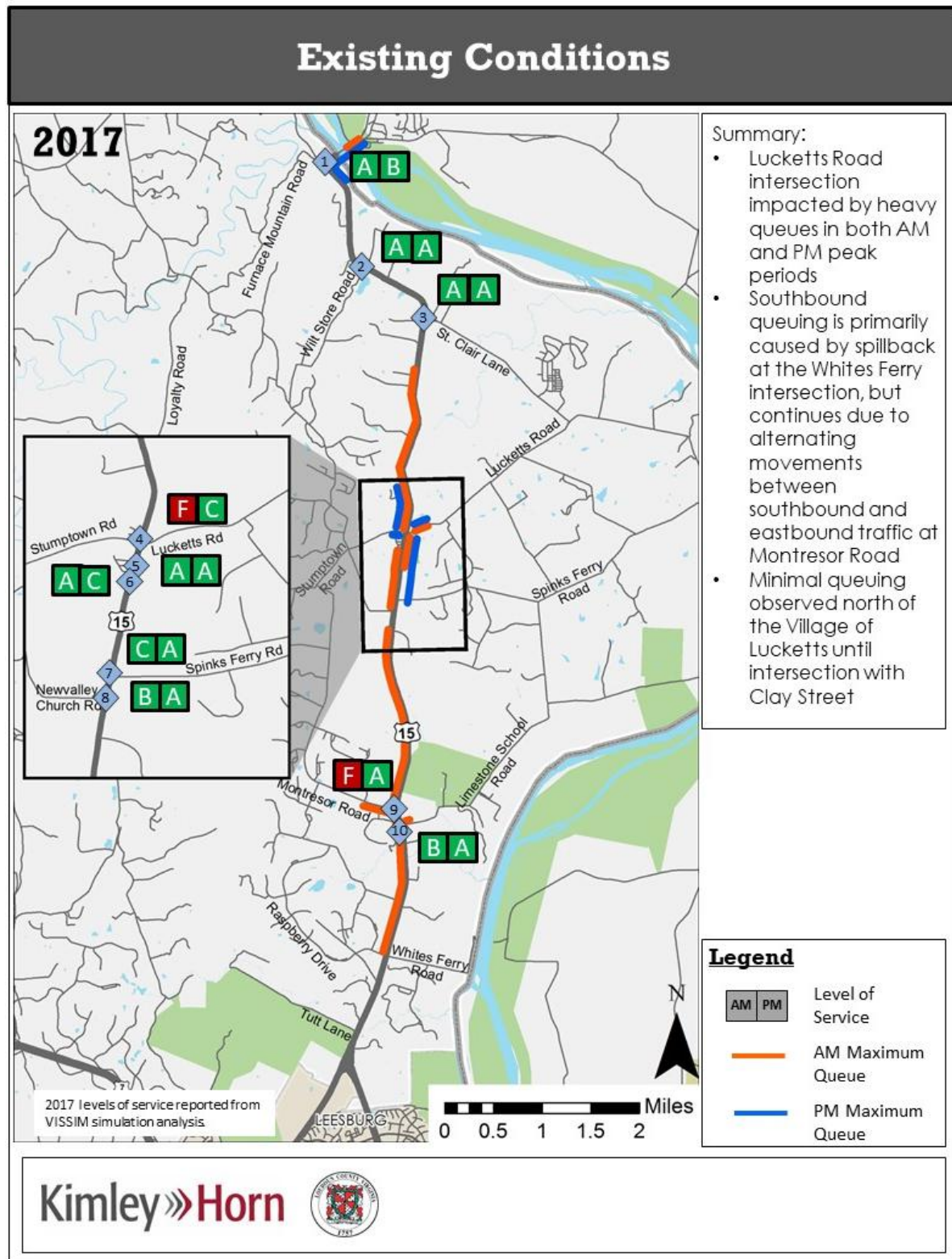


Figure 15: Summary of Existing Conditions (2017) VISSIM Results



4. Future Conditions Analysis

CONCEPT DEVELOPMENT

The two concepts analyzed in this study were developed through a thorough public process, involving public engagement meetings and surveys, stakeholder input, and a technical review. The public input guided the selection of the various components of each concept, including preferred intersection treatments, roadside features, safety improvements, and length of widening. The concepts were also anchored to the Route 15 Vision Statement which aims to address safety and congestion while preserving the historic and rural character. With all these interests in mind, two distinct concepts were created. Concept A focused on safety and included no widening of US Route 15 beyond Montresor Road. Concept B focused on safety and capacity improvements, which corresponded with a majority of the public input by increasing capacity north of Montresor Road while including the same safety features as Concept A.

Future No-Build

The No-Build conditions assumed the improvements identified from the Congestion Report, dated May 2017. For the purposes of this No-Build analysis, US Route 15 was assumed to be widened to four lanes from Battlefield Parkway to 2,000 feet north of Whites Ferry Road. Since this analysis was performed, the Board of Supervisors endorsed the widening of US Route 15 from Battlefield Parkway to Montresor Road at a Business Meeting held on September 20, 2018. The design would also incorporate a realigned section of Limestone School Road to connect with Montresor Road, and a new roundabout at Montresor Road. The No-Build assumptions had to be made at the time of the analysis, as there was an overlap in the analysis study area between the Route 15 Congestion Report and this Route 15 Safety and Operations Study.

Concept A

Concept A, or the Safety Improvement Focus concept, incorporated the geometric modifications made in the No-Build conditions model, as well as the following:

- Widening US Route 15 to four lanes with median from Battlefield Parkway to Montresor Road⁴
- Realignment of Limestone School Road with Montresor Road at a new roundabout²
- Realignment of New Valley Church Road with Spinks Ferry Road at a new roundabout

⁴ Concept A was developed prior to the Board of Supervisors Business Meeting decision on September 20, 2018 to widen Route 15 from Battlefield Parkway to Montresor Road, realign Limestone School Road with Montresor Road, and modifying the intersection to a roundabout.

Route 15

Safety and Operations Study from Whites Ferry Road to the Maryland State Line



- Two-lane median divided bypass (one lane in each direction) of Lucketts that becomes the main through route for traffic traveling north and south on US Route 15. This bypass was assumed on be the west side of Lucketts for the purpose of this analysis, but the alignment and location would be determined in future phases of project development.
- Roundabout control at the new bypass and Stumptown Road (based on the assumption of a western bypass around Lucketts). If the bypass is on the east side of Lucketts, the Bypass will intersect with Lucketts Road.
- Stop control for US Route 15 Local (through the Village of Lucketts) at the intersections with the bypass
- Signalization of US Route 15 at Lovettsville Road
- Left and Right Turn lanes where warranted at intersecting roadways and businesses
- Shoulder improvements along the entire corridor from Montresor Road to the Maryland state line

Concept B

Concept B, or Safety and Capacity Improvement Focus, incorporates all of the modifications outlined for Concept A, with the exception of the length of the four-lane median divided cross section on US Route 15. In Concept B, US Route 15 is widened north to Lucketts and along the Bypass to Stumptown Road (or Lucketts Road if the Bypass is along the east of Lucketts).

Graphic representations of No-Build, Concept A, and Concept B conditions are shown in Figure 16, Figure 17 and Figure 18, respectively.

Route 15

Safety and Operations Study from Whites Ferry Road to the Maryland State Line

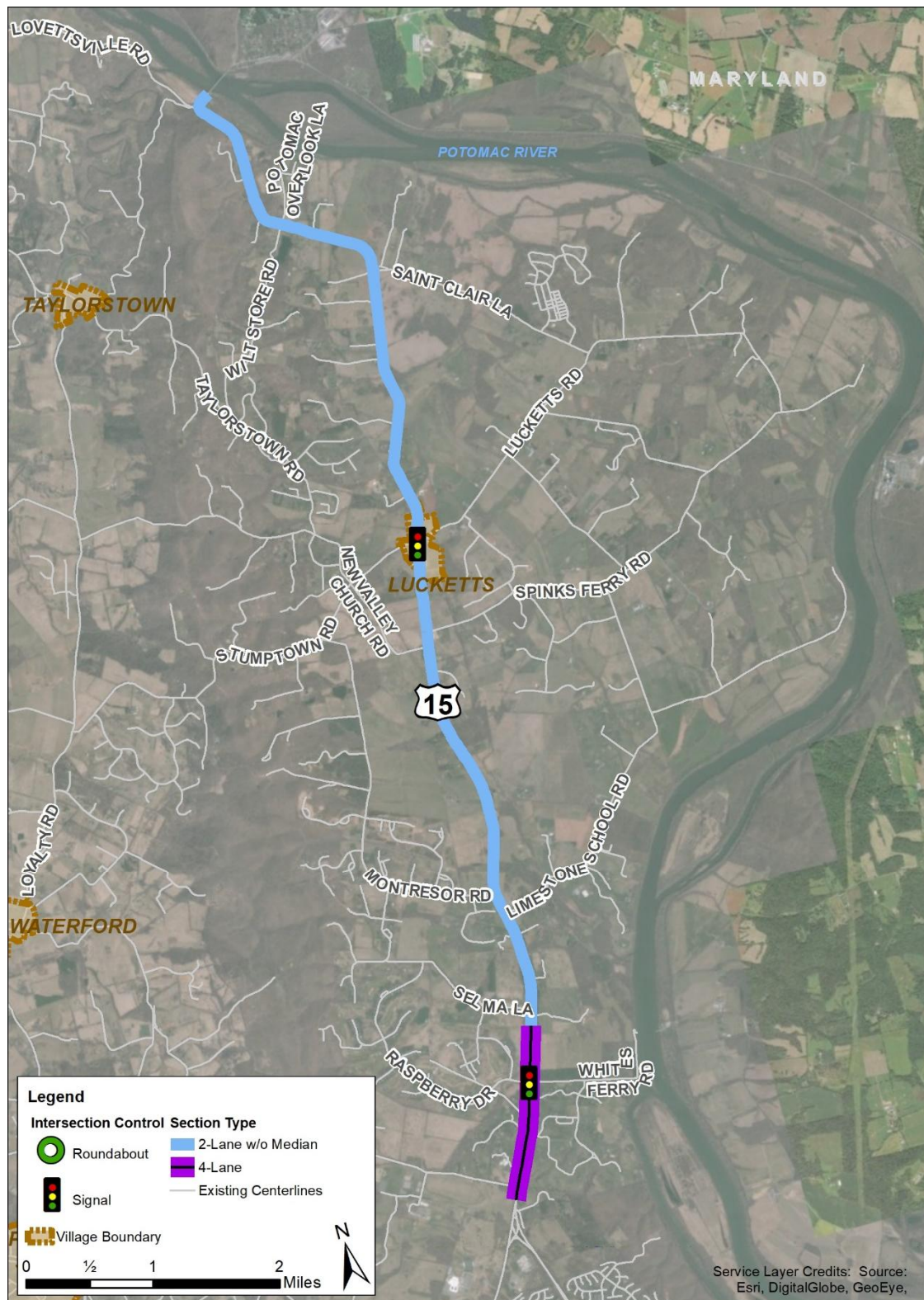


Figure 16: No Build

Route 15

Safety and Operations Study from Whites Ferry Road to the Maryland State Line

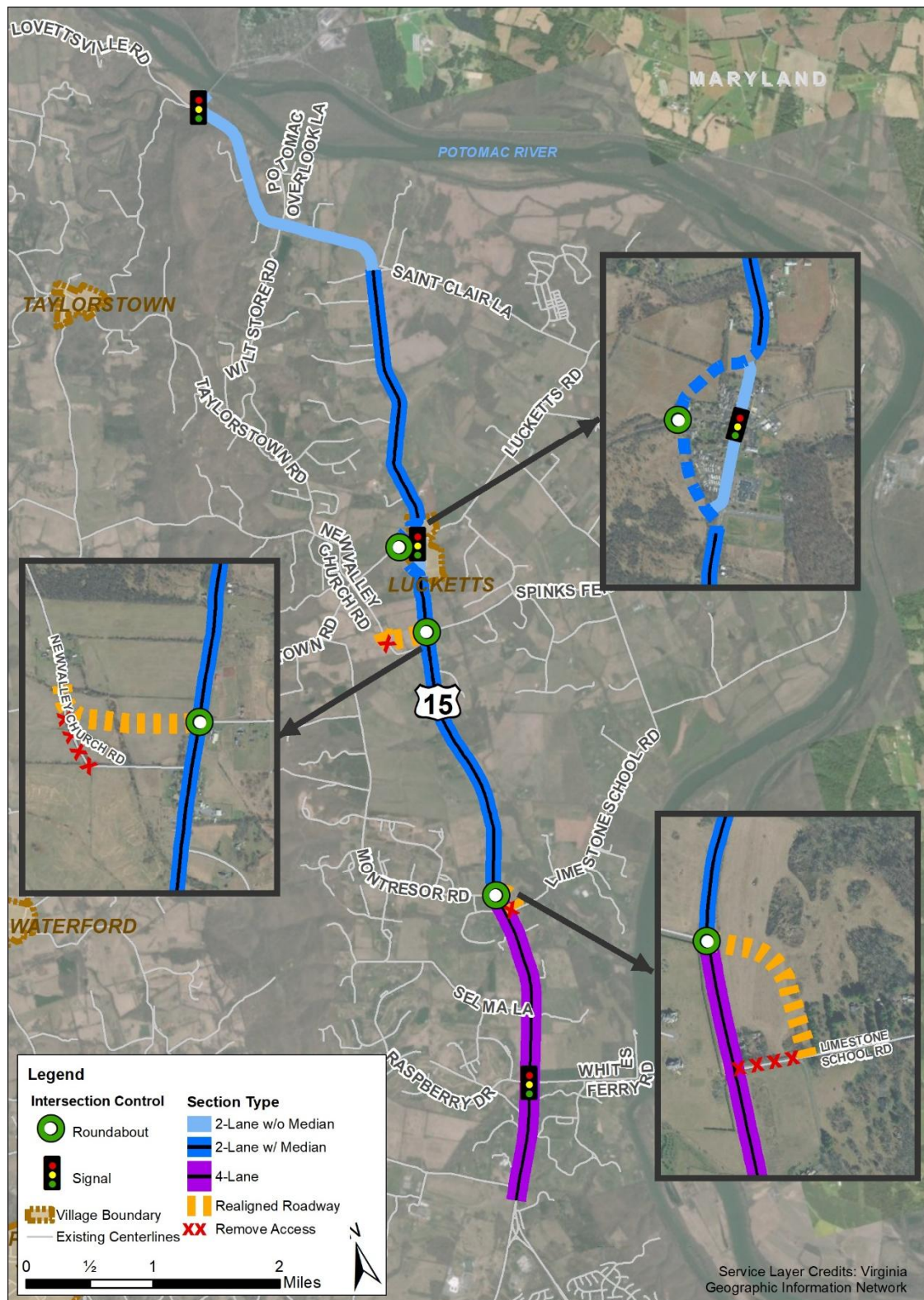


Figure 17: Concept A – Safety Improvement Focus

Route 15

Safety and Operations Study from Whites Ferry Road to the Maryland State Line

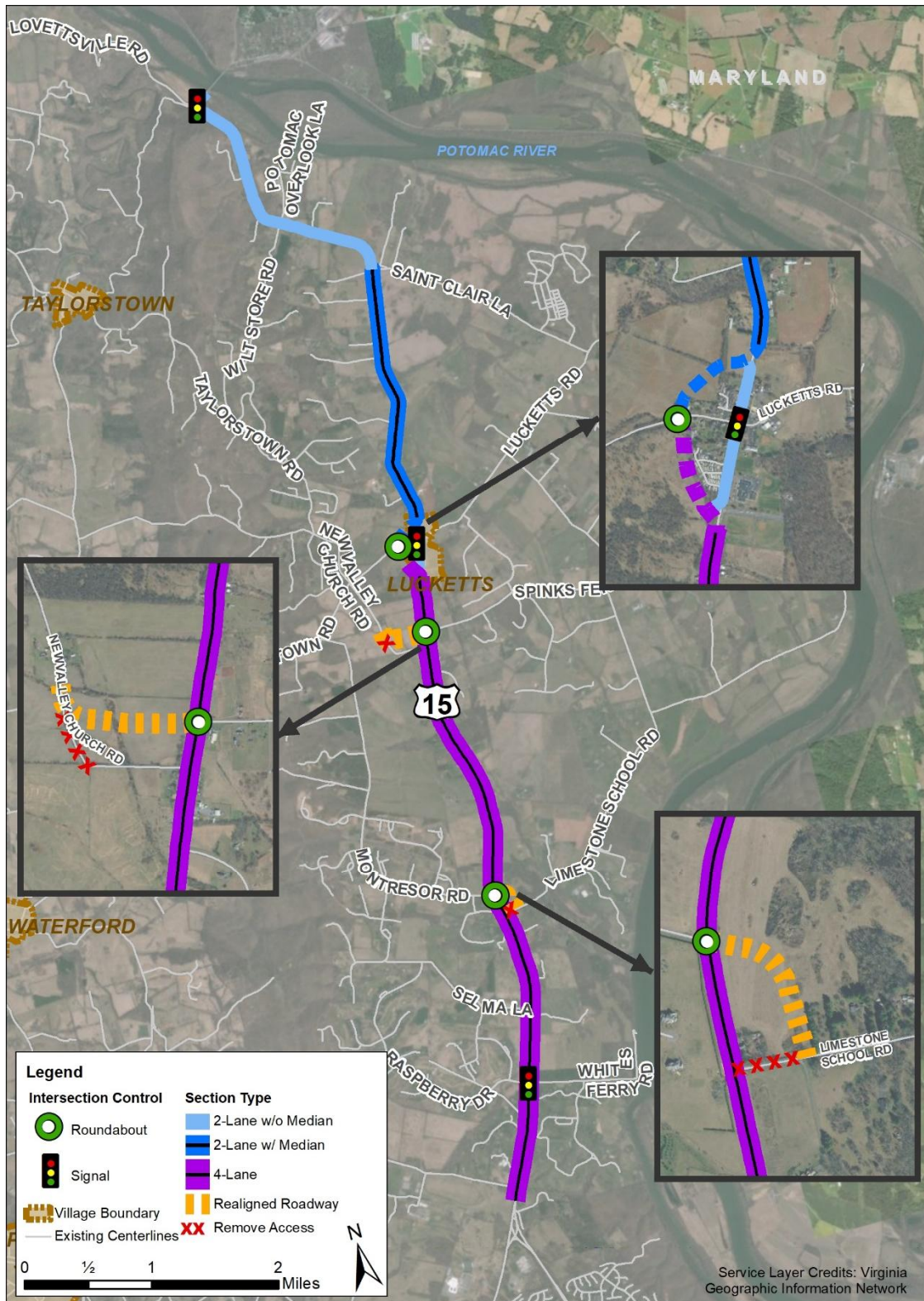


Figure 18: Concept B - Safety and Capacity Improvement Focus



Design Considerations

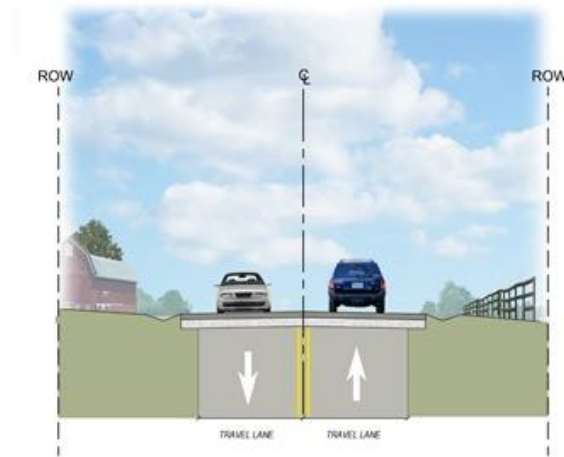
Design for the corridor was a big part of the discussion among Board members, County staff, Stakeholder Committee members, partner agencies, and the public. Design is and will be a very important part of any improvements in the study area. Design considerations developed as part of this study are described in this section.

Representative typical sections were developed for the various cross-sections proposed within Concepts A and B. These sections vary by number of lanes, the presence of a median or turn lane, and shoulder treatments. Figure 19, Figure 20, and Figure 21 show typical cross-sections for two-lane undivided, two-lane divided and four-lane divided segments, respectively. These are conceptual and the cross-sections for each concept will be fully vetted in the design stage of project development.

Other considerations that will be reviewed in the design phase are driveway access, median types, and shoulder treatments. There are over 90 residential and rural business driveways along the length of the corridor, and access control at each of these locations will be evaluated on a case-by-case basis in preliminary design. Median types and turn lanes will also be evaluated along the corridor to provide safe access while considering right-of-way and context-sensitive design. The shoulder design will also be evaluated in the preliminary design to consider material type and width. Some of these variations could include fully paved shoulders, half-paved and half-gravel shoulders, utilizing stabilized grass shoulders for part of the shoulder, etc. The Board has indicated that a task force may be formed in the design phase to assist the selection of context-sensitive design features to preserve the rural and historic nature of the corridor.

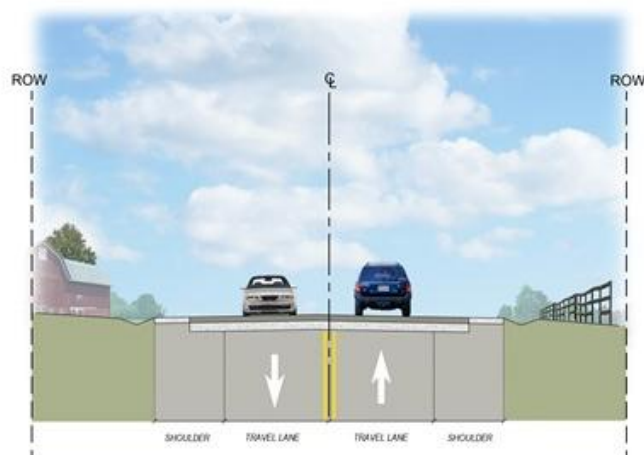
Route 15

Safety and Operations Study from Whites Ferry Road to the Maryland State Line



US Route 15 Existing Condition Typical Section

N.T.S.



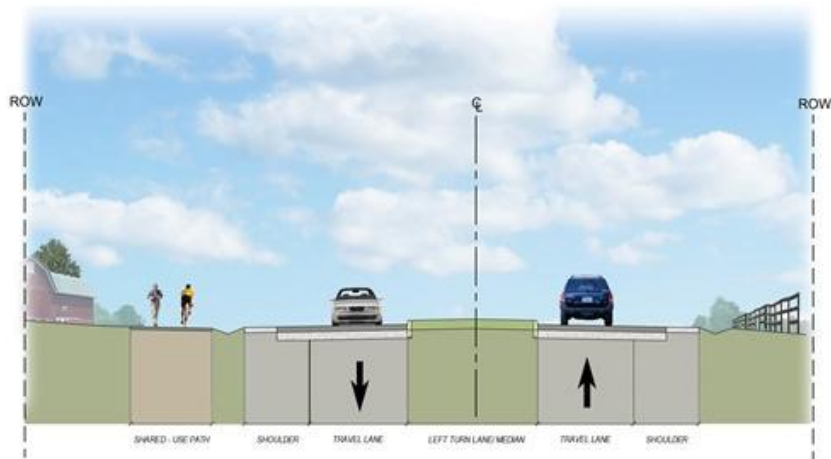
US Route 15 2 Lane Undivided Rural Shoulder Typical Section

N.T.S.

Figure 19: Two-lane, Undivided Typical Sections

Route 15

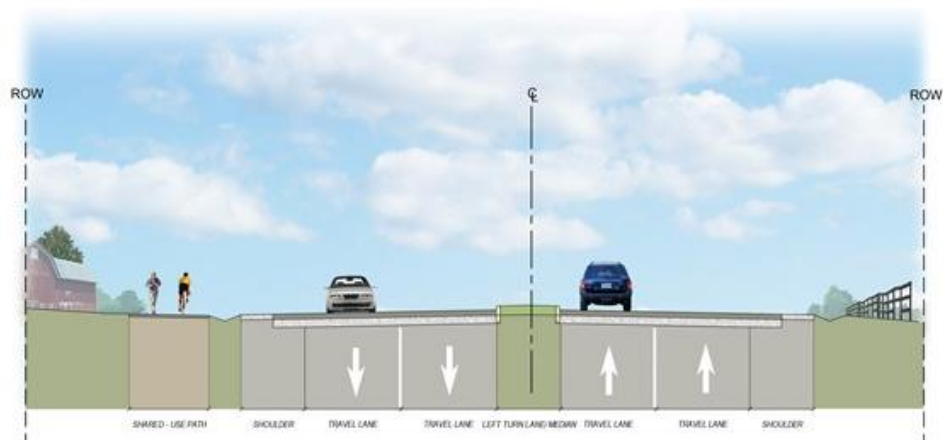
Safety and Operations Study from Whites Ferry Road to the Maryland State Line



US Route 15 2 Lane Divided Rural Shoulder Typical Section

N.T.S.

Figure 20: Two-lane, Divided Typical Section with Shared Use Trail



US Route 15 4 Lane Divided Rural Shoulder Typical Section

N.T.S.

Figure 21: Four-lane, Divided Typical Section with Shared Use Trail



Multimodal Considerations (Transit and Bicycle/Pedestrian)

Bus transit and bike considerations were discussed throughout the study effort. Although there was not a sizable portion of the public asking for bus transit, there was a significant public focus on bike network and trail connectivity. In either case, multimodal considerations were an important piece of the corridor study discussion.

Both Concept A and B incorporate multimodal transportation improvements. As part of the partner agency outreach, the project team met with Maryland officials. At that meeting, bus transit connections and potential park-and-ride lot locations were discussed. Based on conversations with Maryland transportation officials, there is potential to utilize the existing park-and-ride lot at the Point of Rocks for future origin of bus service connecting to points south including future Metrorail stations. Further transit study and inter-state coordination is necessary to determine feasibility.

For trail and path connections, progress was made on identifying likely network connections. Based on feedback from the public and partner agency meetings, a potential shared-use path connecting Leesburg to the Village of Lucketts was identified. In addition, a shared-use path between US Route 15 and Whites Ferry which will connect to the Chesapeake and Ohio (C&O) Canal path in Maryland was identified. Conceptual path alignments are shown in Figure 22 but the locations and types of paths or trails will need to be reviewed as part of the future design.

Village of Lucketts

The Village of Lucketts is a hub for the surrounding communities and a destination for rural economy. It is rural in nature and has a very congested US Route 15 running through the middle. Like many such villages/towns across Loudoun County, the Commonwealth of Virginia, and nationwide, it is desirable to reduce the number of vehicles and congestion within Lucketts in order to preserve the charm and character of the Village.

This Safety and Operations Study considered and incorporated safety and design elements from previous studies to address historic character enhancements and safety. This study also recommended a new roadway bypass on either the western side or eastern side of the Village to divert traffic around Lucketts.

Building upon traffic calming and safety improvements identified by the County through the Lucketts Safety Improvement project, there is opportunity to add streetscaping to compliment the rural context of the Village. This opportunity is much greater if a US Route 15 bypass is implemented. With a new bypass, the majority of through traffic (including large trucks) is anticipated to use the new bypass and reduce the traffic traveling within the Village. With the reduced traffic volume, the street design

Route 15

Safety and Operations Study from Whites Ferry Road to the Maryland State Line



can have tailored elements to reduce speeds for safety and enhance access to businesses, residences, schools, and parks. This lower volume of traffic will improve safety, especially at driveways located within the Village of Lucketts. The existing traffic signal also could potentially be removed.

The bypass could be to the west or east of US Route 15 as shown in Figure 23 and Figure 24. Further environmental study, design, and public outreach will be needed to make this decision.

Finally, the public conceptualized and has since consistently supported the idea of a bypass around Lucketts. During the first round of public meetings where citizens were able to discuss ideas in small groups, the notion of a bypass around the Town of Lucketts was a prevalent theme. During the early meetings of the Stakeholder Committee, nearly half of the stakeholders asked the County to consider the merits of a bypass. The bypass was supported in subsequent public meetings, and as a result of the continued support, a bypass was included in both Concept A and Concept B.

In summation, a bypass helps to reduce congestion through the Village, supports rural and historic character design elements in the Village, and most importantly, it enhances safety for Village residents, businesses, and the Lucketts Elementary School.

Route 15

Safety and Operations Study from Whites Ferry Road to the Maryland State Line

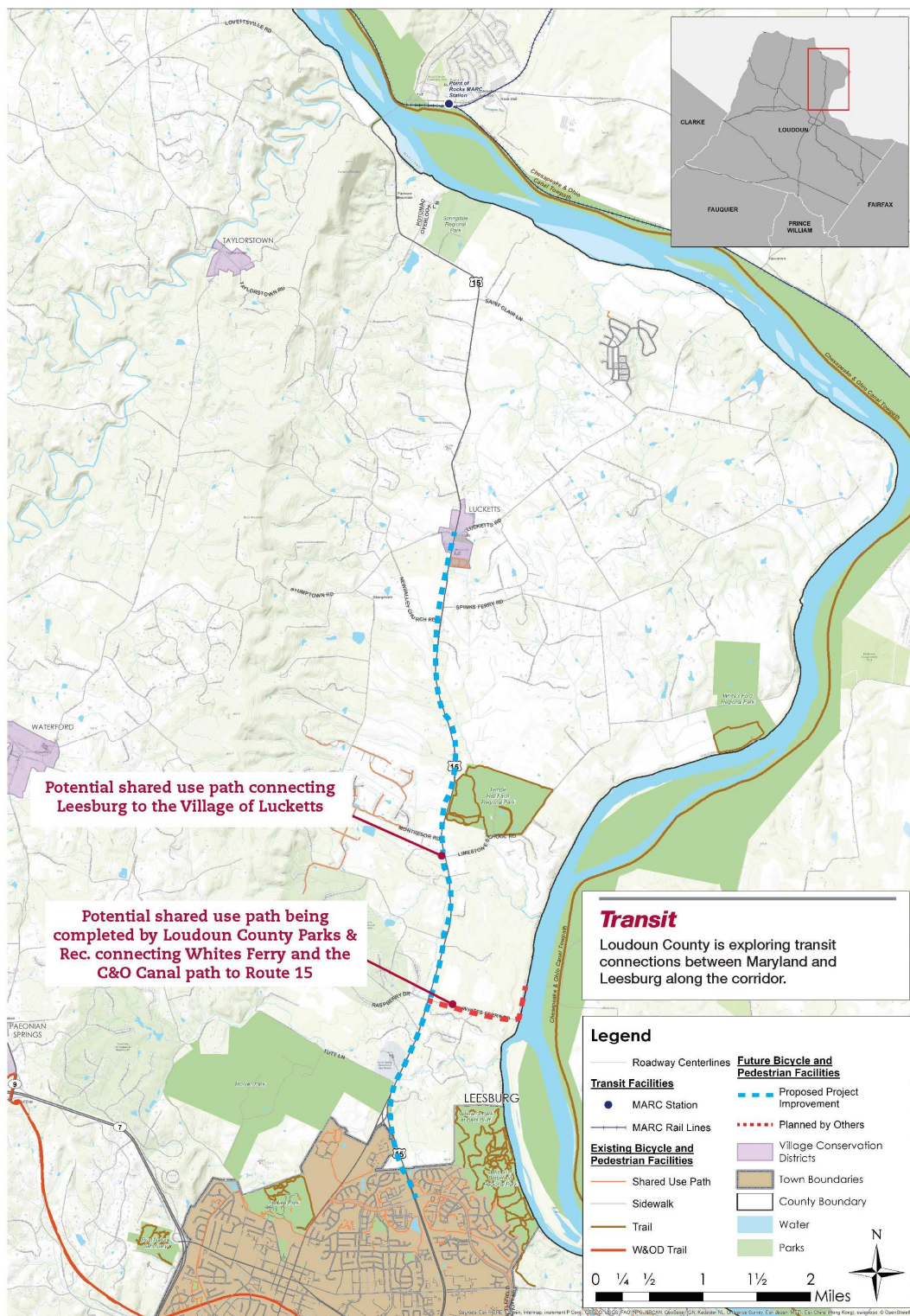


Figure 22: Multimodal Considerations

Route 15

Safety and Operations Study from Whites Ferry Road to the Maryland State Line

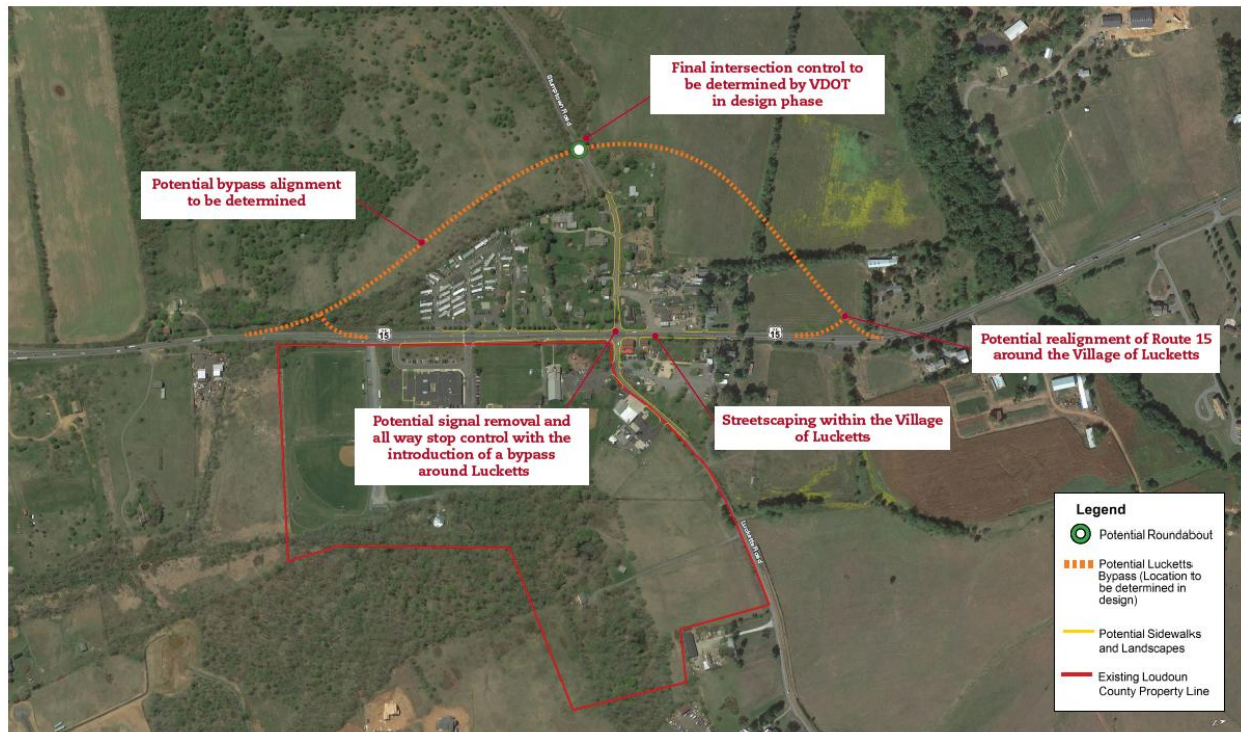


Figure 23: Potential Western Lucketts Bypass

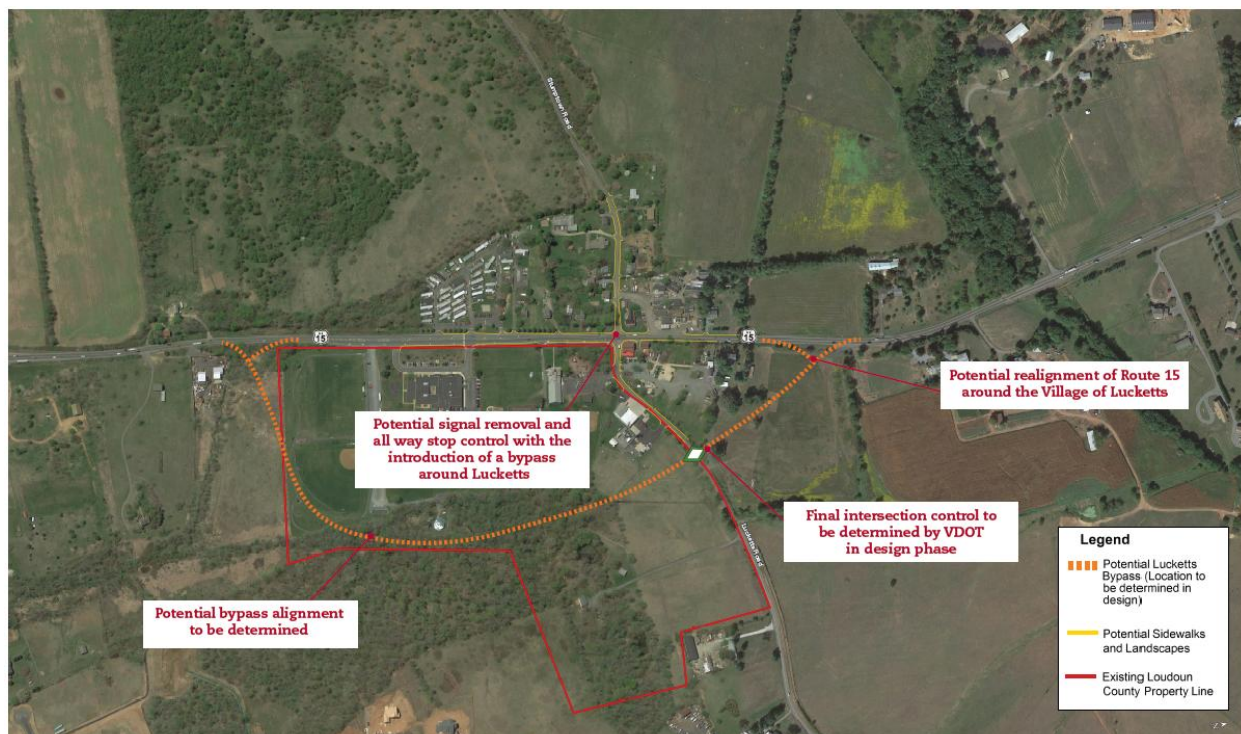


Figure 24: Potential Eastern Lucketts Bypass



FUTURE TRAFFIC FORECASTS

Future Transportation Network

Loudoun County DTCI identified 2030 and 2040 as the study horizon years for traffic analysis. Year 2030 conditions reflect an estimated horizon soon after improvement implementation, and 2040 represents a horizon consistent with regional and County traffic forecasting travel demand modeling horizons. For the purposes of this study, the transportation network improvements from the Congestion Report to widen US Route 15 from Battlefield Parkway to 2,000 feet north of Whites Ferry Road were assumed for completion for the 2030 and 2040 analysis periods.⁵

Future Traffic Volume Projections

To understand future traffic conditions, traffic volumes were forecasted for the future 2030 and 2040 horizon years. The methodology for developing growth rates and projecting future traffic volumes for the study corridor are documented in a Traffic Forecast Memorandum, dated November 5, 2018, as provided in Appendix E. A summary is provided as follows.

Multiple data sources were considered when computing a traffic growth rate for the US Route 15 study corridor. The Loudoun County Travel Demand Model, MWCOG's regional travel demand model, the Northern Virginia Transportation Authority travel demand model, and population and employment data were all referenced during the development of corridor growth rates.

Review of these data sources and test runs of corridor widening resulted in varying growth rates for the different analysis scenarios. Table 5 outlines the traffic growth rates applied to each scenario.

Table 5: Annual Linear Traffic Growth Rates by Scenario

Scenario	Annual Linear Growth Rate
No Build	0.75%
Concept A	0.75%
Concept B	1.25%

The 2030 and 2040 AM and PM peak hour traffic volumes were calculated by applying the growth rates to the 2017 peak hour traffic volumes. The 2030 peak hour traffic volumes for No Build, Concept A, and Concept B are shown in Figure 25, Figure 26, and Figure 27, respectively. The 2040 peak hour traffic volumes for No Build, Concept A, and Concept B are shown in Figure 28, Figure 29, and Figure 30, respectively.

⁵ Analysis was performed prior to the Board of Supervisors Business Meeting decision on September 20, 2018 to widen Route 15 from Battlefield Parkway to Montresor Road, realign Limestone School with Montresor Road, and modifying the intersection to a roundabout.

Route 15

Safety and Operations Study from Whites Ferry Road to the Maryland State Line

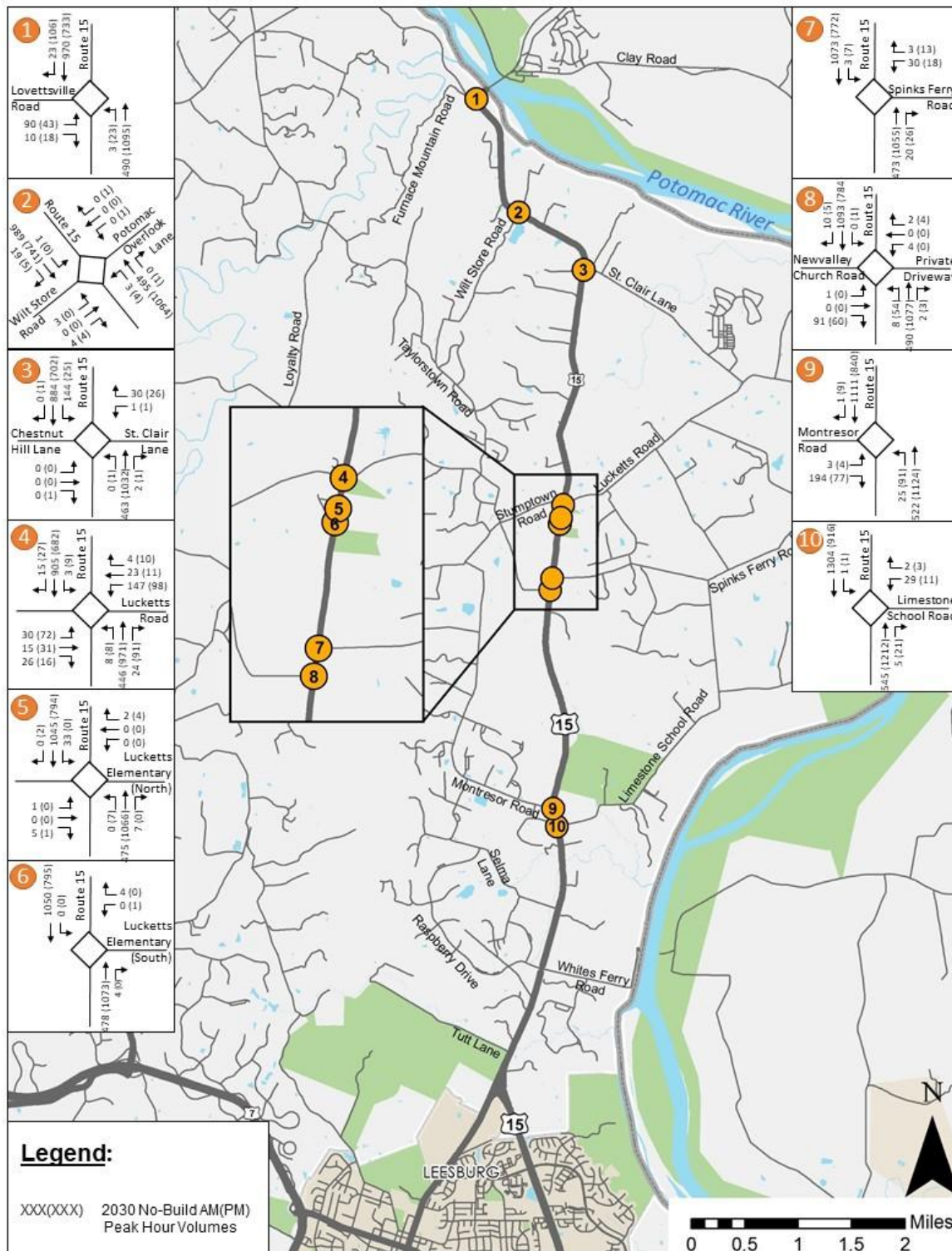
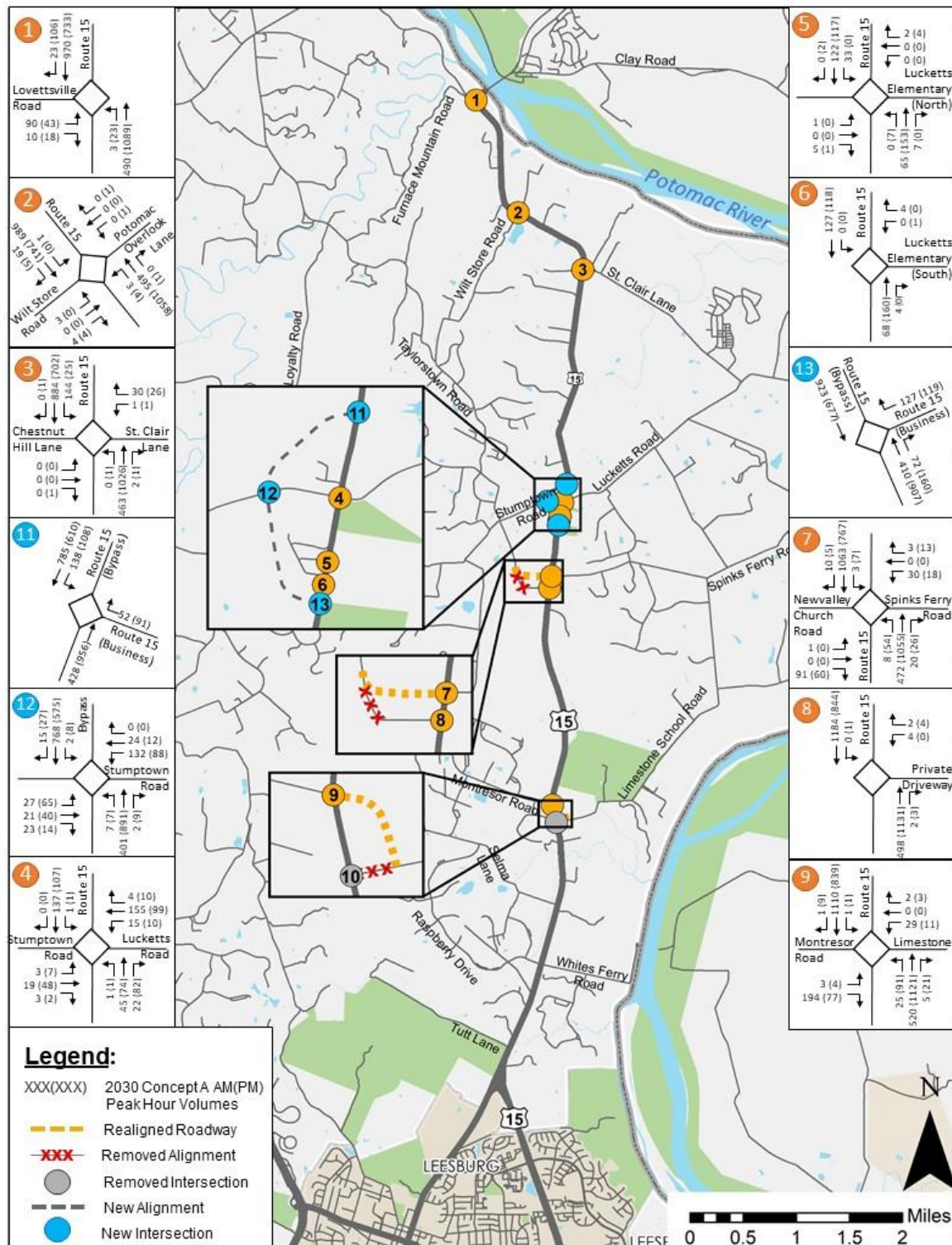


Figure 25: 2030 No-Build Traffic Volumes

Safety and Operations Study from Whites Ferry Road to the Maryland State Line



ROUTE 15 Kimley»Horn

Route 15

Safety and Operations Study from Whites Ferry Road to the Maryland State Line

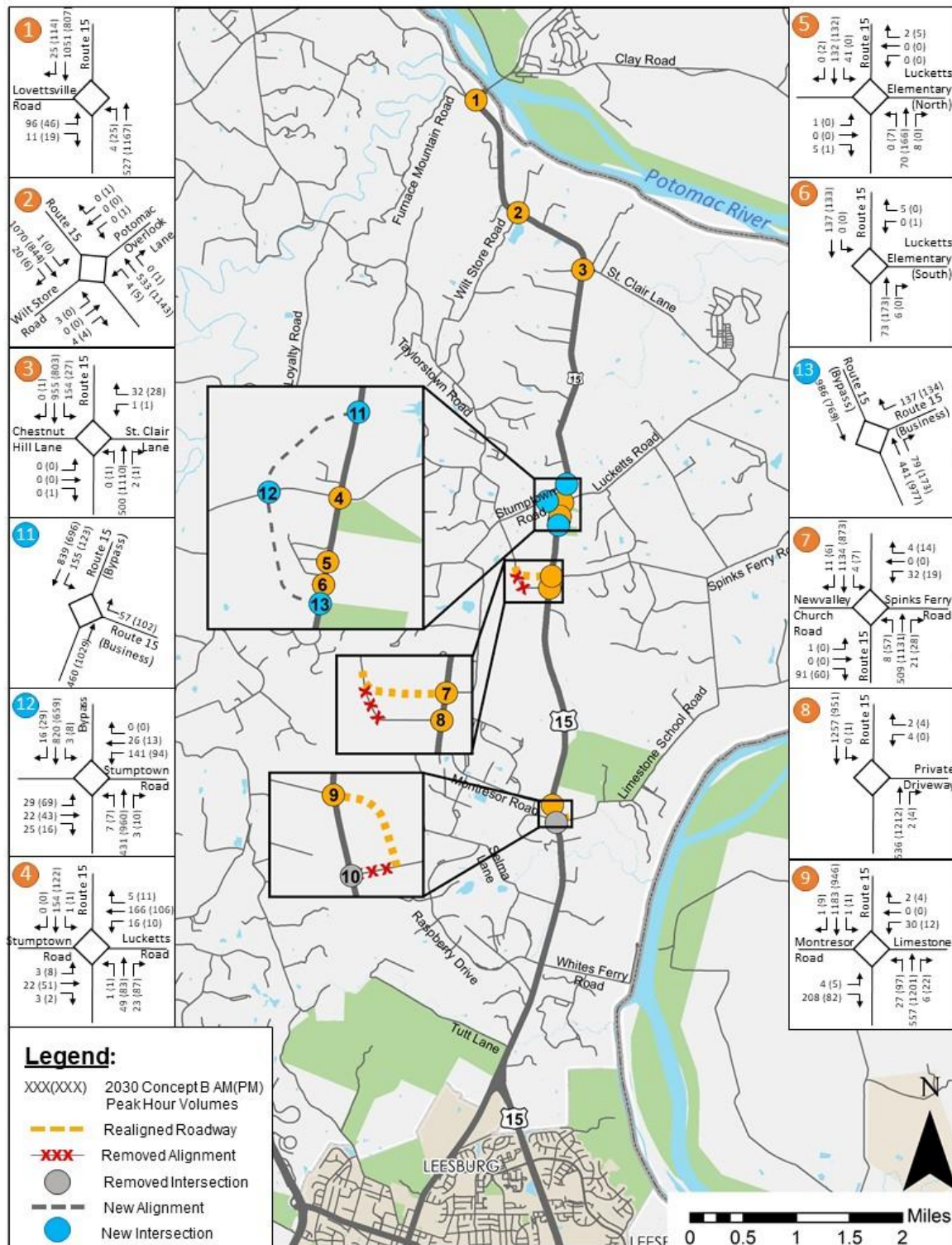


Figure 27: 2030 Concept B Traffic Volumes

Route 15

Safety and Operations Study from Whites Ferry Road to the Maryland State Line

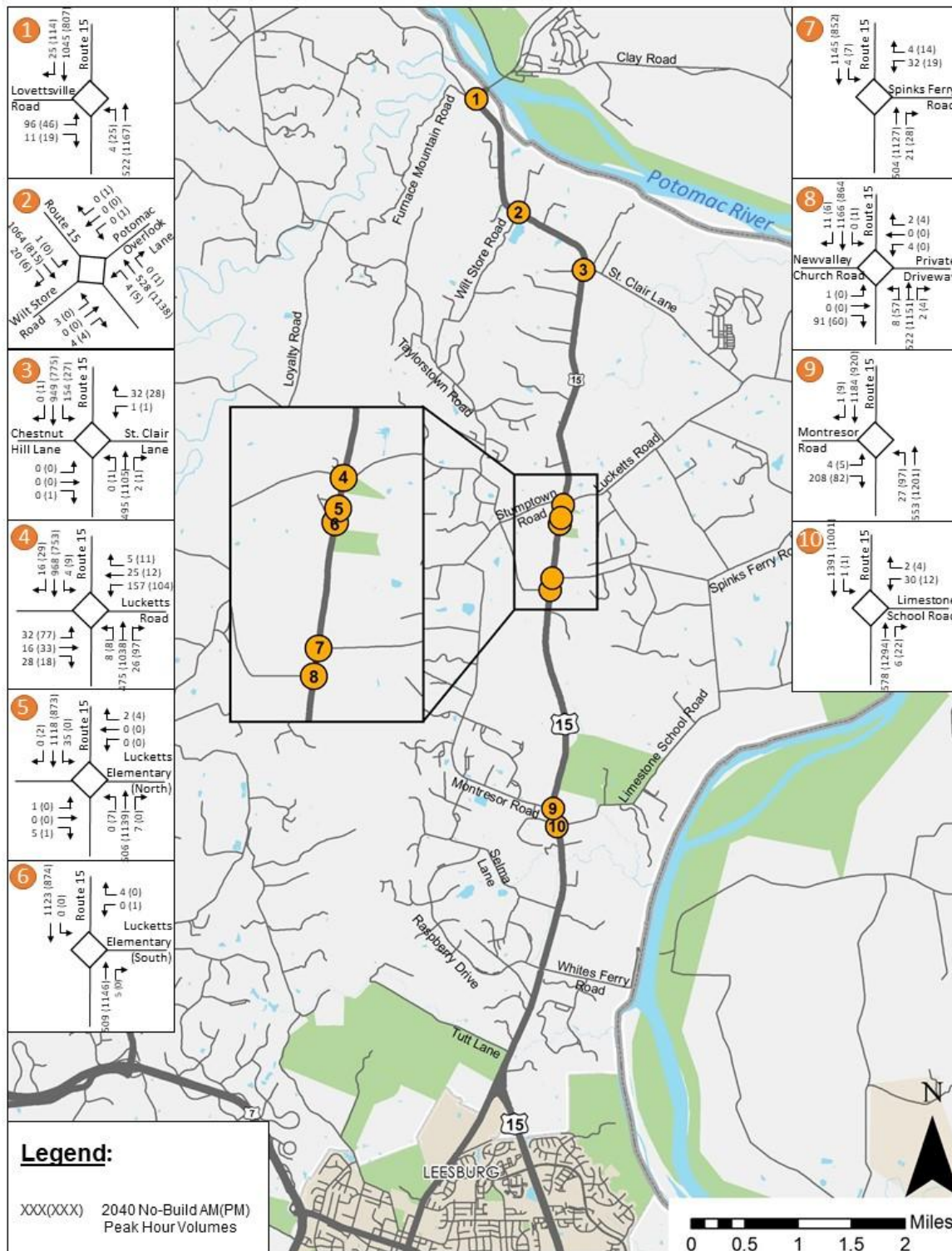


Figure 28: 2040 No-Build Traffic Volumes

Route 15

Safety and Operations Study from Whites Ferry Road to the Maryland State Line

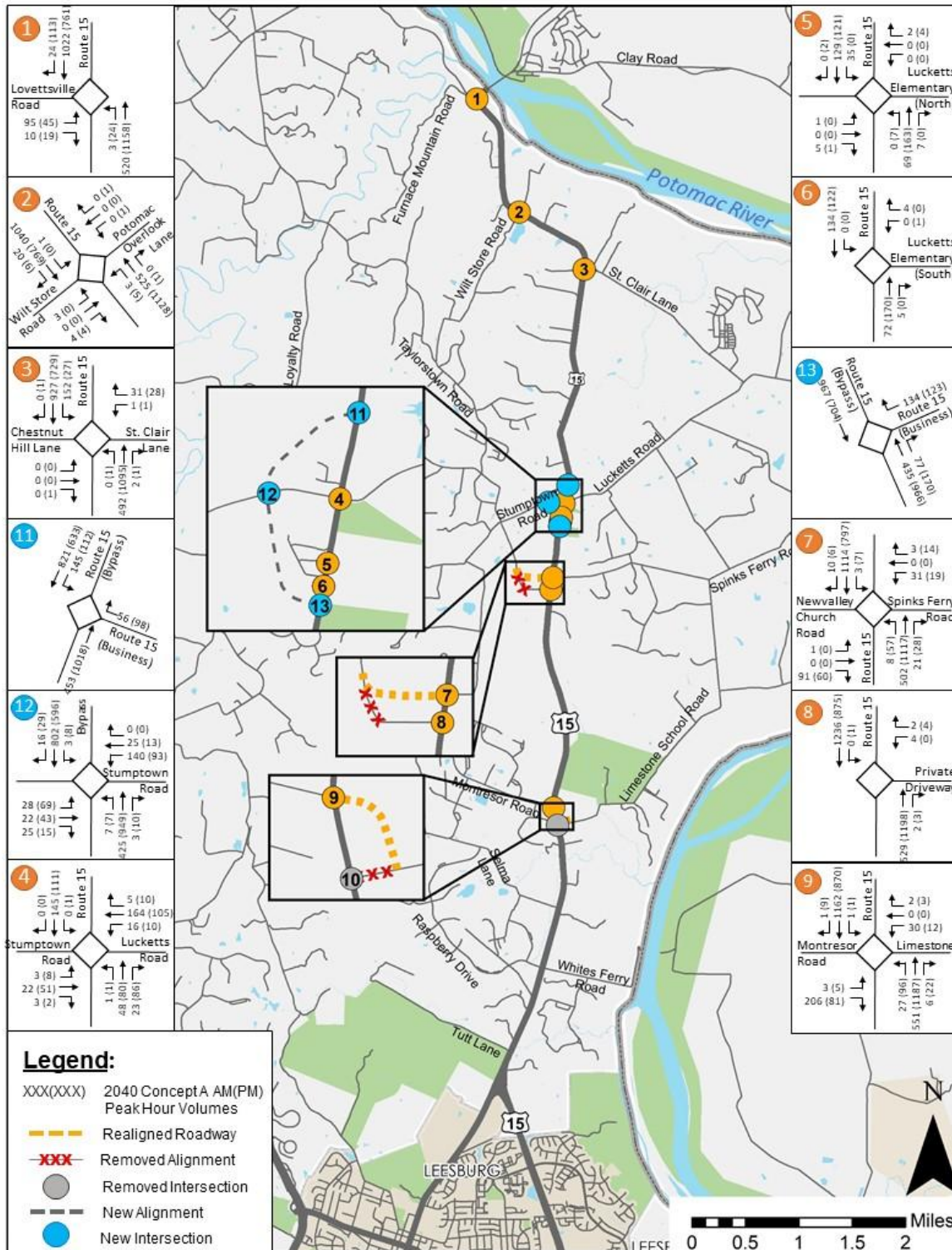


Figure 29: 2040 Concept A Traffic Volumes

Route 15

Safety and Operations Study from Whites Ferry Road to the Maryland State Line

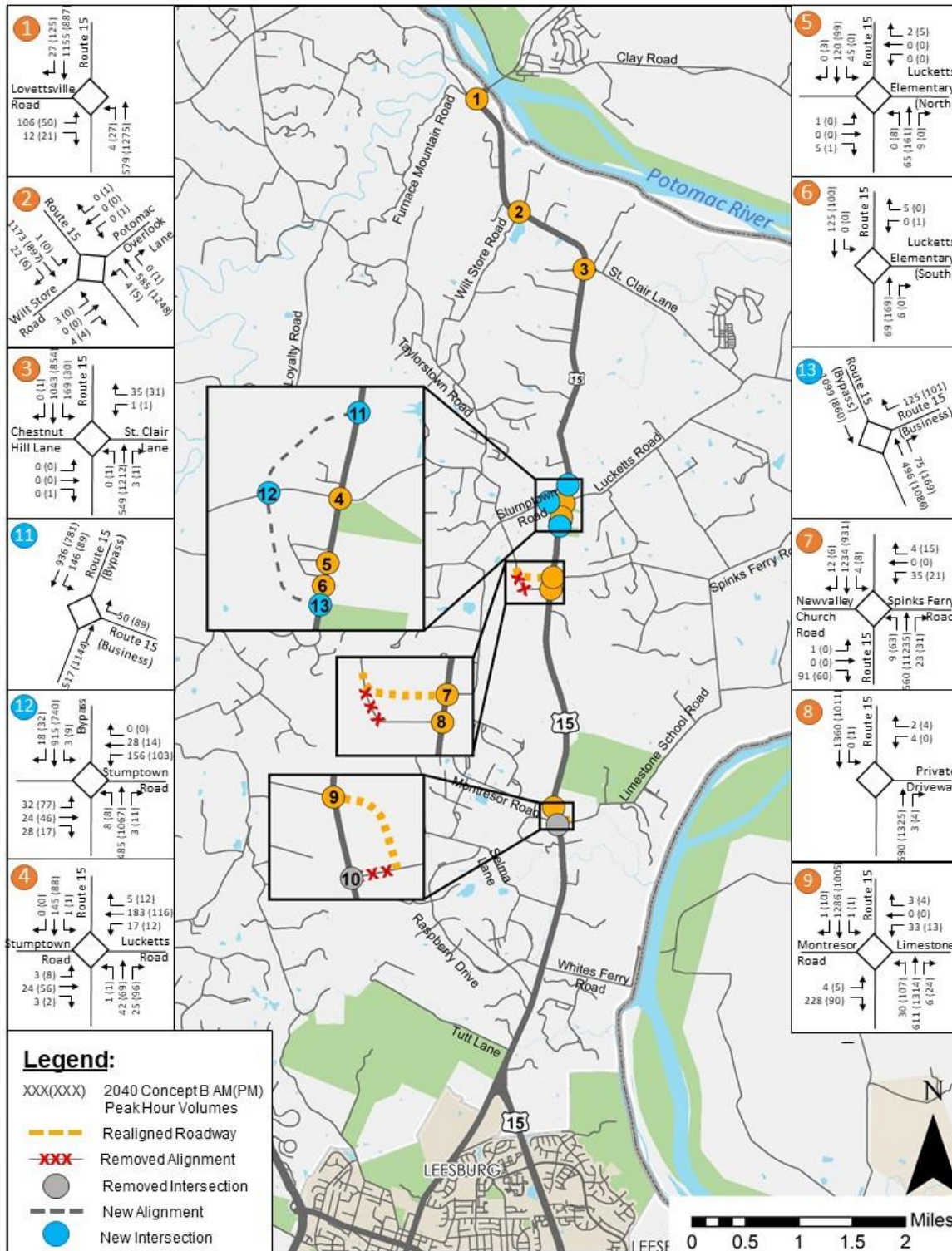


Figure 30: 2040 Concept B Traffic Volumes



TRAFFIC ANALYSIS OF FUTURE CONDITIONS

Analysis Methodology

The existing conditions calibrated VISSIM models were used as a starting point for develop future conditions modeling. The same methodology regarding traffic simulation was used. As mentioned in the Existing Conditions Report, the analysis area is larger than that of the study area, including US Route 15 south to Battlefield Parkway (Congestion Report study area), and the intersection of US Route 15 and Clay Street in Maryland to the north to model traffic arrival patterns. Future conditions analysis was performed for No Build, Concept A and Concept B conditions for 2030 and 2040 analysis years.

VISSIM Models

Existing and future conditions were evaluated using VISSIM 9 traffic modeling software. VISSIM is a microscopic, time-step, and driver behavior-based simulation model that uses the driver behavior model for each vehicle in the system. VISSIM was selected to model the oversaturated conditions on US Route 15 and its study intersections, as advised by guidance from VDOT's Traffic Operations and Safety Analysis Manual (TOSAM) and consistent with the evaluation of existing conditions.

The future conditions VISSIM models were developed by making geometric, and signal timing modifications to the calibrated existing conditions models to reflect the assumptions of the various analysis scenarios. The changes made to each scenario were outlined previously in the Concept Development section of this memorandum. The forecasted traffic volumes in 2030 and 2040 were applied to the corresponding analysis (No-Build, Concept A, or Concept B).

NO-BUILD TRAFFIC ANALYSES

For a baseline comparison, No-Build conditions were evaluated using VISSIM for 2030 and 2040 peak hour traffic volumes. A summary of the results is below. The detailed output tables from the models are contained in Appendix F.

2030 No-Build

Without any improvements implemented north of Whites Ferry Road, as assumed in this analysis⁶, the AM peak period would continue to experience significant southbound queuing throughout the network, primarily at Lucketts Road, extending nearly to St Clair Lane, and at Montresor Road. Both intersections experience significant congestion in 2030.

⁶ The No-Build analysis was developed prior to the Board of Supervisors Business Meeting decision on September 20, 2018 to widen Route 15 from Battlefield Parkway to Montresor Road, realign Limestone School with Montresor Road, and modifying the intersection to a roundabout.

Route 15

Safety and Operations Study from Whites Ferry Road to the Maryland State Line



In the PM peak, significant northbound queuing would occur at Lucketts Road, extending past Montresor Road, and at the signal from Clay Street across the bridge, reaching just north of Wilt Store Road. Multiple intersections in the vicinity of Lucketts experience significant congestion in 2030. The results of this analysis are shown in Figure 31.

2040 No-Build

The congested conditions in the 2030 analysis are worsened in 2040, with longer queues and loss of functionality at additional intersections in both the AM and PM peaks. Southbound AM queues from Lucketts Road extend beyond Wilt Store Road, while northbound PM queues extend from Lucketts Road to King Street. The results of this analysis are shown on Figure 32.

Route 15

Safety and Operations Study from Whites Ferry Road to the Maryland State Line

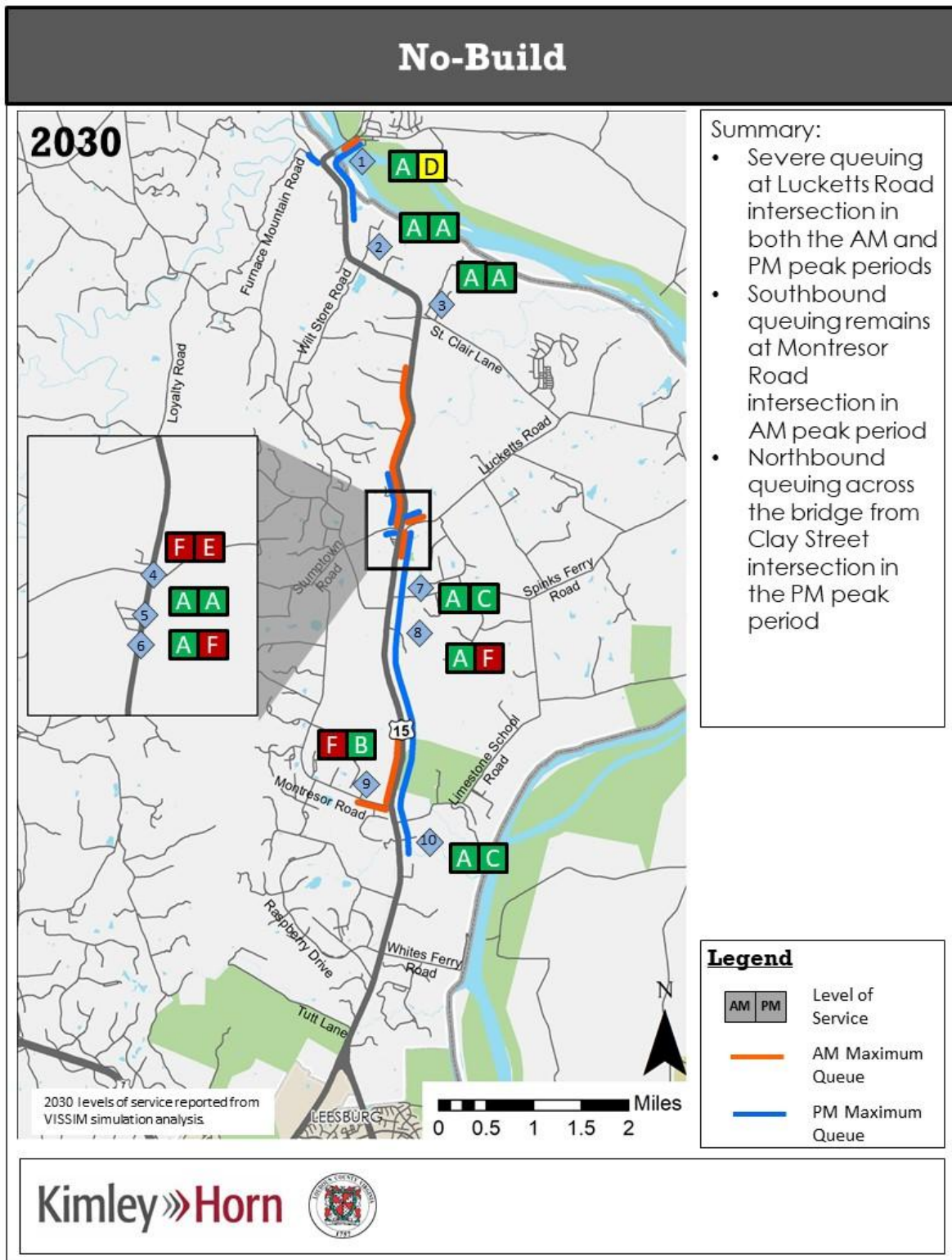


Figure 31: 2030 No-Build Traffic Analysis Results

Route 15

Safety and Operations Study from Whites Ferry Road to the Maryland State Line

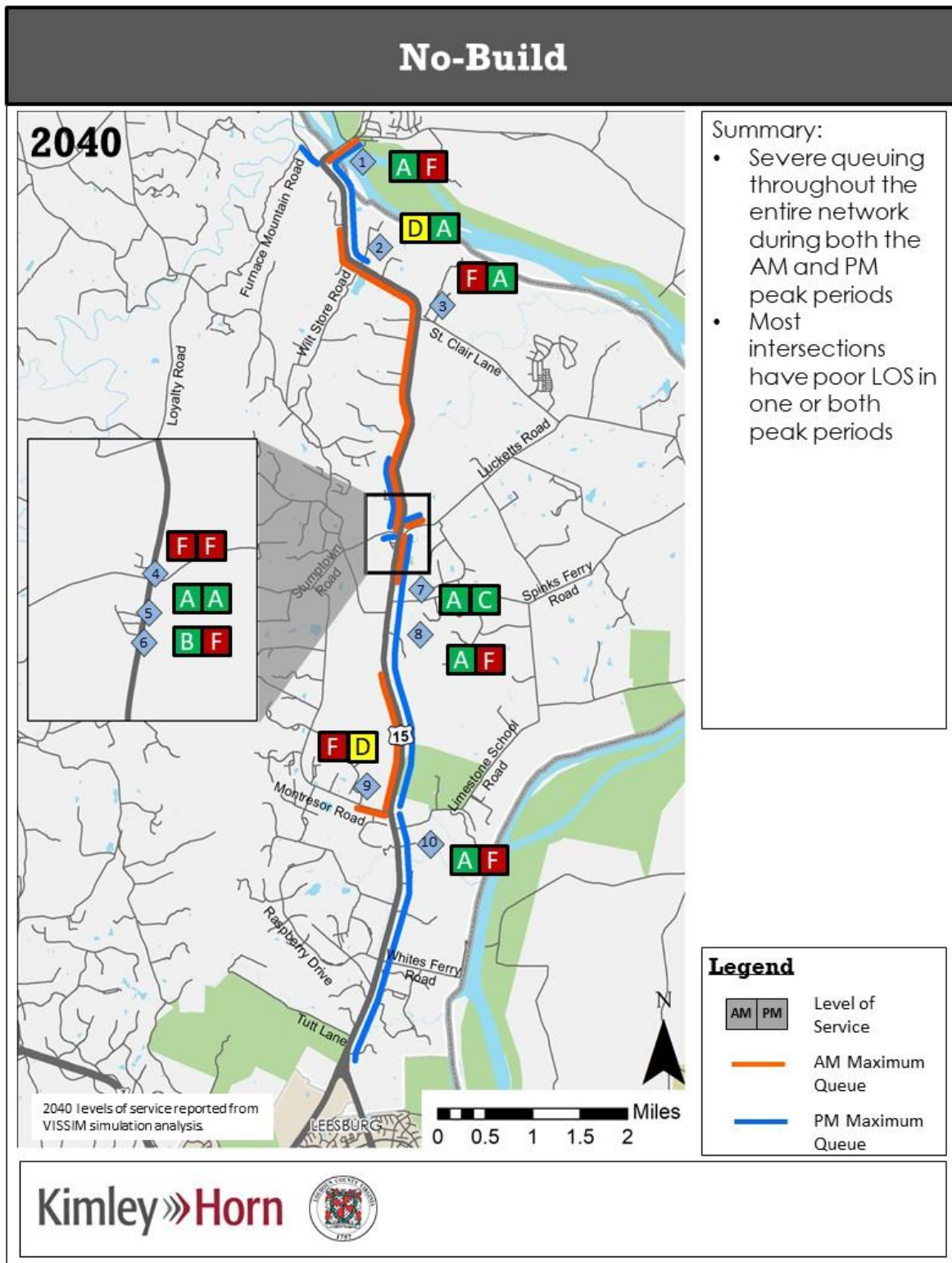


Figure 32: 2040 No-Build Traffic Analysis Results



CONCEPT A AND B TRAFFIC ANALYSES

The results of the 2030 and 2040 traffic conditions are summarized below and are shown graphically on Figure 33 through Figure 36.

The analyses show that under 2040 conditions, neither of the concepts will provide sufficient capacity to completely eliminate congestion from the corridor, but both provide varying degrees of improvement. Under 2030 conditions both concepts will significantly reduce congestion, but some northbound queuing remains. In Concept A, the northbound queue starts at Spinks Ferry Road, while in Concept B, the queue extends back from Clay Street in Maryland. Further descriptions of the results are provided below.

2030 Conditions Traffic Analyses

The results of the 2030 traffic analyses showed that congestion is reduced with the improvements proposed in both Concept A and Concept B. Despite the proposed improvements, northbound queuing remains in the PM peak in both concepts.

Concept A – Safety Improvement Focus

The AM peak shows nominal southbound queuing from the roundabout at Spinks Ferry Road, though the queues do not spill back into the Village of Lucketts. In the PM peak, northbound queuing occurs from the roundabout at Spinks Ferry Road, nearly to the Montresor Road intersection. All intersections operate at LOS D or better in both peak periods.

Concept B – Safety and Congestion Improvement Focus

AM peak queuing and congestion is reduced, and all intersections operate at LOS B or better. In the PM peak, all queuing is relieved by the capacity improvement, until traffic crosses into Maryland at the Clay Street intersection. This northbound PM queue from Clay Street continues into Virginia and extends approximately to Wilt Store Road. All intersections operate at LOS D or better, except for the intersection with Lovettsville Road, which is a result of the northbound queue from Maryland.

2040 Conditions Traffic Analyses

The results of the 2040 traffic analyses showed that both Concept A and B provide improvements to the corridor, but that congestion remains in various locations of the study area, dependent upon the location and type of improvements to the network.

Concept A – Safety Improvement Focus

In Concept A, the widening extends to Montresor Road, resulting in a two-lane section to the north. In the AM peak, the southbound queue at Spinks Ferry Road extends into the Village of Lucketts and along the Bypass to Stumptown Road (note that the Bypass

Route 15

Safety and Operations Study from Whites Ferry Road to the Maryland State Line



was modeled west of Lucketts). Several intersections within the Village of Lucketts operate at LOS F in the AM peak. In the PM peak, the northbound queue at Spinks Ferry Road extends beyond Montresor Road.

Concept B – Safety and Congestion Improvement Focus

In Concept B, the widening of US Route 15 to the Village of Lucketts provides sufficient capacity to relieve congestion in the Town of Leesburg and along the corridor until the south of the Village of Lucketts. In the AM peak, the southbound queues are nearly eliminated by the improvements, with the exception of nominal queuing at Lovettsville Road and Montresor Road. In the PM peak, the southbound queuing is eliminated and the northbound queuing at Clay Street extends to and through the Village of Lucketts.

Route 15

Safety and Operations Study from Whites Ferry Road to the Maryland State Line

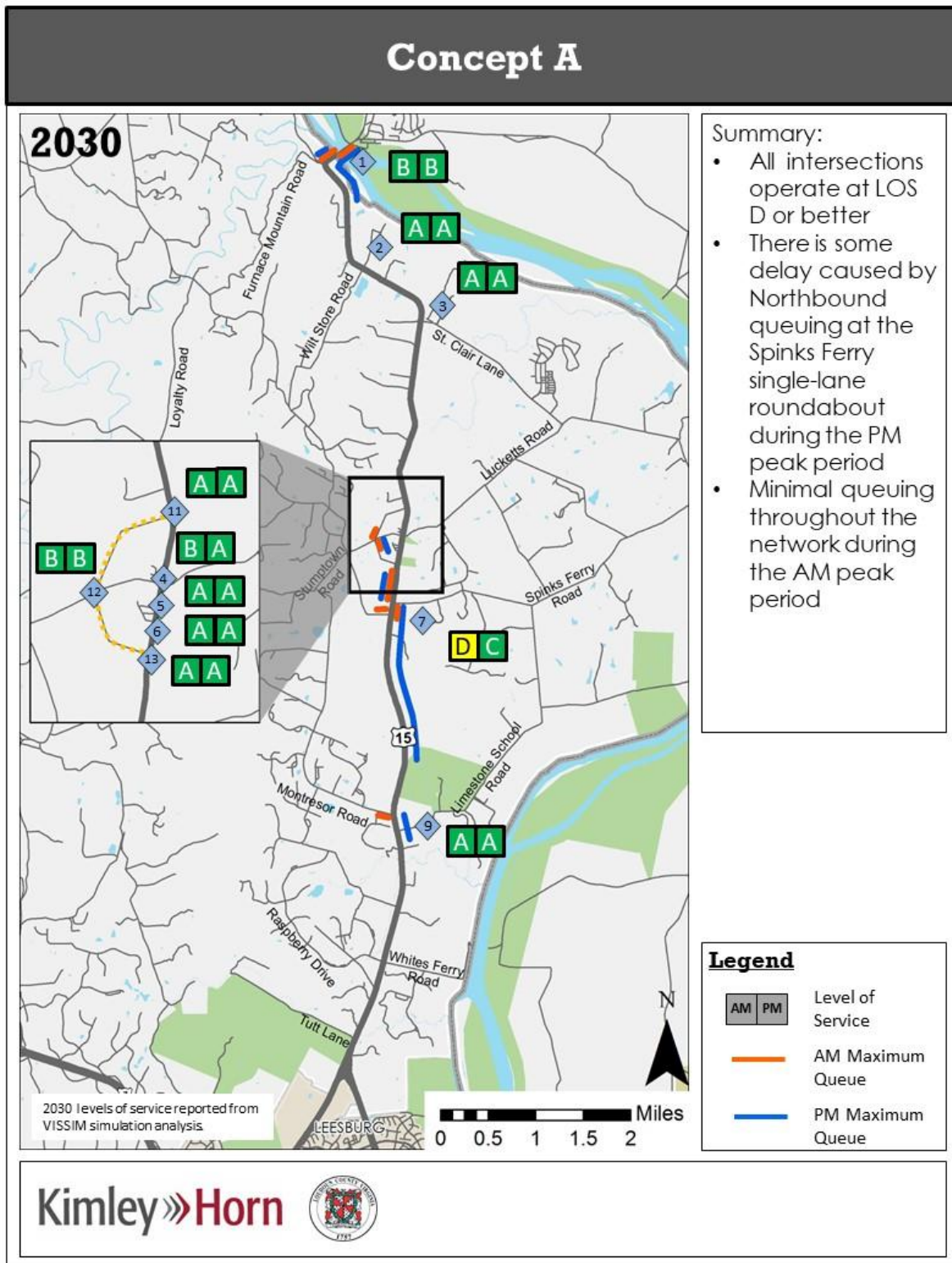


Figure 33: 2030 Concept A Traffic Analysis Results

Route 15

Safety and Operations Study from Whites Ferry Road to the Maryland State Line

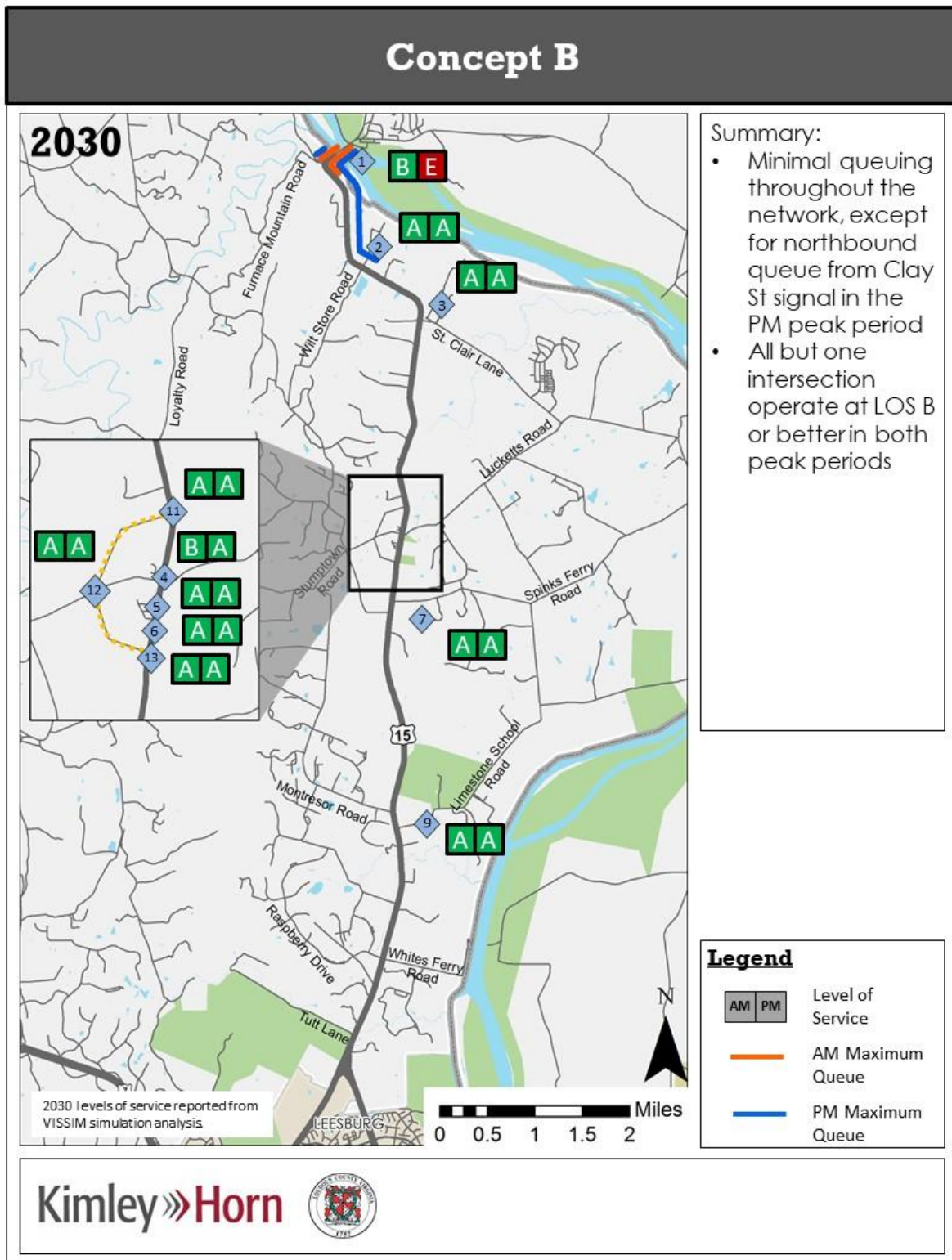


Figure 34: 2030 Concept B Traffic Analysis Results

Route 15

Safety and Operations Study from Whites Ferry Road to the Maryland State Line

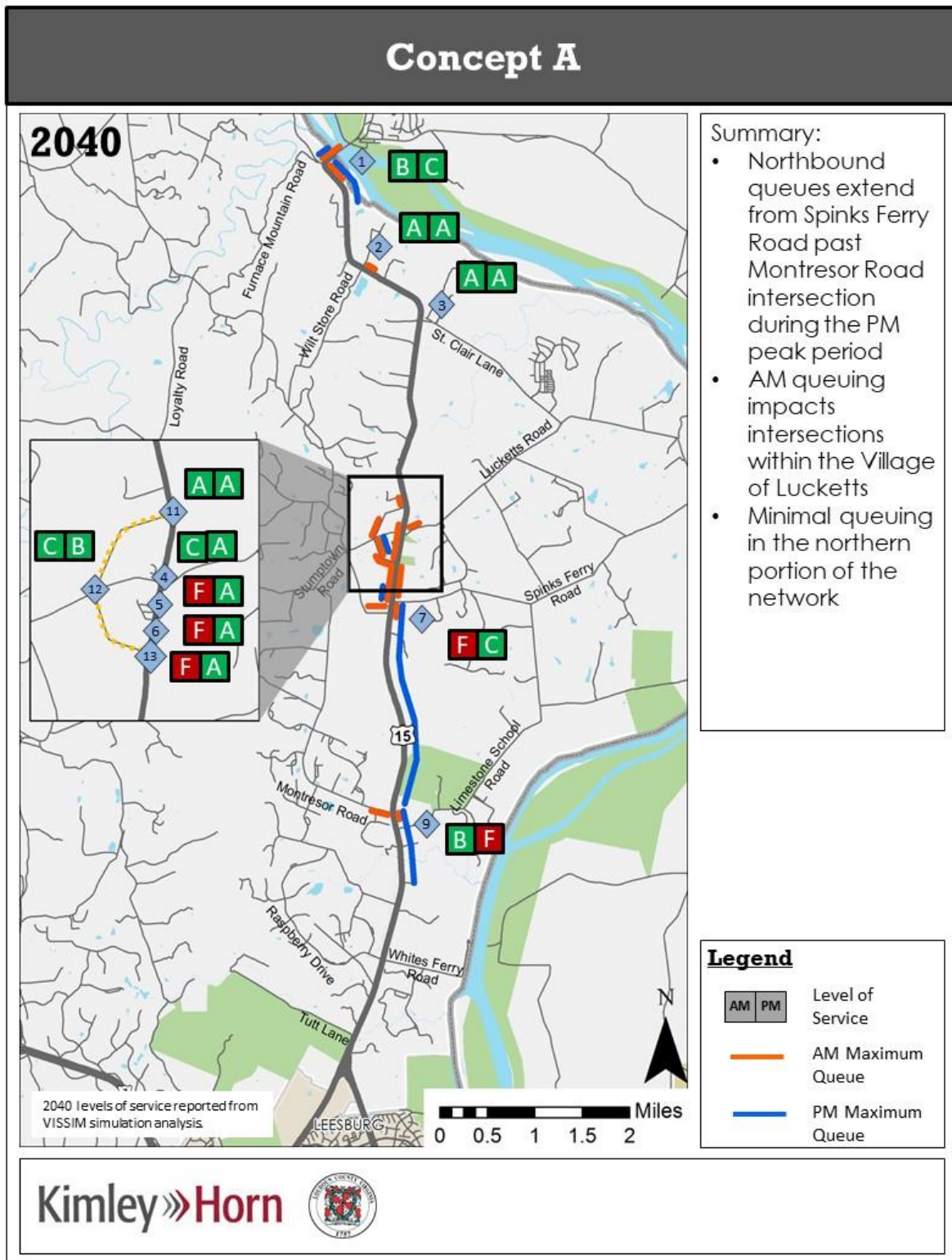


Figure 35: 2040 Concept A Traffic Analysis Results

Route 15

Safety and Operations Study from Whites Ferry Road to the Maryland State Line

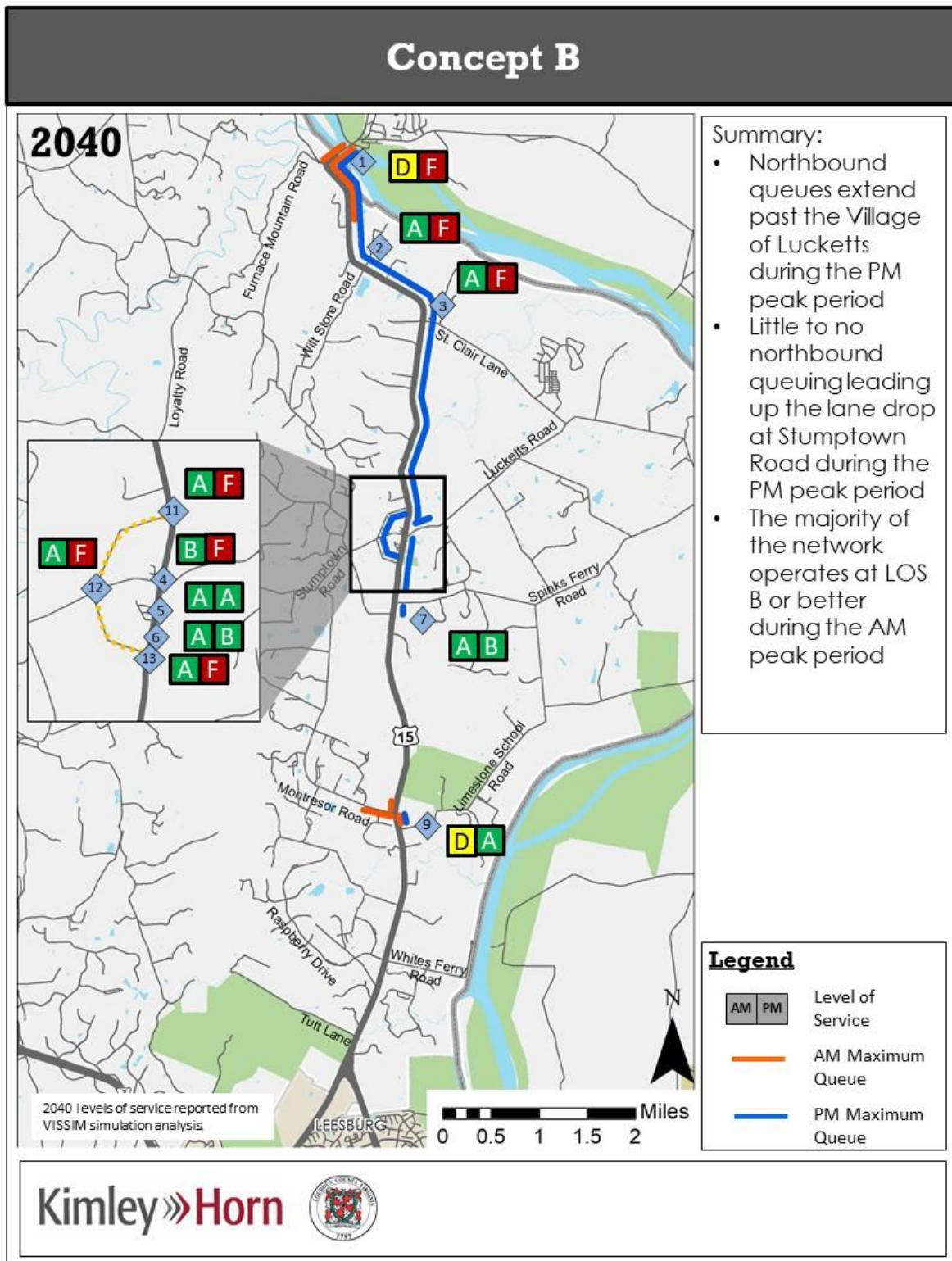


Figure 36: 2040 Concept B Traffic Analysis Results



ADDITIONAL CONSIDERATIONS

Future Conditions Safety Analysis

A future conditions safety analysis was performed using crash modification factors (CMFs) for the Safety and Operations study area. CMFs are used to evaluate the potential benefits of implementing the concept improvements and compute the expected number of crashes after implementing a countermeasure on a road or intersection. Transportation professionals frequently use CMF values to identify countermeasures with the greatest safety benefit for a particular crash type or location. CMFs were pulled from the following sources:

- CMF Clearinghouse: a national repository for CMFs based on various safety studies
- *Highway Safety Manual (HSM), 1st Edition*: a manual published by the American Association of State Highway and Transportation Officials that compiles available information and methodologies for evaluating roadway safety

VDOT constructed several roadway improvements in the study area in the fall of 2017, as outlined in Table 6. Since the constructed improvements are projected to result in a reduction in crashes, the future conditions safety analysis compares the projected benefits of the two proposed concepts against the existing and No-Build scenarios. The two proposed concepts include a median, which replaces the centerline rumble strips in the No-Build condition.

Table 6: No-Build Phase Safety Improvements

Segment	Rumble Strips
550 Feet north of Whites Ferry Road to approximately 800 Feet south of Rocky Meadow Lane	Centerline
800 feet south of Rocky Meadow Lane to 700 Feet north of Montresor Road	Centerline and edge line near Montresor Road
700 Feet north of Montresor Road to Stumptown Road	Centerline and some portions of edge line*
Stumptown Road to 400 feet south of Black Hops Lane	Centerline
400 feet south of Black Hops Lane to Chesnut Hill/Saint Clair Lane	Centerline and edge line
Chestnut Hill/ Saint Clair Lane to Maryland state line	Centerline

*For analysis purposes, continuous edge line rumble strips were assumed

Route 15

Safety and Operations Study from Whites Ferry Road to the Maryland State Line



Table 7 and Table 8 list the applicable CMFs from the *HSM* and the CMF Clearinghouse. These CMFs were applied to the applicable historical crashes for each of the alternatives.

Table 7: Mainline Crash Modification Factors

	Mainline					
	Rumble Strips in Centerline	Rumble Strip in Centerline and Edge Line	Rumble Strips on Edge Line	Rumble Strips on Edge Line	Raised Median	Widening to 4 Lanes with Median
Number of Lanes	2	2 to 4	2	4	2	4
CMF	0.86	0.82	0.74	0.84	0.82 (0.88)	0.712
Crash Affected	All Types/All Severities	All Types/(Fatal or A injuries)	Run off road/All Severities	All Types/All Severities	All Types/PDO (All Injuries)	All Types/All Severities
Source	HSM 13-46	CMF Clearinghouse	CMF Clearinghouse	HSM 13-44	HSM 13-11	CMF Clearinghouse

Table 8: Intersection Crash Modification Factors

	Intersection				
	Signal to Single-lane Roundabout	Signal to Two-lane Roundabout	3 Leg Intersection to Single-lane Roundabout	3 Leg Intersection to Two-lane Roundabout	Stop Control to Signal
Number of Lanes	1	2	1	2	N/A
CMF	0.52	0.955	0.29	0.33	0.56
Crash Affected	All Types/All Severities	All Types/All Severities	All Types/All Severities	All Types/All Severities	All Types/All Severities
Source	HSM 14-3	CMF Clearinghouse	HSM 14-4	CMF Clearinghouse	HSM 14-7

US Route 15 was divided into segments based on the existing, baseline, and proposed geometries so that the geometry in each segment was consistent throughout each scenario. The segments were intended to capture the influence area of each improvement and are different for Concepts A and B. The resulting expected crash

Route 15

Safety and Operations Study from Whites Ferry Road to the Maryland State Line



frequency anticipated with the installation of each individual improvement is shown in Table 9 and Table 10.

Adding rumble strips along the centerline and shoulder is anticipated to decrease the 415 existing crashes by 5 percent, resulting in 19 fewer crashes for the Baseline Scenario. Both Concepts A and B included improvement projects of rumble strips, lane expansions, medians, roundabouts, and signals. The differences between Concepts A and B were attributed to the conditions of widening, medians, and the number of lanes within the proposed roundabouts. For Concept A, the proposed improvements are anticipated to reduce the number of crashes by 22 percent (90 fewer crashes) and Concept B proposed improvements are anticipated to reduce the number of crashes by 24 percent (98 fewer crashes), when compared to the historical crash data. Both concepts project a decrease in crashes compared to the baseline scenario, indicating that the concepts have a greater potential in reducing crashes than the baseline improvements.

Route 15

Safety and Operations Study from Whites Ferry Road to the Maryland State Line



Table 9: Concept A Crash Analysis

Concept	Roadway Segment/Intersection		No-Build		Concept A		Total Crashes		
	From	To	Improvements	CMF	Improvements	CMF	Existing	No-Build	Concept A
A	Whites Ferry Road	Rocky Meadow Lane	Centerline Rumble Strips	0.86	4 lanes, median	0.712	51	44	36
	Rocky Meadow Lane	Montresor Road	Rumble Strip in Centerline AND Edge Line	0.82	4 lanes, median	0.712	3	3	2
					Edge Line Rumble Strips	0.84			
	Montresor Road	Lucketts Road/Stumptown Road	Rumble Strip in Centerline AND Edge Line	0.82	2 lanes, median	0.82	85	84	72
					Edge Line Rumble Strips	0.74			
	Lucketts Road/Stumptown Road	Black Hops Lane	Centerline Rumble Strips	0.86	2 lanes, median	0.82	8	7	7
	Black Hops Lane	Chestnut Hill Lane/St Clair Lane	Rumble Strip in Centerline AND Edge Line	0.86	2 lanes, median	0.82	51	49	36
	Chestnut Hill Lane/St Clair Lane	MD state line	Centerline Rumble Strips	0.86	2 lanes	-	60	52	52
	Route 15 and Montresor Road		-	-	Two-lane Roundabout	0.33	7	7	2
	Route 15 and Spinks Ferry Road		-	-	Single-lane Roundabout	0.29	13	13	4
	Route 15 and Realigned Lucketts Road		-	-	Single-lane Roundabout	0.52	28	28	15
	Route 15 and Lovettsville Road		-	-	Signal	0.56	19	19	11
	Route 15 and Existing Lucketts Road		-	-	-	-	5	5	5
	Other Intersections/Driveways		-	-	-	-	85	85	85
Total Crashes							415	396	325

Table 10: Concept B Crash Analysis

Concept	Roadway Segment/Intersection		No-Build		Concept B		Total Crashes		
	From	To	Improvements	CMF	Improvements	CMF	Existing	No-Build	Concept B
B	Whites Ferry Road	Rocky Meadow Lane	Centerline Rumble Strips	0.86	4 lanes, median	0.712	51	44	36
	Rocky Meadow Lane	Lucketts Road/Stumptown Road	Rumble Strip in Centerline AND Edge Line	0.82	4 lanes, median	0.712	88	87	53
					Edge Line Rumble Strips	0.84			
	Lucketts Road/Stumptown Road	Black Hops Lane	Centerline Rumble Strips	0.86	2 lanes, median	0.82	8	7	7
	Black Hops Lane	Chestnut Hill Lane/St Clair Lane	Centerline Rumble Strips	0.86	2 lanes, median	0.82	51	49	36
	Chestnut Hill Lane/St Clair Lane	MD state line	Centerline Rumble Strips	0.86	2 lanes	-	60	52	52
	Route 15 and Montresor Road		-	-	Two-lane Roundabout	0.33	7	7	2
	Route 15 and Spinks Ferry Road		-	-	Two-lane Roundabout	0.33	13	13	4
	Route 15 and Realigned Lucketts Road		-	-	Two-lane Roundabout	0.955	28	28	27
	Route 15 and Lovettsville Road		-	-	Signal	0.56	19	19	11
	Route 15 and Existing Lucketts Road		-	-	-	-	5	5	5
	Other Intersections/Driveways		-	-	-	-	85	85	85
	Total Crashes							415	396



Concept A and Concept B Cost Estimates

Preliminary cost estimates were created for both Concept A and Concept B. Each of the concepts were estimated utilizing VDOT's Project Cost Estimating System (PCES) tool. The following is a list of improvements that were assumed for each concept:

Concept A:

- Two-lane median divided roadway from Montresor Road north to St. Clair Lane
- Western Lucketts bypass as a two-lane median divided roadway
- Single-lane roundabout at the US Route 15 and Spinks Ferry Road/realigned Newvalley Church Road intersection
- Single-lane roundabout at the US Route 15 bypass and Stumptown Road intersection
- Additional shoulder width along US Route 15 north of St. Clair Lane to the Maryland state line
- New traffic signal and northbound left-turn lane at the US Route 15 and Lovettsville Road intersection

Concept B:

- Four-lane median divided roadway from Montresor Road north to the two-lane roundabout along the Lucketts bypass and Stumptown Road intersection.
- Western Lucketts bypass as a four-lane and two-lane median divided roadway
- Two-lane median divided roadway north from the two-lane roundabout along the Lucketts bypass and Stumptown Road intersection to St. Clair Lane
- Traffic calming improvements in the Village of Lucketts
- Two-lane roundabout at the US Route 15 and Spinks Ferry Road/realigned Newvalley Church Road intersection
- Additional shoulder width along US Route 15 north of St. Clair Lane to the Maryland state line
- New traffic signal and northbound left-turn lane at the US Route 15 and Lovettsville Road intersection

General:

- Both concepts assume a full 8-foot-wide paved shoulder on each side to be conservative along with a Shared Use Path which extends from Montresor Road to the Village of Lucketts
- Right of Way was assumed for each concept based on the conceptual cross section width versus the average existing right of way along the corridor
- Utility costs were estimated based on the existing overhead utilities observed during site visits and desktop review

Route 15

Safety and Operations Study from Whites Ferry Road to the Maryland State Line



- Assumed a construction advertisement year of 2024 and assumed completion of 2027
- Assumed 2% per year inflation

Table 11 depicts the preliminary opinion of probable cost for both concepts and is split by each phase of the project process. These estimates were formed utilizing the VDOT PCES tool. It is standard DTCL practice to utilize a 30% contingency and 3% allocation for staff charges on locally funded projects and a 40% contingency on State funded projects. To be conservative a 40% contingency was applied to the PCES tool estimates.

Table 11: Preliminary Opinion of Probable Costs

US Route 15 Preliminary Opinion of Probable Costs		
Project Phase	Concept A	Concept B
Preliminary Engineering	\$ 8,900,000	\$ 12,300,000
Right of Way and Utilities	\$ 34,300,000	\$ 35,800,000
Construction	\$ 77,400,000	\$ 107,100,000
Contingency (40%)	\$ 48,200,000	\$ 62,100,000
Total Project Cost	\$ 168,800,000	\$ 217,300,000

Overall there is an approximate \$48 million difference between Concept A and B. These costs are for planning purposes only; the costs will be further refined as the project moves through design and more detailed features can be determined.

VDOT SMART SCALE Estimate:

Concept B was also reviewed and estimated by VDOT as a part of a 2018 SMART SCALE application. The VDOT SMART SCALE cost estimate utilized the same list of improvements as the PCES preliminary opinion of probable cost and included the following list of assumptions into their estimate:

- Potential bridge improvement costs
- A contingency of 30% was applied to the raw construction cost by VDOT to account for any unknowns that may come up during the design or construction of the project.
- VDOT also included inflation based on a future advertisement date.
- Wetland/stream mitigation

Table 12 depicts the VDOT SMART SCALE cost estimate split by each phase of the project process.



Table 12: VDOT SMART SCALE Cost Estimate for Concept B

Project Phase	Cost
Preliminary Engineering	\$ 23,500,000
Right of Way and Utilities	\$ 47,000,000
Construction	\$ 234,100,000
Total Project Cost	\$ 304,600,000

5. Future Process

The technical process for a project to reach implementation from the completion of a study to construction typically uses the following steps. Upon completion of the Safety and Operation Study and the presentation to the Board of Supervisors, the Board must approve improvements (Concept A, Concept B, or some other set of improvements) to move forward. Depending on the improvements directed by the Board, this may require a Comprehensive Plan Amendment (CPAM) to allow further widening along US Route 15 north of Montresor Road and potentially a new Lucketts bypass.

Should a CPAM be approved, Loudoun County DTIC would then begin the procurement process for a design consultant to complete design of the recommended improvements as well as a potential environmental study.

Public involvement for the design and would include further public engagement and a possible task force to review context-sensitive design features. The task force may have the ability to comment and recommend alterations to the design in order to ensure context-sensitive solutions are being implemented and the rural and historic nature of the roadway is being appropriately considered. Along with the design task force, the public would also have the ability to comment at three different phases of the design: 30%, 60%, and 90% design phase submissions. During the ROW and Utilities phase of the project, any affected landowners would likely begin discussions with the County to ensure mitigation efforts are implemented and proper assessments for potential land and easement needs are completed. Once approved, utility contractors would begin moving facilities to clear the area for proposed project improvements.

Upon approval, after the design and environmental processes are complete and all the funding is secured, the County would move forward with the procurement of a contractor to construct the improvements. A pre-construction meeting would likely be held with the public to voice any concerns prior to commencing construction.