



PROJECT PIPELINE

**SA-23-08: Montgomery County
ROUTE 114 (PEPPERS FERRY ROAD)**



Route 114 (Peppers Ferry Road) – From Shamrock Circle to Route 1286 (Rolling Hills Drive)

Final Report

July 2024

Prepared for



Prepared by



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Chapter 1:

Needs Evaluation and Diagnosis

Introduction:

Project Pipeline is a performance-based planning program to identify cost-effective solutions to multimodal transportation needs in Virginia. Through this planning process, projects and solutions may be considered for funding through programs, including SMART SCALE, revenue sharing, interstate funding, and others. Visit the Project Pipeline webpage for additional information: vapipeline.org.

This study focuses on concepts targeting identified needs including congestion mitigation, safety improvement, pedestrian and bicycle infrastructure along the corridor, and transit access. The objectives of Project Pipeline are shown below in **Figure 1**.










Figure 1: Project Pipeline Objectives

Background

The Office of Intermodal Planning and Investment (OIPI) prepared the VTrans Virginia's statewide transportation plan for the Commonwealth Transportation Board (CTB) in which mid-term needs (0 - 10 years) were identified for different categories listed in **Table 1**. This study focuses on addressing needs identified in VTrans, and those previously identified by the localities.

Table 1: List of VTrans Needs

VTrans Needs	
	Safety Improvement
	Transportation Demand Management
	Congestion Mitigation
	Pedestrian Safety Improvement
	Transit Access
	Capacity Preservation
	Bicycle Access

Methodology

The study is broken down into three phases. Phase I is the problem diagnosis and brainstorming alternatives, Phase II is the alternative evaluation and sketch level analysis, and Phase III is the investment strategy and cost estimates. Details on methods and solutions for each study phase are outlined below in **Figure 2**.

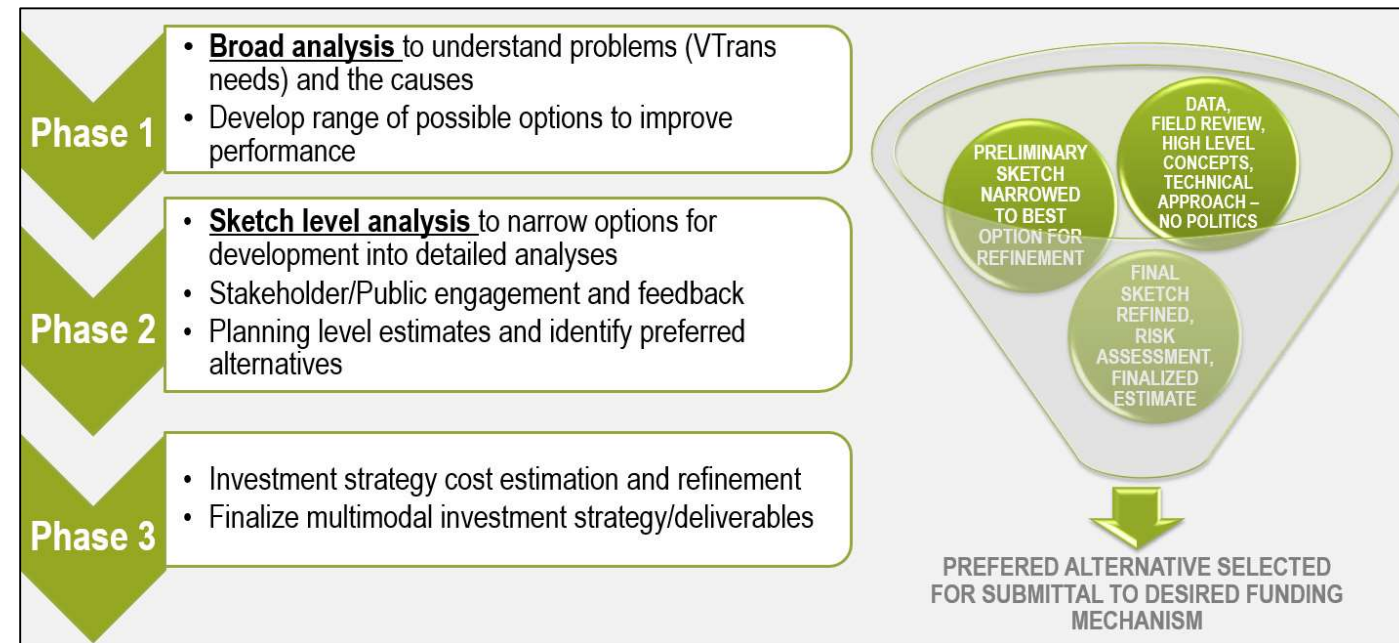


Figure 2: Study Phase Methods and Solutions

The study team is broken down into Technical Teams to improve the efficiency and effectiveness of the study process through extensive collaboration and synchronicity. To achieve the intended efficiency and consistency, it is generally expected that the same Technical Team will be responsible for all studies within a district for the duration of the cycle.

Each Technical Team will include certain leadership and technical roles that will be needed for each study, including the following:

- VDOT District Planning Project Manager – Provides leadership and direction; has overall responsibility for the study progress and outcomes.
- Consultant Team Manager – Provides direct support to the VDOT District Planning Project Manager; coordinates the work and technical efforts of consultant staff.

- District Planning Staff – Provides technical input regarding capacity, forecasting, land use, multimodal, and planning.
- District Traffic Engineering Staff – Provide technical input regarding safety and operations.
- Consultant Team Technical Staff – Provides multidisciplinary input, analysis, technical support, and expertise for the identified VTrans need categories.

A sample organizational chart, including the roles, responsibilities, and structure of a Technical Team is shown below in **Figure 3**.



Figure 3: Structure of a Technical Team

Additional team members and roles should be considered where appropriate. Certain roles may not be necessary for all studies. However, the following roles may contribute to study success during different stages and/or for different types of study areas, as shown in **Table 2**.

Table 2. Roles and Responsibilities for the Technical Team and SWGs

Phase	Responsibility	Role					
		OIPI/Program Support	District	Consultant	DRPT	Locality	VDOT Central Office
Study Selection & Initiation	Identify Study Needs and Priorities		X		X	X	
	Coordinate with CTB Members	X	X				
	Approve final study locations	X					
	Data Collection Planning		X				
	Data Dashboards	X					
	Assign Consultants & Issue Consultant Task Orders	X					X
Phase 1	Initiate Study & Hold Kickoff Meeting		X	X	X		
	Prepare Framework Document		X	X			
	Approve Framework Document		X		X	X	
	Provide Existing Data		X		X	X	
	Collect New Data			X			
	Coordinate with local leaders					X	
	Conduct & Support Initial Public Outreach (if desired)	X	X	X		X	X
	Diagnose Existing Needs			X			
	Brainstorm & Develop Preliminary Alternatives		X	X	X		X
	Present Diagnosis & Alternatives to SWG			X			
	Provide Feedback and Input on Analysis & Alternatives					X	
	Develop Phase 2 Scope of Work			X			
	Approve Scope & Issue Consultant Task Orders	X					X
Phase 2	Conduct Detailed Analysis of Alternatives			X			
	Develop Refinements to Alternatives		X	X	X		X
	Present Alternative Analysis Findings to SWG		X	X			
	Provide Feedback on Alternatives				X	X	X
	Prepare Planning Level Cost Estimates			X			
	Conduct & Support Public Outreach on Alternatives	X	X	X		X	
	Concurrence on Preferred Alternative(s)		X		X	X	X
	Develop Phase 3 Scope of Work			X			
Approve Scope & Issue Consultant Task Orders	X					X	
Phase 3	Conduct Alternative Risk Assessment		X	X			X
	Develop Practical Concept Design & Address Risk of Preferred Alternative		X	X			
	Prepare Cost Estimate with Workbook			X			
	Document Assumptions & Basis of Cost			X			
	Review & Concur with Concept & Estimate		X		X		X
Investment, Application, & Closeout	Prepare Final Study Deliverables, Design Packages, and Estimates			X			
	Apply for Funding of Preferred Alternative(s)				X	X	
	Application Support	X	X	X			
	Submit and Documentation and All Related Work			X			
	Review and approve final deliverables for public visibility		X		X		
Program Closeout and Summary	X						

Study Area

The Peppers Ferry Road (Route 114) study corridor from Shamrock Circle to Rolling Hills Drive (Route 1286) is located in Montgomery County, Virginia. Peppers Ferry Road is classified as a minor arterial with a posted speed limit of 45 MPH through the entire study corridor. A map detailing the locations of the study area corridor is shown below in **Figure 4**.

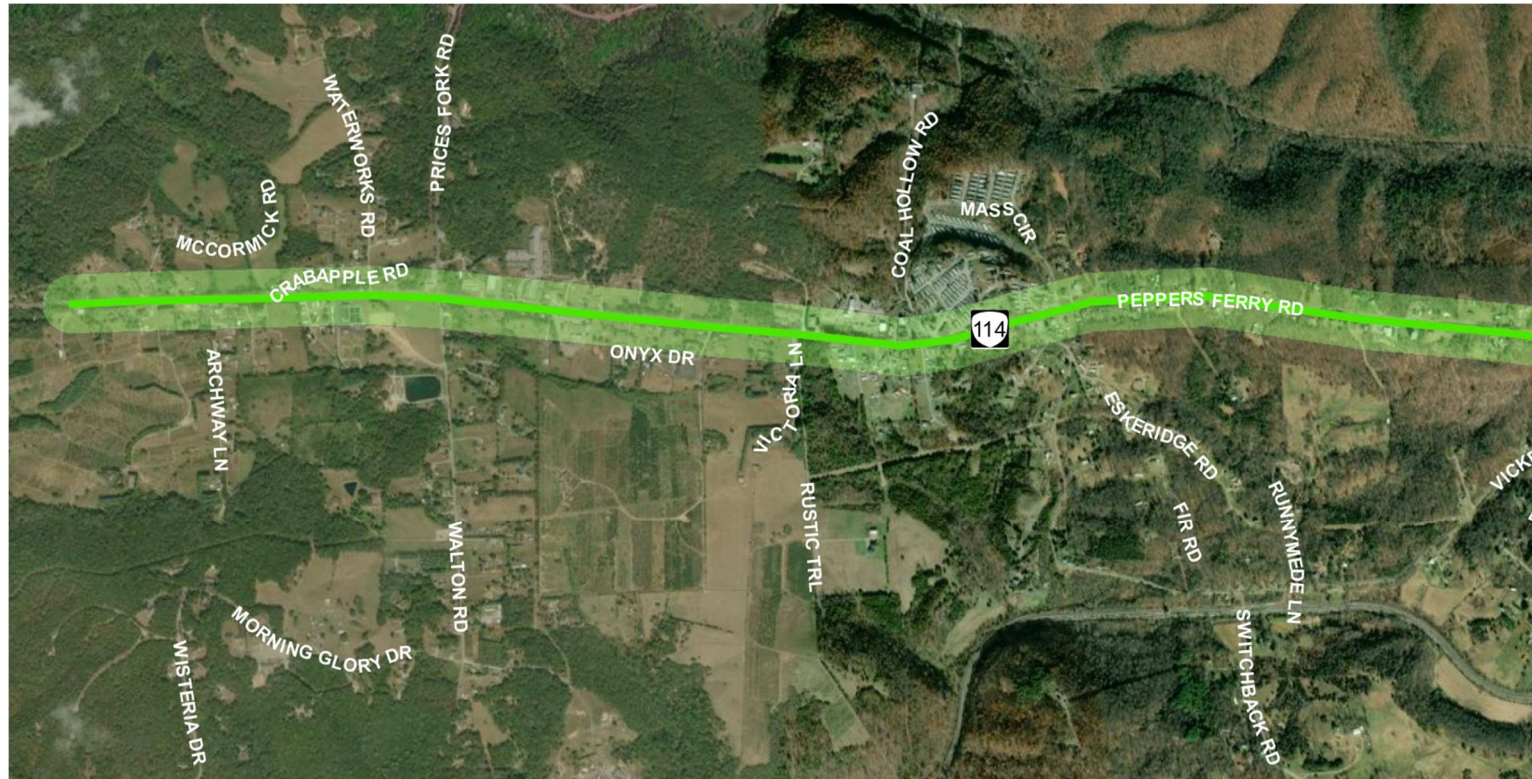


Figure 4: Study Area Map

VTrans is Virginia’s statewide transportation plan. It identifies and prioritizes locations with transportation needs using data-informed transparent processes. The policy for identifying VTrans mid-term needs establishes multimodal need categories that correspond to the Commonwealth Transportation Board-adopted VTrans visions, goals, and objectives.¹ Each need category has one or more performance measures and thresholds to identify one or more needs. Visit the VTrans policy guide for additional information: https://vtrans.org/resources/VTrans_Policy_Guide_v6.pdf.

The mid-term needs, as identified in VTrans for the Peppers Ferry Road study corridor, were ‘Very High’ for Safety Improvement, and ‘Low’ for Bicycle Access, Transit Access, and Transportation Demand Management, as presented in **Table 3**.

Table 3: VTrans Needs in Study Area

VTRANS IDENTIFIED NEEDS	PRIORITIES
Bicycle Access	Low
Capacity Preservation	None
Congestion Mitigation	None
IEDA (UDA) Access	None
Pedestrian Access	None
Safety Improvement	Very High
Pedestrian Safety Improvement	None
Reliability	None
Rail on-time Performance	None
Transit Access	Low
Transit Access for Equity Emphasis Areas	None
Transportation Demand Management	Low

These mid-term needs, identified in VTrans, are prioritized on a tier from 1 to 4, with 1 being the most critical and 4 being the least critical. The segments ranked as “Priority 1” represent those with multiple categories identified as high in need. **Figure 5** presents a map of the study area with the 2019 VTrans mid-term needs prioritized for district construction. **Figure 6** and **Figure 7** presents an overview of this project.

¹ Commonwealth Transportation Board, Actions to Approve the 2019 VTrans Vision, Goals, Objectives, Guiding Principles and the 2019 Mid-term Needs Identification Methodology and Accept the 2019 Mid-term Needs, January 15, 2020

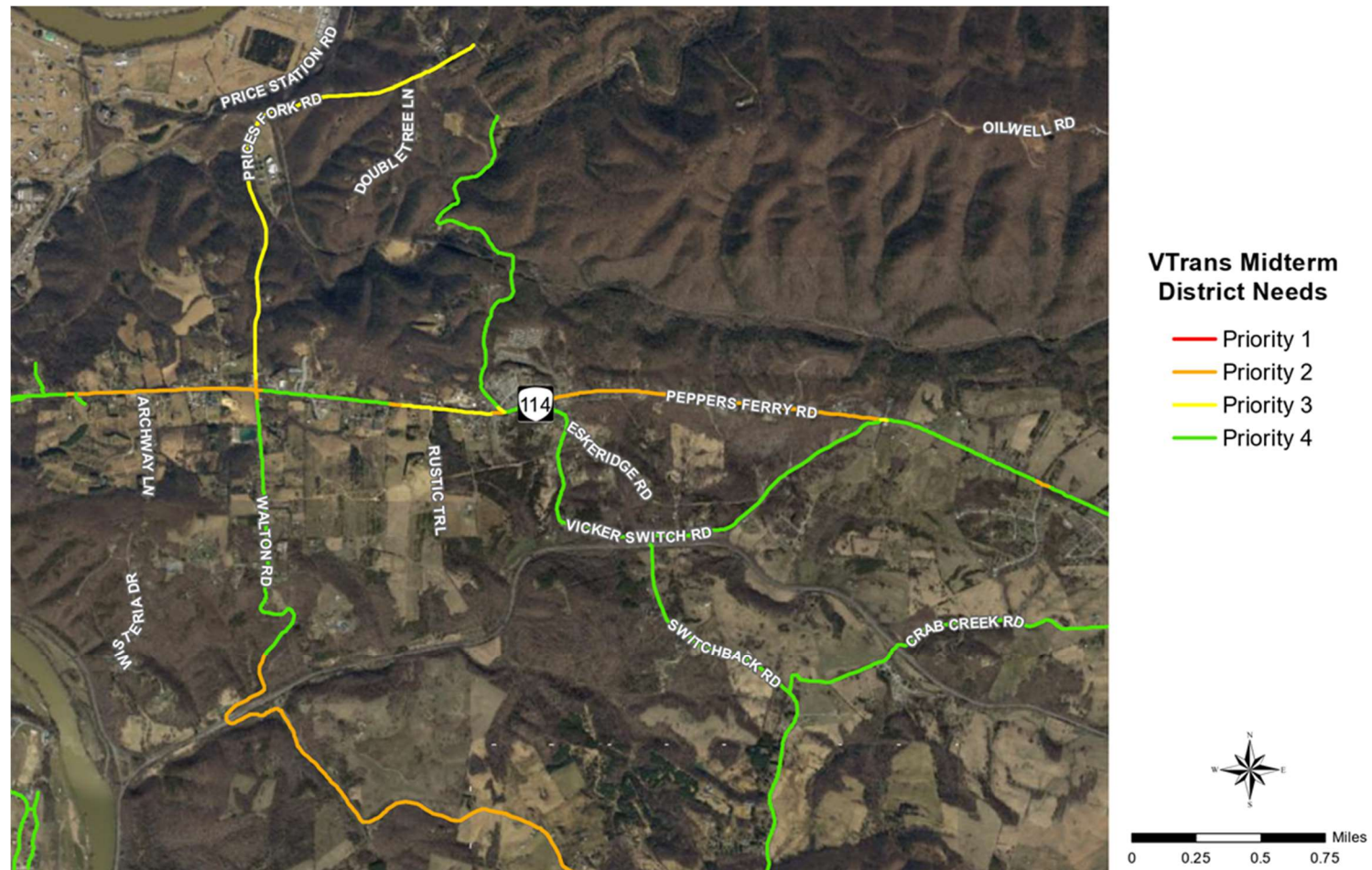


Figure 5: 2019 VTrans Prioritized Mid-term Needs in the Study Area



Purpose, Goals, & Objectives

The purpose of this study is to identify recommendations to improve safety along the Route 114 (Peppers Ferry Road) corridor.

Identify cost-effective improvement alternatives that address the identified safety needs.

Existing Issues in the Study Area

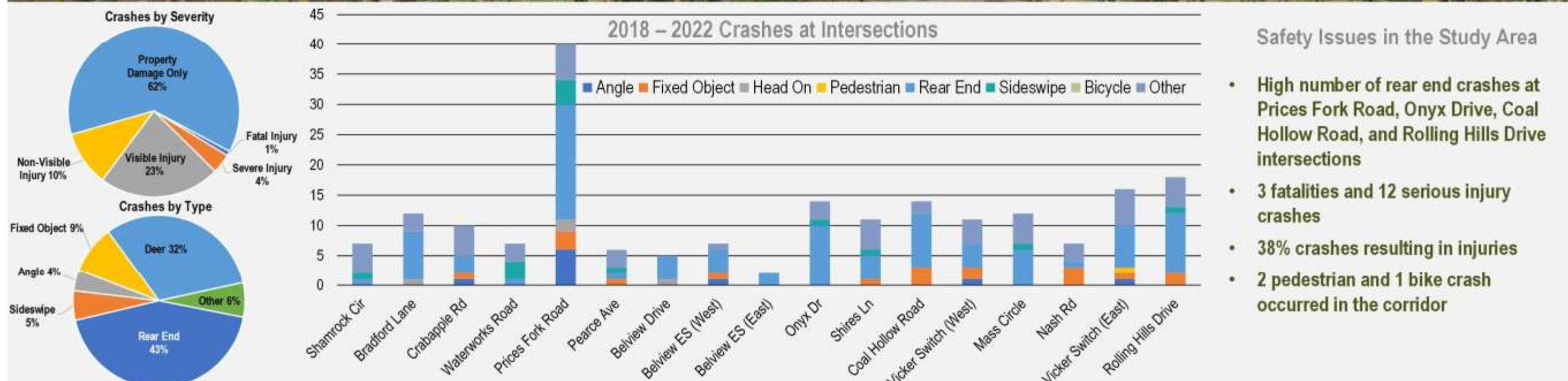
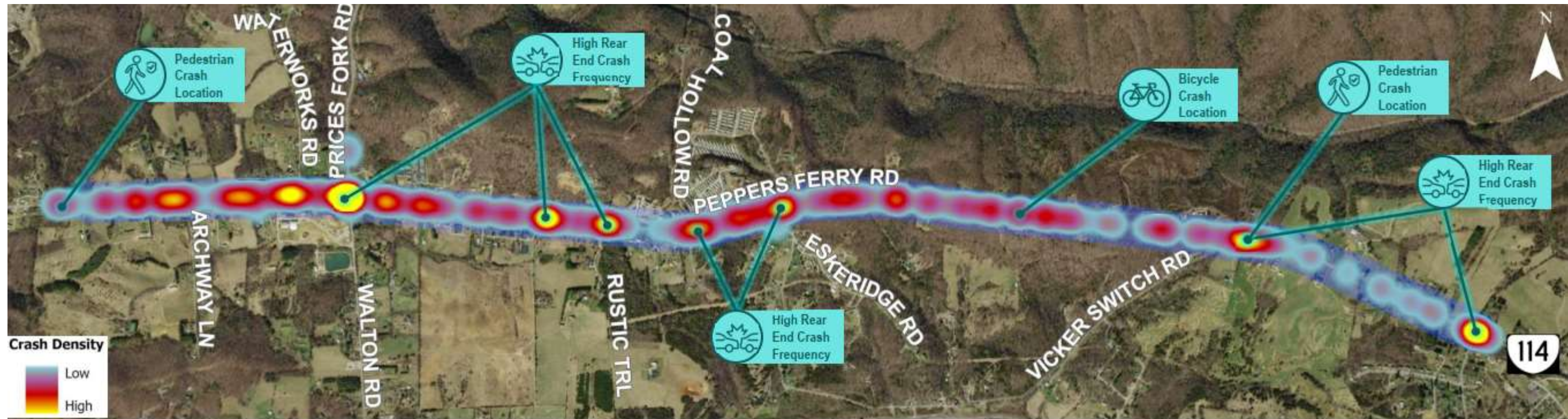
- Lack of left-turn lanes at intersections throughout the corridor
- Vertical curves limit sight distance on approaches to intersections
- Lack of pedestrian facilities along the corridor

VTrans Needs	
NEED	PRIORITY
Safety Improvement	Very High

Study Summary

VDOT District	Salem
Locality	Montgomery County
Length	3.83 miles
Study Limits	From Shamrock Circle to Rolling Hills Drive
Functional Classification	Minor arterial
Speed Limit	45 MPH

Figure 6: Project Overview



- Safety Issues in the Study Area**
- High number of rear end crashes at Prices Fork Road, Onyx Drive, Coal Hollow Road, and Rolling Hills Drive intersections
 - 3 fatalities and 12 serious injury crashes
 - 38% crashes resulting in injuries
 - 2 pedestrian and 1 bike crash occurred in the corridor

Figure 7: Safety Overview

FHWA Screening Tool for Equity Analysis of Projects (STEAP)

The Federal Highway (FHWA) Screening for Equity Analysis of Projects (STEAP) Tool was reviewed for the study area and surrounding locations. The tool allows you to compare the population to evaluate the metrics and needs of the study area to a city, town, county, or the State of Virginia. The tool is used to elevate consciousness of equity desires in the selection of alternatives. The data source used for the analysis was the American Community Survey 2016 – 2020 and a 0.5-mile radius was used for the analysis buffer. The results of the STEAP Tool analysis are shown in **Figures 8-12** and presented below:

- There is a high personal vehicle ownership, with 38% of households owning three or more vehicles, while 0% of the study area does not have a personal vehicle as shown in **Figure 8**.
- The majority of households contain two members at 42% and 5% has more than six members of the household as shown in **Figure 9**.
- Of all the households in the study area, 50% of households make at least \$75,000 in annual income. However, only 1% of households make less than \$15,000 as shown in **Figure 10**.
- When compared to the State of Virginia and Montgomery County, the study area has a lower average of households without computer access at 2% as shown in **Figure 11**.
- The study area has a higher percentage of veterans (13%) and people with disabilities (75%) compared to Montgomery County, as shown in **Figure 12**.

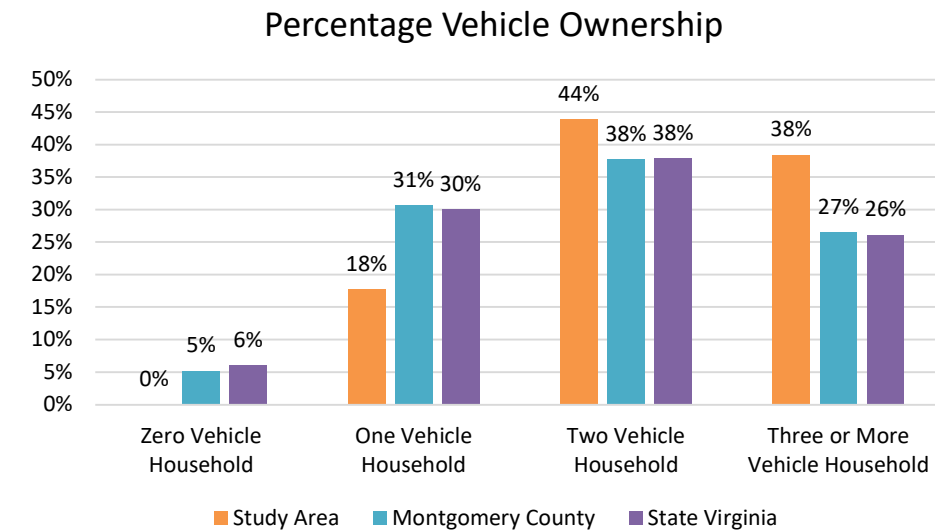


Figure 8: STEAP Tool Analysis Vehicle Ownership

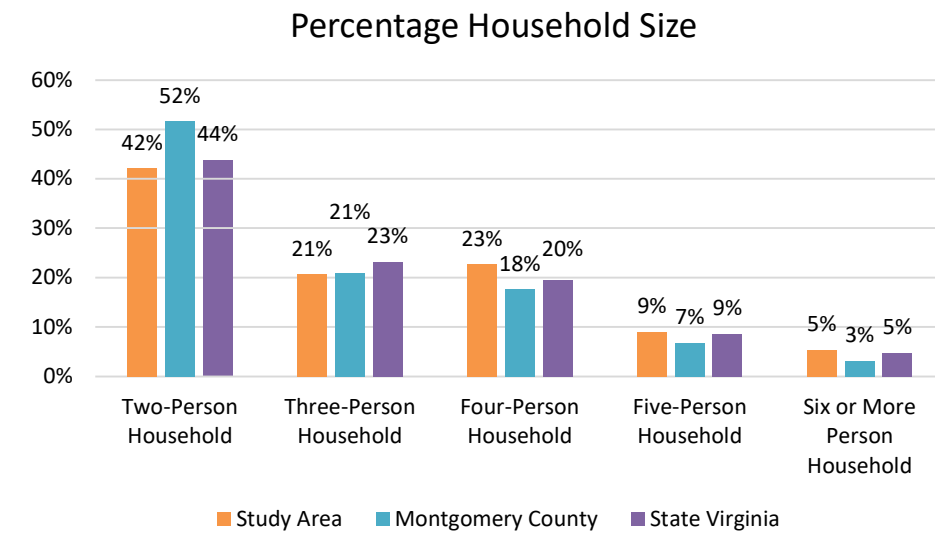


Figure 9: STEAP Tool Analysis Household Size

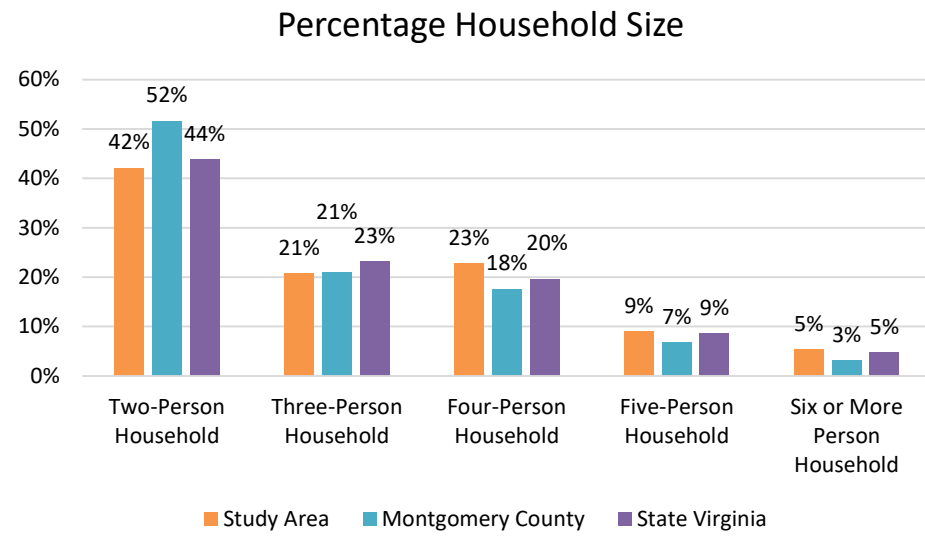


Figure 10: STEAP Tool Analysis Household Income

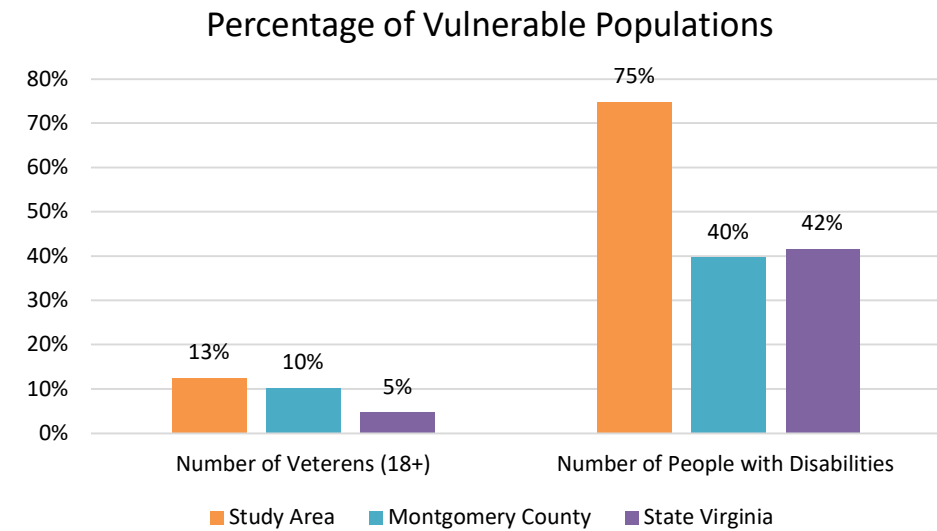


Figure 12: STEAP Tool Analysis Household Computer Access

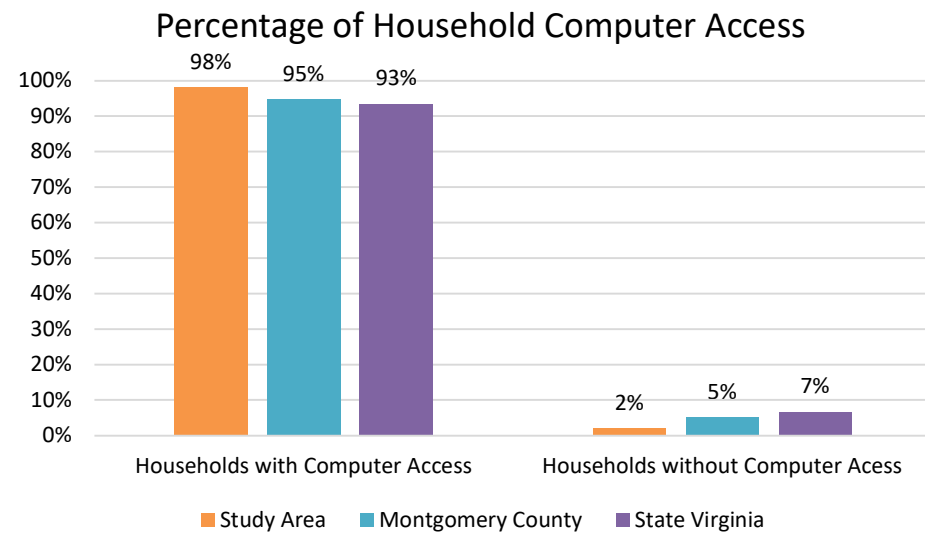


Figure 11: STEAP Tool Analysis Household Computer Access

Funded Projects

UPC 120697 – Prices Fork/Peppers Ferry Turn Lane Improvements – PE Underway

Construction of these improvements is projected to begin in FY 2026. The improvements are detailed below and depicted in Figure 13.

- Extend existing left-turn lane along eastbound Peppers Ferry Road
- Provide new right-turn lane along southbound Prices Fork Road

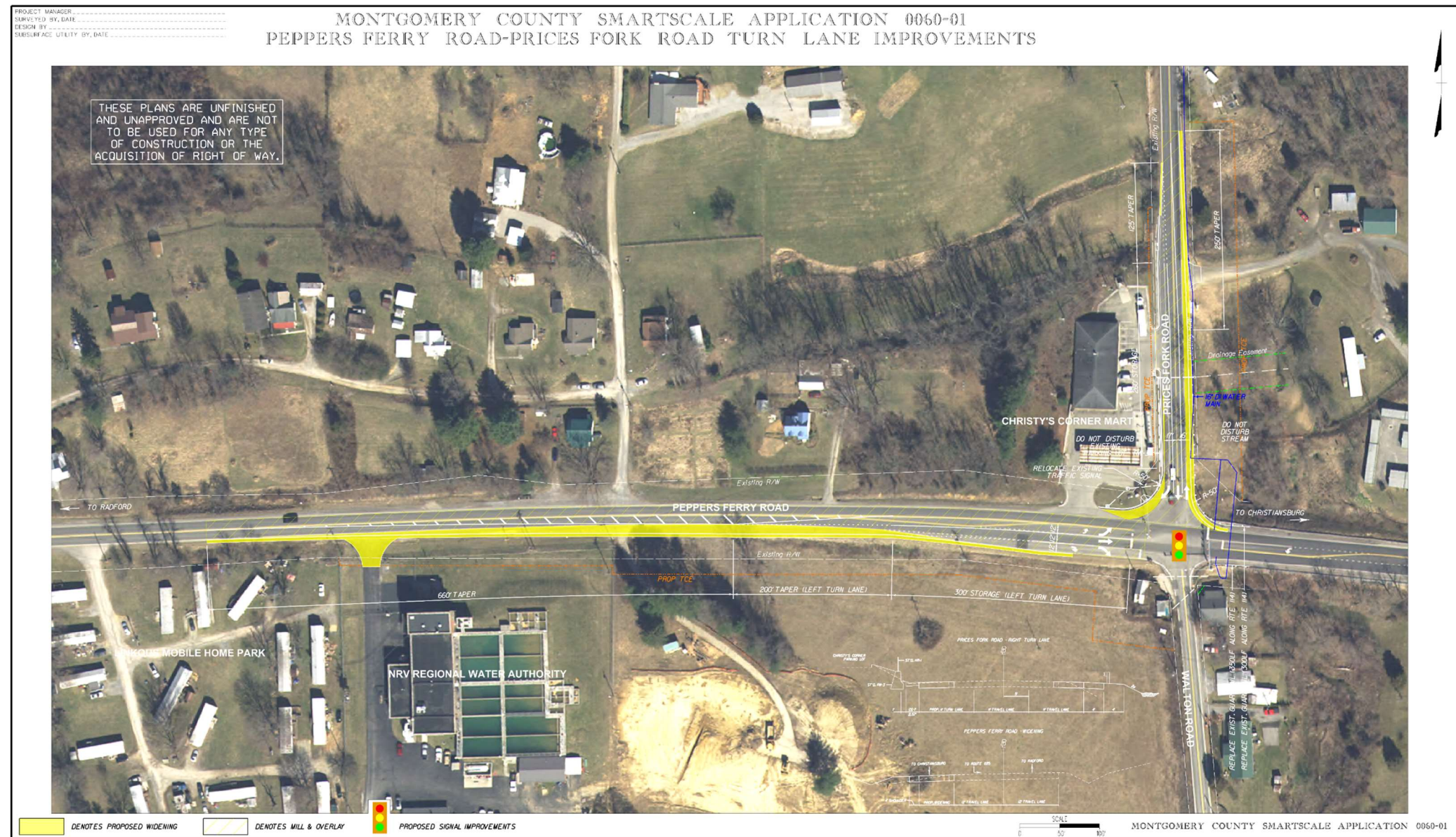


Figure 13: UPC 120697 Proposed Improvements

Phase 1 Existing Conditions Public Outreach

Initial public outreach was conducted to inform the public of the study efforts and goals and solicit feedback on what the public's priorities and perceptions of the corridor are in the evaluation of potential alternatives. The survey was conducted through PublicInput.com and there were 603 participants. The detailed summary of the public survey is included in **Appendix A**.

The survey shows that safety is the major need of the corridor as shown in **Figure 14**.

Project Pipeline Peppers Ferry Road Study (SA-23-08)

Project Engagement			
VIEWS	PARTICIPANTS	RESPONSES	COMMENTS
2,055	603	15,063	986

Safety has been identified as the need for this study. Do you agree with this initial assessment?

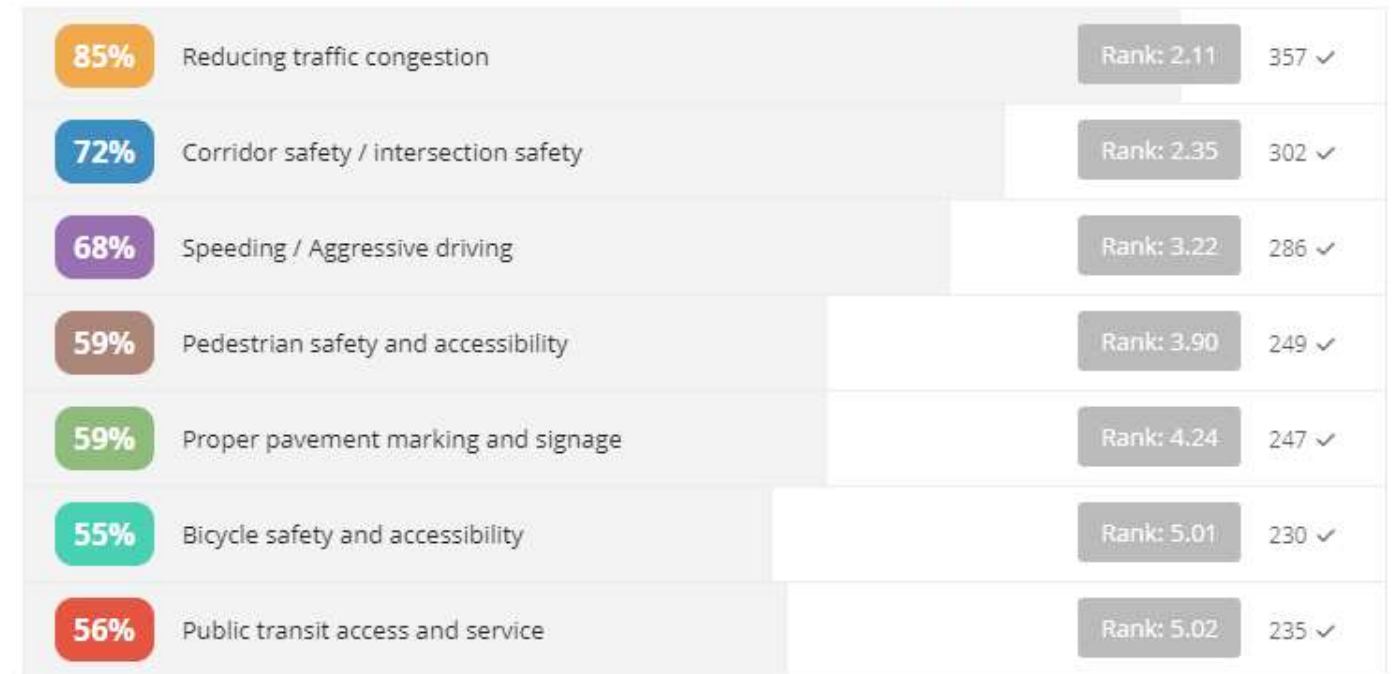


588 Respondents

Figure 14: Public Input Survey Results

Figure 15 shows the most important issues along the study corridor including reducing traffic congestion, corridor/intersection safety, speeding/aggressive driving, pedestrian safety and accessibility, and proper pavement markings and signage.

Rank what is the most important issue to you along the study area.



419 Respondents

Figure 15: Public Input Survey Results

The notable comments from the survey responses are summarized below:

- Roadway congestion caused by new development in the area
- Problems with visibility due to vertical/horizontal curves and vegetation
- Requests for additional lanes/turn lanes
- Concerns with pedestrian/bicyclist accessibility
- Issues with vehicles speeding or traveling far below the speed limit
- Peppers Ferry Rd/Prices Fork Rd intersection heavily congested
- Lack of proper lighting

Traffic Operations and Accessibility:

The initial traffic operational analysis was performed using Synchro 11 software for all study intersections along the Route 114 (Peppers Ferry Road) corridor. Inputs and analysis methodologies are consistent with the VDOT Traffic Operations and Safety Analysis Manual (TOSAM) guidelines. Both AM and PM peak hour analyses were performed for the existing year 2023 for the 2050 design year under no build and build conditions.

Traffic Data

Turning movement counts were collected in April 2023 by Peggy Malone and Associates (PMA). Additional turning movement counts were also collected in September 2023 by PMA. The AM and PM weekday peak hours were identified as 7:15 - 8:15 AM and 4:45 – 5:45 PM, respectively. Existing AM and PM peak hour volumes are shown in Error! Reference source not found.. Raw traffic count data is provided in **Appendix B**.

Measures of Effectiveness

There are many measures of effectiveness (MOE) in traffic operations analysis to quantify operational and safety objectives and provide a basis for evaluating the performance of a transportation network. Several MOEs for intersection analyses can be reported from Synchro/SimTraffic. For this study, guidance for reporting MOEs for signalized and unsignalized intersections was obtained from Chapter 4 of the VDOT TOSAM Version 2.0. A summary of the MOEs evaluated for the study intersections is presented below:

- Maximum queue Length from SimTraffic (measured in feet – ft)
- Level of service (LOS)
- Control Delay (measured in seconds per vehicle – sec/veh)

Future Traffic Forecasting

In order to develop volume forecasts for the future 2050 design year volumes, background linear traffic growth rates were developed in conjunction with VDOT Salem District Planning using the Statewide Planning System data and projections for the study area. **Table 4** presents the annual linear growth rates along Peppers Ferry Road and other study area roadways. The growth rates were applied to the existing traffic volumes to develop the 2050 design year traffic volumes. Future traffic volumes were re-balanced as necessary through the study area. 2050 design year traffic volumes are shown in **Figure 17**.

Table 4: Growth Rate Summary

Facility	From	To	Pathways for Planning Data				Recommended Growth Rate
			Existing ADT		2050 ADT	Linear Annual Growth Rate	
			Year	ADT			
Peppers Ferry Road	West of Prices Fork Road	Vicker Switch Road East	2022	11147	12708	0.5%	0.5%
Peppers Ferry Road	Vicker Switch Road East	Rolling Hills Drive	2022	11875	13538	0.5%	0.5%
Walton Road	Morning Glory Drive	Peppers Ferry Road	2022	713	813	0.5%	0.5%
Prices Fork Road	Peppers Ferry Road	Doubletree Lane	2019	6238	7205	0.5%	0.5%
Jade Drive	Peppers Ferry Road	Onyx Drive	2013	90	107	0.5%	0.5%
Onyx Drive	Jade Drive	Peppers Ferry Road	2019	110	369	6.4%	0.5%
Coal Hollow Road	Mass Circle	Peppers Ferry Road	2013	160	415	4.3%	0.5%
Vicker Switch Road	Peppers Ferry Road	Maury Lane	2022	282	321	0.5%	0.5%
Vicker Switch Road	Peppers Ferry Road	Easy Street	2022	282	321	0.5%	0.5%
Rolling Hills Drive	Plateau Drive	Peppers Ferry Road	2019	350	404	0.5%	0.5%

Existing and No Build Traffic Operations Analysis Results

Table 5 depicts queue lengths, Levels of Service, and delays for intersections within the study area along Peppers Ferry Road, for the AM and PM peak hours under 2023 existing conditions. During the peak hours, the signalized intersection at Prices Fork Road/Walton Road operates at LOS C in the AM peak hour and LOS D in the PM peak hour, with all movements and approaches operating at LOS E or better.

Turning movements at unsignalized intersections also operate at LOS C or better during the AM peak hour and at LOS D or better during the PM peak hour. Lengthy queues in the westbound along Prices Fork Road at the traffic signal with Prices Fork Road/Walton Road are common during the PM peak hour, with queues occasionally extending to Belview Elementary or further. Detailed analysis results for both signalized and unsignalized intersections are contained in **Appendix C**.

The 2050 No Build analysis has been included for evaluation as a benchmark for the comparison of future conditions and impacts. The No Build analysis retains the same geometry as existing conditions with the exception of the VDOT turn lane and signal improvements at the Peppers Ferry at Prices Fork Road/Walton Road signalized intersection and the turn lane improvements at the Rolling Hills Drive intersection related to a proposed residential development.

Table 6 depicts queue lengths, Levels of Service, and delays for intersections along Peppers Ferry Road for the AM and PM peak hours for 2050 No Build conditions. By 2050, intersection delays and queues are projected to generally increase throughout the study area, with worsening levels of service. During the AM and PM peak hours, the signalized intersection at Prices Fork Road/Walton Road is projected to operate at LOS C, with all movements projected to continue operating at LOS E or better and generally reduced delays and queues related to the VDOT improvements. Queue spillbacks are projected to continue along westbound Peppers Ferry Road in the PM peak hour as was noted under existing conditions, although queues and delays are projected to be shorter than under existing conditions.

Turning movements at unsignalized intersections also projected to continue operating at LOS D or better, although additional relatively low-volume side street turning movements are projected to degrade to LOS D. Detailed analysis results for both signalized and unsignalized intersections are contained in **Appendix C**.

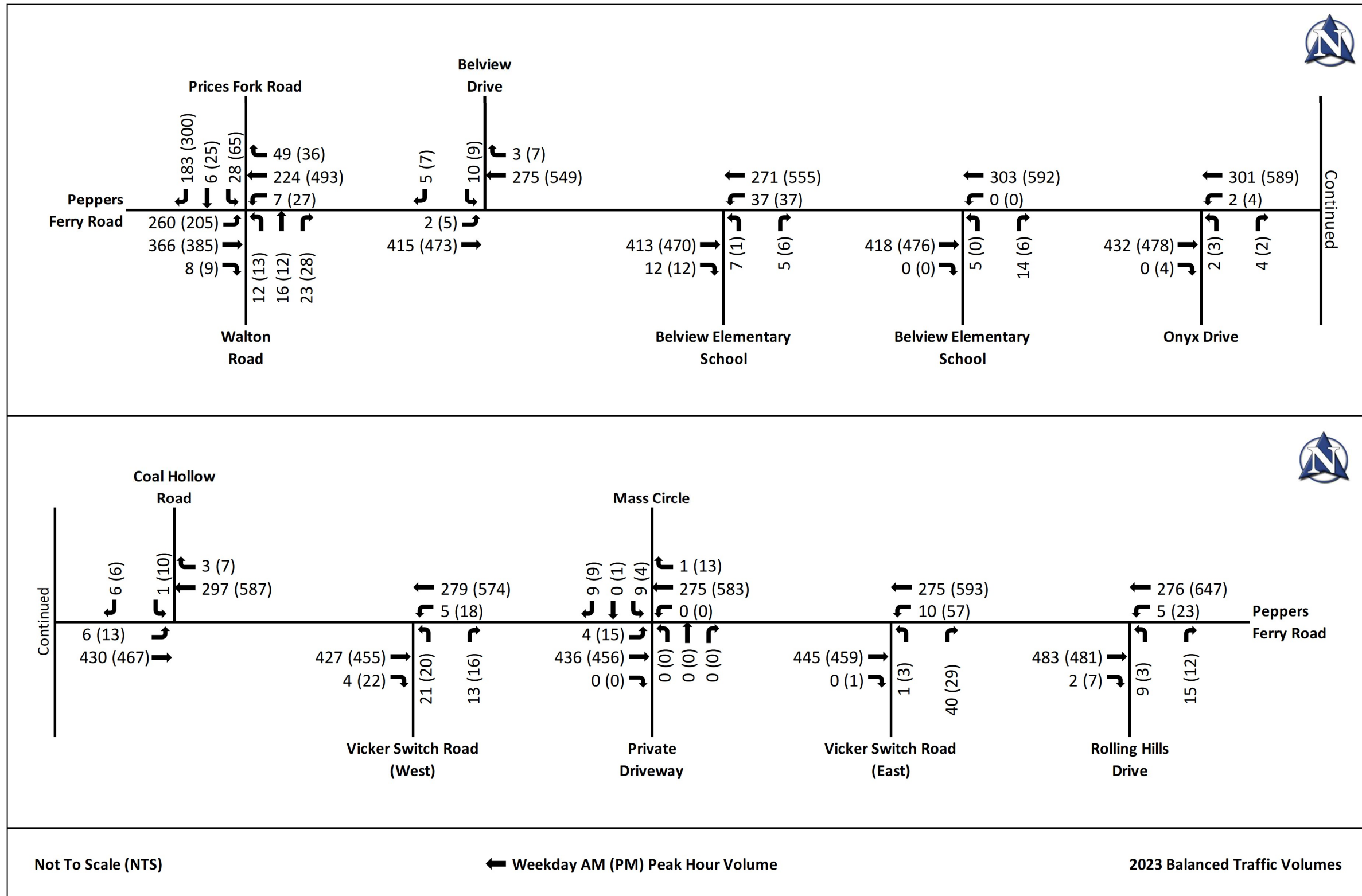


Figure 16: Existing Peak Hour Traffic Volumes

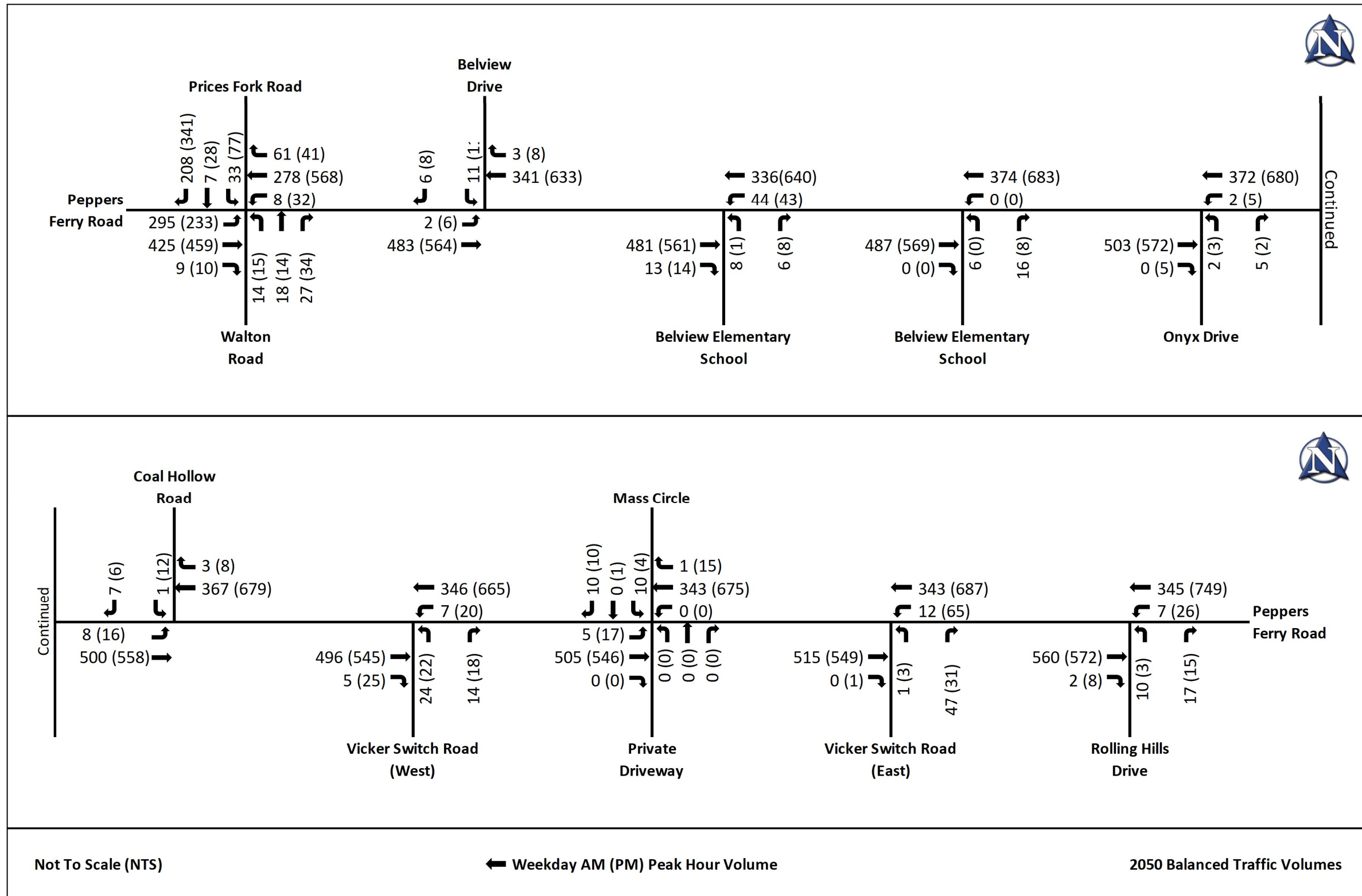


Figure 17: 2050 Peak Hour Traffic Volumes

Table 5: 2023 Existing Conditions Traffic Analysis Results Summary

Intersection	Approach	Movement	Existing AM							Existing PM									
			Queue Length (ft)	Movement LOS	Approach LOS	Overall LOS	Delays (sec)	Approach Delay (sec)	Overall Delay (sec)	Queue Length (ft)	Movement LOS	Approach LOS	Overall LOS	Delays (sec)	Approach Delay (sec)	Overall Delay (sec)			
Peppers Ferry Road & Prices Fork Road Signalized	EB	L	149	B	B	C	16.6	17.2	25.5	149	C	C	D	32.4	29.5	49.1			
		T	286	B			17.6			664	C			28.1					
		R	39	B			13.3			98	C			21.5					
	WB	L	28	B	13.2		132	B		19.9	53.6								
		T-R	211	C	28.3		683	E		55.3									
	NB	L-T-R	88	D	D		45.7	45.7		108	E	E		73.1	73.1				
	SB	L-T-R	161	D	D		41.9	41.9		422	E	E		69.6	69.6				
	Peppers Ferry Road & Belview Drive Unsignalized	EB	L	3	A		-	7.9		-	-	25		A	-		-	8.8	-
T			-	-	-	-		-	-										
WB		T	-	-	-	-		-	91			-	-	-		-			
		R	-	-	-	-		-	12			-	-	-		-			
SB		L-R	32	B	B	13.8		13.8	32			C	C	19.5		19.5			
Peppers Ferry Road & Belview Elementary School Unsignalized	EB	T	-	-	-	-	-	-	-	-	-	-	-	-	-				
		R	-	-		-			-	-			-						
	WB	L	41	A		-			8.5	-			66			A	-	8.7	-
		T	-	-		-			-	-			24			-	-	-	-
	NB	L-R	38	B		B			14.5	14.5			33			B	B	13.4	13.4
Peppers Ferry Road & Belview Elementary School Unsignalized	EB	T	-	-	-	-	-	-	-	-	-	-	-	-	-				
	WB	T	-	-		-			-	-			-			-	-		
	NB	L-R	28	B		B			12.6	12.6			12			B	B	11.7	11.7
Peppers Ferry Road & Onyx Drive Unsignalized	EB	T-R	-	-	-	-	-	-	-	-	-	-	-	-	-				
	WB	L-T	22	A		-			0.1	-			38			A	-	0.1	-
	NB	L-R	22	B		B			12.8	12.8			23			C	C	19.3	19.3
Peppers Ferry Road & Coal Hollow Road Unsignalized	EB	L-T-R	26	A	-	0.2	-	-	88	A	-	-	0.5	-	-				
	WB	L-T-R	0	A		-			0.0	-			0			A	-	0.0	-
	NB	L-T-R	0	A		A			0.0	0.0			0			A	A	0.0	0.0
	SB	L-T-R	30	B		B			11.2	11.2			40			D	D	27.6	27.6
Peppers Ferry Road & Vicker Switch Road (West) Unsignalized	EB	T	-	-	-	-	-	-	-	-	-	-	-	-	-				
		R	29	-		-			-	-			34			-	-	-	
	WB	L-T	45	A		-			0.2	-			100			A	-	0.5	-
	NB	L-R	41	C		C			15.1	15.1			46			C	C	20.1	20.1
Peppers Ferry Road & Mass Circle Unsignalized	EB	L-T-R	32	A	-	0.1	-	-	92	A	-	-	0.5	-	-				
	WB	L-T	0	A		-			0.0	-			0			A	-	0.0	-
		R	-	-		-			-	-			-			-	-	-	-
	NB	L-T-R	0	A		A			0.0	0.0			0			A	A	0.0	0.0

	SB	L-R	52				14.7	14.7		25				19.3	19.3	
Peppers Ferry Road & Vicker Switch Road (East) Unsignalized	EB	L-T-R	0		-		0.0	-		0		-		0.0	-	
	WB	L-T-R	72		-		0.4	-		230		-		1.6	-	
	NB	L-T-R	55				12.1	12.1		55				14.0	14.0	
	SB	L-T-R	0				0.0	0.0		0				0.0	0.0	
Peppers Ferry Road & Rolling Hills Drive Unsignalized	EB	T	-	-			-	-		-	-			-	-	
		R	-	-			-	-		-	-			-	-	
	WB	L-T	34		-		0.2	-		116		-		0.7	-	
	NB	L-R	46				13.9	13.9		50				14.8	14.8	

Table 6: 2050 No Build Traffic Analysis Results Summary

Intersection	Approach	Movement	2050 No Build AM							2050 No Build PM									
			Queue Length (ft)	Movement LOS	Approach LOS	Overall LOS	Delays (sec)	Approach Delay (sec)	Overall Delay (sec)	Queue Length (ft)	Movement LOS	Approach LOS	Overall LOS	Delays (sec)	Approach Delay (sec)	Overall Delay (sec)			
Peppers Ferry Road & Prices Fork Road Signalized	EB	L	186	B	B	C	14.7	15.4	22.7	250	C	B	C	20.5	19.1	33.4			
		T	189	B			16.0			309	B			18.5					
		R	19	B			11.5			92	B			13.4					
	WB	L	81	B	C		11.5	23.9		140	B	C		12.1	33.5				
		T	224	C			25.1			694	D			35.6					
		R	53	C			20.5			250	C			20.7					
	NB	L-T-R	81	D	D		41.3	41.3		107	E	E		57.3	57.3				
	SB	L-T	68	D	D		38.3	37.7		146	E	D		56.0	52.3				
		R	111	D			37.6			251	D			51.2					
	Peppers Ferry Road & Belview Drive Unsignalized	EB	L	16	A		-	8.1		-	-	29		A	-		-	9.1	-
T			-	-	-	-		-	-										
WB		T	-	-	-	-		-	98			-	-	-		-			
		R	-	-	-	-		-	24			-	-	-		-			
SB	L-R	34	C	C	15.5	15.5	51	D	D	25.7	25.7								
Peppers Ferry Road & Belview Elementary School Unsignalized	EB	T	-	-	-	-	-	-	-	-	-	-	-	-	-				
		R	-	-		-			-	-			-						
	WB	L	48	A		-			8.8	-			54			A	-	9.2	-
		T	-	-		-			-	-			37			-	-	-	-
NB	L-R	35	C	C	16.9	16.9	35	B	B	14.9	14.9								
Peppers Ferry Road & Belview Elementary School Unsignalized	EB	T	-	-	-	-	-	-	-	-	-	-	-	-	-				
	WB	T	-	-		-			-	10			-			-	-	-	
	NB	L-R	24	B		B			14.0	14.0			14			B	B	12.7	12.7
Peppers Ferry Road & Onyx Drive Unsignalized	EB	T-R	-	-	-	-	-	-	-	-	-	-	-	-	-				
	WB	L-T	13	A		-			0.1	-			65			A	-	0.2	-
	NB	L-R	24	B		B			13.6	13.6			22			C	C	23.2	23.2
Peppers Ferry Road & Coal Hollow Road Unsignalized	EB	L-T	44	A	-	0.2	-	-	136	A	-	-	0.6	-	-				
	WB	T-R	-	-		-			-	-			-			-	-	-	
	SB	L-R	25	B		B			11.6	11.6			39			D	D	27.3	27.3
Peppers Ferry Road & Vicker Switch Road (West) Unsignalized	EB	T	-	-	-	-	-	-	-	-	-	-	-	-	-				
		R	33	-		-			-	37			-			-	-		
	WB	L-T	55	A		-			0.3	-			140			A	-	0.6	-
	NB	L-R	46	C		C			17.1	17.1			50			D	D	26.1	26.1
Peppers Ferry Road & Mass Circle Unsignalized	EB	L-T-R	47	A	-	0.1	-	-	147	A	-	-	0.6	-	-				
	WB	L-T	0	A		-			0.0	-			0			A	-	0.0	-
		R	-	-		-			-	-			-			-	-	-	-

	NB	L-T-R	0				0.0	0.0		0				0.0	0.0
	SB	L-R	56				16.6	16.6		25				23.2	23.2
Peppers Ferry Road & Vicker Switch Road (East) Unsignalized	EB	L-T-R	2		-		0.0	-		2		-		0.0	-
	WB	L-T-R	101		-		0.5	-		256		-		2.0	-
	NB	L-T-R	59				13.1	13.1		59				16.2	16.2
	SB	L-T-R	0				0.0	0.0		0				0.0	0.0
Peppers Ferry Road & Rolling Hills Drive Unsignalized	EB	T	-	-	-		-	-		-	-	-		-	-
		R	-	-	-		-	-		-	-	-		-	-
	WB	L	24		-		8.8	-		46		-		9.0	-
		T	-	-	-		-	-		-	-	-		-	-
	NB	L-R	50				15.8	15.8		56				16.8	16.8

Safety and Reliability:

For the analysis of existing safety conditions, the VDOT Crash Analysis PowerBI Tool was utilized to determine the crash history at the study intersections and along the Peppers Ferry Road study corridor. Crash data was collected and analyzed for five years spanning from January 2018 to December 2022. The study team reviewed the FR-300 reports provided by VDOT to determine specific trends and “hot spot” areas for consideration in developing alternative improvement concepts. For the purposes of this analysis, “injury crashes” is defined as the sum of type A (severe injury), B (visible injury), and C (non-visible injury) crashes.

Safety Analysis Results

The crash severity within the study area is summarized by year and type in **Table** and

Table , respectively. Crash severity and crash type by intersection along the Peppers Ferry Road study corridor are summarized in **Table 9** and **Table 10**, respectively.

Table 7: Study Area Crash Severity by Year

Crash Year and Severity	K. Fatal Injury	A. Severe Injury	B. Visible Injury	C. Nonvisible Injury	PDO. Property Damage Only	Total
2018	2	1	12	5	34	54
2019	1	2	18	4	44	69
2020	0	5	12	8	32	57
2021	0	2	19	11	45	77
2022	0	2	14	6	49	71
Total	3	12	75	34	204	328

Table 8: Study Area Crash Severity by Type

Collision Type and Crash Severity	K. Fatal Injury	A. Severe Injury	B. Visible Injury	C. Nonvisible Injury	PDO. Property Damage Only	Total
Rear End	0	3	49	20	70	142
Angle	0	2	3	2	6	13
Sideswipe	0	2	3	3	10	18
Fixed Object	0	3	12	1	1	17
Head On	2	1	3	0	1	7
Pedestrian	1	1	0	0	0	2
Bike	0	0	1	0	0	1
Other	0	0	4	8	116	128
Total	3	12	75	34	204	328

Table 9: Study Area Crash Severity by Intersection

Collision Type and Crash Severity	K. Fatal Injury	A. Severe Injury	B. Visible Injury	C. Nonvisible Injury	PDO. Property Damage Only	Total
Shamrock Circle/McCormick Road	0	0	1	0	6	7
Bradford Lane	0	0	0	2	6	8
Bradford Lane	0	0	1	2	7	10
Waterworks Road	0	1	2	1	3	7
Prices Fork Road	0	0	12	5	23	40
Pearce Avenue	0	1	2	1	3	7
Belview Drive	0	0	0	0	5	5
Belview ES (West)	0	0	1	0	6	7
Belview ES (East)	0	0	1	0	1	2
Onyx Drive	0	0	5	0	9	14
Shires Lane	0	1	2	0	8	11
Coal Hollow Road	0	1	7	0	6	14
Vicker Switch (West)	0	0	2	1	8	11
Mass Circle	0	1	2	2	7	12
Nash Road	0	0	2	0	5	7
Vicker Switch (East)	0	2	3	2	9	16
Rolling Hills Drive	0	0	6	1	11	18
Total	0	7	49	17	123	196

Table 10: Study Area Crash Types by Intersection

Collision Type and Crash Severity	Rear End	Angle	Sideswipe	Fixed Object	Head On	Pedestrian	Bicycle	Other	Total
Shamrock Circle/McCormick Road	1	0	1	0	0	0	0	5	7
Bradford Lane	6	0	0	0	0	0	0	2	8
Bradford Lane	3	1	0	1	0	0	0	5	10
Waterworks Road	1	0	3	0	0	0	0	3	7
Prices Fork Road	19	6	4	3	2	0	0	6	40
Pearce Avenue	2	0	1	1	0	0	0	3	7
Belview Drive	4	0	0	0	1	0	0	0	5
Belview ES (West)	4	1	0	1	0	0	0	1	7
Belview ES (East)	2	0	0	0	0	0	0	0	2
Onyx Drive	10	0	1	0	0	0	0	3	14
Shires Lane	4	0	1	1	0	0	0	5	11
Coal Hollow Road	9	0	0	3	0	0	0	2	14
Vicker Switch (West)	4	1	0	2	0	0	0	4	11
Mass Circle	6	0	1	0	0	0	0	5	12
Nash Road	1	0	0	3	0	0	0	3	7
Vicker Switch (East)	7	1	0	1	0	1	0	6	16
Rolling Hills Drive	10	0	1	2	0	0	0	5	18
Total	93	10	13	18	3	1	0	58	196

1. The approximate average number of reported crash incidents per year is 65.6.
2. The majority of reported crash incidents within the corridor are rear end crashes. These crashes account for 43% of all crashes in the study area.
3. A total of 124 crash incidents were associated with injuries, which account for approximately 37.8% of the total reported crashes within the corridor.

The collision diagram is presented in **Figure 18** and detailed collision diagrams for each study intersection are included in **Appendix A**.

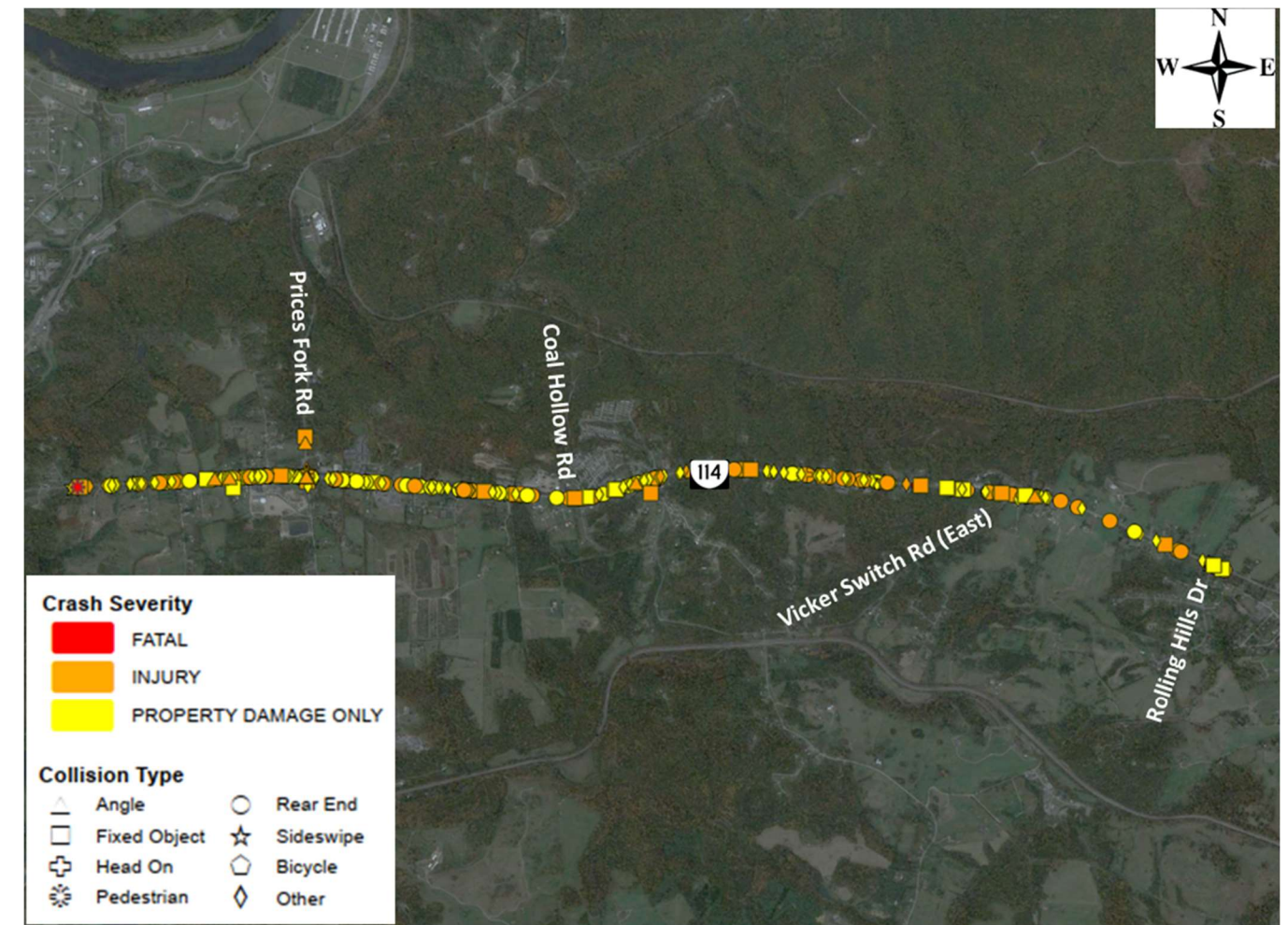


Figure 18: Collision Diagram

A total of 328 crashes were reported within the Peppers Ferry Road study area during the five-year study period. Key takeaways from the crash data are as follows:

1. Year-over-year crash occurrence varies with the highest number of crashes (77) occurring in 2021, followed by 71 crashes in 2022 and 69 crashes in 2019 as shown in **Table** .

The locations of the pedestrian and bicycle crashes are depicted in **Figure 19** in addition to the locations of the Pedestrian Safety Action Plan (PSAP) corridors.

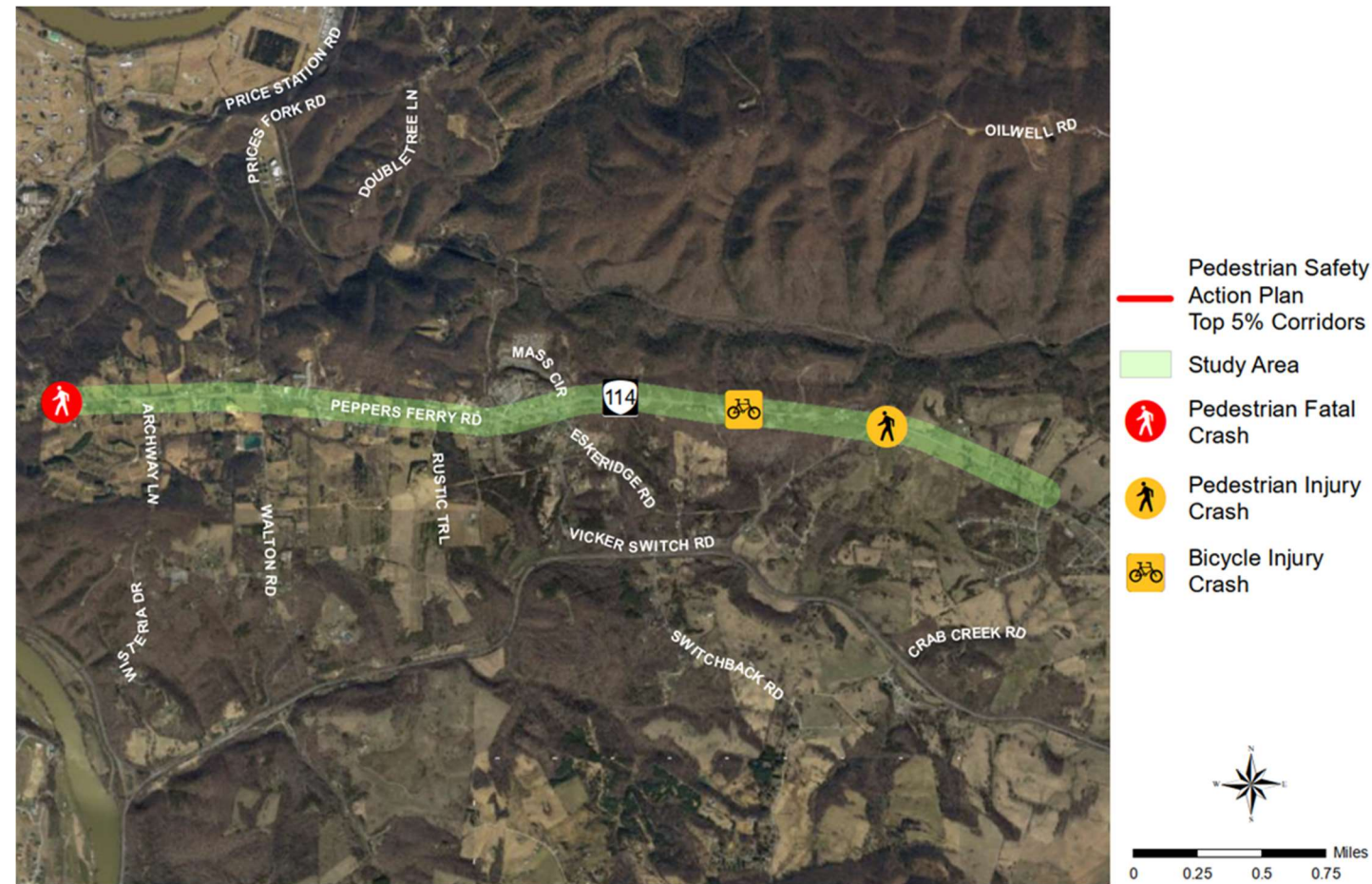


Figure 19: Pedestrian and Bicycle Crash Locations and PSAP Corridors

The locations of the Potential for Safety Improvement (PSI) intersections and segments are depicted in **Figure 20**.

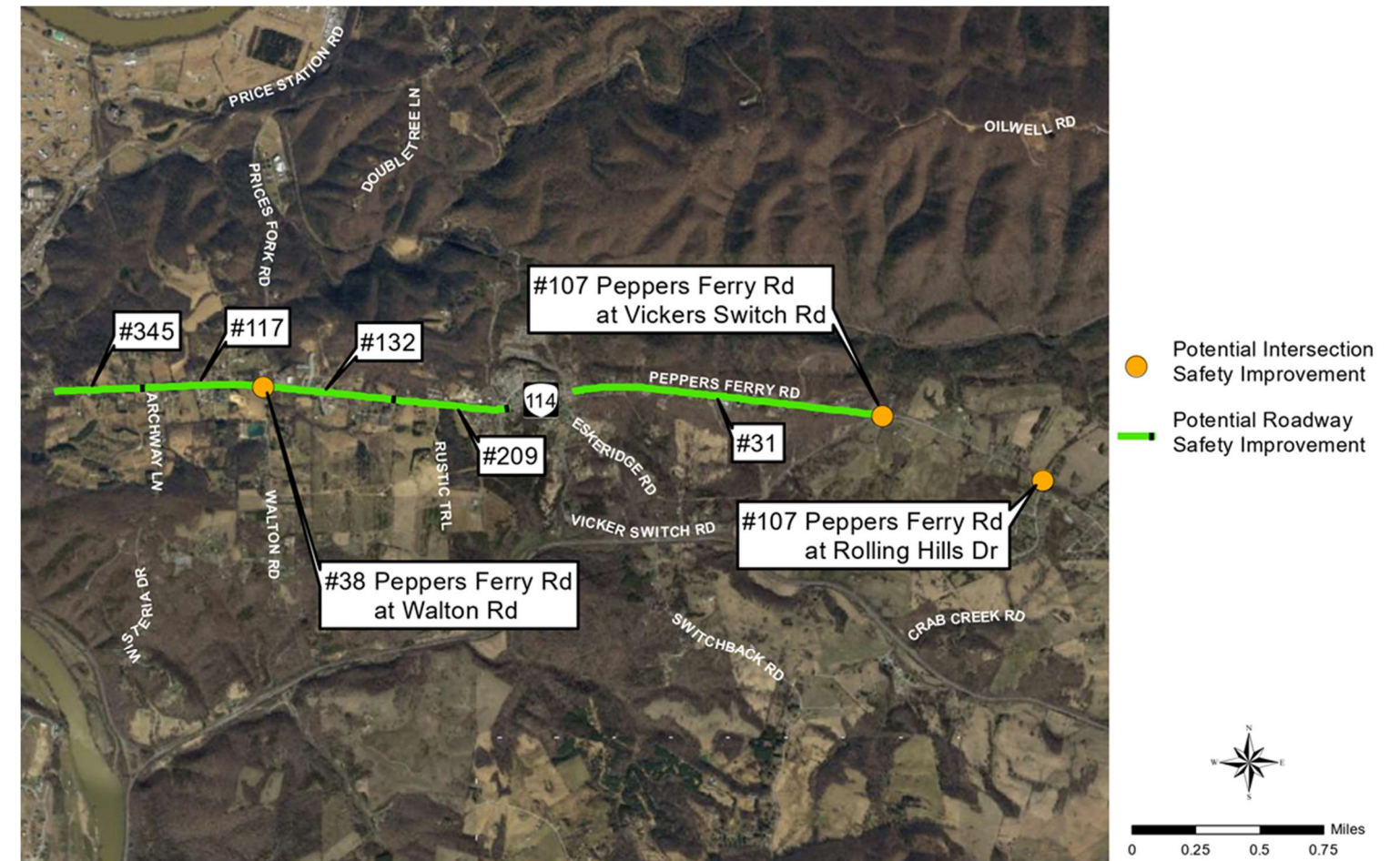


Figure 20: Potential for Safety Improvement (PSI) Locations



Chapter 2:

Alternative Development and Refinement

Alternative Development and Screening

In order to develop alternative concepts to address the needs and incorporate diagnosis identified in Chapter 1, a thorough review of the existing conditions data was conducted. A screening-level analysis was performed to identify potential improvements along Peppers Ferry Road. Intersection improvements were identified at each study intersection as described in the following sections. A more detailed evaluation of operational and safety benefits is included in the Stakeholder Working Group Meeting #3 presentation included in **Appendix A**.

Peppers Ferry Road at Onyx Drive

A westbound left-turn lane from Peppers Ferry Road to Onyx Drive was considered due to the number of crashes at the intersection and to help mitigate the sight distance restriction for westbound traffic approaching the intersection. This improvement will help to improve intersection safety by separating turning vehicles to reduce the potential for westbound rear end crashes.

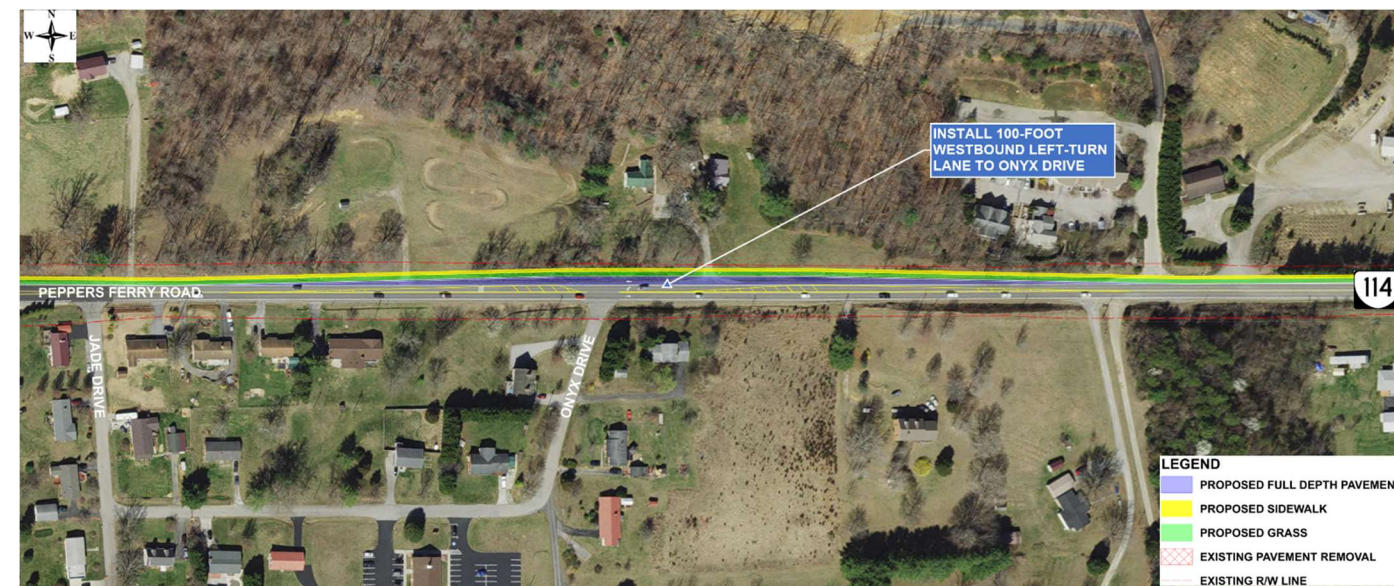


Figure 21: Peppers Ferry Road at Onyx Drive

Peppers Ferry Road at Coal Hollow Road and Vicker Switch (West)

An eastbound left-turn lane along Peppers Ferry Road to Coal Hollow Road along with reconfiguring the intersection to a standard T-intersection were considered as improvements to increase the overall safety at the intersection. Reconfiguring the intersection will remove the confusion at Coal Hollow Road by simplifying it to single entrance and exit lanes at the intersection.

Constructing a westbound left-turn lane along Peppers Ferry Road to Vicker Switch (West) and removing the westbound right-turn lane to Mass Circle were considered as improvements to increase the safety of the intersection. Reconfiguring the Peppers Ferry Road at Vicker Switch (West) intersection to a standard T-intersection was also considered in order to simplify it to single entrance and exit lanes at the intersection.

These improvements will help to improve intersection safety at both intersections by separating left-turning vehicles to reduce the potential for eastbound and westbound rear-end crashes at Coal Hollow Road and Vicker Switch Road (West), respectively.



Figure 22: Peppers Ferry Road at Coal Hollow Road and Vicker Switch (West)

Peppers Ferry Road at Vicker Switch (East)

The construction of a westbound left-turn lane on Peppers Ferry Road to Vicker Switch Road (East) was considered to reduce the crashes at the intersection and to accommodate the relatively heavy westbound left-turn volume, particularly during the PM peak hour. This improvement will help to improve intersection safety by separating turning vehicles to reduce the potential for westbound rear end crashes.



Figure 23: Peppers Ferry Road at Vicker Switch East

Peppers Ferry Road Pedestrian Improvements

In addition to the proposed intersection improvements, pedestrian improvements were proposed through much of the corridor. A sidewalk was considered along Peppers Ferry Road from Belview Drive to Coal Hollow Road. A pedestrian crosswalk across Peppers Ferry Road between Belview Drive and Belview Elementary School with rectangular rapid flashing beacons (RRFBs) controlled by pushbuttons was considered in order to give pedestrians at the school a safer, more visible crossing of Peppers Ferry Road. In addition, flashing warning lights in advance of the crosswalk are proposed along both the eastbound and westbound Peppers Ferry Road approaches to provide additional notice to motorists for the pedestrian crossing.

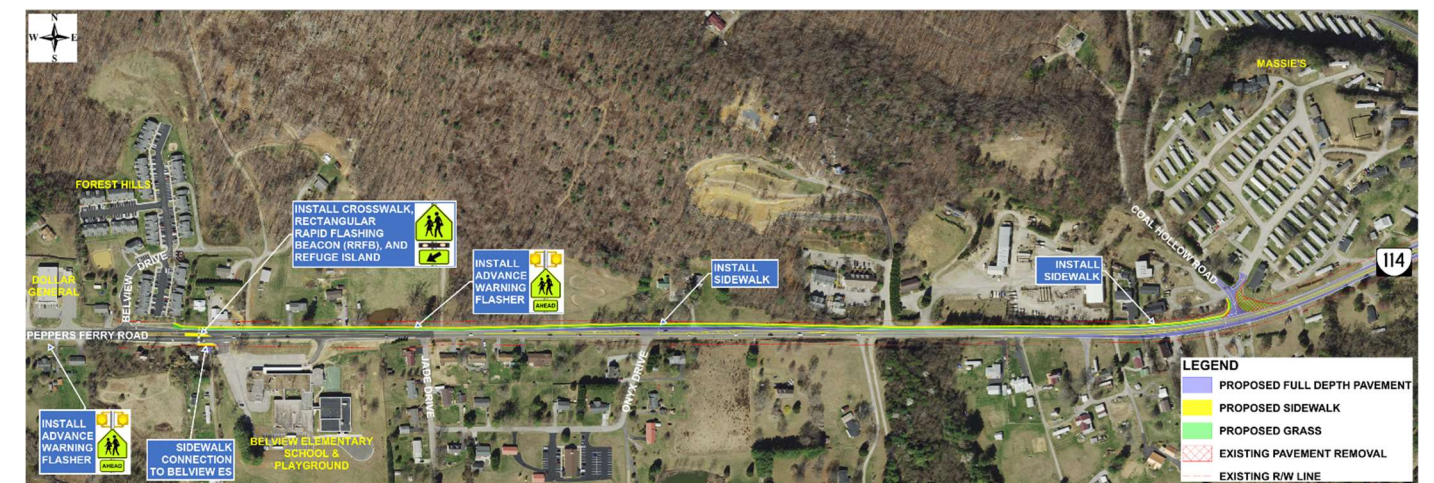


Figure 24: Peppers Ferry Road Pedestrian Improvements

Preferred Alternative

The Preferred Alternative option was developed for the study area based on the results of a screening-level Synchro analysis as discussed in the previous *Alternative Development and Screening* section as well as through stakeholder meetings to gauge general interest. The proposed improvement and analyses performed for the Preferred Alternative are discussed in greater detail in the following section.

Summary of Preferred Alternative

A summary of the proposed improvement included in the Preferred Alternative is shown in **Table 11** and a detailed concept is included in **Appendix D**.

Table 11: List of Preferred Alternative Improvement

Location	Proposed Improvement	Improvement Categories
Peppers Ferry Road at Belview Elementary School (West Entrance)	Install High Visibility Crosswalk & pedestrian refuge island	Pedestrian Access Pedestrian Safety Improvement
	Install RRFB & Advance Warning Flashers	Pedestrian Access Pedestrian Safety Improvement
Peppers Ferry Road at Onyx Drive	Install WB left-turn lane	Safety Improvement
Belview Elementary School (West Entrance) to Coal Hollow Road	Install sidewalk along the north side of Peppers Ferry Road	Pedestrian Access Pedestrian Safety Improvement
Peppers Ferry Road at Coal Hollow Road	Install EB left-turn lane	Safety Improvement
	Reduce intersection skew	Safety Improvement
Peppers Ferry Road at Vicker Switch Road (West Entrance)	Install WB left-turn lane	Safety Improvement
	Reduce intersection skew	Safety Improvement
Peppers Ferry Road at Vicker Switch Road (East Entrance)	Install WB left-turn lane	Safety Improvement

Traffic Operations Analysis

Following the alternatives development process and the selection of preferred improvements, the 2050 No Build Synchro traffic analysis network files were updated to reflect the recommended improvements proposed for intersections within the Peppers Ferry Road study area. The results of the Synchro traffic analysis and SimTraffic microsimulation are documented for the measures of effectiveness (MOEs) in accordance with the TOSAM.

Table 12 depicts queue lengths, Levels of Service, and delays for intersections along Peppers Ferry Road for the AM and PM peak hours for 2050 Build conditions. During the AM and PM peak hours, the signalized intersection at Prices Fork Road/Walton Road is projected to continue operating at LOS C with all movements at LOS E or better, the same as under No Build conditions since no additional improvements are proposed at this intersection.

Turning movements at the unsignalized intersections are projected to continue operating at LOS D or better, during both AM and PM peak hours. At Onyx Drive, Coal Hollow Road, and both Vicker Switch Road intersections where mainline left-turn lanes are proposed, significant reductions in traffic queues are projected under Build conditions compared to No Build conditions, as through traffic can continue through those intersections without queuing up behind the left-turning vehicles. Detailed analysis results for both signalized and unsignalized intersections are contained in **Appendix C**.

Table 12: 2050 Build Traffic Analysis Results Summary

Intersection	Approach	Movement	2050 Build AM							2050 Build PM									
			Queue Length (ft)	Movement LOS	Approach LOS	Overall LOS	Delays (sec)	Approach Delay (sec)	Overall Delay (sec)	Queue Length (ft)	Movement LOS	Approach LOS	Overall LOS	Delays (sec)	Approach Delay (sec)	Overall Delay (sec)			
Peppers Ferry Road & Prices Fork Road Signalized	EB	L	196	B	B	C	14.7	15.4	22.7	254	C	B	C	20.5	19.1	33.4			
		T	238	B			16.0			316	B			18.5					
		R	58	B			11.5			92	B			13.4					
	WB	L	83	B	11.5		140	B		12.1									
		T	241	C	25.1		701	D		35.6									
		R	110	C	20.5		250	C		20.7									
	NB	L-T-R	84	D	D		41.3	41.3		126	E	E		57.3	57.3				
	SB	L-T	76	D	D		38.3	37.7		168	E	D		56.0	52.3				
		R	123	D			37.6			248	D			51.2					
	Peppers Ferry Road & Belview Drive Unsignalized	EB	L	8	A		-	8.1		-	-	19		A	-		-	9.1	-
T			-	-	-	-		-	-										
WB		T	-	-	-	-		-	69			-	-	-		-			
		R	-	-	-	-		-	-			-	-	-					
SB	L-R	32	C	C	15.5	15.5	40	D	D	25.7	25.7								
Peppers Ferry Road & Belview Elementary School Unsignalized	EB	T	-	-	-	-	-	-	-	-	-	-	-	-	-				
		R	-	-		-			-	-									
	WB	L	48	A		8.8			52	A			9.2						
		T	-	-		-			34	-			-						
NB	L-R	45	C	C	16.9	16.9	35	B	B	14.9	14.9								
Peppers Ferry Road & Belview Elementary School Unsignalized	EB	T	-	-	-	-	-	-	-	-	-	-	-	-	-				
	WB	T	-	-		-			7	-			-			-			
	NB	L-R	20	B		B			14.0	14.0			16			B	B	12.7	12.7
Peppers Ferry Road & Onyx Drive Unsignalized	EB	T-R	-	-	-	-	-	-	-	-	-	-	-	-	-				
	WB	L	8	A		8.6			22	A			8.9						
		T	-	-		-			-	-			-						
NB	L-R	27	B	B	13.6	13.6	25	C	C	23.2	23.2								
Peppers Ferry Road & Coal Hollow Road Unsignalized	EB	L	22	A	-	8.2	-	-	42	A	-	-	9.4	-	-				
		T	-	-		-			-	-									
	WB	T-R	-	-		-			-	-			-			-	-		
	SB	L-R	29	B		B			11.6	11.6			37			D	D	27.3	27.3
	EB	T	-	-	-	-	-	-	-	-	-	-	-	-	-				

Peppers Ferry Road & Vicker Switch Road (West) Unsignalized	WB	R	-	-	-	-	-	-	-	-	-	-	-	-	-
		L	28		-		8.6	-		34		-		8.9	-
		T	-	-	-	-	-	-	-	-	-	-	-	-	-
	NB	L-R	48				17.1	17.1		51				26.1	26.1
Peppers Ferry Road & Mass Circle Unsignalized	EB	L-T-R	44		-		0.1	-		124		-		0.6	-
	WB	L-T	0		-		0.0	-		0		-		0.0	-
		R	-	-	-	-	-	-	-	2		-	-	-	-
	NB	L-T-R	0				0.0	0.0		0				0.0	0.0
SB	L-R	48				16.6	16.6		35				23.2	23.2	
Peppers Ferry Road & Vicker Switch Road (East) Unsignalized	EB	L-T-R	4		-		0.0	-		6		-		0.0	-
	WB	L	29		-		8.8	-		73		-		9.0	-
		T-R	-	-	-	-	-	-	-	-		-	-	-	-
	NB	L-T-R	63				13.1	13.1		55				16.2	16.2
SB	L-T-R	0				0.0	0.0		0				0.0	0.0	
Peppers Ferry Road & Rolling Hills Drive Unsignalized	EB	T	-	-	-		-	-		-		-		-	-
		R	-	-	-		-	-		-		-		-	-
	WB	L	27		-		8.8	-		40		-		9.0	-
		T	-	-	-	-	-	-	-	-		-	-	-	-
NB	L-R	54				15.8	15.8		55				16.8	16.8	

Expected Crash Reduction

A Crash Modification Factor (CMF) is used to determine the expected number of crashes after implementing a countermeasure on a road or intersection. CMFs for the various improvements under consideration were applied to the relevant crash history to evaluate the expected crash reduction. CMFs were obtained from SMART SCALE, Virginia State Preferred CMF List, or the Crash Modification Factors Clearinghouse, which provides a searchable database of CMFs along with a five-star quality rating. **Table 13** presents the CMF value used for each crash severity type to calculate the crash reduction expected from the installation of the various safety improvements.

Table 13: Recommended Improvement CMFs by Crash Severity

Location	Proposed Improvement	Applicable Crash Type	K	A	B C	O
Peppers Ferry Road at Belview Elementary School (West Entrance)	Install High Visibility Crosswalk & pedestrian refuge island	Pedestrian	0.60	0.60	0.60	0.60
	Install RRFB		0.53	0.53	0.53	0.53
	Combined CMF		0.32	0.32	0.32	0.32
Peppers Ferry Road at Onyx Drive	Install WB left-turn lane	All	0.56	0.56	0.56	0.56
Belview Elementary School (West Entrance) to Coal Hollow Road	Install sidewalk along the north side of Peppers Ferry Road	Pedestrian	0.60	0.60	0.60	0.60
Peppers Ferry Road at Coal Hollow Road	Install EB left-turn lane	All	0.56	0.56	0.56	0.56
	Reduce intersection skew		0.79	0.79	0.79	0.79
	Combined CMF		0.44	0.44	0.44	0.44

Peppers Ferry Road at Vicker Switch Road (West Entrance)	Install WB left-turn lane	All	0.56	0.56	0.56	0.56
	Reduce intersection skew		0.79	0.79	0.79	0.79
	Combined CMF		0.44	0.44	0.44	0.44
Peppers Ferry Road at Vicker Switch Road (East Entrance)	Install WB left-turn lane	All	0.56	0.56	0.56	0.56

CMFs for total crashes were applied to the total number of crashes during the 5-year study period to determine the expected crash reductions within the study area. CMFs for fatal and injury crashes were applied to the type K (fatal), A (severe injury), B (visible injury), and C (non-visible injury) crashes. **Table 14** summarizes the expected crash reductions for each crash severity and the overall crashes.

Table 14: Total Expected Number of Crashes and % Crash Reduction (2018 – 2022)

Location		K	A	B C	O	Total
Peppers Ferry Road at Belview Elementary School (West Entrance)	Pedestrian Crashes	0	0	0	0	0
	Total Expected Crashes	0.0	0.0	0.0	0.0	0.0
	<i>Change in Crashes</i>	0.0	0.0	0.0	0.0	0.0
Peppers Ferry Road at Onyx Drive	Total Crashes	0	0	5	9	14
	Total Expected Crashes	0.0	0.0	2.8	5.0	7.8
	<i>Change in Crashes</i>	0.0	0.0	-2.2	-4.0	-6.2
Belview Elementary School (West Entrance) to Coal Hollow Road	Pedestrian Crashes	0	0	0	0	0
	Total Expected Crashes	0.0	0.0	0.0	0.0	0.0
	<i>Change in Crashes</i>	0.0	0.0	0.0	0.0	0.0
Peppers Ferry Road at Coal Hollow Road	Total Crashes	0	1	7	6	14
	Total Expected Crashes	0.0	0.4	3.1	2.6	6.2
	<i>Change in Crashes</i>	0.0	-0.6	-3.9	-3.4	-7.8
Peppers Ferry Road at Vicker Switch Road (West Entrance)	Total Crashes	0	0	3	8	11
	Total Expected Crashes	0.0	0.0	1.3	3.5	4.8
	<i>Change in Crashes</i>	0.0	0.0	-1.7	-4.5	-6.2
Peppers Ferry Road at Vicker Switch Road (East Entrance)	Total Crashes	0	2	5	9	16
	Total Expected Crashes	0.0	1.1	2.8	5.0	9.0
	<i>Change in Crashes</i>	0.0	-0.9	-2.2	-4.0	-7.0
Total Crashes Associated with Improvements Influence Area		0	3	20	32	55
Total Expected Crashes After Improvements		0.0	1.6	10.0	16.2	27.8
<i>Change in Crashes (Expected - Total)</i>		0.0	-1.4	-10.0	-15.8	-27.2
Percent Crash Reduction After Improvements		N/A	48%	50%	49%	49%

*Total expected number of crashes is rounded to the nearest tenth

Key findings from the expected crash analysis are as follows:

- An annual crash reduction of 5 crashes is expected along Peppers Ferry Road from Shamrock Circle to Rolling Hills Drive, which is equivalent to an approximately 49% reduction in crashes.

A sketch depicting the Preferred Build Alternative is shown in **Appendix D**.



Chapter 3:

Public and Stakeholder Outreach and Feedback

Public Involvement

Following the development and analysis of the build alternatives, a public involvement survey was developed to determine the public’s response to the improvements and what they perceived as the relevant issues within the study area. This survey was available online for 14 days from March 1 – March 15, 2024.

Survey Design

Public involvement for this study took place in the form of an online survey developed in Public Input, which is an online engagement platform that is designed to educate the public while gathering informed output. The goal of this survey was to educate the public and to seek feedback on the possible alternative solutions in the area.

Overall, the survey is divided into three sections, which include the following:

1. Introduction with overview of the project and study area
2. Recommended improvements at each intersection
3. Recommended pedestrian improvements through the corridor
4. Wrap up with demographic questions

For the recommended improvement concepts, participants were asked to provide a rating based on their opinion from one to five, with one being strongly opposed to the concept and 5 being strongly support the concept. Respondents were also provided with an option to provide comments or concerns. At the end of the survey, the participants were asked demographic questions. A total of 891 surveys were completed and 716 comments were provided. **Figure 25** presents an example of one of the rating screens from the survey.

Peppers Ferry Road at Onyx Drive



Click the image to see the proposed recommendations

A 100-foot left-turn lane is proposed along westbound Peppers Ferry Road at Onyx Drive to provide a place for left-turning vehicles to wait to find a gap in opposing traffic and improve safety by reducing the potential for rear-end crashes.

	1. Strongly oppose	2. Somewhat oppose	3. Neutral	4. Somewhat support	5. Strongly support
Rate the concept on a scale of 1 to 5. (1 = Strongly oppose; 5 = Strongly support)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Figure 25: Public Survey Layout

Survey Question and Results

The proposed left turn lane along westbound Peppers Ferry Road at Onyx Drive received an average rating of 4.304 (see Figure 26).

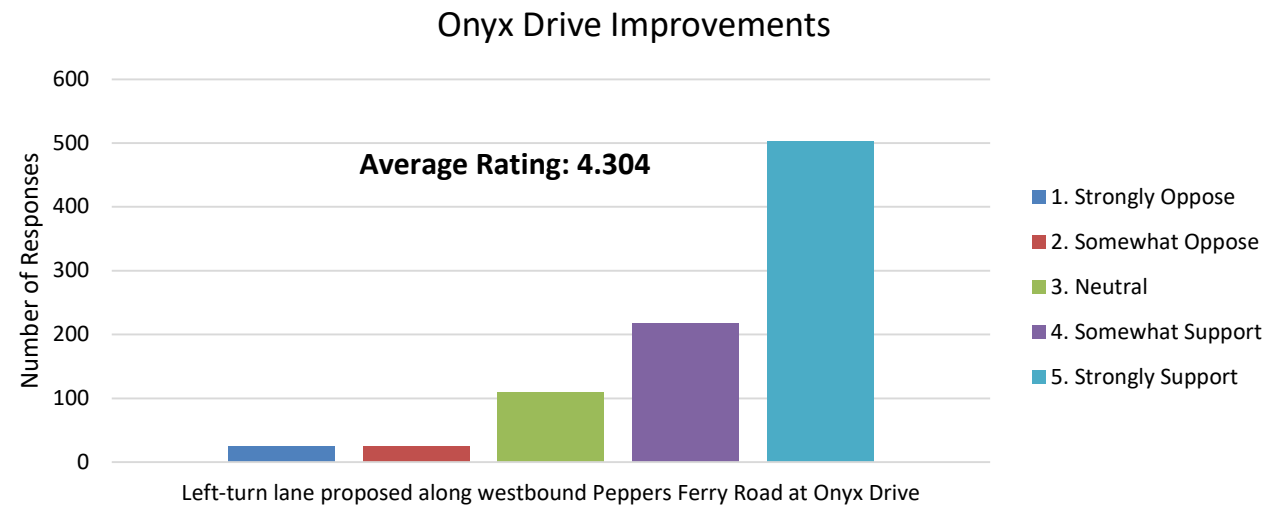


Figure 26: Onyx Drive Survey Results

The proposed reconfiguration of the Coal Hollow Road intersection and the left-turn lane along eastbound Peppers Ferry Road received an average rating of 4.476. The proposed reconfiguration of the Vicker Switch Road (West) intersection and the left-turn lane along westbound Peppers Ferry Road received an average rating of 4.521 (see Figure 27).

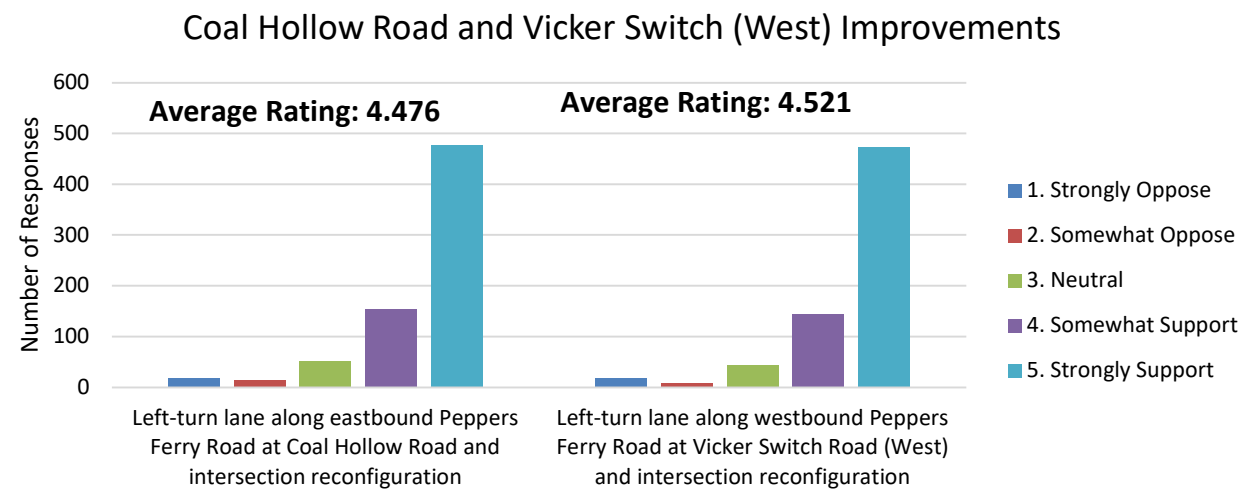


Figure 27: Coal Hollow Road and Vicker Switch (West) Survey Results

The proposed left-turn lane along westbound Peppers Ferry Road at Vicker Switch Road (East) received an overall rating of 4.532 (see Figure 28).

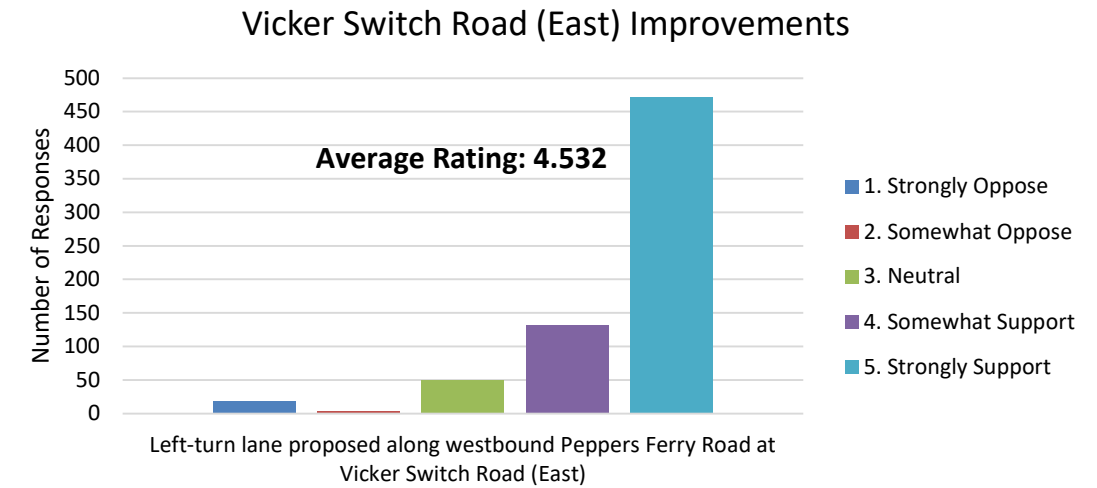


Figure 28: Vicker Switch Road (East) Survey Results

Two pedestrian improvements were proposed from Belview Drive to Coal Hollow Road along the corridor (see Figure 29). The proposed sidewalk along Peppers Ferry Road from Belview Drive to Coal Hollow Road received a rating of 3.998. The signalized crosswalk across Peppers Ferry Road between Belview Drive and Belview Elementary School was given an average rating of 3.860.

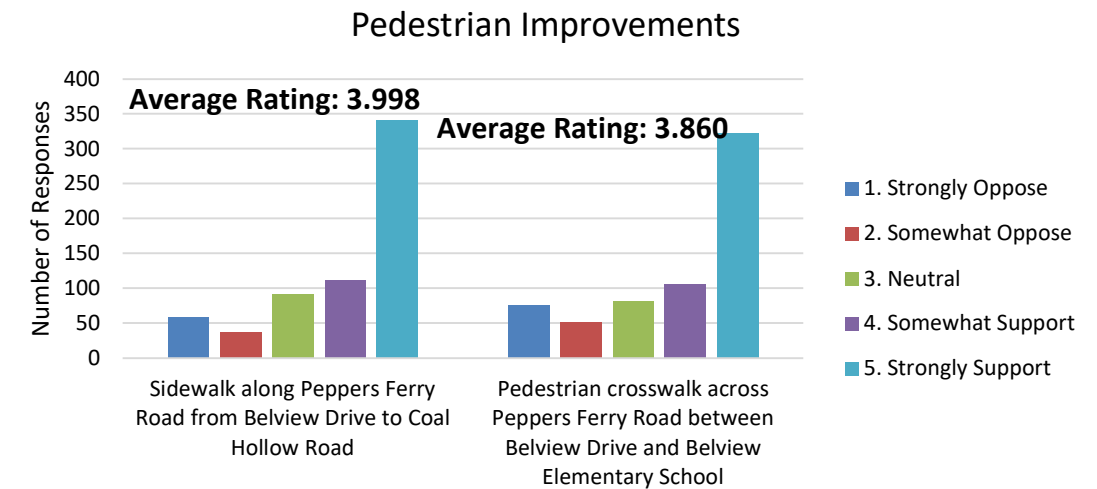


Figure 29: Pedestrian Survey Results

Chapter 4:

Preferred Alternative Design Refinement & Investment Strategy

Investment Strategy

This study should be used as a planning tool to achieve the next steps of planning, programming, designing, and constructing the identified improvements along study corridor. To build upon the efforts of this study, VDOT Salem District should continue to coordinate with Montgomery County and other stakeholders.

Improvement projects should be prioritized on a local and regional level. Prior to submitting funding applications, the applicant must have inclusion or proven consistency with the Constrained Long-Range Transportation Plan (CLRP) or resolution of support from a governing body.

Preferred Alternative

Throughout the study process, proposed improvements were presented for stakeholder and public engagement, refined based on feedback, and analyzed in detail to verify that they met both safety and operational needs. As of the completion of this report, the concept plan displayed in **Appendix D** is the final recommended preferred alternative. This conceptual design was developed in accordance with the following applicable guidelines:

- A Policy on Geometric Design of Highways and Streets (AASHTO 2018)
- VDOT Road Design Manual (Issued January 2005, Revised June 2022)
- VDOT Road and Bridge Standards (VDOT 2016, latest revisions)
- Manual on Uniform Traffic Control Devices (MUTCD 2009)
- 2011 Virginia Supplement to the MUTCD

Design criteria and guidance from these documents were applied to roadways within the project limits based on functional classification and roadway design speeds.

Planning-Level Cost Estimates

An engineer's preliminary opinion of probable cost was created for construction costs, right of way acquisition costs, and utility relocation costs for the preferred alternative using Version 3.1 of the Cost Estimate Workbook (CEWB) as shown in **Table 15**. **Appendix E** includes detailed cost estimates.

Table 15: Planning Level Cost Estimates for the Preferred Alternative

Phase Description	Budget*
Preliminary Engineering	\$5,214,593
Right of Way and Utility Relocation	\$5,262,263
Construction	\$45,874,450
Total Project Budget	\$56,351,306

*Estimate as of July 26, 2024

Project Risks

The project team worked with VDOT staff to identify potential project risks, discuss mitigation strategies and determine risk items which needed additional contingencies carried with the project estimate. The Salem District Scope of Work document identifies project risks (see **Appendix F**).

Possible Funding Sources

The development of this study and the preferred alternative were conducted in accordance with eligibility criteria for SMART SCALE, a competitive funding program that allocates funding from the construction District Grants Program (DGP) and High-Priority Projects Program (HPPP) to transportation projects. SMART SCALE uses a scoring process that evaluates, scores, and ranks project applications based on six measures: congestion mitigation, economic development, accessibility, safety, environmental quality, and land use. Montgomery County submitted the proposed roadway improvements for SMART SCALE Round 6 funding consideration.

Other funding sources that may be considered for the proposed roadway improvements identified in this study include:

- **Revenue Sharing:** a competitive funding program providing a dollar-for-dollar state match to local funds for transportation projects. Projects eligible for Revenue Sharing funds include construction, reconstruction, improvement, and maintenance projects.
- **Congestion Mitigation and Air Quality (CMAQ):** a competitive funding program allocating funds to surface transportation projects that improve air quality by reducing congestion.
- **Highway Safety Improvement Program (HSIP):** a competitive funding program providing funds for improvements that correct or improve safety on a section of roadway or intersection with a high incidence of crashes.