FINAL

Port Republic Road – Peach Grove Avenue – Neff Avenue Small Area Study

FINAL Study Report
Harrisonburg, Virginia

PREPARED FOR

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Study Background and Overview

The Port Republic Road – Peach Grove Avenue – Neff Avenue Small Area Study was conducted to identify context-sensitive solutions to address existing and future constraints within the transportation system related to safety, operations, connectivity, and land use.

Study Objective

In Fall 2024, the Central Shenandoah Planning District Commission (CSPDC) and Harrisonburg Rockingham Metropolitan Planning Organization (HRMPO) partnered with VHB to conduct a Small Area Study for the Port Republic Road – Peach Grove Avenue – Neff Avenue area in the City of Harrisonburg, Virginia, and Rockingham County, Virginia. CSPDC/HRMPO is seeking to align the future projected land uses within the study area with the transportation infrastructure by balancing multimodal, operational, and safety objectives. The Port Republic Road / Peach Grove Avenue / Neff Avenue intersection is also the highest crash intersection within the MPO, so there is specific interest in identifying appropriate mitigation measures to reduce crash frequency and severity. The outcomes of this study will identify a holistic transportation plan for growth and streamline the traffic impact study process of future land development projects. This outcome could inform future updates to planning documents such as the Harrisonburg Comprehensive Plan or the Bike and Pedestrian Plan.

This report documents the following items for the small area study:

- Project background
- Data inventory
- Existing conditions analysis
- Future transportation demand projections in 2045
- Alternatives development
- Public engagement
- Study recommendations and preferred alternative identification
- Preferred alternative preliminary design and cost estimate

Study Stakeholders

CSPDC organized a multidisciplinary stakeholder group to participate in this Small Area Study, including representatives from the PDC, both localities, James Madison University, and VDOT. This stakeholder group met throughout the study period to review key deliverable, provide feedback, and make decisions. The stakeholder group consists of the following individuals:

- CSPDC
  - Garreth Bartholomew
  - Zach Beard
  - Paula Melester
- City of Harrisonburg
  - Jakob ZumFelde
  - Tom Hartman
  - Timothy Mason
  - James Polhamus
  - Cheryl Spain
  - Gerald Gatobu
  - Thanh Dang
  - Nyrma Soffel
  - Sgt. Wayne Westfall
  - Kyle Lawrence
- James Madison University
  - Valerie Kramer
- Rockingham County
  - Dylan Nicely
  - Casey Armstrong
  - Rachel Salatin
- VDOT
  - Adam Campbell
  - Don Komara
  - Jeremy Mason
  - Shane McCabe
  - Jeff Lineberry
  - Burgess Lindsey
- VHB
  - Chuck Conran

Study Area and Characteristics

The study area is generally bound by the Port Republic Road / Devon Lane intersection in the northwest, the Neff Avenue / Turner Ashby Lane / Thomas Bowers Circle intersection in the northeast, the Port Republic Road / Portland Road / Wine Drive intersection in the southeast, and the Peach Grove Avenue / Stone Spring Road intersection in the southwest as shown in **Figure 1** below. The study area includes and/or is adjacent to major land uses such as James Madison University, significant multifamily housing developments, the Stone Spring Urban Development Area in Rockingham County, and Sentara RMH Medical Center. While the study area encompasses a broader area, the study included five specific intersections for multimodal analysis, listed below and shown in Figure 1.

1. Port Republic Road / Peach Grove Avenue / Neff Avenue
2. Peach Grove Avenue / Lois Lane
3. Port Republic Road / Deer Run
4. Port Republic Road / Food Lion Shopping Center Entrance
5. Port Republic Road / Devon Lane

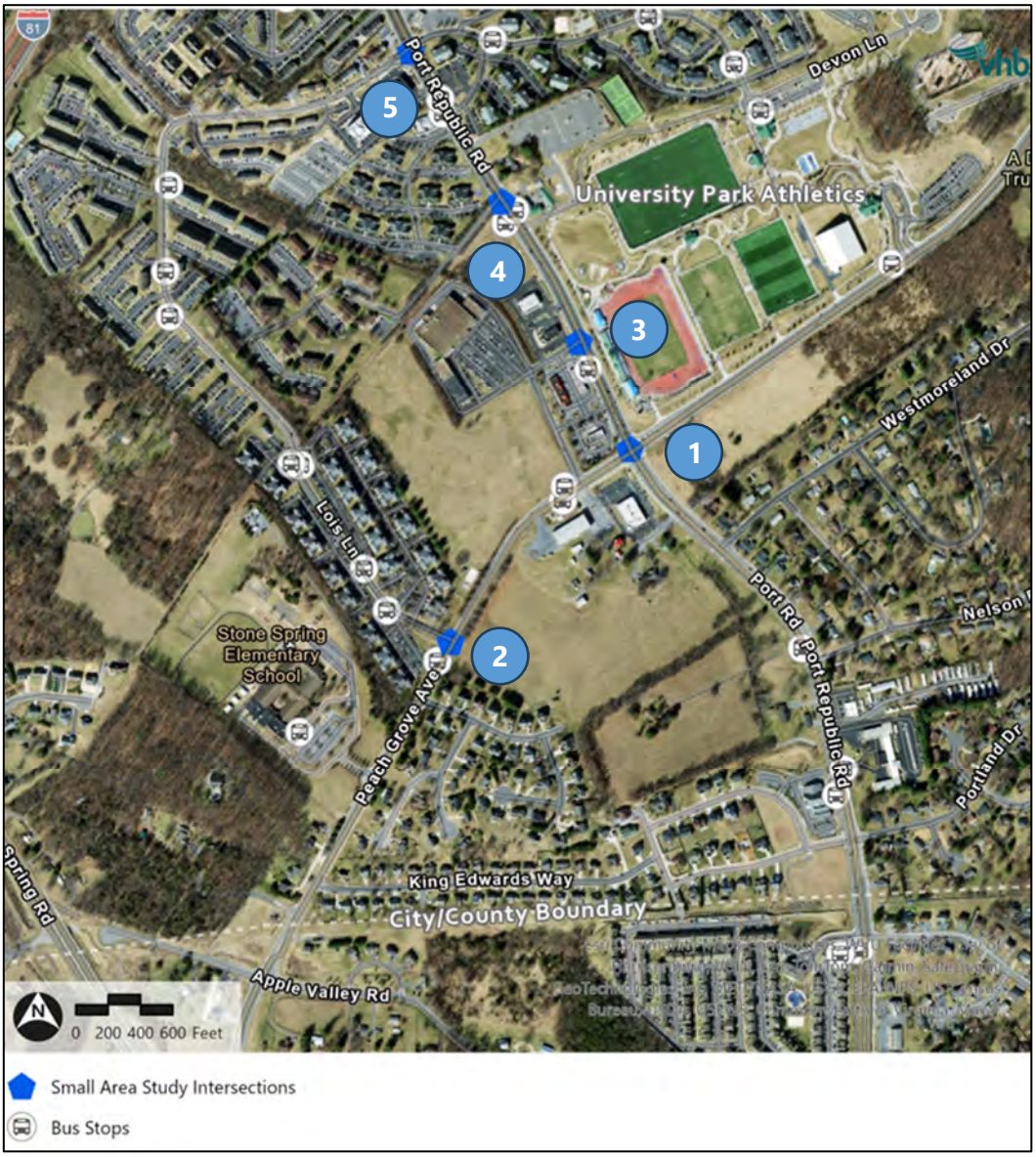

Figure 1 Study Area Map

Port Republic Road is designated as a VDOT minor arterial with a 2023 Average Annual Daily Traffic (AADT) of 27,400 vehicles per day (VPD) north of Peach Grove Avenue / Neff Avenue. South of that intersection, Port Republic Road had a 2023 AADT of 14,000 VPD. Both segments have a 35 MPH speed limit and a five-lane cross-section – two travel lanes per direction plus a two-way left turn lane. North of Peach Grove Avenue / Neff Avenue, there are also four-foot unbuffered bike lanes and five-foot sidewalks. South of that intersection, there is a ten-foot shared use path on the west side of the street and a five-foot sidewalk on the east side of the street. **Figures 2 and 3** show typical sections for Port Republic Road north and south of Peach Grove Avenue / Neff Avenue.

Peach Grove Avenue is designated as a VDOT major collector, has a 25 MPH speed limit, and a three-lane cross-section – one travel lane per direction plus a two-way left turn lane. Additionally, there is a 4-foot unbuffered bike lane in the westbound direction plus a five-foot sidewalk on the north side of the street. Neff Avenue's designation as a major collector is in process of being updated to a minor

arterial. Neff Avenue has a 35 MPH speed limit and a four-lane cross-section – two travel lanes per direction. Additionally, it has 4-foot unbuffered bike lanes in both directions plus a five-foot sidewalk on the north side of the street. **Figures 4 and 5** show typical sections for Peach Grove Avenue and Neff Avenue. Historical AADT data is not available for either Peach Grove Avenue or Neff Avenue.

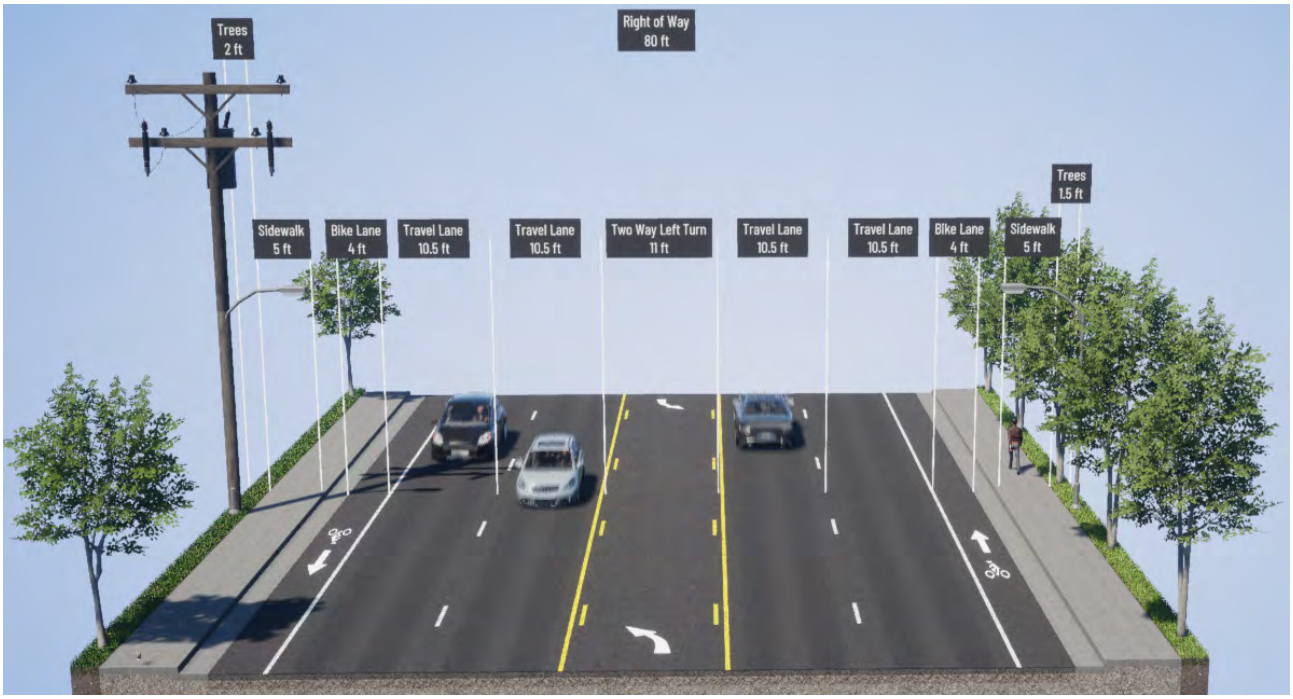

Figure 2 Typical Section for Port Republic Road (north of Peach Grove Avenue / Neff Avenue)

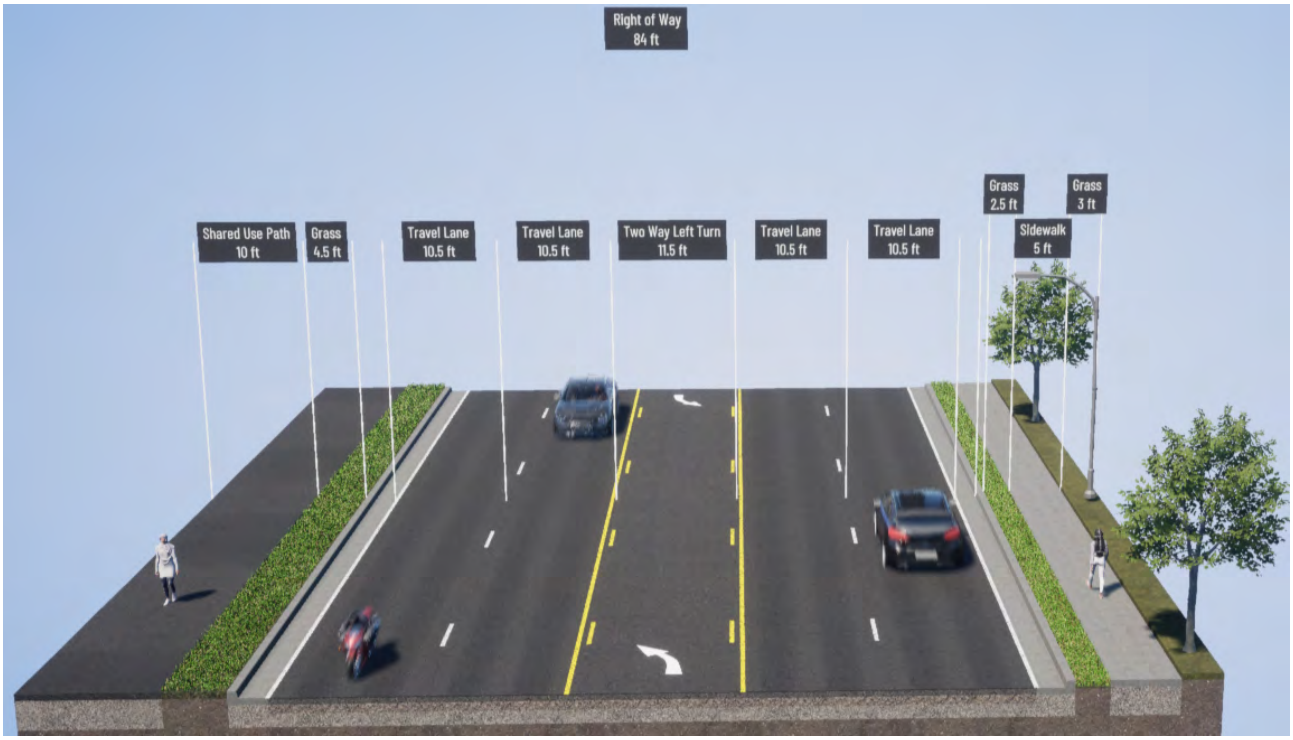

Figure 3 Typical Section for Port Republic Road (south of Peach Grove Avenue / Neff Avenue)

Figure 4 Typical Section for Peach Grove Avenue

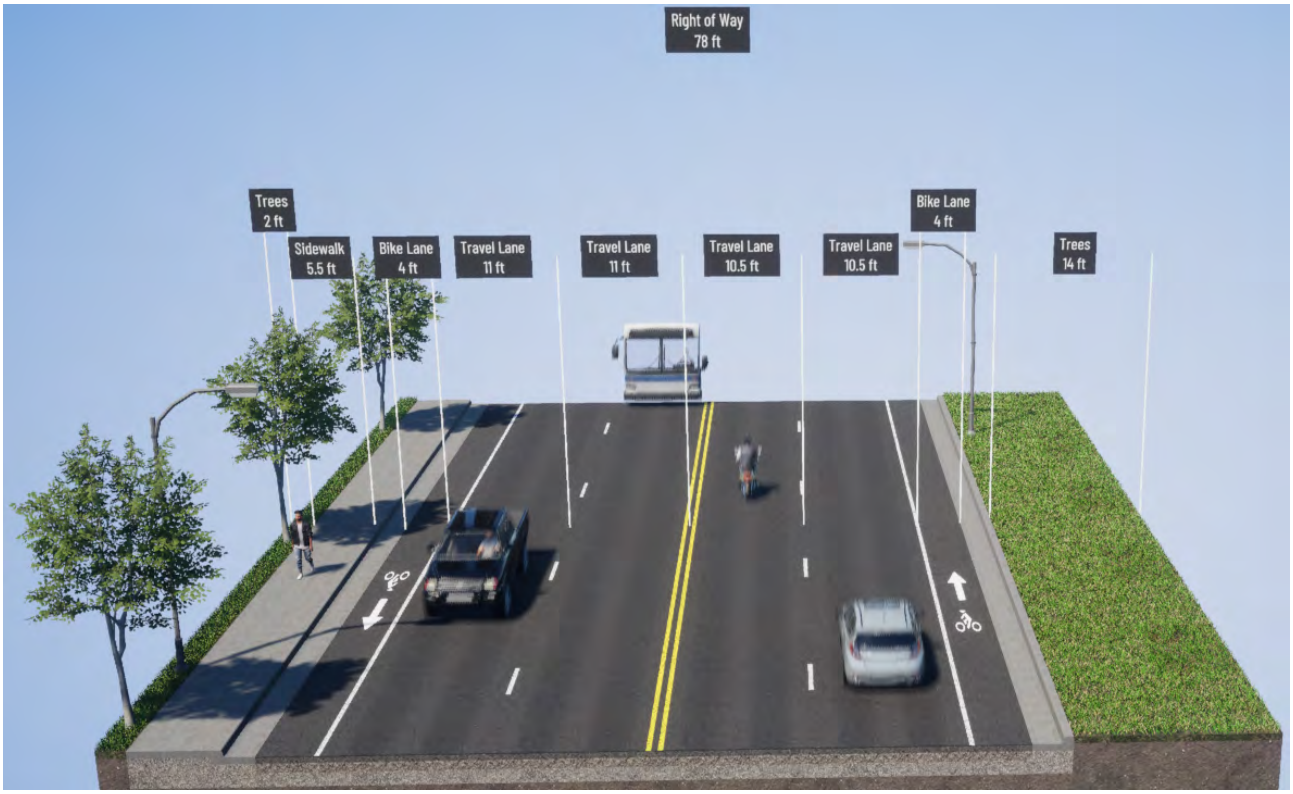

Figure 5 Typical Section for Neff Avenue

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Data Collection

The VHB team collaborated with the stakeholder group to obtain a wide variety of multimodal transportation data, including statewide safety screening, bicycle/pedestrian heat maps, transit ridership, traffic volume and speed counts, and crash data.

Statewide Safety Screening

The Virginia Department of Transportation (VDOT) conducts several types of statewide screening to identify intersections and roadway segments that have experienced an overrepresentation of crashes or that have characteristics indicative of significant crash risk. Two of these screenings are the Potential for Safety Improvement (PSI) and the Pedestrian Bicycle Safety Action Plan (PBSAP).

Potential for Safety Improvement

VDOT maintains a metric called the Potential for Safety Improvement (PSI)[1], which is computed as the difference between experienced and predicted crashes. Based on *Highway Safety Manual* methodology, this metric is indicative of an intersection or roadway segment having more crashes than would be expected based on that location's characteristics (geometry, volume, etc.). **Figure 6** shows the PSI metrics for the Port Republic Road corridor. Notably, the Port Republic Road segment near the Devon Lane intersection has the 2nd highest PSI segment ranking in VDOT's Staunton District, the segment between Deer Run and Peach Grove Avenue – Neff Avenue has the 6th highest PSI ranking, and the segment south of Peach Grove Avenue – Neff Avenue has the 71st highest PSI ranking. The predominant Port Republic Road corridor coverage indicates a corridor wide safety need based on 2016-2020 crashes.

[1] https://vdot.maps.arcgis.com/apps/webappviewer/index.html?id=36c14ce72fde488fb2ce3ed44377588d

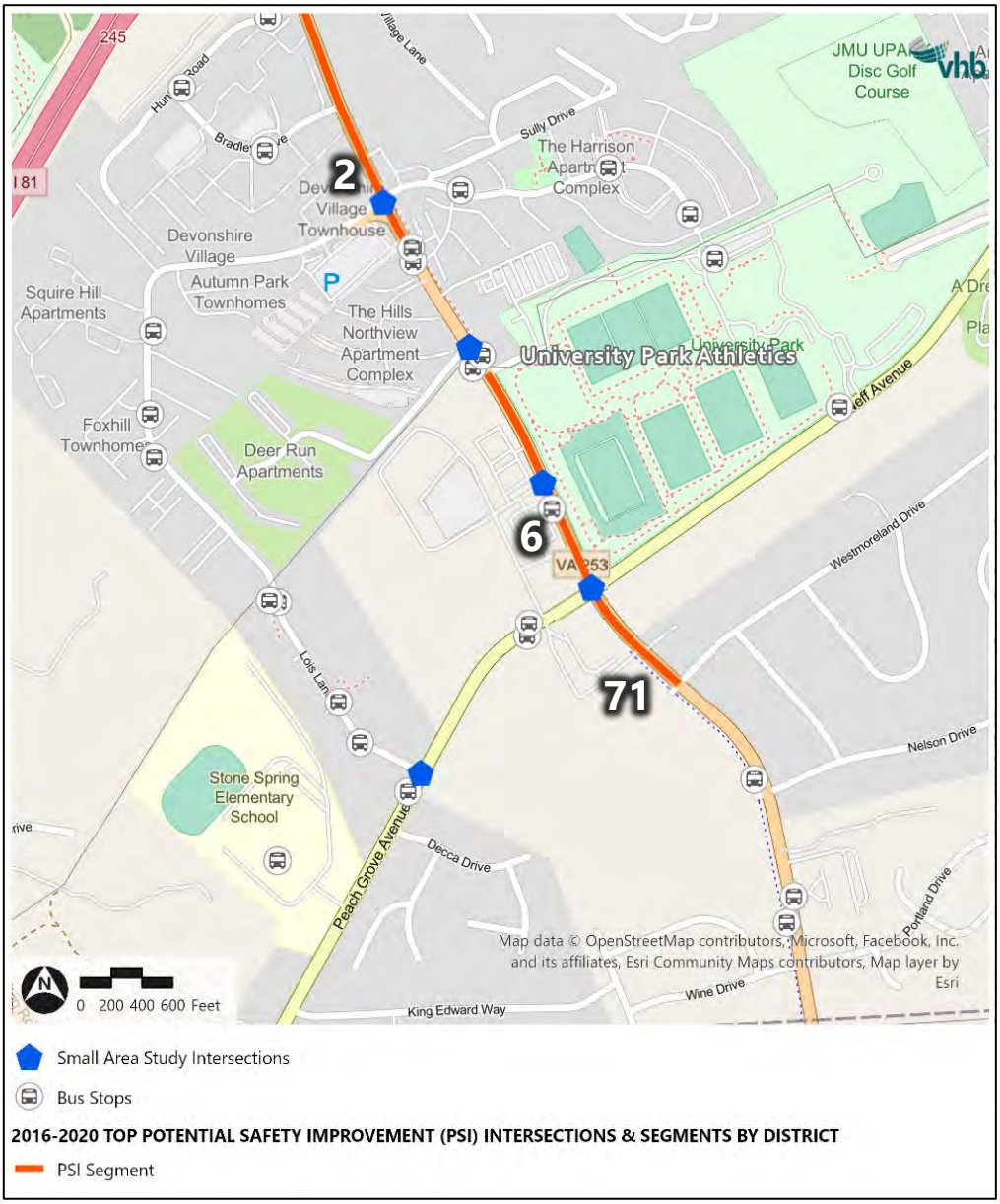

Figure 6 2016-2020 Potential for Safety Improvement Map

Pedestrian Bicycle Safety Action Plan

VDOT developed the PBSAP to systemically identify the roadway segments at highest risk of pedestrian and bicycle crashes. The specific PBSAP scoring is based on a combination of 2018-2022 pedestrian- and bicycle-involved crashes, roadway characteristics, sociodemographic information, and corridor proximity to pedestrian generators. Per VDOT's PBSAP 4.0 – *most current version as of the writing of this report* – as seen in **Figure 7**, all of Port Republic Road within the study area is included in the statewide top 5% of priority pedestrian safety needs corridors, including the Devon Lane to Peach Grove Avenue / Neff Avenue segment that is in the statewide top 1% of priority corridors. Neff Avenue is also in the statewide top 5% of priority corridors. The statewide top priority designation means that due to a combination of crash history, presence of transit, and systemic safety risk, the road segments are in the highest scoring need for pedestrian / bicycle safety improvements.

Figure 7 Pedestrian Bicycle Safety Action Plan Map

Pedestrian and Bicycle Activity Heat Maps

Figure 8 and **Figure 9** depict heat maps showing respective activity levels of walking/running and biking. This data is sourced from the Strava, so it only includes data from people using the application and thus skews towards recreational activity. Observations from these activity level figures include:

- Pedestrian activity walking along the two sides of Port Republic Road is approximately equal.
- There may be pedestrian crossing demand on Port Republic Road at Deer Run / Kelsey Lane.
- There is pedestrian demand along the south sides of Peach Grove Avenue and Neff Avenue where there are no existing sidewalks.
- Bicycle activity along both travel directions of Port Republic Road, Peach Grove Avenue, and Neff Avenue are approximately equal.

Figure 8 Pedestrian Activity Relative Heat Map (Source: STRAVA)

Note: the lighter/brighter yellow/white color indicates higher pedestrian activity

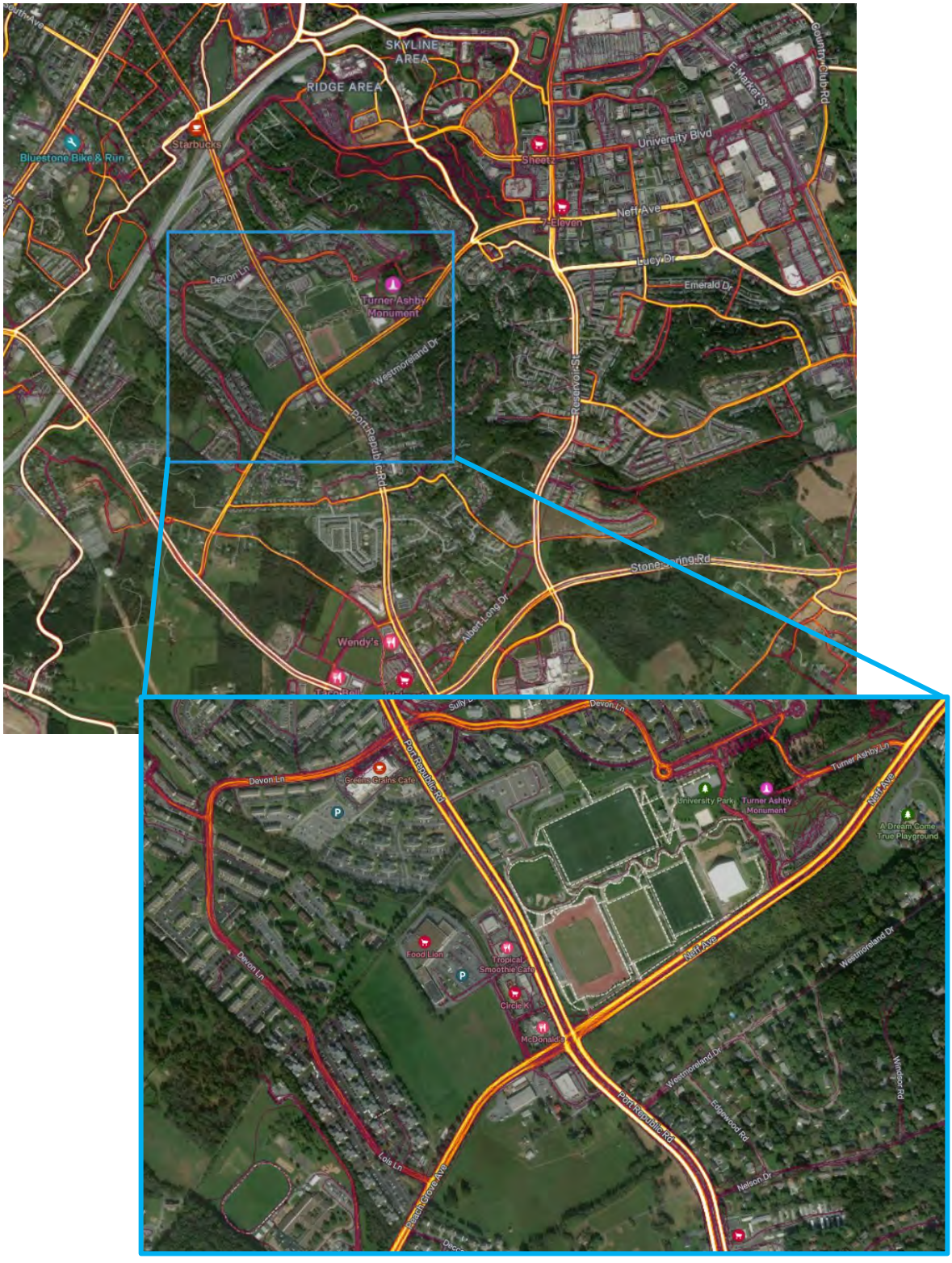

Figure 9 Bicycle Activity Relative Heat Map (Source: STRAVA)

Note: the lighter/brighter yellow/white color indicates higher bicycle activity

Transit Ridership

The Harrisonburg Department of Public Transportation (HDPT) provided thirteen months of ridership data by stop, covering the period October 2023 to October 2024. **Figure 10** depicts the stops within the study area with boarding ("on") and alighting ("off") ridership totals. The five highest ridership stops are located on or adjacent to Devon Lane / Lois Lane, which contains a high density of multifamily residential that caters to James Madison University (JMU) students. The following observations are gleaned from the data.

› The northbound Port Republic Road stop at Deer Run appears underutilized given the southbound stop ridership – this underutilization is potentially due to challenges crossing Port Republic Road.

› Significant boarding and alighting differences at the same stop indicate that people may board and alight at different stops, which would indicate demand for sidewalk connections.

Figure 10 Transit Ridership by Stop October 2023 to October 2024

Figure 11 depicts transit ridership by month for different stops within the study area. The September 2023 through July 2024 data captures the expected peak and valley ridership totals that align with JMU's academic calendar. The significant ridership spike in Fall 2024 appears to indicate the success of JMU's campaign to encourage students to embrace alternative forms of transportation to travel to and from campus. Ridership at some of the stops in September 2024 was nearly 50% higher than the peak months from Fall 2023 and Spring 2024. If this mode shift to transit is sustained, it would lessen dependence on vehicle travel while enhancing the need for transit amenities at bus stops.

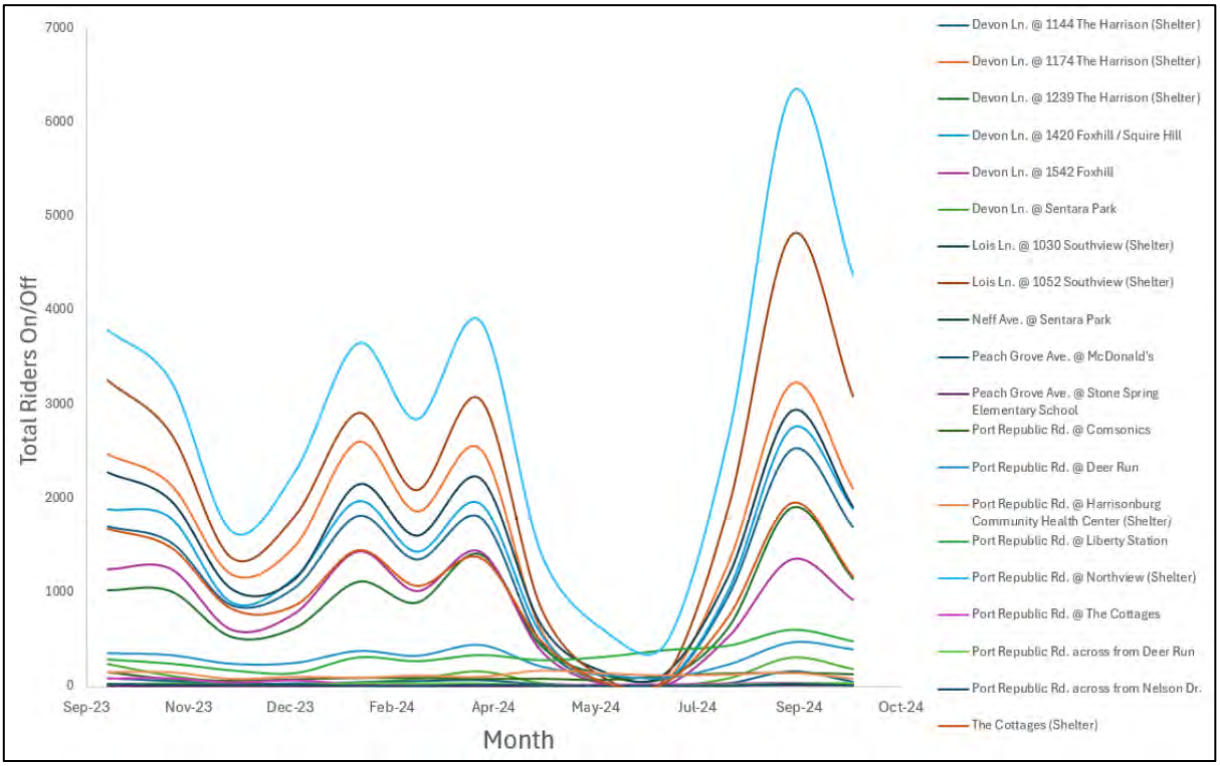

Figure 11 Transit Ridership by Month

Multimodal Traffic Counts and Vehicular Speed Data

The VHB team collected several types of traffic volume and speed data on Tuesday October 22nd and Wednesday October 23rd, 2024, days representative of typical weekday traffic conditions when JMU is in session. Data collection specifically included twelve hours (6 AM – 6 PM) of turning movement counts (TMCs) at four of the study intersections, with the City of Harrisonburg providing TMCs for the fifth study intersection at Port Republic Road / Devon Lane. These intersection counts included both pedestrians and bicyclists in addition to vehicular counts. **Figure 12** displays the computed peak hour TMCs for the five study intersections – 8:15-9:15 AM and 4:30-5:30 PM. At the Port Republic Road / Peach Grove Avenue / Neff Avenue intersection, there were 62 crossing pedestrians across twelve hours, two-thirds of whom crossed the Peach Grove Avenue approach, plus 17 on-road bicycles.

Additionally, at four locations, the team collected 48 hours of volume by lane and speed data. **Figure 13** synthesizes by travel direction the 24-hour average daily traffic (ADT), the 50th percentile operating speed (i.e., average speed), and the 85th percentile operating speed (i.e., the speed at which 85% of traffic travels at or below). Analysis of the volume and speed data is presented in Report Chapter 3.

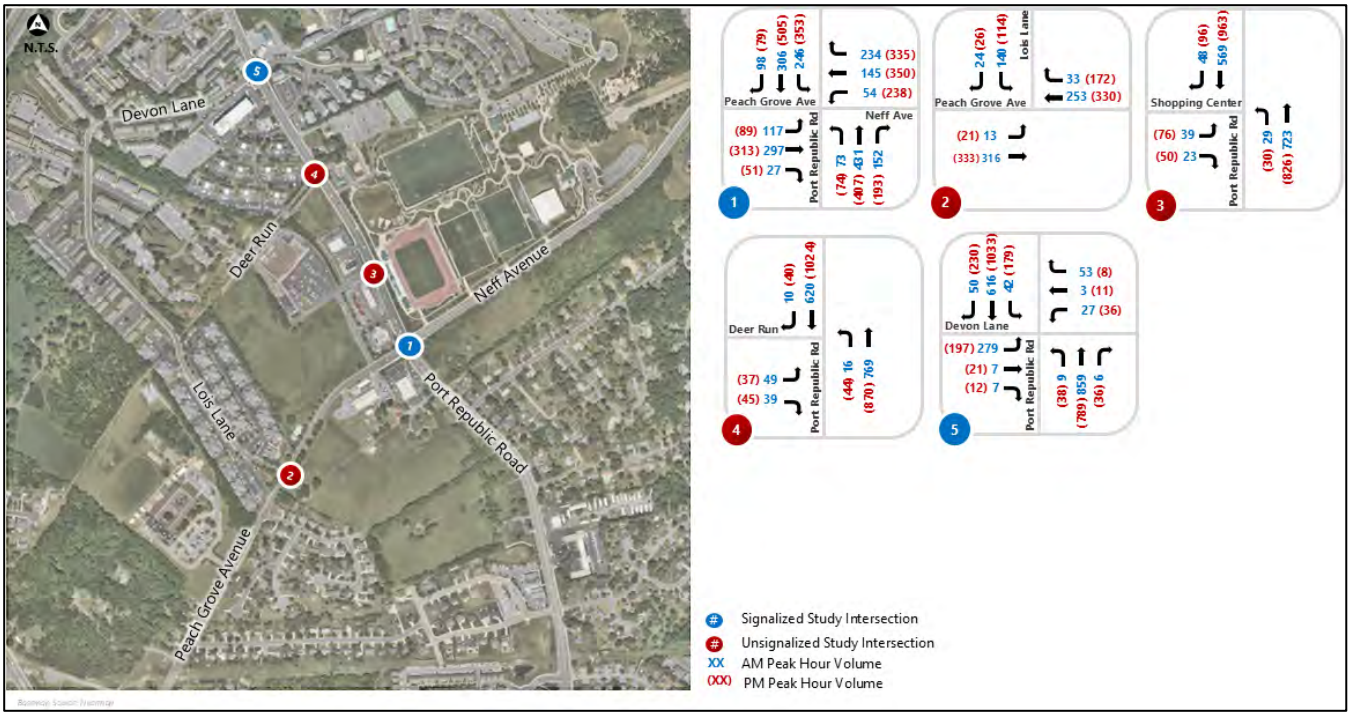

Figure 12 Peak Hour Intersection Turning Movement Counts (TMCs)

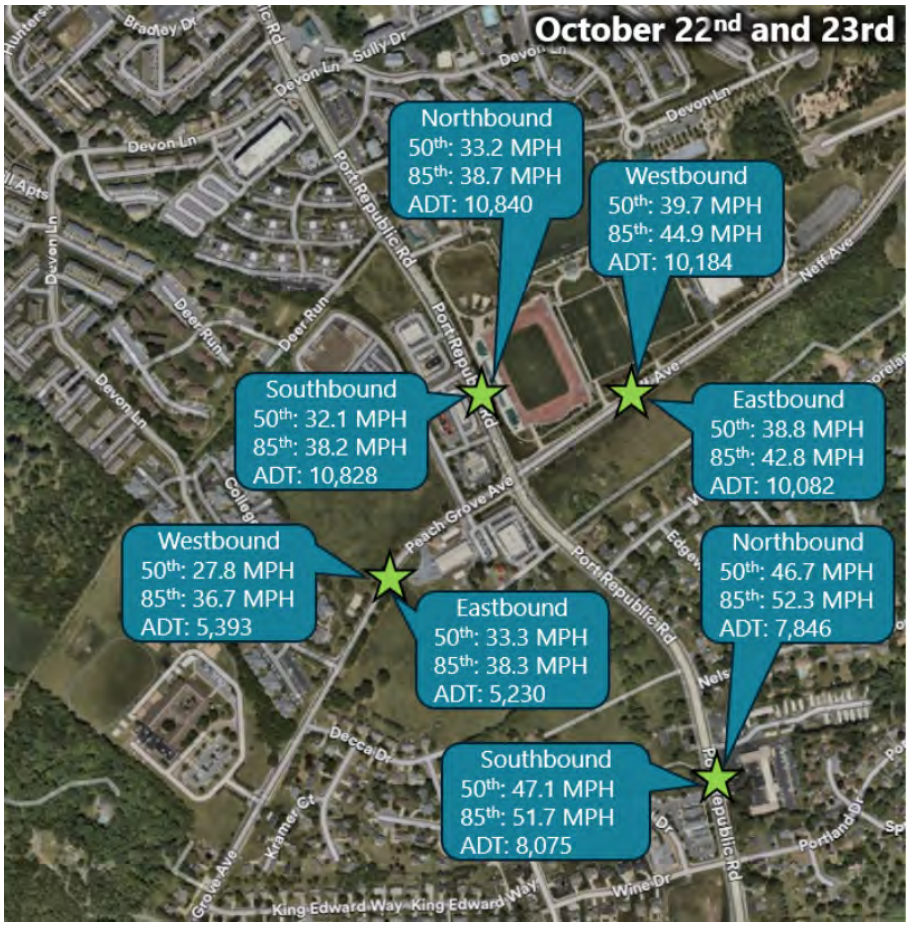

Figure 13 Roadway Operating Speed and Average Daily Traffic (ADT) by Travel Direction

Crash Data

To analyze and review the crash experience in the study area, VHB retrieved five (5) years of crash data (2019-2023) from the VDOT crash database. This time window includes around a year and a half between 2020 and 2021 when JMU students were full-time remote, which depressed local vehicle traffic volume and likely crash totals; this five-year crash data may be slightly under-representative of a typical five-year window. **Table 1** summarizes the 2019-2023 crash data. Of the nearly 150 crashes that occurred, approximately one-third were rear end collisions and over 40% were angle crashes. Approximately 25% of the crashes (38) resulted in injury, including six severe injuries. Additionally, around one-third of the crashes occurred in darkness conditions (with roadway lighted), slightly over half involved a young driver (15-21 years old), eleven crashes involved impairment (alcohol, drugs, drowsiness), and 22 crashes involved driver distraction. Chapter 3 of this report (Existing Conditions Analysis) analyzes crash patterns further, including specific location trends.

Table 1 Five-Year Crash Summary

2019-2023 Crashes	Crash Severity				
Collision Typology	A. Severe Injury	B. Visible Injury	C. Nonvisible Injury	PDO. Property Damage Only	**Total**
Rear End	1	3	5	41	**50**
Deer				2	**2**
Pedestrian	1	3			**4**
Backed Into				1	**1**
Other				2	**2**
Angle	4	11	6	43	**64**
Head On			2	9	**11**
Sideswipe - Same Direction		1		9	**10**
Sideswipe - Opposite Direction				3	**3**
Fixed Object - Off Road			1		**1**
Total	**6**	**18**	**14**	**110**	**148**

Additional Data

In addition to the previously referenced data, VHB also obtained the following information:

- Roadway design plans for Port Republic Road, Peach Grove Avenue, and Neff Avenue
- GIS data including 2-foot contours, easements, parcel boundaries, stormwater infrastructure, light utility poles, sewer and water lines
- Traffic signal phasing/timing plans for the two study area signalized intersections
- HRMPO Travel Demand Model
- Details for planned land-use development projects within the study area
- Existing comprehensive and master plans for City of Harrisonburg, Rockingham County, and JMU

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Existing Conditions Analysis

VHB completed detailed analysis on the existing conditions to establish the baseline operating conditions of the study area, including vehicle speeds along Peach Grove Avenue, five-year crash history, and intersection capacity. These analyses inform the identification of multimodal transportation challenges that could be mitigated by proposed improvements identified in future phases of this small area study.

Peach Grove Avenue Speed Study

In existing conditions, the entire three-quarter mile segment of Peach Grove Avenue between Stone Spring Road and Port Republic Road, including both the portion in Rockingham County maintained by VDOT and the portion in the City of Harrisonburg maintained by the City, is posted at 25 MPH. Per VDOT, a previously completed speed study established this 25 MPH speed limit for the corridor. As part of the October 2024 data collection effort, the VHB team gathered new 48-hour speed data on Peach Grove Avenue, at a location approximately 675 feet southwest of Port Republic Road and 550 feet northeast of Lois Lane. **Figure 13** previously displayed this data by travel direction; **Table 2** documents the raw data plus the average bidirectional speed.

Table 2 Peach Grove Avenue Speed Data

Speed Metric	Westbound Speed	Eastbound Speed	Average Speed
50th Percentile Speed	27.8 MPH [1]	33.3 MPH	31 MPH
85th Percentile Speed	36.7 MPH [1]	38.3 MPH	37 MPH

Source: October 22nd – 23rd, 2024 Speed Data Collection.

1 Westbound Peach Grove Avenue speeds are likely lower than eastbound speeds because the VHB team gathered the speed data just west of a horizontal roadway curve (as seen in **Figure 13**), which likely restricts the westbound operating speeds within this segment.

VHB utilized USLIMITS2, an industry standard tool developed by the Federal Highway Administration, to help conduct a speed study for Peach Grove Avenue. The tool considers factors such as vehicular operating speed (50th and 85th percentile), AADT, roadway characteristics and geometric conditions, land use context, crash rates, presence of on-street parking, and multimodal activity. Data gathered and calculated for entry into USLIMITS2 was as follows:

- One (1) traffic signal
- Thirteen (13) driveways
- 10,600 AADT
- 151 crashes per 100M Vehicle Miles Traveled (VMT) – below the critical 375 crashes per 100M VMT threshold
- 41 injury crashes per 100M VMT – below the critical 130 injury crashes per 100M VMT threshold
- No on-street parking
- On-road, unbuffered bike lane
- Predominantly residential land use, elementary school

USLIMITS2 defaults to a speed limit based on the 85th percentile operating speed rounded to the nearest 5 MPH increment. If crash rate, signal / driveway density, or qualitative assessment of bike/pedestrian activity thresholds are exceeded, then USLIMITS2 recommends a speed limit based on the 50th percentile operating speed rounded to the nearest 5 MPH increment. While the Peach Grove Avenue corridor exceeds neither the crash rate nor signal/driveway density thresholds, based on USLIMITS2 documentation, the corridor does meet the qualitative assessment of bike/pedestrian activity as high. This determination is based on the nearby residential land use density and the presence of pedestrian infrastructure. Since bike/pedestrian activity is high, USLIMITS2 recommends a 30 MPH speed limit for Peach Grove Avenue, which corresponds to the nearest 5 MPH increment to the 31 MPH 50th percentile operating speed. **Appendix A** contains the USLIMITS2 report.

While USLIMITS2 recommends a 30 MPH speed limit for Peach Grove Avenue, there are potential reasons to maintain the existing 25 MPH speed limit. One design reason is limited intersection sight distance at Decca Drive and King Edwards Way, both unsignalized intersections located on the slopes of the Peach Grove Avenue vertical crest curve that "peaks" near Stone Spring Elementary School. This vertical curvature limits the sight distance left at Decca Drive and the sight distance right at King Edwards Drive. The 35 MPH design speed requisite sight distances (**Table 3**) – roughly corresponding to a 30 MPH posted speed limit – appear to exceed the available sight distance based on available aerial and street imagery, which would restrict posting the 30 MPH speed limit. In contrast, the requisite sight distances for a 30 MPH design speed (existing 25 MPH speed limit) appear to be met.

Table 3 Peach Grove Avenue Intersection Sight Distance

Design Speed	Corresponding Posted Speed	Decca Drive Stopping Distance Left	King Edwards Way Stopping Distance Right
30 MPH	25 MPH	355 feet	375 feet
35 MPH	30 MPH	415 feet	440 feet

Source: VDOT *Roadway Design Manual (RDM), Appendix F,* Table 2-5 Intersection Sight Distance, 3-Lane Road.

Another reason to maintain the existing 25 MPH speed limit is to limit the speed differential between westbound vehicles and bicycles in the adjacent, unbuffered bike lane. The greatest safety risk for two

road users traveling in the same direction often comes from speed differential magnitude. Research has shown that increasing the posted speed limit will increase vehicular operating speeds as well. Finally, the presence of Stone Spring Elementary School – and the vulnerable road users associated with it – justify maintenance of the existing 25 MPH speed limit. The City of Harrisonburg indicated that an increase to a 30 MPH speed limit would need to be accompanied by the introduction of a school zone reduced speed limit of 25 MPH. For all the reasons mentioned here, VHB recommends maintenance of the existing 25 MPH posted speed limit in conjunction with the exploration of speed management techniques to reduce vehicular operating speeds on Peach Grove Avenue. This recommendation aligns with feedback received during the December 17th, 2024, stakeholder meeting. The future alternatives analysis section of this report will document potential options.

Detailed Crash Analysis

VHB completed a detailed analysis of the five-year crash data. The following report section documents the crash trends and findings at each of the five study intersections, building on the crash data introduced in the Data Collection Chapter.

Port Republic Road / Peach Grove Avenue / Neff Avenue

Eighty-five (85) crashes occurred at the Port Republic Road / Peach Grove Avenue / Neff Avenue intersection between 2019 and 2023. **Figure 14** displays the crash diagram for these collisions, illustrating the involved vehicles, location within the intersection, collision type, crash severity, and weather condition. VHB identified the following crash trends and characteristics:

- 46% of the crashes were rear end collisions.
- 30% of the crashes were angle collisions.
- 62% of the crashes involved young drivers (15-21 years old).
- Four (4) crashes – all angle collision types – resulted in severe injury.
- Eleven (11) crashes involved distracted drivers.
- There is a significant crash pattern of northbound thru vehicles conflicting with southbound left turns – twenty-two (22) total crashes, and fourteen (14) of these occurred at night.
- North of the intersection, drivers appear to be turning left into the McDonald's / Dunkin driveway from the inside thru lane on Port Republic Road, which is resulting in some rear end collisions.
- Improper driver action cited in the crashes:
  - Thirty-six (36) crashes involved a driver cited for "Failure to Yield Right of Way," including sixteen (16) drivers heading southbound, eleven (11) drivers heading eastbound, three (3) drivers heading westbound, and six (6) drivers heading northbound. There is existing protected-permissive left-turn phasing, which could contribute to these totals.
  - Nineteen (19) crashes involved a driver cited for "Following Too Close."
  - Seven (7) crashes involved a driver cited for "Improper Turns" (e.g., too wide, cut corner).
  - Five (5) crashes involved a driver cited for "Disregard Traffic Control" (e.g., ran red light).
  - Four (4) crashes involved a driver cited for "Improper/Unsafe Lane Change."
  - Three (3) crashes involved a driver cited for "Failure to Maintain Proper Control."

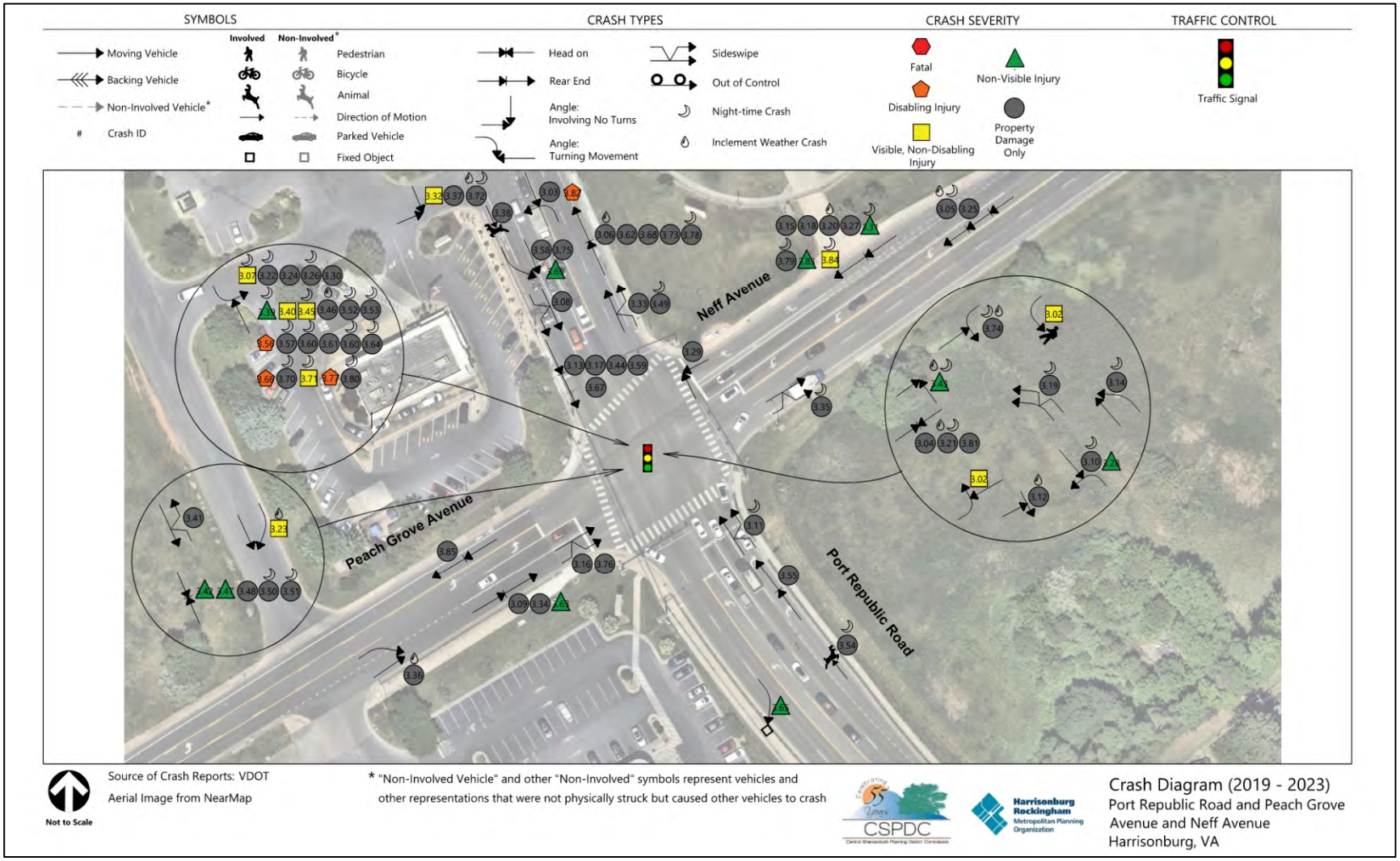


Figure 14 Crash Diagram: Port Republic Road / Peach Grove Avenue / Neff Avenue

Regarding the twenty-two crashes involving the combination of a southbound left turn vehicle and a northbound thru vehicle on Port Republic Road, it appears that sight distance may be a contributing factor to accurately judging permissive left turn gaps. **Figure 15** shows the view from the southbound left turn towards the northbound approach – the horizontal curvature combined with the roadside visual obstructions on the inside of the curve limit available sight distance.

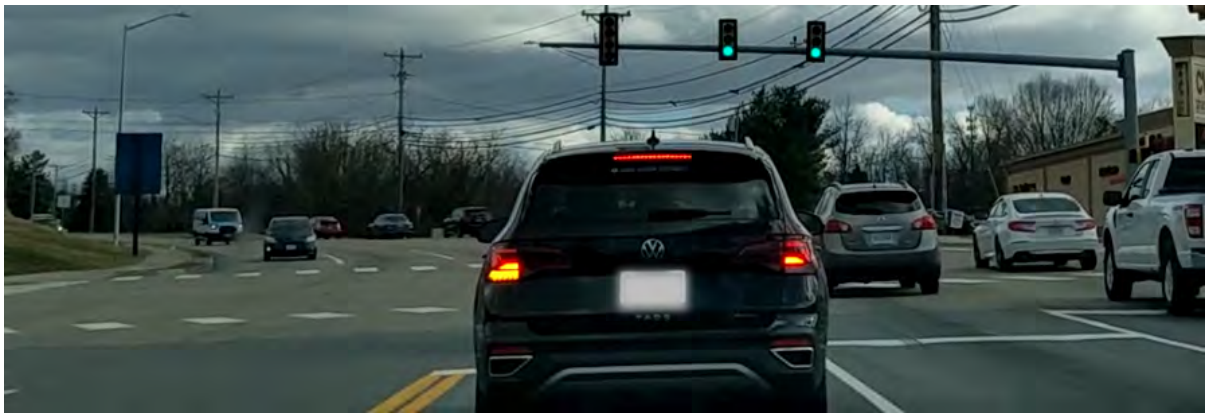


Figure 15 Southbound Port Republic Road Left Turn View of Northbound Travel Lanes

Peach Grove Avenue / Lois Lane

Four (4) crashes occurred at the Port Republic Road / Lois Lane intersection between 2019 and 2023. **Figure 16** displays the crash diagram for these collisions, illustrating the involved vehicles, location within the intersection, collision type, crash severity, and weather condition. VHB identified the following crash trends and characteristics:

- One (1) crash was a rear end collision.
- Three (3) of the crashes were angle collisions – two (2) involved an eastbound driver who did not have right of way and collided with a southbound driver.
- One (1) angle crash resulted in a visible injury.
- Two (2) crashes involved distracted drivers.
- Two (2) crashes involved young drivers (15-21 years old).

Port Republic Road / Shopping Center Driveway

Fifteen (15) crashes occurred at the Port Republic Road / Shopping Center Driveway intersection between 2019 and 2023. **Figure 17** displays the crash diagram for these collisions, illustrating the involved vehicles, location within the intersection, collision type, crash severity, and weather condition. VHB identified the following crash trends and characteristics:

- 53% of the crashes were angle collisions.
- 53% of the crashes involved young drivers (15-21 years old).
- One (1) pedestrian crash occurred that resulted in a visible injury. A driver turning right out of the shopping center onto southbound Port Republic Road struck a pedestrian crossing the driveway.
- Ten (10) crashes involved a driver cited for "Did Not Have Right-of-Way," including four (4) drivers heading northbound and four (4) drivers heading eastbound.

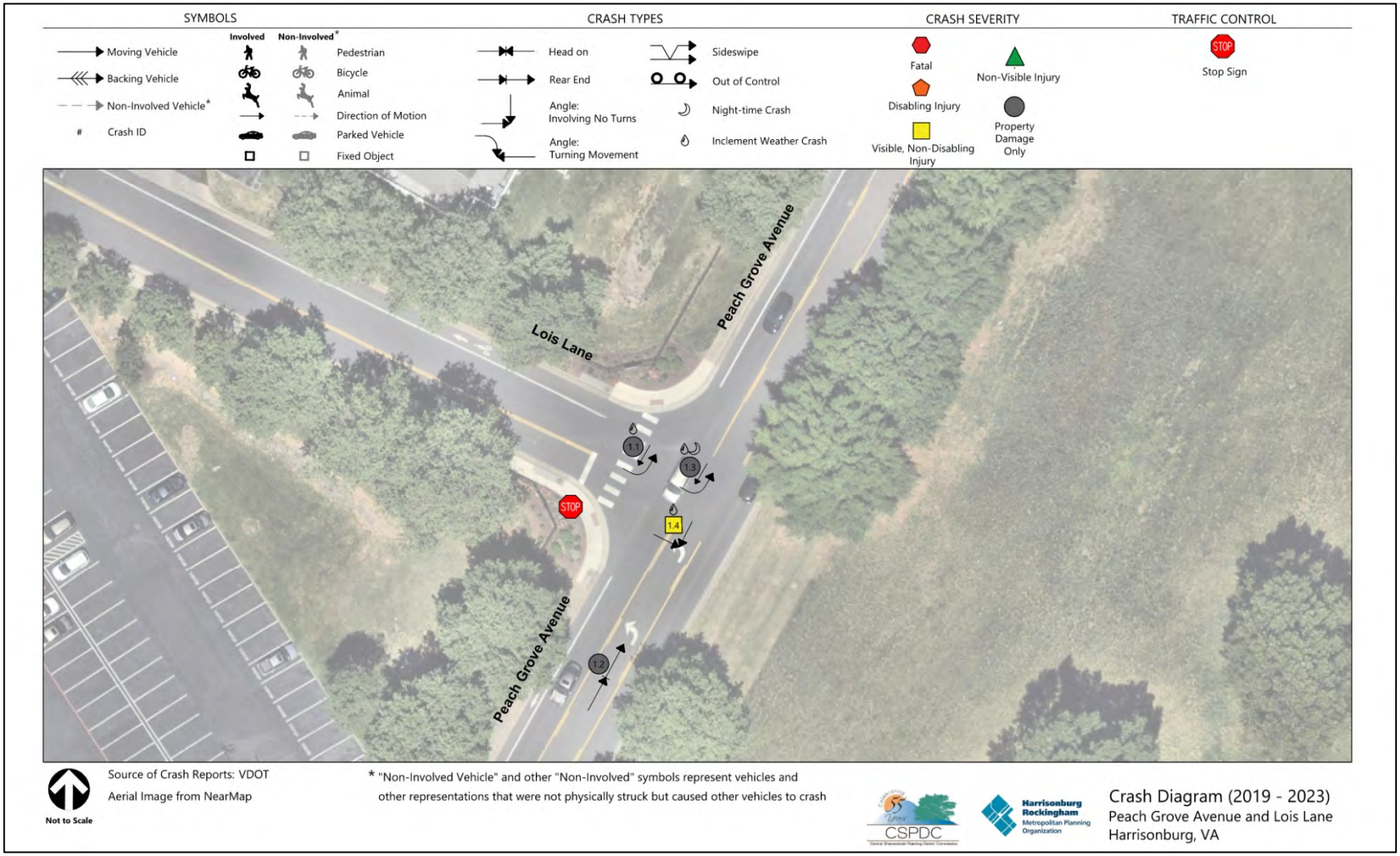


Figure 16 Crash Diagram: Peach Grove Avenue / Lois Lane

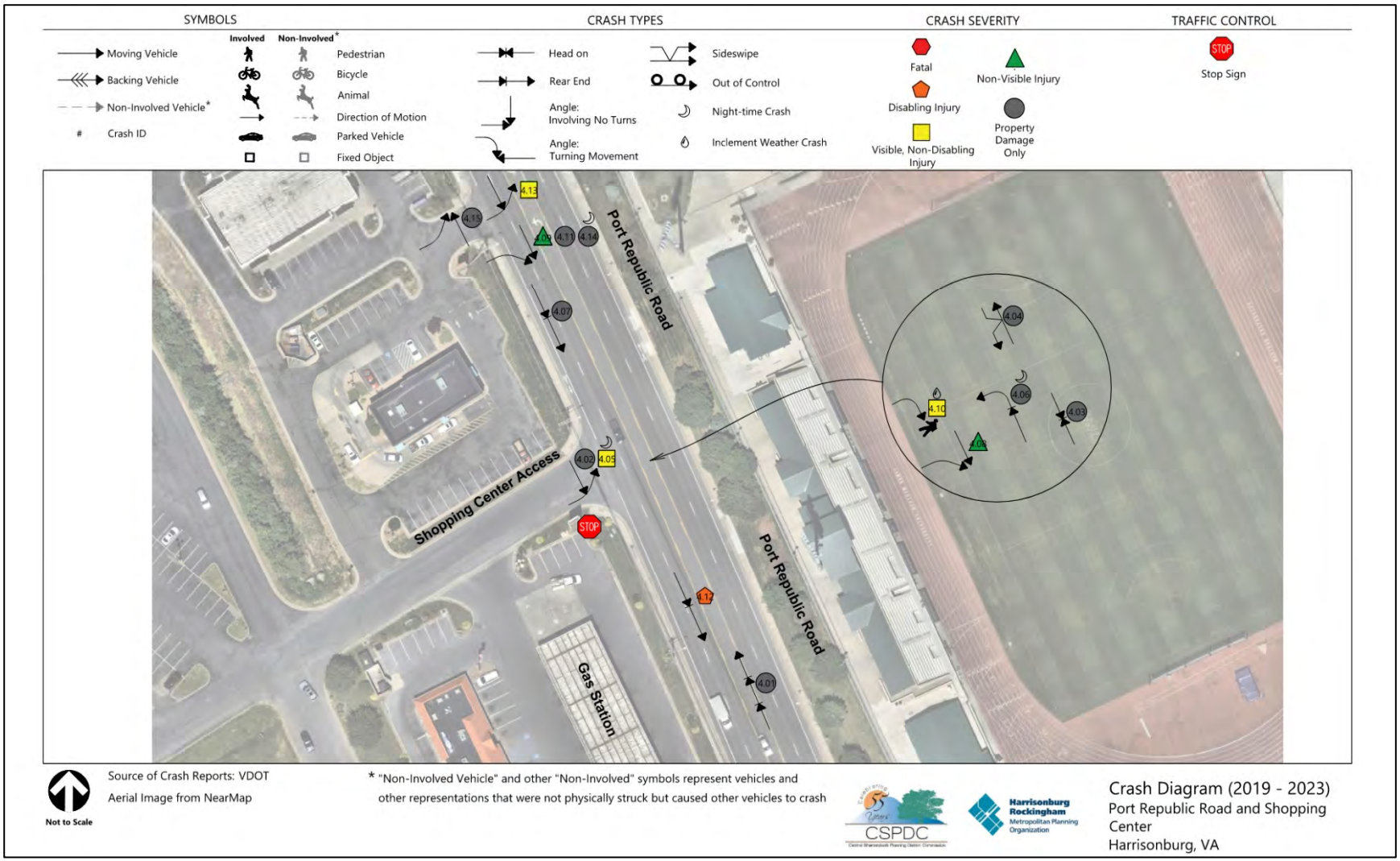


Figure 17 Crash Diagram: Port Republic Road / Shopping Center Driveway

Port Republic Road / Deer Run

Six (6) crashes occurred at the Port Republic Road / Deer Run intersection between 2019 and 2023. **Figure 19** displays the crash diagram for these collisions, illustrating the involved vehicles, location within the intersection, collision type, crash severity, and weather condition. VHB identified the following crash trends and characteristics:

- 67% of the crashes were rear end collisions.
- Improper driver action cited in the crashes:
  - Four (4) drivers were cited for "Following Too Close," including two (2) drivers heading northbound.
  - One (1) driver was cited for "Hit and Run" in a pedestrian crash.
  - One (1) driver was cited for "Failure to Maintain Proper Control."

Port Republic Road / Devon Lane

Thirty-eight (38) crashes occurred at the Port Republic Road / Devon Lane intersection between 2019 and 2023. **Figure 20** displays the crash diagram for these collisions, illustrating the involved vehicles, location within the intersection, collision type, crash severity, and weather condition. VHB identified the following crash trends and characteristics:

- 42% of the crashes were rear end collisions.
- 37% of the crashes were angle collisions.
- 53% of the crashes involved young drivers (15-21 years old), including six (6) angle collisions and six (6) rear end collisions.
- Improper driver action cited in the crashes:
  - Fifteen (15) drivers were cited for "Following Too Close," including nine (9) drivers heading northbound. **Figure 18** shows the northbound signal heads, which due to location at top of crest curve, may be visually lost in the horizon.
  - Eleven (11) drivers were cited for "Failure to Yield Right of Way," including two (2) drivers heading southbound, six (6) drivers heading eastbound, one (1) driver heading westbound, and two (2) drivers heading northbound. Most of the crashes involving the six drivers heading eastbound occurred at intersection-adjacent driveways rather than at the intersection.
  - Two (2) drivers were cited for "Improper Turns" (e.g., too wide).
  - Two (2) drivers were cited for "Disregard Traffic Control."
  - Two (2) drivers were cited for "Improper/Unsafe Lane Change."
  - Two (2) drivers were cited for "Hit and Run."
  - One (1) driver was cited for "Failure to Maintain Proper Control."

Figure 18 Northbound Approach at Devon Lane

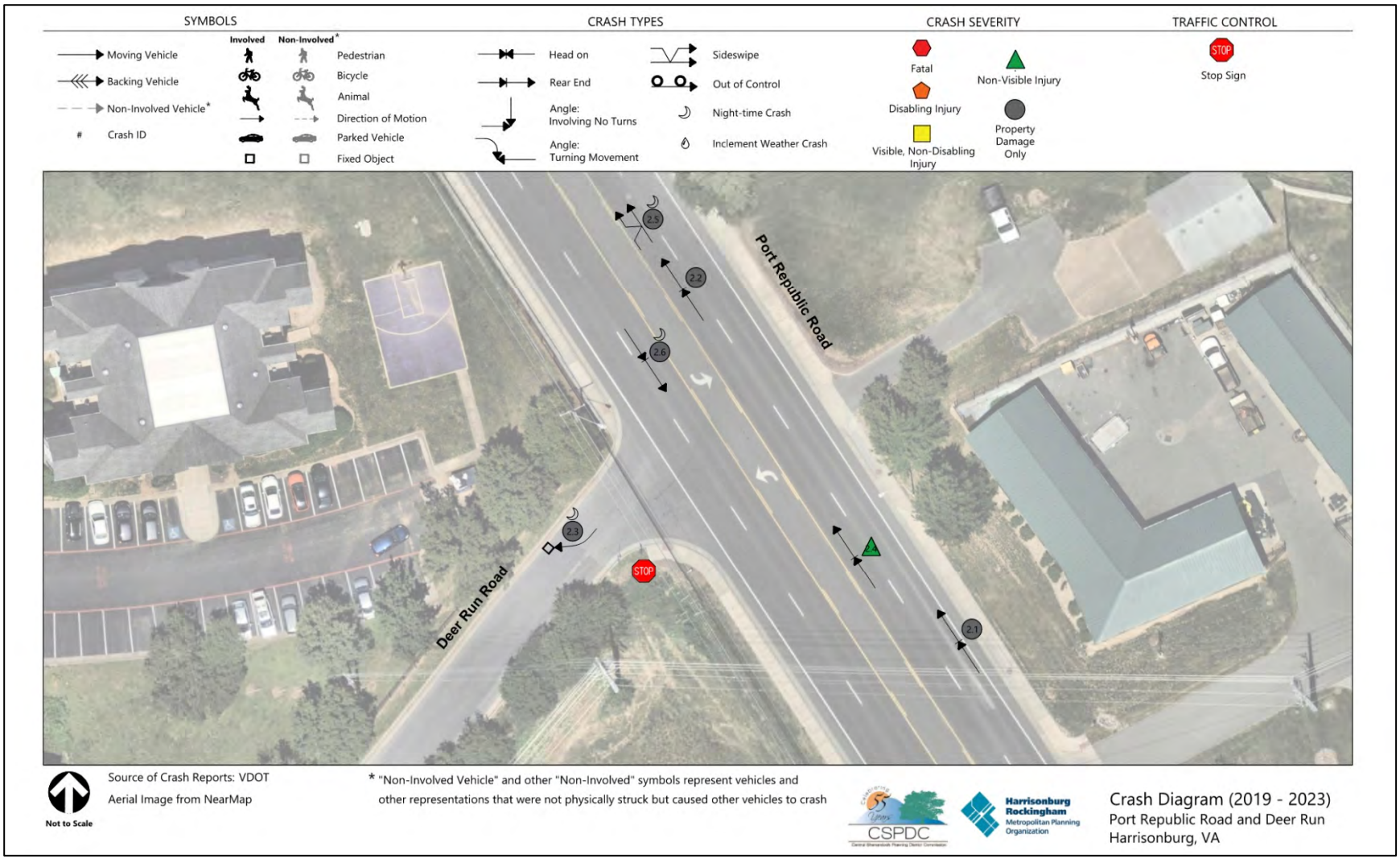


Figure 19 Crash Diagram: Port Republic Road / Deer Run

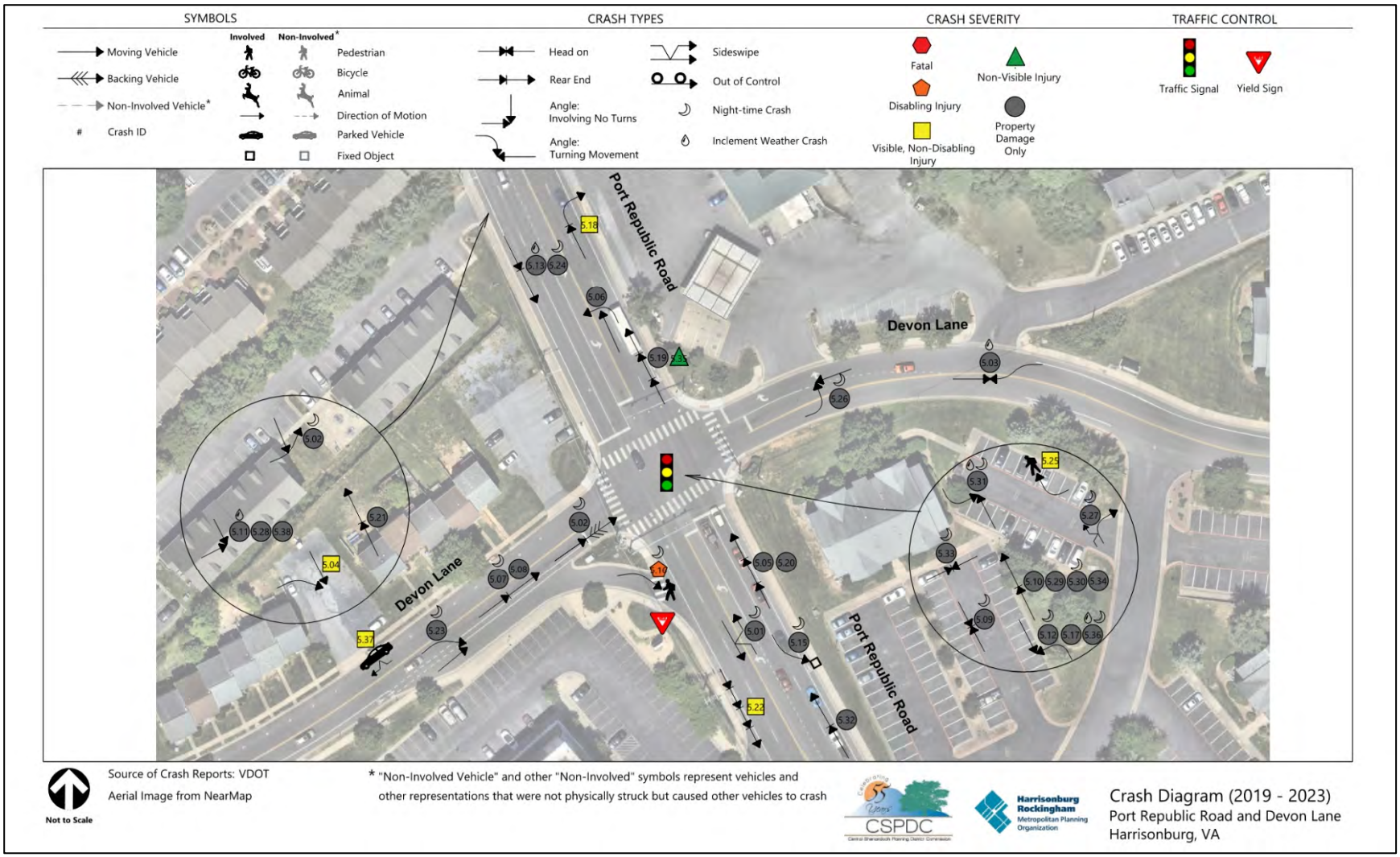


Figure 20 Crash Diagram: Port Republic Road / Devon Lane

Existing Conditions Operations Analysis

VHB completed a detailed analysis of the existing study intersection operational performance by modeling the AM and PM peak hour conditions in *Synchro/SimTraffic* software. VHB conducted its analysis in accordance with VDOT's *Traffic Operations and Safety Analysis Manual (TOSAM).* The following report section documents the existing conditions operational performance findings at each of the five study intersections. **Appendix B** contains *SimTraffic* output reports.

Port Republic Road / Peach Grove Avenue / Neff Avenue

Table 4 documents the AM and PM peak hour operational performance findings for the Port Republic Road / Peach Grove Avenue / Neff Avenue intersection, including movement delay (seconds), associated Level of Service, and queuing metrics. VHB identified the following operational constraints in existing conditions:

- Traffic is blocked from entering the northbound Port Republic Road left turn lane during 22% of the AM peak hour and 33% of the PM peak hour, leading to green time starvation.
- During the PM peak hour, the westbound Neff Avenue thru movement experiences more than 55 seconds of average delay per vehicle and 95th percentile queue lengths nearing 700 feet. This queuing blocks traffic from entering the right turn lane during 22% of the peak hour, leading to green time starvation.
- The southbound left turn from Port Republic Road onto Neff Avenue appears to be approaching capacity, particularly in the PM peak hour. This movement experiences nearly 55 seconds of average delay per vehicle and vehicle queues extend beyond the storage lane during 36% of the peak hour.
- During the PM peak hour, southbound Port Republic Road queue lengths of greater than 450 feet significantly limit the ability of traffic to turn left at the shared Circle K / McDonald's driveway and nearly limit the ability of traffic to turn left at the Shopping Center driveway – queue lengths extend to the driveway about 1% of the peak hour.

Table 4 Existing Operations: Port Republic Road / Peach Grove Avenue / Neff Avenue

Approach	Movement	Movement Delay (sec)	Level of Service (LOS)	95th Queue (feet)	Maximum Queue (feet)	Upstream Block Time (%)[1]	Storage Block Time (%)[2]	Storage / Link Distance (feet)
AM Peak Hour								
Eastbound Peach Grove Ave	Left	26.8	C	126	139	0	1	140
	Thru	25.8	C	162	211	0	2	1,220
	Right	17.4	B	156	198	0	0	250
Westbound Neff Avenue	Left	23.3	C	75	87	0	-	1,400
	Thru	34.7	C	164	185	0	0	1,400
	Right	5.0	A	109	145	0	0	225
Northbound Port Republic Rd	Left	19.8	B	124	109	0	1	110
	Thru	24.9	C	250	293	0	22	850
	Right	4.3	A	86	141	0	0	200
Southbound Port Republic Rd	Left	29.6	C	177	150	0	8	150
	Thru	14.0	B	247	308	0	3	500
	Right	9.8	A	202	261	0	-	500
PM Peak Hour								
Eastbound Peach Grove Ave	Left	45.0	D	152	140	0	2	140
	Thru	46.4	D	274	349	0	11	1,220
	Right	33.9	C	223	243	0	0	250
Westbound Neff Avenue	Left	39.6	C	296	348	0	-	1,400
	Thru	55.1	**E**	683	741	0	22	1,400
	Right	18.8	B	292	225	0	2	225
Northbound Port Republic Rd	Left	30.2	C	127	109	0	1	110
	Thru	36.8	D	273	304	0	33	850
	Right	5.2	A	135	200	0	0	200
Southbound Port Republic Rd	Left	54.9	D	169	150	0	36	150
	Thru	24.9	C	456	471	<1	23	500
	Right	25.2	C	388	434	0	0	500

Source: SimTraffic.

1 Upstream Block Time (%) = percentage of peak hour that the queue length extends to the upstream intersection.

2 Storage Block Time (%) = percentage of peak hour that the queue length fills the turn lane storage – thus extending into the adjacent thru lane – or extends in the thru lane past the entrance to the turn lane – thus blocking traffic from entering the turn lane.

Peach Grove Avenue / Lois Lane

Table 5 documents the AM and PM peak hour operational performance findings for the Peach Grove Avenue / Lois Lane intersection, including movement delay (seconds), associated Level of Service, and queuing metrics. VHB did not identify any operational constraints in existing conditions – all movements operate with minimal delay and queuing.

Table 5 Existing Operations: Peach Grove Avenue / Lois Lane

Approach	Movement	Movement Delay (sec)	Level of Service (LOS)	95th Queue (feet)	Maximum Queue (feet)	Upstream Block Time (%)[1]	Storage Block Time (%)[2]	Storage / Link Distance (feet)
AM Peak Hour								
EB Peach Grove Ave	Left	1.8	A	22	33	0	0	50
WB Peach Grove Ave	Through / Right	0.2/0.2	A/A	0	0	0	-	1,200
Southbound Lois Lane	Left/Right	8.8/5.5	A/A	89	120	0	-	800
PM Peak Hour								
EB Peach Grove Ave	Left	4.5	A	32	35	0	0	50
WB Peach Grove Ave	Through / Right	0.1/0.1	A/A	10	21	0	-	1,200
Southbound Lois Lane	Left/Right	14.1/9.0	B/A	99	128	0	-	800

Source: SimTraffic.

1 Upstream Block Time (%) = percentage of peak hour that the queue length extends to the upstream intersection.

2 Storage Block Time (%) = percentage of peak hour that the queue length fills the turn lane storage – thus extending into the adjacent thru lane – or extends in the thru lane past the entrance to the turn lane – thus blocking traffic from entering the turn lane.

Port Republic Road / Shopping Center

Table 6 documents the AM and PM peak hour operational performance findings for the Port Republic Road / Shopping Center intersection, including movement delay (seconds), associated Level of Service, and queuing metrics. VHB identified the following operational constraints in existing conditions:

› In the PM peak hour, traffic turning left from the Shopping Center onto northbound Port Republic Road experiences 38 seconds of average delay per vehicle (LOS E), which is due to challenges associated with finding a gap in Port Republic Road traffic as well as southbound Port Republic Road queue spillback from the Peach Gove Avenue / Neff Avenue intersection.

Port Republic Road / Deer Run

Table 7 documents the AM and PM peak hour operational performance findings for the Port Republic Road / Deer Run intersection, including movement delay (seconds), associated Level of Service, and queuing metrics. VHB identified the following operational constraints in existing conditions:

› In the PM peak hour, traffic turning left from Deer Run onto northbound Port Republic Road experiences 30 seconds of average delay per vehicle (LOS D), which is due to challenges associated with finding a gap in Port Republic Road traffic.

Table 6 Existing Operations: Port Republic Road / Shopping Center

Approach	Movement	Movement Delay (sec)	Level of Service (LOS)	95th Queue (feet)	Maximum Queue (feet)	Upstream Block Time (%)[1]	Storage Block Time (%)[2]	Storage / Link Distance (feet)
AM Peak Hour								
EB Shopping Center	Left/Right	12.7/6.1	B/A	62	81	0	-	525
NB Port Republic Rd	Left	3.2	A	32	33	0	0	50
SB Port Republic Rd	Thru/Right	0.0/0.0	A/A	6	9	0	-	750
PM Peak Hour								
EB Shopping Center	Left/Right	38.1/23.5	E C	134	160	0	-	525
NB Port Republic Rd	Left	10.5	B	44	47	0	1	50
SB Port Republic Rd	Thru/Right	0.1/0.0	A/A	7	13	0	-	750

Source: SimTraffic.

1 Upstream Block Time (%) = percentage of peak hour that the queue length extends to the upstream intersection.

2 Storage Block Time (%) = percentage of peak hour that the queue length fills the turn lane storage – thus extending into the adjacent thru lane – or extends in the thru lane past the entrance to the turn lane – thus blocking traffic from entering the turn lane.

Table 7 Existing Operations: Port Republic Road / Deer Run

Approach	Movement	Movement Delay (sec)	Level of Service (LOS)	95th Queue (feet)	Maximum Queue (feet)	Upstream Block Time (%)[1]	Storage Block Time (%)[2]	Storage / Link Distance (feet)
AM Peak Hour								
EB Deer Run	Left/Right	14.9/7.6	B/A	76	98	0	-	625
NB Port Republic Rd	Left	3.3	A	27	38	0	0	50
SB Port Republic Rd	Thru/Right	0.1/0.1	A/A	15	26	0	-	800
PM Peak Hour								
EB Deer Run	Left/Right	29.6/13.1	D/B	86	114	0	-	625
NB Port Republic Rd	Left	12.3	B	57	62	0	3	50
SB Port Republic Rd	Thru/Right	0.2/0.2	A/A	9	17	0	-	800

Source: SimTraffic.

1 Upstream Block Time (%) = percentage of peak hour that the queue length extends to the upstream intersection.

2 Storage Block Time (%) = percentage of peak hour that the queue length fills the turn lane storage – thus extending into the adjacent thru lane – or extends in the thru lane past the entrance to the turn lane – thus blocking traffic from entering the turn lane.

Port Republic Road / Devon Lane

Table 8 documents the AM and PM peak hour operational performance findings for the Port Republic Road / Devon Lane intersection, including movement delay (seconds), associated Level of Service, and queuing metrics. VHB identified the following operational constraints in existing conditions:

- During the AM and PM peak hour, the eastbound Devon Lane left turn and thru movements experience significant delay – more than 60 seconds of average delay per vehicle in the AM peak and approximately 85 seconds of average delay per vehicle in the PM peak – as well as approximately 500 feet of queuing, which blocks traffic from entering the right turn lane about 30% of the peak hour.
- During the AM and PM peak hour, the westbound Devon Lane left turn and thru movements experience significant delay – more than 60 seconds of average delay per vehicle in the AM peak and approximately 70 seconds of average delay per vehicle in the PM peak.

Table 8 Existing Operations: Port Republic Road / Devon Lane

Approach	Movement	Movement Delay (sec)	Level of Service (LOS)	95th Queue (feet)	Maximum Queue (feet)	Upstream Block Time (%)[1]	Storage Block Time (%)[2]	Storage / Link Distance (feet)
AM Peak Hour								
Eastbound Devon Lane	Left	67.4	**E**	473	542	0	29	1,000+
	Thru	60.2	**E**	473	542	0	29	1,000+
	Right	17.5	B	68	157	0	0	175
Westbound Devon Lane	Left	60.4	**E**	60	65	0	2	75
	Thru	65.3	**E**	60	65	0	2	75
	Right	9.9	A	63	82	0	0	1,000+
Northbound Port Republic Rd	Left	34.8	C	55	89	0	0	210
	Thru	11.3	B	292	321	0	4	800
	Right	7.6	A	292	321	0	-	800
Southbound Port Republic Rd	Left	28.7	C	63	74	0	0	310
	Thru	14.3	B	259	295	0	0	430
	Right	8.8	A	236	272	0	-	430
PM Peak Hour								
Eastbound Devon Lane	Left	88.8	**F**	465	488	0	30	1,000+
	Thru	84.6	**F**	465	488	0	30	1,000+
	Right	33.1	C	93	157	0	0	175
Westbound Devon Lane	Left	70.4	**E**	80	72	0	11	75
	Thru	70.2	**E**	80	72	0	11	75
	Right	10.3	B	83	101	0	0	1,000+
Northbound Port Republic Rd	Left	34.4	C	87	121	0	0	210
	Thru	9.6	A	222	260	0	1	800
	Right	8.1	A	222	260	0	-	800
Southbound Port Republic Rd	Left	19.8	B	238	309	0	0	310
	Thru	12.1	B	425	478	0	3	430
	Right	10.9	B	425	478	0	-	430

Source: SimTraffic.

1 Upstream Block Time (%) = percentage of peak hour that the queue length extends to the upstream intersection.

2 Storage Block Time (%) = percentage of peak hour that the queue length fills the turn lane storage – thus extending into the adjacent thru lane – or extends in the thru lane past the entrance to the turn lane – thus blocking traffic from entering the turn lane.

4

Future Transportation Demand Projections

VHB projected future transportation demand by establishing a traffic forecasting methodology and growing the existing volumes to the 2045 study horizon year. This growth incorporated historical trends as well as all active nearby development projects. VHB then conducted a No Build 2045 operations analysis to identify constraints in existing intersection designs under projected transportation demand. The No Build 2045 operations results are then used as a baseline to evaluate the operational benefits of potential roadway improvements.

Traffic Forecasting

There are a variety of different data sources that can be compiled and utilized to determine appropriate traffic forecasts for a study area. These data sources include historical traffic counts and growth trends, travel demand models (TDMs), and active development projects (e.g., residential, commercial, hospitality). VHB reviewed and analyzed these various sources, presented them to the study stakeholder group, and identified a consensus forecasting methodology.

Historical Traffic Counts and Growth Trends

VHB first looked at the historical traffic count data for Port Republic Road to calculate annual growth rates based on historical trends. Historical count data is not available for Peach Grove Avenue or Neff

Avenue as neither road is in VDOT's traffic monitoring program. **Table 9** shows 25 years of historical traffic data on Port Republic Road, derived annual linear growth rates based on that traffic data, and projected 2045 traffic growth utilizing those calculated growth rates.

Table 9 Growth Rate Projections Based on Historical Traffic Counts

Average Daily Traffic (ADT) Count Year [1]	Port Republic Road ADT north of Peach Grove Avenue / Neff Avenue (vehicles per day) [2]	Port Republic Road ADT south of Peach Grove Avenue / Neff Avenue (vehicles per day)
2000	23,493	7,164
2003	20,105	6,972
2006	24,502	6,438
2009	25,378	7,625
2012	24,199	8,383
2015	27,257	12,453
2018	28,342	14,429
2022	28,466	14,617
2024	- [3]	16,534
Growth Calculation		
Annual Linear Growth Rate	1.18%	2.47%
2024 AADT	29,499 (Estimated)	16,534 (Counted)
Overall 2024 – 2045 Growth	23%	52%
2045 Projected AADT	36,214	25,094

[1] VDOT collected actual short-term (24-72 hour) count data in these years rather than applying growth factors to count data collected in previous years.

[2] October 2024 ADT count on Port Republic Road south of Devon Lane was 21,668 VPD; therefore, these historical counts appear to have been collected north of Devon Lane and south of I-81.

[2] VDOT did not collect count data in 2024 on Port Republic Road north of Peach Grove Avenue / Neff Avenue.

Travel Demand Model

A Travel Demand Model (TDM) utilizes anticipated changes to land use and transportation infrastructure to project future traffic volumes. These models are regional, accounting for origin-destination attraction within an urbanized area. The TDM modelers typically source anticipated land use changes from Comprehensive Plans; within the TDM, these land use changes are modeled as changes to employee population, college enrollment, residential population, and residential households. **Figure 21** shows the study area vicinity's anticipated growth within the TDM; the growth is subdivided by Transportation Analysis Zones (TAZ). The Harrisonburg Rockingham Metropolitan Planning Organization Model has a base year of 2019, and a horizon year of 2045. The largest concentrations of anticipated growth are west of Port Republic Road / north of Peach Grove Avenue (TAZ 82), east of Port Republic Road / south of Neff Avenue (TAZ 113), south of Peach Grove Avenue / west of Port Republic Road (TAZ 81 and 199), and southwest of Stone Spring Road (TAZ 128). **Table 10** compares the land use growth (i.e., population and dwelling units) assumed in the TDM through 2045 to the growth currently proposed in active development projects. Active development projects are outpacing the growth assumed in the TDM.

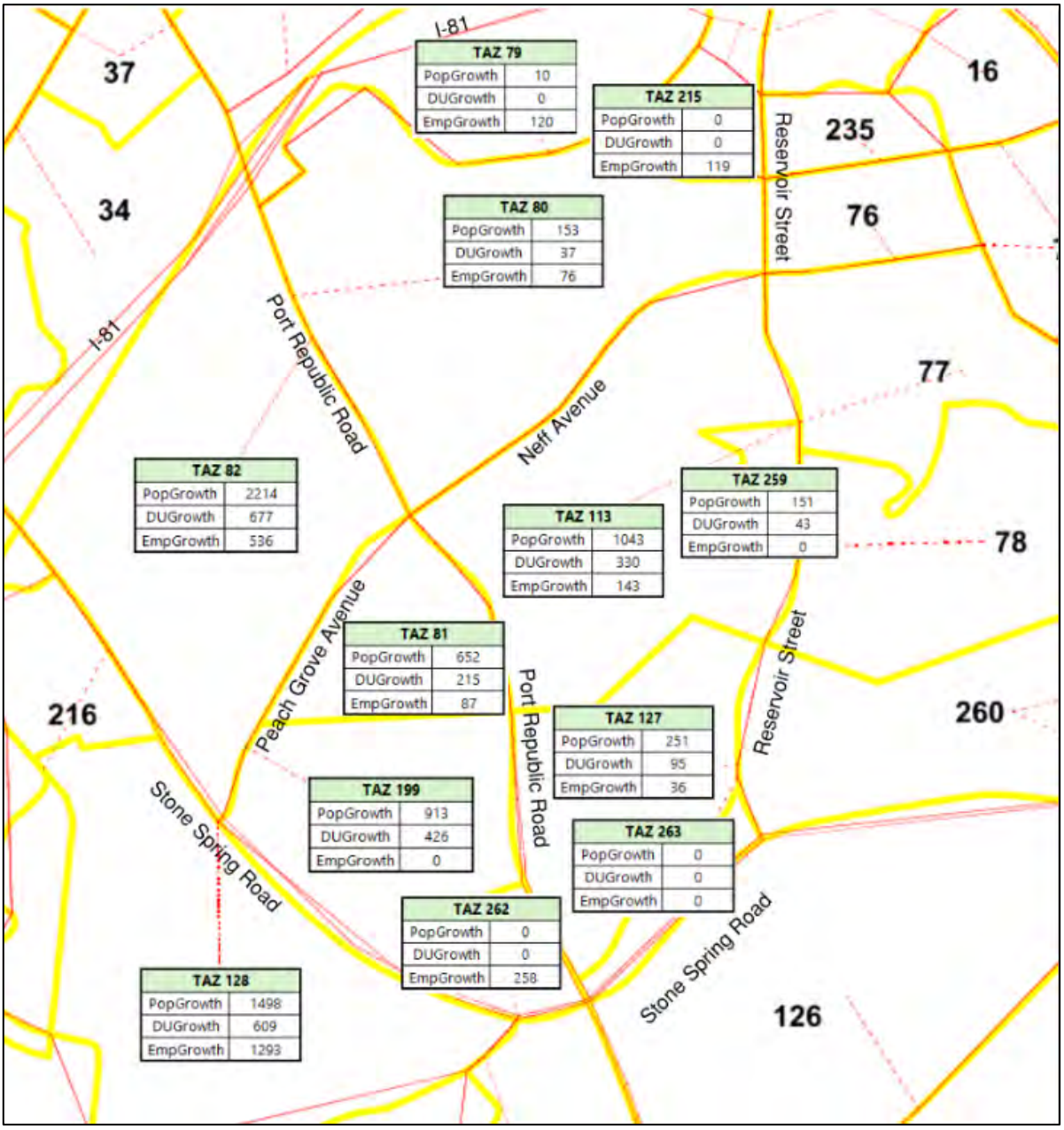


Figure 21 Travel Demand Model TAZ Growth (2019-2045)

Table 10 Comparison of Land Use Growth in Current Development Projects vs TDM

TAZ	Growth Metric	Active Development Projects	TDM Assumed Growth	Development Percentage of TDM
TAZ 80	Population	440	153	288%
	Dwelling Units	119	37	322%
TAZ 82	Population	1,584	2,214	72%
	Dwelling Units	662	677	98%
TAZ 113	Population	520	1,043	50%
	Dwelling Units	260	330	79%

Per VDOT policy, the raw outputs of a TDM should not be utilized as growth rates for a transportation study. Instead, the TDM should be validated and calibrated to actual base year traffic counts so that the TDM projected growth is applied to real – not modeled – base year traffic volumes. **Table 11** documents the raw TDM forecasts as well as the adjusted TDM forecasts following application of VDOT's methodology for validating and calibrating raw TDM results. Compared to the historical trend-based growth rates computed from the historical AADT data, these TDM derived linear growth rates for Port Republic Road are significantly smaller.

Table 11 TDM Forecast Projections: Raw and Adjusted

Road Segment	TDM 2045 AADT Forecast Unadjusted	TDM 2045 Linear Growth Rate Unadjusted	TDM 2045 AADT Forecast Adjusted	TDM 2045 Linear Growth Rate Adjusted
Port Republic Rd from I-81 to Peach Grove Ave / Neff Ave	28,270	1.00%	32,274	0.93%
Port Republic Rd from Peach Grove Ave / Neff Ave to City Limits	13,786	1.19%	16,634	1.08%
Peach Grove Ave from King Edwards Way to Port Republic Rd	9,223	5.21%	Cannot adjust TDM forecast due to lack of historical traffic data	
Neff Ave from Port Republic Rd to Reservoir St	16,869	1.47%		

After reviewing the TDM inputs and forecasts, the study stakeholder group ultimately decided not to utilize the TDM projections. This decision was primarily based upon the apparent under forecasting of the TDM regarding population growth within the study area. Study ADT counts in October 2024 already exceed 2045 TDM projections on Port Republic Road from Peach Grove Ave / Neff Ave to City Limits, Peach Grove Avenue, and Neff Avenue. The TDM decision was also based on known data and coding issues within the TDM that will be addressed within the next TDM update; notably, within the study area, this includes all traffic associated with the Sentara RMH Medical Center utilizing Boyers Road rather than Port Republic Road and Stone Spring Road.

Active Development Projects

VHB coordinated with the City of Harrisonburg to identify the following seven development projects within the immediate study area:

- Forest Hills Hotel
- Vista at Forest Hills
- 856 East
- Peach Grove Terrace Apartments
- Shoppes at Peach Grove
- Weston Park
- Neff Avenue, City-Owned property (southeast quadrant of Port Republic Road and Neff Avenue intersection). Note: this study based analysis on the highest density affordable housing development concept prepared for the City in 2023. In late January 2025, a private development was proposed but would require City Council approval; therefore, the study stakeholder group decided not to change the traffic forecasting methodology.

The study team estimated site trips for each development using the trip generation methodology outlined in the ITE *Trip Generation Manual, 11th Edition*, and then performed trip distribution and assignment for each development. The total trips projected for all seven developments was nearly 8,000 vehicles per day; the distribution and assignment for all the trips at each of the study intersections can be found in **Appendix C**.

Consensus Traffic Forecasting Methodology

The study stakeholder group identified a consensus traffic forecasting methodology that included both historical growth trends and traffic associated with active development projects. Based on the quantity of traffic that will be generated by the active development projects, the stakeholder group decided to reduce the annual linear growth rates shown in Table 10. The northern segment of Port Republic Road was reduced to 0.75% and the southern segment of Port Republic Road was reduced to 2.0%. This reduction was completed so as not to overestimate traffic growth given the quantity of active development. In the absence of historical traffic data on Peach Grove Avenue and Neff Avenue, the stakeholder group determined that the current and future land uses adjacent to Peach Grove Avenue are similar to the south segment of Port Republic Road, and the current and future land uses adjacent to Neff Avenue are similar to the north segment of Port Republic Road.

VHB thus applied a growth rate of 0.75% on the north segment of Port Republic Road and on Neff Avenue, and a growth rate of 2% on the south segment of Port Republic Road and on Peach Grove Avenue. **Table 12** shows the reduced annual linear growth rate, the 2024 AADT, the total growth between 2024 and 2045, and the projected 2045 AADT. In addition to this background growth, VHB added to the volume forecast the estimated traffic from the active development projects. **Appendix C** contains the network traffic volumes associated with each step of the traffic forecasting methodology. **Figure 22** displays the final 2045 study horizon year traffic volumes used for intersection capacity analysis.

Table 12 Recommended Background Traffic Growth Rates and AADT Projections

Growth Calculation	Port Republic Road north of Peach Grove Avenue / Neff Avenue	Port Republic Road south of Peach Grove Avenue / Neff Avenue	Peach Grove Avenue	Neff Avenue
Annual Linear Growth Rate	0.75%	2.0%	2.0%	0.75%
2024 AADT (October count)	21,700	15,900	10,600	20,300
Overall 2024 – 2045 Growth	15%	42%	42%	16%
2045 Projected AADT	25,000	22,600	15,000	23,500

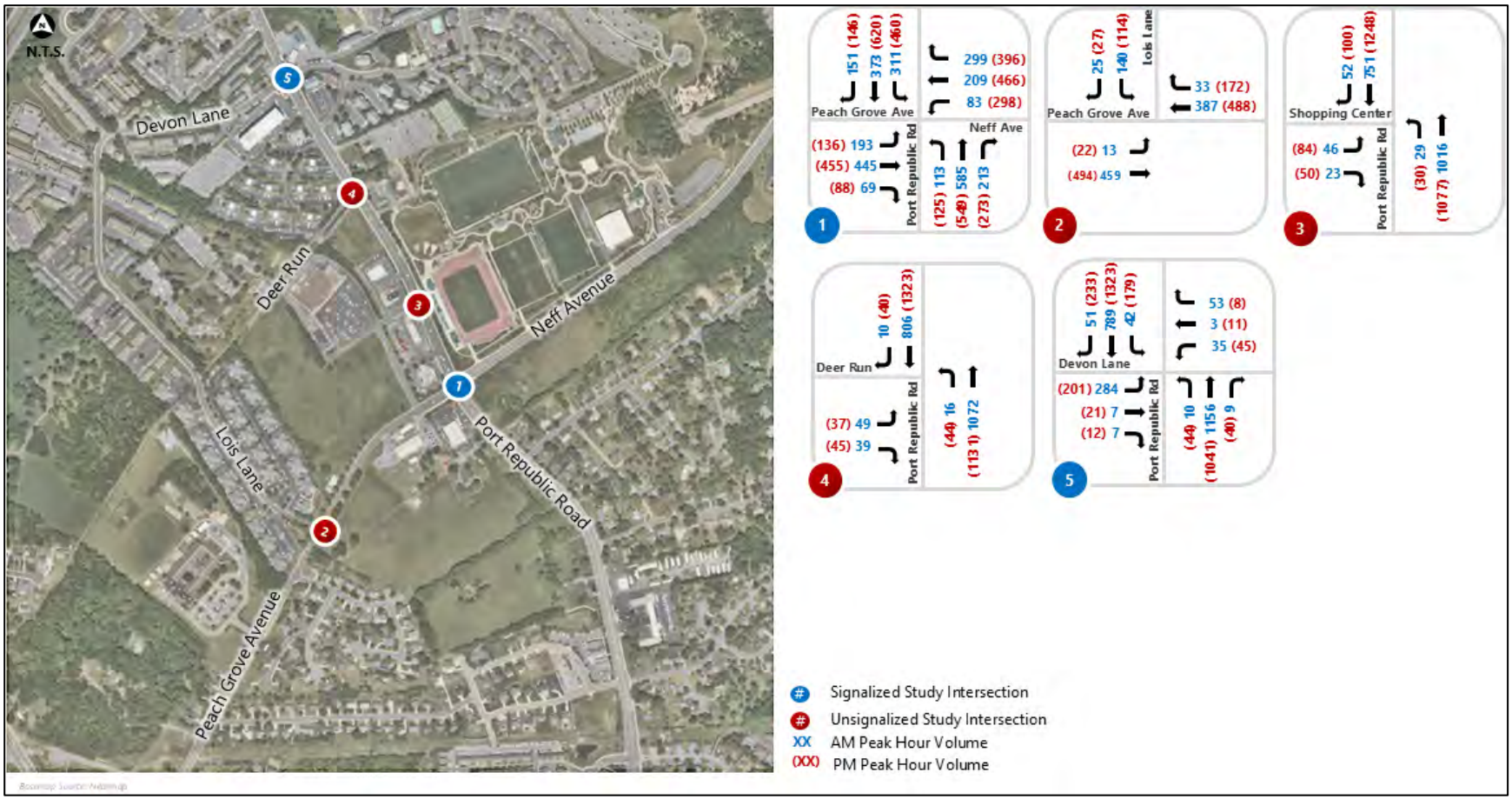


Figure 22 Forecasted 2045 Traffic Volumes

No Build Conditions Operational Analysis

VHB completed a detailed analysis of the future condition intersection operational performance by modeling the AM and PM peak hour conditions in *Synchro/SimTraffic* software without any proposed roadway improvements. VHB conducted its analysis in accordance with VDOT's *Traffic Operations and Safety Analysis Manual (TOSAM)*. The following report section documents the No Build 2045 conditions operational performance findings at each of the five study intersections. **Appendix B** contains *SimTraffic* output reports.

Port Republic Road / Peach Grove Avenue / Neff Avenue

Table 13 documents the AM and PM peak hour operational performance findings for the Port Republic Road / Peach Grove Avenue / Neff Avenue intersection, including movement delay (seconds), associated Level of Service, and queuing metrics. **Figure 23** displays critically operational constraints. VHB identified the following operational constraints in No Build 2045 conditions:

- Traffic is blocked from entering the northbound Port Republic Road left turn lane during 34% of the AM peak hour and 57% of the PM peak hour, leading to green time starvation. During the PM hour, the thru movement 95th percentile queues exceed 550 ft, and the northbound left and thru movements experience high average delays, 98.7 seconds and 67.5 seconds, respectively.
- During the AM peak, the westbound Neff Avenue thru movement faces more than 55 seconds of average delay per vehicle. During the PM peak, the thru movement experiences more than 175 seconds of delay and the max queue length approaches 2,000 feet. This queuing blocks traffic from entering the right turn lane during 53% of the peak hour, leading to green time starvation.
- The southbound left turn from Port Republic Road onto Neff Avenue appears to be over capacity, particularly in the PM peak hour. This movement experiences nearly 115 seconds of average delay per vehicle and vehicle queues extend beyond the storage lane during 66% of the peak hour.
- During the PM peak, southbound Port Republic Road queue lengths of greater than 500 feet restrict the ability of traffic to turn left at the shared Circle K / McDonald's driveway and partially limit the ability of traffic to turn left at the Shopping Center driveway – queues extend to the driveway during 33% of the peak hour.
- Overall intersection operations are projected to significantly worsen in the No Build 2045 conditions, especially during the PM peak hour with almost every movement operating at an LOS E or F.
- The study team also performed a sensitivity analysis by modeling No Build 2035 conditions, and this intersection experiences similar operational degradation trends in this interim analysis year.

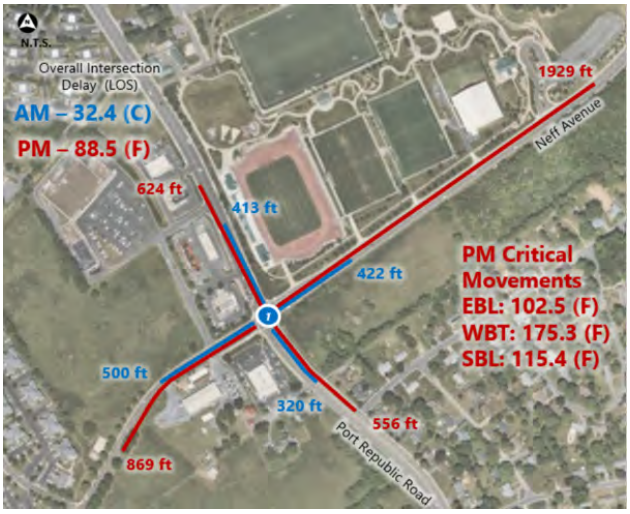


Figure 23 No Build 2045 Operations at Port Republic Rd / Peach Grove Ave / Neff Ave

Table 13 No Build 2045 Operations: Port Republic Road / Peach Grove Avenue / Neff Avenue

Approach	Movement	Movement Delay (sec)	Level of Service (LOS)	95th Queue (feet)	Maximum Queue (feet)	Upstream Block Time (%)[1]	Storage Block Time (%)[2]	Storage / Link Distance (feet)
AM Peak Hour								
Eastbound Peach Grove Ave	Left	57.0	E	165	140	0	14	140
	Thru	44.3	D	500	639	0	20	1,220
	Right	36.1	D	286	250	0	1	250
Westbound Neff Avenue	Left	35.1	D	133	173	0	-	1,400
	Thru	58.1	E	422	485	0	7	1,400
	Right	14.0	B	239	225	0	1	225
Northbound Port Republic Rd	Left	30.1	C	139	109	0	2	110
	Thru	28.3	C	320	360	0	34	850
	Right	5.7	A	161	199	0	0	200
Southbound Port Republic Rd	Left	51.5	D	180	150	0	26	150
	Thru	18.0	B	413	408	0	15	500
	Right	14.4	B	317	377	0	-	500
PM Peak Hour								
Eastbound Peach Grove Ave	Left	102.5	F	173	140	0	17	140
	Thru	86.0	F	869	840	0	45	1,220
	Right	80.0	E	295	250	0	4	250
Westbound Neff Avenue	Left	77.4	E	1,929	1,421	32	-	1,400
	Thru	175.3	F	1,812	1,432	52	53	1,400
	Right	153.6	F	270	225	0	5	225
Northbound Port Republic Rd	Left	98.7	F	136	109	0	18	110
	Thru	67.5	E	556	602	0	57	850
	Right	21.5	C	253	200	0	2	200
Southbound Port Republic Rd	Left	115.4	F	159	150	0	66	150
	Thru	36.8	D	624	524	33	61	500
	Right	37.6	D	608	536	0	0	500

Source: SimTraffic.

1 Upstream Block Time (%) = percentage of peak hour that the queue length extends to the upstream intersection.

2 Storage Block Time (%) = percentage of peak hour that the queue length fills the turn lane storage – thus extending into the adjacent thru lane – or extends in the thru lane past the entrance to the turn lane – thus blocking traffic from entering the turn lane.

Peach Grove Avenue / Lois Lane

Table 14 documents the AM and PM peak hour operational performance findings for the Peach Grove Avenue / Lois Lane intersection, including movement delay (seconds), associated Level of Service, and queuing metrics. VHB did not identify any operational constraints in No Build conditions – all movements operate with minimal delay and queuing.

Table 14 No Build 2045 Operations: Peach Grove Avenue / Lois Lane

Approach	Movement	Movement Delay (sec)	Level of Service (LOS)	95th Queue (feet)	Maximum Queue (feet)	Upstream Block Time (%)[1]	Storage Block Time (%)[2]	Storage / Link Distance (feet)
AM Peak Hour								
EB Peach Grove Ave	Left	2.3	A	24	36	0	0	50
WB Peach Grove Ave	Through / Right	0.2/0.2	A/A	0	0	0	-	1,200
Southbound Lois Lane	Left/Right	13.4/9.2	B/A	105	133	0	-	800
PM Peak Hour								
EB Peach Grove Ave	Left	4.9	A	36	35	0	0	50
WB Peach Grove Ave	Through / Right	0.1/0.1	A/A	12	22	0	-	1,200
Southbound Lois Lane	Left/Right	21.8/13.6	C/B	117	148	0	-	800

Source: SimTraffic.

1 Upstream Block Time (%) = percentage of peak hour that the queue length extends to the upstream intersection.

2 Storage Block Time (%) = percentage of peak hour that the queue length fills the turn lane storage – thus extending into the adjacent thru lane – or extends in the thru lane past the entrance to the turn lane – thus blocking traffic from entering the turn lane.

Port Republic Road / Shopping Center

Table 15 documents the AM and PM peak hour operational performance findings for the Port Republic Road / Shopping Center intersection, including movement delay (seconds), associated Level of Service, and queuing metrics. VHB identified the following operational constraints in No Build 2045 conditions:

› In the PM peak hour, traffic turning left from the Shopping Center onto northbound Port Republic Road experiences around 500 seconds of average delay per vehicle (LOS F), which is due to southbound Port Republic Road queue spillback from the Peach Gove Avenue / Neff Avenue intersection.

Port Republic Road / Deer Run

Table 16 documents the AM and PM peak hour operational performance findings for the Port Republic Road / Deer Run intersection, including movement delay (seconds), associated Level of Service, and queuing metrics. VHB identified the following operational constraints in No Build 2045 conditions:

› In the PM peak hour, traffic turning left from Deer Run onto northbound Port Republic Road experiences slightly elevated average delay per vehicle, approximately 40 seconds (LOS E). This is due to challenges associated with finding a gap in Port Republic Road traffic. While increased delay compared to Existing Conditions, this delay is still manageable in one peak hour condition.

Table 15 No Build 2045 Operations: Port Republic Road / Shopping Center

Approach	Movement	Movement Delay (sec)	Level of Service (LOS)	95th Queue (feet)	Maximum Queue (feet)	Upstream Block Time (%)[1]	Storage Block Time (%)[2]	Storage / Link Distance (feet)
AM Peak Hour								
EB Shopping Center	Left/Right	23.4/12.4	B/A	77	99	0	-	525
NB Port Republic Rd	Left	6.2	A	36	39	0	0	50
SB Port Republic Rd	Thru/Right	0.0/0.0	A/A	11	20	0	-	750
PM Peak Hour								
EB Shopping Center	Left/Right	486.9/500.6	**F/F**	653	521	36	-	525
NB Port Republic Rd	Left	28.5	C	47	47	0	4	50
SB Port Republic Rd	Thru/Right	14.6/2.2	B/A	456	492	0	-	750

Source: SimTraffic.

1 Upstream Block Time (%) = percentage of peak hour that the queue length extends to the upstream intersection.

2 Storage Block Time (%) = percentage of peak hour that the queue length fills the turn lane storage – thus extending into the adjacent thru lane – or extends in the thru lane past the entrance to the turn lane – thus blocking traffic from entering the turn lane.

Table 16 No Build 2045 Operations: Port Republic Road / Deer Run

Approach	Movement	Movement Delay (sec)	Level of Service (LOS)	95th Queue (feet)	Maximum Queue (feet)	Upstream Block Time (%)[1]	Storage Block Time (%)[2]	Storage / Link Distance (feet)
AM Peak Hour								
EB Deer Run	Left/Right	22.2/11.0	C/B	83	102	0	-	625
NB Port Republic Rd	Left	6.1	A	28	37	0	0	50
SB Port Republic Rd	Thru/Right	0.1/0.1	A/A	13	17	0	-	800
PM Peak Hour								
EB Deer Run	Left/Right	41.4/26.4	**E** D	101	127	0	-	625
NB Port Republic Rd	Left	20.0	C	61	64	0	6	50
SB Port Republic Rd	Thru/Right	0.7/0.4	A/A	96	74	0	-	800

Source: SimTraffic.

1 Upstream Block Time (%) = percentage of peak hour that the queue length extends to the upstream intersection.

2 Storage Block Time (%) = percentage of peak hour that the queue length fills the turn lane storage – thus extending into the adjacent thru lane – or extends in the thru lane past the entrance to the turn lane – thus blocking traffic from entering the turn lane.

Port Republic Road / Devon Lane

Table 17 documents the AM and PM peak hour operational performance findings for the Port Republic Road / Devon Lane intersection, including movement delay (seconds), associated Level of Service, and queuing metrics. **Figure 24** displays critically operational constraints. VHB identified the following operational constraints in No Build 2045 conditions:

- During the AM and PM peak hour, the eastbound Devon Lane left turn and thru movements experience significant delay – more than 60 seconds of average delay per vehicle in the AM peak and more than 90 seconds of average delay per vehicle in the PM peak – as well as approximately 500 feet of queuing, which blocks upstream driveways as well as traffic from entering the right turn lane during approximately 30% of the peak hour.
- During the AM and PM peak hour, the westbound Devon Lane left turn and thru movements experience high delay – more than 60 seconds of average delay per vehicle in the AM peak and approximately 80 seconds of average delay per vehicle in the PM peak.
- During the PM peak hour, the northbound Port Republic left-turn movement experiences an average delay above 60 seconds per vehicle.
- The study team also performed a sensitivity analysis by modeling No Build 2035 conditions, and this intersection experiences similar operational degradation trends in this interim analysis year.

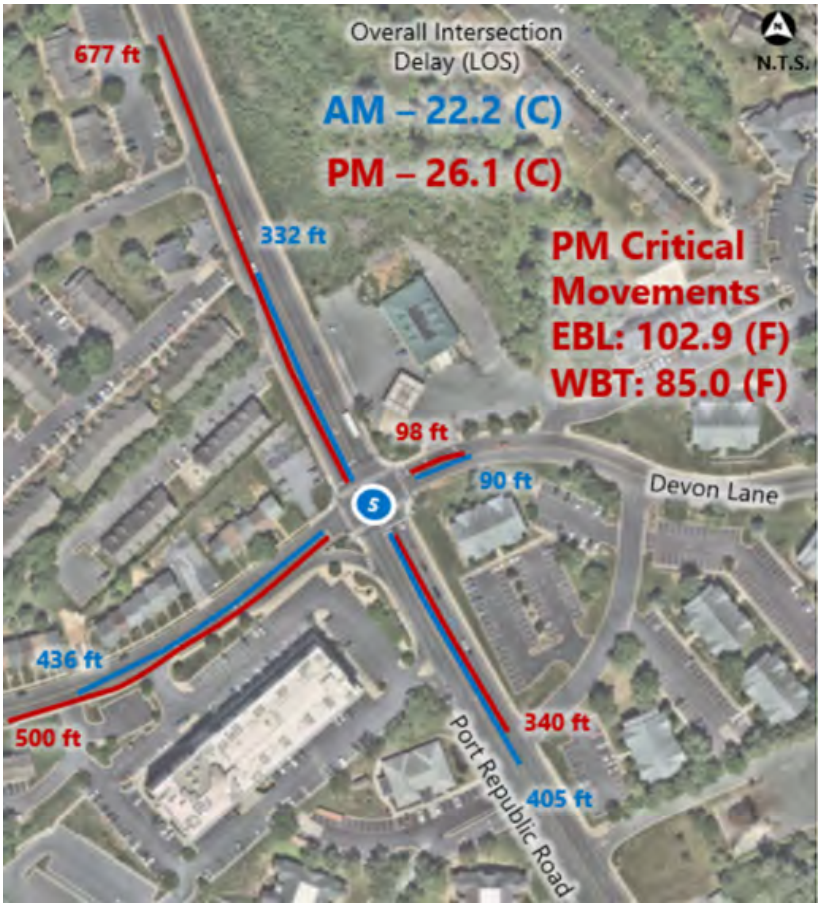


Figure 24 No Build 2045 Operations at Port Republic Road / Devon Lane

Table 17 No Build 2045 Operations: Port Republic Road / Devon Lane

Approach	Movement	Movement Delay (sec)	Level of Service (LOS)	95th Queue (feet)	Maximum Queue (feet)	Upstream Block Time (%)[1]	Storage Block Time (%)[2]	Storage / Link Distance (feet)
AM Peak Hour								
Eastbound Devon Lane	Left	62.5	**E**	436	496	0	31	1,000+
	Thru	64.5	**E**	436	496	0	31	1,000+
	Right	18.9	B	63	122	0	0	175
Westbound Devon Lane	Left	61.4	**E**	72	72	0	5	75
	Thru	69.1	**E**	72	72	0	5	75
	Right	14.0	B	90	139	0	1	1,000+
Northbound Port Republic Rd	Left	37.2	D	71	144	0	0	210
	Thru	14.3	B	405	452	0	10	800
	Right	13.4	B	405	452	0	-	800
Southbound Port Republic Rd	Left	39.9	D	115	228	0	0	310
	Thru	16.1	B	332	388	0	1	430
	Right	13.8	B	311	351	0	-	430
PM Peak Hour								
Eastbound Devon Lane	Left	102.9	**F**	500	529	1	34	1,000+
	Thru	96.5	**F**	500	529	1	34	1,000+
	Right	31.6	C	97	174	0	0	175
Westbound Devon Lane	Left	82.0	**F**	84	73	0	17	75
	Thru	85.0	**F**	84	73	0	17	75
	Right	11.8	B	98	153	0	0	1,000+
Northbound Port Republic Rd	Left	60.6	**E**	129	175	0	0	210
	Thru	17.9	B	340	355	0	9	800
	Right	16.3	B	340	353	0	-	800
Southbound Port Republic Rd	Left	30.3	C	321	310	0	0	310
	Thru	17.1	B	677	709	1	12	430
	Right	16.5	B	655	678	0	-	430

Source: SimTraffic.

1 Upstream Block Time (%) = percentage of peak hour that the queue length extends to the upstream intersection.

2 Storage Block Time (%) = percentage of peak hour that the queue length fills the turn lane storage – thus extending into the adjacent thru lane – or extends in the thru lane past the entrance to the turn lane – thus blocking traffic from entering the turn lane.

5

Alternatives Analysis

VHB developed alternatives to mitigate the multimodal, operational, and safety constraints identified in both existing and future transportation demand analysis. VHB modeled the intersection improvement alternatives to determine their impact on operational performance. The stakeholder group engaged the public to obtain feedback on the proposed alternatives and ultimately selected a set of alternative recommendations.

Multimodal Facilities

VHB developed multimodal improvement alternatives for the roadway typical sections within the study area based on pedestrian and bicycling infrastructure needs. The following section of the report outlines the different alternatives that the study stakeholder team developed.

Port Republic Road: Devon Lane to Peach Grove Ave / Neff Ave

In existing conditions, the study team identified a gap in enhanced bicycle facilities along Port Republic Road between Devon Lane and Peach Grove Avenue / Neff Avenue. This segment currently only has narrow (four-foot), unbuffered bike lanes and five-foot sidewalks. Additionally, this segment of Port Republic has a significant vertical grade, which creates a significant speed differential between northbound vehicle traffic and cyclists. The study team developed three alternatives to improve these bike and pedestrian facilities within the available 80-foot right-of-way; due to the constrained built environment and topography along the corridor, the team sought to avoid substantial right-of-way impacts.

The first alternative consists of constructing two nine-foot shared use paths (SUPs), one on each side of the roadway. These SUPs would be constructed by shifting both curb lines inward, removing both on-road bike lanes, and reallocating that width to sidewalks widened/converted to SUPs. **Figure 25** depicts an alternative cross-section rendering. This alternative has the safety benefit of providing off-road bike facilities; however, it combines pedestrians and bicyclists in a substandard width SUP (9-feet) and carries the expense of moving two curb lines (and the associated stormwater infrastructure).

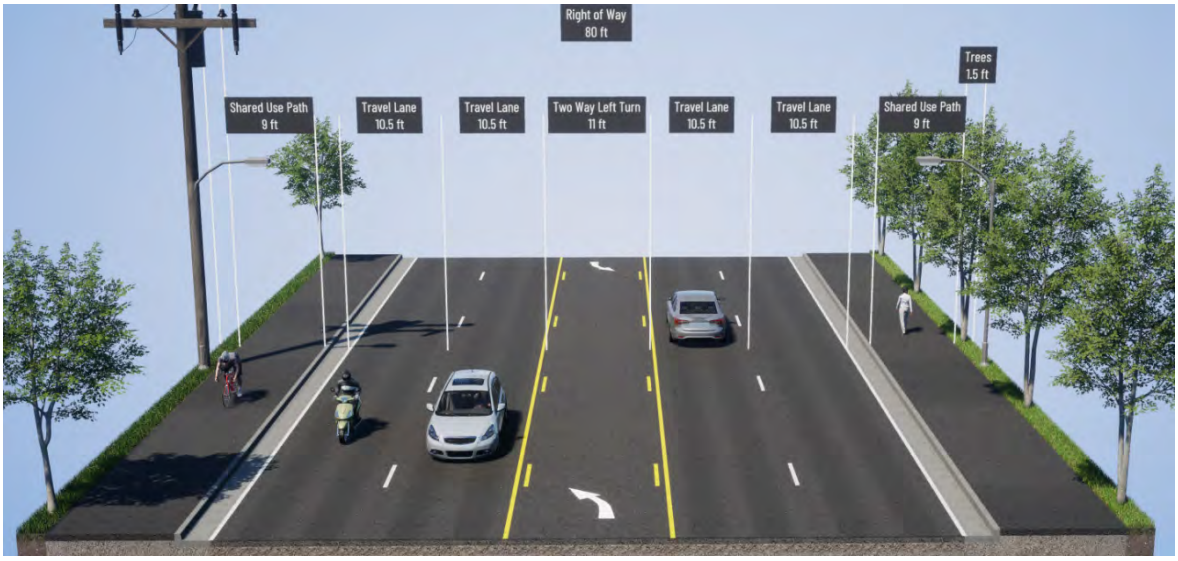


Figure 25 Dual-Sided SUP Alternative: Port Republic Road

The second alternative consists of constructing a single 13-foot shared use path on the east side of Port Republic Road and maintaining the existing sidewalk on the west side. This SUP would be constructed by shifting just the east curb inward, removing both on-road bike lanes, and reallocating that width to a sidewalk widened/converted to a SUP. **Figure 26** depicts an alternative cross-section rendering. This alternative has the safety benefit of providing off-road bike facilities in a standard width SUP (13-foot). Placing the SUP on the east side of Port Republic Road connects it to planned bike infrastructure north of Devon Lane.

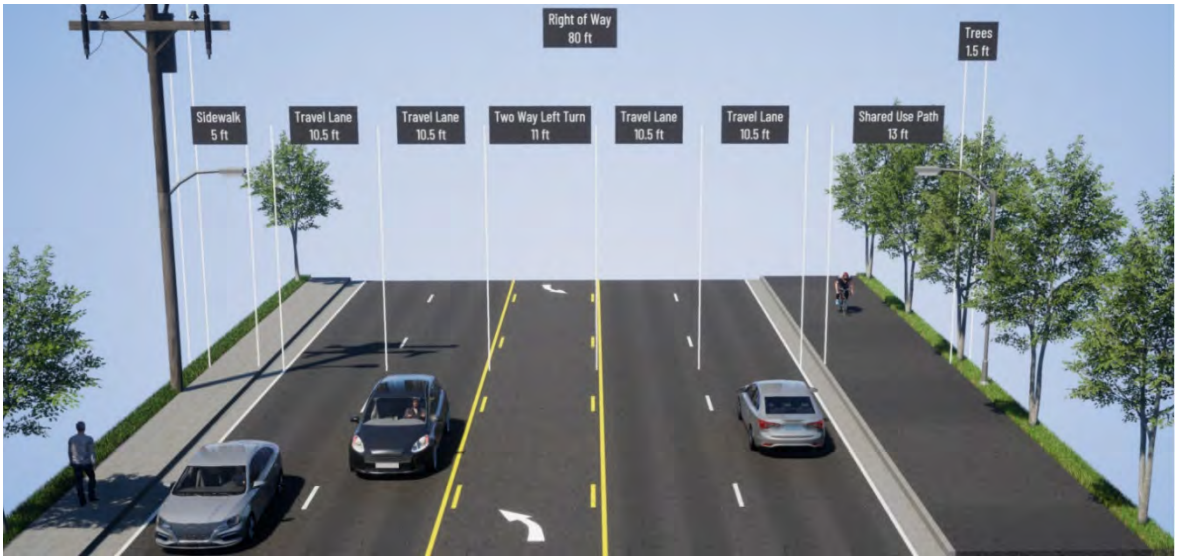


Figure 26 East Side SUP Alternative: Port Republic Road

The third alternative consists of accommodating southbound bicycle traffic in a shared bike/vehicle travel lane and building a raised five-foot bike lane on the east side of the roadway separated from the adjacent sidewalk. **Figure 27** depicts an alternative cross-section rendering. This alternative physically separates northbound bike traffic (slower due to uphill grade) from vehicle and pedestrian traffic while the faster southbound bike traffic (downhill) mixes with vehicle traffic.

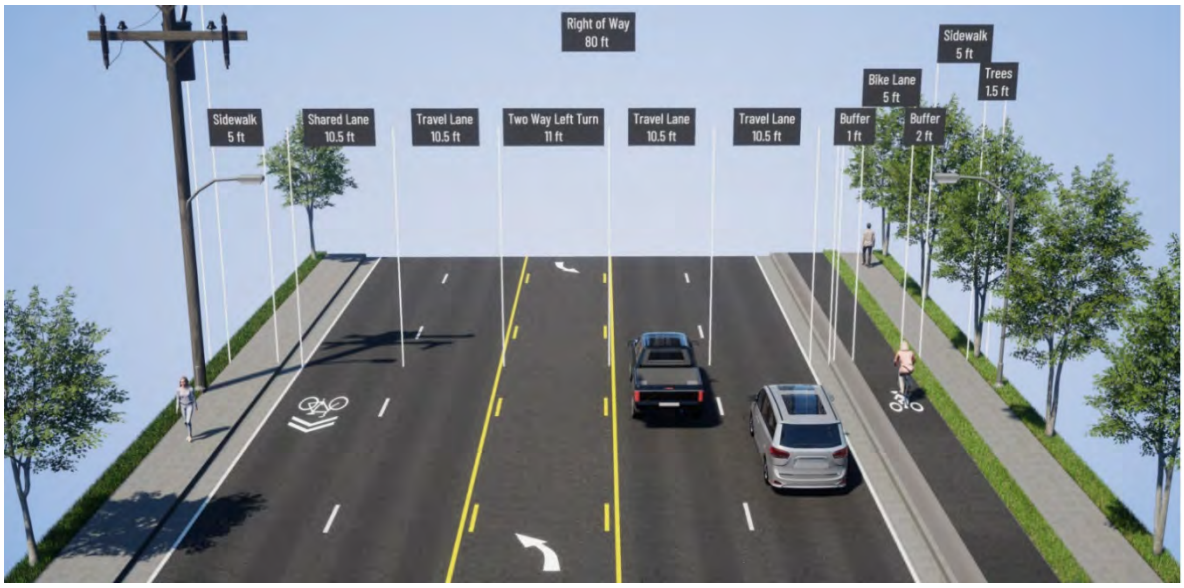


Figure 27 Raised Bike Lane and Shared Travel Lane: Port Republic Road

The study stakeholder group presented these alternatives to the public at both an in-person public meeting at Stone Spring Elementary School on March 6th, 2025, and in an online public survey. Both public engagement groups strongly supported the idea of enhanced bike facilities on Port Republic Road; **Figure 28** displays the alternative preference of the public. While there was a slight preference to Alternative 1 (dual SUPs), the study stakeholder group ultimately selected Alternative 2 (one wider SUP) for the following reasons:

- Relatively cheaper than Alternative 1 as it only moves a single curb line.
- Includes a standard SUP width (compared to Alternative 1).
- Provides off-street bicycle facilities in both directions of travel (compared to Alternative 3).

Appendix D contains a complete summary of all public engagement activities.

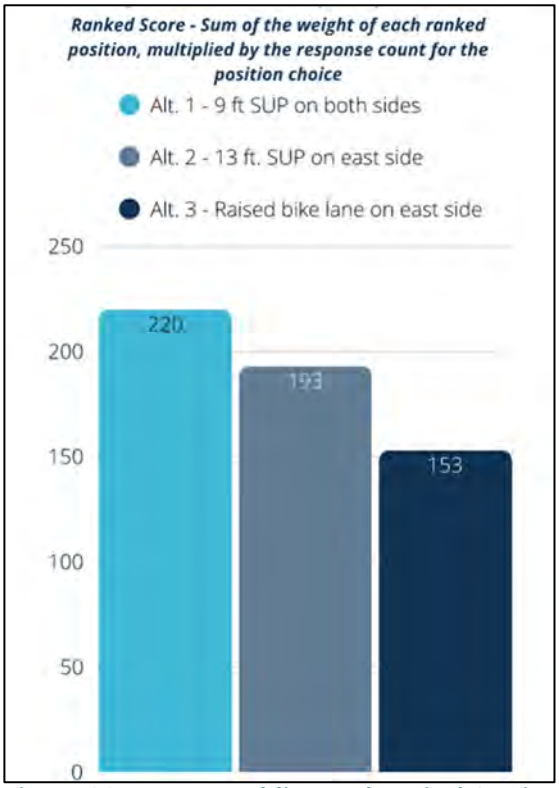


Figure 28 Port Republic Road Typical Section Public Survey Results

Peach Grove Avenue

In existing conditions, the study team identified a gap in bicycle and pedestrian facilities along Peach Grove Avenue. This segment currently only has a westbound narrow (four-foot), unbuffered bike lane and one four-foot sidewalk. The VHB study team developed one alternative to be constructed within the existing 79-foot right-of-way to improve multimodal access along the roadway. This alternative consists of repurposing a portion of the grass buffer on the south side of the roadway to construct a 10-foot shared use path, as shown in **Figure 29**, while maintaining the existing sidewalk and bike lane on the north side of the roadway. A first phase of this SUP could run between Stone Spring Elementary School and Port Republic Road, with a second phase extending it to Stone Spring Road.

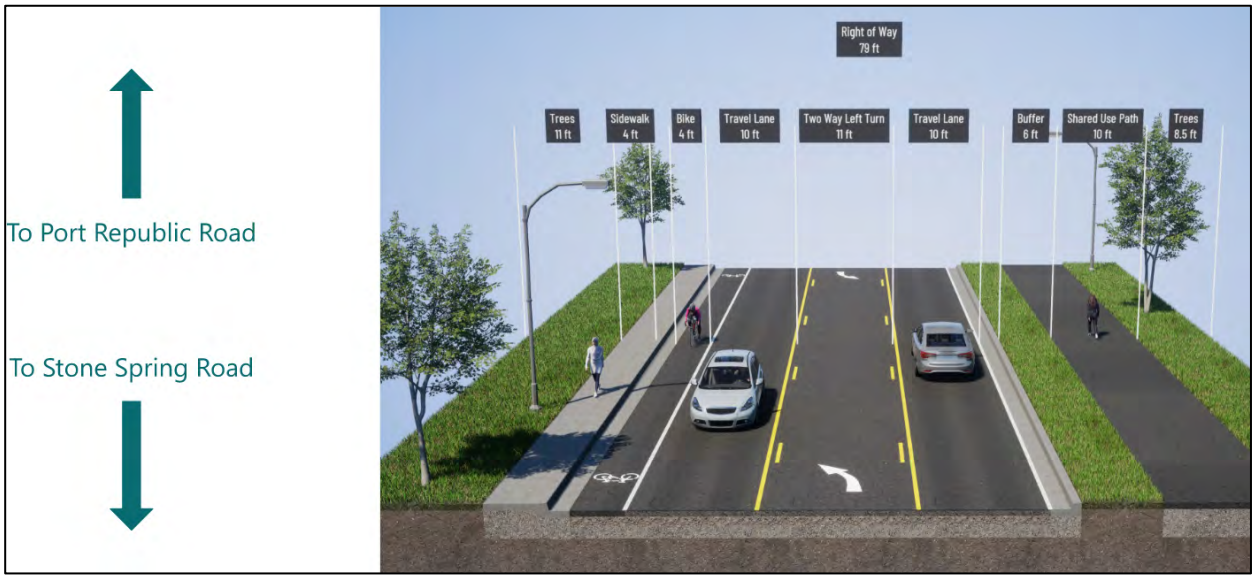


Figure 29 Shared Use Path: Peach Grove Avenue

During Spring 2025 public engagement, 93% of the respondents supported the addition of this shared use path on Peach Grove Avenue, with a robust majority (82%) in strong support of the concept. **Figure 30** displays the public response results.

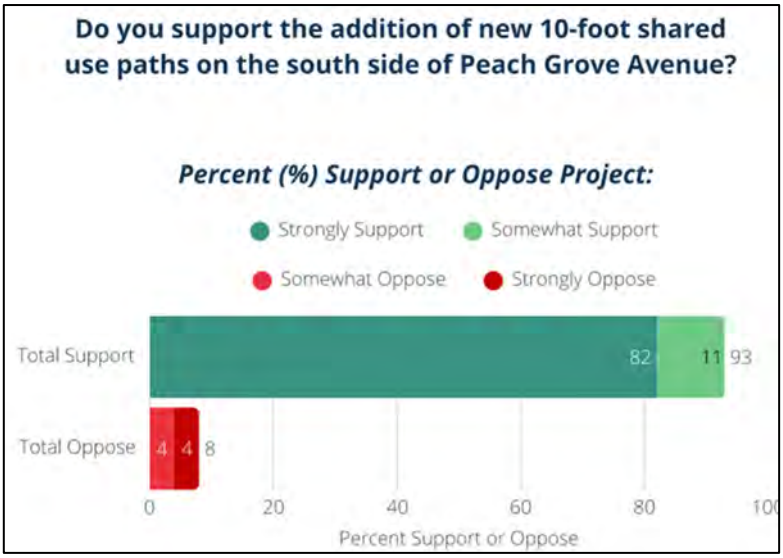


Figure 30 Peach Grove Avenue Typical Section Public Survey Results

The VHB study team also explored potential traffic calming elements to reduce the existing operating speeds on Peach Grove Avenue that exceed the posted speed limit by 12 MPH. The team considered raised vertical elements such as speed tables, bumps, and cushions as well as horizontal elements such as pedestrian refuge islands and a median. Raised elements on the roadway directly mitigate operating speeds by requiring vehicles to slow down as they traverse the elements, while horizontal elements reduce operating speeds in part due to the perceived narrowing of the roadway width. Based on national traffic calming guidance, the team determined that raised elements were not appropriate for Peach Grove Avenue due to existing and future daily traffic volumes. Peach Grove Avenue has an existing two-way left turn lane but several three-leg intersections. The two-way left turn lane is thus not used at multiple places; at these locations, the team recommends replacing the lane with a raised landscaped median. At intersections, a pedestrian refuge island and crossing can be added opposite the left turn lane; the crossing would connect to the proposed SUP on the south side of Peach Grove Avenue. **Figure 31** displays the potential traffic calming elements.

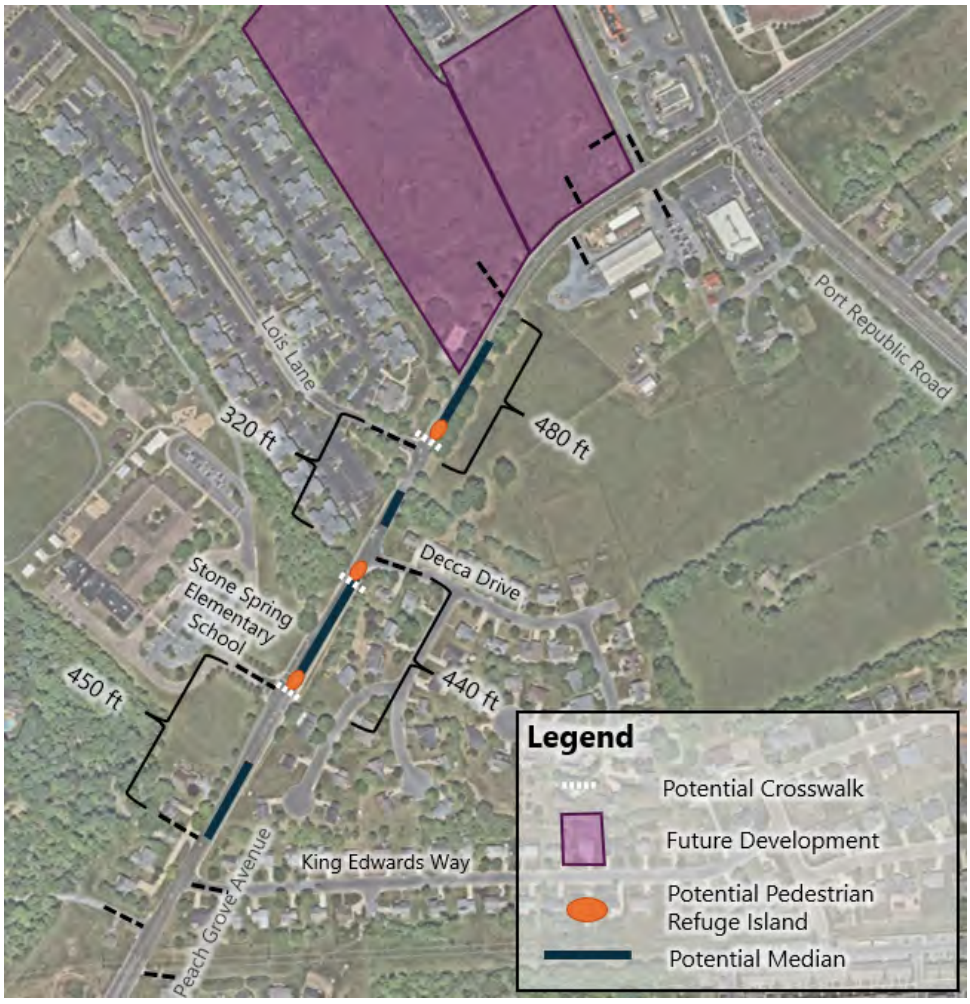


Figure 31 Peach Grove Avenue Potential Traffic Calming Elements

Neff Avenue

In existing conditions, the study team identified a gap in bicycle and pedestrian facilities along Neff Avenue. This segment currently has narrow (four-foot), unbuffered bike lanes in both directions and one five-foot sidewalk. The VHB study team developed one alternative for Neff Avenue to improve

multimodal access along the roadway. This alternative includes reallocating the pavement width for the eastbound bicycle lane to a widened westbound bicycle lane with buffer. Additionally, it includes a new 10-foot shared use path on the south side of Neff Avenue. **Figure 32** depicts the proposed cross-section rendering. This cross-section would extend from Port Republic Road to the Arboretum pedestrian crossing – a separate study is recommending a road diet at this location to replace one of the existing travel lanes with a median and pedestrian refuge island at the crossing.

Figure 32 Shared Use Path: Neff Avenue

During Spring 2025 public engagement, 91% of the respondents supported the addition of this shared use path on Neff Avenue, with a robust majority (85%) in strong support of the concept. **Figure 33** displays the public response results.

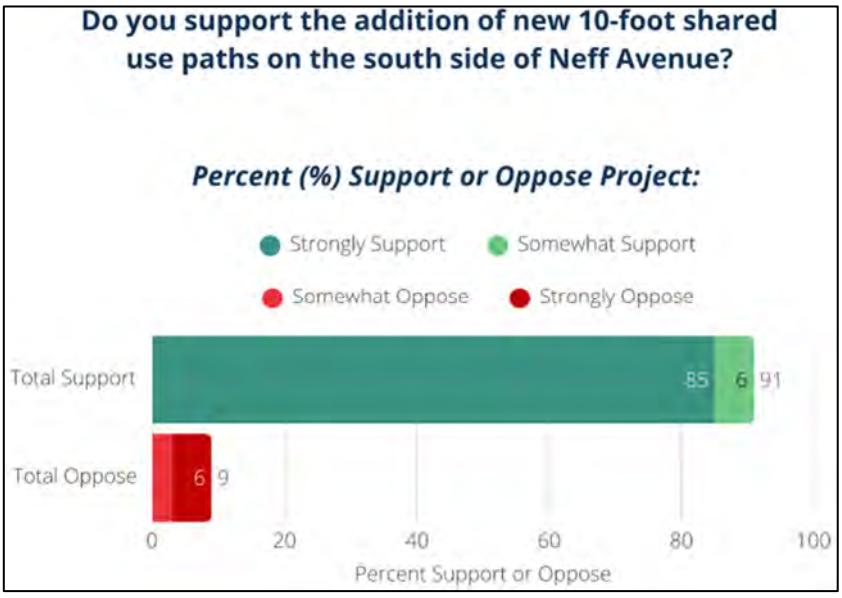


Figure 33 Neff Avenue Typical Section Public Survey Results

New Pedestrian Crossings

The VHB study team also looked at two locations to potentially introduce unsignalized crossings for pedestrians to cross Port Republic Road. The team identified these crossing locations based on existing pedestrian activity, transit data, nearby pedestrian generators, and stakeholder/public feedback. VDOT has design guidance (I&IM 384.1) to evaluate A) whether the crossing location meets minimum safety requirements; B) whether the crossing location should or could be provided based on need criteria; and C) what crossing countermeasures should accompany a crossing if it were to be provided.

In accordance with VDOT guidance, a crossing may be considered if the location is at least 300 feet from the closest marked crosswalk, drivers have an unrestricted view of the proposed crosswalk based on stopping sight distance requirements, and appropriate crossing countermeasures are provided along with the crossing. The need criteria for a marked crosswalk consist of the following:

- Location must be between pedestrian oriented land uses.
- Location connects to at least one pedestrian facility.
- Location is on a road with a posted speed limit of at least 30 mph.
- Location is more than 600 feet in urban contexts or 1,000 feet in suburban contexts traffic from the closest crosswalk.
- The location is on an identified Pedestrian Safety Action Plan.

Pedestrian Crossing at Deer Run

VHB evaluated a potential pedestrian crossing at Deer Run to provide better connectivity for the pedestrians in the area. There are JMU-focused residential developments on the west side of Port Republic Road at this intersection, and there are JMU athletics fields adjacent to the east side of Port Republic Road. In addition, there is a bus stop on both sides of the street and a crossing could help pedestrians access either bus stop from the apartments and the athletics fields. **Figure 8**, earlier in the report, shows existing pedestrian activity on Deer Run and Kelsey Lane.

The closest marked crossings are Devon Lane, approximately 825 feet north, and Peach Grove Avenue / Neff Avenue, approximately 1,350 feet south. The proposed crosswalk would connect to existing sidewalk on either side of Port Republic Road. At this segment, Port Republic Road has a posted speed limit of 35 mph, an AADT of 27,400 VPD, and is located on VDOT's Pedestrian Safety Action Plan. Per VDOT policy, a crossing would need to be accompanied by a Pedestrian Hybrid Beacon (PHB) due to the combination of roadway configuration, posted speed limit, and AADT. A PHB is a regulatory traffic control device that displays red signal control to vehicular traffic when a pedestrian pushes the button.

The study stakeholder group considered three potential crossing locations (A, B, and C) near Dear Run, as seen in **Figure 34**. VHB recommended that Location A (north side of Deer Run) be discarded due to concerns associated with the stopping sight distance for southbound Port Republic Road traffic as it crests the vertical roadway curve south of Devon Lane. JMU Facilities voiced concern with Location B, on the north side of Kelsey Lane, due to it restricting left turn traffic in and out of Kelsey Lane. The study team thus selected Location C on the south side of Kelsey Lane and recommended that the transit stops be relocated near the proposed crossing location.

Figure 34 Deer Run Pedestrian Crossing Potential Locations

During Spring 2025 public engagement, 82% of the respondents supported the addition of this pedestrian crossing on Port Republic Road near Deer Run, with half (50%) in strong support of the concept. **Figure 35** displays the public response results.

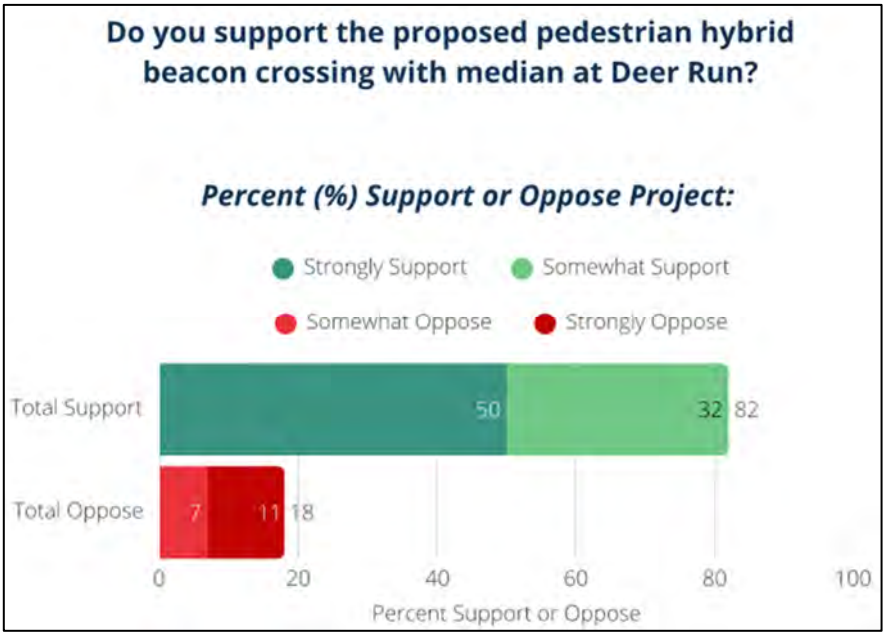


Figure 35 Deer Run Pedestrian Crossing Public Survey Results

Pedestrian Crossing at Portland Drive / Wine Drive

VHB also evaluated a potential marked crossing at the Port Republic Road / Portland Drive / Wine Drive intersection. There are residential neighborhoods on both sides of Port Republic Road, in addition to a convenience store, a pharmacy and community health center, and transit stops. In addition to these pedestrian generators, several public engagement participants indicated interest in

a crossing at this location, in part to be able to walk/bike their kids to Stone Spring Elementary School. **Figure 8**, earlier in the report, shows existing pedestrian activity on Portland Drive and Wine Drive.

The closest marked crossings are Peach Grove Avenue / Neff Avenue, approximately 2,200 feet north, and Stone Port Boulevard / Misty Court, approximately 2,150 feet south. The proposed crosswalk would connect to a shared use path on the west side of Port Republic Road as well as sidewalk on both the east side of Port Republic Road and on Wine Drive. At this location, Port Republic Road has a posted speed limit of 35 mph and an AADT of 14,000 VPD. Per VDOT policy, a crossing would need to be accompanied by a Pedestrian Hybrid Beacon (PHB) due to the combination of roadway configuration, posted speed limit, and AADT. VHB recommended a crossing on the north side of the intersection, as shown in **Figure 36**, to connect to existing sidewalk.

Figure 36 Port Republic Road / Portland Drive / Wine Drive Proposed Crossing

Transit

The study area is currently served by five transit lines – Silver, Black, Pink, Green, and Route 6 – with a relatively high stop density. The following transit recommendations, which are typical of ongoing transit planning, should serve the next 20 years of need within the study area:

- Plan for transit stop upgrades at stops that will likely receive higher ridership in the future as new development opens. As one example, the westbound stop on Peach Grove Avenue is currently just a sign on a utility pole. Two major residential developments have been approved in front of this stop. Essential transit infrastructure such as a bench and shelter should be planned for.
- One or two new transit stops may be needed to service future development in the southeast corner of Port Republic Road / Neff Avenue. There is currently not a stop immediately proximate to this development site.
- Monitor transit ridership and crowding on buses to determine potential need to increase transit route frequency.

Safety

Based on the existing conditions crash analysis, there are five distinct crash trends that can be addressed by this study. Here are the five trends accompanied by potential mitigation strategies, both infrastructure and cultural change:

1. 65 crashes over a five-year span (65% of all crashes) involved a young driver (15-21 years old). While local demographics support a higher proportion of crashes involving young drivers, this quantity is significant. One mitigation strategy is to encourage alternative modes of transportation for college students; rather than relying on cars, students can ride transit, walk, and bike. This partially requires the transit and walk/bike infrastructure to support this activity, but it also involves a culture shift.
2. There were 22 crashes, including 14 at night, between northbound Port Republic Road traffic and southbound Port Republic Road traffic turning left onto Neff Avenue. This is a significant crash pattern that appears at least partially caused by limited sight distance for the permissive left turn movement. This quantity of left turn crashes warrants consideration of conversion to protected only left turn phasing; however, that reduces left turn capacity. Given that 14 of the crashes occurred at night, a solution could be time-of-day protected phasing, where protected-permissive phasing is maintained during peak conditions to preserve capacity and protected-only phasing is implemented during off-peak conditions for safety reasons.
3. There were ten crashes in the five-year span that could be attributed to access issues at the Port Republic Road / McDonald's / Liberty Gas Station driveway. These crashes are influenced by the southbound Port Republic Road queues from the Peach Grove Avenue / Neff Avenue intersection that often extend past this driveway. The introduction of a median on Port Republic Road to restrict left turns at this driveway would help mitigate these crashes; there are alternate ingress and egress routes.
4. At Port Republic Road / Devon Lane, there were nine northbound rear end collisions with a likely contributing factor of signal head visibility as the signal heads can be visually lost in the horizon due to the vertical roadway curvature. High visibility signal backplates can help define the signal heads within the horizon and increase their visibility to drivers.
5. There was a severe injury pedestrian crash in the crosswalk of the channelized right turn from Devon Lane onto southbound Port Republic Road. Unsignalized channelized right turn lanes induce higher turning speeds and could have contributed to the crash severity. One solution is removing the channelization and bringing the right turn movement to the stop bar.

Intersection Designs

Based on the future transportation demand projections and No Build 2045 traffic operations analysis, VHB identified the Port Republic Road / Peach Grove Avenue / Neff Avenue intersection and the Port Republic Road / Devon Lane intersection as operationally constrained and in need of improved capacity to accommodate future demand. The VHB study team thus developed and analyzed intersection improvement concepts for both intersections; specifically, VHB evaluated two concepts at each intersection. VHB modeled each alternative concept in *Synchro/SimTraffic* software using the 2045 traffic volume projections to estimate the operational performance. The study stakeholder team presented the alternative concepts to the public during the Spring 2025 engagement effort and ultimately recommended an improvement concept.

Port Republic Rd / Peach Grove Ave / Neff Ave: Alternative 1

The first alternative identified by the study team for this intersection is an expanded intersection that initially included (at time of Spring 2025 public engagement) the following project features:

- Widened Port Republic Road to facilitate construction of a second southbound left turn lane onto Neff Avenue.
- A median on Port Republic Road between the primary shopping center driveway and Peach Grove Avenue / Neff Avenue.
- A landscaped median on Port Republic Road between Peach Grove Avenue / Neff Avenue and the CVS driveway.
- An extended left turn lane on Peach Grove Avenue (additional 100 feet).
- An extended right turn lane on Neff Avenue (additional 150 feet).

Figure 37 displays the intersection concept shown to the public in Spring 2025.

Figure 37 Port Republic Road / Peach Grove Avenue / Neff Avenue Expanded Intersection

Subsequent discussions with the study stakeholder group led to additional refinement of the proposed condition for the right turn from Neff Avenue onto northbound Port Republic Road. City of Harrisonburg staff requested that VHB conduct a sensitivity analysis to determine the most appropriate turn lane length as well as implement a channelized, signalized right turn with right turn on red restriction. The later request is to provide operational capacity for the right turn, improve safety by protecting a movement with limited sight distance, and enhance pedestrian accommodations by introducing a porkchop island to shorten pedestrian crossing distances. VHB analyzed three different

effective storage lengths for the right turn lane to determine the appropriate length. **Table 18** shows the results of the operational performance comparison, which indicates that an effective storage length of 500 feet (an additional 100 feet than shown in Figure 35) optimizes operational performance with construction cost (i.e., the additional cost to construct 600 feet of effective storage is not justified by the operational performance).

Table 18 Neff Avenue Right-Turn Lane Storage Length Analysis

Effective Storage Length	WBL		WBT		WBR	
	Delay (s)	95th Queue (ft)	Delay (s)	95th Queue (ft)	Delay (s)	95th Queue (ft)
400 ft	59.9	752	65.8	1,011	23.2	482
500 ft	59.6	430	62.8	785	12.8	486
600 ft	60.5	462	65.7	746	10.5	506

Table 19 documents the overall AM and PM peak hour 2045 operational performance findings for the expanded intersection alternative at the Port Republic Road / Peach Grove Avenue / Neff Avenue intersection, including movement delay (seconds), associated Level of Service, and queuing metrics. **Appendix B** contains *SimTraffic* output reports. These results reflect the Neff Avenue expanded right-turn lane with 500 feet of effective storage, signalized channelization, and right turn on red restriction. VHB identified the following operational benefits in this alterative compared to No Build 2045 conditions:

- The southbound Port Republic Road dual left turn lanes reduce AM/PM peak hour left turn delay by approximately 15/55 seconds per vehicle, reduce left turn spillback into the thru lanes from 26%/66% of the peak hour to just 4%/1%, and reduce approach queue spillback to the shopping center driveway from 15%/61% of the peak hour to 0%/0%.
- Because southbound Port Republic Road queue lengths do not reach the shopping center driveway, this queue will not restrict left turn movements at the driveway.
- The extended left turn lane on Peach Grove Avenue reduces AM/PM peak hour left turn delay by approximately 25/30 seconds per vehicle and reduces the frequency of the thru movement queue blocking access to the left turn lane from 20%/45% of the peak hour to just 1%/6%. The eastbound thru movement queue is reduced by approximately 200/400 feet.
- The extended right turn lane on Neff Avenue reduces AM/PM peak hour thru movement delay by over 20/110 seconds per vehicle and PM peak right turn delay by approximately 145 seconds per vehicle. The left turn PM peak queue length is reduced by over 1,500 feet and the PM peak thru movement queue length by approximately 1,100 feet.

In addition to the operational benefits, dual left turns require protected-only signal phasing, so the existing left turn crash pattern will be mitigated by this intersection improvement.

Table 19 Expanded Intersection 2045 Operations: Port Republic Road / Peach Grove Avenue / Neff Avenue

Approach	Movement	Movement Delay (sec)	Level of Service (LOS)	95th Queue (feet)	Maximum Queue (feet)	Upstream Block Time (%)[1]	Storage Block Time (%)[2]	Storage / Link Distance (feet)
AM Peak Hour								
Eastbound Peach Grove Ave	Left	37.2	C	226	266	0	0	300
	Thru	35.4	C	286	347	0	1	1,220
	Right	26.3	C	243	248	0	0	250
Westbound Neff Avenue	Left	28.8	C	101	126	0	-	1,400
	Thru	37.2	D	232	268	0	0	1,400
	Right	8.5	A	228	258	0	0	500
Northbound Port Republic Rd	Left	35.9	C	139	109	0	3	110
	Thru	34.5	C	360	425	0	41	850
	Right	7.3	A	179	200	0	0	200
Southbound Port Republic Rd	Left	36.0	D	184	216	0	4	285
	Thru	18.8	C	221	260	0	0	520
	Right	15.7	B	273	289	0	-	520
PM Peak Hour								
Eastbound Peach Grove Ave	Left	71.3	E	260	299	0	0	300
	Thru	52.9	D	435	513	0	6	1,220
	Right	43.1	D	277	250	0	2	250
Westbound Neff Avenue	Left	58.8	E	419	464	0	-	1,400
	Thru	59.9	E	694	809	1	6	1,400
	Right	11.0	B	473	500	0	0	500
Northbound Port Republic Rd	Left	79.2	E	135	109	0	15	110
	Thru	49.4	D	458	485	0	52	850
	Right	15.4	B	240	200	0	13	200
Southbound Port Republic Rd	Left	61.2	E	316	284	0	1	285
	Thru	26.3	C	435	482	0	0	520
	Right	28.1	C	418	489	0	2	520

Source: SimTraffic.

1 Upstream Block Time (%) = percentage of peak hour that the queue length extends to the upstream intersection.

2 Storage Block Time (%) = percentage of peak hour that the queue length fills the turn lane storage – thus extending into the adjacent thru lane – or extends in the thru lane past the entrance to the turn lane – thus blocking traffic from entering the turn lane.

Port Republic Rd / Peach Grove Ave / Neff Ave: Alternative 2

The second alternative identified by the study team for this intersection is a modified quadrant left intersection design. The quadrant left concept improves intersection operations by reducing the number of signal phases at the primary intersection via the rerouting of left-turn movements through two secondary intersections and a connector roadway. **Figure 38** displays a VDOT graphic depicting travel paths through a quadrant left intersection. At this intersection, the southbound left turn from

Port Republic Road to Neff Avenue would potentially remain at the primary intersection due to the difficulty in rerouting such a significant left turn volume.

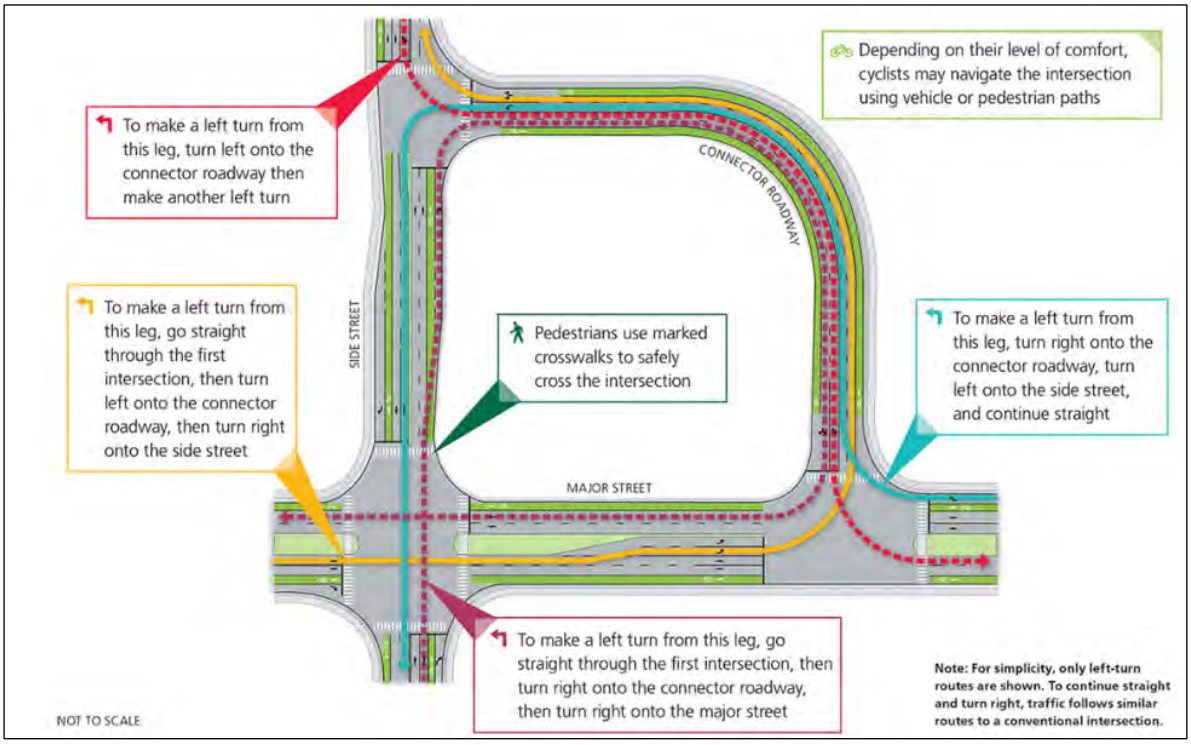


Figure 38 Travel through a Quadrant Left Intersection (Source: VDOT Innovative Intersections)

At the Port Republic Road / Peach Grove Avenue / Neff Avenue intersection, the study team considered two quadrant alternatives – one with a connector roadway in the southeast quadrant, and one with a connector roadway in the southwest quadrant between Lois Lane and Westmoreland Drive. **Figure 39** depicts the conceptual alignment of these two options; both require construction of brand-new roadway alignment on undeveloped land.

Figure 39 Two Potential Alignments for Quadrant Left Intersection

A quadrant left intersection concept theoretically has a safety benefit by reducing the number of overall conflict points and distributing conflicting vehicle movements across multiple intersections; however, a VDOT before-after study of the one quadrant left intersection constructed in Virginia (near Front Royal) did not identify a measurable crash reduction following project opening. Operationally, thru traffic experiences the primary benefit as the left turn signal phases are eliminated from the primary intersection. Left turn traffic experiences less delay at the intersection; however, to complete the desired movement, this traffic must travel additional distance via the secondary intersections and connector roadway. **Table 20** documents the comparison of travel distance and time (at speed of 35 MPH) for left turn movements on the two possible quadrant alignments. This travel time only reflects the time spent traveling between intersections, not intersection delay.

Table 20 Quadrant Left Turn Travel Distance Impacts

Movement	Alignment #1			Alignment #2		
	Existing	Proposed	Difference	Existing	Proposed	Difference
Eastbound Left	1,300 ft	2,600 ft	+1,300 ft (+25 sec)	1,300 ft	2,100 ft	+800 ft (+16 sec)
Northbound Left	500 ft	2,200 ft	+1,700 ft (+33 sec)	1,950 ft	1,450 ft	-500 ft (-10 sec)
Westbound Left	1,150 ft	1,150 ft	+0 ft (+0 sec)	700 ft	2,850 ft	+2,150 ft (+42 sec)

Table 21 documents the AM and PM peak hour 2045 operational performance findings for the quadrant left alternative at the Port Republic Road / Peach Grove Avenue / Neff Avenue intersection, including movement delay (seconds), associated Level of Service, and queuing metrics. **Appendix B** contains *SimTraffic* output reports. This table shows the results for a quadrant left with connector Alignment #1 between Peach Grove Avenue / Lois Drive and Westmoreland Drive. Alignment #2 results would be comparable. After iteratively testing the operational performance, the study team analyzed a conversion of the westbound Neff Avenue left turn lane to a second thru lane all the way to Lois Lane. Both secondary intersections were also modeled as signalized intersections.

VHB identified the following movements where Alternative 2 Quadrant Left performed better than Alternative 1 Expanded Intersection:

› In the PM peak hour, on the Neff Avenue thru movement the quadrant has approximately 15 seconds less delay and approximately 300 feet less queue length.

› In the PM peak hour, the quadrant has approximately 40 seconds less delay on the northbound left turn and approximately 20 seconds less delay on the southbound left turn.

VHB identified the following movements where Alternative 1 Expanded Intersection performed better than Alternative 2 Quadrant Left:

› The expanded intersection has approximately 40 seconds less delay on the eastbound left turn in the AM peak hour and approximately 15 seconds less delay in the PM peak hour.

› On the Neff Avenue left turn, the expanded intersection has approximately 80 seconds less delay in the AM peak hour and approximately 70 seconds less delay in the PM peak hour.

› On southbound Port Republic Road, the expanded intersection queue is projected to never block the shopping center driveway whereas the quadrant queue is projected to block the driveway during 3% of the peak hour.

Table 21 Quadrant Intersection 2045 Operations: Port Republic Road / Peach Grove Avenue / Neff Avenue

Approach	Movement	Experienced Travel Time (sec)	Level of Service (LOS)	95th Queue (feet)	Maximum Queue (feet)	Upstream Block Time (%)[1]	Storage Block Time (%)[2]	Storage / Link Distance (feet)
AM Peak Hour								
Eastbound Peach Grove Ave	Left	71.5	E	-	-	-	-	300
	Thru	32.6	C	240	288	0	<1	1,220
	Right	24.0	C	227	244	0	<1	250
Westbound Neff Avenue	Left	107.1	F	-	-	-	-	1,400
	Thru	30.0	C	158	179	0	0	1,400
	Right	9.3	A	156	194	0	0	500
Northbound Port Republic Rd	Left	15.3	B	-	-	-	-	110
	Thru	14.9	B	226	270	0	1	850
	Right	3.9	A	156	200	0	<1	200
Southbound Port Republic Rd	Left	48.5	D	316	297	0	6	285
	Thru	6.8	A	312	400	0	3	520
	Right	6.1	A	213	313	0	0	520
PM Peak Hour								
Eastbound Peach Grove Ave	Left	86.4	F	-	-	-	-	300
	Thru	41.4	D	268	326	0	1	1,220
	Right	33.7	C	241	249	0	<1	250
Westbound Neff Avenue	Left	127.3	F	-	-	-	-	1,400
	Thru	45.4	D	393	457	0	7	1,400
	Right	16.5	B	308	250	0	1	500
Northbound Port Republic Rd	Left	40.4	D	-	-	-	-	110
	Thru	30.7	C	307	358	0	6	850
	Right	14.7	B	216	200	0	1	200
Southbound Port Republic Rd	Left	37.8	D	349	300	0	6	285
	Thru	12.1	B	415	460	<1	3	520
	Right	12.5	B	312	427	0	0	520

Source: SimTraffic.

1 Upstream Block Time (%) = percentage of peak hour that the queue length extends to the upstream intersection.

2 Storage Block Time (%) = percentage of peak hour that the queue length fills the turn lane storage – thus extending into the adjacent thru lane – or extends in the thru lane past the entrance to the turn lane – thus blocking traffic from entering the turn lane.

During Spring 2025 public engagement, 32% of the respondents supported Alignment #2 (Peach Grove Avenue to Port Republic Road), compared to 20% support for Alignment #1 (Neff Avenue to Port Republic Road) and 48% support for no quadrant left intersection at all. When asked to compare Intersection Alternative 1 Expanded Intersection versus Intersection Alternative 2 Quadrant Left, 87% of the respondents supported Intersection Alternative 1 Expanded Intersection. **Figure 40** displays the public response results.

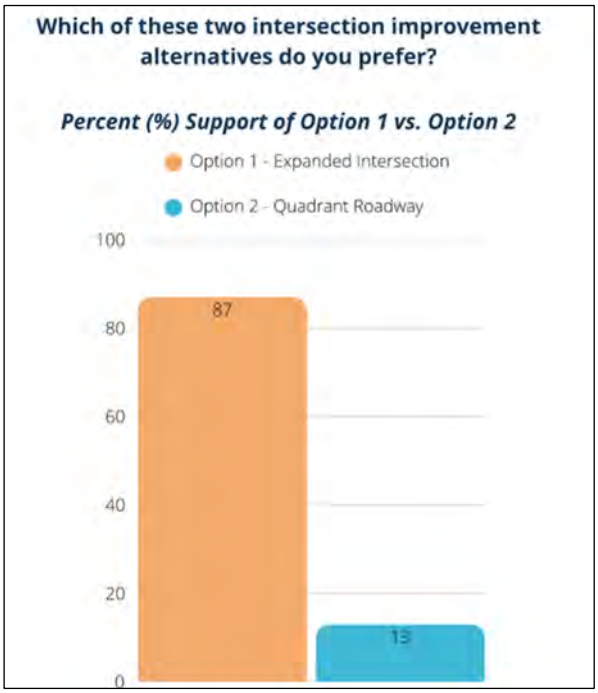


Figure 40 Port Republic Rd / Peach Grove Ave / Neff Ave Public Survey Results

The study stakeholder group wholistically considered all aspects of the two intersection concepts. Both concepts have significant operational improvement compared to anticipated No Build 2045 operations and each concept has some operational benefit compared to the other. In the end, the stakeholder group selected Alternative 1 Expanded Intersection as the recommended improvement for the following reasons:

- The expanded intersection distributes delay across all movements whereas the quadrant achieves lower thru movement delay by placing higher delay on some of the left turn movements.
- The expanded intersection better mitigates the queue impacts on the shopping center access.
- The public strongly supports the expanded intersection.
- The quadrant would likely be significantly more expensive due to new roadway alignment construction and right-of-way acquisition costs.

In No Build 2045 conditions, the Port Republic Road / Shopping Center intersection experiences significant side street delay and queueing in the PM peak hour due to queue spillback on Port Republic Road from the Peach Grove Avenue / Neff Avenue intersection. The recommended improvement at the Port Republic Road / Peach Grove Avenue / Neff Avenue intersection significantly reduces the queue spillback and thus the delay at the Shopping Center driveway. **Table 22** documents the AM and PM peak hour 2045 operational performance findings for the Port Republic Road / Shopping Center intersection in the Build improvement condition, including movement delay (seconds), associated Level of Service, and queuing metrics. **Appendix B** contains *SimTraffic* output reports. VHB identified the following operational benefit with the improvement compared to No Build 2045 conditions:

- In the PM peak hour, the shopping center driveway is projected to experience approximately 400 seconds less delay per vehicle and approximately 500 feet less vehicle queuing.

Table 22 Recommended Improvement 2045 Operations: Port Republic Road / Shopping Center

Approach	Movement	Movement Delay (sec)	Level of Service (LOS)	95th Queue (feet)	Maximum Queue (feet)	Upstream Block Time (%)[1]	Storage Block Time (%)[2]	Storage / Link Distance (feet)
AM Peak Hour								
EB Shopping Center	Left/Right	23.7/10.3	C/B	80	111	0	-	525
NB Port Republic Rd	Left	11.0	A	43	54	0	0	50
SB Port Republic Rd	Thru/Right	0.0/0.0	A/A	7	12	0	-	750
PM Peak Hour								
EB Shopping Center	Left/Right	103.9/81.7	**F/F**	137	327	0	-	525
NB Port Republic Rd	Left	23.2	C	46	52	0	0	50
SB Port Republic Rd	Thru/Right	0.1/0.1	B/A	22	39	0	-	750

Source: SimTraffic.

1 Upstream Block Time (%) = percentage of peak hour that the queue length extends to the upstream intersection.

2 Storage Block Time (%) = percentage of peak hour that the queue length fills the turn lane storage – thus extending into the adjacent thru lane – or extends in the thru lane past the entrance to the turn lane – thus blocking traffic from entering the turn lane.

While the improvements to the Port Republic Road / Peach Grove Avenue / Neff Avenue intersection are projected to alleviate the queueing impacts on the shopping center driveway and thus make it significantly easier to turn left out of the shopping center, it will still be an unsignalized left turn movement across multiple lanes of traffic that may be challenging during peak periods. A right-in / right-out only conversion of this intersection is feasible; however, it limits the ability for traffic to head north on Port Republic Road, particularly with the extension of the Peach Grove Avenue left turn lane past its shopping center driveway. A full-time or peak period right-in / right-out only conversion with appropriate signage could be considered by the City as a near-term, interim improvement prior to completion of Port Republic Road / Peach Grove Avenue / Neff Avenue intersection improvements. Once these improvements are completed, traffic and crashes could be monitored to determine if full access is viable or if right-in / right-out only operation should continue.

Port Republic Road / Devon Lane: New Study Concept

The first alternative considered at this intersection includes widening eastbound Devon Lane to add a dedicated left turn lane in addition to a shared left/thru/right lane, removing the existing channelized right-turn at the eastbound approach, extending the Devon Lane bike lane thru the intersection, and maintaining the existing on-street parking along the north side of Devon Lane. **Figure 41** displays the intersection concept shared with the public during Spring 2025; this graphic only focuses on the proposed intersection improvements, not the connections to the under-design project north of Devon Lane or the proposed shared use path south of Devon Lane. This intersection concept seeks to address the operational constraints identified in the future transportation demand projections as well as the pedestrian safety issue with the unsignalized channelized right turn.

Figure 41 Port Republic Road / Devon Lane Alternative: Eastbound Devon Lane

Table 23 documents the AM and PM peak hour 2045 operational performance findings for Port Republic Road / Devon Lane intersection improvement concept, including movement delay (seconds), associated Level of Service, and queuing metrics. **Appendix B** contains *SimTraffic* output reports. VHB identified the following operational impacts in this alternative compared to the No Build 2045 conditions:

- On eastbound Devon Lane, reduces anticipated queue length by approximately 175 feet in AM peak hour and 225 feet in PM peak hour.
- On eastbound Devon Lane, reduces anticipated left turn and thru movement delay by approximately 8 seconds in AM peak hour and 30 seconds in PM peak hour.
- On eastbound Devon Lane, increases right turn delay by approximately 35 seconds in PM peak hour due to conversion of unsignalized channelized right turn to a signalized stop bar approach.

During Spring 2025 public engagement, 81% of the respondents supported these intersection improvements, with half of those (39%) in strong support of the concept. **Figure 42** displays the public response results.

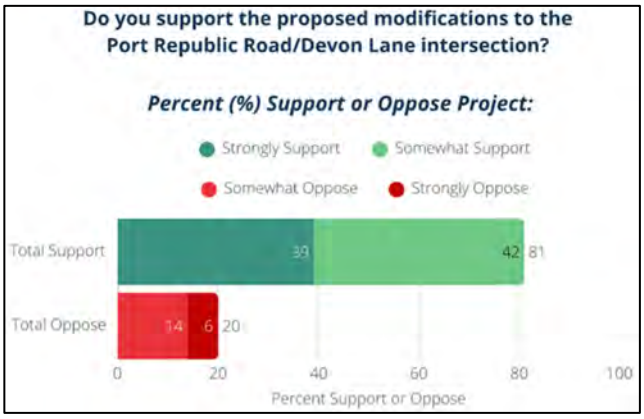


Figure 42 Port Republic Road / Devon Lane New Study Concept Public Survey Results

Table 23 New Study Concept 2045 Operations: Port Republic Road / Devon Lane

Approach	Movement	Movement Delay (sec)	Level of Service (LOS)	95th Queue (feet)	Maximum Queue (feet)	Upstream Block Time (%)[1]	Storage Block Time (%)[2]	Storage / Link Distance (feet)
AM Peak Hour								
Eastbound Devon Lane	Left	53.6	D	229	199	0	0	200
	Thru	59.7	**E**	282	179	0	7	1,000+
	Right	50.7	D	282	179	0	7	175
Westbound Devon Lane	Left	61.8	**E**	68	73	0	5	75
	Thru	68.7	**E**	68	73	0	5	75
	Right	17.3	B	83	110	0	1	1,000+
Northbound Port Republic Rd	Left	31.3	C	74	145	0	0	210
	Thru	10.9	B	340	371	0	7	800
	Right	9.3	A	351	378	0	-	800
Southbound Port Republic Rd	Left	41.3	C	71	86	0	0	310
	Thru	13.0	B	297	352	0	1	430
	Right	9.1	A	279	324	0	-	430
PM Peak Hour								
Eastbound Devon Lane	Left	71.3	**E**	226	199	0	0	200
	Thru	76.9	**E**	293	358	0	7	1,000+
	Right	67.8	**E**	293	358	0	7	175
Westbound Devon Lane	Left	77.7	**E**	82	73	0	15	75
	Thru	75.3	**E**	82	73	0	15	75
	Right	13.7	B	104	168	0	0	1,000+
Northbound Port Republic Rd	Left	66.3	**E**	157	209	0	0	210
	Thru	15.9	B	435	473	0	12	800
	Right	18.3	B	452	480	0	-	800
Southbound Port Republic Rd	Left	33.2	C	331	310	0	0	310
	Thru	16.3	B	638	742	0	11	430
	Right	15.4	B	616	690	0	-	430

Source: SimTraffic.

1 Upstream Block Time (%) = percentage of peak hour that the queue length extends to the upstream intersection.

2 Storage Block Time (%) = percentage of peak hour that the queue length fills the turn lane storage – thus extending into the adjacent thru lane – or extends in the thru lane past the entrance to the turn lane – thus blocking traffic from entering the turn lane.

Port Republic Road / Devon Lane: Prior Study Concept

The study stakeholder group requested that VHB compare the new intersection improvement concept to the old intersection improvement concept recommended in the 2019 Port Republic Road MPO Study. This concept, seen in **Figure 43**, added a left turn lane to both eastbound and westbound Devon Lane.

Figure 43 Port Republic Road / Devon Lane Alternative: Prior Study Concept

Table 24 documents the AM and PM peak hour 2045 operational performance findings for the Port Republic Road / Devon Lane prior study improvement concept, including movement delay (seconds), associated Level of Service, and queuing metrics. **Appendix B** contains *SimTraffic* output reports. VHB identified the following operational comparisons to the new study concept:

- On eastbound Devon Lane, the new concept provides significant operational benefits, with approximately 60 seconds less delay in the AM peak hour and 15 seconds less delay in the PM peak hour. Queue lengths in the new concept are also 400 feet and 100 feet shorter.
- On westbound Devon Lane, the old concept has lower delay due to the additional left turn lane, including approximately 15 seconds lower in the AM peak hour and 25 seconds in the PM peak hour.
- In the old concept, a conversion from Devon Lane split-phase to concurrent phasing facilitated more green time to Port Republic Road, resulting in 10-20 second delay improvement on mainline left turns compared to the new intersection concept.

After comparing the two improvement concepts, the study stakeholder group recommended the new study concept for the following reasons:

- Since the old study concept was proposed, the City approved a redevelopment plan for the northeast intersection quadrant. This redevelopment limits the ability to widen Devon Lane towards the north to construct the old concept left turn lane.
- The new study concept has significant operational benefits on eastbound Devon Lane, which is where most of the land use and traffic growth has occurred and is projected to occur over the next 20 years. Providing this approach with more capacity is of higher importance than improving westbound Devon Lane.
- The removal of the channelized right turn lane in the new study concept will have pedestrian safety benefits.

Table 24 Prior Study Concept 2045 Operations: Port Republic Road / Devon Lane

Approach	Movement	Movement Delay (sec)	Level of Service (LOS)	95th Queue (feet)	Maximum Queue (feet)	Upstream Block Time (%)[1]	Storage Block Time (%)[2]	Storage / Link Distance (feet)
AM Peak Hour								
Eastbound Devon Lane	Left	113.7	F	164	149	0	49	150
	Thru	122.2	F	676	588	0	30	1,000+
	Right	52.0	D	60	122	0	0	175
Westbound Devon Lane	Left	49.1	D	69	86	0	2	150
	Thru	53.2	D	21	31	0	2	75
	Right	14.2	A	65	82	0	0	150
Northbound Port Republic Rd	Left	23.3	C	36	51	0	0	210
	Thru	9.1	A	331	387	0	5	800
	Right	6.6	A	331	387	0	-	800
Southbound Port Republic Rd	Left	17.2	B	65	92	0	0	310
	Thru	6.4	A	210	250	0	0	430
	Right	5.0	A	193	229	0	-	430
PM Peak Hour								
Eastbound Devon Lane	Left	85.7	F	172	149	0	29	150
	Thru	82.3	F	408	434	0	12	1,000+
	Right	15.9	B	91	175	0	0	175
Westbound Devon Lane	Left	48.0	D	77	100	0	0	150
	Thru	57.1	E	37	52	0	0	75
	Right	10.6	B	31	34	0	0	150
Northbound Port Republic Rd	Left	42.0	D	130	196	0	0	210
	Thru	9.9	A	341	386	0	5	800
	Right	9.5	A	341	386	0	-	800
Southbound Port Republic Rd	Left	21.0	C	241	309	0	0	310
	Thru	9.1	B	475	584	0	5	430
	Right	8.2	B	460	549	0	-	430

Source: SimTraffic.

1 Upstream Block Time (%) = percentage of peak hour that the queue length extends to the upstream intersection.

2 Storage Block Time (%) = percentage of peak hour that the queue length fills the turn lane storage – thus extending into the adjacent thru lane – or extends in the thru lane past the entrance to the turn lane – thus blocking traffic from entering the turn lane.

6

Implementation Plan

The study stakeholder group recommended a set of improvement concepts based on the alternatives analysis, Spring 2025 public engagement, and implementation priority. Stakeholders identified these concepts as either "Study Recommendations" or "Preferred Alternative," a distinction related to funding priority and strategy. The following report section documents these improvements as well as Preferred Alternative preliminary engineering.

Funding Strategy

One of the primary transportation funding programs in Virginia is VDOT's biannual Smart Scale. This needs-based, competitive funding program has two pots of funding – High Priority Projects (HPP) and District Grant Program (DGP). Improvements that are identified as the "Preferred Alternative" within a MPO planning study are eligible for both HPP and DGP funding, thereby increasing the odds of successful funding; otherwise, if improvements do not address a statewide or regionally significant need, they are only eligible for DGP funds. For a Smart Scale application, the entire "Preferred Alternative" from a study must be submitted for consideration for HPP funds.

Given this funding distinction, this planning study has identified two separate buckets of recommendations – "Study Recommendations" and the "Preferred Alternative." "Study Recommendations" are supported by this study for ultimate implementation; however, stakeholders do not intend to seek near-term funding from VDOT's Smart Scale program. Conversely, the "Preferred Alternative" is a set of improvements supported by this study for near-term implementation, and stakeholders intend to seek near-term funding from VDOT's Smart Scale program in the 2026 Round 7 application cycle.

Study Recommendations

As mentioned, "Study Recommendations" are supported by this study's alternatives analysis and public engagement, and the study stakeholder group recommends their ultimate implementation; however, immediate funding will not be sought from VDOT's Smart Scale program. It is anticipated that future private development projects will complete or contribute towards construction of shared use paths and potentially other Study Recommendation improvements. These recommendations include the following improvements:

- Low-cost safety countermeasures including high visibility signal backplates (HVSB) at Port Republic Road / Devon Lane and time-of-day protected-only phasing for the southbound Port Republic Road left-turn onto Neff Avenue
- Neff Avenue Shared Use Path: Port Republic Road to Arboretum Crosswalk
- Peach Grove Avenue Shared Use Path: Stone Spring Elementary School to Port Republic Road (Phase 1), Stone Spring Road to Stone Spring Elementary School (Phase 2)
- Expanding to two-way bike traffic the under-design one-way bike lane north of Devon Lane
- Port Republic Road pedestrian crossing with Pedestrian Hybrid Beacon (PHB) at Deer Run
- Port Republic Road pedestrian crossing with PHB at Wine Drive / Portland Drive
- Peach Grove Avenue speed management via median and pedestrian refuge islands to "narrow" the perceived roadway width

Bike Facilities North of Devon Lane

The study stakeholder group dedicated specific attention to the implementation plan for bicycle facilities along Port Republic Road. **Figure 44** depicts the planned and funded facilities from Forest Hill Road to south of Devon Lane. Smart Scale Round 6 recently funded the Segment A SUP, the Segment B northbound cycle track is funded and currently under design, and this Small Area Study recommends the Segment C SUP. The City of Harrisonburg envisions widening the Segment B cycle track to a two-way SUP so that there is a continuous SUP from Forest Hill Road to Peach Grove Avenue / Neff Avenue. Stakeholders considered including this widening within this study's Preferred Alternative; however, the following Smart Scale funding requirement creates an eligibility challenge for that improvement. Stakeholders thus determined to classify this as a Study Recommendation.

"Once a project is selected for funding, an entity must wait for two rounds of SMART SCALE following the end date of construction before submitting a new project application for the same location that meets the same need as the project that was selected for funding." (Source: VDOT Smart Scale Technical Guide)

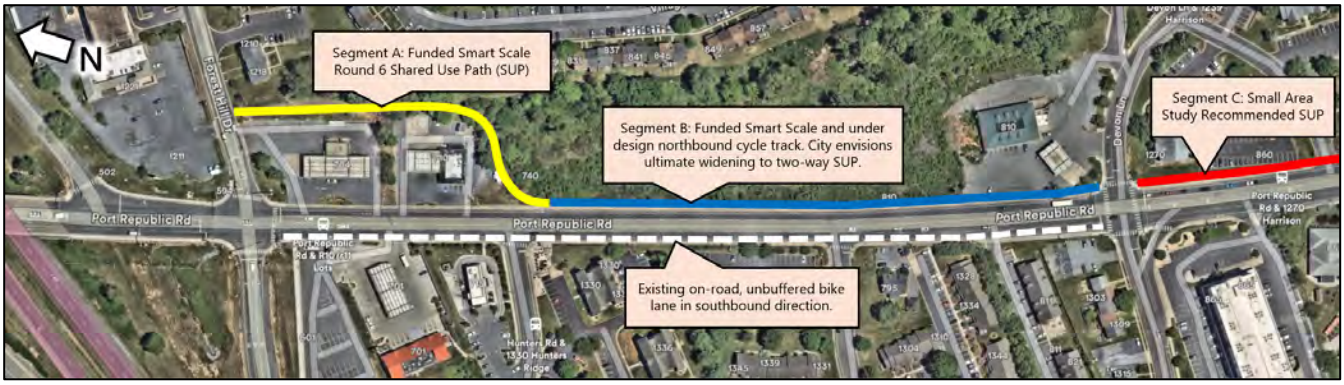


Figure 44 Existing and Planned Bike Facilities on Port Republic Road

Preferred Alternative

As mentioned, the "Preferred Alternative" is supported by this study's alternatives analysis and public engagement, and the study stakeholder group recommends its near-term implementation via VDOT's Smart Scale program. The Preferred Alternative includes the following improvements:

- Shared Use Path on east side of Port Republic Road from Devon Lane to Peach Grove Avenue / Neff Avenue. Utilize truncated painted median south of Devon Lane to provide more buffer and clearance for SUP proximate to existing retaining walls.
- Widened eastbound Devon Lane approach to include a left turn lane and a shared left/thru/right lane. Remove the channelized right turn.
- Widened southbound Port Republic Road at Peach Grove Avenue / Neff Avenue to include a dual left turn and a median from the shopping center driveway to the traffic signal.
- Extended westbound right turn on Neff Avenue at Port Republic Road. Channelize the right turn under signal control and restrict right turn on red.
- Extended eastbound left turn on Peach Grove Avenue at Port Republic Road.

VHB developed a preliminary design drawing of the Preferred Alternative that meets VDOT Smart Scale application requirements. **Appendix E** contains this complete concept drawing.

Port Republic Road / Devon Lane

Figure 45 shows the segment of the Preferred Alternative drawing at this intersection. At this intersection, the Preferred Alternative includes the following project features:

- Removing the channelized right-turn on the eastbound Devon Lane approach
- Approximately 125 feet of widening along eastbound Devon Lane to create a dedicated left turn lane with a 100-foot taper and 165-foot storage plus a shared left/thru/right lane
- Maintaining the on-street parking on the north side of Devon Lane
- Remove on-street bike lanes on Port Republic Road south of Devon Lane. Shift travel lanes to accommodate curb shift to facilitate shared use path construction
- Construct a 10-foot shared use path on the east side of Port Republic Road south of Devon Lane

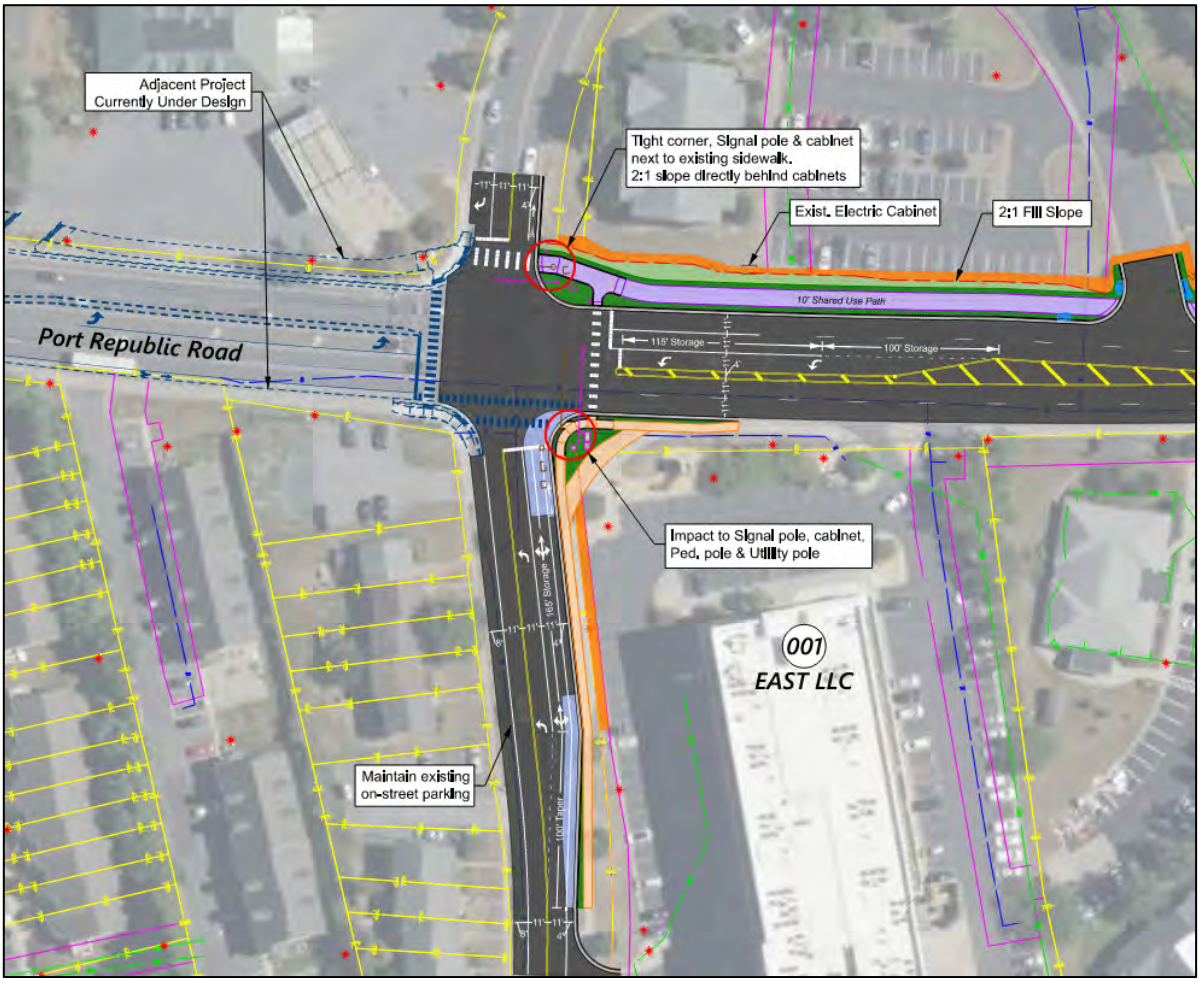


Figure 45 Preferred Alternative Concept Design: Devon Lane

Port Republic Road: Devon Lane to Deer Run

Figure 46 shows the segment of the Preferred Alternative drawing at this location. In this segment, the Preferred Alternative includes the following project features:

- Remove on-street bike lanes on Port Republic Road. Shift travel lanes to accommodate curb shift to facilitate shared use path construction
- South of the northbound left turn lane onto Devon Lane, remove the two-way left-turn lane and taper the median down to a 7-foot painted median to facilitate consistent SUP and buffer widths around existing retaining walls
- Remove retaining wall in front of Parcel 006 and regrade slope to facilitate consistent SUP and buffer width as well as two-way left-turn lane south of Deer Run

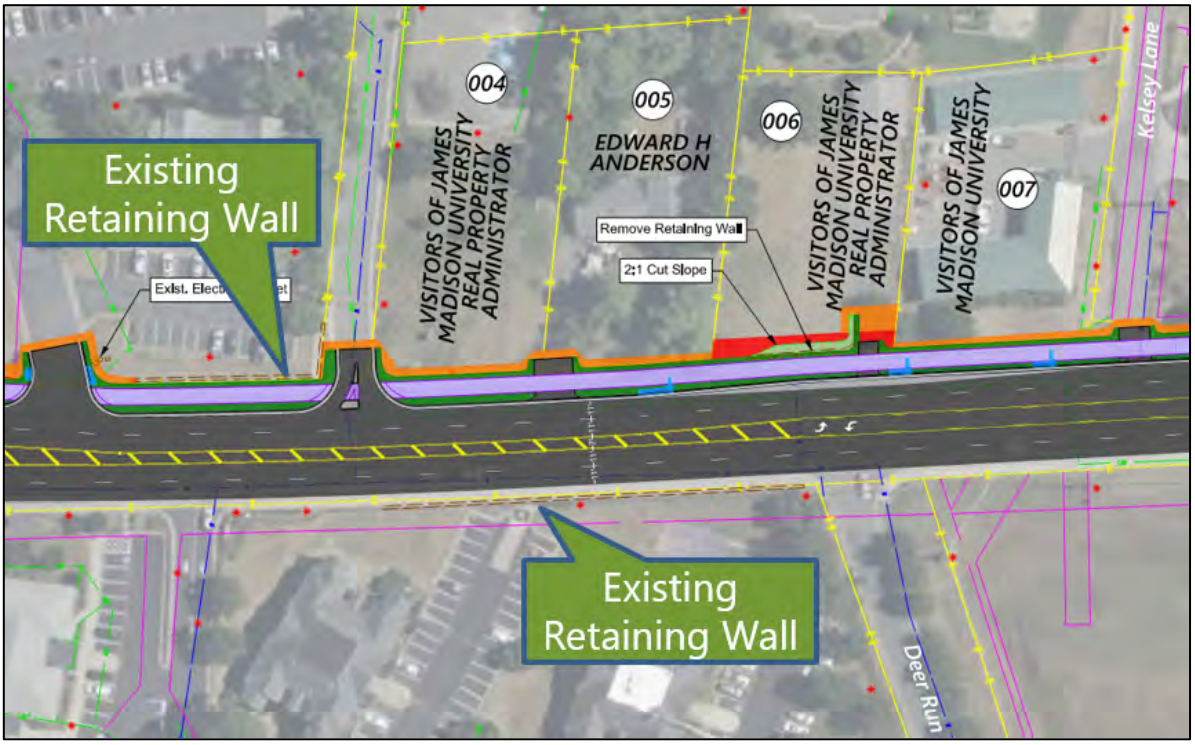


Figure 46 Preferred Alternative Concept Design: Devon Lane to Deer Run

Port Republic Road / Peach Grove Avenue / Neff Avenue

Figure 47 shows the segment of the Preferred Alternative drawing at this intersection. At this intersection, the Preferred Alternative includes the following project features:

- Widened Port Republic Road (entirely to the east) to facilitate construction of dual left-turn lanes for the southbound approach (215-foot storage plus 150-foot taper)
- Four-foot median on Port Republic Road between shopping center driveway and Peach Grove Avenue / Neff Avenue
- Restriped Peach Grove Avenue to designate a left-turn lane with 250-foot storage plus 100-foot taper. Although this lengthened left-turn storage will extend past the commercial driveways, the study stakeholders decided to not formally restrict driveway left turn movements at this stage
- Extended right turn lane on Neff Avenue to create 350-feet of storage with a 100-foot taper, plus a signalized channelization and a right-turn on red restriction
- Minor widening of Neff Avenue bike lane from four to six feet between thru and right turn lane
- New 10-foot shared use path on east side of Port Republic Road north of intersection will connect to existing shared use path on west side of Port Republic Road south of intersection via the southeast intersection quadrant
- Improved pedestrian crossings, including shorter, perpendicular crossings, new curb ramps, porkchop island in northeast quadrant, and refuge island with pedestrian pedestal pole with pushbutton on south leg
- Restriping to designate a northbound Port Republic Road left-turn lane with 50-foot storage and 50-foot taper into CVS driveway

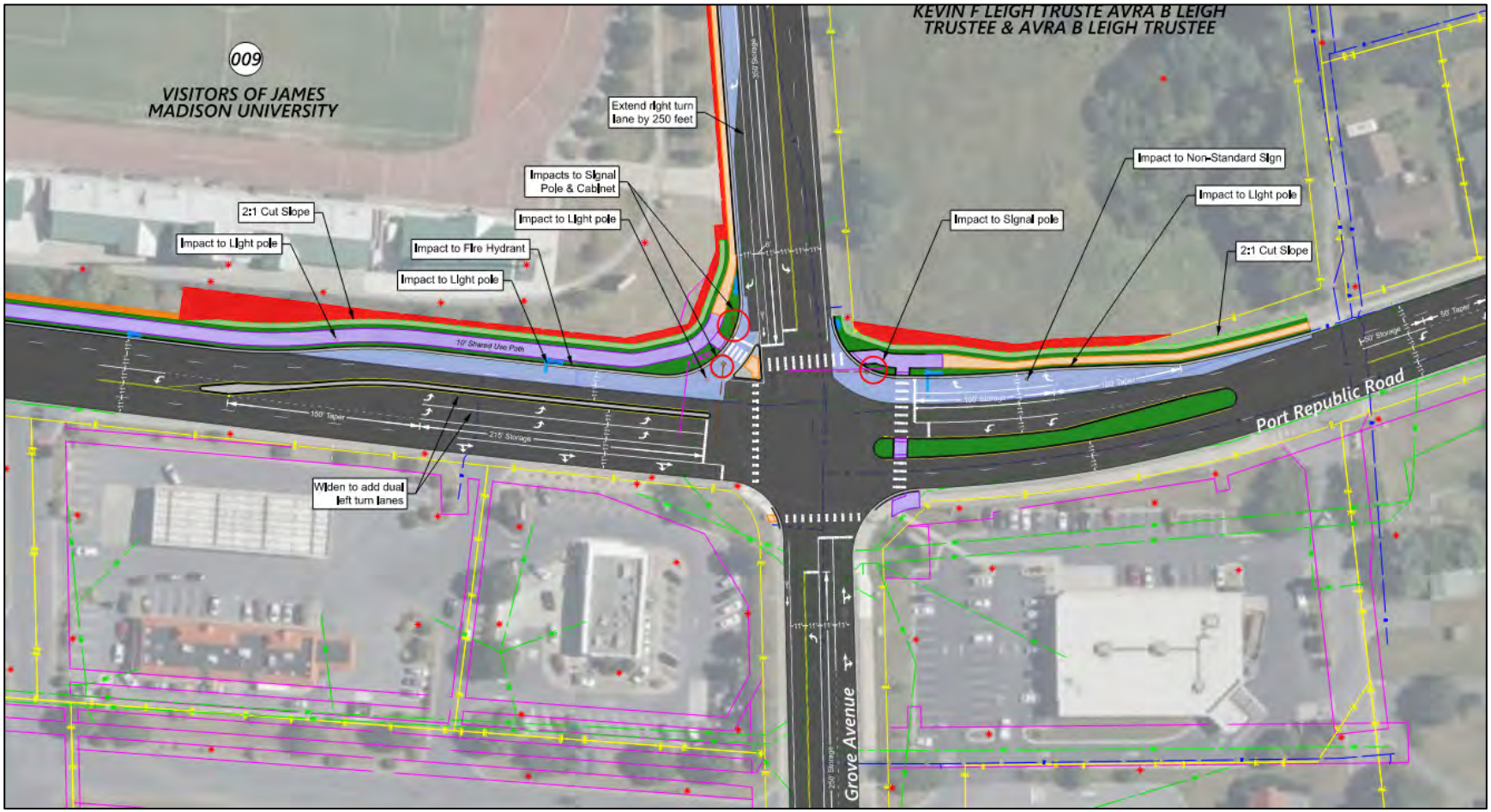


Figure 47 Preferred Alternative Concept Design: Peach Grove Avenue / Neff Avenue

Preliminary Cost Estimate

VHB prepared a Preferred Alternative preliminary cost estimate using VDOT pre-scoping cost estimation methodology. This includes an Engineer's Estimate of key construction items and quantities, as well as a Project Estimate within VDOT's Project Estimate Summary (PES). This project estimate includes appropriate contingency factors, construction engineering inspection (CEI), and other VDOT cost estimate elements. **Table 25** details the preliminary cost estimate by project phase. **Appendix E** contains the complete Project Estimate and Engineer's Estimate. If the Preferred Alternative is submitted for Smart Scale, VDOT will validate the estimate as well as apply appropriate inflation factors to escalate the estimate to the years of expected cost expenditure.

Table 25 Preferred Alternative Preliminary Cost Estimate

Project Phase	Preliminary Estimate
Preliminary Engineering (2025 Dollars, Non-Inflated)	$1,440,000
Right of Way and Utilities (2025 Dollars, Non-Inflated)	$1,690,000
Construction (2025 Dollars, Non-Inflated)	$9,335,000
Total (2025 Dollars, Non-Inflated)	**$12,465,000**
Total Estimate with Anticipated Inflation	**$17,305,000**

Sensitivity Analysis

The study team conducted a sensitivity analysis to project when the existing intersection design operations begin to fail under increased volume demand and thus would benefit from the Preferred Alternative improvements. VHB interpolated 2035 traffic volume demand as a halfway point between Existing Conditions and the 2045 small area study horizon year and then modeled the AM and PM No Build peak hour conditions in *Synchro/SimTraffic* software. **Appendix B** contains the results from the *SimTraffic* analysis.

The sensitivity analysis indicates that the Port Republic Road / Peach Grove Avenue / Neff Avenue intersection will be at capacity by 2035 with high vehicle delays and long queue lengths that spill into upstream intersections such as the shopping center driveway on Port Republic Road. This queue spillback will in turn make it difficult to turn left in and out by 2035. The Port Republic Road / Devon Lane intersection already has relatively high delays and long queue lengths in existing conditions on both the eastbound and the westbound approaches. The 2035 sensitivity analysis results are comparable to existing conditions, whereas the 2045 conditions deteriorate further. Based on this analysis, it would be beneficial to implement the Preferred Alternative by 2035, which will require near-term seeking of funding (e.g., VDOT Round 7 Smart Scale application in 2026) given project lifecycle of design, right-of-way acquisition, and construction.

Small Area Study Takeaways

This Port Republic Road – Peach Grove Avenue – Neff Avenue Small Area Study has holistically considered the existing and projected transportation needs of the study area over a 20-year horizon. The following key takeaways summarize these needs as well as study recommended implementation steps to accommodate the region's growth.

- Active and planned growth within the study area will heighten the need for transportation upgrades, including improved multimodal connections, safety countermeasures, and increased roadway capacity
- Several key improvement projects are recommended for adoption into the region's planning documents, such as the Harrisonburg Comprehensive Plan or the City's Bike and Pedestrian Plan
- The Preferred Alternative project will fill in an important bicycle infrastructure gap as well as provide much needed capacity, safety, and pedestrian improvements at two major intersections
- The Preferred Alternative project should be considered for VDOT Round 7 Smart Scale application submittal (2026)
- Localities should partner with future development projects to contribute towards the Study Recommendation improvements

A

USLIMITS2 Speed Study Report

USLIMITS2 Speed Zoning Report

Project Overview

Project Name: Peach Grove Avenue Speed Study

Analyst: Chuck Conran

Date: 2024-11-13

Basic Project Information
Project Number: 35311.00
Route Name: Peach Grove Avenue
From: Port Republic Road
To: Stone Spring Road
State: Virginia
County: Harrisonburg city
City: Harrisonburg city
Route Type: Road Section in Developed Area
Route Status: Existing

Roadway Information
Section Length: 0.75 mile(s)
Statutory Speed Limit: 35 mph
Existing Speed Limit: 25 mph
Adverse Alignment: No
One-Way Street: No
Divided/Undivided: TWLTL
Number of Through Lanes: 2
Area Type: Residential-Collector/Arterial
Number of Driveways: 13
Number of Signals: 1

Crash Data Information
Crash Data Years: 5.00
Crash AADT: 10623 veh/day
Total Number of Crashes: 22
Total Number of Injury Crashes: 6
Section Crash Rate: 151 per 100 MVM
Section Injury Crash Rate: 41 per 100 MVM
Crash Rate Average for Similar Roads: 297
Injury Rate Average for Similar Roads: 86

Traffic Information
85th Percentile Speed: 37 mph
50th Percentile Speed: 31 mph
AADT: 10623 veh/day
On Street Parking and Usage: Not High
Pedestrian / Bicyclist Activity: High

Project Description: Port Republic Road - Peach Grove Avenue - Neff Avenue Small Area Study

Recommended Speed Limit:

Equations Used in the Crash Data Calculations

Exposure (M)
M = (Section AADT * 365 * Section Length * Duration of Crash Data) / (100000000)
M = (10623 * 365 * 0.75 * 5.00) / (100000000)
M = 0.1454

Crash Rate (Rc)
Rc = (Section Crash Average * 100000000) / (Section AADT * 365 * Section Length)
Rc = (4.40 * 100000000) / (10623 * 365 * 0.75)
Rc = 151.30 crashes per 100 MVM

Injury Rate (Ri)
Ri = (Section Injury Crash Average * 100000000) / (Section AADT * 365 * Section Length)
Ri = (1.20 * 100000000) / (10623 * 365 * 0.75)
Ri = 41.26 injuries per 100 MVM

Critical Crash Rate (Cc)
Cc = Crash Average of Similar Sections + 1.645 * (Crash Average of Similar Sections / Exposure) ^ (1/2) + (1 /

(2 * Exposure))
Cc = 297.07 + 1.645 * (297.07 / 0.1454) ^ (1/2) + (1 / (2 * 0.1454))
Cc = 374.86 crashes per 100 MVM

Critical Injury Rate (Ic)
Ic = Injury Crash Average of Similar Sections + 1.645 * (Injury Crash Average of Similar Sections / Exposure) ^ (1/2) + (1 / (2 * Exposure))
Ic = 86.34 + 1.645 * (86.34 / 0.1454) ^ (1/2) + (1 / (2 * 0.1454))
Ic = 129.87 injuries per 100 MVM

B

SimTraffic Reports

Existing (2024)
AM Peak Hour

1: Port Republic Road & Peach Grove Avenue/Neff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Stop Del/Veh (s)	26.8	25.8	17.4	23.3	34.7	5.0	19.8	24.9	4.3	29.6	14.0	9.8

1: Port Republic Road & Peach Grove Avenue/Neff Avenue Performance by movement

Movement	All
Stop Del/Veh (s)	20.3

2: Peach Grove Avenue & Lois Lane Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Stop Del/Veh (s)	1.8	0.0	0.2	0.2	8.8	5.5	1.8

3: Port Republic Road & Shopping Center Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Stop Del/Veh (s)	12.7	6.1	3.2	0.2	0.0	0.0	0.6

4: Port Republic Road & Deer Run Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Stop Del/Veh (s)	14.9	7.6	3.3	0.0	0.1	0.1	0.8

5: Port Republic Road & Devon Lane Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Stop Del/Veh (s)	67.4	60.2	17.5	60.4	65.3	9.9	34.8	11.3	7.6	28.7	14.3	8.8

5: Port Republic Road & Devon Lane Performance by movement

Movement	All
Stop Del/Veh (s)	21.4

Total Network Performance

Stop Del/Veh (s)	30.1

Intersection: 1: Port Republic Road & Peach Grove Avenue/Neff Avenue

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	R	L	T	T	R	L	T
Maximum Queue (ft)	139	211	198	87	185	145	109	293	262	141	150	308
Average Queue (ft)	70	90	91	35	95	59	59	159	107	43	110	101
95th Queue (ft)	126	162	156	75	164	109	124	250	211	86	177	247
Link Distance (ft)		1219		1404	1404			847	847			507
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	140		250			225	110			200	150	
Storage Blk Time (%)	1	2	0		0	0	1	22	0	0	8	3
Queuing Penalty (veh)	2	6	0		0	0	1	16	1	0	13	8

Intersection: 1: Port Republic Road & Peach Grove Avenue/Neff Avenue

Movement	SB
Directions Served	TR
Maximum Queue (ft)	261
Average Queue (ft)	95
95th Queue (ft)	202
Link Distance (ft)	507
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: Peach Grove Avenue & Lois Lane

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	33	120
Average Queue (ft)	4	52
95th Queue (ft)	22	89
Link Distance (ft)		791
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	50	
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Intersection: 3: Port Republic Road & Shopping Center

Movement	EB	NB	NB	SB	SB
Directions Served	LR	L	T	T	TR
Maximum Queue (ft)	81	33	10	4	9
Average Queue (ft)	33	9	1	0	0
95th Queue (ft)	62	32	10	4	6
Link Distance (ft)	532		507	734	734
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		50			
Storage Blk Time (%)		0	0		
Queuing Penalty (veh)		0	0		

Intersection: 4: Port Republic Road & Deer Run

Movement	EB	NB	NB	NB	SB	SB
Directions Served	LR	L	T	T	T	TR
Maximum Queue (ft)	98	38	3	11	24	26
Average Queue (ft)	41	6	0	0	1	1
95th Queue (ft)	76	27	3	6	12	15
Link Distance (ft)	616		734	734	788	788
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		50				
Storage Blk Time (%)		0				
Queuing Penalty (veh)		0				

Intersection: 5: Port Republic Road & Devon Lane

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	TR	L	T	TR
Maximum Queue (ft)	542	157	65	82	89	316	321	74	295	272
Average Queue (ft)	265	8	27	32	10	144	151	28	137	114
95th Queue (ft)	473	68	60	63	55	285	292	63	259	236
Link Distance (ft)	638			699		788	788		1012	1012
Upstream Blk Time (%)	2									
Queuing Penalty (veh)	0									
Storage Bay Dist (ft)		175	75		210			310		
Storage Blk Time (%)	29	0	2	0	0	4			0	
Queuing Penalty (veh)	2	0	1	0	0	0			0	

Network Summary

Network wide Queuing Penalty: 53

Existing (2024)
PM Peak Hour

1: Port Republic Road & Peach Grove Avenue/Neff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Stop Del/Veh (s)	45.0	46.4	33.9	39.6	55.1	18.8	30.2	36.8	5.2	54.9	24.9	25.2

1: Port Republic Road & Peach Grove Avenue/Neff Avenue Performance by movement

Movement	All
Stop Del/Veh (s)	35.8

2: Peach Grove Avenue & Lois Lane Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Stop Del/Veh (s)	4.5	0.0	0.1	0.1	14.1	9.0	2.0

3: Port Republic Road & Shopping Center Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Stop Del/Veh (s)	38.1	23.5	10.5	0.2	0.1	0.0	2.2

4: Port Republic Road & Deer Run Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Stop Del/Veh (s)	29.6	13.1	12.3	0.0	0.2	0.2	1.1

5: Port Republic Road & Devon Lane Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Stop Del/Veh (s)	88.8	84.6	33.1	70.4	70.2	10.3	34.4	9.6	8.1	19.8	12.1	10.9

5: Port Republic Road & Devon Lane Performance by movement

Movement	All
Stop Del/Veh (s)	19.6

Total Network Performance

Stop Del/Veh (s)	41.0

Intersection: 1: Port Republic Road & Peach Grove Avenue/Neff Avenue

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	R	L	T	T	R	L	T
Maximum Queue (ft)	140	349	243	348	741	225	109	304	276	200	150	471
Average Queue (ft)	81	153	140	163	363	168	60	183	141	60	144	271
95th Queue (ft)	152	274	223	296	683	292	127	273	246	135	169	456
Link Distance (ft)		1219		1404	1404			847	847			507
Upstream Blk Time (%)												0
Queuing Penalty (veh)												1
Storage Bay Dist (ft)	140		250			225	110			200	150	
Storage Blk Time (%)	2	11	0		22	2	1	33	1	0	36	23
Queuing Penalty (veh)	7	32	0		75	6	1	25	2	0	92	81

Intersection: 1: Port Republic Road & Peach Grove Avenue/Neff Avenue

Movement	SB
Directions Served	TR
Maximum Queue (ft)	434
Average Queue (ft)	224
95th Queue (ft)	388
Link Distance (ft)	507
Upstream Blk Time (%)	0
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: Peach Grove Avenue & Lois Lane

Movement	EB	WB	SB
Directions Served	L	TR	LR
Maximum Queue (ft)	35	21	128
Average Queue (ft)	9	1	54
95th Queue (ft)	32	10	99
Link Distance (ft)		1219	791
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	50		
Storage Blk Time (%)	0		
Queuing Penalty (veh)	0		

Intersection: 3: Port Republic Road & Shopping Center

Movement	EB	NB	NB	NB	SB	SB
Directions Served	LR	L	T	T	T	TR
Maximum Queue (ft)	160	47	60	10	24	13
Average Queue (ft)	70	16	5	0	2	1
95th Queue (ft)	134	44	32	10	26	7
Link Distance (ft)	532		507	507	734	734
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		50				
Storage Blk Time (%)		1	0			
Queuing Penalty (veh)		6	0			

Intersection: 4: Port Republic Road & Deer Run

Movement	EB	NB	NB	SB	SB
Directions Served	LR	L	T	T	TR
Maximum Queue (ft)	114	62	30	2	17
Average Queue (ft)	43	25	1	0	1
95th Queue (ft)	86	57	18	0	9
Link Distance (ft)	616		734	788	788
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		50			
Storage Blk Time (%)		3			
Queuing Penalty (veh)		14			

Intersection: 5: Port Republic Road & Devon Lane

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	TR	L	T	TR
Maximum Queue (ft)	488	157	72	101	121	250	260	309	476	478
Average Queue (ft)	243	14	42	20	31	102	114	104	223	226
95th Queue (ft)	465	93	80	83	87	207	222	238	424	425
Link Distance (ft)	638			699		788	788		1012	1012
Upstream Blk Time (%)	1									
Queuing Penalty (veh)	0									
Storage Bay Dist (ft)		175	75		210			310		
Storage Blk Time (%)	30	0	11	0	0	1		0	3	
Queuing Penalty (veh)	4	0	1	0	0	0		0	6	

Network Summary

Network wide Queuing Penalty: 354

Sensitivity Analysis
(No Build 2035)
AM Peak Hour

1: Port Republic Road & Peach Grove Avenue/Neff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Stop Del/Veh (s)	31.7	31.0	21.7	25.1	40.3	6.1	24.2	25.9	5.2	34.9	15.7	11.9

1: Port Republic Road & Peach Grove Avenue/Neff Avenue Performance by movement

Movement	All
Stop Del/Veh (s)	23.4

2: Peach Grove Avenue & Lois Lane Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Stop Del/Veh (s)	1.5	0.0	0.2	0.3	12.8	8.8	2.2

3: Port Republic Road & Shopping Center Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Stop Del/Veh (s)	16.6	8.5	4.9	0.2	0.0	0.0	0.7

4: Port Republic Road & Deer Run Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Stop Del/Veh (s)	16.6	8.6	4.1	0.0	0.1	0.1	0.8

5: Port Republic Road & Devon Lane Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Stop Del/Veh (s)	60.7	58.8	6.0	58.4	85.6	11.3	31.0	12.3	13.0	32.5	14.5	10.3

5: Port Republic Road & Devon Lane Performance by movement

Movement	All
Stop Del/Veh (s)	20.4

Total Network Performance

Stop Del/Veh (s)	32.2

Intersection: 1: Port Republic Road & Peach Grove Avenue/Neff Avenue

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	R	L	T	T	R	L	T
Maximum Queue (ft)	139	318	244	91	277	217	109	283	238	166	150	355
Average Queue (ft)	86	132	124	39	122	68	71	170	122	50	125	129
95th Queue (ft)	147	245	209	77	225	146	131	256	215	102	179	305
Link Distance (ft)		1219		1404	1404			847	847			507
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	140		250			225	110			200	150	
Storage Blk Time (%)	2	6	0		1	0	1	26	0	0	13	5
Queuing Penalty (veh)	9	22	0		3	0	3	23	1	0	23	14

Intersection: 1: Port Republic Road & Peach Grove Avenue/Neff Avenue

Movement	SB
Directions Served	TR
Maximum Queue (ft)	288
Average Queue (ft)	115
95th Queue (ft)	235
Link Distance (ft)	507
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: Peach Grove Avenue & Lois Lane

Movement	EB	EB	WB	SB
Directions Served	L	T	TR	LR
Maximum Queue (ft)	41	8	2	127
Average Queue (ft)	4	0	0	58
95th Queue (ft)	24	8	2	102
Link Distance (ft)		486	1219	791
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	50			
Storage Blk Time (%)	0			
Queuing Penalty (veh)	0			

Intersection: 3: Port Republic Road & Shopping Center

Movement	EB	NB	NB	SB	SB
Directions Served	LR	L	T	T	TR
Maximum Queue (ft)	82	52	53	2	9
Average Queue (ft)	33	13	2	0	0
95th Queue (ft)	65	39	21	0	4
Link Distance (ft)	532		507	734	734
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		50			
Storage Blk Time (%)		0	0		
Queuing Penalty (veh)		1	0		

Intersection: 4: Port Republic Road & Deer Run

Movement	EB	NB	NB	NB	SB	SB
Directions Served	LR	L	T	T	T	TR
Maximum Queue (ft)	100	38	26	35	12	18
Average Queue (ft)	42	6	1	1	0	1
95th Queue (ft)	78	28	10	16	6	14
Link Distance (ft)	616		734	734	788	788
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		50				
Storage Blk Time (%)		0	0			
Queuing Penalty (veh)		0	0			

Intersection: 5: Port Republic Road & Devon Lane

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	TR	L	T	TR
Maximum Queue (ft)	509	87	66	80	105	358	360	133	328	295
Average Queue (ft)	244	5	23	32	9	173	182	30	160	133
95th Queue (ft)	425	53	58	65	52	316	321	85	280	253
Link Distance (ft)	638			699		788	788		1012	1012
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)		175	75		210			310		
Storage Blk Time (%)	26	0	2	0	0	5		0	0	
Queuing Penalty (veh)	2	0	1	0	0	0		0	0	

Network Summary

Network wide Queuing Penalty: 105

Sensitivity Analysis
(No Build 2035)
AM Peak Hour

Intersection: 1: Port Republic Road & Peach Grove Avenue/Neff Avenue

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	R	L	T	T	R	L	T
Maximum Queue (ft)	140	406	250	1052	1238	225	109	366	343	200	150	500
Average Queue (ft)	86	193	170	427	826	212	76	226	183	79	144	292
95th Queue (ft)	159	335	255	1175	1487	278	141	325	291	174	168	484
Link Distance (ft)		1219		1404	1404			847	847			507
Upstream Blk Time (%)				4	8							1
Queuing Penalty (veh)				0	0							3
Storage Bay Dist (ft)	140		250			225	110			200	150	
Storage Blk Time (%)	1	20	1		45	3	2	43	3	0	39	27
Queuing Penalty (veh)	4	70	2		158	14	5	39	8	1	106	102

Intersection: 1: Port Republic Road & Peach Grove Avenue/Neff Avenue

Movement	SB
Directions Served	TR
Maximum Queue (ft)	484
Average Queue (ft)	241
95th Queue (ft)	429
Link Distance (ft)	507
Upstream Blk Time (%)	0
Queuing Penalty (veh)	1
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: Peach Grove Avenue & Lois Lane

Movement	EB	EB	WB	SB
Directions Served	L	T	TR	LR
Maximum Queue (ft)	46	9	18	139
Average Queue (ft)	9	0	1	59
95th Queue (ft)	34	10	9	108
Link Distance (ft)		486	1219	791
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	50			
Storage Blk Time (%)	0			
Queuing Penalty (veh)	2			

Intersection: 3: Port Republic Road & Shopping Center

Movement	EB	NB	NB	NB	SB	SB
Directions Served	LR	L	T	T	T	TR
Maximum Queue (ft)	216	47	71	32	55	40
Average Queue (ft)	82	15	5	1	3	2
95th Queue (ft)	165	43	38	23	28	17
Link Distance (ft)	532		507	507	734	734
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		50				
Storage Blk Time (%)		2	0			
Queuing Penalty (veh)		9	0			

Intersection: 4: Port Republic Road & Deer Run

Movement	EB	NB	NB	SB
Directions Served	LR	L	T	TR
Maximum Queue (ft)	108	63	32	23
Average Queue (ft)	43	25	1	1
95th Queue (ft)	86	54	18	9
Link Distance (ft)	616		734	788
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		50		
Storage Blk Time (%)		3		
Queuing Penalty (veh)		16		

Intersection: 5: Port Republic Road & Devon Lane

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	TR	L	T	TR
Maximum Queue (ft)	553	140	73	147	187	317	310	309	556	526
Average Queue (ft)	264	12	42	23	35	138	146	110	261	252
95th Queue (ft)	486	84	79	92	102	274	278	253	498	480
Link Distance (ft)	638			699		788	788		1012	1012
Upstream Blk Time (%)	0									
Queuing Penalty (veh)	0									
Storage Bay Dist (ft)		175	75		210			310		
Storage Blk Time (%)	35	0	13	0	0	4		0	5	
Queuing Penalty (veh)	4	0	1	0	0	1		0	10	

Network Summary

Network wide Queuing Penalty: 556

No Build (2045)
AM Peak Hour

1: Port Republic Road & Peach Grove Avenue/Neff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Stop Del/Veh (s)	57.0	44.3	36.1	35.7	58.1	14.0	30.1	28.3	5.7	51.5	18.0	14.4

1: Port Republic Road & Peach Grove Avenue/Neff Avenue Performance by movement

Movement	All
Stop Del/Veh (s)	32.4

2: Peach Grove Avenue & Lois Lane Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Stop Del/Veh (s)	2.3	0.0	0.2	0.2	13.4	9.2	2.0

3: Port Republic Road & Shopping Center Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Stop Del/Veh (s)	23.4	12.4	6.2	0.2	0.0	0.0	0.9

4: Port Republic Road & Deer Run Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Stop Del/Veh (s)	22.2	11.0	6.1	0.0	0.1	0.1	0.9

5: Port Republic Road & Devon Lane Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Stop Del/Veh (s)	62.5	64.5	18.9	61.4	69.1	14.0	37.2	14.3	13.4	39.9	16.1	13.8

5: Port Republic Road & Devon Lane Performance by movement

Movement	All
Stop Del/Veh (s)	22.2

Total Network Performance

Stop Del/Veh (s)	41.1

Intersection: 1: Port Republic Road & Peach Grove Avenue/Neff Avenue

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	R	L	T	T	R	L	T
Maximum Queue (ft)	140	639	250	173	485	225	109	360	343	199	150	408
Average Queue (ft)	123	259	189	63	194	119	82	216	168	73	134	200
95th Queue (ft)	165	500	286	133	422	239	139	320	282	161	180	413
Link Distance (ft)		1219		1404	1404			847	847			507
Upstream Blk Time (%)												0
Queuing Penalty (veh)												0
Storage Bay Dist (ft)	140		250			225	110			200	150	
Storage Blk Time (%)	14	20	1		7	1	2	34	2	0	26	15
Queuing Penalty (veh)	74	96	5		22	2	7	38	5	1	49	48

Intersection: 1: Port Republic Road & Peach Grove Avenue/Neff Avenue

Movement	SB
Directions Served	TR
Maximum Queue (ft)	377
Average Queue (ft)	159
95th Queue (ft)	317
Link Distance (ft)	507
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: Peach Grove Avenue & Lois Lane

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	36	133
Average Queue (ft)	5	59
95th Queue (ft)	24	105
Link Distance (ft)		791
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	50	
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Intersection: 3: Port Republic Road & Shopping Center

Movement	EB	NB	NB	SB	SB
Directions Served	LR	L	T	T	TR
Maximum Queue (ft)	99	39	26	10	20
Average Queue (ft)	40	11	1	0	1
95th Queue (ft)	77	36	13	6	11
Link Distance (ft)	532		507	734	734
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		50			
Storage Blk Time (%)		0	0		
Queuing Penalty (veh)		2	0		

Intersection: 4: Port Republic Road & Deer Run

Movement	EB	NB	NB	NB	SB	SB
Directions Served	LR	L	T	T	T	TR
Maximum Queue (ft)	102	37	11	19	15	17
Average Queue (ft)	45	7	0	1	1	1
95th Queue (ft)	83	28	9	11	12	13
Link Distance (ft)	616		734	734	788	788
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		50				
Storage Blk Time (%)		0	0			
Queuing Penalty (veh)		1	0			

Intersection: 5: Port Republic Road & Devon Lane

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	TR	L	T	TR
Maximum Queue (ft)	496	122	72	139	144	448	452	228	388	351
Average Queue (ft)	263	7	34	37	14	206	216	37	186	165
95th Queue (ft)	436	63	72	90	71	398	405	115	332	311
Link Distance (ft)	638			699		788	788		1012	1012
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)		175	75		210			310		
Storage Blk Time (%)	31	0	5	1	0	10		0	1	
Queuing Penalty (veh)	2	0	3	0	0	1		0	1	

Network Summary

Network wide Queuing Penalty: 356

No Build (2045)
PM Peak Hour

1: Port Republic Road & Peach Grove Avenue/Neff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Stop Del/Veh (s)	102.5	86.0	80.0	77.4	175.3	153.6	98.7	67.5	21.5	115.4	36.8	37.6

1: Port Republic Road & Peach Grove Avenue/Neff Avenue Performance by movement

Movement	All
Stop Del/Veh (s)	88.5

2: Peach Grove Avenue & Lois Lane Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Stop Del/Veh (s)	4.9	0.0	0.1	0.1	21.8	13.6	2.4

3: Port Republic Road & Shopping Center Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Stop Del/Veh (s)	486.9	500.6	28.5	0.2	14.6	2.2	27.2

4: Port Republic Road & Deer Run Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Stop Del/Veh (s)	41.4	26.4	20.0	0.0	0.7	0.4	1.8

5: Port Republic Road & Devon Lane Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Stop Del/Veh (s)	102.9	96.5	31.6	82.0	85.0	11.8	60.6	17.9	16.3	30.3	17.1	16.5

5: Port Republic Road & Devon Lane Performance by movement

Movement	All
Stop Del/Veh (s)	26.1

Total Network Performance

Stop Del/Veh (s)	100.3

Intersection: 1: Port Republic Road & Peach Grove Avenue/Neff Avenue

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	R	L	T	T	R	L	T
Maximum Queue (ft)	140	840	250	1421	1432	225	109	602	589	200	150	524
Average Queue (ft)	118	466	228	1022	1184	213	91	354	319	142	149	471
95th Queue (ft)	173	869	295	1929	1812	270	136	556	547	253	159	624
Link Distance (ft)		1219		1404	1404			847	847			507
Upstream Blk Time (%)				32	52							33
Queuing Penalty (veh)				0	0							217
Storage Bay Dist (ft)	140		250			225	110			200	150	
Storage Blk Time (%)	17	45	4		53	5	18	57	24	2	66	61
Queuing Penalty (veh)	91	202	16		209	22	50	72	65	5	206	282

Intersection: 1: Port Republic Road & Peach Grove Avenue/Neff Avenue

Movement	SB
Directions Served	TR
Maximum Queue (ft)	536
Average Queue (ft)	379
95th Queue (ft)	608
Link Distance (ft)	507
Upstream Blk Time (%)	5
Queuing Penalty (veh)	34
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: Peach Grove Avenue & Lois Lane

Movement	EB	WB	SB
Directions Served	L	TR	LR
Maximum Queue (ft)	35	22	148
Average Queue (ft)	11	1	64
95th Queue (ft)	36	12	117
Link Distance (ft)		1219	791
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	50		
Storage Blk Time (%)	0		
Queuing Penalty (veh)	1		

Intersection: 3: Port Republic Road & Shopping Center

Movement	EB	NB	NB	NB	SB	SB
Directions Served	LR	L	T	T	T	TR
Maximum Queue (ft)	521	47	103	61	514	492
Average Queue (ft)	322	19	8	2	216	145
95th Queue (ft)	653	47	55	43	554	456
Link Distance (ft)	532		507	507	734	734
Upstream Blk Time (%)	36				1	0
Queuing Penalty (veh)	0				9	2
Storage Bay Dist (ft)		50				
Storage Blk Time (%)		4	0			
Queuing Penalty (veh)		20	0			

Intersection: 4: Port Republic Road & Deer Run

Movement	EB	NB	NB	NB	SB	SB
Directions Served	LR	L	T	T	T	TR
Maximum Queue (ft)	127	64	45	20	60	74
Average Queue (ft)	51	28	2	1	10	10
95th Queue (ft)	101	61	29	15	98	96
Link Distance (ft)	616		734	734	788	788
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		50				
Storage Blk Time (%)		6				
Queuing Penalty (veh)		33				

Intersection: 5: Port Republic Road & Devon Lane

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	TR	L	T	TR
Maximum Queue (ft)	529	174	73	153	175	355	353	310	709	678
Average Queue (ft)	265	15	46	25	47	180	189	146	347	337
95th Queue (ft)	500	97	84	98	129	337	340	321	677	655
Link Distance (ft)	638			699		788	788		1012	1012
Upstream Blk Time (%)	1								1	0
Queuing Penalty (veh)	0								0	0
Storage Bay Dist (ft)		175	75		210			310		
Storage Blk Time (%)	34	0	17	0	0	9		0	12	
Queuing Penalty (veh)	4	0	1	0	0	4		2	21	

Network Summary

Network wide Queuing Penalty: 1566

Preferred Alternative (2045) AM Peak Hour

Includes Expanded Intersection at Peach Grove Ave / Neff Ave and New Study Concept at Devon Lane

1: Port Republic Road & Peach Grove Avenue/Neff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Stop Del/Veh (s)	37.2	35.4	26.3	28.8	37.2	8.5	35.9	34.5	7.3	36.0	18.8	15.7

1: Port Republic Road & Peach Grove Avenue/Neff Avenue Performance by movement

Movement	All
Stop Del/Veh (s)	27.5

2: Peach Grove Avenue & Lois Lane Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Stop Del/Veh (s)	2.2	0.0	0.2	0.2	18.9	12.8	2.8

3: Port Republic Road & Shopping Center Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Stop Del/Veh (s)	23.7	10.3	11.0	4.5	0.0	0.0	3.2

4: Port Republic Road & Deer Run Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Stop Del/Veh (s)	23.9	14.6	3.8	0.0	0.1	0.1	0.9

5: Port Republic Road & Devon Lane Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Stop Del/Veh (s)	53.6	59.7	50.7	61.8	68.7	17.3	31.3	10.9	9.3	41.3	13.0	9.1

5: Port Republic Road & Devon Lane Performance by movement

Movement	All
Stop Del/Veh (s)	18.2

Total Network Performance

Stop Del/Veh (s)	35.9

Intersection: 1: Port Republic Road & Peach Grove Avenue/Neff Avenue

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	R	L	T	T	R	L	L
Maximum Queue (ft)	266	347	248	126	268	258	109	425	384	200	194	216
Average Queue (ft)	127	171	160	52	135	103	79	241	197	81	99	110
95th Queue (ft)	226	286	243	101	232	228	139	360	329	179	172	184
Link Distance (ft)		1215		1399	1399			848	848			
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	300		250			500	110			200	285	285
Storage Blk Time (%)	0	1	0				3	41	4	0		0
Queuing Penalty (veh)	1	5	2				7	47	9	1		0

Intersection: 1: Port Republic Road & Peach Grove Avenue/Neff Avenue

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	260	289
Average Queue (ft)	113	152
95th Queue (ft)	221	273
Link Distance (ft)	520	520
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Intersection: 2: Peach Grove Avenue & Lois Lane

Movement	EB	EB	SB
Directions Served	L	T	LR
Maximum Queue (ft)	29	5	169
Average Queue (ft)	4	0	66
95th Queue (ft)	20	0	133
Link Distance (ft)		486	791
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	50		
Storage Blk Time (%)	0		
Queuing Penalty (veh)	0		

Intersection: 3: Port Republic Road & Shopping Center

Movement	EB	NB	SB	SB
Directions Served	LR	L	T	TR
Maximum Queue (ft)	111	54	26	12
Average Queue (ft)	40	14	1	1
95th Queue (ft)	80	43	11	7
Link Distance (ft)	527		734	734
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		75		
Storage Blk Time (%)		0		
Queuing Penalty (veh)		0		

Intersection: 4: Port Republic Road & Deer Run

Movement	EB	NB	NB	NB	SB	SB
Directions Served	LR	L	T	T	T	TR
Maximum Queue (ft)	125	38	11	20	21	35
Average Queue (ft)	46	7	1	1	1	1
95th Queue (ft)	91	28	8	12	14	17
Link Distance (ft)	616		734	734	780	780
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)		50				
Storage Blk Time (%)		0	0			
Queuing Penalty (veh)		0	0			

Intersection: 5: Port Republic Road & Devon Lane

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	LTR	LT	R	L	T	TR	L	T	TR
Maximum Queue (ft)	199	344	73	110	145	371	378	86	352	324
Average Queue (ft)	117	179	31	38	14	190	200	30	172	149
95th Queue (ft)	229	282	68	83	74	340	351	71	297	279
Link Distance (ft)		636		698		780	780		1006	1006
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	200		75		210			310		
Storage Blk Time (%)	0	7	5	1	0	7			1	
Queuing Penalty (veh)	1	10	3	1	0	1			0	

Network Summary

Network wide Queuing Penalty: 88

Preferred Alternative (2045) PM Peak Hour

Includes Expanded Intersection at Peach Grove Ave / Neff Ave and New Study Concept at Devon Lane

1: Port Republic Road & Peach Grove Avenue/Neff Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Stop Del/Veh (s)	71.3	52.9	43.1	58.8	59.9	11.0	79.2	49.4	15.4	61.2	26.3	28.1

1: Port Republic Road & Peach Grove Avenue/Neff Avenue Performance by movement

Movement	All
Stop Del/Veh (s)	44.1

2: Peach Grove Avenue & Lois Lane Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Stop Del/Veh (s)	8.0	0.0	0.1	0.1	27.7	19.8	2.8

3: Port Republic Road & Shopping Center Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Stop Del/Veh (s)	103.9	81.7	23.2	3.8	0.1	0.1	6.9

4: Port Republic Road & Deer Run Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Stop Del/Veh (s)	56.6	31.2	17.4	0.1	0.0	0.0	1.6

5: Port Republic Road & Devon Lane Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Stop Del/Veh (s)	71.3	76.9	67.8	77.7	75.3	13.7	66.3	15.9	18.3	33.2	16.3	15.4

5: Port Republic Road & Devon Lane Performance by movement

Movement	All
Stop Del/Veh (s)	22.8

Total Network Performance

Stop Del/Veh (s)	53.0

Intersection: 1: Port Republic Road & Peach Grove Avenue/Neff Avenue

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	R	L	T	T	R	L	L
Maximum Queue (ft)	299	513	250	464	809	500	109	485	472	200	276	284
Average Queue (ft)	137	256	204	234	414	205	94	313	272	136	199	226
95th Queue (ft)	260	435	277	419	694	473	135	458	435	240	292	316
Link Distance (ft)		1215		1399	1399			848	848			
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	300		250			500	110			200	285	285
Storage Blk Time (%)	0	6	2		6	0	15	52	13	1	0	2
Queuing Penalty (veh)	0	28	8		22	2	41	65	35	2	1	8

Intersection: 1: Port Republic Road & Peach Grove Avenue/Neff Avenue

Movement	SB	SB
Directions Served	T	TR
Maximum Queue (ft)	482	489
Average Queue (ft)	250	259
95th Queue (ft)	435	418
Link Distance (ft)	520	520
Upstream Blk Time (%)	0	0
Queuing Penalty (veh)	2	1
Storage Bay Dist (ft)		
Storage Blk Time (%)	5	
Queuing Penalty (veh)	21	

Intersection: 2: Peach Grove Avenue & Lois Lane

Movement	EB	EB	WB	SB
Directions Served	L	T	TR	LR
Maximum Queue (ft)	42	44	30	169
Average Queue (ft)	12	2	1	71
95th Queue (ft)	37	22	12	132
Link Distance (ft)		486	1215	791
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	50			
Storage Blk Time (%)	0	0		
Queuing Penalty (veh)	2	0		

Intersection: 3: Port Republic Road & Shopping Center

Movement	EB	NB	NB	SB	SB
Directions Served	LR	L	T	T	TR
Maximum Queue (ft)	327	52	20	44	39
Average Queue (ft)	137	17	1	3	3
95th Queue (ft)	295	46	21	33	22
Link Distance (ft)	527		520	734	734
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		75			
Storage Blk Time (%)		0	0		
Queuing Penalty (veh)		2	0		

Intersection: 4: Port Republic Road & Deer Run

Movement	EB	NB	NB	NB	SB
Directions Served	LR	L	T	T	TR
Maximum Queue (ft)	164	49	117	80	2
Average Queue (ft)	57	24	17	4	0
95th Queue (ft)	125	55	73	42	2
Link Distance (ft)	616		734	734	780
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		50			
Storage Blk Time (%)		5	0		
Queuing Penalty (veh)		28	0		

Intersection: 5: Port Republic Road & Devon Lane

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	LTR	LT	R	L	T	TR	L	T	TR
Maximum Queue (ft)	199	358	73	168	209	473	480	310	742	690
Average Queue (ft)	110	177	46	25	60	229	247	158	342	339
95th Queue (ft)	226	293	82	104	157	435	452	331	638	616
Link Distance (ft)		636		698		780	780		1006	1006
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	200		75		210			310		
Storage Blk Time (%)	0	7	15	0	0	12		0	11	
Queuing Penalty (veh)	0	7	1	0	0	5		1	20	

Network Summary

Network wide Queuing Penalty: 303

Port Republic - Peach Grove Ave - Neff Ave Quadrant Left Intersection (2045) AM Peak Hour

1: Port Republic Road & Peach Grove Avenue Performance by movement

Movement	EBT	EBR	WBT	WBR	NBT	NBR	SBL	SBT	SBR	All
Stop Del/Veh (s)	32.6	24.0	30.0	9.3	14.9	3.9	48.5	6.8	6.1	20.1

2: Westmoreland Dr/Lois Lane & Peach Grove Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Stop Del/Veh (s)	11.4	9.0	6.3	9.9	6.2	4.4	14.3	3.1	9.1	13.1	14.0	8.8

2: Westmoreland Dr/Lois Lane & Peach Grove Avenue Performance by movement

Movement	All
Stop Del/Veh (s)	8.7

16: Port Republic Road & Westmoreland Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Stop Del/Veh (s)	34.3	8.7	25.2	33.7	28.9	7.8	11.0	3.7	2.3	10.0	2.9	1.6

16: Port Republic Road & Westmoreland Dr Performance by movement

Movement	All
Stop Del/Veh (s)	8.0

Intersection: 1: Port Republic Road & Peach Grove Avenue

Movement	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	T	TR	T	T	R	T	T	R	L	T	TR
Maximum Queue (ft)	288	244	164	179	194	260	270	200	297	400	313
Average Queue (ft)	148	145	88	92	88	143	143	66	189	98	84
95th Queue (ft)	240	227	145	158	156	221	226	156	316	312	213
Link Distance (ft)	1221		1404	1404		563	563			502	502
Upstream Blk Time (%)										0	
Queuing Penalty (veh)										0	
Storage Bay Dist (ft)		250			250			200	300		
Storage Blk Time (%)	0	0			0		1	0	6	3	
Queuing Penalty (veh)	1	1			0		2	1	11	11	

Intersection: 2: Westmoreland Dr/Lois Lane & Peach Grove Avenue

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (ft)	61	251	134	279	125	139
Average Queue (ft)	9	124	60	114	51	59
95th Queue (ft)	40	208	115	218	97	111
Link Distance (ft)		477	1221	1221	637	766
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	100					
Storage Blk Time (%)		9				
Queuing Penalty (veh)		1				

Intersection: 16: Port Republic Road & Westmoreland Dr

Movement	EB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	T	TR	L	T	TR
Maximum Queue (ft)	304	74	134	197	192	37	163	162
Average Queue (ft)	159	23	47	80	70	5	52	51
95th Queue (ft)	260	58	98	156	148	25	118	123
Link Distance (ft)	661	672		828	828		563	563
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			150			100		
Storage Blk Time (%)			0	1			1	
Queuing Penalty (veh)			1	1			0	

Port Republic - Peach Grove Ave - Neff Ave Quadrant Left Intersection (2045) PM Peak Hour

1: Port Republic Road & Peach Grove Avenue Performance by movement

Movement	EBT	EBR	WBT	WBR	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.1	0.3	1.9	0.0	0.0	0.0	0.0	0.0	0.2
Total Del/Veh (s)	41.4	33.7	45.4	16.5	30.7	14.7	37.8	12.1	12.5	29.0

2: Westmoreland Dr/Lois Lane & Peach Grove Avenue Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	3.3	0.5	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	18.0	15.8	10.7	19.9	15.0	13.6	32.4	36.4	21.3	38.2	4.9	25.9

2: Westmoreland Dr/Lois Lane & Peach Grove Avenue Performance by movement

Movement	All
Denied Del/Veh (s)	0.2
Total Del/Veh (s)	17.3

16: Port Republic Road & Westmoreland Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.1	0.1	0.1	2.6	0.3	0.2	0.0	0.0	0.0
Total Del/Veh (s)	29.0	1.0	20.0	23.8	28.0	8.0	18.0	10.3	7.6	18.4	8.7	9.3

16: Port Republic Road & Westmoreland Dr Performance by movement

Movement	All
Denied Del/Veh (s)	0.2
Total Del/Veh (s)	12.3

Intersection: 1: Port Republic Road & Peach Grove Avenue

Movement	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	T	TR	T	T	R	T	T	R	L	T	TR
Maximum Queue (ft)	326	249	404	457	250	348	358	200	300	460	427
Average Queue (ft)	165	163	234	253	176	188	183	110	219	172	143
95th Queue (ft)	268	241	345	393	308	301	307	216	349	415	312
Link Distance (ft)	1221		1404	1404		563	563			502	502
Upstream Blk Time (%)										0	0
Queuing Penalty (veh)										2	0
Storage Bay Dist (ft)		250			250			200	300		
Storage Blk Time (%)	1	0		7	1		6	1	6	3	
Queuing Penalty (veh)	3	1		27	5		17	2	20	12	

Intersection: 2: Westmoreland Dr/Lois Lane & Peach Grove Avenue

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (ft)	113	358	313	373	176	182
Average Queue (ft)	16	161	137	136	73	88
95th Queue (ft)	61	305	258	321	141	154
Link Distance (ft)		477	1221	1221	637	766
Upstream Blk Time (%)		0				
Queuing Penalty (veh)		0				
Storage Bay Dist (ft)	100					
Storage Blk Time (%)	0	16				
Queuing Penalty (veh)	0	4				

Intersection: 16: Port Republic Road & Westmoreland Dr

Movement	EB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	T	TR	L	T	TR
Maximum Queue (ft)	372	65	146	261	263	46	198	212
Average Queue (ft)	170	19	49	115	116	8	70	74
95th Queue (ft)	306	51	110	218	224	32	150	159
Link Distance (ft)	661	672		828	828		563	563
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)			150			100		
Storage Blk Time (%)			0	3			3	
Queuing Penalty (veh)			0	4			0	

Port Republic - Devon Lane Prior Study Concept (2045) AM Peak Hour

5: Port Republic Road & Devon Lane Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Stop Del/Veh (s)	113.7	122.2	52.0	49.1	53.2	14.2	23.3	9.1	6.6	17.2	6.4	5.0

5: Port Republic Road & Devon Lane Performance by movement

Movement	All
Stop Del/Veh (s)	22.2

Intersection: 5: Port Republic Road & Devon Lane

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	TR	L	T	TR
Maximum Queue (ft)	149	588	122	86	31	82	51	363	387	92	250	229
Average Queue (ft)	144	329	6	29	4	31	8	164	177	25	117	92
95th Queue (ft)	164	676	60	69	21	65	36	317	331	65	210	193
Link Distance (ft)		638			698			781	781		1005	1005
Upstream Blk Time (%)		7										
Queuing Penalty (veh)		0										
Storage Bay Dist (ft)	150		175	150		150	210			310		
Storage Blk Time (%)	49	30	0	0				5				
Queuing Penalty (veh)	7	88	0	0				1				

Port Republic - Devon Lane Prior Study Concept (2045) PM Peak Hour

5: Port Republic Road & Devon Lane Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Stop Del/Veh (s)	85.7	82.3	15.9	48.0	57.1	10.6	42.0	9.9	9.5	21.0	9.1	8.2

5: Port Republic Road & Devon Lane Performance by movement

Movement	All
Stop Del/Veh (s)	16.5

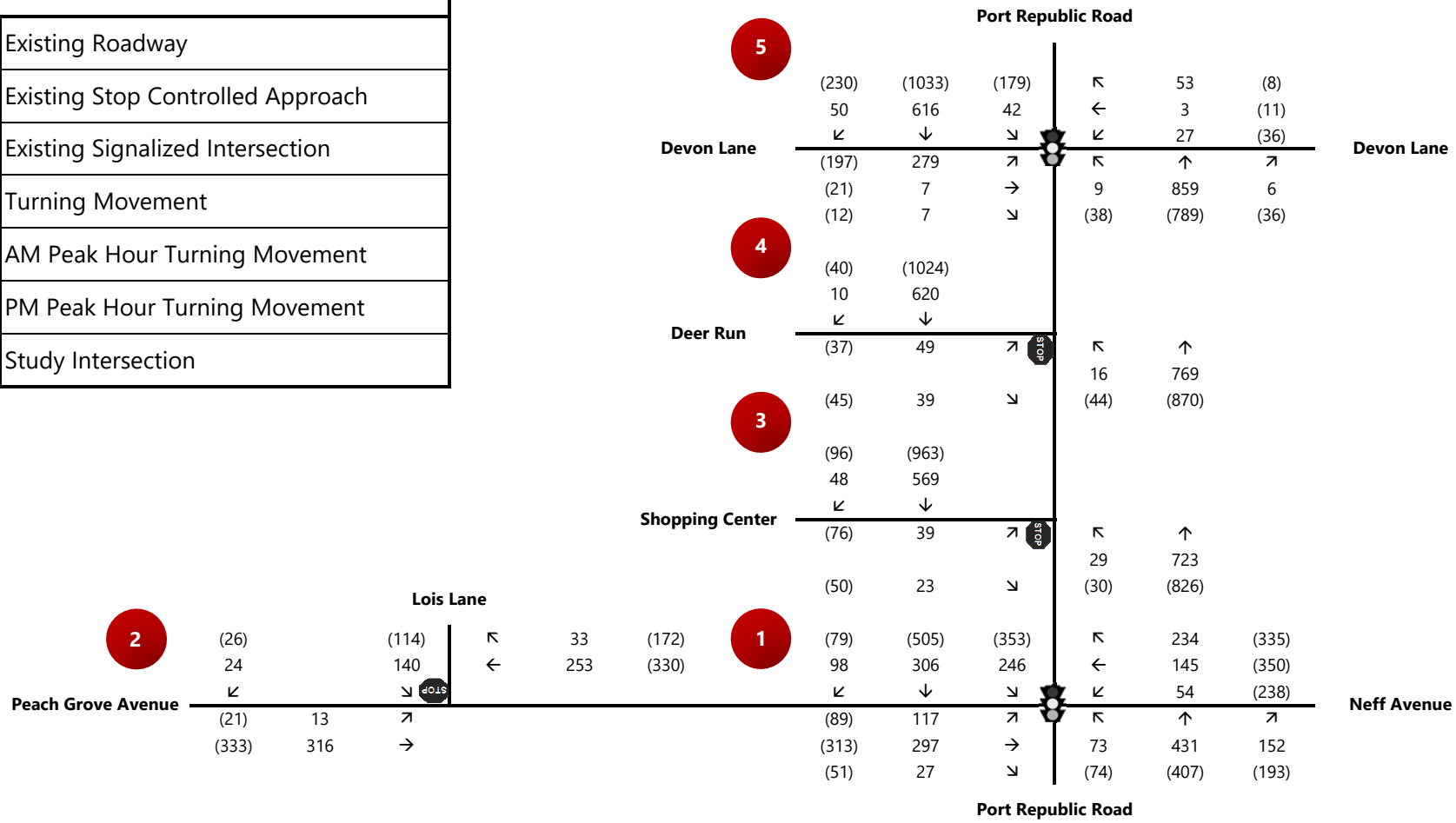
Intersection: 5: Port Republic Road & Devon Lane

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	TR	L	T	TR
Maximum Queue (ft)	149	434	175	100	52	34	196	375	386	309	584	549
Average Queue (ft)	135	163	14	35	12	9	49	163	178	103	243	241
95th Queue (ft)	172	408	91	77	37	31	130	330	341	241	475	460
Link Distance (ft)		638			698			781	781		1005	1005
Upstream Blk Time (%)		0										
Queuing Penalty (veh)		0										
Storage Bay Dist (ft)	150		175	150		150	210			310		
Storage Blk Time (%)	29	12	0				0	5		0	5	
Queuing Penalty (veh)	10	25	0				0	2		0	8	

C

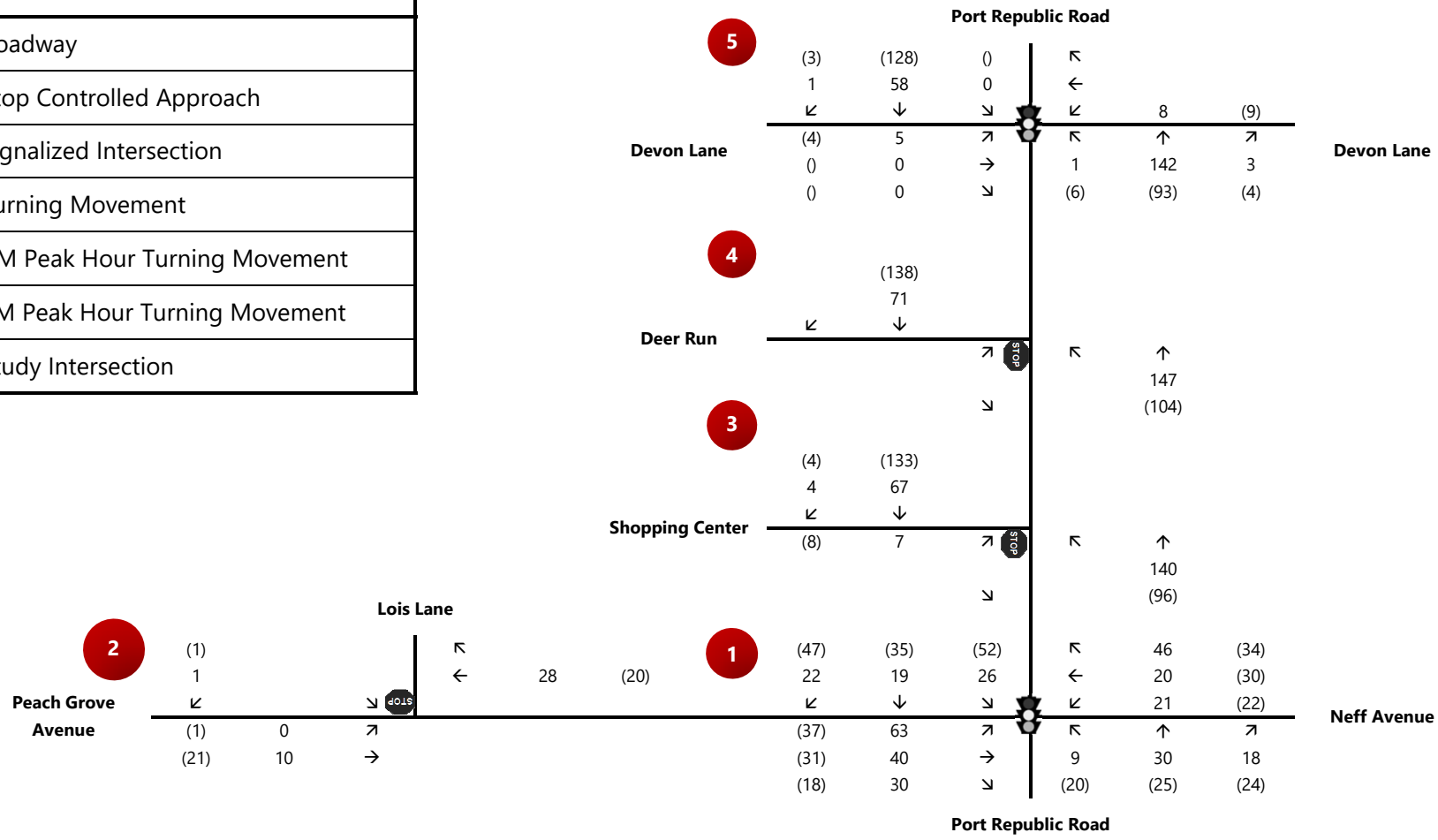
Traffic Forecasting Volumes

LEGEND	
———	Existing Roadway
STOP	Existing Stop Controlled Approach
	Existing Signalized Intersection
←	Turning Movement
XX	AM Peak Hour Turning Movement
(XX)	PM Peak Hour Turning Movement
#	Study Intersection



Port Republic Road - Peach Grove Avenue - Neff Avenue Small Area Study	Existing Traffic Volumes	vhb

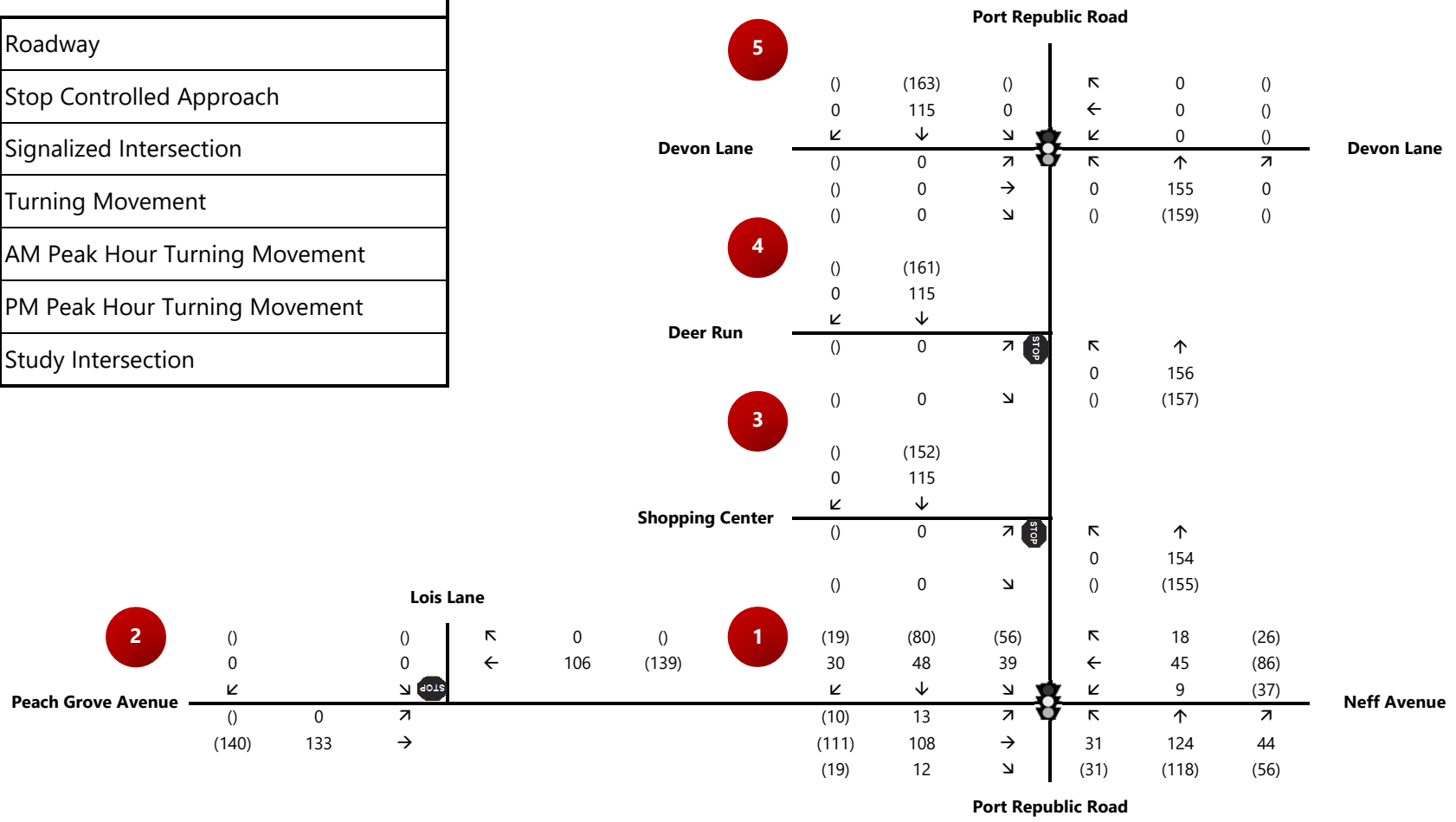
LEGEND	
▬	Roadway
STOP	Stop Controlled Approach
	Signalized Intersection
◄	Turning Movement
XX	AM Peak Hour Turning Movement
(XX)	PM Peak Hour Turning Movement
#	Study Intersection



Port Republic Road - Peach Grove Avenue - Neff Avenue Small Area Study

Known Development Growth

LEGEND	
———	Roadway
STOP	Stop Controlled Approach
	Signalized Intersection
←	Turning Movement
XX	AM Peak Hour Turning Movement
(XX)	PM Peak Hour Turning Movement
#	Study Intersection

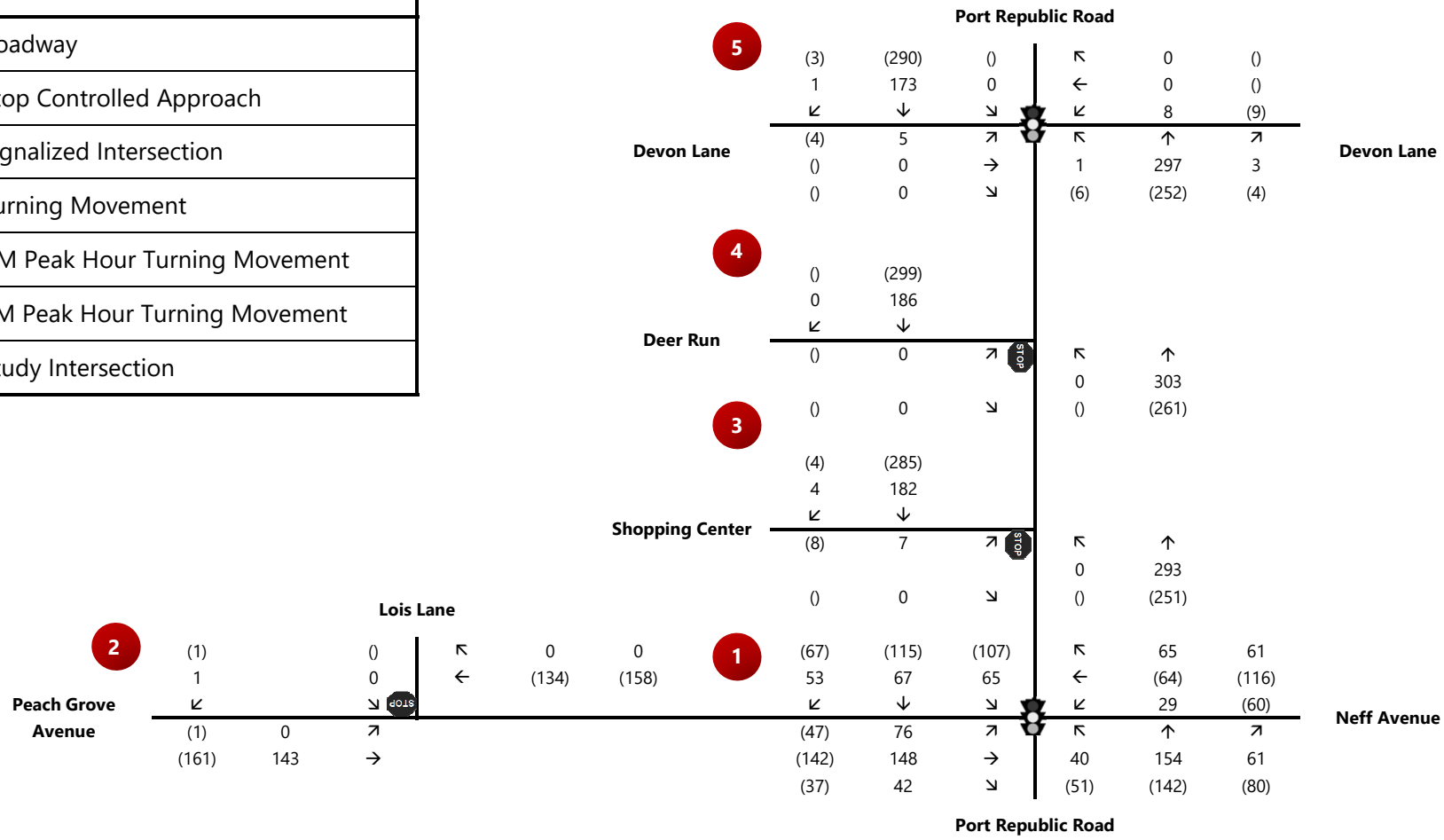


Port Republic Road - Peach Grove Avenue - Neff Avenue Small Area Study

Background Growth 2024-2045

vhb

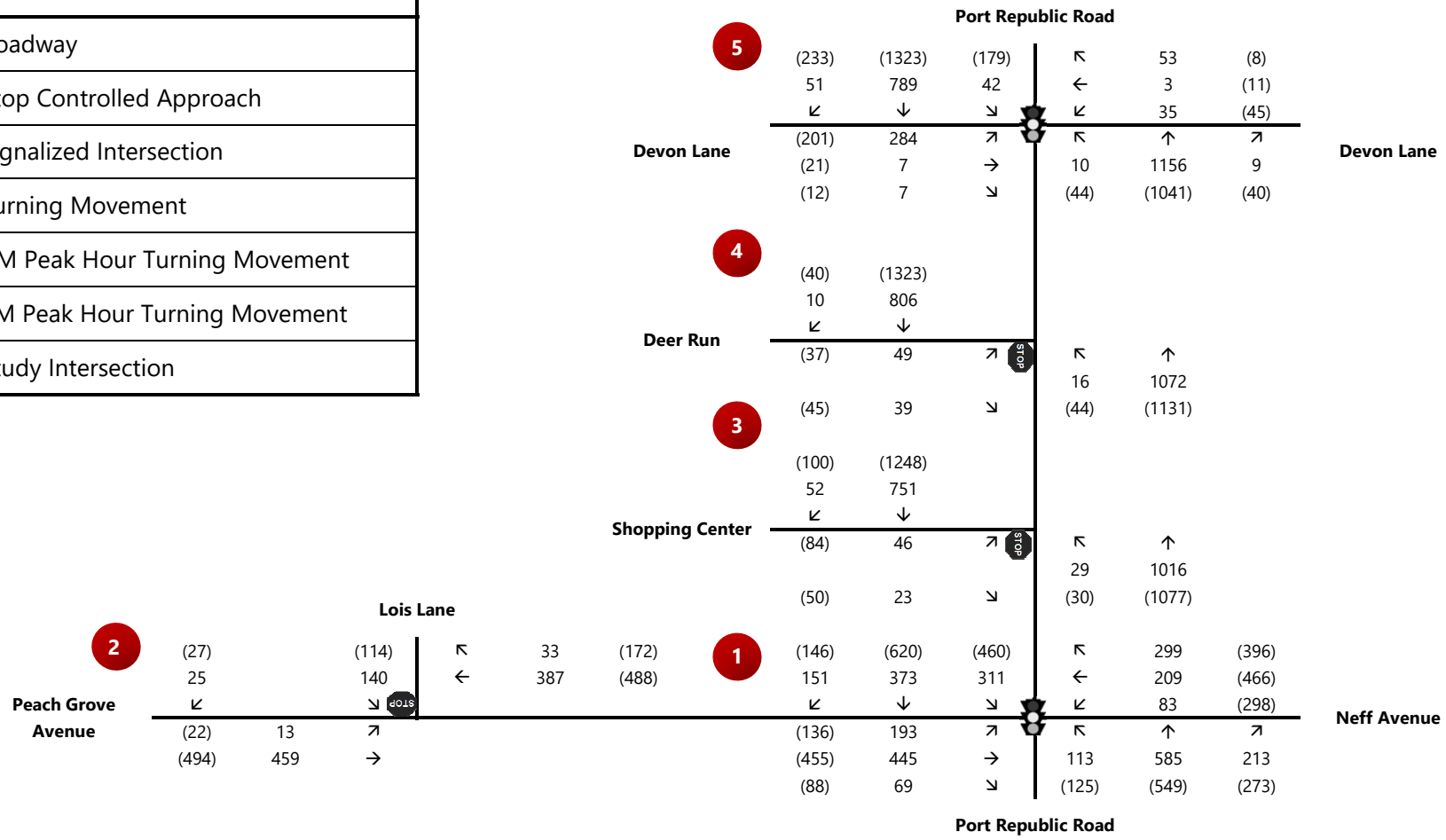
LEGEND	
▬	Roadway
STOP	Stop Controlled Approach
	Signalized Intersection
◄	Turning Movement
XX	AM Peak Hour Turning Movement
(XX)	PM Peak Hour Turning Movement
#	Study Intersection



Port Republic Road - Peach Grove Avenue - Neff Avenue Small Area Study

2024 to 2045 Volume Growth

LEGEND	
———	Roadway
STOP	Stop Controlled Approach
	Signalized Intersection
←	Turning Movement
XX	AM Peak Hour Turning Movement
(XX)	PM Peak Hour Turning Movement
#	Study Intersection



Port Republic Road - Peach Grove Avenue - Neff Avenue Small Area Study	2045 Volumes	vhb

D

Public Engagement Summary

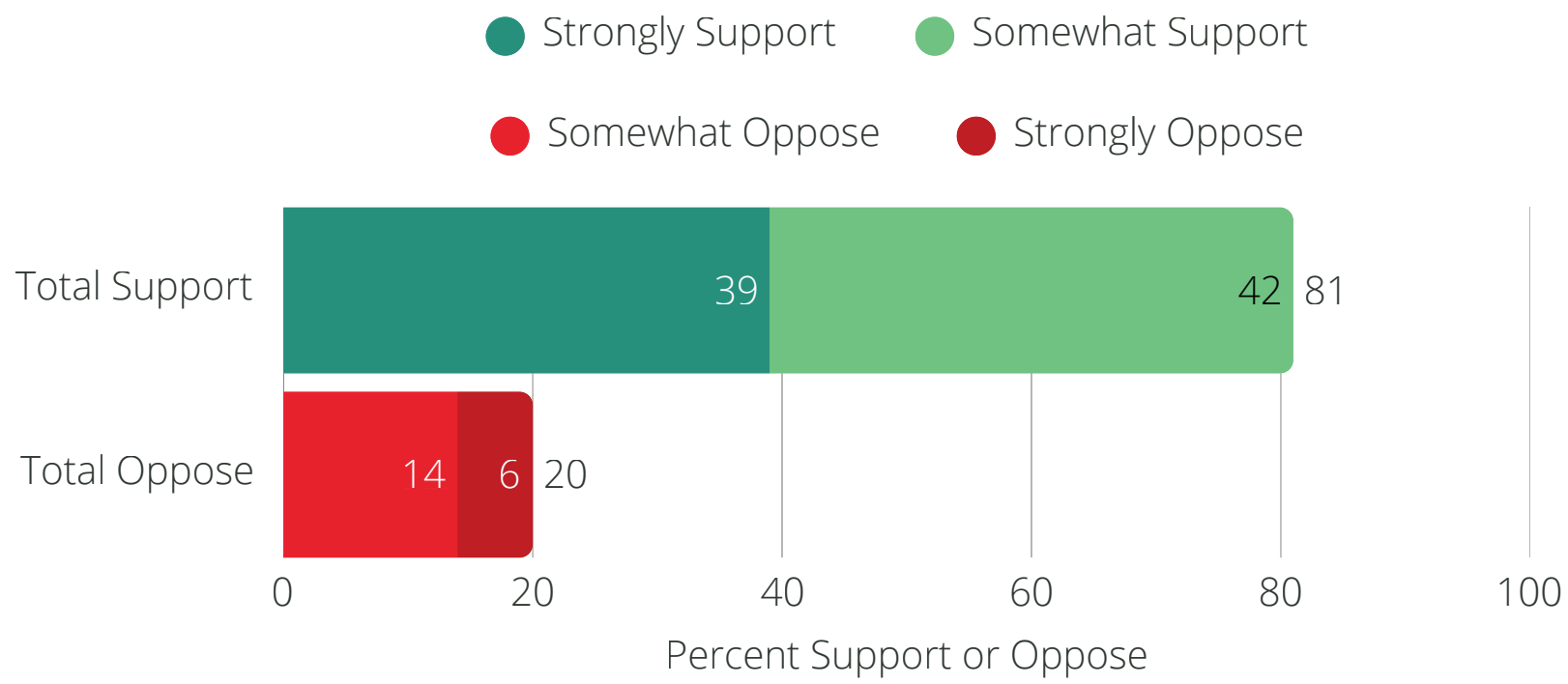
Port Republic Road - Peach Grove - Neff Ave. Public Engagement Takeaways

Harrisonburg Rockingham Metropolitan Planning Organization

Modified Port Republic Road / Devon Lane Intersection

Do you support the proposed modifications to the Port Republic Road/Devon Lane intersection?

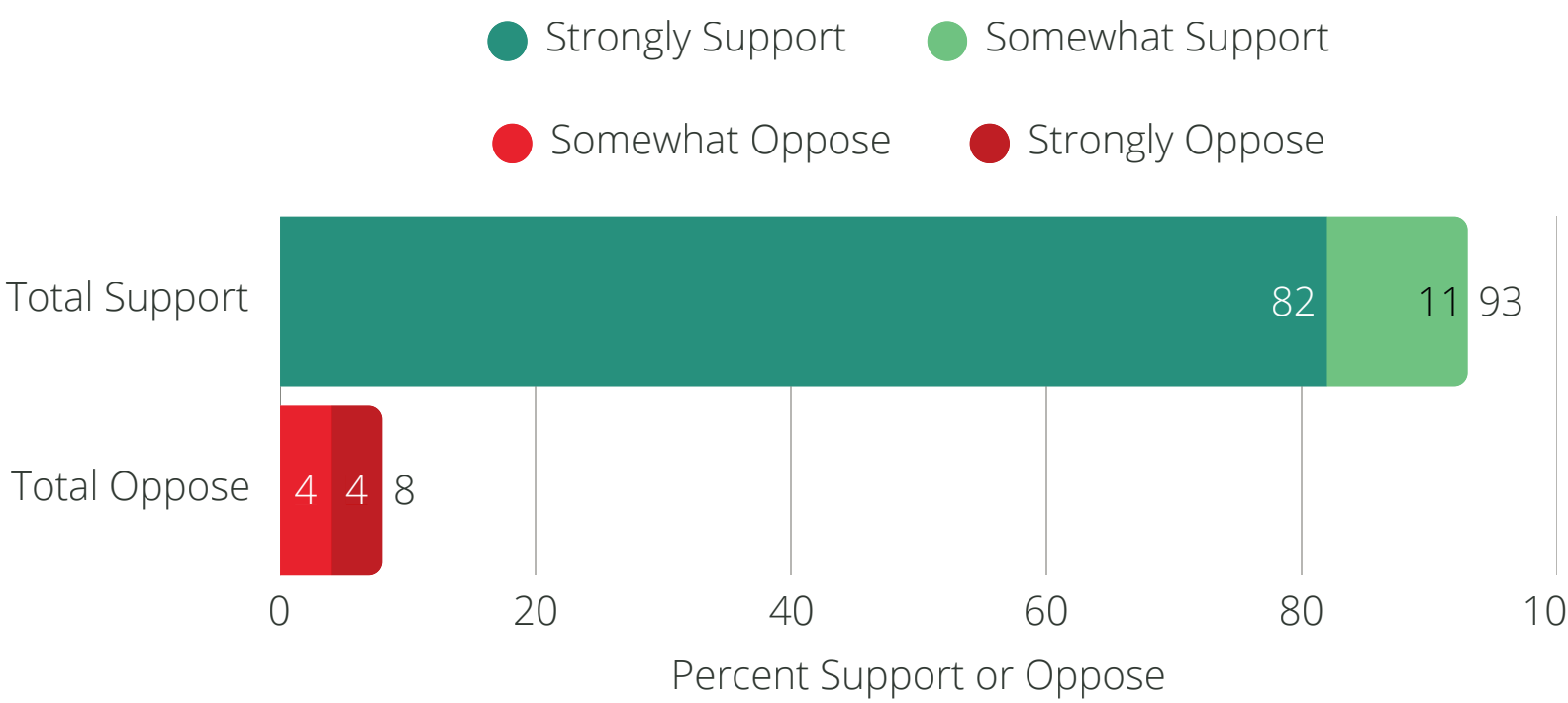
Percent (%) Support or Oppose Project:



Peach Grove Shared Use Path

Do you support the addition of new 10-foot shared use paths on the south side of Peach Grove Avenue?

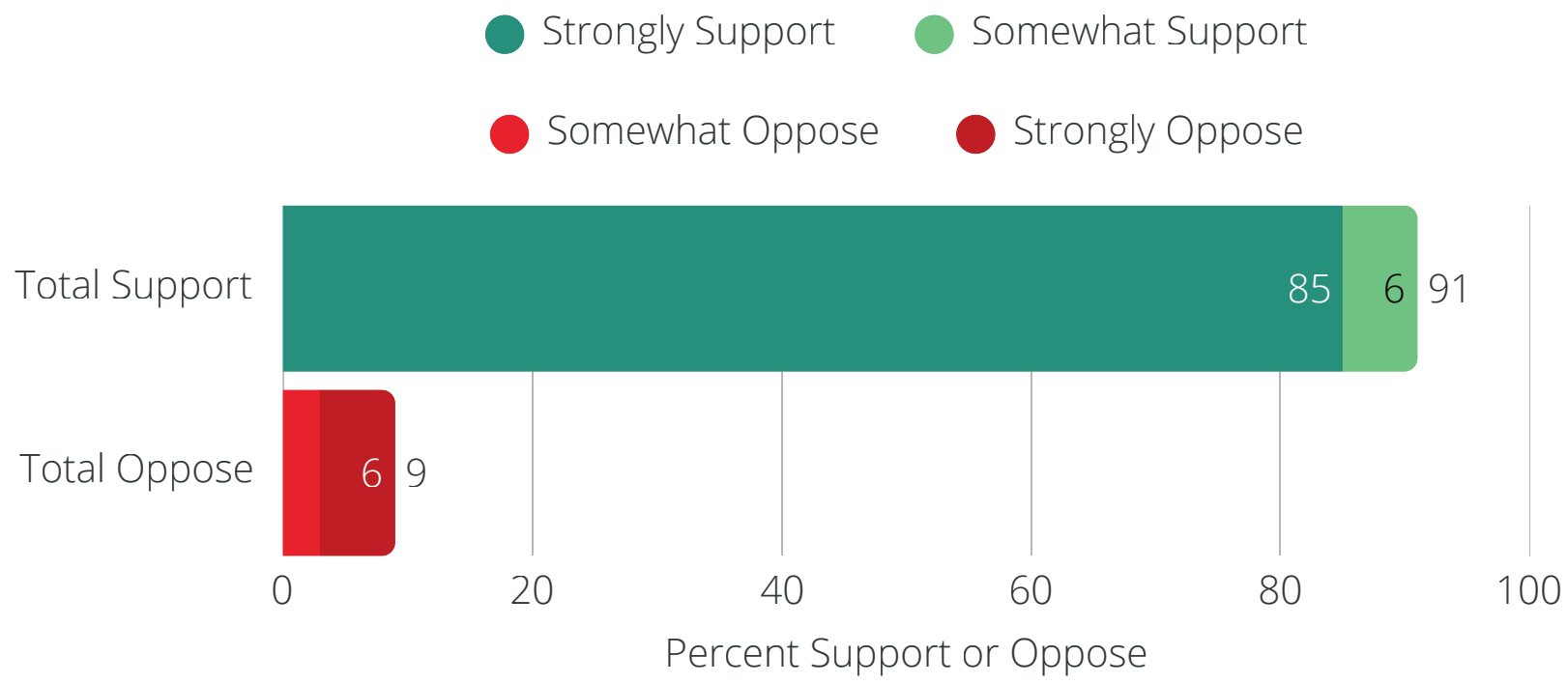
Percent (%) Support or Oppose Project:



Neff Avenue Shared Use Path

Do you support the addition of new 10-foot shared use paths on the south side of Neff Avenue?

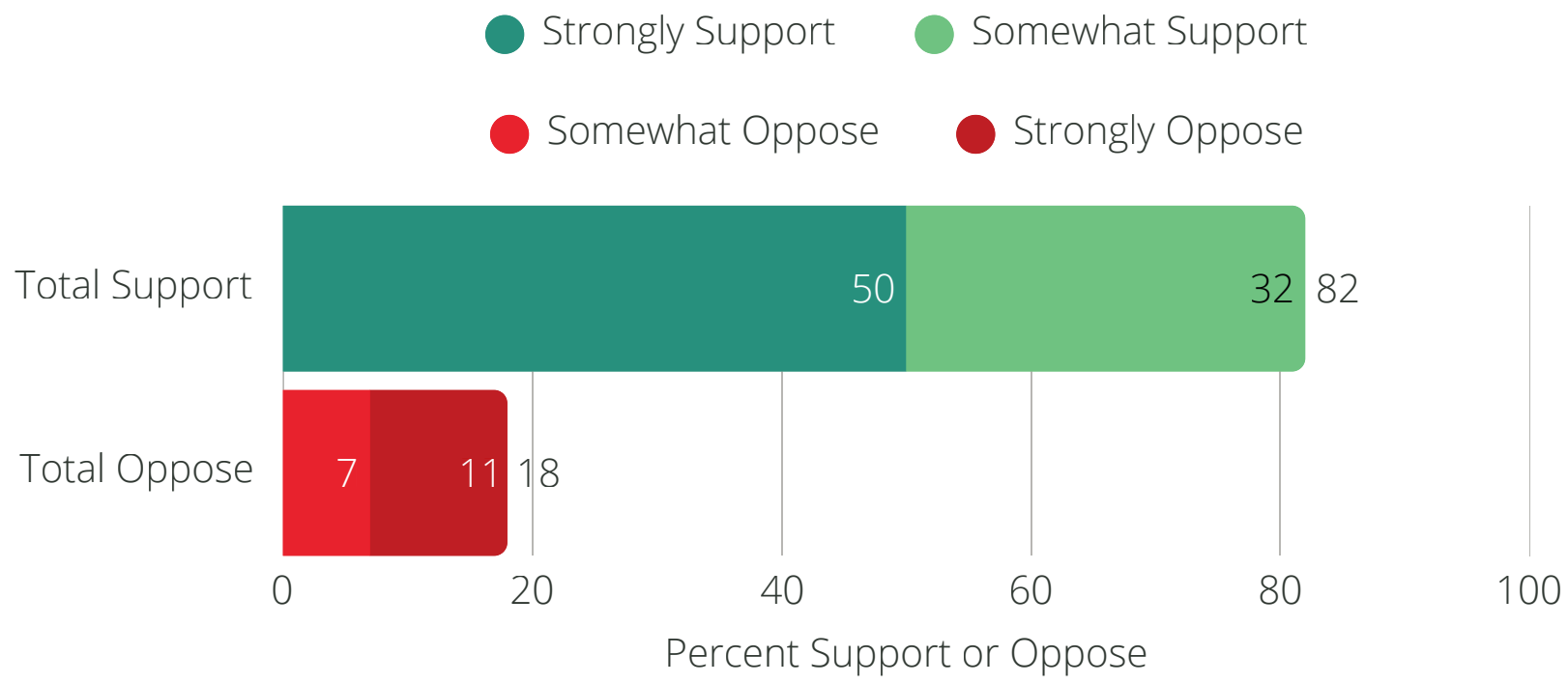
Percent (%) Support or Oppose Project:



Deer Run Pedestrian Crossing

Do you support the proposed pedestrian hybrid beacon crossing with median at Deer Run?

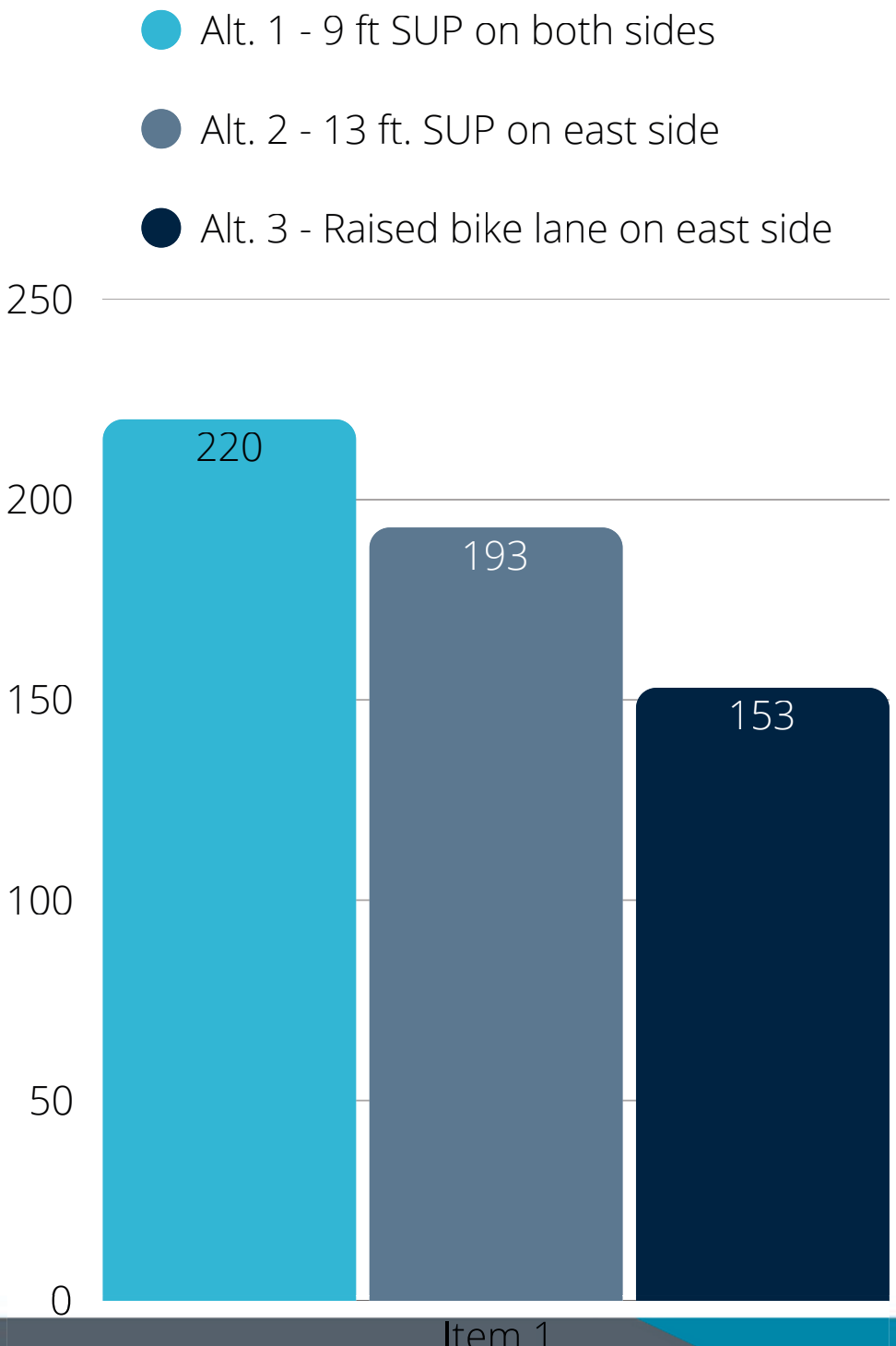
Percent (%) Support or Oppose Project:



Port Republic Bike Improvements

If the quadrant roadway concept is selected, which alignment would you prefer?

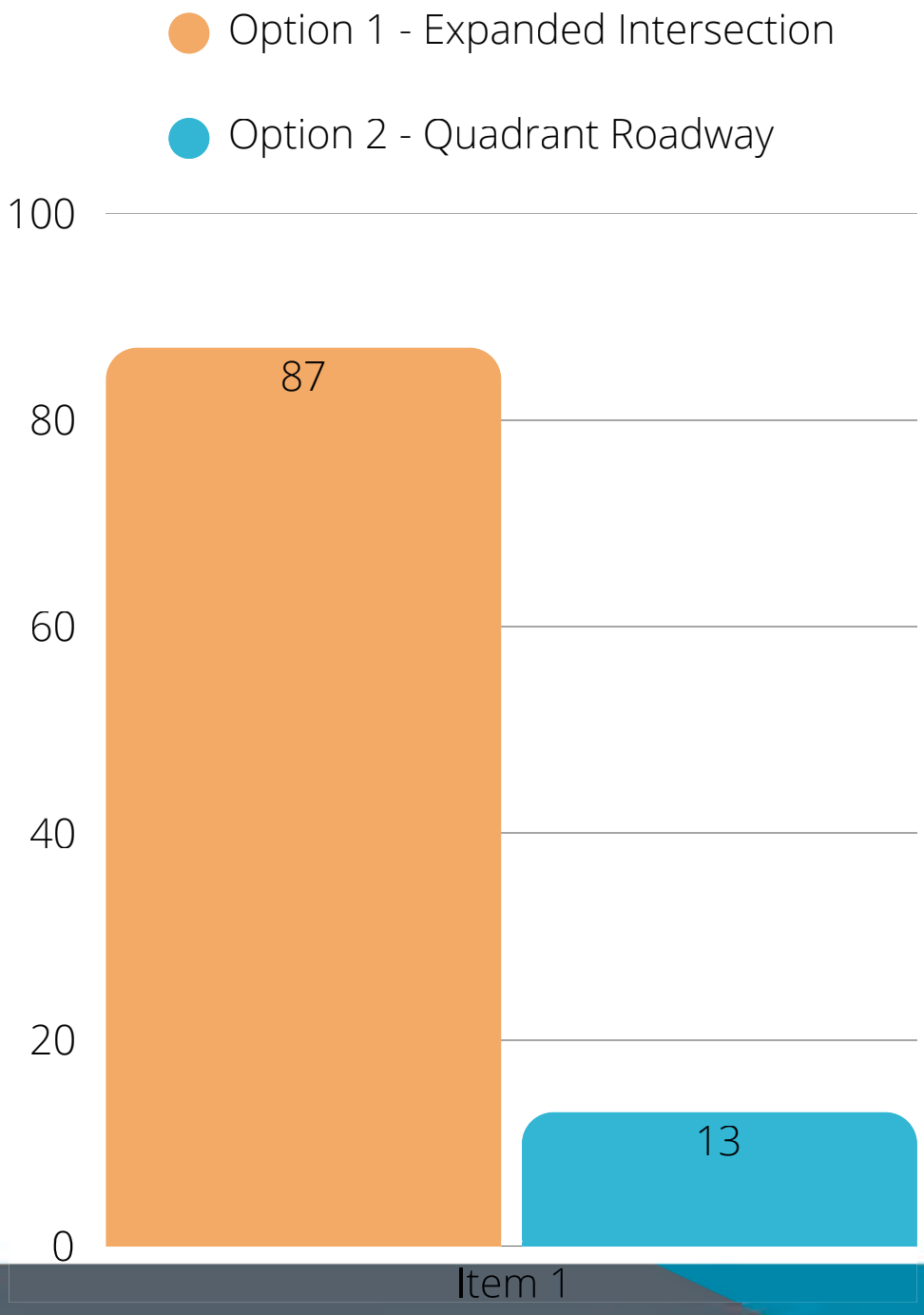
Ranked Score - Sum of the weight of each ranked position, multiplied by the response count for the position choice



Main Intersection Improvements

Which of these two intersection improvement alternatives do you prefer?

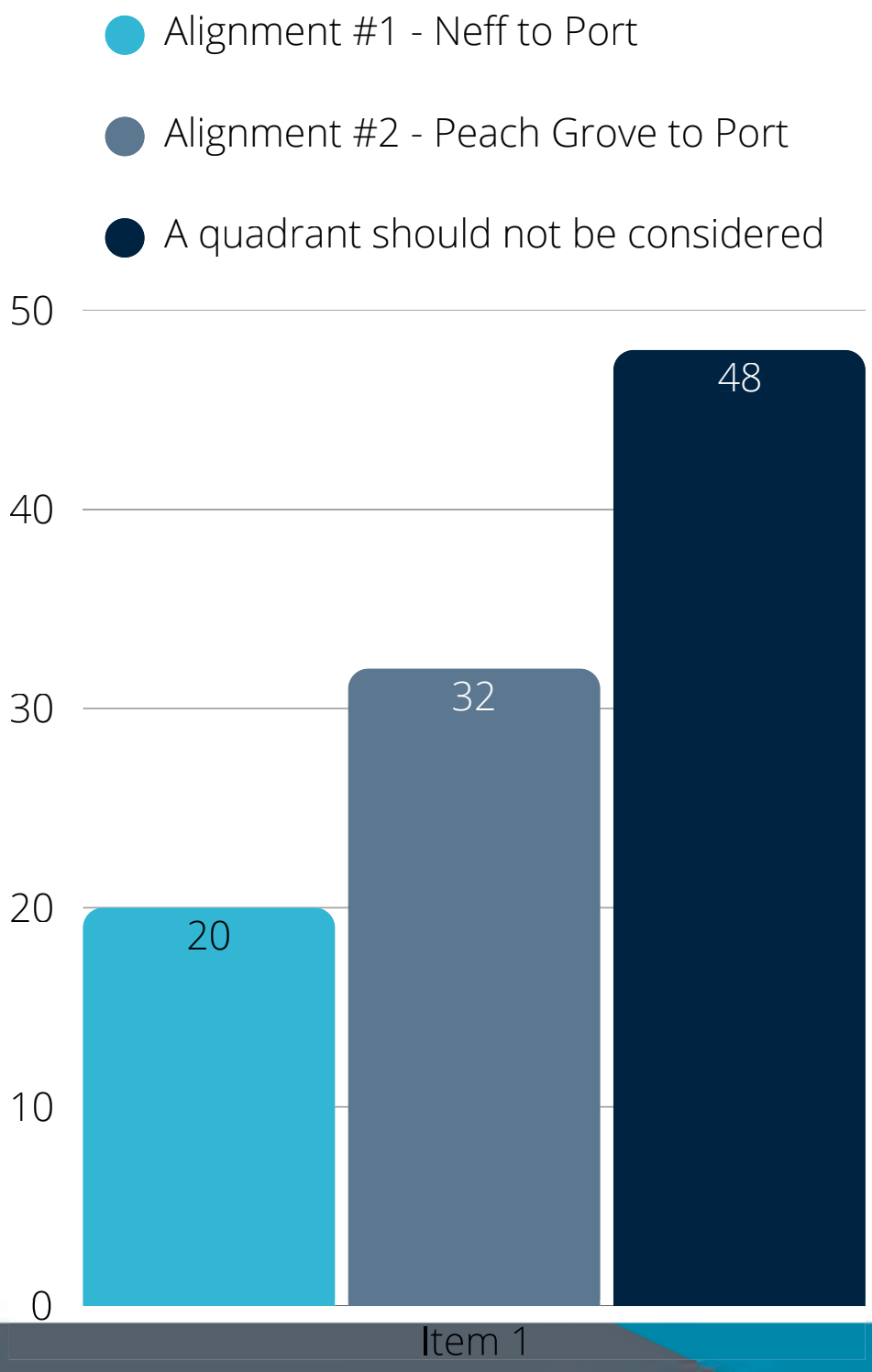
Percent (%) Support of Option 1 vs. Option 2



Quadrant Preference

If the quadrant roadway concept is selected, which alignment would you prefer?

Percent (%) Support of Alignments



Takeaways by Improvement

Qualitative Comments in Survey, Focus Group, and Public Meeting

Respondents provided written feedback on transportation improvements in and around the intersection. Among these comments, common themes emerged. The comments below are a sampling by area of concern.

Port Republic Road/Devon Lane Intersection Modifications

- Respondents expressed conflicting priorities between traffic flow and safety, with some advocating to "facilitate right on red" by removing shoulders while others worried about "cyclist visibility" and suggested removing "slip lanes to help improve pedestrian" safety.

Deer Run Pedestrian Crossing

- JMU' stated desire for "uninterrupted access" and public desires for pedestrian infrastructure. Comments note that "JMU facilities and athletics do not want" the crossing and "would prefer crosswalk at another location,"
- Multiple comments express skepticism about driver behavior, questioning if "people will actually stop" at the hybrid beacon and noting current dangerous conditions where "you get two cars, two lanes that might stop... but it's the one that isn't really paying attention" that creates hazards.

Neff and Peach Grove Shared Use Paths

- Comments describe a hostile environment where "buses and cars use that [bike lane] as extra space" and turning vehicles "cut into the bike lane all the time," leading to strong statements like "I'm never going to ride on that road again" and riders feeling "terrified" in current conditions.
- Strong preference for physical separation from traffic, with participants consistently supporting options that create a "buffer shared path" and maintain adequate space "for bikes and pedestrians on both sides" without removing vehicle capacity.

Port Republic Bike Facilities

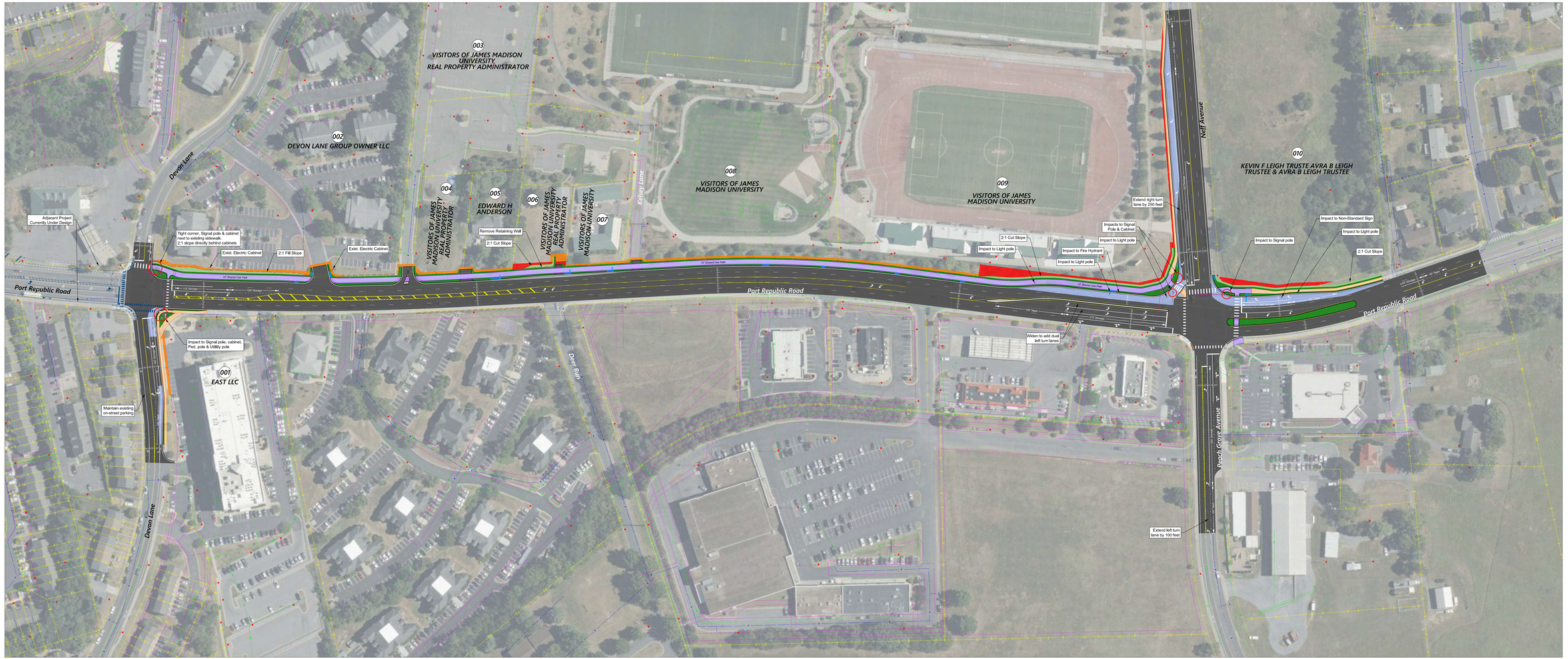
- Comments consistently prioritize physical separation over dedicated cycling lanes, with participants expressing they "don't like alternative three" specifically because of the "bike lane being shared on the road." This suggests that perceived safety trumps directness of travel in user preferences.

Main Intersection Alternatives

- Comments reveal strong preference for conventional intersection improvements over creative solutions, with concerns that quadrant roadways would be too complex in an area where "student housing changes every 3-4 years." One participant directly stated that if "people don't know how to work that" innovative design, they "would rather have pedestrian crossing and new anti-flashing and stop lights than this whole quadrant situation."
- Multiple comments identify sun glare as a serious unaddressed hazard, with one user describing trying to turn left when "you can't see anything because the sun is right there" and having to "look through my fingers to see if it has changed,"
- The substantial difference in projected wait times (at least for PG Quadrant) between alternatives (Option 1: "90 seconds to an average PM peak of 29 seconds" for Option 2) contrasts with user concerns about navigability. One participant noted the quadrant option "feels like a Mario cut-through" while others expressed that despite potential efficiency gains, it would be "very confusing" and potentially "more of an accident" risk due to merging challenges.
- Several comments addressed the right-in, right-out restrictions, with participants questioning the proposed solution that "if I need to go on Port Road towards campus, and I'm in this lot... I actually come across, make a right and do a U-turn and go back." This suggests significant skepticism about the practicality of recommended mitigation measures for access changes, with one participant calling it "a horrible idea."

E

Preferred Alternative Design Drawing and Preliminary Cost Estimate



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LEGEND

- Proposed Mill and Overlay
- Proposed Full Depth Pavement
- Proposed Limits of Cut/Fill
- Proposed Raised Grass Median / Graded Buffer
- Proposed Concrete Sidewalk
- Proposed Curb/Curb & Gutter/Concrete Median
- Proposed Shared Use Path
- Proposed Right of Way
- Proposed Temp. Construction Easement
- Right Of Way Line/Property Line (Based on GIS)
- Easements (Based on GIS)
- Pavement Marking
- High Visibility Crosswalk

0 30 60 120 Feet

No.	Revision	Date	Appvd.

Designed by | Checked by

Issued for | Date

City of Harrisonburg
Port Republic Rd - Shared Use Path
Fr: Devon Ln
To: Neff Ave/Peach Grove Ave

Drawing Number
1 1

Sheet of

Project Number

Port Republic Rd - Shared Use Path
From: Devon Lane - To: Neff Ave/Peach Grove Ave
City of Harrisonburg
6/25/2025

ITEM NUMBER	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT COST	Estimate Amount	Notes/References/Assumptions
513SD20-0001	MOBILIZATION	LS	1	$281,289.60	$281,289.60	
517SD20-0001	CONSTRUCTION SURVEYING CONSTR.	LS	1	$53,606.88	$53,606.88	
			Subtotal		**$334,896.48**	
	Earthwork					
301SD20-0002	CLEARING AND GRUBBING	ACRE	1.584	$50,000.00	$79,201.10	
303SD20-0001	REGULAR EXCAVATION	CY	3,704	$52.68	$195,111.11	
303SD20-0007	BORROW EXCAVATION	CY	333	$72.96	$24,320.00	
	Subtotal				**$298,632.21**	
	Pavement Items					
515SD20-0013	FLEXIBLE PAVE.PLANING 0"-2"	SY	25,312	$11.41	$288,811.92	
315SD20-0007	ASPHALT CONCRETE TY. SM-9.5A CONST	TON	270	$216.02	$58,326.45	Shared Use Path
315SD20-0001	ASPHALT CONCRETE TY. SM-12.5A CONST	TON	2986	$170.62	$509,476.20	
315SD20-0004	ASPHALT CONCRETE TY. IM-19.0A CONST	TON	201	$218.65	$43,948.19	
315SD20-0010	ASPHALT CONCRETE BM-25.0	TON	604	$149.29	$90,172.83	
308SD20-0012	AGGR. BASE MATL. TY. I NO. 21B	TON	688	$62.61	$43,062.44	
308SD20-0012	AGGR. BASE MATL. TY. I NO. 21B	TON	303	$62.61	$18,962.78	Sidewalk
308SD20-0012	AGGR. BASE MATL. TY. I NO. 21B	TON	981	$62.61	$61,430.20	Shared Use Path
315SD20-0104	SAW-CUT ASPHALT CONCRETE	LF	1,488	$12.28	$18,276.57	
	Subtotal				**$1,132,467.60**	
	Incidental Items					
502SD20-0011	CURB, STD. CG-2	LF	336	$60.72	$20,414.66	
502SD20-0022	COMB. CURB & GUTTER, STD. CG-6	LF	3,730	$69.50	$259,217.44	
502SD20-0029	ENTRANCE GUTTER CG-9D	SY	29	$272.69	$7,951.06	
504SD20-0003	HYDR. CEMENT CONC. SIDEWALK 4"	SY	760	$113.09	$85,994.67	Pedestrian Travel Zone
502SD20-0053	MEDIAN STRIP MS-1	SY	224	$211.52	$47,310.23	
502SD20-0058	MEDIAN STRIP MS-2	LF	275	$96.51	$26,540.97	
508SD20-0004	DEMO. OF PAVEMENT FLEXIBLE	SY	1,879	$14.38	$27,015.86	
510SX20-0038	NS REMOVE EXIST.	SY	270	$106.00	$28,620.00	
	Subtotal				**$503,064.90**	
	Drainage Items					
302SD20-0041	24" STORM SEWER PIPE	LF	46	$206.86	$9,598.52	
302SD20-0312	DROP INLET DI-3B,L=6'	EA	1	$7,553.80	$7,553.80	
302SD20-0313	DROP INLET DI-3B,L=8'	EA	2	$9,377.98	$18,755.95	
302SD20-0314	DROP INLET DI-3B,L=10'	EA	1	$10,905.84	$10,905.84	
302SD20-0315	DROP INLET DI-3B,L=12'	EA	6	$13,221.34	$79,328.04	
302SD20-0319	DROP INLET DI-3B,L=20'	EA	1	$13,993.81	$13,993.81	
302SD20-0329	DROP INLET DI-3C,L=6'	EA	3	$9,269.68	$27,809.03	
	Subtotal				**$167,944.99**	
	SWM					
	SWM/BMP (Nutrient Credits)	LS	1	$500,000.00	$500,000.00	
	Subtotal				**$500,000.00**	
	Roadside Development					
603SD20-0003	REGULAR SEED	LB	137	$16.60	$2,274.09	
602SD20-0003	TOPSOIL CLASS B 2"	ACRE	0.63	$21,015.75	$13,176.87	
603SX20-0013	NS FERTILIZER	LB	27	$21.31	$575.37	
306SD20-0001	LIME	TON	273	$447.13	$122,066.78	
	Subtotal				**$138,093.11**	
	Signing and Pavement Marking					
704SD20-0006	TYPE B CLASS I PVMT LINE MRKG 4"	LF	7634	$3.86	$29,434.35	
704SD20-0010	TYPE B CLASS I PVMT LINE MRKG 24"	LF	1423	$29.57	$42,079.50	
704SD20-0050	DBL TURN ARR.THRU/LT OR RT TY B, CL I	EA	5	$359.70	$1,798.48	
704SD20-0053	PVMT SYMB MRKG TRPL TURN ARR TY B, CL I	EA	2	$426.45	$852.90	
704SD20-0047	PVMT SYMB MRKG SGL TURN ARR. TY B CL I	EA	29	$409.29	$11,869.46	
704SD20-0101	SYMB MRKG HELMETED BICYCLIST TY B CL I	EA	5	$345.05	$1,725.23	
	Subtotal				**$87,759.92**	
	Signals					
	Signal	LS	4	$250,000.00	$1,000,000.00	
	Pedestrian Pole	LS	5	$10,000.00	$50,000.00	
	Subtotal				**$1,050,000.00**	
	Lighting					
	Lighting	LS	3	$5,000.00	$15,000.00	
	Subtotal				**$15,000.00**	
	In Plan Utilities					
	Fire Hydrant Relocation	LS	1	$3,000.00	$3,000.00	
	Subtotal				**$3,000.00**	
	Construction Item Estimate Total (Excluding Mobilization)				**$3,895,962.73**	
	Erosion and Sediment Control		**5%**		**$ 194,798.14**	
	MOT		**7%**		**$ 272,717.39**	
	Environmental		**7%**		**$ 272,717.39**	
	Unknown Items (Allowance)		**10%**		**$ 389,596.27**	
	Total Constructon Bid Item Cost (CN)				**$5,360,688.40**	

PROJECT ESTIMATE SUMMARY (PES)

UPC: unspecified

(Project Description is TBD)

PRELIMINARY ENGINEERING PHASE

	Category	Comments	Defined Cost	Allowance	Contingency	Total
○	Overall PE Phase				$0 0%	$0
	Roadway		$300,000		$105,000 35%	**$405,000**
	Structures & Bridge				$0 0%	**$0**
	Right-of-Way and Utilities		$50,000		$17,500 35%	**$67,500**
	Survey and SUE		$50,000		$17,500 35%	**$67,500**
◉	**Hydraulics, SWM, and E&S**		$200,000		$70,000 35%	**$270,000**
	Traffic (MOT & permanent)		$180,000		$63,000 35%	**$243,000**
	Materials and Geotech		$30,000		$10,500 35%	**$40,500**
	Environmental (NEPA, permits, etc.)		$50,000		$17,500 35%	**$67,500**
	Project Management & VDOT/LAP Coordination	2% of Construction Estimate	$144,739	$60,000	$71,659 35%	**$276,397**
	Other				$0 0%	**$0**
	PE PHASE SUBTOTAL:		**$1,004,739**	**$60,000**	$372,659 35%	**$1,437,397**

RIGHT OF WAY AND UTILITIES PHASE

	Category	Comments	Defined Cost	Allowance	Contingency	Total
○	Overall RW Phase				$0 0%	$0
	Right-of-Way Acquisition			$843,215	$295,125 35%	**$1,138,341**
◉	**Utilities (relocations)**			$300,000	$105,000 35%	**$405,000**
	VDOT RW/UT Oversight & VDOT/LAP Coordination	2% of Construction Estimate	$144,739		$0 0%	**$144,739**
	RW PHASE SUBTOTAL:		**$144,739**	**$1,143,215**	**$400,125** 31%	**$1,688,079**

CONSTRUCTION PHASE - BID ITEMS

	Category	Comments	Defined Cost	Allowance	Contingency	Total
○	Overall CN Bid Items				$0 0%	$0
	Roadway (road, earthwork)			$2,072,258	$725,290 35%	**$2,797,548**
	Bridge (bridges, major retaining walls & culverts, etc.)				$0 0%	**$0**
	Utilities (in-plan utilities, including water & sewer)			$3,000	$1,050 35%	**$4,050**
◉	**Hydraulics** (drainage, SWM, E&S, env, etc.)			$1,135,461	$397,411 35%	**$1,532,872**
	Traffic (signals, signs, pavement markings, etc.)			$1,137,760	$398,216 35%	**$1,535,976**
	MOT			$272,717	$95,451 35%	**$368,168**
	Mobilization & CN Survey			$334,896	$117,214 35%	**$452,110**
	Other	Lighting/Unknowns		$404,596	$141,609 35%	**$546,205**
	BID ITEMS SUBTOTAL:		**$0**	**$5,360,688**	**$1,876,241** 35%	**$7,236,929**

Category	Comments	Defined Cost	Allowance	Contingency	Total
Non-Bid Items (State Police, State Forces, etc.)				$0 0%	**$0**
Railroad				$0 0%	**$0**
Project CEI % or $-value can be overwritten by user. Default = 20%.		$1,447,386 20%			**$1,447,386**
Project Management & VDOT/LAP Coordination	2% of Construction Estimate	$144,739		$0 0%	**$144,739**
Management Reserve % or $-value can be overwritten by user. Maximum is set by Complexity.		$361,846 5.0%	Complexity Max = 5%		**$361,846**
Contract Req. (Incentives & Disincentives).		$144,739 2.0%			**$144,739**
NON-BID ITEMS SUBTOTAL:		**$2,098,710**	**$0**	$0 0%	**$2,098,710**
CN PHASE (Bid and Non-Bid) SUBTOTAL		**$2,098,710**	**$5,360,688**	$1,876,241 25%	**$9,335,639**

TOTAL PROJECT ESTIMATE WITHOUT INFLATION IN CURRENT DAY DOLLARS (PE, RW & CN): **$12,461,115**

TOTAL PROJECT ESTIMATE SUMMARY

Project Phase	Comments	Phase Start Date	Total Estimate	Inflation (Compounded Factor)	Total with inflation
Preliminary Engineering (PE)		9/1/2029	$1,437,397	$414,598 28.8%	**$1,851,995**
Right of Way and Utilities (RW)		10/1/2031	$1,688,079	$619,360 36.7%	**$2,307,440**
Construction (CN)		4/1/2033	$9,335,639	$3,808,096 40.8%	**$13,143,735**
TOTAL ESTIMATE (PE, RW & CN) WITH INFLATION:				**$4,842,054**	**$17,303,169**

Field Key

- User-Entered Data (editable)
- Dropdown Choices (editable)
- Calculated Fields (protected)
- Imported from POOL (protected)

PROJECT INFORMATION

Date Estimate Prepared: 6/25/2025

Edit Project Information

Administered By: Locally

Lead Designer: ○ In-House ◉ Consultant — VHB

PWA Schedule Template Type: Tier 1 - Road work w RW (PE, RW, CN)

PCES Estimate Type (Milestone): Pre-Scoping

UPC and APP ID (Data required): ◉ UPC ○ APP

Project Manager (Data required)

Project Description (Data required)

District: Staunton

Jurisdiction (City/Town/County): Harrisonburg

Project Complexity: Non complex

BETTERMENT BREAKOUT

PE	
RW	
CN Defined Cost	
CN Allowance	
Contingency	$0 0%
Subtotal	**$0**
CEI	$0 0%
Management Reserve	
Contract Requirements	
Inflation (Same as CN phase below)	40.8%
BETTERMENT TOTAL	**$0**

Comments

Note: *Betterment costs are to be included in total cost. This Betterment Breakout is for information purposes only.*

PROJECT ESTIMATE SUMMARY V 2.0

Form revised 02/03/25

VBA code revised 3/06/25

VDOT