PROJECT PIPELINE

BR-23-06: TOWN OF ABINGDON, VA
US 11 (MAIN STREET) FROM HOLSTON STREET TO THOMPSON DRIVE

DRPT Virginia Department of Rail and Public Transportation

Office of INTERMODAL Planning and Investment

VDOT Virginia Department of Transportation

US 11 (Main Street) From Holston Street to Thompson Drive

Complete Project Pipeline Study Report

Draft Submittal: July 2024
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Prepared for

VDOT Virginia Department of Transportation

Prepared by

vhb

115 S 15th Street, Suite 200
Richmond, Virginia 23219

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Chapter 1:

Needs Evaluation and Diagnosis

Introduction

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

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

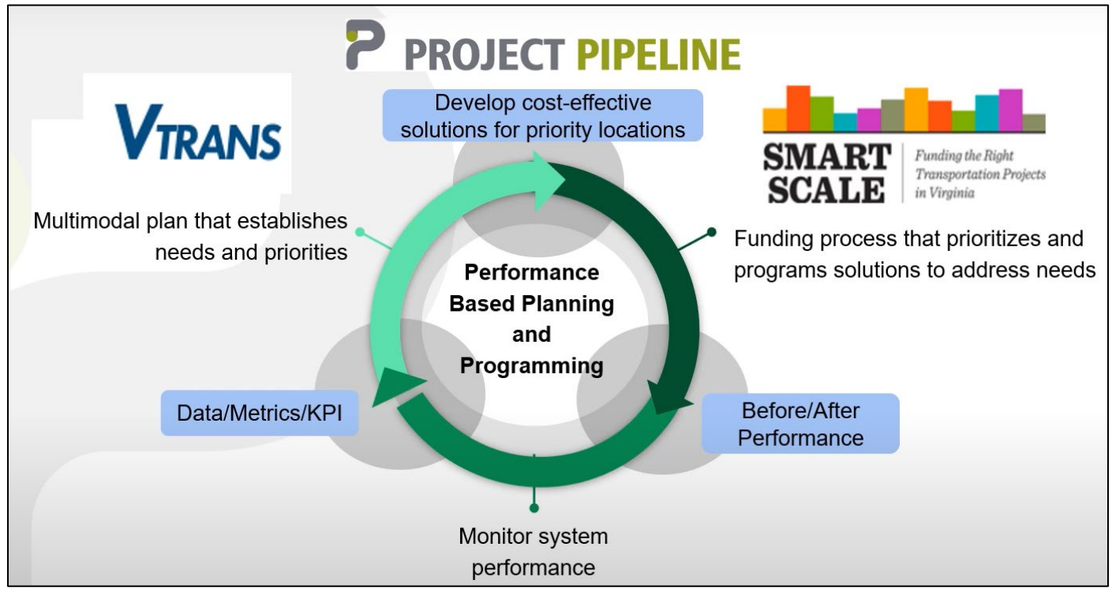


Figure 1: Project Pipeline Objectives

Background

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

Table 1: List of VTrans Needs

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

Methodology

The study is broken down into three phases. Phase 1 involves problem diagnosis and brainstorming of alternatives, Phase 2 is the detailed evaluation of alternatives and developed of initial concepts, and Phase 3 is the finalization of the preferred alternative in regard to design concept and cost estimate. Details on methods and solutions for each study phase are outlined below in **Figure 2**.

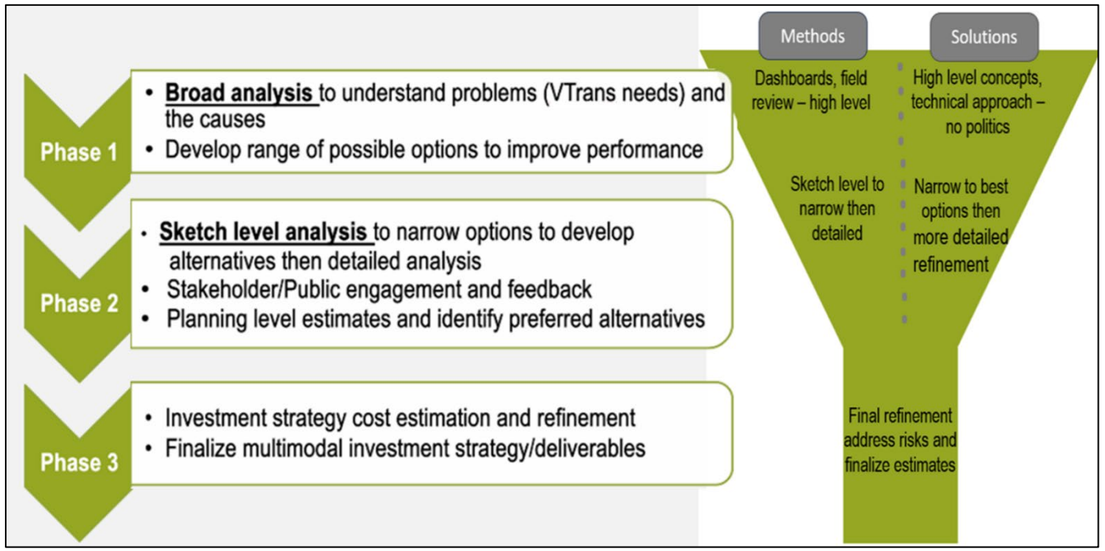


Figure 2: Study Phase Methods and Solutions

The study team is also broken down into three teams with each team simultaneously working on different areas of the study. Team 1 focuses on Traffic Operations, Capacity, and Access, Team 2 focuses on Road Reliability and Safety, while Team 3 focuses on Rail, Transit, and Transportation Demand Management (TDM), as shown in **Figure 3**. The following details the focus area of study for each team:

- Team 1 – Identify operation and access needs by conducting future traffic demand volume forecasts and performing operational analysis of future conditions using Synchro/SimTraffic. Evaluate operational mitigations such as geometric modifications, access management improvements, and installation of facilities for pedestrians and bicycles.
- Team 2 – Identify safety needs with respect to vehicles, pedestrians, and cyclists by evaluating existing roadway conditions as well as crash patterns and crash hot spot locations based on the most recent five-year crash history obtained from the Virginia Department of Transportation (VDOT) Crash Database Tool. Recommend safety improvement options through geometric modifications, access management improvements, and installation of facilities for pedestrians and bicycles.
- Team 3 – Identify needs with respect to transit and transportation demand management (TDM) by reviewing existing transit routes and future traffic demand volume forecasts. Consider improvements that would enhance transit ridership and shift mode choice away from single-occupancy vehicles.

Figure 3: Study Team and Focus Area of Study

Study Area

The US 11 (Main Street) study corridor from Holston Street to Thompson Drive is located within the Town of Abingdon in Washington County, Virginia. The 2.7-mile US 11 (Main Street) corridor is classified as an urban minor arterial road within the study area and is a Corridor of Statewide Significance (CoSS). The facility has a varying cross-section and speed limit; within the center of town the corridor is two lanes with on-street parking, turn bays at certain intersections, and posted 25 MPH; on either end of town the corridor is an undivided road of four to five lanes with a posted speed limit of 35 MPH. There are eight signalized intersections along the corridor. A map detailing the general location of the US 11 (Main Street) study area is shown below in **Figure 4**.

Figure 4: US 11 (Main Street) Study Area Map

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

The mid-term needs, as identified in VTrans for the US 11 (Main Street) study corridor, were identified as 'Very High' for five different need areas, 'Medium' for two need areas, and 'None' for four need areas, as presented in **Table 2.** These mid-term needs, identified in VTrans, are prioritized on a tier from 1 to 4, with 1 being the most critical and 4 being the least critical. The segments ranked as "Priority 1" represent those with multiple categories identified as high in need. **Figure 5** presents a map of the study area with 2019 VTrans mid-term needs prioritized for district attention. As can be seen in the figure, a large part of the study corridor had Priority 2 needs, with a segment in the middle with Priority 1 needs.

Each VTrans need present on the US 11 (Main Street) corridor (as identified in Table 2) is individually shown in **Table 3**. This facilitates the identification of specific need locations along the corridor.

Table 2: VTrans Needs in Study Area

VTrans 2019 Mid-Term Need	District Priority*
Congestion	Very High
Reliability	None
Transit Access for Equity Emphasis Areas	Very High
Transit Access to Activity Centers	Medium
Pedestrian Access to Activity Centers	Medium
Bicycle Access to Activity Centers	Very High
Access to Industrial & Economic Development Areas	None
Road Safety	Very High
Capacity Preservation	None
Transportation Demand Management (TDM)	Very High
Pedestrian Safety	None

*Max priority within study area

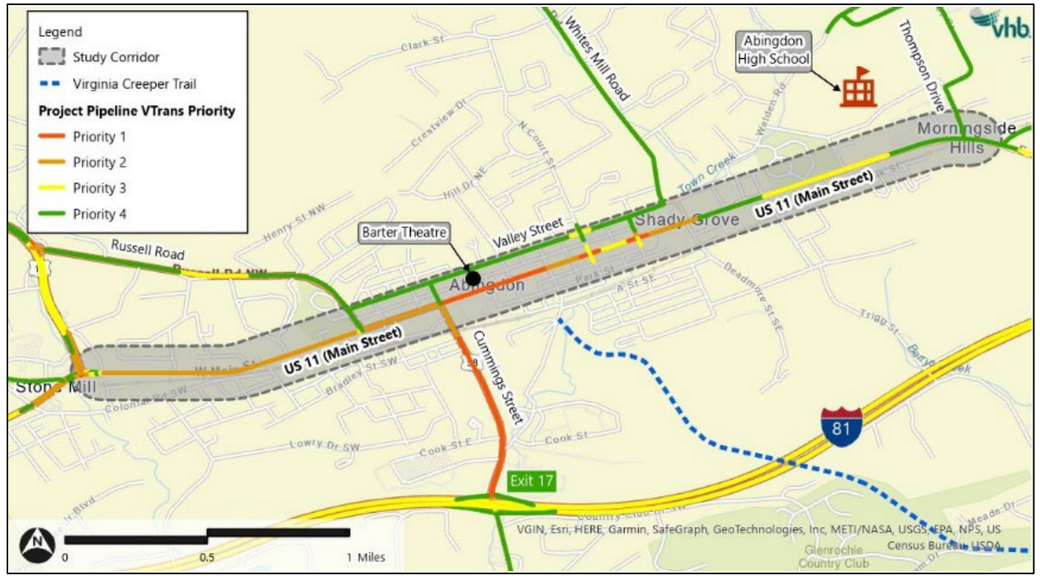
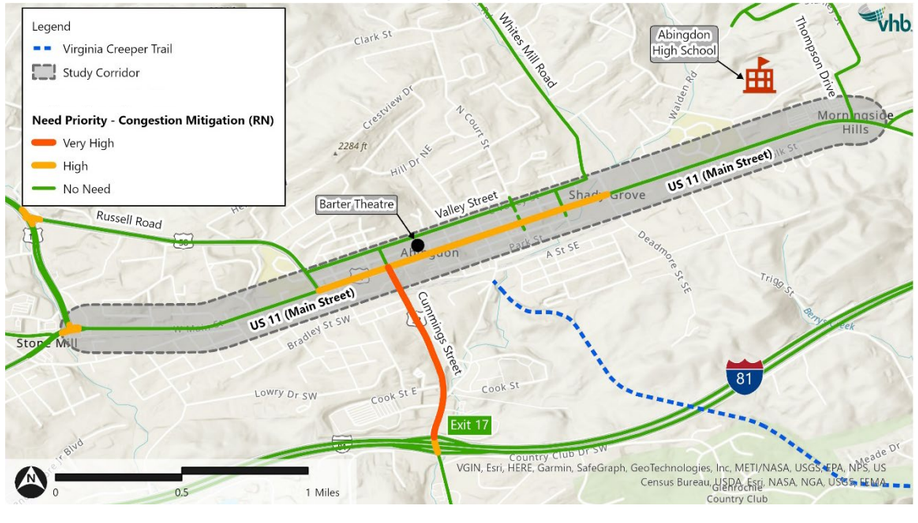


Figure 5: 2019 VTrans Prioritized Mid-term Needs in the Study Area

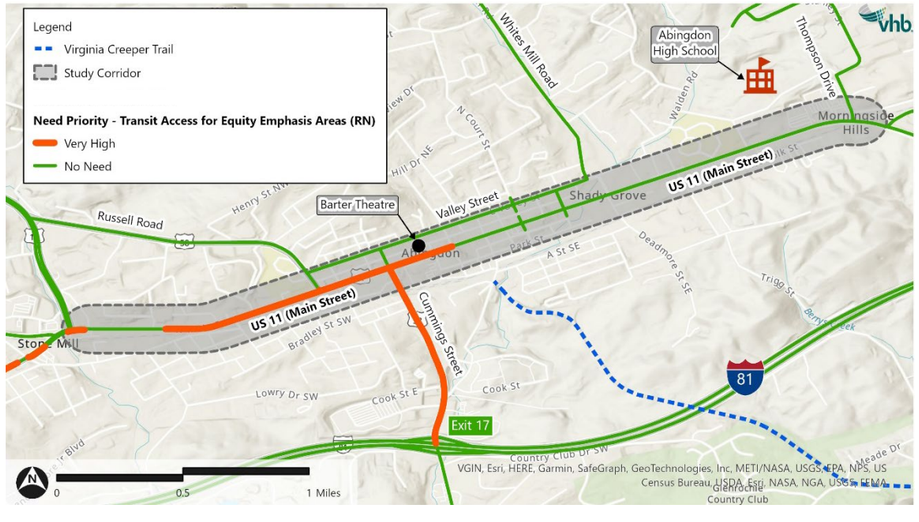
[1] Commonwealth Transportation Board, Actions to Approve the 2019 VTrans Vision, Goals, Objectives, Guiding Principles and the 2019 Mid-term Needs Identification Methodology and Accept the 2019 Mid-term Needs, January 15, 2020

Table 3: Specific VTrans Needs in Study Area

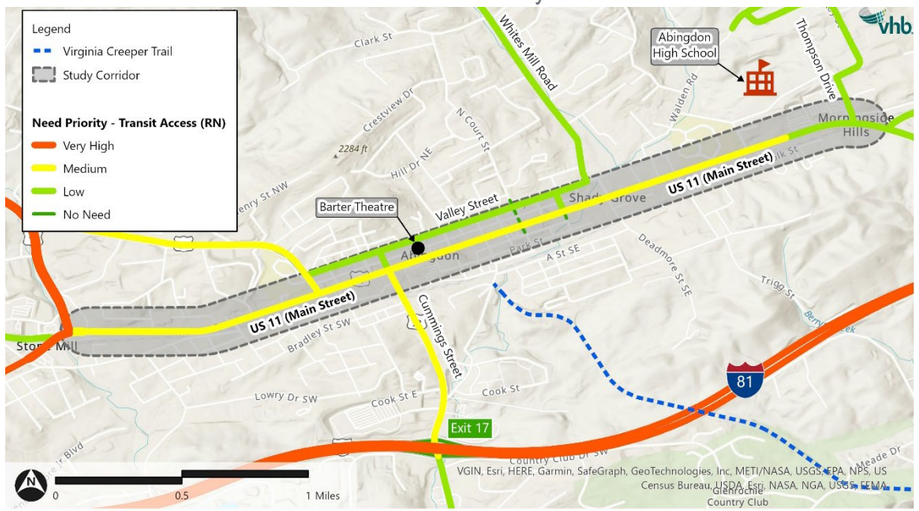
Congestion



Transit Access for Equity Emphasis Area



Transit Access to Activity Centers



Pedestrian Access to Activity Centers

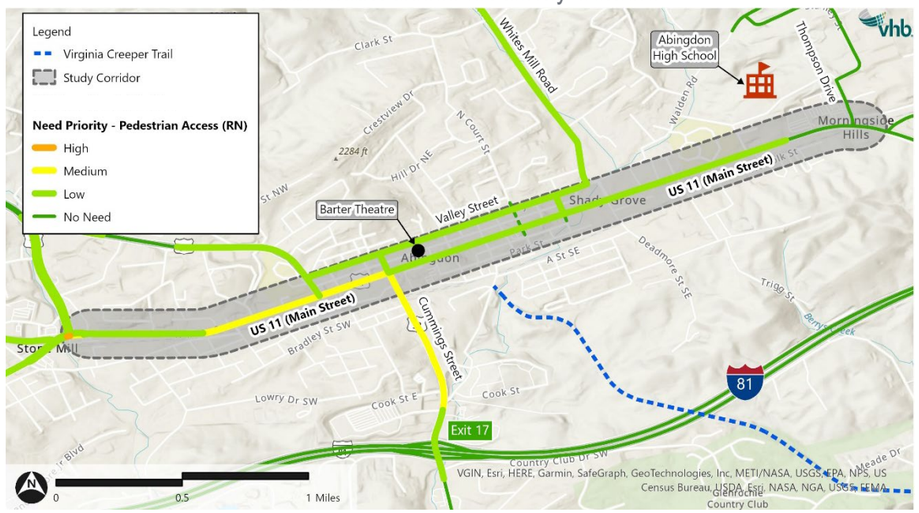
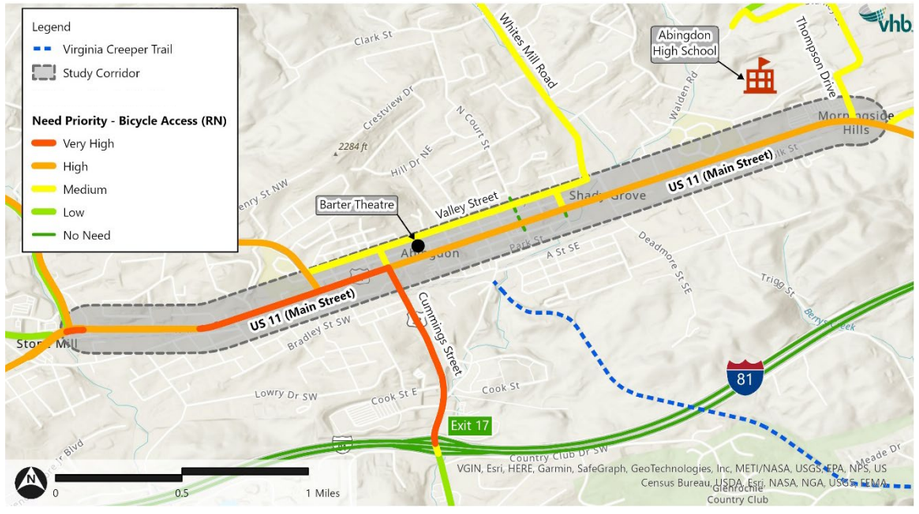


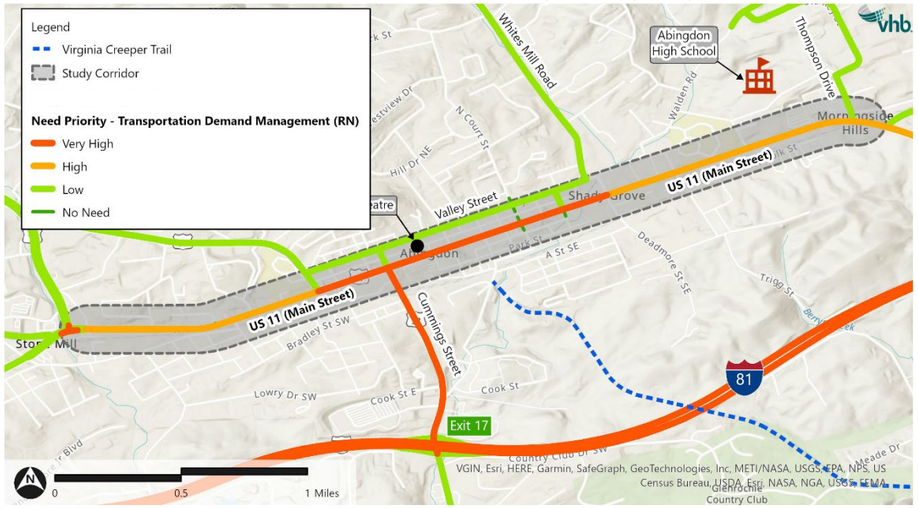
Table 3 Continued: Specific VTrans Needs in Study Area

Bicycle Access to Acitvity Centers



Road Safety

Transportation Demand Management (TDM)



Underway Projects, Previous Studies, and Planning Documents

PROJECTS

There are multiple projects in the vicinity of the study corridor that may impact conditions within the study area. All of these are discussed in greater detail in the following subsections.

Parallel I-81 Route Improvements

Two projects aim to extend French Moore Jr Boulevard and Cook Street to create a secondary parallel route to I-81 between exits 14 and 17. Currently, US 11 (Main Street) serves as the only parallel route to I-81 and is the primary detour in the case of incidents on I-81. The first of these projects will extend Cook Street from the current termini at Towne Centre Drive to Stone Mill Road. This project was funded in the previous round of SMART SCALE. The second project will extend French Moore Jr Boulevard east to Stone Mill Road, connecting to the future Cook Street extension. This project was submitted for funding in the previous round of SMART SCALE but is not currently funded.

Additionally, VDOT has a separate ongoing project for signal improvements on the I-81 detour routes to better facilitate detour traffic on parallel routes (including US 11) during an incident on I-81.

SMART SCALE Funded Projects

There are three separate SMART SCALE funded projects that are proximate to the study corridor. The first project is to construct a single-lane roundabout at the Thompson Drive and Stanley Street intersection. The second is to realign Poplar Street and Old Russell Road to a perpendicular intersection with Russell Road. The last funded SMART SCALE project is to realign Old Eleven Drive to a perpendicular approach to Hillman Highway.

VHSIP Projects

The Town of Abingdon received Virginia Highway Safety Improvement Program (VHSIP) funding to install high visibility signal backplates (HVSB) and flashing yellow arrows (FYA) at signalized intersections throughout the Town. The exact locations of these improvements are still being coordinated in conjunction with the I-81 detour route signal improvements project.

Hydrology Project

The Town of Abingdon has a planned project to replace the Town Creek culvert beneath US 11 (Main Street) (between Tanner Street and Deadmore Street), which should mitigate the semifrequent flooding of US 11 (Main Street).

STUDIES AND PLANNING DOCUMENTS

In addition to underway infrastructure and development projects, there are multiple transportation studies and municipal planning documents that have previously analyzed the study corridor and recommended transportation solutions. The following subsections detail these studies and plans.

Downtown Abingdon Traffic Circulation Study

The *Downtown Abingdon Traffic Circulation Study* looked at the area of US 11 (Main Street) and Valley Street between Cummings Street and Pecan Street. Recommendations from this study include a range of potential improvements to the Barter Theatre Pedestrian Crossing, updated signal timing, pavement marking and signing improvements, consideration for a mini roundabout at the US 11 (Main Street) and Pecan Street intersection, and other pedestrian facility improvements. Since the study, at Barter Theater, rapid flashing beacons have been installed/repaired on the pedestrian crossing warning signs.

US 11 (Main Street) / Pecan Street Alternatives

Following the *Downtown Abingdon Traffic Circulation Study,* the Town of Abingdon took a closer look at one of the study intersections: US 11 (Main Street) and Pecan Street. Additional recommendations from the follow-on study included installation of a westbound left turn lane on US 11 (Main Street) at Pecan Street, and the removal of the eastbound left turn lane on US 11 (Main Street) at Church Street.

Valley Street Traffic Calming

Valley Street serves as a parallel route to US 11 (Main Street), and the Town of Abingdon conducted a traffic calming study for Valley Street between Russell Road and Walden Road. The recommendations from this study include longitudinal edge line pavement markings, two crosswalks with curb extensions, and two speed feedback indicator signs. The pavement marking recommendations have been implemented.

Traffic Operations and Accessibility:

Initial diagnosis of the traffic operations and accessibility issues along the US 11 (Main Street) corridor was completed via traffic count data, Town of Abingdon signal timing plans, field and aerial imagery review, and geospatial analysis.

Traffic Data

Traffic data (i.e., peak hour turning movement counts at intersection locations and 72-hour volume and speed counts at three locations) were collected in April 2023 for this study. Peak hour turning movement counts and the raw traffic volume data are provided in **Appendix A**. Other available traffic data included INRIX speed data, which indicates the average vehicle speeds along the corridor at different times of day. VDOT's 2021 Average Annual Daily Traffic (AADT) for the study area is reported as follows:

US 11 (Main Street):

- West of Russell Road: 12,000 Vehicles per Day (VPD)
- Between Russell Road and Tanner Street: 10,000 VPD
- East of Tanner Street: 12,000 VPD

The 72 hours of collected volume and speed data were graphed to evaluate the temporal distribution over the data collection period. **Figure 6** shows the volume distribution for the data collected on US 11 (Main Street) at three different locations in Abingdon; the temporal distribution at all locations mirror one another, with a larger afternoon peak than morning peak. The temporal distribution of the speed data was consistent across the day.

Table 4 shows the average daily traffic (ADT), 85th percentile speed, and outer (O) and inner (I) lane utilizations at these locations. Both the table data and **Figure 6** indicate that the US 11 (Main Street) segment in the middle of Town (i.e., near Barter Theater) carries 20-30% less daily traffic volume than the US 11 (Main Street) segments on either end of Town. The 85th percentile speed data does not signify a speeding concern as the metric at all three data collection locations is within approximately 5 MPH of the posted speed limit. Finally, the data shows that within the two four-lane segments of US 11 (Main Street), there is a significant imbalance in lane utilization; in both locations, this imbalance is likely due to the upstream lane configurations.

Table 4: US 11 (Main Street) 72-Hour Volume and Speed Data

Metrics	Between Holston and Patton Streets	In Front of Barter Theatre	In Front of Cinemall
Average Daily Traffic (ADT)	12,776	10,306	14,830
85th Percentile Speed (Speed Limit)	36.65 MPH (35 MPH)	25.47 MPH (25 MPH)	40.69 MPH (35 MPH)
Lane Utilization O – Outer Lane I – Inner Lane	Eastbound: 72% (O) / 28% (I) Westbound: 68% (O) / 34% (I)	Not applicable due to only one lane in each direction	Eastbound: 10% (O) / 90% (I) Westbound: 9% (O) / 91% (I)

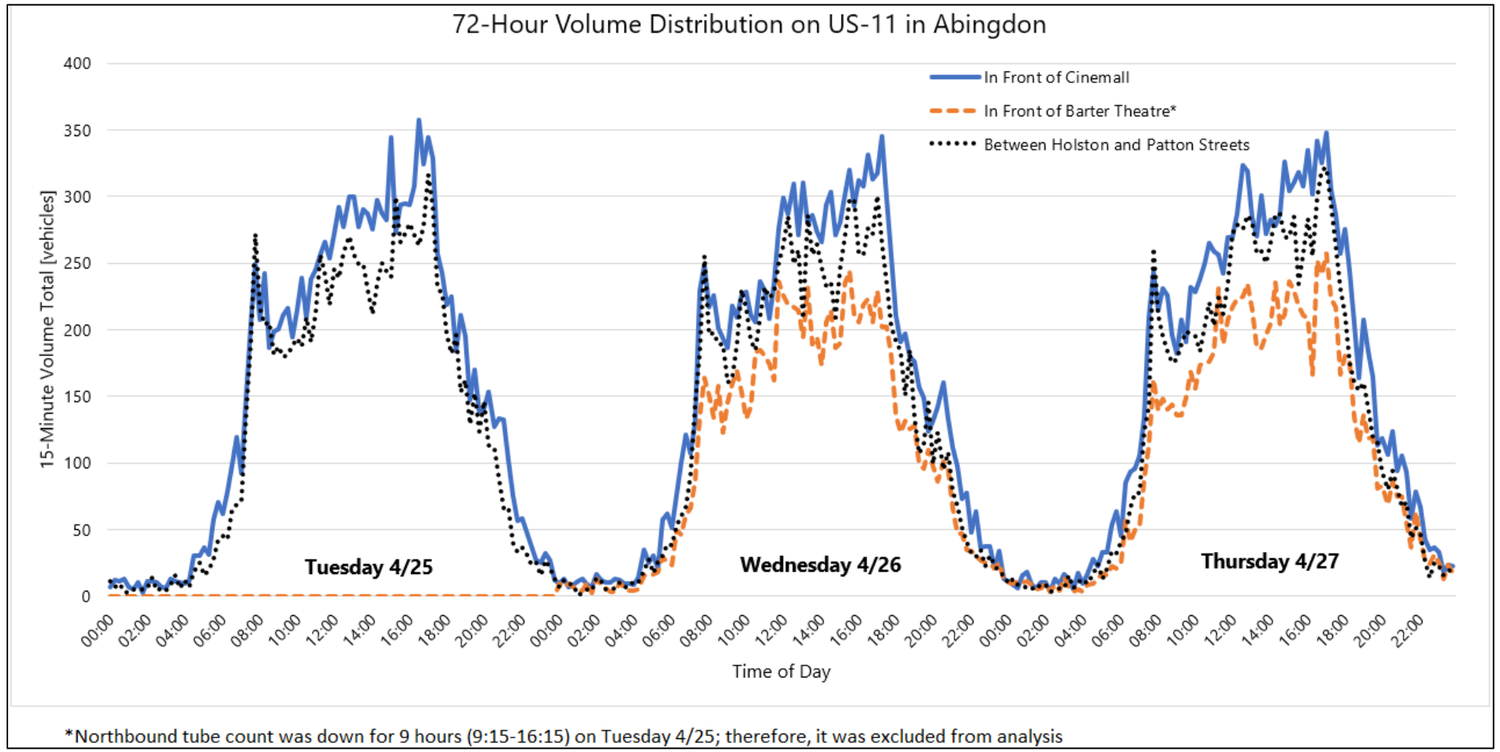


Figure 6: 72-hour US 11 (Main Street) Abingdon Volume Diagram

Measures of Effectiveness

There are many measures of effectiveness (MOE) in traffic operations analysis to quantify operational and accessibility metrics and provide a basis for evaluating the performance of a transportation network. A summary of the MOEs evaluated for the study corridor during the Phase 1 analysis is presented below:

- Signalized Intersection Operations Metrics (Computed in Synchro/SimTraffic)
  - Control Delay (measured in seconds per vehicle – sec/veh)
  - Level of Service (LOS)
  - Maximum Queue Length (measured in feet – ft)
- Average Segment Vehicle Speed by Direction of Travel and Time of Day (Sourced from INRIX)
- Travel Time Index (TTI) by Direction of Travel and Time of Day (Sourced from VDOT)
- Access Point Density (geospatially computed in GIS)
- Inventory of Pedestrian and Bicyclist Accommodations

Traffic Operations Analysis Results

In Phase 1, a traffic operational analysis was performed using Synchro/SimTraffic 11 software for the study intersections along the US 11 (Main Street) corridor. Synchro is a traffic operations software package that is based upon *Highway Capacity Manual* (HCM) calculations, while SimTraffic is a microsimulation traffic operations software package that is utilized to estimate vehicle queuing. Utilized inputs and analysis methodologies are consistent with the VDOT *Traffic Operations and Safety Analysis Manual (TOSAM)* guidelines. AM and PM peak hour analyses were performed for the traffic volume dataset. In addition to the US 11 (Main Street) study intersections, the study team also analyzed the US 11 (Main Street) and US 19 intersection, the US 11 (Main Street) and Hillman Highway intersection, and the Valley Street corridor to better understand traffic flow that impacts the study corridor.

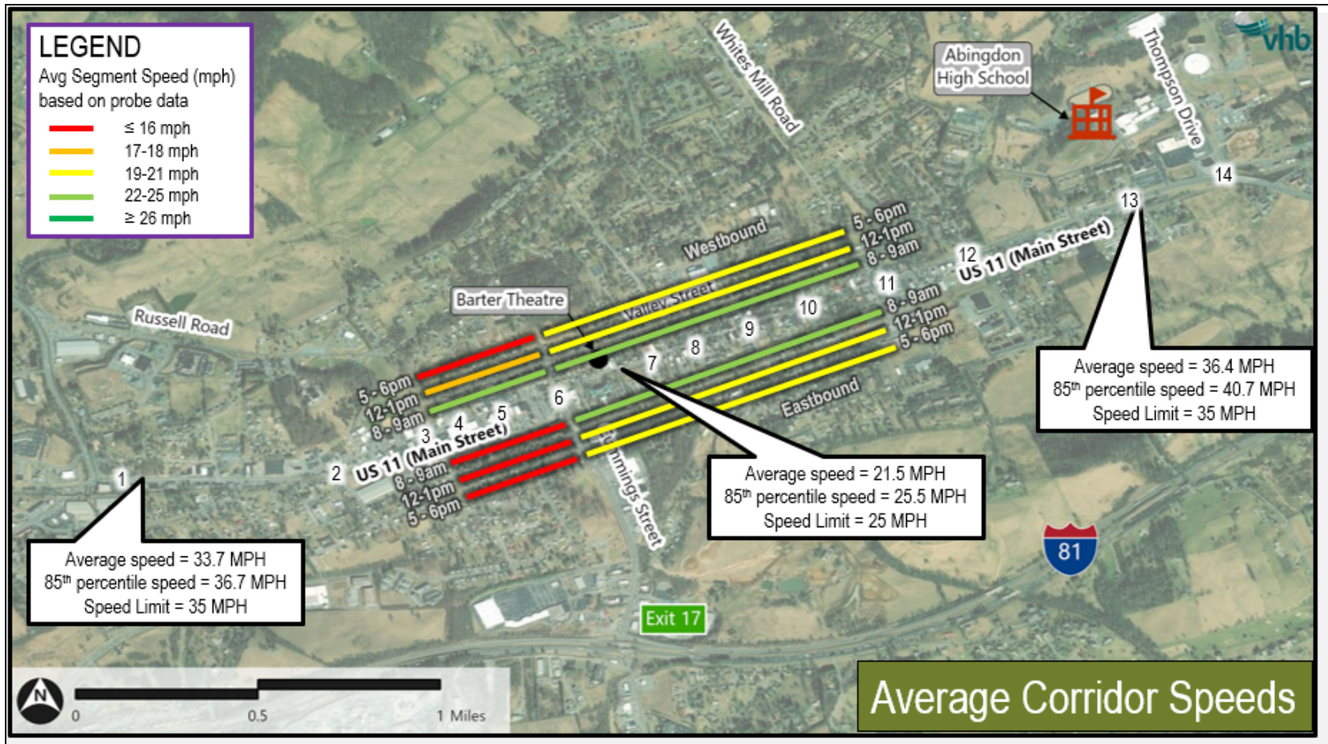
Table 5 summarizes the maximum queue lengths that are near to or exceed the existing storage length for movements along the corridor. **Figure 7** summarizes the operations needs of the corridor and presents the AM and PM peak hour Synchro analysis intersection Level of Service (LOS) and delay (seconds) summary. The full Synchro reports are included in **Appendix B**. The intersection level LOS/delay is reported for signalized intersections, while the LOS/delay for the worst operating approach is reported for two-way stop-controlled intersections. As indicated in the table, the intersection of US 11 (Main Street) and Cummings Street experiences the most delay of the signalized intersections, operating at LOS C in the AM peak hour and LOS D in the PM peak hour. The remaining signalized intersections perform at an acceptable level of service. Two stop-controlled side street approaches (i.e., southbound Court Street and southbound Tanner Street) operate at LOS E in the PM peak hour. The congestion VTrans need (high priority) extends from Russell Road to Deadmore Street, which aligns with the existing conditions congestion metrics. There is also a Very High priority congestion VTrans need on the Cummings Street leg of the US 11 (Main Street) / Cummings Street intersection.

Table 5: Queue Summary for Key Locations

Intersection	Movement	Max Queue Length (AM) (ft)	Max Queue Length (PM) (ft)	Storage Length (ft)
US 58 Alt (Russell Road) and US 11 (Main Street)	Southbound LT	51	131	150
Wall Street and US 11 (Main Street)	Northbound LT	226	298	125
Cummings Street and US 11 (Main Street)	Eastbound RT	238	356	250
	Westbound LT	80	230	180
Trigg Street and US 11 (Main Street)	Westbound LT	99	167	100

Figure 7 also shows average corridor segment speed by time of day, which indicates that the slowest travel speeds along the corridor are between the intersections of Russell Road and Cummings Street (note: average segment speed is not shown on the two ends of Town due to the speed limit change within the data segments). In the eastbound direction, the speeds between these two intersections are slow in all three peak periods, but in the westbound direction, the speeds are slowest in the 5-6PM time frame and fastest in the 8-9AM time frame.

The average Travel Time Index (TTI) is shown on **Figure 8** and **Figure 9**. TTI is a metric that compares average travel time to free flow travel time; it is a surrogate measure for level of congestion. A TTI value of 1.0 means that average travel time equals free flow travel time. VDOT considers a TTI value greater than 1.3 as an indicator of minor congestion, a TTI value greater than 1.5 as an indicator of moderate congestion, and a TTI value greater than 2.0 as an indicator of severe congestion. As seen in the figures, the greatest TTI values on US 11 (Main Street) are approximately 1.3 during the mid-afternoon / evening peak period. These figures also show travel time data across the day; the highest travel times occur in the afternoon for both the eastbound and westbound directions, corresponding to the greatest TTI values. This data corroborates the previously discussed operations data and needs.



Operations Summary

- Most intersections perform at an acceptable level of service (LOS). The intersection of US 11 and Cummings Street experiences the most delay of the signalized intersections along the corridor.
- Numerous access points, on-street curb activity (parking and loading), and pedestrian activity contribute to average speeds lower than the speed limit.

VTrans Operations Needs

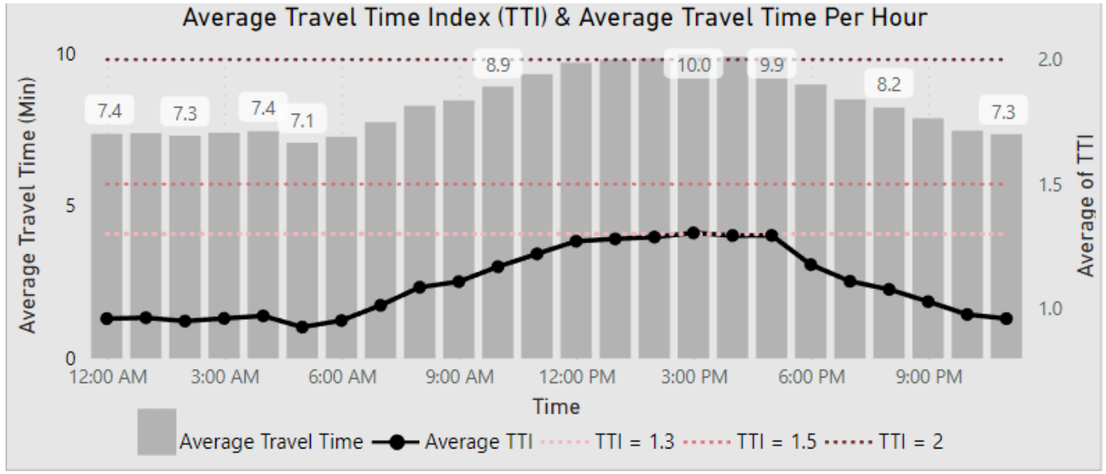
NEED	PRIORITY
Congestion	Very High
Capacity Preservation	No Need

Existing Conditions – Synchro Output

Intersection	Level of Service AM	PM
Porterfield Highway and US 11*	B	B
1. Holston Street and US 11	A	A
2. Preston Street and US 11**	C	C
3. Fuller Street and US 11**	B	B
4. Russell Road and US 11	A	B
5. Wall Steet and US 11	B	B
6. Cummings Street and US 11	C	D
7. Church Street and US 11**	A	B
8. Pecan Street and US 11	A	B
9. Court Street and US 11**	C	E
10. Tanner Street and US 11**	C	E
11. Deadmore Street and US 11**	D	D
12. Trigg Street and US 11	A	A
13. Bank Street / Boone Street and US 11**	B	C
14. Thompson Drive and US 11	B	B
Hillman Highway and US 11*	B	B
Russell Road and Valley Street*	C	C
Cummings Street and Valley Street*	B	B
Church Street and Valley Street*,**	C	C
Court Street and Valley Street*	C	B

*Intersection is outside of study area but was analyzed to determine effects on the study area.
**Intersection Level of Service is not calculated for two-way stop control intersection. Level of Service shown is worse of side street approaches.

Figure 7: Operations Needs and Diagnosis Summary



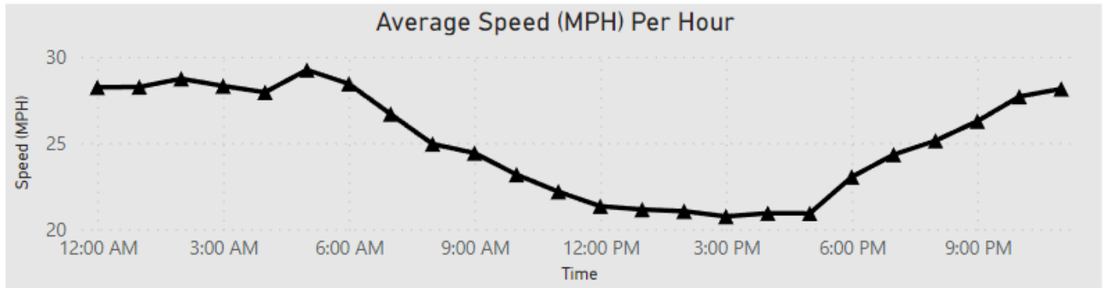
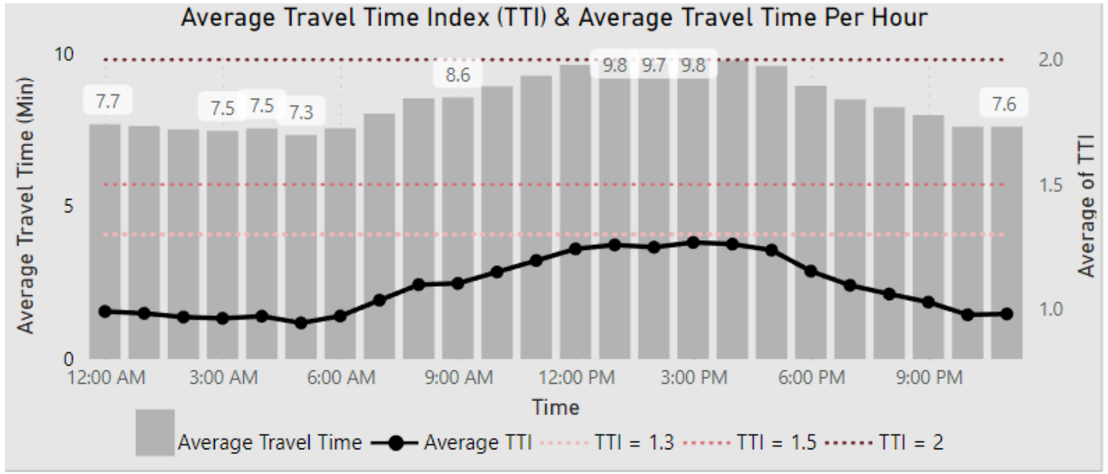


Figure 8: Eastbound US 11 (Main Street) Travel Time and Speed Data (source: VDOT Dashboard)



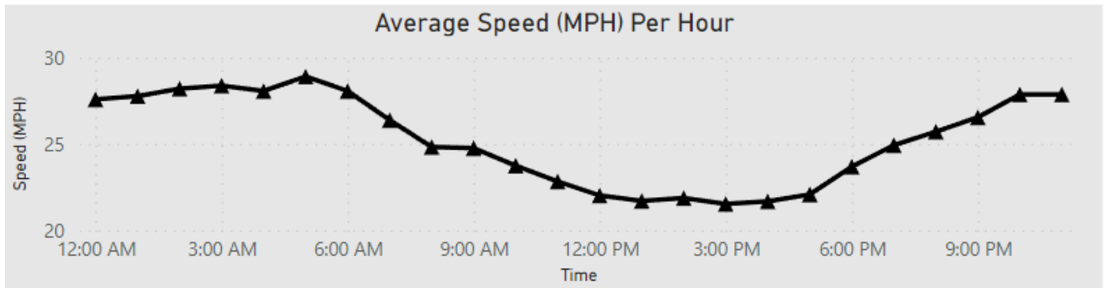


Figure 9: Westbound US 11 (Main Street) Travel Time and Speed Data (source: VDOT Dashboard)

Pedestrian and Bicycle Access

To identify the needs with respect to multimodal accessibility, the study team reviewed existing conditions of pedestrian and bicycle accommodations, which are summarized in **Figure 13**. There are multiple pedestrian crossings across US 11 (Main Street) at signalized intersections, unsignalized intersections, and mid-block. Most of the pedestrian crossings at signalized intersections include pedestrian signal heads; however, they are not present at the Wall Street and Pecan Street intersections. All midblock pedestrian crossings within the study area are uncontrolled. One midblock pedestrian crossing, in front of Barter Theatre, experiences very high, consolidated pedestrian activity before and after a show occurs as the primary parking lot is on the opposite side of US 11 (Main Street) from the theater (see **Figure 10**). There has been one fatal pedestrian crash and one severe injury crash at this crossing within the last five years; since then, the crossing has been updated with additional crossing features such as curb extensions, pedestrian-actuated flashing lights embedded within the pedestrian crossing warning signs, enhanced pedestrian lighting, an in-road pedestrian crossing sign, in-pavement crosswalk lighting, and retroreflective strips on the pedestrian crossing signposts. Another midblock crossing between Wall Street and Cummings Street has relatively steady crossing volume throughout the afternoon period (**Figure 11**).

Figure 10: Barter Theater Crosswalk Volume (April 25th, 2023)

Sidewalks are currently provided along US 11 (Main Street) through much of the study corridor. On the north side of US 11 (Main Street), sidewalks are provided between Patton Street and Thompson Drive; however, some locations have large gaps in the sidewalk due to open access parcel parking lots. On the south side of the corridor, sidewalks are provided within the entire study area, except for a ~1,500 ft segment between Hutton Street and east of the Food Country USA shopping center. This gap is primarily due to multiple back-to-back open-access parcel entrances. The Virginia Creeper Trail, a 34-mile recreational bike trail, connects Abingdon to the Town of Damascus and the Mount Rogers National Recreation Area. There is a marked bike route from the Creeper Tail terminus, along Railroad Street, adjacent to the railroad tracks beneath Cummings Street, connecting to the Abingdon Farmer's Market / Remsburg Drive, along Elm Street, Preston Street, Hagy / Hurt Street, and turning south to French Moore Boulevard. There are no other bike facilities within the study area.

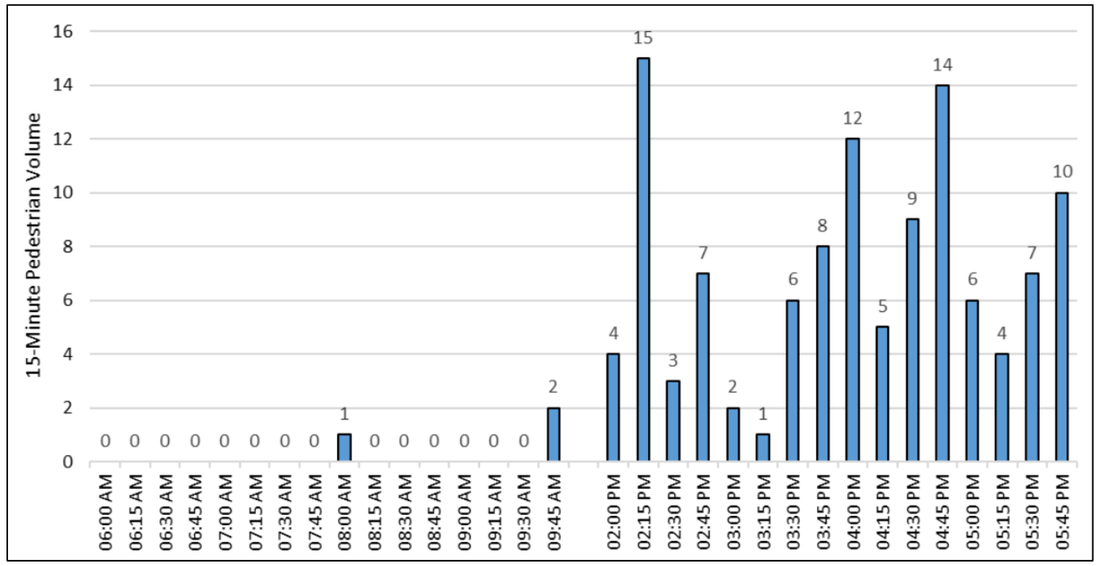


Figure 11: Midblock Crosswalk Volume between Wall and Cummings Street (April 25th, 2023)

The study area has VTrans needs of pedestrian access to activity center (medium priority) and bicycle access to activity center (very high priority). Activity centers are shopping and/or employment hubs identified by VTrans. In this instance, the activity centers are the Town of Abingdon, Virginia Highlands Community College, Johnston Memorial Hospital, and I-81 Exit 13. The VTrans needs are identified based on a commuting distance threshold from these activity centers.

Vehicle Access

Figure 13 also displays a density (heat map) of vehicular access points to properties along US 11 (Main Street). This figure shows the relative density of driveways / open curb cuts along the corridor. The highest density along the corridor is on the two ends of Town, with lower density within the center of Town. On the two ends of Town, there are several instances of undefined, open curb cuts where a

parking area is flush to the roadway; in some cases, parking vehicles must maneuver directly into the roadway.

Transit and TDM:

Mountain Lynx Transit currently serves the Town of Abingdon and the study area with a combination of fixed-deviated route service and on-demand service. The fixed-deviated routes are fixed routes that, with advance notice, may deviate a few blocks from the general route to pick-up or drop-off a passenger from an adjacent location without a fixed bus stop. If the driver does deviate from the route, they will rejoin the fixed route at the same location they exited or deviated. The fixed-deviated route operates Monday through Friday 8AM to 5PM. Passengers can board anywhere along the route. In contrast, the on-demand service is door-to-door transit that is requested in advance and does not follow a fixed route or service fixed transit stops. Mountain Lynx runs the following routes to service Abingdon:

- Two fixed-deviated routes – the silver loop servicing the west side of Abingdon and the blue loop servicing the east side of Abingdon
- Two on-demand "zones" that can be requested 24 hours in advance through a call center Monday through Friday 8AM-4PM
- Weekly on-demand routes to smaller towns and areas throughout Southwest Virginia

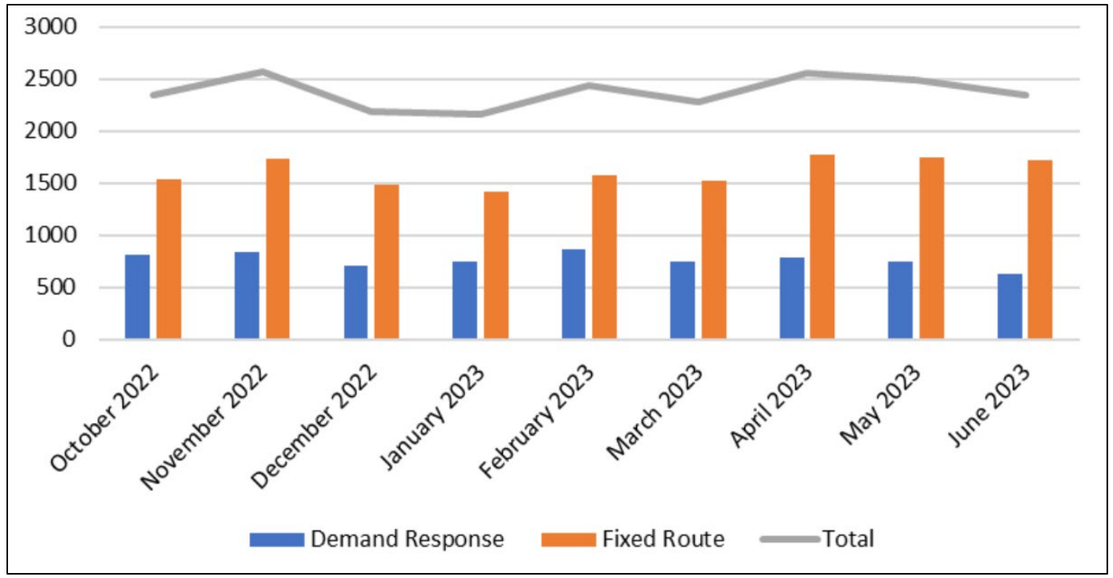
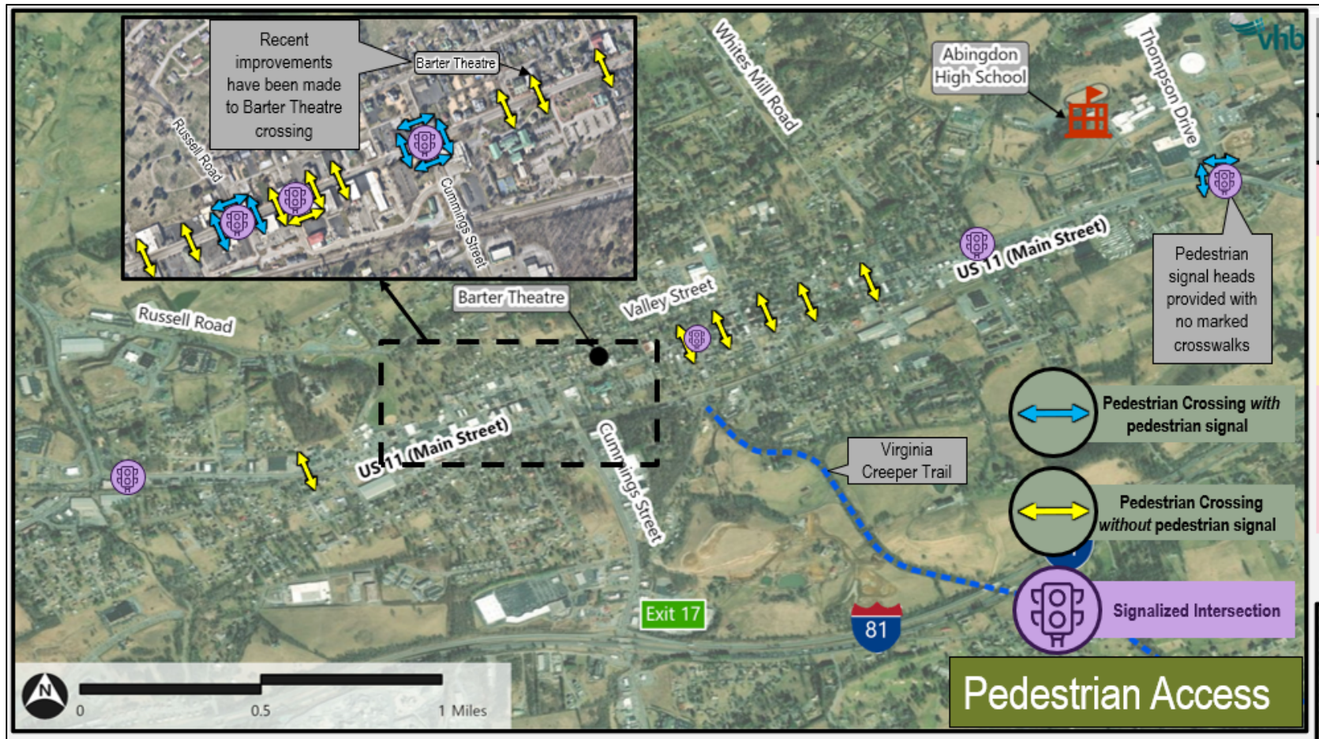


Figure 12: Mountain Lynx Transit Monthly Ridership in Abingdon

Figure 12 displays the monthly transit ridership in Abingdon; the fixed route service has approximately twice the monthly ridership of the on-demand service, with a total monthly ridership of approximately 2,400 individuals. The study area has VTrans needs of transit access to activity center (medium priority), transit access to equity emphasis area (very high priority), and transportation demand management (very high priority). These VTrans needs are defined by the following characteristics:

- The transit access to activity center VTrans need was identified based on an analysis indicating that fewer workers are able to reach a VTrans activity center within 45 minutes by transit than by private automobile.
- The transit access to equity emphasis area VTrans need was identified based on an analysis indicating census block groups with socioeconomic needs, transit viability based on population density, and an existing status of being underserved by transit.
- The TDM VTrans need is automatically assigned to non-limited access facilities that are on the Corridors of Statewide Significance (CoSS), such as US 11 (Main Street). This assignment is indicative of the importance of these statewide transportation arteries to moving people and goods. The goal of TDM in general is to convert private automobile trips to carpools or multimodal (transit, walk, bike, etc.).

The study team held conversations with Mountain Lynx Transit, the Bristol MPO, Department of Rail and Public Transportation (DRPT), and VDOT, to discuss the existing transit service and understand improvement needs. The Town of Abingdon and Mountain Lynx Transit are interested in the viability of improving the on-demand service with a mobile application dedicated to micro-transit in the area. There is also a desire to improve the bus stops and amenities to provide comfort and security while waiting for a bus on the fixed routes. Currently, there are no shelters at the bus stops, which exposes transit riders to the sun and inclement weather. To improve regional transit and connections throughout southwestern Virginia, regional transit connections were also discussed; however, that initiative requires cross-state coordination with the Tennessee Department of Transportation and will not be a focus within this Project Pipeline study.

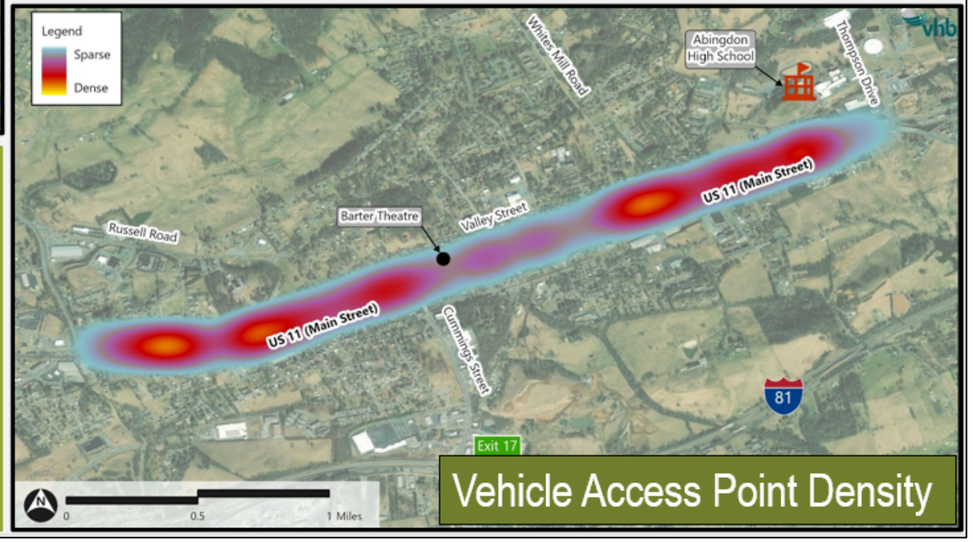


VTrans Multimodal Access Needs

NEED	PRIORITY
Transit Access for Equity Emphasis Areas	Very High
Transit Access to Activity Centers	Medium
Pedestrian Access to Activity Centers	Medium
Bicycle Access to Activity Centers	Very High
Transportation Demand Management (TDM)	Very High
Pedestrian Safety	No Need

Access Summary

- Many pedestrian crossings are provided through the downtown corridor; however, survey respondents noted that drivers do not always stop for pedestrians.
- Many crashes involved vehicles stopping for pedestrians.
- Virginia Creeper Trail begins in Abingdon just south of the study corridor; however, no bicycle facilities are provided in the study area.
- Highest density of access points on west end and east end of study area.



Existing Transit Service

- Transit routes serviced by Mountain Lynx Transit
  - Operate two fixed routes that can deviate off the general route for a requested pick-up/drop-off. Service is provided Monday-Friday 8AM-5PM and buses run every hour.
  - Additional demand-response buses available weekdays 7:30AM-4:30PM.
  - The fixed routes serve approximately 2/3 of passengers, and the on-demand service serves approximately 1/3 of passengers.
  - Weekly connection routes to other destinations throughout Washington County.
- No regional connections (e.g., Bristol, Kingsport, Johnson City) provided beyond Washington County.

Figure 13: Multimodal and Accessibility Needs and Diagnosis Summary

Safety and Reliability:

For the analysis of existing safety conditions, the VDOT Crash Analysis Tool was utilized to determine the crash history at the study intersections along the study corridor on US 11 (Main Street). Crash data was collected and analyzed for a five-year period spanning from January 2018 to December 2022. The study team reviewed the crash details provided by VDOT as well as the FR300 crash reports to determine specific trends and performed geospatial analysis to identify "hot spot" areas for consideration in developing alternative improvement concepts. The study team also reviewed the reliability metrics for the study area; reliability is the consistency of expected travel time along a corridor. While the study area does not have a reliability VTrans need, US 11 (Main Street)'s status as an I-81 detour route induces the potential for varying travel time during incidents on the interstate.

Safety Analysis Results

VDOT SAFETY SCREENING

Through a systemic analysis methodology that incorporates bicycle/pedestrian crash history, roadway characteristics, proximity to pedestrian generating land uses, and socioeconomic data, VDOT identified a Pedestrian Safety Action Plan (PSAP) roadway network of high-risk corridors. As seen in **Figure 14**, the PSAP Districtwide Top 5% Corridor segment ends just west of the US 11 (Main Street) study corridor, and the study corridor is not considered a PSAP corridor.

Figure 14: VDOT PSAP 3.0 Map of US 11 (Main Street) Corridor

VDOT also conducts safety screening analysis at a network level to identify critical hot spots where crashes are statistically overrepresented. A metric called Potential for Safety Improvement (PSI) is computed that identifies locations where actual crashes are overrepresented compared to what would be anticipated for a roadway of those characteristics (e.g., traffic volume, classification, number of lanes, etc.). The top 100 intersections and segments are then ranked by PSI in each VDOT District. **Figure 13** shows that the US 11 (Main Street) study corridor contains seven of the top 100 intersections and ten of the top 100 segments within the Bristol District, conveying the multiple safety needs on this specific corridor.

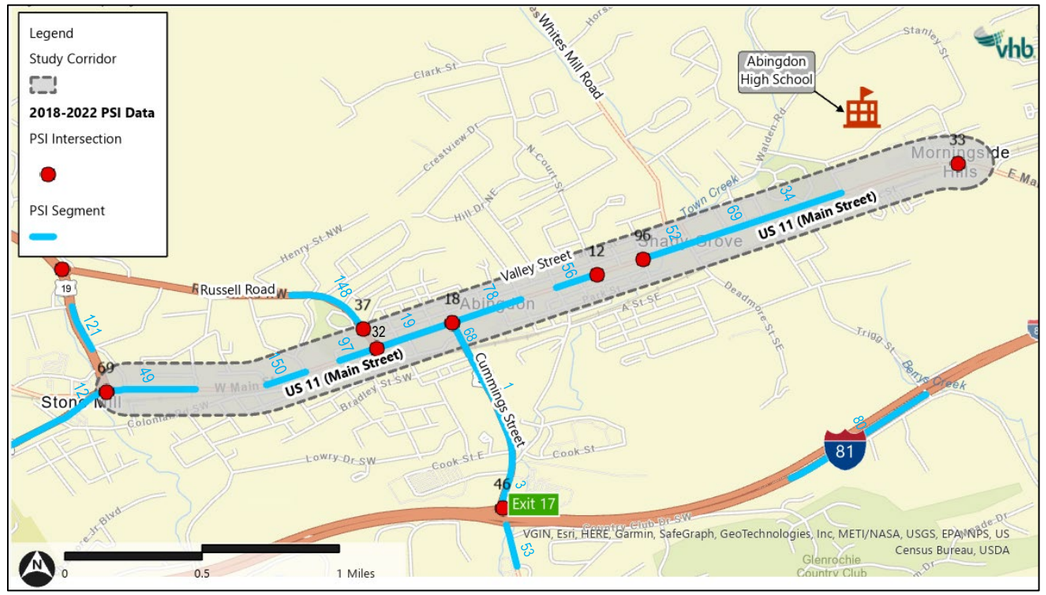


Figure 15: PSI Map of US 11 (Main Street) Corridor

CRASH ANALYSIS

The crashes within the study area are summarized by type and severity in **Figure 16** and **Figure 17.** There was a total of 228 crashes, and the two most common crash types were rear ends and angle crashes. The rear end crashes could be attributed to the numerous access points on US 11 (Main Street), a lack of lane markings and stop bars, and conflicts with on-street parking and pedestrian crossings. Sideswipes and off-road crashes also made up a portion of the crash types. In this study area, crashes involving senior citizens account for 40% of all crashes and 61% of sideswipe crashes. In the study area, senior citizens account for 21% of the population, which is greater than the statewide composition of 15% senior citizens. Many of the off-road crashes were fixed object crashes in which the vehicle crashed into a utility pole. While most crashes only involved property damage, four of the crashes involved either a fatality or a severe injury. These high-impact crashes are of particular importance in regard to identifying and addressing potential safety concerns.

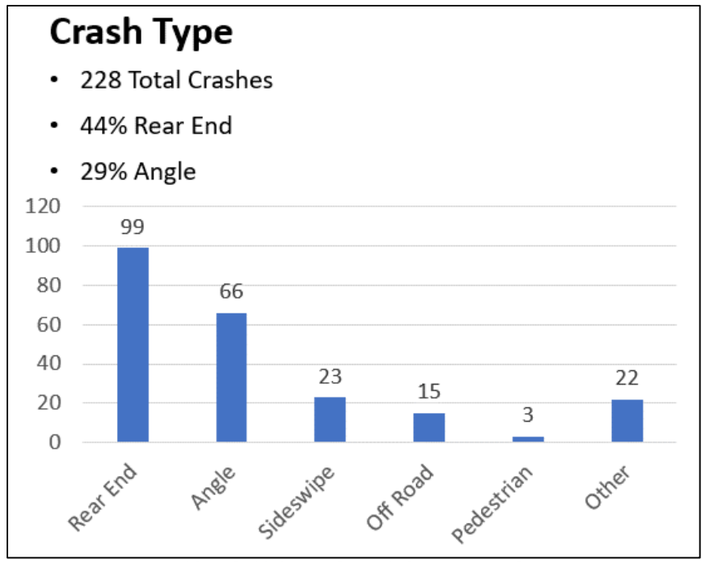


Figure 16: US 11 (Main Street) Crash Type Statistics

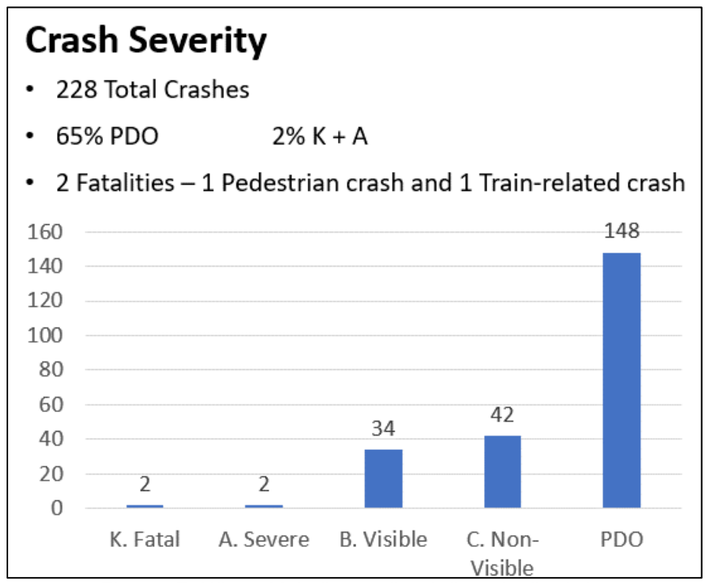


Figure 17: US 11 (Main Street) Crash Severity Statistics

Figure 18 displays a heat (density) map of all crashes on the corridor; there are a few clear clusters at intersections and corridors. These clusters correspond with the PSI segments and intersections shown in **Figure 15**.

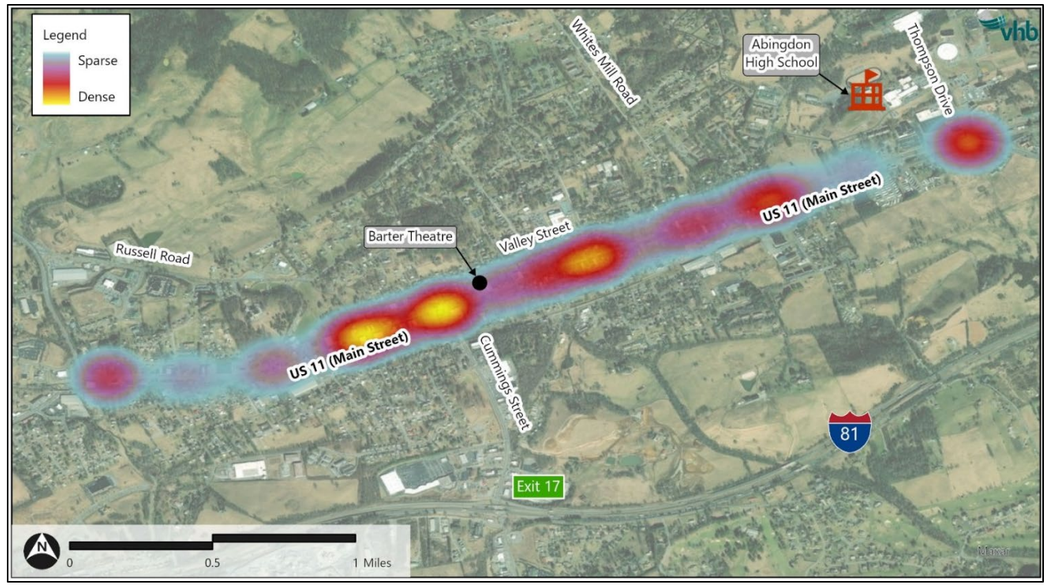


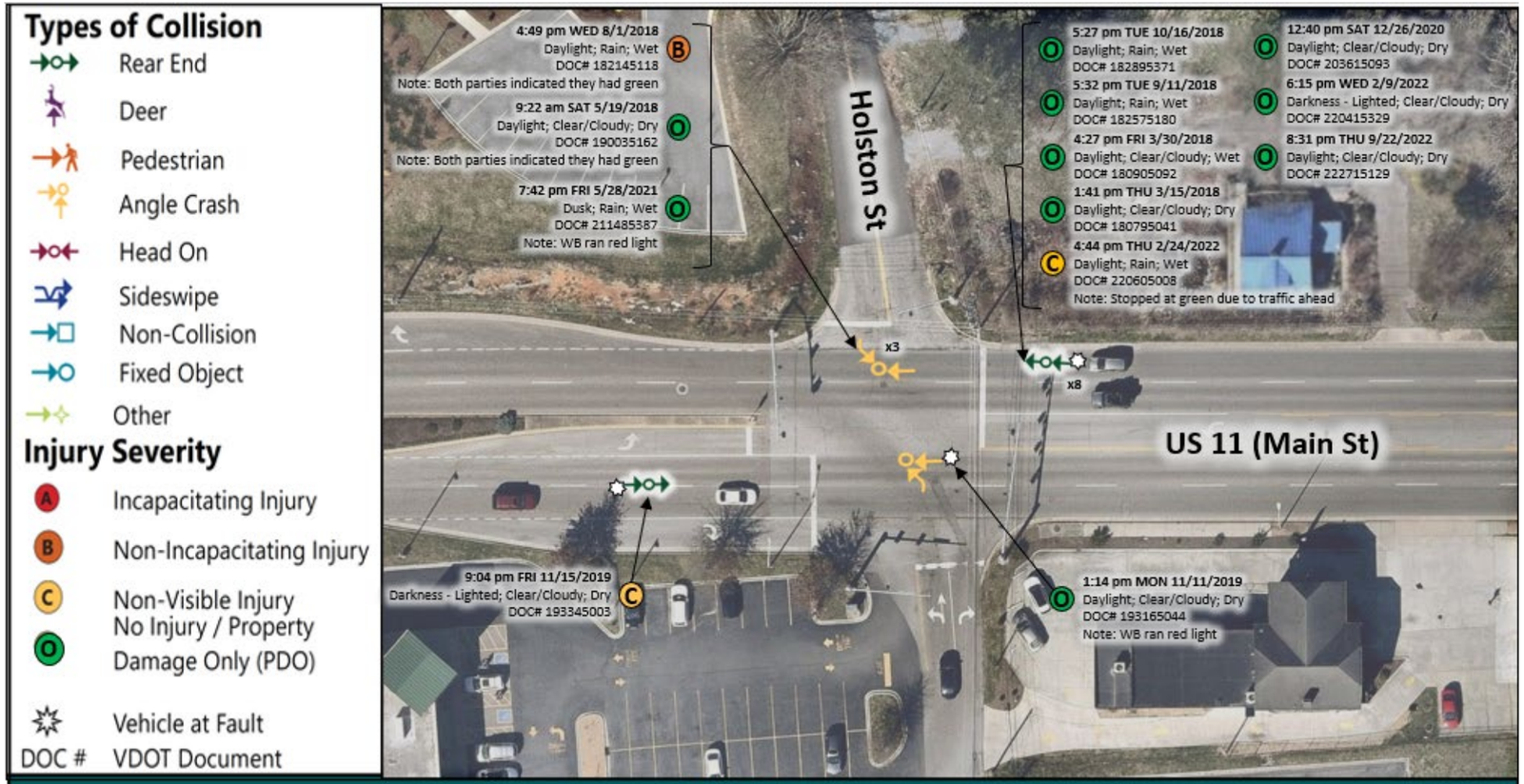
Figure 18: US 11 (Main Street) Crash Heat Map

The study team further studied the clusters seen in **Figure 18** to identify patterns and trends in the location or type of crashes. The FR 300 reports as well as the VDOT crash details were used to create collision diagrams that are shown in the following figures. The collision diagrams, **Figure 19** through **Figure 28,** show the crash trends at each location (i.e., multiple collisions that follow a pattern regarding crash location, type or description/reason of the crash). **Table 6** summarizes the key findings related to each collision diagram.

The safety needs and diagnosis (including crash type and severity by intersection) identified during the analysis are summarized in **Figure 29.**

Table 6: Collision Diagram Key Findings

Collision Diagram	PSI Ranking (2028-2022)	Key Findings
Figure 18: US 11 (Main Street) / Holston Street	PSI Segment #49	Numerous rear end crashes in the westbound direction, and a few angle crashes involving westbound vehicles. Many of these crashes occurred in the PM peak hour. Likely contributing factors include westbound queue spillback from the Porterfield Highway intersection, visibility of the signal head indications at Porterfield Highway, and sun glare.
Figure 19: US 11 (Main Street) / Academy Drive / Fuller Street	PSI Segments #50 and #97	Rear ends and sideswipes throughout segment, particularly eastbound rear end crashes at Fuller Street and with vehicles exiting Fuller Street.
Figure 20: US 11 (Main Street) / Russell Road	PSI Segments #19 and #97 PSI Intersection #32	Numerous eastbound rear end crashes, angle crashes involving westbound left-turning vehicles, and sideswipe crashes in the eastbound direction. Likely contributing factors include the sudden left-turn trap lane and drivers attempting to maneuver out of the left-turn lane or continue straight from the left-turn lane.
Figure 21: Segment between Russell Road and Cummings Street	PSI Segment #19	A significant amount of rear end crashes throughout segment caused by corridor friction (e.g., vehicles parking, pedestrians crossing, delivery trucks, etc.) Many crashes cited stopping for a downstream event (e.g., parking vehicle or pedestrian crossing) as the cause of the crash.
Figure 22: US 11 (Main Street) / Cummings Street	PSI Segments #19, #68, and #78 PSI Intersection #18	A pattern of rear end crashes, particularly in the eastbound and northbound directions. Congestion may be a contributing factor to the rear end crashes. Nine angle crashes occurred at this location, including three crashes between westbound left-turning vehicles and eastbound through vehicles.
Figure 23: US 11 (Main Street) / Pecan Street	PSI Segment #56	Eight angle crashes occurred at this location, but there is no apparent trend or pattern.
Figure 24: US 11 (Main Street) / Court Street	PSI Segment #56 PSI Intersection #12	A pattern of rear end crashes and angle crashes. The rear end crashes occurred in the eastbound (5 crashes) and westbound (4 crashes) directions. Many crashes cited stopping for an upstream event (e.g., a pedestrian crossing) as a contributing factor of the crash. The angle crashes primarily involved southbound vehicles, and many occurred in wet conditions. This intersection is on the apex of two vertical curves – one in the eastbound/westbound direction and one in the northbound/southbound direction. The southbound approach (stop-controlled) has very limited sight distance due to the approach grades of the eastbound and westbound directions, building faces, and on-street parked vehicles. Many of the crashes involving southbound vehicles occurred in wet pavement conditions.
Figure 25: US 11 (Main Street) / Deadmore Street	PSI Segments #52 and #69	Two crashes at this location involved the utility pole in the northwest quadrant.
Figure 26: US 11 (Main Street) / Trigg Street	PSI Segments #34 and #69	The primary crash trend at this intersection are rear end crashes. 6 rear end crashes occurred in the westbound direction, and 2 rear end crashes occurred in the eastbound direction.
Figure 27: US 11 (Main Street) / Thompson Street	PSI Intersection #33	A pattern of rear end crashes and angle crashes. Six westbound rear end crashes occurred in the study period, potentially contributed to by congestion. Another trend includes four angle crashes between eastbound left-turning vehicles and westbound through vehicles.



Collision Summary

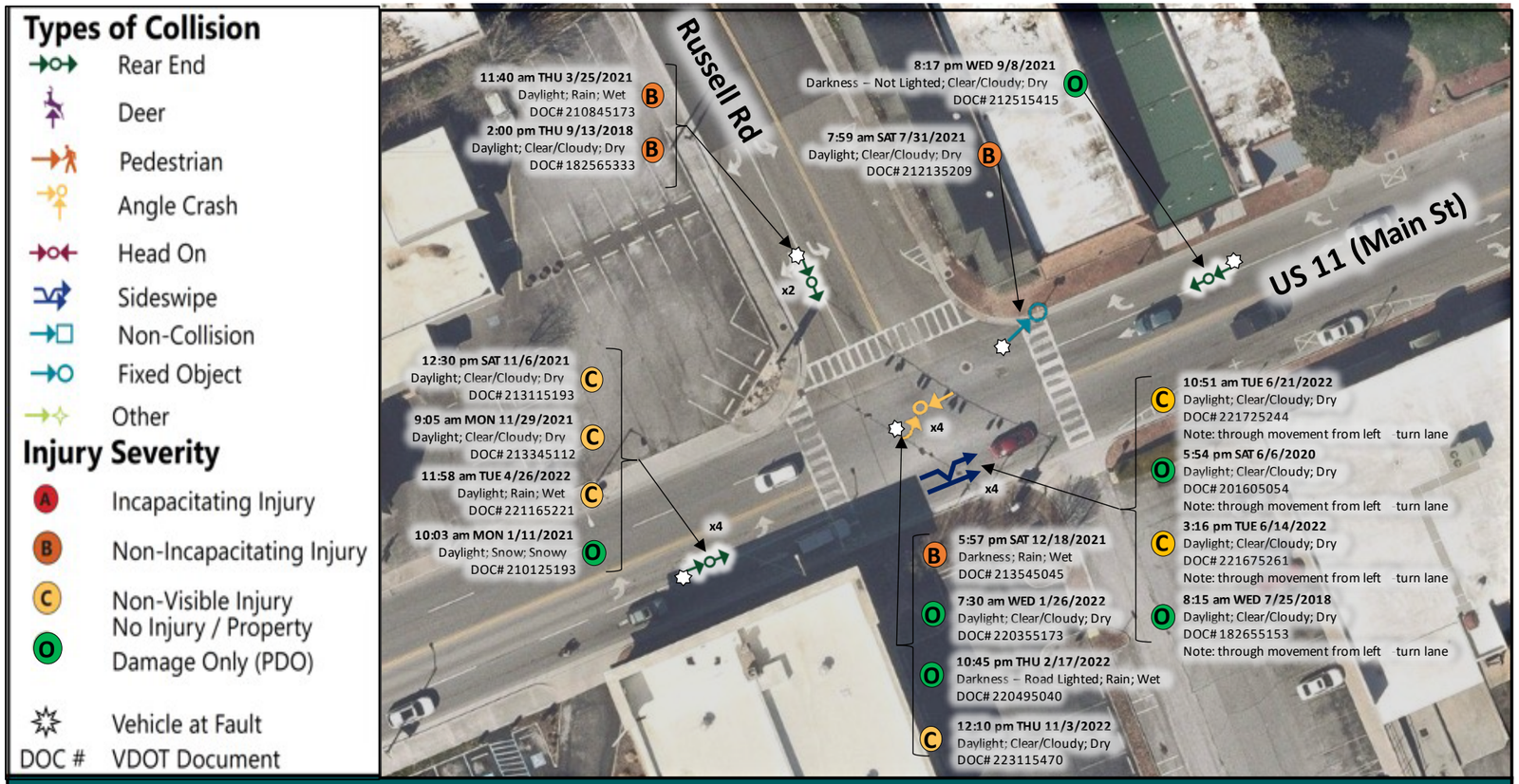
Year	Type of Collision						Time of Day			Lighting			Weather		Pavement Condition			Severity					Total
	Angle	Rear-End	Head-On	Sideswipe	Fixed Object	Other	AM Peak (7-10AM)	PM Peak (4-7PM)	Off Peak	Daylight	Dawn/Dusk	Darkness – Lighting	Clear	Rain/Snow	Dry	Wet	Icy	K	A	B	C	PDO	
2018	2	4					1	4	1	6			3	3	2	4				1		5	6
2019	1	1							2	1		1	2		2						1	1	2
2020		1							1	1			1		1							1	1
2021	1								1		1			1		1						1	1
2022		3						2	1	2		1	2	1	2	1					1	2	3
Total	4	9					1	6	6	10	1	2	8	5	7	6				1	2	10	13

Figure 19: US 11 (Main Street) / Holston Street Collision Diagram

Collision Summary

Year	Type of Collision						Time of Day			Lighting			Weather		Pavement Condition			Severity					Total
	Angle	Rear-End	Head-On	Sideswipe	Fixed Object	Other	AM Peak (7-10AM)	PM Peak (4-7PM)	Off Peak	Daylight	Dawn/Dusk	Darkness – Lighting	Clear	Rain/Snow	Dry	Wet	Icy	K	A	B	C	PDO	
2018		2		1			1		2	3			3		3					1		2	3
2019		2						1	1	2			1	1	1	1						2	2
2020		2	1				1	1	1	3			1	2	1	2				1		2	3
2021	1	1							2	2				2		2				1		1	2
2022	1	1		1	2		1	1	3	4		1	5		4	1			1		1	3	5
Total	2	8	1	2	2		3	3	9	14		1	10	5	9	6			1	3	1	10	15

Figure 20: US 11 (Main Street) / Academy Drive / Fuller Street Collision Diagram



Collision Summary

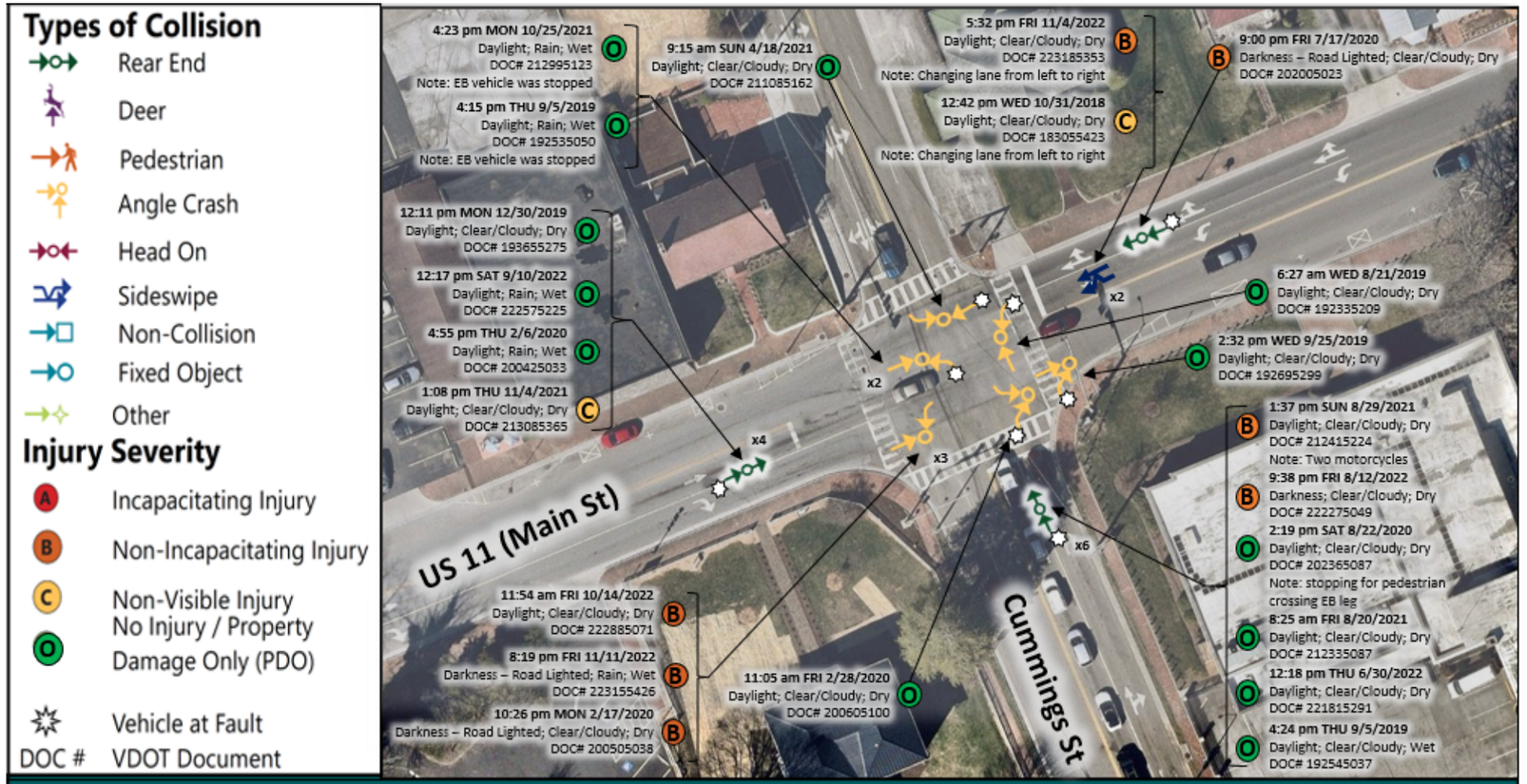
Year	Type of Collision						Time of Day			Lighting			Weather		Pavement Condition			Severity					Total
	Angle	Rear-End	Head-On	Sideswipe	Fixed Object	Other	AM Peak (7 - 10AM)	PM Peak (4 - 7PM)	Off Peak	Daylight	Dawn/Dusk	Darkness – Lighting	Clear	Rain/Snow	Dry	Wet	Icy	K	A	B	C	PDO	
2018		1		1			1		1	2			2		2							2	2
2019				1																			
2020								1		1			1		1							1	1
2021	1	5			1		2	1	4	5		2	4	3	4	3				3	2	2	7
2022	3	1		2			1	1	4	5		1	4	2	4	2					4	2	6
Total	4	7		4	1		4	3	9	13		3	11	5	11	5				3	6	7	16

Figure 21: US 11 (Main Street) / Russell Road Collision Diagram

Collision Summary

Year	Type of Collision						Time of Day			Lighting			Weather		Pavement Condition			Severity					Total
	Angle	Rear-End	Head-On	Sideswipe	Fixed Object	Other	AM Peak (7-10AM)	PM Peak (4-7PM)	Off Peak	Daylight	Dawn/Dusk	Darkness – Lighting	Clear	Rain/Snow	Dry	Wet	Icy	K	A	B	C	PDO	
2018		3	1			1		1	4	3		2	2	3	2	3				1		4	5
2019	1	2						1	2	3			3		2	1						3	3
2020		4					1		3	4			3	1	3	1				1	2	1	4
2021		5						1	4	5			3	2	3	2					1	4	5
2022		3							3	3			2	1	2	1					1	2	3
Total	1	17	1			1	1	3	16	18		2	13	7	12	8				2	4	14	20

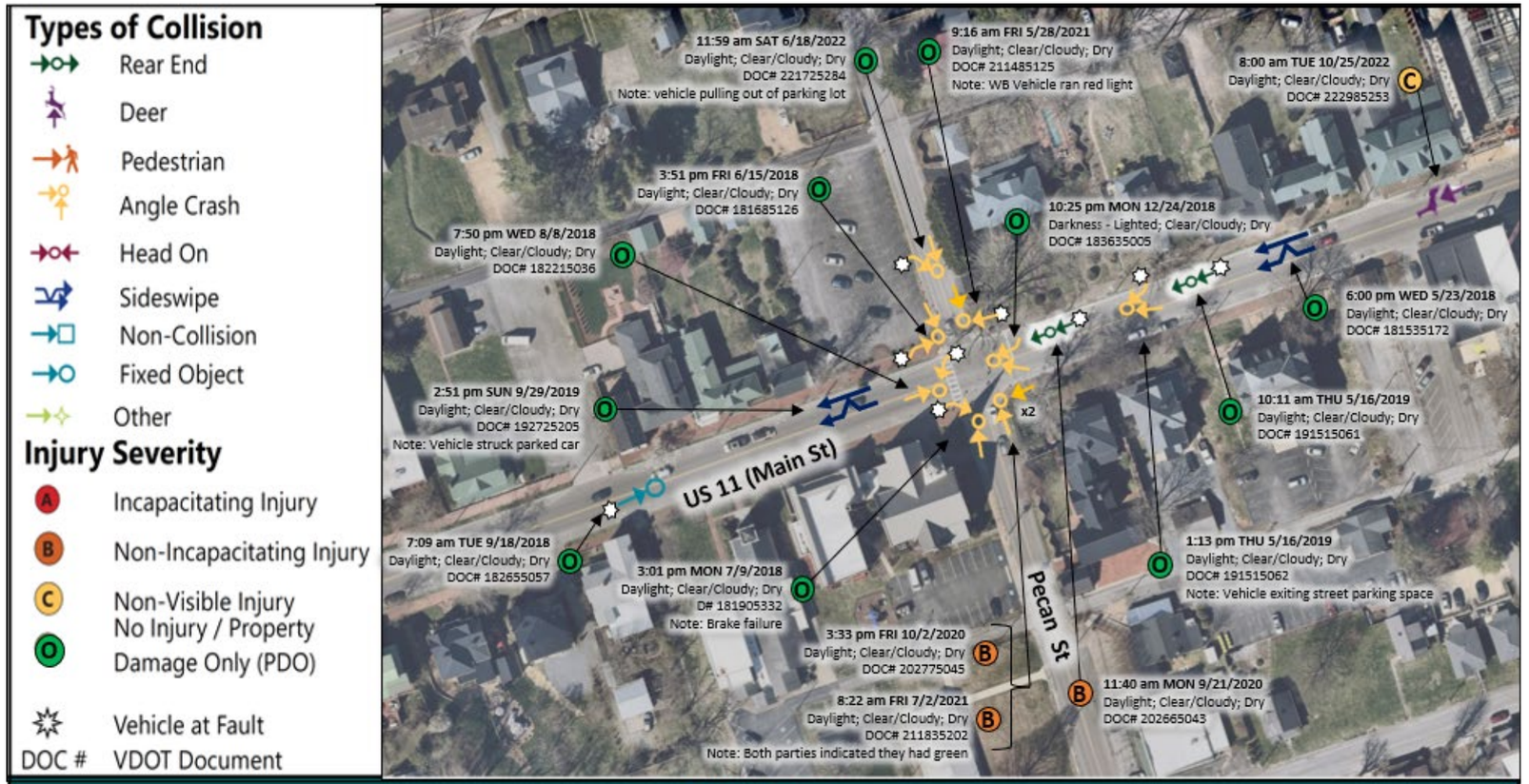
Figure 22: Segment between Russell Road and Cummings Street Collision Diagram



Collision Summary

Year	Type of Collision						Time of Day			Lighting			Weather		Pavement Condition			Severity					Total
	Angle	Rear-End	Head-On	Sideswipe	Fixed Object	Other	AM Peak (7-10AM)	PM Peak (4-7PM)	Off Peak	Daylight	Dawn/Dusk	Darkness – Lighting	Clear	Rain/Snow	Dry	Wet	Icy	K	A	B	C	PDO	
2018				1					1	1			1		1						1		1
2019	3	2						2	3	5			4	1	3	2						5	5
2020	2	3						2	3	3		2	4	1	4	1				2		3	5
2021	2	3					1	1	3	5			4	1	4	1				1	1	3	5
2022	2	3	1					1	53	4		2	4	2	4	2				3	1	2	6
Total	9	11	1	1			1	6	15	18		4	17	5	16	6				6	3	13	22

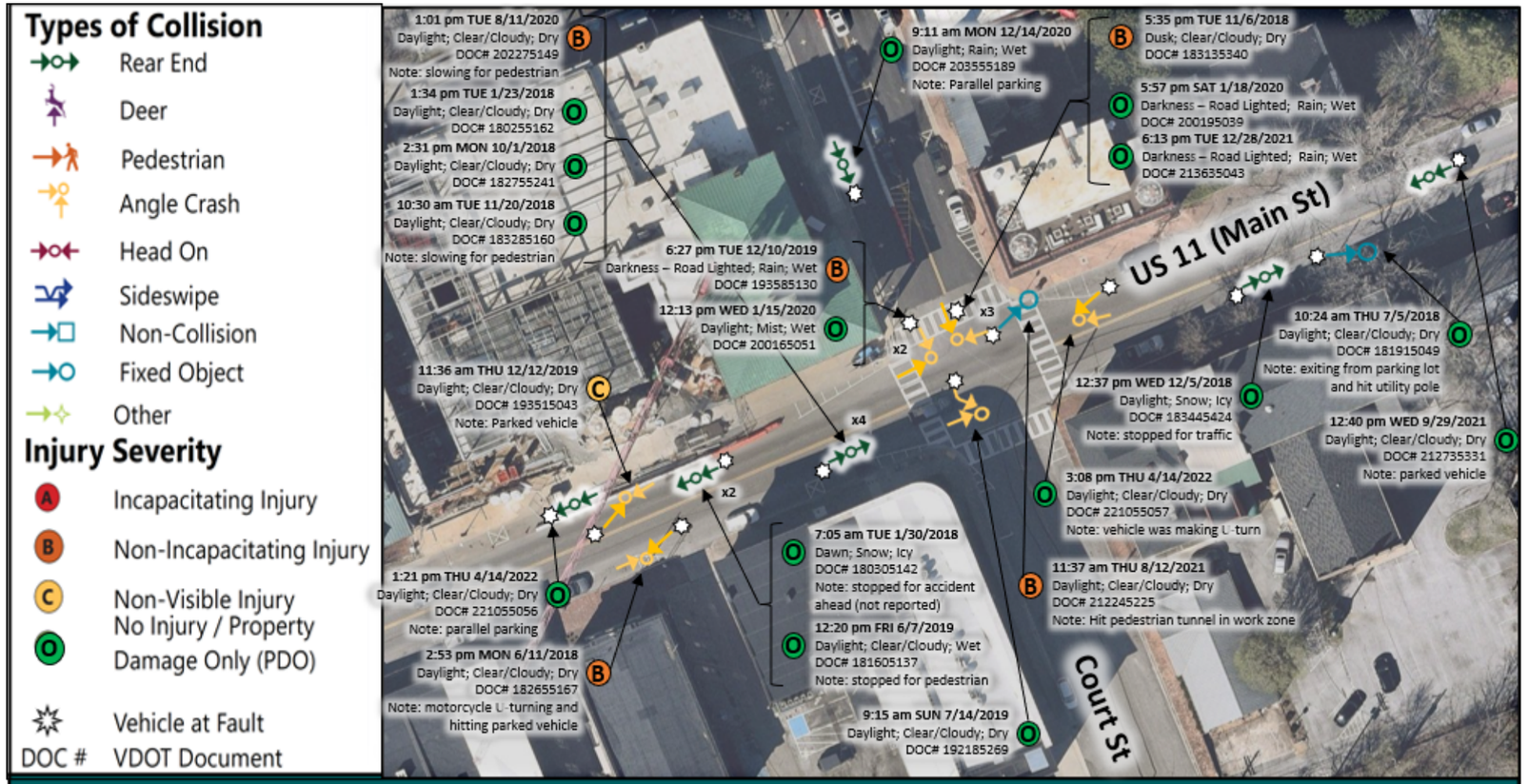
Figure 23: US 11 (Main Street) / Cummings Street Collision Diagram



Collision Summary

Year	Type of Collision						Time of Day			Lighting			Weather		Pavement Condition			Severity					Total
	Angle	Rear-End	Head-On	Sideswipe	Fixed Object	Other	AM Peak (7-10AM)	PM Peak (4-7PM)	Off Peak	Daylight	Dawn/Dusk	Darkness – Lighting	Clear	Rain/Snow	Dry	Wet	Icy	K	A	B	C	PDO	
2018	4			1	1		1	2	3	6			6		6							6	6
2019	1	1		1					3	3			3		3							3	3
2020	1	1							2	2			2		2					2			2
2021	2						2			2			2		2					1		1	2
2022	1					1	1		1	1			1		1						1	1	2
Total	9	2		2	1	1	4	2	9	15			15		15					3	1	11	15

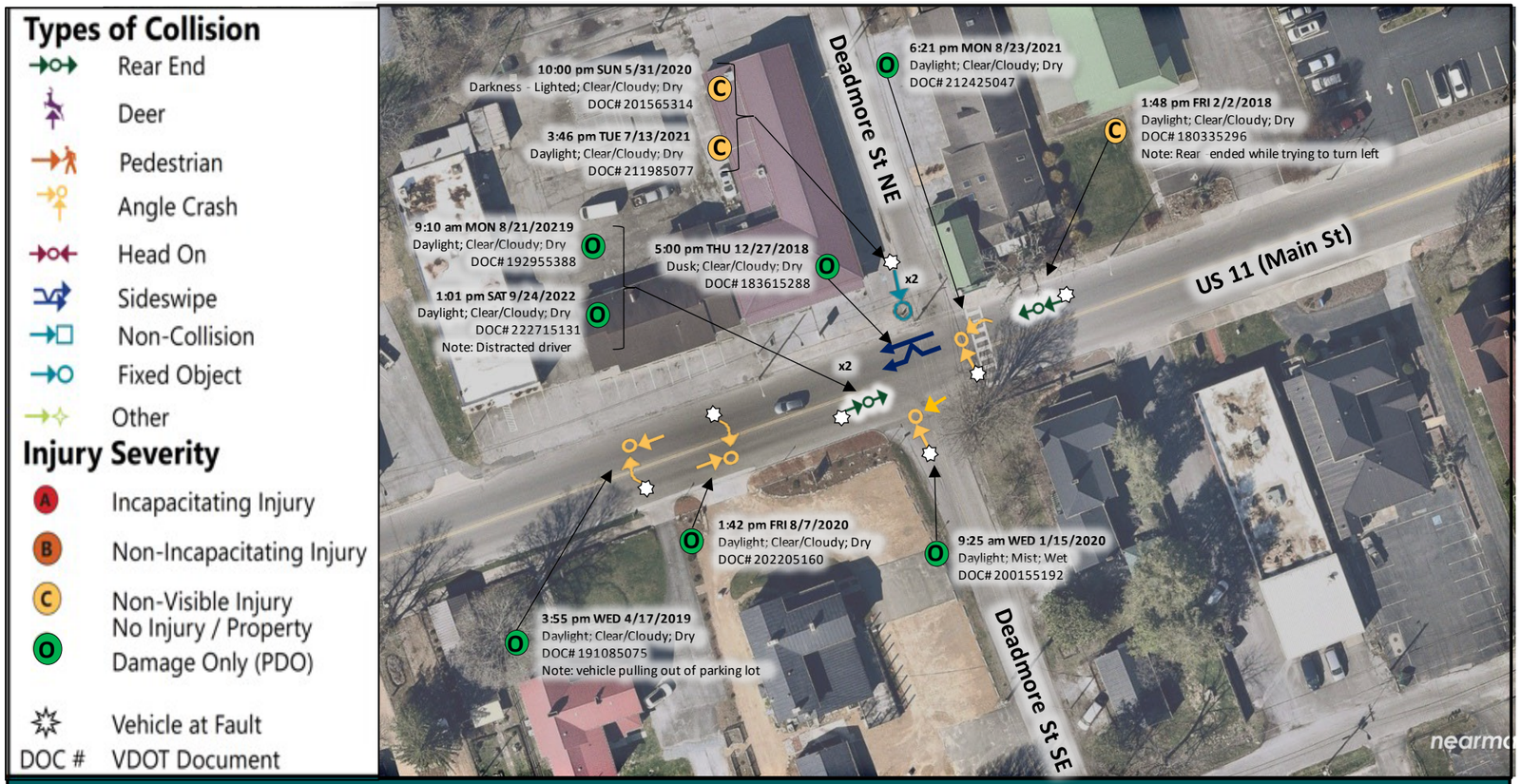
Figure 24: US 11 (Main Street) / Pecan Street Collision Diagram



Collision Summary

Year	Type of Collision						Time of Day			Lighting			Weather		Pavement Condition			Severity					Total
	Angle	Rear-End	Head-On	Sideswipe	Fixed Object	Other	AM Peak (7-10AM)	PM Peak (4-7PM)	Off Peak	Daylight	Dawn/Dusk	Darkness – Lighting	Clear	Rain/Snow	Dry	Wet	Icy	K	A	B	C	PDO	
2018	2	5			1		1	1	6	6	2		6	2	6	1	1			2		6	8
2019	3	1					1	1	2	3		1	3	1	2	2				1	1	2	10
2020	2	2					1	1	2	3		1	1	3	1	3				1		3	10
2021	1	1			1			1	2	2		1	2	1	2	1				1		2	3
2022	1	1						1	1	2			2		2							2	2
Total	9	10			2		3	5	13	16	3	3	14	7	13	7	1			5	1	15	21

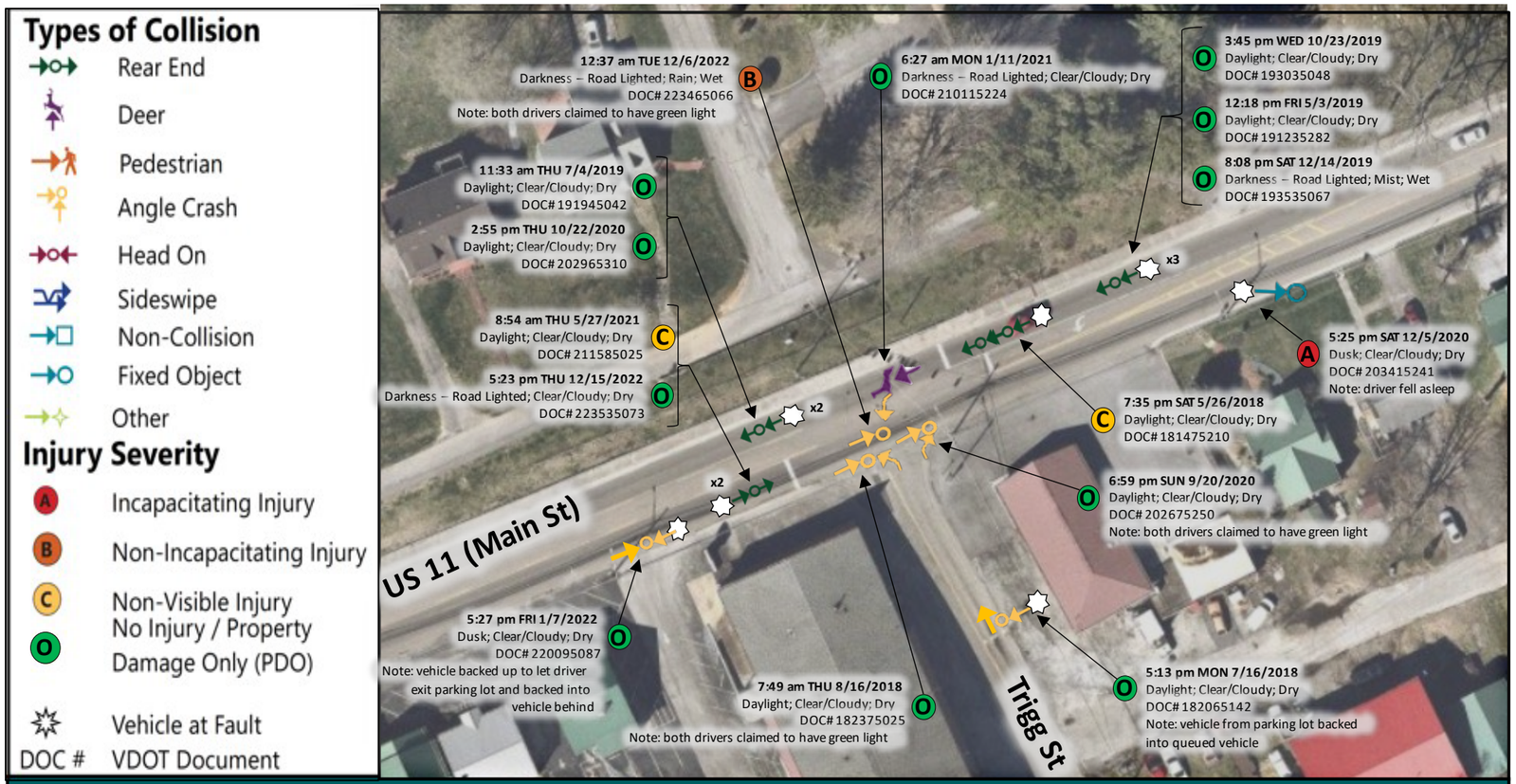
Figure 25: US 11 (Main Street) / Court Street Collision Diagram



Collision Summary

Year	Type of Collision						Time of Day			Lighting			Weather		Pavement Condition			Severity					Total
	Angle	Rear-End	Head-On	Sideswipe	Fixed Object	Other	AM Peak (7 - 10AM)	PM Peak (4 - 7PM)	Off Peak	Daylight	Dawn/Dusk	Darkness – Lighting	Clear	Rain/Snow	Dry	Wet	Icy	K	A	B	C	PDO	
2018		1		1				1	1	1	1		2		2						1	1	2
2019	1	1					1		1	2			2		2							2	2
2020	2				1		1		2	2		1	2	1	2	1					1	2	3
2021	1				1			1	1	2			2		2						1	1	2
2022		1							1	1			1		1							1	1
Total	4	3		1	2		2	2	6	8	1	1	9	1	9	1					3	7	10

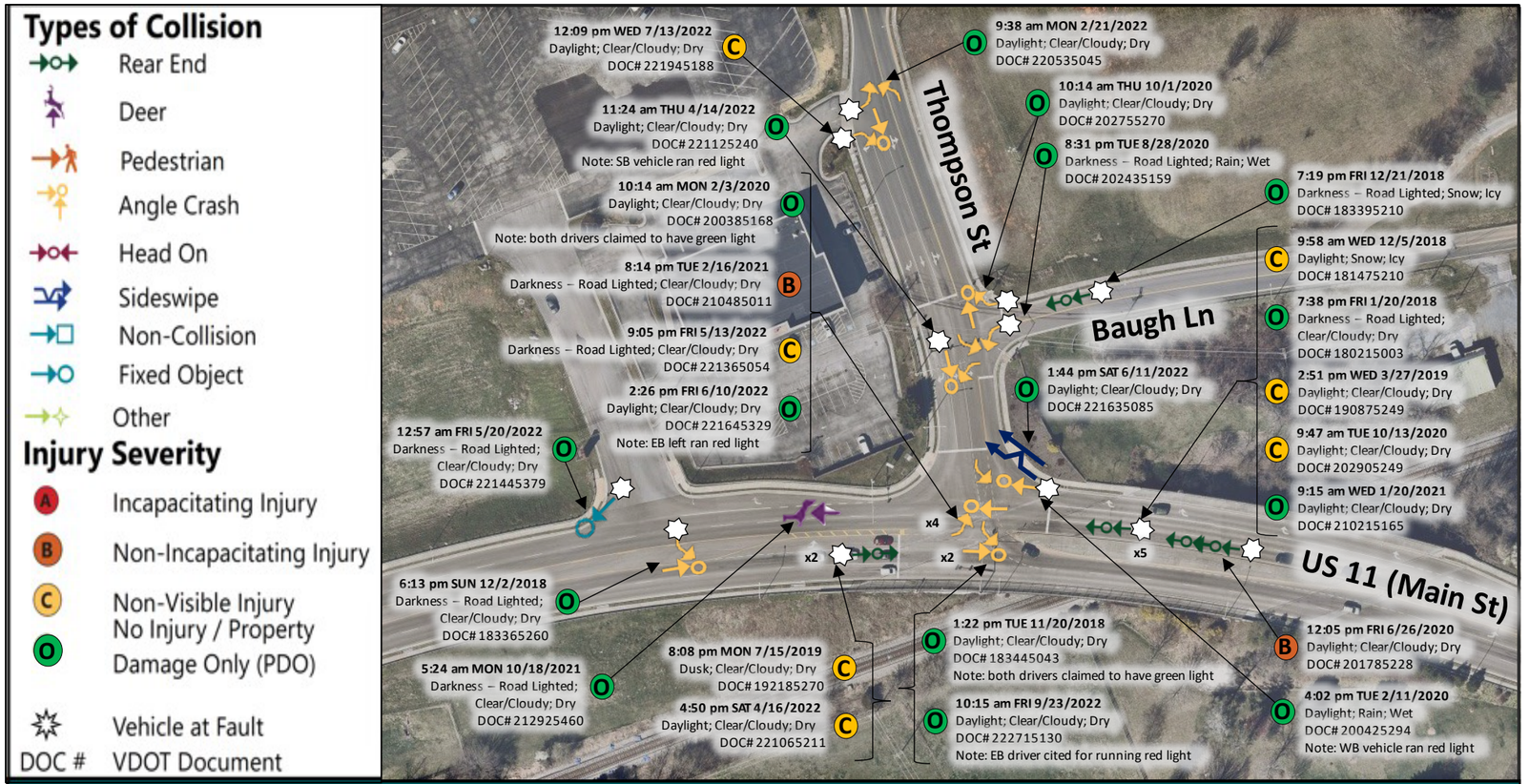
Figure 26: US 11 (Main Street) / Deadmore Street Collision Diagram



Collision Summary

Year	Type of Collision						Time of Day			Lighting			Weather		Pavement Condition			Severity					Total
	Angle	Rear-End	Head-On	Sideswipe	Fixed Object	Other	AM Peak (7 - 10AM)	PM Peak (4 - 7PM)	Off Peak	Daylight	Dawn/Dusk	Darkness – Lighting	Clear	Rain/Snow	Dry	Wet	Icy	K	A	B	C	PDO	
2018	1	1				1	1	1	1	3			3		3						1	2	3
2019		4							4	3		1	3	1	3	1						4	4
2020	1	1			1			2	1	2	1		3		3				1			2	3
2021		1				1	1		1	1		1	2		2						1	1	2
2022	1	1				1		2	1		1	2	2	1	2	1				1		2	3
Total	3	8			1	3	2	5	8	9	2	4	13	2	13	2			1	1	2	11	15

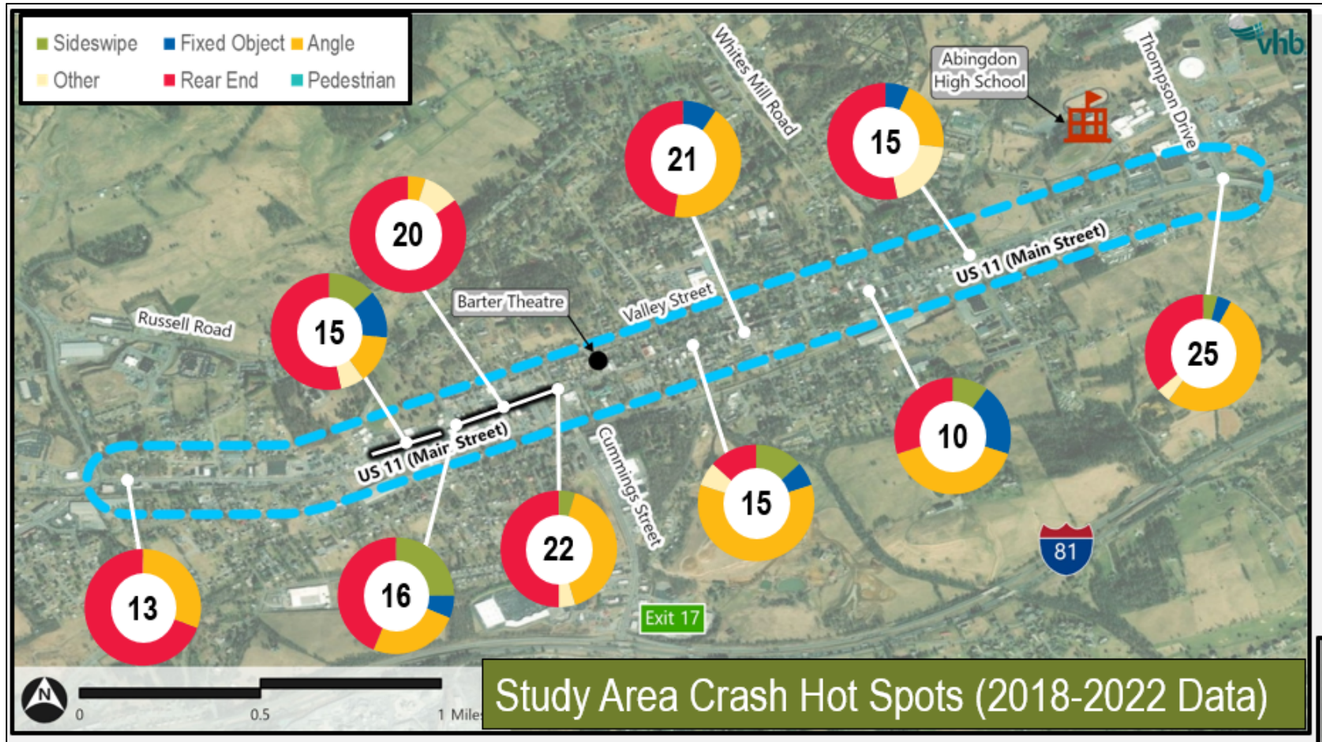
Figure 27: US 11 (Main Street) / Trigg Street Collision Diagram



Collision Summary

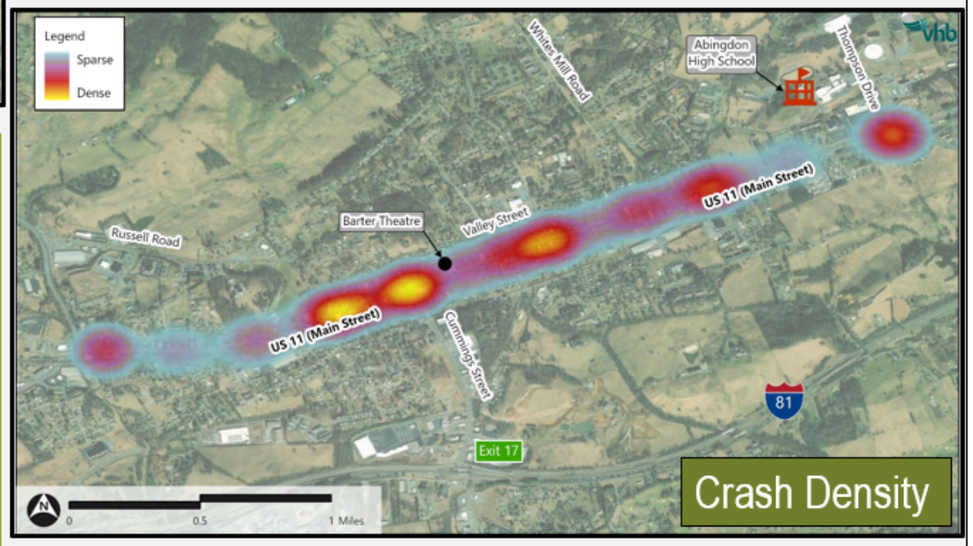
Year	Type of Collision						Time of Day			Lighting			Weather		Pavement Condition			Severity					Total
	Angle	Rear-End	Head-On	Sideswipe	Fixed Object	Other	AM Peak (7 - 10AM)	PM Peak (4 - 7PM)	Off Peak	Daylight	Dawn/Dusk	Darkness – Lighting	Clear	Rain/Snow	Dry	Wet	Icy	K	A	B	C	PDO	
2018	2	3					1	1	3	2		3	3	2	3		2				1	4	5
2019		2							2	1	1		2		2						2		2
2020	4	2					1	1	4	5		1	4	2	4	2				1	1	4	6
2021	1	1				1	1		2	1		2	3		3					1		2	3
2022	6	1		1	1		1	1	7	7		2	9		9						3	6	9
Total	13	9		1	1	1	4	3	18	16	1	8	21	4	21	2	2			2	7	16	25

Figure 28: US 11 (Main Street) / Thompson Street and Thompson Street / Baugh Lane Collision Diagram



VDOT 2018-2022 Crash Data	Crashes by Severity				
Intersection / Segment	**A**	**B**	**C**	**O**	**Total**
Holston Street and US 11	0	1	2	10	**13**
Between Academy Drive and Fuller Street	1	3	1	10	**15**
Russell Road and US 11	0	3	6	7	**16**
Between Russell Road and Cummings Street	0	2	4	14	**20**
Cummings Street and US 11	0	6	3	13	**22**
Pecan Street and US 11	0	3	1	11	**15**
Court Street and US 11	0	5	1	15	**21**
Deadmore Street and US 11	0	0	3	7	**10**
Trigg Street and US 11	1	1	2	11	**15**
Thompson Street and US 11	0	2	7	16	**25**
Total	2	26	30	114	**172**

K = Fatal Injury; A = Severe Injury; B = Visible Injury; C = Non-visible Injury; O = Property Damage Only



VTrans Safety / Reliability Needs

NEED	PRIORITY
Reliability	No Need
Road Safety	Very High
Pedestrian Safety	No Need

Safety Summary

- The primary crash pattern includes rear end and angle crashes related to friction between various road uses in the downtown corridor (e.g., driving vehicles, parking vehicles, pedestrians, delivery trucks, etc.). 20-25% of all crashes estimated to be "friction" crashes.
- 17 of the crashes along the corridor directly involved parked vehicles, and 12 involved utility poles along the corridor.
- Many rear end crashes noted stopping for activities in front (e.g., pedestrians crossing, vehicles parking, etc.) of the vehicles involved.

Figure 29: Safety and Reliability Needs and Diagnosis

FHWA Screening Tool for Equity Analysis of Projects (STEAP)

This screening shows the demographic make-up of the population residing within the study area, the city/town, the county, and then all of Virginia. The tool allows you to compare the representation of the population with regard to a demographic characteristic, such as age or household income, within the study area compared to the city/town, county, and all of Virginia. **Figure 30** shows the household incomes present in the study area compared to all of Abingdon and Virginia, and **Figure 31** shows the age groups present in the study area compared to Abingdon and Virginia. **Figure 30** shows that there is a higher representation of households with a $35,000 or lower household income in the study area when compared to the rest of Virginia, and a significantly higher representation of households with a household income below $15,000. There is also a slightly larger representation of seniors in the study area compared to the percentage of seniors present in all of Virginia. **Appendix C** provides the full STEAP analysis results.

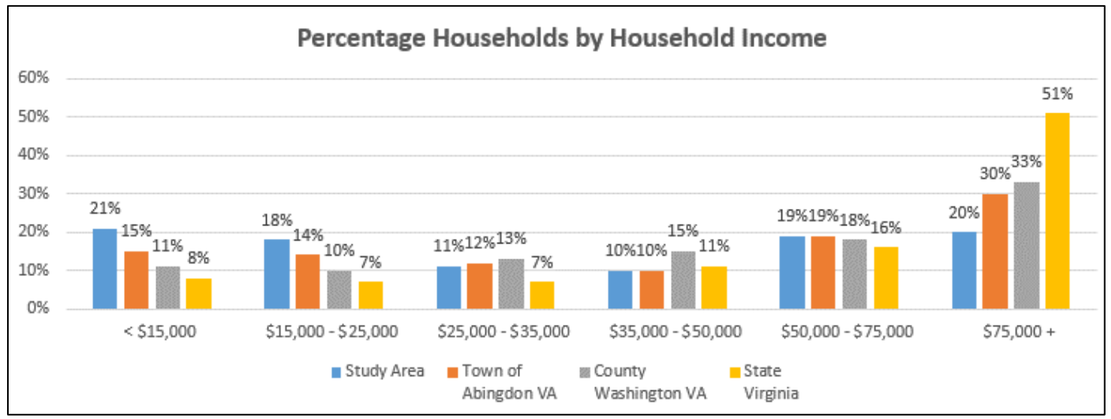


Figure 30: Percent Households by Income

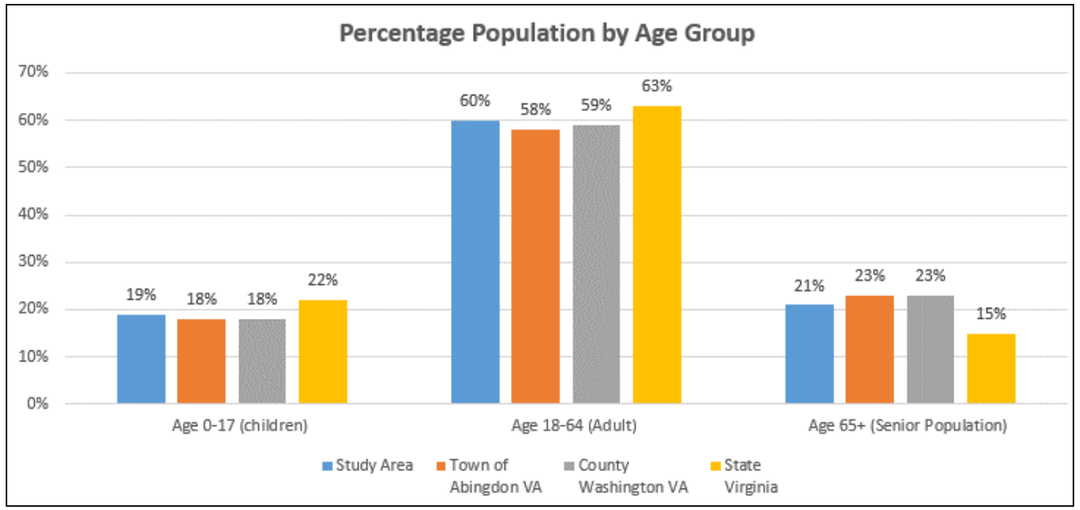


Figure 31: Percent Population by Age

Public Involvement

During Phase 1, a public survey was developed to garner public input on the study corridor. The survey asked the public to rank the issues along the corridor and provided multiple free-form questions for the public to input open-ended responses. The survey was distributed online via VDOT's PublicInput platform between June 19, 2023, and July 3, 2023. The survey received 307 participants with 8,714 responses and 441 comments. The participants of the survey ranged from people who drive on the study corridor daily to a few times per month, the breakdown of participants can be seen in **Figure 32**. Full public survey results are provided in **Appendix D**.

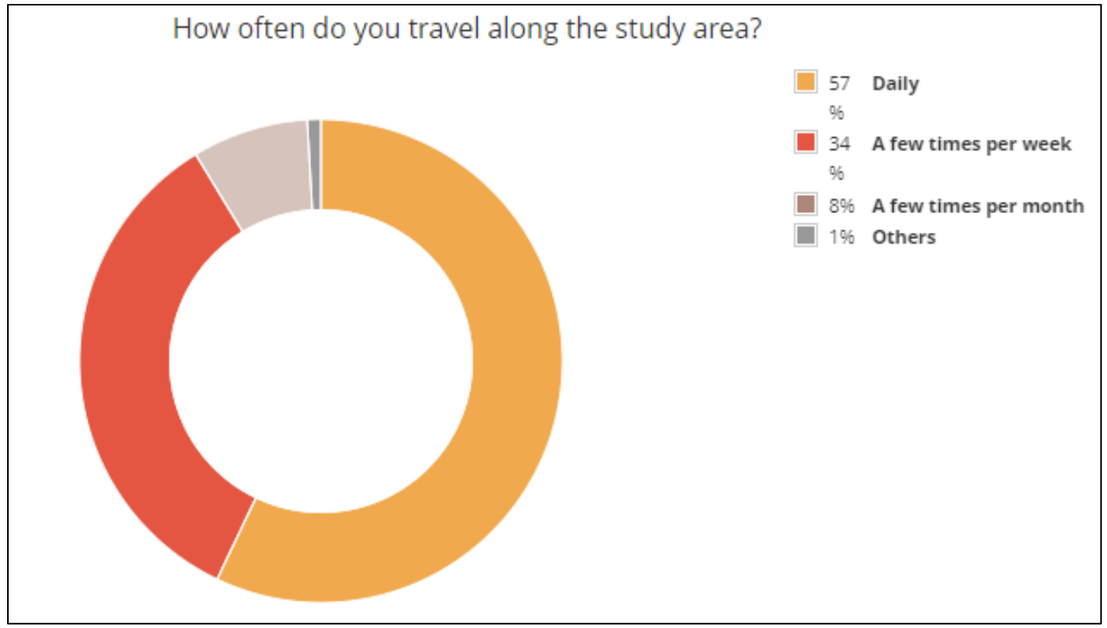


Figure 32: Frequency of Survey Participants Driving on the Study Corridor

The top issues that concerned the public include congestion mitigation, pedestrian access, and safety improvement. When asked "what is the most important issue to you along the study area", participants said "reducing traffic congestion", "pedestrian safety and accessibility", "corridor safety / intersection safety", and "bicycle safety and accessibility". **Figure 33** shows how the survey participants ranked the issues on the study corridor with regard to what was important to them. The survey also asked, "what mobility issues do you typically experience when using the study area?" As shown in **Figure 34**, the top responses include "poor signal coordination", "difficulty making left turns", "difficulty when walking", and "difficulty accessing businesses". "Insufficient / missing crosswalks" and "pedestrian signal timing and lack of sidewalks / missing sidewalks" were the major safety issues cited by survey responses.

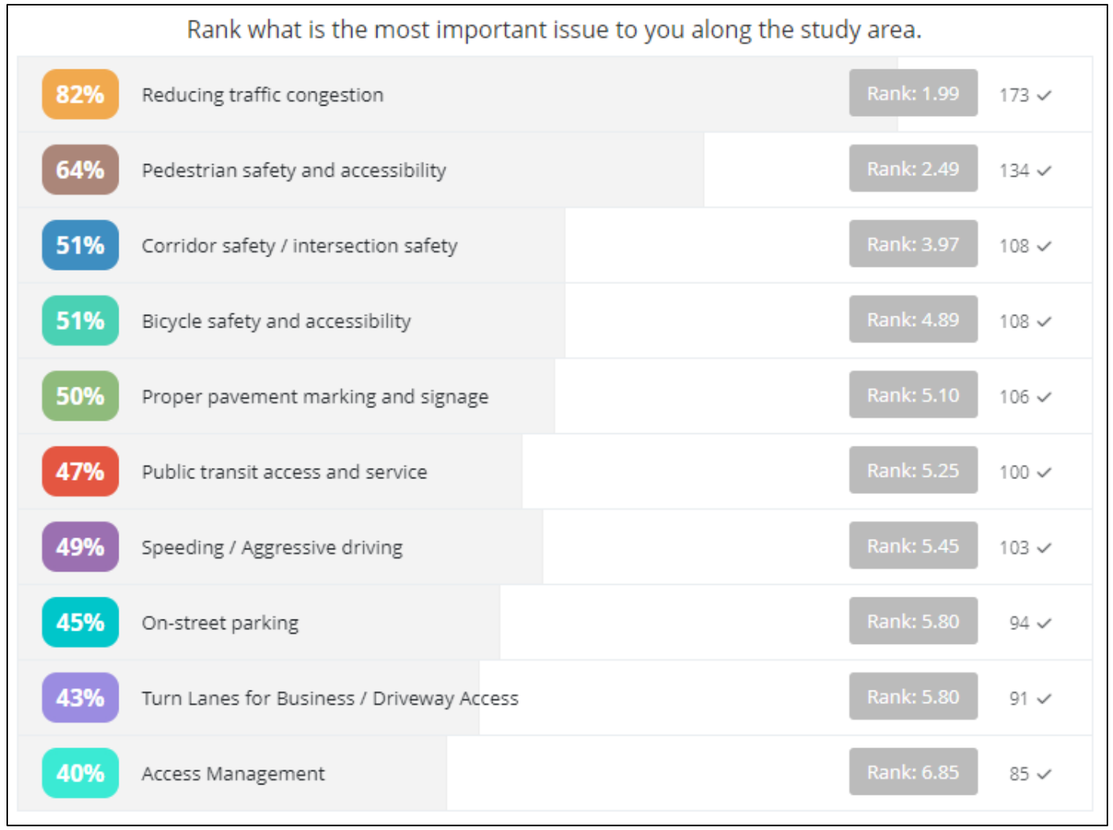


Figure 33: Study Corridor Issues Rankings per Survey

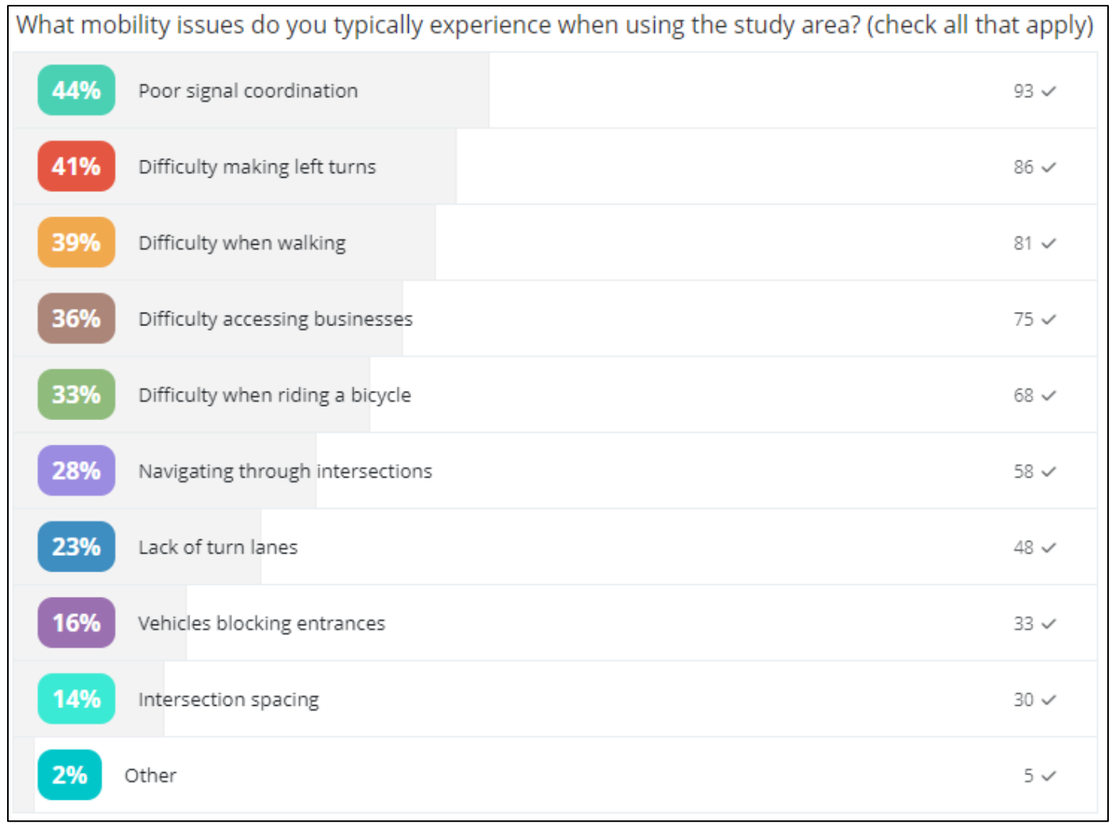


Figure 34: Mobility Issues Ranking per Survey

The survey had sections for participants to provide freeform comments. The open-ended responses are summarized by major themes as follows and binned in **Figure 35**:

- Traffic
  - General concern of congestion throughout town, especially when there is an incident on I-81.
  - Some drivers avoid US 11 (Main Street) due to congestion.
- Safety
  - Confusing turn lanes.
  - Speeding and red-light running is common.
  - Many driveways with trucks entering the roadway and limited visibility.
- Pedestrian / Multimodal
  - Cars do not yield to pedestrians.
  - Additional crosswalks are needed.
  - Lack of bicycle accommodations, especially connecting to Virginia Creeper Trail.
- Parking
  - Difficulty with on-street parking.
  - Limited parking availability; not enough parking; need more off-street parking.

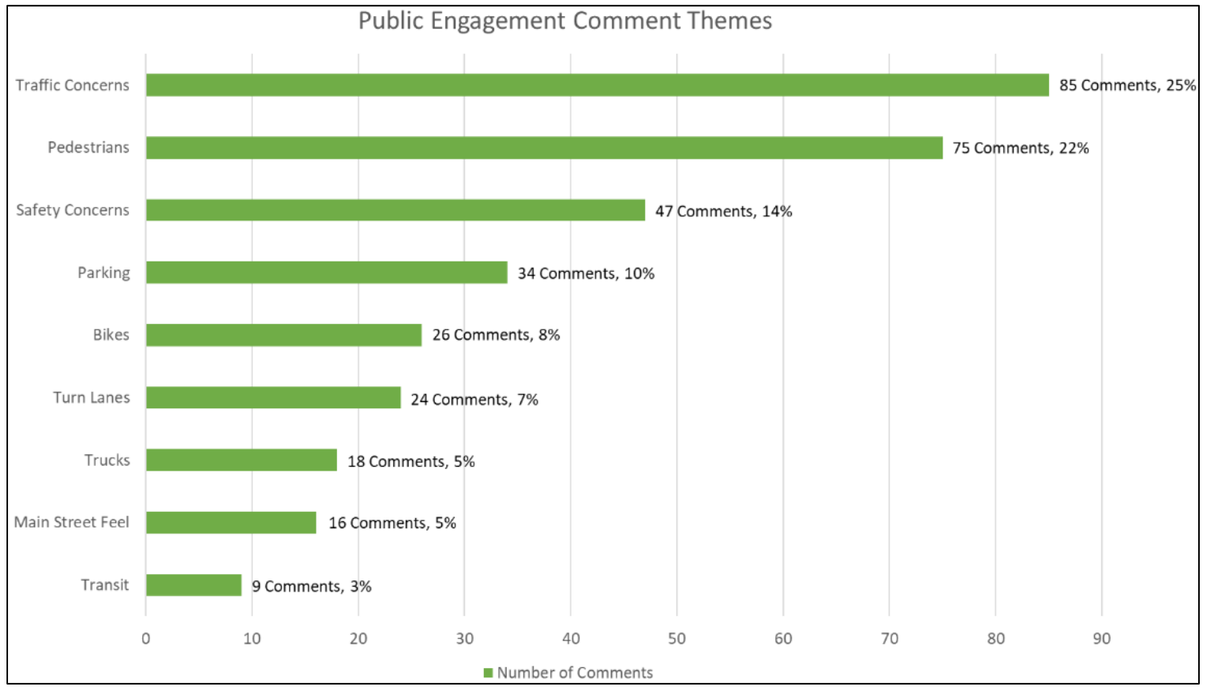


Figure 35: Survey Freeform Comment Major Themes

Chapter 2:

Alternative Development and Refinement

Alternative Development and Screening

To develop alternative concepts that address the needs and incorporate diagnosis identified in Chapter 1, a thorough review of the existing conditions data was conducted. There were multiple safety needs and areas identified for the study area in the Town of Abingdon. The study team brainstormed multiple alternatives and improvements to address the safety and operations concerns identified throughout the rest of the study area. The alternatives were developed, evaluated, and presented to the stakeholders in their varying stages in the development process. Stakeholder input was also considered when determining the final preferred alternatives.

Initial Alternatives Development

The following sections document the alternatives developed for a safety or operations need. The development process for each alternative is explained with regard to the origin of the concept, detailed analysis to quantity potential benefits, and further consideration and refinement.

TRANSIT ACCESS

One of the VTrans needs that was categorized as "very high" was transit access for the equity emphasis areas. To address this need, one of the alternatives considered in Phase 1 was investigation into improving the transit services provided in the Town of Abingdon. **Figure 36** shows a flowchart from a Virginia Department of Rail and Public Transportation (DRPT) report on microtransit. As seen in the flowchart, for an area such as Abingdon that already has fixed-route transit service with infrequent headways (hourly), there is opportunity to consider fixed-route service enhancements and to consider replacing underperforming fixed-route service with demand-response service. Per Table 12 within the same DRPT report (see **Figure 37**), the existing transit ridership in Abingdon (an average of 8.3 fixed-route passengers per revenue-hour[2]), qualifies as "poor" route performance and "strong" candidate for fixed-route service replacement with microtransit. That said, Mountain Lynx Transit currently offers both a fixed-route service and a demand-based service, with two-thirds of its Abingdon ridership utilizing the fixed-route service, so there appears to be preference for fixed-route service, at least in the current iteration of provided transit service options. The study team thus decided to consider both enhancements to the fixed-route service and ways in which microtransit could be bolstered.

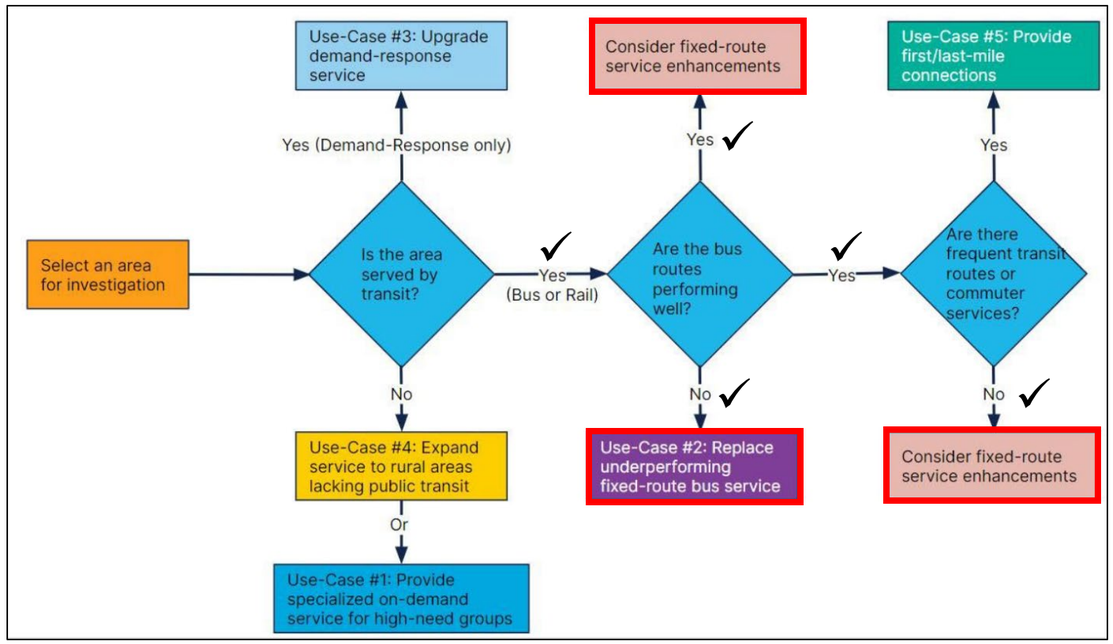


Figure 36: Microtransit Suitability Flowchart (Source: DRPT[3])

Route Performance	Candidate For Replacement	Productivity	Cost per Passenger trip
		Passengers per revenue-hour	*Operating expense per passenger trip*
Good	Weak	20+	<$5
Average	Moderate	10-20	$5 - $10
Poor	Strong	<10	>$10

Figure 37: Transit Metrics for Consideration of Replacing Fixed-Route Service with Microtransit (Source: DRPT[3])

[2] Based on transit ridership data between October 2022 and June 2023, provided by Mountain Lynx Transit.

[3] *Rural Microtransit Case Study and Report*, Virginia Department of Rail and Public Transportation, April 2023. https://drpt.virginia.gov/wp-content/uploads/2023/05/drpt-rural-microtransit-case-study-and-report-final.pdf

The study team collaborated with Mountain Lynx Transit to prepare a customer survey to solicit feedback on existing service in Abingdon. This survey was distributed in September and October of 2023, and a total of 54 individuals responded to the survey. Of note, these individuals are all current transit riders, so the survey did not capture input from people who currently do not use transit for various reasons. The following seven survey questions and summarized responses capture highlights of the survey. The number one improvement request by riders was temporal expansion of service into the weekends and later in the evenings (i.e., beyond 5pm). The existing transit population is largely transit-dependent and desires the stops to be located close to origins and destinations. Shelters and benches were the biggest requests for bus stop improvements.

1. Is it easy to find bus route and schedule information?
    a. Yes – 51
    b. No – 3
2. If improvements were made, what would be most useful to you?
    a. Service on Saturdays – 34
    b. Service on Sundays – 18
    c. More Frequent Service – 6
    d. More Areas Served – 6
    e. Service Earlier in the Morning – 4
    f. Service Later in the Evening – 16
    g. More Shelters/Benches – 9
    h. Improved Access to Transit Information – 4
    i. More Direct Routing – 8
3. If you were not riding the bus, how would you make this trip?
    a. Drive Myself – 0
    b. Ride with Family/Friends – 16
    c. Walk – 22
    d. Bicycle – 2
    e. Taxi – 2
    f. Would not Make this Trip – 20
4. What are your most important reasons for not riding the bus more frequently?
    a. Bus is Inconvenient – 5
    b. Bus is not Economical – 0
    c. Bus does not go where I want to travel – 7
    d. Bus does not operate when I want to travel – 7
    e. Hard to access bus stops – 5
    f. Lack of knowledge about when or where to access bus - 5
    g. Bus stops are uncomfortable – 2
5. How far do you walk to access a bus stop?
    a. Less than 1 block – 46
    b. 1-2 blocks – 2
    c. 2-3 blocks – 2
    d. 3+ blocks – 2
6. Which bus stop improvements would be most beneficial to you?
    a. Shelters – 46
    b. Benches – 23
    c. Bus information signage – 6
    d. Better sidewalk connections – 6
    e. Better crosswalk connections – 6
7. Where would you ideally prefer bus stops to be located?
    a. Directly along roadways closest to origins and destinations – 20
    b. Directly along lower-volume roadways somewhat further from origins/destinations – 3
    c. Shopping center parking lots – 11

Based on the analysis completed and feedback received, the study team considered fixed-route service enhancements such as bus stop amenities (e.g., benches, transit shelters, etc.), improvements to the pedestrian network to ensure connectivity to bus stops, and the relocation of bus stops. Many of the existing stops consist of just a sign and they are located along side streets and within shopping center parking lots. In discussions with Mountain Lynx, there has been an intentional decision to place stops near origins/destinations and away from Main Street, which is perceived to have traffic congestion issues that constrain bus travel time. One of the downsides of locating stops within shopping centers is that this is private property and bus stop infrastructure such as shelters and benches are thus extremely challenging – if not impossible – to install and maintain. This study recommends that Mountain Lynx further consider relocating some stops onto Main Street, where physical bus stop amenities could be provided within the public right of way. It also recommends that Mountain Lynx consider expanding service hours to evenings and/or weekends.

While a detailed microtransit propensity study is beyond the scope of this Pipeline study, there are several microtransit considerations offered here. Several areas of Virginia have seen great success with microtransit in cooperation with DRPT. Microtransit often functions via technology solutions such as mobile applications that may be challenging for senior populations to utilize. While no transit alternatives moved forward to the final preferred alternatives in this study, a foundation was established for a future transit-focused study, which should include regional transit considerations and representation from the Tennessee Department of Transportation to investigate regional connections between Bristol, Kingsport, Abingdon, and other neighboring locations.

TRAFFIC CALMING AND ACCESS MANAGEMENT

Two needs identified for the section of US 11 (Main Street) between the Russell Road intersection and Cummings Street intersection were traffic calming and multimodal accommodations. While the limits of the VTrans needs only extend between Russell Road and Cummings Street, these alternatives may be applied elsewhere along the corridor as well, between Fuller Street and Tanner Street, as shown in **Figure 38**.

To address these two needs, the following were considered:

- Curb bump outs at intersections and midblock pedestrian crossings to calm traffic and shorten pedestrian crossing distances
- Angled parking instead of parallel parking to help with parking maneuvers on this segment of US 11 (Main Street)
- Streetscaping and curb management strategies
- Bicycle accommodations
- Improvements to the Barter Theatre crosswalk, including consideration to a crossing guard or other temporary measures during peak pedestrian activity concurrent to Theatre events

Access management strategies considered included access consolidation/relocation and access definition. At this point in the alternative development process, these access management strategies were not applied to specific driveway locations; however, these strategies may be implemented at high-density access point locations or locations with open, undefined access points.

Figure 38: Traffic Calming Limits for Consideration

INTERSECTION CONTROL – US 11 (MAIN STREET) AND CUMMINGS STREET

For the US 11 (Main Street) and Cummings Street intersection, a VJuST analysis was completed to assist in the determination of the appropriate intersection configuration (i.e., conventional signal, innovative intersection, etc.). VJuST is a screening tool that helps in the decision-making process of identifying intersection configurations that are most appropriate in reducing congestion and improving safety. The VJuST tool was used to compare two intersection control types: a conventional signal and a quadrant roadway. The existing intersection control type is a conventional signal, and the quadrant roadway was considered to relocate the high volume of northbound left turns from Cummings Street onto US 11 (Main Street) via Remsburg Drive and Wall Street. A concept of the re-routed traffic for the quadrant roadway intersection is shown in **Figure 39**.

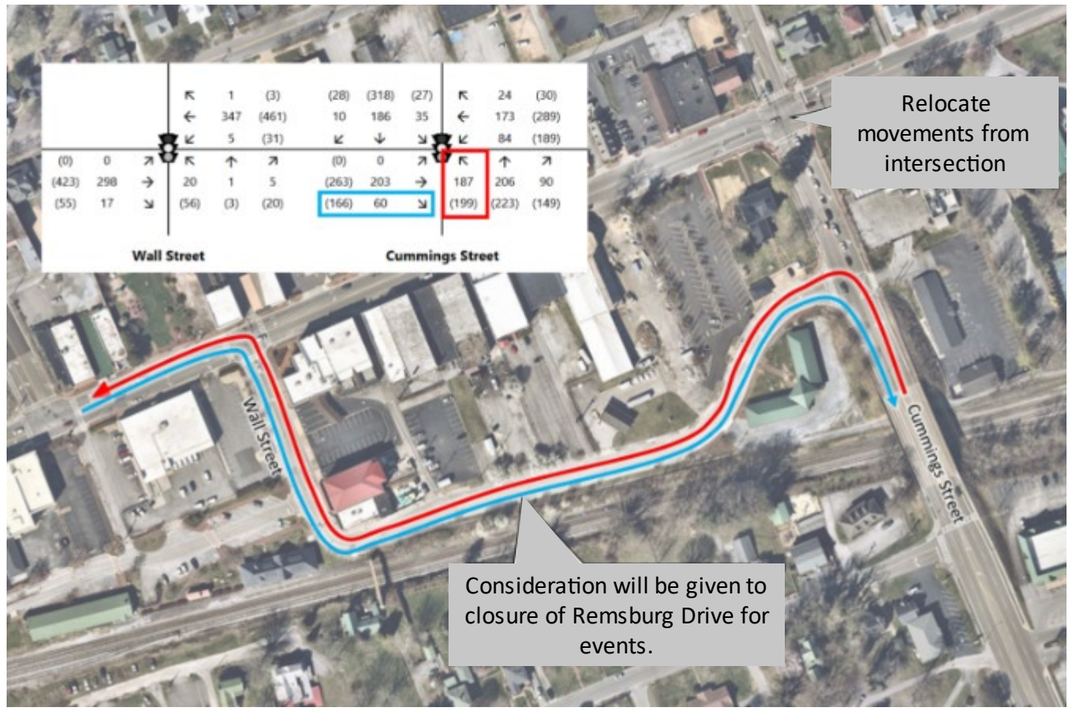


Figure 39: Quadrant Intersection Concept at US 11 (Main Street) and Cummings Street

Both intersection control types yielded similar results in the VJuST tool (shown in **Table 7**), with the quadrant roadway intersection performing slightly better with regard to the maximum v/c ratio in both the AM and PM peaks, and the safety measured by number of conflict points. The only category the quadrant roadway intersection did not perform better in was the cost estimate as the conventional signal is the

existing configuration and has no cost. VJuST assumed a medium cost (cost level 3 of 5) for the quadrant concept as it assumes a new roadway connection is required; however, the cost for installing a quadrant roadway intersection at this location would be minimal as the concept utilizes the existing roadway network (Remsburg Drive and Wall Street). Minor modifications (e.g., pavement marking updates and signal head modifications) may be needed for the quadrant roadway intersection.

Table 7: VJuST Tool Results

Intersection Control Type	Max v/c AM Peak Hour	Max v/c PM Peak Hour	Conflict Points	Cost
Conventional Signal	0.35	0.54	48	Low
S-W Quadrant Roadway	0.47	0.47	43*	Medium

*VJuST assumes that all left-turn movements will be rerouted; therefore, the number of conflict points reported by VJuST is lower than the number of conflict points in the proposed scenario, removing only one left-turn movement. Removing the northbound left-turn movement eliminates 5 conflict points at the Main Street / Cummings Street intersection.

Ultimately, the quadrant roadway intersection alternative at US 11 (Main Street) and Cummings Street was dropped from further consideration as Remsburg Drive is occasionally closed to vehicular traffic for festivals and events, which would block the requisite quadrant vehicle path. Additionally, a different concept was developed for the Main Street / Cummings Street intersection that stakeholders were more enthusiastic in supporting.

LANE CONFIGURATION AND SIGNAL IMPROVEMENTS AT US 11 (MAIN STREET) AND THOMPSON DRIVE

In existing conditions, heading eastbound, the US 11 (Main Street) corridor transitions from three lanes to five lanes near Boone Street; the study team considered extending the three-lane cross section east to Thompson Drive (i.e., reducing the five-lane cross section to three-lanes) as the traffic data and field observations both indicated that the outside travel lanes were significantly underutilized (carrying only 10% of the traffic volume in each direction). Additionally, the crash data at the US 11 (Main Street) / Thompson Drive intersection indicated that a lane imbalance may be a contributing factor to the crash patterns at this intersection. The reconfiguration of the cross-section could occur through restriping or reconstruction with some streetscaping. This alternative did not advance beyond the preliminary alternatives stage as the stakeholders envision a future planning effort for US 11 (Main Street) from Thompson Drive to I-81 that may include widening this segment of US 11; therefore, they did not want to make a recommendation on repurposing the pavement space at this time.

Another alternative the study team evaluated was removing the traffic signal at Thompson Drive / Baugh Lane as well as the westbound left turn movement from Baugh Lane onto Thompson Drive. This signal is part of the US 11 / Thompson Drive signal due to the proximate intersection spacing, with southbound Thompson Drive and westbound Baugh Lane operating sequentially within the signal cycle, resulting in back-to-back signal phases from the “same approach” separated by a change and clearance interval. The uniqueness of this signal control operation may be contributing to a few vehicular crashes due to its unexpected operation. Removing this control and left turn movement would require provision of alternate access to US 11 from Baugh Lane. Several options were considered, including the realignment of Baugh Lane to the Thompson Drive intersection with the Wolf Hill Shopping Center, the introduction of a new roadway connection between Baugh Lane and Hillman Highway via a new at-grade rail crossing, and the utilization of the SMART SCALE-funded roundabout at Stanley Street to facilitate U-turn movements back towards US 11, as shown in **Figure 40**. These alternatives were not considered further due to the challenges associated with realigning a roadway, creating a new at-grade rail crossing, and restricting movements / routing movements as U-turns through a not-yet-constructed roundabout.

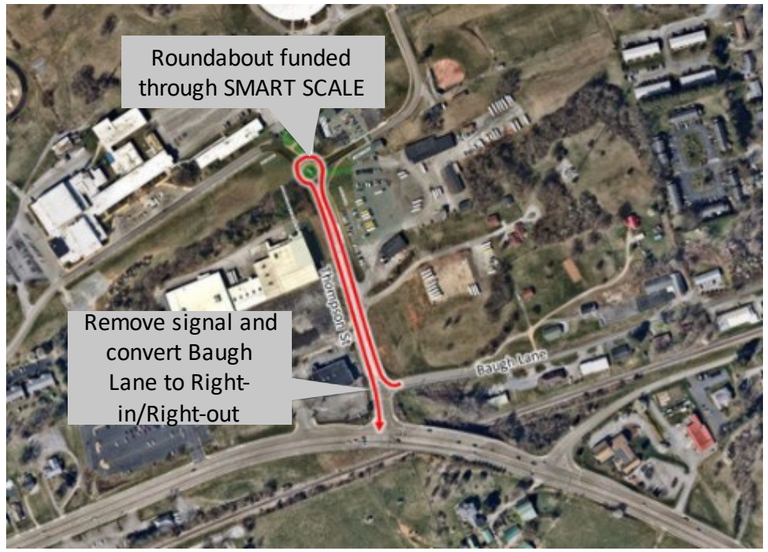


Figure 40: Baugh Lane Intersection Right-in / Right-out Concept

MISCALLANEOUS IMPROVEMENT CONCEPTS

One of the issues noted in Chapter 1 was lane alignment and “unexpected” turn lanes along US 11. At this point in the alternative development process, the study team identified three such locations to focus on improvement concepts, including the eastbound approaches of US 11 (Main Street) at Russell Road, Wall Street, and Church Street. Some other items considered by the study team in this stage of the alternatives development were louvered signal heads on westbound US 11 at Porterfield Highway, high visibility signal backplates, advance warning signs, and vegetation trimming near existing signs. The study team would evaluate opportunities to optimize existing signal control, confirm recommendations from prior studies such as the Downtown Circulation Study, and consider alternatives at the US 11 (Main Street) / Court Street intersection such as high-friction surface treatment, sight distance enhancements, curb extensions, and an intersection flashing beacon.

Intermediate Proposed Alternatives

This section discusses alternative concepts in the next stage of the development process where the study team conducted detailed analyses and produced more comprehensive concept sketches. The study team also solicited stakeholder and public feedback at this stage to further refine alternatives. The operational analysis documented in this section utilized 2045 traffic volume forecasts that were developed according to an approved traffic forecasting memo included in **Appendix E**.

US 11 (MAIN STREET) AND CUMMINGS STREET INTERSECTION

The proposed alternative at the US 11 (Main Street) and Cummings Street intersection is to reconfigure the lane configuration within the existing roadway footprint to improve traffic operations and safety. In existing conditions, Cummings Street is a shared left/thru and a shared thru/right lane in each direction of travel, which necessitates split phase signal control. The study team's review of the traffic volumes indicated that it would be more efficient to restripe southbound Cummings Street to a left turn lane and a single thru/right lane, and northbound Cummings Street to a left turn lane, a thru lane, and a right turn lane. This restriping facilitates the removal of split phase signal control, which will result in more efficient signal operations. **Figure 41** shows the alternative for US 11 (Main Street) and Cummings Street.

Figure 41: US 11 (Main Street) / Cummings Street. and Cummings Street / Remsburg Drive Intersection Alternatives

The concept also includes a left turn lane on Cummings Street to turn onto Remsburg Drive, the prohibition of the left turn from Remsburg Drive onto Cummings Street, pedestrian improvements, and at least a partial signal rebuild. **Table 8** compares the Existing, No Build 2045, and Build 2045 intersection operation metrics**;** the proposed concept results in decreased delay and improved vehicle queuing. Notably, the proposed alternative significantly improves the high delay movements and reduces the northbound Cummings Street vehicle queues that often extend to the railroad bridge in existing conditions. This concept will also improve safety by providing dedicated left turn lanes on Cummings Street, eliminate an unsignalized left turn movement that is often blocked by vehicle queues, and enhance pedestrian crossings at both Remsburg Drive and US 11 (Main Street) / Cummings Street.

Table 8: Traffic Operations Analysis for the US 11 (Main Street) and Cummings Street Intersection

Scenario	Movement	Delay in sec (LOS)				Queue (ft)	
		AM		PM		AM	PM
Existing	EBT	36.2 (D)	34.4 ©	49.1 (D)	46.1 (D)	238	356
	EBR	28.5 (C)		41.4 (D)		80	230
	WBL	17.6 (B)	18.3 (B)	24.7 (C)	24.4 (C)	80	178
	WB T/R	18.6 (B)		24.2 (C)		174	309
	NB L/T/R	32.2 (C)	32.2 (C)	45.3 (D)	45.3 (D)	248	#389*
	SB L/T/R	36.7 (D)	36.7 (D)	48.2 (D)	48.2 (D)	141	250
	Intersection	**30.4 (C)**		**40.4 (D)**		–	
No Build 2045	EBT	49.2 (D)	45.8 (D)	68.0 (E)	61.6 (E)	311	#488*
	EBR	34.3 (C)		51.5 (D)		99	293
	WBL	23.6 (C)	24.6 (C)	36.9 (D)	32.9 (C)	97	220
	WB T/R	25.0 (C)		30.5 (C)		225	401
	NB L/T/R	36.3 (D)	36.3 (D)	66.7 (E)	66.7 (E)	#382*	#564*
	SB L/T/R	47.4 (D)	47.7 (D)	62.5 (E)	62.5 (E)	186	315
	Intersection	**37.7 (D)**		**55.6 (E)**		–	
Build 2045	EBT	36.3 (D)	33.7 (C)	52.3 (D)	47.1 (D)	239	#328*
	EBR	25.0 (C)		39.0 (D)		77	197
	WBL	17.7 (B)	18.3 (B)	57.0 (E)	37.2 (D)	76	#234*
	WB T/R	18.6 (B)		25.5 (C)		172	295
	NBL	17.5 (B)	19.0 (B)	36.4 (D)	27.0 (C)	169	#238*
	NBT	20.9 (C)		23.2 (C)		229	230
	NBR	17.6 (B)		20.0 (B)		36	48
	SBL	21.7 (C)	29.9 (C)	21.9 (C)	46.5 (D)	38	30
	SB T/R	31.3 (C)		48.4 (D)		#265*	#464*
	Intersection	**23.9 (C)**		**38.2 (D)**		–	

*# indicates that the 95th percentile volume exceeds capacity, queue may be longer

COURT STREET

The study team developed two different alternative concepts for Court Street between US 11 (Main Street) and Valley Street. One option is to permanently convert Court Street to one-way northbound traffic between Main Street and Plumb Alley, which is the temporary maintenance of traffic configuration during construction of the Washington County Circuit Courthouse. This option, as seen in **Figure 42**, mitigates the southbound angle crash risk at Main Street. The Town of Abingdon police department supports this permanent configuration. This concept also provides a net increase in on-street parking supply with the restriping of the southbound travel lane to angled parking.

Figure 42: Court Street One-Way Configuration

The second option, seen in **Figure 43,** is to maintain the two-way operation at Court Street and implement new safety countermeasures to address the angle crash pattern at Main Street. Proposed safety countermeasures include:

- Construct a curb bump out to improve sight distance for drivers turning from Court Street onto US 11 (Main Street). The bump out would improve line of sight around the Courthouse building.
- Apply a high-friction surface treatment to Court Street pavement to mitigate wet-weather crashes.
- Remove two on-street parking spaces on US 11 (Main Street) to improve sight distance.
- Install an intersection warning flasher to provide supplementary warning to vehicles on US 11 (Main Street) to be alert for vehicles turning from Court Street.

Figure 43: Court Street Two-Way Option with Additional Safety Improvements

US 11 (MAIN STREET) BETWEEN COLLEGE STREET AND PECAN STREET

On this section of US 11 (Main Street), the study team recommends installation of curb bumpouts at the intersections to shorten pedestrian crossing distance at crosswalks. The curb bumpouts would also provide traffic calming benefit by encouraging slower vehicle speed, which in turn would increase driver reaction time. This concept includes curb bumpouts on both approaches to the Barter Theatre pedestrian crossing, so vehicles approaching the crossing from both directions should slow as a result of this project. The study team also recommends the removal of the existing eastbound left-turn lane at Church Street; in existing conditions, many eastbound drivers were observed to crest the vertical roadway curvature and continue straight within the left turn lane rather than transitioning curbside with the marked thru lane. On the far side of the intersection, the thru lane also transitions sharply back towards the centerline to avoid the on-street parking. Traffic analysis (documented in **Table 9**) indicates that there is negligible operational impact imparted to eastbound thru vehicles by the removal of the left turn lane. The proposed location of the curb bumpouts and the proposed lane configuration at Church Street is shown in **Figure 44.**

Table 9: Level of Service Analysis for the Church Street and US 11 (Main Street) Intersection

Scenario	Movement	Delay in sec (LOS)		Queue (ft)	
		AM	PM	AM	PM
Existing	EBL	7.9 (A)	8.4 (A)	0	3
	EBT	–	–	–	–
	WB L/T/R	0 (A)	8.3 (A)	–	0
	NB L/T/R	0 (A)	13.0 (B)	–	0
	Intersection	**0.2 (–)**	**0.3 (–)**	**–**	
EBL Turn Lane Removed (2024 volumes)	EB L/T	8.1 (A)	8.8 (A)	0	3
	WB L/T/R	0 (A)	8.6 (A)	0	0
	NB L/T/R	0 (A)	14.8 (B)	–	0
	Intersection	**0.2 (–)**	**0.3 (–)**	**–**	

The Downtown Circulation Study previously recommended the installation of a westbound left-turn lane on US 11 (Main Street) at Pecan Street. The study team evaluated this recommendation as part of this study and arrived at the conclusion that this left-turn lane recommendation was made based on traffic volume projections that have not materialized. Specifically, the Meadow Sports Complex Traffic Impact Study projected a significant quantity of trips would access the site via the westbound left turn from US 11 (Main Street) onto Pecan Street / Green Spring Road; however, traffic counts from May 2023 (after Food City opened) do not show this traffic volume. Based on the May 2023 traffic volumes, the study team does not recommend a westbound left-turn lane on US 11 (Main Street) at Pecan Street.

Figure 44: College Street to Pecan Street Curb Improvements

US 11 (MAIN STREET) BETWEEN FULLER STREET AND WALL STREET

On this section of US 11 (Main Street), the study team recommended alternative reconfigures the lanes within the existing cross-section and provides pedestrian focused improvements. In existing conditions, there is an eastbound drop left turn lane at Russell Road, which is associated with a crash pattern involving drivers making lane changes within the intersection to continue eastbound. This concept mitigates this condition by transitioning to a single eastbound lane west of Fuller Street and then providing a left-turn lane at Russell Road; thereby, clearly demarking the thru lane to mitigate driver confusion. This recommendation, depicted in **Figure 45**, also includes a westbound left turn lane at Fuller Street, an enhanced pedestrian crossing with refuge island at Fuller Street, improved pavement marking between Russell Road and Wall Street, the removal of the westbound left turn lane at Wall Street, and curb bumpouts at the midblock crossing east of Wall Street. The operations analysis documented in **Table 10**, **Table 11 ,** and **Table 12** shows no significant adverse impact resulting from these changes. These alternatives will improve lane continuity, mitigate existing crash patterns, provide traffic calming measures, and enhance pedestrian safety.

Figure 45: Fuller Street to Wall Street Reconfiguration Concept

Table 10: Traffic Operations Analysis for the Fuller Street and US 11 (Main Street) Intersection

Scenario	Movement	Delay in sec (LOS)		Queue (ft)	
		AM	PM	AM	PM
Existing	EB T/R	0 (–)	0 (–)	–	–
	WB T/L	8.8 (A)	8.6 (A)	3	0
	NBR	10.5 (B)	10.5 (B)	3	5
	Intersection	**0.5 (–)**	**0.4 (–)**	–	
No Build 2045	EB T/R	0 (–)	0 (–)	–	
	WB T/L	9.3 (A)	9.1 (A)	3	0
	NBR	11.2 (B)	11.1 (B)	5	5
	Intersection	**0.5 (–)**	**0.4 (–)**	–	–
Build 2045	EB T/R	0 (–)	0 (–)	–	–
	WBL	9.3 (A)	9.1 (A)	3	0
	WBT	0 (–)	0 (–)	–	–
	NBR	14.4 (B)	14.4 (B)	5	8
	Intersection	**0.5 (–)**	**0.5 (–)**	–	

Table 11: Traffic Operations Analysis for the Wall Street and US 11 (Main Street) Intersection

Scenario	Movement	Delay in sec (LOS)				Queue (ft)	
		AM		PM		AM	PM
Existing	EBT	4.6 (A)	4.7 (A)	5.0 (A)	5.2 (A)	48	76
	EBR	6.9 (A)		7.1 (A)		0	m0**
	WBL	10.2 (B)	16.5 (B)	8.4 (A)	15.0 (B)	4	13
	WBT	16.6 (B)		15.5 (B)		226	298
	NBL	27.6 (C)	27.4 (C)	33.7 (C)	33.2 (C)	32	62
	NBT	27.0 (C)		31.8 (C)		12	22
	Intersection	**11.6 (B)**		**11.9 (B)**		–	
No Build 2045	EBT	4.3 (A)	4.4 (A)	6.4 (A)	6.2 (A)	57	109
	EBR	6.3 (A)		4.6 (A)		m0**	m0**
	WBL	9.7 (A)	17.8 (B)	9.0 (A)	22.3 (C)	4	16
	WBT	18.0 (B)		23.2 (C)		315	#536*
	NBL	31.5 (C)	31.3 (C)	36.2 (D)	35.5 (D)	36	77
	NBT	30.7 (C)		33.8 (C)		13	27
	Intersection	**12.2 (B)**		**15.9 (B)**		–	
Build 2045	EBT	3.1 (A)	3.1 (A)	3.4 (A)	3.3 (A)	56	93
	EBR	3.7 (A)		2.7 (A)		0	m1**
	WB L/T/R	22.6 (C)	22.6 (C)	37.4 (D)	37.4 (D)	324	#611*
	NBL	28.1 (C)	27.4 (C)	34.5 (C)	33.8 (C)	36	77
	NBT	27.9 (C)		32.2 (C)		13	27
	Intersection	**13.9 (B)**		**21.6 (C)**		–	

*# indicates that the 95th percentile volume exceeds capacity, queue may be longer
**m indicates that the volume for the 95th percentile queue is metered by an upstream signal

Table 12: Traffic Operations Analysis for the Russell Road and US 11 (Main Street) Intersection

Scenario	Movement	Delay in sec (LOS)				Queue (ft)	
		AM		PM		AM	PM
Existing	EBL	5.4 (A)	7.6 (A)	6.9 (A)	9.9 (A)	50	40
	EBT	8.9 (A)		10.8 (B)		152	242
	WBT	6.7 (A)	5.5 (A)	11.5 (B)	10.5 (B)	51	131
	WBR	1.5 (A)		5.7 (A)		2	8
	SBL	27.8 (C)	27.5 (C)	34.5 (C)	33.0 (C)	34	66
	SBR	27.5 (C)		32.4 (C)		41	37
	Intersection	**9.6 (A)**		**13.8 (B)**		–	
No Build 2045	EBL	6.0 (A)	7.7 (A)	10.9 (B)	13.3 (B)	63	52
	EBT	8.7 (A)		14.0 (B)		195	330
	WBT	8.1 (A)	7.3 (A)	25.8 (C)	22.7 (C)	94	#538*
	WBR	4.9 (A)		8.3 (A)		10	m9**
	SBL	31.8 (C)	31.4 (C)	37.3 (D)	35.4 (D)	40	84
	SBR	31.3 (C)		34.6 (C)		45	39
	Intersection	**10.9 (B)**		**20.7 (C)**		–	
Build 2045	EBL	6.6 (A)	5.7 (A)	11.4 (B)	7.6 (A)	63	52
	EBT	5.2 (A)		6.4 (A)		111	199
	WBT	9.8 (A)	8.9 (A)	31.5 (C)	27.5 (C)	97	m#531***
	WBR	5.6 (A)		9.2 (A)		10	m8
	SBL	28.3 (C)	28.0 (C)	35.4 (D)	33.7 (C)	40	84
	SBR	28.0 (C)		33.0 (C)		45	39
	Intersection	**10.1 (B)**		**20.0 (C)**		–	

*# indicates that the 95th percentile volume exceeds capacity, queue may be longer
**m indicates that the volume for the 95th percentile queue is metered by an upstream signal

RUSSELL ROAD EXTENSION

This alternative concept, seen in **Figure 46**, extends Russell Road south of US 11 (Main Street) to Depot Square. In existing conditions, Russell Road and Wall Street form an extended offset-T intersection that operates on a single traffic signal controller. The proposed Russell Road extension partially utilizes existing public right of way south of US 11 that in existing conditions is functionally a parking lot extension. This alternative concept promotes the grid network in the Town of Abingdon and removes the traffic signal at Wall Street, thereby reducing delay and stops for traffic on US 11. The roadway extension would require the full property take of a parking lot, though some new on-street parking would be provided with the project. In the concept shown in **Figure 46**, Wall Street is shown as two-way with right-in/right-out access at US 11; however, the ultimate configuration of Wall Street could vary. For example, Wall Street could be converted to a one-way street with additional parking. Traffic currently on Wall Street will be diverted to the new Russell Road extension via Depot Square.

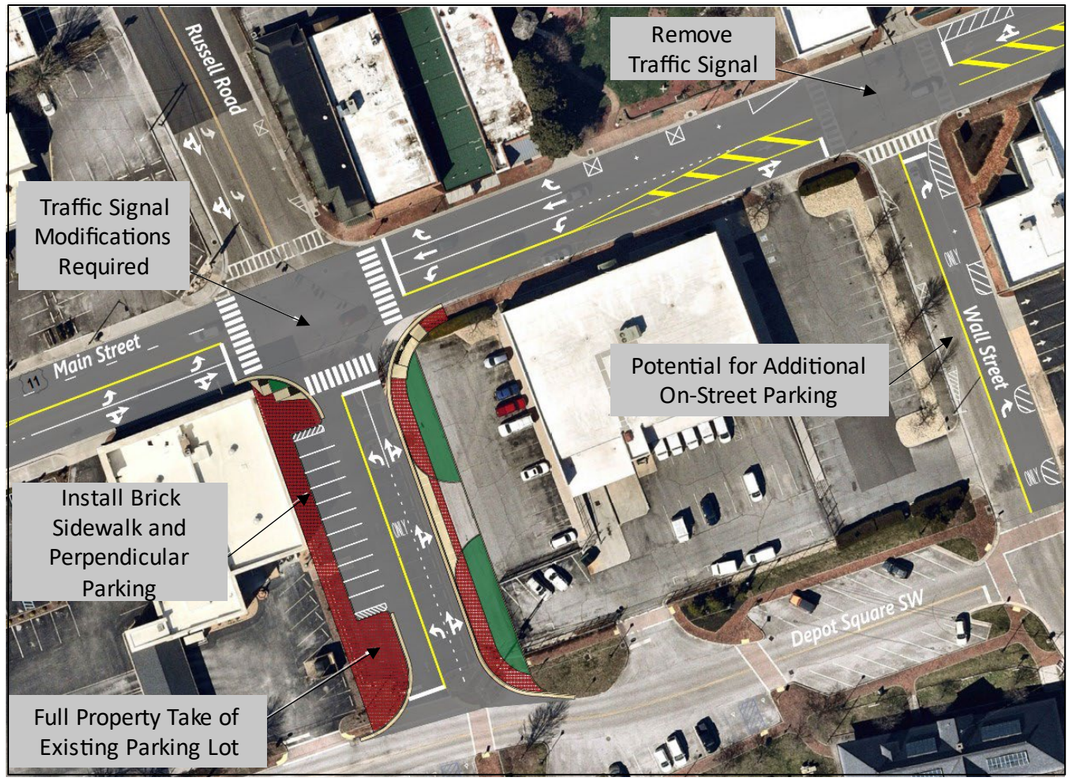


Figure 46: Russell Road Extension Concept

The traffic operations of the proposed four-leg Russell Road intersection are shown in **Table 13**. When compared to the cumulative delay in Tables 11 and 12, US 11 (Main Street) traffic would experience less delay in this scenario, particularly in the PM peak hour. Although this alternative attracted interest from the Town of Abingdon, it ultimately did not advance further due to the significant property impacts and public feedback, which is documented in Chapter 3.

Table 13: Russell Road and Wall Street Combined Intersection Operations Results

Scenario	Movement	Delay in sec (LOS)				Queue (ft)	
		AM		PM		AM	PM
Russell Road Extension	EBL	12.0 (B)	14.0 (B)	18.7 (B)	23.1 (C)	133	69
	EB T/R	15.1 (B)		24.3 (C)		337	464
	WBL	12.2 (B)	14.6 (B)	10.1 (B)	21.3 (C)	m3**	m16**
	WBT	13.8 (B)		25.2 (C)		#151*	294
	WBR	17.5 (B)		7.1 (A)		m5	5
	NBL	50.7 (D)	49.3 (D)	53.9 (D)	52.3 (D)	46	79
	NB T/R	44.6 (D)		48.1 (D)		16	32
	SBL	47.0 (D)	46.0 (D)	35.7 (D)	39.5 (D)	53	85
	SB T/R	45.8 (D)		40.9 (D)		0	81
	Intersection	**19.3 (B)**		**26.1 (C)**		–	

*# indicates that the 95th percentile volume exceeds capacity, queue may be longer
**m indicates that the volume for the 95th percentile queue is metered by an upstream signal

ABINGDON CINEMALL ACCESS MANAGEMENT

Figure 47 depicts the first iteration of this alternative that proposed a landscaped median on US 11 (Main Street) from the Thompson Drive intersection to the VDOT Residency. This would improve access management and serve as a gateway treatment to Abingdon. The concept provides an eastbound left-turn lane at Thompson Drive and a westbound left-turn lane at the VDOT Residency entrance.

Figure 47: Abingdon Cinemall Access Management Improvement

WESTGATE SHOPPING CENTER – ACCESS MANAGEMENT IMPROVEMENT

In existing conditions, the Westgate Shopping Center has eight access points on US 11 (Main Street). This alternative proposes reconfiguring the parking lot and installing curb and gutter along US 11 (Main Street) to consolidate the eight access points to three access points, seen in **Figure 48.** In lieu of extending the sidewalk in front of the shopping center, a crosswalk may be installed east of the shopping center to connect a terminating sidewalk on the south side of US 11 (Main Street) to a continuous sidewalk on the north side. The benefit of this alternative is the improved access management and definition of access points, thus reducing conflict points between vehicles entering/exiting the Westgate Shopping Center and vehicles traveling along US 11 (Main Street). This alternative also provides better pedestrian connectivity and does not result in a loss of parking. While the stakeholders were interested in this project, it did not advance due to the complexities of modifying private right of way.

Figure 48: Westgate Shopping Center Access Management

KISER FURNITURE ACCESS MANAGEMENT

A similar access management issue exists in front of the Kiser Furniture store on the west end of the study corridor. The study team developed an alternative concept to better define the parking lot access and eliminate parking lot maneuvers that utilize US 11 (Main Street). This alternative involves shifting the westbound US 11 travel lanes into the existing two-way left turn lane to create sufficient offset to physically separate the parking lot from US 11. This concepts results in the net loss of just one marked parking space, but it mitigates the existing condition of parking maneuvers for the store occurring within US 11 (Main Street). This option can be seen in **Figure 49.** While the stakeholders were interested in this project, it did not advance due to the complexities of modifying private right of way.

Figure 49: Kiser Furniture Access Management Option 1

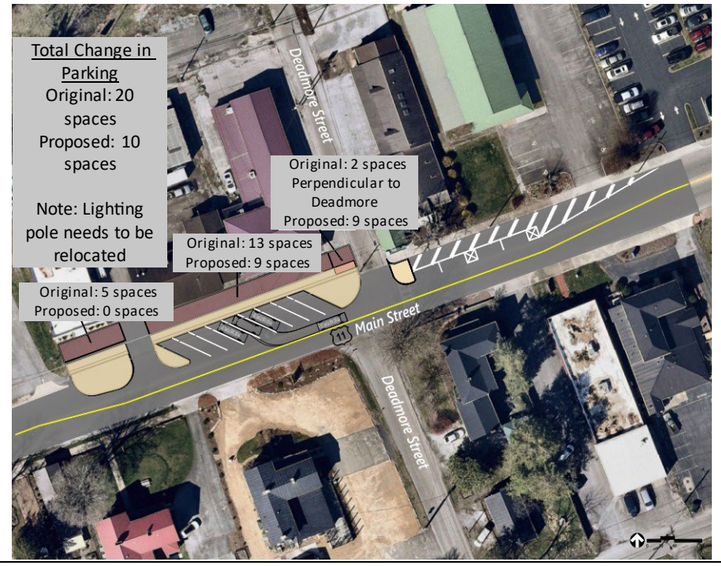
The second alternative concept developed by the study team removes the existing two-way left-turn lane between Holston Street and Patton Street and replace it with a landscaped median with left turn lanes onto each respective termini street. This median improves access management on this segment of US 11 and introduces a gateway treatment for downtown Abingdon. This concept does not directly modify the parking access on the Kiser Furniture site, though it does limit left turn movements. This option can be seen in **Figure 50.**

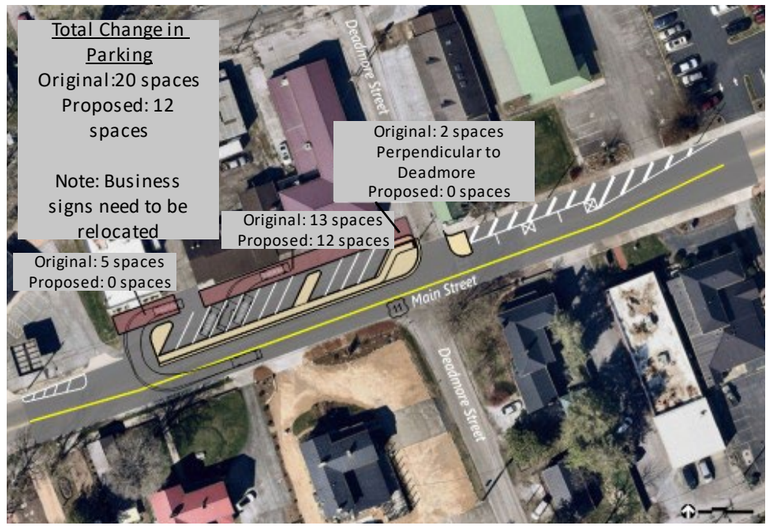
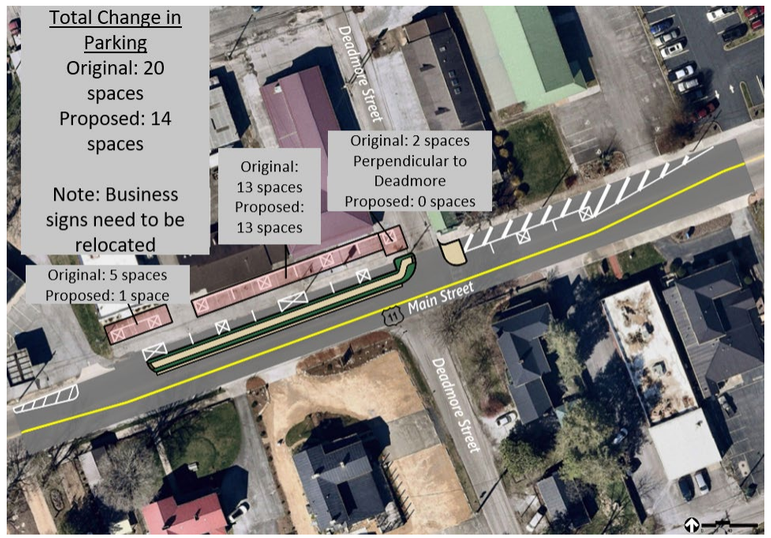
Figure 50: Kiser Furniture Access Management Option 2

DEADMORE STREET ACCESS MANAGEMENT ALTERANTIVES

The study team developed multiple access management concepts for the section of US 11 (Main Street) near the Deadmore Street intersection. Each option aims to mitigate the confusion caused by the existing off-street parking lot that necessitates vehicles maneuvering within the footprint of US 11. Drivers on US 11 (Main Street) may not be alert for parking vehicles to maneuver within the travel way. Similarly, parking drivers may believe that they can perform the parking maneuvers without entering the travel way and may not watching for oncoming traffic. The alternatives developed can be seen in **Table 14.** While the stakeholders were interested in this project, it did not advance due to the complexities of modifying private right of way.

Table 14: Deadmore Street Access Management Improvement Concepts

Concept Sketch	Concept Highlights
	• Install more traditional on-street angled parking so that parking manuevers are expected. • Drivers will pull into the angled parking spaces directly from westbound US 11 (Main Street).
	• Install more traditional on-street parallel parking so that parking manuevers are expected. • Drivers will access the parking spaces on the south via eastbound US 11 (Main Street) and will access the parking spaces on the north via wesbound US 11 (Main Street). • Requires closure of one access point on the south side.

Concept Sketch	Concept Highlights
	• Physically separate parking from US 11 (Main Street) via raised median. • Pull-in angled parking within the separate parking lot accessed via one-way (westbound) parking aisle. • Drivers enter from Deadmore Street and exit at the western entrance.
	• Physically separate parking from US 11 (Main Street). • Parallel parking within the separate parking lot accessed via one-way (westbound) parking aisle. Drivers enter from Deadmore Street and exit at the western entrance. • Alternatively, parking aisle could be one-way eastbound, and drivers would enter at the western driveway and exit onto Deadmore Street.

Concept Sketch	Concept Highlights
	• Define parking area and US 11 (Main Street) travel way via pavement markings. • A curb bumpout in the northeast quadrant of the intersection guides westbound US 11 (Main Street) traffic away from the parking maneuvers. • No change to the existing parking along the buildings.

Final Preferred Alternatives

The following preferred alternatives are the result of the development process. These alternatives have been presented to stakeholders, been analyzed by the study team, and are recommended to address safety issues and concerns at the identified locations in the study area. **Figure 51** and **Figure 52** show all the recommended alternatives locations on the study corridor.

Figure 51: West Side of the Study Corridor

Figure 52: East Side of the Study Corridor

CONCEPT 1 - US 11 (MAIN STREET) BETWEEN HOLSTON STREET AND PATTON STREET

The preferred alternative at this location, Location 1 on **Figure 51**, is to replace the existing two-way left-turn lane between Holston Street and Patton Street with a landscaped median with a full access median opening at the Farmer's Mutual Insurance property and a 100-foot storage left turn lanes at Holston Street, Farmer's Mutual Insurance, and Patton Street. **Figure 53** shows the recommended alternative at this location.

This alternative provides safety benefits such as reducing the number of conflict points and a traffic calming gateway treatment for vehicles entering downtown Abingdon. The Town of Abingdon supports this alternative. The median opening at the Farmer's Mutual Insurance was added in response to public input.

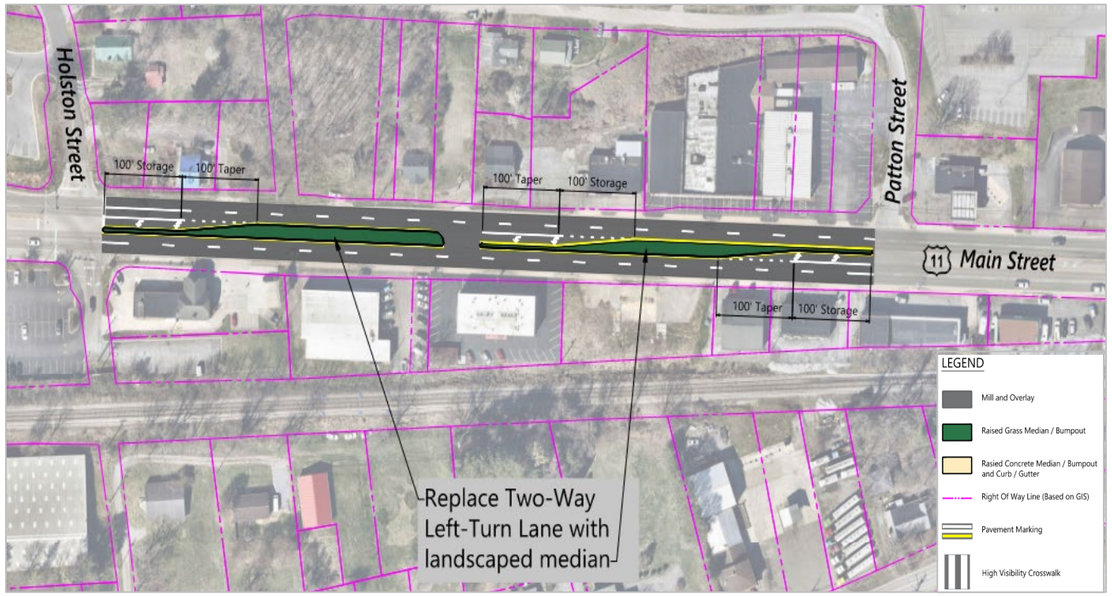


Figure 53: Landscaped Median between Holston Street and Patton Street

CONCEPT 2 - US 11 (MAIN STREET) BETWEEN FULLER STREET AND WALL STREET

At this segment, Location 2 in **Figure 51**, there are multiple components to the preferred alternative. The first recommendation is to drop the second eastbound through lane on US 11 (Main Street) west of the Fuller Street intersection and open a left-turn pocket at the Russell Road intersection. This recommendation improves the continuity of the through lanes to avoid driver confusion and mitigate existing crashes. Two recommended alternatives for pedestrian safety are constructing a pedestrian refuge island at the Fuller Street crossing and signalizing the pedestrian crossing at Wall Street.

The safety benefit of these alternatives includes improved lane continuity along US 11 (Main Street), which will help mitigate existing crash patterns related to lane changing. The pedestrian accommodations will facilitate safe crossing conditions for pedestrians by reducing pedestrian crossing exposure at Fuller Street and shortening the distance pedestrians must cross as well as adding a controlled crossing at Wall Street. The Town of Abingdon supports these recommended alternatives.

Figure 54 shows the recommended alternatives for this section of the study corridor.

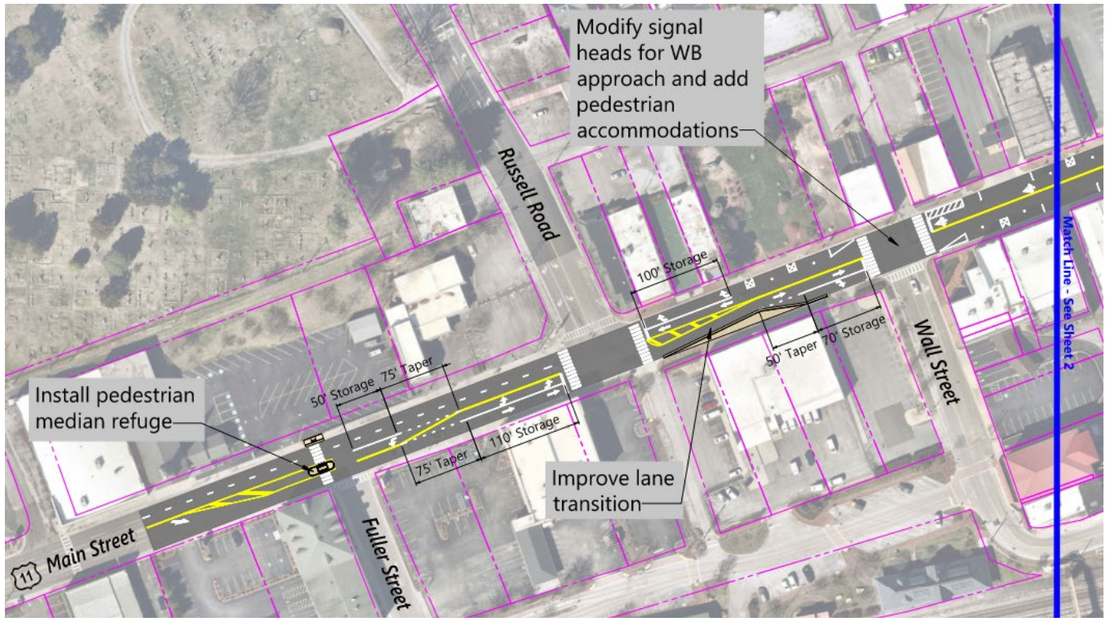


Figure 54: US 11 (Main Street) between Fuller Street and Wall Street

CONCEPT 3 - CUMMINGS STREET BETWEEN US 11 (MAIN STREET) AND REMSBURG DRIVE

The preferred alternative at this location, Location 3 in **Figure 51**, involves a reconfiguration of the two intersections on Cummings Street. The alternative optimizes the lane configuration at the US 11 (Main Street) and Cummings Street intersection to better balance lane use to meet the volume demand. The reconfiguration converts Cummings Street south of US 11 to three northbound lanes and one southbound lane. This reconfiguration will occur within the existing roadway footprint; however, the traffic signal needs to be at least partially rebuilt to accommodate the new lane configuration and signal phasing. At the Remsburg Drive intersection, the recommendation is to add a left turn lane from Cummings Street onto Remsburg Drive, implement a right turn only configuration from Remsburg Drive, and construct a landscaped median on Remsburg Drive with a pedestrian refuge. On US 11 (Main Street), the alternatives includes improving the thru lane transitions and extending the westbound left

turn lane storage. West of Cummings Street on US 11, curb extensions are recommended to shorten the midblock pedestrian crossing.

The recommended improvements will mitigate the crash risk from Remsburg Drive left turn movements and create better thru lane continuity along US 11 (Main Street). The pedestrian improvements reduce the pedestrian crossing exposure at the midblock crossing and at Remsburg Drive by shortening the distance pedestrians must cross. The lane reconfiguration at the US 11 (Main Street) and Cummings Street improves the operational performance, notably reducing delay and queuing for the northbound Cummings Street approach. The Town of Abingdon supports preferred alternative. All the recommended alternative features for this location can be seen in **Figure 55.**

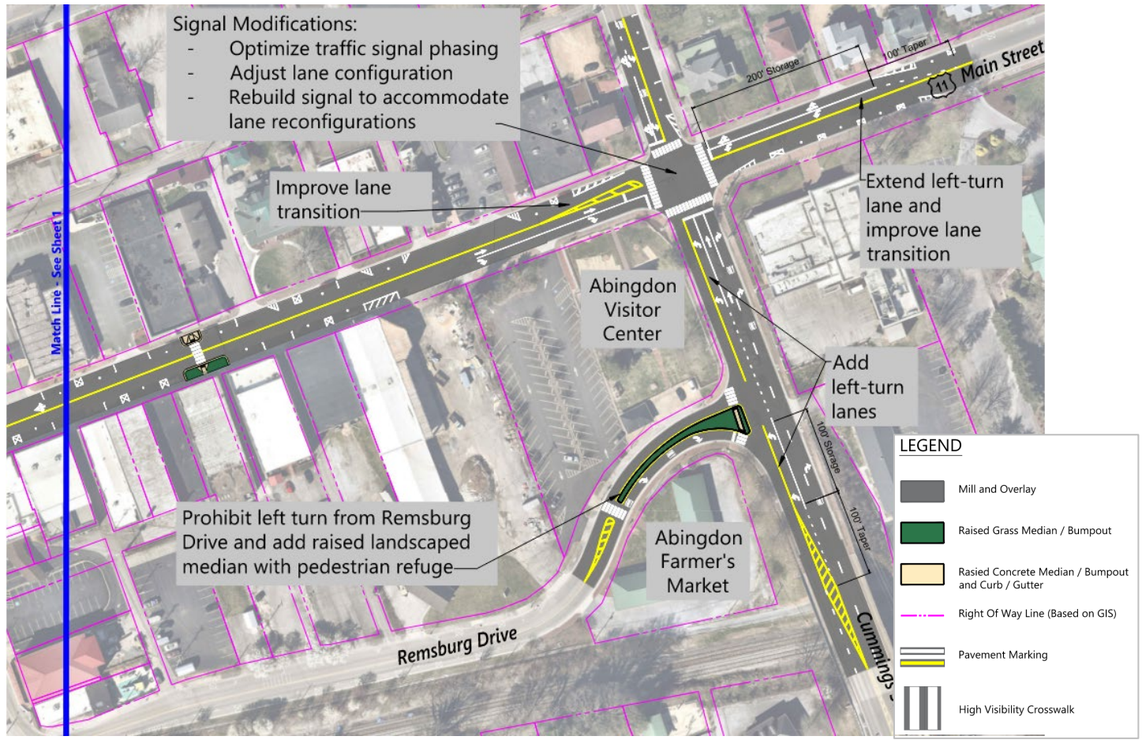


Figure 55: Cummings Street Reconfiguration and US 11 (Main Street) Enhancements

CONCEPT 4 - US 11 (MAIN STREET) BETWEEN COLLEGE STREET AND PECAN STREET

There are multiple components to the preferred alternative for this section of the study corridor, which is Location 4 in **Figure 51**. The recommended improvements for this section are curb extensions at the College Street, Church Street, and Pecan Street intersections, the removal of the existing eastbound left-turn lane from US 11 (Main Street) onto Church Street; and the relocation of the pedestrian crossing at the US 11 (Main Street) and Church Street intersection from the east leg of the intersection to the west leg. The curb extensions will help calm vehicular travel speeds on both approaches to the Barter Theatre pedestrian crossing, which is located within this segment of the study corridor. The removal of the left turn lane at the Church Street intersection will improve the thru lane continuity on US 11 (Main Street) with minimal operational impact. The curb extensions reduce the pedestrian crossing exposure at the three intersections by shortening the distance pedestrians must cross. These recommendations, which have the Town of Abingdon's support, can be seen in **Figure 56**.

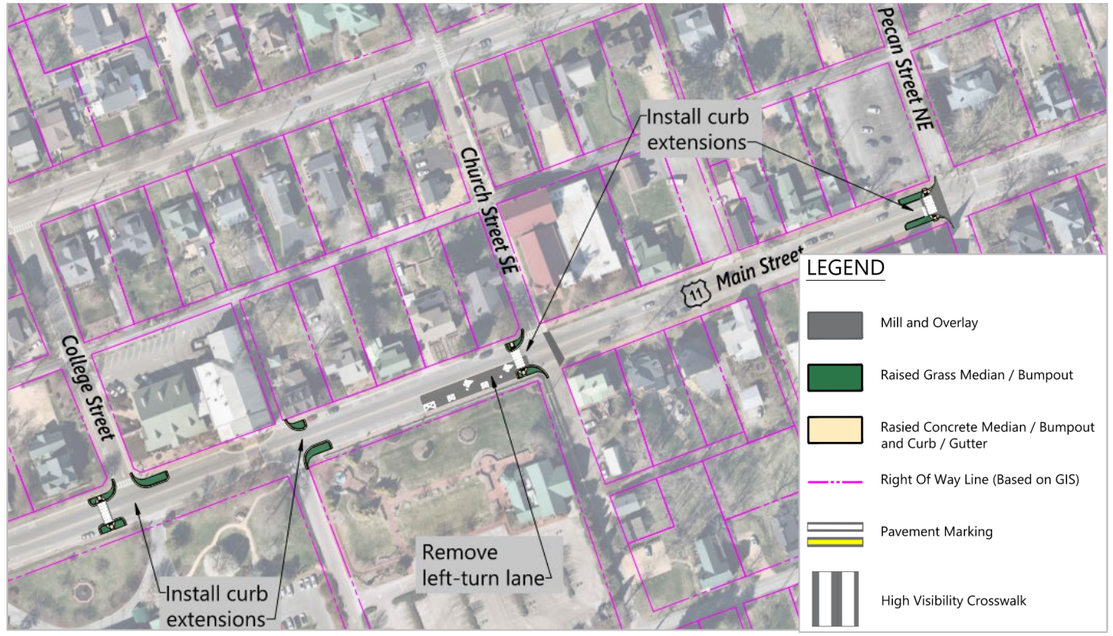


Figure 56: Recommended Improvements between College Street and Pecan Street

CONCEPT 5 - COURT STREET BETWEEN US 11 (MAIN STREET) AND VALLEY STREET

At Court Street, Location 5 in **Figure 52**, the preferred alternative is to convert the Court Street segment between US 11 (Main Street) and Valley Street from a two-way street to a one-way northbound street. This recommendation makes the temporary configuration during the Washington County Circuit Court construction permanent. The Court Street and Valley Street signalized intersection would need to be modified to prohibit movements onto southbound Court Street, and the southbound Court Street travel lane will be repurposed as on-street parking. This recommendation eliminates the southbound approach of Court Street at US 11 (Main Street), which had a significant crash pattern associated with the limited sight distance for vehicles turning onto US 11 (Main Street). The additional parking is also an added

benefit of this alternative. The alternative has support from the Town of Abingdon, although there are some public concerns about the concept potentially routing additional traffic onto Plumb Alley, which is between the two intersections and allows local residential access. The extension of the one-way configuration all the way to Valley Street is meant to mitigate that concern. **Figure 57** shows all the recommendations for this section of the study corridor.

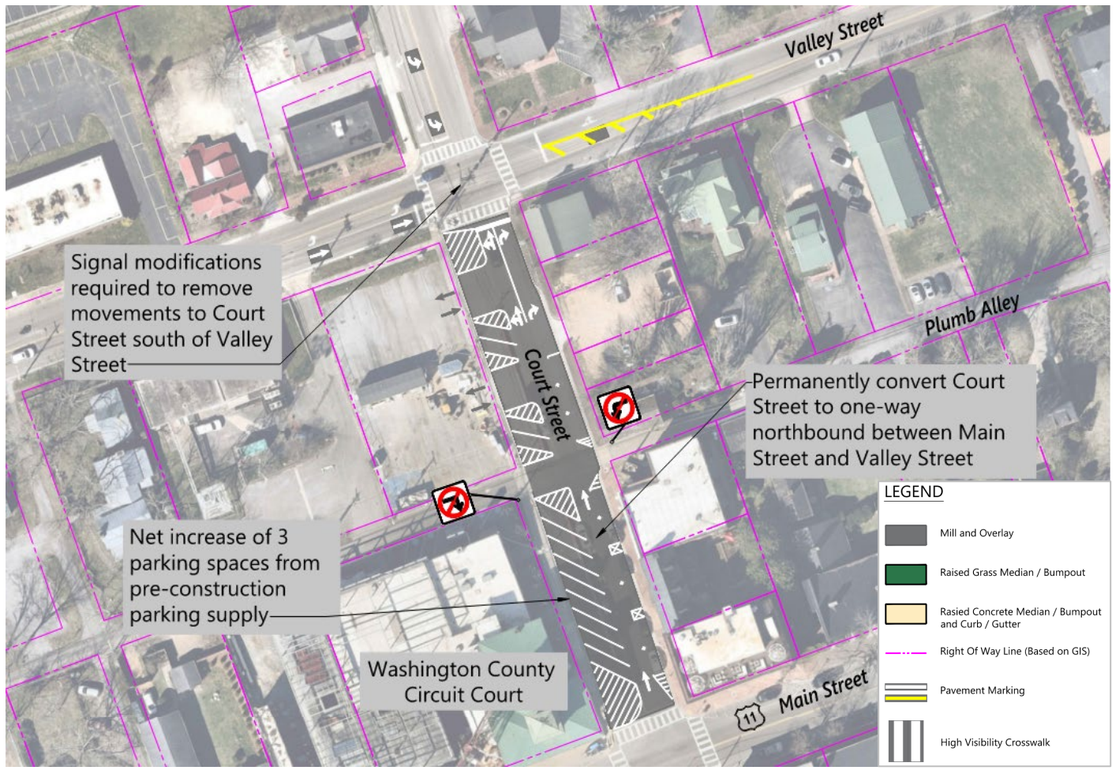


Figure 57: Court Street Improvements

CONCEPT 6 - US 11 (MAIN STREET) WEST OF THOMPSON DRIVE

The preferred alternative at this location, Location 6 in **Figure 52**, is to replace approximately 1,300 feet of the existing two-way left-turn lane west of the Thompson Drive and US 11 (Main Street) intersection with a landscaped median. Full access median openings and left turn lanes are recommended at the Abingdon Cinemall and the VDOT Residency Office. At the US 11 (Main Street) and Thompson Drive intersection, it is recommended to extend the existing left-turn lane from US 11 (Main Street) onto Thompson Drive to 250 feet of storage and 100 feet of taper. This alternative, including the restriction of left turns at Wolf Hill Shopping Center, reduces the number of conflict points within the functional area of the Thompson Drive intersection. It also provides a traffic calming measure and a gateway treatment for vehicles entering downtown Abingdon. The alternative is supported by the Town of Abingdon and is shown in **Figure 58**.

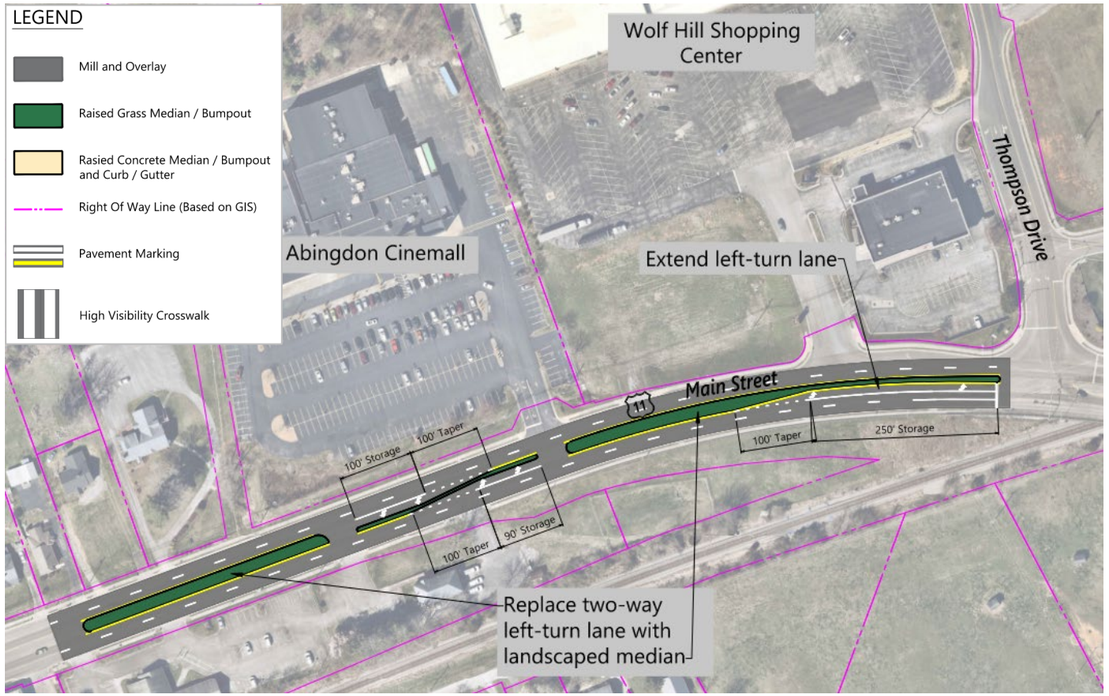


Figure 58: Abingdon Cinemall Improvements

PEDESTRIAN ACCOMODATIONS

Four of the six preferred alternative concepts proposed for the Town of Abingdon have recommended pedestrian improvements for existing crosswalks. The recommended improvements at the crosswalks consist of new refuge islands, pedestrian signalization at the Wall Street intersection, and installation of curb extensions at multiple crossings along US 11 (Main Steet).

The study team completed “Study for Pedestrian Crossings at Uncontrolled Approaches” forms for the improvements recommended at the five unsignalized crosswalks within the preferred alternative. The form is designed to evaluate the crosswalk context against the requirements listed in VDOT I&IM 384.1 that dictates when an unsignalized crosswalk should, may, or could be installed, along with the appropriate crossing enhancements. Although not all the requirements for installing a crosswalk per

VDOT I&IM 384.1 are met for each of these five crosswalks, they are all existing crosswalks that have recommended enhancements.

The existing unsignalized crossing of US 11 (Main Street) at the Fuller Street intersection does not satisfy all three safety screening requirements, but it does meet three of the five installation criteria. As a Tier 2 countermeasure location, the recommended enhancements at this crosswalk consist of visibility enhancements and installing a pedestrian refuge island to reduce pedestrian crossing exposure.

- Summary of Safety Screening Requirements:
  - The proposed crosswalk is within 300 feet of another marked crosswalk (280 feet); however, it is an existing crossing at an intersection with pedestrian-oriented land uses and sidewalk on both sides of the road.
  - With an estimated operating speed of 32 mph, the stopping sight distance (SSD) on US 11 (Main Street) is approximately 220 feet. The SSD is sufficiently met on both approaches to the proposed crossing location.
  - This segment of US 11 (Main Street) carries 13,000 vehicles per day (VPD) and has a posted speed limit of 25 mph; this combination falls into the Tier 2 pedestrian safety countermeasure category.
- Summary of Three Installation Criteria Met:
  - The proposed crosswalk location is between two pedestrian-oriented land uses – residential areas, convenience stores, and shopping centers.
  - The proposed crosswalk location connects two sidewalk facilities.
  - This segment of US 11 (Main Street) has an AADT above 1,500.

The existing midblock crossing located between the Wall Street intersection and the Cummings Street intersection satisfies all three safety screening requirements and meets three of the five installation criteria. As a Tier 1 countermeasure location, the recommended enhancements at this crosswalk consist of installing curb extensions to increase pedestrian visibility.

- Summary of Safety Screening Requirements:
  - The proposed crosswalk is not within 300 feet of another marked crosswalk.
  - With an estimated operating speed of 32 mph, the stopping sight distance (SSD) on US 11 (Main Street) is approximately 220 feet. The SSD is sufficiently met on both approaches to the proposed crossing location.
  - This segment of US 11 (Main Street) carries 12,000 vehicles per day (VPD) and has a posted speed limit of 25 mph; this combination falls into the Tier 1 pedestrian safety countermeasure category.
- Summary of Three Installation Criteria Met:
  - The proposed crosswalk location is between two pedestrian-oriented land uses – residential areas, convenience stores, and shopping centers.
  - The proposed crosswalk location connects two sidewalk facilities.
  - This segment of US 11 (Main Street) has an AADT above 1,500.

The existing midblock crossing on Remsburg Drive does not satisfy all three safety screening requirements, but it meets two of the five installation criteria. As a Tier 1 countermeasure location, the recommended enhancements at this crosswalk consist of constructing a landscaped median with a pedestrian refuge.

- Summary of Safety Screening Requirements:
  - The proposed crosswalk is within 300 feet of another marked crosswalk; however, this crossing is directly aligned with a high-volume pedestrian desire path between the Abingdon Farmer's Market and associated parking lot.
  - With an estimated operating speed of 32 mph, the stopping sight distance (SSD) on US 11 (Main Street) is approximately 220 feet. The SSD is sufficiently met on both approaches to the proposed crossing location.
  - The AADT data is unavailable, but the based on TMC data it is a low volume street, and the posted speed limit is 25 mph; this combination falls into the Tier 1 pedestrian safety countermeasure category.
- Summary of Two Installation Criteria Met:
  - The proposed crosswalk location is between two pedestrian-oriented land uses – residential areas, convenience stores, and shopping.
  - The proposed crosswalk location connects two sidewalk facilities.

The existing unsignalized crossing at the College Street intersection does not satisfy all three safety screening requirements, but it does meet three of the five installation criteria. As a Tier 1 countermeasure location, the recommended enhancements at this crosswalk consist of installing curb extensions.

- Summary of Safety Screening Requirements:
  - The proposed crosswalk is within 300 feet of another marked crosswalk (200 feet); however, it is an existing crossing at an intersection with pedestrian-oriented land uses and sidewalk on both sides of the road.
  - With an estimated operating speed of 32 mph, the stopping sight distance (SSD) on US 11 (Main Street) is approximately 220 feet. The SSD is sufficiently met on both approaches to the proposed crossing location.

    - This segment of US 11 (Main Street) carries 10,000 vehicles per day (VPD) and has a posted speed limit of 25 mph; this combination falls into the Tier 1 pedestrian safety countermeasure category.
- Summary of Three Installation Criteria Met:
    - The proposed crosswalk location is between two pedestrian-oriented land uses – residential areas, convenience stores, and shopping centers.
    - The proposed crosswalk location connects two sidewalk facilities.
    - This segment of US 11 (Main Street) has an AADT above 1,500.

The existing unsignalized crossing at the Church Street intersection satisfies all three safety screening requirements, and meets three of the five installation criteria. As a Tier 2 countermeasure location, the recommended enhancements at this crosswalk consist of installing curb extensions to improve pedestrian visibility.

- Summary of Safety Screening Requirements:
    - The proposed crosswalk is not within 300 feet of another marked crosswalk.
    - With an estimated operating speed of 32 mph, the stopping sight distance (SSD) on US 11 (Main Street) is approximately 220 feet. The SSD is sufficiently met on both approaches to the proposed crossing location.
    - This segment of US 11 (Main Street) carries 10,000 vehicles per day (VPD) and has a posted speed limit of 25 mph; this combination falls into the Tier 2 pedestrian safety countermeasure category.
- Summary of Three Installation Criteria Met:
    - The proposed crosswalk location is between two pedestrian-oriented land uses – residential areas, convenience stores, and shopping.
    - The proposed crosswalk location connects two sidewalk facilities.
    - This segment of US 11 (Main Street) has an AADT above 1,500.

PROPOSED SMART SCALE APPLICATIONS

Two Round 6 SMART SCALE pre-applications were submitted in March 2024. The first application, submitted by the Town, includes Concepts 2 and 3. The second application, submitted by the MPO, includes all 6 concepts (i.e., the entirety of the preferred study alternative). The preliminary cost estimate for each project is shown in **Table 15**. A detailed cost estimate will be completed in Phase 3 of the Project Pipeline process to inform the SMART SCALE application. Further refinements to each preferred alternative concept design will be made in Phase 3, which will be reflected in the detailed cost estimate.

Table 15: Preliminary Cost Estimates for SMART SCALE Applications

SMART SCALE Application	Preliminary Engineering	Row/Utilities	Construction	Total
Concepts 2 and 3	$ 643,200	$ 145,000	$ 3,730,700	**$ 4,518,900**
Concepts 1 through 6	$ 893,600	$ 145,000	$ 6,910,800	**$ 7,949,400**

Chapter 3:

Public and Stakeholder Outreach and Feedback

Public Involvement:

Following the development and analysis of the Preliminary Build Alternatives, a public involvement survey was developed to determine the public's response to the recommended improvements. This survey was available online for 14 days spanning from February 12, 2024, to February 25, 2024. In addition to the online survey, an in-person public meeting was held on February 20, 2024, at the Harry L. Coomes Recreation Center. The same material was shared in the survey and at the meeting.

Survey Design

Public involvement for this study partially took place in the form of an online survey developed in VDOT's PublicInput Platform, which is an online engagement platform that is designed to educate the public while gathering informed output. The goals of this public outreach effort were to present relevant issues, educate the public on the recommended improvement concepts outlined in Chapter 2, and to receive the public's feedback on the proposed improvements.

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

1. Introduction to the study and background information
2. Proposed intersection improvements
3. Proposed downtown enhancements
4. Proposed downtown gateway treatments
5. Wrap up with demographic questions

The first section provides an overview of the study partners, background, and study location, as shown in **Figure 59**. In the second section, participants were presented with recommended improvements at the Cummings Street and Court Street intersections that addressed vehicular-based operation and safety needs. Next, in the third section, participants were presented with proposed downtown enhancement concepts addressing multimodal needs. In the fourth section, participants were presented with recommended improvements for either end of the study corridor, presented as gateway treatments.

For each concept, participants were asked (on a 1 to 5 scale) if they opposed or supported the project concept. A score of 1 represented "strongly oppose", and a score of 5 represented "strongly support." Participants were also able to provide freeform comments on each concept. At the end of the survey, the participants were asked a few demographic questions.

A total of 523 people responded to the survey with 707 unique freeform comments. A compilation of all freeform public comments can be found in **Appendix E**.

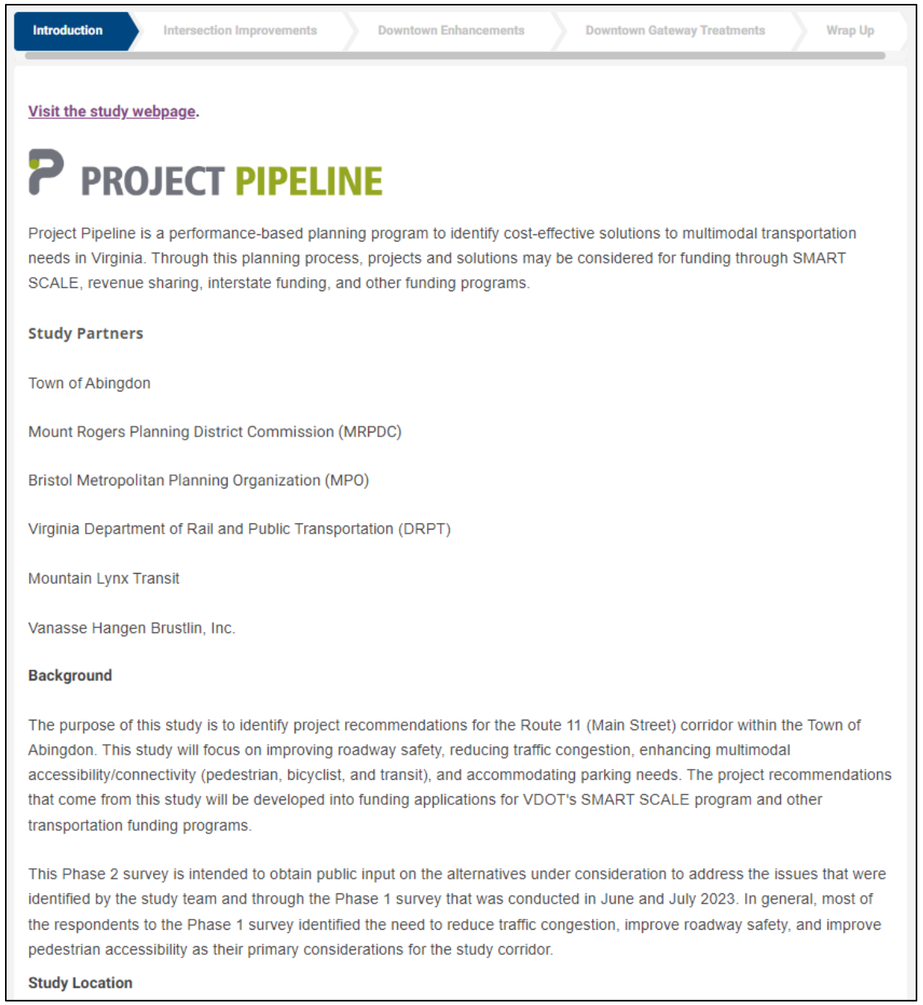


Figure 59: Public Survey Layout

Survey Questions and Results

INTERSECTION IMPROVEMENTS

The first concept presented to the public for feedback consisted of the following improvements at Cummings Street and Remsburg Drive:

1. Optimize lane configuration at US 11 (Main Street) / Cummings Street intersection to best accommodate volume demand. Rebuild traffic signal and optimize signal phasing.
2. Improve lane transitions along US 11 (Main Street) and extend turn lane storage where needed.
3. Implement right-out only configuration from Remsburg Drive and construct a landscaped median on Remsburg Drive with pedestrian refuge.
4. Construct curb extensions to shorten midblock pedestrian crossing on US 11 (Main Street).

Respondents were informed that *"The Main Street / Cummings Street intersection has the #25 crash safety need in the region and a Very High Congestion VTrans need. Vehicle queues on Cummings Street often extend over the railroad bridge. The proposed concept will restripe both Main Street and Cummings Street within the existing roadway footprint to modify the number and alignment of lanes on each approach. Combined with modifications to the traffic signal, these changes will significantly reduce the delay and queues that drivers experience at this intersection. Safety will be improved by restricting the left turn from Remsburg Drive onto Cummings Street, providing dedicated left turn lanes along Cummings Street, and improving the thru lane alignment on Main Street."*

The respondents' feedback is recorded in **Figure 60;** they had the opportunity to rate the proposed concept on a 1 (strongly oppose) to 5 (strongly support) scale. The average respondent score is a 4.02, indicating support for the concept.

Next, the public was invited to provide feedback on two different scenarios for Court Street between Main Street and Valley Street. The first concept shown proposed a conversion of Court Street to northbound one-way between Main Street and Plumb Alley. Respondents were informed "*The Main Street / Court Street intersection has the #7 crash safety need in the region. Many of the existing crashes involve a driver turning from southbound Court Street onto Main Street; this movement has limited sight lines to oncoming traffic. The first of two improvement options at this location is to permanently convert Court Street to one-way northbound traffic between Main Street and Plumb Alley. This condition has already been in place during the county courthouse construction. This improvement would eliminate the biggest crash risk at this intersection and would provide new parking for the courthouse."* **Figure 61** provides the public response for this concept. Based on the weighted score of the 3.77, the majority of respondents support this concept.

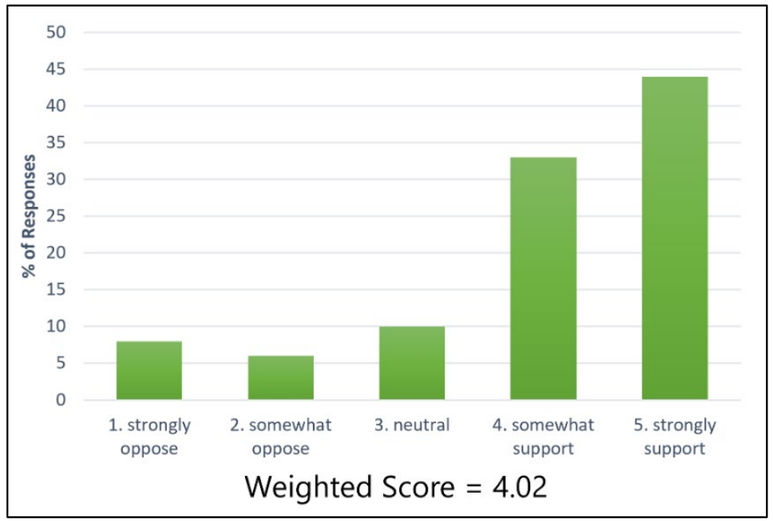


Figure 60: Respondents' Feedback on Cummings Street and Remsburg Drive Intersections

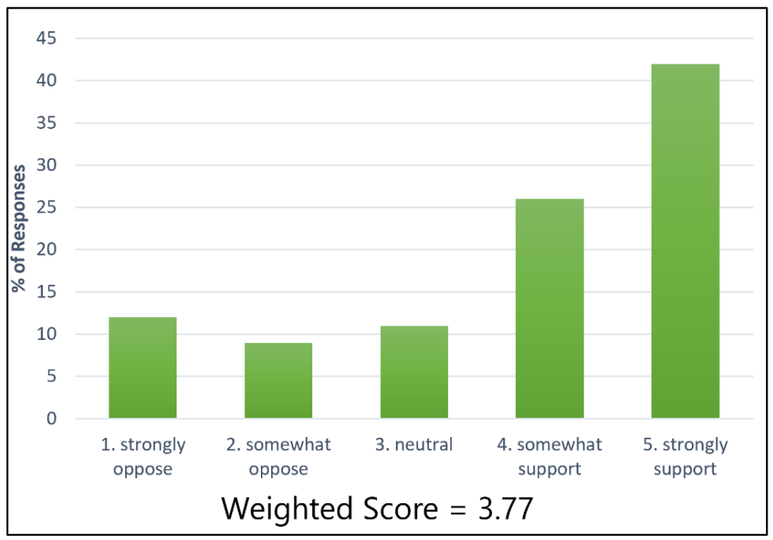


Figure 61: Respondents' Feedback on One-Way Court Street between Main Street and Plumb Alley

The second Court Street concept presented for public feedback was maintaining Court Street as two-way and installing additional low-cost safety countermeasures. The safety improvements included a curb extension to improve sight lines towards oncoming traffic, the removal of on-street parking that currently obstructs sight lines, and an overhead intersection warning flasher to alert drivers of turning traffic. For this concept, respondents were asked to rank each safety improvement separately. The results are shown in **Figure 62** through **Figure 64**. Based on the weighted score, participants were generally neutral on these proposed improvements.

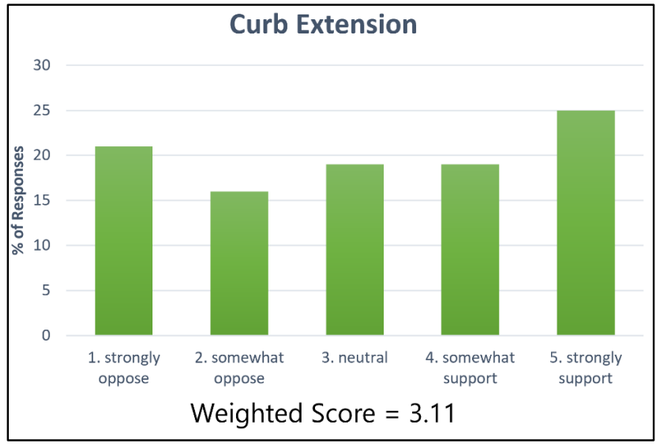


Figure 62: Respondents' Feedback on Curb Extensions at Court Street

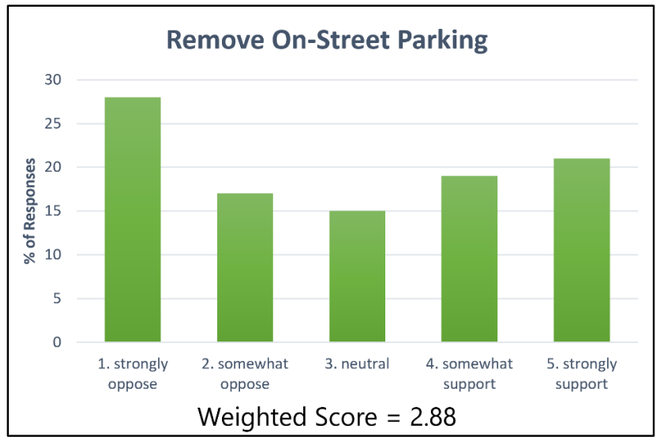


Figure 63: Respondents' Feedback on Removing On-Street Parking at Court Street

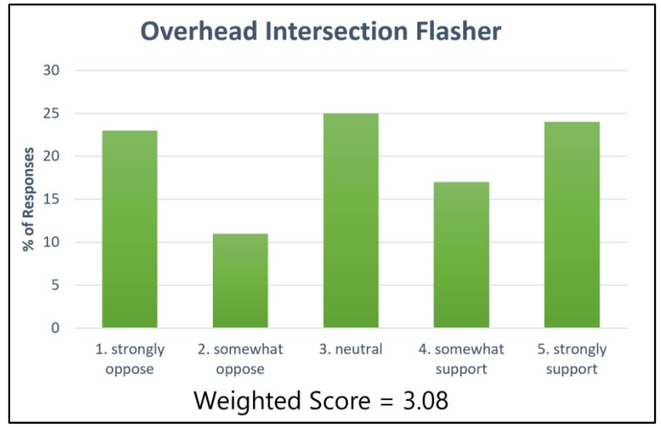


Figure 64: Respondents' Feedback on Overhead Intersection Flasher at Court Street

After being presented both options for Court Street, respondents were asked which concept option they preferred. The results of that question are presented in **Figure 65** – approximately twice as many respondents favored the one-way configuration option over the two-way option.

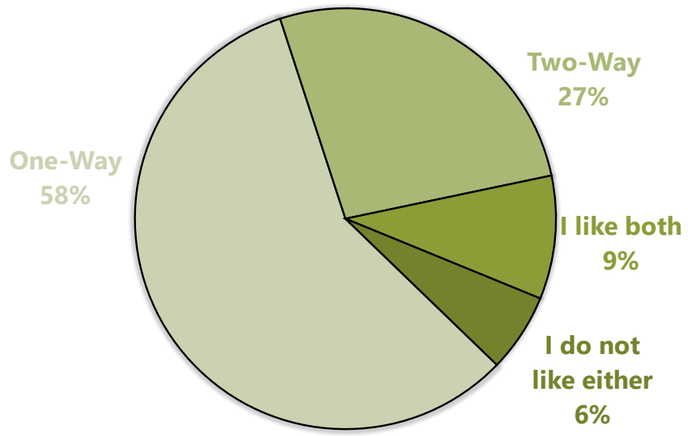


Figure 65: Respondents' Preference on Court Street Proposed Alternatives

DOWNTOWN ENHANCEMENTS

In the next section of the public input survey, respondents were presented with downtown enhancement concepts. The first concept presented for feedback in this section is the segment of Main Street near Fuller Street and Wall Street. The respondents were informed *"The segment of Main Street between Russell Road and Cummings Street has the #13 crash safety need in the region. This is also the heart of downtown Abingdon with a high concentration of pedestrians and on-street parking. The proposed concept would improve thru lane alignment on Main Street, shorten pedestrian crossings with curb extensions and a refuge island, and modify left turn lanes to meet vehicular demand. This concept would improve roadway safety and pedestrian accessibility."* **Figure 66** provides the public response for this concept. Based on the weighted score of the 3.28, the majority of respondents support this concept.

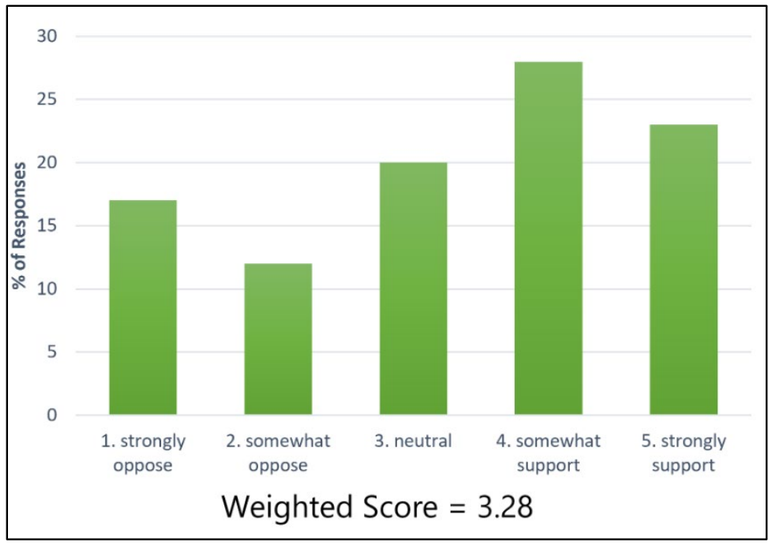


Figure 66: Respondents' Feedback on Downtown Enhancements between Fuller Street and Cummings Street

Next, the respondents were presented with a concept to extend Russell Road south of Main Street and reutilize Wall Street. Respondents were informed that "*The segment of Main Street between Russell Road and Cummings Street has the #13 crash safety need in the region. The closely spaced traffic signals at Russell Road and Wall Street create operational and safety challenges. The proposed concept would construct a new roadway segment between Russell Road and Depot Square SW. The existing traffic signal at Wall Street would be removed and part of Wall Street would be converted to new parking. This concept would improve traffic operations along Main Street."* **Figure 67** provides the public response for this concept. Based on the weighted score of the 3.55, most respondents support this concept. For the Russell Road extension concept, respondents were also asked how they would like to see the Wall Street pavement space be reutilized. Most respondents indicated that they would prefer Wall Street stay open as two-way traffic with no modifications.

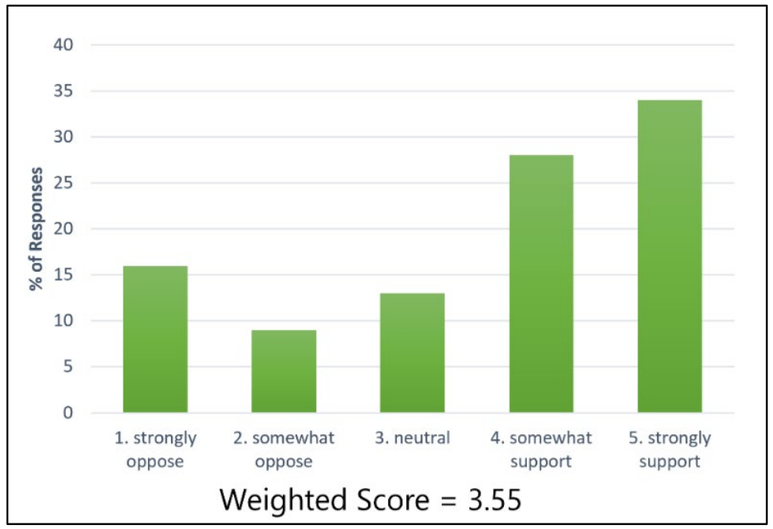


Figure 67: Respondents' Feedback on Russell Road Extension and Wall Street Reutilization

After the two previous concepts, respondents were asked which concept they prefer for the Russell Road / Wall Street section of Main Street. Of the two concepts presented, the respondents slightly preferred the Russell Road Extension. The full results are shown in **Figure 68**.

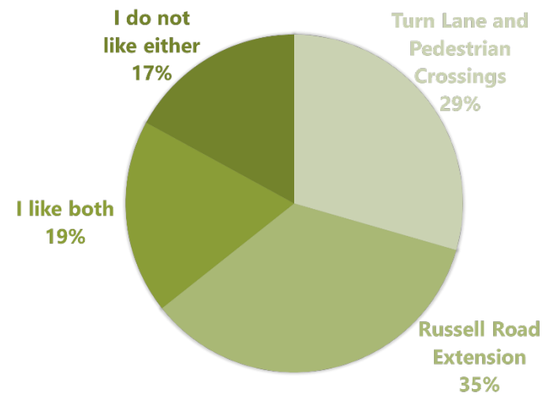


Figure 68: Respondents' Feedback on Russell Road and Wall Street Alternatives

Lastly in this section, respondents were presented with a downtown enhancement concept between College Street and Pecan Street. This concept includes:

- Construct curb extensions to shorten pedestrian crossings on Main Street at College Street, Church Street, and Pecan Street.
- Curb extensions will also calm vehicular travel speeds on both directional approaches to Barter Theatre pedestrian crossing.
- Remove the existing left turn lane on Main Street at Church Street and add parking spaces.
- Relocate the pedestrian crossing on Main Street at Church Street to west leg from east leg.

Respondents were informed *"The segment of Main Street between College Street and Pecan Street has the #37 and #49 crash safety needs in the region. Land uses such as the Barter Theatre generate a high concentration of pedestrian traffic. The proposed concept would shorten pedestrian crossings with curb extensions and remove the unneeded left turn lane on Main Street at Church Street to better align the through lane. This concept would improve roadway safety and pedestrian accessibility."* Respondents rated each item (pedestrian upgrades and removal of left-turn lane at Church Street) separately. **Figure 69** and **Figure 70** present the survey results. The respondents were generally supportive of the presented concept.

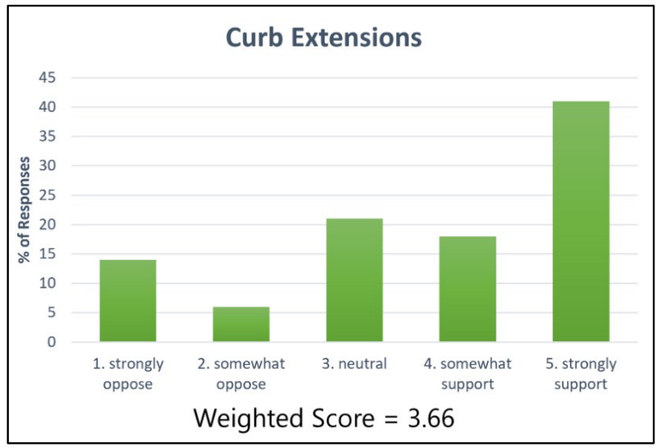


Figure 69: Respondents' Feedback on Curb Extensions between College Street and Pecan Street

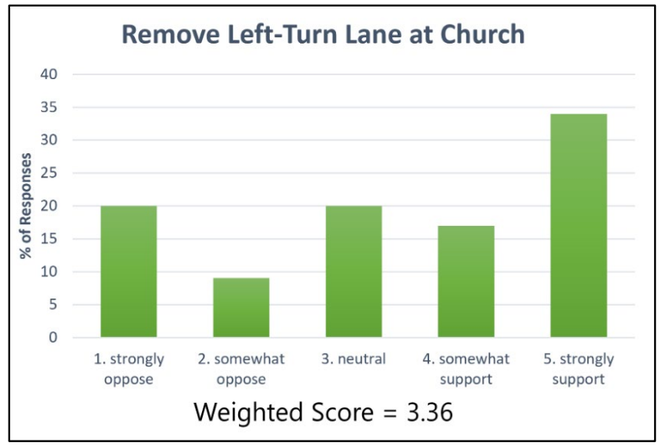


Figure 70: Respondents' Feedback on Removing the Left-Turn Lane at Church Street

DOWNTOWN GATEWAY TREATMENTS

The fourth section of the survey presented two downtown gateway treatments. These included converting the existing two-way left-turn lane to a landscaped median at two locations: between Holston Street and Patton Street and 1,300 feet between Boone Street and Thompson Drive. The landscaped medians will reduce crash risk/conflict points and introduce a gateway landscaping treatment as drivers enter downtown Abingdon. As shown in **Figure 71** and **Figure 72**, respondents were generally in support of these concepts.

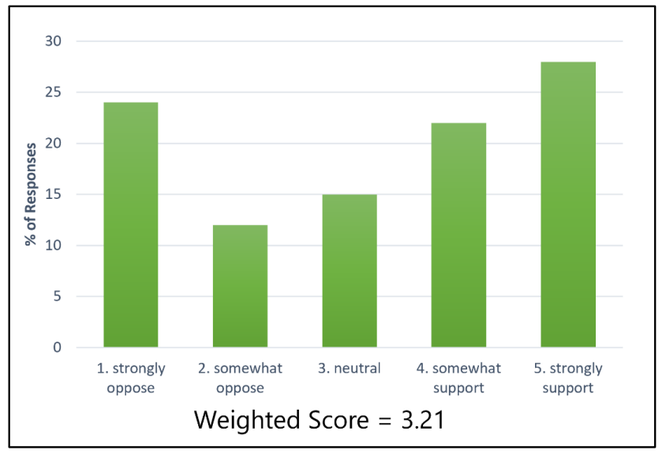


Figure 71: Respondents' Feedback on Landscaped Median between Holston Street and Patton Street

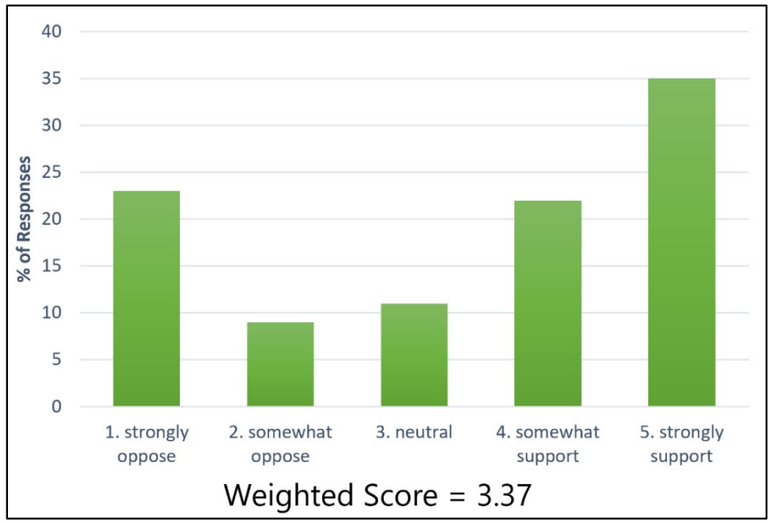


Figure 72: Respondents' Feedback on Landscaped Median west of Thompson Drive.

FREEFORM SURVEY COMMENTS

In addition to being invited to score and rank the proposed alternatives, survey respondents had the option to provide freeform comments both generally on the study area and on individual concepts. A sampling of these comments with study team responses are shown in **Table 16**. A compilation of all freeform public comments can be found in **Appendix F**.

IN-PERSON PUBLIC MEETING

In addition to the online survey, an in-person public meeting was held on February 20, 2024, at the Harry L. Coomes Recreation Center. 35 participants officially signed into the meeting; however, estimated attendance was 75 people. The public feedback received at that meeting was generally positive and generally followed the same themes and level of support as the online survey responses. The one study recommendation where level of support appeared to be different at the meeting was Court Street. Multiple attendees expressed concern with a permanent one-way operation of Court Street. Several attendees lived nearby and anecdotally observed that traffic volumes have increased on Plumb Alley and Whites Aly during the one-way Court Street operation during the courthouse construction.

Several weeks after the meeting, after the Town voted to include the one-way Court Street concept in the SMART SCALE application, one of these nearby residents sent an email to Town and VDOT representatives reiterating their concern with increased traffic volumes on Plumb Alley, which inhibit this resident from accessing and egressing their property.

Table 16: Summary of Public Comments and Study Team Responses

Public Comments and Study Team Responses		
	Public Comment	**Study Team Response**
Cummings Street and Remsburg Drive Intersection Improvements	1. "I strongly oppose the part about not allowing left turns from Remsburg onto Cummings. Most of the time this is not necessary. How about putting time restrictions on when turns are allowed? And the raised divider is just too ugly. I do like the turn lanes added to Cummings." 2. "Good idea, but tractor trailers making right turns from Main to Cummings (southbound) swing into the proposed new left turn lane."	1. Removing the left-turn lane from Remsburg Drive to Cummings Street reduces conflict points at this intersection. Drivers destined for Main Street can head west on Remsburg Drive and utilize the traffic signal at Wall Street to turn either left or right on Main Street. The raised median provides many benefits including traffic calming and the opportunity for beauty enhancements within the landscaped median. 2. Preliminary analysis confirms that a SU-40 style vehicle can make all turns with the lanes configured as shown.
Court Street Concepts	1. "People are used to this being one way now and the additional parking spaces for shopping and dining are needed." 2. "Any consideration being given to a traffic light instead of making Court Street one way?"	1. Acknowledged. The one-way concept maintains the configuration as it was during construction but adds additional diagonal parking spaces on Court Street. 2. The *Manual on Uniform Traffic Control Devices* (MUTCD) and VDOT set requirements for when a traffic signal should be installed, defined as traffic signal warrants. The warrants are primarily based on volume and crash history. This intersection does not meet the warrant thresholds for traffic signal installation.
Downtown Enhancements between Fuller Street and Cummings Street	1. "You have just cut off access to the Post Office from cars travelling east on Main Street." 2. "It looks like we would be losing the left turn lane onto Wall St coming west on Main. This is going to cause a traffic backup at that intersection." 3. "I may be misunderstanding, but I regularly use the 2nd eastbound lane west of Fuller Street and I believe removing it would bog down traffic, especially with lots of businesses people may need to turn into which will slow it down further. If we remove the left lane to Wall Street, there is no convenient way to enter the Post Office, which is already a little inconvenient to access." 4. "How is traffic going South on Main St going to access the Post Office if the Left Turn onto Wall St is removed?"	1. Vehicles heading east on Main Street are still able to turn right in to the post office parking lot as they can in existing conditions. No changes to this access are proposed. 2. The preliminary operational analysis indicates that while vehicle delay will slightly increase for westbound movements, the length of the queue will decrease when comparing future (2045) No Build (no change to the roadway network, accounting for background growth of the area) conditions and Build (roadway network modified as proposed) conditions. 3. In existing conditions, the 2nd eastbound lane becomes a left-turn only lane at Russell Road, and only a single lane continues through beyond Russell Road. Therefore, vehicles heading eastbound through Russell Road already need to be in the outside lane. This change only impacts the vehicles who will be turning left at Russell Road as they now must merge and then enter the left-turn lane bay. Merging the 2nd eastbound lane and providing a left-turn bay at Russell Road offers the opportunity for a pedestrian refuge island as well as a westbound left-turn lane for Fuller Street. Many vehicles continue straight through the left-turn only lane at eastbound Russell Road in existing conditions as they don't realize that it is a left-turn only lane. In the proposed conditions, vehicles must intentionally get into the left-turn bay. 4. In proposed conditions, vehicles can still make the westbound left-turn at Wall Street to access the post office, as in existing conditions. That movement will still remain. Alternatively, vehicles can utilize Cummings Street and Remsburg Drive to access the post office.

Public Comments and Study Team Responses		
	Public Comment	**Study Team Response**
Russell Road Extension and Wall Street Reutilization	1. "It looks like the new connector between Depot Square and Main is one way to Main. Why then is there a dedicated left hand turn lane on Main to the new connector?"	1. In the proposed concept, the Russell Road extension is two-way and includes travel in the southbound direction as well. The left-turn lane on Main Street is to serve the left-turn movement to southbound Russell Road (on the extension).
Curb Extensions between College Street and Pecan Street	1. "The curb extension are going to make an already tight right turn from Main onto Pecan going east, even worse." 2. "Bump outs will cause people to run them over. May elderly will not see them. People will misjudge where they are causing accident hazards. Removing a lane leads to congestion, confusion and increased accidents."	1. The curb extension will be designed with appropriate turn radii. The vehicles will be turning right from closer to the centerline and allow for a larger turn radius for vehicles to make their maneuver than in existing conditions. 2. Curb extensions / bump outs have been proven to reduce travel speeds and calm traffic along the roadway. The bump outs will be positioned within the existing parking areas and will not be within the trajectory of the travel lanes, minimizing the potential to run over the bump outs. When turning, the bump outs will act just as the curb acts in existing conditions. In this scenario, the current alignment of the left-turn lane introduces confusion within the roadway. In many cases, vehicles do not realize that the through lane shifts when the turn lane is introduced and instead travel straight through the intersection from the left-turn lane, introducing conflicts between vehicles.

Chapter 4:

Preferred Alternative Design Refinement

Preferred Alternative Design Refinement

Phase 3 of the Project Pipeline study advanced the design of the preferred alternative to prepare it for SMART SCALE application. This design refinement was focused on identifying all significant project features, defining project risk and contingency factors, and developing an appropriate cost estimate. The intent was to progress the design to a sufficient level (approximately 10% design) such that all necessary cost items were included in the project application.

To maximize funding potential for the preferred alternative, the Town of Abingdon and the Bristol Metropolitan Planning Organization (MPO) decided to submit overlapping SMART SCALE applications. The MPO applied for the entirety of the Pipeline Study's preferred alternative, while the Town applied for just the preferred alternative components on US 11 from Fuller Street to Cummings Street and on Cummings Street from Valley Street to Remsburg Drive.

MPO Application: US 11 (Main Street) Corridor Improvements (Entirety of Preferred Alternative)

This application (the entirety of the Project Pipeline Study preferred alternative) was prepared for the August 1st, 2024, Round 6 SMART SCALE Application deadline. The final application included the following deliverables: design exhibit, cost estimate, project risk register, basis of design memorandum, and supporting documentation (this Pipeline study report). This preferred alternative combines multiple improvements previously discussed. The improvements included in this package include:

- Landscaped median between Holston Street and Patton Street.
- Lane optimization and pedestrian improvements between Fuller Street and Cummings Street, including pedestrian signalization at Wall Street.
- Lane configuration optimization and pedestrian improvements at the US 11 (Main Street) and Cummings Street intersection, including a complete traffic signal rebuild.
- Landscaped median and pedestrian improvements on Remsburg Drive at Cummings Street.
- Lane optimization and pedestrian improvements between College Street and Pecan Street.
- One-way northbound conversion of Court Street between US 11 (Main Street) and Valley Street.
- Landscaped median between Boone Street and Thompson Drive.

Design Updates and Assumptions

As the design of these various improvements progressed, several design refinements were completed, and design assumptions clarified. These are covered in more extensive detail in the Basis of Design document (see **Appendix G**) that accompanied this project's Round 6 SMART SCALE Application, but a summary of these items is provided here. **Figure 73 - Figure 78** show the refined design alternative.

- Landscaped median between Holston Street and Thompson Street
  - Based on discussion with VDOT and the Town, and based on public input, an additional median opening was provided at 629/640 Main Street. This change reduces U-turn movements and maintains access to additional properties.
- Lane utilization and pedestrian improvements between Fuller Street and Cummings Street
  - Converted the originally proposed painted curb extension east of Russell Road to a raised curb extension between Russell Road and Wall Street.
  - Added ADA curb ramps at Wall Street intersection, which required curb extensions.
  - The midblock curb extension designs were optimized.
- Lane utilization and pedestrian improvements at the US 11 (Main Street) and Cummings Street intersection
  - Multiple design options were evaluated for the new ADA curb ramps and traffic signal design at the US 11 (Main Street) and Cummings Street intersection. This iterative design process included a final decision of a SU-40 design vehicle. ADA curb ramps could only be provided in the northwest and northeast quadrants by introducing curb extensions. **Figure 79** shows a detailed conceptual design for this intersection.
  - Pavement marking modifications were made to accommodate SU-40 traffic for all turning movements except the westbound right-turn movement. The westbound right-turn movement was signed for a truck restriction.
  - Extended mill and overlay and pavement markings on Cummings Street to Valley Street.
- Landscaped median and pedestrian improvements on Remsburg Drive at Cummings Street
  - Converted the originally proposed painted median to a raised landscaped median with pedestrian refuge for the crossing at Cummings Street.
- Lane utilization and pedestrian improvements between College Street and Pecan Street
  - The pedestrian crossing across US 11 (Main Street) at Church Street was relocated to the west side of the intersection.
  - The curb extension designs were optimized.
- One-way northbound conversion of Court Street between US 11 (Main Street) and Valley Street
  - Extended one-way conversion of Court Street from Plumb Alley to Valley Street. This change requires additional signal improvements at the Court Street / Valley Street intersection to account for the removal of southbound movements.
  - Convert parallel parking on the west side of Court Street between Plumb Alley to Valley Street to angled parking, matching the proposed angled parking between Main Street and Plumb Alley.

- Landscaped median between VDOT residency and Thompson Drive
    - Based on discussion with VDOT, an additional left turn was provided at the VDOT Residency public parking lot. This change reduces left turn movements from the thru lane.

The major design features and design assumptions for each proposed improvement are documented in the accompanying Basis of Design document.

Project Risk and Contingency

Contingencies per category are covered in more extensive detail in the Basis of Design document (see **Appendix G**) that accompanied this project's Round 6 SMART SCALE application. Specific project risks are highlighted in the Risk Analysis Matrix that also accompanied the application. This matrix documents the risk items, assesses their potential impact, and proposes mitigation strategies.

Cost Estimate

The cost estimate was developed via quantity take offs, historical VDOT bid prices, VDOT input, and percentage-based preliminary engineering costs. The estimate process is covered in more extensive detail in the Basis of Design document (see **Appendix G**) that accompanied this project's Round 6 SMART SCALE application.

The total project cost is estimated to be **$13,943,049** and broken down by Phase/Major area as follows:

- Preliminary Engineering Phase $3,164,125
- Right of Way and Utilities Phase $1,018,120
- Construction Phase (without CEI) $8,089,900
- Construction Phase (with CEI) $9,760,804

Truck Traffic in Abingdon

The project team selected a SU-40 design vehicle for the project based on existing truck restrictions within the Town and a constraint of maintaining existing curb radii – both to avoid impacts to right of way and historical properties and to prioritize design for pedestrian traffic and urban conditions. As such, the proposed design does not accommodate larger trucks such as WB-67s turning between US 11 (Main Street) and Cummings Street. If this project is funded and constructed, during incidents on I-81 that require detours onto US 11, detours will need to operate between Exits 14 and 19, bypassing Exit 17 at Cummings Street.

Figures 80-82 document the Autoturn vehicle turning path analysis for the Main Street and Cummings Street intersection. These figures collectively show the following design vehicle assumptions:

- A SU-40 "box truck" is accommodated for all turn movements except the westbound Main Street right turn onto northbound Cummings Street.
- The westbound Main Street right turn onto northbound Cummings Street does accommodate all "personal" vehicles such as an F350 pickup truck.
- In addition to a SU-40, the eastbound Main Street right turn onto southbound Cummings Street accommodates both a large 40-foot-long school bus and a rear load trash truck.
- WB-67 semi-trailers are not accommodated for any turning movements.

Figure 73: Landscaped Median Between Holston Street and Patton Street

Figure 74: Fuller Street to Cummings Street Improvements - Sheet 1

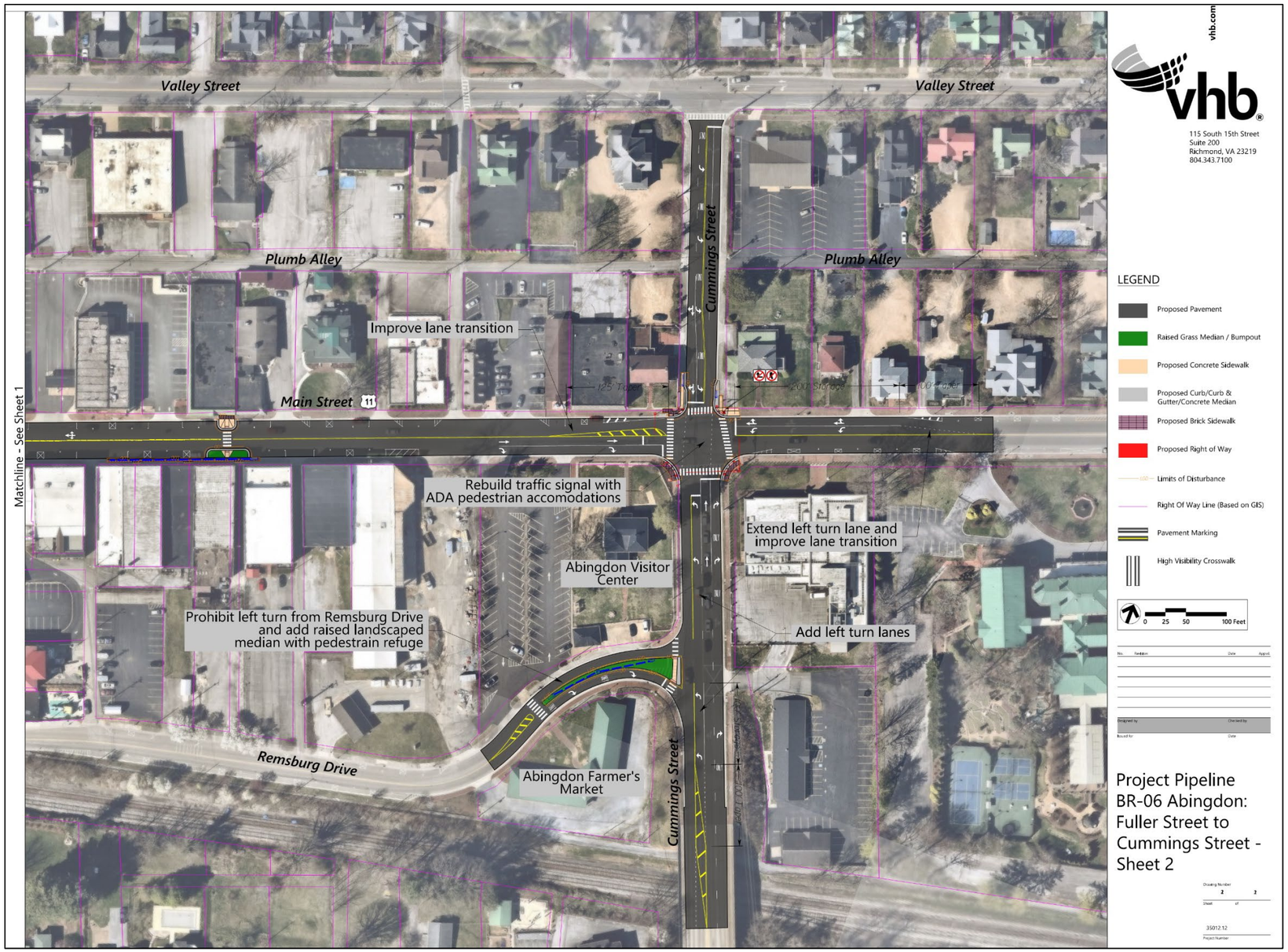


Figure 75: Fuller Street to Cummings Street Improvements - Sheet 2

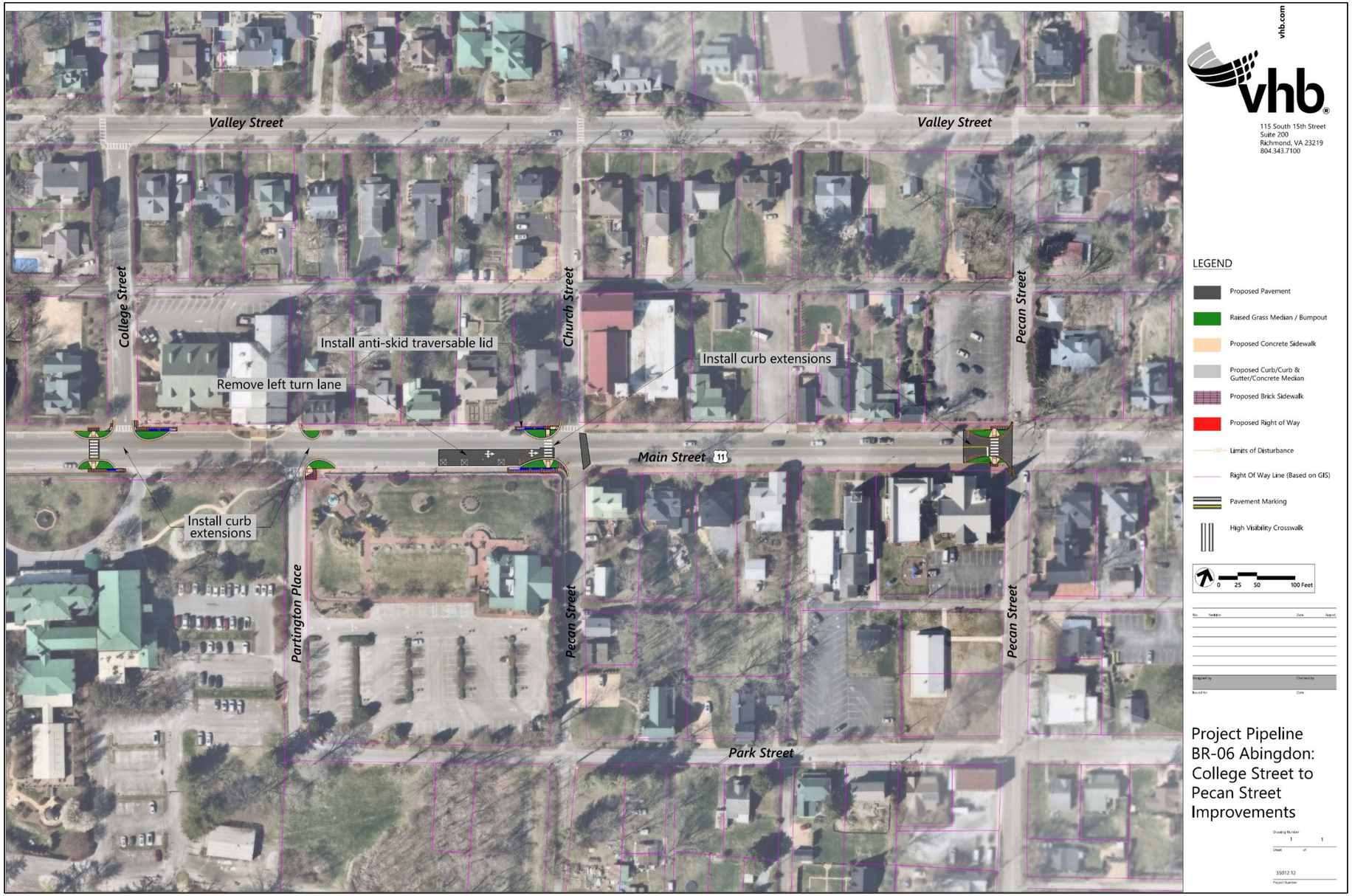


Figure 76: College Street to Pecan Street Improvements

Figure 77: Court Street Improvements

Figure 78: Landscaped Median West of Thompson Drive

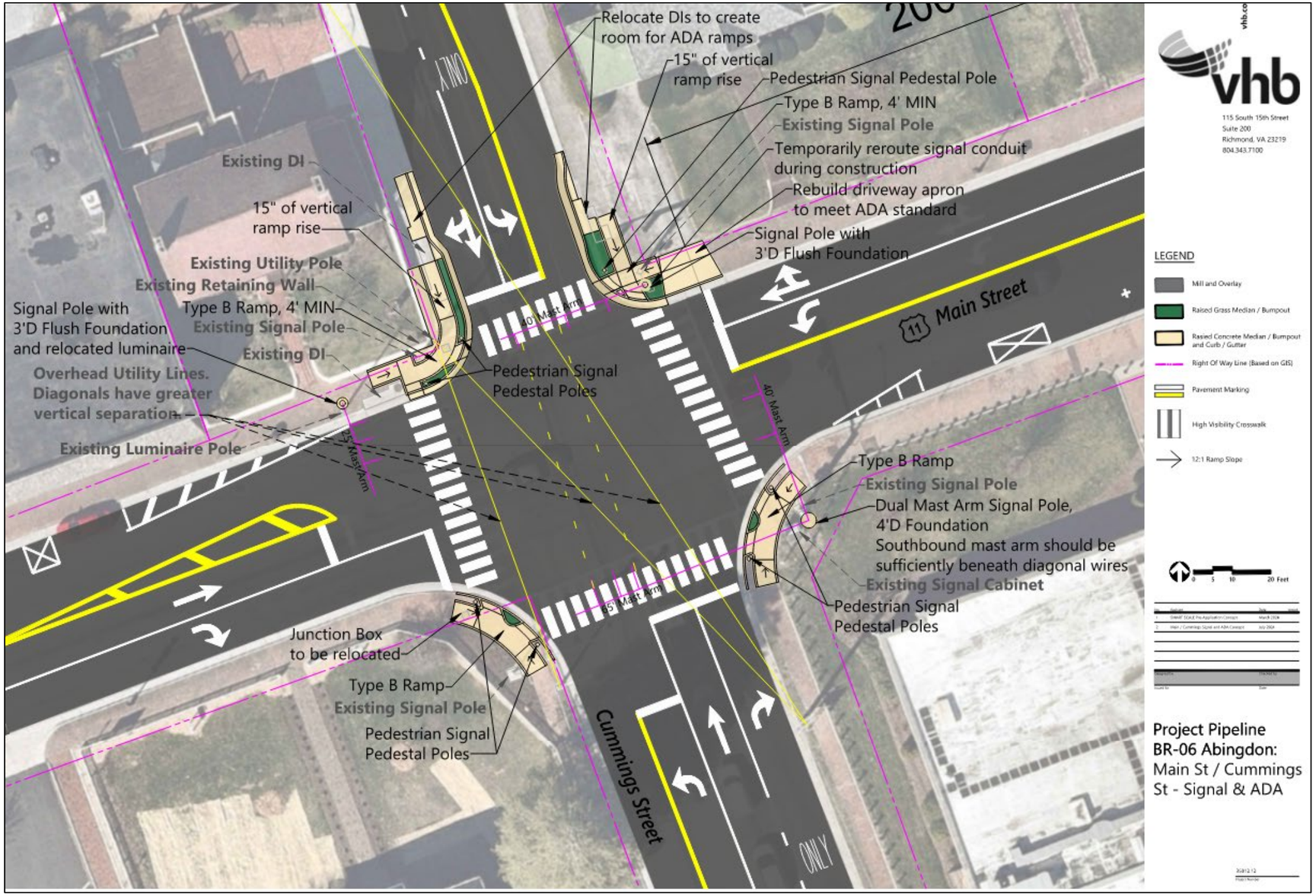


Figure 79: Detailed Conceptual Design for Main Street / Cummings Street Intersection

Figure 80: Main Street / Cummings Street Autoturn Exhibit #1

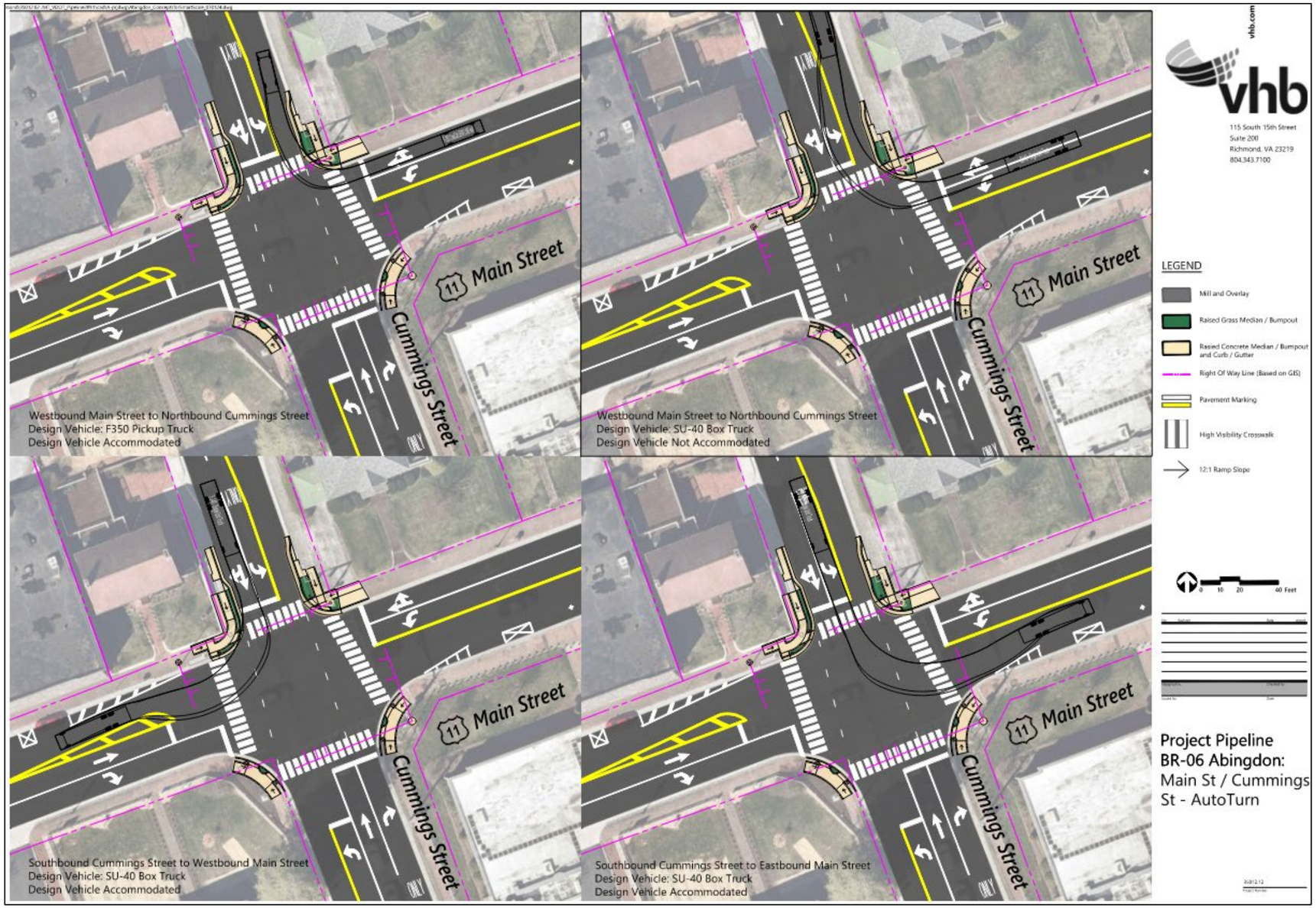


Figure 81: Main Street / Cummings Street Autoturn Exhibit #2

Figure 82: Main Street / Cummings Street Autoturn Exhibit #3

Town Application: Cummings St at US 11 and Remsburg Dr Improvements (Subset of Preferred Alternative)

This application (a subset of the Project Pipeline Study preferred alternative) was prepared for the August 1st, 2024, Round 6 SMART SCALE Application deadline. The final application included the following deliverables: design exhibit, cost estimate, project risk register, basis of design memorandum, and supporting documentation (this Pipeline study report). This preferred alternative combines multiple improvements previously discussed. The improvements included in this application include:

- Lane optimization and pedestrian improvements between Fuller Street and Cummings Street, including pedestrian signalization at Wall Street.
- Lane configuration optimization and pedestrian improvements at the US 11 (Main Street) and Cummings Street intersection, including a complete traffic signal rebuild.
- Landscaped median and pedestrian improvements on Remsburg Drive at Cummings Street.

Design Updates and Assumptions

As the design of these various improvements progressed, several design refinements were completed, and design assumptions clarified. These are covered in more extensive detail in the Basis of Design document (see **Appendix H**) that accompanied this project's Round 6 SMART SCALE Application, but a summary of these items is provided here. **Figure 83-Figure 84** show the refined design along US 11 (Main Street) and Cummings Street.

- Lane utilization and pedestrian improvements between Fuller Street and Cummings Street.
  - Converted the originally proposed painted curb extension east of Russell Road to a raised curb extension between Russell Road and Wall Street.
  - Added ADA curb ramps at Wall Street intersection, which required curb extensions.
  - The midblock curb extension designs were optimized.
- Lane utilization and pedestrian improvements at the US 11 (Main Street) and Cummings Street intersection.
  - Multiple design options were evaluated for the new ADA curb ramps and traffic signal design at the US 11 (Main Street) and Cummings Street intersection. This iterative design process included a final decision of a SU-40 design vehicle. ADA curb ramps could only be provided in the northwest and northeast quadrants by introducing curb extensions. **Figure 79** shows a detailed conceptual design for this intersection.
  - Pavement marking modifications were made to accommodate SU-40 traffic for all turning movements except the westbound right-turn movement. The westbound right-turn movement was signed for a truck restriction.
  - Extended mill and overlay and pavement markings on Cummings Street to Valley Street.
- Landscaped median and pedestrian improvements on Remsburg Drive at Cummings Street.
  - Converted the originally proposed painted median to a raised landscaped median with pedestrian refuge for the crossing at Cummings Street.

The major design features and design assumptions for each proposed improvement are documented in the accompanying Basis of Design document.

Project Risk and Contingency

Contingencies per category are covered in more extensive detail in the Basis of Design document (see **Appendix H**) that accompanied this project's Round 6 SMART SCALE application. Specific project risks are highlighted in the Risk Analysis Matrix that also accompanied the application. This matrix documents the risk items, assesses their potential impact, and proposes mitigation strategies.

Cost Estimate

The cost estimate was developed via quantity take offs, historical VDOT bid prices, VDOT input, and percentage-based preliminary engineering costs. The estimate process is covered in more extensive detail in the Basis of Design document (see **Appendix H**) that accompanied this project's Round 6 SMART SCALE application.

The total project cost is estimated to be **$8,069,680** and broken down by Phase/Major area as follows:

- Preliminary Engineering Phase $1,744,062
- Right of Way and Utilities Phase $553,227
- Construction Phase (without CEI) $4,896,425
- Construction Phase (with CEI) $5,772,391

Truck Traffic in Abingdon

The same truck traffic restrictions noted above in the MPO Application apply within this application.

Figure 83: Fuller Street to Cummings Street Improvements - Sheet 1

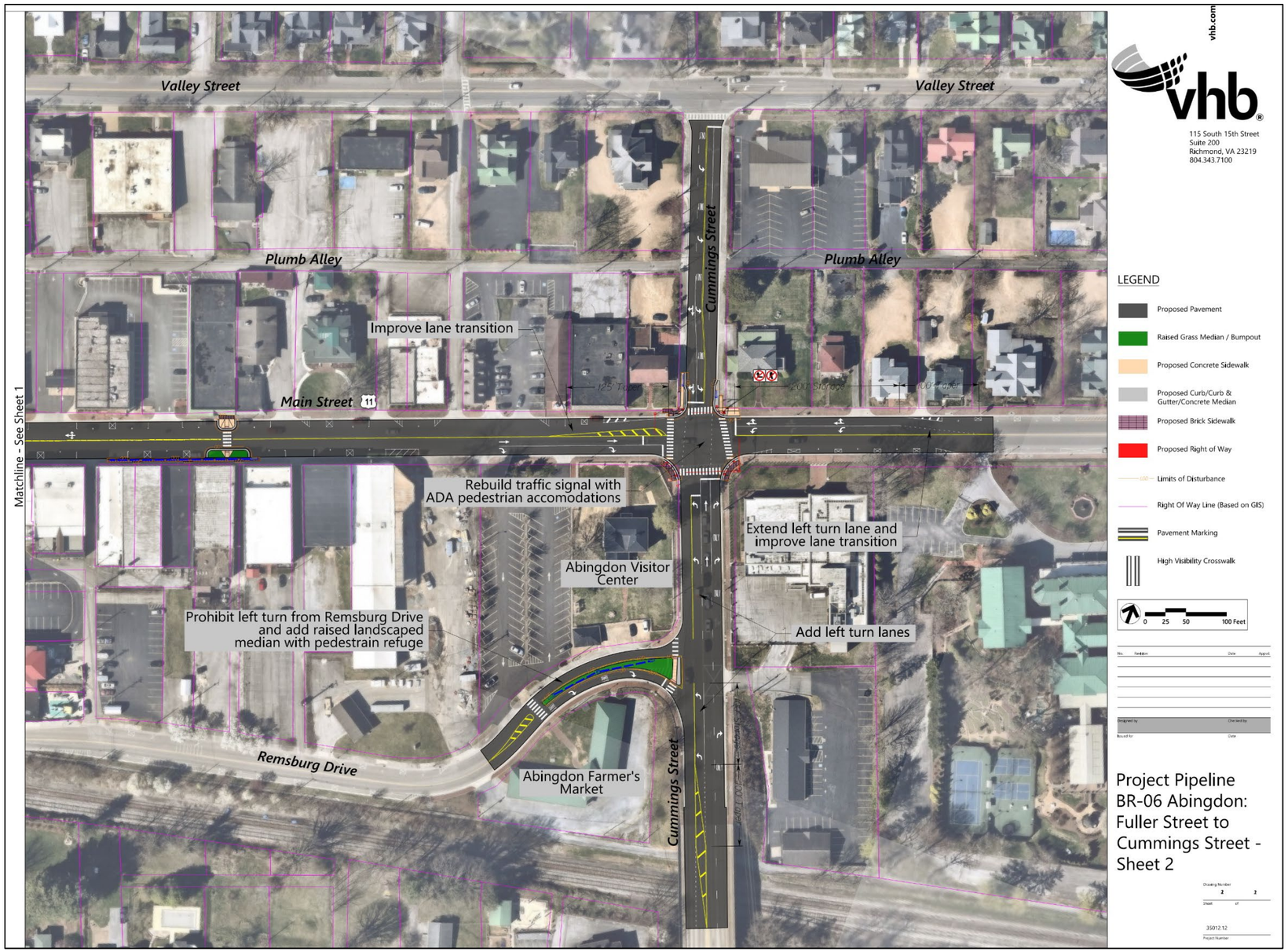


Figure 84: Fuller Street to Cummings Street Improvements - Sheet 2