TECHNICAL MEMORANDUM

Growth & Accessibility Planning
TECHNICAL ASSISTANCE PROGRAM

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TO: Mayor William Polk and Patrick Mauney
The Rappahannock / Rapidan Commission and the Town of Remington

SUBJECT: Town of Remington Pedestrian Infrastructure and Traffic Calming Evaluation, Task 2 and 3 Technical Memorandum - **Revised**

DATE: Original July 21, 2022/**Revised and Resubmitted August 9, 2022**

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Introduction

This project has two primary objectives that support the Town of Remington's goal to revitalize the Town into a destination leveraging the historic and natural assets of the Town. The first objective is to identify location-specific traffic calming measures and on/off-road multimodal improvements between M.M. Pierce Elementary School, located north of the Town's corporate boundary, and the Rappahannock River Bridge, located south of the Town's corporate boundary (**Figure 1**). This will enable connectivity to the recently opened river access at the Rector Tract, as well as to the planned Rappahannock Station Battlefield Park. This objective builds on the Remington Walks Plan, adopted in 2017 along James Madison Street Business Route U.S. 15/29), and is the focus of this technical memorandum.

The second objective of the project is to analyze the feasibility of converting East Main Street in the Town to one-way, eastbound traffic movements and utilizing East Madison Street for one-way, westbound traffic movements, and to provide additional traffic calming and multimodal improvement alternatives along the two corridors to enhance the Town's walkability and increase the safety, connectivity, and vibrancy of downtown Remington. A prior memo dated June 13, 2022 "Existing Conditions and One-Way Circulation Technical Memorandum" explored the feasibility of one-way circulation and found that it would: a) not be feasible with the current level of large truck traffic through Main Street, b) not support the objective of improved pedestrian comfort and safety in the downtown.

A survey and right-of-way assessment were not included in this scope of work, and additional information will be needed as these projects move into design.

Study Area Existing Conditions Summary

The following existing conditions summary, which is also presented in the Task 4 memo, focuses on relevant conditions and facilities in the study area. **Figure 1** below highlights the Town of Remington boundary as well as important destinations.

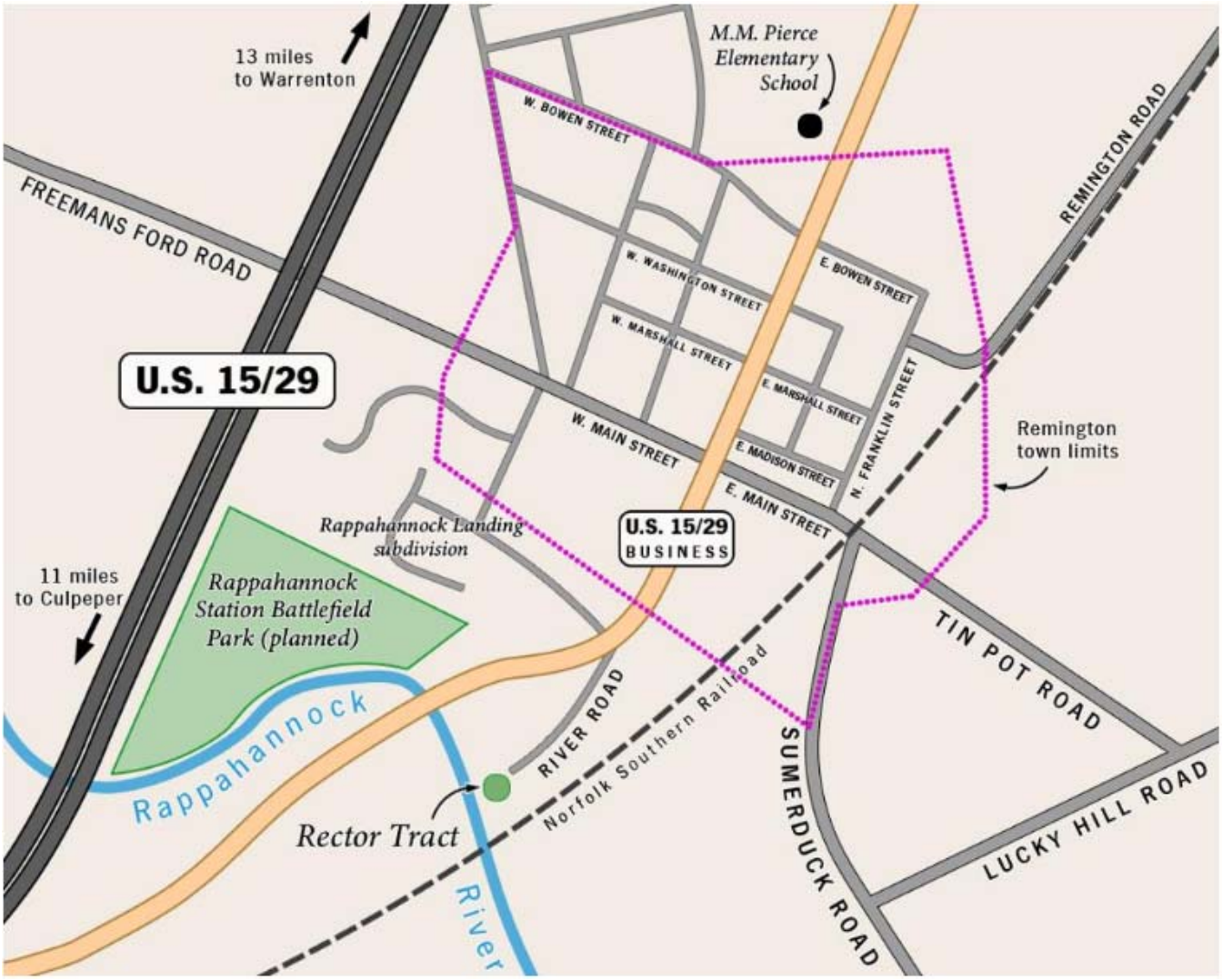


Figure 1. Town of Remington, Source: Project TAP application materials

Relevant desinations include:

- M.M. Pierce Elementary School
- Rappanhannock Station Battlefield Park (Planned)
- Rector Tract River Access
- Main Street Commercial Area

The roadways included in the study area include Business 15/29 from Pierce Elementary School to the Rector Tract River Access (a 2 mile section), Main Street from N Franklin Street to Business 15/29 and Madison Street from N Franklin Street to Business 15/29.

Business 15/29 is classified as a Major Collecter by Virginia Department of Transportation (VDOT) and has a posted speed limit of 35 MPH. It consists of a single lane in each direction heading North and South. There is a sidewalk on the eastern side of the road that varies in width ranging from 3 feet to 5.5 feet. The sidewalks extends from M.M. Pierce Elementary School to E Madison Street. There are no sidewalks on Business 15/29 South of W Main Street within the study area (**Figure 2**). Based on data collected in 2020, the segment has an Average Daily Trafic (ADT) of 2,300 and an Annual Average Daily Traffic (AADT) of 2,600.

Figure 2. Business 15/29 Facing South In front of the Remington Car Wash

Similarly, Main Street, **Figure 3**, is also classified as a Major Collector by VDOT but has a posted speed limit of 25 MPH. Main Street has an ADT of 1,500. There are sidewalks on both sides of Main Street with varying widths. Main Street does not have any lane markings between Business 15/29 and Franklin Street, and operates with parking on both sides of the street and two-way travel.

Figure 3. W Main Street and N Franklin Street Facing West

Madison Street, **Figure 4**, is a local street with a posted speed limit of 25 MPH and an ADT of 430. There are no pavement markings nor sidewalks, with the exception of a single building frontage in the northeast quadrant of Madison Street and N. John Stone Street. The Town desires to create a second “Main Street” on Madison Street in the future with additional development.

Figure 4. E Madison St Facing West at N John Stone St Intersection

Fieldwork Observations and Measurements

Fieldwork was conducted through the entire study area on Tuesday April 5, 2022 from 8:00 AM to approximately 3:00 PM. The weather was generally rainy and overcast during observations, which may have limited the number of people walking and biking who were observed. Observations were conducted at M. M. Pierce Elementary School during morning arrival, on Main and Madison Street in the mid-morning, and then south on Business 15/29 to the Rector Tract and Battlefield Parkway at approximately 2:00 PM. The project consultants were joined in the field by Mayor William Polk, Mr. Patrick Mauney of the Rappahannock / Rapidan Commission, and Julie Bolthouse of Piedmont Environmental Council to observe operations and existing conditions on Main and Madison Street south to the Battlefield Parkway entrance. Notes taken during the field visit on April 5, 2022, and dimensions taken from the field can be found in **Appendix A** accompanying this memorandum. A second field meeting was held on July 7, 2022 with Mayor William Polk, Mr. Patrick Mauney of the Rappahannock / Rapidan Commission, Mr. Gary Rzepecki of the Fauquier County Parks and Recreation Department, and Mr. Walter Burke and Mr. Mark Nesbit of the VDOT Warrenton Residency office. During this field meeting, the consultants discussed all project recommendations and solicited feedback from participants.

Main Street and Madison Street Area

During field observations, a steady stream of vehicles was observed on Business 15/29 in both directions making it difficult for vehicles turning from Main Street to find gaps. This caused a noticeable queue on Main Street at the stop signs shown in **Figure 5.**

Figure 5. Motorists Queuing on Eastbound Main Street and Business 15/29

At that time, based on Waze mapping, a crash was noted on the main Route 15/29, just north of the Business 15/29 bypass. It is likely that northbound traffic from Route 15/29 was re-routing to Business 15/29 and potentially southbound traffic was re-routing to Main Street. This condition was confirmed by local stakeholders to be unusual, and observations of high delays at Business 15/29 at Main Street are not considered to be typical.

There is parking permitted on both sides of Main Street between Franklin and Business 15/29, and while there were more available spaces than occupied spaces, vehicles were intermittently parked on both

sides of the street through the length of the study area. The remaining travel way between parked vehicles is less than 20 feet, and vehicles were observed to pull partially behind parked cars to yield to oncoming traffic, a roadway configuration known as a "yield street". Sidewalks are provided on both sides of Main Street, but width and condition vary, with some sections of sidewalk being 3.5 feet wide which does not comply with minimum requirements set by VDOT or the Americans with Disabilities Act (ADA). Other sections have a wider existing sidewalk that goes directly to the building face of commercial buildings (**Figure 3)**.

Land use along Main Street is generally commercial, and includes Town Hall, a lumber yard, and smaller businesses in older buildings, some with residential on upper floors. Many of the buildings are located with zero setback from the street right-of-way, and sidewalks extend directly to the building faces.

Building patterns on Madison Street are more set back from the street, with parking lots and rear-building access areas for the businesses on Main Street. Madison Street is also a mix of residential and commercial but appears to be primarily commercial in nature.

Business 15/29

It was observed that during morning drop-off at M.M. Pierce Elementary that bus drivers were exclusively using the Northern entrance of the school and buses were not utilizing the right turn lane (**Figure 6)**.

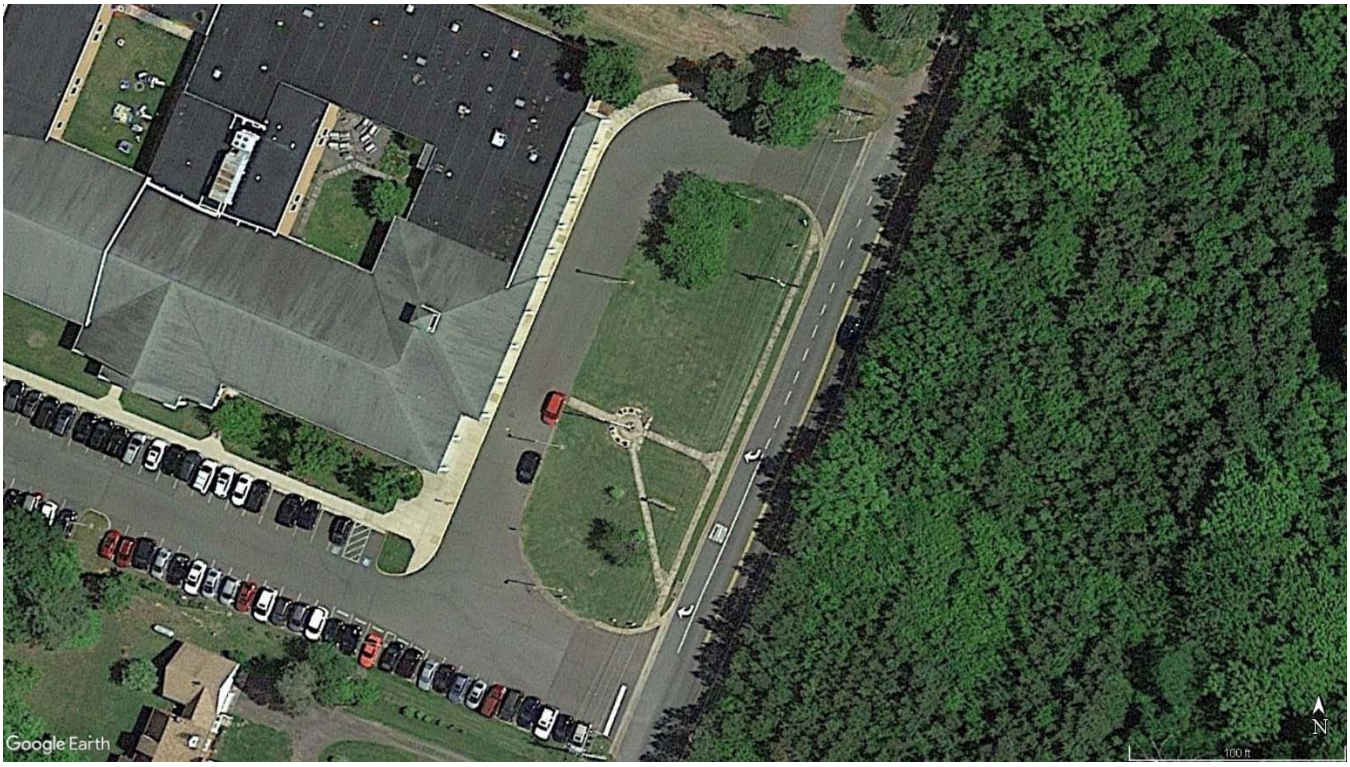


Figure 6. Right Turn Lane on Business 15/29 by M. M. Pierce Elementary School

Based on observations and confirmed by feedback from Town/agency stakeholders, parent vehicle drop-offs at the school generally use Bowen Street to the south to access the circular drop-off area at the back of the school. Vehicles entering at the southern driveway off Business 15/29 were observed parking on the lot, and presumably are mostly school staff and faculty.

A school speed zone flasher is installed to the north of the school for southbound traffic, and just north of Bowen Street for northbound traffic. Anecdotally, southbound drivers appear to be traveling above the speed limit as the enter the town. A speed study performed by VDOT, discussed in more detail below, confirms this observation.

At the southern terminus of the study area is the intersection with River Road and the access to the planned Rappahannock Station Battlefield Park. Like the southbound traffic, northbound traffic appears to be faster as it approaches Remington, exiting the higher speed limit sections to the south. There is both a horizontal and vertical curve between the Battlefield Park entrance and the Rappahannock River bridge that limits sight distance for northbound traffic; however, based on field measurements at least 400' of sight distance is available for northbound drivers as they approach the Battlefield Park entrance and required stopping sight distance as per the VDOT Road Design Manual for a 35 mph roadway is 250.[1]

Observations Shared by Stakeholders

During field visits and subsequent project meetings, Mayor Polk and other stakeholders have shared their experiences with these facilities. Their observations and impressions are summarized as follows. Generally, the current yield street condition on Main Street is perceived as chaotic and undesirable. National Association of City Transportation Officials (NACTO)[2] notes that for a yield street to function effectively, motorists should be able to use the street intuitively without the risk of head-on collision, which is not always the case on Main Street. During peak hours the truck traffic and narrow effective roadway results in drivers and pedestrians perceiving Main Street as unsafe. Business 15/29 has also been reported to Mayor Polk and others as being a barrier to pedestrian access from the east to west side of towns. This issue was discussed in the context of residents from west side homes not walking to Main Street businesses, as well as students not being permitted to walk to school and cross Business 15/29. Residents have also expressed concerns about the speeding that often occurs on Business 15/29, contributing to a perceived lack of pedestrian of safety.

[1] https://www.virginiadot.org/business/resources/locdes/rdm/appendf.pdf

[2] National Association of City Transportation Officials Urban Street Design Guide – Yield Street: https://nacto.org/publication/urban-street-design-guide/streets/yield-street/

Design Guidance

This section summarizes the leading state and national design guidance for three facility types that are applicable to this study:

- Shared use paths
- On-road bicycle facilities
- Sidewalks

Shared Use Paths

Figure 7 depicts the national design guidance for a typical cross section of a shared use path.[3] The minimum paved width for a two-directional shared use path is 10 feet. Typically, widths range from 10 to 14 feet (3.0 to 4.3 m), with the wider values applicable to areas with high use and/or a wider variety of user groups. VDOT allows a shared use path width of 8 feet for short distances if needed due to a physical constraint such as an environmental feature, bridge abutment, utility structure, etc.[4]

[3] American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities, 2012.

[4] Virginia Department of Transportation, Roadway Standards Appendix A(1): Bicycle and Pedestrian Facility Guidelines, Bus Stop Design, and Parking Guidelines, https://www.virginiadot.org/business/resources/locdes/rdm/Appenda1.pdf

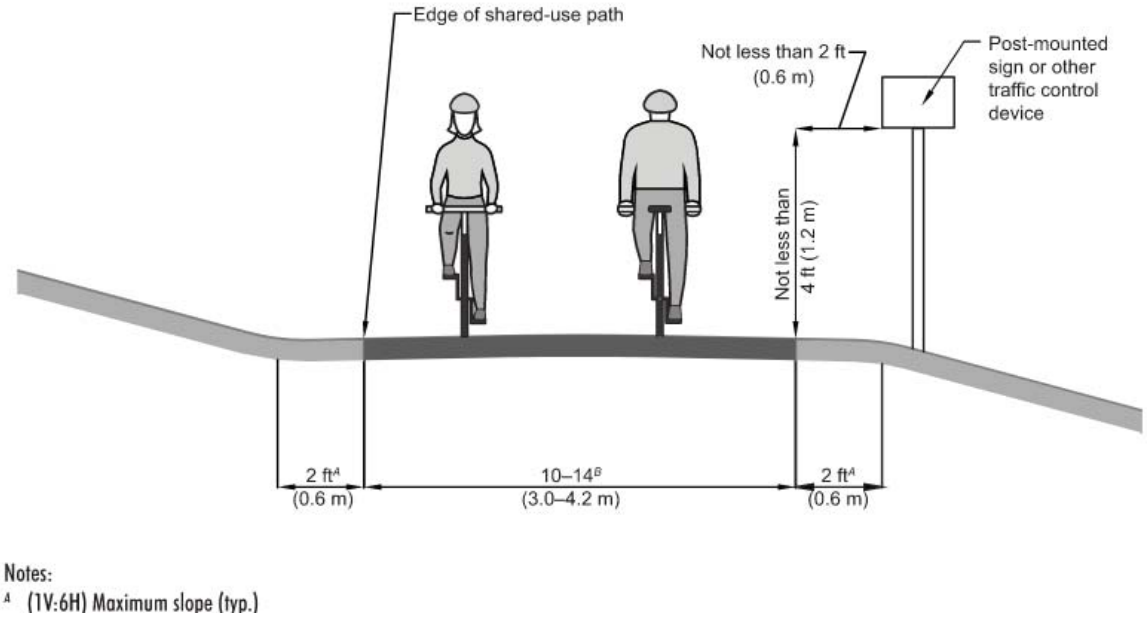


Figure 7. Typical Cross Section of Two-Way, Shared Use Path on Independent Right-of-Way

Source: 2012 AASHTO Bike Guide

Other state design guidance, such as the Ohio Department of Transportation Multimodal Design Guide (April 2022), distinguishes between shared use path level of service (SUPLOS) and operating conditions (see **Table 1).**

Table 1. Shared Use Path Operating Conditions Based on Level of Service Criteria

SUPLOS	Description	Peak Operating Conditions
A	Excellent	A significant ability to absorb more users across all modes is available
B	Good	A moderate ability to absorb more users across all modes is available
C	Fair	Path is close to functional capacity with minimal ability to absorb more users
D	Poor	Path is at its functional capacity. Additional users will create operational and safety problems
E	Very Poor	Path operation beyond its functional capacity resulting in conflicts and people avoiding path
F	Failing	Path operating beyond functional capacity resulting in significant conflicts and people avoiding the path

Table 2 shows preferable shared use path widths to achieve a SUPLOS of "C" for typical mode split conditions.

Table 2. Shared Use Path Width and Operational Lanes

Operational Lanes	Preferable Width (ft)	SUPLOS "C" Peak Hour Volumes at Preferable Width	Minimum Width (ft)	SUPLOS "D" Peak Hour Volumes at Minimum Width
2	10 - 12	150 – 300	8	50
3	12 - 15	300 - 500	11	400
4	16 - ≥20	500 - ≥600	15	600

FHWA SUPLOS Methodology

The US Federal Highway Administration (FHWA) found in their Shared Use Path Level of Service Calculator User's Guide that widths of 11 - 15 feet provide improved levels of service (LOS) for higher volumes and more balanced user mixes than narrower widths. This is consistent with AASHTO recommendations that under certain conditions it may be necessary or desirable to increase the width of a shared-use path to 12 feet or even to 14 feet, due to substantial use by people walking, biking, and those using wheelchairs, scooters, skateboards, and other modes. Trails of 11 – 15 feet are wide enough to operate as three-lane paths. The increased passing capacity provided by a trail that operates as three lanes improves LOS and increases the trail's ability to absorb higher volumes and a wider variety of use-types without degrading service.

On-Road Bicycle Facilities

For on-road facilities, the FHWA published the Bikeway Selection Guide in February 2019 which highlights the preferred bikeway type for based on volume and speed. A summary graphic from this guidance is depicted in **Figure 8**.

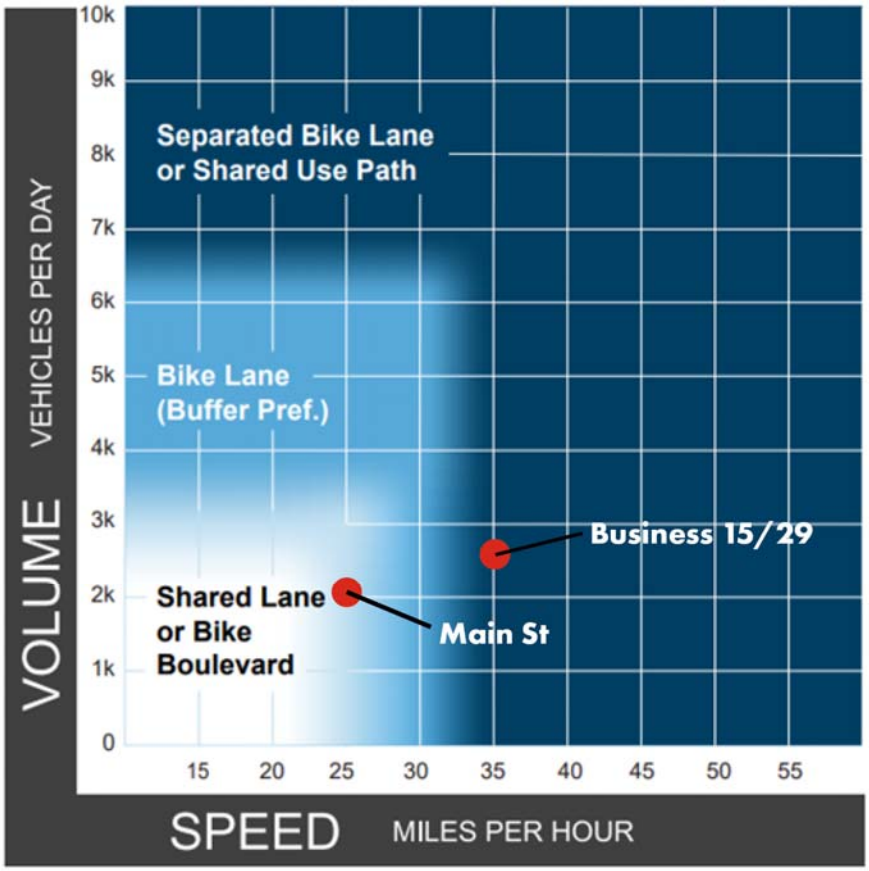


Figure 8. Preferred Bikeway Type for Urban, Urban Core, Suburban and Rural Town Contexts

Source: FHWA Bikeway Selection Guide, 2019

Notes: 1. Chart assumes operating speeds are similar to posted speed. 2. Advisory bike lanes may be an option where traffic volume is <3K ADT.

The recommendations for on-road bicycle access options have used this guidance as a starting point to determine alternatives for on-road bike access.

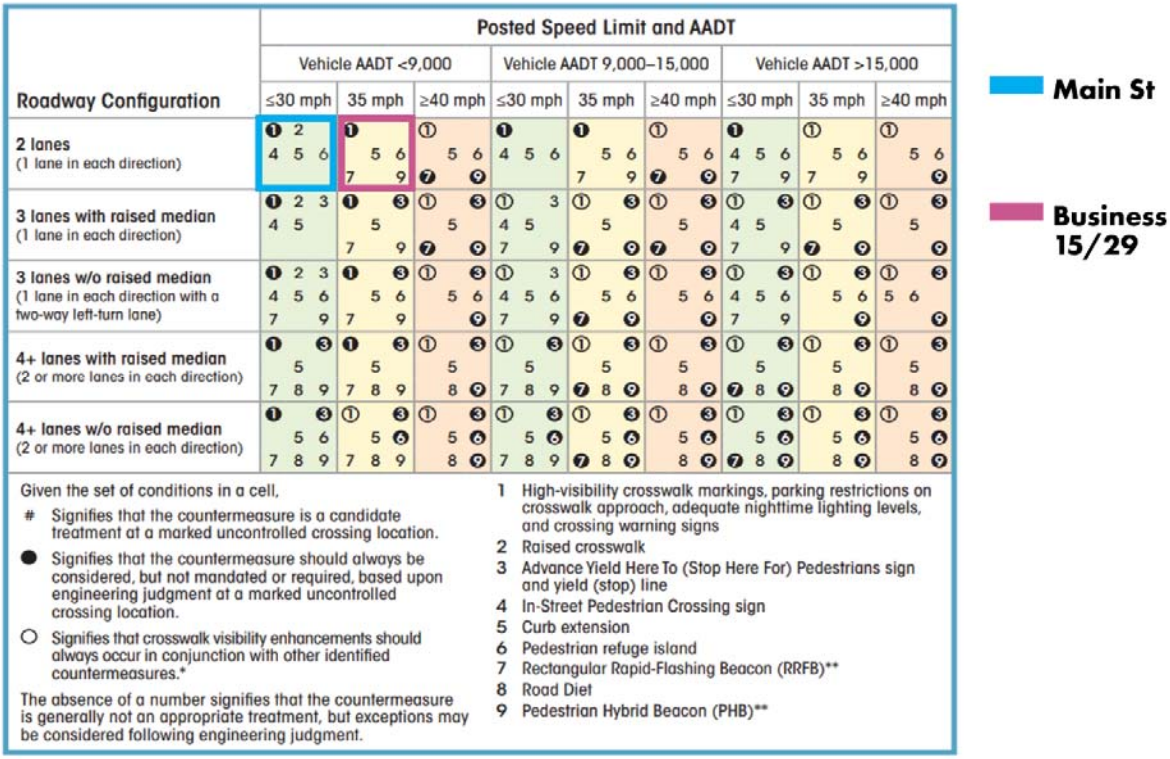
Sidewalks

VDOT Road Design Manual[4] outlines geometric design standards for the state of Virginia. As per both the roadway design guidelines, and the pedestrian guidelines in Appendix A(1) referenced previously, a 5 foot sidewalk, excluding the width of the curb, with a minimum buffer of 4 feet for roadways posted at greater than 25 mph and 3 feet for the roadways posted at 25 mph and less is required. Narrower widths are allowable for unique situations and short sections.

ADA Compliant curb ramps should also be provided at all corners where pedestrian access is provided and at all pedestrian pathway crossings.

These minimums provide a basic pedestrian access route for users of all types, and while a 5' minimum width provides adequate access for people walking alone, in areas of heavy use, wider sidewalks should be considered. The NACTO *Urban Street Design Guide* suggests a width of 5-7 feet for residential areas.[5]

Trail and pedestrian path crossings at uncontrolled locations may need additional design features to provide for a safe and comfortable crossing experience. The FHWA Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations, often referred to as the STEPS Guide, provides guidance on appropriate crossing treatments based on vehicular speed and volume and has been referenced when reviewing potential treatments recommended for this project. The countermeasure summary chart from the STEPS guide is shown in **Figure 9**.



Roadway Configuration	Posted Speed Limit and AADT								
	Vehicle AADT <9,000			Vehicle AADT 9,000–15,000			Vehicle AADT >15,000		
	≤30 mph	35 mph	≥40 mph	≤30 mph	35 mph	≥40 mph	≤30 mph	35 mph	≥40 mph
2 lanes (1 lane in each direction)	❶ 2 4 5 6	❶ 5 6 7 9	① 5 6 ❼ ❾	❶ 4 5 6	❶ 5 6 7 9	① 5 6 ❼ ❾	❶ 4 5 6 7 9	① 5 6 7 9	① 5 6 ❾
3 lanes with raised median (1 lane in each direction)	❶ 2 3 4 5	❶ ❸ 5 7 9	① ❸ 5 ❼ ❾	① 3 4 5 7 9	① ❸ 5 ❼ ❾	① ❸ 5 ❼ ❾	① ❸ 4 5 7 9	① ❸ 5 ❼ ❾	① ❸ 5 ❾
3 lanes w/o raised median (1 lane in each direction with a two-way left-turn lane)	❶ 2 3 4 5 6 7 9	❶ ❸ 5 6 7 9	① ❸ 5 6 ❾	① 3 4 5 6 7 9	① ❸ 5 6 ❼ ❾	① ❸ 5 6 ❾	① ❸ 4 5 6 7 9	① ❸ 5 6 ❾	① ❸ 5 6 ❾
4+ lanes with raised median (2 or more lanes in each direction)	❶ ❸ 5 7 8 9	❶ ❸ 5 7 8 9	① ❸ 5 8 ❾	① ❸ 5 7 8 9	① ❸ 5 ❼ 8 ❾	① ❸ 5 8 ❾	① ❸ 5 ❼ 8 ❾	① ❸ 5 8 ❾	① ❸ 5 8 ❾
4+ lanes w/o raised median (2 or more lanes in each direction)	❶ ❸ 5 6 7 8 9	① ❸ 5 ❻ 7 8 9	① ❸ 5 ❻ 8 ❾	① ❸ 5 ❻ 7 8 9	① ❸ 5 ❻ ❼ 8 ❾	① ❸ 5 ❻ 8 ❾	① ❸ 5 ❻ ❼ 8 ❾	① ❸ 5 ❻ 8 ❾	① ❸ 5 ❻ 8 ❾

Given the set of conditions in a cell,

\# Signifies that the countermeasure is a candidate treatment at a marked uncontrolled crossing location.

● Signifies that the countermeasure should always be considered, but not mandated or required, based upon engineering judgment at a marked uncontrolled crossing location.

○ Signifies that crosswalk visibility enhancements should always occur in conjunction with other identified countermeasures.*

The absence of a number signifies that the countermeasure is generally not an appropriate treatment, but exceptions may be considered following engineering judgment.

1 High-visibility crosswalk markings, parking restrictions on crosswalk approach, adequate nighttime lighting levels, and crossing warning signs
2 Raised crosswalk
3 Advance Yield Here To (Stop Here For) Pedestrians sign and yield (stop) line
4 In-Street Pedestrian Crossing sign
5 Curb extension
6 Pedestrian refuge island
7 Rectangular Rapid-Flashing Beacon (RRFB)**
8 Road Diet
9 Pedestrian Hybrid Beacon (PHB)**

Figure 9. STEPS Guide Pedestrian Crossing Countermeasures
Source: FHWA "Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations" 6

Additionally, VDOT adopted an Instructional and Informational memorandum in 2016 that focuses on pedestrian crossing accommodations at unsignalized intersections crossings and mid-block crossings. It provides additional guidance beyond what is in the 2009 Manual on Uniform Traffic Control Devices

[5] https://nacto.org/publication/urban-street-design-guide/street-design-elements/sidewalks/
[6] https://safety.fhwa.dot.gov/ped_bike/step/docs/STEP_Guide_for_Improving_Ped_Safety_at_Unsig_Loc_3-2018_07_17-508compliant.pdf

(MUTCD) and the 2011 Virginia Supplement to the MUTCD. Guidance introduces height, width, and material specifications that should be consulted in further design phases.

Previous and Planned Projects

There are previous and ongoing initiatives in Remington and the surrounding area to stimulate economic growth and safety that complement the pedestrian safety improvements that are recommended as part of this effort. There have also been prior studies by VDOT on speed and traffic control within the study area. A subset of these projects are discussed below.

Figure 10. Previous and Ongoing Project Locations

Two Way to Four Way Stop Review; 15/29 Bus, &651 East Main St. Intersection

This review was conducted by VDOT in 2018 based on a request from the localities to determine feasibility of installing an "All-Way Stop" at the intersection of 15/29 Bus (James Madison St) and Rte. 651 (Main St). As stated in that review, the major street approaches for this intersection are 15/29 Bus. James Madison St (Northbound & Southbound) with a combined vehicular volume of 4,600 vehicles per

day (vpd as of 2017) and is currently a through-street with a posted speed of 35 mph. The minor street approaches Rte. 651 W. Main St (1900 vpd as of 2017) and Rte. 651 E. Main St (1800 vpd as of 2017) are currently posted 25 mph and are both currently controlled by stop signs, “STOP” word markings and stop bars. All four approaches are asphalt surfaced within the study area and have centerline pavement markings except for Rte. 651 E. Main St. The review determined that the existing intersection configuration is appropriate and does not meet the criteria for an All-Way Stop application.

However, while reported crashes have been minimal (based on Culpeper District averages) and appropriate signage, pavement markings, and advanced warning signs are currently installed, the review recommends that the stop bars on the approaching lanes of Rte. 651 East and West Main St should be eradicated and relocated 8 feet from the edge of the travel lane of Bus 15/29 James Madison to enhance driver awareness and further increase intersection sight distance.

The review did not detail the all-way or two-way stop warrant criteria or discuss pedestrian access considerations.

VDOT Speed Limit Study

The Culpeper District Traffic Engineering section received a request from Warrenton Residency to perform an engineering speed study along this segment to determine if reducing the current speed limit from 35 mph to 25 mph is appropriate. The study was presented in a memo dated January 15, 2021. Speed samples were collected for the 0.68-mile segment of Rte. 15/29 Bus within the Town of Remington in Fauquier County. Speed data recorded an 85th percentile speed of 37.96 mph. A field investigation concluded that existing signage and markings are adequate. The three-year (11-1-2017 thru 10-31-2020) crash history shows that there were 4 crashes and 1 related injury in the study area. The study concluded that based on the collected speed data and roadway characteristics, this existing 0.68-mile portion of Route 15/29 Bus “James Madison St.” with a current regulatory speed of 35 mph was appropriate and reducing to 25 mph was not recommended at that time; however, the speed data collected supports the fact that there is poor compliance (specifically N. of Main St.) with the existing speed limit. The study recommended that law enforcement be notified to continue monitoring the speed of motorists along this segment.

Rappahannock Station Battlefield Park

The project site is currently made up of ten separate lot parcels totaling 27.68 acres and will be converted into a passive recreation and interpretive park that highlights the historic significance of the site and surrounding area, with an emphasis on the Battles of Rappahannock Station that took place in this area during the Civil War. Located within Fauquier County just southwest of the Town of Remington. The site is accessed from James Madison Street by a gravel driveway. There is an existing house on the site that is scheduled to be removed prior to beginning of this project. The existing walkway in front of

the house, carport, shed and play structure which will all be removed as part of this project. Proposed improvements for the site include paving the driveway, constructing a paved 10-car capacity parking lot, an 8-ft wide asphalt trail, and a small terrace, and placing interpretive signs that inform visitors about the site's history and ecology. A mowed path leading through the field is proposed to provide additional walking and viewing opportunity. Invasive plant species on the site will be removed and replaced with appropriate native species, and a densely planted mix of native shade and evergreen trees and shrubs will be planted along the north boundary of the project site to provide visual screening of the houses north of the site.

Dollar General

There is a proposed development of a Dollar General on the east side of Business 15/29 across from Pierce Elementary. This development is currently in the approval process. Once built it will serve as a new destination point that is located within walking and biking distance of town and may attract pedestrian traffic from school children or other users of the recreational facilities near the school.

Pedestrian Connection along Business 15/29

Virginia's statewide transportation plan, VTrans, identified that the study area's walkability can be described as "car-dependent" indicating that most errands require a car and bikeability as "somewhat bikeable" indicating minimal bicycle infrastructure. There is not currently a connected and comfortable path for pedestrians or bicycles along Business 15/29 to serve the new recreational facilities to the south of Remington. The connection to Pierce Elementary to the north is limited by a lack of comfortable crossings on Business 15/29, and the existing sidewalk is narrow and cannot serve cyclists or allow for passing or side-by-side walking. This study proposes a shared use path that runs alongside Business 15/29 to safely accommodate non-motorist users. The path will connect M.M. Pierce Elementary School, just north of the Remington town limits to the planned Rappahannock Station Battlefield Park and the Rector Tract just south of the Remington town limits as shown in **Figure 11**. Throughout the length of the shared use path high visibility crosswalks are recommended at the intersections of Business 15/29 with Bowen Street, Washington Street, Marshall Street, and Main Street. The recommendations at the intersection with Main Street are discussed in further detail in subsequent sections. Consistent marked crossings along the corridor would facilitate pedestrian travel between the residential neighborhoods on the west side of Business 15/29 and the new shared use path and connecting destinations. These crossings may require additional study, as well as modifications to the western receiving side to provide a dedicated pedestrian pathway in order to comply with VDOT and MUTCD standards.

Figure 11. Shared Use Path Alignment

Connection to M.M. Pierce Elementary School

As previously mentioned, there is a Dollar General store that is being developed across from the Elementary School. There are pedestrian ramps on either side of Business 15/29 where a marked crosswalk was previously provided, but has since been removed. The Dollar General plan proposes a high visibility crosswalk across Business 15/29 to connect the two ramps. However, based on feedback from project stakeholders this crossing location was previously perceived as unsafe and was removed based on local request. A crossing at this location would create a conflict within the school site as pedestrians would need to cross the path of the bus loop.

An alternative location for the crossing, just south of the school's southern driveway, would allow for fewer conflicts within the school site, as seen in **Figure 12**.

Figure 12. Shared Use Path Crossing to M.M. Pierce Elementary School

This is recommended as it would decrease the overall width of the crossing, making it safer for users. It was observed that during school pick-up and drop-off hours vehicles would instead use W Bowen Street and Center Street to access the rear entrance of the school. As such the proposed crosswalk would not conflict with heavy turning movements. The path could continue within the school property, shifting existing parking to the north and ending in a marked crossing to the school sidewalks. School staff supervision at this internal crossing may still be necessary, but vehicular conflicts at this point are minimized compared to the bus loop.

The crossing on Business 15/29 should be designed to include curb extensions bump outs if possible, to minimize crossing distance, as well as high visibility markings, appropriate pedestrian crossing signage and a rectangular rapid flashing beacon (RRFB). An example of a similar crossing is shown in **Figure 13.**

Figure 13. Example RRFB

Since school buses enter the bus loop via the northern driveway, the southern driveway right-turn lane is not currently being utilized by larger vehicles that may require the additional space. This memorandum recommends repurposing that space to create a center median with a southbound lane shift to help slow southbound vehicles as they enter the town of Remington and approach the pedestrian crossing. This change, combined with the additional geometric modifications and additional marked crossings discussed below may help slow drivers entering Remington and traveling on Business 15/29. As the character of this roadway is shifted to provide additional multimodal connection and experiences changes in land use, such as the Dollar General development, driver behaviors may also change accordingly. The speed limit change to 25 mph as previously requested by the locality and studied by VDOT should be considered for additional study at that time.

Figure 14. Example Center Median with Lane Shift
Source: Federal Highway Administration

Business 15/29 and Main Street Intersection

It is recommended that the shared use path be located on the eastern side of Business 15/29 north of Main Street. The shared use path transitions to the western side of Business 15/29 at the intersection of Main Street and provides direct access to the planned Rappahannock Station Battlefield Park and includes a crossing to access the Rector Tract access on River Road. Based on a preliminary assessment of existing right-of-way that considered utility pole locations and GIS parcel lines, there is approximately 17 feet of available right-of-way on the east side of Business 15/29 north of Main Street, and 10-12 feet available on the west side.[7] This would provide space on the east side for a 10-foot shared use path and a variable buffer with a minimum of five feet. This meets current AASHTO Bikeway Design Guide

[7] Right-of-way is estimated using GIS parcel data and must be verified through field survey as concepts advance for further consideration and design.

guidance for minimum buffer widths but may require a waiver from VDOT for a narrower buffer than the standard detail in the Road Design Manual referenced previously.

South of Main Street, the east side of Business 15/29 has a variety of stormwater swales and larger ditches as shown in **Figure 15.** Maintaining the trail on this side of the roadway would require extensive impacts to these existing drainage facilities.

Figure 15. Business 15/29 Facing North Near Godwins Landing Dr Intersection

Based on field measurements of utility pole locations, there may also be more right-of-way available on the west side south of Main Street. The only exception to this is on the southwest corner of Main Steet and E. Madison, where an existing structure currently occupies part of the roadway right-of-way. Based on conversations with representatives from the Town of Remington, this structure is planned to be removed in the future. Based on these factors, the shared use path is recommended to connect to the school on the east side of Business 15/29 to the north of Main Street and continue on the west side of Business 15/29 to the south of Main Street.

In order to safely accommodate the trail users transitioning from the eastern side of Business 15/29 to the western side, operational and geometric changes are recommended as shown in **Figure 16.**

Figure 16. Main Street and Madison Street Intersection

The design shown here assumes that the two-way stop control would remain in place and narrows the crossing by defining the edge of traveled way on both the east and west sides of the roadway. In addition to the geometric changes, we recommend installation of an RRFB for the southbound approach if the intersection remains a two-way stop control. As discussed in previous sections, VDOT has previously studied this intersection to determine if an all-way stop control would be warranted and concluded that the current two-way stop control was appropriate. However, with the addition of pedestrian and bike facilities crossing this roadway this determination should be reexamined. As per the MUTCD, "*Multi-way stop control can be useful as a safety measure at intersections if certain traffic conditions exist. Safety concerns associated with multi-way stops include pedestrians, bicyclists, and all road users expecting other road users to stop. Multi-way stop control is used where the volume of traffic on the intersecting roads is approximately equal.*" Though the 2017 traffic volumes used in the VDOT All-way Stop Memo do not reflect equal volumes on both roadways, the hourly turning movement count collected for this study indicates that during the peak hours the E. Main Street approach volumes were 80% of the volume of the Business 15/29 approach volume over the course of all gathered hours, and

during the morning peak period, Main Street was at times higher than Business 15/29 which may indicate a shift in traffic patterns for more recently gathered data. All-way stop control at this location would provide a safer and more predictable pedestrian crossing in all directions then an uncontrolled crossing of Business 15/29.

Connection to Planned Rappahannock Station Battlefield Park and River Access

The southern terminus of the shared use path has two destinations on either side of Business 15/29, the planned Rappahannock Station Battlefield Park and the River Access (Rector Tract) as shown in **Figure 17.**

Figure 17. Business 15/29 and River Road

The shared use path terminates at the Battlefield Park entrance, and crosses Business 15/29 to provide access between the Battlefield Park and the River Access. Based on the Safe Transportation for Every

Pedestrian (STEP) guide guidance, this crossing should be designed to include high visibility markings as well as an RRFB to enhance vehicular yielding. Advance crosswalk ahead signage should also be considered for the northbound approach. Though the existing sight distance is adequate for a 35 mph roadway, drivers traveling above the speed limit may need advance warning to react to crossing bikes and pedestrians. This concept also recommends removal of the acceleration and deceleration lanes for Godwin's Landing Road. The VDOT access manual[8] does not require an acceleration lane or deceleration lane for 35 mph roadways, and removal will help narrow the pedestrian crossing distance, provide space for the shared use path and enhance traffic calming efforts.

As a long-term alternative, an alternative intersection layout such as a roundabout, or realignment of River Road could be considered at this location to eliminate the Y-intersection with River Road and consolidate the movements with the Battlefield Park access and River Road. There may be available right-of-way at this location based on parcel mapping, but ROW considerations would require further study to determine feasibility.

On River Road between Business 15/29 and the Rector Tract, the roadway currently operates with an approximately 15-foot traveled way within an 30-foot right-of-way (right-of-way estimates need to be confirmed/refined via field survey as concepts advance). Existing operations have pedestrians, bicycles and vehicles operating in a shared condition with very slow operating speeds observed, and limited space for passing. Based on the limited access and low volumes for this roadway, the existing shared space is an appropriate usage. If future pedestrian or bicycle volumes increase such that a more formal treatment is desired, an advisory/dashed bike lane treatment could be considered (Figure 19). As of July 2022, this treatment is currently under an interim approval with FHWA and would require a request to experiment. At this time FHWA is not accepting new requests to experiment, but in the future this may change.[9]

[8] VDOT Access Management Design Standards for Entrances and Intersections https://www.virginiadot.org/business/resources/locdes/rdm/appendf.pdf

[9] https://mutcd.fhwa.dot.gov/knowledge/faqs/faq_part9.htm#otq4

Figure 18. Example of Advisory/Shoulder Bike Lane

Traffic Calming and Pedestrian Improvements

As discussed in the existing conditions section, Main Street currently operates with vehicular parking on both sides, and a 30-foot two-way traveled way with variable sidewalks. There is significant heavy vehicle traffic, including lumber trucks traveling to and from the lumber yard on the southwest quadrant of the intersection of Main Street and Franklin Street, trucks transporting sod, heavy construction equipment and other unknown materials traveling through town, and food service company trucks serving local restaurants. As shown in the photographs in **Figure 19**, these trucks are visually out of scale to Main Street. When cars are parked on both sides of Main Street, these trucks use the entirety of the available roadway, and oncoming traffic must yield.

Figure 19. Trucks on Main Street by Lumberyard Entrance

Based on field observations of Main Street, standard passenger vehicles also generally yield to oncoming traffic in the presence of parked cars, since the available roadway width is, or can be perceived as inadequate for passing when vehicles are parked on both sides of the roadway. There is no centerline marking currently on Main Street. Based on MUTCD guidance, centerline markings are not required or recommended based on volumes for rural collector roadways under 3000 vpd; however, they may be recommended based on an engineering study of other factors.

Existing sidewalks on Main Street are between 3.5 and 5 feet wide, with some wider sections adjacent to businesses where the sideway continues to the building face.

Madison Street has an existing pavement width of 22 feet, with one discontinuous sections of sidewalk at the church located at 100 N John Stone St. The edge of the traveled way is not defined in many sections, as private parking areas directly abut the roadway with no defined entrance.

In order to provide a more comfortable pedestrian experience, provide space for green elements such as street trees, stormwater infiltration facilities, or grass plantings, and define the vehicular movements through these roadways, we recommend reallocating the available variable right-of-way on E. Main Street to provide a two 11-foot travel lanes, a single 8-foot parking lane, and use the remaining space to create continuous sidewalks of at least 5 feet and up to 10-feet wide where possible based on specific right-of-way availability.

This roadway reconstruction should also include consideration for driveway design, including consolidation or narrowing where possible.

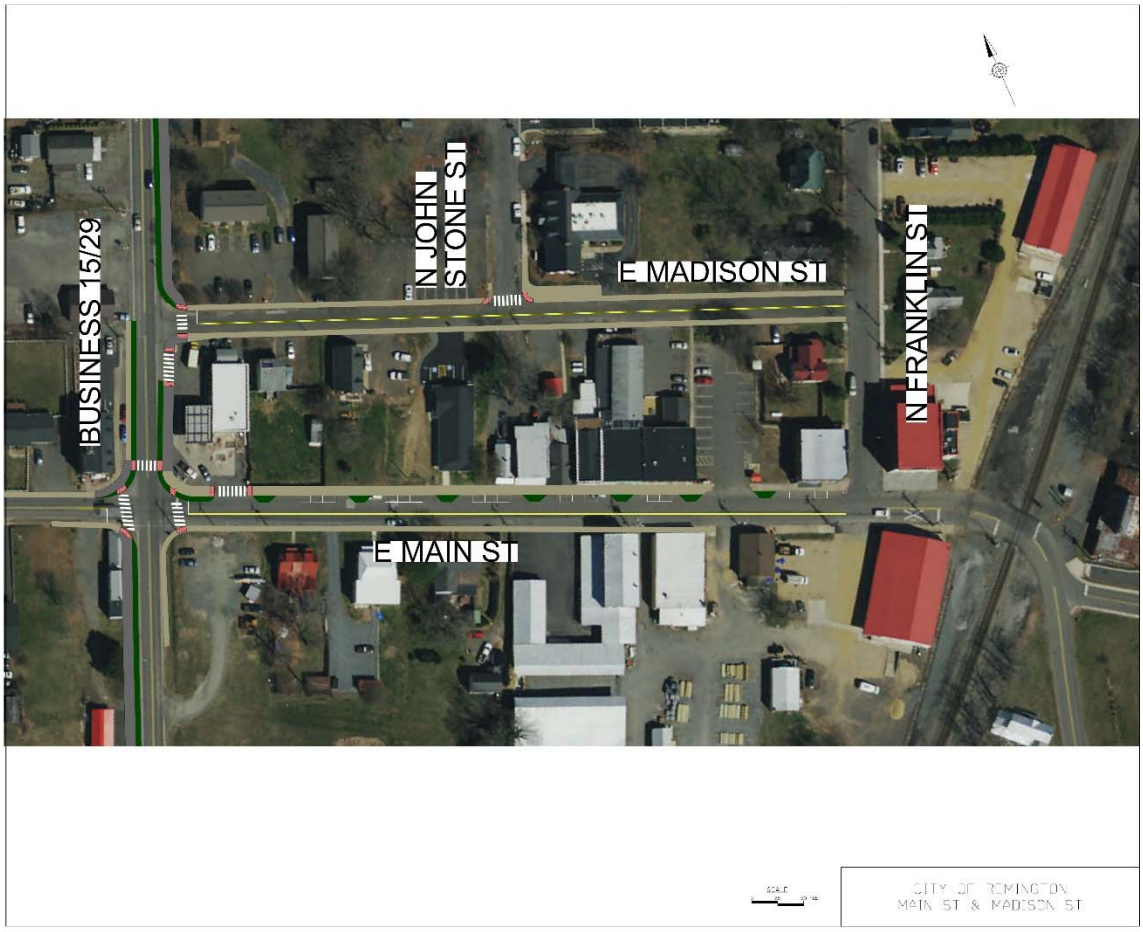


Figure 20. Main Street and Madison Street Pedestrian Improvements

This recommendation would impact existing stormwater and drainage facilities as curbs would be moved and may require utility relocation which significantly impacts project costs. It is not within the scope of this study to fully explore the project costs of a comprehensive stormwater and utility approach. The planning level cost estimate completed for this study applied "typical" project costs for sidewalk construction as per the VDOT Cost Estimating Tool, which it is assumed would include some level of stormwater design as related to curb reconstruction, but stormwater design has not been explicitly included as a separate line item. Utility costs are included in the cost estimates as a percentage of total costs. If the town were to pursue a larger project relating to utility relocation and comprehensive stormwater upgrades, it would be complimented by this roadway redesign, but the costs of such a plan may not be reflected by the planning level cost estimates included in this memo.

Though Main Street does not meet MUTCD guidance for minimum volumes for recommended centerlines, based on engineering study considering the higher than typical truck traffic and the current usage of the road, fully defining the available lanes will provide clarity to users of the street as to permitted parking locations as well as driver expectations for lane location.

To help create a “Main Street” feel on E. Madison Street to meet the goals of increased vibrancy and pedestrian comfort on both E. Main Street and E. Madison Streets, this concept recommends two 10-foot travel lanes, with minimum five-foot sidewalks the full length of the E. Madison Street between Business 15/29 and Franklin Street. Based on field observations of existing travel-way width GIS parcel mapping, this may require some right-of-way acquisition. As discussed for Main Street, updating the roadway to include continuous sidewalk will require significant stormwater management and drainage design and may require utility relocation. Additional study will be needed in the design phase of this project to understand the full impacts of these aspects. This roadway reconstruction should also include consideration for driveway design, including creating defined access locations and consolidating driveways if possible, to reduce breaks in the sidewalk.

Summary

As noted previously, the goal of this project is to explore two primary objectives that support the Town of Remington’s goals of pedestrian and cyclist safety and comfort and economic vitality:

1. Identify location-specific traffic calming measures and on/off-road multimodal improvements between M.M. Pierce Elementary School and the Rappahannock River Bridge.
2. Analyze the feasibility of converting East Main Street to one-way, eastbound traffic movements and utilizing East Madison Street for one-way, westbound traffic movements, and to provide additional traffic calming and multimodal improvement alternatives along the two corridors.

Objective 1

North-south through the study area along Business 15/29, an off-road 10-foot-wide shared use path is recommended for the full length of the study area. This would provide a safe and efficient multimodal option for residents to travel between northern and southern limits of the town, between the M.M. Pierce Elementary and the Rector Tract river access

Three locations were identified to implement traffic calming measures: at M.M. Pierce Elementary School, at the Business 15/29 and Main Street intersection, and at the connection to the planned Rappahannock Station Battlefield Park and River Road access to the Rector Tract. High visibility crosswalks, curb extension bump outs, and center medians have been recommended at the elementary school in order to slow southbound travelling vehicles as well as to provide a safe route to the school.

The shared use path transitions to the western side of Business 15/29 at the intersection of Main Street and provides direct access to the planned Rappahannock Station Battlefield Park and includes a crossing to access the Rector Tract access on River Road. The recommendations shown earlier suggest geometric changes to the intersection, upgrading to a four-way stop at Main Street, as well as providing high visibility crosswalks.

The southern terminus of the shared use path has two destinations on either side of Business 15/29, the planned Rappahannock Station Battlefield Park and the River Access (Rector Tract). Recommendations include high visibility crosswalk markings as well as an RRFB to enhance vehicular yielding. Additionally, advance crosswalk ahead signage should also be considered for the northbound approach.

Objective 2

A prior memo dated June 13, 2022 titled "Existing Conditions and One-Way Circulation Technical Memorandum" explored the feasibility of one-way circulation and found that it would: a) not be feasible with the current level of large truck traffic through Main Street, b) may not support the objective of improved pedestrian comfort and safety in the downtown.

To provide traffic calming and multimodal improvement alternatives along Main Street and Madison Street it is recommended to reallocate the available variable right-of-way on E. Main Street to establish two 11-foot travel lanes, a single 8-foot parking lane, and use the remaining space to create continuous sidewalks of at least 5 feet and up to 10-feet wide where possible based on specific right-of-way availability. This will enhance a more comfortable pedestrian experience, provide space for green elements such as street trees, stormwater infiltration facilities, or grass plantings, and define the vehicular movements through these roadways.

All recommendations are summarized in **Table 3.**

Table 3. Summary of Recommendations

Recommendation | No.	Description
M.M. Pierce Elementary School	
High Visibility Crosswalk | 1	High-visibility crosswalks use patterns that are visible to both the driver and pedestrian from farther away compared to traditional transverse line crosswalks.
Bump out | 2	Bump outs extend the curb into the street on both sides of the street at a pedestrian crossing, effectively making the pedestrian crossing shorter and keep pedestrians safe.
Pedestrian Crossing Signage | 3	Pedestrian crossing signs provide advance notice of areas of high pedestrian activity so drivers can prepare to slow down or stop on short notice.
Rectangular Rapid Flashing Beacon | 4	RRFB are pedestrian-actuated conspicuity enhancements used in combination with a pedestrian, school, or trail crossing warning sign to improve safety at uncontrolled, marked crosswalks.
Business 15/29 and Main Street Intersection	
Geometric Changes | 5	Changes to the physical infrastructure at the intersection such as expanding the sidewalk to 5 feet installing new sidewalk, narrowing lanes, etc.)
Four Way Stop | 6	A traffic management system which requires vehicles on all the approaches to a road intersection to stop at the intersection before proceeding through it.

High Visibility Crosswalk | 7	High-visibility crosswalks use patterns that are visible to both the driver and pedestrian from farther away compared to traditional transverse line crosswalks.
Pedestrian Crossing Signage | 8	Pedestrian crossing signs provide advance notice of areas of high pedestrian activity so drivers can prepare to slow down or stop on short notice.
Rectangular Rapid Flashing Beacon | 9	RRFB are pedestrian-actuated conspicuity enhancements used in combination with a pedestrian, school, or trail crossing warning sign to improve safety at uncontrolled, marked crosswalks.
- **Planned Rappahannock Station Battlefield Park and River Access**	
High Visibility Crosswalk | 10	High-visibility crosswalks use patterns that are visible to both the driver and pedestrian from farther away compared to traditional transverse line crosswalks.
Pedestrian Crossing Signage | 11	Pedestrian crossing signs provide advance notice of areas of high pedestrian activity so drivers can prepare to slow down or stop on short notice.
Rectangular Rapid Flashing Beacon | 12	RRFB are pedestrian-actuated conspicuity enhancements used in combination with a pedestrian, school, or trail crossing warning sign to improve safety at uncontrolled, marked crosswalks.
Main Street and Madison Street	
High Visibility Crosswalk | 13	High-visibility crosswalks use patterns that are visible to both the driver and pedestrian from farther away compared to traditional transverse line crosswalks.
Bump out | 14	Bum pouts extend the curb into the street on both sides of the street at a pedestrian crossing, effectively making the pedestrian crossing shorter and keep pedestrians safe.
Pedestrian Crossing Signage | 15	Pedestrian crossing signs provide advance notice of areas of high pedestrian activity so drivers can prepare to slow down or stop on short notice.
Lane Usage Pavement Marking | 16	Pavement marking to distinguish between eastbound and westbound moving lanes as well as a parking lane.
Expanding sidewalks | 17	Expanding the sidewalk to 5-10 feet would allow for a more comfortable and safe pedestrian user experience.
LENGTH OF STUDY AREA	
Shared Use Path | 18	A multi-use path designed primarily for use by bicyclists and pedestrians, including pedestrians with disabilities, for transportation and recreation purposes. Shared use paths are physically separated from motor vehicle traffic by an open space or barrier.

The recommendations and their respective number are mapped in Appendix B – City of Remington Rollplot.

It is important to note that not all recommendations need to be installed simultaneously. Pedestrian crossing markings, signing and enhancements at several locations could be installed prior to construction of the Shared Use Path or the reconfiguration of Main or Madison Street. Recommendations that include reconstruction or reconfiguration of curbs, such as narrowing Main Street, adding sidewalks to Madison Street, and defining the edges of the traveled way at the

intersection of Business 15/29 and Main Street will require more engineering investigation and design to understand right-of-way and stormwater impacts. Recommendations 1, 3, 4, 6, 7, 8, 9, 13, and 15 can be implemented prior to and independently of the other recommendations.

Cost Estimate

The following is a planning level cost estimate for the construction of the proposed sidewalk sections, and trail sections. During the Engineering Design process, these values will likely change as the design is finalized. The estimated values are based on VDOT prices for residential/suburban settings, adjusted for inflation. Using the VDOT Cost Estimating Tool, the estimates are presented below as ranges, with a low-end and high-end estimate for each project. Estimated costs for crossing treatments, a 10' paved shared use off road path, parking restriping, right-of-way/utility allowances, and contingencies are included in the overall sidewalk and trail cost estimates. The range in estimates accounts for additional expenses that may be needed for some projects, such as retaining walls or other features. Additional details about the cost estimate assumptions and unit costs applied are available in the submitted Planning Level Cost Opinion Excel workbook. These cost estimates were prepared in July 2022 and should be considered valid for no more than 6 months.

Table A1 outlines the cost for the shared use path along Business 15/29. It includes a 10' path the full length of the study area, exclusive of the 140 feet at the intersection with Main Street, as well as nine potential pedestrian crossings. The costs are broken down into two segments of the shared use path, north and south of the intersection with Main Street. Table A2 outlines the estimated cost for Streetscape and Pedestrian Improvements along Main Street and Madison Street, assuming sidewalk construction between Business 15/29 and Franklin Street. The level of detail of this estimate does not capture the nuances of the specific design options available on these roadways, the range of prices shown reflects a conceptual level of estimate and would need to be refined with details on utility and drainage impacts as well as aesthetic or public use design decisions in subsequent design phases. Table A3 outlines the estimated cost for pedestrian and traffic calming improvements at the intersection of Business 15/29 and Main Street. It includes the recommended path and sidewalk sections within a 720' influence area of the intersection, as well as new pedestrian crossings. Similarly, these estimates include a range of prices to reflect the potential unknown costs such as drainage design, right-of-way, and utility impacts.

Table A1. Shared Use Path Cost Estimate Summary

	North of Main St. Shared Use Path		South of Main St. Shared Use Path	
	Low	**High**	**Low**	**High**
Project Length (Miles)	.28		.23	
Subtotal Roadway Cost	$430,606	$747,045	$291,364	$483,977
Right-of-way and Utilities Cost[1]	$107,652	$261,466	$72,841	$169,392

Total Roadway Cost[2]	$559,788	$1,098,157	$378,773	$711,447
TOTAL SEGMENT COST[3]	**$699,735**	**$1,372,696**	**$473,466**	**$889,308**

[1] Low end estimate assumes 25% and high end assumes 35% [2] Includes crossings [3]Includes contingency

Table A2. Streetscape and Pedestrian Improvements Cost Estimate Summary

	Streetscape & Pedestrian Improvements	
	Low	**High**
Project Length (Miles)	0.13	
Subtotal Roadway Cost	$283,736	$805,316
Right-of-way and Utilities Cost[1]	$70,934	$281,861
Total Roadway Cost[2]	$368,857	$1,183,815
TOTAL SEGMENT COST[3]	**$461,071**	**$1,479,769**

[1] Low end estimate assumes 25% and high end assumes 35% [2] Includes crossings [3]Includes contingency

Table A3. Main St and Business 15/29 Intersection Improvements Cost Estimate Summary

	Intersection Improvements	
	Low	**High**
Project Length (Miles)	0.06	
Subtotal Roadway Cost	$189,572	$416,799
Right-of-way and Utilities Cost[1]	$47,393	$145,880
Total Roadway Cost[2]	$246,444	$612,695
TOTAL SEGMENT COST[3]	**$308,054**	**$765,869**

[1] Low end estimate assumes 25% and high end assumes 35% [2] Includes crossings [3]Includes contingency

Attachments

Attached is a Conceptual Plan (MicroStation drawings), and Planning Level Cost Opinion.

NOTE: Information contained in this document is for planning purposes and should not be used for final design of any project. All results, recommendations, concept drawings, cost opinions, and commentary contained herein are based on limited data and information and on existing conditions that are subject to change. Further analysis and engineering design are necessary prior to implementing any of the recommendations contained herein.

Appendix A

SHEET
RT 15 1

CONTINUED ON RT 15 SHEET 2

CITY OF REMINGTON
FIELDWORK

CONTINUED ON MAIN ST SHEET 2

SHEET
MAIN ST 1

CITY OF REMINGTON
FIELDWORK

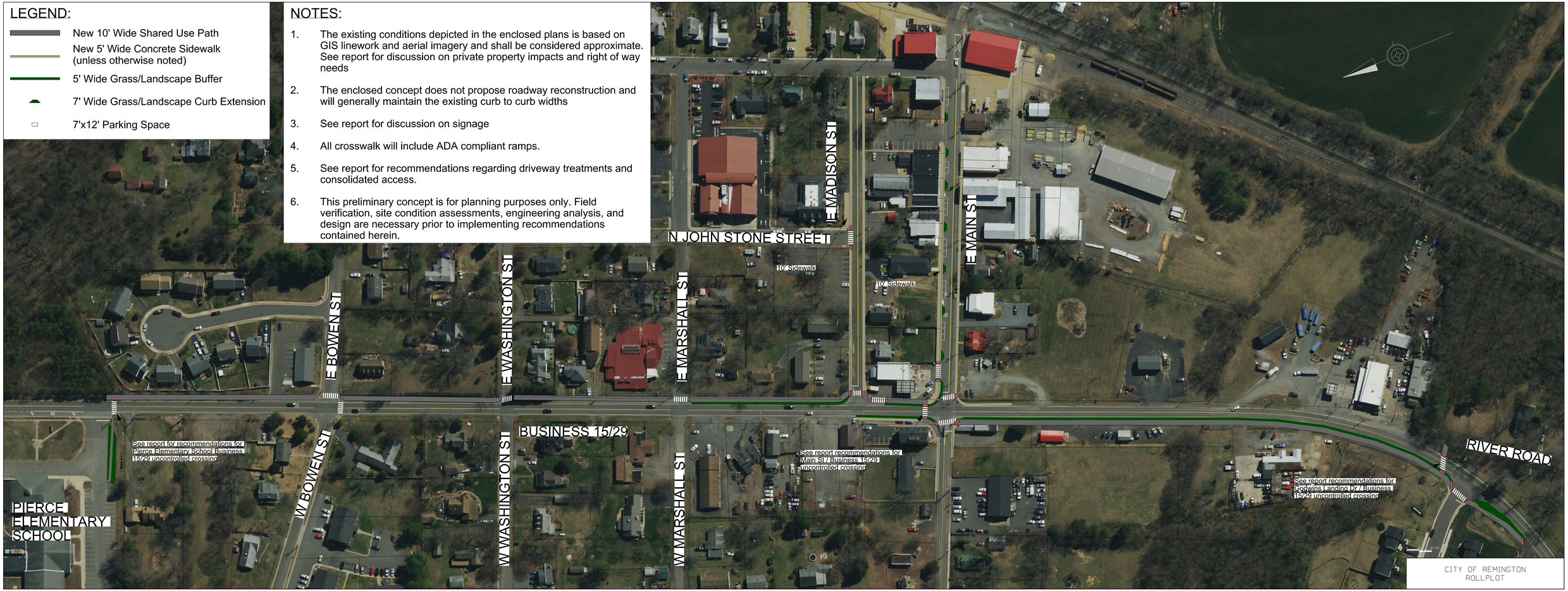
CONTINUED ON MAIN ST SHEET 3

CITY OF REMINGTON
FIELDWORK

SHEET
MAIN ST 2

CONTINUED ON MAIN ST SHEET 1

Appendix B


LEGEND:
New 10' Wide Shared Use Path
New 5' Wide Concrete Sidewalk (unless otherwise noted)
5' Wide Grass/Landscape Buffer
7' Wide Grass/Landscape Curb Extension
7'x12' Parking Space
NOTES:
1. The existing conditions depicted in the enclosed plans is based on GIS linework and aerial imagery and shall be considered approximate. See report for discussion on private property impacts and right of way needs
2. The enclosed concept does not propose roadway reconstruction and will generally maintain the existing curb to curb widths
3. See report for discussion on signage
4. All crosswalk will include ADA compliant ramps.
5. See report for recommendations regarding driveway treatments and consolidated access.
6. This preliminary concept is for planning purposes only. Field verification, site condition assessments, engineering analysis, and design are necessary prior to implementing recommendations contained herein.
N JOHN STONE STREET
E MADISON ST
E MAIN ST
E BOWEN ST
E WASHINGTON ST
E MARSHALL ST
10' Sidewalk
10' Sidewalk
BUSINESS 15/29
W BOWEN ST
W WASHINGTON ST
W MARSHALL ST
See report for recommendations for Pierce Elementary School Business 15/29 uncontrolled crossing
See report recommendations for Main St / Business 15/29 uncontrolled crossing
See report recommendations for Godwins Landing Dr / Business 15/29 uncontrolled crossing
PIERCE ELEMENTARY SCHOOL
RIVER ROAD
CITY OF REMINGTON
ROLLPLOT