### TECHNICAL MEMORANDUM



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	Group (providing technical assistance on behalf of the Office of Intermodal Planning and Investment	t)
TO:	Lisa Cooper, Stephanie Mathena	
	Franklin County	
SUBJECT:	Westlake-Hales Ford Planning-Level Bicycle and Pedestrian Recommendations	
	Final Recommendations Memo	
DATE:	April 23, 2024	

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# Recommendations

### Introduction

The overall goal of this project is to enhance opportunities for active transportation in the Westlake-Hales Ford Designated Growth Area (DGA) by creating a connected network of sidewalks and shared use paths in areas of highest existing and future need. The project team worked with the County to identify the highest priority elements of that network and concept designs for each of these high priority projects are presented in this report.

Top priority projects were chosen based on their ability to:

- connect to projects with existing or active funding pursuits,
- serve major activity areas or have high residential populations,
- contribute to a connected network of active transportation infrastructure,
- increase safety for all modes on VA-122,
- move towards implementation with most feasibility and with the least impact on private development.

The top priority projects were further refined, and ten projects were broken out form the concept design. The project descriptions and key features are summarized in Table 1 below. Typical Sections, Concept Design Plans, and Cost Estimates are provided as an attachment.



## **Priority Projects**

Project No.	Description	Key Features		
1	Sidewalk along the south side of VA-122 from Village Springs Drive/Shoppers Pride Drive to Scruggs Road.	1980-ft sidewalk		
2	SUP along the north side of VA-122 from Parkcrest Road to Morewood Road.	1340-ft SUP		
3	Intersection improvements at VA-122 and Village Springs Drive/Shoppers Pride Drive including Shared Use Path (SUP) connection from the crossing to Shoppers Pride Drive.	Pedestrian Hybrid Beacon (PHB) Crossing with pedestrian refuge. 230-ft Shared Use Path (SUP)		
	Intersection improvements at VA-122 and Morewood Road/Westlake Road including sidewalk connection from the CVS driveway to the intersection and the sidewalk connection from Apron Road to the intersection.	Pedestrian improvements at signalized crossing, 55-ft SUP, 660-ft sidewalk		
4	Sidewalk along the northside of Apron Road from Westlake Road to Shoppers Pride Drive.	460-ft sidewalk		
5	SUP on the west side of Shoppers Pride Drive. Sidewalk on the east side of Shoppers Pride Drive.	Shoppers Pride Drive: 1030- ft SUP, 480-ft sidewalk		
	Sidewalk connection on both sides of Village Springs Drive from VA-122 to Brookview Lane.	Village Springs Drive: 270-ft sidewalk		
6	SUP from Shoppers Pride Drive to Professional Drive.	490-ft SUP		
7	Intersection improvements at VA-122 and Scruggs Road.	Pedestrian improvements at signalized crossing		
8	Sidewalk on the south side of VA-122 at the Bridgewater Plaza.	730-ft sidewalk		
9	SUP on the north side of VA-122 from Bridgewater Grande Drive to Bridgewater Plaza.	1430-ft SUP 300-ft retaining wall		
10	Trail crossing at Bridgewater Plaza driveway.	Uncontrolled marked crossing with pedestrian refuge		



# **Design Criteria**

Toole Design reviewed the following documents to identify the design criteria:

- VDOT Road Design Manual (RDM), 2023
- VDOT Road and Bridge Standards, 2022
- VDOT Road and Bridge Specification Book, 2020
- The Manual on Uniform Traffic Control Devices (MUTCD), 2023
- American Association of State Highway and Transportation Officials (AASHTO) A Policy on Geometric Design of Highways and Streets (AASHTO Green Book), 2018
- Americans with Disabilities Act (ADA), 1990
- Public Rights-of-Way Accessibility Guidelines (PROWAG), 2023
- American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities (Draft AASHTO Bike Guide) \*

\*As the primary authors for the forthcoming 5<sup>th</sup> Edition of AASHTO's Bike Guide, Toole Design has also considered the draft design guidance from this document, where appropriate.

The following tables provide key design criteria associated with the roadway, shared use path, and sidewalk design.



## **Roadway Design Criteria**

	Source	Standard	Design Criteria		
Functional		NI/A	VA-122: Minor Arterial		
Classification	VDOT	N/A	Scruggs Rd: Major Collector		
Average Daily	VDOT	NI/A	VA-122: 14,000-17,000 vehicles per day (vpd)		
Traffic (ADT)	VDOT	N/A	Scruggs Rd: 12,000 vpd		
Design Speed	Evicting	NI/A	VA-122: 45 mph		
Design speed	Existing	N/A	Scruggs Rd: 35-45 mph		
			VA-122, curbed section: Lane width = 11'		
Lana Width	VDOT RDM	GS-2, GS-3, GS-6,	VA-122, open section: Lane width = 12'		
		GS-7	Scruggs Rd, curbed section: Lane width = 11'		
			Scruggs Rd, open section: Lane width = 11'		
			Rural, Design Speed ≤ 45 mph		
	VDOT RDM		Length of Storage, L = 100' (min.)		
Turn Lanes		Appendix F,	Taper, T = 100' (min.)		
Turri Laries		Section 3			
			Urban, Design Speed ≤ 45 mph		
			Taper Rate = 8:1		
Crosswalk Marking	MUTCD	High Visibility	24-inch string 26-inch gan		
	MOTED	Crosswalk	24-inch stripe, 50-inch gap		
Curb Ramos		CG-12	CG-12 Detectable Warning Surface		
		0-12			
Curb and gutter		CG-2 / CG-7	CG-2 Standard 6" Curb		
			CG-7 Combination 4" Curb and Gutter		

<sup>&</sup>lt;sup>1</sup> <u>https://www.virginiaroads.org/maps/VDOT::functional-classification-web-map-1/explore?location=37.132482%2C-79.704567%2C12.67</u>



## Shared Use Path (SUP) and Sidewalk Design Criteria

	Source	Standard	Design Criteria	
CLID Design Speed	VDOT RDM,		Segments: 18 mph (VDOT RDM)	
SUP Design Speed	AASHTO Bike Guide		Intersections: 12 mph (AASHTO Bike Guide)	
		10'	10'	
SUP WILLIN	VDOT KDIVI	10	Constrained locations: 8'	
			8' (min.) – lateral offset from face of curb if signs	
	VDOT RDM, c r, e, will be placed in buffer.		will be placed in buffer.	
SUP Buller	Appendix A(1)	8- 2.0	6.5' (min.) – lateral offset from face of curb if	
			signs will be placed outside of shared use path.	
SUP Cross Slope	VDOT RDM	2% crowned	2% crowned	
SUP Shoulder		$2^{\prime}$ (min)	2' (min.)	
Width	VDOT KDIVI	2 (mm.)		
SUP Shoulder		6:1 (max)	6:1 (max.)	
Slope		0.1 (max.)		
SUP Lateral		3' from edge of	3' from edge of nath	
Clearance		path	S nom edge of path	
SUP Pavement		Eiguro $\Lambda(1)$ 12	2" Asphalt Concrete (9.5mm)	
Structure		Figure A(1)-12	6" Aggregate Base	
Sidowalk		Design Standards	Width: 5' (min.) / 6' (design)	
SILLEWAIK		for Urban Minor		
		Arterial		
Design Details	VDOT Road and	CG-12	CG-12 Detectable Warming Surface	
	Bridge Standards CG-9		CG-9 Standard Entrance Gutter	



# **Significant Design Elements**

The concept design plans for the top priority projects in the study area include continuous sidewalk and/or shared use path along VA-122 and on intersecting roads. There are several significant design elements that are explained in more detail below. These are the most complex elements that will require the greatest coordination and collaboration with VDOT and other stakeholders in the project area.

### Westlake Towne Center Area

### VA-122 Roadway Shift near Westlake Towne Center

The goal for this section of VA-122 is to provide a safe, accessible shared use path for people on foot, bikes, wheelchairs, and other non-motorized vehicles on the north side of the road, as well as a sidewalk on the south side. This is likely to be the busiest section of the project area, with an increasing amount of pedestrian and bike activity generated by additional residential development and commercial attractions in the Westlake Towne Center area.

There is a significant change in elevation on the north side of VA-122 between the edge of the existing roadway and the commercial parking lots and structures. It is particularly pronounced between Village Springs Drive and Scruggs Road. We propose a 4-ft shift from the current alignment of VA-122 from the CVS driveway to Morewood Road, to provide sufficient width for the shared use path (and appropriate buffer), as well as curb ramps at the intersections. The roadway shift would also avoid impacts to the existing signal mast arm and minimize impacts to the slope between VA-122 and the CVS parking lot.

### Raised Crossings for Minor Driveways in Westlake Towne Center

There are no existing pedestrian facilities along VA-122 in the study area, although there are clearly worn paths where people are walking despite the presence of sidewalks. The internal sidewalks in Westlake Towne Center end before VA-122. The goal for this section of the project area is to increase the safety, comfort, and priority given to people on foot, bike, wheelchair, and other nonmotorized devices with continuous sidewalk on the south side of VA-122 and sections of shared use path or sidewalk on the north side.

We propose raised crossings of the minor driveways along VA-122 in the Westlake Towne Center to increase the visibility of path users, improve path user comfort by keeping them at a consistent level, and increase safety for path users by slowing vehicles that are turning across the path at the potential conflict point. Existing right turn deceleration lanes provide areas in which drivers can slow down prior to turning off VA-122 and into the Towne Center area.

Potential drainage issues associated with these roadway designs will need to be addressed in later stages of design.

### Intersection Improvements at VA-122 and Westlake Road / Morewood Road

One key goal of this study is to identify opportunities to provide safe crossings of this busy, high-speed arterial roadway. There are currently no marked or signalized crossings of VA-122 in the Westlake Towne Center project area. The



intersection of VA-122 and Westlake Road/Morewood Road is currently a signalized intersection but there are no pedestrian accommodations. We understand that VDOT pursued HSIP funding in 2023 to add pedestrian crossing infrastructure at this location. At the time of this Technical Memorandum, that award had not been announced. If funding is not received, it should be a high priority in future years. We recommend changes to the existing conditions include installation of curb ramps, high-visibility crosswalks, pedestrian signal heads and push buttons, and pedestrian phasing.

### VA-122 Mid-block Crossing near Westlake Towne Center

Additional opportunities to cross VA-122 are also recommended in the Westlake Towne Center area. People are generally unlikely to walk out of their way to use a signalized crossing and there is likely to be increased pedestrian and bike activity in the area because of additional residential and commercial development on both sides of the highway.

We propose one additional crossing to the west of the existing intersection of VA-122 and Shoppers Pride Drive / Village Springs Drive. This location would provide a safe crossing for people seeking access to homes and businesses as the area develops and would facilitate future access to potential trail connections to the Booker T. Washington National Monument.

We propose the crossing be independent from the intersection of VA-122 and Shoppers Pride Drive/Village Springs Drive as it would shorten the overall crossing distance (thus reducing exposure), avoid the threats caused by turning traffic at the intersection, and take advantage of the presence of a median to create a pedestrian refuge.

VA-122 has a posted speed of 45 mph and daily traffic volumes of 15,000 vpd. We recommend a Pedestrian Hybrid Beacon (PHB) if a full pedestrian signal is not warranted. The *FHWA Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations* recommends a PHB where the vehicle AADT is greater than 15,000 and the posted speed limit is greater than or equal to 40 mph. VDOT guidance for pedestrian crossings at uncontrolled locations aligns with FHWA guidance and can be found in the VDOT Traffic Engineering Instructional and Information Memorandum, IIM-TE-384.1.

The recommended PHB installation includes two overhead PHB heads per approach, pedestrian signal heads and push buttons, signage, and a high visibility crosswalk. The PHB is pedestrian-activated and remains dark/off until activated. This minimizes the impact to motorists on the main road.

#### Intersection Improvements at VA-122 and Scruggs Road

The intersection of VA-122 and Scruggs Road is another location where people may want to cross the road, but today there are no marked crosswalks, signals, or pedestrian accommodations of any kind on any of the four legs of the intersection. The proposed sidewalks and SUPs along VA-122 will generate pedestrian and bicycle traffic in the future. Therefore, we propose a series of changes to this intersection that include the installation of curb ramps, high-visibility crosswalks, pedestrian signal heads and push buttons, and pedestrian phasing.



### **Bridgewater Plaza Area**

#### Intersection Improvements at Bridgewater Grande Drive

There is a major residential development underway (Bridgewater Grande) on the north side of VA-122 just to the west of Smith Mountain Lake. The County has approved site plans for the overall development, which included intersection improvements at Bridgewater Grande Drive; VDOT may require more detailed plans for construction. Access to the shared use path and a crossing at the driveway is proposed.

#### VA-122 Crossing Near Bridgewater Plaza

Bridgewater Plaza is a high activity area today with several commercial, retail, and food service businesses in the plaza area, as well as existing and potential residential development. The opening of the Bridgewater Grande development will not only increase the number of people accessing the plaza on foot but is likely to generate demand for walking and biking between the two locations. The distance from the Plaza area to the intersection of Bridgewater Grande Drive is less than 1,500 feet.

We propose a shared use path on the northside of VA-122 to connect the new residential development to the attractions at the plaza area. A proposed sidewalk on the southside of VA-122 will connect the various parking areas, retail, and residential land uses and create a safer, more clearly defined area for people on foot. People will also need to cross VA-122 to get from the Bridgewater Grande development to Bridgewater Plaza. We propose a pedestrian crossing of VA-122 just west of the existing driveways into the parking area for Bridgewater Plaza. We recommend the crossing include a raised median to provide pedestrian refuge, high visibility crosswalk markings, and pedestrian crossing warning signs.



# **Cost Estimate**

Cost estimates were developed for the 10 projects identified by the County. These estimates are intended to be general and used by the County in applying for funding. Construction costs will vary based on the ultimate project scope, actual site conditions and constraints, schedule, and economic conditions at the time of construction.

The VDOT Pre-Quantity Tool (PQT) Version 1.3 was used to develop the cost estimate for each project. The tool and user guide were downloaded from the VDOT website, <u>https://www.vdot.virginia.gov/doing-business/technical-guidance-and-support/cost-estimation/</u>.

The original scope required the use of the VDOT SPLCE tool to develop cost estimates. However, through discussion with VDOT and OIPI, it was determined that the PQT would provide a more accurate cost estimate, as it was published in March 2024 and contains more current unit prices than the SPLCE tool.

### **Cost Estimate Assumptions**

### Contingency

The construction estimates (CN Estimate), which includes roadway, hydraulic, traffic, structure, and earthwork pay items, includes a 30% contingency to cover items that are undefined or are typically unknown early in the planning phase of a project.

### **Preliminary Engineering Cost**

The VDOT PQT includes an estimate for preliminary engineering (PE) costs. The PE cost is a percent of the construction estimate. VDOT provides the following recommendations based on construction estimate totals. Projects with a construction estimate less than \$2M had a PE cost equal to 35% of the construction estimate. Projects with a construction estimate between \$2M and \$5M, had a PE cost equal to 25% of the construction estimate.

### **Pavement Design and Measurement**

The pavement design for minor VA-122 widening was provided by the County and is shown in Figure 1. The pavement design was proposed for VA-122 in the Bridgewater Grande Development Plan dated June 14, 2023. The thicknesses for each pavement layer were used to estimate roadway pavement quantities. Pavement areas for roadway widening, shared use path, and sidewalk were measured using MicroStation.





#### **Earthwork Volumes**

A typical section for shared use path and sidewalk were assumed to determine a rough order of magnitude volume for earthwork. A cross-sectional area was calculated and multiplied by the length of the facility measured in MicroStation. The typical sections and cross-sectional area calculations are below.

**Shared Use Path** - The shared use path (SUP) typical section includes the 10-ft wide SUP, 2-ft wide shoulders on each side, 4:1 slopes each side, and 1-ft elevation. The cross-sectional area of the proposed section was calculated as shown below.



Figure 2 Shared Use Path Typical Section

$$Area = \frac{1}{2} * 4ft * 1ft * 2 + \left[ (2ft + 10ft + 2ft) * (1ft) - \left( 10ft * \frac{8in}{12in/ft} \right) \right] = 11.33 \, SFt + 10ft + 2ft + 10ft + 10ft + 2ft +$$

**Sidewalk** – The sidewalk typical section includes a 6-ft wide buffer, 6-ft wide sidewalk, 2-ft wide shoulder, 4:1 slope, and 6-inch elevation was drawn. The cross-sectional area of the proposed section was calculated as shown below.



SIDEWALK TYPICAL

Figure 3 Sidewalk Typical Section

$$Area = \left[ (6ft + 2ft) * \frac{6in}{\frac{12in}{ft}} \right] + \left( 6ft * \frac{6in}{\frac{12in}{ft}} \right) - \left( 6ft * \frac{4in}{\frac{12in}{ft}} \right) + \left( \frac{1}{2} * 2ft * \frac{6in}{\frac{12in}{ft}} \right) = 5.5 SF$$



**Shared Use Path with Retaining Wall** - For the segments of shared use path with an adjacent retaining wall, an existing 2:1 slope was assumed. The typical section includes the 10-ft wide SUP, 2-ft wide shoulders on each side, and adjacent retaining wall. The cross-sectional area of the proposed section was calculated as shown below.



Figure 4 Shared Use Path with Retaining Wall Typical Section

$$Area = \left[\frac{1}{2} * (2ft + 10ft + 2ft) * 7ft\right] - \left(10ft * \frac{8in}{\frac{12in}{ft}}\right) = 42.33 SF$$



### **Cost Estimate Summary**

Below is a summary of the cost estimate for Westlake-Hales Ford Designated Growth Area (DGA) Multi-Modal Facility Concept Design projects.

Project No.	CN Estimate	Mobilization	Construction Surveying	PE	Project Total
1	\$ 1,808,000.00	\$ 128,000.00	\$ 20,000.00	\$ 685,000.00	\$ 2,641,000.00
2	\$ 2,497,000.00	\$ 165,000.00	\$ 27,000.00	\$ 672,000.00	\$ 3,361,000.00
3	\$ 1,123,000.00	\$ 92,000.00	\$ 13,000.00	\$ 430,000.00	\$ 1,658,000.00
4	\$ 318,000.00	\$ 32,000.00	\$ 4,000.00	\$ 124,000.00	\$ 478,000.00
5	\$ 682,000.00	\$ 62,000.00	\$ 8,000.00	\$ 263,000.00	\$ 1,015,000.00
6	\$ 168,000.00	\$ 19,000.00	\$ 2,000.00	\$ 66,000.00	\$ 255,000.00
7	\$ 530,000.00	\$ 49,000.00	\$ 6,000.00	\$ 205,000.00	\$ 790,000.00
8	\$ 627,000.00	\$ 57,000.00	\$ 7,000.00	\$ 242,000.00	\$ 933,000.00
9	\$ 2,708,000.00	\$ 176,000.00	\$ 30,000.00	\$ 729,000.00	\$ 3,643,000.00
10	\$ 65,000.00	\$ 8,000.00	\$ 1,000.00	\$ 26,000.00	\$ 100,000.00
	\$ 14,874,000.00				

Table 2 Cost Estimate Summary



# Attachments

- 1. Typical Sections
- 2. Westlake-Hales Ford Multi-Modal Facility Concept Design Plans
- 3. Cost Estimates (1 estimate for each project, 10 total estimates)



#### Attachment 1 – Typical Sections



Figure 1 VA-122 at Westlake Towne Center, from Parkcrest Road to Morewood Road/Westlake Road



Figure 2 VA-122 from Morewood Road/Westlake Road to Scruggs Road





Figure 3 VA-122 at Bridgewater Plaza



Figure 4 Shoppers Pride Drive





Figure 5 Morewood Road



Figure 5 Apron Road