



# ROUTE 58 WEST ACCESS MANAGEMENT STUDY

FINAL REPORT

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## Introduction

US Route 58 traverses over 500 miles from Virginia Beach, Virginia to Harrogate, Tennessee. In the western portion of the Danville, Virginia metropolitan area, an 11-mile portion of US 58 runs from Piedmont Drive within the City of Danville to Long Circle in the Brosville area of Pittsylvania County.

This portion of US 58 serves multiple functions. Commuters use it to travel to downtown Danville and other areas of the City from western Pittsylvania and Henry Counties. Trucks use it for freight movement between Danville, Martinsville, and areas further west. Residents and patrons use it to access the properties that are located along it.

The corridor's crash history shows a prevalence of rear-end and angle crashes at intersections and driveways, which often result in injuries. The spacing of access points is deficient along most of the corridor compared to VDOT's access spacing requirements.

## Study Purpose

The purpose of the Route 58 West Access Management Study is to implement a standard of access spacing to help maintain roadway capacity, minimize crash potential, and ensure reliable travel times for the movement of people and goods. The Route 58 West Access Management Study creates a unified plan for the 11-mile study corridor with optimal spacing of access points, recommendations for improvement projects, and policy recommendations to implement as properties redevelop.

The 11-mile portion of US 58 defined above is the subject of this access management study and is referred to as the "study corridor" throughout this report. East of the Danville Expressway, the study corridor is known as US 58 Business. Within the City of Danville, the US 58 study corridor is known as Riverside Drive, and it is called Martinsville Highway within Pittsylvania County.

The context of the US 58 corridor, including anticipated land use, historical traffic trends, crash trends, access spacing, and observations from the site visit, are described in the following sections. Subsequent sections summarize the recommendations from prior plans and findings from other relevant studies and documents and identify deficiencies from the existing traffic operations analysis. Later tasks in the study will involve developing recommendations for addressing the deficiencies and identifying possible funding sources and next steps for implementation.

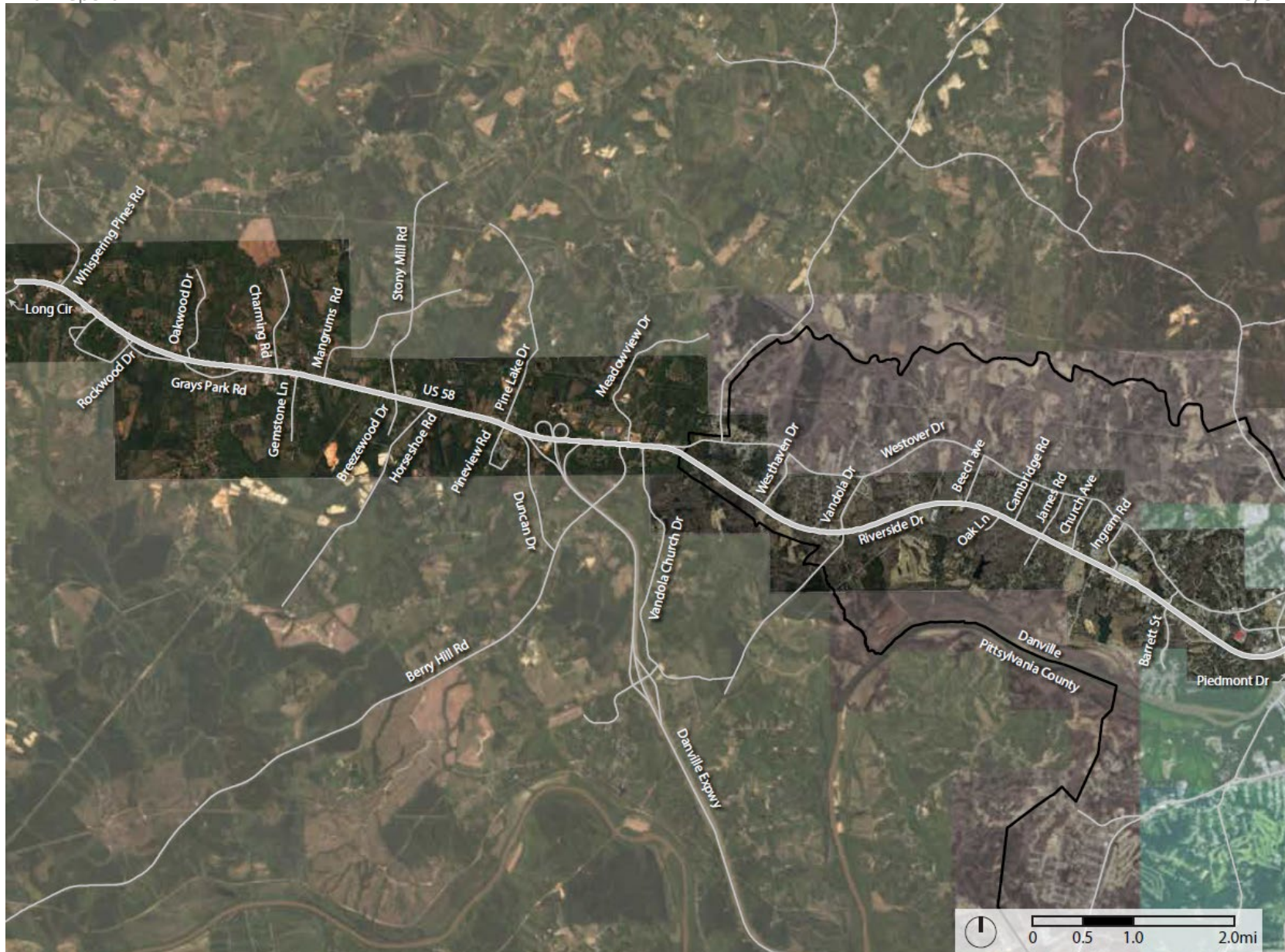


FIGURE 1: US 58 STUDY CORRIDOR

## Corridor Context

### Land Use

The western portion of the study corridor, located in Pittsylvania County, has a mainly rural character. Here, US 58 is spotted with mostly single-family houses with direct driveway access. Commercial businesses appear periodically, sometimes in small clusters, including at Whispering Pines Road, Charming Road, and Berry Hill Road.

### Zoning

Current zoning is mostly R-1 Residential Suburban Subdivision, with some B-2 General Business and RC-1 Residential Combined Subdivision parcels, and a few small parcels with RMF Residential Multi-family, MHP Residential Manufactured Housing Park, M-1 Light Industrial and M-2 Heavy Industrial zoning. The entire Pittsylvania County portion of the corridor is within the Brosville Growth Node Area, one of ten growth areas where the County expects the majority of growth over the 20-year period of the County Comprehensive Plan to occur. The County's Comprehensive Plan also designates this portion of the US 58 study corridor as an Economic Development Corridor.

Moving east into the City of Danville, the land on either side is mostly undeveloped wooded areas. Land use activity adjacent to US 58 Business becomes visible between James Road and Barrett Street, with auto dealer and service shops, a dental office, and other commercial uses. Zoning for most of the land adjacent to the US 58 study corridor within the City is S-R Suburban Residential. Within the City limits, residential subdivisions feed onto the US 58 study corridor with increasing frequency to the east. The westernmost half-mile portion of the study corridor within the City limits has a mixture of commercial and attached residential zoning, although this area is currently undeveloped. East of James Road, the north side of the US 58 study corridor has highway retail commercial zoning, which applies to both sides of the corridor from Ingram Rd to Barrett Street. East of Barrett Street, the zoning is a mix of residential zoning types.

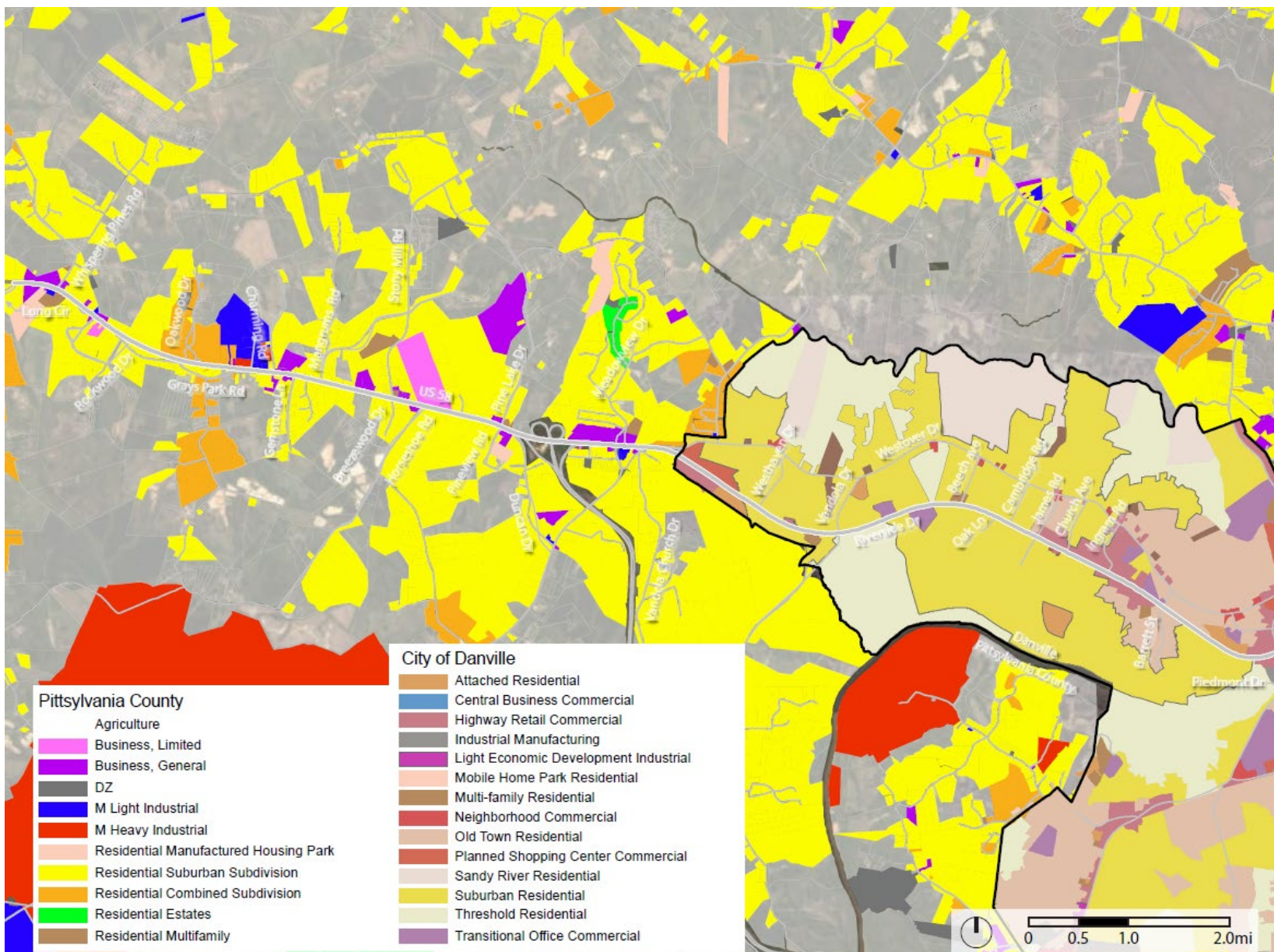


FIGURE 2: ZONING MAP

### Future Land Use

The Pittsylvania County Comprehensive Plan generally designates most of the area within the MPO urban area boundary as “medium to high density residential” future land use as opposed to “agricultural and rural residential.” The Comprehensive Plan indicates developments in the “medium to high density residential” areas would involve lots ranging from 0.25 to 1.0 acres in size. These areas are where “public utilities should generally be available or could reasonably be extended in the future.”

The County Comprehensive Plan designates the US 58 corridor east of Pine Lake Drive and Pineview Road as commercial future land use. The future land use map designates the area near the Brosville Industrial Center as “mixed commercial/ industrial,” and there is a small commercial node at Whispering Pines Road. The Brosville Industrial Center land clearing was the only visible change from a visual inspection comparing the 2006 and 2007 aerial photographs to current aerial imagery.

The portion of the US 58 study corridor within the City has future land use similar to the existing land use and current zoning.



**FIGURE 3: BROSVILLE INDUSTRIAL PARK ENTRANCE SIGN**

*Although largely vacant today, the land in the Brosville Industrial Park just west of Charming Road has been cleared and is zoned for light industrial uses.*

*Image Credit: Google*

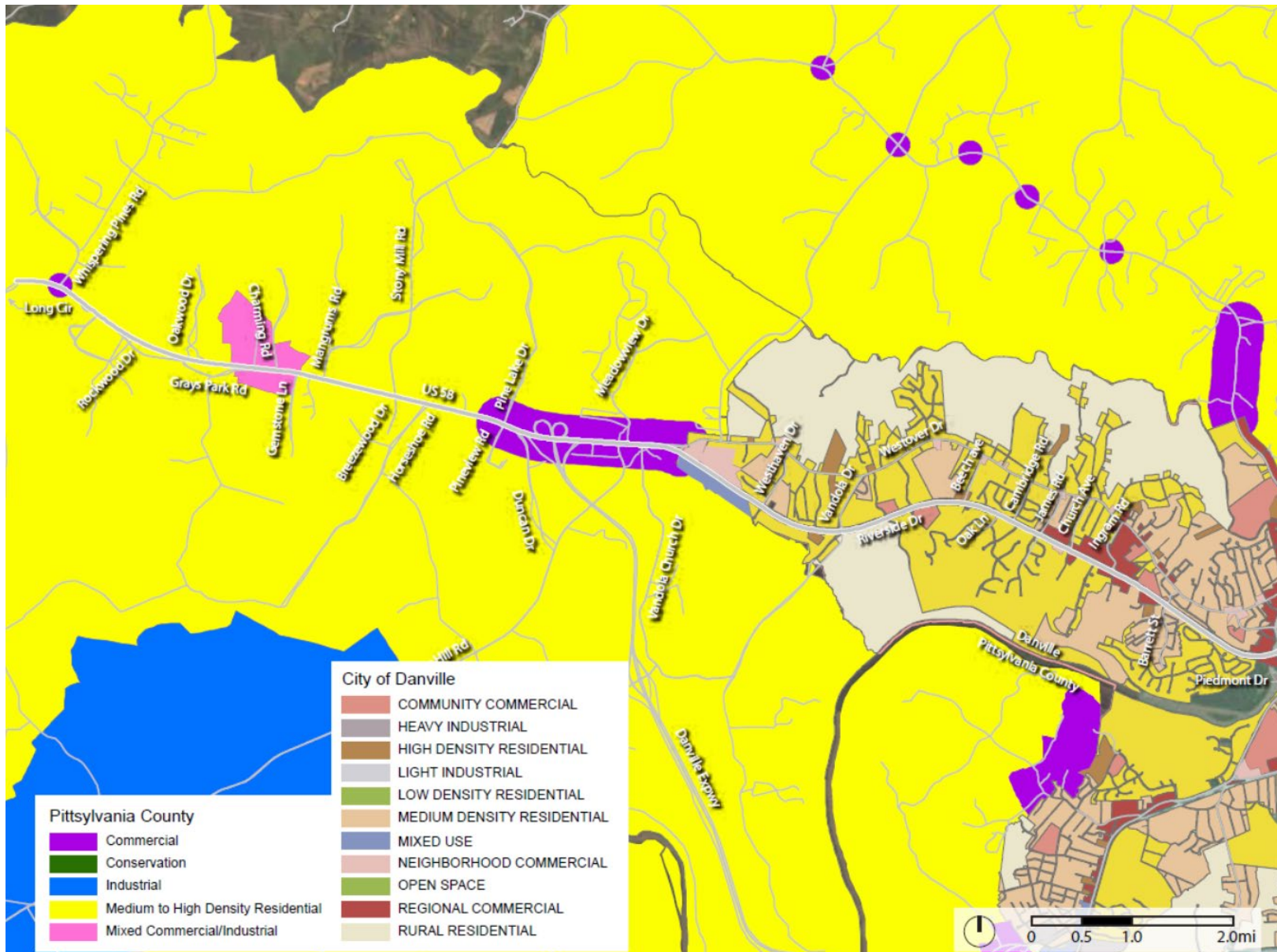


FIGURE 4: FUTURE LAND USE MAP



### Planning Areas

The City of Danville Comprehensive Plan identifies 19 sub areas that are suitable for new development or redevelopment within the Westover Planning Area (see **Figures 6 and 7** on the following pages). Many of these sub areas are located along US 58 Riverside Drive. The four sub areas with commercial zoning have a potential yield of almost 750,000 sq. ft. of commercial uses.

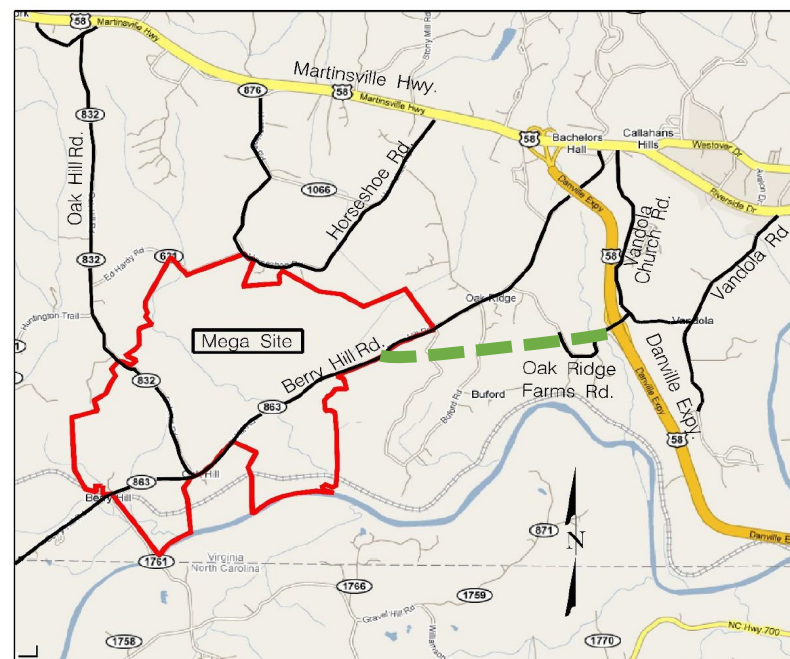
### Southern Virginia Mega Site at Berry Hill

The 3,528-acre Southern Virginia Megasite at Berry Hill is located less than five miles from the US 58 study corridor. The Megasite is owned by Pittsylvania County, the City of Danville, and the Southern Virginia Regional Alliance, who are readying and marketing it to industrial businesses interested in locating on the east coast. The public entities have invested over \$100 million in infrastructure, including water, sewer, electric, broadband, natural gas pipeline, and rail access. The entities have also ensured that permitting and zoning is ready for industrial users.<sup>1</sup>

Prior transportation analyses projected 11,500 employees by 2040.<sup>2</sup> In March 2018, the City and County broke ground at Berry Hill for Phase I, and the Southern Power natural gas electric plant was planned to occupy a portion of the site. In January 2019, Southern Power backed out of the deal, but other prospects have shown interest in the property.<sup>3</sup>

In 2018, the Danville Metropolitan Planning Organization submitted a SMART SCALE application for a connector road extending from the

existing interchange of Oak Ridge Farms Road and the Danville Expressway west to tie in with Berry Hill Road to serve the Megasite. This project scored extremely well in the economic development factors and is expected to be funded with the High Priority Projects Program as of Fiscal Year 2020,<sup>4</sup> and construction is scheduled to take place in subsequent years, based on the Six Year Improvement Program.



**FIGURE 5: SOUTHERN VIRGINIA MEGA SITE AT BERRY HILL MAP**

Image Source: Southern Virginia Mega Site at Berry Hill Transportation Update (Dewberry, 2018). Connector road added for illustrative purposes.

<sup>1</sup> <https://sovamegasite.org/mega-site-overview>

<sup>2</sup> VDOT (2015). *US 58 Bypass/ Route 311 Interchange Justification Report*.

<sup>3</sup> McMiller (2019). “\$250 million Berry Hill Industrial Park Project canceled.” Accessed 6 Feb 2019 from <https://wset.com/news/local/250-million-berry-hill-industrial-park-project-canceled>.

<sup>4</sup> VDOT (2019). *SMART SCALE Project Scores: Fiscal Year 2020 Cohort*.

Accessed 6 Feb 2019 from

<http://vasmartscale.org/documents/20190115/7scorebook2020p.pdf>.

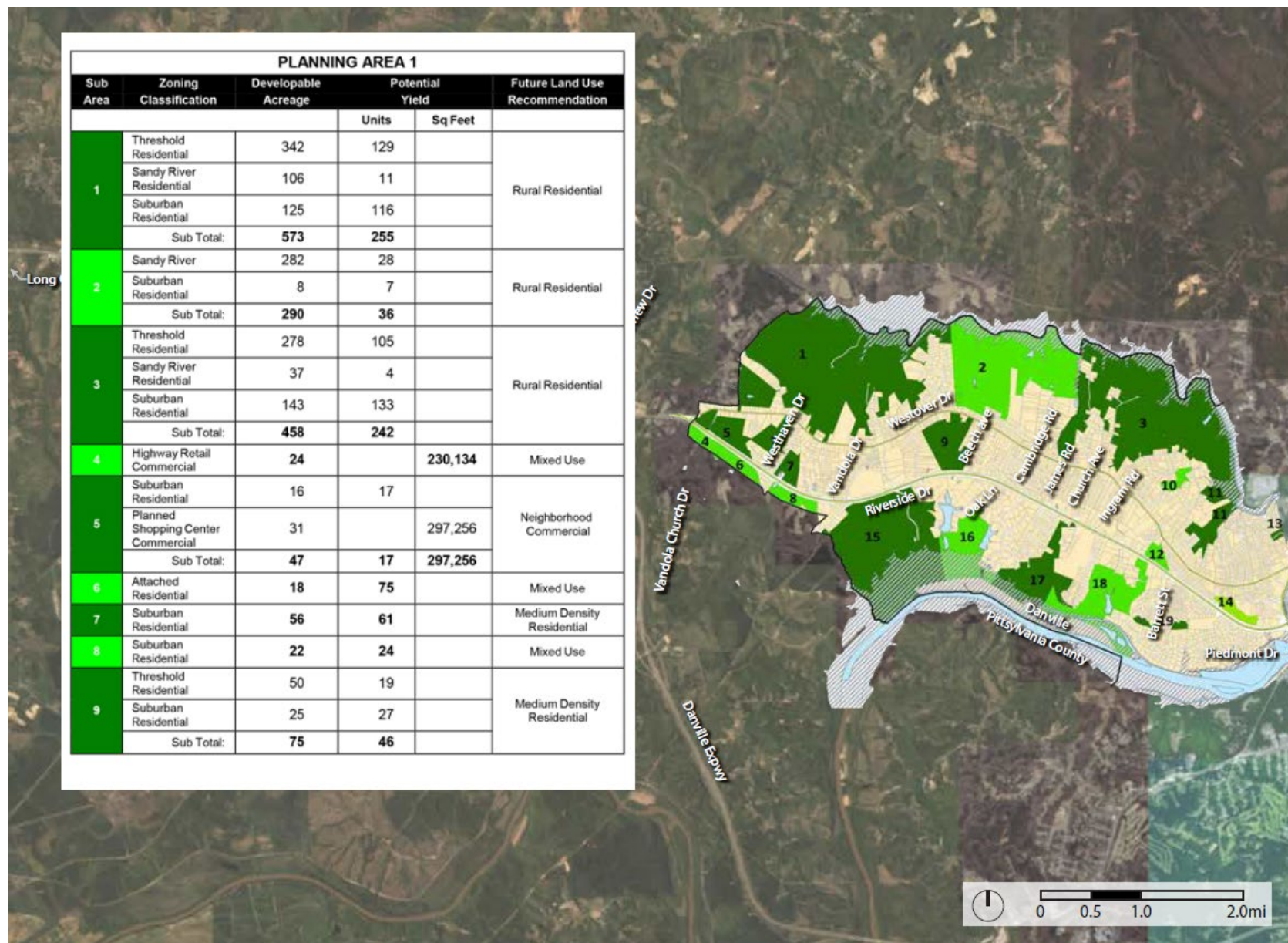


FIGURE 6: PLANNING AREA WESTOVER A

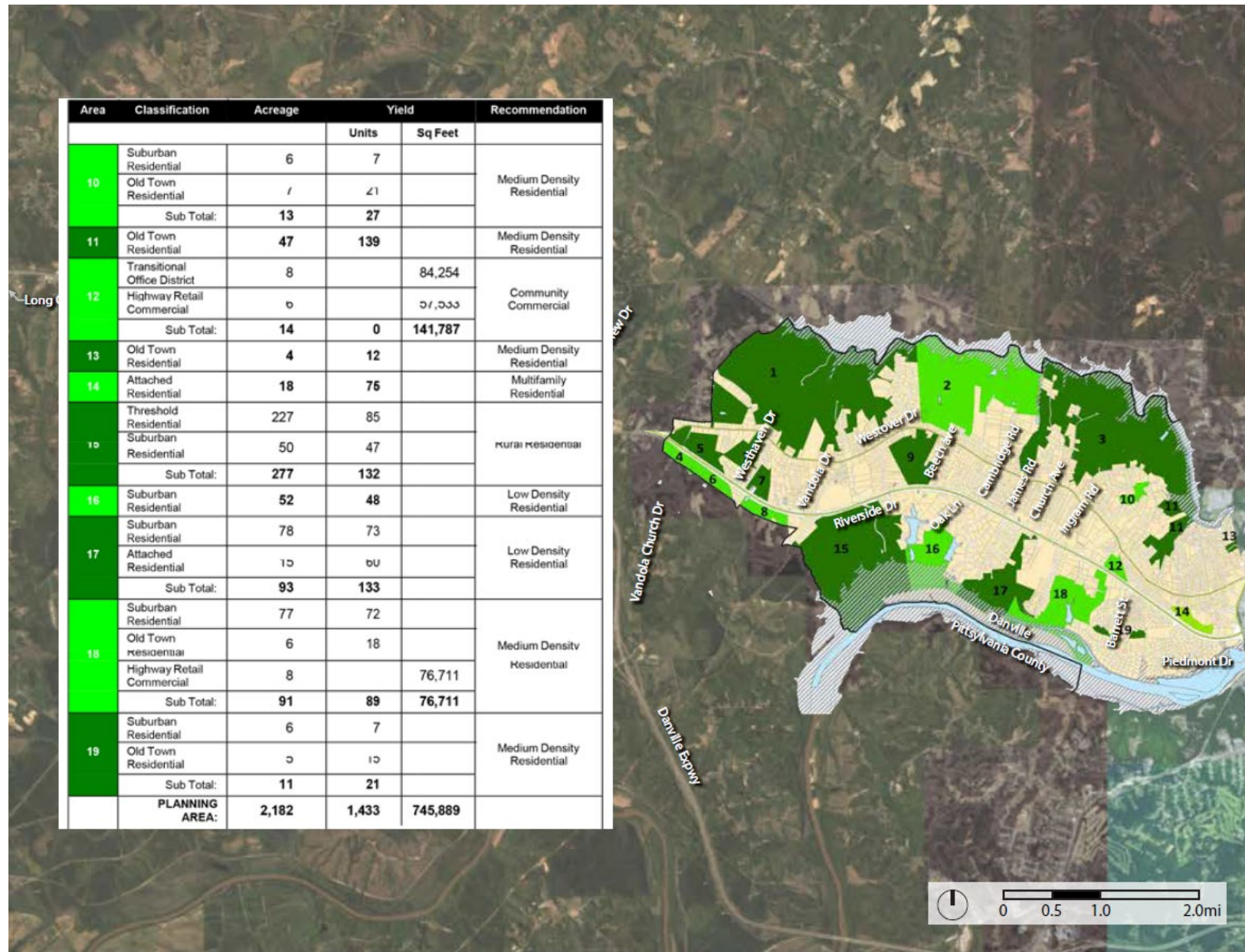


FIGURE 7: PLANNING AREA WESTOVER B

## Posted Speeds

Posted speeds in the US 58 study corridor are generally 55 to 60 mph, except at the approach to Berry Hill Road, where the speed limit changes to 45 mph, and at Barrett Street and to the east, where the posted speed limit is 40 mph.

There are two areas where school zone flashing beacons lower the speed limit to 35 mph during school arrivals and departures. These occur at the Brosville Elementary School just east of Whispering Pines Road, and the Westover Baptist Church between Beech Avenue and Parkway Drive.



FIGURE 8: POSTED SPEEDS MAP

### Historical Traffic Trends

The US 58 study corridor carries 13,000 to 14,000 vehicles per day west of the Danville Expressway, as shown in FIGURE 10.<sup>5</sup> The traffic volumes on the US 58 study corridor have generally remained constant over the past 10 years, ranging between 11,000 and 15,000 vehicles per day. Volumes on the intersecting roads have also remained constant over the past decade.

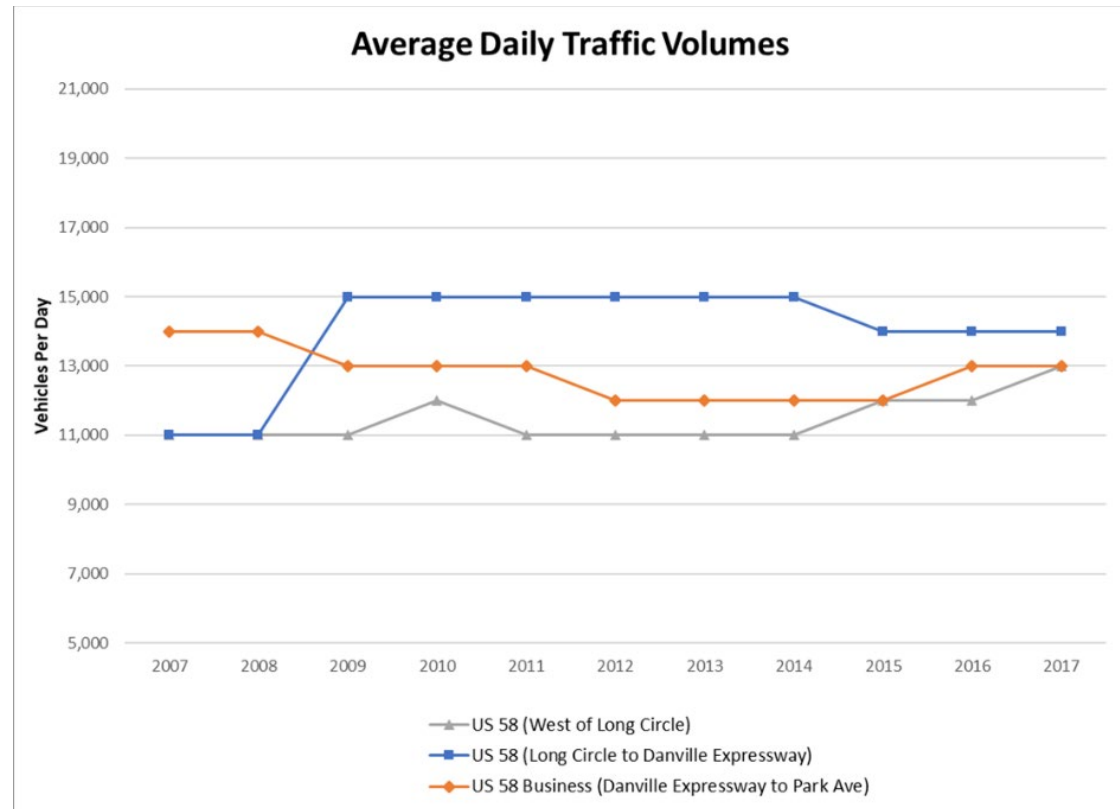


FIGURE 9: HISTORICAL AVERAGE ANNUAL DAILY TRAFFIC VOLUMES. SOURCE: VDOT TRAFFIC DATA.

<sup>5</sup> VDOT 2017 Average Daily Traffic Data. Accessed 22 Apr 2019 from <http://www.virginiadot.org/info/ct-TrafficCounts.asp>.



FIGURE 10: 2017 AVERAGE ANNUAL DAILY TRAFFIC VOLUMES

## Crash History

426 crashes of various types have occurred throughout the corridor between 2013 and 2018, as illustrated in **Figure 13**. Angle crashes are the most prevalent crash type, accounting for 27 percent of the crashes in the corridor. Off-road fixed object and rear-end crashes are the next most common, representing 24 and 23 percent of crashes respectively.

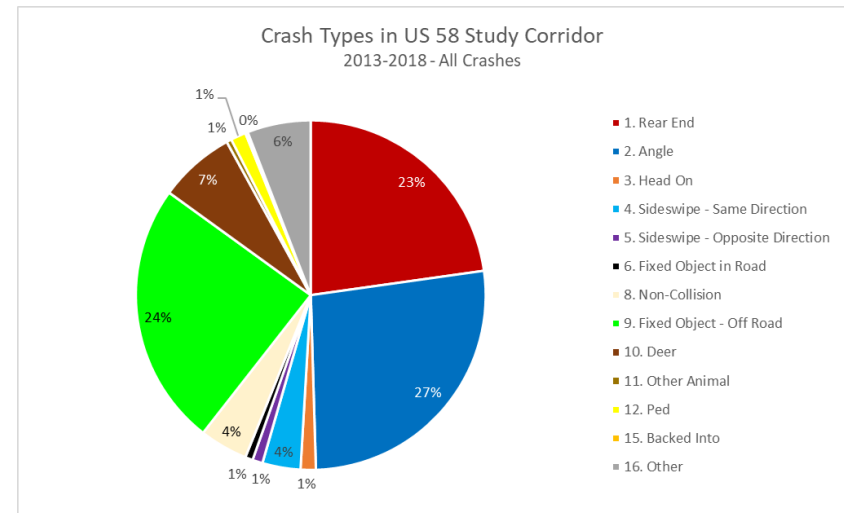
Angle crashes and rear-end crashes together represent 50 percent of all crashes that occurred in the corridor and 56 percent of crashes that resulted in injury.

The majority of these angle and rear-end crashes occur at median breaks, whose access spacing is deficient when compared to VDOT's access spacing requirements, as explained later in this report.

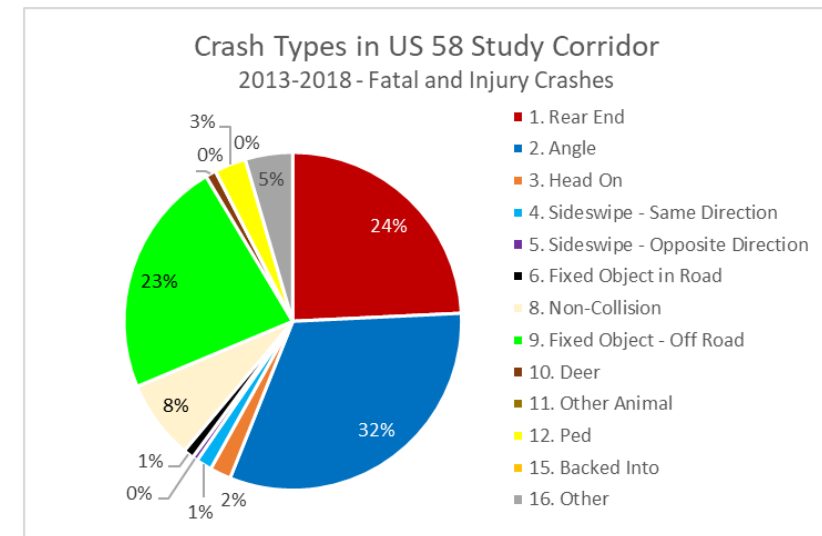
### Fatal Crashes

Three fatal crashes occurred in the study corridor between 2013 and 2018. One fatal crash occurred on Saturday June 7, 2017 at 8:19 PM just east of Oakwood Drive. The driver ran off the road, striking a ditch, a fence, and a tree. The driver had been drinking and was not wearing a seat belt. Another fatal crash occurred on Friday March 22, 2013 at 11:36 AM just west of Piedmont Drive. The driver ran off the road while traveling east, struck a curb, and landed in a retaining pond. The driver was not wearing a seat belt.

The third fatal crash was a pedestrian fatality. On Friday October 7, 2016 at 1:25 PM, a westbound vehicle struck and killed a pedestrian crossing US 58 Riverside Drive between Church Avenue and James Road. The crash record indicates the pedestrian had been drinking.



**FIGURE 11: CRASH TYPES ON US 58.**



**FIGURE 12: FATAL AND INJURY CRASH TYPES ON US 58.**



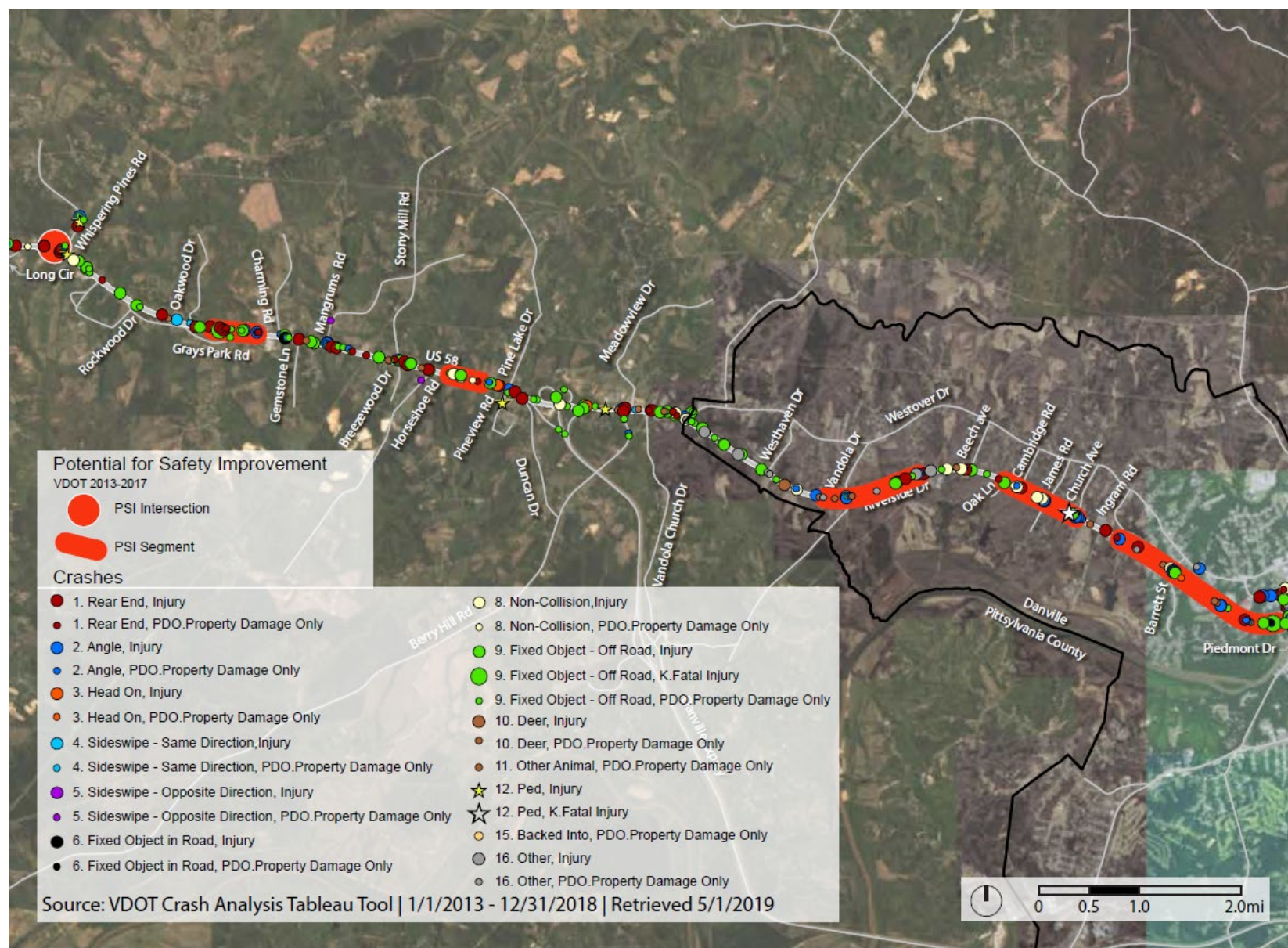


FIGURE 13: CRASHES IN THE US 58 STUDY CORRIDOR (2013-2018).

### *Pedestrian Injury Crashes*

Five crashes resulting in pedestrian injuries occurred in this corridor between 2013 and 2018:

- One occurred at Barrett Street. The pedestrian, who had been drinking, disregarded oncoming traffic and stepped into the path of an oncoming westbound vehicle.
- One occurred along the eastbound approach to the Berry Hill Road intersection.
- One occurred on Pineview Road just south of US 58.
- Two occurred on Whispering Pines Road – one at the intersection with US 58, and the other occurred a quarter mile to the north.



**FIGURE 14: CRASHES AT THE INTERSECTION OF US 58 AND WHISPERING PINES ROAD. (2013-2018)**

*Potential for Safety Improvement*

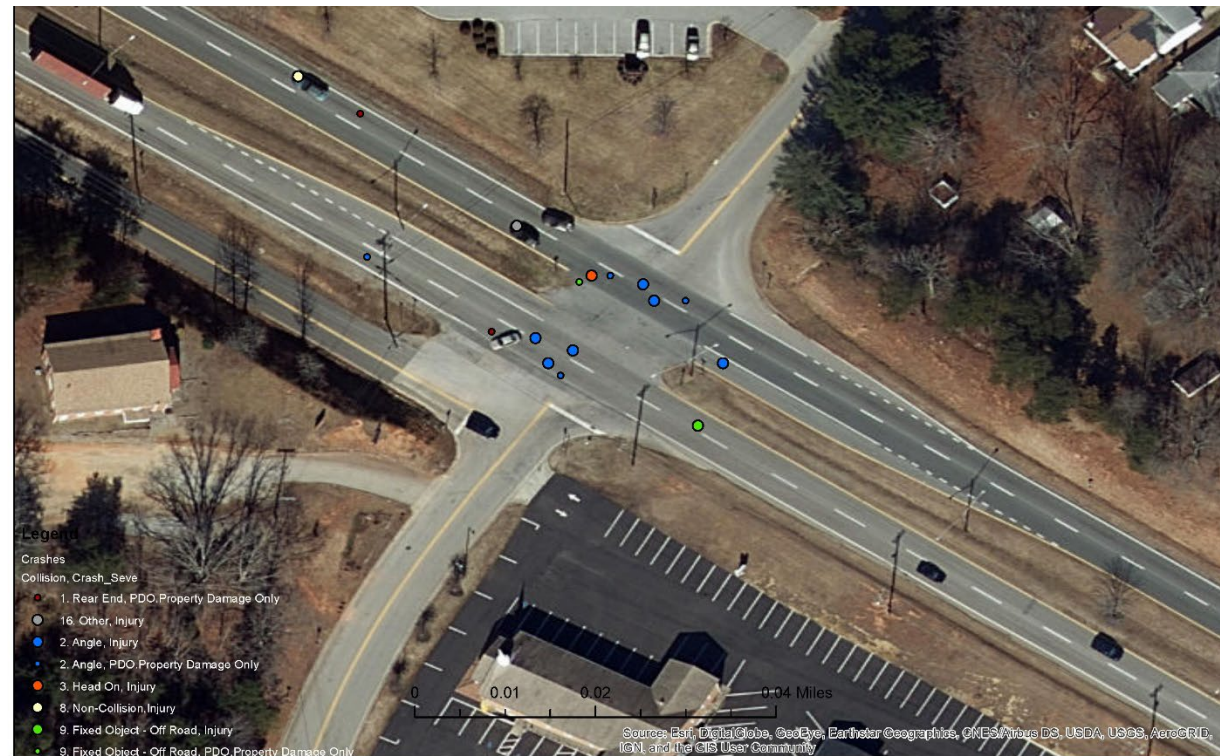
**Figure 13** also shows the locations along the study corridor with “potential for safety improvement” (PSI). These are locations where the actual crash rate is higher than the predicted crash rate for the geometry and traffic volumes on each segment or intersection. The locations with the greatest PSI (i.e. locations where the actual crash rate most exceeded the predicted crash rate) are:

1. US 58 at Whispering Pines Road – A traffic signal was recently installed at this location, possibly in response to the high PSI.
2. US 58 between James Road and Cambridge Road – Of the 14 crashes that occurred at the intersection with James Road, 12 resulted in injuries – a very high injury rate. Most of the injury crashes were angle crashes involving a vehicle turning left from James Road and colliding with a vehicle on Riverside Drive.



**FIGURE 15: CRASHES AT THE INTERSECTION OF US 58 AND JAMES ROAD. (2013-2018)**

- 3. US 58 between Barrett Road and Ingram Road – 17 crashes occurred at the intersection of US 58 and Barrett Road between 2013 and 2018, with a prevalence of angle crashes. This intersection is located on the crest of a hill. There are speed warning signs on both eastbound and westbound approaches to the Barrett Road intersection that flash when a vehicle's speed exceeds the 40 mph speed limit.



**FIGURE 16: CRASHES AT THE INTERSECTION OF US 58 AND BARRETT ROAD. (2013-2018)**



**FIGURE 17: SPEED WARNING SIGNS ON RIVERSIDE DRIVE APPROACHING BARRETT ROAD.**

## Findings from Other Relevant Studies and Planning Documents

Danville-Pittsylvania Long Range Transportation Plan Year 2040 Update  
Danville-Pittsylvania MPO, 2015

The **financially constrained list** of projects, shown in **Figure 18**, includes two projects on or adjacent to the US 58 study corridor:

1. Route 58 Business & Berry Hill Road Intersection Improvement (Map ID 1) – This project is described in more detail later in this section.
2. Berry Hill Road from Route 58 Business to Industrial Park (Map ID 10) – This project will improve the pavement section of Berry Hill Road to 24 feet in width.

Additionally, the financially constrained project list includes two projects in proximity to the US 58 study corridor:

1. Moorefield Bridge Road Improvements (Map ID 6) – This project will provide improvements at three locations.
2. Mt. Cross Road from City Line to Old Mt. Cross (Phase 1 & 2) (Map ID 4) – This project will widen Mount Cross Road to four lanes with a two-way center left turn lane.

The **vision list** of projects, shown in **Figure 19** includes several projects on and within proximity to the US 58 study corridor:

Map ID	Project Description	Remarks
6	Moorefield Bridge Road Improvements	Improvements at 3 locations
10	VA 863 from US 58 to 0.8 miles south of VA 750	Construct roadway on new alignment
11	Oak Ridge Farms Interchange	Interchange improvements
12	Berry Hill Connector Road	Construct 4-lane road on new alignment
13	VA 750 (Mount Cross Parkway) from VA 863 to US 29 Business	Construct 2-lane parkway on new alignment
19	Riverside Drive (US 58 Bus.) from Piedmont Dr. to Westover Dr.	Safety & Access Management
24	VA 750 from VA 863 to VA 883	Widen to four lanes
25	Berry Hill Road (US 311) from US 58 to North Carolina Line	Improve two-lane facility
28	VA 863 from 0.8 miles south of VA 750 to 0.5 miles south of VA 719	Improve 2-lane facility

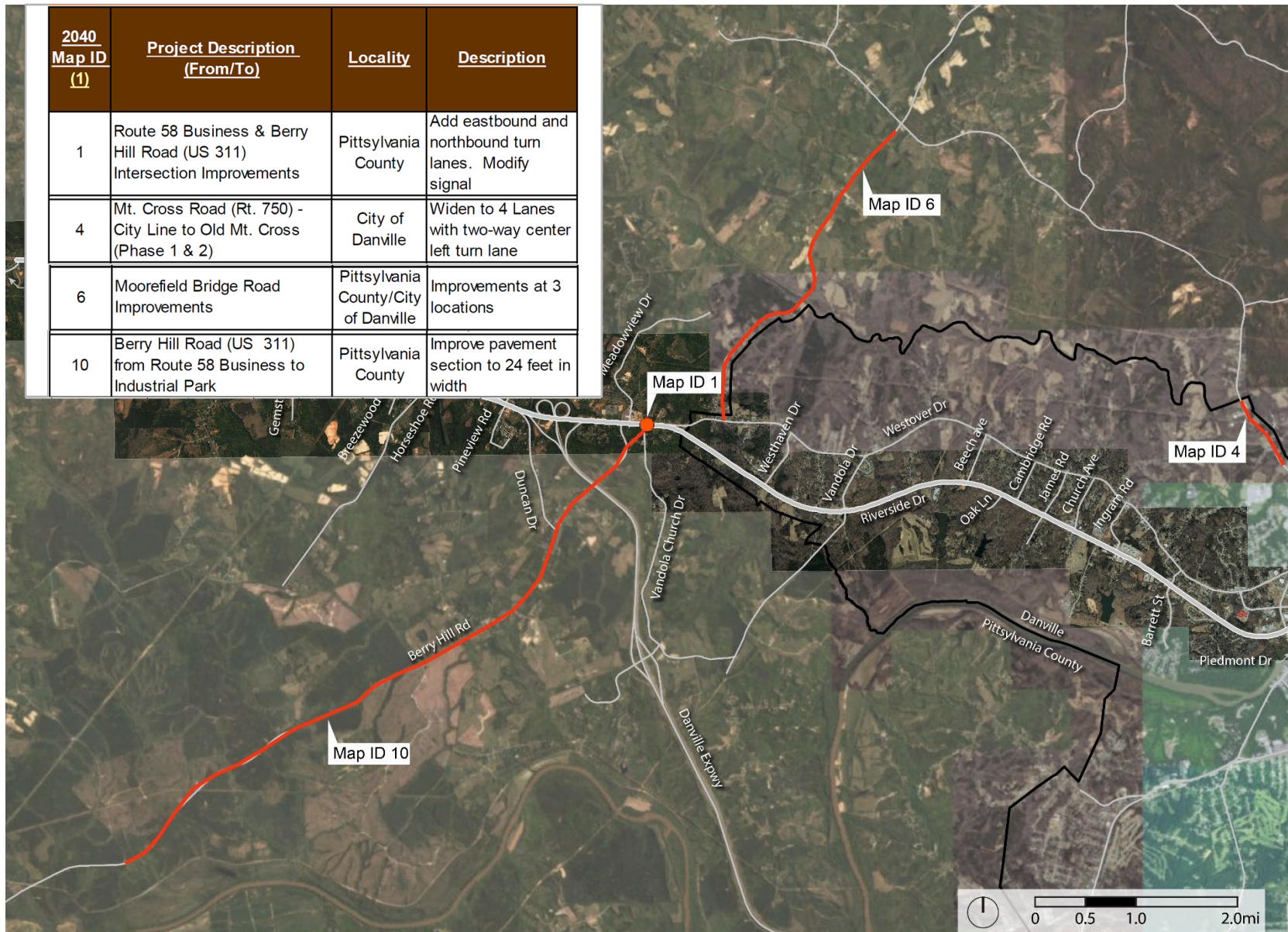


FIGURE 18: DANVILLE 2040 LTRP FINANCIALLY CONSTRAINED PROJECTS NEAR THE US 58 STUDY CORRIDOR.

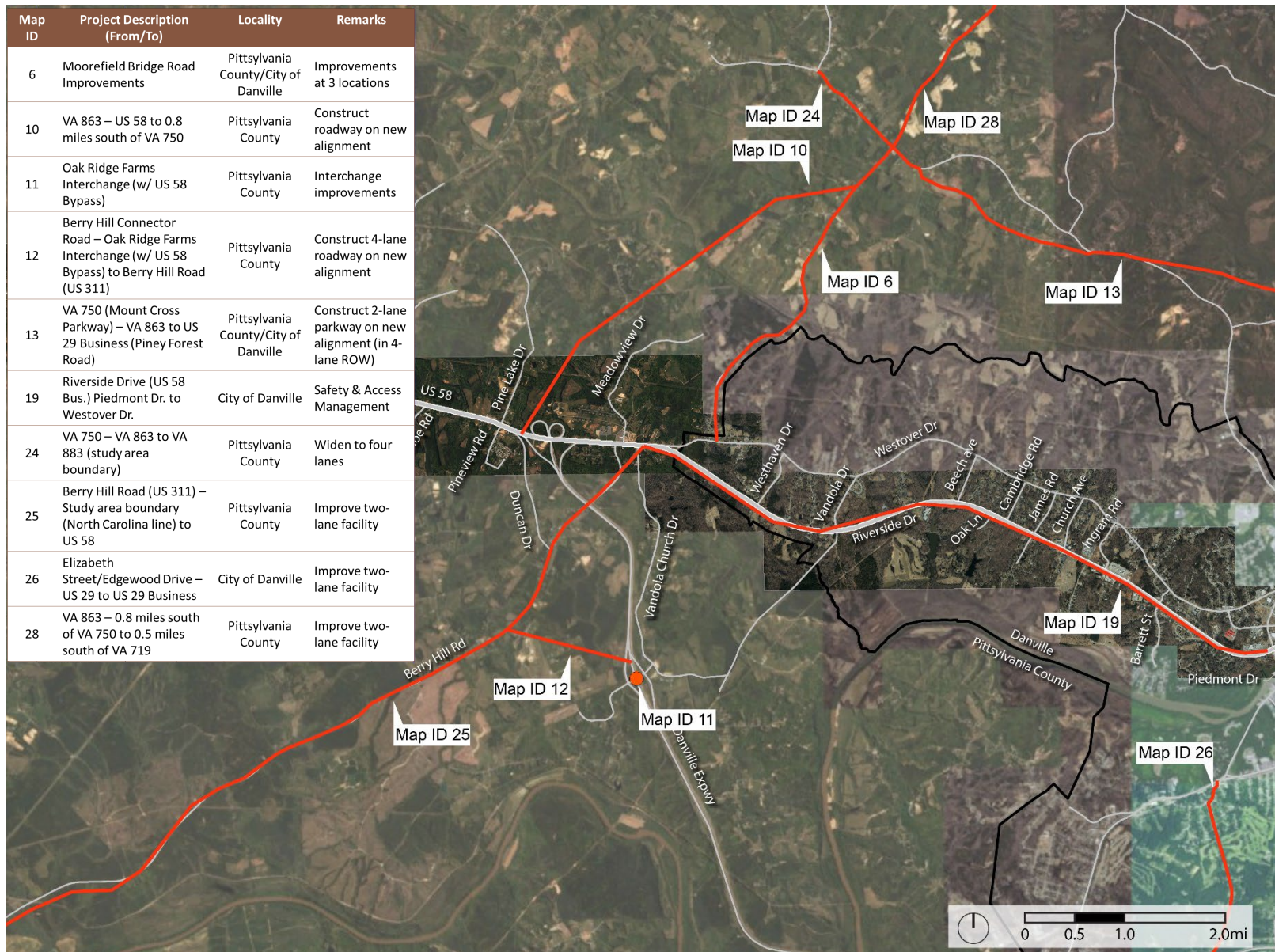


FIGURE 19: DANVILLE 2040 LRTP VISION PROJECTS NEAR THE US 58 STUDY CORRIDOR

2035 Rural Long Range Transportation Plan  
West Piedmont Planning District Commission, 2011

The Rural Long Range Transportation Plan (RLRTP) contains two recommendations within proximity to the US 58 study corridor. The locations of these recommendations are shown in **Figure 20**.

1. Intersection Improvements at US 58 at Whispering Pines Road – The RLRTP calls for reducing speed limits, consolidating driveways, and installing a traffic signal. A traffic signal was recently installed here with rumble strips and “Be Prepared to Stop When Flashing” beacons. The speed limit remains at 55 mph and no driveway consolidation appears to have occurred.
2. Long Term Road Reconstruction of Long Circle (VA 708) to address geometric deficiencies and provide full-width lanes and shoulders.



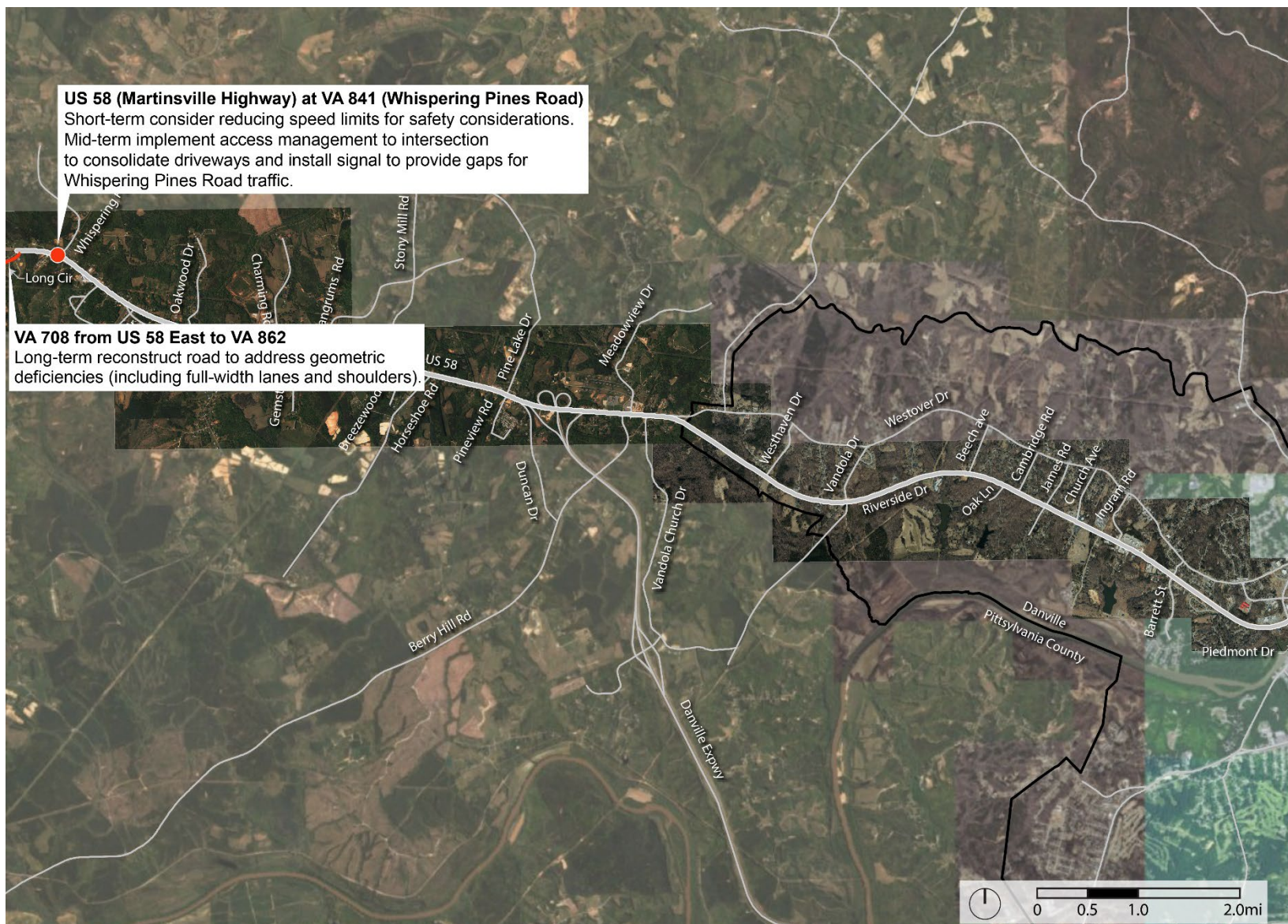


FIGURE 20: RECOMMENDATIONS FROM THE 2035 RURAL LONG RANGE TRANSPORTATION PLAN.

### Rt 58 Business & Berry Hill Road Intersection Improvement Project

Construction is currently underway for improvements at the intersection of Berry Hill Road (US 311) and the US 58 study corridor. This intersection improvement project will add turn lanes to the northbound Berry Hill Road approach, which will consist of one exclusive left turn lane, one shared left turn and through lane, and one channelized right turn lane. The eastbound US 58 left- and right-turn lanes will also be extended to 500 feet and 450 feet, respectively, each with a 200-foot long taper. Construction began in April 2020 and is anticipated to conclude in December 2020.

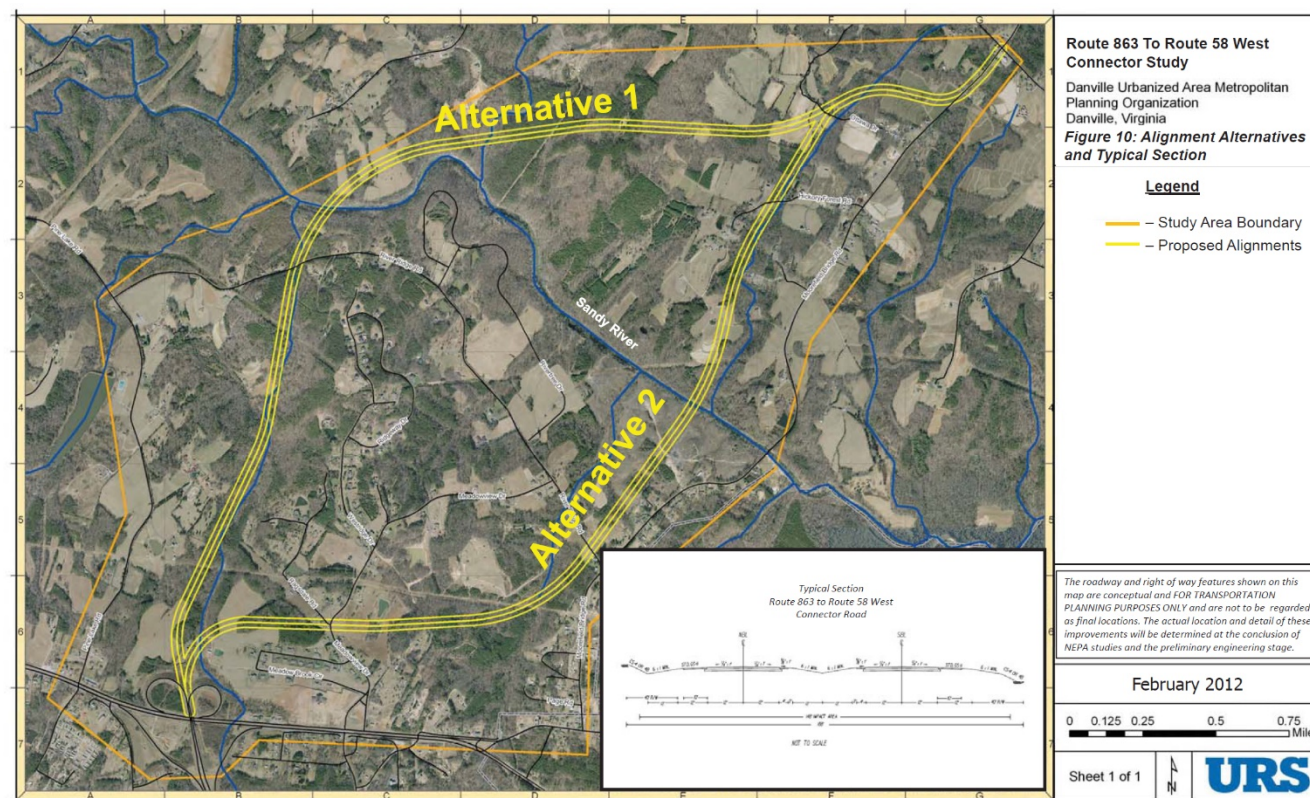


**FIGURE 21: BERRY HILL ROAD INTERSECTION IMPROVEMENT PROJECT SKETCH.** THIS SYNCHRO SCREENSHOT SHOWS THE NEW NORTHBOUND APPROACH CONFIGURATION AND EXTENDED EASTBOUND TURN LANES.

Route 863 to US Route 58 West Connector Study  
Danville-Pittsylvania Metropolitan Planning Organization, 2012

For many years, regional planning discussions have involved conversations and debate around “completing the expressway loop” – creating a limited access or enhanced connection between the western interchange of the Danville Expressway with US 58 (Martinsville Hwy) and the northern terminus of the US 29 Bypass just north of Blairs. The 2040 Danville-Pittsylvania LRTP vision list of projects included the construction of a new roadway between US 58 to Mount Cross Road (VA 750), and the LRTP included preliminary engineering for this connection in the financially constrained plan.

In 2012, the Danville-Pittsylvania MPO developed concepts for a new arterial level roadway that could accommodate growing traffic volumes and avoid increasing future growth (including growth associated with the Mega Site) from using unsuitable collector and local streets. The MPO developed and evaluated two different alignments for a new roadway, shown in



**FIGURE 22: CONNECTOR STUDY ALTERNATIVE ALIGNMENTS.** THE STUDY RECOMMENDED THE NO BUILD ALTERNATIVE (NO NEW ROADWAY) AS THE PREFERRED ALTERNATIVE.

Figure 22, and a No Build alternative. Ultimately, the study recommended the No Build alternative (no new roadway) because Moorefield Bridge Road has adequate capacity to accommodate the forecasted traffic growth and the almost \$40 million in construction and other costs greatly exceeded the travel time benefits.

## Bicycle and Trail Planning Efforts

### *Beaches-to-Bluegrass Trail Master Plan*

Virginia Dept. of Conservation and Recreation, 2015

The Beaches-to-Bluegrass (B2B) Trail is a concept to connect the Virginia Beach Oceanfront to the Cumberland Gap in Tennessee, weaving together existing trails, national and state parks, and other recreational amenities and destinations, with a trail for non-motorized transportation.

The US 58 study area is located along the Danville to Martinsville section of the Beaches-to-Bluegrass Trail System planning area. The B2B Trail Master Plan identifies this section as a priority area and recommends developing a detailed corridor study to identify an off-road path or trail opportunity in this area. The Trail Master Plan identifies an interim on-road route, shown with an orange buffer in **Figure 23**. The interim on-road route follows Westover Drive to Vandola Drive and meanders west via portions of Vandola Church Drive, Oak Ridge Farms Road, Bachelor Hall Farm Road, Berry Hill Road, Loomfixer Lake Road, Horseshoe Road, Ed Hardy Road, and other roads further to the west.

### *West Piedmont Regional Bicycle Plan*

West Piedmont Planning District Commission, 2018

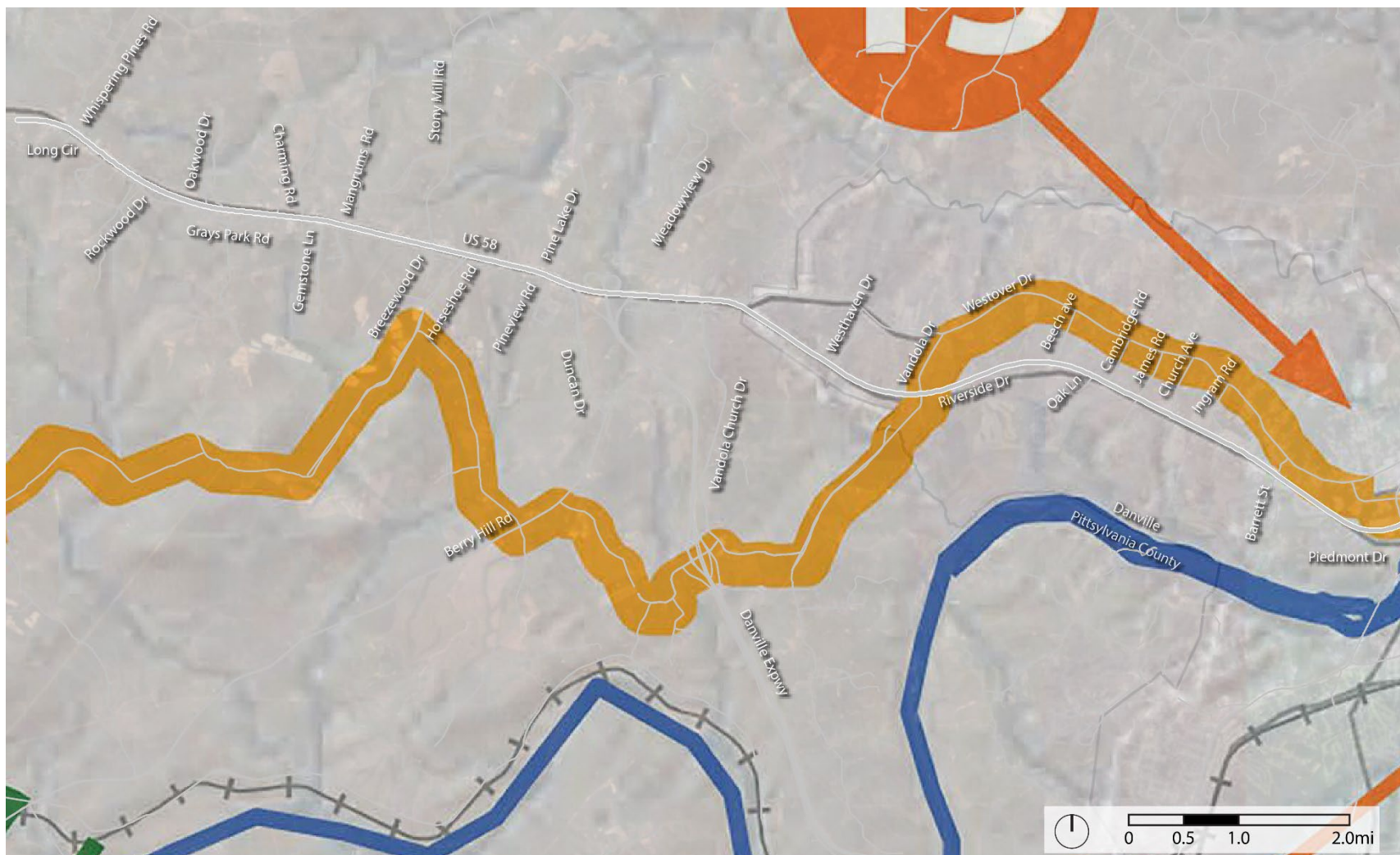
The West Piedmont Regional Bicycle Plan designates the Beaches-to-Bluegrass as a priority route and notes the on-road route is an excellent alternative to US 58 which has (or is characterized by) high volumes of general vehicular and truck traffic.

The plan also contains policy-level recommendations and support for more detailed bicycle facilities planning throughout the region.

### *Westover Drive Road Diet Feasibility Assessment*

City of Danville, 2018

The City of Danville has studied the Westover Drive corridor, which currently has shared-lane markings, for improvements to the bicycling facilities. The City is considering converting the four-lane portion of Westover Drive to a two-lane facility with on-street buffered bicycle lanes. This conversion would extend the existing on-street bicycle lanes which currently end at Wentz Circle/ Capri Court past Vandola Drive to the end of Westover Drive at US 58 (Riverside Drive).



**FIGURE 23: BEACHES-TO-BLUEGRASS TRAIL ALIGNMENT.** THE BEACHES-TO-BLUEGRASS TRAIL MASTER PLAN IDENTIFIES AN INTERIM ON-ROAD ALIGNMENT (SHOWN IN ORANGE) ALONG WESTOVER DRIVE, VANDOLA DRIVE, AND OTHER LOCAL ROADS WEST OF DANVILLE.

## Access Spacing

The pattern of access points along the US 58 study corridor varies depending on the adjacent development. In the easternmost portion of the corridor, access is generally limited to median breaks at unsignalized intersections with side-streets. Direct driveway access is uncommon east of Beech Avenue, although there are some exceptions, such as at Spring Avenue and Ingram Road. Direct driveway access for both residential and non-residential properties increases west of Westover Drive.

### Access Spacing Standards

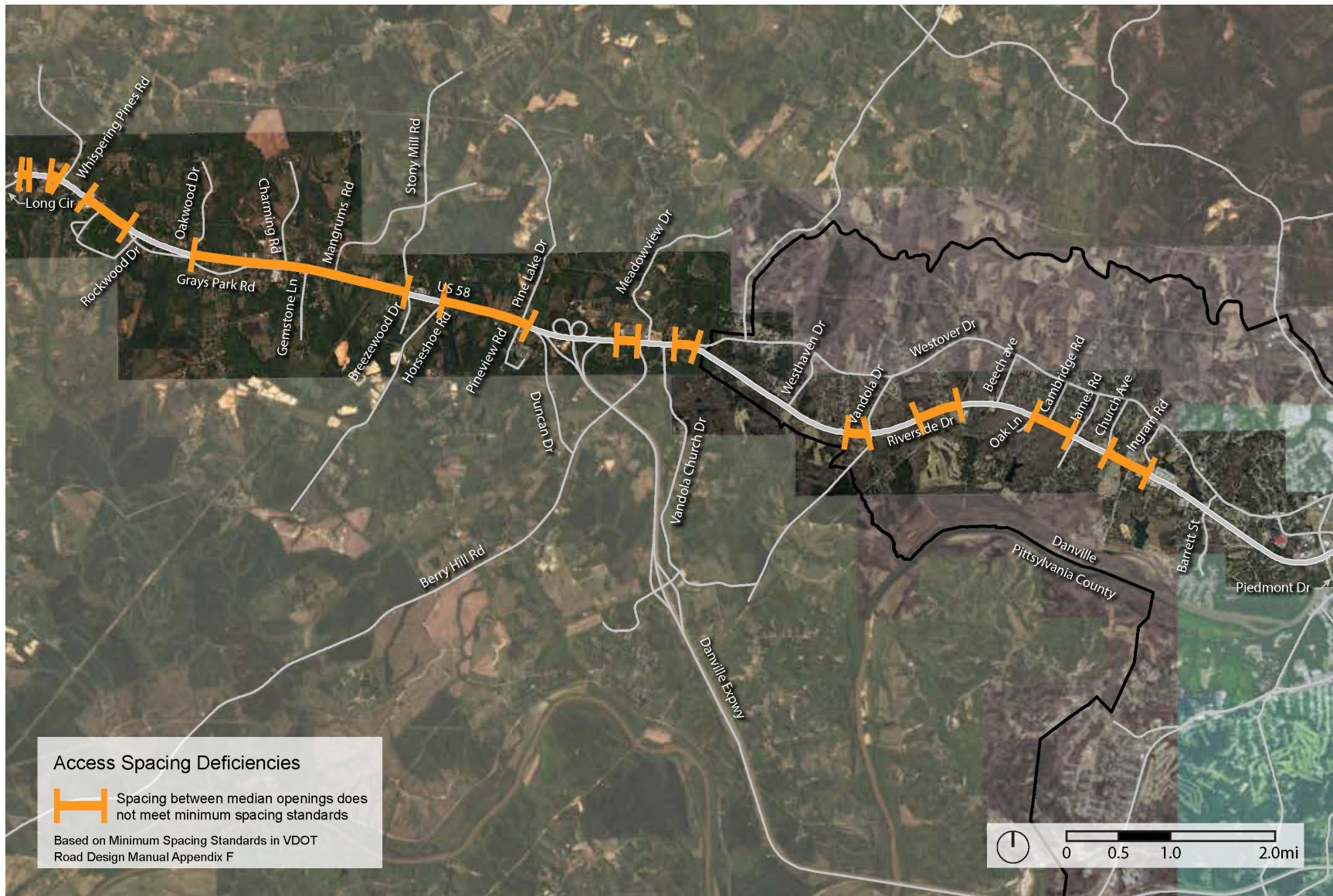
The VDOT Road Design Manual provides spacing standards to ensure an appropriate balance of providing access to adjacent land uses and maintaining the flow of traffic. By managing the location, spacing, and design of entrances and intersections, planners and designers can reduce the number of conflict points, traffic congestion, and crashes. Businesses benefit from access management because more efficient traffic flow expands their market area.

VDOT classifies the US 58 study corridor as a *Principal Arterial*. VDOT's Access Management Design Standards indicate Principal and Minor Arterials should have "limited or partial" access control because the functional purpose of these roads is "high mobility, low to moderate access."<sup>6</sup> The access management standards applicable to the US 58 study corridor are listed in **Table 1**. **Figure 24** shows the general locations where the spacing between median openings is shorter than VDOT's standards.

**TABLE 1: ACCESS MANAGEMENT STANDARDS FOR PRINCIPAL ARTERIALS**

Description of Type of Access Points				Minimum Spacing Distance (feet)	
				Posted Speed Limit ≥ 50 mph	Posted Speed Limit = 35 to 45 mph
From	<b>Signalized Intersections</b>	To	<b>Other Signalized Intersections</b>	2,640	1,320
From	<b>Unsignalized Intersections &amp; Full Median Crossovers</b>	To	<b>Signalized or Unsignalized Intersections &amp; Full Median Crossovers</b>	1,320	1,050
From	<b>Full Access Entrances or Directional Median Crossovers</b>	To	<b>Other Full Access Entrance and Any Intersection or Median Crossover</b>	750	565
From	<b>Partial Access One- or Two-Way Entrances</b>	To	<b>Any Type of Entrance, Intersection, or Median Crossover</b>	495	305
From	<b>Start/End of Ramp Terminal</b>	To	<b>Any Intersection, Full Access Entrance, or Full Median Crossover</b>	1,320	
From	<b>Start/End of Ramp Terminal</b>	To	<b>Directional Median Crossover</b>	990	
From	<b>Start/End of Ramp Terminal</b>	To	<b>Right-in/Right-Out Partial Access Entrance</b>	750	

<sup>6</sup> VDOT Road Design Manual Appendix F. Pg. F-11.



**FIGURE 24: ACCESS SPACING DEFICIENCIES**

## Access Spacing Deficiencies

The spacing between median breaks is deficient for many portions of the US 58 study corridor, especially in the western portions in Pittsylvania County. VDOT requires 1,320 feet between full access median breaks when the posted speed limit is 50 mph or higher.

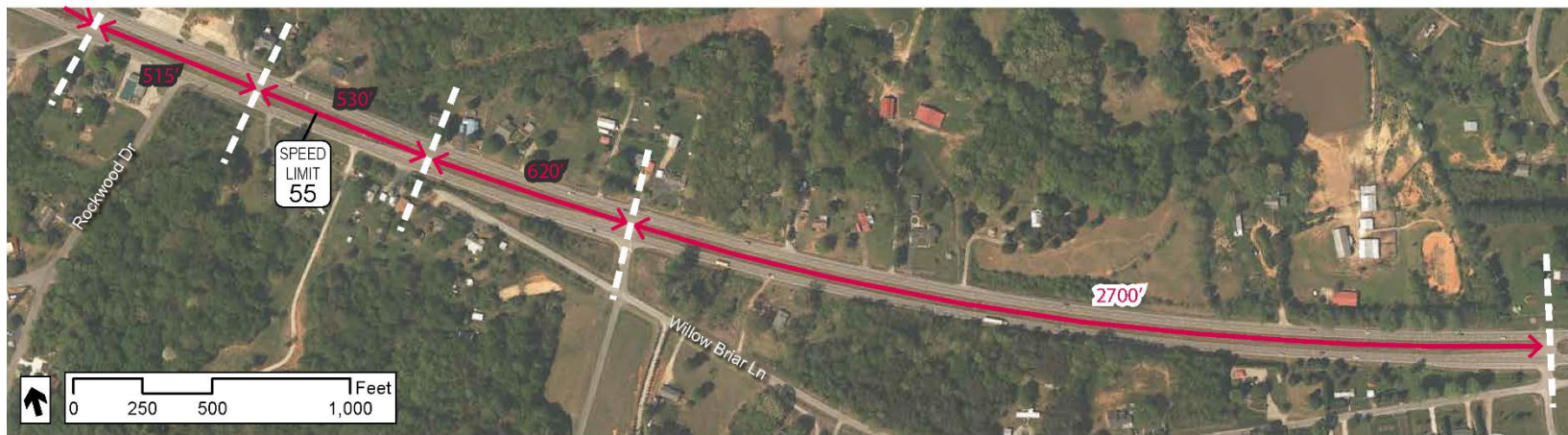
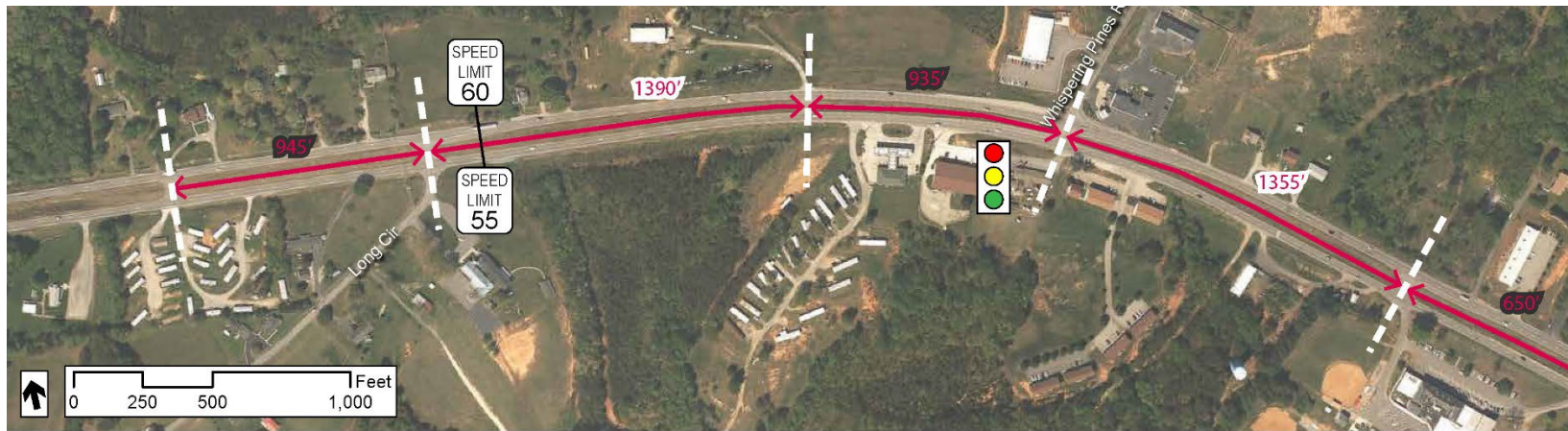
**Figures 25 through 31** show a more detailed map series of the access spacing in comparison with VDOT's minimum spacing standards.

In several locations, median breaks are located less than 660 feet apart (i.e. less than half of the minimum distance required):

- In Brosville, there are four adjacent median breaks between the Brosville Elementary School and Rockwood Drive, each less than 660 feet apart (shown in Figure 24).
- East of Mangrums Road, there are three adjacent median breaks, each spaced less than 600 feet apart (shown in Figure 25).
- At Pine Lake Rd and Pineview Rd just west of the Danville Expressway, two median breaks are spaced only 510 feet apart, and the Pine Lake Road intersection is only 420 feet from the start of the Danville Expressway on-ramp (shown in Figure 26).

**Figure 32** shows the access spacing deficiencies, locations of angle and rear-end crashes, and PSI locations. In most of the US 58 study corridor (west of Barrett Street where the speed limit is 55-60 mph), there is a correlation between access spacing deficiencies and the locations of rear-end and angle crashes. This correlation underscores the importance of addressing access management issues at these locations to reduce crashes and improve safety.





- Spacing from Unsignalized Intersections & Full Median Crossovers to Signalized or Unsignalized Intersections & Full Median Crossovers (1320' required where speed limit is > 50 mph)
- Spacing from Unsignalized Intersections & Full Median Crossovers to Signalized or Unsignalized Intersections & Full Median Crossovers (1050' required where speed limit is 35 to 45 mph)
- Spacing from Full Access Entrances & Directional Median to Other Full Access Entrance and Any Intersection or Median Crossover (750' required where speed limit is > 50 mph)
- Spacing from Start or End of Ramp Terminal to the First Full Access Median Crossover (1320' required)
- Deficient Length
- Signalized Intersection

1 of 7

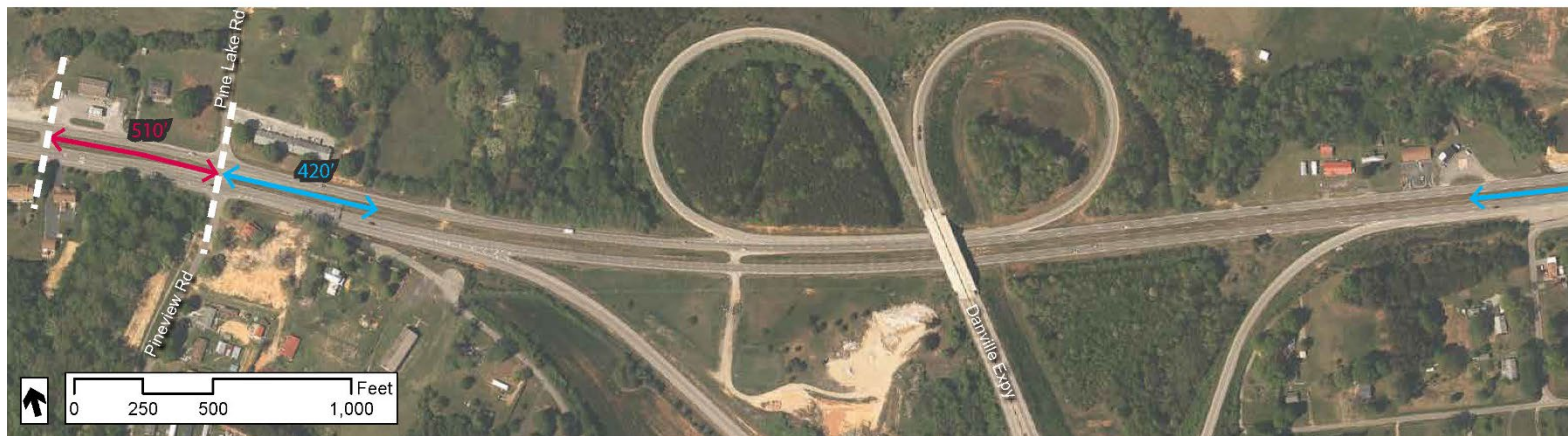
FIGURE 25: ACCESS SPACING MAP SERIES (MAP 1 OF 7).



- Spacing from Unsignalized Intersections & Full Median Crossovers to Signalized or Unsignalized Intersections & Full Median Crossovers (1320' required where speed limit is > 50 mph)
- Spacing from Unsignalized Intersections & Full Median Crossovers to Signalized or Unsignalized Intersections & Full Median Crossovers (1050' required where speed limit is 35 to 45 mph)
- Spacing from Full Access Entrances & Directional Median to Other Full Access Entrance and Any Intersection or Median Crossover (750' required where speed limit is > 50 mph)
- Spacing from Start or End of Ramp Terminal to the First Full Access Median Crossover (1320' required)
- Deficient Length
- Signalized Intersection

2 of 7

FIGURE 26: ACCESS SPACING MAP SERIES (MAP 2 OF 7).



- Spacing from Unsignalized Intersections & Full Median Crossovers to Signalized or Unsignalized Intersections & Full Median Crossovers (1320' required where speed limit is > 50 mph)
- Spacing from Unsignalized Intersections & Full Median Crossovers to Signalized or Unsignalized Intersections & Full Median Crossovers (1050' required where speed limit is 35 to 45 mph)
- Spacing from Full Access Entrances & Directional Median to Other Full Access Entrance and Any Intersection or Median Crossover (750' required where speed limit is > 50 mph)
- Spacing from Start or End of Ramp Terminal to the First Full Access Median Crossover (1320' required)
- Deficient Length
- Signalized Intersection

3 of 7

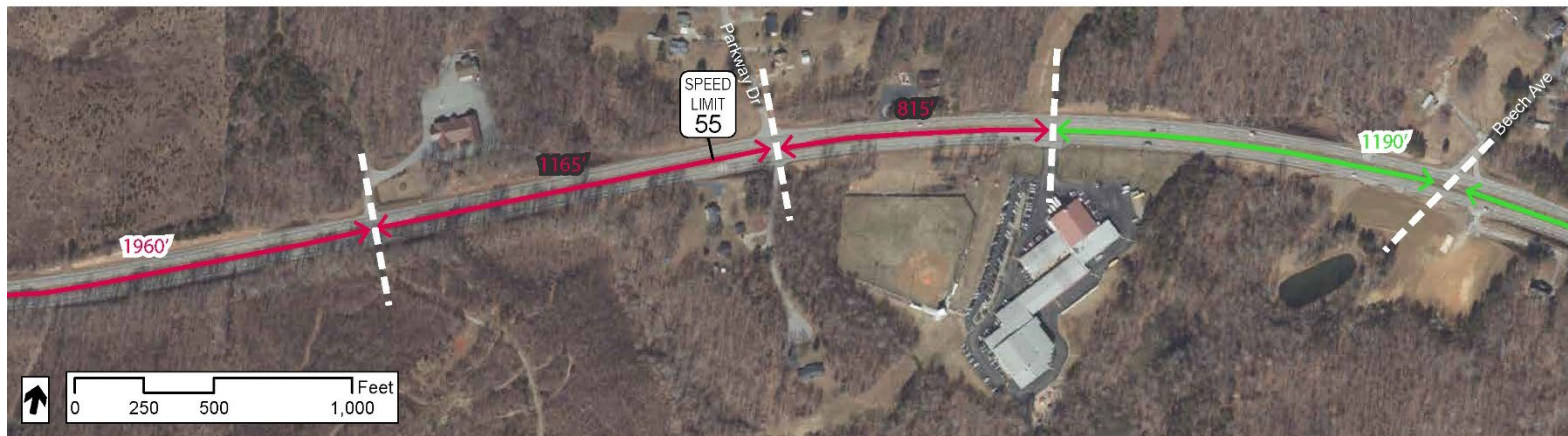
FIGURE 27: ACCESS SPACING MAP SERIES (MAP 3 OF 7).



-  Spacing from Unsignalized Intersections & Full Median Crossovers to Signalized or Unsignalized Intersections & Full Median Crossovers (1320' required where speed limit is > 50 mph)
-  Spacing from Unsignalized Intersections & Full Median Crossovers to Signalized or Unsignalized Intersections & Full Median Crossovers (1050' required where speed limit is 35 to 45 mph)
-  Spacing from Full Access Entrances & Directional Median to Other Full Access Entrance and Any Intersection or Median Crossover (750' required where speed limit is > 50 mph)
-  Spacing from Start or End of Ramp Terminal to the First Full Access Median Crossover (1320' required)
-  Deficient Length
-  Signalized Intersection

4 of 7

FIGURE 28: ACCESS SPACING MAP SERIES (MAP 4 OF 7).



- Spacing from Unsignalized Intersections & Full Median Crossovers to Signalized or Unsignalized Intersections & Full Median Crossovers (1320' required where speed limit is > 50 mph)
- Spacing from Unsignalized Intersections & Full Median Crossovers to Signalized or Unsignalized Intersections & Full Median Crossovers (1050' required where speed limit is 35 to 45 mph)
- Spacing from Full Access Entrances & Directional Median to Other Full Access Entrance and Any Intersection or Median Crossover (750' required where speed limit is > 50 mph)
- Spacing from Start or End of Ramp Terminal to the First Full Access Median Crossover (1320' required)
- Deficient Length
- Signalized Intersection

5 of 7

FIGURE 29: ACCESS SPACING MAP SERIES (MAP 5 OF 7).



- Spacing from Unsignalized Intersections & Full Median Crossovers to Signalized or Unsignalized Intersections & Full Median Crossovers (1320' required where speed limit is > 50 mph)
- Spacing from Unsignalized Intersections & Full Median Crossovers to Signalized or Unsignalized Intersections & Full Median Crossovers (1050' required where speed limit is 35 to 45 mph)
- Spacing from Full Access Entrances & Directional Median to Other Full Access Entrance and Any Intersection or Median Crossover (750' required where speed limit is > 50 mph)
- Spacing from Start or End of Ramp Terminal to the First Full Access Median Crossover (1320' required)
- Signalized Intersection
- Deficient Length

6 of 7

FIGURE 30: ACCESS SPACING MAP SERIES (MAP 6 OF 7).



-  Spacing from Unsignalized Intersections & Full Median Crossovers to Signalized or Unsignalized Intersections & Full Median Crossovers (1320' required where speed limit is > 50 mph)
-  Spacing from Unsignalized Intersections & Full Median Crossovers to Signalized or Unsignalized Intersections & Full Median Crossovers (1050' required where speed limit is 35 to 45 mph)
-  Spacing from Full Access Entrances & Directional Median to Other Full Access Entrance and Any Intersection or Median Crossover (750' required where speed limit is > 50 mph)
-  Spacing from Start or End of Ramp Terminal to the First Full Access Median Crossover (1320' required)
-  Deficient Length
-  Signalized Intersection

7 of 7

FIGURE 31: ACCESS SPACING MAP SERIES (MAP 7 OF 7).

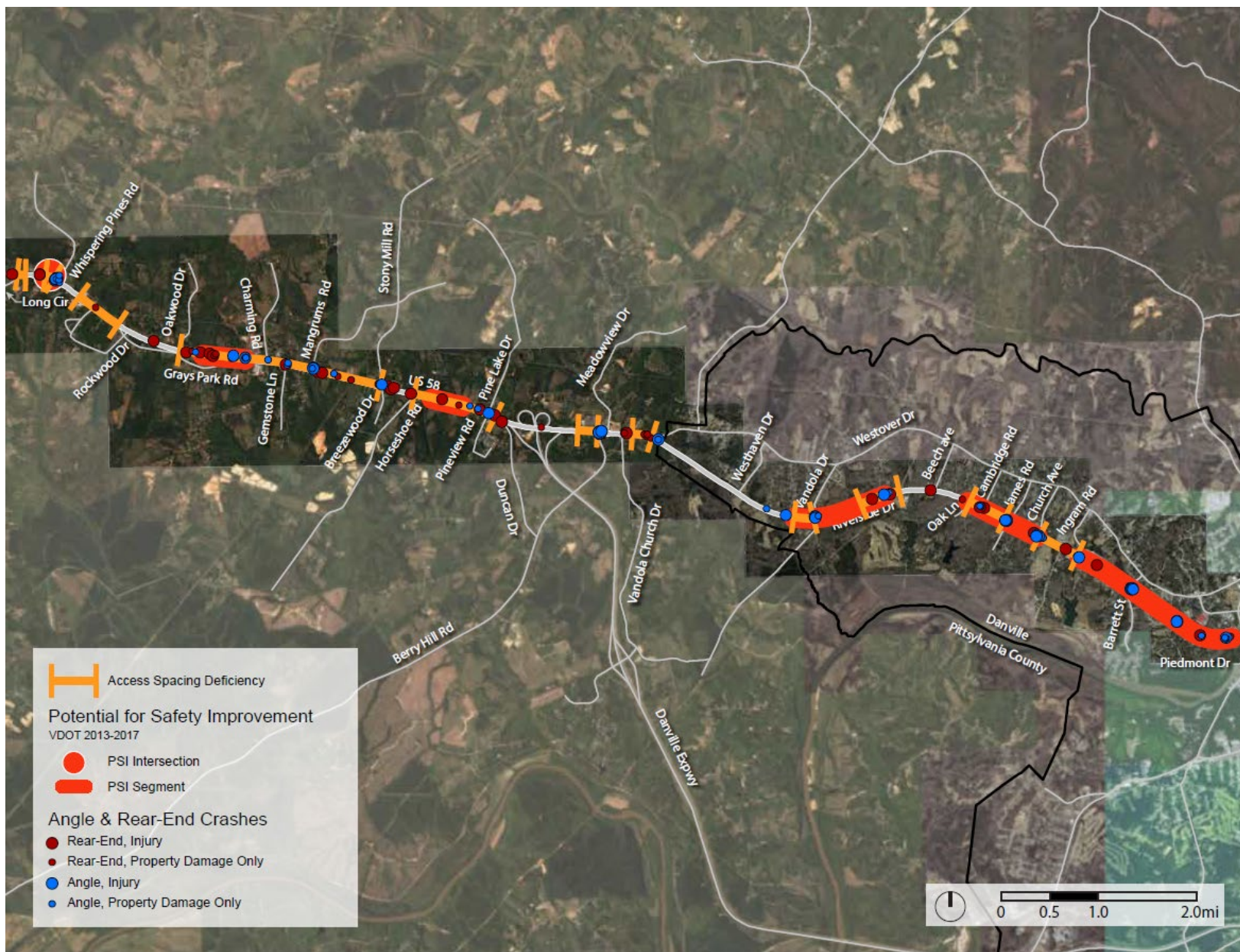


FIGURE 32: ACCESS SPACING DEFICIENCIES, ANGLE AND REAR-END CRASHES, AND PSI MAP.



## Site Visit Observations

The project team conducted observations throughout the study corridor during peak and off-peak times in May 2019. The team generally confirmed the existing intersection geometries, except as noted below, identified apparent operational issues and possible deficiencies, and noted other relevant observations as described below. In general, the project team did not observe major issues with driveway access for residential properties.

### Commercial Entrance Spacing Deficiencies

A few commercial properties have redundant entrances which create additional conflict points and increase crash potential.

At Church Avenue, the commercial buildings in the northeast corner have three entrances on US 58, each about 100 feet apart, in addition to two entrances on Church Avenue. VDOT requires 495 feet between entrances on principal arterials like US 58. At the time of the PM site visit, a food truck was parked on the northeast corner, drawing a lot of traffic. Most vehicles used the entrance immediately in advance of the intersection to access the parking lot.



**FIGURE 33: ENTRANCE SPACING AT CHURCH AVENUE.** SUCCESSIVE ENTRANCES DO NOT MEET VDOT SPACING STANDARDS.

At Ingram Road, there are multiple entrances to the cluster of mostly vacant commercial properties on the northeast quadrant of the intersection within 800 feet of the intersection. The Kwik Shop

convenience store and gas station on the northwest quadrant has two entrances, one on US 58 and one on Ingram Road.



**FIGURE 34: ENTRANCE SPACING AT INGRAM ROAD.** ENTRANCES ON THE NORTH SIDE OF RIVERSIDE DRIVE DO NOT MEET VDOT SPACING STANDARDS.

At Whispering Pines Road, the Champion gas station and corner market on the northeast quadrant has two entrances on US 58 within 300 feet of the intersection, in addition to an entrance on Whispering Pines Road which spans more than 100 feet wide.



**FIGURE 35: ENTRANCE SPACING AT WHISPERING PINES ROAD.** ENTRANCES TO THE CHAMPION GAS STATION DO NOT MEET VDOT SPACING STANDARDS.

## Other Site Visit Observations

At the Whispering Pines Road intersection, a new traffic signal was installed since the last date of aerial photography. Three sets of rumble strips are also present in advance of the intersection in both directions. The project team observed heavy truck activity at this location, especially trucks going straight through the intersection in both eastbound and westbound directions.

At the Stony Mill Road intersection, the project team observed a noticeable elevation difference between the eastbound and westbound travel lanes. The westbound lanes are several feet lower than the eastbound lanes. The elevation difference makes it more difficult for the southbound approach and westbound left- and U-turning vehicles to accelerate upon finding a gap. The project team observed vehicles waiting in the median to make these movements in the AM peak period. Sight distance was slightly obstructed by median grass, weeds, and shrubs. The project team also noted the speeds of vehicles on US 58 felt uncomfortably high when waiting at the side-streets to turn onto US 58, although speed data was not collected for this study effort.

In the AM peak period, the project team observed a truck waiting to turn left from the southbound approach to the Pine Lake Road and Pineview Road intersection. This intersection is located less than 600 feet from the on-ramp to the Danville Expressway. The truck was too large to wait in the median and had to find a gap in both directions before making the turn.



**FIGURE 36: TRACTOR-TRAILER AT GRAYS PARK RD.** NOTICEABLE TRUCK ACTIVITY OCCURS IN BOTH DIRECTIONS WEST OF THE DANVILLE EXPRESSWAY.



**FIGURE 37: ELEVATION DIFFERENCE AT STONY MILL ROAD.** EASTBOUND US 58 IS HIGHER THAN WESTBOUND, MAKING IT DIFFICULT FOR WESTBOUND LEFT TURNING VEHICLES TO ACCELERATE FROM A STOP.

The project team noted new or extended turn lanes at intersections within the City limits since 2008, based on historical aerial imagery:

- Eastbound and westbound left turn lanes on US 58 at the Vandola Road intersection were extended between 2008 and 2011.
- Eastbound and westbound left turn lanes on US 58 at the James Road intersection were extended between 2012 and 2014.
- An eastbound right turn lane was added to the James Road intersection between 2017 and 2018.

At the James Road intersection, the embankment on the south side of the road makes it difficult for northbound vehicles to see oncoming eastbound vehicles. Additionally, the southbound approach has an up slope, which can make it difficult for southbound vehicles to see oncoming westbound vehicles. The project team observed a conflict between a southbound left turning vehicle and a northbound right-turning vehicle in the AM peak period.

A directional median opening was recently constructed at the Beech Avenue intersection, allowing left turns from the southbound approach onto eastbound US 58.

In the eastern section of the study corridor, the project team observed the median width felt narrow for vehicle storage at several intersections, including Barrett Street, Ingram Road, Church Avenue, and James Road. The project team measured 20-foot wide medians with 11-foot wide turn lanes for a vehicle storage length of 31 feet in the medians.



**FIGURE 38: JAMES ROAD INTERSECTION.** THE EMBANKMENT AT THE SOUTHWEST QUADRANT SHORTENS SIGHT DISTANCE FOR DRIVERS LOOKING WEST FROM THE NORTHBOUND APPROACH.



**FIGURE 39: MEDIAN OPENING AT BEECH AVENUE.** THE NEWLY PAVED MEDIAN OPENING ALLOWS LEFT TURNS FROM BEECH AVENUE ONTO EASTBOUND US 58, BUT EASTBOUND VEHICLES ON US 58 CANNOT MAKE A LEFT TURN INTO BEECH AVENUE.

Pedestrian warning signs are posted in both directions in advance of the Brosville Elementary School and Westover Christian Academy, but there are no crosswalks across the road.

Some of the existing median openings lack left turn storage lanes even though left turns and U-turns are not restricted. To help avoid rear-end crashes resulting from vehicles slowing down to make a turn, it is best practice to provide left turn lanes at all median openings where left and/or U-turns are allowed.



**FIGURE 41: VEHICLE WAITING IN MEDIAN AT CHURCH AVENUE.** THE MEDIAN STORAGE WIDTH AT SEVERAL INTERSECTIONS IN THE EASTERN PORTION OF THE STUDY AREA IS NARROW, MEASURING 20 FEET WIDE WITH AN 11-FOOT LEFT TURN STORAGE LANE, FOR 31 FEET OF VEHICLE STORAGE.

The roadside features on Route 58 throughout the study corridor consist of a grassy ditch with no paved shoulders, which does not meet current VDOT standards.



**FIGURE 40: “NO DOUBLE STACKING IN CROSSOVER” SIGN AT BARRETT STREET.** A SIGN WARNS MOTORISTS TO AVOID DOUBLE STACKING IN THE MEDIAN CROSSOVER.

## Recommendations from Previous Access Management Plans 2008 U.S. Route 58 West (Riverside Drive) Access Management Study

The City of Danville conducted an access management study for the eastern portion of the US 58 study corridor within the City limits in 2008.

The 2008 study identified existing crossover spacing deficiencies, locations for future crossovers and right-in/right-out entrances, recommendations for lengthening turn lanes and tapers at intersections, and areas with redundant entrances that could be consolidated.

The 2008 study identified several locations where the median crossover spacing does not meet recommended guidelines (shown with red dots in Figure 42 and listed from west to east):

- Avalon Drive (900 feet west of Vandola Drive)
- Kayewood Lane (2,000 feet east of Vandola Drive)
- Westover Baptist Church (1,200 feet west of Beech Ave)
- Oak Lane
- Cambridge Road
- Wyndover Drive (west of Ingram Rd)



**FIGURE 42: 2008 STUDY RECOMMENDATIONS.** RECOMMENDATIONS ARE SHOWN ON TOP OF CURRENT ACCESS SPACING DEFICIENCIES PREVIOUSLY IDENTIFIED IN FIGURE 24.

The study identified redundant entrances and recommended closing them if possible, at the following locations (shown with red Xs in Figure 42 and listed from west to east):

- Wrenn-Yeatts Funeral Home at Kayewood Lane
- Commercial and residential properties at Church Ave
- Commercial properties at Ingram Rd and Spring Ave

The study also recommended closing a residential entrance on the south side of US 58 just west of the intersection of Parkway Dr (if alternate access from Parkway Dr would be provided).

The 2008 study also recommended the City establish a new Highway Corridor Overlay zoning district that would define requirements for intersection spacing, acceptable entrance locations, and design parameters for setbacks, corner clearances, shared entrances, and frontage roads. VDOT adopted access management regulations in July 2008 that establish a process for access permits on all VDOT-maintained roadways. VDOT's regulations are similar to the regulations within the proposed Highway Corridor Overlay District, except that in the zoning district regulations, the City has the power to grant access permits, not VDOT, because the City has maintenance responsibilities for all roads within the city limits. To date, the City of Danville has not established a Highway Corridor Overlay zoning district.

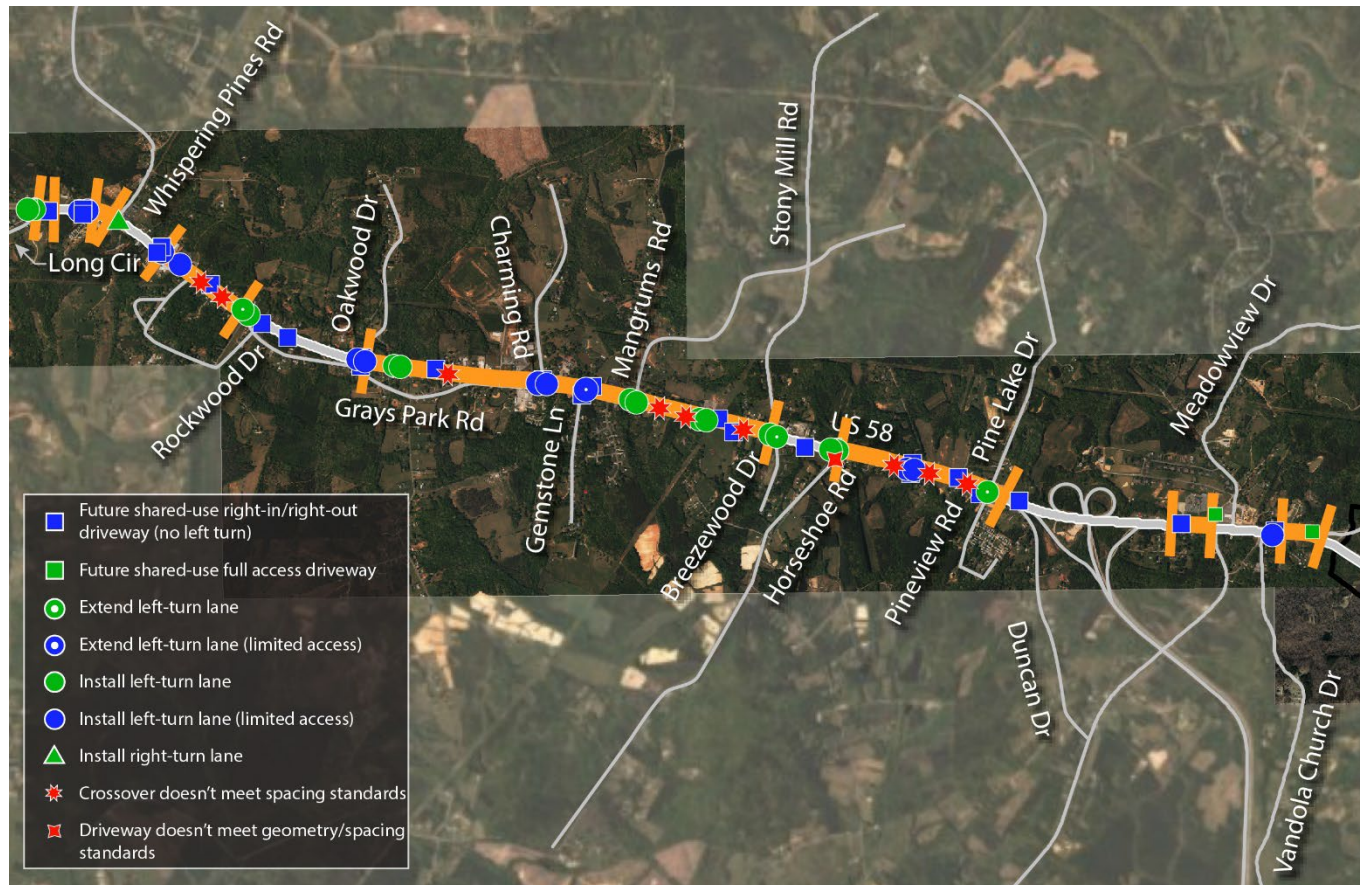


## 2012 Route 58 West Access Management Study and Plan

The Danville-Pittsylvania Area MPO conducted an access management study for the western portion of the US 58 study corridor in Pittsylvania County in 2012, with an emphasis on managing future commercial driveway locations.

The study identifies median crossovers that do not meet VDOT's access spacing standards and proposes locations for future shared-use full access driveways, as shown in **Figure 43**.

The study recommends installing or extending turn lanes at full access median openings at the areas with green circles. Directional median openings (allowing left turns from US 58 but forcing side-street approaches to turn right) are recommended at areas with blue circles. Red starburst symbols indicate areas where an existing median crossover does not meet the spacing standards.



**FIGURE 43: 2012 STUDY RECOMMENDATIONS.** RECOMMENDATIONS ARE SHOWN ON TOP OF CURRENT ACCESS SPACING DEFICIENCIES PREVIOUS IDENTIFIED IN FIGURE 24.

Of the 27 median openings in this portion of the corridor (all of which are currently full access), the 2012 study recommends keeping 10 as full access and converting 7 to directional openings. The study identifies the remaining 10 existing median openings that simply do not meet spacing standards and recommends installing a

new median opening in two locations (one full access and one directional).

**Figure 44** simplifies the 2012 study recommendations to show the locations of the proposed full access and directional access median breaks and the existing median breaks that do not meet spacing standards.

Two of the proposed median openings do not currently exist:

- Full access median opening at Foxwood Place (between Horseshoe Rd and Pink Lake Dr/ Pineview Rd)
- Directional median opening at the 58 West Auto Auction west of Stony Mill Rd.

Three segments of the proposed median openings from the 2012 study in the westernmost area of the US 58 study corridor do not meet current VDOT standards and are shown with a yellow outline in Figure 44.

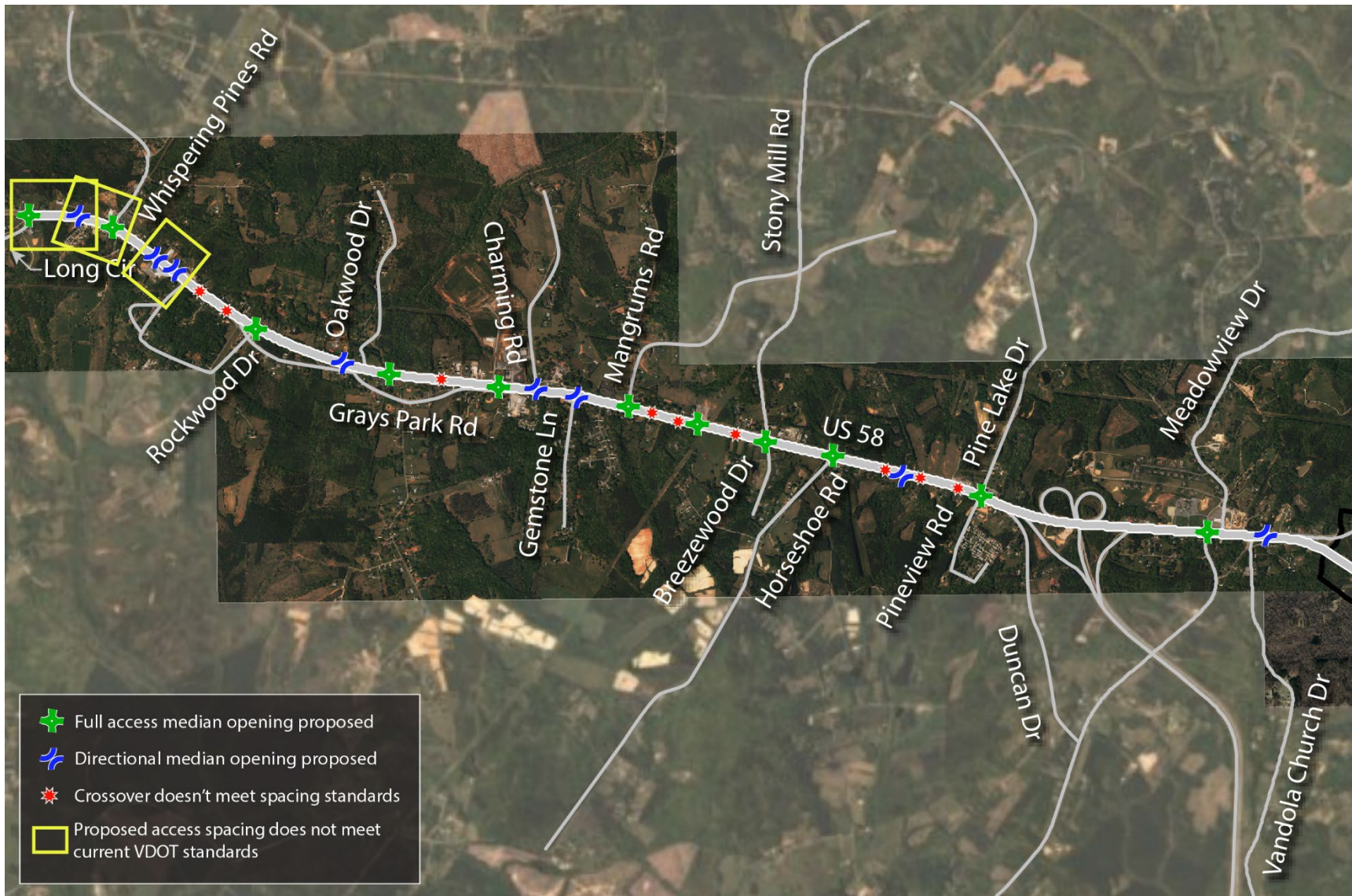


FIGURE 44: MEDIAN OPENING RECOMMENDATIONS FROM 2012 STUDY.

## Traffic Operations Analysis

Two intersections along the US 58 study corridor are signalized:

1. US 58 (Martinsville Hwy) at Berry Hill Road/ Meadowview Drive
2. US 58 (Martinsville Hwy) at Whispering Pines Road

All other intersections along the US 58 study corridor are unsignalized.

The prior 2008 and 2012 access management studies evaluated traffic operational conditions at select intersections and found that none of the intersections were experiencing significant delays or capacity problems at current traffic levels.

The 2012 study for the portion of US 58 in Pittsylvania County analyzed future year 2035 conditions, assuming the Mega Site becomes a major center of employment. The future analysis indicated the intersections of US 58 with Whispering Pines Road (unsignalized at the time of the 2012 study) and Pine Lake Road would operate at Level of Service (LOS) F in one or both weekday peak hours. The analysis also indicated the intersections of US 58 with Grays Park Road, Westover Drive, and Stony Mill Road would approach LOS E during the PM peak hour. All other intersections, including the Berry Hill Road/ Meadowview Road intersection, were projected to operate at an adequate level of service.

Building from the prior studies, the study team collected intersection turning movement count data at select intersections and analyzed the existing and projected future traffic operations. The following sections describe the analysis and results.

## Existing Traffic Conditions

The project team examined the turning movement volumes and projected levels of service from the prior studies, crash data, and historical side-street AADT growth rates for the intersections listed in **Table 2**. The project team identified intersections for analysis based on the reasoning outlined in Table 2. **Figures 45 and 46** show the peak hour turning movement volumes, and **Figures 47 and 48** show the results from the analysis.

**TABLE 2: INTERSECTIONS INCLUDED IN TRAFFIC OPERATIONS ANALYSIS**

Intersection	Need to Analyze Traffic Operations?
Long Circle	No. Low turning volumes and projected LOS C in 2035.
Whispering Pines Rd	<b>Yes. The 2012 study projects high turning volumes and LOS E/F in 2035, although the analysis did not include a traffic signal. Recent AADT counts show a higher growth rate than other roads.</b>
Rockwood Dr	No. Low turning volumes and projected LOS C in 2035.
Grays Park Rd	<b>Yes. Noticeable activity occurring to the north since 2006/07 aerial.</b>
Mangrums Rd	No. Low turning volumes and projected LOS C/D in 2035.
Stony Mill Rd	<b>Yes. Projected LOS E in 2035. Significant variation in historical AADTs.</b>
Horseshoe Rd	No. Low turning volumes and projected LOS B-D in 2035.
Pine Lake Rd	<b>Yes. Highest PM peak hour volumes of all intersections. Forecasted to operate at LOS E/F in 2035.</b>
Berry Hill Rd/ Meadowview Dr	<b>Yes. Use 2018 Dewberry Southern Virginia Mega Site turning movement count data.</b>
Westover Dr	No. Historical AADT indicates volumes are decreasing. 2012 study indicated 2035 projected LOS C. 2018 Westover Drive Study indicated AADTs around 2,000 vehicles per day.
Vandola Dr	No. Low turning volumes in prior studies.
James Rd	<b>Yes. Prior studies showed higher overall intersection volumes compared to other intersections.</b>
Church Ave	<b>Yes. Significant crash cluster with pedestrian crash.</b>
Ingram Rd	<b>Yes. Roadway geometry includes frontage roads and close entrances which will likely require closer examination.</b>
Barrett St	<b>Yes. Significant crash cluster.</b>

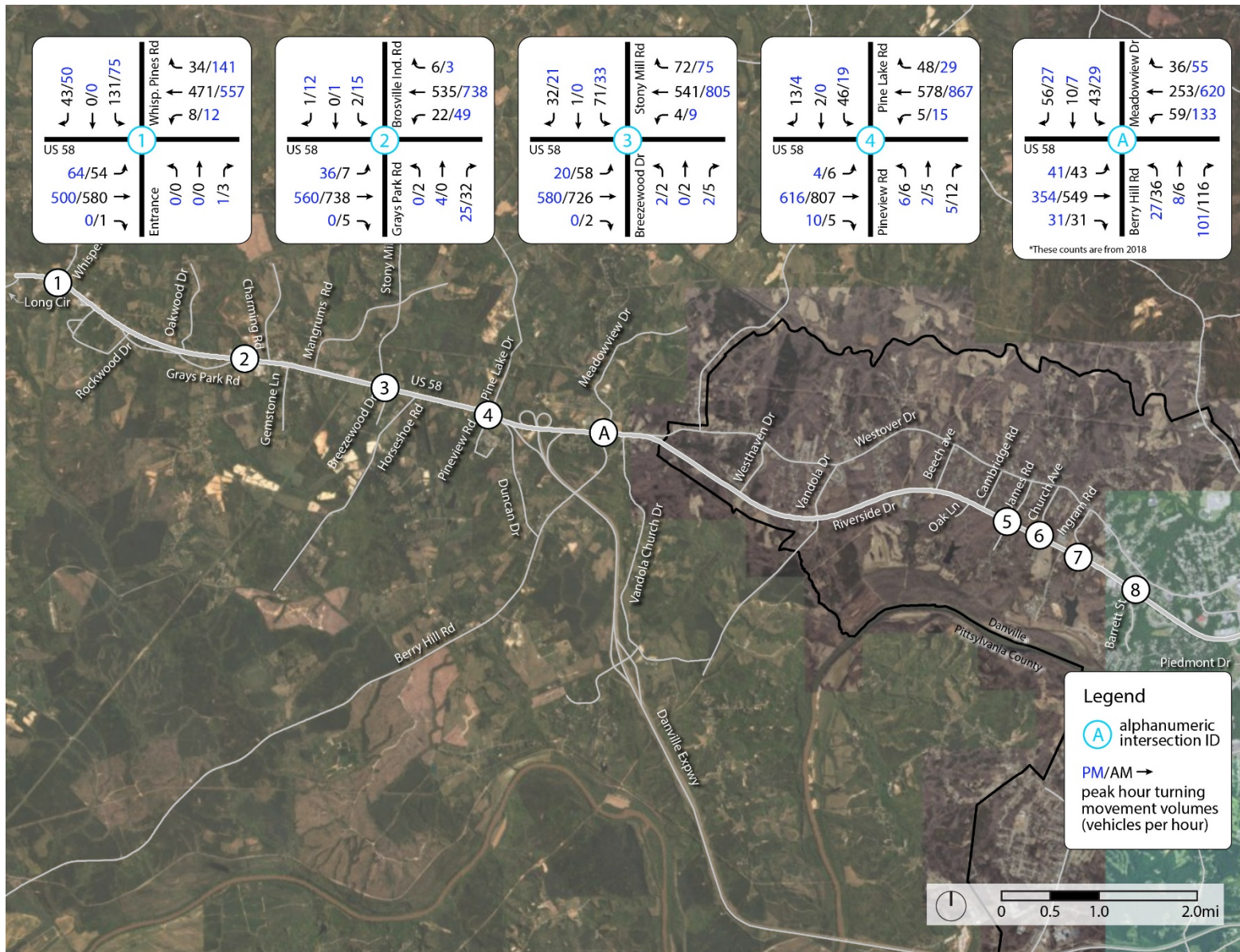


FIGURE 45: INTERSECTION TURNING MOVEMENT COUNTS - EXISTING YEAR 2019 (1 OF 2)

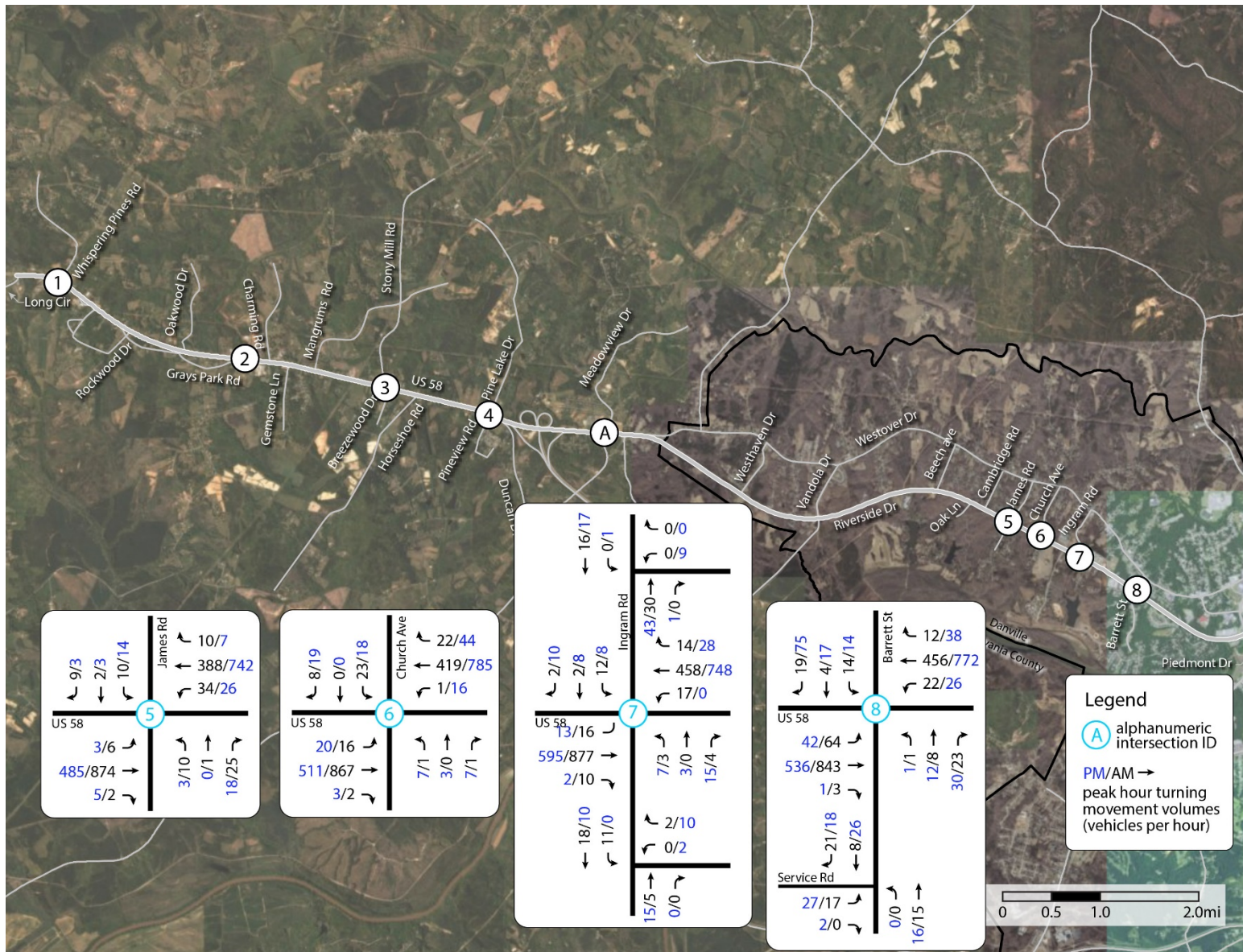


FIGURE 46: INTERSECTION TURNING MOVEMENT COUNTS - EXISTING YEAR 2019 (2 OF 2)

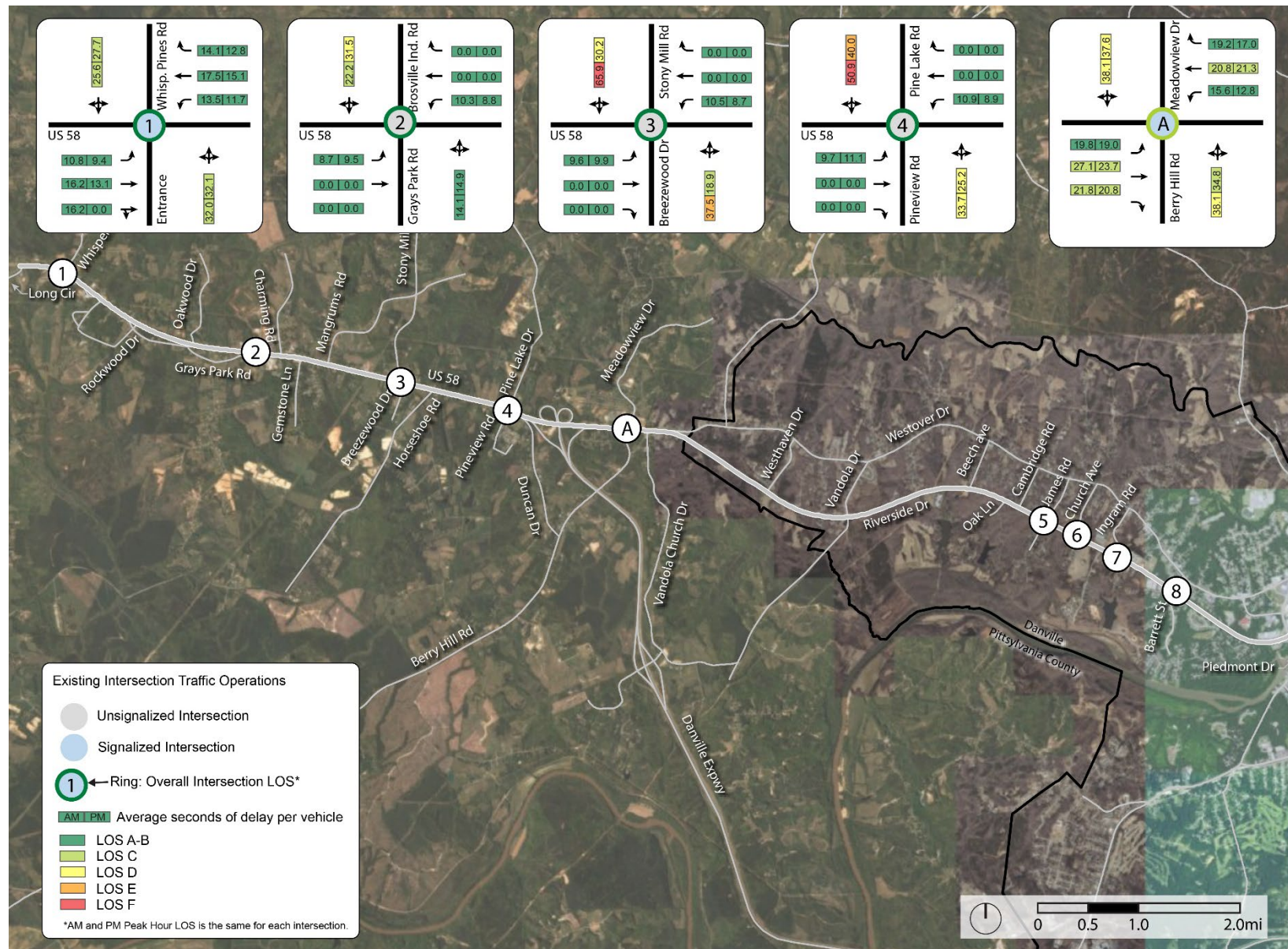


FIGURE 47: EXISTING (2019) INTERSECTION TRAFFIC OPERATIONS (1 OF 2). LEVELS OF SERVICE ARE DEFINED BY HIGHWAY CAPACITY MANUAL DELAY CRITERIA.

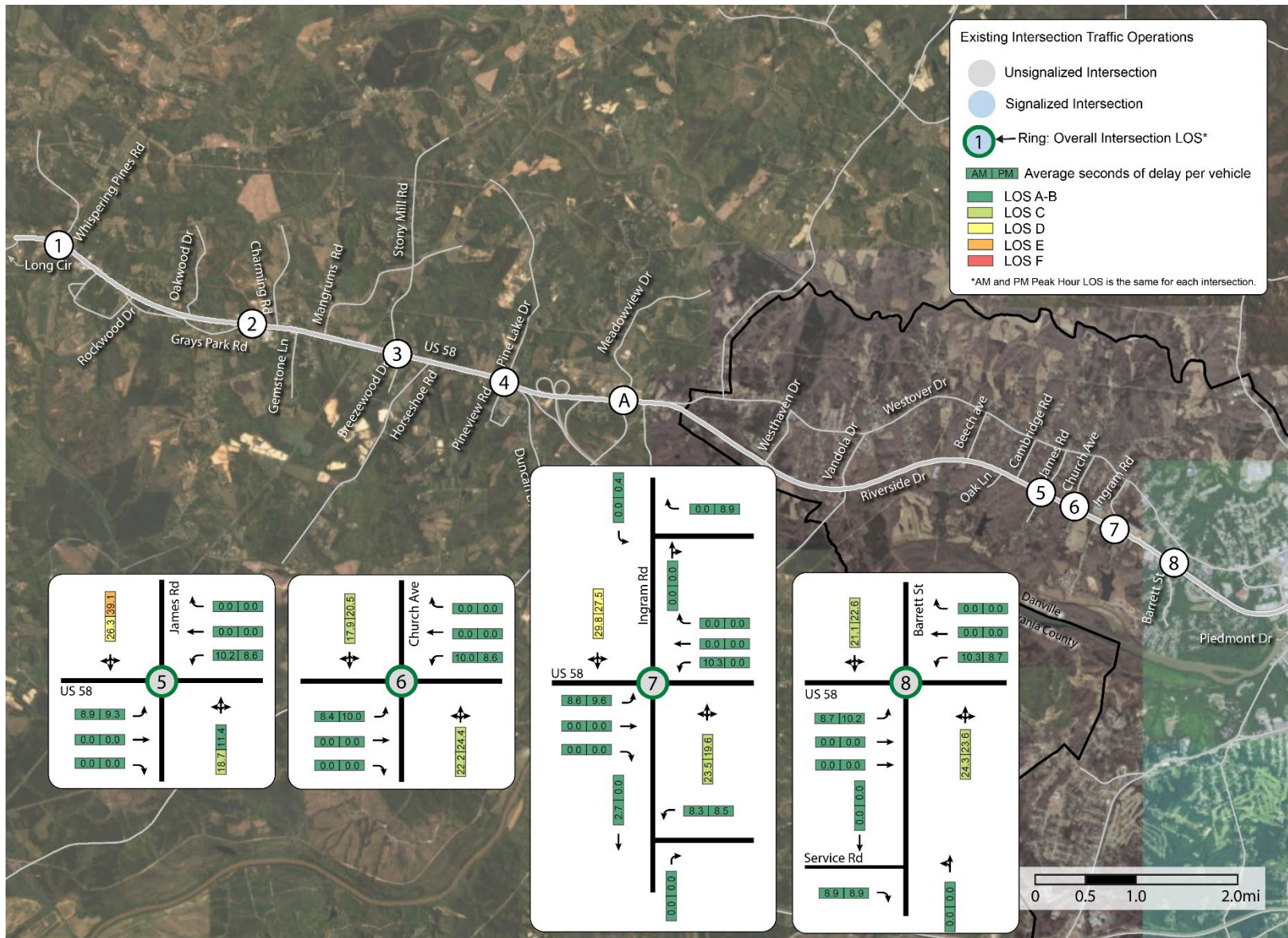


FIGURE 48: EXISTING (2019) INTERSECTION TRAFFIC OPERATIONS (2 OF 2). LEVELS OF SERVICE ARE DEFINED BY HIGHWAY CAPACITY MANUAL DELAY CRITERIA.



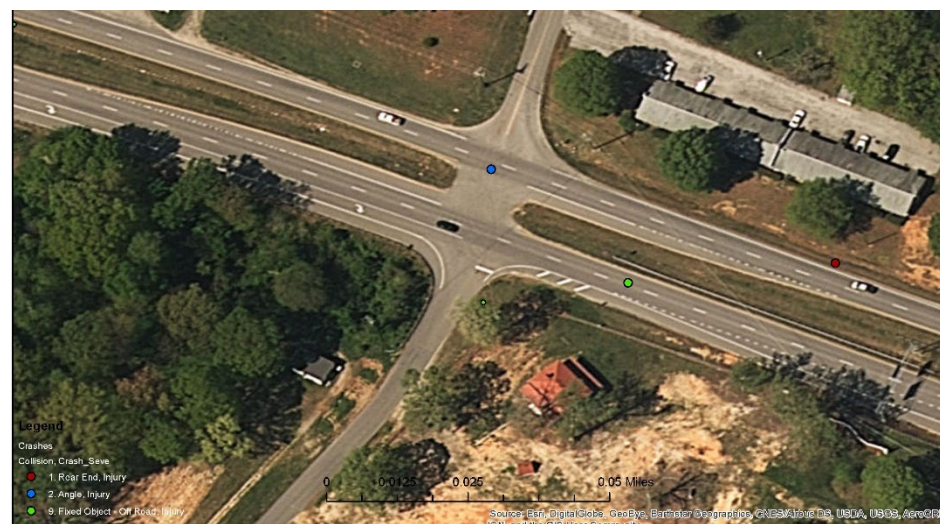
### Results

The intersection of US 58 and Berry Hill Road/ Meadowview Drive operates at overall LOS C in both AM and PM peak hours. All other analyzed intersections operate at overall LOS A or B. The only delay that vehicles on US 58 traveling through the corridor encounter occurs at the Berry Hill Road intersection. Left turns from US 58 generally take less than 15 seconds to initiate.

The only potentially problematic delays in this corridor occur from the stop-controlled side-streets, most notably at Stony Mill Road and Pine Lake Road. At these locations, southbound vehicles experience over 50 seconds of delay in the AM peak hour. Although a few injury crashes occurred at these locations (see **Figures 49 and 50**), neither of these intersections are included in VDOT's top 100 lists of intersections or segments with PSI.



**FIGURE 49: CRASHES AT THE INTERSECTION OF US 58 AND STONY MILL ROAD.**



**FIGURE 50: CRASHES AT THE INTERSECTION OF PINEVIEW ROAD/ PINE LAKE DRIVE.**

## Future Traffic Growth Projections

To understand how traffic conditions will change in the future, the project team developed projections for future traffic volume growth. The project team reviewed several sources of historical and projected traffic growth:

- VDOT's historical average annual traffic volumes (2001-2017)
- VDOT's Statewide Planning System (SPS) projections for year 2045
- 2045 traffic projections from the Danville regional travel demand model, released in 2019
- Growth rates from the 2012 Route 58 West Access Management Study
- Traffic projections from the 2018 Southern Virginia Mega Site at Berry Hill Transportation Study Update

Based on the information from the above listed sources, the project team developed annual linear growth rates for the US 58 corridor and the side-street approaches for the nine analyzed intersections.

Traffic growth on US 58 and most of the intersection side-streets is projected at 0.5 percent per year. This most closely follows the travel demand model traffic projections, which most accurately incorporate projected population and employment growth.

Exceptions to the 0.5 percent annual growth rate include:

- Stony Mill Road at 2.5 percent per year
- Pineview Road at 4.5 percent per year
- Berry Hill Road at 5.5 percent per year
- Meadowview Drive at 5.0 percent per year

The project team reviewed these projections with staff from the Danville MPO, VDOT, City of Danville, and Pittsylvania County. The development of the traffic growth rates is documented in greater detail in the separate *Traffic Forecast Analysis Memorandum*.

Using the agreed-upon growth rates, the project team developed peak hour turning movement volumes for Year 2045. **Figures 51 and 52** show the future turning movement volumes for the nine analyzed intersections.

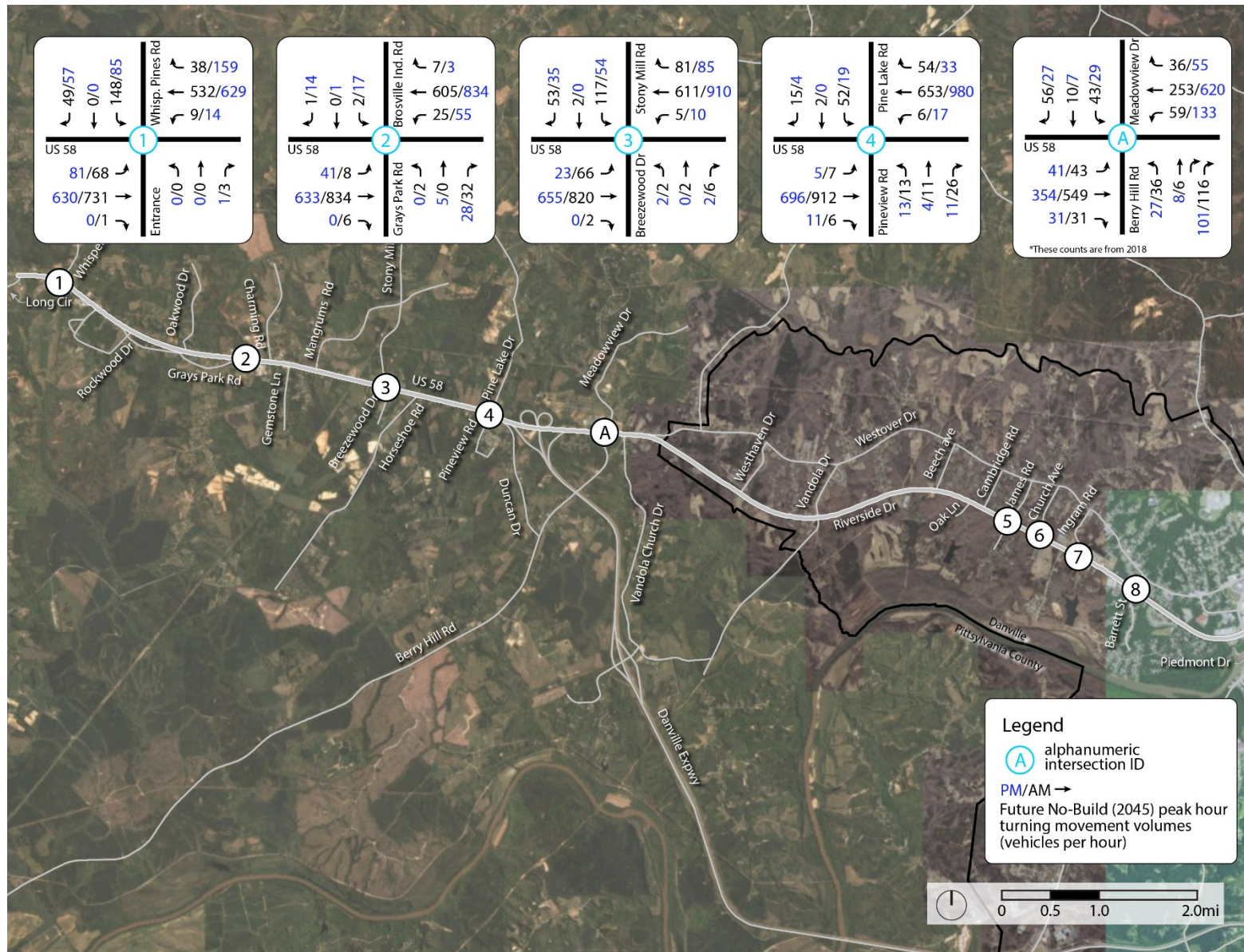


FIGURE 51: INTERSECTION TURNING MOVEMENT VOLUMES – FUTURE YEAR 2045 (1 OF 2)

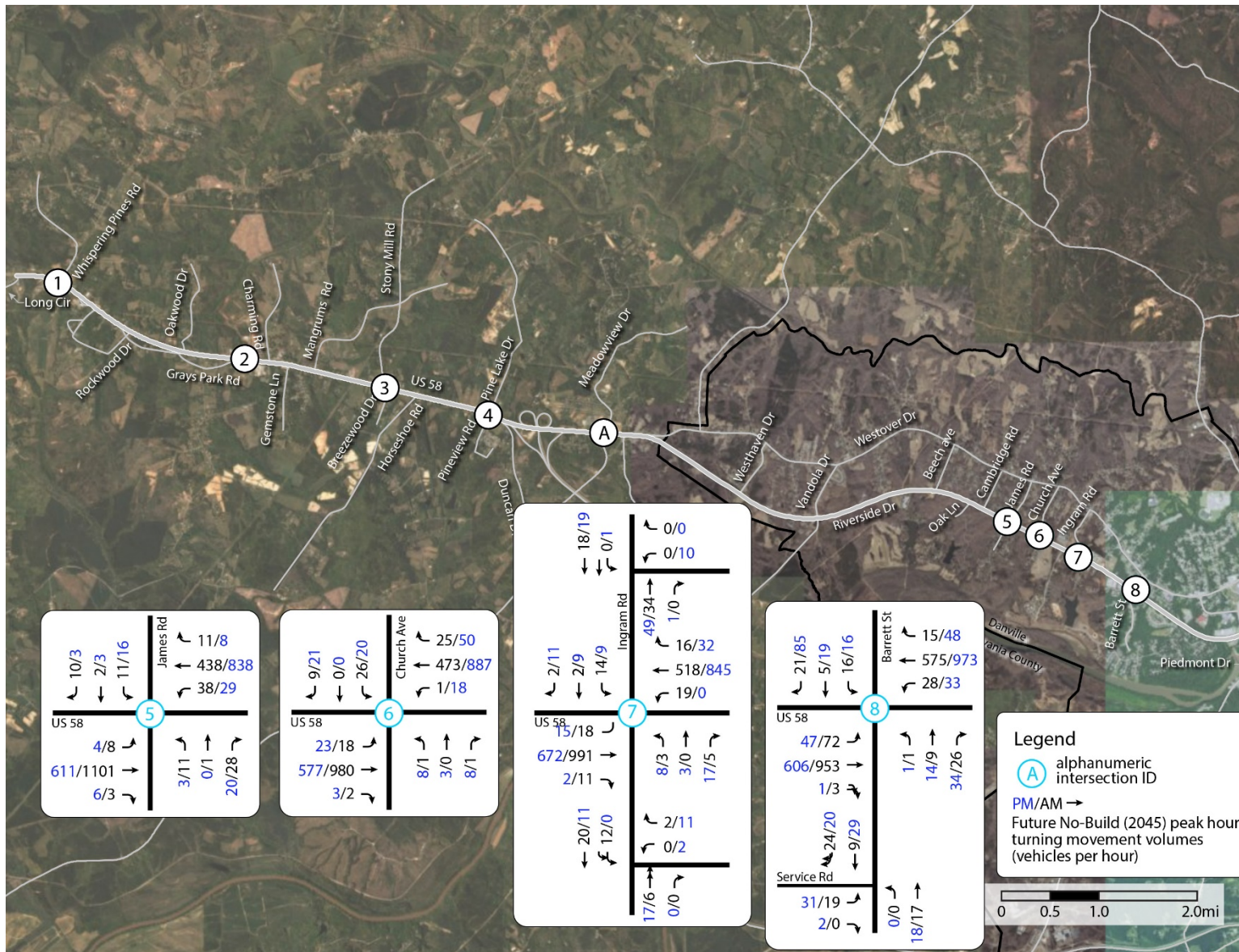


FIGURE 52: INTERSECTION TURNING MOVEMENT VOLUMES – FUTURE YEAR 2045 (2 OF 2)

### Projected Future Traffic Conditions

The project team analyzed the projected traffic conditions for Year 2045, which are shown in **Figures 53 and 54**. The future year analysis included the programmed improvements to add and extend turn lanes at the intersection of US 58 at Berry Hill Road.

The results indicate traffic conditions on US 58 will continue to operate at an acceptable level of service. The only disruptions to through traffic on US 58 are the two signalized intersections at Whispering Pines Road and Berry Hill Road. All approaches at these two intersections are projected to operate at LOS D or better.

The existing conditions analysis identified potentially problematic delays at the stop-controlled side-streets, most notably at Stony Mill Road and Pine Lake Road. With the increase of through traffic on US 58, it will be increasingly harder for vehicles waiting at the side-streets to find a gap, especially to turn left. The analysis indicates it will likely take two minutes on average to find a gap in traffic in the AM peak hour, and over one minute in the PM peak hour.

This problem is worst at Stony Mill Road, where the projected growth rate of 2.5 percent per year is higher than the 0.5 percent growth rate for many of the other intersections. The 95<sup>th</sup> percentile queue length on the southbound approach queue length is 120 feet, roughly four or five car lengths, in the AM peak hour in existing conditions. This grows to 320 feet, roughly 12 to 13 car lengths, by Year 2045.

The analysis also indicates the southbound approach of James Road could begin to experience a similar problem in the future. In the PM peak hour of the future analysis, the average delay on the southbound approach extends over one minute long.

Despite the delays, the future projected traffic volumes at these intersections are low and unlikely to warrant a traffic signal by 2045.

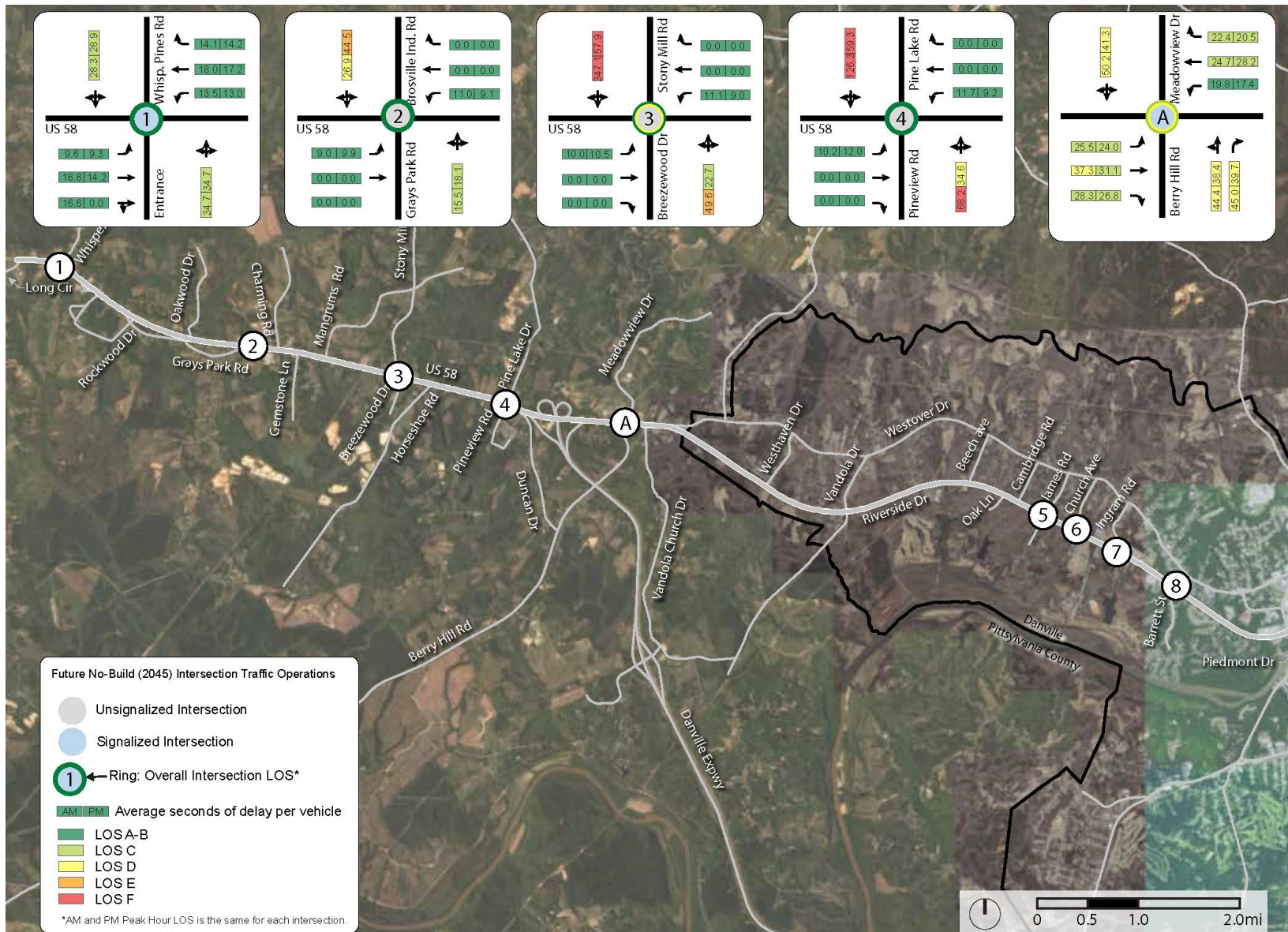


FIGURE 53: FUTURE (2045) INTERSECTION TRAFFIC OPERATIONS (1 OF 2). LEVELS OF SERVICE ARE DEFINED BY HIGHWAY CAPACITY MANUAL DELAY CRITERIA.

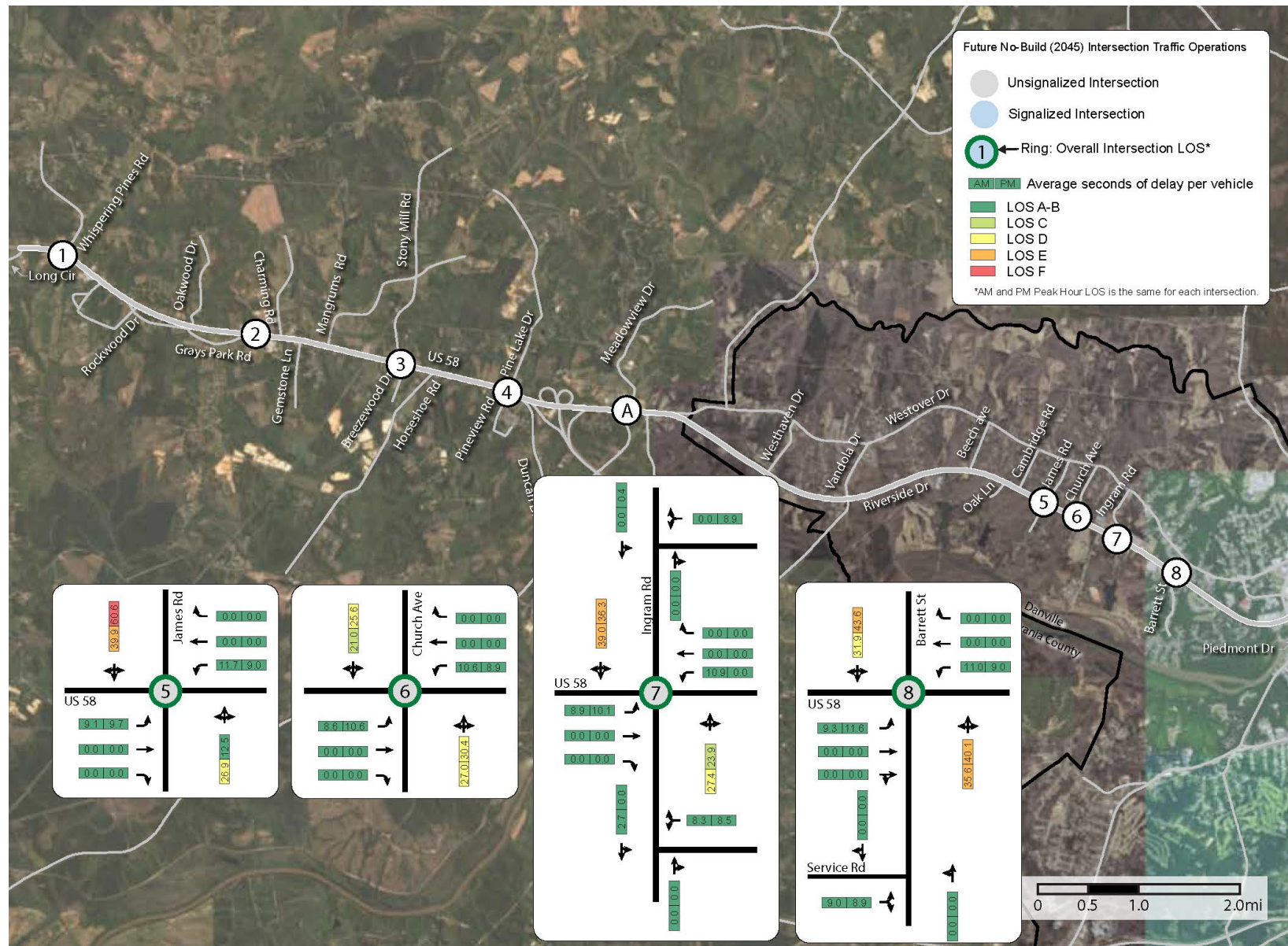


FIGURE 54: FUTURE (2045) INTERSECTION TRAFFIC OPERATIONS (2 OF 2). LEVELS OF SERVICE ARE DEFINED BY HIGHWAY CAPACITY MANUAL DELAY CRITERIA.

## Summary of Issues and Deficiencies

The most significant issues in the 11-mile study corridor are described as follows:

- The spacing of median openings is deficient along most of the corridor, especially in the western portions of the study corridor in Pittsylvania County, when compared to VDOT's access spacing requirements. The map showing the segments of the study corridor where access spacing is deficient is provided previously in **Figure 24**.
  - Several segments of the study corridor have potential for safety improvement (PSI), meaning the observed crash rate is higher than expected. Most of the segments with PSI are located in the eastern portion of the study segment within the Danville City limits. Segments with PSI are shown previously in **Figure 13**. The three segments with the highest ranked PSI are:
    - US 58 between James Road and Cambridge Drive
    - US 58 between Barrett Street and Ingram Road
    - US 58 between Vandola Road and Parkway Drive
  - A total of 426 crashes occurred within the six-year period of 2013 to 2018, averaging one crash every five days. Three fatal crashes occurred over the six-year period.
  - The crash data shows a prevalence of angle and rear-end crashes at unsignalized intersections and driveways, which often result in injuries. The likelihood of a crash resulting in injury increases with vehicle speeds.
- Vehicles turning left onto US 58 from Stony Mill Road wait over 60 seconds on average to find a gap in the AM peak hour in existing conditions. The delay is projected to increase to almost six minutes by Year 2045. The four to five car queue length in existing conditions is projected to increase to 12 to 13 car lengths in the future.
  - Several commercial properties have redundant entrances that do not meet VDOT spacing standards, which create additional conflict points and increase crash potential. The worst deficiencies for commercial entrance spacing are at Church Avenue, Ingram Road, and Whispering Pines Road.
  - The roadside features on Route 58 throughout the study corridor area lack paved shoulders, which does not meet current VDOT standards.

The following sections describe the recommendations to address these issues.



## Recommendations

The recommendations in this report build upon the recommendations from the 2008 and 2012 prior access management studies. Between 2008 and 2012, VDOT made several changes to its access spacing standards, including:

- adding a new Full Access Entrance category
- removing the distinction between spacing standards for urban vs. rural roadways
- decreasing the minimum spacing for principal and minor arterials

Since the 2012 study was completed, VDOT's access spacing requirements have changed to clarify that directional median crossovers have the same minimum access spacing standards as full access entrances.

In general, most of the recommendations from the 2008 and 2012 prior studies are still valid. The project team examined the recommendations from these studies and confirmed their validity, with some exceptions that are discussed later in this section.

In developing new recommendations, the project team focused on segments and intersections where the VDOT crash data indicates potential for safety improvement, as well as locations with identified issues as described in the previous section. At these locations, the project team conducted a more in-depth review of the crash history, including a review of the crash descriptions.

The following section describes the recommendations that have highest priority due to the potential for safety improvement or the

issues previously described. Later sections provide a full list of recommendations, including those for longer term implementation.

### High Priority Recommendations

High Priority Recommendation #1: Restricted Crossing U-Turns at James Road and Cambridge Drive

The intersection of James Road at US 58 is located where two PSI segments connect, one of which is PSI segment #54 – the segment with the highest ranked PSI in the study corridor, meaning the actual crash rate exceeds the expected crash rate more than any other location.<sup>7</sup> Between 2013 and 2018, 14 crashes occurred, 12 of which resulted in injury. All of the severe injury and most of the visible injury crashes resulted from motorists trying to make a left turn from the side-street.

Although the recent construction of an eastbound right turn lane improved sight distance for drivers looking west at the northbound James Road approach, it did not eliminate the left turn conflicts, which appear to be a major contributing factor to the injury crashes at this intersection.

The intersection of Cambridge Drive at US 58 is located at the other end of PSI segment #54 and connects to another PSI segment. Between 2013 and 2018, nine crashes occurred at this intersection. Several crashes at this location involved left turns from Cambridge Drive.

**To address the safety issues, a series of Restricted Crossing U-Turns is recommended along the stretch of US 58 including the intersections of James Road and Cambridge Drive.**

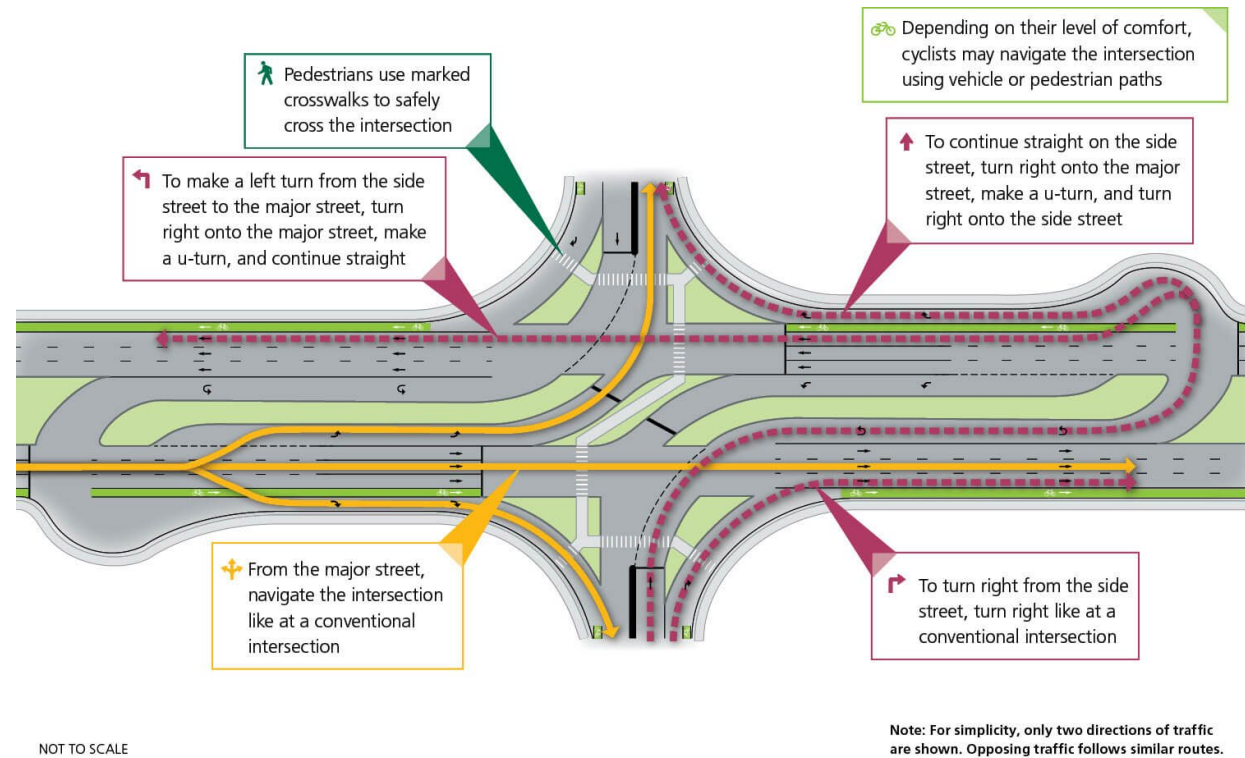
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<sup>7</sup> Data source: VDOT 2013-2017 PSI data.

**Figure 55** illustrates the concept of a Restricted Crossing U-Turn, also called an RCUT.<sup>8</sup>

RCUTs are a type of directional median opening in which a median barrier is placed in the middle of the intersection. The barrier allows vehicles on the major street (US 58) to turn left into the side-street, and it directs all traffic on the side-streets to make a right turn. Motorists who want to turn left or go straight across from the side-streets must first turn right and make a U-turn at the next median opening. This configuration makes it safer for side-street traffic because instead of having to find a gap in both directions, drivers only need to look for a gap in one direction at a time.

**Figure 56** shows a concept of the recommended RCUT configurations for this segment of US 58.



**FIGURE 55: RESTRICTED CROSSING U-TURN**  
IMAGE CREDIT: VDOT

<sup>8</sup> More information about how RCUTs work is available at:  
[http://www.virginia.gov/info/innovative\\_intersections\\_and\\_interchanges/rcut.asp](http://www.virginia.gov/info/innovative_intersections_and_interchanges/rcut.asp).



**FIGURE 56: RESTRICTED CROSSING U-TURN RECOMMENDATIONS AT JAMES ROAD AND CAMBRIDGE DRIVE**

A SERIES OF RCUTS IS RECOMMENDED AT THE INTERSECTIONS OF US 58 AT JAMES ROAD AND CAMBRIDGE DRIVE TO ELIMINATE CONFLICT POINTS FOR VEHICLES TURNING LEFT FROM STOP-CONTROLLED SIDE-STREETS.

The recommendations for the segment of US 58 shown in **Figure 56** include the following improvements, which are part of the larger list of recommendations in **Table 8** as Recommendations #65 through #69:

- Converting the existing James Road intersection to an RCUT, allowing left turns from US 58 onto James Road. Vehicles on James Road would turn right and proceed to a downstream U-turn.
- Installing a new turnaround for eastbound-to-westbound U-turns midway between James Road and Church Avenue. Northbound vehicles on James Road would utilize this U-turn to go west on US 58. It is recommended that a turnaround loon be provided here to allow trucks, school buses, and other large vehicles to turn around.
- Installing a new turnaround for westbound-to-eastbound U-turns midway between James Road and Cambridge Drive.<sup>9</sup> Southbound vehicles on James Road would utilize this U-turn to go east on US 58. It is recommended that a turnaround loon be provided here to allow trucks, school buses, and other large vehicles to turn around.
- Converting the existing Cambridge Drive intersection to an RCUT, allowing left turns from US 58 onto Cambridge Drive. Vehicles on Cambridge Drive would turn right and proceed to Oak Lane to turn around to head east.
- Converting the existing Oak Lane intersection to an RCUT, allowing left turns from US 58 onto Oak Lane. Vehicles on

Oak Lane would turn right and proceed to Cambridge Drive to turn around to head west.

- Extending all turn lanes on US 58 at James Road, Cambridge Drive and Oak Lane to meet VDOT criteria for 200' storage and 200' tapers.
- Turn lanes at the new U-turn locations would also meet VDOT criteria for 200' storage and 200' tapers.

The volume of traffic that would be diverted at James Road is very low – a total of 23 vehicles in the AM peak hour and 20 vehicles in the PM peak hour. Traffic volumes on Cambridge Road and Oak Lane were not available and are not expected to be greater than James Road. The recommendations would divert less than 2% of the traffic at these intersections while significantly reducing the number of conflict points at each intersection.

The turnaround locations shown in **Figure 56** and in the Recommendations Appendix may need to be adjusted to accommodate turnaround loons for trucks, school buses, and other heavy vehicles prior to design, based on more in-depth analysis and public input.

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<sup>9</sup> A U-turn midway between James Road and Cambridge Drive would be located approximately 650 feet from either intersection. VDOT requires 750 feet between directional median openings for principal arterials with

50 mph or greater speed limits. This recommendation would require a design waiver, unless the posted speed limit is reduced to 45 mph.

### High Priority Recommendation #2: Restricted Crossing U-Turn at Barrett Street

The intersection of Barrett Street at US 58 is located where two PSI segments connect. Between 2013 and 2018, 15 crashes occurred, nine of which resulted in injury. Eight of the 15 crashes resulted from vehicles turning left from the side-street approaches.

The volume of vehicles making a left turn or going straight across from either northbound or southbound Barrett Street approaches is relatively low. In the AM peak hour, there are 9 and 18 vehicles on the northbound and southbound approaches, respectively, either turning left or going straight. In the PM peak hour, there are 13 and 31 vehicles on the northbound and southbound approaches, respectively, either turning left or going straight.

**To address the left turn crashes, an RCUT at Barrett Street is recommended.**

**Figure 57** shows a concept of the recommended RCUT configuration at this location. The recommendation includes the following improvements, which are part of the larger list of recommendations in **Table 8** as Recommendations #78 through #80:

- Converting the existing Barrett Street intersection to an RCUT, allowing left turns from US 58 onto Barrett Street. Vehicles on Barrett Street would turn right and proceed to a downstream U-turn.
- Installing a new turnaround for eastbound-to-westbound U-turns 725 feet<sup>10</sup> east of Barrett Street. Northbound vehicles on Barrett Street would utilize this U-turn to go west on US 58.

- Installing a new turnaround for westbound-to-eastbound U-turns approximately 600 feet west of Barrett Street. Southbound vehicles on Barrett Street would utilize this U-turn to go east on US 58.

The RCUT at Barrett Street would divert 27 vehicles in the AM peak hour and 44 vehicles in the PM peak hour – less than 3% of the traffic at this intersection, while significantly reducing the number of conflict points and eliminating the conflict of traffic turning left directly from the side-street approaches.

The turnaround locations shown in **Figure 57** and in the Recommendations Appendix may need to be adjusted to accommodate turnaround loons for trucks, school buses, and other heavy vehicles prior to design, based on more in-depth analysis and public input.

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<sup>10</sup> VDOT requires a minimum of 565 feet between directional median openings on principal arterials with posted speeds of 35 to 45 mph. The

recommended spacing of 725 feet avoids light poles and drainage features to minimize costs.



**FIGURE 57: RESTRICTED CROSSING U-TURN RECOMMENDATIONS AT BARRETT STREET**

AN RCUT IS RECOMMENDED AT THE INTERSECTION OF US 58 AND BARRETT STREET TO ELIMINATE CONFLICT POINTS FOR VEHICLES TURNING LEFT FROM THE STOP-CONTROLLED SIDE-STREETS.

High Priority Recommendation #3: Examine the Feasibility of Reducing the Speed Limit between Barrett Street and Oak Lane  
The speed limit on US 58 changes west of Barrett Street from 40 mph to 55 mph, shown previously in **Figure 8**, a 15 mph difference. The crash analysis revealed 46 percent of crashes in the study corridor resulted in injury. The likelihood of a crash resulting in injury increases with vehicle speeds.

The roughly 1.5-mile segment west of Barrett Street to Oak Lane has several PSI segments, including the two highest ranked PSI segments of the 11-mile study corridor. This 1.5-mile stretch of US 58 could be a candidate for a speed limit reduction. **This study recommends examining the feasibility of lowering the speed limit on this 1.5-mile segment from 55 mph to 45 mph** to provide a more gradual speed transition and potentially reduce the severity of injuries.

In order to implement this recommendation, a more detailed engineering study would need to be prepared, including the collection of speed data at this location.

High Priority Recommendation #4: Restricted Crossing U-Turns at Vandola Road, Avalon Drive, and Kayewood Lane  
The intersection of Vandola Road and US 58 is located where two PSI segments connect. Between 2013 and 2018, 10 crashes occurred, five of which resulted in injury. The five injury crashes resulted from vehicles crossing US 58 from Vandola Road.

The 2008 study indicates the volume of vehicles making a left turn or going straight across from either northbound or southbound Vandola Road approaches is relatively low. In the AM peak hour, there are 4 and 20 vehicles on the northbound and southbound approaches, respectively, either turning left or going straight. In the

PM peak hour, there are 4 and 28 vehicles on the northbound and southbound approaches, respectively, either turning left or going straight.

The spacing between Vandola Road and Avalon Drive is deficient. There is only 915 feet between these two full access unsignalized intersections, where VDOT requires a minimum of 1,320 feet. The 2008 study indicated the crossover spacing at Avalon Drive does not meet recommended guidelines, and it identified the location in front of the Stallings Collision entrance as meeting spacing requirements for a future crossover.

Similarly, the spacing between Parkway Drive and Kayewood Lane (where the Wrenn-Yeatts funeral home is located) is deficient. There is only 1,165 feet in between these intersections, where VDOT requires a minimum of 1,320 feet. The 2008 study indicated the crossover spacing at Kayewood Lane does not meet recommended guidelines, and it identified a new location for a future crossover 400 feet to the west of the existing median opening.

**A series of RCUTs at Avalon Drive, Vandola Road, and Kayewood Lane is recommended** for several reasons. The RCUT at Vandola Road would eliminate the conflicts between US 58 through traffic and side-street traffic turning left or going straight across the intersection. The RCUTs at Avalon Drive and Kayewood Lane would retain access at these locations, as opposed to complete closures.

**Figure 58** shows a concept of the recommended RCUT configurations along this segment of US 58.



**FIGURE 58: RESTRICTED CROSSING U-TURN RECOMMENDATIONS AT AVALON DRIVE, VANDOLA ROAD, AND KAYEWOOD LANE**



The recommendations in **Figure 58** include the following improvements, which are part of the larger list of recommendations in **Table 8** as Recommendations #52 through #58:

- Converting the existing Avalon Drive, Vandola Road, and Kayewood Lane full access intersections to RCUTs, allowing left turns from US 58 onto the side-streets. Vehicles on the side-streets would turn right and proceed to a downstream U-turn.
- Installing a new turnaround for westbound-to-eastbound U-turns 750 feet west of Avalon Drive. Southbound vehicles on Avalon Drive would utilize this U-turn to go east on US 58.
- Installing a new turnaround for eastbound-to-westbound U-turns midway between Vandola Road and Kayewood Lane. Northbound vehicles on Vandola Road would utilize this U-turn to go west on US 58.
- Installing a new turnaround for westbound-to-eastbound U-turns midway between Vandola Road and Kayewood Lane. Southbound vehicles on Kayewood Lane would utilize this U-turn to go east on US 58.
- Extending all turn lanes on US 58 at Avalon Drive, Vandola Road, and Kayewood Lane to meet VDOT criteria for 200' storage and 200' tapers.
- Turn lanes at the new U-turn locations would also meet VDOT criteria for 200' storage and 200' tapers.

The RCUT at Vandola Road would divert 24 vehicles in the AM peak hour and 32 vehicles in the PM peak hour – less than 3% of the traffic at this intersection, while significantly reducing the number of conflict points and eliminating the conflict of traffic turning left directly from the side-street approaches. Turning movement

volumes were not available for Avalon Drive or Kayewood Lane, and it is anticipated that turning movement volumes at these intersections would be less than at Vandola Road.

The RCUT at Vandola Road should ideally be constructed with crossing facilities for pedestrians and bicyclists. The Beaches-to-Bluegrass Trail Master Plan identifies an interim on-road alignment crossing over US 58 along Vandola Drive.

The turnaround locations shown in **Figure 58** and in the Recommendations Appendix may need to be adjusted to accommodate turnaround loons for trucks, school buses, and other heavy vehicles prior to design, based on more in-depth analysis and public input.

## Other Tested Improvements

### *Stony Mill Road Continuous Green T*

As noted in the Summary of Issues and Deficiencies, it is difficult for drivers turning left from southbound Stony Mill Road to find a gap in traffic, and this difficulty will increase in the future as traffic grows. The project team evaluated a Continuous Green T configuration for the southbound approach combined with a right-

in/right-out only for the northbound approach. An example of a Continuous Green T configuration is shown in **Figure 59**. While this configuration is typically reserved for three leg intersections, it can be implemented for four leg intersections where the fourth leg is right-in/right-out only.



**FIGURE 59: CONTINUOUS GREEN T INTERSECTION.** A CONTINUOUS GREEN T IS USUALLY IMPLEMENTED ON THREE LEG INTERSECTIONS AND FORMALIZES A TWO-STAGE LEFT TURN MANEUVER FROM THE SIDE-STREET. IT CAN BE IMPLEMENTED AS A SIGNALIZED OR UNSIGNALIZED INTERSECTION. THE PROJECT TEAM TESTED AN UNSIGNALIZED CONTINUOUS GREEN T CONFIGURATION FOR THE SOUTHBOUND APPROACH OF STONY MILL ROAD WITH AN ADDED RIGHT-IN/RIGHT-OUT ONLY CONFIGURATION FOR THE NORTHBOUND APPROACH.

IMAGE LOCATION: US 40 (COLUMBIA PIKE) AT RIVERS EDGE ROAD, COLUMBIA, MD. IMAGE CREDIT: GOOGLE EARTH

**Table 3** below documents the traffic analysis results of the Continuous Green T configuration for the southbound approach of Stony Mill Road, showing marginal improvement in the AM peak hour, which is the most problematic approach in the existing and no

build conditions. The southbound delay improves slightly but is still almost five minutes long. The queue length decreases from 12-13 car lengths to 6-7 car lengths.

**TABLE 3: STONY MILL ROAD CONTINUOUS GREEN T CONFIGURATION TRAFFIC ANALYSIS RESULTS FOR THE SOUTHBOUND APPROACH.**

	Southbound Approach			
	AM Peak Hour		PM Peak Hour	
	Control Delay (seconds)	95 <sup>th</sup> Percentile Queue Length (feet)	Control Delay (seconds)	95 <sup>th</sup> Percentile Queue Length (feet)
2019 Existing Conditions	65.9	117	30.2	55
2045 No Build	347.1	322	57.9	95
2045 Continuous Green T	295.3	169	57.2	90

The project team prepared a planning level cost estimate to understand the magnitude of the cost of implementing this improvement, shown in **Table 4**.

**TABLE 4: PLANNING LEVEL COST ESTIMATES FOR THE CONTINUOUS GREEN T CONFIGURATION AT STONY MILL ROAD**

Project Phase	Future Year Costs	Future Year
Prelim. Eng.	\$518,000	2024
R/W	\$48,000	2028
Construction	\$5,363,000	2030
<b>Total Project</b>	<b>\$5,929,000</b>	

The marginal improvements in delay and queue length do not appear to justify the cost of nearly six million dollars for design and construction. Therefore, the Continuous Green T is not recommended as an improvement at this time. However, the MPO and Pittsylvania County may continue to monitor the delays and crashes at this intersection. If crash patterns at this location intensify, the Continuous Green T may be reconsidered to address future safety issues.

Project Costs and Schedules

The project team prepared planning-level cost estimates for the top two high priority recommendations, including preliminary engineering, right-of-way and utility relocation, and construction costs, provided in **Table 5**. The prepared cost estimates are intended to be used for funding applications, such as SMART SCALE or Highway Safety Improvement Program for implementation.

**TABLE 5: PLANNING LEVEL COST ESTIMATES FOR THE TOP TWO HIGH PRIORITY RECOMMENDATIONS**

Project Phase	Future Year Costs		Future Year
	High Priority Recommendation #1: RCUT Series at James Rd & Cambridge Dr	High Priority Recommendation #2: RCUT at Barrett St	
Prelim. Eng.	\$1,217,000	\$895,000	2024
R/W	\$131,000	\$84,000	2028
Construction	\$12,583,000	\$9,263,000	2030
<b>Total Project</b>	<b>\$13,931,000</b>	<b>\$10,242,000</b>	

High Priority Recommendation #1 could be separated out into two smaller projects and implemented in two phases. The first phase could be the RCUT at James Road and the associated U-turns. The second phase could be the RCUT at Cambridge Road and associated U-turns. **Table 6** shows the cost estimates of each phase if implemented separately.

**TABLE 6: PLANNING LEVEL COST ESTIMATES FOR HIGH PRIORITY RECOMMENDATION #1 IN TWO PHASES**

Project Phase	Future Year Costs	
	RCUT at James Road w/ U-turns	RCUT at Cambridge Drive w/ U-turns
Prelim. Eng.	\$679,000	\$611,000
R/W	\$77,000	\$83,000
Construction	\$7,011,000	\$6,309,000
<b>Total Project</b>	<b>\$7,767,000</b>	<b>\$7,003,000</b>

The project team also developed schedule estimates for each project. **Table 7** summarizes the projected timeframes for the preliminary engineering, right-of-way and utilities, and construction phases of the top two high priority recommendations.

**TABLE 7: SCHEDULE ESTIMATES (MONTHS)**

Project Phase	High Priority Recommendation #1: RCUT Series at James Rd & Cambridge Dr	High Priority Recommendation #2: RCUT at Barrett St
Prelim. Eng.	20	16
R/W	10	8
Construction	24	18
<b>Total</b>	<b>54</b>	<b>42</b>

### Funding and Implementation

The next step for *High Priority Recommendation #3: Examine the Feasibility of Reducing the Speed Limit between Barrett Street and Oak Lane* is to collect speed data and conduct a more detailed engineering study to determine the feasibility of reducing the speed limit. VDOT should be consulted to provide guidance.

The other three high priority recommendations all involve converting full access intersections into RCUTs. It is recommended that the MPO conduct additional outreach meetings to share the concepts with the public, discuss the ways in which the recommended projects would address safety and access spacing deficiencies, and address potential concerns. The MPO may consider targeting residents and business owners along the corridor for future outreach.

Most funding programs require projects to either:

- Be included or be proven consistent with the Constrained Long-Range Transportation Plan, or
- Have a resolution of support from the governing body

As the Danville MPO is updating its Long Range Transportation Plan, the recommended projects should be included in the latest update.

Possible funding sources for these recommendations include the following:

- Highway Safety Improvement Program (HSIP): a program that provides funding for improvements that correct or improve safety on a section of roadway or intersection with

a high incidence of crashes. All three high priority recommendations involving RCUTs are candidate projects for HSIP.

- SMART SCALE: a program that allocates funding from the construction District Grants Program (DGP) and High-Priority Projects Program (HPPP) to transportation projects. SMART SCALE uses a scoring process that evaluates, scores, and ranks project applications based on six measures: congestion mitigation, economic development, accessibility, safety, environmental quality, and land use. All three high priority recommendations involving RCUTs are eligible for SMART SCALE funding.
- Revenue Sharing: a program that provides a dollar for dollar state match to local funds for transportation projects. Projects eligible for Revenue Sharing funds include construction, reconstruction, improvement, and maintenance projects. All three high priority recommendations involving RCUTs are candidate projects for Revenue Sharing.

It should also be noted that as part of the review process for this access management study, the draft report was provided to the Virginia Department of Conservation and Recreation (DCR) for their consideration. DCR noted that tree removal would fragment an Ecological Core (C5) as identified in the Virginia Natural Landscape Assessment. C5 is the least ecologically relevant of the five types of ecological cores. In consideration of the DCR review and all environmental regulations, future design and construction projects should seek to avoid, or minimize, environmental impacts.

## Longer-Term Recommendations

A full list of recommendations is provided in **Table 8** and illustrated conceptually in the 11" x 17" sheets in the **Recommendations Appendix**. **Table 8** provides a description of each recommendation, the reason for the recommendation, the source of the recommendation (i.e. from a prior study or a new recommendation), and the priority level and timeframe. Each recommendation is identified by an ID number that corresponds to the number in the **Recommendations Appendix**. Additional notes are provided following **Table 8**.

High priority (short-term) projects are those that should be implemented as soon as possible and as soon as funding can be identified. These projects should be included in the Danville MPO's constrained long range transportation plan.

Medium priority projects are those that would correct turn lane deficiencies or where the crash history indicates a pattern of crashes and median closure is recommended. These projects should be included in the Danville MPO's long range transportation plan, and preferably in the constrained project list if possible.

Low priority projects are those that would correct access spacing deficiencies, but the crash data does not indicate a hot spot of crashes. These projects would be implemented over time as new

development or redevelopment occurs, and as the policy recommendations in the last section of this report are implemented.

In general, median closures are considered to be low-priority and implemented in the long-term as redevelopment occurs, unless the crash data revealed a prevalence of crashes at a specific location. Turn lane extensions and new turn lanes are considered to be medium priority and implemented in a mid-term timeframe unless the crash data revealed a prevalence of crashes because they do not change existing access patterns.

In addition to the recommendations listed in Table 8, the 2008 Access Management study noted the wide utility easement between Barrett Street and Radio Lane/Fairview Avenue might provide an opportunity for a multi-use bicycle or pedestrian trail that could connect the residential properties east of Barrett Street to the Riverwalk trail along and across the Dan River.

Finally, roadside conditions could be brought up to current VDOT standards by opportunities provided by spot improvements and other future projects.

**TABLE 8: RECOMMENDATIONS**

<b>ID</b>	<b>DESCRIPTION OF RECOMMENDATION</b>	<b>REASON</b>	<b>SOURCE</b>	<b>PRIORITY LEVEL (TIMEFRAME)</b>
<b>1</b>	Close existing median opening. Convert entrances to right-in/right-out only.	Existing median opening does not meet minimum spacing required from Long Circle.	2012 Study	Low Priority (Long-Term)
<b>2</b>	Long Circle - Retain full-access median opening. Construct a new eastbound left turn lane. Extend westbound left turn lane to meet required 200' storage length w/ 200' taper. This location could accommodate a full-access entrance on the north side in the future.	Existing configuration does not meet VDOT requirements for eastbound and westbound left turn lanes.	2012 Study	Medium Priority (Mid-Term)
<b>3</b>	This location could accommodate a shared right-in/right-out entrance on the south side in the future.	This location meets minimum spacing distance from Long Circle for a right-in/right-out only entrance.	2012 Study	Low Priority (Long-Term)
<b>4</b>	Convert existing median opening to a directional median opening, allowing eastbound and westbound left turns from US 58 and converting side-streets to right-in/right-out only.	Existing median opening does not meet minimum spacing required from Whispering Pines Road.	2012 Study	Low Priority (Long-Term)
<b>5(a)</b>	Whispering Pines Road – Extend the westbound right turn lane to meet required 200' storage length w/ 200' taper. <sup>11</sup> Extend the existing eastbound left turn lane to provide 200' storage and 200' taper.	Existing turn lanes do not meet VDOT width and length requirements.	2012 Study	Medium Priority (Mid-Term)
<b>5(b)</b>	Whispering Pines Road – Entrance modifications on northeast quadrant. Close entrances on US 58. Retain and modify entrance on Whispering Pines Road to decrease entrance width.	Entrances on US 58 do not meet minimum spacing requirement from Whispering Pines Road. Entrance on Whispering Pines Road does not meet VDOT geometric standards.	New Recommendation	Low Priority (Long-Term)

<sup>11</sup> The existing westbound approach configuration includes a substandard right turn lane approximately 50 feet long that is not a full-width turn lane. It is recommended that this turn lane be widened to a full width turn lane with 200 feet of queue storage and 200 feet of taper.

ID	DESCRIPTION OF RECOMMENDATION	REASON	SOURCE	PRIORITY LEVEL (TIMEFRAME)
6	Brosville Elementary School West Entrance – Convert existing median opening to a directional median opening, allowing westbound left turns from US 58 and converting school entrance to right-in/right-out only. Extend westbound left turn lane to meet required 200’ storage length w/ 200’ taper. This location could accommodate a shared right-in/right-out entrance on the north side in the future.	Existing median opening does not meet minimum spacing required for a full access entrance from Brosville Elementary School East Entrance.	2012 Study	Low Priority (Long-Term)
7	Brosville Elementary School East Entrance – Install a new eastbound U-turn lane. Remove westbound left turn lane. Configure median opening to allow eastbound-to-westbound U-turns, but restrict westbound left turns and westbound-to-eastbound U-turns.	Existing eastbound left turn lane does not meet VDOT geometric standards.	2012 Study	Low Priority (Long-Term)
8	Close existing median opening	Existing median opening does not meet minimum spacing required from Brosville Elementary School East Entrance.	2012 Study	Low Priority (Long-Term)
9	This location could accommodate a shared right-in/right-out entrance on the north side in the future.	This location meets minimum spacing distance from Rockwood Drive for a right-in/right-out only entrance.	2012 Study	Low Priority (Long-Term)
10	Close existing median opening	Existing median opening does not meet minimum spacing required from Rockwood Drive.	2012 Study	Low Priority (Long-Term)
11(a)	Rockwood Drive - Retain full-access median opening. Construct a new westbound left turn lane. Extend eastbound left turn lane to meet required 200’ storage length w/ 200’ taper.	Existing configuration does not meet VDOT requirements for eastbound and westbound left turn lanes.	2012 Study	Medium Priority (Mid-Term)
11(b)	Rockwood Drive – Extend eastbound right turn lane to provide required 200’ storage and 200’ taper.	Existing turn lane does not meet VDOT geometric requirements.	New Recommendation	Medium Priority (Mid-Term)



<b>ID</b>	<b>DESCRIPTION OF RECOMMENDATION</b>	<b>REASON</b>	<b>SOURCE</b>	<b>PRIORITY LEVEL (TIMEFRAME)</b>
<b>12</b>	This location could accommodate a shared right-in/right-out entrance on the south side in the future.	This location meets minimum spacing distance from Rockwood Drive for a right-in/right-out only entrance.	2012 Study	Low Priority (Long-Term)
<b>13</b>	This location could accommodate a shared right-in/right-out entrance on the south side in the future.	This location meets minimum spacing distance for a right-in/right-out only entrance from the location proposed in Recommendation #12.	2012 Study	Low Priority (Long-Term)
<b>14</b>	Construct a new westbound-to-eastbound U-turn with a full length turn lane.	Accommodate U-turns from future southbound right-in/right-out entrance from Recommendation #15.	New Recommendation	Low Priority (Long-Term)
<b>15</b>	Convert existing median opening to a directional median opening (Restricted Crossing U-Turn), allowing eastbound left turns and westbound-to-eastbound U-turns from US 58. Convert northbound approach to right-in/right-out only. This location could accommodate a shared right-in/right-out entrance on the north side in the future. Extend existing eastbound right and left turn lanes.	Existing median opening does not meet minimum spacing from Oakwood Drive required for a full access entrance. Existing eastbound turns lanes do not meet VDOT geometric standards.	2012 Study	Medium Priority (Mid-Term)
<b>16</b>	Oakwood Drive – Retain full-access median opening. Extend eastbound left turn lane. Construct new westbound U-turn lane. Install pavement markings with yellow hatching for proper median storage. (See Note #3 on and Figure 60 on page 92.) Extend westbound left turn lane.	Existing turn lanes do not meet VDOT geometric standards.	2012 Study	Medium Priority (Mid-Term)
<b>17</b>	This location could accommodate a shared right-in/right-out entrance on the north side in the future.	This location meets minimum spacing distance for a right-in/right-out only entrance from Oakwood Drive.	2012 Study	Low Priority (Long-Term)
<b>18</b>	Close existing median opening.	Existing median opening does not meet minimum spacing required from Oakwood Drive and Brosville Industrial Road.	2012 Study	Low Priority (Long-Term)

ID	DESCRIPTION OF RECOMMENDATION	REASON	SOURCE	PRIORITY LEVEL (TIMEFRAME)
19	Brosville Industrial Road – Retain existing full access median opening. Extend existing westbound left turn lane.	Existing turn lane does not meet VDOT geometric standards for 200’ storage bay w/ 200’ taper.	2012 Study	Medium Priority (Mid-Term)
20	Charming Road - Convert existing median opening to a directional median opening, allowing eastbound left turns and westbound-to-eastbound U-turns from US 58. Convert southbound approach to right-in/right-out only. Extend eastbound left turn lane to meet required 200’ storage length w/ 200’ taper. Construct a new westbound left turn lane.	Existing median opening does not meet minimum spacing required for a full access entrance from Brosville Industrial Road and Gemstone Lane.  Existing turn lanes do not meet VDOT geometric standards.	2012 Study	Medium Priority (Mid-Term)
21(a)	Gemstone Lane - Convert existing median opening to a directional median opening, allowing westbound left turns and eastbound-to-westbound U-turns from US 58. Convert northbound approach to right-in/right-out only. Extend westbound left turn lane to meet required 200’ storage length w/ 200’ taper. v	Existing median opening does not meet minimum spacing required for a full access entrance from Charming Road and Mangrums Road. Existing turn lane does not meet VDOT geometric standards.	2012 Study	Medium Priority (Mid-Term)
21(b)	Construct a new turn lane for eastbound-to-westbound U-turns.	Vehicles making an eastbound-to-westbound U-turn need a lane to safely decelerate out of the way of through vehicles.	New Recommendation	Medium Priority (Mid-Term)
21(c)	Consolidate redundant entrances on the southwest quadrant of the intersection.	Multiple redundant entrances do not meet VDOT spacing standards.	New Recommendation	Low Priority (Long-Term)
22	This location could accommodate a shared right-in/right-out entrance on the north side in the future.	This location meets minimum spacing distance for a right-in/right-out only entrance from Mangrums Road.	2012 Study	Low Priority (Long-Term)
23	Mangrums Road - Retain full-access median opening. Extend existing eastbound left turn lane. Construct a new turn lane for westbound-to-eastbound U-turns.	Existing turn lanes do not meet VDOT geometric standards.	2012 Study	Medium Priority (Mid-Term)

ID	DESCRIPTION OF RECOMMENDATION	REASON	SOURCE	PRIORITY LEVEL (TIMEFRAME)
24	Close existing median opening	Existing median opening does not meet minimum spacing required from Mangrums Road.	2012 Study	Low Priority (Long-Term)
25	Close existing median opening	Existing median opening does not meet minimum spacing required from Mangrums Road.	2012 Study	Low Priority (Long-Term)
26	This location could accommodate a new median opening with a full-access entrance on the south side in the future. The new median opening would need to have 200-ft long left/U-turn lanes with 200-ft tapers on both eastbound and westbound approaches.	This location meets minimum spacing requirements for a full-access intersection from Mangrums Road.	2012 Study	Low Priority (Long-Term)
27	This location could accommodate a shared right-in/right-out entrance on the north side in the future.	This location meets minimum spacing distance for a right-in/right-out only entrance between Mangrums Road and Stony Mill Road.	2012 Study	Low Priority (Long-Term)
28	This location could accommodate a shared right-in/right-out entrance on the south side in the future.	This location meets minimum spacing distance for a right-in/right-out only entrance between Mangrums Road and Stony Mill Road.	2012 Study	Low Priority (Long-Term)
29	Close existing median opening	Existing median opening does not meet minimum spacing required from Stony Mill Road.	2012 Study	Low Priority (Long-Term)
30(a)	Stony Mill Road – Extend existing eastbound and westbound left turn lanes.	Existing turn lanes do not meet VDOT geometric standards.	2012 Study	Medium Priority (Mid-Term)
30(b)	Stony Mill Road – Extend existing eastbound right turn lane.	Existing turn lane does not meet VDOT geometric standards.	New Recommendation	Medium Priority (Mid-Term)
30(c)	<i>Stony Mill Road – The project team evaluated a reconfiguration of this intersection to provide a Continuous Green-T for the southbound approach with a right-in/right-out on the northbound approach to formalize the two-stage left turn movement. This configuration remains an option in the future, as the County and MPO continue to monitor this intersection. (See previous discussion in the Other Tested Improvements section)</i>			

ID	DESCRIPTION OF RECOMMENDATION	REASON	SOURCE	PRIORITY LEVEL (TIMEFRAME)
31	Reconfigure entrances	Entrances do not meet VDOT spacing standards.	New Recommendation	Medium Priority (Mid-Term)
32	This location could accommodate a shared right-in/right-out entrance on the south side in the future.	This location meets minimum spacing distance for a right-in/right-out only entrance between Breezewood Drive/ Stony Mill Road and Horseshoe Road.	2012 Study	Low Priority (Long-Term)
33(a)	Horseshoe Road – Retain a full access median opening. Construct a new turn lane for eastbound-to-westbound U-turns. Extend existing westbound left turn lane. This location could accommodate a shared full-access entrance on the north side in the future.	Existing configuration does not meet VDOT requirements for eastbound and westbound left turn lanes.	2012 Study	Medium Priority (Mid-Term)
33(b)	Horseshoe Road – Existing gravel entrance on the west side of Horseshoe Road does not meet spacing standards.	Entrance does not meet VDOT spacing standards.	2012 Study	Medium Priority (Mid-Term)
34	Construct a new limited access westbound-to-eastbound U-turn with a full length turn lane. This configuration should allow for westbound-to-eastbound U-turns and prohibit eastbound-to-westbound U-turns.	Accommodate U-turns from southbound right-in/right-out approach at the Foxwood Place intersection (Recommendation #36).	New Recommendation	Medium Priority (Mid-Term)
35	Close existing median opening	Existing median opening does not meet minimum spacing required from the median opening to the east and from Horseshoe Road.	2012 Study	Medium Priority (Mid-Term)
36	Foxwood Place – Construct a new directional median opening, allowing eastbound left turns into Foxwood Place and westbound-to-eastbound U-turns on US 58. Construct an eastbound left turn lane and westbound U-turn lane with 200' storage and 200' taper. This location could accommodate a shared right-in/right-out entrance on the south side in the future.	New directional median opening will meet minimum access spacing requirements if implemented with median opening closures in Recommendations #35 and #37.	2012 Study	Medium Priority (Mid-Term)

<b>ID</b>	<b>DESCRIPTION OF RECOMMENDATION</b>	<b>REASON</b>	<b>SOURCE</b>	<b>PRIORITY LEVEL (TIMEFRAME)</b>
<b>37</b>	Close existing median opening	Existing median opening does not meet minimum spacing required from adjacent median openings.	2012 Study	Medium Priority (Mid-Term)
<b>38</b>	Construct a new eastbound-to-westbound U-turn with a full length turn lane.	Accommodate U-turns from a future northbound right-in/right-out approach at the Foxwood Place intersection (Recommendation #36).	New Recommendation	Medium Priority (Mid-Term)
<b>39</b>	This location could accommodate a shared right-in/right-out entrance on the north side in the future.	This location meets minimum spacing distance for a right-in/right-out only entrance from Pine Lake Road.	2012 Study	Low Priority (Long-Term)
<b>40</b>	Close existing median opening	Existing median opening does not meet minimum spacing required from Pine Lake Road. Crash history includes a small pattern of crashes involving vehicles pulling into and out of gas station on the north side.	2012 Study	Medium Priority (Mid-Term)
<b>41</b>	Pine Lake Road/Pineview Drive - Retain a full access median opening. Extend existing eastbound and westbound left turn lanes to provide 200' storage and 200' taper.	Existing turn lanes do not meet VDOT geometric standards.	2012 Study	Medium Priority (Mid-Term)
<b>42</b>	This location could accommodate a shared right-in/right-out entrance on the north side in the future.	This location meets minimum spacing distance for a right-in/right-out only entrance from Pine Lake Road.	2012 Study	Low Priority (Long-Term)
<b>43</b>	Lemon Lane – Convert existing median opening to a directional median opening, allowing eastbound left turns from US 58 onto Lemon Lane. Convert the southbound Lemon Lane approach to right-in/right-out only. Configure median opening to prohibit westbound U-turns and remove the westbound left/U-turn lane. Extend the existing eastbound left turn lane.	Existing median opening does not meet minimum spacing requirements for a full-access intersection from Westover Drive.	2012 Study	Low Priority (Long-Term)

<b>ID</b>	<b>DESCRIPTION OF RECOMMENDATION</b>	<b>REASON</b>	<b>SOURCE</b>	<b>PRIORITY LEVEL (TIMEFRAME)</b>
44	Lemon Lane – Retain full access median opening allowing all movements to and from Lemon Lane.	Location meets minimum access spacing requirements.	2012 Study	Low Priority (Long-Term)
45	This location could accommodate shared right-in/right-out entrances on both north and south sides in the future.	This location meets minimum spacing distance from Westover Drive for right-in/right-out only entrances.	2008 Study	Low Priority (Long-Term)
46	This location is appropriate for a future full-access median opening in the future.	This location meets the required minimum spacing distance for a full-access median opening east of Westover Drive.	2008 Study	Low Priority (Long-Term)
47	This location could accommodate shared right-in/right-out entrances on both north and south sides in the future.	This location meets minimum spacing distance from the proposed full-access median openings in Recommendations #46 and #48.	2008 Study	Low Priority (Long-Term)
48	This location is appropriate for a future full-access median opening in the future.	This location meets the required minimum spacing distance for a full-access median opening west of Westhaven Drive/Kingston Road.	2008 Study	Low Priority (Long-Term)
49	This location could accommodate a shared right-in/right-out entrance on the south side in the future.	This location meets minimum spacing distance from Westhaven Drive/Kingston Road.	2008 Study	Low Priority (Long-Term)
50	Westhaven Drive/Kingston Road – Retain full access median opening. Extend existing westbound left turn lane to provide 200' storage and 200' taper. Construct new eastbound right turn lane with 200' storage and 200' taper.	Existing turn lanes do not meet VDOT geometric standards.	2008 Study	Medium Priority (Mid-Term)
51	This location could accommodate shared right-in/right-out entrances on both north and south sides in the future.	This location meets minimum spacing distance from Westhaven Drive/Kingston Road.	2008 Study	Low Priority (Long-Term)
52	Construct a new westbound-to-eastbound U-turn with a full length turn lane.	Accommodate U-turns from southbound right-in/right-out approach at Avalon Drive (Recommendation #53).	New Recommendation	High Priority (Short-Term)

ID	DESCRIPTION OF RECOMMENDATION	REASON	SOURCE	PRIORITY LEVEL (TIMEFRAME)
53	Avalon Drive – Convert the existing full access median opening into a directional median opening, allowing eastbound and westbound left turns from US 58. Extend the existing eastbound left turn lane to provide 200’ storage and 200’ taper. Construct a new westbound left turn lane with 200’ storage and 200’ taper. Convert the northbound and southbound approaches into right-in/right-out only.	Existing median opening does not meet minimum spacing distance from Vandola Road for a full-access opening. This location meets the minimum spacing required for a directional median opening and works in tandem with the proposed directional median opening at Vandola Road (Recommendation #55).	New Recommendation	High Priority (Short-Term)
54(a)	Vandola Road – Convert the existing full access median opening into a directional median opening, allowing eastbound and westbound left turns from US 58 onto Vandola Road. Convert the northbound and southbound approaches into right-in/right-out only.	This location has potential for safety improvement. Injury crashes resulted from vehicles making left turns from side-streets. The proposed directional median opening decreases the number of conflict points and crash potential.	New Recommendation	High Priority (Short-Term)
54(b)	Vandola Road – Extend the existing eastbound and westbound right turn lanes to provide 200’ storage and 200’ taper. Cut back the slope on the northeast quadrant to improve visibility.	Existing eastbound and westbound right turn lanes do not meet VDOT geometric standards.	New Recommendation	High Priority (Short-Term)
55	This location could accommodate shared right-in/right-out entrances on both north and south sides in the future.	This location meets minimum spacing distance from Vandola Road.	New Recommendation	Low Priority (Long-Term)
56(a)	Construct a separate new eastbound-to-westbound U-turn with a full length turn lane.	Accommodate U-turns from northbound right-in/right-out approach at Vandola Road (Recommendation #54).	New Recommendation	High Priority (Short-Term)
56(b)	Construct a separate new westbound-to-eastbound U-turn with a full length turn lane.	Accommodate U-turns from southbound right-in/right-out approach at Kayewood Lane (Recommendation #58)	New Recommendation	Low Priority (Long-Term)
57	This location could accommodate shared right-in/right-out entrances on both north and south sides in the future.	This location meets minimum spacing distance from Kayewood Drive.	New Recommendation	Low Priority (Long-Term)

ID	DESCRIPTION OF RECOMMENDATION	REASON	SOURCE	PRIORITY LEVEL (TIMEFRAME)
58(a)	Kayewood Lane - Convert the existing full access median opening into a directional median opening, allowing eastbound and westbound left turns from US 58. Convert the northbound and southbound approaches into right-in/right-out only.	Existing median opening does not meet minimum spacing requirements for a full access opening from Parkway Drive. Converting the intersection to a directional median opening lowers the minimum spacing required. This location meets the minimum spacing required for a directional median opening.	New Recommendation	Low Priority (Long-Term)
58(b)	Extend the existing eastbound and westbound left turn lanes to provide 200' storage and 200' taper. Construct a new full length westbound right turn lane.	Existing turn lanes do not meet VDOT geometric standards.	2008 Study	Low Priority (Long-Term)
59	Close existing entrance.	Entrance is redundant with entrance on Kayewood Lane.	2008 Study	Low Priority (Long-Term)
60	Close existing entrance and provide access from Parkway Drive.	Access could be provided via Parkway Drive.	2008 Study	Low Priority (Long-Term)
61	Parkway Drive – Retain full-access median opening. Extend existing eastbound left turn lane and westbound left and right turn lanes to provide 200' storage and 200' taper. Construct new full length eastbound right turn lane.	Existing turn lanes do not meet VDOT geometric standards.	2008 Study	Low Priority (Long-Term)
62	Close existing median opening. Convert entrance on the south side to right-in/right-out only. Construct a new full length eastbound right turn lane.	Existing median opening does not meet minimum spacing requirements from Parkway Drive.	2008 Study	Low Priority (Long-Term)
63	This location could accommodate a shared right-in/right-out entrance on the north side in the future.	This location meets minimum spacing distance from Beech Avenue.	2008 Study	Low Priority (Long-Term)
64(a)	Beech Avenue - This location is appropriate for a future full-access median opening in the future.	This location meets the required minimum spacing distance for a full-access median opening between Parkway Drive and Oak Lane.	2008 Study	Low Priority (Long-Term)



ID	DESCRIPTION OF RECOMMENDATION	REASON	SOURCE	PRIORITY LEVEL (TIMEFRAME)
64(b)	Private Drive - The existing entrance for Private Drive should be realigned with Beech Avenue and consolidated with the entrances to the west.	The current configuration does not meet minimum VDOT spacing standards.	New Recommendation	Low Priority (Long-Term)
65(a)	Oak Lane – Convert existing full-access median opening to a directional median opening, allowing westbound left turns and westbound-to-eastbound U-turns and prohibiting eastbound-to-westbound U-turns. Convert northbound Oak Lane approach into a right-in/right-out only.	Existing median opening does not meet minimum spacing distance from Cambridge Drive for a full-access opening. This location meets the minimum spacing required for a directional median opening and works in tandem with the proposed directional median opening at Cambridge Drive (Recommendation #66).	New Recommendation	High Priority (Short-Term)
65(b)	Oak Lane - Extend westbound left turn lane to provide 200' storage and 200' taper.	Existing turn lane does not meet VDOT geometric standards.	New Recommendation	High Priority (Short-Term)
66(a)	Cambridge Drive - Convert existing full-access median opening to a directional median opening, allowing eastbound left turns and U-turns and prohibiting westbound-to-eastbound U-turns. Convert southbound Cambridge Drive approach into a right-in/right-out only.	This location has potential for safety improvement. Crashes involved vehicles making left turns from side-streets. The proposed directional median opening decreases the number of conflict points and crash potential.	New Recommendation	High Priority (Short-Term)
66(b)	Extend westbound right turn lane and eastbound left turn lane to provide 200' of full-width storage and 200' taper.	Existing turn lanes do not meet VDOT geometric standards.	New Recommendation	High Priority (Short-Term)
67(a)	Construct a separate new eastbound-to-westbound U-turn with a full length turn lane.	Accommodate eastbound U-turns from planned future road (shown in parcel layer) on south side.	New Recommendation	Low Priority (Long-Term)
67(b)	Construct a separate new westbound-to-eastbound U-turn with a full length turn lane.	Accommodate U-turns from southbound right-in/right-out approach at James Road (Recommendation #68a)	New Recommendation	High Priority (Short-Term)

ID	DESCRIPTION OF RECOMMENDATION	REASON	SOURCE	PRIORITY LEVEL (TIMEFRAME)
68(a)	James Road - Convert existing full-access median opening to a directional median opening, allowing eastbound and westbound left turns from US 58 onto James Road. Convert northbound and southbound James Road approaches into right-in/right-out only.	This location has potential for safety improvement. Crashes involved vehicles making left turns from side-streets. The proposed directional median opening decreases the number of conflict points and crash potential.	New Recommendation	High Priority (Short-Term)
68(b)	Extend existing westbound right turn lane to provide 200' storage and 200' taper.	Existing turn lane does not meet VDOT geometric standards.	2008 Study	High Priority (Short-Term)
69	Construct an eastbound-to-westbound U-turn with a full length turn lane.	Accommodate U-turns from northbound right-in/right-out approach at James Road (Recommendation #68a)	New Recommendation	High Priority (Short-Term)
70	Consolidate entrances on the south side of US 58 with inter-parcel connection. Entrances could be consolidated into one right-in/right-out entrance.	Existing entrances do not meet minimum spacing requirements.	2008 Study	Low Priority (Long Term)
71	Northwest quadrant of Church Avenue intersection – Upgrade the main entrance on the north side of US 58 to a right-in/right-out only entrance, and close entrance to the west.	Existing entrances do not meet minimum spacing requirements. Main entrance does not meet VDOT geometric standards.	2008 Study	Low Priority (Long Term)
72	Church Avenue – Retain full access median opening at the intersection. Extend the westbound left turn lane, westbound right turn lane, and eastbound left turn lane to provide 200' storage and 200' tapers. Construct new eastbound right turn lane with 200' storage and 200' taper. Consolidate entrances on the north side of US 58 east of the intersection into one right-in/right-out only entrance. Provide new westbound right turn (deceleration) lane for entrance on US 58 east of the Church Avenue intersection.	Existing turn lanes do not meet VDOT geometric standards. Entrances do not meet minimum spacing standards.	2008 Study	Low Priority (Long Term)

ID	DESCRIPTION OF RECOMMENDATION	REASON	SOURCE	PRIORITY LEVEL (TIMEFRAME)
73(a)	Wyndover Drive – Convert existing full-access median opening to a directional median opening, allowing eastbound and westbound left turns from US 58 onto Wyndover Drive. Convert northbound and southbound Wyndover Drive approaches to right-in/right-out only.	Existing median opening does not meet full-access minimum spacing standards from Ingram Road. Converting the intersection to a directional median opening lowers the minimum spacing required. This location meets the minimum spacing required for a directional median opening.	New Recommendation	Low Priority (Long-Term)
73(b)	Extend eastbound left turn lane to provide 200' storage and 200' taper.	Existing turn lane does not meet VDOT geometric standards.	2008 Study	Low Priority (Long-Term)
74	Commercial entrance does not meet minimum spacing standards.	Commercial entrance does not meet minimum spacing standards.	2008 Study	Low Priority (Long-Term)
75	Ingram Road – Retain full-access median opening. Extend eastbound and westbound left and right turn lanes to provide 200' storage and 200' taper. Consolidate entrances.	Existing turn lanes do not meet VDOT geometric standards. Entrances do not meet minimum spacing standards.	2008 Study	Medium Priority (Mid-Term)
76	Modify access points and service road configuration. Short term and longer term access reconfigurations will be provided in a separate illustration.	Entrances and service road intersections do not meet VDOT geometric standards and access spacing standards.	New Recommendation	Short- and Long-Term Solutions Proposed
77	Spring Avenue – Modify entrances and service road configuration. Consolidate entrances on the north side of US 58 east of the intersection into one right-in/right-out only entrance.	Entrances and service road intersections do not meet VDOT geometric standards and access spacing standards.	New Recommendation	Low Priority (Long-Term)
78	Construct a new westbound-to-eastbound U-turn with a full length turn lane.	Accommodate U-turns from southbound right-in/right-out approach at Barrett Street (Recommendation #80a)	New Recommendation	High Priority (Short-Term)

ID	DESCRIPTION OF RECOMMENDATION	REASON	SOURCE	PRIORITY LEVEL (TIMEFRAME)
<b>79(a)</b>	Barrett Street - Convert existing full-access median opening to a directional median opening, allowing eastbound and westbound left turns from US 58 onto Barrett Street. Convert northbound and southbound Barrett Street approaches into right-in/right-out only. The frontage road and existing entrance do not currently meet VDOT standards.	This location has potential for safety improvement. Crashes involved vehicles making left turns from side-streets. The proposed directional median opening decreases the number of conflict points and crash potential.	New Recommendation	High Priority (Short-Term)
<b>79(b)</b>	Barrett Street - Extend eastbound left turn lane and westbound left and right turn lanes to provide 200' storage and 200' taper. Construct a new eastbound right turn lane with 200' storage and 200' taper.	Existing turn lanes do not meet VDOT geometric standards.	2008 Study	High Priority (Short-Term)
<b>80</b>	Construct a new eastbound-to-westbound U-turn with a full length turn lane.	Accommodate U-turns from northbound right-in/right-out approach at Barrett Street (Recommendation #79a)	New Recommendation	High Priority (Short-Term)
<b>81</b>	Fairview Avenue – Retain full access median opening. Extend eastbound left and right turn lanes to provide 200' storage and 200' taper.	Existing turn lanes do not meet VDOT geometric standards.	2008 Study	Medium Priority (Mid-Term)

Notes on the recommendations shown in the **Recommendations Appendix** and listed in **Table 8**:

1. U-Turns along US 58 are assumed to be allowed everywhere left turns are allowed. The symbols for installing left turn lanes and extending left turn lanes, including limited access left turn lanes assume that vehicles in these lanes may make U-turns. U-turns are not shown with arrows at these locations, but they are assumed to be allowed.
2. The symbol for Future Right-in/Right-out Entrance shows a green triangle depicting a porkchop island to separate the right turn in from the right turn out. Not all locations where a future right-in/right-out entrance is proposed would have a curbed porkchop island. This symbol simply identifies locations where a right-in/right-out only entrance would be appropriate in the future. It is also used in conjunction with limited access left turn lanes on US 58, including RCUTs. In these instances, the side-street right-in/right-out only configuration would be designed to allow left turns into the side-street from US 58.
3. Recommendation #16 – The specific treatment recommended here is a diagonally hatched yellow center line and white arrows, like the pavement markings currently at Brosville Industrial Park Road, shown in **Figure 60**. This type of pavement marking will help delineate the space within the median and indicate drivers making a left turn or U-turn should pull up and wait in the median without blocking the view of a vehicle waiting in the median in the opposite direction.



**FIGURE 60: MEDIAN PAVEMENT MARKINGS AT BROSVILLE INDUSTRIAL PARK ROAD.** A SIMILAR PAVEMENT MARKING SCHEME IS RECOMMENDED AT THE INTERSECTION OF OAKWOOD DRIVE.

## Policy Recommendations

The recommendations in the previous sections identify specific improvement projects to correct existing access spacing deficiencies and locations for future median openings and entrances that meet VDOT spacing standards.

Access permitting and roadway improvements are important pieces to achieving access management and need to be implemented in tandem with policies that ensure access management is integrated into the land development and site plan approval processes, where the majority of access spacing decisions are made.

**Table 9** provides an outline of various policy level recommendations, and identifies the outcome potential, regulatory impact, level of effort, and the responsible parties for implementing each.

**TABLE 9: POLICY RECOMMENDATIONS**

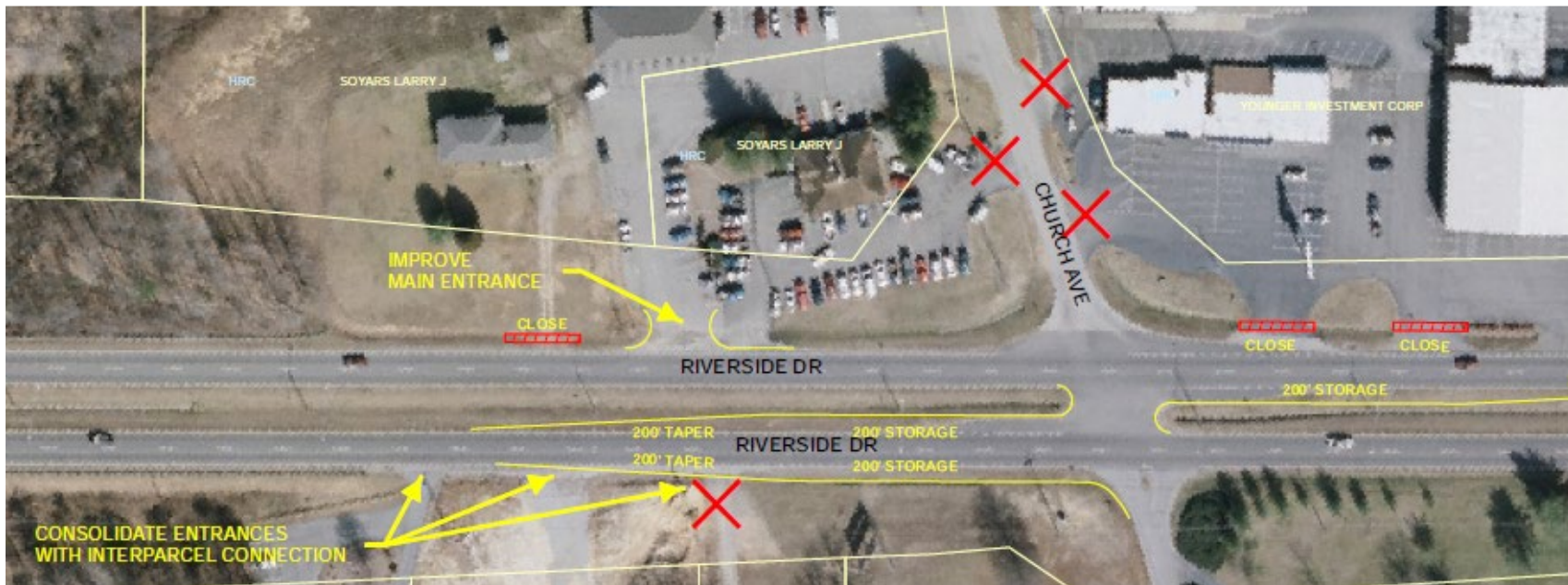
Policy Recommendation	Outcome Potential	Regulatory Impact/ Level of Effort	Who Implements?
Integrate access management principles and policies into City and County Comprehensive Plans	LOW on its own, but important for supporting future decisions to grant, deny, or modify entrances and median openings	LOW	City and County Planning staff
Provide funding for access management projects (e.g. median modifications, driveway consolidations as part of streetscaping, etc.)	HIGH	LOW	VDOT offers several funding streams and has a statewide access management program. Danville MPO can include access management projects into the LRTP, TIP, and UPWP. City/County staff can work with the City/County budget office to get projects programmed into the CIP.
Encourage property owner agreements (e.g. with benefits during site plan review and approval process)	MEDIUM	MEDIUM. Requires staff diligence to incorporate and emphasize during site plan review process.	City and County Planning staff
Amend the City and County subdivision ordinances to incorporate requirements for block length, parcel width, connectivity, and/or reverse frontage access	MEDIUM	MEDIUM	City and County Planning staff
Establish standards for access spacing in site plan review process	MEDIUM	MEDIUM	City Planning staff
Revise the City and County zoning code to include access spacing and access management standards in zoning district text descriptions, including planned unit developments.	HIGH	HIGH	City Planning staff
Create an overlay zone with access management standards	HIGH	HIGH	City Planning staff
Require interparcel connectivity in site plan review and/or through a corridor overlay zone	HIGH	HIGH	City Planning staff

The Highway Corridor Overlay zoning district recommendations and language provided in the 2008 study remain a valid tool the City of Danville can choose to implement.

### Commercial Entrance Modifications

At Church Avenue, the recommendations from the 2008 study, shown in **Figure 61** are still valid and recommended as part of this study.

The project team developed illustrations showing example concepts of how entrances could be consolidated at several locations where the commercial entrances do not meet VDOT's minimum spacing requirements.



**FIGURE 61: ENTRANCE MODIFICATION RECOMMENDATIONS AT CHURCH AVENUE.** THE RECOMMENDATIONS FROM THE 2008 STUDY ARE STILL VALID AND INCLUDED AS RECOMMENDATIONS IN THIS REPORT.

**Figure 62** shows a potential concept for consolidating commercial entrances on the northeast quadrant of the Whispering Pines Road intersection. The concept shows the two entrances on the north side of US 58 could be closed, and the entrance on Whispering Pines Road could be modified to narrow the width of the entrance opening.



**FIGURE 62: POTENTIAL COMMERCIAL ENTRANCE MODIFICATIONS AT WHISPERING PINES ROAD**



**Figure 63** shows a potential concept for reconfiguring entrances along the north side of US 58 just east of the Stony Mill Road intersection to better meet VDOT's minimum spacing requirements.

This concept includes constructing a westbound right turn lane to provide a space for vehicles turning right to decelerate out of the way of through vehicles.



**FIGURE 63: POTENTIAL COMMERCIAL ENTRANCE MODIFICATIONS EAST OF STONY MILL RD**

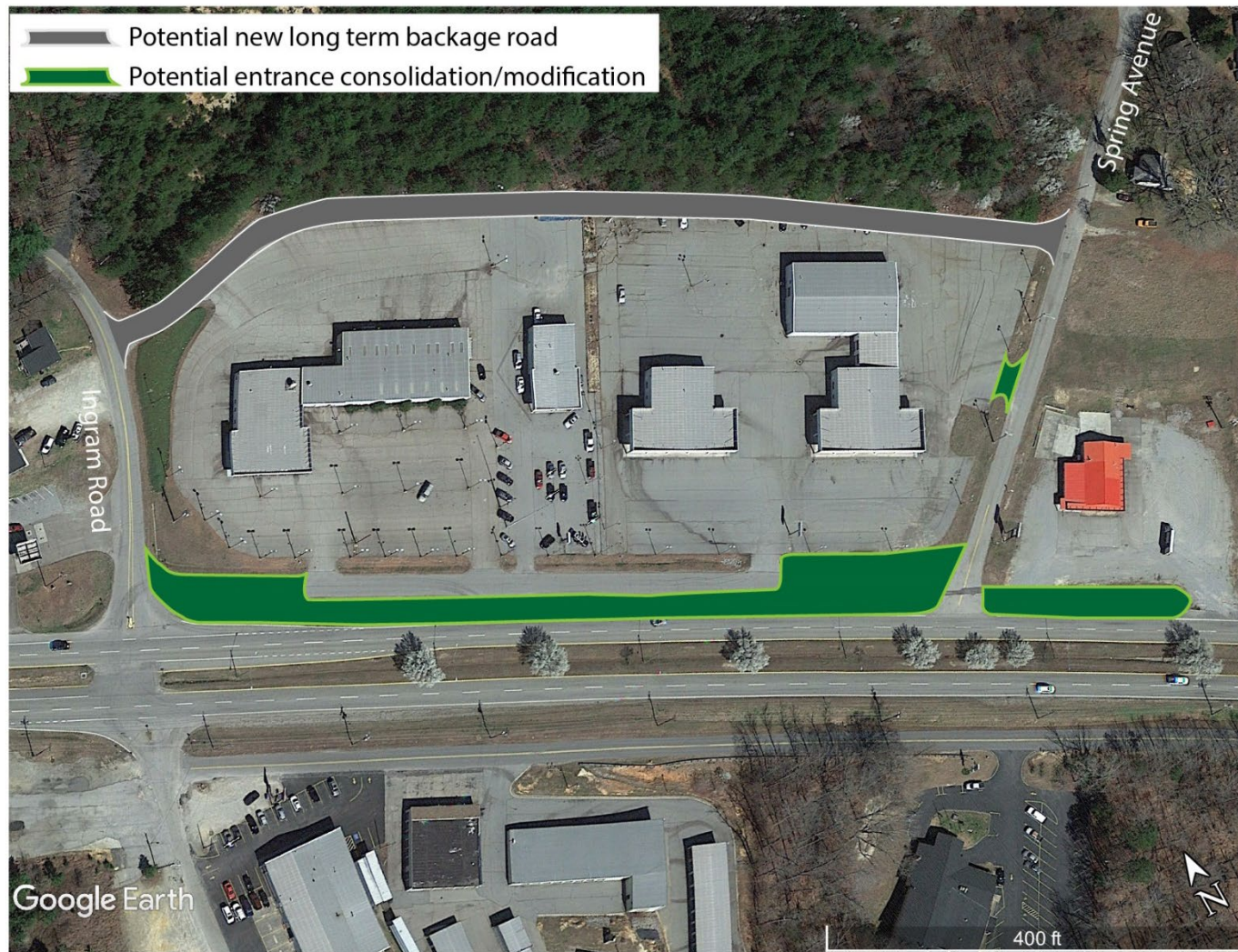
**Figures 64 and 65** show two potential concepts for reconfiguring the access points to the largely abandoned commercial properties on the north side of US 58 between Ingram Road and Spring Avenue.

**Figure 64** shows a shorter-term solution to provide one central entrance 500 feet east of the Ingram Road intersection to meet VDOT's minimum spacing requirements and close off the frontage road intersections with Ingram Road and Spring Avenue.

**Figure 65** shows a longer-term solution where access to these properties is provided by a backage road, and all entrances directly on US 58 could be closed.



**FIGURE 64: POTENTIAL SHORTER-TERM COMMERCIAL ENTRANCE MODIFICATIONS AT INGRAM ROAD**



**FIGURE 65: POTENTIAL LONGER-TERM BACKAGE ROAD ACCESS CONFIGURATION AT INGRAM ROAD**

## Next Steps

The immediate next steps for implementing the recommendations from this access management study are as follows:

- The Danville MPO policy board should pass a resolution adopting this Access Management Study Report and the recommendations therein.
- City staff should work with VDOT District planners and MPO staff to prepare funding applications for the high priority recommendation projects
- Danville MPO staff should incorporate the recommendations into the Long Range Transportation Plan.
- City staff, MPO staff, and VDOT staff should begin to undertake the policy recommendations provided in this report.

Achieving successful access management is a long-term process that requires diligence in applying access spacing requirements in the land development approval process. Retrofitting deficient entrances and intersections takes patience. It is through development and redevelopment opportunities that access management can be implemented.

This report serves as a guide for the City of Danville, Pittsylvania County, VDOT, and the Danville MPO to work together to achieve successful access management along US 58, which is critical for maintaining long term roadway capacity, minimizing crash potential, and ensuring reliable travel times for the movement of people and goods.