Roanoke Valley Transportation
PLANNING ORGANIZATION
Staffed by the REGIONAL commission

Gus Nicks Boulevard/Washington Avenue Corridor Improvement Study

2019

Contents

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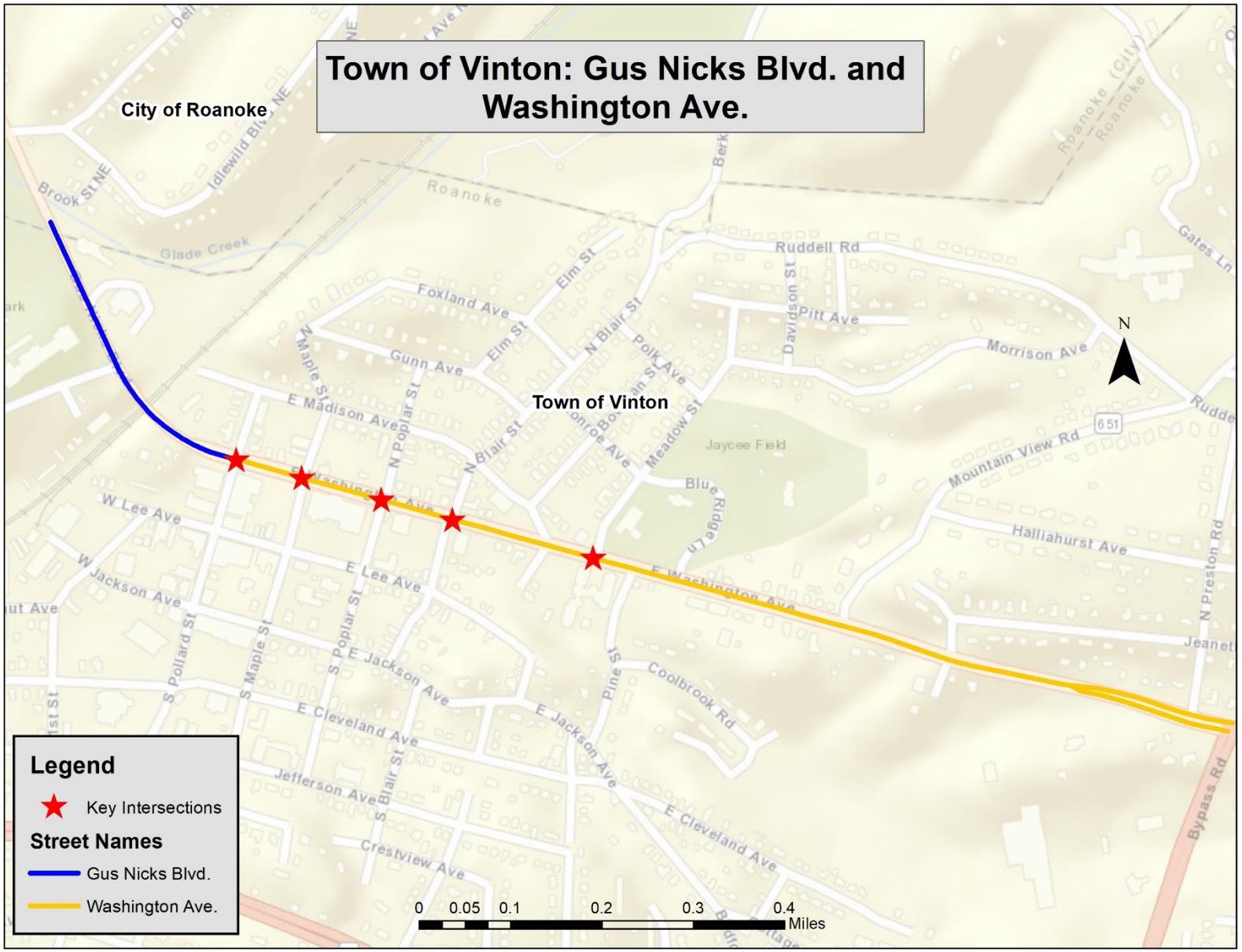

Town of Vinton: Gus Nicks Blvd. and Washington Ave.
City of Roanoke
Town of Vinton
Roanoke
Glade Creek
Brook St NE
Idlewild Blvd NE
Ruddell Rd
Foxland Ave
Elm St
N Blair St
Davidson St
Pitt Ave
Morrison Ave
Gales Ln
Gunn Ave
N Maple St
N Poplar St
E Madison Ave
Polk Ave
Meadow St
Jaycee Field
Mountain View Rd
651
Blue Ridge Ln
W Lee Ave
W Jackson Ave
E Lee Ave
E Washington Ave
Halliahurst Ave
N Preston Rd
Jeanet
S Pollard St
S Maple St
S Poplar St
E Jackson Ave
S Pine St
Coolbrook Rd
E Cleveland Ave
Jefferson Ave
S Blair St
Crestview Ave
Bypass Rd
N
Legend
Key Intersections
Street Names
Gus Nicks Blvd.
Washington Ave.
0 0.05 0.1 0.2 0.3 0.4
Miles

1. Overview

The Town of Vinton requested that RVARC study the Gus Nicks Boulevard/Washington Avenue corridor and key intersections on Washington Avenue for improvements in the FY2019 Unified Planning Work Program. The purpose of the study is to generate ideas for projects that can be submitted for Smart Scale and other funding opportunities to improve Gus Nicks Boulevard/Washington Avenue corridor in the Town of Vinton. The study considers crash history, current and future traffic conditions, and impacts from surrounding corridors (including the corridor outside of the Town of Vinton).

This study investigates measures that will promote:

1) Safety: Reduce traffic fatalities and injuries for all travelers who drive, ride the bus, bicycle, or walk.
2) Placemaking: Promote livability and economic development with beautiful and welcoming spaces, establishing the corridor as a gateway to Vinton, creating a sense of Vinton as separate from the City of Roanoke, and promoting Vinton as a destination.
3) Connectivity: Preserve efficient travel within and through the corridor for drivers, improve efficiency of travel during peak hours for drivers, and improve connectivity between multimodal centers and districts and urban development areas for bicyclists and pedestrians.
4) Accessibility: Preserve access to destinations within the corridor for drivers and improve access to destinations for bicyclists and pedestrians.

2. State of the corridor

To improve safety, placemaking, connectivity, and accessibility, this study examines the current state of Gus Nicks Boulevard/Washington Avenue. Crash data, patterns, and trends can point the way to improved safety. Reviewing the corridor as the gateway to Vinton helps understand how the corridor can create a sense of identity for Vinton and establish Vinton as a destination. Examining multimodal access reveals deficiencies in connectivity and access to destinations for bicyclists and pedestrians. Assessing traffic flow, including impacts from surrounding corridors, identifies patterns and causes of peak hour congestion. Identifying potential for access management will be necessary to preserve access to destinations while improving traffic flow and safety.

2.1 Crashes

The Virginia Department of Motor Vehicles provides crash data collected from law enforcement reports[1]. Gus Nicks Boulevard and Washington Avenue in Vinton, from 2013 to 2017, experienced an average of 35 crashes per year, 37% of those involving an injury or fatality (Figure 1). One person was killed in a traffic crash, and 104 people injured in that five-year period. Characteristics of crashes were examined that were more prevalent in crashes that did result in injuries compared to crashes that did not result

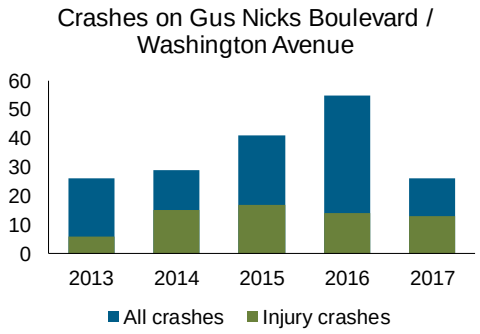


Figure 1. Crashes in Vinton on Gus Nicks Boulevard/Washington Avenue from 2013-2017.

[1] http://services.arcgis.com/p5v98VHDX9Atv3l7/arcgis/rest/services/VirginiaCrashes/FeatureServer

in injuries, suggesting these characteristics are associated with more severe crashes (Table 1).

Conditions: Poor lighting or poor road conditions were not more prevalent in crashes with injuries compared to crashes without injury. Crashes occurring from 9 am to 12 pm are overrepresented in injury crashes, and crashes occurring from 3 pm to 6 pm are underrepresented.

Driver characteristics: Drivers under 25 years old are more likely to be involved in crashes without injury and drivers who are male are more likely to be involved in crashes without injury.

Driver behavior: Driver behaviors were similar between crashes with and without injury. The three most common behaviors observed in crashes, with or without injury, were "Following Too Close", "Did Not Have Right-of-Way", and "Fail to Maintain Proper Control". Drivers involved in crashes with injury were a little more likely "Did Not Have Right-of-Way" and "Fail to Maintain Proper Control", and a little less likely "Following Too Close", compared to drivers involved in crashes without injury. Analysis of driver impairment showed that 2 crashes involved impaired drivers and 12 distracted.

Table 1. Conditions, driver characteristics, and driver behavior in crashes with and without injury

Condition	**% crashes with injury**	**% crashes without injury**
Not Daylight - Dusk, Dawn, Darkness (with or without lighting)	22%	16%
Road not dry – Wet, Snowy, Icy, Muddy, Gravel, Sand	28%	36%
Driver Characteristics	**% drivers in crashes with injury**	**% drivers in crashes without injury**
% drivers under 25 years old	20%	27%
% drivers 25 – 64 years old	62%	57%
% drivers over 64 years old	18%	15%
% male drivers	46%	60%
Driver Behavior	**% driver behaviors in crashes with injury**	**% driver behaviors in crashes without injuries**
Exceeded Speed Limit	1%	1%
Exceeded Safe Speed But Not Speed Limit	0%	1%
Wrong Side Of Road - Not Overtaking	1%	0%
Did Not Have Right-of-Way	25%	18%
Following Too Close	41%	45%
Improper Turn - Cut Corner on Left Turn	1%	1%
Other Improper Turn	0%	1%
Improper Backing	1%	0%
Disregarded Traffic Signal	6%	3%
Disregarded Stop or Yield Sign	0%	1%
Avoiding Other Vehicle	1%	0%
Hit and Run	0%	4%
Eluding Police	0%	1%
Fail to Maintain Proper Control	16%	11%
Improper Passing	0%	1%
Improper or Unsafe Lane Change	1%	4%
Over Correction	1%	0%

Virginia Department of Transportation calculated expected crashes at intersections and road segments based on road configuration and traffic volume and compared that estimate to the observed crashes to get the Potential for Safety Improvement (PSI). These locations are likely to benefit from safety improvements, while other locations, even those with more crashes, are less likely to benefit from safety improvements. The Washington Avenue intersections and segments with high or moderate PSI (Figure 2) are:

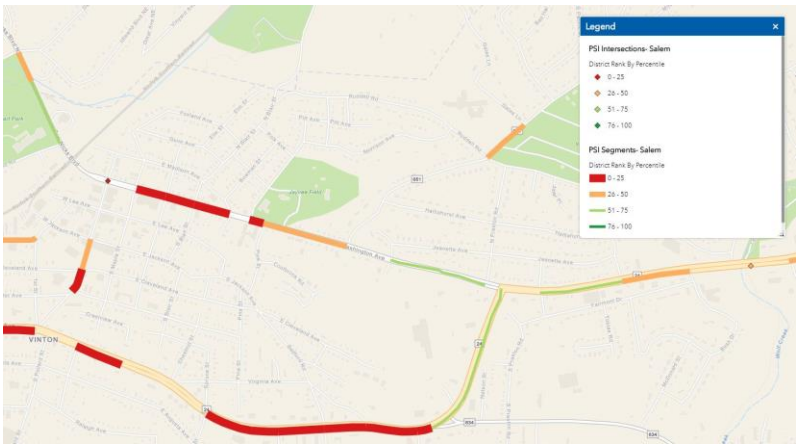


Figure 2. Washington Avenue intersections and segments with Potential for Safety Improvements.

- High PSI intersection (red diamond) – Pollard Street, awarded Pedestrian Safety Action Plan funding (a set-aside of the Highway Safety Improvement Program) for pedestrian improvements in 2019
- High PSI segment (red line) – Maple Street to Madison Avenue
- High PSI segment (red line) – Meadow Street to Pine Street
- Moderate PSI intersection (orange diamond) – Shell station near the Wolf Creek Greenway (east Roanoke County)
- Moderate PSI segment (orange line) – Pine Street to Mountain View Road
- Moderate PSI segment (orange line) – Halliahurst Avenue to Bush Dr.

2.2 Gateway to Vinton

The segment of Washington Avenue from Pollard Street to Blair Street is an opportunity to establish a unique identity for Vinton. Washington Avenue is designated a priority street as the "primary gateway into Vinton from Roanoke and Bedford Counties" in the Vinton UDA: Downtown Realm Design Guidelines and Action Plan, which recommends expanding streetscapes with new building facades[2].

Strengths of the corridor are its gateway signage (Figure 4) and many buildings (Figure 5).

However, the corridor has some placemaking barriers:

- Parking lots abutting the street
- Abundance of driveway accesses
- Unused buildings surrounded by unused parking
- Lack of trees
- Fast traffic

[2] Vinton UDA: Downtown Realm Design Guidelines and Action Plan, 2019

Acres of pavement are the greatest placemaking detractor of the sense of "Vinton". From Pollard Street to Maple Street, 48% of the frontage is parking lots on the south side of Washington Avenue and 45% on the north side, and, except for Advance Auto Parts, there is no buffer between the parking lot and the sidewalk. Using the Google Maps Area Calculator Tool, public parking surface lots consume roughly 38%, 7 of the 20 acres, of the available land area within one block of the core commercial Washington Avenue (Figure 3). A parking study can determine more accurately the amount of parking, the proportion of land area that is parking lots, and whether parking is oversupplied.

Figure 4. Gateway signage and "LOVE" art is a strength of the corridor

Figure 5. Land uses include beautiful churches, residential buildings repurposed for commercial use (top), attractive buildings like Lotz Funeral Home (middle), and residential (bottom).

Zoned "Residential-Business", this stretch of Washington Avenue is subject to parking requirements (Article V, Division 6, Sec. 5-30):

Sec. 5-32: All such parking spaces shall be located within 500 feet by normal pedestrian route of a principal entrance to the building they serve…The property on which such parking spaces are located shall be under the same ownership and control as the

Figure 3. Public off-street parking surface lots (upper panel) and total area (lower panel).

property on which the use to be served is located, or under the same ownership and control as the use.

Parking reforms that can reduce the amount of space devoted to parking while still supplying enough parking include:

- Shared parking
- Off-site parking
- Provisions in lieu of parking

Recommendation: Conduct a parking study of public lots from Pollard Street to Blair Street and from Madison Avenue to Lee Avenue to determine if parking is oversupplied.

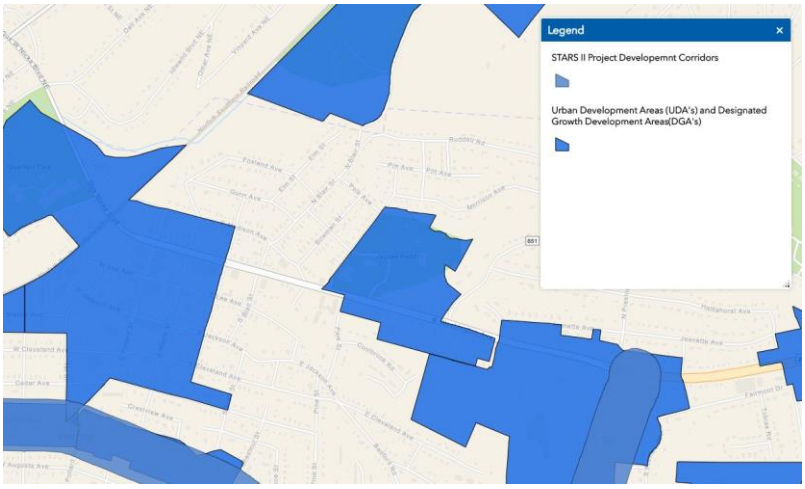


Figure 6. Urban Development Areas

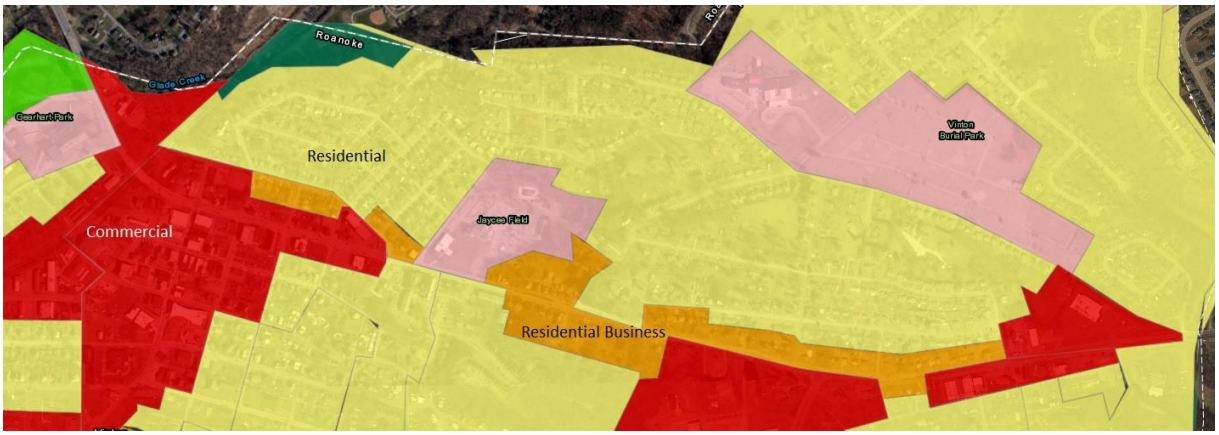


Figure 7. Zoning

Much of the corridor is designated an Urban Development Area (Figure 6). The Strategically Targeted and Affordable Roadway Solutions program, created in 2007 by the Virginia Department of Transportation, identifies ByPass Road, including the intersection with Washington Avenue, as a STARS II Project Development Corridor. The corridor is zoned commercial, residential, and residential business (Figure 7).

2.3 Multimodal Access

Most travelers on Gus Nicks Boulevard / Washington Avenue are in passenger vehicles. The corridor also serves people who are walking, bicycling, using transit, and moving freight.

2.3.1 Biking and Walking

Access for biking and walking was assessed through an on-road audit, local and regional plans, and crash history.

On-road bike/walk/disability site visit

The Regional Bicycle & Pedestrian Advisory Committee conducted bike/walk/disability site visits of Gus Nicks Boulevard/Washington Avenue. A summary is provided here; see Appendix for complete reports.

Pedestrian and bicyclist trip generators include churches on Washington Avenue, downtown Vinton, William Byrd Lofts (new apartments in the old high school off Gus Nicks Boulevard), and new businesses downtown and on Washington Avenue. The Gish Mill property has been designated for redevelopment and could be a pedestrian/bicycle trip attractor. Mountain bicyclists and bicyclists use the Blue Ridge Parkway, Tinker Creek Greenway, Wolf Creek Greenway, and/or Glade Creek Greenway. This section of Washington Avenue is a connection between Wolf Creek Greenway and Tinker Creek Greenway. Bicyclists riding the Blue Ridge Parkway and mountain bike trails use Washington Avenue westbound (the downhill side) or use parallel routes and cross Washington Avenue.

For the site visits, bicyclists rode from the Vinton Town West Limit on Gus Nicks Boulevard and Washington Avenue to ByPass Road (1.2 miles). Bicyclists reported that the four lanes of fast-moving traffic created uncomfortable conditions and it was difficult to find gaps in traffic to cross the road.

Figure 8. Steep cross slope at a driveway

Pedestrians and a wheelchair user walked/rolled Gus Nicks Boulevard from the old high school to Pollard Street and Washington Avenue from Pollard Street to Blair Street (3 blocks). Sidewalks were in reasonably good condition, but crossing the road was difficult. For people with mobility impairment, uneven pavement, debris, high lips on curb ramps, and steep cross slopes at driveways and side streets were obstacles (Figure 8). Two marked midblock crossings installed at the request of churches (Figure 9) may be hazardous without additional marking or the Sunday-morning crossing guard. A few hours after the Gus Nicks Boulevard walk/disability audit, a pedestrian was struck in the intersection of Washington Avenue and Pollard Street, which has been approved for pedestrian improvements.

Figure 9. Crossing guards help churchgoers cross at midblock crossings

Local and regional plans

Local and regional plans that address bicycling and walking on Gus Nicks Boulevard/Washington Avenue are the Vinton UDA: Downtown Realm Design Guidelines and Action Plan, Town of Vinton Comprehensive Plan, Vision 2040: Roanoke Valley Transportation, Regional Bikeway Plan, and Regional Pedestrian Vision Plan.

The Vinton UDA: Downtown Realm Design Guidelines and Action Plan recommends Washington Avenue streetscape reconstruction with pedestrian enhancements and crosswalks at the intersection of Washington Avenue and Pollard Street as a Priority 2025 Action Project[3].

[3] Vinton UDA: Downtown Realm Design Guidelines and Action Plan, 2019

The Town of Vinton Comprehensive Plan calls for widening Washington Avenue from ByPass Road to Feather Road to accommodate bicycles and restriping Gus Nicks Boulevard and Washington Avenue from the Town of Vinton limit to ByPass Road to add bicycle lanes[4].

Vision 2040: Roanoke Valley Transportation, identifies one project on Washington Avenue in the Vision List of Projects: "Washington Avenue Pedestrian Crossing".

The Washington Avenue corridor is in both the Regional Bikeway Plan and the Regional Pedestrian Vision Plan (Figure 10). Gus Nicks Boulevard has bike lanes within the City of Roanoke from Orange Avenue to the Vinton Town Limit. Bicycle accommodation on Washington Avenue from the Vinton town

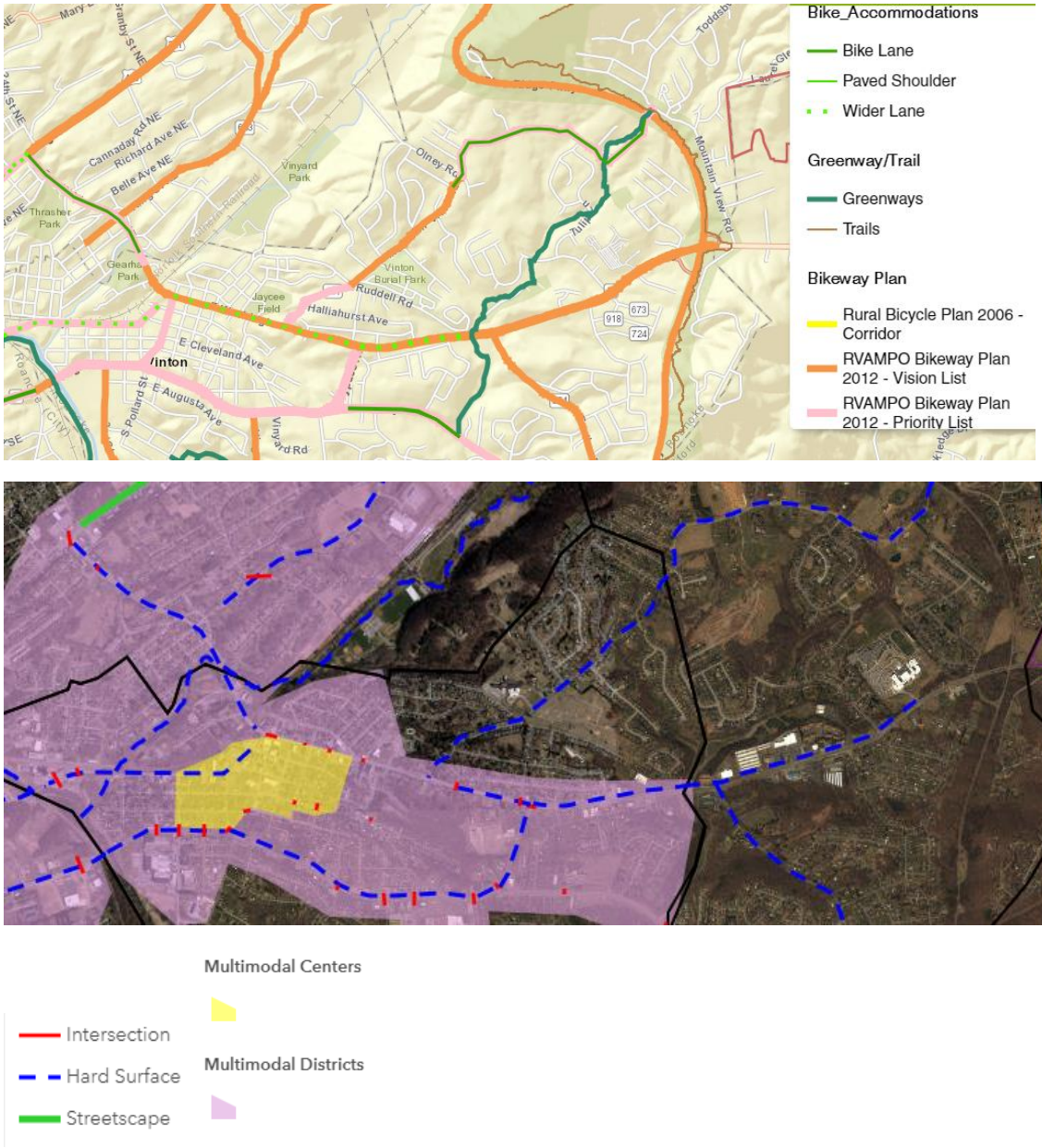


Figure 10. Regional Interactive Bicycle Map (top) and Pedestrian Vision Plan Recommendations Map (bottom)

[4] Town of Vinton 2004-2024 Comprehensive Plan, pages 54-57

limit to the Blue Ridge Parkway is identified on the Vision List. The Vision 2040: Roanoke Valley Transportation Plan defines downtown Vinton as a multimodal center, with Washington Avenue from Pollard Street to Madison Avenue forming the northern border. It identifies intersection and hard surface pedestrian improvements needed along the corridor.

Pedestrian crash history

The crash history of crashes involving pedestrians and bicyclists is uninformative because these events are rare or underreported. The VDOT Pedestrian Safety Action Plan interactive crash history heat map shows three crashes on or near Washington Avenue involving pedestrians since 2011 (Figure 11).

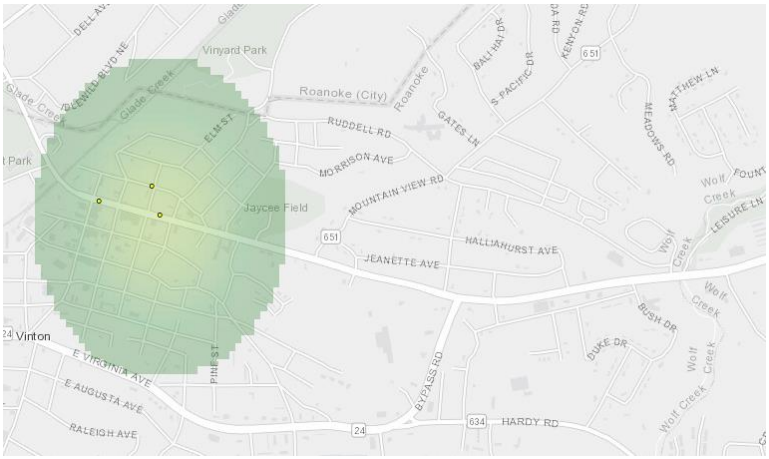


Figure 11. VDOT Pedestrian Safety Action Plan interactive crash history heat map

2.3.2 Transit

Bus stops generate and attract pedestrian trips. Until recently, the entire corridor was served by #31/#32 and #35/#36. As of January 2019, #35/#36 now serves Washington Avenue from Pollard Street to ByPass Road, and #31/#32 serves Gus Nicks Boulevard NE in the City of Roanoke (Figure 12). The portion of Gus Nicks Boulevard that is in Vinton does not have direct bus service.

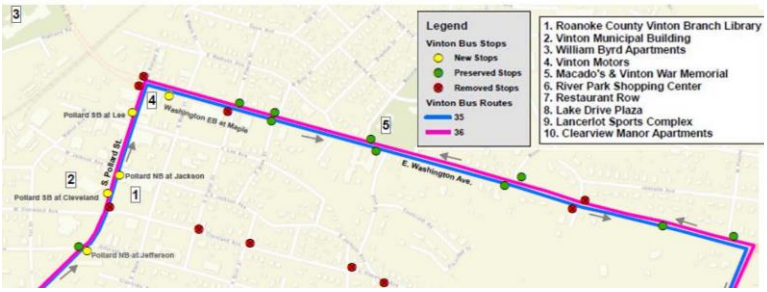


Figure 12. Valley Metro #35/#36 route

The Transit Vision Plan and the Transit Development Plan discuss transit in Vinton.

The Transit Vision Plan[5] lists three recommendations specific to Vinton, as well as general recommendations for the system such as increased frequency of service and expanded hours. Funding has not been identified for these recommendations.

- Recommendation 1D: Enhance activity and improve connectivity in and between Vinton and Downtown Roanoke by adding peak and Sunday service.
- Recommendation 2H: Reduce dependency on paratransit services and provide new connections for residents via a new circulator connecting key destinations in Vinton and Eastern Roanoke County.

[5] Roanoke Valley Transit Vision Plan, 2016

- Recommendation 3N: Quick and continuous connections between Grandin Village, Downtown Roanoke, and Downtown Vinton.

The Transit Development Plan[6] identifies the proposed changes to #31/#32 and #35/#36 which took effect in January 2019, but does not have further recommendations that would affect Vinton specifically.

2.3.3 Freight

Two percent, about 400 vehicles, of the average annual daily traffic on Gus Nicks Boulevard/Washington Avenue is trailer-trucks (Figure 13). The corridor is not a designated freight route. Much of the traffic may be coming from Orange Avenue due to these designations:

- Strategic Highway Network
- Corridor of Statewide Significance
- VDOT Truck Route

Figure 13. Heavy vehicles on Washington Ave

2.4 Traffic Flow

Changes to road configuration must consider the volume of traffic and predicted future volume of traffic. Traffic flow is affected by congestion, impacts from surrounding corridors, and access management.

Table 2. Glossary of traffic flow terms

Average Annual Daily Traffic	AADT, or ADT: The total volume of traffic on a highway segment for one year divided by the number of days in the year.
Capacity	The maximum rate per hour at which vehicles can be reasonably expected to traverse a point or uniform segment of a lane or roadway during a specified period under usual roadway, traffic, and control conditions.
Delay	The travel time experienced by a driver beyond the free flow time. For example, if free flow time is 10 minute and actual time is 15 minutes, delay is 0.5.
Flow Rate	The number of vehicles passing a reference point per unit of time, vehicles per hour.
Level of Service	A qualitative rating of the effectiveness of a highway in serving traffic, measured in terms of operating conditions ranging from "A" for best operation (low volume, high speed) to "F" for poor operation where volumes are below capacity. “D” or better is often considered an acceptable level of service.
Vehicles Per Hour	The number of vehicles per hour, calculated from the average annual daily traffic.
Volume / Capacity	Vehicles per hour divided by the capacity. A ratio approaching 1 or greater than 1 indicates a heavily congested road or intersection.

[6] Valley Metro Transit Development Plan Fiscal Years 2019 – 2028, 2018

Traffic flow terminology is defined in Table 2. Road characteristics and traffic flow are described in Table 3.

Table 3. Road configuration and traffic flow

Segment	**Gus Nicks**[a]	**Pollard-Mitchell**[b]	**Mitchell-ByPass**[c]	**Bypass-Limit**[d]
Road segment length (miles)	0.11	0.25	0.10	0.21
Functional Classification	Minor Arterial	Minor Arterial	Minor Arterial	Minor Arterial
Number Through-Lanes	4	4	4	4
Pavement Width	48	52	48	44
Average Lane Width	12	12	12	11
Median Width	No median	No median	No median	10
Median Type	None	None	None	Raised
Number of Signals	1	2	1	1
2016 Average Annual Daily Traffic	20980	20163	17430	22044
2040 Average Annual Daily Traffic	30269	23080	21124	29592
2016 Vehicles Per Hour	1825	1875	1569	1984
2040 Vehicles Per Hour	2633	2146	1901	2663
2016 Flow Rate	937	1089	948	1170
2040 Flow Rate	1353	1247	1149	1570
Capacity	1684	1684	1684	1650
2016 Volume / Capacity	0.56	0.65	0.56	0.71
2040 Volume / Capacity	0.80	0.74	0.68	0.95
Posted Speed Limit	35	25	35	35
2016 Level of Service	C	B	C	C
2040 Level of Service	C	B	C	D
2016 Delay	0.26	0.52	0.17	0.52
2040 Delay	0.34	0.59	0.19	0.77

[a]Gus Nicks: Gus Nicks Boulevard from Vinton Town Limit to Pollard Street
[b]Pollard-Mitchell: Washington Avenue from Pollard Street to Mitchell Street
[c]Mitchell-ByPass: Washington Avenue from Mitchell Street to ByPass Road
[d]ByPass-Limit: Washington St from ByPass Road to Vinton Town Limit

2.4.1 Congestion

The Congestion Management Process and the travel demand model assess congestion.

Gus Nicks Boulevard and Washington Avenue are included in the Congestion Management Process that the RVTPO adopted in 2013. The Congestion Management Process identified “Areas of Emphasis”; Gus Nicks Boulevard and Washington Avenue are part of Area of Emphasis #7. Congestion can be recurring, caused by regular commuting patterns, or non-recurring, caused by incidents, weather, and special events. The Congestion Management Process identified recurring congestion because it is one of two

major east-west corridors through Vinton (the other being Hardy Road / Virginia Avenue). Crashes contribute to non-recurring congestion.

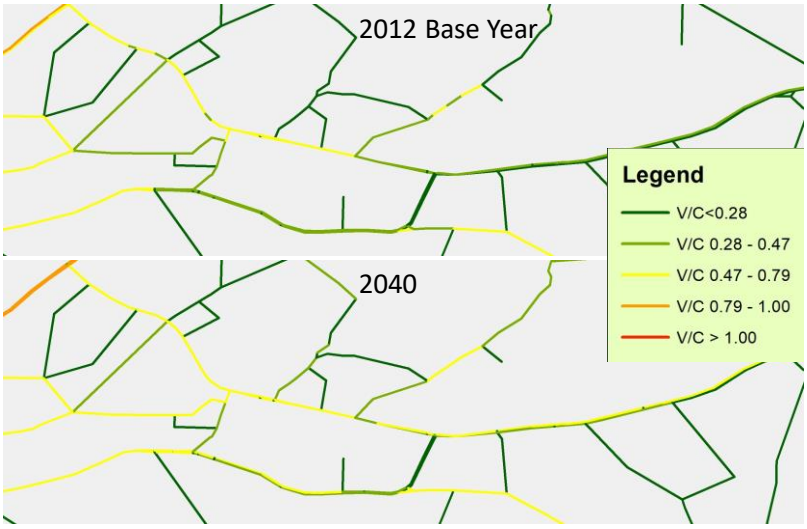


Figure 14. Volume/Capacity for 2012 (top) and 2040 No-Build (bottom).

The #7 Area of Emphasis congestion management strategies that pertain to Washington Avenue are:

- Access management[7],
- Extend transit service on Washington Avenue into Roanoke County[8],
- Widen Washington Avenue from ByPass Road to east Vinton town limit to accommodate bicycles and infill sidewalks[9],
- Complete Roanoke River Greenway, Tinker Creek Greenway, and Glade Creek Greenways[10].

Progress has been made on the greenways, and otherwise these strategies have not been pursued. The RVTPO Congestion Management Process is being updated and will be reexamining congestion management strategies.

VDOT developed a travel demand model for the Roanoke Valley through 2040 to predict the volume/capacity ratio. A volume/capacity ratio approaching 1 or greater than 1 indicates heavy congestion. Currently, the Gus Nicks Boulevard/Washington Avenue corridor carries less than 50% of its capacity east of Mountain View Road and between 50% and 80% west of Mountain View Road. This is predicted to increase between 50% and 80% for most of the corridor by 2040 (Figure 14). The travel demand model considers future land use and assumes the current road configuration.

Travel patterns used in the travel demand model are typically assessed by census commute data, even though people travel for many reasons, including work, school, shopping, health care, and much more. Ninety-four percent of Vinton workers, or 3,440 of the 3,671 total workers, travel outside of Vinton to work (Table 4). Of Vinton's 2,540 workers, 9% also live in Vinton.

Surrounding corridors affect travel on Gus Nicks Boulevard / Washington Avenue. Nearby corridors that feed into the study corridor are Orange Avenue and Virginia Avenue / Hardy Road (Figure 15).

[7] Vinton Area Corridors Plan, 2010
[8] Vinton Area Corridors Plan, 2010
[9] Town of Vinton Comprehensive Plan
[10] 2007 Greenway Plan

Table 4. Where Vinton residents work (left) and where Vinton workers live (right). Source: Census Bureau, OnTheMap Application, 2015.

Work	No. living in Vinton
Roanoke City	1,352
Salem	295
Vinton	*231*
Hollins	215
Cave Spring	197
Lynchburg	60
Rocky Mount	36
Christiansburg	35
Daleville	35
Blacksburg	30
Other	1,185
Total	**3,671**

Home	No. working in Vinton
Roanoke City	502
Vinton	*231*
Cave Spring	115
Hollins	72
Salem	58
Lynchburg	37
Cloverdale	22
Blue Ridge	20
Blacksburg	17
Laymantown	17
Other	1,448
Total	**2,540**

2.4.2 Accesses

Driveway and parking lot entrances and exits are essential for access to businesses and residences, but each access affects traffic flow. Access can be balanced with traffic flow.

Figure 15. Annual average daily traffic on roads that feed into Gus Nicks Boulevard/Washington Avenue

From Pollard to Madison (about 1/3 mile), Washington Avenue has 21 accesses at a density of 68 per mile, 14 on the north side and 7 on the south (not including streets). From Vinton Town West Limit on Gus Nicks Boulevard and Washington Avenue to ByPass Road, there are 64 accesses, at a density of 29 per mile.

There are good examples of well managed accesses and access consolidation in the corridor. Vinton Baptist Church, with half a block of parking, has accesses only on the side streets (Maple Street and Poplar Street) and none on Washington Avenue. Across the street, the old Vinton Motors has no direct access to Washington Avenue, although its parking lot is continuous with the sidewalk. It can be accessed from the side street (Poplar Street) and from the SunTrust parking lot which has multiple accesses to Washington Avenue.

3. Recommendations

Recommendations are provided for the Gus Nicks Boulevard/Washington Avenue corridor and improvements for pedestrian crossings of key intersections.

3.1 Corridor

Recommendations for the Gus Nicks Boulevard/Washington Avenue corridor are considered in two segments: Gus Nicks Boulevard from the Vinton Town Limit to Pollard Street and Washington Avenue from Pollard Street to ByPass Road.

3.1.1 Gus Nicks Boulevard: Vinton Town Limit to Pollard Street

This segment of the corridor has sidewalks and is residential with few destinations immediately off the corridor. The bike lanes in the City portion of Gus Nicks Boulevard end abruptly at the Town limit. The width and traffic flow of the City portion of Gus Nicks Boulevard has handled the bike lanes with no problem, so there should be no problems with bike lanes on the Town portion of Gus Nicks Boulevard. Residents of the new apartments in the old high school will use the sidewalks and may bike into Vinton.

Gus Nicks Boulevard, as it curves down the hill to the traffic light at Pollard Street, provides an impressive half-mile vista of Vinton's Washington Avenue.

Recommendation: Continue the bike lanes from the City of Roanoke portion of Gus Nicks Boulevard through the Vinton portion.

Cost: The cost is lowest if done as part of routine repaving. The typical minimum cost of bike lanes is $5,360 per mile[11]. The segment of 0.4 miles may cost as little as $2,144.

3.1.2 Washington Avenue: Pollard Street to ByPass Road

From Pollard Street to Blair Street, Washington Avenue has multiple functions which conflict with each other: Smooth traffic flow for commuters and trucks vs. safety, bicycle and pedestrian travel, and the Gateway to Vinton identity. Improving peak capacity for commuters and trucks may result in more crashes, impede bicycle and pedestrian travel, and compromise the Gateway identity, while measures that slow traffic speeds improve safety and bicycle and pedestrian travel and strengthen the Gateway identity.

Table 5. Trade-offs of road configuration options

Treatment	Traffic flow	Safety	Multimodal	Identity
Narrow lanes to 10 feet	No change in capacity	Improved by slowing traffic	Bicycle accommodation possible	No effect
4-to-3 lane conversion	Reduced capacity	Improved safety benefit	Bicycle accommodation possible, center turn lane improves bicycle and pedestrian crossing safety	Possible improved identity with planters
Reversible lane	Improved capacity	No effect or improved safety	Bicycle accommodation possible, center turn lane during off-peak	Possible improved

[11] Costs for Pedestrian and Bicyclist Infrastructure Improvements, UNC Highway Safety Research Center, 2013.

			improves bicycle and pedestrian crossing safety	identity with planters

Narrowing or reducing lanes can improve safety, bicycle and pedestrian travel, and identity. For the Pollard – ByPass segment of Washington Avenue, three road diet options that use the existing curb-and-gutter were examined: narrowing the lanes, road diet, and reversible lane (Table 5).

Narrow the lanes to 10 feet

Keeping the same lane configuration but narrowing the lanes, with bike lanes or planters in the extra space, slows traffic (Figure 16).

According to the National Association of City Transportation Officials *Urban Design Street Guide* (chapter "Lane Width"), "Lane widths of 10 feet are appropriate in urban areas and have a positive impact on a street's safety without impacting traffic operations", and "For designated truck or transit routes, one travel lane of 11 feet may be used in each direction."

Narrowing the existing 12-foot lanes to 10 feet yields 4 feet on each side plus the 2-foot gutter pans. This extra space can be used for bike lanes with a small separation or for planters (Figure 16). If the seam between the gutter pan and the pavement is smooth, the gutter pans can be included as part of the bike lane. An alternative to 10-foot lanes is an outer 11-foot lane with a two-directional bike path on one side of the street (Figure 17, top panel).

Planters enhance the appearance of the corridor and create a sense of a barrier which reduces traffic speed. Alternatively, the extra right-of-way can accommodate bike lanes with a narrow, one-foot buffer.

The cost of the planters is approximately $500 each but the maintenance is an important consideration too. Downtown Roanoke, Inc. has experience with the self-watering planter system from EarthPlanter. They maintain about 100 planters of varying sizes around downtown and spend on average 10 hours a week for 75% of the year, up to 25 hours per week in peak season depending on the weather.

Four-to-three lane conversion

Another option is the four-to-three lane conversion, removing one travel lane in each direction and introducing a center turn lane (Figure 17, bottom panel). Bike lanes on each side could be added, or an alternative is a two-directional bike path on one side.

Table 6. Trade-offs of a four-to-three lane conversion

Positive	**Negative**
Fewer crashes	More delays at peak travel
Fewer injury crashes	Vehicles divert to other roads during peak travel
Reduced speeds	Negative public perception
Fewer extreme speeders	

Four-to-three lane conversions have trade-offs (Table 6). Fewer crashes, reduced speeds, and fewer extreme speeders improves conditions for bicycling and walking. Vehicles diverting to other roads will reduce the AADT on Washington Avenue, but may cause problems on other roads. Traffic may divert to Berkley Road and King Street, Walnut Avenue,

There are several examples across the country where Road Diets have been successful with ADTs as high as 26,000. Capacity may be affected at this volume. – Road Diet Mythbusters, Federal Highway Administration, March 2016

ByPass Road, and Virginia Avenue/Dale Avenue/Hardy Road. Large trucks may experience issues following GPS navigation that reroutes them to smaller roads.

The Federal Highway Administration suggests that roads with less than 20,000 AADT may be good candidates for road diets, and that roads with greater than 20,000 AADT may be suitable for a road diet[12].

Washington Avenue between Pollard Street and Mitchell Road carries 20,163 AADT and is projected to increase to 23,080 in 2040. The concern for roads that carry >20,000 AADT is that a road diet will reduce the level of service. Signal timing optimization may alleviate this potential effect. There are several examples of successful road diets in the US on roads exceeding 20,000 AADT (Table 7).

Table 7. Examples of road diets on roads with > 20,000 AADT[13]

Road	**City**	**AADT before**	**AADT after**	**Crash**	**Injury crashes**	**Speed**
Ocean Park Boulevard[14]	Santa Monica, CA	23,000	20,000	<65%	<60%	27 mph (outside of road diet, 37 mph is the typical speed)
Grand River Boulevard	East Lancing, MI	23,000	23,000			35 mph (down from 40)
Lake Washington Boulevard	Kirkland, WA	23,000	25,913			
Main Street	Santa Monica, CA	20,000	18,000			
Danforth	Toronto, Ontario	22,000	22,000			
Rainier Avenue[15]	Seattle, WA	26,600		15% reduction		80% reduction in top speeders
Maximum AADT of road with road diet included in Highway Safety Information Systems study[16]		24,000	26,376			

To determine if a road diet is feasible on a road >20,000 AADT, further study is needed to collect additional data:

- Left-turn volumes
- Speed differential
- 85th percentile speed
- AADT on side streets

[12] Road Diet Informational Guide, Federal Highway Administration, 2014.
[13] Several examples from "Road Diets: Fixing the Big Roads", Dan Burden and Peter Lagerwey, Walkable Communities, Inc. 1999.
[14] Road Diet Case Studies, Federal Highway Administration, FHWA-SA-15-052
[15] Road Diet Guide, Bike Walk KC, 2017.
[16] Evaluation of Lane Reduction "Road Diet" Measures on Crashes, Federal Highway Administration, 2010.

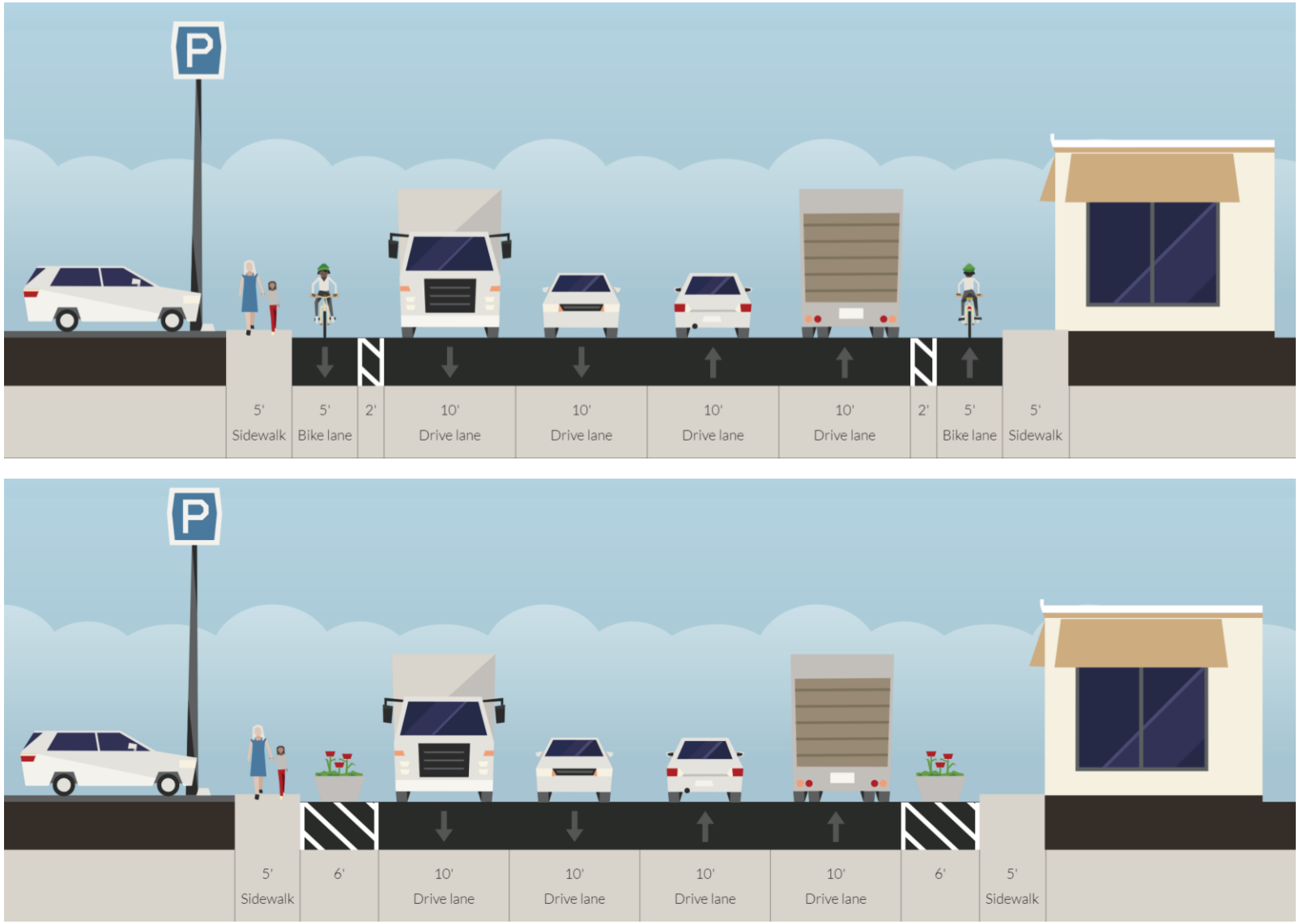


Figure 16. 10-foot lanes with bike lanes (top), 10-foot lanes with planters (bottom)

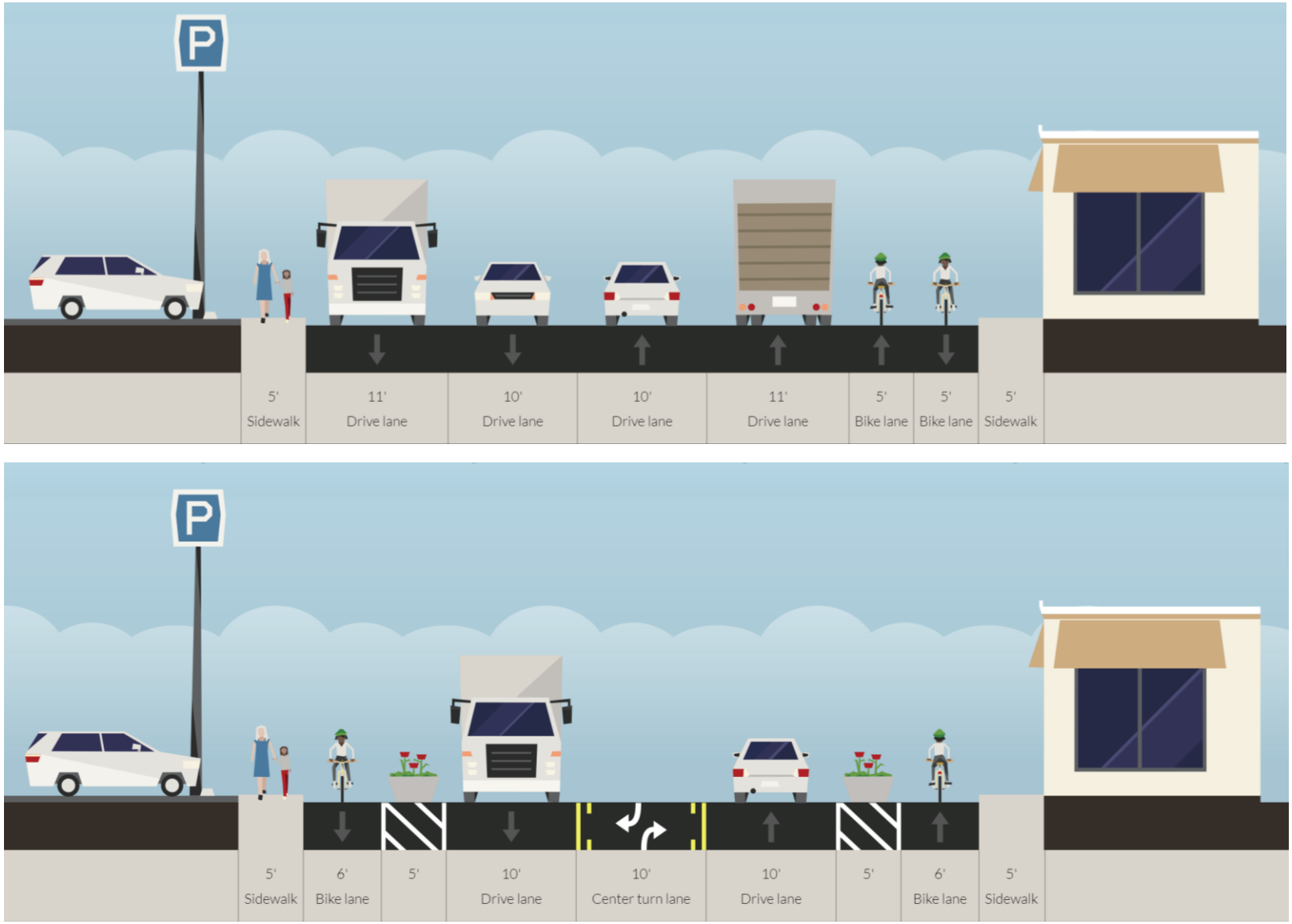


Figure 17. 10-foot lanes with bike path (top), Four-to-three lane conversion with buffered bike lanes (bottom)

Left turn volumes: A road that currently operates as a "de facto three-lane roadway", in which left-turning vehicles result in most of the through-traffic using the outside lanes, may be a candidate for a road diet. When left turn volumes are 25-33% of the mainline volume, three- and four-lane roads have equivalent capacity.

Speed: On a road with a large speed differential (extreme speeders), a road diet will result in fewer extreme speeders and more uniform traffic speeds. On a road with an 85th percentile speed that is higher than the posted speed limit, a road diet will result in an 85th percentile speed that is closer to the posted speed limit.

Side streets: A study presented at the Transportation Research Board 2013 meeting concluded that the volume of side streets at signalized intersections can affect the success of a road diet. The two signalized intersections on Washington Avenue between Pollard Street and Mitchell Road are at Pollard Street and Mountain View Road Based on the AADT of these streets, FHWA guidance would not recommend a road diet that includes Pollard Street and recommends further evaluation for a road diet that includes Mountain View Road. A road diet that included the intersection with Pollard Street would likely experience higher delays than the current four-lane configuration. The intersection of Mountain View Road might also be subject to higher delays with a road diet compared to the current four-lane configuration.

Temporary treatment: If a feasibility study indicates that a road diet could be appropriate for Washington Avenue, a temporary treatment could provide an opportunity to test it before installing it permanently. A temporary treatment uses tape and other impermanent features to temporarily change the configuration of a road. Black or gray tape obscures existing paint markings and yellow or white tape creates new striping. A temporary treatment could help build support for making it permanent. Using a temporary treatment to test a road diet on Washington Avenue would establish the precedent of temporary treatments, pilot projects, or tactical urbanism. The City of Roanoke successfully used a temporary treatment to try out a roundabout recently, and has investigated (but not yet implemented) a temporary treatment to test a road diet on Williamson Road. The quote for the cost of a temporary treatment on Williamson Road (a similar length) was $73,240.

Recommendation: Collect data on left-turn volumes, speed differential, 85th percentile speed, and AADT of side streets.

Cost estimate: VDOT may be able to develop a cost estimate for this study.

Recommendation: Consider a temporary treatment to determine if a four-to-three lane conversion will work and to mitigate negative public perception.

Cost estimate: $80,000

Reversible lane

A reversible lane is a center lane that is one-way during peak traffic and operates as a center turn lane during off-peak hours, with traffic signals to communicate the direction of travel. Reversible lanes provide safety and operations benefits and are relatively low cost (Table 8). They are more common on access-limited freeways, but there are many examples on US streets that are not access-limited (Table 9).

Table 8. Trade-offs of reversible lane[17]

Characteristics	Potential Benefits	Potential Liabilities
Safety	Typically achieves small but statistically significant accident reductions due to reduced congestion.	May preclude access management techniques.
Operations	Provides additional capacity to accommodate peak direction flows.	None identified
Multimodal	None identified	Reversible lanes may prevent the use of median pedestrian refuges.
Physical	May postpone or eliminate the need to widen a facility.	None identified
Socioeconomic	Relatively low cost.	None identified
Enforcement, Education, and Maintenance	None identified	None identified

Table 9. Examples of reversible lanes on streets without limited access (this list is not exhaustive)

Location	Lanes	AADT	Year Implemented	Comments
W Alabama Street, Houston TX	3	12,000	~2000	
Studewood Street, Houston TX	3	10,000	2002	
Collins Street, Arlington TX	5	30,000	2009	
Division Street, Arlington TX	5	30,000		3 reversible lanes
Wythe Creek Road, Hampton VA[18]	3	16,000	2020	
Georgia Avenue, Montgomery County MD	7	40,000		
Colesville Road, Montgomery County MD	6	50,000		
16th Street, Washington DC	5	25,000		
Canal Road, Washington DC	3	20,000		1-way at peak
Chain Bridge Road, Washington DC	3	30,000		
Connecticut Avenue, Washington DC	6	33,000		2 reversible lanes
Rock Creek Parkway, Washington DC	4	45,000		1-way at peak
7th Avenue, Phoenix AZ	6	27,000	1978	
Nicholasville Road, Lexington KY	7	40,000	1979	

The Federal Highway Administration stated that reversible lanes have not had unusual problems with head-on collisions and may even improve safety[19]. There is at least a strong perception that reversible lanes can lead to increased crashes, and in one instance this has been documented (Connecticut Street in Washington DC). A Houston traffic engineer cautions that the stop bar of the reversible lane at a

[17] Reproduced from "Signalized Intersections: Information Guide", Federal Highway Administration, 2004, Table 135

[18] Wythe Creek Rd. reversible lane project: http://www.virginiadot.org/projects/hamptonroads/wythe_creek_road.asp

[19] Signalized Intersections: Information Guide, Federal Highway Administration, 2004

signalized intersection should be pulled back 35 or 40 feet to allow enough room for right-turn movements from the cross street[20]. To warrant reversible lanes, the street should have a directional imbalance of 70/30 percent[21].

Reversible lanes on streets without limited access seem to have been successful in many instances, given the long list identified (Table 9). However, reversible lanes have been removed for the following reasons:

- To make room for bus lanes or bike lanes (16th Street)
- Reversible lane is no longer needed (W Alabama Street)
- Perceived (but not confirmed) safety issues (site unknown)
- Actual safety issues (Connecticut Street)

Even if a reversible lane is functionally successful, it can be a failure in the public eye. A reversible lane project should include substantial education, marketing, and monitoring[22].

Using the existing 4-lane configuration of Washington Avenue, two lanes could be made reversible so that three lanes carry peak direction traffic (3:1) and two lanes carry traffic in each direction off-peak (2:2). In conjunction with a road diet, the center lane could be a reversible lane during peak traffic and a turn lane off-peak. In either configuration, design and striping costs would be comparable to that of a road diet, plus expenses for traffic signals and signage.

Additional data needed to determine if a reversible lane is appropriate for Washington Avenue:

- Whether the remaining lane(s) can accommodate off-peak traffic
- The directional imbalance

Recommendation: Collect data on the directional imbalance of peak traffic and determine whether two lanes and a center turn lane can accommodate off-peak traffic.

Cost estimate: VDOT may be able to develop a cost estimate for this study.

Moving curb and gutter

Moving curb and gutter within the existing right-of-way allows streetscape options that aren't possible with the current curb and gutter, such as wider sidewalks or a mixed-use path.

Wider sidewalks: The minimum width for sidewalks that meets ADA accessibility standards is 5 feet, which is the current width of the sidewalks on Washington Avenue. The National Association of City and Transportation Officials recommends downtown or commercial areas have sidewalks 8 to 12 feet wide[23]. The Federal Highway Administration recommends a through zone for pedestrians of 6 feet, with an absolute minimum of 5 feet, and if it is directly adjacent to moving traffic, it should be at least 8 feet (allowing a buffer for utilities and street furniture). A width of 40 feet from curb to curb allows for four

[20] Teofilo Rebagay, personal communication Jan 11, 2019
[21] Freeway Management and Operations Handbook, Chapter 8 "Managed Lanes", Federal Highway Administration, 2011
[22] Reversible Lanes: Combating Traffic Since the 1970's, RoadTrafficSigns. Accessed 01/17/2019. https://www.roadtrafficsigns.com/reversible-lanes-article
[23] Urban Street Design Guide, National Association of City Transportation Officials, 2013. https://nacto.org/publication/urban-street-design-guide/street-design-elements/sidewalks/

10-foot lanes with 22 feet to distribute among sidewalk, a buffer verve with trees, grass, etc., and/or a bike path. Outer lanes of 11 feet would allow 20 feet to distribute among the other uses.

Moving the curb and gutter would be considerably more costly than the other options presented. There is no recommendation or cost estimate at this time.

3.1.3 Access management

Traffic flow can be improved through access management, which is controlling turning movements with:

- Medians,
- Turn lanes,
- Spacing and number of accesses, and
- Spacing and coordinating traffic signals.

With constrained right-of-way on Washington Avenue, the most feasible ways to control turning movements are managing the spacing and number of accesses and spacing and coordination of traffic signals.

By controlling turning movements, we can

- Limit the number of conflict points,
- Separate conflict points,
- Reduce deceleration requirements, and
- Separate turning movements from through movement.

On an undivided four-lane road like Washington Avenue, controlling the spacing and number of accesses promotes safer and more efficient traffic flow[24]. However, destinations on Washington Avenue need accesses either directly or indirectly (such as a side street) from Washington Avenue, and as new development occurs, managing accesses and taking advantage of opportunities to consolidate accesses will be critical to keep traffic flowing smoothly and safely even as traffic volumes increase.

Access management:

- Reduces potential conflict points with other traffic, including pedestrians,
- Minimizes the number of places traffic can get hung behind a left-turner,
- Is friendlier to people with mobility impairments who struggle with the cross slope of driveways,
- Creates opportunities to enhance the delineation between the street or sidewalk and the parking lot.

A report on Access Management for Local Governments[25] reviewed the treatment of access management in local governments' comprehensive plans and ordinances. At the time, the 1994 Comprehensive Plan was the most current and briefly mentioned access management strategies. Vinton's current Comprehensive Plan seeks "to minimize unneeded curb-cuts and resulting congestion by adopting VDOT's minimum entrance standards, particularly along commercial strips" but otherwise

[24] Safe Access is Good for Business, Federal Highway Administration, 2006. Accessed 2018 12 31: https://ops.fhwa.dot.gov/publications/amprimer/access_mgmt_primer.htm

[25] Access Management for Local Governments, Roanoke Valley Area Metropolitan Planning Organization, 2003.

does not mention access management[26]. Neither the Access Management report nor a recent report on Urban Development Areas mentioned access management principles in Vinton zoning regulations or subdivision ordinances[27]. The 2010 Vinton Area Corridors Plan, which includes the Gus Nicks Boulevard/Washington Avenue corridor, recommends access management principles[28].

Further study could identify specific opportunities for consolidating accesses and reducing wide accesses, particularly in the denser activity center from Pollard Street to Madison Street. Examples include:

- Development of the vacant property on Washington Avenue between Pollard Street and Maple Street is an opportunity to improve the street front of an entire block. The three accesses to that parking lot could be consolidated, reduced in size, or eliminated entirely since there is access from Maple Street.
- Consolidate accesses to private homes, perhaps in conjunction with an alley. Pairs or groups of homes could share a single access with an easement agreement.

Recommendation: Conduct an access management study to identify specific opportunities to consolidate and reduce accesses, considering easement agreements, zoning opportunities, redevelopment opportunities, and trade-offs.

3.2 Pedestrian crossings at key intersections

On Washington Avenue, Pollard Street and Maple Street intersections are key for pedestrian crossings because these streets lead to downtown Vinton. Poplar Street and Meadow Street intersections serve pedestrian travel to churches, and Meadow Street further accesses Macado's and the Vinton War Memorial. Transit users getting on or off at bus stops on the north side of Washington Avenue near Poplar Street, Blair Street, and Meadow Street may need to cross at these intersections (Figure 12).

Of these intersections, the only signalized intersection is Washington Avenue and Pollard Street, which has funding for improvements through VDOT Pedestrian Safety Action Plan funding. There are two striped midblock crossings on Washington Avenue, one for Vinton Baptist Church and one for Thrasher Memorial United Methodist. Pedestrians may prefer midblock crossings because of the reduced number of conflict points[29]. However, pedestrian crossings of multiple lanes in the same direction can place pedestrians in multiple threat, where one vehicle stops in one lane but a second vehicle in the next lane does not stop and strikes the pedestrian in the crosswalk. Restriping Washington Avenue in a 4-to-3 lane conversion removes the multiple threat risk of midblock crossings.

The pedestrian treatments available for intersections and midblock crossings are listed in Table 10.

[26] Town of Vinton 2004-2024 Comprehensive Plan
[27] Vinton UDA: Downtown Realm Design Guidelines and Action Plan, 2019.
[28] Vinton Area Corridors Plan, 2010.
[29] Urban Street Design Guide, National Association of City Transportation Officials. Accessed 2/6/2019 https://nacto.org/publication/urban-street-design-guide/intersection-design-elements/crosswalks-and-crossings/midblock-crosswalks/

Table 10. Pedestrian treatments for intersections

Cross street	Low-cost improvements	Higher cost improvements	In conjunction with road diet
Pollard Street	Right-turn-on-red restriction Leading pedestrian interval High visibility crosswalk on highest pedestrian volume leg Marked crosswalk on other legs	Raised crossing	Curb extensions Pedestrian safety islands
Maple Street	High visibility crosswalk on highest pedestrian volume leg Marked crosswalk on other legs	Rectangular rapid flashing beacon OR Pedestrian hybrid beacon Raised crossing	Curb extensions Pedestrian safety islands
Poplar Street	High visibility crosswalk on highest pedestrian volume leg Marked crosswalk on other legs	Rectangular rapid flashing beacon OR Pedestrian hybrid beacon Raised crossing	Curb extensions Pedestrian safety islands
Blair Street	High visibility crosswalk on highest pedestrian volume leg Marked crosswalk on other legs	Rectangular rapid flashing beacon OR Pedestrian hybrid beacon Raised crossing	Curb extensions Pedestrian safety islands
Meadow Street	High visibility crosswalk on highest pedestrian volume leg Marked crosswalk on other legs	Rectangular rapid flashing beacon OR Pedestrian hybrid beacon Raised crossing	Curb extensions Pedestrian safety islands
Midblock	High visibility crosswalk	Rectangular rapid flashing beacon OR Pedestrian hybrid beacon Raised crossing	Curb extensions Pedestrian safety islands

Right-Turn-On-Red restriction signs[30]: Vinton has some Right-Turn-On-Red restriction signs. The City of Roanoke has many of these downtown, at Grandin Village, and South Jefferson Street. As the only signalized intersection, Pollard Street is a good candidate for this treatment. Right-turn-on-red restrictions can be used with leading pedestrian interval.

Estimated cost $200 per sign, including labor.

Leading Pedestrian Interval[31] gives pedestrians a 3-7 second head start when entering an intersection with a corresponding green signal in the same direction of travel. They reduce the risk of a pedestrian-vehicle collision as much as 60%. Higher pedestrian volume and longer crossing distance warrant a longer head start. The crossing distance on the longest leg is 67 feet.

[30] Pedestrian Safety Guide and Countermeasure System, US Department of Transportation. Accessed 2/6/2019 http://www.pedbikesafe.org/pedsafe/countermeasures_detail.cfm?CM_NUM=49

[31] Urban Street Design Guide, National Association of City Transportation Officials. Accessed 2/6/2019 https://nacto.org/publication/urban-street-design-guide/intersection-design-elements/traffic-signals/leading-pedestrian-interval/

Estimated cost $0 to $3,500 per existing signal.

High visibility crosswalk markings[32]: Motorists have better crosswalk compliance with high visibility crosswalk markings (ladder, zebra, and continental) compared to standard parallel or dashed pavement markings (Figure 18). The City of Roanoke finds these require more maintenance, and so limits them to the greatest need locations and legs of intersections. Although the high visibility crosswalk marking may be on only one or two legs of the intersection, crossing should be expected and designed for on all legs of the intersection. Consider high visibility crosswalk markings for every marked crosswalk on Washington Avenue. At every crosswalk marked with high visibility markings, consider rotating temporary pedestrian crosswalk signs. State law states motorists must yield to pedestrians within a crosswalk, so this language should be used rather than stop for pedestrians. Better crosswalk compliance is seen when these are moved frequently and when they are used in conjunction with a "gateway" treatment (Figure 19).

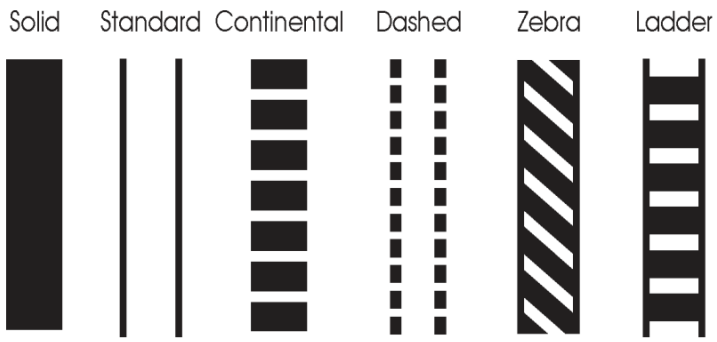


Figure 18. Crosswalk markings. Image source: Countermeasure Costs Report

Figure 19. R1-6 gateway treatment

Estimated cost: $3,070 per crosswalk, $600 per temporary crosswalk sign

Raised crossing[33]: A raised crossing makes pedestrians more visible and doubles as a speed table, slowing traffic.

Estimated cost: $8,170 per crossing

Rectangular Rapid Flashing Beacon[34]: Pedestrians activate the rectangular rapid flashing beacon by pushbutton. The City of Roanoke has installed them on Dale Avenue at 19th Street and on Orange Avenue at 11th Street. They have observed that education is needed for both pedestrians and motorists

[32] Urban Street Design Guide, National Association of City Transportation Officials. Accessed 2/6/2019 https://nacto.org/publication/urban-street-design-guide/intersection-design-elements/crosswalks-and-crossings/conventional-crosswalks/

[33] Urban Street Design Guide, National Association of City Transportation Officials. Accessed 2/6/2019 https://nacto.org/publication/urban-street-design-guide/intersections/intersections-of-major-and-minor-streets/

[34] Pedestrian Safety Guide and Countermeasure System, US Department of Transportation. Accessed 2/6/2019 http://pedbikesafe.org/PEDSAFE/countermeasures_detail.cfm?CM_NUM=54

at both locations. On Orange Avenue, they have increased the flashing period because pedestrians had to spend much of the flashing period waiting for vehicles to yield.

The unsignalized crossing (intersection or midblock) with the highest volume of pedestrian traffic crossing may be a candidate for a rectangular rapid flashing beacon. It would be helpful to know which intersection has the highest volume of pedestrian traffic crossing Washington Avenue, and which side of the intersection seems to be preferred. (Although the RRFB may be on only one side of the intersection, be sure to include crosswalks on all legs of the intersection.) Consider Maple Street, Poplar Street, Blair Street, Madison Avenue, and Meadow Street, or mid-block.

Average cost (includes installation) $22,250 X 3 beacons = $66,750

Pedestrian Hybrid Beacon[35]: Pedestrian hybrid beacons call a red light to stop traffic only when a pedestrian is present. Otherwise, the signal is dark. If the midblock crossings at the churches are retained, a pedestrian hybrid beacon could be considered. Education should be part of this countermeasure as there are no pedestrian hybrid beacons in the Roanoke Valley.

Estimated cost: $75,000 - $150,000

Curb extensions[36]: If restriping yields additional space, consider curb extensions at pedestrian crossings. These reduce the crossing distance for the pedestrian and make the pedestrian more visible to motorists.

Estimated cost: $13,000 X 4 corners = $52,000 per intersection

Pedestrian Safety Islands[37]: If restriping yields additional space, consider pedestrian safety islands at marked pedestrian crossings. These islands facilitate crossing by providing a refuge so that pedestrians can cross one side when there is a gap in traffic and then wait until there is a gap in traffic to cross the other side, instead of having to wait until gaps on both directions coincide.

Estimated cost: The size of the safety island affects the cost. A typical island costs $13,520, or $10 per square foot.

[35] Proven Safety Countermeasures, US Department of Transportation. Accessed 2/6/2019 https://safety.fhwa.dot.gov/provencountermeasures/ped_hybrid_beacon/

[36] Urban Street Design Guide, National Association of City Transportation Officials. Accessed 2/6/2019 https://nacto.org/publication/urban-street-design-guide/intersections/intersections-of-major-and-minor-streets/

[37] Urban Street Design Guide, National Association of City Transportation Officials. Accessed 2/6/2019 https://nacto.org/publication/urban-street-design-guide/intersection-design-elements/crosswalks-and-crossings/pedestrian-safety-islands/

Appendix

BIKE/WALK/DISABILITY SITE VISIT: Washington Avenue

Roanoke Valley Transportation PLANNING ORGANIZATION
Staffed by the REGIONAL commission

Date: 19 December 2018

Time: 2:00 pm – 2:45 pm

Lighting: Sunny

Weather: Sunny, cool

Auditor	Mode
Tiffany Lee	Wheelchair
Greg Walters	Walk
Aishwarya Borate	Walk
Kristine McCormick	Bike
Rachel Ruhlen	Bike

Route: Bicycle – Washington Avenue from Vinton Town West Limit to Bypass Road. Bicyclists traveled east on Washington Avenue from Pollard Street in the right travel lane, turned left on Preston Road, and traveled west in the right travel lane back to Vinton Town West Limit.

Walk – Washington Avenue from Pollard Street to Blair Street. Walkers/wheelchair traveled east on the sidewalk on the north side of Washington Avenue, crossed at Blair Street (wait time: 90 seconds), and traveled west on the sidewalk on the south side of Washington Avenue.

This section of Washington Avenue is a connection between Wolf Creek Greenway, Tinker Creek Greenway, and Glade Creek Greenway. Bicyclists riding the Blue Ridge Parkway and mountain bike trails use Washington Avenue westbound or use parallel routes and cross Washington Avenue.

Trip generators: Churches on Washington Avenue. Downtown Vinton: Library, Farmer's Market. The old high school off of Gus Nicks Boulevard is being converted into apartments. New development such as Macado's on Washington Avenue, a brewery and a restaurant downtown. Mountain bicyclists and bicyclists using the Blue Ridge Parkway, Tinker Creek Greenway, Wolf Creek Greenway, and/or Glade Creek Greenway.

Pavement condition: Good. Some cracks in the sidewalk to grind down.

Obstacles: Parked car in lot extended over the sidewalk at Maple Street & Washington Avenue. Glass at Pollard Street. Steep cross slope at driveways between Washington Avenue and Blair Street. Some signs may impede travel. High lips at storm drains. Snow.

Traffic: 4 lanes of fast-moving traffic are uncomfortable for many bicyclists.

Crosswalks: 30 steps to cross Washington Avenue at Blair Street.

Curb ramps: High lips. Curb ramps don't have landings at the top.

Vision impairment: Crosswalks are not high visibility.

Signs: Signage to direct people to Tinker Creek (west) and Wolf Creek (east) or Blue Ridge Parkway (east, at Mountain View Road).

Recommendations

Biking: Bike lane, at least on the uphill (eastbound) side. Sharrows or “Bikes May Use Full Lane” signs. Signage directing cyclists through parallel routes north and south of Washington Avenue. Improve crossings at Maple Street and/or provide access to Pollard Street north of Washington Avenue from the east so that bicyclists can use the signalized intersection to cross Washington Avenue.

Walk: After pedestrian improvements to Pollard Street and Washington Avenue, consider improving other crosswalks with curb ramps, flashing lights, and enforcement.

Disability: Some small actions would improve the 3-block section from Pollard Street to Blair Street for people with disabilities: grind down lips at storm drains and crosswalks, clean up debris. When pedestrian improvements are made at Pollard Street and Washington Avenue, consider high visibility crosswalks.

Uneven pavement at storm drain

Steep cross slope at drive

Uneven transition from asphalt

WALK/DISABILITY AUDIT: Gus Nicks Boulevard

Roanoke Valley Transportation PLANNING ORGANIZATION Staffed by the REGIONAL commission

Date: March 12, 2019

Time: 3:00 – 4:00 PM

Lighting: Sunny

Weather: Sunny, mild

Auditor	Mode
Tiffany Lee	Wheelchair
Greg Walters	Walk
Nathan McClung	Walk
Rachel Ruhlen	Walk

Route: Gus Nicks Boulevard from old high school parking lot to Pollard Street. Crossed Gus Nicks Boulevard at the old high school, traveled south on the sidewalk on the east side of Gus Nicks Boulevard, crossed at Pollard Street, and traveled north on the sidewalk on the west side of Gus Nicks Boulevard. (The bike audit of Washington Avenue actually began on Gus Nicks Boulevard from Vinton Town East Limit to ByPass Road which includes this segment, so this audit was for walking and disability only.)

This section of Gus Nicks Boulevard, along with Washington Avenue as far as ByPass Road, is identified as a connection between Wolf Creek Greenway, Tinker Creek Greenway, and Glade Creek Greenway. The trailhead for future Phase II of the Glade Creek Greenway is adjacent to the old high school parking lot.

Trip generators: The segment is of interest to Vinton because of current and future development. The old high school is under construction to be repurposed into moderately priced apartments, the Billy Byrd Apartments. It is an easy walk or bike ride to downtown Vinton. Future development of the old Gish Mill site across the street will be an attraction for these tenants as well as other visitors from downtown. Because of recent changes to the bus route, there are no bus stops on Gus Nicks Boulevard within Vinton.

Sidewalk condition: Good. One small lip was noticed and one rough spot for people with wheeled mobility devices. The sidewalk in front of the old school is seven feet wide, and auditors commented on how much more comfortable it was compared to the five-foot-wide sidewalk the rest of the street. Neither segment has separation from the curb.

Obstacles: No obstacles, other than a tree limb which was removed by the auditors. Auditors commended the lack of vegetative overgrowth.

Traffic: 4 lanes of fast-moving traffic with no separation between the road and the sidewalk. Speed limit 35 mph (estimated average actual speed 44 mph), average annual daily traffic 21,000. No street parking.

Crosswalks: The intersection of Pollard Street and Washington Avenue, including its crosswalks, will be improved soon as part of the Pedestrian Safety Action Program (PSAP) funding Vinton received. Coincidentally, three hours after the audit took place, a pedestrian crash occurred in the same intersection.

A critical missing crosswalk for future development is between Billy Byrd Apartments and the Gish Mill site. If the Gish Mill site is developed and is an attraction for tenants of Billy Byrd Apartments, there will be high potential for pedestrian crashes.

Curb ramps: The curb ramp on the southeast corner of Madison Avenue & Gus Nicks Boulevard is not usable. It is narrow (3 feet), steep, has no landing pad, and faces directly onto the street. It lacks a tactile surface. At the moment, it is not a high priority because there is probably not much pedestrian traffic on the street, especially with the removal of the bus stops.

The curb ramps on the northwest and southwest corners of Gus Nicks Boulevard and Highland Road and the northwest and southwest corners of Gus Nicks Boulevard and the old high school parking lot lack a level landing area, tactile surface, and point into the street.

Vision impairment: Curb ramps lack tactile surfaces.

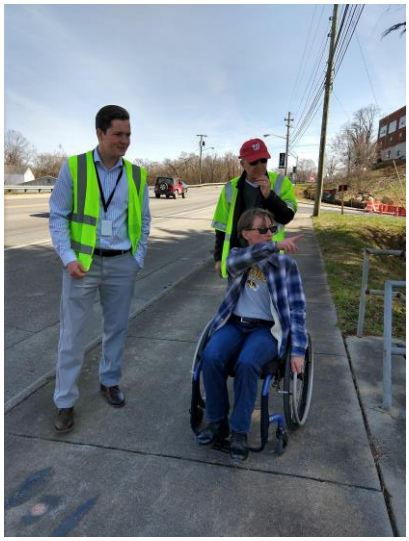
Signs: Wayfinding signs direct travelers to downtown destinations.

Recommendations

With 35 mph traffic and 21,000 average annual daily traffic, a high degree of protection will be needed for safe pedestrian crossing from Billy Byrd Apartments to the Gish Mill site. Consider a pedestrian refuge island, a high-intensity activated crosswalk beacon or rectangular rapid flashing beacon, and high visibility crosswalk markings when improvements are made.

Extend the sidewalk on the east side of Gus Nicks Boulevard north to Madison Avenue and bring the curb ramp up to ADA standards.

Inadequate curb ramp at Madison Avenue and Gus Nicks Boulevard



Participants discuss future development

Curb ramps on the segment lack level landing area, tactile surface, and point into the street.