

2012

# Town of Blacksburg Bicycle and Pedestrian Master Plan



Blacksburg Corridor Committee

3/16/2012

## **I. Preface and Acknowledgements**

Developing a Bicycle and Pedestrian Master Plan is no small effort, and this document is a rich resource and foundation indicating the way for bicycle and pedestrian accommodations in the Town of Blacksburg. The high quality of the effort can be seen in the following pages. In January 2011, the Town of Blacksburg's Greenway/Bikeway/Sidewalk, Corridor Committee ("Corridor Committee") initiated the volunteer effort that went into this plan. No one would have imagined the extent of time and energy committed by over 70 volunteers, town staff and interns with limited financial resources. Support for this plan has been enormous. Volunteers have contributed to the formulation of the vision, collected data on street conditions, analyzed those findings, identified infrastructural options and routes, and drafted chapters. As a result, this plan established well-considered standards for the continual improvement of alternative transportation options for all ages and styles of bicyclists and pedestrians. Two individuals were responsible for coordinating over 2000 hours of volunteer time, Elizabeth Lohman, citizen leader, and Priscilla Cygielnik, town staff. The following individuals, committees, staff, and council contributed to making this plan a success. A special thanks to Adam Lind, a graduate student in Urban Affairs and Planning from Virginia Tech, for his extraordinary efforts in providing maps and content for this plan.

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## II. Executive Summary

In 2009, the Town of Blacksburg's Greenway/Bikeway/Sidewalk/ Corridor Committee ("Corridor Committee") identified the need for a bicycle and pedestrian master plan to complement the Town's Comprehensive Plan and to guide the expansion of the bicycle and pedestrian network. After evaluating resources for hiring professional consulting services it was determined that this would be a community grass roots effort. The Bicycle and Pedestrian Master Plan Committee was formed in January of 2011 as a subcommittee of the Corridor Committee.

The Corridor Committee identified key stakeholders in the community and invited them to be a part of the planning process. The purpose of this subcommittee was to:

- evaluate existing systems,
- identify information gaps,
- propose a continuous network for bicycles and pedestrians, and
- provide a document to guide planners and developers.

The information contained herein is the result of this year long effort. This master plan:

- documents the Town's current existing conditions
- proposes an interconnected network of streets for on-road bicycle facilities and off road bicycle and pedestrian improvements, and
- provides guidance for the design and implementation of these facilities.

## III. Introduction

Various town publications contain references concerning bicycle and pedestrian facilities and amenities. Specifically, the “Pathways to the Future” map in the Comprehensive Plan and town zoning code have served as the guiding documents for implementation of these facilities with new development projects. This Master Plan became necessary not only to provide continuity for the routing of these future pathways and design guidance for these facilities, but also to address where existing infrastructure is inadequate or substandard and to identify the appropriate bicycle and pedestrian improvement in that context.

Other previous planning and efforts towards bicycle and pedestrian improvements included: a bicycle count first performed by the New River Valley Bicycle Association in 2009 to identify critical intersections in town and document ridership; an electronic bicycle survey conducted by the Virginia Tech Center for Geospatial Information & Technology that same year to identify frequently used routes for bicycling and walking in Town; and, in Spring of 2010 the Virginia Tech Department of Urban Affairs & Planning provided a comprehensive survey of Blacksburg streets, detailing conditions related to the bicycling experience, and identified criteria for successful master plans.

This Bicycle and Pedestrian Master Plan is a comprehensive documentation of previous planning and current assessments of existing demand to propose a contiguous network of bicycle and pedestrian routes throughout town. It is intended for area planners and developers to implement with maintenance and new construction projects. This plan is referenced in the Transportation sections of the Town’s Climate Action Plan, the Comprehensive Plan, and the Planning District Commission’s regional plan. The Town may use the recommendations of this plan to identify future new construction projects or address specific projects that may be improved through town maintenance.

### A. Vision

This Bikeway/Pedestrian Master Plan develops a bicycle and pedestrian-friendly environment that provides safe and enjoyable mobility for all citizens. Our vision embraces connectivity of dedicated and shared routes in coordination with an integrated regional transportation system. This plan for Blacksburg expresses the alternative transportation aspirations of our residents.

Our goal is to become a League of American Bicyclists designated Bicycle Friendly Community, achieving Platinum status by 2022.

We have a vision of Blacksburg as:

A town where bicycling and walking becomes primary choices for local trips.

- Bicycling becomes a fundamental pillar of Blacksburg’s transportation system
- Multimodal transportation options in complete streets design



- Cycle lanes follow main routes where there are shops, public transport points and people
- Cycle lanes are safe and physically separated from cars where necessary
- Residents have access to safe, pleasant and continuous bicycle and pedestrian corridors taking to them to where they want to go.
- This bicycle network serves all ages and abilities of users for: shopping, dining, working, socializing, exercising or simply the enjoying the outdoors

## A town that encourages environmental, social and economic sustainability

- A transportation system that reduces Blacksburg's carbon footprint and congestion, improves air quality, and enhances public health.
- An incentive program to encourage alternative modes of commuting.
- Blacksburg becomes a cycling destination raising town revenues and business incomes
- A built environment that makes bicycling and walking more attractive than driving for trips of three miles or less.
- Blacksburg's transportation grid re-purposed for pedestrians, bicyclists, mass transit, freight use, and green landscaping.
- Blacksburg becomes a center for alternative transportation research, teaching, and learning in sustainable urban planning, design, architecture and engineering.
- A funding mechanism to support alternative transportation
- The number of bike commute days increases

## A town where laws and ordinances encourage alternative forms of transportation

- Laws and policies established that encourage bicycle and pedestrian safety, comfort, and connectivity.
- Law enforcement that encourages bicycling and walking as a principle form of transportation.
- Enforcement practices that contribute to the safety and attractiveness of bicycling, including bicycle patrols.
- Recognition of the distinctive nature of bicycles as vehicles.

## A town where alternative transportation options induce a culture that reinforces a calm and courteous lifestyle.

- Bicycles and pedestrians increase local courtesy and friendliness.
- A downtown commercial and recreations center where infrastructure and accommodations assure that walking and bicycling are the norm
- Those coming to town are afforded full access to alternative transport (bus, bike, pedestrian) for all their shopping needs.

## **B. The Test of a Bikeway System**

Would many of us feel comfortable sending two of our ten-year old children from one side of town to the other on bicycles unaccompanied? Can we send them to the library, the pool, to our parks, to the school, to visit their friends or go to a movie?

In building our bikeway network, keeping these traveling children in mind will lead us to our vision realized.

## IV. Existing Conditions

The initial efforts to inventory the Town's existing network of streets and bikeways began in a classroom at Virginia Tech. Students from an urban affairs and planning course were tasked with assessing the bicycle conditions in town. The drafters of this plan began their first task by field verifying the data collected by these students. A condensed tabulation of this data is available in Table 1. It is broken down in accordance with the challenges posed on each functional roadway classification: arterial roadways, collectors, and neighborhood streets.

### A. Arterials

The arterial system of roadways in town serves the major centers of activity, has the highest traffic volume, and comprises a high proportion of the total travel area. Seven (7) streets are identified as arterials, in terms of the nature and composition of travel served. The function of these roads is designed primarily for vehicular travel; however, these roads are frequently used by cyclists and pedestrians.

Throughout the arterial roadways within Blacksburg, cyclist and pedestrians will find a varying degree of available facilities. Of those available, some are up to date while others do not comply with current bicycle and pedestrian standards. Addressing the inconsistencies in the facilities and amenities will serve to create safer and easier alternative transportation options throughout town.

Because of the design limitations, obstacles to safe and easy bicycle and pedestrian travel exist. To create a continuous and expanded network of bicycle and pedestrian facilities in Town, the following issues and challenges on these major arterials present need to be addressed by providing additional facilities or amenities or by providing viable alternative routes.

- **Main Street**

Main Street is the primary north-south arterial in Town, and passes through residential, commercial and industrial areas. For cyclists, this primary arterial provides a quick connection between north, central and south areas of town.

- Crashes and near misses: A high vehicle crash rate exists for various intersections of Main Street with Prices Fork, Turner, College, Clay and Hubbard/Ellett.
- The northbound segment of Main Street between College and Turner Street presents a steep grade for cyclists, which creates a speed differential.

- **University City Boulevard (UCB)**

UCB runs between Prices Fork and Toms Creek roads and is a shared arterial roadway. UCB has four lanes between Prices Fork and Glad Road and becomes two-lane between Glade Road and Toms Creek. Many students and year-round residents use this artery several times per day going to and from home, campus or downtown.

- This segment is congested with mixed-use housing, businesses, satellite classroom space, and driveway entrances to UCB from shopping centers, restaurants, grocery stores, and the main post office.
- Currently, no bike facilities exist from Price's Fork to Broce Drive on this segment with high-traffic volumes and driveway entrances.

- **Prices Fork Road**

Prices Fork runs from North Main Street to town limits and is a highly traveled artery for vehicles with varying speed limits ranging between 25 mph and 40 mph. This arterial roadway has some segments with bike lanes (BL). For cyclists crossing the Route 460 bridge, the bike lane transitions to a multipurpose trail (MT). The trail crosses both the merging and exiting traffic lanes.

- The MT surface consists of broken and crumbling pavement.
- The MT has insufficient width for cyclists and pedestrians.
- The sight lines are inadequate to ensure the safety of cyclists and pedestrians crossing the merging and exiting traffic lanes.

- **Patrick Henry**

Patrick Henry runs between Toms Creek Road and Harding Avenue and is a wide road in both directions and its entire length. This arterial roadway is a shared road from Tom's Creek Road to Main Street on the south side and has a narrow multiuse trail on the north side. There are bike lanes on Patrick Henry Drive from Main Street to Harding Avenue. From Main Street to Toms Creek there are numerous apartments and townhomes. On this portion of Patrick Henry, a cyclist must go from the actual roadway up onto a wide sidewalk or MT.

- Though the sidewalk is wide, the MT has a faded yellow line in the middle of it and no information or signs about how to use the MT.
- The MT exists only on the North side of Patrick Henry.
- The south side of Patrick Henry Drive has a regular sidewalk that students use for walking and cycling.
- The area from Main Street to Harding Avenue is mostly residential, with the exception of a small block of townhouses. The Blacksburg Recreation Center, Aquatic Center, Skate Park, one small town park, and the Blacksburg High School are also located on this segment of roadway. Here the existing BL's are old and faded and need to be re-surfaced.
- On both sides of Patrick Henry Drive from Giles Road to Harding Avenue, the BL's straddle the road and the gutter portion of the curb, where there can be a 1"-2.5" difference in grade. The change in grade creates an unsafe condition for cyclists if he/she is forced to swerve into the gutter. Additionally, where cyclists are pulling a bob-trailer, carrying children or materials, one of the rear wheels of the trailer is riding off the 1"-2.5" onto the gutter side of the road.

- **Toms Creek**

This arterial roadway is highly used by the many Virginia Tech students living off of Patrick Henry Road. There are good BL's located in both directions that are easily seen and located. The problem for cyclist and pedestrians on Toms Creek is at the traffic light located at the 4-way stop of Toms Creek, Patrick Henry, and University City Blvd. As mentioned above in the Patrick Henry section, there is a MT which cyclist is on when they arrive at the stoplight. As for Toms Creek and University City Blvd, the BL's stop about 15 ft short of the intersection. This allows traffic to move forward to the light, while pushing cyclist over toward the curb.

- **West Roanoke Street/Harding Avenue**

This segment runs from town limits to Otey Street. BLs exist on the east bound side of Harding Avenue between the three-way intersection to Windsor Hill Apartments. The westbound portion of the same segment has a wide shoulder for pedestrians and cyclists.

- This arterial road does not have any bike facilities from the transition from Harding Avenue to Roanoke Street.
- The segment between Woolwine Street and Church Avenue is heavily used by college students traveling to and from the downtown area and/or the campus. Additionally, there is on-street parking, increasing the possibility of a cyclist riding into a door of a car being opened.
- The grade of the westbound segment of Harding Avenue allows cyclists to travel at speeds similar to cars. The wide shoulder creates confusion for cyclists on whether to ride in the lane or in the flow of traffic. Cyclists riding in the wide shoulder are often hidden from view of vehicle drivers turning onto Harding Avenue from Patrick Henry.

- **Clay Street**

Clay Street runs from the Town limits to the edge of campus. This arterial road is used by residents traveling to and from the downtown area of Blacksburg. The segment within the downtown area consists of mixed use, including condos, apartments, single-family residences, and commercial and retail facilities. An additional mixed use development is proposed for the old Blacksburg Middle School property. This development presents a good opportunity to include bike facilities that 1) run parallel to Main Street connecting Palmer Drive to Church Street; 2) providing a connection to the Fiddlers Green trail system; and 3) providing an alternative to the steep east bound segment between Wharton and Willard Street, which has limited sight lines.

## **B. Collectors**

The collector street system provides traffic circulation within neighborhoods and commercial and industrial areas. It differs from arterials in that the collector system penetrates residential neighborhoods, distributing trips from arterials through the area to final destination. It also channels the traffic from local streets into the arterial system. In Town, the collector system services twenty four

neighborhoods, Virginia Tech, an industrial complex, professional park, the Corporate Research Center and municipal Airport. Overall, very few collectors have bike facilities (see table 1) and sidewalk continuity is an issue for pedestrians on almost all collectors outside of the downtown area. Below, challenges to bicycle and pedestrian travel along these collectors are captured based on the destinations served.

- **Neighborhoods**

Collectors in neighborhoods provide access to arterials for neighborhood residents, but often serve as an alternate route for travelers to reach destinations without using arterials or primary routes to workplaces, schools, and churches. This creates situations in which roadways have a greater volume of pedestrians, cyclists, and motor vehicles than may have been envisioned. On these roadways, certain limitations of facilities are of greater concern than they would be for a low-traffic neighborhood street. Sidewalk continuity, bicycle facility continuity and design, and on-street parking on these roads impact the experience and safety of pedestrian and bicycle travelers. An example of these issues is present on Country Club Road, which serves as both a neighborhood collector and as a thoroughfare to a shopping area, a recreation field, an elementary school and the Huckleberry Trail. However, the road has limited sidewalk facilities and event parking in a gravel lane next to the paved roadway. Very few neighborhoods have bike lanes. Several housing developments have multi-use trails for intra-community travel, but lack connectivity to bike or pedestrian facilities that can be used for travel beyond the neighborhood. Collectors in neighborhoods with more rural characteristics, such as Mt. Tabor Road or Meadowbrook Drive, often have speed limits greater than 25 mph, but lack bike facilities or signage. In these neighborhoods, there are few alternate routes, and pedestrians/cyclists must use these collectors when they travel.

- **Virginia Tech**

Virginia Tech roadways connect the university to the town and also provide routes to the highway or town arterials. Bike facility continuity and roadway widths are concerns to cyclists on these roads. However, several campus roads have low speed limits (15-25 mph) and University policy permits cyclists to use sidewalks and grass surfaces in addition to roadways and multi-use trails. These trails and sidewalks accommodate both cyclists and pedestrians at the center of campus, but peripheral areas of campus lack bike facilities (eg: Southgate drive between Spring Road and RT 460) and many bike facilities lack continuity (eg: Plantation/Smithfield extension and Duckpond Drive). Additionally, some transitions between roadways and multi-use trails require cyclists to make sharp turns at low speed (eg: West Campus Drive and Duck Pond multi-use trail).

- **Industrial Complex/Professional Park**

The Industrial and Professional Park area is located off of South Main Street. Users of these roads often share the road with heavy trucks, industrial equipment, and buses. Some routes have paved shoulders or bike lanes, but signage, road conditions (pavement, debris), and motor vehicle speeds

pose concern for road users. Additionally, sidewalk continuity is an issue. Pedestrians accessing this area of town must walk on or alongside the road.

- **Airport/Corporate Research Center (CRC)**

The CRC and airport routes are used by the 2200+ CRC employees, business patrons, and individuals using these routes as an alternative means to access the University campus or accessing South Main St. and RT 460. Multi-use Trails are present throughout the CRC campus, but the pavement conditions of these trails and multiple intersections with parking lots cause concern for trail users. Sidewalks and in-road bicycle facilities are generally unavailable.

## C. Residential Streets

Residential streets are comprised of all facilities that are not arterials or collector roadways. These streets provide the interconnectivity to higher order systems. This system of roadways is typically the lower volume streets on which cut through traffic is discouraged and where safe routes for area school children are encouraged. In Town numerous deficiencies exist within the twenty four neighborhoods that discourage bicycle and pedestrian travel on these roads. A short description of a neighborhood in each area is provided below. A full listing and description of all twenty four neighborhoods can be found in Appendix I.

- **Northend**

The Northend's elementary school students are divided between Kipps and Gilbert Linkous, both of which are too far to walk to. Steep grades, the 460 bypass and no shoulders along North Main Street or Bishop Road make this is difficult neighborhood for bikes and pedestrians.

- **Bennett Hill/Progress**

This neighborhood contains Harding Avenue Elementary School, the rescue station on Progress Street, the Wong Park, and several historic buildings. Many college students and young adults live here because they like the proximity to downtown and campus. The steep grade northwest of Giles Road and on-street parking make this neighborhood somewhat challenging for recreational cyclists, but many people commute via bike and on foot, and many children walk to Harding Avenue Elementary.

- **Miller/Southside**

This neighborhood has many beautiful homes with large trees, contains the first mile of the Huckleberry Trail, and is close to the public library. Because it is close to campus and downtown, Draper Road was used as a cut-through until speed bumps were installed. Cyclists often go through this neighborhood to avoid Main Street. Margaret Beeks Elementary is within easy walking distance.

- **Hethwood/Prices Fork**

This is a planned residential development of single family homes and a large apartment complex for students. Kipps Elementary and Blacksburg High School are in this neighborhood, and Blacksburg Middle School will return here once the new high school is built, but most public school students do not walk or bike. Heather Drive has a large number of student drivers, and consequently a higher than usual incidence of accidents. Hethwood has a good network of pedestrian trails, including a path to Plantation Road and campus, but Prices Fork Road is a hazardous place to ride.

A continuation of other neighborhood streets may be found in Appendix I.

## **D. Current Bicycle Facilities**

### **1. On Road Facilities**

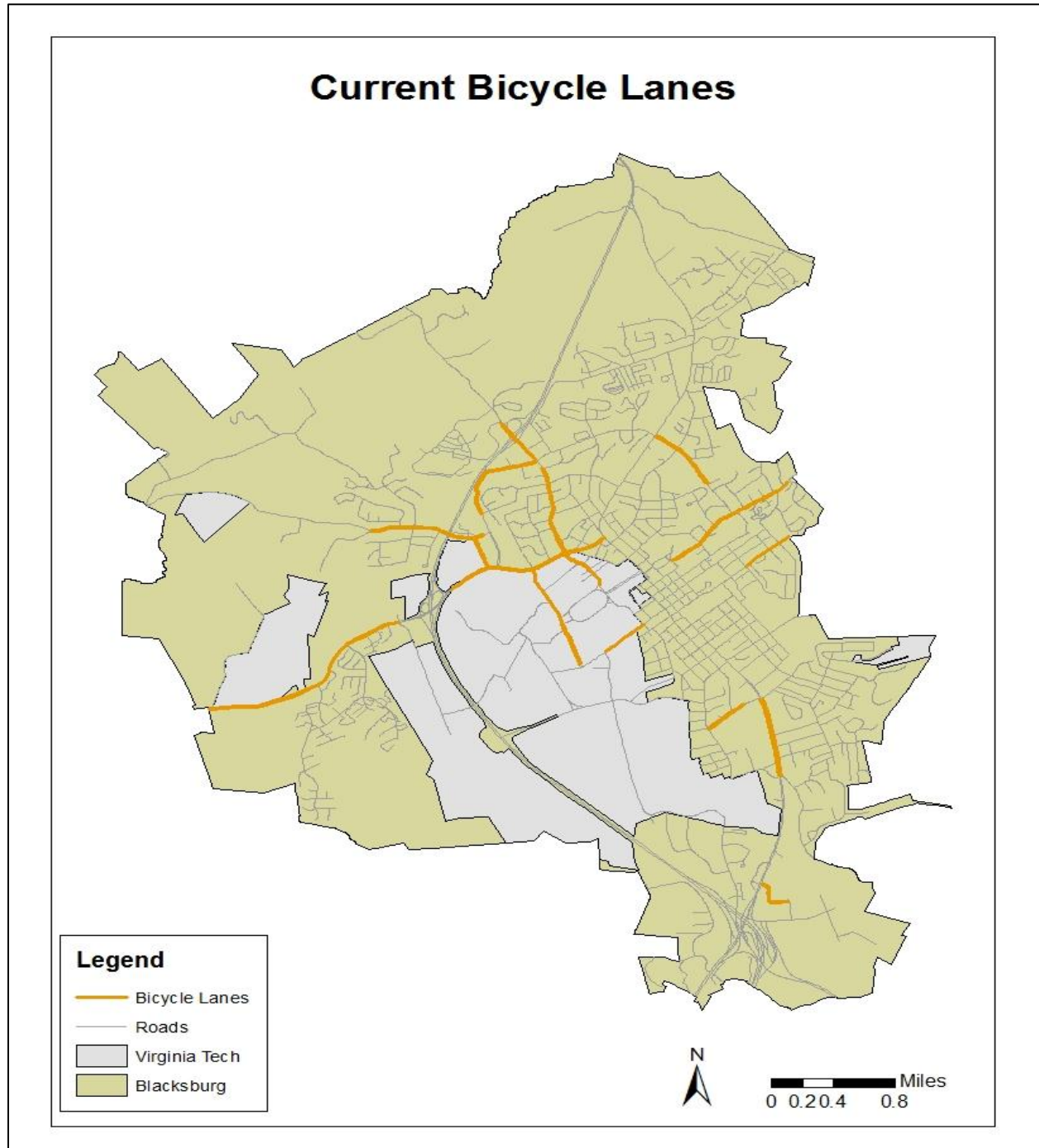
Bike lanes are the only type of on road bicycle facility that currently exists in Blacksburg. The following map displays the location of these bike lanes, which exist on town roads and Virginia Tech campus roads. There are currently a total of approximately 17 miles of bicycle lanes in Blacksburg, with over 15 miles of bike lanes on Town roads. (See Figure 1.)

### **2. Off Road Facilities**

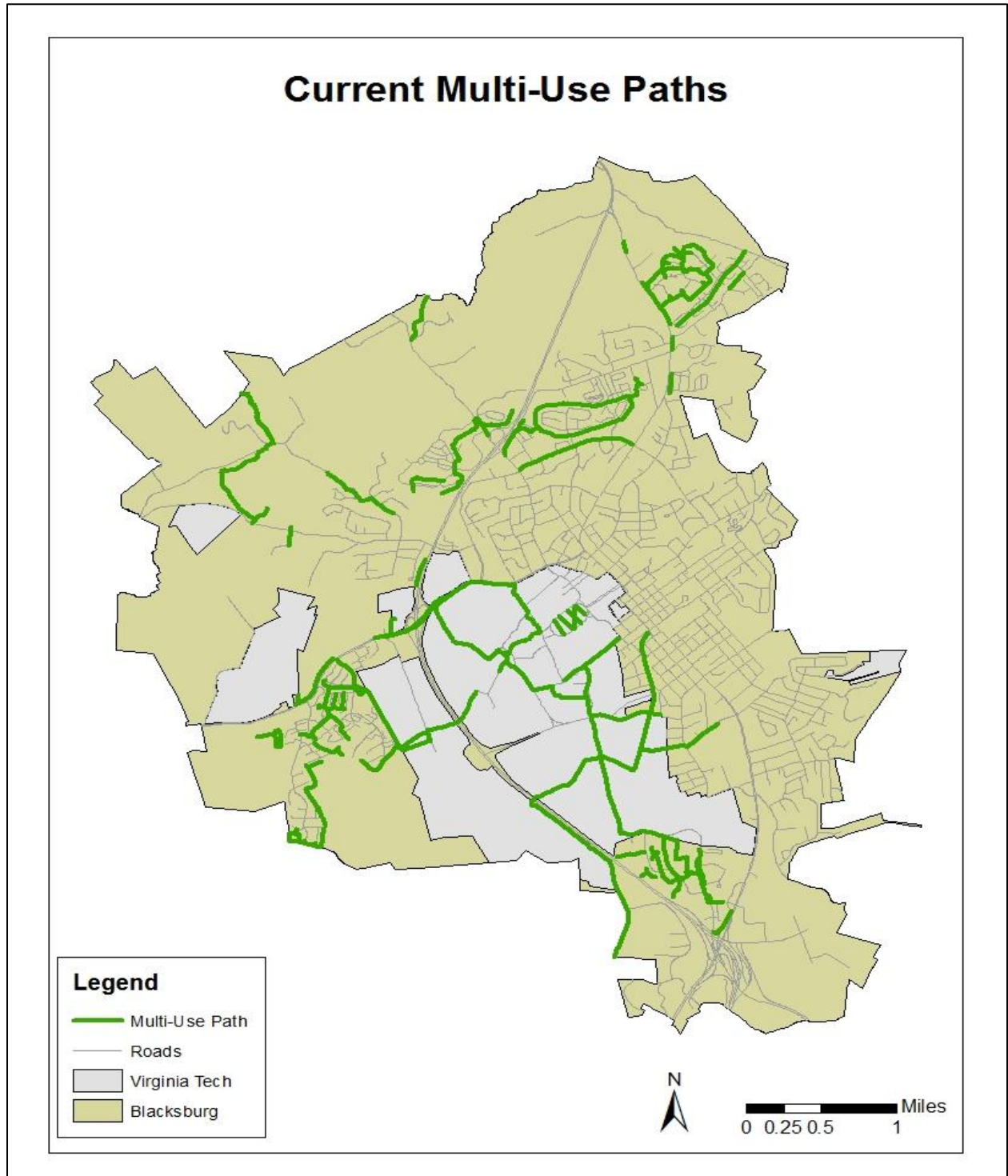
Off road bicycle facilities in Blacksburg consist of public and private multi-use paths, including the Huckleberry Trail. There are private multi-use paths in the Hethwood neighborhood, the (fill Woodbine, and Wyatt Farms. There is also an extensive network of multi-use paths on Virginia Tech's campus. The public multi-use trails are located within Heritage Community Park and Shenandoah Bike Trail and Park, along sections of Price's Fork Road and Patrick Henry Road, and the Huckleberry trail. Together these multi-use paths provide approximately 115 miles of paths for bicycle use. The next step is to improve connectivity between these off road paths so that riders of all age levels and experience will feel comfortable riding around town. (See Figure 2.)

Together, the bike lanes and multi-use paths produce a bicycle network with a lack of continuity and connections. The proposed network aims to eliminate this issue. (See Figure 3.)

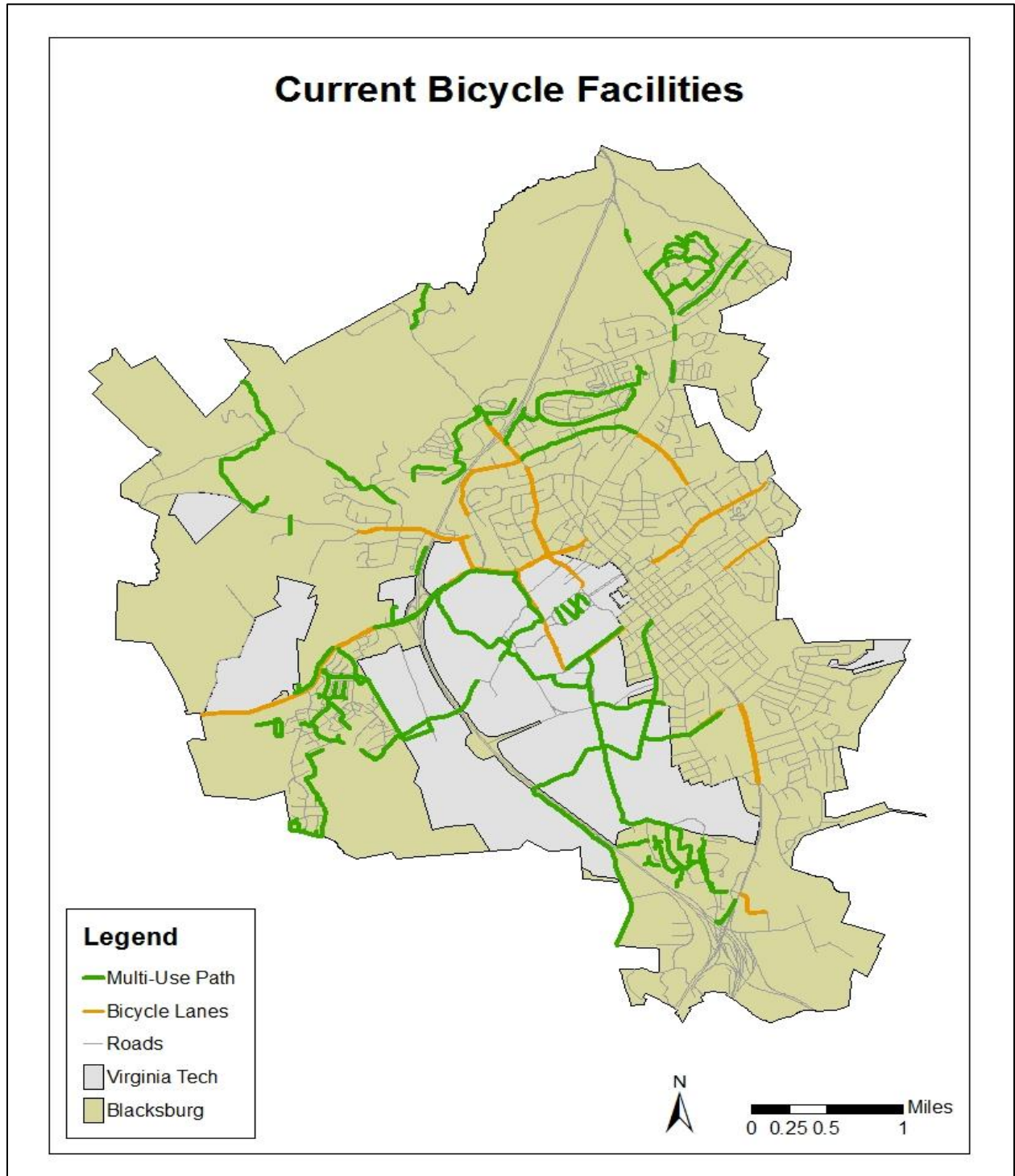




**Figure 1. On-Road Facilities**



**Figure 2. Off-Road Facilities**



**Figure 3. Current Bicycle Facilities**

## E. Barriers

Bicyclists and pedestrians face many of the problems and issues in safely and confidently biking or walking through town. The following list represents issues identified by the stakeholders during community meetings, through the Virginia Tech Center for Geospatial Information & Technology Bike Survey, from field observations, and through research. The strategies in this plan aim to mitigate or eliminate these barriers.

1. High number of accidents: Areas with high number of accidents indicate a poor design and require a heightened awareness to pass through safely.
2. Intersection Crossings: At intersections, cars making turns fail to yield the right of way. Passing through a series of traffic signals requires additional effort for the cyclist to speed up again.
3. Crossing Arterials: Riding across major roads (including making turns across) is dangerous particularly when car speeds are high enough that a large gap in traffic is required to have enough time to cross.
4. Signal Timing and Actuation: A traffic signal that does not detect bicycles requires a cyclist to either wait for a car to trip the actuator, or to treat the light as malfunctioning, which means entering the intersection against a red light.
5. Driveway connections: Driveways are dangerous due to cars pulling or backing out into the cyclist's path without looking.
6. Poor lighting: In areas with poor lighting, there are problems with bicycles being visible to other vehicles.
7. No bike facilities: A lack of bicycle lanes requires a cyclist to ride with motor vehicle traffic while keeping a safe distance from the doors of parked cars, debris and poor pavement near the edge of the road, and other obstacles. For substandard width lanes (lanes that are too narrow for a car to safely pass the bicycle), bicyclists should take the lane. A lack of bicycle racks near a destination requires the cyclist to search for a safe alternative for securing their bicycle.
8. Lack of connections or continuity of facilities: Bicycle lanes that end abruptly are confusing for both the cyclist and motor vehicle operator, particularly at intersections. Discontinuities in bicycle facilities can make it difficult for a cyclist to plan a route.
9. Poor surface conditions: Potholes, uneven pavement, patchwork repairs, loose gravel and debris can easily cause a crash, or damage the bicycle wheels or tires.
10. Faded or non-compliant markings: Lane markings that are missing or incorrect can be confusing and can lead to dangerous interactions. In many situations, non-compliant markings can be more dangerous than no markings at all. Faded markings can also indicate areas where cars usually drive in the bicycle lane.

11. Edge drops: Abrupt changes in pavement in the direction of the bicycle's movement, particularly where asphalt of the road meets a cement gutter or drops to the ditch, can easily cause a crash.
12. Sidewalk discontinues: For cyclists who are more comfortable riding on a sidewalk, or for children who are not experienced enough to ride in the road, when a sidewalk ends they must continue on the road with car traffic.
13. On-street parking: Cars parked next to the roadway require a cyclist to ride far enough away from them to avoid running into a door if one is opened suddenly. Riding too close to the cars and suddenly swerving to miss an opening door can be dangerous if a car is overtaking.
14. Sharp Turns: Sharp turns can be difficult to navigate at speed, particularly if there is debris in the turn. Sharp turns with limited sight distance can also be dangerous.
15. Vehicular Speed: Large differences in speed between the bicycle and motor vehicle traffic can be dangerous, particularly where most motor vehicles are speeding.
16. Steep grades: Climbing a steep grade requires much more energy than riding on a level road and leads to a larger mismatch in speed with car traffic. Many cyclists will choose a considerably longer but more level path to go around a steep climb. Descending a steep grade can be dangerous, particularly if there is debris, turns, or intersections. Bike lanes provide important space on uphill grades. Sharrows can be appropriate for downhill grades if lane widths are restricted.
17. Traffic Volume: When there is a high volume of auto traffic, drivers can be impatient or not looking for bicycles. Maneuvering to make turns, for example, crossing lanes to make a left turn from a bike lane in traffic, requires considerable skill and caution.
18. No shoulders: Roads with no shoulders require the cyclist to travel in the traffic lane, which requires considerable caution when there is a high traffic volume; cars are speeding, or both.
19. Long crosswalk distances: Pedestrians crossing wide streets with multiple lanes have a difficult time getting across safely if there is considerable traffic.
20. Debris in road: Loose debris in the road can cause a cyclist to suddenly lose balance, or to swerve into passing car traffic to avoid the debris. Debris near the edge of the road is especially a problem in the wintertime after the roads have been treated for snow.
21. Cul-de-sacs: Planning a route through areas with many cul-de-sacs can be difficult, particularly if there are a limited number of through-routes that carry most of the traffic.

**V. Sidewalk Existing Conditions**



## VI. Bicycle Facilities

### A. On Road

The following facility descriptions represent the facilities proposed in the first submission of the Town of Blacksburg Bicycle and Pedestrian Master Plan. A full list and associated descriptions of bicycle facilities can be found in Appendix II.

#### Bicycle Lanes

Bike Lanes comprise a portion of a roadway which has been designated by striping, signage, and pavement markings for the preferential or exclusive use of bicyclists.

#### Conventional Bike Lanes



Photo credit: complete Streets/flickr

#### Description

Conventional bike lanes are located adjacent to motor vehicle travel lanes and flows in the same direction as motor vehicle traffic. Bike lanes are typically on the right side of the street, between the adjacent travel lane and curb, road edge, or parking lane

#### Benefits (NACTO, 2011)

- Increases bicyclist comfort/confidence on busy streets
- Creates separation between bicyclists and autos
- Increases predictability of cyclist and motorist positioning
- Increases total capacity for streets carrying mixed mode traffic

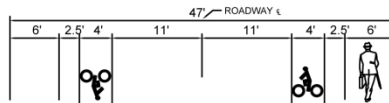
#### Typical Applications (NACTO, 2011)

- Bike lanes are most helpful on streets with  $\geq 3,000$  motor vehicle average daily traffic.
- Bike lanes are most helpful on streets with a posted speed  $\geq 25$  mph. On roads with  $\geq 35$  mph speed limits, consider buffered bike lanes or cycle tracks to provide greater separation between bicycles and vehicles
- On streets with high transit vehicle volume.

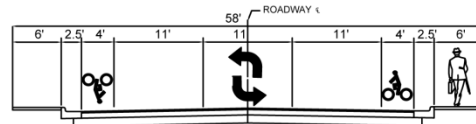
## Guidance and Concerns

Bicycle lanes must provide 4' of usable space for cyclists. Minimum width and symbol/signage guidance must be followed. Refer to accepted publications such as MUTCD or NACTO Design Guide for required specifications. Intersections require special consideration to limit potential conflict between drivers of motor vehicles, bicyclists, and pedestrians.

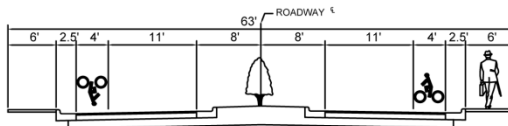
## Typical Sections:



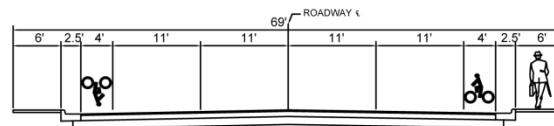
TYPICAL SECTION C  
TWO LANE ROAD WITH BIKE LANE, CURB & GUTTER, AND SIDEWALK



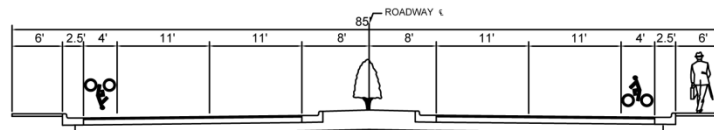
TYPICAL SECTION E  
THREE LANE SECTION WITH SCRAMBLE LANE, BIKE LANES, CURB & GUTTER, AND SIDEWALK



TYPICAL SECTION F  
TWO LANE DIVIDED SECTION WITH BIKE LANES, CURB & GUTTER, AND SIDEWALK



TYPICAL SECTION H  
FOUR LANE SECTION WITH BIKE LANES AND SIDEWALK



TYPICAL SECTION I  
FOUR LANE DIVIDED SECTION WITH BIKE LANES, CURB & GUTTER, AND SIDEWALK



## Contra-Flow Bike Lane



Photo credit (l-r): Dylan Passmore/flickr, gregraisman/flickr, Dan Burden/PBIC Image Library

### Description

Contra-flow bike lanes are designed to allow bicyclists to ride in the opposite direction of motor vehicle traffic.

### Benefits (NACTO, 2011)

- Provides connectivity to cyclists travelling in both direction and decreases trip distance
- Reduces dangerous wrong-way riding and sidewalk riding
- Influences Motorists choice of route without limiting bicycle traffic
- Allows cyclists to use low-traffic streets

### Typical Applications (NACTO, 2011)

- On one-way streets where bicyclists are already riding wrong way or on the sidewalk
- On corridors where alternate routes require excessive out-of-direction travel
- On corridors where alternative routes include streets with high traffic volumes or no bicycle facilities
- Where two-way bicycle facility connections are needed along one way streets
- On low-speed, low-volume roads to minimize risk of interactions between cyclists and turning motor vehicles

### Guidance and Concerns

Cross-street intersection treatments may need to be considered to reduce dangerous conflicts between users when motorists do not anticipate contra-flow bicyclists. (e.g., No right turn on red, or similar). Bicycle lanes or combination of contra-flow lane and shared road markings should be used to prevent wrong way riding in the contra-flow lane. Small traffic signs may be used for bike-only traffic. Specific signage is required on these routes and planners should refer to NACTO Urban Bikeway Design Guide and MUTCD.

## Left Side Bike Lane

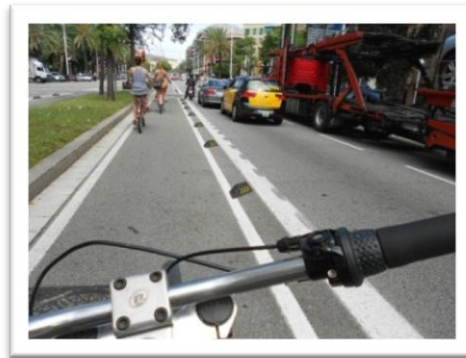


Photo credit (l-r): Bikes On Transit/flickr, Jmarks09/flickr

### Description

Left-side bike lanes are placed on the left side of one-way streets or two-way median divided streets. They offer advantages along streets with heavy delivery or transit use, frequent parking turnover on the right side, or other potential conflicts that could be associated with right-side bicycle lanes.

### Benefits (NACTO, 2011)

- Avoids potential right-side bike lane conflicts on streets
- Improves cyclist visibility to motorists (driver's side)
- In locations with rush-hour parking restriction or other flexible use, it provides a consistent facility configuration for cyclists
- Minimizes door-zone, transit, and truck conflicts (avoids parking zones, loading zones, bus stops)

### Typical Applications (NACTO, 2011)

- On one-way streets or median divided streets with transit stops or truck loading zones on the right side
- On streets with high parking turnover, rush hour parking restrictions, high volume right turn activity
- On streets with significant number of left-turning bicyclists
- On streets where traffic enters into an add lane on the right (e.g., freeway off-ramp)
- For best alignment to connect a path, two-way cycle track, or other bicycle facility

### Guidance and Concerns

Cross-street intersection treatments may need to be considered to reduce conflicts between cyclists and left-turning vehicles. This includes through-lane placement to the right of left turn lane, presence of bike boxes to align cyclists to connecting bicycle facilities, and thorough signage for cyclists and motorists.

## Cycle Tracks

A cycle track is an exclusive bike facility that combines the user experience of a separated path with the on-street infrastructure of a conventional bike lane. A cycle track is physically separated from motor traffic and distinct from the sidewalk. In situations where on-street parking is allowed cycle tracks are located to the curb-side of the parking (in contrast to bike lanes).

### One Way Cycle Tracks



Photo credit (l-r): Dylan Passmore/flickr

#### Description

On street bike paths are at street level and use a variety of methods for physical protection from passing traffic.

#### Benefits (NACTO, 2011)

- Dedicates and protects space for bicyclists in order to improve perceived comfort and safety
- Eliminates risk and fear of collisions with overtaking vehicles
- Prevents double-parking, unlike a bike lane
- Low implementation cost by making use of existing pavement and drainage and by using parking lane as a barrier
- More attractive for bicyclists of all levels and ages

#### Typical Applications (NACTO, 2011)

- Streets with parking lanes.
- Streets on which bike lanes would cause many bicyclists to feel stress because of factors such as multiple lanes, high traffic volumes, high speed traffic, high demand for double parking, and high parking turnover
- Streets for which conflicts at intersections can be effectively mitigated using parking lane setbacks, bicycle markings through the intersection, and other signalized intersection treatments

#### Guidance and Concerns

Cross-street intersection treatments may need to be considered to reduce conflicts between cyclists and left-turning vehicles. Cycle Track recommended lane width is 5' with 7' widths on uphill grades. Special consideration should be given at transit stops to manage bicycle & pedestrian interactions.

## Two-Way Cycle Tracks

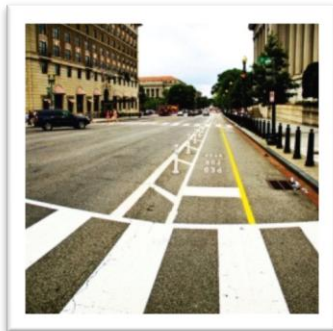


Photo credit (l-r): thisisbossi/flickr, Richard Masoner/ flickr

### Description

Two-way cycle tracks allow bicycle movement in both directions on one side of the road. This facility may require additional considerations at driveway and side-street crossings.

### Benefits (NACTO, 2011)

- Dedicates and protects space for bicyclists in order to improve perceived comfort and safety
- Eliminates risk and fear of collisions with over-taking vehicles
- Reduces dooring risk. Eliminates risk of a doored cyclist landing in motor-vehicle travel lane.
- Provides contra-flow travel option on one-way streets
- More attractive for bicyclists of all levels and ages
- Low implementation cost when making use of existing pavement and drainage and using parking lane or other barrier for protection from traffic.
- On one-way streets where contra-flow bicycle travel is desired
- On streets where more destinations are on one side thereby reducing the need to cross the street
- On streets with extra right-of-way on one side
- To connect with another bicycle facility, such as a second cycle track on one side of the street.
- Along streets on which bike lanes would cause many bicyclists to feel stress because of factors such as multiple lanes, high traffic volumes, high speed traffic, high incidence of double parking, and high parking turnover.
- On streets for which conflicts at intersections can be effectively mitigated using parking lane setbacks, bicycle markings through the intersection, and other signalized intersection treatments
- Along streets with high bicycle volumes, motor vehicle volumes or speeds.

### Typical Applications (NACTO, 2011)

- On streets with few conflicts such as driveways or cross-streets on one side of the street
- On streets where there is not enough room for a one-way cycle track on both sides of the street

### Guidance and Concerns

Minimum width constraint is 8' feet, with a preferred 12' width. Specific signage and markings are required for this treatment; refer to AASHTO, 2010 or NACTO, 2011 for guidance. Intersection and parking design needs to be carefully integrated to avoid cyclist/motorist conflict. Special consideration should be given at transit stops to manage bicycle & pedestrian interactions.

## Bicycle Boulevard



Photo credit (l-r): scrunchieface/flickr, Steven Vance/ flickr

### Description

A street segment, or series of contiguous street segments, that has been modified to accommodate through bicycle traffic but discourage through motor traffic. "Bicycle boulevards are low-volume and low-speed streets that have been optimized for bicycle travel through treatments such as traffic calming and traffic reduction, signage and pavement markings, and intersection crossing treatments." (PSU, 2009)

### Benefits (PSU, 2009)

- Creates dedicated routes prioritized for bicycle use
- Provides convenient access to desired destinations with comfortable/safe intersections
- Reduces motor vehicle traffic on included roadway segments
- Encourages bicyclists to use the bikeway, rather than sidewalks.

### Typical Applications (PSU, 2009)

- Roads with speeds at or less than 25 mph
- Roads with average daily vehicle traffic of <1500 (preferred) – 3000

### Guidance and Concerns:

Due to the need to coordinate multiple road segments, intersections, and origins/destinations, these routes should be selected to create direct, convenient connections for cyclists. (PSU, 2009).

Intersections must be designed to reduce bicycle stop/starts and potential conflicts with motor vehicles. Education and outreach efforts within both the community and residential areas along proposed boulevards are essential for project success. Typical concerns encountered include access to property, impact on traffic patterns, enforcement issues with mopeds/motorcycles, and impacts to emergency response routes (PSU, 2009).

## B. Off Road

### Bike Paths and Shared Use Paths



Photo credit (l-r, from top): anabananasplit/flickr, Stephen Rees/flickr, westfieldwanderer/flickr

#### Description

A bike path is a path exclusively used by bicyclists, where a separate, parallel path is provided for pedestrians and other wheeled users.

“Shared use paths should be thought of as a system of off-road transportation routes for bicyclists and other users that extends and complements the roadway network. Shared use paths should not be used to preclude on-road bicycle facilities, but rather to supplement a network of on-road bike lanes, shared roadways, bike boulevards, and paved shoulders. Shared use path design is similar to roadway design, but on a smaller scale and with typically lower design speeds.”

#### Benefits

- Provides facilities for cyclists & other non-motorists with complete separation from motor vehicles
- Can increase connectivity in areas where roadways exclude bicycles (eg: interstate highways and other limited use facilities)
- Can provide direct routes between destinations, exclusive of existing roadway infrastructure

#### Typical Applications

- Along right of ways (e.g., “rails to trails” or “rails with trails”)
- When an opportunity for more direct connectivity between destinations can be provided through bicycle or shared use path (reduced travel distance).

#### Guidance and Concerns

Width, clearance, grade, visibility, travel speeds, and user volumes/transportation modes must be considered in facility design. Refer to AASHTO, 2010 for guidance. *Bicycle and shared use paths are not to be developed to preclude on-road bicycle facilities.*



## C. Intersection Treatments

### Through Bike Lanes

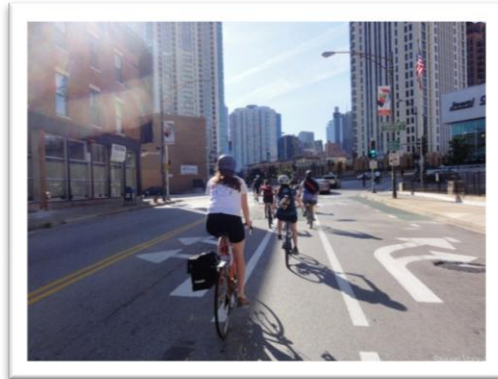


Photo credit: Steven Vance /flickr

#### Description

Enables bicyclists to correctly position themselves to the left of right turn lanes or to the right of left turn lanes.

#### Benefits (NACTO, 2011)

- Enables bicyclists to correctly position themselves to the left of right turn lanes or to the right of left turn lanes.
- Reduces conflicts between turning motorists and bicycle through traffic.
- Provides bicyclists with guidance to follow the preferred travel path.
- Leads to more predictable bicyclist and motorist travel movements.
- Alerts motorists to expect and yield to merging bicycle traffic.
- Signifies an appropriate location for motorists to safely merge across the bike lane into the turn lane.

#### Typical Applications (NACTO, 2011)

- On streets with right-side bike lanes and right-turn only lanes at intersections.
- On streets with left-side bike lanes and left-turn only lanes at intersections.
- On streets with bike lanes and where the right or left travel lane terminates in a turn lane.
- On streets with bike lanes and a parking lane that transition into a turn lane at intersections.

## Combined Bike Lane / Turn Lane



Photo credit: Richard Drdul /flickr

### Description

Places a suggested bike lane within the inside portion of a dedicated motor vehicle turn lane

### Benefits (NACTO, 2011)

- Preserves positive guidance for bicyclists in a situation where the bicycle lane would otherwise be dropped prior to an intersection.
- Maintains bicyclist comfort and priority in the absence of a dedicated bicycle through lane.
- Guides bicyclists to ride in part of the turning lane, which tends to have lower speed traffic than the adjacent through lane, allowing higher speed through traffic to pass unimpeded.
- Encourages motorists to yield to bicyclists when crossing into the narrow right-turn lane.
- Reduces motor vehicle speed within the right turn lane and reduces risk of 'right hook' collisions at intersections.

### Typical Applications (NACTO, 2011)

- On streets where there is a right turn lane but not enough space to maintain a standard-width bicycle lane at the intersection.
- On streets where there is no dedicated right turn lane, but on which high volumes of right turning traffic may cause conflicts between motorists and bicyclists.

### Guidance and Concerns:

May not be appropriate at intersections with very high peak automobile right turn demand. Very specific bicycle pavement markings and signage may be required to enact this design. Please refer to NACTO, 2011 for case-by-case design guidance and MUTCD for regulations on signage and markings.



## Bike Boxes



Photo credit (l-r): sfbike/flickr, Yoav Lerman/flickr, James D. Schwartz/flickr

### Description

A designated area at the head of a traffic lane at a signalized intersection that provides bicyclists with a safe and visible way to get ahead of queuing traffic during the red signal phase.

### Benefits (NACTO, 2011)

- Increases bicyclist visibility to other roadway users
- Full intersection bike boxes facilitate appropriate lane positions (eg: left turn) at intersections during red signal indications
- Facilitates transition from differently positioned bicycle facilities during red signal indication
- Helps prevent 'right hook' conflicts with turning vehicles at the start of green signal indication
- Provides priority for bicycles at signalized crossings
- Groups cyclists together to clear an intersection quickly
- Cyclists breathe less exhaust while queued at signal
- Contributes to perception of safety and reduces vehicle encroachment into crosswalks

### Typical Applications (NACTO, 2011)

- At signalized intersections with high volumes of bicycles and/or motor vehicles, especially those with frequent bicyclist left-turns and/or motorist right-turns.
- Where there may be right or left-turning conflicts between bicyclists and motorists
- Where there is a desire to better accommodate left turning bicycle traffic
- Where a left turn is required to follow a designated bike route, access a shared-use path, or when the bicycle lane moves to the left side of the street
- When the dominant motor vehicle traffic flows right and bicycle traffic continues through (such as a Y intersection or access ramp).

### Guidance and Concerns:

A box formed by transverse lines shall be used to hold queuing bicyclists, typically 10-16 feet deep. A "no-right turn on red" sign must be used. Specific markings and signage are required; refer to NACTO, 2011 or MUTCD for guidance.

## Two-Stage Turn Queue Boxes

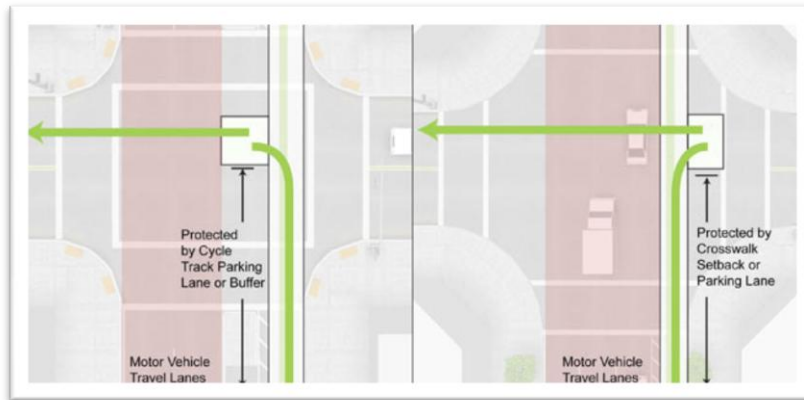


Image credit (l-r): NACTO Bikeway Design Guide

### Description

A type of bike box used to make left turns at multi-lane signalized intersections from a right side cycle track or bike lane, or right turns from a left side cycle track or bike lane. Two-Stage Turn Queue Boxes facilitate the cyclist's movement from a bicycle facility to a visible position in traffic.

### Benefits (NACTO, 2011)

- Improves bicyclist ability to safely and comfortably make left turns
- Provides a formal queuing space for bicyclists making a two-stage turn
- Reduces turning conflicts between bicyclists and motor vehicles
- Prevents conflicts arising from bicyclists queuing in a bike lane or crosswalk

### Typical Applications (NACTO, 2011)

- At signalized intersections
- Along multi-lane roadways or those with high traffic speeds/volumes
- Where a significant number of bicyclists turn left from a right side facility
- To assist bicyclists in navigating safely across streetcar tracks

## D. Signals

### Bicycle Signal Heads



Photo credit: waltarrrr/flickr, Paul Kruger/ flickr

#### Description

Electronically powered traffic control device that should only be used in combination with an existing conventional or hybrid signal. (Bike traffic lights)

#### Benefits (NACTO, 2011)

- Separates bicycle movements from conflicting motor vehicle, streetcar, light rail, or pedestrian movements.
- Provides priority to bicycle movements at an intersection (e.g., a leading bicycle interval).
- Allows for accommodation of bicycle-only movements within signalized intersections (e.g., providing a phase for a contra-flow bike lane that otherwise would not have a phase), though bicycle signals may also occur simultaneously with auto movement if combined with right turn on red restrictions.
- Protects bicyclists in the intersection, which may improve real and perceived safety at high-conflict areas.
- Improves operation and provides appropriate information for bicyclists (as compared to pedestrian signals).
- Helps to simplify bicycle movements through complex intersections and potentially improve

#### Typical Applications (NACTO, 2011)

- Where a stand-alone bike path or multi-use path crosses a street, especially where the needed bicycle clearance time differs substantially from the needed pedestrian clearance time.
- To split signal phases at intersections where a predominant bicycle movement conflicts with a main motor vehicle movement during the same green phase.
- At intersections where a bicycle facility transitions from a cycle track to a bicycle lane, if turning movements are significant.
- At intersections with contra-flow bicycle movements that otherwise would have no signal indication and where a normal traffic signal head may encourage wrong-way driving by motorists.
- To give bicyclists an advanced green (like a leading pedestrian interval), or to indicate an “all-bike” phase where bicyclist turning movements are high.
- To make it legal for bicyclists to enter an intersection during an all-pedestrian phase (may not be

operations or reduce conflicts for all modes.

appropriate in some cities).

- At complex intersections that may otherwise be difficult for bicyclists to navigate.
- At intersections with high numbers of bicycle and motor vehicle crashes or near schools (primary, secondary, and university).

## **Guidance and Concerns:**

If bicycle signal phase does not automatically recall each cycle, signal heads require appropriate detection and actuation device. Passive actuation is preferred over push button actuation. Clearance interval must be adequate for cyclist movement. Refer to AASHTO for guidance on calculations. Bicycle signals are preferred over signage instructing bicyclists to use pedestrian signal.

## Signal Detection and Actuation



Photo credit: DDOTDC /flickr

### Description

Signals that are actuated to alert the signal controller of bicycle crossing demand on a particular approach. Push signals, in-pavement detection loops, video detection, etc.

### Benefits (NACTO, 2011)

- Improves efficiency and reduces delay for bicycle travel.
- Increases convenience and safety of bicycling and helps establish bicycling as a legitimate mode of transportation on streets.
- Discourages red light running by bicyclists without causing excessive delay to motorists.
- Can be used to prolong the green phase to provide adequate time for bicyclists to clear the intersection.

### Typical Applications (NACTO, 2011)

- In the travel lane on intersection approaches without bike lanes where actuation is required.
- At intersections with bicycle signal heads and/or bicycle-specific phasing that are actuated.
- In bike lanes on intersection approaches that are actuated.
- In left turn lanes with actuated left-turn signals where bicyclists may also turn left.
- To increase the green signal phase on intersection approaches whose combined minimum green plus yellow plus all-red is insufficient for bicyclists to clear the intersection when starting on a green signal. Advanced bicyclist detection can be applied to extend the green phase or to call the signal.
- At clearly marked locations to designate where a bicyclist should wait.

### Guidance and Concerns:

Standard detectors must be adjusted to ensure they detect bicyclists. Bicycle signal detection must be visible to cyclists, so that they know where to position themselves to activate the signal. Any push-button system must be located such that bicyclists can push the button without dismounting. Push button systems must have signs facing the bicyclists approach to increase device visibility. Refer to MUTCD for guidance on stencil marking and signage related to signal detection.

## Active Warning Beacon at Un-signalized Intersection



### Description

User-actuated amber flashing lights that supplement warning signs at unsignalized intersections or mid-block crosswalks.

### Benefits (NACTO, 2011)

- Offers lower cost alternative to traffic signals and hybrid signals.
- Significantly increases driver yielding behavior at crossings when supplementing standard crossing warning signs and markings.
- The unique nature of the stutter flash (RRFBs) elicits a greater response from drivers than traditional methods.

### Typical Applications (NACTO, 2011)

- Usually implemented at high-volume pedestrian crossings, but may also be considered for priority bicycle route crossings.
- At locations where bike facilities cross roads at mid-block locations or at intersections where signals are not warranted or desired.
- At locations where driver compliance at bicycle crossings is low.

### Guidance and Concerns:

Must be installed on the side of the road and be unlit when not activated. Refer to MUTCD for design guidance.

## E. Signing and Marking

### Shared Lane Markings



#### Description

Shared Lane Markings (SLMs), or “sharrows,” are road markings used to indicate a shared lane environment for bicycles and automobiles. Among other benefits shared lane markings reinforce the legitimacy of bicycle traffic on the street and recommend proper bicyclist positioning. The shared lane marking is not a facility type, it is a pavement marking with a variety of uses to support a complete bikeway network. The MUTCD outlines guidance for shared lane markings in section 9C.07.

#### Benefits (NACTO, 2011)

- Helps bicyclists position themselves safely in lanes too narrow for a motor vehicle and a bicycle to comfortably travel side by side within the same traffic lane.
- Alerts motor vehicle drivers to the potential presence of bicyclists.
- Alerts road users of the lateral position bicyclists are likely to occupy within the street.
- Indicates a proper path for bicyclists through difficult or potentially hazardous situations such as railroad tracks.
- Advertises the presence of bikeway routes to all users.
- Provides a wayfinding element along bike routes.
- Increases the distance between bicyclists and parked cars, keeping bicyclists out of the “door zone.”

- Encourages safe passing by motorists.
- Requires no additional street space.
- Reduces the incidence of sidewalk riding.
- Reduces the incidence of wrong-way bicycling.

#### Typical Applications (NACTO, 2011)

- To indicate a shared lane situation where the speed differential between bicyclist and motorist travel speeds is very low
- As a reasonable alternative to a bike lane
- To strengthen connections in a bikeway network
- To clarify bicyclist movement and positioning in challenging environments

#### Guidance and Concerns:

The Shared Lane Marking in use within the United States is the bike-and-chevron “sharrow,” illustrated in MUTCD figure 9C-9. Shared Lane Markings shall not be used on shoulders, in designated bicycle lanes, or to designate bicycle detection at signalized intersections. (MUTCD 9C.07 03)

## Colored Bike Facilities



Photo credit SF.STREETSBLOG /flickr

### Description

Colored pavement within a bike lane. Commonly applied at intersections, along non-standard or enhanced facilities (cycle tracks), driveways, and other conflict areas such as places where illegal parking maybe common.

### Benefits (NACTO, 2011)

- Promotes multi-modal nature of a corridor, increases the visibility of bicyclists and discourages illegal parking in the bike lane.
- Used in conflict areas to raise motorist & cyclist awareness and help reduce conflicts between cyclists and turning motorists.
- Increases cyclist comfort with delineated space.
- Increases motorist yielding behavior.

### Typical Applications (NACTO, 2011)

- Within bike lanes or cycle tracks Across turning conflict areas, e.g., right turn lanes.
- Across intersections, particularly through wide or complex intersections where the bicycle path may be unclear.
- Across driveways and Stop or Yield-controlled cross-streets.
- Where vehicle movements frequently encroach into bicycle space, e.g., across ramp-style exits /entries, where prevailing speed of turning traffic at conflict point is low enough that motorist yielding behavior can be expected.
- Color may be applied along an entire corridor, with gaps in coloring to denote crossing areas.

### Guidance and Concerns:

The color green shall be used to minimize confusion with other standard traffic control markings. Facility designers should match coloring strategy to desired design outcomes of projects. Normal white markings must also be used. Color may be applied in a dashed pattern to indicate merge areas. Refer to NACTO, 2011, or City and County of San Francisco (2010) "Evaluation of Solid and Dashed Green Pavement for Bicycle Lanes." May not be applicable for crossings in which bicycles are expected to yield right of way, such as when the street with the bicycle route has Stop or Yield control at an intersection.



## Wayfinding Signage



Photo credit (l – r): League of Michigan Bicyclists / flickr,  
Richard Drdul / flickr

### Description

A wayfinding system that consists of comprehensive signing and/or pavement markings to guide cyclists to their destinations along preferred bike routes.

### Benefits (NACTO, 2011)

- Familiarizes users with the bicycle network and ID's the best routes for destinations
- Overcomes a “barrier to entry” for infrequent bicyclists.
- Signage that includes mileage and travel time to destinations may help minimize the tendency to overestimate the amount of time it takes to travel by bicycle.
- Visually indicates to motorists that they are driving along a bicycle route and should use caution.

- Passively markets the bicycle network by providing unique and consistent imagery throughout the jurisdiction.

### Typical Applications (NACTO, 2011)

- Along all streets and/or bicycle facility types that are part of the bicycle network.
- Along corridors with circuitous bikeway facility routes to guide bicyclists to their intended destination.

**Guidance and Concerns:** None

### Sources

Urban Bikeway Design Guide, National Association of City Transportation Officials (NACTO). April 2011. Available Online at <http://nacto.org/cities-for-cycling/design-guide/>

Guide for the Planning, Design, and Operation of Bicycle Facilities American Association of State Highway and Transportation Officials, 2010

Fundamentals of Bicycle Boulevard Planning and Design, Portland State University, 2009. Available Online at <http://www.ibpi.usp.pdx.edu/media/BicycleBoulevardGuidebook.pdf>.

## **VII. Sidewalk Facilities**

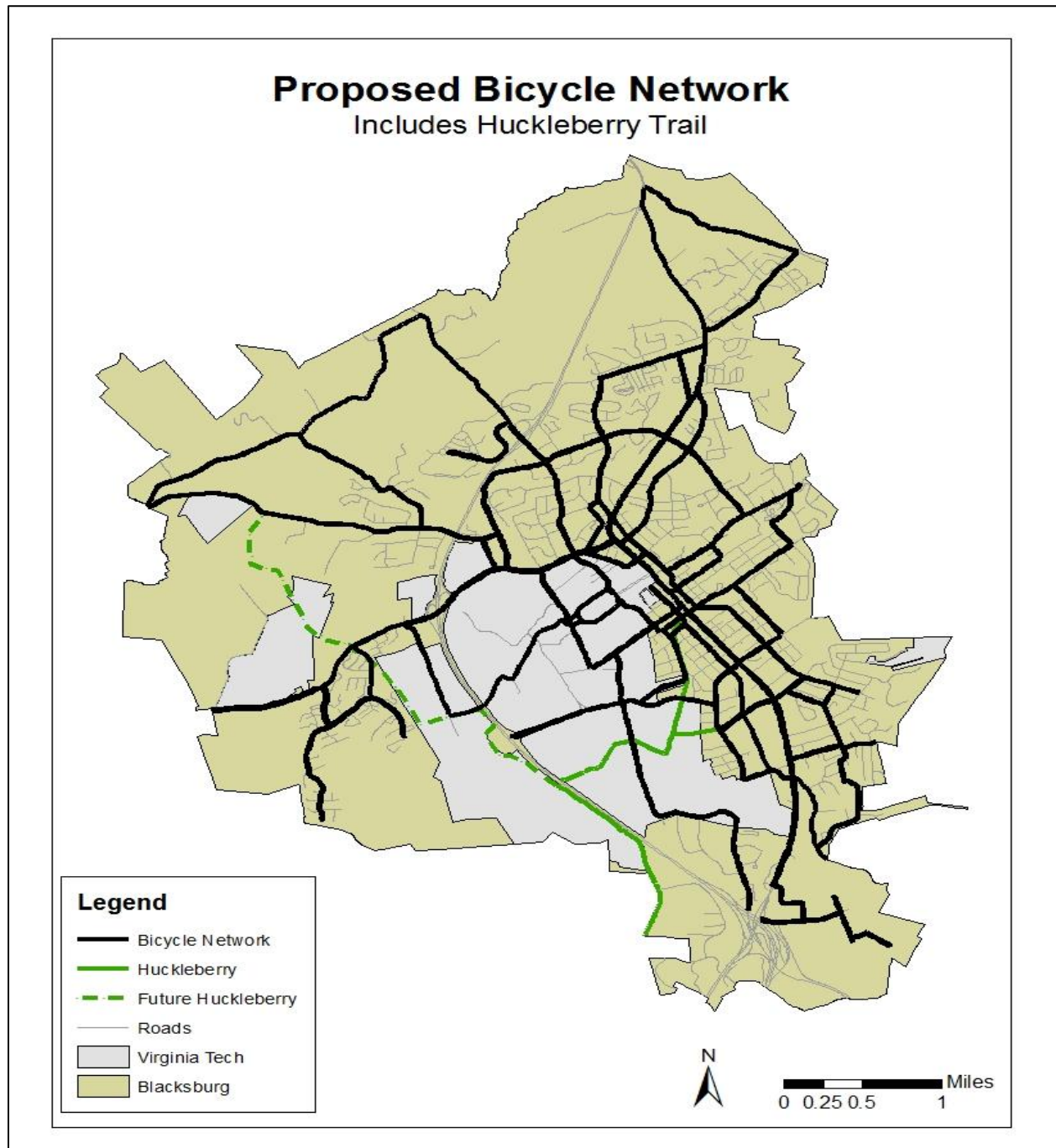
## VIII. Future Network

### A. Network Selection Process

The selection process began with an analysis of the existing conditions. Each street in town was evaluated for pavement conditions, the presence of on-street parking, bicycle continuity, roadway width, terrain, and activity generators. Refer to Table 1 in the Appendix for a summary of these findings. Based on the roadway existing characteristics, each roadway segment was analyzed for appropriateness of facilities. Appendix III provides the road characteristics and the recommended facility type based on the typical applications of the facilities described in the previous Facilities chapter. Table 2 in Appendix III provides a matrix summary of the highly recommended and recommended facilities for these roadway segments. Finally, these roadway segments and routes were assigned priorities based on ten criteria. Those criteria included: bike continuity, accident history, adjacent development project potential, affordability of proposed improvements, and proximity to schools, retail, and transit, existing facility improvement, off road opportunity, and finally high volume and speed. Those segments of road that received the highest priority ratings provide a combination of some of these elements: missing bicycle continuity, a history of prior accidents, adjacency to known future development, moderate to low cost for improvement, proximity to schools, retail and transit stops, already have an existing facility that only needs improvement, ample right of way and available green space for construction of an off road facility, and/or has a speed limit greater than 35 mph and more than 2000 vpd. Weights for each of these categories ranged from 0-3, with 3 being the highest weight. A summary matrix of the scoring for each segment is provided in Appendix III, Table 3.

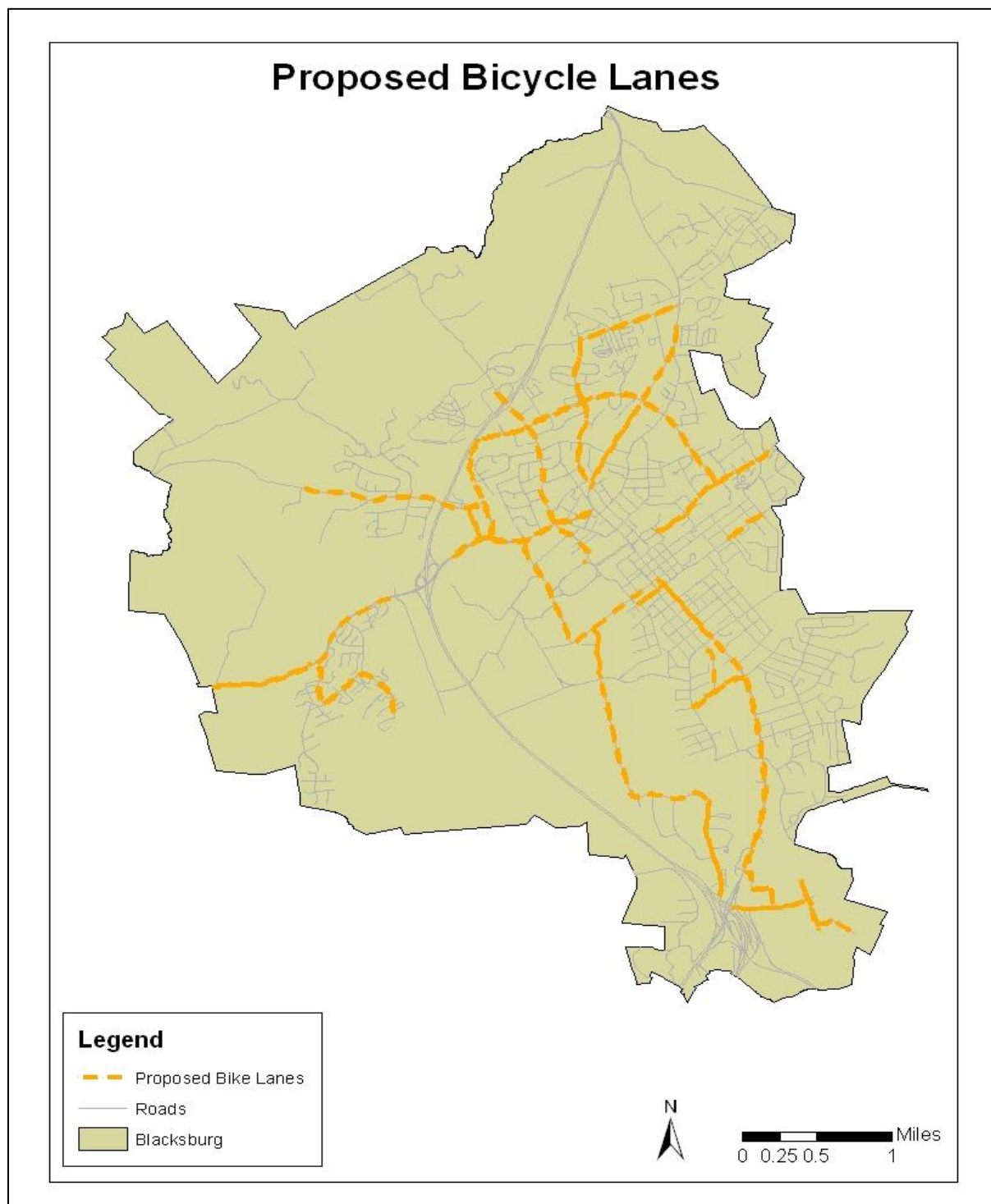
**B. Proposed Network**

**1. Proposed Bicycle Network**



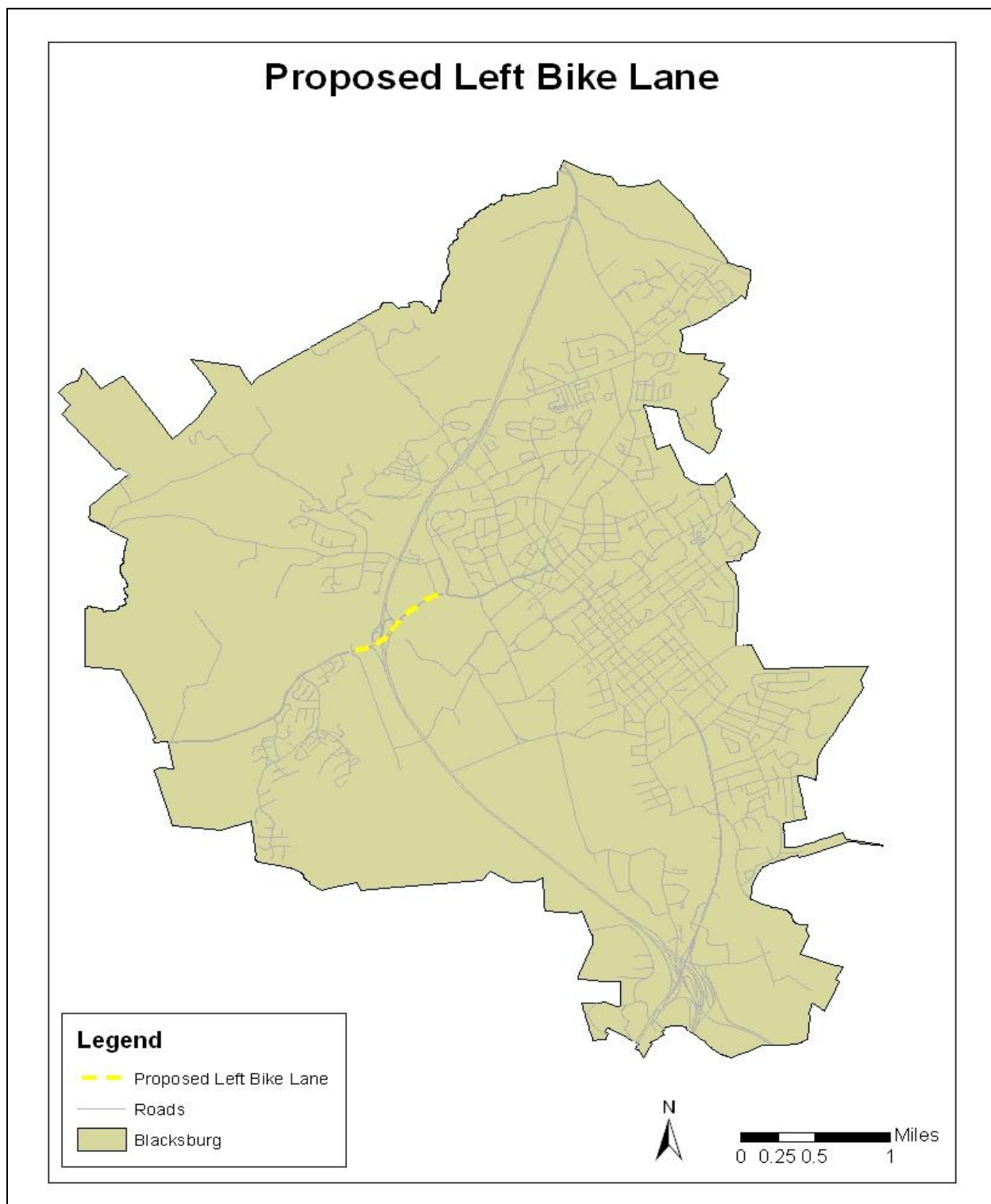
## 2. Proposed Bike Lanes

The following map displays the location of proposed bicycle lanes. The proposed bike lanes would increase the total bike lanes in town from 17 miles to nearly 44 miles.



## 3. Proposed Left Side Bike Lane

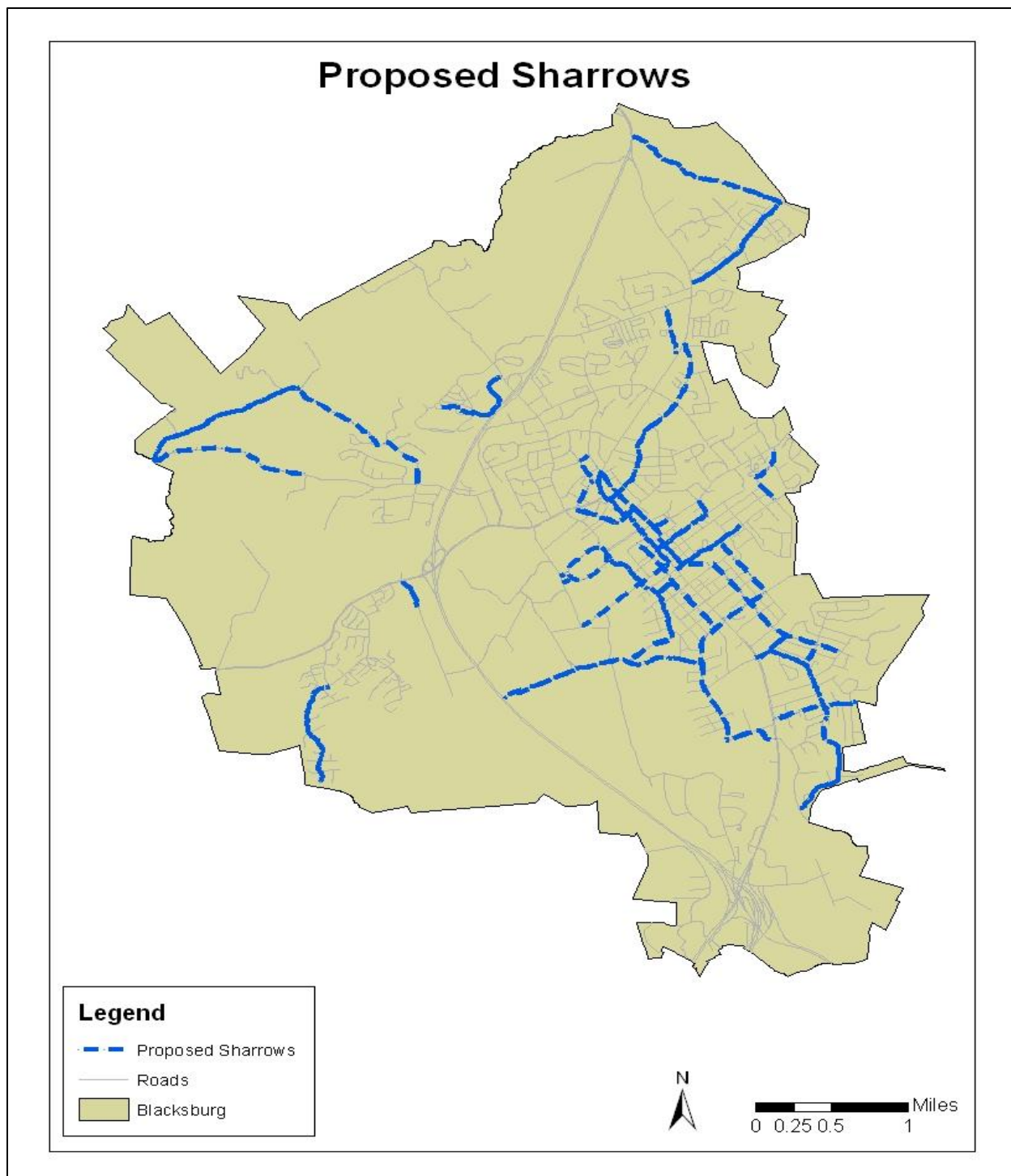
A left side bike lane offers the comfort of a normal bicycle lane on the left side of the road, when it is appropriate. This has been recommended along a section of Price's Fork Road.





## 4. Proposed Sharrows

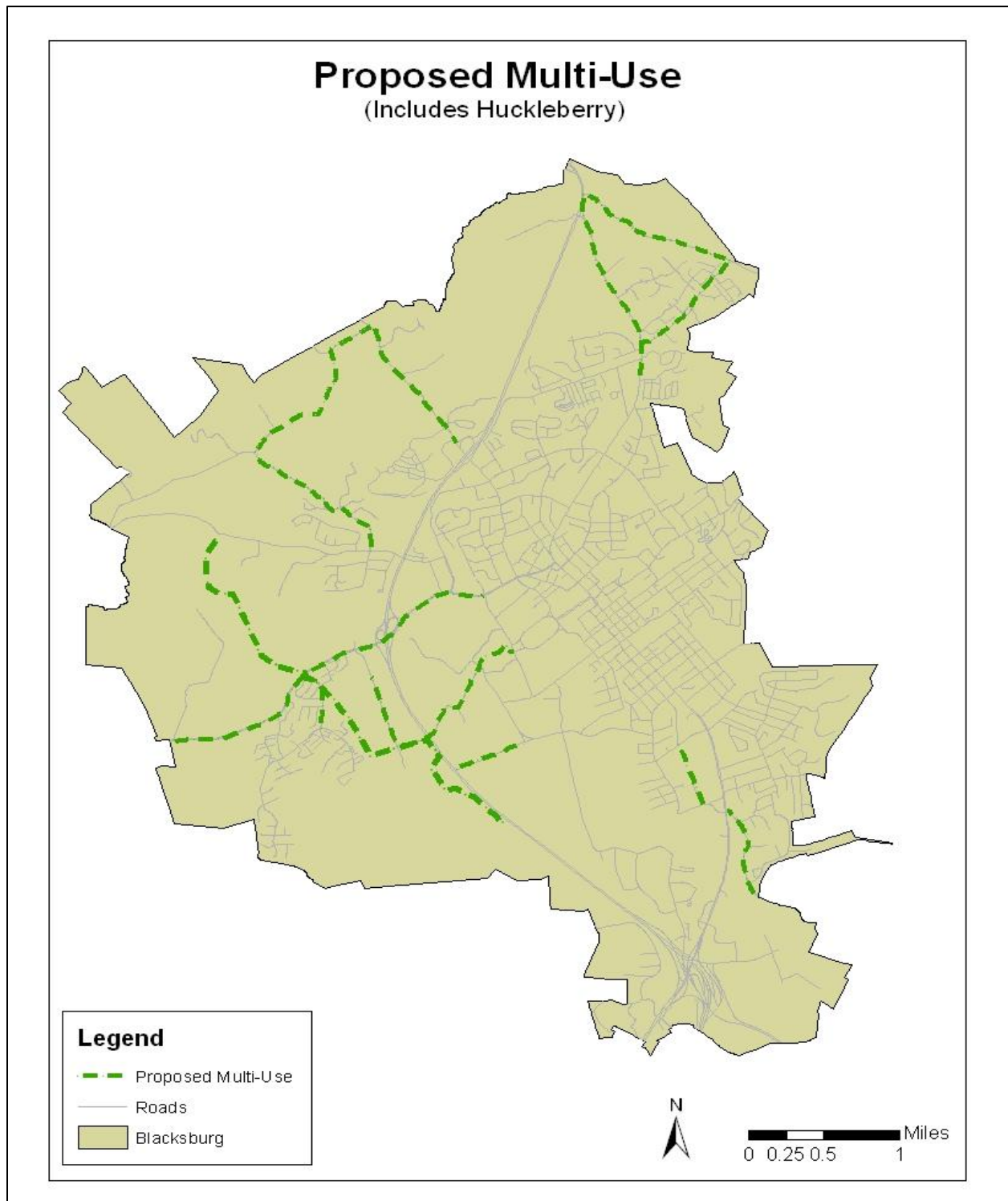
There are currently no Sharrows in the Town of Blacksburg. The proposed use of Sharrows would provide nearly 47 miles of roadway marked with Sharrows. These Sharrows are mostly utilized in the developed areas of downtown Blacksburg.





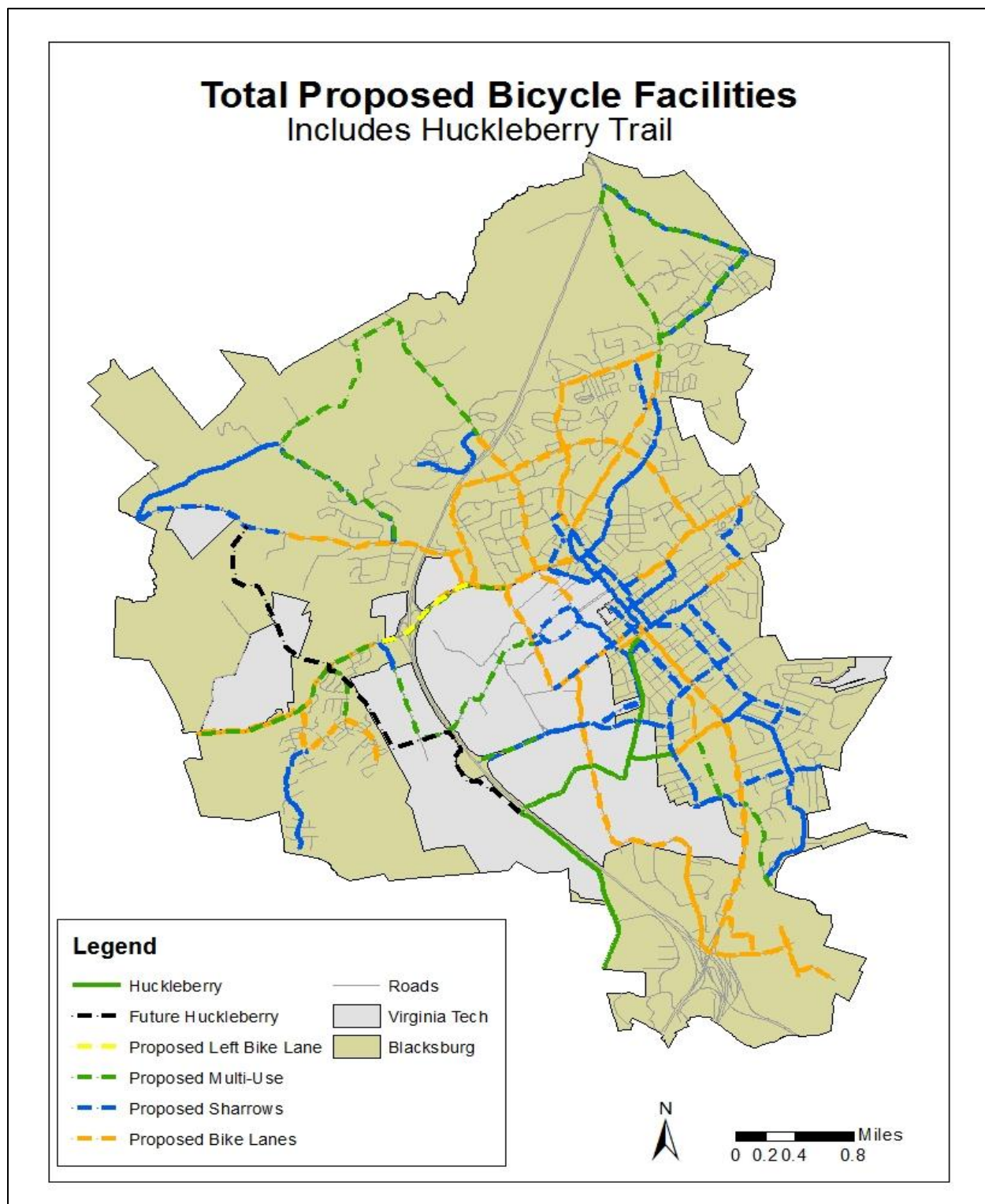
## 5. Proposed Multi-Use Path

Multi-Use paths provide safe riding conditions for bicyclists who are not comfortable riding on the road. It also provides a walking path for pedestrians. The following map shows the proposed locations of these multi-use paths along the bicycle network.



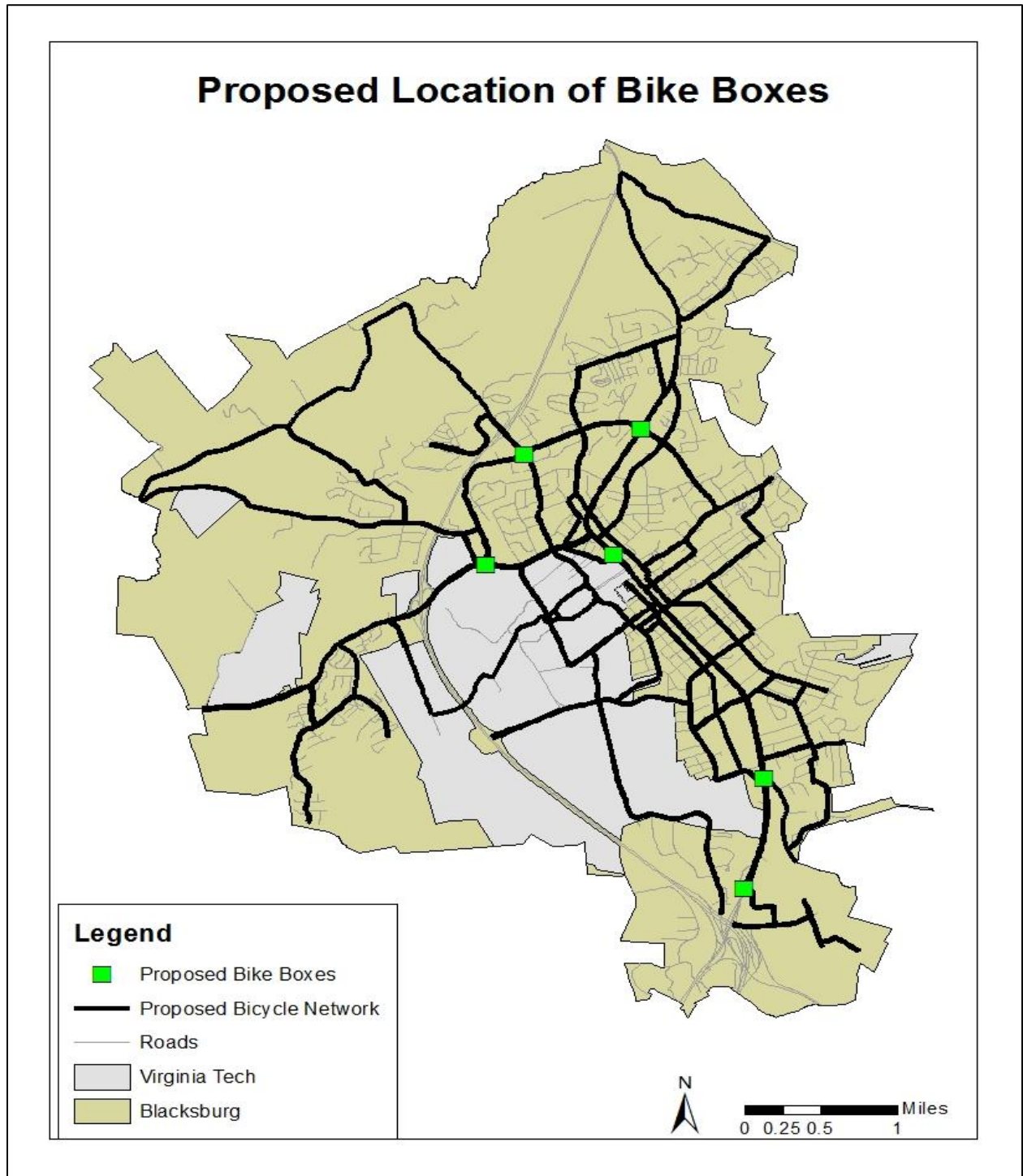
## 6. Total Proposed Bicycle Facilities

Together, these bicycle facility recommendations provide an interconnected, safe bicycle network for cyclists of all ages and riding levels to utilize as a means of transportation and recreation.



## C. Accommodation at Traffic Signal

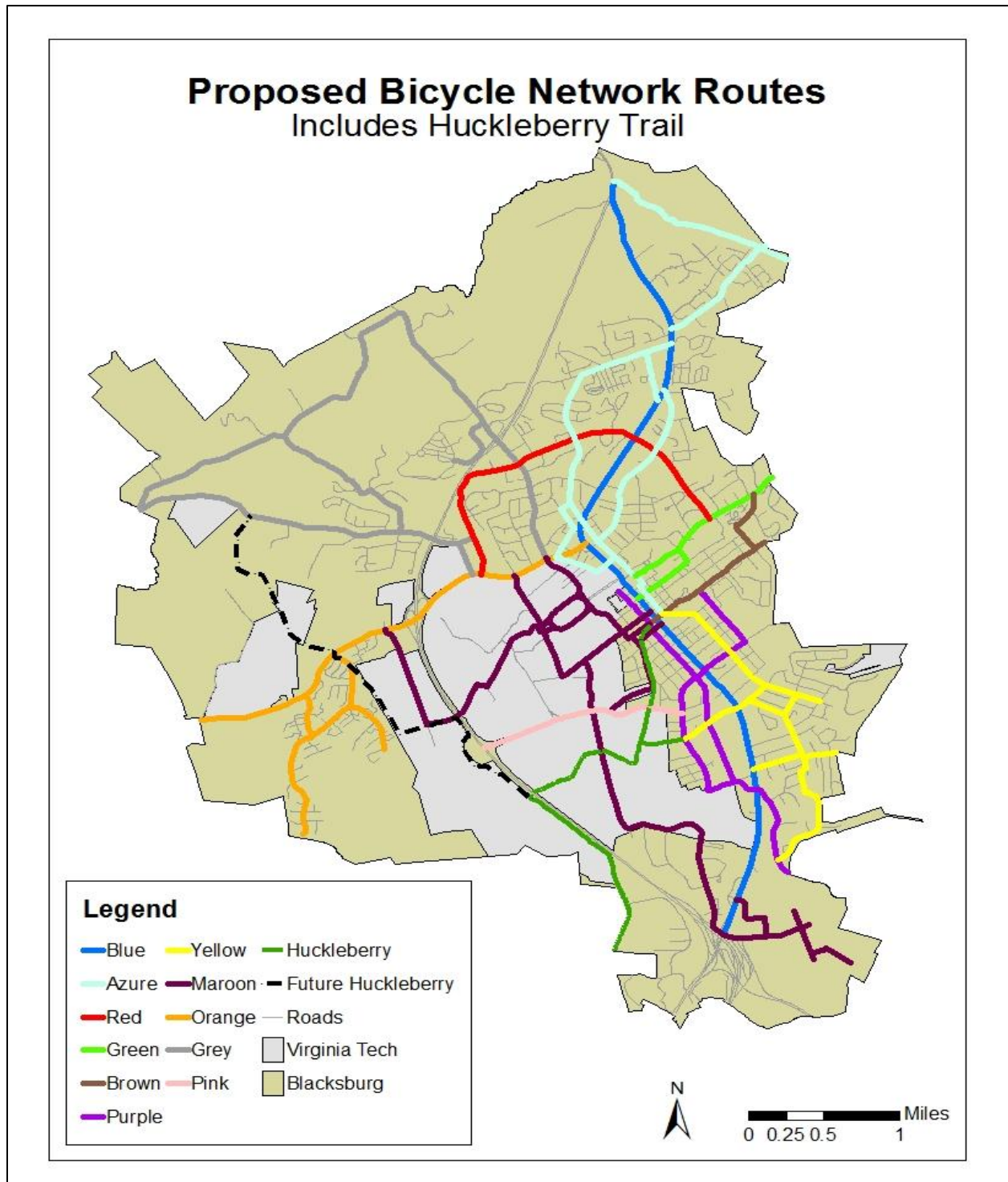
Bike Boxes increase visibility and safety of cyclists by allowing them to move to the front of traffic at stoplights. This reduces the risk of a bicyclist being unseen and hit by a car making a right turn. The following map displays the proposed location of bike boxes at important intersections in Blacksburg.





### D. Routes

In order to provide clarity and direction, the bicycle network is divided into colored routes, similar to a bus or subway system. The following map displays the routes of the network.



The following section contains a description of each route of the proposed bicycle network. A detailed, street-by-street description of the current conditions and recommended bicycle facility type can be found in Appendix III.

## 1. **Blue Line**

The Blue Line follows Main Street, which bisects the town into western and eastern halves. Main Street's characteristics change several times from its northern terminus of town at US 460 as a 2 lane undivided road, to Red Maple Drive where it transitions to a 4 lane undivided road from to Progress Street, back to a two lane road with center turn lane after the traffic circle at Prices Fork to Clay Street, to three lanes (2 lanes northbound 1 lane southbound) to Airport Road, and finally to a 4 lane divided roadway from Airport Road to the southern Town limits.

This line is a major corridor connecting people with various commercial, office, and residential uses for its duration and it's a principal destination in the center of downtown where it is lined with retail and restaurants. Montgomery Regional Hospital, Professional Park, and the Corporate Research Center are large regional employers located at the southern-most point on the Main Street. The Virginia Tech Campus is another large employer, just off of this corridor, adjacent to Downtown.

Sidewalks exist for the majority of this roadway on both sides of the road. Some of the sidewalk infrastructure is dated and curb ramps, structural cracks, and settlement should be improved through maintenance. Where sidewalk is missing, new sidewalk should be constructed on both sides of the road. Currently sidewalk infill is needed for the Northern limits of this road. The recommendation is an extension of sidewalk on the west side and an off road trail on the east side from 460 to Red Maple Drive to accommodate various users.

Bicycle lanes are the principal recommendation for the length of this corridor. Where restrictions are imposed due to road width, sharrows are recommended. In some instances road diets may accommodate bicycle lanes on this corridor. Road diets are appropriate for most any instance where is AADT less than 20,000.

## 2. **Orange Line**

The Orange Line follows Prices Fork to the western part of Town. Heather Drive, Hethwood Drive, and Tall Oaks Drive also make up the Orange Line, providing a bike route to the Hethwood, Fox Ridge, and communities in the western part of town. While road treatments are recommended for the whole route, Prices Fork demands special attention. The Huckleberry extension will cross Prices Fork and connect to Glade Road and Heritage Park. Popular recreational rides to Prices Fork, Long Shop, and McCoy will use Prices Fork.

### 3. **Red Line**

The Red Line consists of Patrick Henry and University City Boulevard. It has mostly higher density residential along the route, but also has Parks and Recreation, Food Lion shopping center, Shawnee Swim Club, and University City shopping center. The Red Line intersects with the Orange, Grey, Azure, Blue, and Green Lines providing connectivity to the eastern, northern, and western parts of town as it bypasses downtown to the north. Beginning at Prices Fork, the Red Line goes north on UCB which is four lane divided road with turn lanes, then goes to two lane undivided before it curves east. At the intersection with Toms Creek, the road turns into Patrick Henry and becomes a four lane undivided road until it turns south and intersects with Main Street. Patrick Henry turns into a two lane undivided road until it dead-ends at Harding Avenue.

### 4. **Grey Line**

The Grey Line comprises of Glade Road, Old Glade Road, Shadowlake Road, Toms Creek Road, and Meadowbrook Drive. This area is mostly residential, and makes up the Toms Creek basin. Glade Road is a popular recreational route that connects to Prices Fork outside of Town limits, and connects to other county roads that parallel Prices Fork and McCoy roads down to the New River.

### 5. **Green Line**

Roanoke Street and Harding Avenue divide the western part of town into northwestern and southwestern quadrants. Owens Street connects the two roads at the cemetery. Harding and Roanoke are the main collector streets in this section of town, which connects multi and single-family residential to downtown and the university. Harding Avenue Elementary is located on this line, and is a Safe Routes school. Recreational bicyclists going to Ellett and Catawba Valleys also heavily use Harding Avenue.

### 6. **Brown Line**

Clay Street is a future arterial for the Town and is an important connection from the County. The Brown line begins on Clay and connects to Harding Ave via Roanoke Street. The route continues on Clay to Downtown and includes Miller Street to connect this route to the Huckleberry Trail.

### 7. **Maroon Line**

The Maroon Line goes through the Virginia Tech Campus. These routes consist mostly of campus roads, but also use multi-use off road paths. The campus and town roads that make up the Maroon Line are Industrial Park Drive, Tech Center Drive, Spring Road, Washington Street, Kent Street, Drillfield Drive, Stanger Street, West Campus Drive, Duck Pond Drive, Smithfield Road, Smithfield Plantation Road, and Plantation Road. In addition to the off-road paths,

bicycles are permitted on sidewalks on campus. Coordination and cooperation between the Town and Virginia Tech is essential for a continuous bike route through campus.

## 8. **Huckleberry Trail**

The Huckleberry Trail is a Rails-to-Trails multi-use path that runs between Blacksburg and Christiansburg. Trail extensions to connect to Heritage Park on Glade Road that connect to an existing trail in the park and the Gateway Trail will make a continuous off-road path from Christiansburg to Jefferson National Forest. Another extension planned in Christiansburg will improve access and connectivity between the two towns.

## 9. **Magenta Line**

The Magenta Line uses Ellett, Hubbard, Airport, Draper, and Preston as it goes through the Miller-Southside and Airport Acres neighborhoods.

## 10. **Azure Line**

The Azure Line serves as the northern section of town, and can be an alternative to the Blue Line. It is a somewhat segmented route that starts in the northern most part of town with Bishop Lane and then Mount Tabor Road where it intersects with the Blue Line. Givens, Giles, and Progress provide alternate north/south routes paralleling N. Main and the Blue Line. This line is almost exclusively single and multi-family residential.

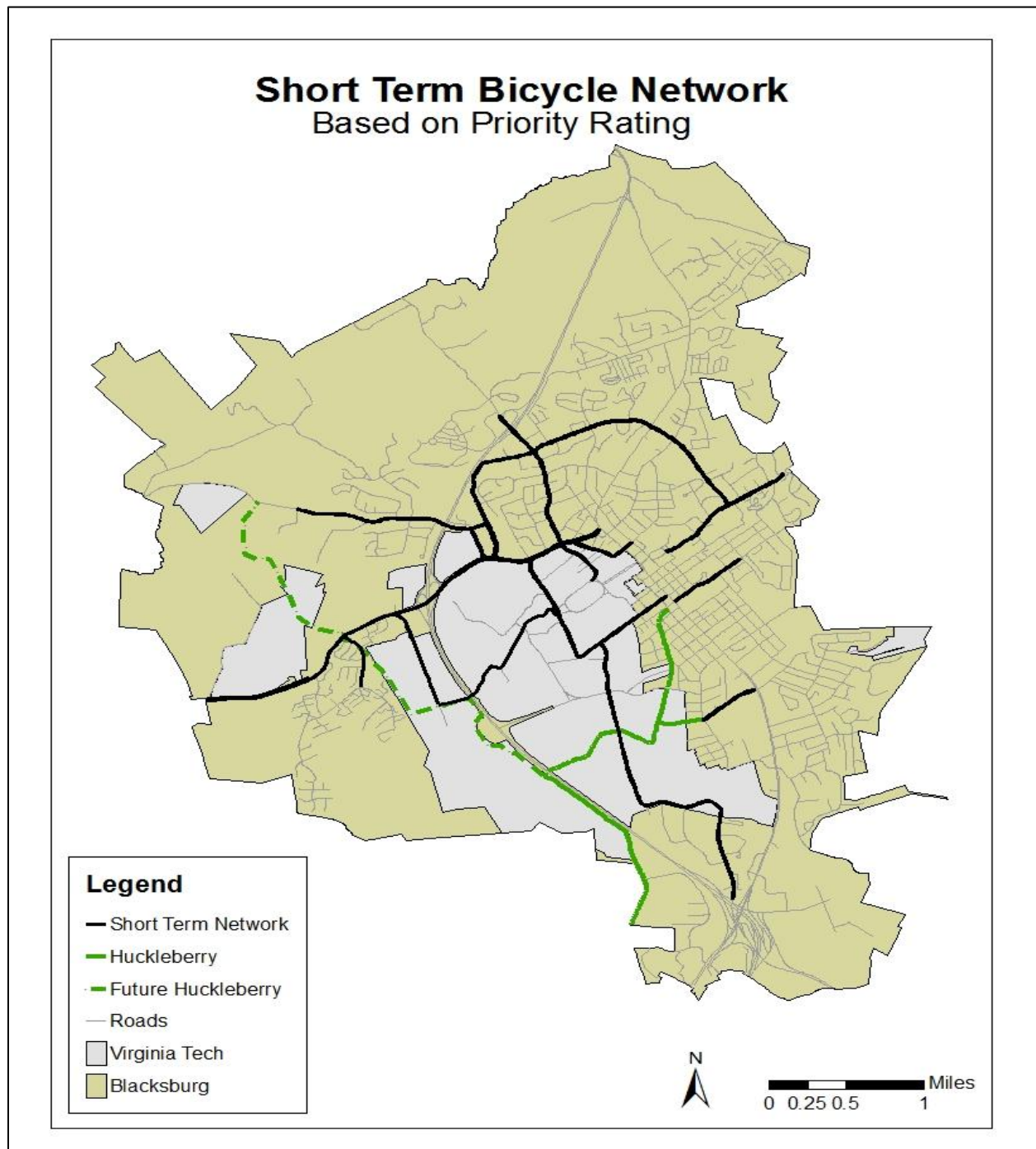
## 11. **Yellow Line**

The Yellow Line is found in the southeastern part of town. It consists of Fairfax Road, New Kent Road, Grissom Lane, Nellies Cave Road, Park Drive, Palmer Drive, and Country Club Drive. This area is predominantly single-family residential, but there is multi-family on the south end of Grissom and on New Kent and Fairfax. This line connects the residential areas to restaurants, groceries stores, retail, and various other businesses and offices along Main Street.



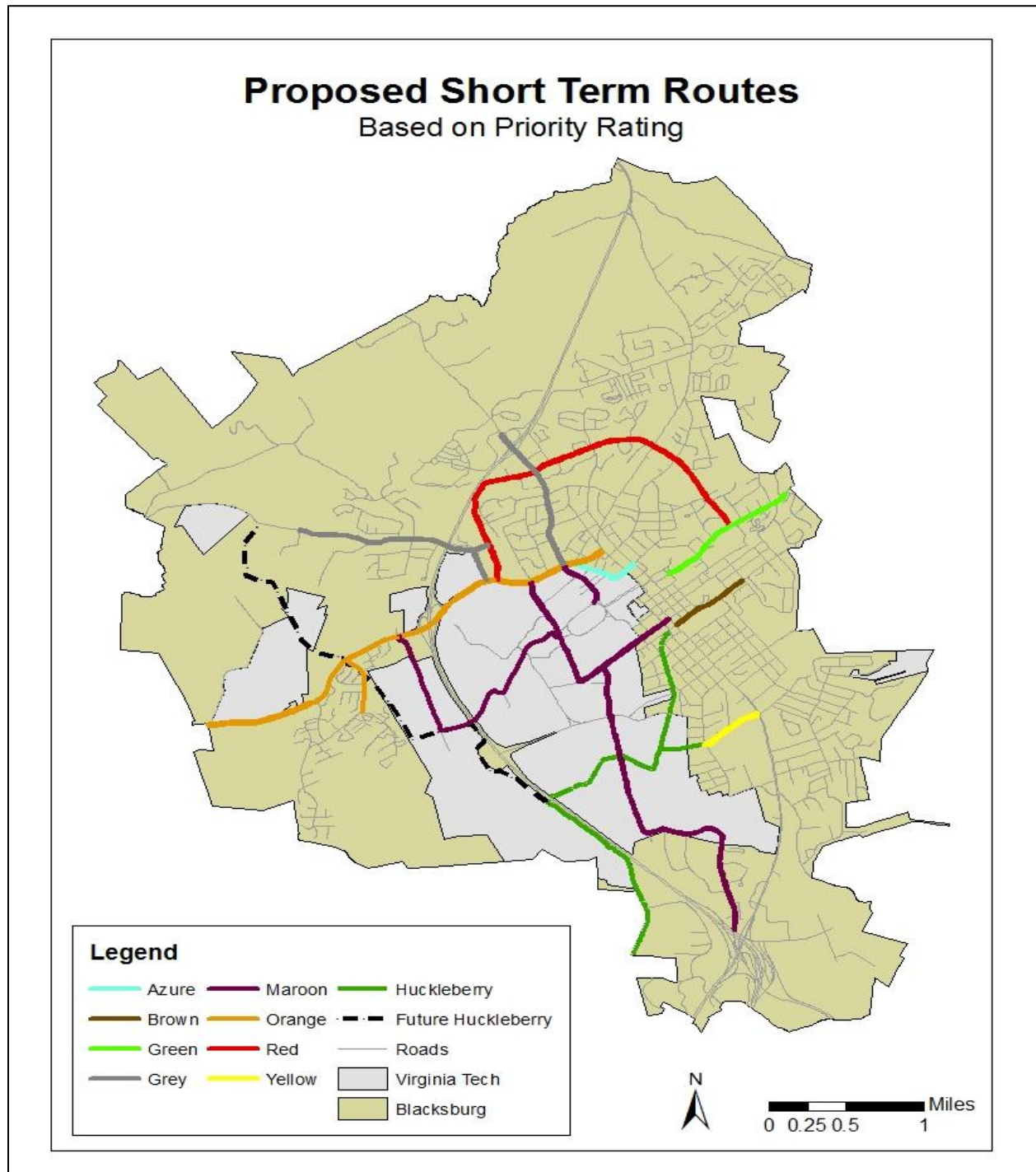
### E. Short Term Bicycle Network

Each segment of the bicycle network was scored based on a variety of criterion. The scores were used to prioritize certain segments of the bicycle network and the result was a short term bicycle network. This network represents the goals for the first five years of the plan. The short term bicycle network will create over 34 miles of on- and off-road bicycle infrastructure. The following criterion was used to score each segment of the bicycle network.

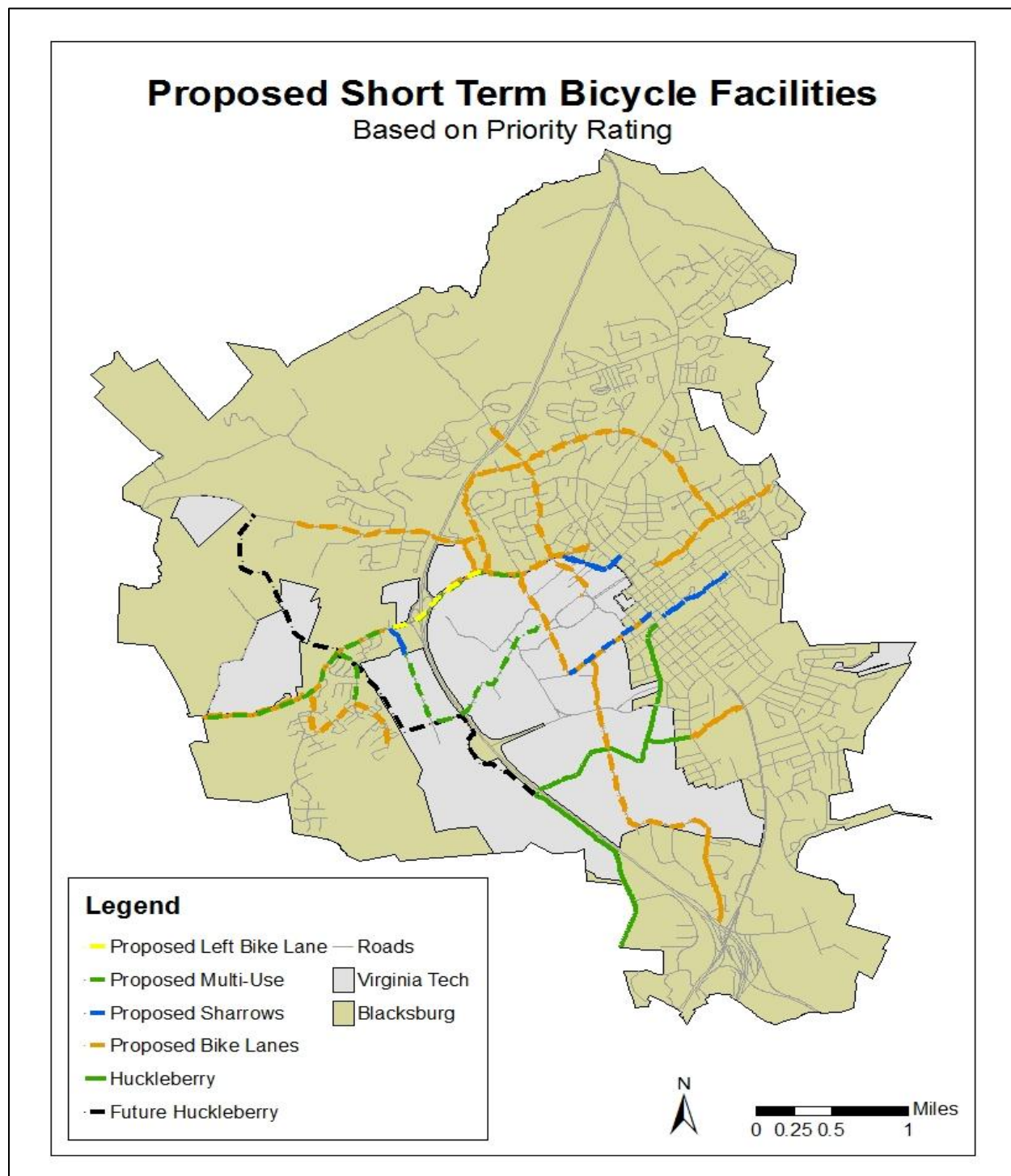


### 1. Short Term Bicycle Routes

The short term bicycle network involves parts of the Red, Grey, Azure, Yellow, Brown, Maroon, Orange, and Green lines, as well as the extension of the Huckleberry Trail. This network will make it possible to travel east to west across the town almost completely on a bicycle facility and north to south from the 460 interchange to Tom's Creek Road and Glade Road.



This short term network combines bicycle lanes, Sharrows, multi-use paths, and left side bike lanes to allow bicyclists to travel throughout the town. The following map displays the location and types of bicycle facilities recommended for the short term network.



## IX. Education and Safety Programs

Creating a connected bicycle network with proper bicycle infrastructure is not enough to increase ridership and safety for bicyclists. Programs that are focused on education, safety and encouragement are crucial elements to a successful bicycle program. While there is a strong bicycle community in Blacksburg made up of students and residents, commuters and recreational riders, road riders and mountain bikers, there is a large population that is currently not riding a bicycle. Many bicyclists and motorists alike do not know or follow the rules when it comes to bicycling. Other community members have not ridden a bicycle recently or do not feel comfortable riding on the road with automobiles. The lack of understanding of traffic laws and low confidence in personal riding ability keeps many people from utilizing a bicycle as a means of transportation or for physical activity.

Therefore, the goal of education and safety programs is to increase the knowledge of cycling rules for both bicyclists and motorists, while also providing bicycle riding training courses, so that all community members feel safe sharing the road. Additionally, community encouragement programs and local business support can improve local ridership levels. The education and safety programs will target four specific groups: adults, children, motorists, and law enforcement.

Increasing bicycle ridership levels in Blacksburg has the additional benefit of meeting the goals set forth in the Climate Action Plan (CAP). The CAP has set a goal of reducing the town's greenhouse gas levels by 80% of 1990 levels by 2050. A significant portion of greenhouse gas emissions is derived from automobile use. Increasing bicycle ridership can aid in reducing the total number of vehicle miles traveled and thus reducing greenhouse gas emissions from these vehicles.

**This plan recommends the creation of a Bicycle Coordinator as a town staff position and the hiring of a person to fill this position. Additionally, a Bicycle Advisory Committee derived of community stake holders should be formed and tasked with implementing and monitoring the bicycle infrastructure and programs described in this plan.**

### A. Adults

Adults make up a large portion of Blacksburg's community and represent a majority of the transportation users. At this point and time, most adults use their personal vehicles to get around town. This group represents the largest potential to increase ridership levels and have the largest impact on reducing greenhouse gas emissions, which is a goal of the Climate Action Plan. Most adult riders fall into three categories: 1) Adults who ride a bicycle, and know how to properly follow traffic and safety laws, 2) Adults who ride a bicycle, but don't fully understand traffic rules related to bicycles and 3) Adults who do not ride a bicycle. This difference in rider types results in the need for a wide variety of education and safety programs.

Education and safety programs for adults should be geared towards explaining and teaching the rules of the road. It should consist of videos, in-class teaching, and hands on riding education that focuses on



traffic rules and how to correctly interact with vehicles, other bicycles, and pedestrians. Education programs for adults should also include bicycle maintenance training. The following programs represent different avenues to educate adults about the proper way to safely and correctly ride and perform maintenance on a bicycle.

**Smart Cycling Courses.** The League of American Bicyclists administers these courses. The course trains riders on how to properly and safely operate a bicycle on trails and roadways. A certified League Cycling Instructor teaches each course.

**Action Item 1: Offer courses at least three times a year (Spring, Summer, Fall)**

Create and distribute bicycle information kits directly to residents-These kits would include a map of the bicycle network, the type of facility along the routes (bike lane, sharrow, multi-use trail), and a calendar of bicycle-oriented events.

**Action Item 2: Send out kits twice a year with other public mailings**

**Action Item 3: Recruit volunteers to distribute kits and answer any questions door to door, once a year**

Provide bicycle safety brochures, network maps at community locations and community meetings. The brochures should also be made available at any town government building. The town should also coordinate with local bicycle shops to provide the brochures and maps.

**Action Item 4: Create, print, and handout brochures at all town operated facilities and distribute to bicycle shops to hand out**

**Implement Bicycle Signage and Safety Banners-**This program would prioritize areas that are high risk for vehicle-bicyclist accidents and post signage alerting motorists to be on the look out for cyclists. Additional traffic calming measures can be implemented at these locations if deemed necessary.

**Action Item 5: Print and Post at least one safety sign or banner each year at a high risk location**

**Action Item 6: Institute at least one traffic calming or safety improvement measure at a high risk location**

**Public Awareness Campaign-**This program is aimed to inform all members of the community about the new bicycle network and infrastructure, traffic laws for interacting with cyclists and pedestrians, and the rights of these cyclists and pedestrians. The campaign can be implemented at public meetings and community events as well integrated into the local business community. Additionally, the campaign can be implemented through print and digital media. It is crucial to utilize social media as well, in the form of Facebook and Twitter.

**Action Item 7: Create a website page dedicated to bicycle programs and development on the town website**

**Action Item 8: Create, operate, and maintain a Blacksburg Bicycle Twitter and Facebook account to keep the town updated on events**

**Action Item 9: Utilize the town's communication department to promote and advertise the bicycle plan, network developments, and community programs**

Bicycle Maintenance Courses-These courses can be offered at a low or no cost to members of the community. These programs can be integrated with other meetings and trainings for cyclists in the community. The town should work with local bicycle shops that are currently offering these maintenance courses to inform the public.

**Action Item 10: Ensure that maintenance courses are offered at least once every three months.**

Low Cost and Free Helmet and Light Programs-Providing helmets and lights are important safety accessories for bicyclists. In fact, in Virginia it is a law that a cyclist must have a light on their bike on any road that is 35 mph or faster. The town should provide these items in coordination with bicycle safety and education events. These items can be used as incentives to get members to attend events and pass bicycle safety exams.

**Action Item 11: Offer one low cost or free program per year.**

## **B. Children**

Children represent a special group of potential bicycle riders, and thus require special programs. A bicycle is the main option for transportation for children and programs should be geared to teach them how to ride safely. A benefit of increasing ridership levels among children is the potential for the continued use of a bicycle as they grow older and become adults. Education and safety programs should be integrated to schools curriculum at the earliest possible stage, including pre-schools, and continue throughout elementary school. Coordinating children's programs with adult programs is another strategy that has been successfully implemented in other communities.

### School Programs

The town should coordinate with area schools to train teachers on bicycle rules and safety. With the assistance of certified instructors these teachers can then implement bicycle education and safety programs into the physical education portion of the school days. For example, the City of Madison, Wisconsin offers a one-day "Teaching Safe Bicycling" course to train teachers on how to correctly teach the bicycle safety curriculum.

The town should work with the school board to create a bicycle education and training curriculum to be integrated into physical education time and courses in elementary school. In coordination with certified instructors, the local police, and teachers this program can be integrated into normal coursework. Madison, Wisconsin offers a course for 4<sup>th</sup> graders entitled "Basics of Bicycling." This course is made up of seven sessions and includes video and on-bike lessons that are designed to teach bicycle safety.

**Action Item 12: Create an education program and offer it to all teachers in Blacksburg during the 2012-2013 school year. This education program should then be offered annually.**

**Action Item 13: Begin dialogue with school board to include bicycle instruction and education as part of physical education requirements for elementary school students.**

Helmet Distribution Program-Children who are learning how to ride a bike and those who have just started riding are more likely than experienced riders to have accidents and fall off their bike. Due to this, it is important for children to properly wear helmets. As a part of the education courses, helmets should be offered to students at a discounted rate or free of cost. The school system and town should apply for grants that can be used to fund this helmet program.

**Action Item 14: Apply to at least one grant or funding source each year that can be used to offer helmets to children at low or no cost.**

Safe Routes to Schools-This is a national program that has already been implemented at some area schools. It provides communities with the resources to designate and construct a walking and bicycling path to a school. The town should work with every school within the corporate limits to implement a "Safe Routes To School" program and town staff should serve as a member and facilitator of each schools committee.

**Action Item 15: At least one school should apply for a Safe Routes To School grant each year until every school in Blacksburg has implemented the program.**

## C. Motorists

Automobiles represent a majority of the traffic on roads and thus it is important to provide bicycle education to this group. However, most drivers do not know how to interact with cyclists because they were not taught how to drive with bicycles on the road. Without any training on how to interact with cyclists, automobile drivers represent a serious threat to health and safety. It is important to increase and improve bicycle education for motorists during initial drivers ed courses, annually through community events, and through license re-examinations. Additional programs focused on specific segments of the local population are listed below.

Bicycle Education in Driver's Ed-While it will take a larger, state-wide effort to change the state's driver's education program, the town can add a bicycle education section to the courses that are offered through the high schools. This program would reach drivers before they create driving habits and create the habit of looking for bicyclists when driving.

**Action Item 16: Work with Montgomery County Public Schools to implement bicycle education with driver's education programs.**

Require Bicycle Education Courses for Town Employees-While the town can't force all residents to take bicycle education courses, it can require town employees to take a course and pass an exam. While this



may not be important for all town positions, it shows a commitment to becoming a bicycle friendly town, and does have direct importance to town staff that operates town vehicles.

**Action Item 17: Implement a driver’s education program as part of employee training that explains and provides hands on training on how to interact with bicyclists on the road.**

Share The Road Campaign-A public awareness campaign that targets motorists to be aware of cyclists on the road. The campaign will include videos, brochures, newspaper ads, signs, and banners dispersed throughout the town. A sign can be as simple as stating “Share the Road” and video’s can go into detail to show motorists how to look for a cyclist before making a turn.

**Action Item 18: Coordinate with Communications department and create a video that can be shown on public access TV that explains the new bicycle infrastructure projects locations, what sharrows, bicycle symbols, bike boxes, and other bicycle designations on the road mean, and how drivers should properly interact with bicyclists.**

**Action Item 19: Identify high-risk car and bicycle locations and post “Share The Road” Signs to make drivers and cyclists aware of each other.**

Bus Drivers-Blacksburg Transit reaches many areas of Blacksburg and together with bicycles can make it possible for residents to get around town without their vehicle. However, some bicyclists may not understand how to use the bike racks on the buses. Increasing the community’s understanding of using bicycle racks on buses is a goal of Blacksburg Transit and the Town of Blacksburg. It is also important that bus drivers are comfortable and understand how to operate buses near cyclists.

**Action Item 20: Assist Blacksburg Transit with the training of bus drivers regarding bicycle loading and unloading, as well as interacting with bicyclists on the road**

## **D. Government and Law Enforcement**

Bicycle Registration-The town should recommend that bicyclists register their bicycles with the town. This will serve as a benefit to the town since they will be able to measure progress and success of the bicycle master plan through increasing ridership. Also, it will provide support for the town as they try and improve bicycle parking and infrastructure by showing an increasing number of riders, and thus a growing need for bicycle infrastructure.

**Action Item 21: Create a database that stores and manages all the bicycle registrations in the town. Allow citizens to register their bicycles on the bicycle webpage, and explain the importance of registration.**

Police Training-Provide local police with training courses in bicycle safety and laws. This will improve the ability of the local police to enforce traffic violations by cyclists and motorists alike.

**Action Item 22: Work with the police department to implement a training course pertaining to bicycle safety and laws.**

Promote Police Enforcement of Bicycle Related Traffic Laws-Along with training police on bicycle laws; the police should enforce the law. Cyclists who are riding recklessly endanger themselves, other cyclists, and pedestrians. Reckless cyclists also represent a risk of physical damage to automobiles. Motorists who do not properly interact with cyclists represent a serious risk to the health and safety of cyclists. Cyclists and drivers alike who are potentially dangerous to others must be reprimanded for their actions. However, due to the lack of knowledge, these offenders may not realize what they are doing is breaking the law. In response to that first, time offenders, cyclists or motorists, who are given citations, should have the option to attend a bicycle education course to avoid paying fine. Repeat offenders will not have this option and the town will dedicate a portion of this ticket revenue to bicycle and pedestrian programs.

**Action Item 23: Create bicycle education program for first time bicycle law offenders to attend.**

Light for Citation Program-Riding without a light at night is against the law in Virginia on roads that are 35 mph or faster. Riding with a light on any road makes a cyclist more visible to drivers and other cyclists. In order to improve the safety of night riding the town should implement a program that will provide lights after a cyclist completes a bicycle education course if they are cited for riding without a light.

**Action Item 24: Purchase quality bicycle lights to distribute after completion of bicycle education course.**

Fines for repeat bicycle offenders-Traffic offenses by cyclists do not pose as big a threat to public safety as automobiles and thus the fine for breaking a law should not be as severe as it is for automobiles. The town should create a fine system that applies only to cyclists.

**Action Item 25: Decide and implement fine structure for different types of violations and for multiple time offenders.**

## X. Encouragement and Promotion Programs

### A. Regional Alternative Transportation Solutions

- **Create a community-wide bicycle share program.** A bike share program consists of several stations placed around town that allows residents to pick up a bicycle at a conveniently station and drop it off at another station anywhere in town. There are several examples of college towns that have successfully implemented a bike share, including Boulder, Colorado and Madison, Wisconsin.
- **Develop and implement a comprehensive town bicycle parking policy.** A policy that requires multi-unit residential, commercial, and industrial buildings to provide bicycle parking is another key element to a successful bicycle program. The town should review and update zoning ordinances and the subdivision code to require short-term and long-term bicycle parking at all future developments. Bicycle parking should be required along with the development of any new town parking facilities.
- **Coordinate with Blacksburg Transit.** The town should coordinate with Blacksburg Transit to ensure that all buses in operation have bicycle racks. Additionally bicycle parking should be provided at all Blacksburg Transit bus stops. Long-term and short-term bicycle parking should be provided at park and ride lots as well. This will allow residents who utilize the Smart Way bus to seamlessly transition between their bicycle and the bus. This policy will allow people to travel farther distances without having to utilize a personal vehicle.

### B. Local Employer Encouragement

- **Go Green NRV.** Expand the Go Green NRV community led “Green Business” ranking system, which motivates business owners to provide employees with more bicycle racks, secure parking, showers, bicycle repair facilities and rewards them for their green achievements.
- **Bicycle Corrals.** The town should remove car parking spots in specifically identified locations and replace them with “bicycle corrals,” which would replace two motor vehicle parking spaces with parking for up to 24 bicycles.
- **Incentives.** The town should provide incentives to local businesses to promote bicycling. Possibilities include a local tax incentive to compensate the subsidy provided to motorists for car parking. Companies should provide financial reimbursement for work related trips made for bicycle as if they were made in a vehicle.
- **Bicycle Business Presentation.** **The town should create a program and presentation that business owners can use to encourage their employees to bicycle to work. This program would be geared towards the larger employers in the town to have a more significant impact. The town can either train the human resource department of a business to give the presentation or directly present the information to the employees. The presentation should focus on the economical, health, and environmental benefits of cycling over driving.**

## C. Community Programs

### 1. Current Programs

- **Annual Fix Fest**-A program put on through a partnership with the New River Valley Bicycle Association (NRVBA), Ride Solutions, and the Town of Blacksburg. The event, normally scheduled for April, brings the three local bicycle shops together at the Farmer's Market Square to provide bicycle tune-ups for community members. This event promotes the bicycle community and is an opportunity for riders of all skill levels and ages to get together. An additional event that could be planned is a group ride around town at the end of the event.
- **Clean Commute Day**-This program is also put on through a partnership with the NRVBA, Ride Solutions, and the Town of Blacksburg. This event is scheduled in May in coordination with Clean Commute Days in other communities in the New River Valley. This event promotes and encourages everyone to walk, bike, or ride the bus to school or work. Anyone who is commuting by one of these methods can stop by the Farmer's Market Square for free coffee and baked goods. Bumper stickers, buttons, and certificates could be provided for anyone who wanted to promote their participation in Clean Commute Day. Additional Clean Commute Days could be promoted during Virginia Tech's Sustainability Week *Active Commuter Celebration* and the Earth Week *Dump the Pump Day*.
- **Bicycle Education Program**-The NRVBA currently has five League of American Bicyclist (LAB) Certified Instructors in Blacksburg who are licensed to teach LAB Bicycle Education Curriculum. In the past the NRVBA has offered classes through the local YMCA and to Virginia Tech staff. The NRVBA has also offered a free beginning bicycle series in the past. The series involved weekly classes that taught a new bicycling skill and involved practice and an on-road ride. The NRVBA can create specific training education programs for any school, organization, or business.
- **Mountains of Misery**-Annual NRVBA century ride that takes place on Memorial Day weekend. The ride moves through Montgomery, Giles, Allegheny, and Craig Counties and is one of the most recognized as one of the best races in the Mid-Atlantic region.

### 2. Potential Community Activities

- Establish a Blacksburg Bicycle Community Program that aides in bicycle promotion, bicycle mechanics, and teaching youth how to bicycle.
- Integrate and encourage national and regional bicycle festivals such as "Bike VA" and National Bike to School day. Bike VA is an annual event, in which riders tour different parts of Virginia. Blacksburg should apply to be a part of this tour every three years.
- National Bike to School Day is a new event that is beginning this year and being held on May 9, 2012. This event is part of the League of American Bicyclist's Bike Month and will aim to encourage kids across the country to ride their bike to school and for their parents to accompany them on this ride.
- Partner with the American League of Cyclists and work towards recognition as a "Bicycle Friendly Community of America."
- Bike to work days, in conjunction with bike to school days

- Create community bike rides where streets are closed from automobile traffic. Additional community ride events can include costume rides and midnight rides.
- Annual bicycle day before school starts for kids and parents to make both parties comfortable with the children bicycling to school and figuring out the best route to take.

## D. Virginia Tech Programs

Virginia Tech is home to over 30,000 students and also serves as the largest employer in Blacksburg. Thus, it is in the position to have a large impact on bicycle use and bicycle culture in the area. Many students already bike to campus and several programs are held each year that aim to increase bicycle use among incoming freshman and current students. Virginia Tech would be a great partner for the town in its efforts to increase bicycle ridership, bicycle education, and safety in Blacksburg. This section describes several bicycle programs that have been completed by Virginia Tech, future programs that Virginia Tech could implement, and identifies additional opportunities for the town and Virginia Tech to work together.

### 1. Current Programs

There are several organizations on campus that have an interest in bicycle transportation and its environmental benefits. SGA Transportation, Environmental Coalition, and Power Shift are three of the main organizations that have worked to increase bicycle use on campus and support bicycle programs. The town and university can work together with the leadership of these organizations to continue to put on bicycle safety, education, and awareness programs.

- **“Wheels in Motion” Campus Bike Tour**-The bike tour is offered several times during the first few weeks of each school year. According to the program description, “the purpose of this ride is to engage students in the Hokie bicycle community by teaching safe community skills, developing confidence and revealing bikeway shortcuts and routes.” The event includes a pre-ride maintenance check of bicycles, a bike safety presentation from Police Bike Officers, and a cyclist “rules of the road” education presentation by League Certified Instructors. The tour goes all throughout the Virginia Tech campus and aims to show how bicycle transportation is a reliable transportation option in Blacksburg.
- **VT Active Commute Celebration**-An event held during Virginia Tech’s Sustainability Week to recognize commuters who travel to school or work on VT’s campus using an active mode of transportation. The event held by SGA Transportation provides a light breakfast for active commuters, offers information to improve active commuting and promote community members to become active commuters. Several local organizations participate in this event to provide information and giveaways.
- **Virginia Tech Office of Energy and Sustainability Green RFP**-The VT Office of Energy and Sustainability awards grants each year to projects around campus that are related to sustainability issues. SGA Transportation applied for this grant in 2011 and was awarded \$1

- **Respect Campaign-A brochure that highlights and promotes** the use of alternative transportation. The brochure includes information on bicycle signaling, riding advice, rules for riding on the road and sidewalks, and general information about safely riding a bicycle on campus. The brochures are distributed at campus events throughout the year.
- **SGA Free Bike Light Giveaway**-This event first happened in December 2011 and promoted bicycle safety and visibility at night through giving out bike lights to cyclists who attended. In order to receive a free bike light, bicyclists had to have previously registered their bicycle with Virginia Tech or register their bike at the event.
- **Freshmen Orientation Bike Sale**-This event offers a 10% discount to all freshmen who purchase a bicycle at one of the local bicycle stores during their campus orientation.

## 2. Potential Future Programs

- Increase the number of fun, educational bicycle programs on campus including campus bike tours, confident cycling skills workshops, and Ciclovias that open streets to bicyclists and pedestrians
- Create an annual event that shuts the drillfield down to all automobiles. This event would give bicyclists and pedestrians the freedom to move anywhere they want through the main section of campus. The experience would show everyone what campus life would be like without the reliance on automobiles.
- Institute programs and activities to achieve “Bicycle Friendly University” recognition by the League of American Bicyclists
- Increase partnerships with Blacksburg town staff to ensure the student voice is heard on transportation issues

## XI. Funding Strategies

One of the most important aspects of this plan will be to utilize a variety of traditional and innovative funding strategies in order to implement the bicycle network and supporting programs. Once the plan is adopted, the town will be able to apply for funds and grants from a variety of federal transportation programs. Additionally, the Virginia Department of Transportation (VDOT) administers several funding programs and the town will have the ability to apply for these funds after the plan is adopted. There are other state agencies that providing funding through grants for pedestrian and bicycle projects, including trails for hiking and mountain biking. At the local level there are both public and private funding options available for improving bicycle and pedestrian conditions and safety. Blacksburg's Capital Improvement Program is the main source of funding for the bicycle and pedestrian plan. This chapter also recommends potential local funding programs the town can institute by enabling new legislation. In addition to public funding sources, the town will pursue private grants and private donations from citizens, organizations, and businesses that support the bicycle culture in Blacksburg. APPENDIX IV shows the proposed cost of implementing the total proposed bicycle network. The cost for each individual bicycle route is shown and it is displayed as each segment and the corresponding type of bicycle facility.

### A. Federal

#### SAFETEA-LU

The current federal transportation bill provides several sources of funding for bicycle and pedestrian infrastructure projects.

1. **Safe Routes To School (SRTS)**-The goal of this program is to improve children's safety while walking and bicycling to school. A SRTS program helps a community to:
  - a. Build sidewalks, bicycle paths, and pedestrian friendly infrastructure
  - b. Reduce speeds in school zones and neighborhoods
  - c. Address distracted driving among drivers of all ages
  - d. Educate generations on pedestrian and bicycle safety

The SRTS program provides funding to local communities to complete the projects that benefit the physical health of the community, traffic congestion, and environmental quality.

**Action Item 1: Encourage each school to apply for a SRTS grant and provide planning and technical assistance. Utilize knowledge and resources from schools that have successfully implemented a SRTS program in Blacksburg.**

2. **Surface Transportation Program**-The Surface Transportation Program provides flexible funding that may be used for projects on any Federal-aid highway, including the National Highway System, bridge projects on any public road, transit capital projects, and intracity and intercity bus terminals and facilities.



Bicycle and pedestrian projects that can be funded by the Surface Transportation Program include: Bicycle and pedestrian plan, Bicycle lanes in-road, Paved shoulders, Signed bike routes, Shared use path/trail, Spot improvement program, Maps, Bike racks on buses, Bicycle parking facilities, Trail/highway intersection, Bicycle storage/service center, Sidewalks (new or retrofit), Crosswalks (new or retrofit), Signal improvements, Curb cuts and ramps, Traffic Calming, Coordinator position, Safety/Education position, Police patrol, Helmet Promotion, Safety brochure/book, and Training.

Bicycle and Pedestrian projects on local roads are eligible for Surface Transportation Program funds as an exception to the rule.

3. **Highway Safety Improvement Program**-Program is focused on reducing traffic fatalities and serious injuries on all public roads, bikeways, and walkways. This program includes the Railway Highway Crossings Program and the High Risk Rural Roads Program. Projects eligible for this funding include: Bicycle lanes in-road, Paved shoulders, Spot improvement program, Trail/highway intersections, Sidewalk (new or retrofit), Crosswalk (new or retrofit), Signal improvements, Curb cuts and ramps, and Traffic Calming.
4. **Transportation Enhancements**-This program is administered by VDOT, through a set-aside amount of STP funds. Transportation Enhancement activities offer funding to expand transportation choices and enhance the transportation experience (FHWA). These funds can be used for pedestrian and bicycle projects including: Bicycle lanes in-road, Paved shoulders, Signed bike route, Shared use path/trail, Spot improvement program, Bike racks on buses, Trail/highway intersection, Bicycle parking facilities, Bicycle storage/service center, Sidewalks (new or retrofit), Crosswalks (new or retrofit), Signal improvements, Curb cuts and ramps, Helmet promotion, Safety brochure/book, and Training.
5. **FTA Formula Grants for Other than Urbanized Areas**-These grants are for areas with a population less than 50,000. The program is designed to support public transportation in rural areas. These funds can be used for pedestrian and bicycle projects including: Bicycle lanes in-road, Bike racks on buses, Bicycle parking facilities, Bicycle storage/service center, Sidewalks (new or retrofit), and Crosswalks (new or retrofit).
6. **Job Access and Reverse Commute**-This program was created to assist welfare recipients and low-income persons to overcome the obstacles seeking to obtain and maintain employment (FTA). These funds can be used for pedestrian and bicycle projects that create a bicycle storage/service center.
7. **Recreational Trails Program**-This program is administered by that state, but is funded by the Federal Highway Administration. The program allows states to create and maintain recreational trails for motorized and non-motorized use, including hiking and bicycling trails. These funds can

be used for pedestrian and bicycle projects including: Shared use path/trail, Single track hike/bike trail, Trail/highway intersection, Safety brochure/book, and Training.

8. **Community Development Block Grants (HUD)**-A program that provides communities with resources to address a wide range of needs. The program is focused on engaging low to moderate-income residents in the citizen participation process in order to improve community. While this program funds a large array of projects, in terms of bicycle and pedestrian planning, these funds can be utilized to build sidewalks, in-road bicycle markings, bicycle signage, greenways, trails, and more in an effort to increase the mobility and safety of transportation of local residents.
9. **Public Lands Highway Discretionary Program**-This program funds projects that are within, adjacent to, or provides access to Federal Lands or facilities. The funds are available for transportation planning, research, engineering, and construction of highways, roads, parkways, and transit facilities. This includes bicycle and pedestrian facilities that connect to federal lands. In Blacksburg, these funds can be used to provide connections to the Jefferson National Forest that is borders Blacksburg to the North. Applications for these funds must be administered by the state of Virginia.
10. **Transportation, Community, and System Preservation Program**-This program provides funding for a comprehensive initiative including planning grants, implementation grants, and research to investigate and address the relationships among transportation, community, and system preservation plans and practices and identify private-sector based initiatives to improve those relationships. The goal of these grants is to support practices that improve the efficiency of the transportation system in the U.S., reduce environmental impacts of transportation, reduce the need for costly future public infrastructure, ensure efficient access to jobs, services, and centers of trade, and examine community development patterns and identify strategies to encourage private sector development patterns and investments that support these goals (<http://www.fhwa.dot.gov/tcsp/>). Funds from this program are available for: Bicycle and pedestrian plans, Bicycle storage/service center, Traffic Calming, and Bicycle and Pedestrian infrastructure.

**Action Item 2: Apply for federal funding for at least three bicycle-only construction projects each year, not related to road construction. Document results and amount of funding for each application.**

**Action Item 3: Apply for federal funding for every bicycle project that is part of the construction, resurfacing, or development of roads and trails. Document results and amount of funding for each application.**

**Action Item 4: Apply for federal funding for at least one off-road bicycle or hiking trail each year.**

## B. State

1. The Land and Water Conservation Fund (LCWF)-This program is administered by the Virginia Department of Conservation and Recreation. This fund reimburses localities for the cost of acquisition and/or development of public outdoor recreation areas. In Virginia, projects that have utilized grants from the LCWF include the acquisition of land for parks, the development of walking, hiking, and bicycle trails, urban bicycle trails, and a bicycle bridge, among other projects.
2. VDOT Highway Construction Funds-VDOT is responsible for constructing and maintaining the roadways in each county. Highway construction funds can be used to build bicycle and pedestrian accommodations either concurrently with new roadway construction, roadway improvements, or as an independent project (VDOT).
3. 402 Highway Safety Program Funds-This program provides funding to support State and community programs to reduce deaths and injuries on the highways. Virginia is allocated funds and communities are eligible to apply for grants for pedestrian and bicycle programs from the state. Bicycle and pedestrian safety programs are eligible for these funds. Examples of projects that are eligible for these funds include school-based pedestrian and bicycle safety programs, helmet distribution programs, and community information and education programs ([bikeleague.org](http://bikeleague.org)).
4. State Aid Transit Grants-The Virginia Department of Rail and Public Transportation administers this grant program. The grant money is available for transit systems including bicycle accommodations.
5. Recreational Access Program-The program is designed to provide adequate access to public recreational facilities or historic sites operated by a state agency, locality, or a local authority. "Access" can either be provided by an access road or a bicycle facility. Funds from this program can be used for the construction, reconstruction, maintenance, or improvements of bikeways that provide access to such areas (VDOT).
6. Virginia Department of Conservation and Recreation (DCR)-The Virginia DCR administers the federally funded Recreational Trails Program. The grants are focused towards projects that are for construction and implementation of trails. Funding can be used for: Development of urban trail linkages near homes and workplaces, Maintenance and restoration of existing recreational trails, Construction of new trails that meet identified needs on state, county municipal, or private lands, and Construction of new trails on federal lands if certain conditions are met. (VDOT)
7. VDOT Revenue Sharing-This program provides additional funding to construct, improve, or maintain primary and secondary roadways. Projects eligible for funding include: Deficits on

completed construction or improvements, Supplemental funding for ongoing construction improvements, Supplemental funding for future construction or improvements listed in the adopted Virginia Transportation Development Plan, and Unprogrammed maintenance whose accomplishment is consistent with the Department's operating policies (VDOT).

**Action Item 5: Apply for state funding to assist at least one on road bicycle facility, one offroad bicycle facility, and on bicycle or hiking trail.**

## C. Local

### 1. Current Sources

1. **Capital Improvement Program**-The town has a Capital Improvement Program that plans and allocates the use of funds for public facilities, infrastructure improvements, maintenance, and acquisition of property and equipment. The town is currently allocating \$15,000 annually for signing, marking, and constructing bikeways. This represents 0.34% of the general fund budget that is recommended in the Fiscal Year 2013-2017 CIP. The estimated cost of the short term bicycle network is \$462,000, which is \$92,400 annually if spread out over the five-year CIP and represents about 2% of the Capital Improvement Program budget.
2. **Operational Budget**-The town's operational budget for resurfacing roads includes a budget for marking. Any resurfacing project on a road that is designated part of the bicycle network will be marked with the appropriate bicycle facility marking during the resurfacing project. Additionally, any resurfacing project on a non-neighborhood road will be marked with the appropriate bicycle facility marking as recommended by the Bicycle Advisory Committee.

**Action Item 6: Create a line item in the Capital Improvement Program that specifically dedicates funding to the bicycle program.**

### 2. Potential Future Sources

3. **Transportation Bonds**-Whenever the town offers bonds for transportation upgrades, a portion of these bonds should be set aside for bicycle and pedestrian improvements.
4. **Sales Tax Increase**-Propose a sales tax increase for the town, which can be used to fund bicycle projects, including infrastructure construction & maintenance and safety & education programs.
5. **Bicycle Excise Tax**-Propose a small tax for every bicycle, new or used, sold anywhere (bike shops, pawn shops, police auctions) in Blacksburg. The tax can either be a % of the price of the bike, a flat rate per bicycle, or a sliding scale based on the price of the bicycle. These funds can only be used on bicycle improvement projects. This strategy has been used successfully in Colorado Springs, CO.

6. **Parking Meter Funds**-Increase the cost of parking at meters and in lots owned by the town. Reduce the number of minutes that a nickel, dime, or quarter is worth. This will result in an increase in revenue from parking facilities. This increase in revenue can be used to support bicycle and pedestrian funding, as well as other transportation or community projects.

**Action Item 7: Implement at least one creative, new funding source that dedicates revenue directly to the bicycle program.**

## **D. Private Grants**

1. **Bikes Belong**-An organization that is sponsored by the U.S. bicycle industry. Their goal is to increase bicycle ridership levels. Bikes Belong offers several types of grants including the ones listed below.
  - a. **Community Partnership Grants (Alta University Funding Guide)**  
These grants are designed to foster and support partnerships between city or county governments, non-profit organizations, and local businesses to improve the environment for bicycling in the community. Grants will primarily fund the construction or expansion of bicycle facilities such as bike lanes, trails, and paths. The grants committee will also consider advocacy projects that promote bicycling as a safe and accessible mode of transportation. Lead (submitting) organization must be a non-profit organization with IRS 501(c)3 designation or a government entity (city or county government office)
  - b. **Facility Grants**-These grants fund projects specific to bicycle facilities. Bikes Belong recommends that the local public agency team up with a local bicycle advocacy group.
2. **The Conservation Fund**-An organization that is dedicated to protecting open space and natural resources. This includes protecting areas that are used for hiking and biking and helping to develop trails and greenways.
  - a. **Kodak American Greenways Grants**-These grants are used to construct and extend greenways throughout the county. Grants can be used to support local trail and open space projects

**Action Item 8: Apply for one private grant each year.**

### *Private Donations*

1. **Corporations/Businesses**-Work with local businesses and corporations in the town to support bicycle and pedestrian projects. This can come in the form of monetary donations, labor, or equipment and materials.

**Action Item 9: Create and informational brochure and presentation to create partnerships with local businesses that support bicycle and pedestrian projects.**

**Action Item 10: Create at least one partnership with a local business or corporation each year.**

2. **Civic Organizations**-Team up with local organizations, such as trail advocates and bicycle advocacy groups to support bicycle and hiking projects. Fundraising possibilities include:
  - 1) Adopt a brick projects for sidewalk replacements-Organizations can purchase bricks with their company name engraved to complete a sidewalk restoration project (best for downtown and future College Avenue project)
  - 2) Adopt a trailhead-Organizations can adopt a trail head and donate money for a specific section of a new trail to be built and maintained
  - 3) Adopt a bikeway-Organizations can donate money to adopt a section of a bike lane, route, or trail, similar to the “adopt a highway” campaign. The donated money will be used for signage, markings, and construction, as well as a sign with the organizations name.

**Action Item 11: Implement one partnership with at least one local civic organization to assist in the completion of one bicycle or pedestrian project each year.**

3. **Citizens**-A citizen outreach campaign can attract monetary donations as well as volunteer time and effort to complete safety and education programs, bicycle advocacy, and trail and bike path clearance and maintenance. Citizens have the option to donate to a bicycle fund set up to be used specifically for bicycle infrastructure projects.

**Action Item 12: Create a funding mechanism that allows local citizens to donate to the bicycle and pedestrian program fund.**

This chapter highlights the importance of utilizing all potential funding opportunities to implement the network and programs recommending in this plan. Accessing federal and state funding sources is especially important due to the current dynamic economic climate and the impact it has had on traditional municipal revenue sources. Creating partnerships with local businesses and civic organizations represents an additional source of funding and can create connections where town funding may fall short. The action items listed throughout this chapter create measurable, achievable goals that aim to ensure the bicycle and pedestrian program will be funded and that the recommended bicycle network will be completed in a timely fashion.



## **XII. Ordinances and Laws**

### **A. Municipal Code and Ordinances**

#### **Chapter 12 – Motor Vehicles and Traffic**

- [Section 12-106. - Riding bicycle or moped without using handlebars.](#)

No person shall ride a bicycle or moped upon any street without having his or her hands upon the handlebars.

- [Section 12-107. - Bicycle trails and operation of other vehicles thereon.](#)

(a)The use of off-street bicycle trails by any person operating a vehicle other than a bicycle is prohibited. The prohibition of this subsection shall not apply to public vehicles entering off-street bicycle trails for maintenance, rescue, fire or police patrol purposes.

(b)The use of off-street bicycle trails by persons guiding, accompanying or riding animals of any kind is prohibited; provided, any person may guide or accompany a dog or cat on a leash. Any person who brings a dog or cat on an off-street bicycle trail must immediately remove any deposit made by the animal.

(c)Whenever a person rides a bicycle on a bicycle route, he or she shall yield the right-of-way to any pedestrian and shall give an audible signal before overtaking and passing any pedestrian or bicycle.

- [Section 12-108. - Bicycle helmets.](#)

(a)Every person fourteen (14) years of age or younger shall wear a protective helmet that at least meets the Consumer Product Safety Commission standard, whenever that person is riding or being carried on a bicycle on any highway, sidewalk, or bikeway in this town.

(b)Violation of this section shall be punishable by a fine of twenty-five dollars (\$25.00). However, such fine shall be suspended (i) for first-time violators and (ii) for violators who, subsequent to the violation but prior to imposition of the fine, purchase helmets of the type required by this section.

(Ord. No. 1368, § 2, 7-13-04)

Editor's note—

Ord. No. 1368, § 6, adopted July 13, 2004, provided for an effective date of July 1, 2004.

State law reference— Code of Virginia, § 46.2-906.1, Authority to require helmets.

## **DIVISION 3. - STREETS**

- [Sec. 5-321. - Bicycle lanes.](#)

All proposed collector and arterial streets within a subdivision shall be constructed with bicycle lanes. The bike lane width and intersection configuration shall meet current VDOT standards. Bike lanes may also be required on local streets as provided for in the Comprehensive Plan

## **DIVISION 4. - SIDEWALKS AND WALKWAYS**

- [Sec. 5-400. - Sidewalk and walkway policy.](#)

Sidewalks and walkways within and adjacent to the subdivision are necessary to provide safe, convenient, and efficient transportation for the citizens of the Town.

(Ord. No. 1217, § 2, 12-14-99)

- [Sec. 5-401. - Sidewalks required.](#)

(a)The subdivider shall install and dedicate to the Town sidewalks along at least one side of all public streets within and adjacent to the subdivision. The sidewalks shall connect with existing sidewalks on streets adjacent to or within the land subdivided, and shall be placed so as to provide for eventual continuation with proposed or future sidewalks in the vicinity of the land subdivided.

(b)Except as otherwise provided by the Zoning Ordinance, sidewalks shall be constructed of concrete and shall be a minimum of five feet in width. A minimum four foot planting strip is required between the curb and sidewalk for pedestrian/vehicle separation and to provide for mailbox and utility service placement.

(c)Where there is no curb between the sidewalk and the street, the sidewalk shall be placed beyond the road shoulder and roadside ditch. Minimum separation in this case shall be as approved by the agent.

(d)Sidewalk construction materials and specifications shall meet current VDOT subdivision street standards, incorporated by reference.

(Ord. No. 1217, § 2, 12-14-99; Ord. No. 1369, § 16, 10-12-04; Ord. No. 1397, § 1, 10-11-05)

- [Sec. 5-402. - Access to open space.](#)

(a)Where common open space or public parkland is provided in a development, the subdivider shall provide pedestrian access to the site.

(b)Access to public parkland shall be dedicated to the Town. The access shall consist of a sidewalk which meets the requirements of [section 5-401](#), above, or a bikeway, which meets the standards of [section 5-503](#), below.

(c) Access to private common open space may be by a private access way. The access shall be paved with gravel, limestone dust, or asphalt. No minimum width is required by this chapter.

(Ord. No. 1217, § 2, 12-14-99)

- [Sec. 5-403. - Sidewalk variance.](#)

(a) The agent or the Planning Commission may waive the requirements of [section 5-401](#) by granting a variance. In reviewing any request to eliminate sidewalks, the agent or Planning Commission shall consider the following issues:

(1) The existing sidewalk network in the area serving both short distance travel within the subdivision and longer distance travel; and

(2) The existing sidewalk network in the area; and

(3) The location of transit stops.

(b) The agent or Planning Commission may grant a variance to the requirement for sidewalks on classified local roads within a subdivision where an acceptable alternate internal asphalt walkway system is provided or proposed as part of the subdivision. This variance is not available for sidewalks on collector and arterial roads. If approved, all asphalt walkways shall be installed and dedicated to the Town.

(1) The agent or Planning Commission shall consider the following factors:

(a) The existing sidewalk network in the area serving both short distance travel within the subdivision and longer distance travel;

(b) Interconnections with existing bikeways or walkways shall be provided where possible;

(c) Consistent material shall be used when connecting to adjacent walkways.

(d) The alternative asphalt walkway serves as internal circulation for the subdivision providing access to all proposed lots in the subdivision;

(e) Interconnections with existing bikeways or walkways shall be provided where possible;

(f) Consistent material shall be used when connecting to adjacent walkways.

(2) The alternative walkway shall be constructed per [section 5-503](#) construction and design standards.

## **DIVISION 5. - BIKEWAYS**

- [Sec. 5-500 - Multi-use trails required.](#)

A multi-use trail dedication and construction is required for proposed subdivisions where needed:

(1) To provide safe and more convenient access to schools, parks, the bikeway/greenway system or other public assembly areas.

(2) To provide safe and convenient access between adjacent subdivisions and certain dead-end streets within subdivisions to facilitate alternative transportation.

(3) To implement the concepts illustrated in the Comprehensive Plan's Bikeway/Greenway Master Plan when a rational nexus and rough proportionality exist.

(Ord. No. 1217, § 2, 12-14-99; Ord. No. 1339, § 34, 9-9-03)

- [Sec. 5-501 - Location of multi-use trails.](#)

The location of the multi-use trail route shall be determined by the agent in consultation with appropriate departments of the Town. The trail route shall follow approximately the route provided for in the comprehensive plan, and it shall be placed so as to take into consideration the topography of the route, visibility, safe grades and curves for recreational use.

(Ord. No. 1217, § 2, 12-14-99; Ord. No. 1339, § 35, 9-9-03)

- [Sec. 5-502 - Access to future multi-use trails rights-of-way.](#)

The agent or Planning Commission may require the reservation and development of rights-of-way for additional multi-use trails in new subdivisions where such routes are necessary for access to routes shown in the comprehensive plan .

(Ord. No. 1217, § 2, 12-14-99; Ord. No. 1339, § 36, 9-9-03)

- [Sec. 5-503. - Construction and design standards.](#)

(a) Multi-use trails shall be constructed of a minimum pavement section of 4" 21B aggregate and 1-½" SM2A asphalt.

(b) Multi-use trails shall be designed to minimize segments of trail where the slope exceeds 8%, to allow for handicap access. Where the slope exceeds 8%, pulloffs are required every 100 feet and a profile of the trail shall be submitted.

(c) Culvert crossings shall be provided where the multi-use trail crosses an existing or proposed drainage way so as to eliminate flow across the trail. The agent may waive this requirement where the flow across the trail is deemed insignificant, for example, less than 1 cubic foot per second.

(d) Minimum pavement width for multi-use trails is ten feet with a two foot graded and a three foot clear shoulder on each side

(e) Landings at road crossings shall be not more than 2% grade for a distance of fifteen (15) feet measured from the edge of the street pavement.

(f) Where the multi-use trail meets the curb, a handicap ramp shall be provided and approved by the Virginia Department of Transportation.

(g) A minimum four foot grass strip separation shall be maintained between the back of the curb and the asphalt trail. Where there is no curb between the asphalt trail and the street, the multi-use trail shall be placed beyond the road shoulder and roadside ditch. Minimum separation in this case shall be as approved by the agent or Planning Commission.

## **B. Recommended Code Adoptions:**

### **Sample from the City of Charlotte Zoning Ordinance, Part 2: Off-Street Parking and Loading**

(b) Location. Short-term bicycle parking should be located along a major building approach line and clearly visible from the approach. The rack area should be no more than a 30-second walk (120 feet) from the entrance it serves and should preferably be within 50 feet. A rack area should be as close or closer than the nearest nonhandicap car parking space. A rack area should be clearly visible from the entrance it serves. A rack area should be provided near each actively used entrance. In general, multiple buildings should not be served with a combined, distant rack area. It is preferred to place smaller rack areas in locations that are more convenient.

## **C. Climate Action Policy**

## **D. State and Federal Laws Regarding Bicycles**

The Commonwealth of Virginia is made up of 95 counties, 39 independent cities and approximately 190 incorporated towns. Counties are administrative divisions of Virginia, each with its own government. Independent cities are legally distinct from the county that surrounds them and interact with the Commonwealth directly. They are considered county equivalents and have their own government. Towns are the only other type of municipal government authority in Virginia and they interact with the Commonwealth through the county government. Towns are a part of the counties within which they are located, with the county usually responsible for some of the town's services.

VDOT maintains all of the interstate and most primary routes throughout Virginia. VDOT maintains the secondary roads for all but two counties, Arlington County and Henrico County. Independent cities generally are responsible for building and maintaining all secondary roads (streets), and some maintain primary routes within their jurisdiction for which they receive an allocation from the commonwealth.

However, for most of Virginia's towns, all streets are maintained by VDOT as primary or secondary routes.

## 1. **Dillon Rule:**

The Dillon Rule is the doctrine that a unit of local government may exercise only those powers that the state expressly grants to it while Home Rule provides a city or county with a greater measure of self government.

Although the Dillon Rule is a concept found in all states, most states have adopted various types of Home Rule provisions that permit some or all of their local governments to undertake those governmental functions that are not specifically precluded by the laws of those states. Virginia is considered to employ the strictest interpretation of the Dillon Rule and the Virginia courts have determined that local governments have only limited authority based on the specific powers expressly conferred on them by the General Assembly. Among other restrictions, this limits the local governments' ability to raise funds for transportation and other improvements.

The Dillon Rule may limit local officials and prevent them from quickly reacting to unique local problems with a specifically tailored local response. For instance, a local government might be prevented by the Dillon Rule from requiring developers to extend improvements off-site of their projects to provide connectivity with an existing bicycling facility. There are periodic calls from within Virginia to reverse the Dillon Rule and institute Home Rule.

## 2. **The Code of Virginia:**

The 1950 Code of Virginia is currently in force and is the statutory law of Virginia. Every person riding a bicycle on a road shall be subject to the provisions of the Code of Virginia section on motor vehicles and shall have the rights and duties applicable to the driver of a vehicle unless a provision clearly indicates otherwise. Bicyclists and motorists basically have the same rights and duties, and the laws governing traffic regulation apply equally to both.

See a summary of Virginia bicycle laws at [www.vdot.virginia.gov/programs/bk-laws.asp](http://www.vdot.virginia.gov/programs/bk-laws.asp).



## **XIII. Design Guidance**

1. American Association of State Highway and Transportation Officials (AASHTO)
2. Americans with Disabilities Act of 1990 (ADA)
3. Civil rights law
4. Virginia Department of Transportation (VDOT)
5. Guide for the Development of Bicycle Facilities (the Bike Guide)
6. A Policy on Geometric Design of Highways and Streets (the Green Book)
7. Highway Capacity Manual (HCM)
8. Manual on Uniform Traffic Control Devices (MUTCD)
9. Town of Blacksburg Comprehensive Plan
10. Zoning Ordinance
11. Planning District Commission Regional Plan

## **XIV. APPENDICES**

### **A. APPENDIX I – NEIGHBORHOOD DESCRIPTIONS**

- **Northend**

The Northend's elementary school students are divided between Kipps and Gilbert Linkous, both of which are too far to walk to. Steep grades, the 460 bypass and no shoulders along North Main Street or Bishop Road make this a difficult neighborhood for bikes and pedestrians.

- **Woodbine/Wyatt**

Woodbine and Wyatt Farms are planned communities with paved trails, which are nice for walking, but contain too many sharp corners for cyclists. Woodbine is within walking distance of Gilbert Linkous Elementary, and it is possible that a Safe Routes to School grant could help with a safe path across Mount Tabor Road and Main Street. This path could also be used as a commuting route from east to west.

- **Northside Park**

This neighborhood of single family homes is somewhat hemmed in by 460 and North Main Street, but improvements to Givens Lane and Progress Street should make it more accessible. Sites that were once mobile home parks are being converted to duplexes and townhouses, which may attract VT students. Elementary school students currently do not have a safe route to Gilbert Linkous, but this could change with the extension of Progress Street.

- **Main/Patrick Henry**

This neighborhood has VT student housing along Whipple Drive, behind the Food Lion shopping center, along Giles Road, and in Maple Ridge, which also contains some single family homes. There are Blacksburg Transit stops on Whipple Drive, Patrick Henry Drive, and in front of Maple Ridge. Steep grades, traffic, and no shoulders on Main Street and Giles Road make this an unfriendly neighborhood for bikes. Elementary school students do not currently have a safe path to Harding Avenue Elementary.

- **Shenandoah**

This neighborhood is a mixture of high density student housing and single family residential housing. There is an oval bike/pedestrian trail around the neighborhood which is well used for recreation. The oval connects to a path at the end of Winslow Drive in the Northside Park neighborhood, but the connector is steep, and may not be practical for bike commuters. There is a paved path along Patrick Henry Drive that is also used by walkers and runners, but most bike commuters ride in the road to avoid pedestrians and bumps in the pavement. There are ample BT stops nearby due to the

presence of VT students, but this also leads to a higher than usual number of accidents at intersections with Patrick Henry Drive. Gilbert Linkous Elementary School is about a mile away, and it participates in the Safe Routes to School program.

- **Kabrich Crescent**

This neighborhood has housing for Virginia Tech students, many of them international, and well-established businesses like Heavener Hardware and East Coasters. There are no specific bike lanes, but the neighborhoods west of Main Street are pedestrian-friendly. Gilbert Linkous Elementary School is within walking/biking distance of the children in this neighborhood, but there is currently no safe route for the students living east of Main Street.

- **McBryde**

This neighborhood is mostly comprised of single family homes built in the 1960s, with winding roads and large trees. Because it is bounded by University City Boulevard, Prices Fork Road and Tom's Creek Road, drivers use it as a cut-through, and there were many accidents on Broce Drive before speed bumps were installed. There are not many Blacksburg Transit stops because it is within walking distance of Virginia Tech. Gilbert Linkous Elementary School is within walking/biking distance of the children in this neighborhood, but about 30 of them ride the school bus.

- **Murphy**

This neighborhood is a mixture of old and new houses, north of the old Blacksburg High School and Caboose Park. The middle part of the neighborhood is not within the town limits, which may make it difficult to build a continuous bike path. There is also a steep grade between Bradley Lane and Giles Road. Harding Avenue Elementary School is within walking/biking distance, and they have a Safe Routes to School program, but some parents are reluctant to allow their children to cross Patrick Henry Drive unattended.

- **Apperson/Dickerson**

This neighborhood contains the old Blacksburg High School, Blacksburg Recreation Center and town park. It has single family homes and the Apartment Heights complex. There is a designated bike route across the street from the old high school, down Lucas and Cork Drive to Harding Avenue. There are few sidewalks because most houses were built before the 1980's, but it is comfortable to walk and bike through, and provides an alternative path to Harding Avenue. Harding Avenue Elementary is within walking/biking distance, but there is concern about crossing Patrick Henry Drive.

- **Bennett Hill/Progress**

This neighborhood contains Harding Avenue Elementary School, the rescue station on Progress Street, the Wong Park, and several historic buildings. Many college students and young adults live

here because they like the proximity to downtown and campus. The steep grade northwest of Giles Road and on-street parking make this neighborhood somewhat challenging for recreational cyclists, but many people commute via bike and on foot, and many children walk to Harding Avenue Elementary.

- **Alleghany**

This neighborhood contains The Vistas, a retirement community, and Windsor Hills, popular with students because pets are allowed, and a mixture of new and older single family homes. There is a BT stop at Windsor Hills. The steep grade from west to east is challenging for cyclists, and traffic on Harding Avenue and Clay Street presents a hazard for children walking to Harding Avenue Elementary.

- **Downtown Eastside**

This neighborhood contains the affordable housing for young families, and is within easy walking distance of downtown and Harding Avenue Elementary. On-street parking and broken beer bottles along Roanoke Street make it hazardous for cyclists, but that is the flattest route west to east.

- **Downtown**

The Downtown neighborhood is the mostly commercial sector between the Old Blacksburg Middle School and Prices Fork Road. Crossing Main Street on foot or on a bicycle is fraught with peril, as is riding along Main Street. Church Street and the Harrell Street intersections have a higher than usual occurrence of accidents. Improving pedestrian safety on Main Street would almost certainly improve foot traffic to downtown businesses.

- **University**

This is the central part of the Virginia Tech campus, where bicyclists may ride on any paved surface. It is the primary activity generator for the town. Pedestrians slow vehicular traffic, and this shunts traffic into surrounding neighborhoods, but it is easy to get through and around the VT campus on a bicycle.

- **Mountain View**

This neighborhood is mostly comprised of well-kept single family homes. Several churches are activity generators, and Palmer Drive is frequently used by cyclists. The children in this neighborhood are within easy walking distance of Margaret Beeks Elementary, but many of them do not walk because of the danger of crossing Main Street.

- **Miller/Southside**

This neighborhood has many beautiful homes with large trees, contains the first mile of the Huckleberry Trail, and is close to the public library. Because it is close to campus and downtown,

Draper Road was used as a cut-through until speed bumps were installed. Cyclists often go through this neighborhood to avoid Main Street. Margaret Beeks Elementary is within easy walking distance.

- **Grissom/Highland**

This neighborhood has some industry along Main Street, a quarry on the northeast corner, and some student housing, but is mostly comprised of single family homes. There is a very steep grade along Park Drive. Children are close enough to walk to Margaret Beeks, but there is no safe Main Street crossing.

- **Airport Acres**

Many houses in Airport Acres were built in the 1940's and have been renovated many times. There is a community garden at the end of Dehart Street, and a comfortable mix of young families and senior citizens. There are avid walkers and cyclists in this neighborhood, and much opposition to the proposed extension of Hubbard Street. This neighborhood contains Margaret Beeks Elementary and a spur to the Huckleberry Trail.

- **Ellett/Jennelle**

This neighborhood contains some student housing, the industrial park, and the 460/3A interchange. High traffic and steep grades make this unfriendly for cyclists in general, but Cedar Run Road is frequently used to get to and from Ellett Valley.

- **Farmview/Ramble**

This neighborhood contains Virginia Tech's Corporate Research Center (CRC), Virginia College of Osteopathic Medicine, housing for young professionals, Montgomery Regional Hospital, a school and a daycare center. These are significant activity generators, and improved walkways/bikeways along Ramble Road are much needed. Because the airport lies between this neighborhood and Margaret Beeks Elementary, walking to school is not practical.

- **Hethwood/Prices Fork**

This is a planned residential development of single family homes and a large apartment complex for students. Kipps Elementary and Blacksburg High School are in this neighborhood, and Blacksburg Middle School will return here once the new high school is built, but most public school students do not walk or bike. Heather Drive has a large number of student drivers, and consequently a higher than usual incidence of accidents. Hethwood has a good network of pedestrian trails, including a path to Plantation Road and campus, but Prices Fork Road is a hazardous place to ride.

- **Glade/Westover**

This neighborhood is near University Mall and on the way to the Brown Farm. Cul-de-sacs and its location across 460 make for close ties among neighbors and limit through traffic. There is currently no good bike or pedestrian route to Kipps Elementary School.

- **Tom's Creek**

The Tom's Creek area contains several planned communities, but is mostly rural in character. Cyclists enjoy Meadowbrook Drive and Glade Road, but the steep grade and winding roads make this area hazardous for inexperienced riders. There is currently no good bike or pedestrian route to Kipps Elementary School.



## B. APPENDIX II – Additional Bicycle Facilities

### Buffered Bike Lanes



Photo credit (l-r, from top): KGrading/flickr, Elly Blue/flickr, The Prudent Cyclist/flickr

#### Description

Buffered bike lanes consist of bicycle lanes paired with a designated buffer space separating the bicycle lane from the adjacent motor vehicle travel lane and/or parking lane.

#### Benefits [compared to conventional bike lanes](adapted from NACTO, 2011)

- Provides additional passing distance between vehicles and bicyclists
- Provides space for cyclists to pass slower cyclists, without encroaching on vehicle travel lane
- Buffer can be used to keep cyclists out of the door zone in areas with street parking
- Provides greater space to cyclists without lane being mistaken for a motor vehicle travel lane
- Appeals to a wider cross-section of bicycle users and contributes to perception of safety

- Increases total capacity for streets carrying mixed mode traffic

#### Typical Applications (adapted from NACTO, 2011)

- Anywhere a conventional bike lane is being considered.
- On streets with higher traffic volume, speed, or truck traffic.
- On streets with extra lanes or extra lane width
- Special consideration must be given at transit stops to manage bicyclist/pedestrian interactions

#### Guidance and Concerns

“Where buffers are used, bike lanes can be narrower because the shy distance function is assumed by the buffer. For example, a 3 foot buffer and 4 foot bike lane next to a curb can be considered a 7 foot bike lane. For travel side buffered lanes next to on street parking, a 5 foot minimum width is recommended to encourage bicyclists to ride outside of the door zone... Buffers should be at least 2 feet wide because it is impractical to mark a zone narrower than that...Where bicyclist volumes are high or where bicyclist speed differentials are significant, the desired bicycle travel area width is 7 feet.” (NACTO, 2011). Intersections require special consideration to limit potential conflict between drivers of motor vehicles, bicyclists, and pedestrians. Refer to NACTO Urban Bikeway Design Guidelines for recommendations.

## Raised Cycle Tracks



Photo credit (l-r): Dylan Passmore/flickr, Jacob-uptown/ flickr

### Description

Raised cycle tracks comprise bicycle facilities that are vertically separated from motor vehicle traffic. Many are paired with a furnishing zone between the cycle track and motor vehicle travel lane and/or pedestrian area. A raised cycle track may allow for one-way or two-way travel by bicyclists.

### Benefits (NACTO, 2011)

- Dedicates and protects space for bicyclists in order to improve perceived comfort and safety
- Prevents motorists from entering the cycle-track
- Encourages bicyclists to use the bikeway, rather than sidewalks.
- Visually reduces street width, from perspective of travel lane (traffic calming)
- Can be less expensive than a standard bicycle lane in new roadway construction
- On higher speed streets with few driveways and cross streets
- On streets where bike lanes would cause cyclists to feel stress because of factors such as multiple lanes, high traffic volumes, high speed traffic, high demand for double parking, and high parking turnover.
- On streets for which conflicts at intersections can be effectively mitigated using parking lane setbacks, bicycle markings through the intersection, and other signalized intersection treatments
- On streets with numerous curves where vehicle encroachment into bike lanes may be a concern
- To connect with another bicycle facility, such as a second cycle track on one side of the street
- Along streets with high bicycle volumes

### Typical Applications (NACTO, 2011)

- Can be considered anywhere a conventional bike lane would be standard recommendation

### Guidance and Concerns:

The cycle track is vertically separated from the street at an intermediate or sidewalk level. Driveways and minor street crossings are a unique challenge to cycle track design. Minimum width requirements vary with proximity to travel/parking lane and one-way vs two-way. Refer to NACTO Urban Bikeway Design Guide.

## Median Refuge Islands



Photo credit: Steven Vance/flickr, freddy/flickr

### Description

A type of bike box used to make left turns at multi-lane signalized intersections from a right side cycle track or bike lane, or right turns from a left side cycle track or bike lane. Two-Stage Turn Queue Boxes facilitate the cyclist's movement from a bicycle facility to a visible position in traffic.

### Benefits (NACTO, 2011)

- Allows cyclists and pedestrians to more comfortably cross streets by providing a protected space to wait for acceptable gap in traffic.
- Provides a means to take advantage of gaps in one direction of traffic at a time
- Reduces crossing length/exposure to traffic and decreases delay time to cross
- Narrows the roadway and restricts left-turn movement, contributing to traffic calming
- Establishes/reinforces bicycle priority on bicycle boulevards by restricting vehicle through-movement
- When used with a protected cycle track, raised medians that extend into the intersection can also provide a shelter for a bicyclist making a two-stage turn across traffic.

### Typical Applications (NACTO, 2011)

- Where a bikeway crosses a moderate to high volume or high speed street
- Along streets with high bicycle and pedestrian volumes
- Along streets with few acceptable gaps to cross both directions of traffic
- At signalized or unsignalized intersections
- Where it is desirable to restrict vehicle through movements, a median can double as a diverter to prevent cut-through traffic on a bicycle route
- With protected cycle tracks

**Guidance and Concerns:** None

## Cycle Track Intersection Approach



Photo credit (l-r): Dylan Passmore/flickr

### Description

Shifts the cyclist back into an adjacent lane or shared roadway by removing the buffer or raised track. Reduces turn conflicts and increases visibility for cyclists.

### Benefits (NACTO, 2011)

- Increases visibility of bicyclists and motorists in advance of the intersection.
- Mitigates the risk of “left or right-hook” crashes with turning motorists.
- May be less expensive than using full bicycle signals.

### Typical Applications (NACTO, 2011)

- Where cycle tracks approach intersections where turning movements across the path of the bicyclist (either left or right) is allowed.
- At intersections with a single dedicated right turn lane for motor vehicles.
- On cycle tracks protected by on street parking or otherwise removed from the travel lane.

### Guidance and Concerns:

“When the cycle track is dropped on an intersection approach, the intersection shall provide some type of bicycle facility to receive cycle track users. This may be a conventional bike lane, bike box, or combined bike lane/turn lane” (NACTO,2011). For a transition to a bike lane, 4 feet width is required and 6 foot width is the minimum desirable width. The drop distance prior to an intersection varies by treatment and configuration. More space is required when motorists or cyclists must merge. Parking should be prohibited at least 30 feet prior to cycle track buffer termination. Maximum slope when returning a raised cycle track to street grade is 1:8.

## Hybrid Signal



Photo credit wfyurasko /flickr

### Description

Also known as a High-intensity Activated Crosswalk (HAWK) consists of a signal-head with two red lenses over a single yellow lens on the major street, and pedestrian and/or bicycle signal heads for the minor street.

### Benefits (NACTO, 2011)

- Can be implemented when a conventional signal warrant is not met or where a conventional traffic signal is not desired due to the potential to increase traffic volumes on minor street approaches.
- Creates gaps for bicyclists to cross busy streets.
- Is more flexible for bicyclists than a full signal as bicyclists do not have to actuate it if they find ample crossing opportunities during off-peak conditions.
- Associated with very high driver compliance (studies show greater than 95% driver compliance with red indications).
- Improves street crossing safety.

### Typical Applications (NACTO, 2011)

- Where bike routes intersect major streets without existing signalized crossings.
- Where off-street bicycle or pedestrian facilities intersect major streets without existing signalized crossings.
- At mid-block crossings of major roadways with high bicycle or pedestrian volumes.

### Guidance and Concerns:

Must be installed on the side of the road and be unlit when not activated. Refer to MUTCD for design guidance.

## Sources

Urban Bikeway Design Guide, National Association of City Transportation Officials (NACTO). April 2011. Available Online at <http://nacto.org/cities-for-cycling/design-guide/>

Guide for the Planning, Design, and Operation of Bicycle Facilities American Association of State Highway and Transportation Officials, 2010

Fundamentals of Bicycle Boulevard Planning and Design, Portland State University, 2009. Available Online at <http://www.ibpi.usp.pdx.edu/media/BicycleBoulevardGuidebook.pdf>.

## C. APPENDIX III

### 1. Characteristics of Routes and Recommendations

Blue Line

#### N. Main Street – Rt. 460 Bypass to Red Maple Dr. (1.3 miles)

This section passes by the New School before the mostly single family residential areas of Wyatt Farms, Woodbine, and Mount Tabor before ending at Red Maple Drive. The Azure Line intersects at Mt. Tabor and Givens.

Existing Road Conditions	Recommended Treatment
23' road width 2 lane undivided 35 mph AADT – 4,700 Some off road trail	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>Off-road multi use bike path</li> </ul> <b>Recommended</b> <ul style="list-style-type: none"> <li>5' bike lanes</li> </ul>

#### North Main Street – Red Maple Dr. to Progress St. (1.3 miles)

Beginning at the mixed residential Red Maple neighborhood, this section intersects with the Azure Line at Giles, Whipple, and Progress. It also passes mostly commercial with the Food Lion shopping center, East Coasters bike shop; but also multi family residential.

Existing Road Conditions	Recommended Treatment
48' road width Four 11' travel lanes undivided 35 mph Raised Sidewalks AADT – 14,000 Two 5' bike lanes	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>Road Diet</li> <li>Two 11' travel lanes</li> <li>Center 11' turn lane</li> <li>Two 5' bike lanes</li> </ul> <b>Recommended</b> <ul style="list-style-type: none"> <li>Two 5' bike lanes</li> </ul>

#### N. Main Street – Progress St. to College Ave. (1.4 miles)

Main curves from a southerly to a south southeasterly direction after the intersection with Progress. Main enters a two-lane traffic circle at the intersection with Prices Fork and goes from 4-lane undivided to two lanes with a center turn lane to Clay Street.



Existing Road Conditions	Recommended Treatment
52' road width Traffic circle Two traffic lanes Crosswalks Two travel lanes Center turn lane Median at Giles and Faculty to College Raised sidewalks	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>Sharrows</li> </ul>

#### S. Main Street – College Ave. to Washington St.

The Blue Line continues south on Main St. through downtown commercial land use with raised sidewalks on both sides and limited right-of-way. Jackson Street bisects this small section providing connection to Purple Line and the Azure Line.

Existing Road Conditions	Recommended Treatment
34' rod width Two travel lanes Center turn lane Raised sidewalk	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>Sharrows</li> </ul>

#### S. Main Street – Washington St. to Airport Rd.

Main southbound is one lane until Airport, but two lanes northbound to Miller Ave. This segment is home to municipal and private offices, downtown commercial, and residential.

Existing Road Conditions	Recommended Treatment
42' road width Two travel lanes Center turn lane Three Travel lanes Raised sidewalk	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>Road Diet</li> <li>Two 11' travel lanes</li> <li>10' center turn lane</li> <li>Two 5' bike lanes</li> </ul>

#### South Main Street – Airport Road to Professional Park

From Airport, Main is a four lane divided road with center turn lanes. This segment is mostly commercial and passes by large shopping centers with the Kroger, Gables, and First and Main, as well as a few professional parks line the southern section of the Blue Line. As Main passes over 460, it becomes limited access that cuts off access and connectivity to additional commercial, residential, as well as the Montgomery Regional Hospital.

Existing Road Conditions	Recommended Treatment
55' road width Four travel lanes Center turn lane Concrete median Raised sidewalk	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>Two 5' bike lanes</li> </ul>

### Orange Line

#### **Prices Fork Road – Merrimac Rd. to Plantation Road**

Prices Fork goes from a two lane undivided to a four lane divided road with a center turn lane right after Merrimac Rd. There is a mix of civic, commercial, residential, and agricultural uses along this section of Prices Fork. Plantation Rd., the Huckleberry extension, private greenways, and the future Southgate extension do and will provide connections to campus and Glade Rd.

Existing Road Conditions	Recommended Treatment
52' road width Four traffic lanes divided Center turn lane 40mph School Zone (25mph school hours)	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>Off-road path</li> <li>Recommended</li> <li>5' bike lanes</li> </ul>

#### **Prices Fork Road – Plantation Rd. to University City Boulevard (UCB)**

After the traffic light at Plantation Rd., Prices Fork intersects with Rt. 460. The eastbound on ramp is before Prices Fork crosses over 460, and the westbound off-ramp is after. There are off-road paths on either side for a majority of this segment. The speed of traffic and the Rt. 460 overpass present challenges to cyclists and pedestrians.

Existing Road Conditions	Recommended Treatment
60' road width Four traffic lanes divided Center turn lane 40mph Rt. 460 bypass overpass Off-road path	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>Off-road path</li> </ul> <b>Recommended</b> <ul style="list-style-type: none"> <li>5' bike lanes</li> <li>Colored bike facilities</li> <li>Cycle track</li> </ul>

## Prices Fork Road – UCB to North Main Street

The speed limit is reduced to 35mph through this four lane divided with a center turn lane section of Prices Fork. Virginia Tech is on the south side of the road for almost the entire segment that ends at the traffic circle on N. Main St.

Existing Road Conditions	Recommended Treatment
60' road width Four traffic lanes divided Center turn lane 35mph	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>• 5' bike lanes</li> </ul> <b>Recommended</b> <ul style="list-style-type: none"> <li>• Off-road path</li> </ul>

## Tall Oaks Drive – End to Heather Dr.

This segment is all single-family residential then moves into the multi-family neighborhoods of Hethwood and Fox Ridge at Cambridge Road.

Existing Road Conditions	Recommended Treatment
36' road width Two lane undivided 25mph	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>• Sharrows</li> </ul> <b>Recommended</b> <ul style="list-style-type: none"> <li>• Off-road path</li> <li>• Bicycle boulevard</li> </ul>

## Tall Oaks Drive – Heather Dr. to Off-road Path

Tall Oaks ends at a cul-de-sac. A connection with the off-road trail is desired which will provide connectivity to Plantation Road.

Existing Road Conditions	Recommended Treatment
44' road width Two lane undivided 25mph	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>• 5' bike lanes</li> </ul> <b>Recommended</b> <ul style="list-style-type: none"> <li>• Off-road path</li> <li>• Bicycle boulevard</li> </ul>

## Hethwood Drive – Prices Fork to Tall Oaks

The four lane divided road goes from Prices fork and commercial/office uses to residential on the Tall Oaks end.

Existing Road Conditions	Recommended Treatment
50' road width Four lane divided 25mph	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>• 5' bike lanes</li> </ul>

## Heather Drive – Tall Oaks Drive to Prices Fork Road

Heather Drive is one lane southbound and two lanes northbound.

Existing Road Conditions	Recommended Treatment
44' road width Three lane undivided 25mph	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>• Off-road path</li> </ul>

## Red Line

### University City Boulevard – Prices Fork Rd. to Glade Rd.

University City Boulevard starts at Prices Fork as a four lane divided road with a center turn lane until the intersection with Glade, where it turns into a two lane undivided road all the way to Toms Creek. In this segment, the Red Line intersects with the Orange (Prices Fork) and Grey (Glade) Lines.

Existing Road Conditions	Recommended Treatment
36' road width Four travel lanes Center turn lane Median Raised sidewalk on west side	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>• Two 5' bike lanes</li> </ul> <b>Recommended</b> <ul style="list-style-type: none"> <li>• Off-road path</li> </ul>

### University City Boulevard – Glade Rd. to Broce Dr.

This short segment serves one of two post offices in town, and starts the transition from commercial into residential on UCB. After Glade the road narrows to two lanes.

Existing Road Conditions	Recommended Treatment
36' road width Two travel lanes Curb and 2' gutter pans Sidewalk on west and north sides	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>Two 5' bike lanes</li> </ul> <b>Recommended</b> <ul style="list-style-type: none"> <li>Off-road path</li> </ul>

## University City Boulevard – Broce Dr. to Toms Creek Rd.

UCB turns from north to east after the intersection with Broce, passing high-density residential structures until the intersection with Toms Creek.

Existing Road Conditions	Recommended Treatment
36' road width Two travel lanes Curb and 2' gutter pans Sidewalk on west and north sides	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>Two 5' bike lanes</li> </ul> <b>Recommended</b> <ul style="list-style-type: none"> <li>Off-road path</li> </ul>

## Patrick Henry Drive – Toms Creek Rd. to N. Main St.

Patrick Henry is a four lane undivided road from Toms Creek to N. Main as it passes high density residential till hitting N. Main at the Food Lion shopping center. It intersects with the Grey at Toms Creek, Azure at Progress, and Blue at Main.

Existing Road Conditions	Recommended Treatment
49' road width Four travel lanes undivided Sidewalk on south side Multi-use trail on north side 11,000 AADT	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>Road diet</li> <li>Two travel lanes</li> <li>Center turn lane</li> <li>Two 5' bike lanes</li> </ul> <b>Recommended</b> <ul style="list-style-type: none"> <li>Off-road bike path</li> </ul>

## Patrick Henry Drive –N. Main St. to Giles Rd.

Patrick Henry becomes a two lane undivided road after the intersection with N. Main. This segment services a mix of multi and single-family residential as well as commercial uses. This section of the Red Line intersects the Blue at N. Main and Azure at Giles.

Existing Road Conditions	Recommended Treatment
48' road width Two travel lanes undivided 5' bike lanes	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>• 5' bike lanes</li> </ul> <b>Recommended</b> <ul style="list-style-type: none"> <li>• Off-road path</li> </ul>

## **Patrick Henry Drive – Giles Rd. to Harding Ave.**

The route remains as a two lane undivided road until it ends at Harding Avenue. Along this section there is single-family residential in addition to various Parks and Recreation facilities. The Rec Center, Aquatic Center, Skate Park, tennis courts, roller hockey rink, and Hand-and-Hand and the Caboose Parks can all be accessed from this segment. The road width narrows at School Dr. from 48' to 36'.

Existing Road Conditions	Recommended Treatment
48-36' road width Two travel lanes undivided 5' bike lanes	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>• 5' bike lanes</li> </ul> <b>Recommended</b> <ul style="list-style-type: none"> <li>• Off-road path</li> </ul>

## **Grey Line**

The Grey Line comprises of Glade Road, Old Glade Road, Shadowlake Road, Toms Creek Road, and Meadowbrook Drive. This area is mostly residential, and makes up the Toms Creek basin. Glade Road is a popular recreational route that connects to Prices Fork outside of Town limits, and connects to other county roads that parallel Prices Fork and McCoy roads down to the New River.

## **Toms Creek Road – Meadowbrook Dr. to Rt. 460 bypass**

Toms Creek Road starts at the base of Brush Mountain as Meadowbrook curves and turns into Toms Creek. This rural stretch of road is mostly residential with some parks.

Existing Road Conditions	Recommended Treatment
19' road width Two lane undivided	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>• Off-road path</li> </ul>

**Toms Creek Road – Rt. 460 to Prices Fork Rd.**

Either end of this segment is multi-family residential with Gilbert Linkous Elementary and single-family residential in the middle. This is a major connection to campus, and bisects the Red line. From just before Winston Ave. to Price Fork Rd. the road widens to 60'.

Existing Road Conditions	Recommended Treatment
36' road width Two lane undivided 25mph School Zone Bike lanes	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>• 5' bike lanes</li> </ul>

**Glade Road – Meadowbrook Dr. to Boxwood Dr.**

This segment is residential in character, and passes Heritage Park as it goes toward University City Blvd. Shadowlake Rd. provides another connection to Meadowbrook.

Existing Road Conditions	Recommended Treatment
22' road width Two lane undivided 25mph	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>• 5' bike lanes</li> </ul> <b>Recommended</b> <ul style="list-style-type: none"> <li>• Sharrows</li> </ul>

**Glade Road – Boxwood Dr. to University City Blvd.**

Glade remains as a residential road before getting to the commercial area of University City.

Existing Road Conditions	Recommended Treatment
25' road width Two lane undivided 25mph Bike lanes Sidewalks	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>• 5' bike lanes</li> </ul>

**Shadowlake Road – Glade Rd. to Meadowbrook Dr.**

Shadowlake is a windy road, passing single-family residential as it connects Glade with Meadowbrook. There is an off-road path for the much of this segment.



Existing Road Conditions	Recommended Treatment
18' road width Two lane undivided Off-road path	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>Continuous off-road path</li> </ul> Recommended <ul style="list-style-type: none"> <li>Signage</li> </ul>

#### Meadowbrook Drive – Glade Rd. to Toms Creek Rd.

Meadowbrook follows Brush Mountain east from Glade Rd. and turns into Toms Creek Rd. 2.5 miles later.

Existing Road Conditions	Recommended Treatment
19' road width Two lane undivided	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>Continuous off-road path</li> </ul> Recommended Signage

#### Green Line

#### Harding Avenue – Ascot Dr. to Owens St.

Beginning at the top of Harding Avenue, the eastern boundary of town, Harding travels westward and intersects with Owens Street. This segment is lined with single and multi-family residential on its way to downtown.

Existing Road Conditions	Recommended Treatment
Two travel lanes undivided 5' bike lanes Sidewalk north side Patrick Henry to Owens	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>5' bike lanes</li> </ul> Recommended <ul style="list-style-type: none"> <li>Off-road path</li> </ul>

## Owens Street – Harding Ave. to Roanoke St.

This very short segment connects Harding and Roanoke. On the east side is the cemetery, while the west side is multi-family residential. The road narrows going from Harding to Owens, and with a limited right-of-way, a Sharrows is preferred.

Existing Road Conditions	Recommended Treatment
Two travel lanes undivided Sidewalk on west side	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>Sharrows</li> </ul>

## Roanoke Street – Owens St. to Main St.

Continuing to Main St., Roanoke has parallel parking for westbound traffic, and a sidewalk on the same side that continues from Owens. Due to the fairly narrow roadway, on street parking, and limited sight distance a shared travel lane with painted Sharrows is highly recommended.

Existing Road Conditions	Recommended Treatment
Two travel lanes undivided On street parking westbound Sidewalk on north side	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>Sharrows</li> </ul>

## Harding Avenue – Owens St. to Bennett St.

After the intersection with Owens Street, Harding continues westward towards downtown. Much of this stretch is in a school zone as Harding Avenue Elementary is on the north side of the road, with multi-family on the south side.

Existing Road Conditions	Recommended Treatment
Two travel lanes undivided 5' bike lanes	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>5' bike lanes</li> </ul> <b>Recommended</b> <ul style="list-style-type: none"> <li>Off-road path</li> </ul>

## Harding Avenue – Bennett St. to Progress St.

Just before the intersection with Bennett Street, the bike lanes stop, the road narrows, has sidewalk on the south side, and parking is permitted on the north side of Harding. Due to these road conditions, shared bike lanes are preferred.

Existing Road Conditions	Recommended Treatment
Two travel lanes undivided Sidewalk on south side	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>• Sharrows</li> </ul>

### **Brown Line**

#### **Clay Street – Alleghany St. to Jefferson St.**

This segment of Clay Street has challenging elevation change as it climbs to one of the highest points in Town.

Existing Road Conditions	Recommended Treatment
Two lane undivided 25mph Climbing lane eastbound Sidewalks	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>• 5' bike lanes</li> </ul> <b>Recommended</b> <ul style="list-style-type: none"> <li>• Off-road path</li> </ul>

#### **Alleghany/E. Roanoke Street – Clay St. to Harding Ave.**

Alleghany turns into E. Roanoke and connects Clay to Harding. The road narrows between Lee St. and Fincastle Dr. and the speed limit slows to 15mph at the turn from Alleghany to Roanoke.

Existing Road Conditions	Recommended Treatment
Two lane undivided 25mph Sidewalk on south side	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>• Sharrows</li> </ul>

#### **Clay Street – Jefferson St. to S. Main St.**

This section of road narrows at Jefferson St. Its mostly residential, but Dayspring Christian Academy and the old Blacksville Middle School property are also along this segment.

Existing Road Conditions	Recommended Treatment
Two lane undivided 25mph Sidewalk on south side Jefferson-Willard	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>• Sharrows</li> </ul>

## Clay Street – S. Main. St. to Harrell St.

Clay has a steep hill down from Main St. to Draper between the Blacksburg Motor Co. and the Municipal Building. The Bicentennial Trail, Police Department and the Floyd-Montgomery Regional Library is also on this segment.

Existing Road Conditions	Recommended Treatment
Two lane undivided 25mph No sidewalk on south side Main-Draper	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>• Sharrows</li> </ul>

## Miller Street – Harrell St. to S. Main St.

Miller Street is one block south of Clay, and is the marked route from Main St. to the Huckleberry Trail and FMR Library.

Existing Road Conditions	Recommended Treatment
Two lane undivided 25mph Sidewalks	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>• Sharrows</li> </ul>

## Harrell Street – Clay St. to Sterrett Dr.

Huckleberry parking is on Harrell as it goes from Clay to Virginia Tech's Sterrett Dr., which is a limited access road through Sterrett Facilities Complex.

Existing Road Conditions	Recommended Treatment
Two lane undivided 25mph Sidewalks	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>• Sharrows</li> </ul>

## **Southgate Drive – Rt. 460 to Airport Rd.**

Starting at Rt. 460, Southgate is a 5 lane divided road, then turns into a two lane undivided road. Virginia Tech is on both sides of the road for most of this segment except for the Airport Acres neighborhood on the east end.

Existing Road Conditions	Recommended Treatment
Two lane undivided 35-25mph Sidewalks	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>• Sharrows</li> <li>• Off-road path</li> </ul>

## **Maroon Line**

### **Industrial Park– Industrial Park Dr., State St., Trade St., Commerce St., Professional Park Dr., Prosperity Rd.**

Industrial Park Drive starts at the intersection with Main Street and Tech Center Dr. The road services various offices and industries.

Existing Road Conditions	Recommended Treatment
Two lane undivided	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>• Off-road paths</li> <li>• Bike lanes</li> </ul>

### **Tech Center Drive – Industrial Park Rd. to Southgate Dr.**

Tech Center Drive services the Corporate Research Center, the Virginia Tech Montgomery Executive Airport, and multi-family residential as it connects S. Main with Southgate.

Existing Road Conditions	Recommended Treatment
Two lane undivided Off-road multi-use path Intersects with the Huckleberry Trail	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>• Off-road paths</li> <li>• Bike lanes</li> </ul>

## Stanger Street – Prices Fork Rd. to Drillfield Dr.

Toms Creek turns into Stanger Street on campus when it crosses Prices Fork. It runs parallel to Turner Street until it becomes Drillfield Dr.

Existing Road Conditions	Recommended Treatment
Two lane undivided 25mph	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>• Bike lanes</li> </ul>

## Drillfield Drive

Drillfield Drive goes around is a 0.7 mile circular road around the Drillfield.

Existing Road Conditions	Recommended Treatment
One-way 15mph	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>• Sharrows</li> </ul>

## New Kent Drive – Drillfield Dr. to Washington St.

New Kent picks up at the eastern side of the Drillfield and runs south to Washington Street.

Existing Road Conditions	Recommended Treatment
Two lane undivided 15mph	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>• Bike lanes</li> </ul>

## West Campus Drive – Prices Fork Rd. to Washington St.

West Campus Drive runs south from Prices Fork Rd. past the west side of the Drillfield and ends at the intersection with Washington St.

Existing Road Conditions	Recommended Treatment
Two lane undivided 25mph	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>• Bike lanes</li> </ul>

## Washington Street – Draper Rd. to West Campus Dr.

Washington Street runs west from Draper Rd. through the side of campus.

Existing Road Conditions	Recommended Treatment
Two lane undivided 25mph	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>• Bike lanes</li> </ul>

#### Spring Road – Washington St. to Southgate Dr.

Spring Road goes through the athletic facilities between Washington St. to Southgate Dr.

Existing Road Conditions	Recommended Treatment
Two lane undivided 25mph	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>• Bike lanes</li> </ul>

#### Sterrett Road – Harrel St. to Southgate Dr.

Sterrett Road is a limited access road that goes through the Sterrett Facilities area between Harrel to Southgate Dr.

Existing Road Conditions	Recommended Treatment
Two lane undivided	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>• Sharrows</li> </ul>

#### Tan Line

#### Huckleberry Trail

Existing Road Conditions	Recommended Treatment
8' multi-use path	<ul style="list-style-type: none"> <li>• Multi-use path</li> <li>• Two-way cycle track</li> <li>• Intersection approach</li> <li>• Active warning beacons at intersections</li> </ul>



## Azure Line

### **Bishop Road – Rt. 460 Bypass to Mt. Tabor**

Starting at the intersection with Rt. 460, Bishop Road is narrow and winds its way to Mt. Tabor. This section is all low-density residential and can only be accessed from Rt. 460 westbound and Mt. Tabor.

Existing Road Conditions	Recommended Treatment
14' road width 7' travel lanes No center line 20 mph Limited right-of-way	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>• Sharrows</li> <li>• Off-road path</li> </ul>

### **Mount Tabor Road – Bishop Rd. to N. Main St.**

At the intersection with Bishop Rd., the line turns right onto Mount Tabor Road, where it intersects with N. Main St. A shared travel lane and an off-road path are highly desired on a road that serves a residential area and popular recreational bikes routes.

Existing Road Conditions	Recommended Treatment
22' road width Two 11' travel lanes undivided 30 mph Limited right-of-way	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>• Sharrows</li> <li>• Off-road path</li> </ul>

### **Givens Lane – N. Main St. to Progress St.**

The Azure Line continues on Givens Lane and heads west from N. Main, until intersects with Progress Street. This area has a mix of residential types along the Givens segment, and an off-road path in addition to bike lanes is highly recommended.

Existing Road Conditions	Recommended Treatment
25' road width Two travel lanes undivided 25 mph	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>• 5' bike lanes</li> <li>• Off-road path</li> </ul>

## **Giles Road – N. Main St. to N. Main St.**

Paralleling N. Main, the Azure Line follows Giles south, crossing Patrick Henry and Progress before ending on N. Main near the intersection with Prices Fork. Sidewalk and on-street parking is on the north side the length of the road. The south side of the road is single-family, while the north side is mostly multi-family residential.

Existing Road Conditions	Recommended Treatment
23' road width Two travel lanes undivided 25 mph Sidewalk on north side	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>• Sharrows</li> </ul>

## **Progress Street – Givens Ln. to Patrick Henry Dr. (0.6 miles)**

This section is in a mostly multi-family residential area and has sidewalk on both sides of the road. Bike lanes are most appropriate for this segment of the Azure line that connects the Red and Blue Lines.

Existing Road Conditions	Recommended Treatment
36' road width 25 mph	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>• 5' bike lanes</li> </ul>

## **Progress Street – Winston Ave. to N. Main St. (200 ft.)**

This very short section would transition from a bike lane to a shared lane through the intersection on Progress and also on Main.

Existing Road Conditions	Recommended Treatment
36' road width 25 mph	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>• Sharrows</li> </ul>

## **Progress Street – N. Main St. to Jackson St. (0.61 miles)**

Progress Street continues southeast and parallels Main until it dead ends at Jackson Street.

Existing Road Conditions	Recommended Treatment
30' road width 25 mph Sidewalk on both sides	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>• Sharrows</li> </ul>

### Yellow Line

#### **Cedar Hill Drive – Ellett Rd. to Sussex Rd.**

Cedar Hill Drive is a single-family residential street off of Ellett Rd. It is on the other side of Nellies Cave Park from Grissom Ln., and an off-road connection through the park to Grissom Ln. is recommended.

Existing Road Conditions	Recommended Treatment
30' road width Two lane undivided 25mph Sidewalk on one side	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>• Sharrows</li> </ul> <b>Recommended</b> <ul style="list-style-type: none"> <li>• Off-road path</li> </ul>

#### **Sussex Road – Cedar Hill Dr. to New Kent Rd.**

Sussex provides a connection from Cedar Hill to New Kent through multi-family residential.

Existing Road Conditions	Recommended Treatment
33' road width Two lane undivided 25mph	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>• Sharrows</li> </ul> <b>Recommended</b> <ul style="list-style-type: none"> <li>• Off-road path</li> </ul>

#### **Fairfax Road – Ellett Rd. to New Kent Rd.**

Fairfax Road intersects with Ellett and New Kent.

Existing Road Conditions	Recommended Treatment
36' road width Two lane undivided 25mph Sidewalk on both sides	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>Sharrows</li> </ul>

#### New Kent Road – Fairfax Rd. to Grissom Ln.

Existing Road Conditions	Recommended Treatment
34' road width Two lane undivided 25mph Sidewalk on one side	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>Sharrows</li> </ul> Recommended <ul style="list-style-type: none"> <li>Off-road path</li> </ul>

#### Grissom Lane – Nellies Cave Park to Country Club Drive

New Kent to Marlinton is multi-family, has sidewalk on both sides, and a road width of 36', while the rest of the road is lined with single-family residences, has sidewalk on the west side, and a road width of 22'.

Existing Road Conditions	Recommended Treatment
36-22' road width Two lane undivided 25mph Sidewalk on one side	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>Sharrows</li> </ul>

#### Nellies Cave Road – Grissom Ln. to Town Limits

Nellies Cave Road goes from Grissom Ln. east out of Town limits and down to Ellett Valley. Nellies Cave is also a residential road with multi and single-family residences.

Existing Road Conditions	Recommended Treatment
19' road width Two lane undivided 25mph Sidewalk on south side	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>Sharrows</li> </ul> Recommended <ul style="list-style-type: none"> <li>Off-road path</li> </ul>

## **Marlington Street – Grissom Ln. to S. Main St.**

The road narrows from 30' to 25' at Charles St.

Existing Road Conditions	Recommended Treatment
30-25' road width Two lane undivided 25mph Sidewalk on one side	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>• Sharrows</li> </ul>

## **Park Drive – Grissom Ln. to Palmer Dr.**

Park Drive is a short connection from Grissom to Palmer.

Existing Road Conditions	Recommended Treatment
19' road width Two lane undivided	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>• Sharrows</li> </ul>

## **Country Club Drive – Palmer Dr. to S. Main St.**

Coming from Palmer, Country Club intersects with Grissom before crossing S. Main. This intersection has a traffic light and limited sight distance due to the hill just after the intersection making a left turn onto S. Main potentially dangerous.

Existing Road Conditions	Recommended Treatment
23' road width Two lane undivided Sidewalk on south side	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>• Sharrows</li> </ul>

## **Country Club Drive – S. Main St. to Airport Dr.**

Coming down the hill after S. Main there is a left turn lane for the Gabbles Shopping Center. Continuing on Country Club there is addition commercial and office on the right, the rugby field on the left with a multi-use trail that goes to the back of First and Main. Then Country Club enters the residential section with Margaret Beeks Elementary on the left. This section intersects with the Blue once and the Purple Line twice. The Huckleberry Extension also intersects at Airport and Country Club/Energy Dr.

Existing Road Conditions	Recommended Treatment
44' road width Two lane road width	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>Off-road path</li> <li>5' bike lanes</li> </ul>

#### Palmer Drive – Sunrise Dr. to Clay St.

Palmer is an alternative to S. Main, as it runs parallel to Main from Eheart to Country Club.

Existing Road Conditions	Recommended Treatment
22' road width Two lane undivided Sidewalk on south side	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>Sharrows</li> <li>Bicycle boulevard</li> </ul>

#### Magenta Line

#### Ellett Road – Town limits to S. Main St.

Ellett Road is a popular route with recreational cyclists coming from or going to Ellett Valley. This segment intersects with the Yellow Line and the Blue Line.

Existing Road Conditions	Recommended Treatment
20' road width Two lane undivided 25mph	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>Off-road path</li> <li>Sharrows</li> <li>Bike lanes</li> </ul>

#### Hubbard Road – S. Main St. to Airport Rd.

Hubbard is a popular alternate route to Main Street into Downtown.

Existing Road Conditions	Recommended Treatment
30' road width Two lane undivided 25mph	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>Off-road path</li> <li>Sharrows</li> </ul> <b>Recommended</b> <ul style="list-style-type: none"> <li>Bike boulevard</li> </ul>

#### Airport Road – Hubbard Rd. to S. Main St.

Airport is a continuation of the popular alternate route to Main Street using Hubbard Rd.

Existing Road Conditions	Recommended Treatment
30' road width Two lane undivided 25mph School Zone	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>Off-road path</li> <li>Sharrows</li> </ul> <b>Recommended</b> <ul style="list-style-type: none"> <li>Bike boulevard</li> </ul>

#### Draper Road –Airport Rd. to Country Club Rd.

Draper provides the critical connection into downtown by way of the Airport/Hubbard alternate route. This one way stretch of road SB frequently experiences wrong way riding NB.

Existing Road Conditions	Recommended Treatment
18' road width One-way 25mph	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>Contra-flow bike lane</li> </ul>

#### Draper Road – Airport Rd. to College Ave.

This segment of the route parallels Main Street, serves as an alternate route, and has various area attractors along the route.

Existing Road Conditions	Recommended Treatment
38-34' road width Two lane undivided 25mph Speed bumps	<b>Highly Recommended</b> <ul style="list-style-type: none"> <li>Sharrows</li> </ul> <b>Recommended</b> <ul style="list-style-type: none"> <li>Bike boulevard</li> </ul>



## **Preston Road – Airport Rd. to Miller St.**

Preston may be used as an alternate to Draper Road as part of the continuum to the Airport/Hubbard Rd route.

Existing Road Conditions	Recommended Treatment
35' road width Two lane undivided 25mph	<b>Highly Recommended</b> <ul style="list-style-type: none"><li>• Sharrows</li></ul> <b>Recommended</b> <ul style="list-style-type: none"><li>• Bike boulevard</li></ul>

2. Existing Conditions Table 1

Town Quadrant	Street	From	To	Road Type	Exist Facility	Problem Type	Terrain	Activity Generator	Accidents (15 yrs)
NE	Bishop Rd	460 Bypass	Mt. Tabor	Collector	S	Narrow Roadway	Moderate	Neighborhood	9
NE	N. Main Street	460 Bypass	Red Maple Dr	Arterial	S	Continuity	Flat/Rolling	Neighborhood	160
NE	N. Main Street	Red Maple Dr	Patrick Henry	Arterial	BL	Continuity	Flat/Rolling	Park	91
NE	N. Main Street	Patrick Henry	Progress Street	Arterial	S	Continuity	Moderate	Shopping	110
NE	Bishop Rd	460 Bypass	Mt. Tabor	Collector		Narrow Roadway	Moderate	Neighborhood	9
NE	N. Main Street	460 Bypass	Red Maple Dr	Arterial		Continuity	Flat/Rolling	Neighborhood	160
NE	N. Main Street	Red Maple Dr	Patrick Henry	Arterial	BL	Continuity	Flat/Rolling	Park	91
NE	N. Main Street	Patrick Henry	Progress Street	Arterial		Continuity	Moderate	Shopping	110
SE	MAIN ST S	YELLOW SULPHUR	DOWDY DR	Arterial		Continuity	Flat/Rolling	Work	
	MAIN ST S	DOWDY DR	COUNTRY CLUB	Arterial		Continuity	Flat/Rolling	Shopping	
	MAIN ST N	COUNTRY CLUB	CLAY ST SW	Arterial		Continuity	Flat/Rolling	Downtown	4
	MAIN ST N	CLAY ST SW	PRICES FORK RD	Arterial		Continuity	Flat/Rolling	Downtown	16
	MAIN ST N	PRICES FORK RD	LUCAS DR	Arterial		Continuity	Flat/Rolling	Shopping	
	MAIN ST N	LUCAS DR	GILES RD	Arterial	BL	Continuity	Flat/Rolling	Shopping	1
	MAIN ST N	GILES RD	MOUNT TAR Rd	Arterial		Pavement Conditions	Flat/Rolling	Neighborhood	

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	MAIN ST N	MOUNT TAR Rd	VINYARD AVE	Arterial		Pavement Conditions	Flat/Rolling	Church	
NW	PRICES FORK RD	MAIN ST N	UNIVERSITY CITY	Arterial	BL	Continuity	Flat/Rolling	School	4
		UNIVERSITY CITY	PLANTATION RD	Arterial	BL	Continuity	Flat/Rolling	School	
		PLANTATION RD	MERRIMAC RD	Arterial	BL	Continuity	Flat/Rolling	School	2
NW	UNIVERSITY CITY	PRICES FORK RD	GLADE RD	Arterial			Flat/Rolling	Shopping	2
		GLADE RD	BROCE DR	Arterial		Continuity	Flat/Rolling	Shopping	1
		BROCE DR	TOMS CREEK RD	Arterial		Continuity	Flat/Rolling	Neighborhood	2
		TOMS CREEK RD	PROGRESS ST	Arterial		Continuity	Flat/Rolling	Neighborhood	
NW	PATRICK HENRY	PROGRESS ST	MAIN ST N	Arterial		Continuity	Flat/Rolling	Neighborhood	
NE		MAIN ST N	GILES RD	Arterial	BL	Continuity	Flat/Rolling	Neighborhood	
NE		GILES RD	HARDING AVE	Arterial	BL	Pavement Conditions	Flat/Rolling	School	
NW	TOMS CREEK RD	PRICES FORK RD	PATRICK HENRY	Arterial	BL	Continuity	Flat/Rolling	Neighborhood	3
		PATRICK HENRY	HONEYSUCKLE D	Arterial	BL	Continuity	Flat/Rolling	Neighborhood	
NE	HARDING RD	MAIN ST N	ROANOKE ST E	Arterial		Continuity	Flat/Rolling	Neighborhood	
		ROANOKE ST E	ASCOT LN	Arterial	MT	Continuity	Hilly	Neighborhood	

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NE	CLAY ST SW	MAIN ST N	JEFFERSON ST	Arterial		Narrow Roadway	Moderate	Neighborhood	
		JEFFERSON ST	ALLEGHANY ST	Arterial	BL	Continuity	Steep	Neighborhood	
SW	Airport Rd.	Main St.	Hubbard	Collector	S	Pavement Conditions, sidewalk continuity	Flat/Rolling	School, Downtown destinations, Work Commutes	17
NW	Chickahominy	UCB	Givens	Collector	S		Flat/Rolling	Neighborhood	1
NE	Church St.	Jackson	Clay	Collector	S	On Street Parking	Flat/Rolling	Downtown, Church	19
SW	Commerce St.		Trade	Collector	S		Moderate	Work Commutes, Industrial Traffic	3
SW	Country Club Dr.	Airport	Main St.	Collector	BL	Continuity, sidewalk continuity	Flat/Rolling	Neighborhood, School, Shopping	5
SE	Country Club Dr.	Main St.	Palmer	Collector	S	Continuity, sidewalk continuity	moderate	Neighborhood, School, Shopping	3
NE	E. Turner St.	Main St.	Giles Road	Collector	S	On Street Parking	Hilly	Neighborhood, Park	1
SE	Eheart	Main St.	Willard	Collector	S	sidewalk continuity	Flat/Rolling	Neighborhood	0
SE	Ellett Rd.	Main	Town Limit	Collector	S	sidewalk continuity	Moderate	Neighborhood	16
NW	Giles St.	Main St.	Main St.	Collector	S	Pavement Conditions, On Street Parking	Moderate	Neighborhood, Church, Transit	34

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NW	Givens Ln.	Main St.	Chickahominy	Collector	S	Pavement Conditions	Moderate	Neighborhood, Transit	12
NE	Glade Rd.	UCB	Meadowbrook	Collector	S, BL	Continuity, Pavement Conditions	Moderate	Work Commutes, Neighborhood, Shopping, Church	61
SE	Grissom Ln.	Country Club	New Kent	Collector	S	Pavement Conditions	Moderate	Neighborhood	11
SE	Hubbard St.	S. Main St.	Airport	Collector	S	Pavement Conditions	Flat/Rolling	Neighborhood, Work Commutes	4
SW	Industrial Park Rd.	S. Main St.	Commerce St.	Collector	S	Pavement Conditions, 3 foot bike lanes in gutter pan	Flat/Rolling	Work Commutes, Industrial Traffic	10
NE	Meadowbrook Rd.	Glade Road	Tom's Creek	Collector	S	Pavement Conditions	Flat/Rolling	Neighborhood, Church	38
NE	Mt Tabor Rd.	Bishop	N. Main	Collector	S	Pavement Conditions	Hilly	Neighborhood, Church	13
SE	Nellies Cave Rd.	Shelor Lane	Grissom	Collector	S	Pavement Conditions	Moderate	Neighborhood	4
NE	Old Glade Rd.	Prices Fork	Glade	Collector	BL	Pavement Conditions	Flat/Rolling	Neighborhood, Shopping	8
SE	Palmer St.	Eheart	Sunrise	Collector	S	On Street Parking	Flat/Rolling	Neighborhood	10
NE	Progress St.	Jackson	N. Main	Collector	S	Pavement Conditions, On Street Parking	Flat/Rolling	Neighborhood	44
NW	Progress St.	N main	Cherokee	Collector	S	Pavement Conditions	Flat/Rolling	Neighborhood, Transit	35

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SE	Ramble Rd.	Tech Center	Knollwood	Collector	S	Narrow Roadway, Pavement Conditions	Moderate	Work Commutes, Day Care, Transit	15
NW	Shadowlake Rd.	Glade Road	Meadowbrook	Collector	S, MT	Continuity	Moderate	Neighborhood, Church	10
SW	Southgate Dr.	Spring	Airport	Collector	S, MT	Continuity, Narrow Roadway, On Street Parking	Flat/Rolling	University Traffic, Neighborhood	6
NW	Tom's Creek Rd.	Rt. 460	Meadowbrook	Collector	S, BL, MT	Continuity	Moderate	Neighborhood, Highway Access, Work Commutes	2
SW	W. Turner St.	Prices Fork	Main St.	Collector	S	Visibility	Flat/Rolling	Shopping, University	23
SE	Willard Ave.	Eheart	Clay	Collector	S	Pavement Conditions	Flat/Rolling	Neighborhood	1
NW	Broce Dr.	N main	UCB	R. Collector	S	On Street Parking	Hilly	Neighborhood	23
SW	College SW	Otey	Main	R. Collector	S	On Street Parking, Narrow Roadway	Flat/Rolling	School	2
NW	Draper	Airport	College	R. Collector	S		Flat/Rolling	Neighborhood, Downtown, Town Offices,	39
NE	Harding Ave	Progress	Owens	R. Collector	BL	On Street Parking	Flat/Rolling	Neighborhood, School	7
SW	Heather Drive	Prices Fork	Hethwood	R. Collector	BL	On Street Parking	Flat/Rolling	Neighborhood, Church, Transit	20

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SW	Hethwood Blvd.	Prices Fork	Tall Oaks	R. Collector	S	On Street Parking	Flat/Rolling	Neighborhood, Shopping, Transit	11
NE	Jackson St.	Main	Church	R. Collector	S	On Street Parking	Flat/Rolling	Neighborhood, Downtown	
SW	Jackson St.	Draper	Main	R. Collector	S	On Street Parking	Flat/Rolling	Neighborhood, Downtown	9
SW	Kent St.	Washington	Clay	R. Collector	S	On Street Parking	Flat/Rolling	Neighborhood, Downtown, University	9
SW	Lee St.	Alleghany	Main	R. Collector	S	On Street Parking	Flat/Rolling	Neighborhood, Downtown	10
SW	Miller St	Main	Harrell	R. Collector	S		Flat/Rolling	Neighborhood, Library	7
SW	New Kent Rd.	Fairfax	Grissom	R. Collector	S	sidewalk continuity	Flat/Rolling	Neighborhood	3
SW	Otey St.	College	Washington	R. Collector	S		Flat/Rolling	Neighborhood, University	1
SW	Tall Oaks Dr.			R. Collector	S		Flat/Rolling	Neighborhood	14
SW	Washington St.	Kent	Main	R. Collector	S	Pavement Conditions, On Street Parking	Flat/Rolling	University	10
SW	Alumni Mall	Main	Drillfield	U. Collector	S	On Street Parking	Flat/Rolling	University, Transit	unknown
SW	Duckpond Dr.	West Campus	Washington St.	U. Collector	S	Narrow Roadway	Moderate	University, Park	unknown
SW	Kent	Drillfield	Washington St.	U. Collector	S	Narrow Roadway, On Street Parking	Moderate	University	unknown



# Blacksburg Bicycle and Pedestrian Master Plan | 2012

SW	Perry	West Campus	Stanger	U. Collector	S		Flat/Rolling	University	unknown
SW	Plantation Road	Plantation Ext.	Prices fork	U. Collector	S	Narrow Roadway, Pavement Conditions	Moderate	University, Health Care, Hotel, Neighborhood	unknown
SW	Plantation Road EXT	Duckpond	Planatation	U. Collector	S, MT	Narrow Roadway	Moderate	University, Museum	unknown
SW	Southgate Drive	RT 460	Spring Street	U. Collector	S, MT	Continuity	Moderate	University, Highway Access	unknown
SW	Spring St.	Southgate	Washington St.	U. Collector	S, MT	Narrow Roadway	Moderate	University	unknown
SW	Stanger St.	Prices Fork	Drillfield	U. Collector	S, BL	Bike Lane Continuity, Narrow Roadway, grates/utility in BL	Moderate	University	unknown
SW	Washington St.	Duckpond	Kent	U. Collector	S, BL	Continuity	Flat/Rolling	University, Church, Transit	unknown
SW	West Campus Dr.	Prices Fork	Washington St.	U. Collector	S, BL	Continuity	Moderate	University, Transit	1 record

## 3. Recommended Facilities Table 2

		Facility Recommendation Ratings for Segment/Groups																					
Segment Group Class	Segment Description	Facility Type																				Route	
		Conventional Bike Lanes	Buffered Bike Lanes	Contra-flow Bike Lanes	Left Side Bike Lanes	Sharrows	One-way Cycle Track	Two-way Cycle Track	Raised Cycle Track	Bike Paths and Shared Paths (Multi Use)	Bicycle Boulevard	Through Bike Lanes	Combined Bike/Turn Lane	Bike Boxes	Two-stage Turn-queue Boxes	Median Refuge Island	Cycle Track	Bicycle Signal Heads	Signal Detection and Actuation	Active Warning Beacons at Unsignalized Intersection	Colored Bike Facilities	Bike Route Signage	
A	N. Main Street Bishop to Red Maple Dr.	○								●												●	Blue Line
	N. Main Street Red Maple Dr. to Patrick Henry	●																				●	Blue Line
	N. Main Street Patrick Henry to Progress Street	●																				●	Blue Line

N. Main Street Progress Street to College Avenue					●																●	Blue Line
S. Main Street College Avenue to Washington Street					●																●	Blue Line
S. Main Street Washington Street to Airport Road	●																				●	Blue Line
S. Main Street Airport Road to Professional Park Drive	●																				●	Blue Line
Price's Fork Merrimac Rd to Plantation Rd	○								●												●	Orange Line
Price's Fork Plantation Rd to University City Boulevard	○			●			○														●	Orange Line

Price's Fork University City Boulevard to N. Main Street	●								○											●	Orange Line
University City Boulevard Price's Fork to Glade Road	●								○											●	Red Line
University City Boulevard from Glade Road to Broce Drive	●								○											●	Red Line
University City Boulevard from Broce Drive to Tom's Creek Road	●								○											●	Red Line
Patrick Henry from Harding Avenue to Giles Road	●								○											●	Red Line
Patrick Henry from Giles Road to N. Main Street	●								○											●	Red Line

Patrick Henry from N. Main Street to Tom's Creek Road	●								○											●	Red Line
Tom's Creek Rd Meadowbrook Drive to 460 Bypass									●											●	Grey Line
Tom's Creek Rd 460 Bypass to Price's Fork	●																			●	Grey Line
Glade Road from Meadowbrook Drive to Linwood Dr	●								○											●	Grey Line
Glade Road from Linwood Dr to Meadowbrook					●				○											●	Green Line
Harding Avenue from Ascot Lane to Owens Street	●								○											●	Green Line
Harding Avenue from Owens Street to Bennett	●																			●	Green Line

Hill																					
Clay Street from Alleghany to Jefferson Street	●								○											●	Brown Line
Clay Street from Jefferson Street to Main Street					●															●	Brown Line
Southgate Drive from 460 to Huckleberry Bridge					●				●											●	Brown Line
Southgate Drive Huckleberry Bridge to Airport Road					●				●											●	Brown Line
Research Center Drive from Industrial Park Drive to Tech Center Drive	●																			●	Maroon Line
Tech Center Drive from Research	●																			●	Maroon Line

# Blacksburg Bicycle and Pedestrian Master Plan | 2012

	Center Drive to Southgate Drive																							
	Industrial Park Drive from Main Street to Commerce Street	●																			●	Maro on Line		
	Plantation Road from Price's Fork to West Campus									●												●	Maro on Line	
		Conventional Bike Lanes	Buffered Bike Lanes	Contra-flow Bike Lanes	Left Side Bike Lanes	Sharrows	One-way Cycle Track	Two-way Cycle Track	Raised Cycle Track	Bike Paths and Shared Paths	Bicycle Boulevard	Through Bike Lanes	Combined Bike/Turn Lane	Bike Boxes	Two-stage Turn-queue Boxes	Median Refuge Island	Cycle Track	Intersection Approach	Bicycle Signal Heads	Signal Detection and Actuation	Active Warning Beacons at Unsignalized Intersection	Colored Bike Facilities	Bike Route Signage	
B	Bishop Rd 460 to Mt. Tabor Rd					●				●													●	Azure Line
	Mt. Tabor Rd from Bishop Rd to Main Street					●				●													●	Azure Line
	Givens Lane from Main St to Progress Street	●									●												●	Azure Line

Giles Road from Main St to Main Street					●																●	Azure Line
Progress Street from Patrick Henry to Winston Ave	●																				●	Azure Line
Progress Street from Winston Ave to Main Street					●																●	Azure Line
Progress Street from Main Street to Jackson Street					●																●	Azure Line
Owens Street from Harding to Roanoke					●																●	Green Line
Roanoke Street from Owens to Main Street					●																●	Green Line
Tall Oaks Drive from Town limits to Heather Drive									●												●	Orange Line



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	to Airport Road																					
	Palmer Drive from Sunrise Drive to Clay Street					●					●										●	Yellow Line
	Ellet Road from Town Limits to Main Street									●											●	Magenta Line
	Hubbard Road from Main Street to Airport					●				●											●	Magenta Line
	Airport Road from Hubbard to Main					●															●	Magenta Line
	Graves Avenue from Main to Willard Drive					●															●	Magenta Line
	Willard Drive from Graves to Clay Street.					●															●	Magenta Line
	Draper Road from Country Club to Airport Road			●																	●	Magenta Line

# Blacksburg Bicycle and Pedestrian Master Plan | 2012

	Draper Road from Airport Road to College Avenue						●															●	Magenta Line
		Conventional Bike Lanes	Buffered Bike Lanes	Contra-flow Bike Lanes	Left Side Bike Lanes	Sharrows	One-way Cycle Track	Two-way Cycle Track	Raised Cycle Track	Bike Paths and Shared Paths	Bicycle Boulevard	Through Bike Lanes	Combined Bike/Turn Lane	Bike Boxes	Two-stage Turn-queue Boxes	Median Refuge Island	Cycle Track	Bicycle Signal Heads	Signal Detection and Actuation	Active Warning Beacons at Unsignalized Intersection	Colored Bike Facilities	Bike Route Signage	
C	E. Roanoke Street from Harding to Clay					●																●	Brown Line
	Sterret from Southgate Drive to Harrel Street																					●	Brown Line
	Harrel Street from Sterret to Clay Street					●																●	Brown Line
	Park Drive from Palmer to Grissom Lane					●																●	Yellow Line
	Nellie's Cave Road from Town Limit's to Grissom Lane					●																●	Yellow Line

	Marlington Street from Main to Grissom Lane					●															●	Yellow Line
	State Street from End to Trade Street	●																			●	Magenta Line
	Trade Street from State Street to Commerce Street	●																			●	Magenta Line
	Commerce Street from End to end	●																			●	Magenta Line
	Professional Park Drive from Main to Prosperity road	●																			●	Magenta Line
	Prosperity Road Professional Park to Industrial Park	●																			●	Magenta Line
D	Main Street and Mt. Tabor Road																●					
	Red Maple Drive and Main Street																●					

# Blacksburg Bicycle and Pedestrian Master Plan | 2012

Giles and Main Street																		●				
Patrick Henry and Main Street												●	●					●				
Progress Street and Main Street												●						●				
Price's Fork and Main Street																		●				
Turner and Main Street												●	●					●				
Roanoke and Main Street																		●				
Washington and Main Street																		●				
College Avenue and Main Street																		●				
Roanoke Street and Main Street																		●				
Airport Road and Main Street																		●				
Country Club and Main Street																		●				

# 2012

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E	Huckleberry Trail						●									●			●			
F	Stanger from Price's Fork to Washington Street	●																				Maro on Line
	West Campus Drive from Price's Fork to Washington Street	●																				Maro on Line
	Washington Street from West Campus Drive to Draper Road	●																				Maro on Line
	Spring Street from Southgate Drive to Washington Street	●																				Maro on Line
	Southgate Drive from Sterret to					●																Brown Line

	Harrel Street																					
--	---------------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Definition
Bike Arterial
Bike Collector
Local Connector Streets
Intersections
Off Road Paths/Green ways
University

Blank	Not Recommended
<input type="radio"/>	Applicable



○	Recommended
●	Highly Recommended

## 4. Priority of Facilities Table 3

		Facility Recommendation Ratings for Segment/Groups											
Segment/ Group Class	Segment Descripton	Factors Influencing Project Priorities										Route	Total Score
		Bike Continuity	Accident History	Adjacent or Area Development Project	Affordability	Schools	Retail / Employment Centers	Bus Connections	Upgrade to Existing Facility	Off Road Opportunity	High Volume and Speed		
A	N. Main Street 460 to Red Maple Dr.	3	3	3	1	3	1	3	1	3	3	Blue Line	24
	N. Main Street Red Maple Dr. to Progress Street	2	3	1	2	2	2	3	3	1	3	Blue Line	22

N. Main Street Progress Street to College Avenue	2	3	2	3	1	3	3	1	0	3	Blue Line	21
S. Main Street College Avenue to Washington Street	2	3	2	3	1	3	3	1	0	3	Blue Line	21
S. Main Street Washington Street to Airport Road	3	3	1	2	2	3	3	1	0	3	Blue Line	21
S. Main Street Airport Road to Professional Park Drive	3	3	1	2	1	2	3	3	0	3	Blue Line	21
Main Street from Professional Park to Davis Street	3	3	3	2	0	3	3	1	2	3	Blue Line	23
Price's Fork Merrimac Rd to Plantation Rd	3	3	1	2	3	3	3	3	3	3	Orange Line	27
Price's Fork Plantation Rd to University City Boulevard	3	3	1	2	3	3	3	3	2	3	Orange Line	26

Price's Fork University City Boulevard to N. Main Street	3	3	1	2	3	3	3	3	2	3	Orange Line	26
Turner from Progress to Price's Fork	3	3	3	2	3	3	3	1	2	3		26
Webb Street from Price's Fork to Kabrich <b>(Watson? Kabrich?)</b>	3	2	1	2	2	3	1	1	1	2		18
University City Boulevard Price's Fork to Glade Road	3	3	1	2	2	3	3	1	2	3	Red Line	23
University City Boulevard from Glade Road to Broce Drive	3	3	1	2	3	3	3	3	1	3	Red Line	25
University City Boulevard from Broce Drive to Tom's Creek Road	3	3	1	2	3	3	3	3	2	3	Red Line	26
Patrick Henry from Harding Avenue to Giles Road	3	2	2	1	3	3	3	3	3	3	Red Line	26

# Blacksburg Bicycle and Pedestrian Master Plan | 2012

Patrick Henry from Giles Road to N. Main Street	3	2	2	1	3	3	3	3	3	3	3	Red Line	26
Patrick Henry from N. Main Street to Tom's Creek Road	3	2	2	1	3	3	3	3	3	3	3	Red Line	26
Tom's Creek Rd Meadowbrook Drive to 460 Bypass	2	1	1	1	2	1	2	2	1	1		Grey Line	14
Tom's Creek Rd 460 Bypass to Price's Fork	3	2	1	2	3	3	3	3	1	3		Grey Line	24
Glade Road from Meadowbrook Drive to Boxwood Drive	2	1	1	2	1	1	2	2	3	3		Grey Line	18
Glade Road from Boxwood Drive to University City Boulevard	3	2	3	2	1	3	3	3	1	3			24
Harding Avenue from Ascot Lane to Roanoke	3	2	2	1	3	3	2	3	3	3		Green Line	25

Street													
Harding Avenue from Ascot Lane to Bennett Street	3	2	2	1	3	3	2	3	3	3	Green Line	25	
Harding Avenue from Bennett Street to Progress Street	3	2	1	2	3	2	2	1	1	2	Green Line	19	
Clay Street from Alleghancy to Jefferson Street	3	2	1	2	3	3	3	2	1	2	Brown Line	22	
Clay Street from Jefferson Street to Main Street	3	3	1	2	3	3	3	2	1	2	Brown Line	23	
Southgate Drive from 460 to Huckleberry Bridge	2	2	1	1	3	2	1	1	2	3	Brown Line	18	
Southgate Drive Huckleberry Bridge to Airport Road	2	3	1	1	3	2	1	1	3	3	Brown Line	20	

Research Center Drive from Industrial Park Drive to Tech Center Drive	3	2	3	1	3	3	3	3	3	3	3	Maroon Line	27
Tech Center Drive from Research Center Drive to Southgate Drive	3	2	3	1	3	3	3	3	3	3	3	Maroon Line	27
Industrial Park Drive from Commerce Street to Main St	2	2	3	2	1	3	3	3	2	2	2	Maroon Line	23
Plantation Road from Price's Fork to West Campus	3	2	3	1	3	3	3	3	3	3	2	Maroon Line	26
Huckleberry Trail	3	0	1	1	3	3	3	3	3	3	0	Tan Line	20
Bishop Rd 460 to Mt. Tabor Rd	2	2	1	2	1	0	1	1	1	1	1	Azure Line	12
Mt. Tabor Rd from Bishop Rd to Main Street	3	2	3	1	3	0	1	1	2	3	3	Azure Line	19

B	Givens Lane from Main St to Progress Street	3	2	3	0	2	2	1	0	3	3	Azure Line	19
	Whipple Drive from Givens to Main	2	2	3	2	1	2	2	1	0	1		16
	Giles Road from Mains St to Main Street	3	2	3	2	2	2	2	1	0	2	Azure Line	19
	Progress Street from Givens Lane to Winston Ave	3	2	2	2	2	3	3	1	0	2	Azure Line	20
	Progress Street from Winston Ave to Main Street	3	3	2	2	2	3	2	1	0	3	Azure Line	21
	Progress Street from Main Street to Jackson Street	3	3	2	2	3	3	2	1	0	3	Azure Line	22
	Owens Street from Harding to Roanoke	3	3	1	2	3	3	2	2	0	2	Green Line	21
	Roanoke Street from Owens to Main Street	3	3	1	2	3	3	2	2	0	2	Green Line	21

# Blacksburg Bicycle and Pedestrian Master Plan | 2012

Meadowbrook from Tom's Creek to Shadowlake Road	2	1	1	1	1	1	0	1	3	2		13
Shadowlake from Meadowbrook Drive to Glade Road	2	1	3	1	1	1	0	2	3	2		16
Old Glade Road from Glade to Price's Fork	3	2	2	2	3	3	3	3	3	1		25
Tall Oaks Drive from End to Hethwood Blvd	1	0	0	1	3	3	3	1	1	1	Orange Line	14
Tall Oaks Drive from Heather Drive to Off Road Paht	1	1	0	2	3	3	3	1	1	1	Orange Line	16
Hethwood Drive from Price's Fork to Tall Oaks Drive	2	2	0	2	3	3	3	1	2	2		20
Heather Drive from Tall Oaks Drive to Price's Fork	3	1	0	3	3	2	3	3	3	2	Orange Line	23



Cedar Hill Drive from Ellet Rd to Sussex Road	2	1	1	1	1	1	2	1	3	2	Yellow Line	15
Sussex Road Cedar Hill to New Kent Rd	2	1	1	1	1	1	2	1	3	2	Yellow Line	15
New Kent Road Sussex Rd to Grissom Lane	2	2	1	1	2	1	2	1	3	2	Yellow Line	17
Grissom Lane New Kent Rd to Country Club Drive	3	3	1	2	3	2	2	1	0	2	Yellow Line	19
Country Club Drive from Palmer Drive to Main Street	3	2	0	2	3	3	1	3	0	2	Yellow Line	19
Country Club Drive from Main Street to Airport Road	3	3	3	2	3	3	3	3	3	2	Yellow Line	28
Palmer Drive from Sunrise Drive to Clay Street	3	2	1	1	3	2	1	1	3	2	Yellow Line	19
Ellet Road from Town Limits to Main Street	3	3	1	1	2	3	2	1	3	3	Magenta Line	22

	Hubbard Road from Main Street to Airport Road	3	3	1	2	2	3	2	1	2	2	Magenta Line	21
	Airport Road from Hubbard to Graves Avenue	3	3	1	2	3	3	2	1	2	2	Magenta Line	22
	Graves Avenue from Main to Willard Drive	2	1	2	2	2	3	3	1	1	1	Magenta Line	18
	Willard Drive from Graves to Clay Street.	2	2	3	2	2	2	1	1	2	2	Magenta Line	19
	Draper Road from Country Club to Airport Road	3	1	1	2	3	3	2	1	3	1	Magenta Line	20
	Draper Road from Airport Road to College Avenue	3	1	2	2	2	3	3	1	1	2	Magenta Line	20
C	E. Roanoke Street from Harding to Alleghany St	3	3	2	2	3	2	3	1	1	2	Brown Line	22
	Washington Street from Draper to Main Street	3	3	1	2	3	3	3	3	3	2	Maroon Line	26

Alleghaney St from Roanoke to Clay	2	1	3	2	2	1	2	1	2	2	Brown Line	18
Sterret from Southgate Drive to Harrel Street	3	1	1	2	3	3	2	1	2	1	Brown Line	19
Harrel Street from Sterret to Clay Street	3	1	1	2	3	3	2	1	1	1	Brown Line	18
Kent Street from Stanger Street to Clay Street	3	3	1	2	3	3	3	2	0	2	Maroon Line	22
Clay Street from Kent to Main Street	3	1	1	2	3	3	2	1	0	1	Maroon Line	17
Miller Street from Harrel Street to Main Street	3	2	2	2	2	3	3	1	1	1	Brown Line	20
Church Street from Jackson to Clay Street	2	2	1	2	2	3	2	1	0	2		17
Park Drive from Palmer to Grissom Lane	3	3	3	2	2	3	2	1	3	2	Yellow Line	24

Nellie's Cave Road from Town Limit's to Grissom Lane	2	2	2	2	1	1	1	1	2	2	Yellow Line	16
Marlington Street from Grissom Lane to Main St	3	2	1	2	1	3	3	1	1	2	Yellow Line	19
King Street from Hubbard to Main Street	3	1	3	2	2	3	3	1	3	2	Magenta Line	23
State Street from End to Trade Street	2	1	3	2	0	3	3	1	3	2	Maroon Line	20
Trade Street from State Street to Commerce Street	2	1	3	2	0	3	3	1	3	2	Maroon Line	20
Commerce Street from End to end	2	1	3	2	0	3	3	1	3	2	Maroon Line	20
Professional Park Drive from Main to Prosperity road	3	3	3	2	0	3	3	3	3	2	Maroon Line	25

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	Prosperity Road Professional Park to Industrial Park	3	3	3	2	0	3	3	3	3	2	Magenta Line	25
<b>D</b>	Main Street and Mt. Tabor Road	3	3	3	2	2	1	1	1	3	2		21
	Red Maple Drive and Main Street	3	3	3	2	1	2	3	3	3	2		25
	Giles and Main Street	3	3	3	2	2	3	3	1	1	2		23
	Patrick Henry and Main Street	3	3	3	2	2	3	3	1	2	2		24
	Progress Street and Main Street	3	3	3	2	3	3	3	1	1	2		24
	Price's Fork and Main Street	3	3	3	2	2	3	3	1	2	2		24
	Turner and Main Street	3	3	3	2	2	3	3	1	1	2		23

# Blacksburg Bicycle and Pedestrian Master Plan 2012

Alumni Mall and Main Street	3	3	1	2	3	3	3	1	2	2		23
Clay and Main Street	3	3	3	2	3	3	3	1	1	2		24
Washington and Main Street	3	3	3	2	3	3	3	1	1	2		24
College Avenue and Main Street	3	3	3	2	3	3	3	3	3	1		27
Roanoke Street and Main Street	3	3	1	2	3	3	3	1	1	2		22
Eheart and Main Street	3	3	3	2	2	3	3	1	2	2		24
Airport Road and Main Street	3	3	1	2	2	3	3	1	2	2		22
Country Club and Main Street	3	3	1	2	3	3	3	2	2	2		24
Marlington and Main Street	3	2	3	2	2	3	3	1	1	2		22

# Blacksburg Bicycle and Pedestrian Master Plan | 2012

Ellet and Main Street	3	2	3	2	2	3	3	1	3	3		25
Professional Pak and Main Street	3	2	1	2	0	3	3	3	3	2		22
Industrial Park and Main Street	3	2	1	2	0	3	3	3	3	2		22
Huckleberry Trail and Tech Center Drive	3	3	3	1	3	3	3	3	3	3		28
Huckleberry Trail and Proposed 460 crossing at Southgate	3	0	3	1	3	3	1	0	3	3		20
Huckleberry Trail and Glade Road Proposed	3	0	3	1	2	1	1	0	3	2		16
Huckleberry Trail and Mabry Road	3	2	1	1	0	2	1	3	3	2		18
Price's Fork and 460	3	3	3	1	3	3	3	3	3	3		28

# Blacksburg Bicycle and Pedestrian Master Plan | 2012

	Price's Fork and University City Boulevard	3	3	3	1	3	3	3	3	3	3		28
	Glade Road and University City Boulevard	3	3	3	1	3	3	3	3	1	3		26
	Tom's Creek Road and Patrick Henry Drive	3	2	1	2	3	3	3	3	3	3		26
	Tom's Creek Road and 460	3	2	1	2	3	3	3	3	3	3		26
E	Stanger from Price's Fork to Kent Street	3	2	1	2	3	3	3	3	1	3	Maroon Line	24
	Drillfield	3	2	1	2	3	3	3	2	3	1	Maroon Line	23
	West Campus Drive from Price's Fork to Washington Street	3	2	1	2	3	3	3	2	3	2	Maroon Line	24
	Washington Street from West Campus Drive to Draper Road	3	3	1	2	3	3	3	3	3	2	Maroon Line	26



Spring Street from Southgate Drive to Washington Street	3	2	1	2	3	3	2	1	3	2	Maroon Line	22
Southgate Drive from Sterret to Harrel Street	3	3	1	2	3	3	1	1	3	3	Brown Line	23

Definition
Bike Arterial
Bike Collector
Local Connector Streets
Intersections

Blank	Priority Rank
0	Not a Consideration
1	Low

**Key:**

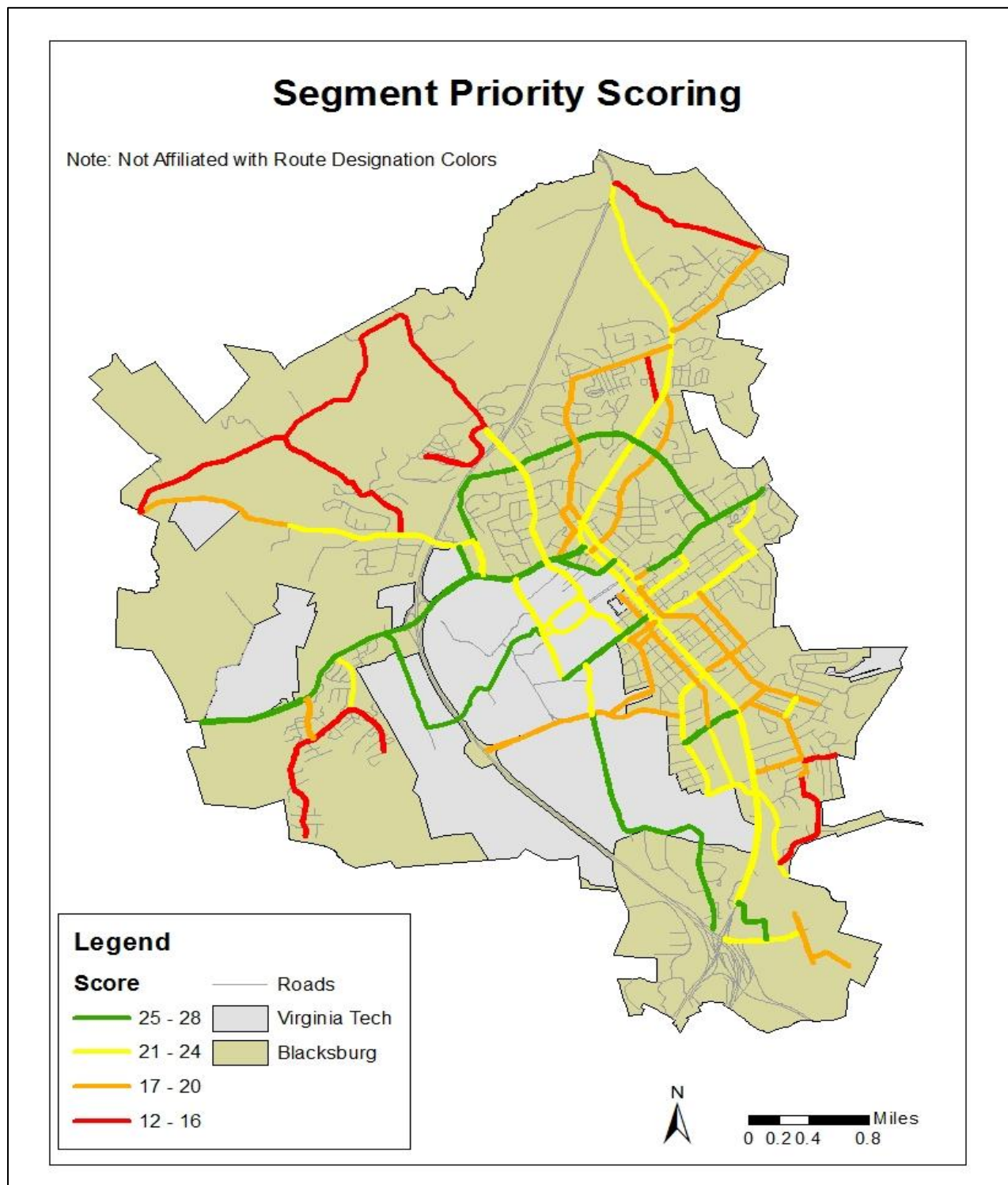
Bike Continuity: 3 missing link, 2 potential link, 1 no immediate adjacency  
 Accident History: 3 major accidents, 2 minor accidents, 1 near misses  
 Development Project: 3 pending, 2 proposed, 1 potential, 0 developed  
 Affordability: 3 signage, 2 markings, 1 bike path, 0 prohibitive  
 Schools: 3 - within 1 mile, 2 - within 2 mile, 1 - within 3 miles, 0 - >3 miles  
 Retail - 3 - within 1 mile, 2 - within 2 miles, 1 within 3 miles, 0 - >3 miles  
 Bus Connections - 3 - within 1 mile, 2 - within 2 miles, 1 within 3 miles, 0 - >3  
 Upgrade to Existing Facility - 3 - restriping/signage, 2 - repairs, 1 -

University
Off Road Trails and Private Paths (TBD)

2	Moderate
3	High

resurfacing, 0 - construction of new facility  
 Off Road Opportunity - 3 - available R/W, 2  
 - undeveloped green space, 1 R/W  
 required, 0 prohibitive  
 High Volume and Speed - 3 - >35 mph and  
 2000 vpd, 2 >25 mph and 2000 vpd, 1 less  
 than 25 mph and 2000 vpd

The following map displays the results of the priority scoring system.



#### D. APPENDIX IV Estimated Costs

##### 1. Total Network

LINE	Cost
BLUE	\$142,258
AZURE	\$197,552
RED	\$28,627
GREEN	\$16,832
BROWN	\$13,602
PURPLE	\$102,718
YELLOW	\$45,439
MAROON	\$193,754
ORANGE	\$222,810
GREY	\$283,201
PINK	\$44,204
HUCKLEBERRY	\$207,570
BIKE MARKINGS	\$30,000
<b>TOTAL</b>	<b>\$1,528,567</b>
<b>Without Huckleberry</b>	<b>\$1,320,997</b>

## 2. Blue Line

BLUE LINE						
Bike Lanes						
Street	From_Street	To_Street	Length	Unit_Cost	Est_Tot_Cost	
N. Main Street	Patrick Henry	Red Maple Dr	3218	\$1	\$3,218	
N. Main Street	Red Maple Drive	Patrick Henry	3202	\$1	\$3,202	
N. Main Street	Progress	Patrick Henry	3916	\$1	\$3,916	
N. Main Street	Patrick Henry	Progress	3640	\$1	\$3,640	
S. Main Street	Airport	Washington	3004	\$1	\$3,004	
S. Main Street	Washington	Airport	3022	\$1	\$3,022	
S. Main Street	Professional Park Dr	Airport	9467	\$1	\$9,467	
S. Main Street	Airport	Professional Park Dr	9385	\$1	\$9,385	
S. Main Street	Industrial Park	Professional Park Dr	1329	\$1	\$9,385	
				SUBTOTAL	\$48,237	
Sharrows						
Street	From_Street	To_Street	Length	Unit_Cost	Count	Est_Tot_Cost
N. Main Street	College	Progress	2959	\$250	12	\$3,000
N. Main Street	Progress	College	3099	\$250	12	\$3,000
S. Main Street	Washington	College	1330	\$250	5	\$1,250
S. Main Street	College	Washington	1312	\$250	5	\$1,250
					SUBTOTAL	\$8,500
Multi Use						
Street	From_Street	To_Street	Length	Unit_Cost	Est_Tot_Cost	
N. Main Street	Bishop	Red Maple	7502	\$11.40	\$85,522	
				SUBTOTAL	\$85,522	
		ESTIMATED TOTAL BLUE LINE COST				\$142,258

### 3. Azure Line

<b>AZURE LINE</b>						
<b>Bike Lanes</b>						
Street	From_Street	To_Street	Length	Unit_Cost	Est_Tot_Cost	
Givens	N. Main Street	Progress	4469	\$1	\$4,469	
Givens	Progress	N. Main Street	4615	\$1	\$4,615	
Progress	Patrick Henry	Winston	3179	\$1	\$3,179	
Progress	Winston	Patrick Henry	3193	\$1	\$3,193	
Progress	Patrick Henry	Givens	1574	\$1	\$1,574	
Progress	Givens	Patrick Henry	1612	\$1	\$1,612	
				<b>Subtotal</b>	<b>\$18,643</b>	
<b>Sharrow</b>						
Street	From_Street	To_Street	Length	Unit Cost	Count	Est Total Cost
Bishop	Mt. Tabor	460	5940	\$250	24	\$6,000
Bishop	460	Mt. Tabor	5900	\$250	24	\$6,000
Mt. Tabor	Main	Bishop	4496	\$250	18	\$4,500
Mt. Tabor	Bishop	Main	4486	\$250	18	\$4,500
Giles	N. Main Street	N. Main Street	7040	\$250	28	\$7,000
Giles	N. Main Street	N. Main Street	7101	\$250	28	\$7,000
Progress	N. Main Street	Winston	249	\$250	1	\$250
Progress	Winston	N. Main Street	211	\$250	1	\$250
Progress	N. Main Street	Jackson	3221	\$250	13	\$3,250
Progress	Jackson	N. Main Street	3170	\$250	13	\$3,250
Church	Clay	Jackson	1314	\$250	5	\$1,250
Church	Jackson	Clay	1304	\$250	5	\$1,250
Jackson	Church	Progress	170	\$250	1	\$250
Jackson	Progress	Church	165	\$250	1	\$250
Watson	Progress	Kabrich	377	\$250	2	\$500
Watson	Kabrich	Progress	368	\$250	2	\$500
Kabrich	Watson	Webb	886	\$250	4	\$1,000
Kabrich	Webb	Watson	887	\$250	4	\$1,000
Webb	Kabrich	Prices Fork	1182	\$250	5	\$1,250
Webb	Prices Fork	Kabrich	1134	\$250	5	\$1,250
Turner	Progress	Prices Fork	2262	\$250	10	\$2,500
Turner	Prices Fork	Progress	2376	\$250	10	\$2,500
Whipple	Main	Gives	1857	\$250	8	\$2,000
Whipple	Givens	Main	1917	\$250	8	\$2,000
				<b>Subtotal</b>		<b>\$59,500</b>
<b>Multi Use</b>						
Street	From_Street	To_Street	Length	Unit_Cost	Est_Tot_Cost	
Bishop	460	Mt. Tabor	5905	\$11.40	\$ 67,320	
Mt. Tabor	Bishop	Main	4569	\$11.40	\$ 52,090	
				<b>Subtotal</b>	<b>\$ 119,409</b>	
<b>ESTIMATED TOTAL AZURE LINE COST</b>						<b>\$197,552</b>

#### 4. Red Line

<b><u>RED LINE</u></b>					
<b>Bike Lanes</b>					
Street	From_Street	To_Street	Length	Unit_Cost	Est_Tot_Cost
University City Blvd	Prices Fork	Glade	1470	\$1	\$1,470
University City Blvd	Glade	Prices Fork	1472	\$1	\$1,472
University City Blvd	Glade	Broce	835	\$1	\$835
University City Blvd	Broce	Glade	817	\$1	\$817
University	Broce	Toms Creek	3574	\$1	\$3,574
University	Toms Creek	Broce	3596	\$1	\$3,596
Patrick Henry	Harding	Giles	3255	\$1	\$3,255
Patrick Henry	Giles	Harding	3241	\$1	\$3,241
Patrick Henry	Giles	N. Main Street	964	\$1	\$964
Patrick Henry	N. Main Street	Giles	960	\$1	\$960
Patrick Henry	N. Main Street	Toms Creek	4254	\$1	\$4,254
Patrick Henry	Toms Creek	N. Main Street	4189	\$1	\$4,189
				<b>Subtotal</b>	<b>\$28,627</b>
		<b>ESTIMATED TOTAL RED LINE COST</b>			<b>\$28,627</b>

## 5. Green Line

<b>GREEN LINE</b>						
<b>Bike Lanes</b>						
Street	From_Street	To_Street	Length	Unit_Cost	Est_Tot_Cost	
Harding Ave	Owens	Ascot	3953	\$1	\$3,953	
Harding Ave	Ascot	Owens	3928	\$1	\$3,928	
Harding Ave	Owens	Bennett	1227	\$1	\$1,227	
Harding Ave	Bennett	Owens	1224	\$1	\$1,224	
				<b>Subtotal</b>	<b>\$10,332</b>	
<b>Sharrows</b>						
Street	From_Street	To_Street	Length	Unit_Cost	Count	Est_Tot_Cost
Owens	Harding	Roanoke	544	\$ 250	2	\$ 500
Owens	Roanoke	Harding	614	\$ 250	2	\$ 500
Roanoke	Owens	S. Main Street	2185	\$ 250	9	\$ 2,250
Roanoke	S. Main Street	Owens	2180	\$ 250	9	\$ 2,250
Harding	Bennett	Progress	549	\$ 250	2	\$ 500
Harding	Progress	Bennett	542	\$ 250	2	\$ 500
					<b>Subtotal</b>	<b>\$ 6,500</b>
		<b>ESTIMATED TOTAL GREEN LINE COST</b>				<b>\$ 16,832</b>

## 6. Brown Line

<b>BROWN LINE</b>						
<b>Bike Lanes</b>						
Street	From_Street	To_Street	Length	Unit_Cost	Est_Tot_Cost	
Clay	Alleghany	Jefferson	1547	\$ 1	\$ 1,547	
Clay	Jefferson	Alleghany	1555	\$ 1	\$ 1,555	
				<b>Subtotal</b>	<b>\$ 3,102</b>	
<b>Sharrows</b>						
Street	From_Street	To_Street	Length	Unit_Cost	Count	Est_Tot_Cost
Clay	Jefferson	S. Main Street	2844	\$ 250	11	\$ 2,750
Clay	S. Main Street	Jefferson	2851	\$ 250	11	\$ 2,750
E. Roanoke	Harding	Clay	2549	\$ 250	10	\$ 2,500
E. Roanoke	Clay	Harding	2576	\$ 250	10	\$ 2,500
					<b>Subtotal</b>	<b>\$ 10,500</b>
<b>ESTIMATED TOTAL BROWN LINE COST</b>						<b>\$ 13,602</b>

## 7. Purple Line

<b>PURPLE LINE</b>						
<b>Bike Lane (Contra Flow or Cycle Track)</b>						
Street	From_Street	To_Street	Length	Unit_Cost	Est_Tot_Cost	
Draper	Airport	Country Club	1824	\$ 1	\$ 1,824	
				<b>Subtotal</b>	<b>\$ 1,824</b>	
<b>Sharrows</b>						
Street	From_Street	To_Street	Length	Unit_Cost	Count	Est_Tot_Cost
Hubbard	Airport	S. Main Street	1887	\$ 250	8	\$ 2,000
Hubbard	S. Main Street	Airport	1855	\$ 250	8	\$ 2,000
Airport	Hubbard	S. Main Street	5162	\$ 250	21	\$ 5,250
Airport	S. Main Street	Hubbard	5213	\$ 250	21	\$ 5,250
Graves	S. Main Street	Willard	1773	\$ 250	7	\$ 1,750
Graves	Willard	S. Main Street	1775	\$ 250	7	\$ 1,750
Willard	Graves	Clay	2537	\$ 250	10	\$ 2,500
Willard	Clay	Graves	2546	\$ 250	10	\$ 2,500
Draper	Airport	College	4271	\$ 250	17	\$ 4,250
Draper	College	Airport	4268	\$ 250	17	\$ 4,250
					<b>Subtotal</b>	<b>\$ 31,500</b>
<b>Multi Use</b>						
Street	From_Street	To_Street	Length	Unit_Cost	Est_Tot_Cost	
Ellet	Town Limit	S. Main Street	3660	\$11.40	\$41,720	
Gables-FirstMain	Country Club	Hubbard	2427	\$11.40	\$27,673	
				<b>Subtotal</b>	<b>\$69,393</b>	
<b>ESTIMATED TOTAL PURPLE LINE COST</b>						<b>\$102,718</b>



## 8. Yellow Line

<b>YELLOW LINE</b>						
<b>Bike Lanes</b>						
Street	From_Street	To_Street	Length	Unit_Cost	Est_Tot_Cost	
Country Club	Airport	S. Main Street	2213	\$1	\$2,213	
Country Club	S. Main Street	Airport	2226	\$1	\$2,226	
				<b>Subtotal</b>	<b>\$4,439</b>	
<b>Sharrows</b>						
Street	From_Street	To_Street	Length	Unit Cost	Count	Est Total Cost
Cedar Hill	Ellett	Sussex	3604	\$250	14	\$3,500
Cedar Hill	Sussex	Ellett	3516	\$250	14	\$3,500
Sussex	Cedar Hill	New Kent	812	\$250	4	\$1,000
Sussex	New Kent	Cedar Hill	878	\$250	4	\$1,000
New Kent	Sussex	Grissom	203	\$250	1	\$250
New Kent	Grissom	Sussex	270	\$250	1	\$250
Grissom	Country Club	New Kent	3575	\$250	15	\$3,750
Grissom	New Kent	Country Club	3642	\$250	15	\$3,750
Country Club	S. Main Street	Palmer	1389	\$250	6	\$1,500
Country Club	Palmer	S. Main Street	1394	\$250	6	\$1,500
Palmer	Sunrise	Clay	6775	\$250	27	\$6,750
Palmer	Clay	Sunrise	6800	\$250	27	\$6,750
Park	Grissom	Palmer	842	\$250	3	\$750
Park	Palmer	Grissom	824	\$250	3	\$750
Nellie's Cave	Town Limit	Grissom	1156	\$250	5	\$1,250
Nellie's Cave	Grissom	Town Limit	1141	\$250	5	\$1,250
Marlington	S. Main Street	Grissom	1755	\$250	7	\$1,750
Marlington	Grissom	S. Main Street	1746	\$250	7	\$1,750
					<b>Subtotal</b>	<b>\$41,000</b>
<b>ESTIMATED TOTAL YELLOW LINE COST</b>						<b>\$45,439</b>

## 9. Maroon Line

MAROON LINE						
Bike Lanes						
Street	From_Street	To_Street	Length	Unit_Cost	Est_Tot_Cost	
Research Center Drive	Industrial Park Drive	Tech Center Drive	3779	\$1	\$3,779	
Research Center Drive	Tech Center Drive	Industrial Park Drive	3742	\$1	\$3,742	
Tech Center Drive	Research Center Drive	Southgate	7471	\$1	\$7,471	
Tech Center Drive	Southgate	Research Center Drive	7482	\$1	\$7,482	
Industrial Park Drive	Commerce	S. Main Street	2755	\$1	\$2,755	
Industrial Park Drive	S. Main Street	Commerce	2754	\$1	\$2,754	
State	End	Trade	976	\$1	\$976	
State	Trade	End	973	\$1	\$973	
Trade	State	Commerce	565	\$1	\$565	
Trade	Commerce	State	544	\$1	\$544	
Commerce	End	End	2033	\$1	\$2,033	
Commerce	End	End	2033	\$1	\$2,033	
Professional Park	Prosperity	S. Main Street	1469	\$1	\$1,469	
Professional Park	S. Main Street	Prosperity	1505	\$1	\$1,505	
Prosperity	Professional Park	Industrial Park Drive	825	\$1	\$825	
Prosperity	Industrial Park Drive	Professional Park	708	\$1	\$708	
Stanger	Prices Fork	Drillfield	1936	\$1	\$1,936	
West Campus Drive	Prices Fork	Washington	4206	\$1	\$4,206	
West Campus Drive	Washington	Prices Fork	4206	\$1	\$4,206	
Washington	West Campus Drive	Draper	3640	\$1	\$3,640	
Spring	Southgate	Washington	2034	\$1	\$2,034	
Spring	Washington	Southgate	2036	\$1	\$2,036	
Clay	Main	Kent	1196	\$1	\$1,196	
Clay	Kent	Main	1197	\$1	\$1,197	
Stanger	Drillfield	Prices Fork	1766	\$1	\$1,766	
3A	Ramble	Industrial Park Drive	450	\$1	\$450	
3A	Industrial Park Drive	Ramble	508	\$1	\$508	
				Subtotal	\$62,790	
Sharrows						
Street	From_Street	To_Street	Length	Unit Cost	Count	Est Total Cost
Harrell	Clay	Sterrett	2091	\$250	9	\$2,250
Harrell	Sterrett	Clay	2142	\$250	9	\$2,250
Sterrett	Harrell	Southgate	1799	\$250	7	\$1,750
Sterrett	Southgate	Harrell	1788	\$250	7	\$1,750
Plantation	Apts	Prices Fork	1185	\$250	5	\$1,250
Plantation	Prices Fork	Apts	1165	\$250	5	\$1,250
Miller	Harrell	Main	688	\$250	3	\$750
Miller	Main	Harrell	689	\$250	3	\$750
Washington	Draper	Main	290	\$250	1	\$250
Washington	Main	West Campus	3903	\$250	16	\$4,000
Kent	Washington	Clay	293	\$250	1	\$250
Kent	Clay	Washington	286	\$250	1	\$250
Drillfield	Alumni	Alumni	3769	\$250	15	\$3,750
Kent	Washington	Drillfield	2198	\$250	9	\$2,250
Kent	Drillfield	Washington	1572	\$250	6	\$1,500
Drillfield	Drillfield	West Campus	379	\$250	2	\$500
Drillfield	West Campus	Drillfield	452	\$250	2	\$500
					Subtotal	\$25,250
MultiUse						
Street	From_Street	To_Street	Length	Unit_Cost	Est_Tot_Cost	
Plantation	Plantation (EXT)	Apt	2764	\$11.40	\$31,511	
Plantation EXT	Plantation	West Campus	6139	\$11.40	\$69,985	
Plantation EXT	Plantation	West Campus	370	\$11.40	\$4,218	
				Subtotal	\$105,714	
		ESTIMATED TOTAL MAROON LINE COST			\$193,754	

## 10. Orange Line

<b>ORANGE LINE</b>						
<b>Bike Lanes</b>						
Street	From_Street	To_Street	Length	Unit_Cost	Est_Tot_Cost	
Prices Fork	University City Blvd	N. Main Street	4065	\$1	\$4,065	
Prices Fork	N. Main Street	University City Blvd	4001	\$1	\$4,001	
Tall Oaks	Hethwood	East Cul-de-sac	3991	\$1	\$3,991	
Tall Oaks	East Cul-de-sac	Hethwood	3872	\$1	\$3,872	
Prices Fork	460 Ramp	University City Blvd	1745	\$1	\$1,745	
Prices Fork	University City Blvd	460 Ramp	1444	\$1	\$1,444	
Prices Fork	Town Limit	460	7808	\$1	\$7,808	
Prices Fork	Hethwood	Town Limit	3711	\$1	\$3,711	
Hethwood	Tall Oaks	Prices Fork	1628	\$1	\$1,628	
Hethwood	Prices Fork	Tall Oaks	1644	\$1	\$1,644	
				<b>Subtotal</b>	<b>\$33,910</b>	
<b>Left Bike Lane</b>						
Street	From_Street	To_Street	Length	Unit_Cost	Est_Tot_Cost	
Prices Fork	Plantation	University City Blvd	4121	\$ 1	\$ 4,121	
					<b>Subtotal</b>	<b>\$ 4,121</b>
<b>Sharrows</b>						
Street	From_Street	To_Street	Length	Unit_Cost	Count	Est_Tot_Cost
Tall Oaks	West Cul-de-sac	Hethwood	4331	\$ 250	17	\$ 4,250
Tall Oaks	Hethwood	West Cul-de-dac	4338	\$ 250	17	\$ 4,250
					<b>Subtotal</b>	<b>\$ 8,500</b>
<b>Multi Use</b>						
Street	From_Street	To_Street	Length	Unit_Cost	Est_Tot_Cost	
Prices Fork	Town Limit	Plantation	7801	\$11.40	\$ 88,932	
Price's Fork	Plantation	West Campus	5339	\$11.40	\$ 60,861	
Heather	Tall Oaks	Prices Fork	2323	\$11.40	\$ 26,488	
				<b>Subtotal</b>	<b>\$ 176,280</b>	
				<b>ESTIMATED TOTAL ORANGE LINE COST</b>		<b>\$ 222,810</b>

## 11. Grey Line

<b>GREY LINE</b>						
<b>Bike Lanes</b>						
Street	From_Street	To_Street	Length	Unit_Cost	Est_Tot_Cost	
Toms Creek	460 Bypass	Prices Fork	5818	\$ 1	\$ 5,818	
Toms Creek	Prices Fork	460 Bypass	5821	\$ 1	\$ 5,821	
Glade	University City Blvd	Linwood	6688	\$ 1	\$ 6,688	
Glade	Linwood	University City Blvd	6714	\$ 1	\$ 6,714	
Old Glade	Prices Fork	Glade	1219	\$ 1	\$ 1,219	
Old Glade	Glade	Prices Fork	1209	\$ 1	\$ 1,209	
				<b>Subtotal</b>	<b>\$ 27,470</b>	
<b>Sharrow</b>						
Street	From_Street	To_Street	Length	Unit Cost	Count	Est Total Cost
Glade	Linwood	Meadowbrook	5634	\$ 250	23	\$5,750
Glade	Meadowbrook	Linwood	5618	\$ 250	23	\$5,750
Meadowbrook	Glade	Shadow Lake	6113	\$ 250	25	\$6,250
Meadowbrook	Shadow Lake	Glade	6140	\$ 250	25	\$6,250
Shadow Lake	Meadowbrook	Glade	6131	\$ 250	25	\$6,250
Shadow Lake	Glade	Meadowbrooke	6136	\$ 250	25	\$6,250
Honeysuckle	End	Toms Creek	3595	\$ 250	14	\$3,500
Honeysuckle	Toms Creek	End	3582	\$ 250	14	\$3,500
					<b>Subtotal</b>	<b>\$43,500</b>
<b>Multi Use</b>						
Street	From_Street	To_Street	Length	Unit_Cost	Est_Tot_Cost	
Tom's Creek	Meadowbrook	460 Bypass	5422	\$11.40	\$ 61,813	
Shadow Lake	Glade	Meadowbrook	6141	\$11.40	\$ 70,010	
Meadowbrook	Shadow Lake	Toms Creek	7053	\$11.40	\$ 80,408	
				<b>Subtotal</b>	<b>\$ 212,232</b>	
				<b>ESTIMATED TOTAL GREY LINE COST</b>		
				<b>\$ 283,201</b>		

## 12. Pink Line

<b>PINK LINE</b>						
<b>Sharrow</b>						
Street	From_Street	To_Street	Length	Unit_Cost	Count	Est_Tot_Cost
Southgate	Huckleberry B	460	6126	\$ 250	25	\$ 6,250
Southgate	460	Huckleberry Bridge	6071	\$ 250	25	\$ 6,250
Southgate	Airport	Huckleberry Bridge	1127	\$ 250	5	\$ 1,250
Southgate	Huckleberry B	Airport	1133	\$ 250	5	\$ 1,250
					<b>Subtotal</b>	<b>\$ 15,000</b>
<b>MultiUse</b>						
Street	From_Street	To_Street	Length	Unit_Cost	Est_Tot_Cost	
Southgate	460	Duckpond	2562	\$11.40	\$ 29,204	
				<b>Subtotal</b>	<b>\$ 29,204</b>	
		<b>ESTIMATED TOTAL PINK LINE COST</b>			<b>\$ 44,204</b>	

## 13. Huckleberry Trail

<b>HUCKELBERRY</b>		
<b>Future</b>		
Length		
18208	\$11.40	\$207,570
<b>ESTIMATED HUCKLEBERRY TOTAL COST</b>		<b>\$207,570</b>

## 14. Bike Markings

Bicycle Symbols				
COUNT	UNIT_COST	TOTAL_COST	Street_1	Street_2
4	\$250	\$1,000	Prices Fork	Hethwood
4	\$250	\$1,000	Prices Fork	University City
8	\$250	\$2,000	Toms Creek	UCB/Patrick Henry
4	\$250	\$1,000	Prices Fork	West Campus
8	\$250	\$2,000	Main	Patrick Henry
8	\$250	\$2,000	Patrick Henry	Progress
8	\$250	\$2,000	Main	Progress
4	\$250	\$1,000	Main	Prices Fork
8	\$250	\$2,000	Main	Turner
4	\$250	\$1,000	Main	Roanoke
8	\$250	\$2,000	Tech Center	Southgate
4	\$250	\$1,000	Main	Washington
8	\$250	\$2,000	Main	Graves
8	\$250	\$2,000	Main	County Club
4	\$250	\$1,000	Main	Marlington
4	\$250	\$1,000	Main	Hubbard
4	\$250	\$1,000	Prices Fork	Heather
4	\$250	\$1,000	Main	Clay
8	\$250	\$2,000	Prices Fork	Toms Creek
4	\$250	\$1,000	University City	Glade
4	\$250	\$1,000	Prices Fork	Plantation
	Total	120		\$30,000

## E. APPENDIX V Rendering for Proposed Facilities

### 1. Draper Road from Country Club to Airport Road - Proposed Contra-flow Lane





2. S. Main Street from Airport Road to Washington Street – Road Diet





3. N. Main Street from Progress Street to College Avenue – Proposed Sharrows

