

CHAPTER 3: THE 5 E'S OF BICYCLE AND PEDESTRIAN PLANNING

The success and effectiveness of a bicycle and pedestrian network depends on many factors. A comprehensive approach to creating a bicycle- and walk-friendly region is more effective than focusing solely on infrastructure issues. Recognizing this, the



**BICYCLE FRIENDLY
COMMUNITY**



League of American Bicyclists and the Pedestrian and Bicycle Information Center recommend a multifaceted approach based on the five E's: Engineering, Education, Encouragement, Enforcement, and Evaluation & Planning.

This chapter will identify recommendations to address these categories. When developing education and outreach programs, it is also important to remember there are several fundamental benefits of bicycling and walking:

- **Transportation Network Benefits:** Bicycling is often quicker than driving for short trips, it helps alleviate local traffic congestion, and certain demographics (children, adolescents and sometimes seniors) rely on it as their sole means of mobility. Forty percent of all trips in the U.S. are three miles or less, and two-thirds of them happen in automobiles.¹ Bicycle and pedestrian infrastructure is also low-cost when compared to motor vehicle infrastructure, and it reduces the amount of space needed for automobile parking.
- **Health Benefits:** Bicycling is an excellent form of exercise that has been linked with increased cardiovascular health, which reduces the likelihood of stroke, heart disease and obesity. Doctors are even starting to “prescribe” bicycling and walking. Bicycling has also been found to lower healthcare costs.
- **Economic Benefits:** A comprehensive bicycle and pedestrian network and its associated facilities can help connect people to local businesses and generate new trips to retail and tourist destinations. When bicyclists visit the area, they are likely to spend money on food, lodging and other travel costs. The City of Fredericksburg and counties of Spotsylvania and Stafford could benefit greatly from a comprehensive bicycle and pedestrian network that connects all the Fredericksburg and Spotsylvania National Military Park sites. Additionally, bicycling and walking help save on automobile-related fuel and maintenance costs.
- **Environmental Benefits:** Bicycling and walking create opportunities to decrease air and noise pollution because they require zero fossil fuels. They reduce the need to build, service and dispose of automobiles. They also require less space than automobiles, providing opportunities to increase green space.
- **Community Benefits:** A community with a comprehensive bicycle and pedestrian network tends to generate a significant amount of bicycle and pedestrian traffic, which promotes interaction between residents and, in turn, can create a greater sense of community. Higher levels of bicycling and walking also have a positive impact on an area's perceived sense of safety and livability.

ENGINEERING

Engineering refers to creating safe, accessible and convenient places to bicycle, walk and park. It also refers to a community's current bicycle and pedestrian infrastructure, what conditions it is in and what amenities are provided. Changes to the built environment through engineering improvements are extremely important components of a

¹ <http://peopleforbikes.org/national-household-travel-survey-trip-distances-2009/>

successful bicycle and pedestrian plan. Making these improvements cost effective, comprehensive and implemented in a timely manner will be important in creating a robust bicycle and pedestrian network.

The most visible and perhaps most tangible evidence of a great place for bicycling and walking is the presence of infrastructure that welcomes and supports it. Survey after survey shows the physical environment is a key determinant in whether people will get on a bicycle and ride. The most advanced bicycle and walk friendly communities have well-connected networks, consisting of quiet neighborhood streets, conventional and protected bike lanes, shared-use paths, and policies to ensure connectivity and maintenance of these facilities. Secure, convenient and readily available bicycle parking is also a key component. Great bicycle parking, in addition to showers and locker facilities, are vital to promoting bicycling in the workplace and the wider community.

SAFE ROUTES TO SCHOOL

Safe Routes to School (SRTS) is a federal transportation program that uses a comprehensive approach to make routes to and from school safer for children to walk and bicycle. These programs can be developed by numerous stakeholders, but overall, the schools must be in full cooperation for the program to succeed. Partnerships may include the schools/school districts, localities, community groups, health professionals, regional organizations, etc. These programs also promote healthier living through exercise and improve air quality by reducing the number of vehicle trips required to transport students to and from school.

In Virginia, funding for this program is divided into four grant categories. Please refer to Table 5 for information on each grant. The Infrastructure Grants are for projects within a two-mile radius of the school. For more information, please visit the Safe Routes to School website.

Table 5: Virginia Safe Routes to School Program Grants

Grant Type	Amount	Due Dates
QuickStart Mini-grants – \$1,000 grants for schools interested in funding a small (or large) Safe Routes to School activity.	\$1,000	Six times per year; spring and fall
Walkabout Mini-grants – a hands-on walking and bicycling infrastructure survey and written report about the walking and bicycling conditions in the area around their school coordinated by the Local Technical Assistance Coordinator serving their region.	Varies	Twice a year; spring and fall
Non-Infrastructure Grants – grants for education, encouragement, evaluation and enforcement programs related to Safe Routes to School. Can also be used to fund a SRTS coordinator.	\$5,000 - \$100,000	Once a year; spring
Infrastructure Grants – The VDOT Local Assistance Division manages the application and award process for all Transportation Alternatives Program projects, including SRTS-designated projects.	Varies	Once a year; due November 1

Source: http://www.virginiadot.org/programs/srsm_school_travel_plans_and_grants.asp

SHARED-USE PATHS AND TRAILS

Shared-use paths and trails are at the backbone of any bicycle and pedestrian infrastructure network, as well as the backbone of this plan. These facilities are intended to be used solely by cyclists and pedestrians and offer a space free from the concerns of automobile traffic. Shared-use paths and trails are at least eight feet in width and can include a dashed centerline. It is crucial for localities to continue to take a proactive approach to addressing bicycle and pedestrian demands and its importance in reducing congestion and reliance on the automobile.

BICYCLE PARKING

Bicycle parking features can range from a simple bicycle rack to an elaborate parking structure equipped with showers, lockers, and secure bicycle storage for cyclists. In some cases, these parking features offer maintenance for members of the facility. All bicycle parking racks should comply with the performance criteria listed in Table 4.

Table 4: Performance Criteria for Bicycle Parking Racks

Criteria	Details
Supports bike upright without putting stress on wheels	The rack should provide two points of contact with the frame – at least 6” apart horizontally. Or, if a rack cradles a bicycle’s wheel, it must also support the frame securely at one point or more. The rack’s high point should be at least 32”.
Accommodates a variety of bicycles and attachments	Avoid designs and spacing that restrict the length, height, or width of bicycles, attachments, or wheels.
Allows locking of frame and at least one wheel with a U-lock	A closed loop of the rack should allow a single U-lock to capture one wheel and a closed section of the bike frame. Rack tubes with a cross section larger than 2” can complicate the use of smaller U-locks.
Provides security and longevity features appropriate for the intended location	Steel and stainless steel are common and appropriate materials for most racks. Use tamper-resistant mounting hardware in vulnerable locations. Rack finish must be appropriate to the location.
Rack use is intuitive	First-time users should recognize the rack as bicycle parking and should be able to use it as intended without the need for written instructions.

Source: “Essentials of Bike Parking,” The Association of Pedestrian and Bicycle Professionals

Effective bike parking for short-term users depends on two main factors: 1) proximity to the destination and 2) ease of use. Short-term bicycle parking is designed to meet the needs of people visiting businesses and institutions, and others with similar needs – typically lasting up to two hours. Short-term users may be infrequent visitors to a location, so the parking installation needs to be readily visible and self-explanatory. In places with limited sidewalk space and strong bicycle activity, placing bike parking in on-street bike corrals might make the most sense. Bike corrals generally hold eight to twelve bicycles and fit nicely in an on-street parking space.

Users of long-term parking generally place high value on security and weather protection. Long-term parking is designed to meet the needs of employees, residents, public transit users, and others with similar needs. These users typically park either at home or at a routine destination such as a workplace. They often leave their bicycles unmonitored for a period of several hours or longer, so they require security and weather protection that let them park without unreasonable concern for loss or damage.

Long-term parking can take a variety of forms, including a room within a residential building or workplace, a secure enclosure within a parking garage, or a cluster of bike lockers. Some long-term parking is open to the public, such as at a transit center, and some of it is on private property with access only for employees, residents, etc.



Covered Bicycle Parking in New York City

SIGNAGE, SIGNALS, AND PAVEMENT MARKINGS

Signs, signals, and pavement markings related to cyclists and pedestrians must adhere to the Manual for Uniform Traffic Control Devices (MUTCD), which ensures uniformity of traffic control devices across the nation. All must be properly designed and maintained to command respect from motorists and cyclists alike. For more information please refer to the MUTCD.

ENGINEERING STRATEGIES

- Continue to encourage regional school districts to institute Safe Routes to School programs;
- Include bicycle and pedestrian facilities in engineering documents, plans and drawings, where appropriate;
- Continue to work with localities to ensure shared-use paths and trails are interconnected;
- Continue to work with localities and VDOT to implement signage, signals and pavement markings, where appropriate; and
- Encourage local engineers and planners to attend non-motorized transportation trainings through the University of Virginia Transportation Training Academy.

EDUCATION

Education involves giving people of all ages, abilities and socioeconomic status the skills and confidence to bicycle and walk. Educational programs provide the groundwork for communities/regions to begin supporting bicycling; they raise community awareness, promote safety, and often help inform motorists, bicyclists and pedestrians how to navigate the public right of way. Ensuring current and potential motorists, bicyclists and pedestrians understand and practice essential rules of the road is a crucial component of a safe transportation network.

BIKE VIRGINIA

Bike Virginia is a 501(c)(3) non-profit organization that supports bicycling in Virginia through education, advocacy and public policy, facilitation and promotion to inspire more human-powered recreation and transportation on bicycles. Bike Virginia's mantra is "Biking makes sense. It is economical, environmentally friendly, and healthy."

Bike Virginia wants to improve the environment and increase the level of public health by encouraging individuals to burn calories in place of burning fossil fuels. They organize Bike Month and the Bike Virginia Tour, statewide programs that support improving the state of cycling. The organization also coordinates unique projects on top of the ongoing programs, including media campaigns, free learning webinars, share the road tip cards and educational videos.

BICYCLE HELMET DISTRIBUTION PROGRAM

Helmet use is of top priority in considering bicycle safety. Bicycle helmet programs can include demonstrations of proper fit, public service announcements, reduced helmet prices and free helmet giveaways. Local hospitals, health care providers, state agencies, private organizations, and local police departments often play an active role in promoting, organizing and participating in helmet safety and distribution programs.

The Virginia Bike Helmet Distribution program was established to provide children, ages 17 and under, with helmets in the towns, cities, and counties program sponsors visited when promoting bicycle events such as the annual Bike Virginia ride. Event registration fees along with the Virginia Department of Motor Vehicles mini-grants funded the distribution program. Bell Sports made available the previous model year's helmets at a discount price to groups

affiliated with the Safe Kids USA coalitions. There is a statewide Safe Kids USA coalition in Virginia as well as seven local coalitions.

CYCLOVIA

Cyclovias are days set aside for a section of streets to be used solely by bicyclists, pedestrians and just about any other human powered activity imaginable. Stemming from its Latin American origins and roughly translated from Spanish, cyclovía means “bike path”. These events have grown in popularity throughout the United States over the years and have been held in Roanoke, VA since 2009. One was also held in Richmond in 2014. With sponsorship through Bike Virginia, a cyclovía could become a yearly tradition in the GW Region and be used as a staging ground for bicycle education programs. It should be noted that cyclovias are not a replacement for bicycle and pedestrian infrastructure.



Cyclovía Participants –
Roanoke, VA

COMMUNITY YOUTH BICYCLE SAFETY INITIATIVES

Bicycle safety can be targeted locally through community youth bicycle safety initiatives. These programs are ongoing and continually reinforce bicycle safety through local youth groups, school groups, local recreation programs and community police programs. Helmet use, “rules of the road,” and local bicycle rides are often organized by youth groups and local volunteers.

BICYCLE SAFETY RODEOS



Discover Fairfax Bicycle Rodeo – Fairfax, VA

Bicycle safety rodeos are conducted throughout Virginia and provide a fun and interactive environment for teaching the benefits of bicycling and safe bicycling skills. Rodeos can be developed and organized for small or large groups and can provide a forum for other community programs such as bicycle registration, health and safety fairs, cyclovias, etc. Hospitals and health care providers as well as law enforcement agencies are frequently involved in sponsoring bicycle rodeos as a measure to reduce head-related trauma injuries through the proper use of bicycle helmets and safe cycling practices. Bicycle safety rodeos often feature the following components: bicycle safety

inspections; traffic cone/obstacle safety course; certificates for participation; proper helmet fitting instruction; and free helmets for children who do not own one.

ADULT BICYCLE PROGRAMS

Bicycle programs targeted towards adult audiences are needed to educate adult cyclists on today’s “rules of the road” and the importance of helmet use for all cyclists regardless of age. There are several programs and organizations with materials and courses targeted towards adult cyclists. For example, the League of American Bicyclists offers a Smart Cycling course for adults. Within Virginia there are 35 certified League Cycling Instructors, two of which are in the GW Region.

Similarly, Bike Virginia offers bicycle safety courses at many of its annual organized rides. These educational programs occur during registration and the information is reinforced during the ride with on-the-road skill building at select rest stops along the route. Participation in these safety programs is voluntary, but incentives are given to encourage participation. These skill building workshops, however, are restricted to those participating in the Bike Virginia events.

EDUCATIONAL OUTREACH STRATEGIES:

- Implement a bicycle and pedestrian safety education program into the curricula of elementary and middle schools;
- Submit yearly bicycle helmet mini-grant applications to provide helmets to low-income children. Possible applicants could include schools, community groups, localities and regional agencies;
- Hold an annual bicycle safety rodeo, cyclovia or both in the Region;
- Work with local League Cycling Instructors to offer Smart Cycling courses;
- Encourage members of local cycling clubs to become certified League Cycling Instructors; and
- Offer bicycle and pedestrian education courses for all ages at select community events around the Region (e.g. Earth Day, the Fredericksburg Agricultural Fair and the Virginia State Fair).

ENCOURAGEMENT

Programs and initiatives that encourage cycling and walking are also an important element in creating a bicycle and pedestrian friendly community. One way to promote and encourage cycling and walking is to provide maps, brochures and travel guides, which will help make cycling and walking more approachable and enjoyable. These steps can also improve experiences for novice and advanced cyclists alike. Another effective technique is to highlight the myriad of benefits cycling can provide.

BICYCLE MAPS/BROCHURES

Bicycle maps can provide invaluable information to encourage cycling. Specific bicycle routes are often highlighted in regional and local bicycle brochures, as well as other attractions and destinations that are easily accessible by bicycle, such as scenic roads, intermodal connections, historic and culturally significant sites, and recreational and natural resource locations. Area accommodations and unique events are often featured within a cycling brochure to promote extended stays.

The Virginia Department of Transportation publishes a *Bicycling in Virginia* map. This map focuses on routes and information that is of most interest to cyclists. It includes setting, terrain, elevation, as well as surface conditions. Inset enlargements of selected locations provide details for parking and other facilities. The colored areas of the map show Virginia's state parks, national parks, and tourism regions, making it simple to find further information about food, lodging and other attractions.

The GWRC could also develop a regional bicycle map. This map could illustrate bicycle facilities, walking/hiking trails, equestrian trails, and attractions in the Region. It could be published online and in print form through the GWRC, localities, and regional organizations.

WEBSITE INFORMATION

The internet can be an excellent source of information to encourage cycling. Established bicycle routes, local bike programs and organizations, and upcoming bicycle events such as organized rides, educational classes and bicycle

rodeos can be periodically posted on the web. For example, VDOT currently maintains a web page for its bicycle and pedestrian program and provides a variety of bicycle-related information and resources. In addition, many bicycle clubs in Virginia maintain websites to encourage participation and keep members informed of upcoming events.

BIKE TO WORK WEEK

Bike to Work Week is a national event that encourages commuters to forego their automobiles during a designated week in May. Bike to Work Week is intended to demonstrate that bicycle commuters have the potential to assist in alleviating traffic congestion, reduce parking issues, and support healthy communities. At the local level, communities can sponsor special events to generate awareness of Bike to Work Week. These events can include breakfast receptions with local officials, organized rides, and raffles for cyclists participating in Bike to Work Week. Out of the success of Bike to Work Week, some communities have designated a day, week or even an entire month for bicycle awareness. Public service announcements on local television stations, radio stations, and newspapers can help promote the events.

COMMUTER LOTS AND TRANSIT

Provisions for bicycles on transit vehicles and in commuter lots help encourage cycling and transit as alternative modes of transportations. Bicycle racks on buses and bicycle access to VRE stations and commuter lots has encouraged some commuters to consider cycling to stations or parking lots instead of driving. Providing secure and safe bicycle parking at intermodal stations, bus stops, train stations and commuter lots also reinforce cycling as a viable mode of access to transit.

BICYCLE TOURS

Organized tours are a popular means to encourage cycling. Tours vary from short local rides for cyclists of all levels to major, multi-day events. Virginia has a series of well-known bicycle tours including Bike Virginia, Pedal the Parkway, Fun Day on the Bay, and the Fall Foliage Festival. Additionally, there are two local tours: the Cannonball Century and the Lakes and Grapes Century Ride. These tours have been extremely successful and not only showcase great cycling opportunities in Virginia; they also encourage the communities along the tour to become bicycle friendly. Volunteers in each community often prepare meals, organize rest stops, and provide entertainment for the cyclists.

BICYCLE CLUBS

Local and regional bicycle clubs are often very active in bicycle education and encouragement. Bicycle clubs are a key advocacy group in developing local and regional bicycle networks. In addition to bicycle advocacy, bicycle clubs are often dedicated to promoting health and fitness benefits of cycling, as well as the sport of bicycle racing. Bicycle clubs are also involved with volunteer efforts for trail development, promotion, and maintenance.

There are a few bicycle advocacy and riding clubs already established in the GW Region. These clubs also perform trail maintenance, volunteer at community events, organize group rides, and have guided the development of a few bicycle and pedestrian plans. A list of these organizations could be included on a bicycle and pedestrian resources page on the FAMPO website.

ENCOURAGEMENT STRATEGIES:

- Encourage local elected officials to build and support bicycle and pedestrian improvements;
- Establish a webpage on the GWRC website that contains a comprehensive listing of bicycle and pedestrian resources;

- Publish a regional bicycle infrastructure map, both print and online;
- The GWRC will work with local organizations, agencies, businesses, and media to establish and promote Bike Month and a Bike to Work Day/Week in May;
- Encourage each locality to sponsor special events during Bike to Work Week;
- The GWRC will partner with VDOT/PRTC/localities to install covered and secure bicycle racks at commuter lots, transit centers and rail stations throughout the Region;
- The GWRC/FAMPO will work with localities to ensure bicycle racks are provided where needed;
- Encourage and work with the City of Fredericksburg to implement secure bicycle parking at the train station;
- Continue to work with FRED to ensure all its facilities are bicycle and pedestrian friendly;
- Coordinate with Bike Virginia/the Fredericksburg Cyclists Club to encourage more bicycle tours in the Region. These tours could include Downtown Fredericksburg and the Fredericksburg and Spotsylvania National Military Park; and
- The GWRC will continue to work with the Region’s various organizations and clubs to further cycling through technical support, community outreach, and by funding bicycle improvements.

ENFORCEMENT

The goal of enforcement is for bicyclists, pedestrians and motorists to recognize and respect each other’s rights on the roadway. Rules and regulations define user expectations and reduce the risk of injury. Law enforcement officers must understand these laws and regulations, know how to enforce them, and apply them equitably to ensure public safety. Similarly, having more police officers on bikes helps increase understanding of cyclists’ issues. Having law enforcement partners and great policies in place is essential to promoting bicycling.

In Virginia, a bicycle is considered a vehicle when operated on a roadway. Thus, cyclists and motorists basically have the same rights and duties, and the laws governing traffic regulation apply equally to both. Bicycle laws and regulations must be readily enforced in a manner to encourage bicycle use.²

POLICE BICYCLE PATROLS

Numerous police departments throughout the Commonwealth, including the City of Fredericksburg, King George County, and Spotsylvania County have successfully introduced bicycle patrols as part of their overall patrol efforts. These patrols have proven to be a particularly positive way for police officers to interact with the community. Police officers on bicycles can readily enforce laws and regulations by quickly and effectively addressing bicycle and pedestrian infractions. Bicycle police patrols have an added responsibility of following the “rules of the road” and demonstrating proper cycling etiquette by setting an example for other cyclists in the community. Bicycle patrols have also proven effective in educational, encouragement, and community outreach efforts.

BICYCLE AND PEDESTRIAN TICKETING

Ticketing illegal bicycle and pedestrian operations is sometimes needed to reinforce the importance of the “rules of the road.” Warnings may be appropriate in most cases, allowing the cyclist or pedestrian to recognize their mistake without paying a fine. Some police departments administer “tickets” that are coupons redeemable for discounted or free bicycle helmets for youth who are spotted without a helmet. Other communities distribute leaflets with the “rules of the road” or safety tips as a warning to cyclists and pedestrians not obeying traffic laws and regulations. Additionally, motorists must be held responsible when endangering cyclists and pedestrians. Failure to yield to pedestrians in marked

² More information on Virginia bicycling laws can be found at: <http://www.virginiadot.org/programs/bk-laws.asp>

or unmarked crosswalks, as well as harassment of cyclists, present major dangers to cyclists and pedestrians and discourage individuals from walking or cycling.

ENFORCEMENT STRATEGIES:

- Ensure Virginia’s laws regarding bicycles and pedestrians are readily available throughout the Region. These locations could include: community centers, libraries, recreational facilities, schools, and city and county government buildings;
- Establish police bicycle patrols in the localities that do not have them currently;
- Provide regional bicycle trainings for law enforcement officers; and
- Issue warnings to first-time offenders and tickets thereafter for observed bicycle and pedestrian infractions.

EVALUATION & PLANNING

The Region’s ability to track and measure travel behavior, safety, the condition of its infrastructure and the impact of its projects is critical for the planning process. A comprehensive bicycle and pedestrian plan, with dedicated funding and active support, is the foundation of a great bicycling and walking community, and progress without it is difficult. The GWRC its localities could survey cyclists and pedestrians on what can be done to improve their experiences. It may also behoove the localities and regional planners alike to survey non-cyclists and occasional walkers on what changes can be made to shift their behavior. Gathering and evaluating bicycle and pedestrian crash data will assist planners in locating trouble spots within the existing bicycle and pedestrian infrastructure so improvements can be made in a timely manner.

BICYCLE AND PEDESTRIAN CRASH REPORTING

Reporting, cataloging, and analyzing high-frequency bicycle and pedestrian crash locations, and the circumstances surrounding incidents, can help determine appropriate mitigation measures to improve bicycle and pedestrian travel. Bicycle and pedestrian crashes are often not reported unless they involve serious injury and the deployment of emergency services. Efforts to report all bicycle and pedestrian crashes can assist in identifying potential safety hazards for other users. The bicycling community and local bike clubs can assist localities in identifying these areas. It would also be beneficial for police officers to attend training courses for investigating crashes involving cyclists and pedestrians.

EVALUATION AND PLANNING STRATEGIES:

- Monitor the implementation of this Plan and evaluate progress through regularly-scheduled meetings of the BPAC;
- Continue to count bicycle and pedestrian activity on the Region’s shared-use paths;
- Continue to map bicycle- and pedestrian-related crash locations, and update periodically; and
- Utilize the crash location map to prioritize facility improvements, education initiatives and enforcement.