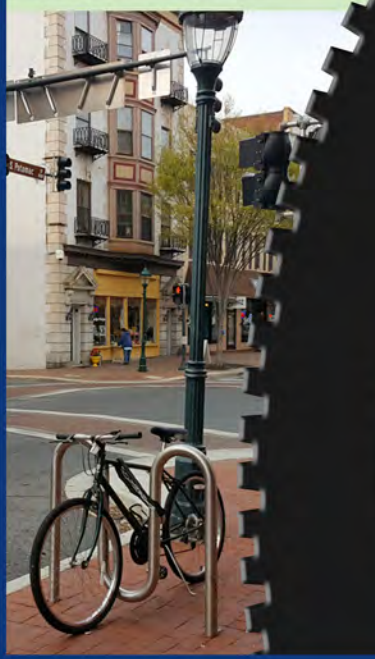

REGIONAL BICYCLE PLAN

July 2016

Submitted to : **Hagerstown/Eastern Panhandle Metropolitan Planning Organization**

Submitted by : **Michael Baker International, Inc.**

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Acknowledgments

The Hagerstown/Eastern Panhandle Metropolitan Planning Organization (HEPMPO) would like to thank the Bicycle Study Guiding Committee (BSGC) for its valuable contributions throughout the planning process.

Prepared for:

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Executive Summary

What is the Regional Bicycle Plan?

The Regional Bicycle Plan, encompassing three West Virginia counties (Morgan, Berkeley, and Jefferson) and Washington County, Maryland, is a collaborative effort on behalf of the Hagerstown/Eastern Panhandle Metropolitan Planning Organization (HEPMPO) and the plan's Bicycle Study and Guiding Committee (BSGC). The Plan identifies goals & objectives, evaluates existing bicycle conditions, and proposes context-sensitive recommendations that seek to improve safety and mobility for cyclists traveling in, around, and through the region.

How does the plan evaluate needs?

A bicycle-level-of-service (BLOS) tool was used to approximate bicycle comfort and a bicycle demand tool was used to predict where potential bicycle demand is highest. The BSGC helped steer the planning process, while the public participated in several web-based surveys and provided input at four workshops, with one held in each jurisdiction.

What does the Plan recommend?

The Regional Bicycle Plan recommends a variety of infrastructure, signage, and policy-oriented improvements to help create a safer, healthier bicycle environment. The Plan recommends designated bike lanes, signage to increase motorists' awareness of cyclists (see example on the left), paths for cyclists of all skill levels, and other recommendations that include special events, such as "Open Streets" days where a roadway is temporarily closed to car traffic, giving locals a fun opportunity to bike, walk, skate, and play.

Examples of the Plan's different types of infrastructure recommendations.

How can we get there?

The Plan includes an Implementation section that prioritizes investments based on a data-driven process, examining projects' varying proximities to schools, parks, trails, housing, and jobs. The Implementation section also considers anticipated construction costs, maintenance, community collaboration, and funding sources.

Did you know?

...the region is home to several nationally recognized bicycle routes, such as U.S. Bicycle Route 50 (which follows the C&O Canal Towpath) and U.S. Bicycle Route 11?

...the WV Route 9 Bike Path offers over 10 miles of virtually uninterrupted cycling?

...the Western Maryland Rail Trail (WMRT), extending from Big Pool Station, Maryland to Pearre, Maryland, hosted 135,000 visitors in 2011, contributing to $1.8 million in spending?

...the City of Hagerstown is designated a bronze-level Bicycle Friendly Community by the League of American Bicyclists?

Introduction

The Regional Bicycle Plan study area is comprised of three West Virginia counties (Morgan, Berkeley, and Jefferson) and Washington County, Maryland, and is bisected by the serpentine Potomac River. While the Potomac River physically divides the region and is an obstacle to regional bicycle connectivity, it also parallels the treasured C&O Canal Towpath and is dotted with historic trail towns, many of which are connecting their local bicycle networks to the C&O and other recreational facilities, such as the Western Maryland Rail Trail (WMRT). Meanwhile, new off-road paths in West Virginia, such as the Route 9 Bike Path, are drawing visitors from around the region and nearby communities are exploring opportunities for additional bicycle connectivity and expansion. This Regional Bicycle Plan seeks to identify and facilitate those connections and ultimately help identify guidelines for implementation.

This Regional Bicycle Plan is the culmination of several prior studies, such as Direction 2040, the region's Long-Range Transportation Plan (LRTP). The Regional Bicycle Plan highlights the benefits of cycling, proposes goals and objectives, discusses the existing bicycle network, evaluates bicycle safety, and concludes with a series of policy and infrastructure recommendations that strive to improve bicycle safety, signage, and connectivity throughout the region. The Plan uses public input and data analysis to help prioritize recommendations and includes additional funding guidance to help the region's communities implement improvements and expand their own bicycle networks.

Bike route signage in Williamsport, Maryland directs cyclists from downtown to the C&O Canal Towpath.

The Benefits of Cycling

Cycling can help stimulate local economies, particularly in those communities who offer bike-friendly connections to prominent bicycle routes. The Town of Williamsport, Maryland is a good example of a "trail community" whose bicycle infrastructure and signage make it easy for cyclists to travel between the C&O Canal Towpath and downtown (see image above).

Cycling can also help assist with weight loss and slow the decline of cardiovascular health in older adults. In addition, a shift from automobile travel to bicycle travel leads to reduced emissions, better air quality, and a healthier environment, overall.

The following summary provides additional detail on some of the tremendous benefits of cycling.

Economic Benefits

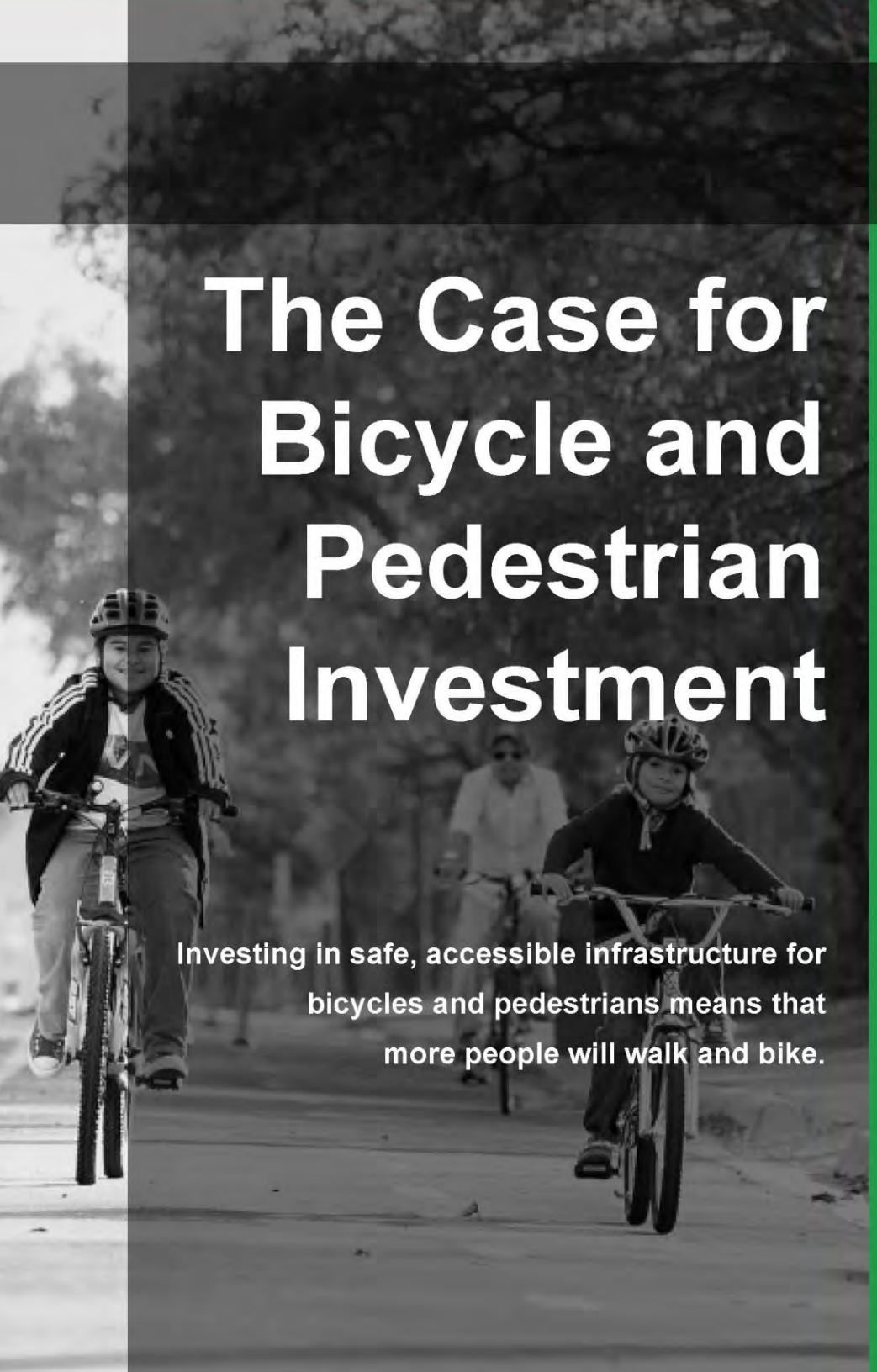
- The use of bicycling as a family's primary method of transportation helps lower the need for households to purchase automobiles and gas, saving families money.
- Bike trails help to increase the property values of nearby homes. A Portland, Oregon survey showed that 62 percent of the city's new residents said they factored in the city's bike-friendliness in their choice to move there (Bike Maryland).
- Bike trails also benefit communities by allowing bicyclists to visit and spend money at local shops and restaurants. The Great Allegheny Passage (GAP) in Pennsylvania boosted the local economy by providing over $4.0 million in direct revenue from the trail in just a year (Bike Maryland). On average, overnight trail users spent almost $100.00 per day in the trail towns (League of American Bicyclists).
- Bicycle projects help create more jobs per dollar invested than traditional highway projects. A study from the University of Massachusetts found that around 11.4 jobs are created per million dollars spent for bicycle projects, whereas only around 7.8 jobs are created for road projects (Bike Maryland).
- Investments in bike projects are very successful in the long-term. In Vermont, $9.8 million investments in bicycling infrastructure created 1,400 jobs and brought in $83.0 million in economic activity (Bike Maryland).

Health Benefits

- An increased rate of commuters choosing to bike to work would drastically reduce the amount of air pollution that would otherwise come from automobile emissions. This pollution severely hurts air quality and can cause serious health issues.
- Obesity is becoming increasingly prevalent in the United States and is leading to serious health risks, such as heart disease and diabetes. In West Virginia, adult obesity rates in 2014 were as high as 35.7 percent while childhood obesity rates (ages 10-17) were at 18.5 percent. Meanwhile, in 2014, the rate of adult diabetes cases in West Virginia was 14.1 percent, the highest in the country. Increasing the number of regular bicycle riders could greatly reduce the rate of obesity and obesity-related diseases (State of Obesity).
- On average, a person loses 13 pounds in his/her first year of riding a bike to work. Regular cycling can also reduce the risk of a heart attack by more than 50 percent (The Many Benefits of Cycling).

Environmental Benefits

- Increasing the mode share of all trips made by bicycling and walking from 12% to 15% could lead to fuel savings of 3.8 billion gallons a year and reduce greenhouse gas emissions by 33.0 million tons per year (Active Transportation for America).
- Approximately half of U.S. schoolchildren are dropped off at school in the family car. If 20.0 percent of those living within two miles of school were to bike or walk instead, it would save 4.3 million miles of driving per day. Over a year, that saved driving would prevent 356,000 tons of CO2 and 21,500 tons of other pollutants from being emitted (Safe Routes to School).



The Case for Bicycle and Pedestrian Investment

Investing in safe, accessible infrastructure for bicycles and pedestrians means that more people will walk and bike.

Between 2010-2014, Maryland's working population grew by 2%. Maryland's bicycle commuter population grew by[1] **12%**

More people walking and biking means...

- Reduced household transportation costs
- More transportation choices
- Reduced emissions, improved air quality
- Increased mobility for seniors, youth and disabled
- Improved safety for all users
- More economic activity on walkable and bikeable streets
- Equitable access to transit, jobs and services
- More choices for safe, active recreation

1 American Community Survey, Commuting Characteristics by Sex, 2010, 2014

Photo credit: Adam Coppola Photography, public domain

Opportunities

The League of American Bicyclists, a nationally recognized advocacy group that promotes cycling, provides resources and guidance to help businesses, communities, and states cultivate more bicycle-friendly environments. The League also ranks communities and states and awards unique distinctions for those who achieve standards pertaining to:

- Legislation and enforcement;
- Policies and programs;
- Infrastructure and funding;
- Education and encouragement; and
- Evaluation and planning.

In 2015, The League of American Bicyclists ranked Maryland as the 10th most bicycle friendly state in the country, down from 7th in 2014. Meanwhile, the League considers West Virginia the 42nd most bicycle friendly state, an improvement from 2014 where the state ranked 44th. The League also evaluates communities and the City of Hagerstown is one of only eight jurisdictions in Maryland and West Virginia with "Bicycle Friendly Community" status. While the rankings are not perfect indicators of bike friendliness, both states have room for improvement, and the Hagerstown/Eastern Panhandle region, with its rich recreational heritage, has an opportunity to be a model for other areas of the mid-Atlantic. The next section discusses the region's existing bicycle network and its unique capacity to draw visitors from around the country. This network will serve as the foundation for many future bicycle initiatives.

The Existing Regional Bicycle Network

The following section provides an overview of the region's existing bicycle network and highlights several of the region's most prominent bicycle facilities. These facilities are of local, regional, and even national significance and are referred to throughout this plan. Not surprisingly, many of the plan's recommendations focus on connections to these key bicycle corridors.

Two U.S. Bicycle Routes (USBR) traverse the region and offer connections to other states. **USBR 50**, one of the nation's most prominent bike routes, follows the C&O Canal Towpath from Washington, D.C. to Cumberland, Maryland and terminates on the west coast, in San Francisco, California. Meanwhile, **USBR 11** runs north-south and extends from the Washington County border with Pennsylvania to northwestern North Carolina.

The **C&O Canal Towpath** is a nationally-recognized multiuse trail that parallels the Potomac River from Washington, D.C. to Cumberland, Maryland. The 184.5-mile trail is predominately flat and connects to the Great Alleghany Passage (GAP) in Cumberland, Maryland. The GAP then continues west for another 150 miles before ending in Pittsburgh, Pennsylvania. The C&O traverses approximately 80 miles of Washington County and forms the backbone for recreational cycling in the HEPMPO region, connecting to dozens of communities in West Virginia and Maryland. The trail attracts visitors from around the world and provides economic benefits to local businesses and communities. In fact, Washington County hotel lodging tax revenue surpassed $2.0 million in 2014-2015 for the first time in history, an accomplishment that can be partially attributed to the region's prominent historical and recreational landmarks, such as the C&O Canal Towpath (Herald-Mail Media).

The C&O Canal Towpath traverses the entire region.

The **Western Maryland Rail Trail (WMRT),** paralleling the C&O for a portion of Washington County, is a 22.5-mile asphalt path that was reclaimed from the former Western Maryland Railroad. The WMRT currently runs from Big Pool Station, Maryland to Pearre, Maryland. According to the Maryland Department of Natural Resources (DNR), the WMRT hosted 135,000 visitors in 2011, contributing to $1.8 million in spending.[1] The Maryland State Department of Transportation (MDOT) and the Maryland DNR plan to extend the trail west another 4.5 miles to Little Orleans, Maryland.[2] It is anticipated that construction will begin in July 2016, with the trail opening in July 2017.

The Western Maryland Rail Trail offers opportunities for cyclists of all abilities.

[1] Source: http://www.dnr.maryland.gov/naturalresource/summer2013/journey.pdf

[2] There were initially plans to extend the trail 15 miles to Paw Paw, WV, but those plans have since been abandoned.

The **WV Route 9 Bike Path**, running from Charles Town Road in Martinsburg, West Virginia to Currie Road in Ranson, West Virginia, is a 10.6-mile asphalt multi-use path that offers ample recreational opportunities for the region's residents and showcases the region's growing commitment to healthy living, active transportation, and "bicycle tourism".

The Route 9 Bike Path offers over 10 miles of off-road cycling.

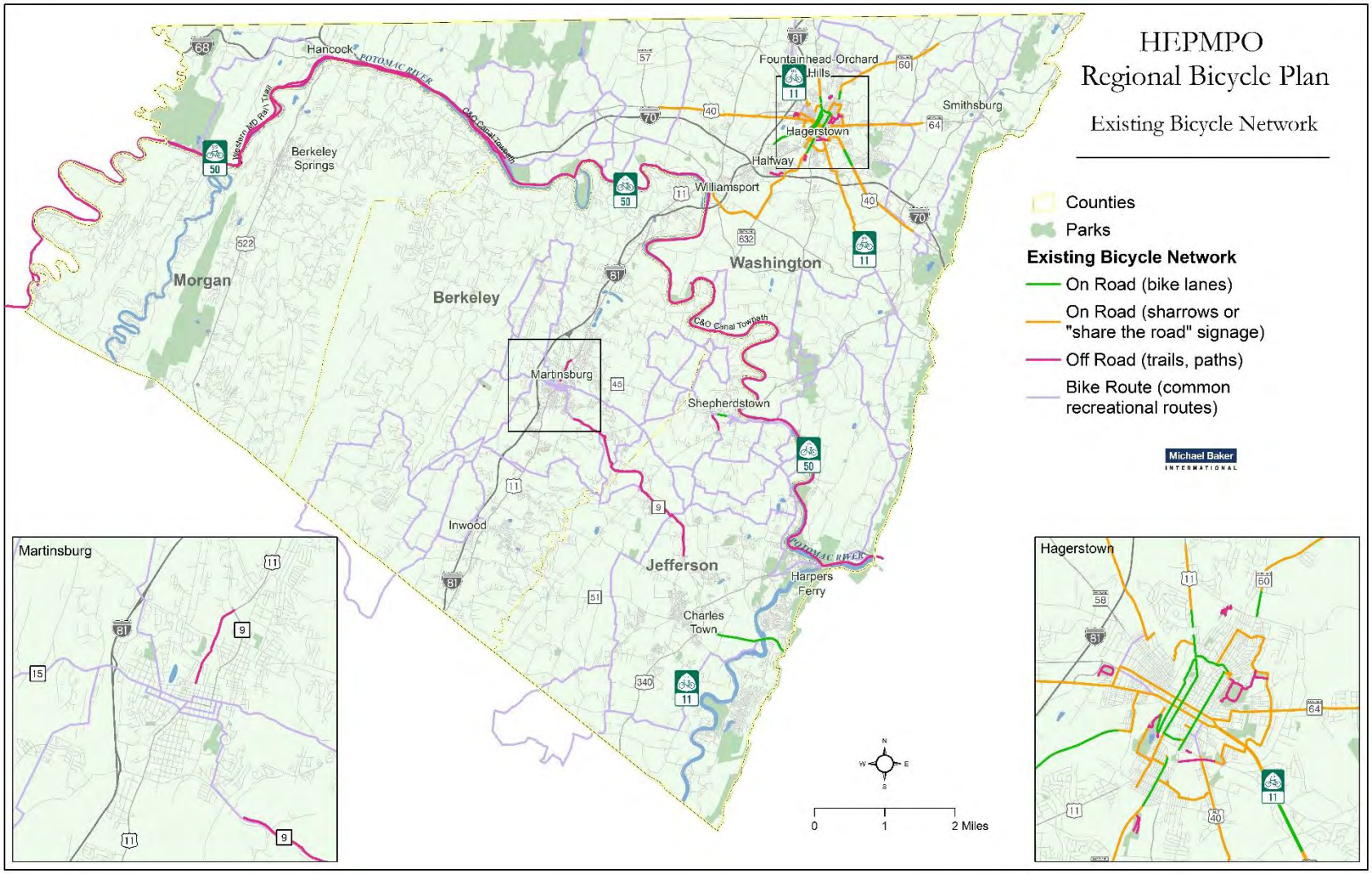
The **Raleigh Street Bike Path** in Martinsburg, while shorter (1.1 miles), is another example of the region's expanding network of off-road bicycle infrastructure. The trail runs from West Race Street to Forbes Drive and connects downtown Martinsburg to the Old Courthouse Square shopping center off Edwin Miller Boulevard.

The recently completed Raleigh Street bike path.

The City of Hagerstown, Maryland, the region's largest city, is emerging as one of Maryland's most bike-friendly cities. In November 2014, the City of Hagerstown was honored by the League of American Bicyclists with the distinction of being a bronze-level "Bicycle Friendly Community", making the City one of only seven jurisdictions in Maryland with BFC status (all of which are "bronze"). Hagerstown's Hub City Bicycle Loop, a signed 10-mile bike loop that utilizes on-road and off-road bicycle infrastructure, embodies the city's vision for bicycle connectivity. In addition, the City has recently launched policy initiatives to help encourage cycling and promote bike safety. The City, working with local cycling organizations and bike shops, hosts the annual "Ride with the Mayor" event, which travels the Hub City Bike Loop. The City has also been working to educate residents on bicycle safety, providing detailed information on the City website and through a YouTube video.

The Hub City Bicycle Loop is a 10-mile loop used by cyclists of all ages. Source: City of Hagerstown

FIGURE 1: THE EXISTING BICYCLE NETWORK



Goals and Objectives

The following goals and objectives were developed during the early stages of the plan and reflect input from the Bicycle Study Guiding Committee (BSGC).

Promote bicycling as a healthy transportation alternative

- Support annual events to help promote and encourage active transportation for all ages, backgrounds, and abilities
- Build on the success of Hagerstown's "Hub City Bike Loop" by encouraging family-friendly bicycle loops in other communities
- Encourage bicycling beyond commuting for health and fitness purposes

Leverage the economic benefits generated by cycling

- Capitalize on the daily bicycle traffic along key regional, state, and national routes
- Improve connections between nationally significant routes (U.S. Bicycle Route 11, U.S. Bicycle Route 50/C&O Canal Towpath/Great Allegheny Passage) and nearby communities

Plan and design with all users in mind

- Encourage local jurisdictions to consider bicycle users in their long-term planning and design strategies
- Identify potential bicycle improvements in underserved, low-income areas
- Work with stakeholders to develop a regional wayfinding system

Expand the bicycle network and enhance connectivity

- Identify gaps and needs in the region's bikeway network
- Connect neighborhoods to jobs, schools, recreational centers, parks, and frequently used bicycle routes
- Encourage local government bicycle projects that connect local bicycle infrastructure to regional and national bicycle corridors

Enhance bicycle safety

- Improve accessibility and safety for bicyclists at barriers such as intersections, rail crossings, bridges, and along high traffic routes
- Support education programs about bicycle operation, bicyclists' rights and responsibilities, and lawful interactions between motorists and cyclists
- Create a bicycle safety brochure about different types of bicycle facilities and "rules of the road"

Implement the plan and explore funding opportunities

- Evaluate the plan every two years, assessing the progress in achieving the goals and objectives
- Raise regional awareness about potential funding opportunities, including grants, public/private partnerships and "fees-in-lieu of" options

Summary of Prior Studies

The following section captures several of the region's prior studies related to active transportation. In many cases, these studies serve as a foundation for this plan and may include additional recommendations outside of the scope of this plan.

Direction 2040: Long-Range Transportation Plan

Direction 2040, a long-range, multimodal regional transportation plan covering Washington County, Maryland and Berkeley and Jefferson Counties in West Virginia, was produced by the Hagerstown/ Eastern Panhandle Metropolitan Planning Organization (HEPMPO) and was the culmination of a partnership between local, state, and federal policy- makers. Based on an in-depth analysis of current and anticipated transportation issues, the plan presented a vision, goals, policies, and priorities for improving the region's roadways, bridges, transit services, and bicycle and pedestrian networks. The plan contained extensive input from citizens, business owners, and key stakeholders who are most impacted by transportation decisions. Direction 2040 identified the current bicycle pedestrian initiatives in each jurisdiction, available funding sources, and 55 project recommendations to improve the integration of bike/pedestrian facilities. In addition, the following bicycle planning goals were established for each county.

- **Washington County, Maryland**
  - Provide bicycle access to public transit
  - Reserve the right-of-way on new or expanded roads for bicycle paths
  - Establish bicycle routes on new and existing city streets
  - Include bicycle/pedestrian accommodations in each project as it moves forward
  - Create more bicycle/walking paths
  - Include bike plans in rehabilitation of major state highways
  - Greenway Plan
- **Berkeley County, West Virginia**
  - Develop a Regional Trail Network
  - Integrate bicycle/pedestrian facilities into new and existing development
  - Provide bicycle access to public transit
  - Include bicycle/pedestrian accommodations in each project as it moves forward
  - Trails for hiking and biking
- **Jefferson County, West Virginia**
  - Provide incentives for alternative forms of transportation
  - Encourage bicycle/pedestrian paths in new residential subdivisions and adjacent to new state roadways
  - Provide bicycle access to public transit
  - Include bicycle/pedestrian accommodations in each project as it moves forward
  - Encourage walkability in new developments
  - Allow people to travel without using motor vehicles
  - Seek a coordinated transportation plan

Maryland Twenty-Year Bicycle & Pedestrian Master Plan, 2014

The Bicycle and Pedestrian Master Plan, developed by the Maryland Department of Transportation (MDOT), established a 20-year vision for making walking and bicycling an integral part of Maryland's transportation system. Developed in close coordination with the 2035 Maryland Transportation Plan (MTP), this plan focused on creating a strategic framework to guide MDOT's policies and actions towards a more walkable, bikeable future. The plan presented a next step toward implementing the State's recently adopted Complete Streets policy, by outlining strategies to ensure that bicycle and pedestrian needs will be routinely considered as part of all projects, while also maintaining resources devoted to pedestrian and bicycle-specific projects. The plan's vision statement reflects the input of a wide range of stakeholders, as well as the policy direction provided by State law and the 2035 MTP. The following vision statement summarizes the fundamental, long-term objectives for walking and bicycling in the State of Maryland:

> *"Maryland will be a place where bicycling and walking are safe, practical and inviting ways for people of all ages and abilities to complete their everyday travel. Sound policy will enable communities to craft the best solutions to their unique mobility and access challenges, and to reap the social, economic, health and environmental benefits of expanded transportation choices. Smart prioritization and creative collaboration will ensure wise and effective use of all State resources."*

Furthermore, the Plan established the following goals, which collectively strive to make that a vision a reality.

1. **Build Connected Networks:** expand walking and bicycling networks, remove barriers, and enhance connections with transit and travel destinations.
2. **Improve Safety**: enhance pedestrian and bicycle safety to reduce injuries and fatalities and to make walking and biking comfortable and inviting.
3. **Plan and Design for Everyone:** effectively balance the needs of all transportation user to promote travel choices, ensuring that bicyclists and pedestrian needs are prioritized in appropriate locations.
4. **Strengthen Communities:** partner with local governments to support walkable and bikeable communities to achieve sustainability, livability, health, and economic benefits.
5. **Promote Walking and Biking in Maryland:** support walking and biking as everyday modes of transportation and recreation and vital elements of a livable community through encouragement, marketing, and information.

West Virginia Bicycle Connectivity Study

The purpose of this planning study was to identify and finalize a network of designated, signed bicycle routes using West Virginia's highway system. This network would ultimately connect to other states, potentially expanding the U.S. Bicycle Route System and/or helping connect West Virginia cities and communities. The preliminary routes through the HEP region are shown as "bicycle routes" in this Plan's existing network map and are also referred to in the Recommendations Section.

A Vision for Walking, Biking, and Trails in Berkeley County, WV, 2009

The Plan, prepared by the Rails-to-Trails Conservancy, reflects the input received through a July 2009 community workshop. The workshop had approximately 30 participants and included community mapping, prioritization, and an in-depth discussion of potential trail developments in Berkeley County. The participants identified the following as the most significant regional anchors for a well-connected bicycle and pedestrian network.[3]

1. **Downtown Martinsburg** – The walkable and historic nature of downtown Martinsburg can act as a natural hub for a trail system in Berkeley County. The downtown area was ranked as the most important location to consider in terms of its ability to provide connections to other areas of interest like Poor House Farm Park.
2. **C&O Canal Towpath and Western Maryland Rail-Trail** – Connecting dozens of communities along the northern bank of the Potomac River, the C&O Towpath is a national treasure that links Washington, DC to Pittsburgh, PA (by way of the Great Allegheny Passage connection in Cumberland, MD). Participants placed high priority on creating safe bicycle and pedestrian access to the Towpath and to the nearby Western Maryland Rail-Trail. There was common interest in creating safe bicycle and pedestrian connections to these popular trails from downtown Martinsburg, Poor House Farm Park, and Route 45.
3. **Route 9 Bike Path** - The new multi-use path adjacent to Route 9 expansion was one of the most acknowledged existing opportunities for developing regional multi-use trail connections to destinations in neighboring Jefferson County. Participants would like to see the path extended to Charlestown and other connections made to the C&O Canal Towpath and Western Maryland Rail-Trail.
4. **Poor House Farm** – The importance of this site to local residents is evident in trail user surveys and feedback from the mapping/visioning session. Owned and operated by Martinsburg-Berkeley County Parks and Recreation, Poor House Farm Park provides several miles of walking trails within the 137-acre site. Safe bicycle and pedestrian connections from downtown Martinsburg to the Poor House Farm Park was identified.
5. **Tuscarora Creek Trail** – Participants would like to see the trail completed through Martinsburg, and cite the trail as one the most important points of interest in terms of trail development.

The workshop participants also mapped a series of corridors where they would like to see bicycle, pedestrian, and trail improvements. The key corridors are highlighted below, several of which are addressed in the recommendations section of this plan.

High Priority Corridors

- Route 9 bicycle and pedestrian path to Charlestown, WV
- Downtown Martinsburg to C&O Canal Towpath
- Cherry Run to Western Maryland Rail-Trail
- Martinsburg to Shepherdstown (via County Highway 45/Shepherdstown Road)
- Downtown Martinsburg to Berkeley County Youth Fairgrounds
- Poor House Farm Park to C&O Canal Towpath

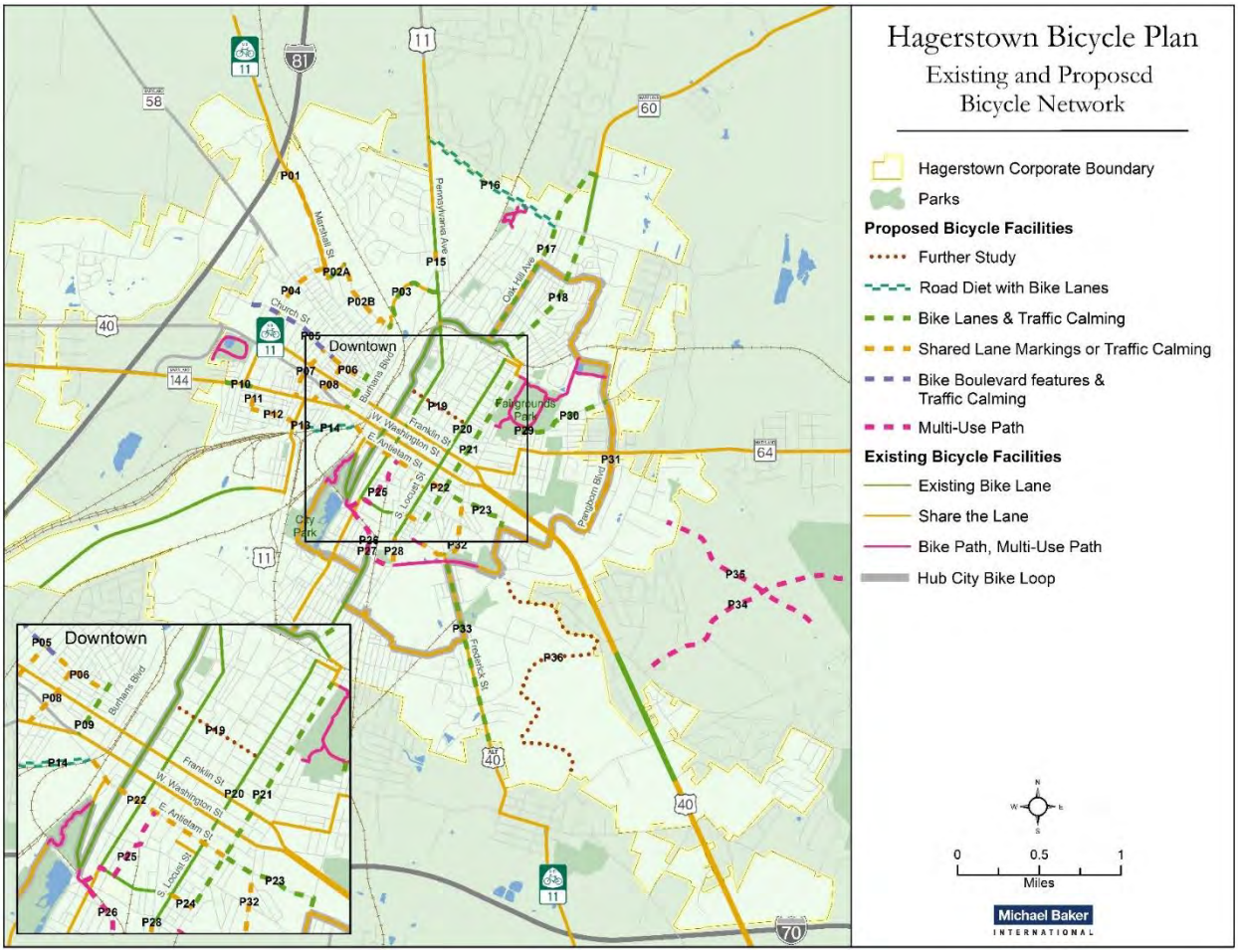
[3] Source (for discussion of regional anchors): *A Vision for Walking, Biking, and Trails in Berkeley County, WV*

Hagerstown Bicycle Master Plan (BMP)

The Hagerstown BMP (2010 and 2016), the latter of which was completed alongside this Regional Bicycle Plan, evaluates the city's existing bicycle environment (safety, connectivity, policies) and proposes a variety of new improvements over the next ten years. The plan recommendations include physical improvements, such as bike lanes and trails, and policy initiatives, such as safety programs and bicycle events.

The 2016 BMP recommends a variety of on-road, off-road, and policy-oriented improvements to help cultivate a healthier bicycle environment. For example, the BMP recommends road diets on Northern Avenue and South Burhans Boulevard, which would reduce the number of travel lanes and use the newly available space for bike lanes (buffered bike lanes, in the case of South Burhans). The plan also recommends safety and policy initiatives to help generate interest/awareness for cycling and ensure that cyclists and motorists understand their roadway responsibilities.

Finally, the 2015 BMP includes an Implementation Plan that prioritizes investments based on a data-driven process, which examines projects' varying proximities to schools, parks, trails, housing, and jobs. The Implementation Plan also considers construction costs, sequencing, and anticipated funding constraints.



The City of Hagerstown Bicycle Master Plan. Existing and Proposed Bicycle Network.

Analysis

An analysis of bicycle comfort and demand indicators were used in tandem with public input to help identify bicycle needs in the region.

Bicycle Comfort

Bicycle Level of Service (BLOS) is a nationally used tool for quantifying the "bike friendliness" of a roadway. While BLOS was used to approximate the relative quality of service that a "typical" cyclist could expect along different stretches of the network, it should also be recognized that cyclists vary greatly in terms of competency and level of comfort.

BLOS results can be useful in evaluating existing cycling conditions. Specifically, the analysis can help identify "weak links" in the existing bicycle network and help prioritize roads for future improvements. BLOS, when combined with bicycle demand analyses and public input, can help tell a story about safety concerns, barriers to cycling, gaps in frequently used routes, and where cyclists would want to bike under optimal conditions. BLOS could only be calculated for Washington County State owned roadways due to insufficient data for West Virginia roadways. As a result, a different analytical approach was used for Morgan, Berkeley, and Jefferson counties, relying primarily on 2014 traffic volumes, public input, and aerial imagery.

Methodology

The study's BLOS analysis replicates the formula (Version 2.0) developed by Sprinkle Consulting, Inc. The Maryland State Highway Administration (SHA) and the Baltimore Metropolitan Council have used a similar formula to approximate bicycle comfort at the state and metropolitan level, respectively. The formula's calculations are based on various roadway characteristics and conditions (shown below).

FIGURE 2: BICYCLE LEVEL OF SERVICE COMPONENTS

Image sources: Michael Baker International, creativecommons.org, pixbay.com

Maryland SHA Geographic Information Systems (GIS) data were used to obtain the roadway characteristics and calculate BLOS throughout Washington County. The BLOS scale is based on six letter grades, A through F (from best to worst), to approximate the quality of a roadway segment for bicycle travel. The results were displayed on a Google Map interface and are discussed below.

Results

The bicycle-level-of-service analysis indicates that Washington County roadways are generally comfortable for cyclists. The analysis shows that over one-half (59 percent) of all State owned roads in the county (excluding interstates and interstate ramps) have a BLOS equivalent to "A" or "B" (Figure 3). The majority of the "A" and "B" facilities are characterized by roadways with wide shoulders and/or low traffic volumes. As shown in Figure 4 (following page), several Washington County State owned roadways stand out as having particularly poor bicycle level of service, including:

- **MD 63 from I-70 to county line** – roadway lacks shoulders and has high truck volumes.
- **MD 66 from Boonsboro to Smithsburg** – roadway lacks shoulders for much of the segment and has high truck volumes. The public identified similar deficiencies in the web survey. Mountain Laurel Road and Crystal Falls Drive, running parallel to MD 66, may represent more suitable alternatives for cyclists traveling between US 40 Alt. and MD 64 (Jefferson Boulevard) because they have less traffic, lower vehicle speeds, fewer blind curves, and better overall visibility. *See Recommendation W14.*
- **MD 68 from Downsville Pike to Old National Pike** – roadway lacks shoulders or has narrow shoulders for much of the segment. The public identified similar deficiencies in the web survey. Given that bicycle lanes cannot easily be installed on MD 68 due to roadway width constraints, this plan recommends signage to help convey cyclists onto more comfortable, lower-volume facilities, such as Spielman Road and Manor Church Road.
- **US 522 from West Main Street in Hancock to WV State Line** (bridge over the Potomac River) – roadway lacks shoulders, forcing cyclists to ride in the general purpose lanes. This segment was also identified as a safety concern through the web survey.

FIGURE 3: BICYCLE-LEVEL-OF-SERVICE RESULTS (WASHINGTON COUNTY ONLY)

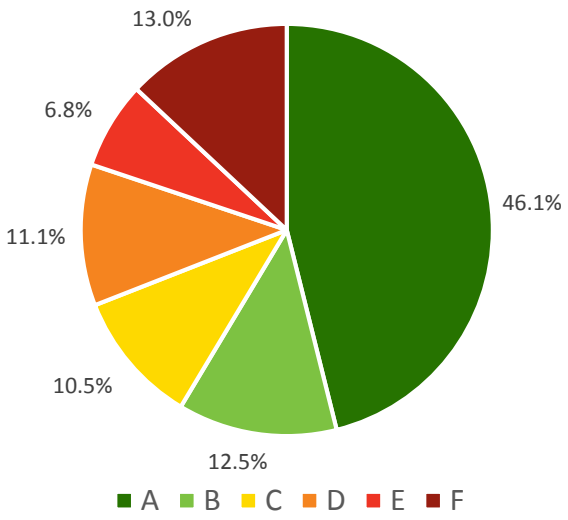
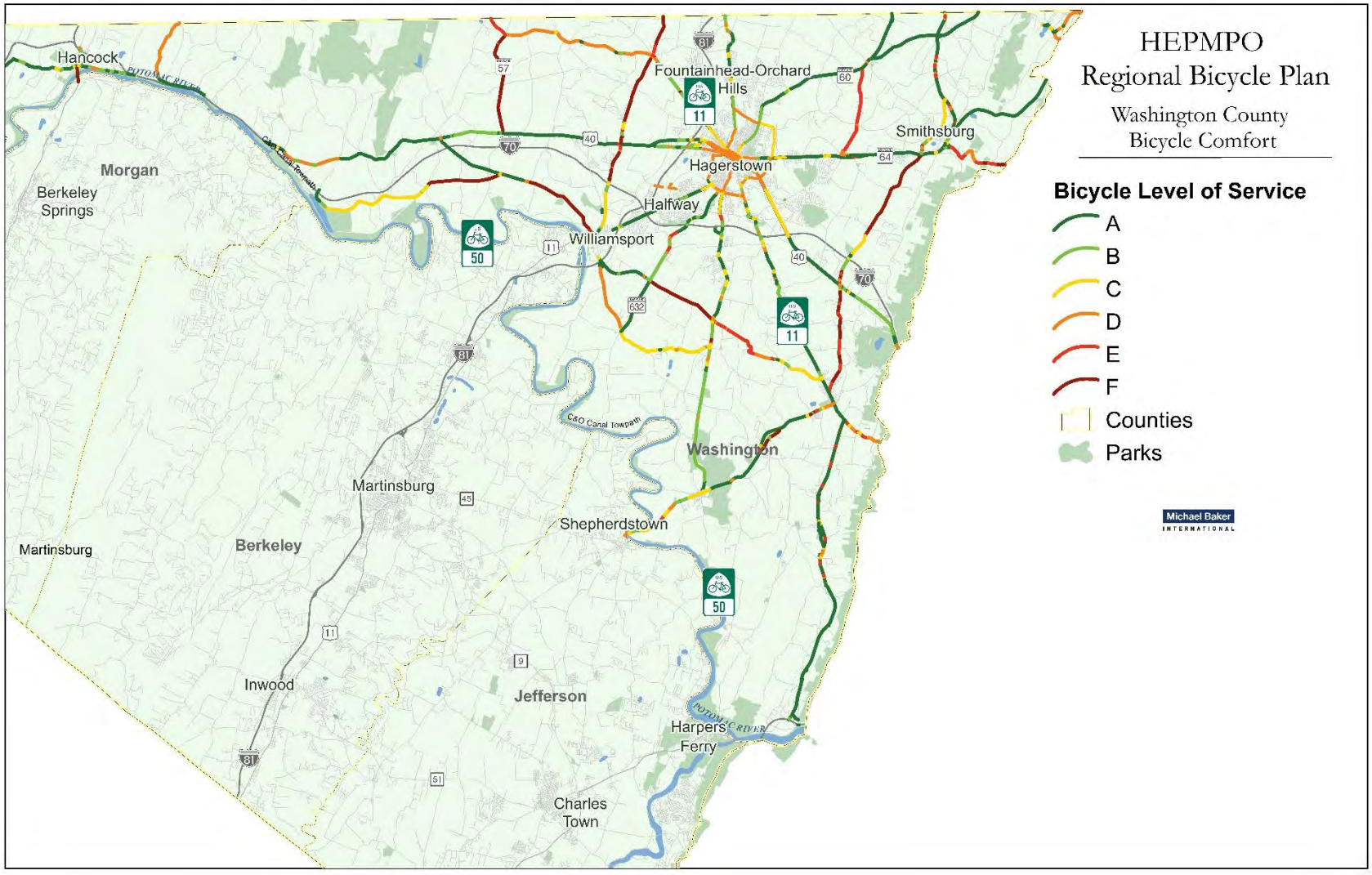


FIGURE 4: WASHINGTON COUNTY BICYCLE LEVEL OF SERVICE RESULTS



The City of Hagerstown's network of bicycle lanes have significantly increased bicycle comfort. Prospect Street and Prospect Avenue, for example, improve from a "C" BLOS without bike lanes to an "A" or "B" with bike lanes, depending on the segment. Maryland Avenue, from Downsville Road to East Memorial Boulevard, is equipped with bi-directional bike lanes and is an extremely comfortable facility for cyclists (BLOS = "A" except at approach to West Wilson Boulevard).

It is recommended that jurisdictions and State Departments of Transportation continue to compile roadway and traffic data for the purposes of bicycle comfort analysis. And while bicycle level of service is useful in evaluating cycling conditions in a city or region, it only captures existing roadways and does not help us understand cycling behavior, habits, and preferences. Public outreach and demand analyses can be used in tandem with BLOS to help address these gaps and ultimately identify concerns, needs, and priorities for current and future cyclists.

Bicycle Demand

Introduction

According to the 2009 National Household Transportation Survey (NHTS), approximately 40 percent of U.S. trips are 2 miles or less in length. Many of these shorter trips can be accomplished by bicycle, which is certainly true in the region's largest cities. There are many factors that help encourage and discourage cycling, including the environment (ex: weather, hills), land use patterns, demographics, and the existence of bicycle facilities. This plan, in an effort to help identify opportunities and constraints for cycling, used geospatial analysis to approximate potential bicycle demand throughout the region.

According to the 2009 National Household Transportation Survey (NHTS), approximately 40 percent of U.S. trips are 2 miles or less in length.

Methodology

A Latent Demand model was used to estimate the amount of bicycle travel (or "demand") likely to occur along existing street segments based on surrounding population, employment, and selected land uses. It is important to note that the demand is calculated based on network distances and without regard to existing traffic or the presence of bicycle facilities (trails, lanes, sidewalks). In other words, the model results are not constrained by existing bicycle facilities. The model evaluated roadway segments' proximity to a range of activity centers, such as parks, schools, universities, employment centers, train stations, and transit routes. It is important to note that bicycle demand was separately calculated for each individual jurisdiction, meaning that a roadway in Morgan County was only measured against other roadways in Morgan County. The same was true for the region's largest cities, including Martinsburg, Charles Town/Ranson, and the City of Hagerstown.[4] While the model is not a perfect predictor of bicycle demand, it efficiently consolidates large quantities of data into one map layer, providing a manageable method to identify potential high-demand areas. The model is described in more detail in **Appendix C.**

[4] While this is a regional plan, it is important to see the relative bicycle demand in each jurisdiction. The cities were scored separately in order to show demand ranges within the city limits.

The latent demand model measures roadways' proximities to a range of activity centers, such as the Caperton Train Station (top) and Martinsburg High School (bottom)

Results

The model results are shown in the map below (Figure 5). Not surprisingly, potential bicycle demand is concentrated in the region's cities and towns. As described above, roadways in Martinsburg, Charles Town/Ranson, and Hagerstown were only scored against roadways in their respective cities (not against roadways outside the city limits). As a result, Figure 5 shows a "halo effect" on the periphery of city boundaries, suggesting diminishing bicycle demand for the cities, themselves (as one moves away from downtown), but high demand for the representative counties due to the proximity to urban areas. The following provides a brief summary by county.

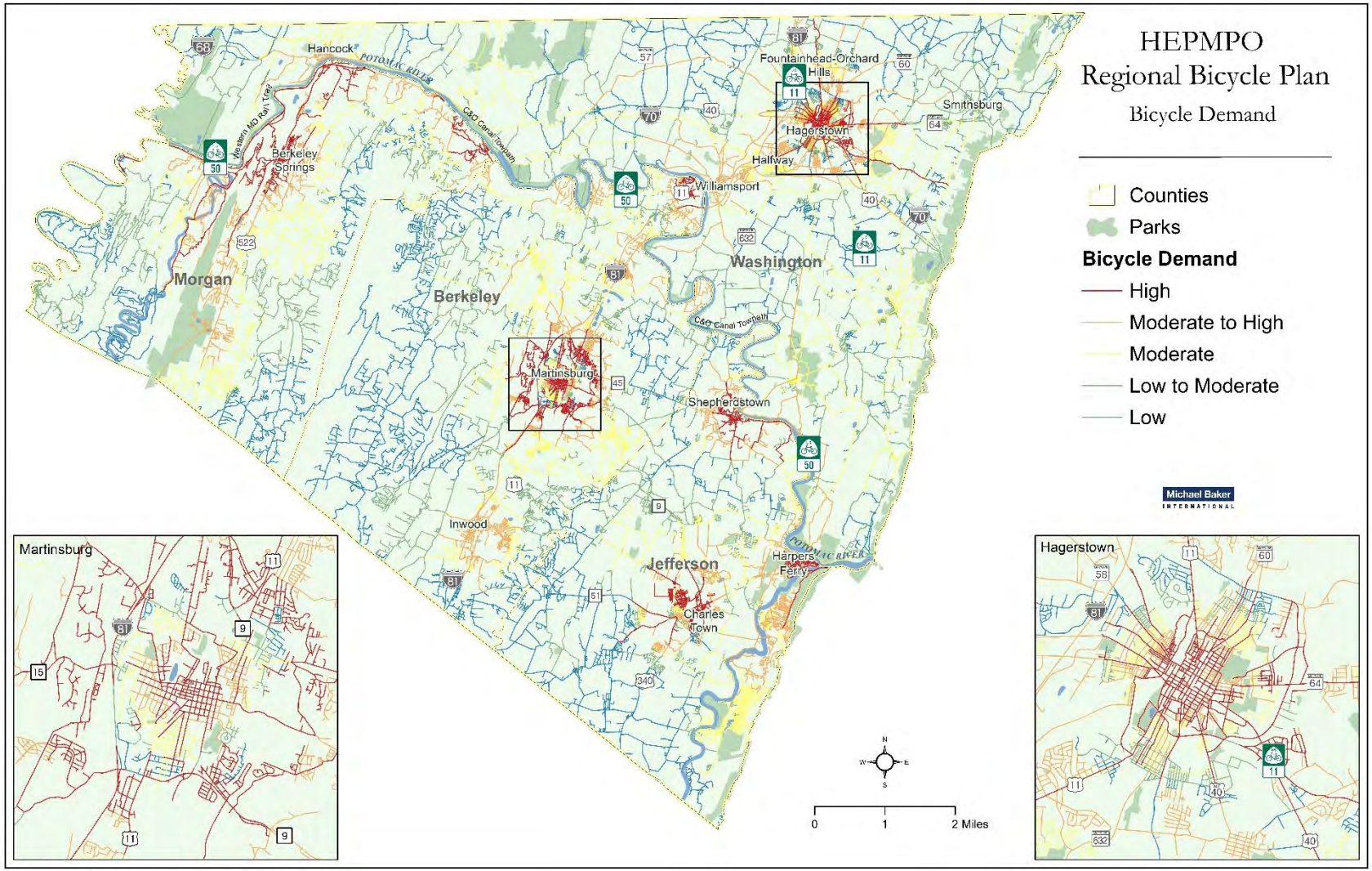
Morgan County: Demand appears highest in Berkeley Springs and on roadways which provide access to key recreational areas, such as Cacapon Resort State Park. Demand also appears high on Fairview Drive and Fairfax Street due to their connections to the Blue Ridge Community & Technical College and Warm Springs Middle School. In addition, Cherry Run shows high relative demand, likely due to its proximity to the C&O Canal Towpath. While there is not direct access between Cherry Run and the C&O, the participants in the 2009 trails workshop in Berkeley County expressed interest in establishing a future connection.

Berkeley County: The results suggest high bicycle demand in the Martinsburg area. For example, the Baker Heights area of Martinsburg shows high demand, likely due to the presence of the Veterans Administration Center, one of the county's largest employers (1,569 employees). The analysis also shows high demand in Marlowe, which provides direct access to Williamsport, Maryland and the C&O Canal Towpath. Inwood, with approximately 3,000 residents, also exhibits above-average bicycle demand for the county.

Jefferson County: The analysis shows high bicycle demand in Shepherdstown, Harpers Ferry, and the Charles Town/Ranson area. Shepherdstown has several key drivers of bicycle demand, such as Shepherd University and Morgan's Grove Park. In addition, North Duke Street provides direct access to the C&O Canal Towpath. Similarly, Harpers Ferry connects to the C&O (and other recreational areas) via a pedestrian bridge and also has a train station, which is served by Amtrak and MARC commuter service. Meanwhile, in Charles Town, the analysis indicates high bicycle demand on Augustine Avenue (Page Jackson Elementary School and Washington High School) and between Ranson and Currie Road, where the Route 9 Bike Path begins/ends.

Washington County: Demand appears highest in the Hagerstown-area, particularly in communities such as Halfway, Funkstown, and Robinwood. Williamsport, which includes a network of bicycle facilities that connect with the C&O, also exhibit high bicycle demand. Finally, the analysis suggests high demand in Hancock, which is not surprising given the proximity to both the C&O and the Western Maryland Rail Trail.

FIGURE 5: LATENT DEMAND RESULTS

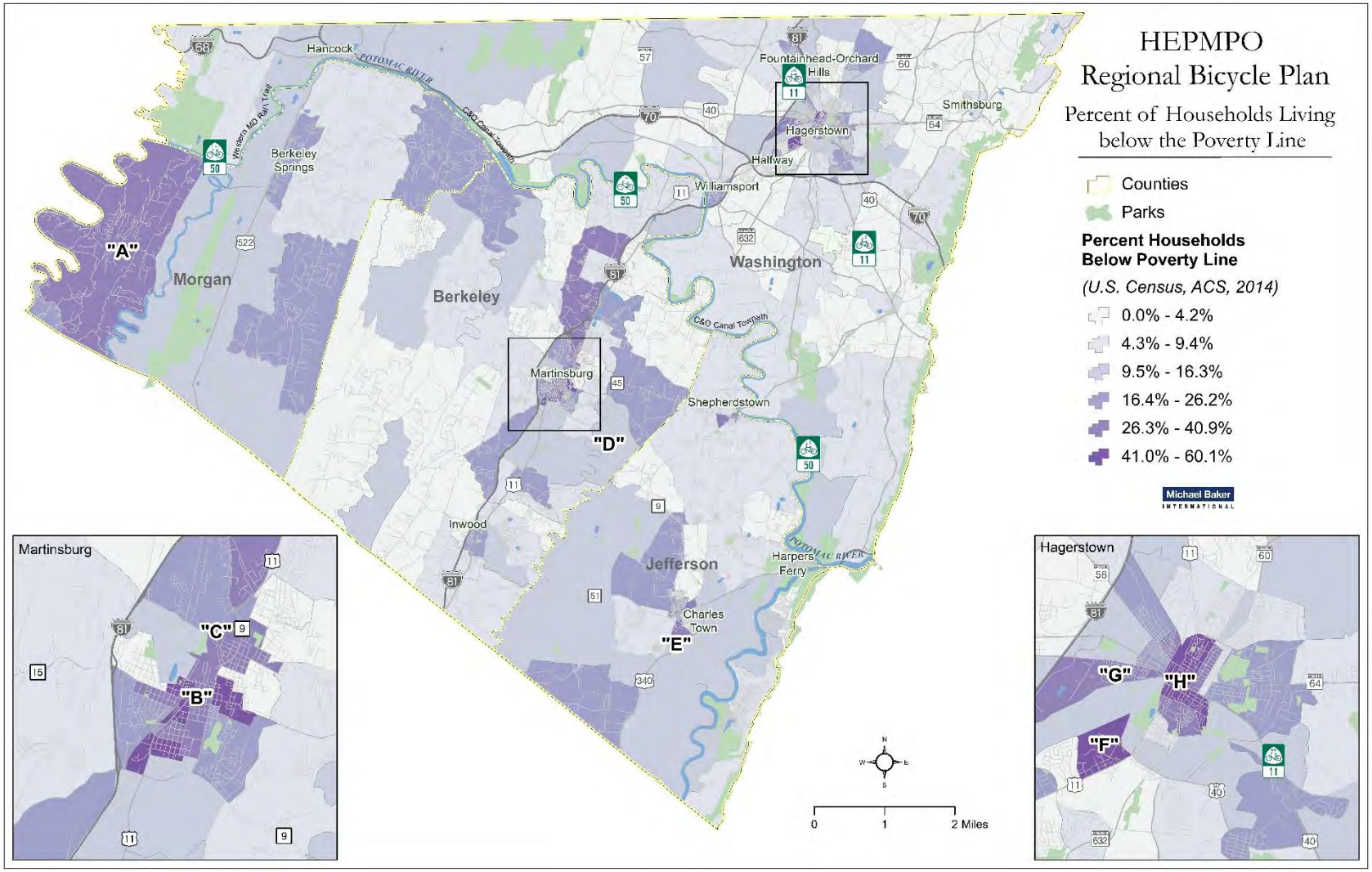


The plan also evaluated the proximity of bicycle facilities to underprivileged communities, with the understanding that many residents do not have access to personal vehicles and whose livelihood may depend on safe and connected bicycle and pedestrian infrastructure. Census data (American Community Survey – ACS, 2014) were used to evaluate socioeconomic conditions in the region and to determine which areas may require better bicycle connectivity. The analysis considered households living below the poverty line (Figure 6), median household income, zero-car households, and minorities. Several examples of neighborhoods which may need safer, more accessible bicycle infrastructure are identified in Table 1 (below) and highlighted in the maps Figure 6.

TABLE 1: POTENTIAL UNDERPRIVILEGED COMMUNITIES IN NEED OF BICYCLE INFRASTRUCTURE

	Households	Percent Living below the Poverty Line	Median Household Income	Percent Zero-Car Households	Percent Minorities	Map ID (next page)
Morgan County						
Potomac River to WV Route 9 and from Virginia State Line to Great Cacapon	556	36%	$26,932	10%	2%	"A"
Berkeley County						
Downtown Martinsburg, I-81 to South Queen Street and from WV 45 to West King Street	2,374	31%	$32,419	24%	21%	"B" (Map Inset)
North Martinsburg, Harlan Springs Road to US 11 and from Raleigh Street (at Edwin Miller Boulevard) to Nipetown Road	942	30%	$28,750	24%	24%	"C" (Map Inset)
Southeast Martinsburg, Baker Heights	652	16%	$46,875	21%	13%	"D"
Jefferson County						
Charles Town, South McDonald Street to Flowing Springs Road and from 5th Avenue to East Washington Street	741	30%	$35,185	9%	30%	"E"
Washington County						
Halfway/Hagerstown, Linwood Road to South Burhans Boulevard and from Wesel Boulevard to Virginia Avenue	627	60%	$19,609	15%	29%	"F" (Map Inset)
Hagerstown, south of West Washington Street and north of South Burhans Boulevard	971	40%	$22,736	26%	34%	"G" (Map Inset)
Downtown Hagerstown (three Census Block Groups), between North Burhans Boulevard and Potomac Avenue and from East Baltimore Street to Prospect Avenue	952	48%	$15,841	56%	51%	"H" (Map Inset)

FIGURE 6: PERCENT OF HOUSEHOLDS LIVING BELOW THE POVERTY LINE



Safety

In order to further evaluate bicycle safety, the study team mapped all motor vehicle-bicycle crashes over a five-year period to identify crash patterns and ultimately help formulate recommendations to improve existing infrastructure or convey cyclists to safer streets.[5] There were 19 recorded motor vehicle-bicycle crashes in Morgan, Berkeley, and Jefferson counties from 2011 to 2015. While several occurred in rural areas, the majority of the crashes occurred in the jurisdictions' cities and towns. Meanwhile, there were 91 crashes in Washington County from 2010 to 2014, most of which were located in the City of Hagerstown (61 crashes) where there is a higher concentration of cyclists. The following summaries review crash patterns throughout the region, focusing on several of the most populous communities, and provide preliminary guidance on how future crashes can hopefully be avoided at these locations.

Ranson: Two crashes occurred on North Mildred Street at the approach to Cranes Lane during the five-year survey period. One crash occurred at night (July 2009) and the other occurred during the day (September 2010). In both instances, cyclists were injured. While the exact causes of the crashes are not specified in the data, it appears as though the City has recently installed pedestrian warning signals, just north of the intersection at 12th Street (right). These signals, along with this plan's proposed bicycle improvements along N. Mildred Street, will hopefully help enhance motorists' awareness of bicyclists and pedestrians at this intersection, particularly since 12th Street provides access to Ranson Elementary School.

Martinsburg: Two crashes occurred on North Queen Street (1200 block and 1100 block) during the survey period. The crashes (2011 and 2013) occurred in close proximity to the Tractor Supply Company and Weis Markets on a stretch of North Queen Street with numerous driveways and vehicle turning movements. High traffic volumes and lack of shoulders also contribute to an unsafe environment for cyclists. While right-of-way is limited on North Queen (making bike lanes unfeasible), there are other opportunities to enhance north-south connections in the City.

It is recommended that the City consider opportunities to link Woodbury Avenue to E Road via a multiuse path. For example, the path could connect the end of 3rd Street (north of Cloud Street) to the other section of 3rd Street, just south of E Road. This addition would provide a safer alternative for cyclists and pedestrians and would connect to the Nichols City Shopping Center, as well as the existing paths west of Martinsburg North Middle School. In addition, a spur trail could run east from the proposed path and connect to the northwest corner of the Berkeley 2000 Recreation Center parking lot. It is recommended that the alternatives discussed above are evaluated following the signalization of the Woodbury Avenue and North High Street intersection since those improvements could alter the traffic dynamics in the area.

[5] Sources: WVDOT wvOasis, 2011-2015 and Maryland Automated Accident Retrieval System (MAARS), 2010-2014

Hagerstown: There were 9 crashes (8 with injuries) on W. Washington Street from 2010 to 2014 involving motor vehicles hitting cyclists. The median age of the cyclists involved was 12. In addition, there were six motor vehicle-bicycle crashes on Locust Street and four motor vehicle-bicycle crashes on Mulberry Street during the five-year survey period. While the precise causes for each crash are unknown, the 2016 Hagerstown Bicycle Master Plan (BMP) includes infrastructure recommendations to help convey cyclists onto safer streets. In addition, the 2016 BMP offers policy recommendations to help improve bicycling education and awareness.

Public Input

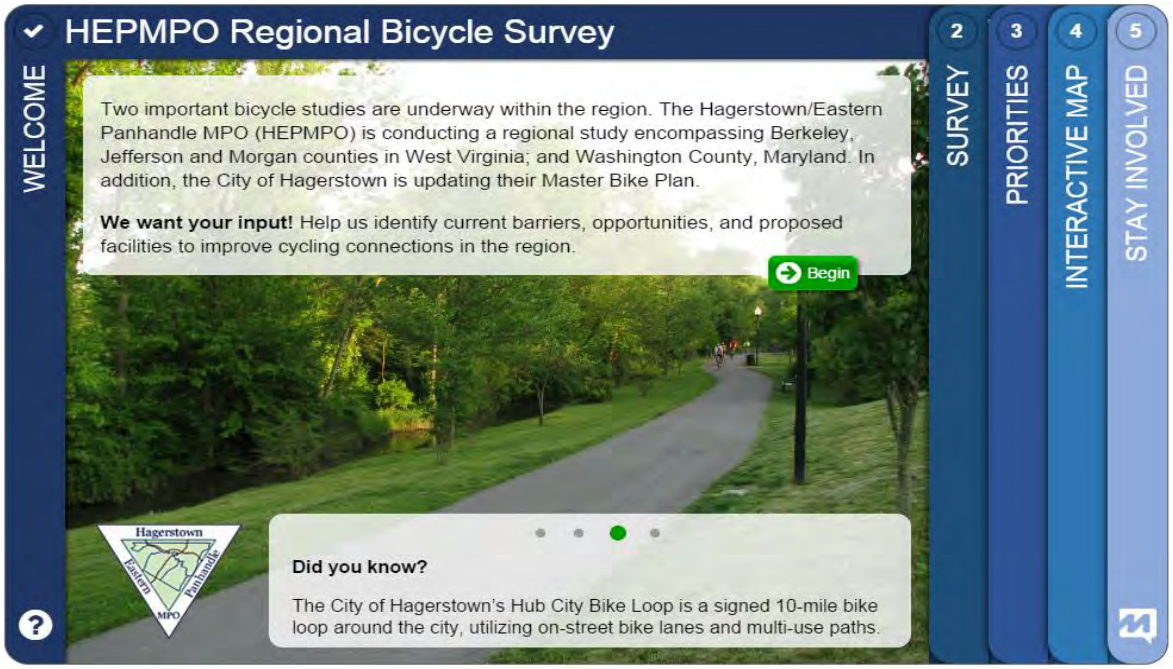
The following section summarizes the plan's public engagement initiatives, highlighting the roles that the Bicycle Study Guiding Committee, web survey, and public meeting played in the planning process. Appendix B includes additional detail on the results received through the public forums.

Bicycle Study Guiding Committee

The Bicycle Study Guiding Committee (BSGC), consisting of community members of the region, contributed significantly and were highly involved throughout the plan's development. Over the course of the project, the BSGC developed goals and objectives for the plan, provided input and direction for the web-based survey, reviewed the results of the survey, and participated in a project prioritization exercise.

Web Survey

In January 2016, the HEPMPO launched an interactive, web-based survey. The survey was open for one month and asked participants about their cycling habits, concerns, and priorities. The survey also included an interactive map where users could drop pins on a map to identify their homes, destinations, safety concerns, and locations for new bicycle facilities and amenities. In the month that the survey was open, the website logged almost 700 visitors with nearly 400 people responding to the survey.



Overall, the 386 respondents from around the region tended to be:

- Frequent cyclists: over 60 percent of respondents cycle more than five days per month
- Long distance cyclists: half of the respondents average over 10 miles per trip
- Experienced cyclists: nearly 60 percent of respondents are either always or sometimes comfortable cycling in traffic

Respondents were asked to rank their top three strategies for improving cycling within the region. As shown in Figure 7, the highest and most frequently ranked improvement strategy was adding bike lanes to streets. Following bike lanes, new recreational trails, bicycle safety initiatives, and city bike loops were the next most popular strategies.

FIGURE 7: PREFERRED STRATEGIES

Over the course of the survey, nearly 1,000 map markers were dropped within the region. The following map series (Figure 8 to Figure 13) highlight the map input received by the type of comment, while Table 2 shows the type of map markers by county.

TABLE 2: MAP MARKERS BY COUNTY

Type of Marker	Maryland	West Virginia			Total
	Washington County	Berkeley County	Jefferson County	Morgan County	
New Bike Lane or Trail	85	43	156	16	300
Safety Concern	106	74	116	3	299
Bike Destination	94	18	73	4	189
Home	54	28	41	2	125
Bike Amenity	23	4	17	1	45
Other Comment	14	6	6	2	28
Total	376	173	409	28	986

Public Meetings

Four public meetings were held in June and July 2016. The meetings included maps of the proposed bicycle improvements and the public will be able to provide comments and prioritize projects. The dates and locations are below.

Public Meeting Dates and Times

Date: June 27, 2016 (8 attendees)
Time: 6:00-7:30pm
Location: Martinsburg Public Library, Martinsburg Room
101 West King Street
Martinsburg WV 25401

Date: June 29, 2016 (11 attendees)
Time: 7:00-8:30pm
Location: Charles Town Library, Commissioners Meeting Room
200 East Washington Street (Basement)
Charles Town WV 25414

Date: June 30, 2016 (4 attendees)
Time: 7:00-8:30pm
Location: Washington County Free Library, Community Room 1&2 – 308/309
100 South Potomac Street
Hagerstown MD 21740

Date: July 6, 2016 (3 attendees)
Time: 6:00-7:30pm
Location: Morgan County Courthouse, Commissioners Meeting Room
77 Fairfax Street
Berkeley Springs WV 25411

FIGURE 8: WEB SURVEY INPUT (HOME LOCATIONS)

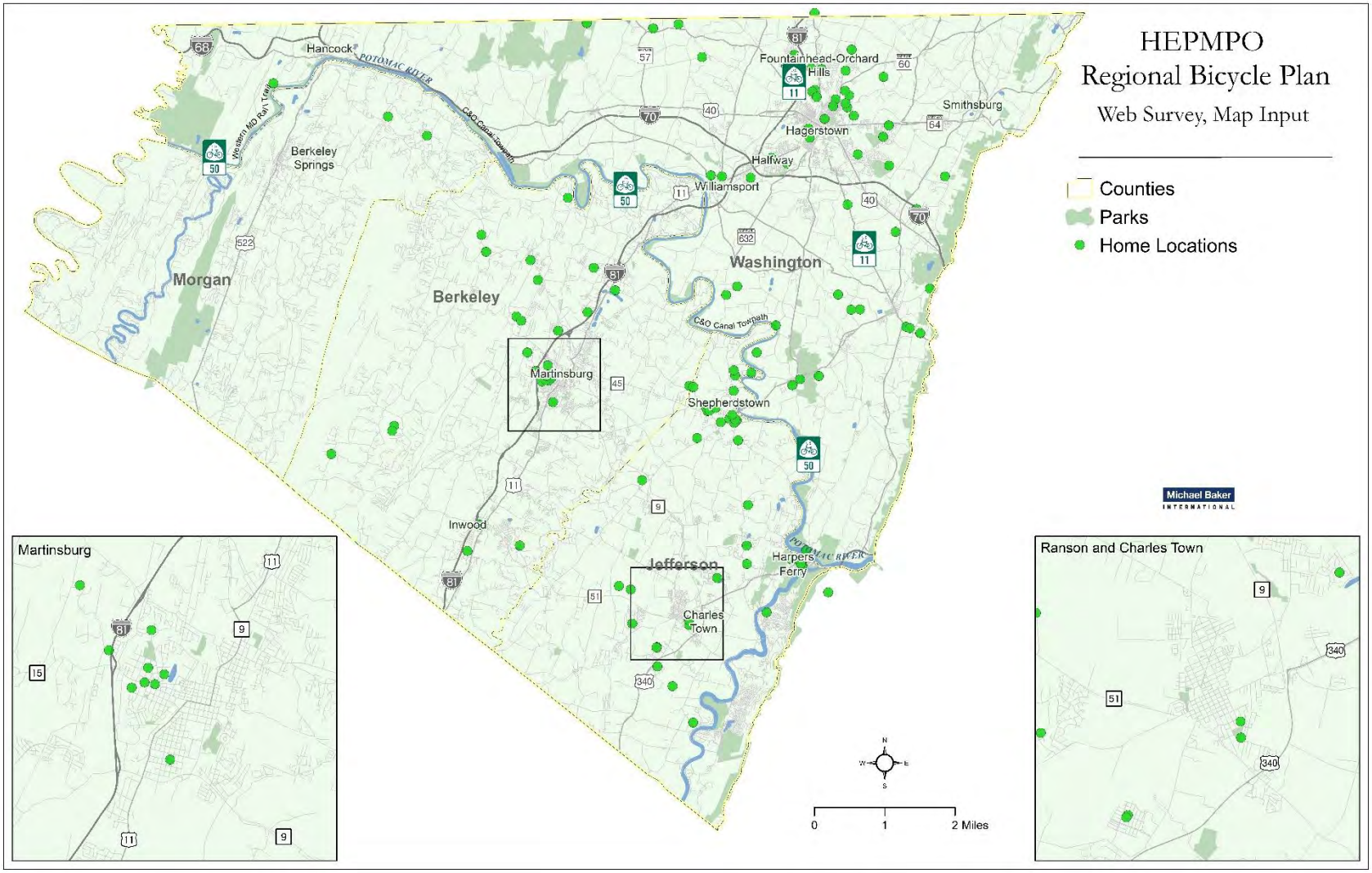


FIGURE 9: WEB SURVEY INPUT (DESTINATIONS)

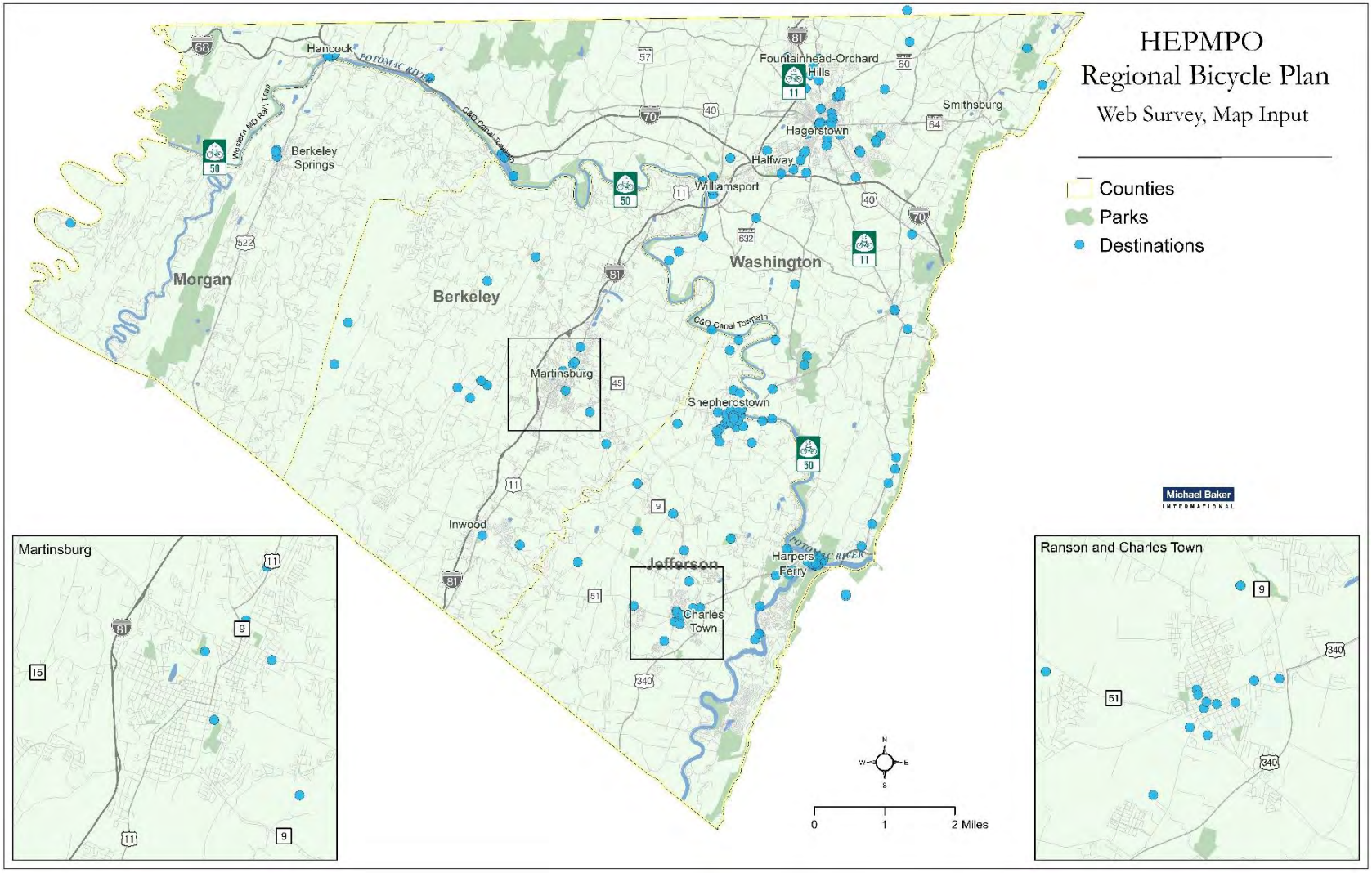


FIGURE 10: WEB SURVEY INPUT (SAFETY CONCERNS)

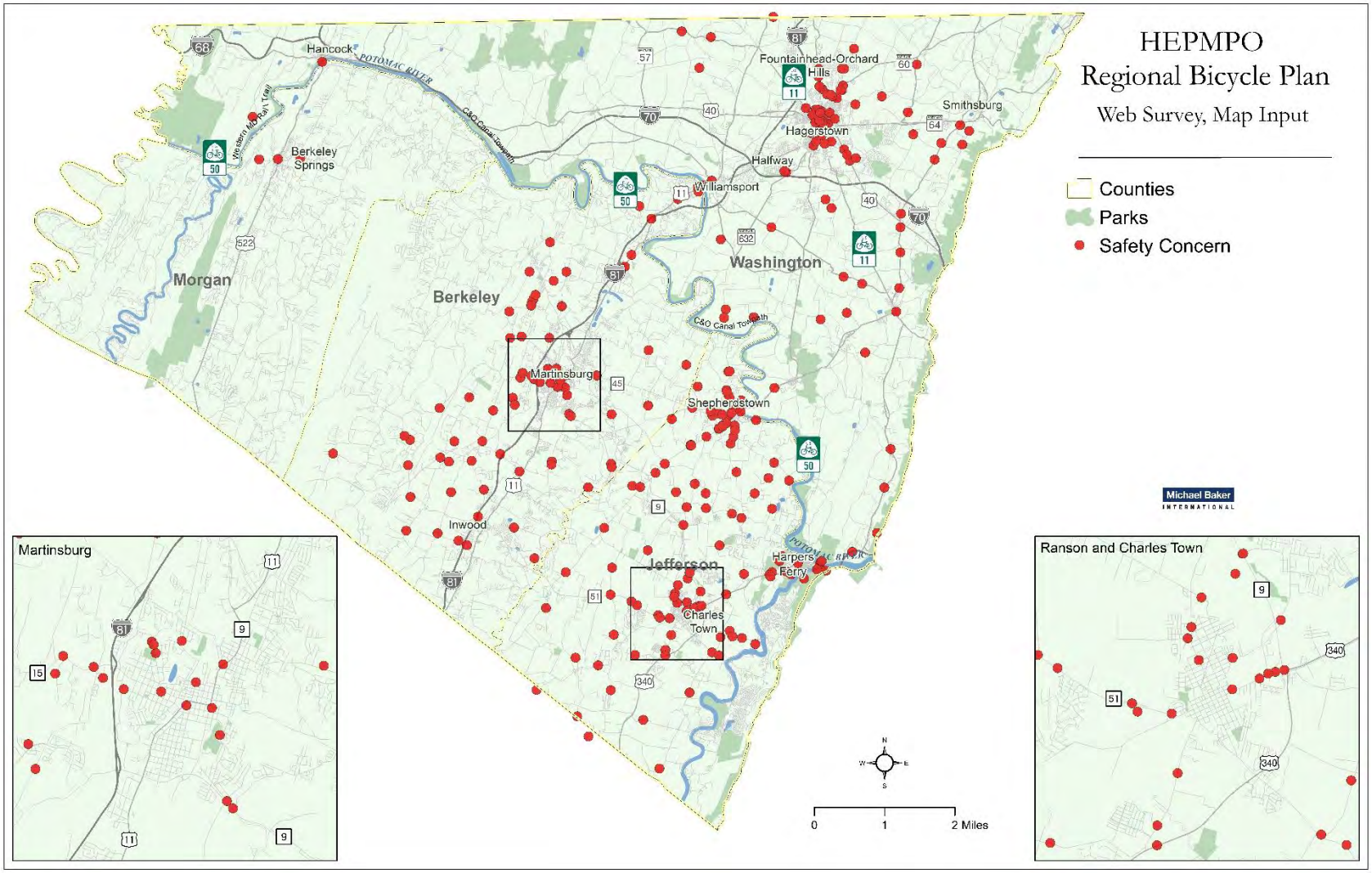


FIGURE 11: WEB SURVEY INPUT (DESIRED FACILITIES)

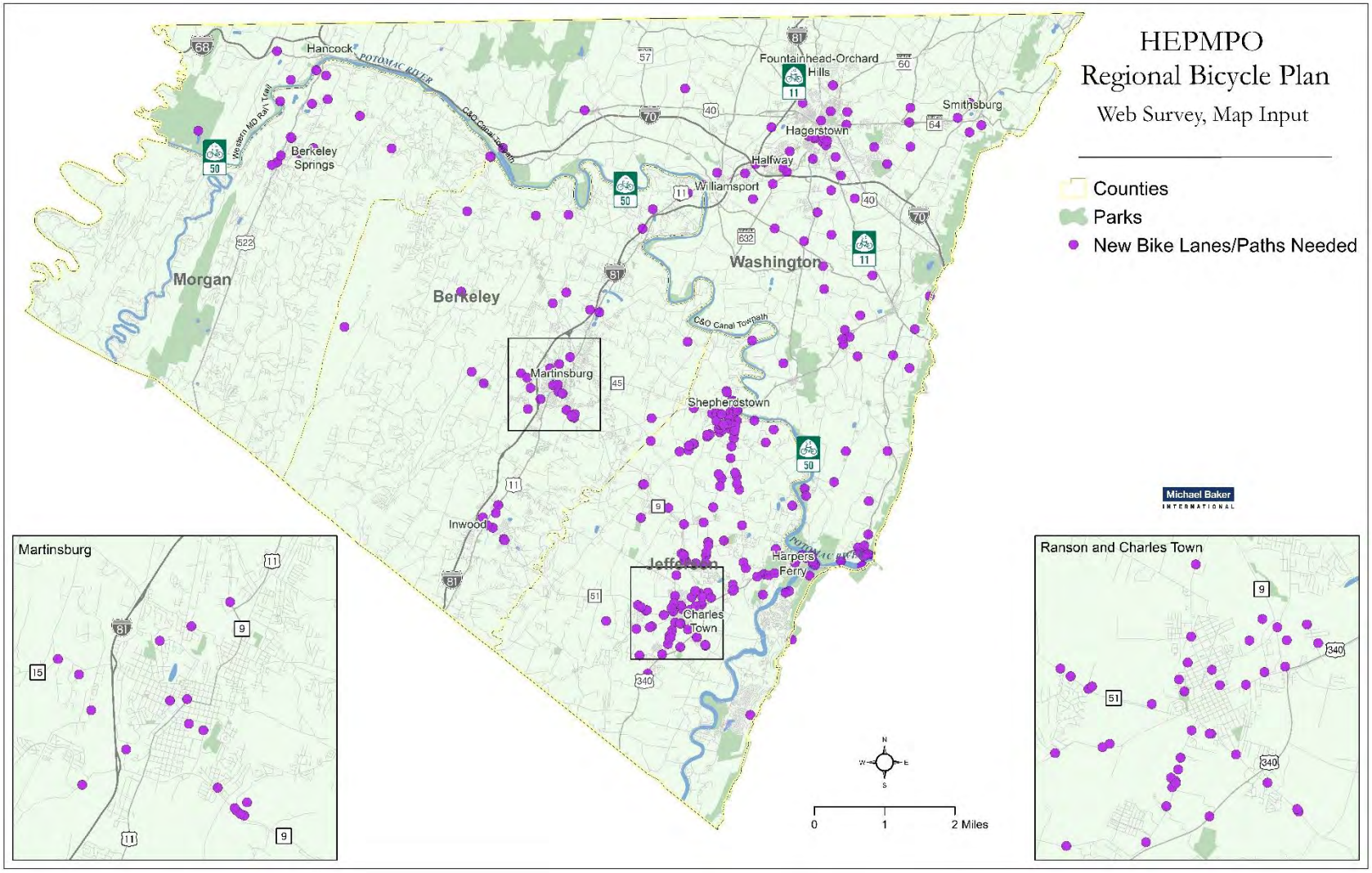


FIGURE 12: WEB SURVEY INPUT (DESIRED BIKE AMENITIES)

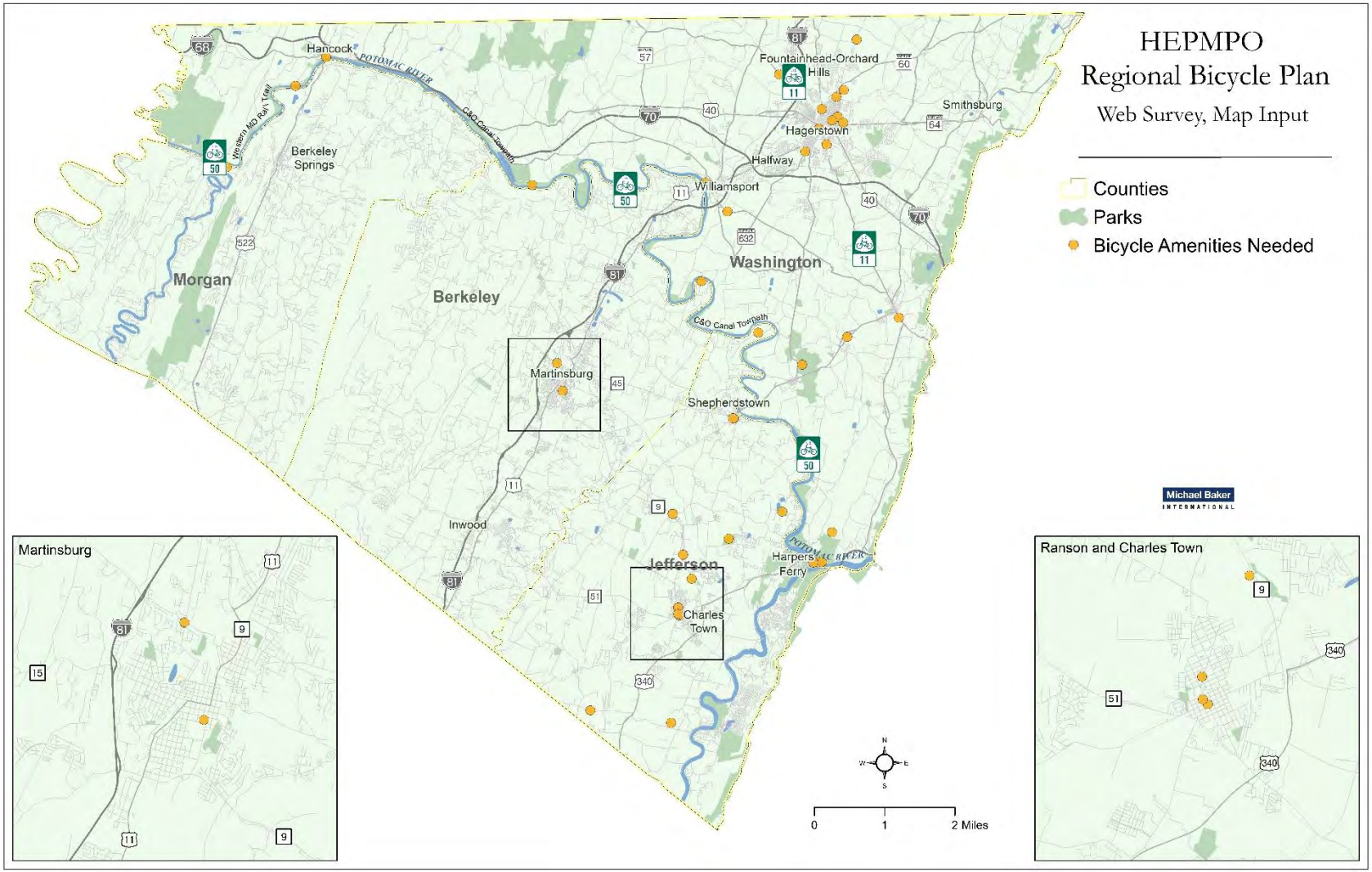
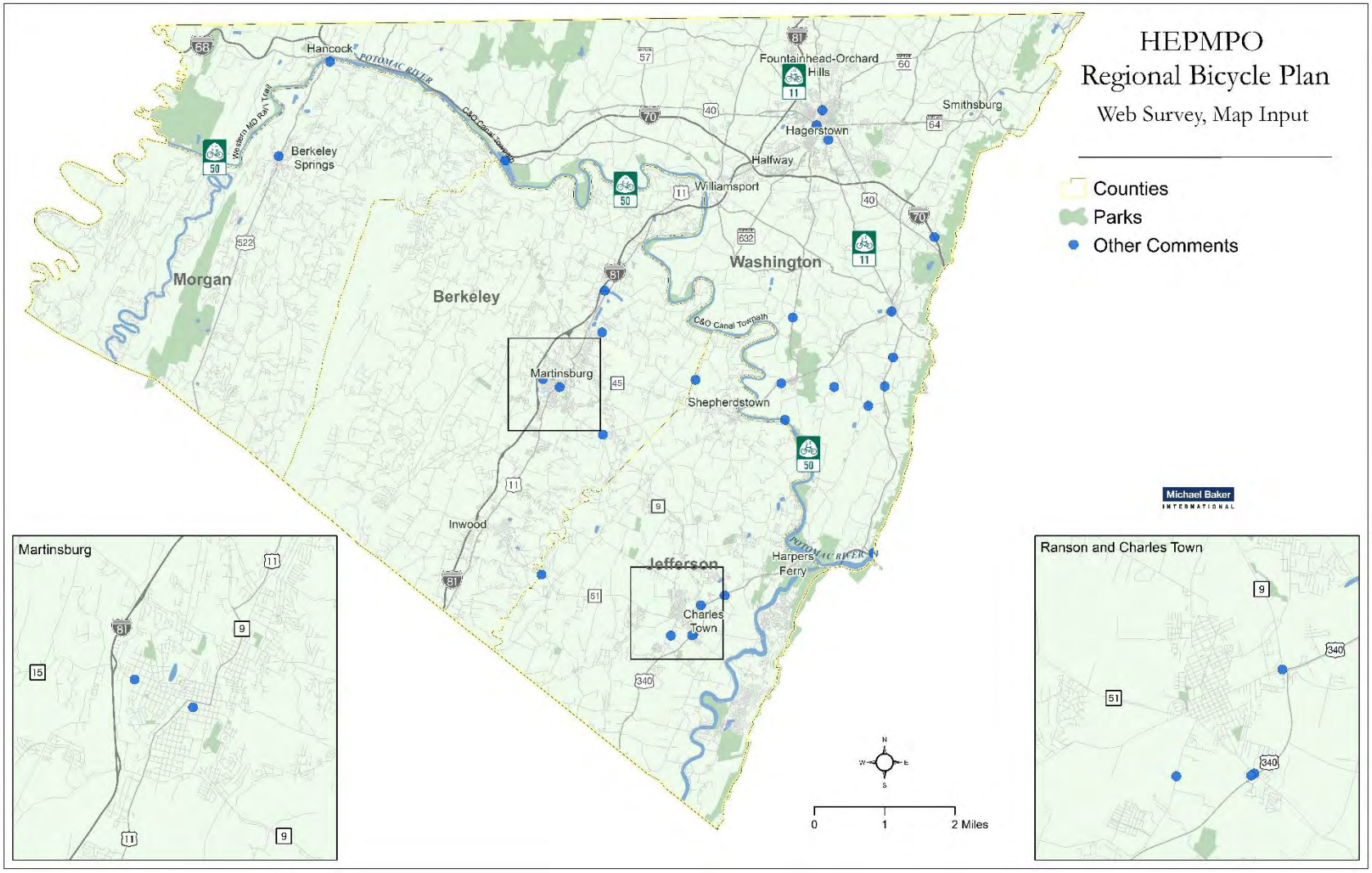


FIGURE 13: WEB SURVEY INPUT (OTHER COMMENTS)



Recommendations

The recommendations section below includes proposed policy and infrastructure improvements for the region. The section begins with safety and marketing recommendations, primarily focusing on youth safety, and is followed by signage, infrastructure (on-road and off-road improvements), bike parking, and projects for further study. The section concludes with an overview of rails-to-trails initiatives.

Safety

A safer bicycle network can be achieved through engineering and infrastructure, but also through policy, education, and increased awareness. The plan's infrastructure recommendations, discussed in the following sub-sections, highlight some of physical improvements needed to make the region safer for cyclists. Meanwhile, the list below provides examples of other non-infrastructure initiatives that can help enhance safety for cyclists, particularly for children.

- **Encourage communities to sponsor a "bicycle safety week"** in which jurisdictions provide daily bicycle safety tips, announcements, and trainings. Work with local organizations, media outlets, and businesses, such as bike shops, to help facilitate the events and circulate information. Some of the recommendations below could be included as part of the bicycle safety week.
- **Bike programs in public schools.** Starting Fall 2015, all DC second graders learned how to ride a bike, bike safety (including hand signals), and basic bike maintenance (things to check). The program culminates with a ride to the park and ties in with fitness, map-reading skills, and decision-making lessons. District Department of Transportation (DDOT) funded the purchase of 475 durable bikes (which rotate around schools).
- **Actively build bike lanes in low-income neighborhoods.** In many cities, there are fewer bike lanes (and less safe bike lanes) in low-income neighborhoods.
- **Have a dedicated funding source for helmet/safety programs.** North Carolina uses funding from specialty "Share the Road" license plates to fund helmet purchase programs to buy/distribute helmets to low-income kids through school and law enforcement offices.
- **Invest in helmet Give-Away Programs, especially through schools.** Children who were given free helmets were significantly more likely to wear their helmets (61.4%) than children who already owned helmets (43.4%) and children who attended the school in which free helmets were distributed showed a significant increase in helmet use.
- **Include helmet-fitting education for kids.** Safe Routes to School has a good guide for this.
- **Establish a safe "bike" zone around schools.** Washington State developed a guidebook for this process in 2015. The state focused on a small radius around the school (school districts are responsible for developing these plans) emphasizing maximum separation from high vehicle speeds; there are also strict vehicle speed enforcement (and have implemented traffic calming) around schools. The City of Hagerstown has already taken important steps in installing speed cameras in school zones.
- **Include safety materials in Spanish** (and/or other prominent local languages). Safe Routes to School has safety tips in Spanish.

- Use **community bicycle patrols** to help police stay aware of hazards facing bicyclists in your community.
- **Design streets for 20 mph travel speeds** through design rather than signage because at a collision speed of less than 25 miles per hour, 90% of cyclists/pedestrians survive a crash with a vehicle. Raised crosswalks, mini traffic circles, speed tables, curb extensions, and road diets are all good tools for lowering design speeds. The traffic circles on Summit Avenue in Hagerstown and the landscaped curb extensions in Williamsport offer good examples of how design features can reduce motor vehicle travel speeds.

Landscaped curb extensions on West Potomac Street in Williamsport physically and visually help narrow the roadway, slowing vehicle speeds and creating safer and shorter crossings for pedestrians

The traffic circles along Summit Avenue in Hagerstown are nicely landscaped and help reduce motor-vehicle travel speeds

Events and Marketing

This Plan includes goals to enhance safety and promote bicycling as a healthy transportation alternative. The recommendations below, pertaining to events and outreach, offer examples of potential initiatives to help generate interest in and awareness for cycling.

- In addition to helmet giveaways (discussed above), consider holding other events such as free **Light Giveaways**. Work with government and corporate sponsors to help fund the events. There are many examples of these programs throughout the country.

"**Bike Brightly", Portland, Maine:** The Bike Coalition of Maine hosted a large-scale bike giveaway in 2013, focused on educating commuters. The giveaway was followed by a night ride around the city. The lights were donated by Nite Ize.

Source: Bicycle Coalition of Maine.

"Light the Night", Tucson, Arizona: The City's Bicycle and Pedestrian Program, in collaboration with the regional Metropolitan Planning Organization (MPO) and the Living Streets Alliance, held a light giveaway event in 2015. Volunteers also distributed free bicycle helmets for youth and safety education material, available in both Spanish and English.

Promotional materials for Tucson's "Light the Night" Source: City of Tucson, Arizona

Bicycle accessory giveaways, Philadelphia, Pennsylvania: In 2014, the Bicycle Coalition of Greater Philadelphia offered two days of bicycle light giveaways, in which the Coalition helped distribute 250 sets of front and rear bicycle lights. The Coalition partnered with local bicycle shops and received discounted lights through Planet Bike.

Promotional materials for Philadelphia's Bicycle Light Giveaways

- Form local or regional groups to participate in the **National Bike Challenge**, a nationwide event that unites bicyclists and encourages ridership for commuting and recreational purposes. Consider promoting the group through active social media channels, such as the Facebook pages for the City of Hagerstown (8,300 likes) and Main Street Martinsburg (3,900 likes). The National Bike Challenge website helps participants log miles throughout the year, not just during the challenge (May through September).

- **Host Bike-To-School Days** which include a safety education component and a neighborhood bike train. Adopt a local champion, possibly a member of a local bicycle group, to help organize this effort. Work with local bike shop owners to see if they would be willing to help with the event because every bike train needs a conductor! The City of Traverse, Michigan currently operates 13 bike trains, which connect eight neighborhoods to five different elementary schools for "Bike to School Fridays".

"Bike to School Fridays" in Traverse City, Michigan (population: 15,000)

One of 13 weekly neighborhood bike trains in Traverse City, Michigan. Source: Norte!

- Promote cycling through **utility inserts**. The City of Hagerstown has used utility inserts in the past to promote outreach initiatives and could broaden these initiatives to include a cycling-specific insert. The example below, from Billings, Montana, graphically encourages cycling and includes important safety tips.

Utility bill insert. Source: City of Billings, Montana

- Pursue a "Ciclovia" or Open Streets type events, closing off commercial corridors to auto traffic and offering the space for active transportation users. This type of event can be held annually, monthly, or even weekly. Ciclovias began in Bogota, Colombia in 1974 and now attract 2 million people (30 percent of Bogota's population) every Sunday. The Open Streets concept has since spread all over the world, including many communities, large and small, in the United States. These events can also include bicycle safety demonstrations and other tutorials, such as "Bike-on-Bus" demos (below).

Advertising for Open Streets in Shakopee, Minnesota (population: 37,000)

Advertising for Open Streets in Fort Worth, Texas (population: 793,000)

The 2014 Open Streets event in Carrboro, North Carolina included bike-on-bus demonstrations (top) and "bike blenders" (bottom). Source: Carrboro Bicycle Coalition

- Advertise bicycle-related events through graphical calendars, such as the City of Hagerstown's "National Bike Month Calendar" (example below).

City of Hagerstown 2016 National Bike Month Calendar. Source: City of Hagerstown

Signage

The following includes recommendations for wayfinding and route signage, as well as general considerations when designating and marking bike lanes and sharrows (shared lane markings).

The American Association of State Highway and Transportation Officials (AASHTO) bicycle and pedestrian design guides were traditionally the primary national resources for planning, designing, and operating bicycle and pedestrian facilities. The passage of the FAST Act provides greater flexibility and the FHWA now supports additional design resources, including the National Association of City Transportation Officials (NACTO) Urban Bikeway Design Guide and the Institute of Transportation Engineers (ITE) Designing Urban Walkable Thoroughfares. These guidelines build upon the flexibilities provided in the AASHTO guides, which can help communities plan and design safe and convenient facilities for pedestrian and bicyclists. In addition, the Maryland Bicycle Policy and Design Guidelines provides guidance on signage specifications and bicycle design treatments.

- Install wayfinding (guide) signage to the region's prominent bicycle facilities, such as the C&O Canal Towpath, the Western Maryland Rail Trail, and the Route 9 Bike Path. This wayfinding signage should also direct cyclists to the towns and communities along the trails. Please refer to the Manual on Uniform Traffic Control Devices (MUTCD), Section 9B.01, for details on the application and placement of signs. The Town of Williamsport represents a great example of how to utilize signage to visually connect the C&O Canal Towpath with downtown. In addition, Bike Route (MUTCD D11-1) signage should be used to designate primary bike routes in, around, and through communities.

Signage (MUTCD, D11-1) directs cyclists from downtown Williamsport to the C&O Canal Towpath

- Communities should also work together to sign the region's two U.S. bicycle routes (USBR 50 and USBR 11). This is an important initiative that will help bring more regional awareness to these nationally designated routes. Signage is required at key decision points (turns, intersections) and as confirmation to notify cyclists that they are on the correct route. The MUTCD provides interim guidance for new U.S. bicycle route signs (M1-9) and offers more information at the following website: http://mutcd.fhwa.dot.gov/resources/interim_approval/ia15/.

Recommended M1-9 signage for U.S. bicycle routes

- Bicycle lanes, general guidelines.
  - Rural Areas
    - Many of the region's rural roadways are currently equipped with wide 8' shoulders. This is particularly evident on the Maryland State Highways, such as MD 34, MD 65, and segments of MD 68. While these rural facilities with wide shoulders are generally comfortable for confident cyclists, additional signage is warranted to help increase motorists' awareness of cyclists. Although the Maryland State Highway Administration (SHA) does not currently provide guidance on how to address bicycle facilities on rural shoulders (whether through symbols or signage), the agency is considering different design standards. In the meantime, it is recommended that appropriate warning signage (rather than bicycle lane markings) be used to designate these "rural bikeways." The recommended signage, shown to the right, includes a bicycle symbol and "on shoulder" text. This signage is currently utilized in other areas of Maryland, including US 15, north of Frederick.

Recommended "bike on shoulder" signage

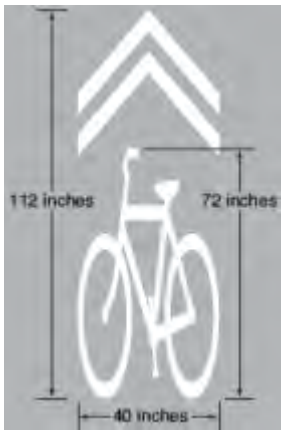
  - Urban areas
    - Ensure that bicycle lane pavement markings are placed after major intersections and placed approximately every ¼ mile along continuous bike lane segments in urban areas.
    - Install "Bike Lane Ends" signage in cases where a bike lane ends. Signage should be placed as close as practicable to the point where the bike lane ends. In some locations, it may be necessary to temporarily end the bike lane in advance of an intersection and then regain the bike lane after the intersection. If the resulting gaps exceeds 200 feet length, not including the width of the intersection itself, the "bike lane ends" signage should be used. This is likely required for the recommended bike lanes in Martinsburg (Bowers Street, Wilson Street, and S. Raleigh Street) and in Ranson (N. Mildred Street and E. 5th Avenue).

Bike lane sign (R3-17) with "ends" plaque

    - Please visit Chapter 2 of the Maryland Bicycle Policy & Design Guidelines for additional detail and guidance on urban bike lanes or consult with WVDOT on acceptable design standards for state-funded projects.

- Sharrows and "Share the Road", general guidelines.
  - Sharrows (shared lane markings) are recommended where the posted speed limit is 35 mph or less while "Share the Road" signage may be used on roadways with higher speeds.
  - Do *not* use both Sharrows and "Share the Road" assemblies.
  - According to NACTO, the number of markings along a street should correspond to the difficulty bicyclists experience taking the proper travel path or position. Sharrows used to bridge discontinuous bicycle facilities or along busier streets should be placed more frequently (50 to 100 feet) than along low traffic bicycle routes (up to 250 feet or more).

"Share the road" signage



Sharrow dimensions (Source: Maryland Design Guidelines)

  - Sharrows should be placed a minimum of 4 feet from the face of curb or roadway edge to the center of the sharrow marking. When used adjacent to a parking lane, they should be placed a minimum of 4 feet from the edge of the parking edge line to the center of the sharrow marking.
  - Please visit Chapter 3 of the *Maryland Bicycle Policy & Design Guidelines* or the National Association of City Transportation Officials (NACTO) Urban Bikeway Design Guide for additional information.

Bicycle Parking

Bicycle parking is a critical element in encouraging bicycling at the local level. Bicyclists need a safe and convenient place to park their bicycles along and at the end of most trips. Bike racks are scattered throughout the region and are missing at some key locations, such as parks, town centers, and shopping centers. New bike rack locations were identified based on public input, popular bike destinations, and proximity to points of interest. Note: the 2016 City of Hagerstown Bicycle Master Plan recommends 20 new locations for bike racks. As a result, additional bicycle racks are not recommended as part of this Regional Plan.

Bike racks are recommended at the following locations, as shown in Figure 16:

Map ID	Location
1	Shepherdstown Visitors Center
2	Shepherdstown Public Library
3	Downtown Boonsboro
4	Harpers Ferry Train Station
5	Harpers Ferry Lower Town
6	Downtown Sharpsburg
7	Byron Memorial Park
8	Williamsport Visitor Center
9	Downtown Martinsburg
10	Martinsburg Train Station
11	Black Dog Coffee Shop
12	Ranson City Hall
13	Evitts Run Park
14	Shafer Park
15	Morgan's Grove Park
16	Berkeley Springs Park/ Downtown Berkeley Springs
17	Devil's Backbone County Park
18	Foxcroft Towne Center at Martinsburg
19	Marketplace at Potomac Towne Center
20	Berkeley County Recreation Center
21	Paw Paw

Bike rack in Hagerstown, Maryland

Bike rack in Martinsburg, West Virginia

In addition to these locations, bike lockers should be installed at Harpers Ferry Train Station to allow for safe, extended storage of bicycles.

All bicycle racks are not equally effective. The Association of Pedestrian and Bicycle Professionals (APBP) publication, *Essentials of Bike Parking*, suggest that bicycle racks:

- Support bike upright without putting stress on wheels
- Accommodate a variety of bicycles and attachments
- Allow locking of frame and at least one wheel with a U-lock
- Provide security and longevity features appropriate for the intended location
- Are easy and intuitive to use

The recommended racks, as shown in Figure 14, such as the Inverted U or the Post & Ring, support the bike with at least two points of contact, minimize the potential for damage by not binding to the wheel, and allows the frame and at least one wheel to be locked to the rack. Commonly used racks that are not

recommended are “the wave”, which is not intuitive to use and only allows one point of contact, and the “schoolyard” (Figure 15), which does not allow locking of the frame and can lead to wheel damage.

FIGURE 14: RECOMMENDED BIKE RACK TYPES

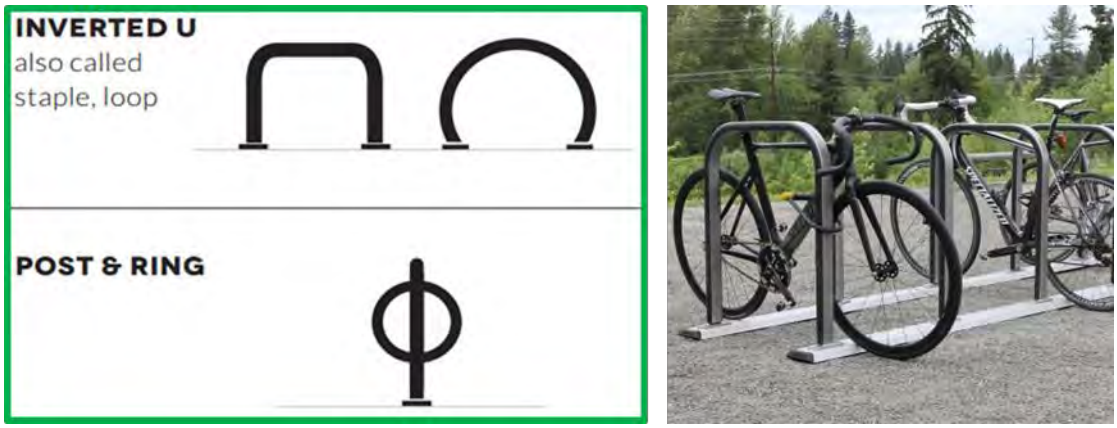
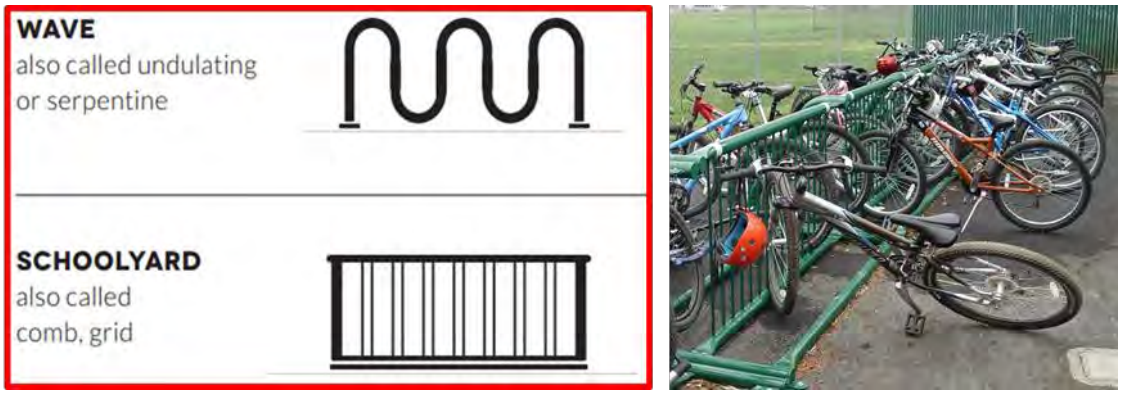


FIGURE 15: NOT RECOMMENDED BIKE RACK TYPES

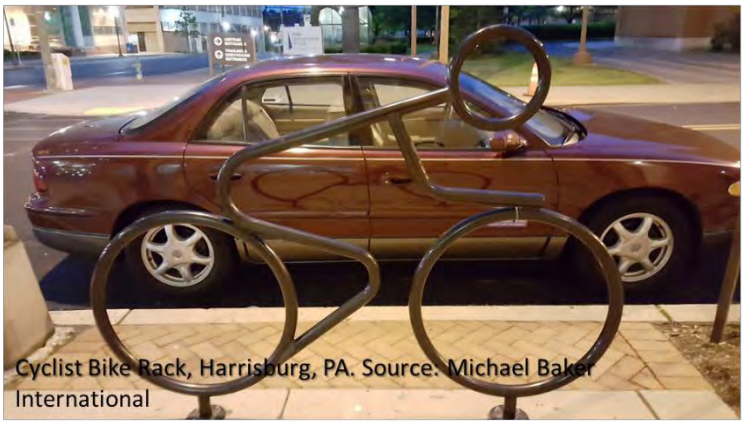


The recommended design criteria above do not need to limit creativity. Creative designs should balance form with function, supporting the bike in two places and allowing the bicycle to be securely locked. A well-designed bike rack enhances the visual appeal of the area in which it is placed. Though custom racks cost more than a standard bike rack, the returns on investment include heightened visibility and improved public perception of cycling in the city. The following page shows several examples of creative bike racks from around the country.

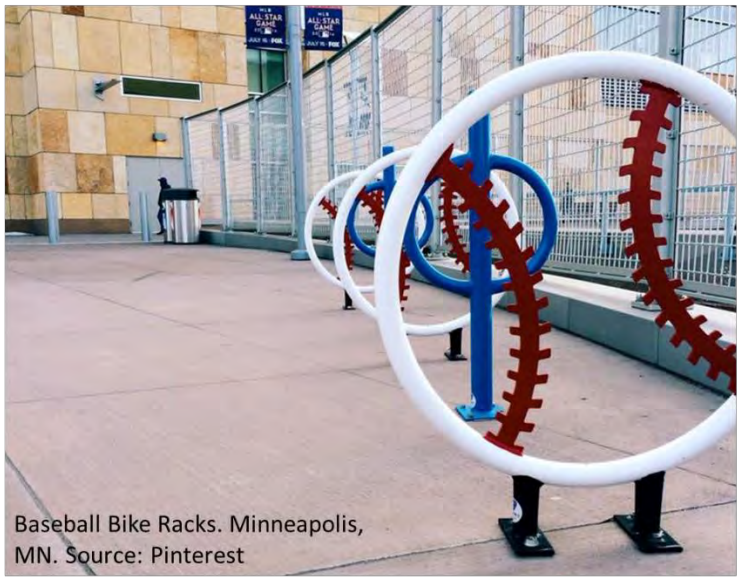

Coffee Shop Bike Rack, Washington, DC. Source: Waba


Variation of "Inverted U" Bike Rack. Richmond, VA. Source: Michael Baker


High Visibility Bike Rack, Roanoke, VA. Source: Michael Baker International

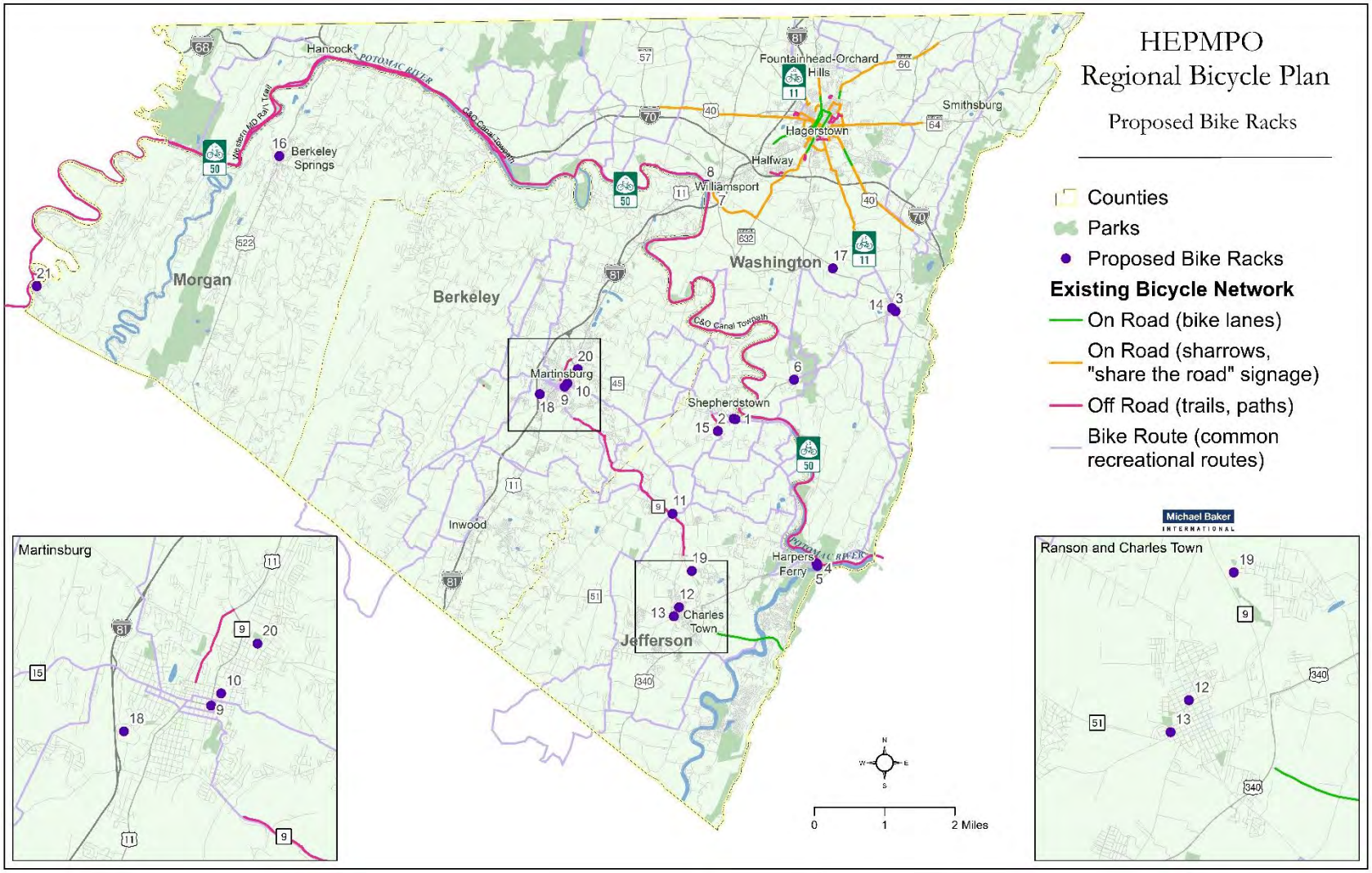

Cyclist Bike Rack, Harrisburg, PA. Source: Michael Baker International


Umbrella Bike Racks, Minneapolis, MN. Source: Pinterest.


Baseball Bike Racks. Minneapolis, MN. Source: Pinterest


Parking Meter Bike Racks, Washington, DC. Source: DC Curbed

FIGURE 16: PROPOSED BIKE RACK LOCATIONS



Infrastructure

This section includes the plan's recommendations for bike lanes, sharrows, trails, and other physical improvements. Each recommendation has a unique Project ID (Map ID) and a description of the need and the suggested improvements. The majority of the project descriptions include a photo or aerial of the existing conditions and several projects provide a cross-sectional diagram to help visualize specific improvements. As discussed earlier, the City of Hagerstown recently updated its own 2016 Bicycle Master Plan. As such, this Regional Plan focuses on connections to Hagerstown's existing and proposed network rather than proposing new recommendations in the City limits. Table 3 lists the recommendations and anticipated costs, while Figure 17 maps the existing and proposed bicycle network. The photos below highlight some of the notable types of bicycle facilities discussed in the project recommendations. Please see Appendix D for design guidelines and illustrations for several of these types of facilities, as well as others.

This Regional Bicycle Plan proposes several types of bicycle facilities (examples above)

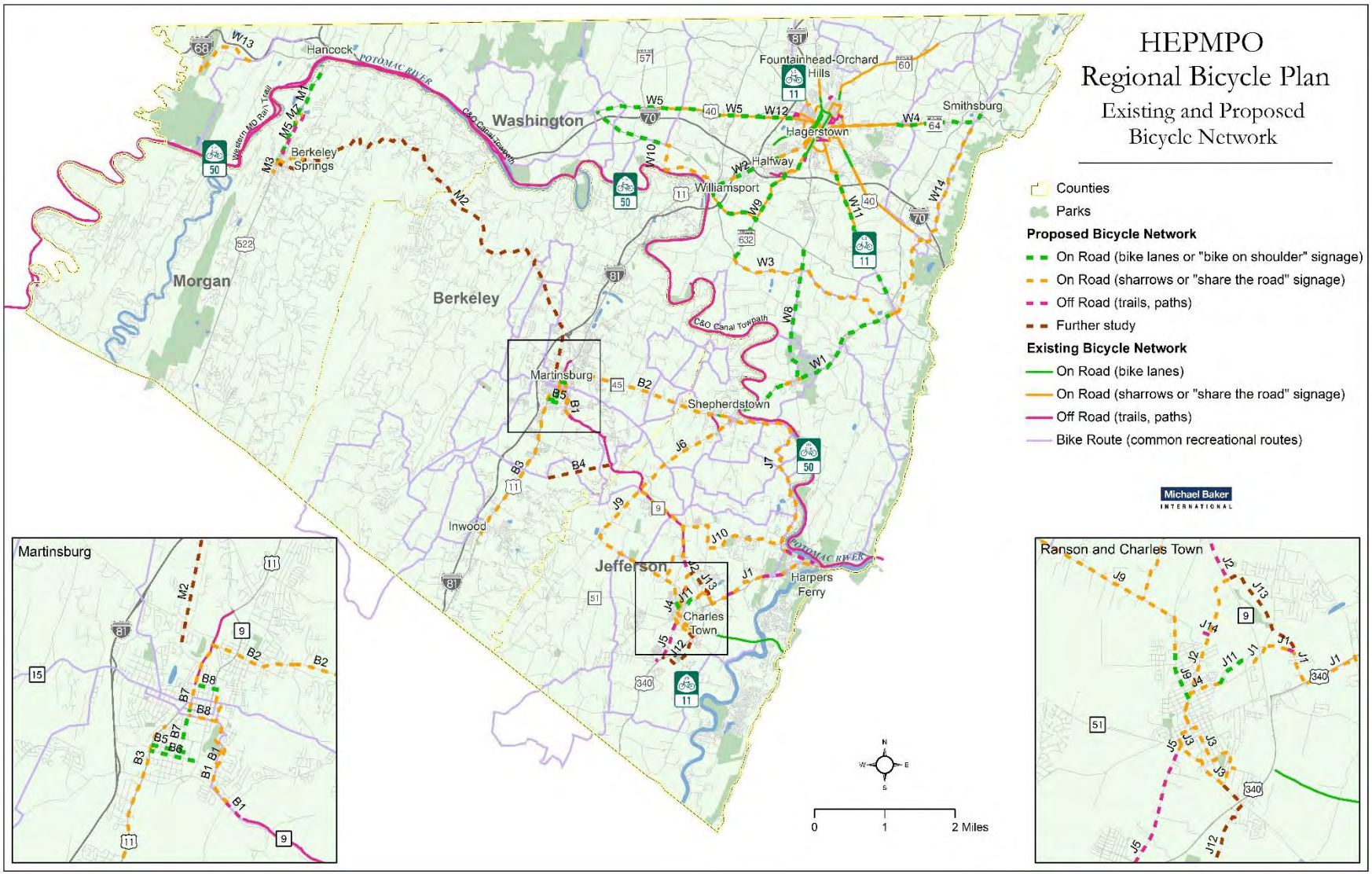
TABLE 3: PROPOSED BICYCLE FACILITIES

Map ID	Description	Facility	Type	Cost Estimate
Morgan County				
M1	Improve bicycle facilities between Hancock and Berkeley Springs along US 522	Rt. 522	Proposed bike on shoulder signage, resurfacing shoulders	$763,691
M2	WV9 Improvements (Further Study)	Rt. 9	Further Study	NA/TBD
M3	Install sharrows between Berkeley Springs and Berkeley Springs High School	Rt. 522, Concord Ave.,	Proposed sharrows	$17,680
M4	Install a bicycle/ pedestrian bridge over the Potomac River (Great Cacapon to the C&O Canal Towpath)	-	Proposed 14’ wide bridge	$2,840,472
M5	North Berkeley Rail Trail	-	Proposed sharrows	$1,611,962
M6	Improve bicycle facilities between Berkeley Springs and Warm Springs Schools	Warm Springs Way, S Pine, Fairfax St.	Proposed share the road signage	$9,250
M7	Install sharrows on Sand Mine Road, connecting to the proposed North Berkeley Rail Trail	Sandmine Rd.	Proposed share the road signage	$2,900
Berkeley County				
B1	Connect WV 9 Bike Path to Downtown Martinsburg	Hack Wilson Way, State Cir., Stephen St.	Proposed multi-use path and sharrows	$229,813
B2	Improve bicycle facilities on Shepherdstown Road between Martinsburg and Shepherdstown	Shepherdstown Rd, Moler Ave., Raleigh St.	Proposed share the road signage	$46,700
B3	Improve bicycle facilities on US 11 between Martinsburg and Inwood	Rt. 11	Proposed share the road signage	$42,350
B4	Novak Drive Extension (Further Study)	-	Further Study	NA/TBD
B5	Improve eastbound bicycle connectivity and safety in Martinsburg (Bowers Street)	Bowers St.	Proposed buffered bike lane	$29,657
B6	Improve westbound bicycle connectivity and safety in Martinsburg (Wilson Street)	Wilson St.	Proposed bike lane	$11,166
B7	Improve connections to Raleigh Street bicycle path and to other proposed facilities (Raleigh Street)	Raleigh St.	Proposed bi-directional bike lanes	$31,524
B8	Improve bicycle connectivity in east side of Downtown Martinsburg	Race St., Stephen St.	Proposed bi-directional bike lanes	$25,125

Map ID	Description	Facility	Type	Cost Estimate
Jefferson County				
J1	Improve bicycle facilities between Harpers Ferry and Charles Town/Ranson	Somerset Blvd., Flowing Spring Rd., others	Proposed path, sharrows	$1,062,309
J2	Connect Route 9 Bike Path with Charles Town/Ranson	Fairfax Blvd., George St.	Proposed multi-use path and sharrows	$516,654
J3	Create a bicycle-friendly loop in Charles Town (3 miles)	George St., Washington St., others	Proposed sharrows and bike route signs	$50,262
J4	Improve bicycle facilities between Charles Town, Ranson and the new residential development east of Route 9	5th Ave., George St., Flowing Springs Rd., Pacesetter Way	Proposed sharrows	$12,818
J5	Install multi-use trail along Augustine Avenue (TAP grant application pending)	Augustine Ave.	Proposed multi-use path	$1,639,517
J6	Improve bicycle facilities along WV 480	WV 480	Proposed share the road signage	$28,850
J7	Connect Shepherdstown with Harpers Ferry (River Road, Knott Road, Bakerton Road)	River Rd., Knott Rd., Bakerton Rd.	Proposed share the road signage	$54,600
J8	Connect Shepherdstown w/ Harpers Ferry (Potomac St.)	Potomac St.	Proposed multi-use path	$1,102,196
J9	Recreational bike route from Ranson to Leetown to Route 9 bike path and back to Ranson	Mildred St., Olde Leetown Pike, Leetown Rd., WV 9 Trail, War Admiral	Proposed share the road signage and bike lanes	$40,292
J10	Connect Shenandoah Junction with Harpers Ferry	Shenandoah Junction Rd., Job Corps Rd.	Proposed share the road signage	$33,050
J11	Fifth Avenue Road Diet	Fifth Ave.	Road diet (traffic counts recommended prior to conversion)	$58,236
J12	Multi-use trail for Further Study	Multi-use trail	Further Study	NA/TBD
J13	Connect to Flowing Springs Park	Multi-use trail	Further Study	NA/TBD
J14	16th Street Bicycle Connection	Multi-use trail	Proposed multi-use path	$68,887

Map ID	Description	Facility	Type	Cost Estimate
Washington County				
W1	Improve bicycle facilities on MD 34 between Boonsboro and Shepherdstown	Rt. 34	Proposed bike on shoulder signage	$22,572
W2	Improve bicycle facilities on Virginia Ave. between Hagerstown and Williamsport	Rt. 11 (Virginia Ave.)	Proposed bike on shoulder signage	$13,840
W3	Improve bicycle facilities between Williamsport and Boonsboro	Rt. 68, Downsville Pike, Spielman Rd., Manor Church Rd., Monroe Rd.	Proposed bike on shoulder signage, share the road signage	$51,000
W4	Improve bicycle facilities on MD 64 between Hagerstown and Smithsburg	Rt. 64	Proposed bike on shoulder signage	$19,740
W5	Improve bicycle facilities on US 40 between Hagerstown and Clear Spring	US 40	Proposed bike on shoulder signage	$10,454
W6	Improve bicycle accessibility to Harpers Ferry (bike ramp)	-	Proposed bike ramp	NA/TBD
W7	Introduce bicycle signage on US 11 bridge	Rt. 11	Proposed share the road signage	$2,150
W8	Improve bicycle facilities on MD 65 between MD 68 and Sharpsburg	Rt. 65	Proposed bike on shoulder signage	$8,100
W9	Improve bicycle facilities between Hagerstown and Williamsport as an alternative to Virginia Avenue	Downsville Pike, Maryland Ave.	Proposed bike on shoulder signage	$7,000
W10	Improve cycling comfort and connectivity on MD 68 between Clear Spring and Williamsport	Rt. 68 and Bottom Rd.	Proposed bike on shoulder signage, share the road signage	$28,320
W11	Improve cycling comfort and connectivity on US 40-Alt (USBR 11) from Funkstown to Boonsboro	US 40-Alt	Proposed bike on shoulder signage	$7,872
W12	Improve connections to Hagerstown via W. Washington Street	W. Washington St.	Proposed bike on shoulder signage	$2,136
W13	Scenic Route 40 Improvements	Scenic Route 40	Proposed share the road signage	$26,700
W14	Connect Boonsboro and Cavetown-Smithsburg	Mountain Laurel Rd. and Crystal Falls Dr.	Proposed share the road signage	$67,200

FIGURE 17: THE EXISTING AND PROPOSED BICYCLE NETWORK



Morgan County

M1: Improve bicycle facilities on US 522 between Berkeley Springs and Hancock

- Potomac River Bridge to WV 9 along US 522
- Purpose and need
  - Better connectivity to Western Maryland Rail Trail (WMRT) and C&O Canal Towpath
  - High bicycle demand score
  - The public expressed need to connect Berkeley Springs to the WMRT via Hancock
- Recommendation
  - Improve the quality of existing shoulders, which likely requires resurfacing (replacing existing granular shoulders with asphalt shoulders). Consult with WVDOT on the preferred approach (bike lane symbols versus "bike on shoulder" signage).
  - Install sharrows (if less than 35 mph) where bicycle lanes are not feasible (due to on-street parking and turn lanes).

M2: Conduct further study regarding the development of bicycle facilities between Martinsburg and Berkeley Springs

- Martinsburg to Berkeley Springs via WV 9
- Purpose and need
  - Serves as a critical connection between Berkeley Springs and other areas of the Eastern Panhandle
  - The public expressed the need to connect Berkeley Springs with Martinsburg, as well as desire to extend the Route 9 Bike Path to Berkeley Springs
- Recommendation
  - Planning-Environmental Linkages Study is underway with WVDOT
  - *See "Further Study" section for details*

M3: Improve bicycle connectivity between Berkeley Springs and schools on US 522

- WV 9 to Morgan Square via US 522, Broadway Street, Concord Avenue, and Myers Road
- Purpose and need
  - Improve access to schools (Berkeley Springs High School and Widmyer Elementary School) and grocery stores
  - High bicycle demand score
- Recommendation
  - Install sharrows on US 522, Broadway Street, and Concord Avenue
  - Coordinate with Berkeley Springs Hill School on potential to widen existing paths through the campus
  - Evaluate the feasibility of a multi-use trail along Warm Springs Run from Widmyer Elementary School to Morgan Square shopping center

M4: Install a bicycle/pedestrian bridge over the Potomac River

- Great Cacapon to the C&O Canal Towpath/WMRT
- Purpose and need
  - Improve interstate bicycle connections
  - Connect Great Cacapon and the C&O Canal/WMRT
- Recommendation
  - Install a bicycle-pedestrian bridge (14' width) over the Potomac River, providing a connection to existing trails. *Note: image above is very preliminary.*

M5: Install multi-use path (North Berkeley Rail Trail)

- Union Street to Sand Mine Road along abandoned rail line
- Purpose and need
  - Improve off-road bicycle connectivity
  - High bicycle demand score
  - Currently in West Virginia Statewide Transportation Improvement Program (STIP)
- Recommendation
  - Coordinate effort with regional stakeholders
  - Complete final design and begin construction

M6: Improve bicycle facilities between Berkeley Springs and Warm Springs schools

- WV 9 to Warm Springs Intermediate School via South Green Street, Ewing Street, Lee Circle, Fairfax Street, and Warm Springs Way
- Purpose and need
  - Provide access to schools (Warm Springs Middle School and Warm Springs Intermediate School)
  - High bicycle demand score
  - Improve safety (cyclist fatality in 2010)
- Recommendation
  - Install sharrows (speed limit is 25)
  - Evaluate the future feasibility of a multi-use path along this roadway segment, which would likely require land acquisition and/or easements

M7: Install sharrows on Sand Mine Road, providing a connection to the proposed North Berkeley Rail Trail and US 522

- North Berkeley Rail Trail to US 522 via Sand Mine Road
- Purpose and need
  - Regional connectivity
  - High bicycle demand score
- Recommendation
  - Use sharrows (speed limit is 35) to convey cyclists to/from the proposed North Berkeley Rail Trail and US 522 improvements
  - Recommendation contingent on North Berkeley Rail Trail development

Berkeley County

B1: Connect WV 9 Bike Path to Downtown Martinsburg

- Route 9 Bicycle Path to South Queen Street via Hack Wilson Way, State Circle, Ryneal Street, Sycamore Street, and East Stephen Street
- Purpose and need
  - Connect Downtown Martinsburg with Route 9 Bicycle Path
  - Access to parks and Saint Joseph School
  - High bicycle demand score
  - The public expressed the need for connections to the Route 9 Bicycle Path
- Recommendation
  - Install 0.3 mile shared-use path from WV Route 9 bicycle path parking lot to Royal Crest Drive
  - Install sharrows and bicycle route signs along Hack Wilson Way, State Circle, Ryneal Street, Sycamore Street, and East Stephen Street
  - If path is not an option, consider bicycle lanes along Route 9 and install pedestrian refuge to help eastbound cyclists cross from south side of Route 9 to the bicycle path parking lot

B2: Improve bicycle facilities on Shepherdstown Road between Martinsburg and Shepherdstown

- North Raleigh Street to Maddex Square Drive via Moler Avenue and Shepherdstown Road
- Purpose and need
    - Connect existing facilities (bicycle path) in Martinsburg and existing facilities (bicycle lanes) in Shepherdstown
    - Link areas of high bicycle demand
    - Improve safety along Shepherdstown Road (2 motor vehicle-bicycle crashes from 2011 to 2015)
    - Need for better east-west connections within the region
- Recommendation
    - Install “share the road” signs and bike route signs
    - Evaluate the future feasibility of wider shoulders along this roadway segment

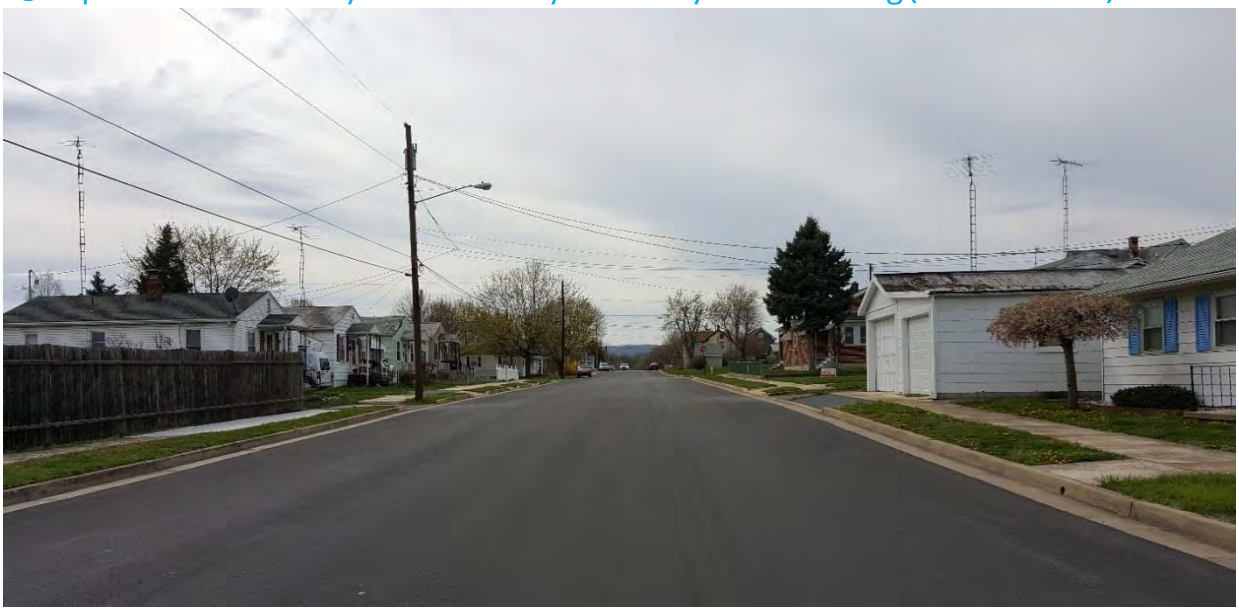
B3: Improve bicycle facilities on US 11 between Martinsburg and Inwood

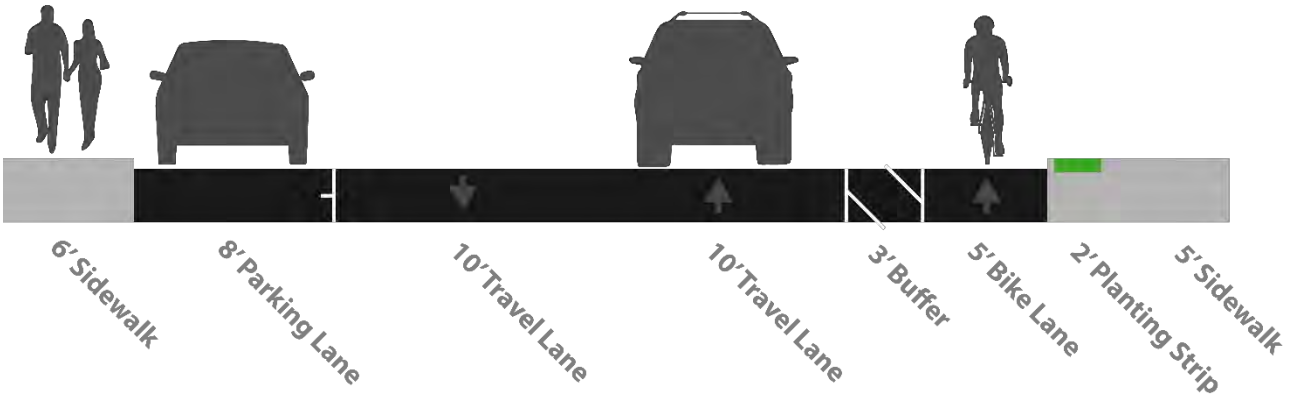
- Mall Drive to Musselman Middle School via US 11
- Purpose and need
    - Link areas of high bicycle demand
    - Need for better connections in southwest Berkeley County
    - Access to parks and schools (Musselman Middle School, Mill Creek Intermediate School, Inwood Primary School, Musselman High School, and Winchester Avenue Elementary)
- Recommendation
    - Install “share the road” signs and bike route signs

B4: Conduct further study on extending Novak Drive to Short Road and evaluate the potential for bicycle facilities along that route

- Novak Drive to Short Road
- Purpose and need
    - East-west connectivity south of Martinsburg
    - Location of future planned development
- Recommendation
    - Study is currently in the early planning phase
    - See “Further Study" section for details

B5: Improve eastbound bicycle connectivity and safety in Martinsburg (Bowers Street)

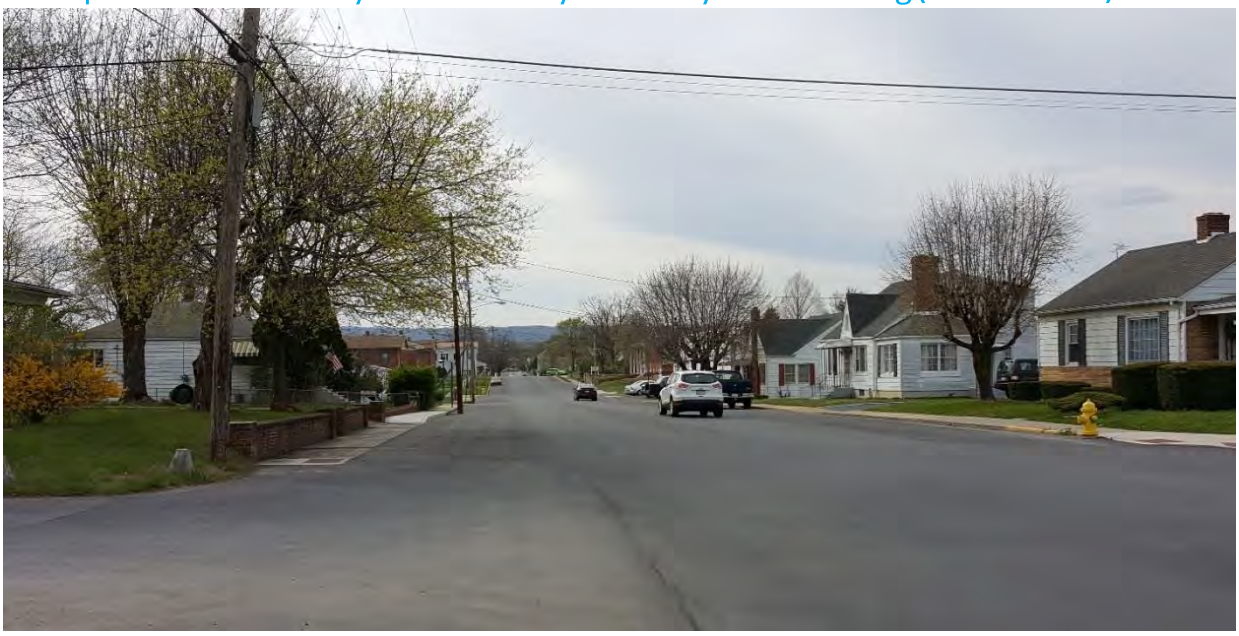


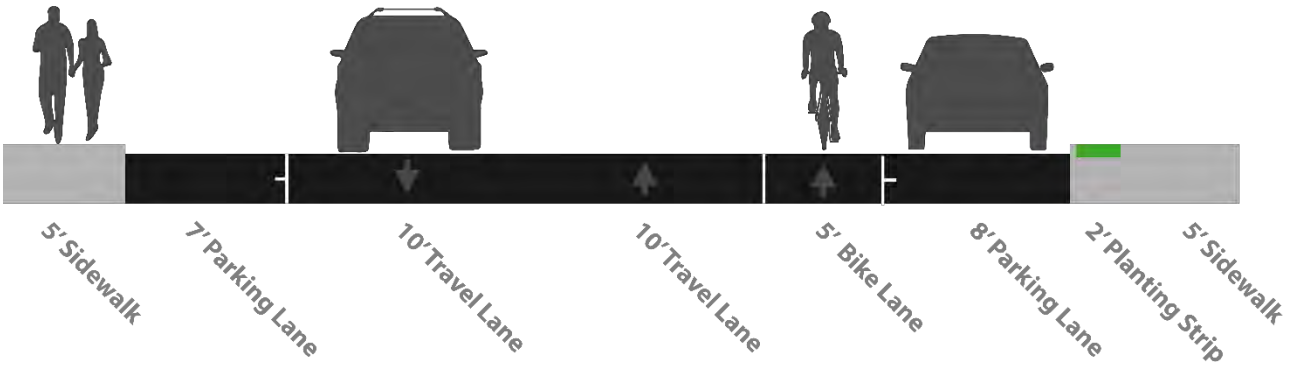


Cross-section showing proposed improvements

- Winchester Avenue to South Maple Avenue via Bowers Street
- Purpose and need
  - Eastbound connectivity within Martinsburg
  - Access to Martinsburg High School
  - High bicycle demand score
  - Serves as one-way pair with proposed bicycle lane on Wilson Street (Recommendation B6)
- Recommendation
  - Install an eastbound 5' bicycle lane with 3' cross-hatch buffer on south side of Bowers Street (prohibit parking on south side of Bowers)
  - Consider sharrows if a bike lane is not desired at this time

B6: Improve westbound bicycle connectivity and safety in Martinsburg (Wilson Street)





Cross-section showing proposed improvements

- Winchester Avenue to S. Queen Street via Wilson Street
- Purpose and need
  - Westbound connectivity within Martinsburg
  - Access from Martinsburg High School
  - High bicycle demand score
  - Serves as one-way pair with proposed bicycle lane on Bowers Street (Recommendation B5)
- Recommendation
  - Install a westbound 5' bicycle lane on north side of Wilson Street
  - Consider sharrows if a bike like is not desired at this time

B7: Improve connections to Raleigh Street bicycle path and to other proposed facilities (Raleigh Street)

- Wilson Street to West Race Street via Raleigh Street
- Purpose and need
  - Serve as a safe North-South alternative to Queen Street
  - Connect existing facilities (Raleigh Street bicycle path) with proposed facilities (bicycle lanes on Wilson Street and Bowers Street)
  - High bicycle demand score
- Recommendation
  - Install 5’ bi-directional bicycle lanes on Raleigh Street from Wilson Street to West John Street. Prohibit parking on east side of Raleigh Street from Wilson Street to W. Addition Street (it is already prohibited from W. Addition to W. John Street). Install sharrows from W. Race Street to W. John Street.
  - Consider sharrows if bike lanes are not desired at this time

B8: Improve connectivity in east side of Downtown Martinsburg

- Raleigh Street at W. Stephen Street to Raleigh Street at W. Race Street via Stephen Street, Water Street, White Avenue, E. Martin Street, N. Spring Street, and Race Street
- Purpose and need
  - High bicycle demand score
  - Enhances multimodal connectivity by improving access to the Martinsburg Train Station
  - Creates a two-mile city loop when paired with proposed facilities on Raleigh Street (Recommendation B7)
- Recommendation
  - Install sharrows to increase motorists' awareness of cyclists

Jefferson County

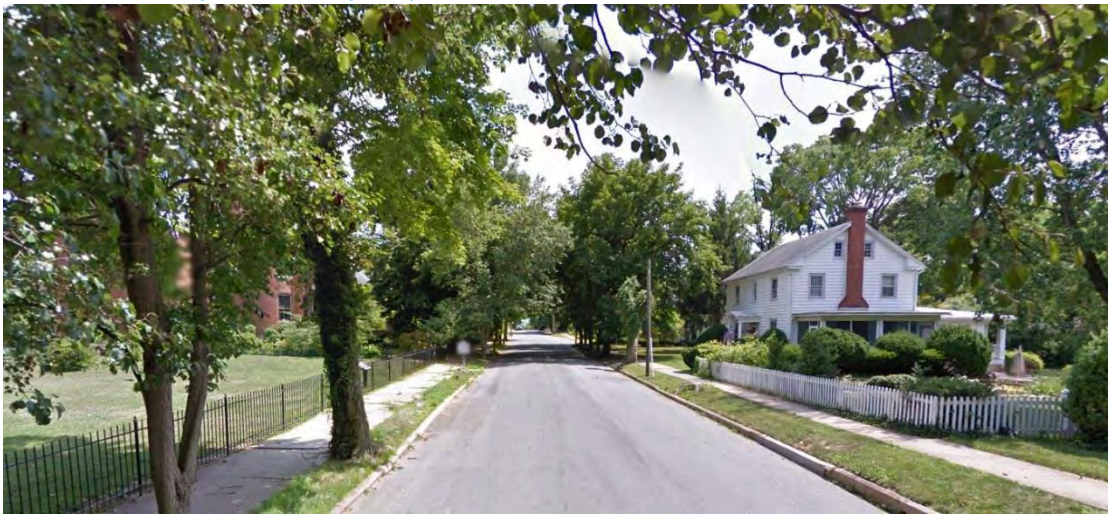
J1: Improve bicycle facilities between Harpers Ferry and Charles Town/Ranson

- Shenandoah Street to North Fairfax Boulevard via High Street, Washington Street, Shipley School Road, Shepherdstown Pike, Halltown Road, Somerset Boulevard, Patrick Henry Way, Mountain Laurel Boulevard, Flowing Springs Road, and 5th Avenue
- Purpose and need
  - Link areas of high bicycle demand
  - The public identified several safety concerns along US 340 and expressed support for a safer connection between Charles Town/Ranson and Harpers Ferry
- Recommendation
  - Install several short shared-use paths (1.5 miles total)
  - Install "share the road" signage or sharrows (if 35 mph or less) along other segments (5.8 miles total)

J2: Improve bicycle facilities between Route 9 Bike Path and Charles Town/Ranson

- Route 9 Bike Path to E. Washington Street via Fairfax Boulevard and N. George Street
- Purpose and need
  - Connect Route 9 Bike Path and Charles Town/Ranson
  - High bicycle demand score
  - The public identified a need for improved connections to the Route 9 Bike Path
- Recommendation
  - Install a 0.7-mile shared-use path between the southern terminus of the Route 9 Bike Path and Oak Lee Drive
  - Install sharrows on Fairfax Boulevard as currently recommended in the Fairfax Boulevard development plans

J3: Create a bicycle-friendly loop in Charles Town



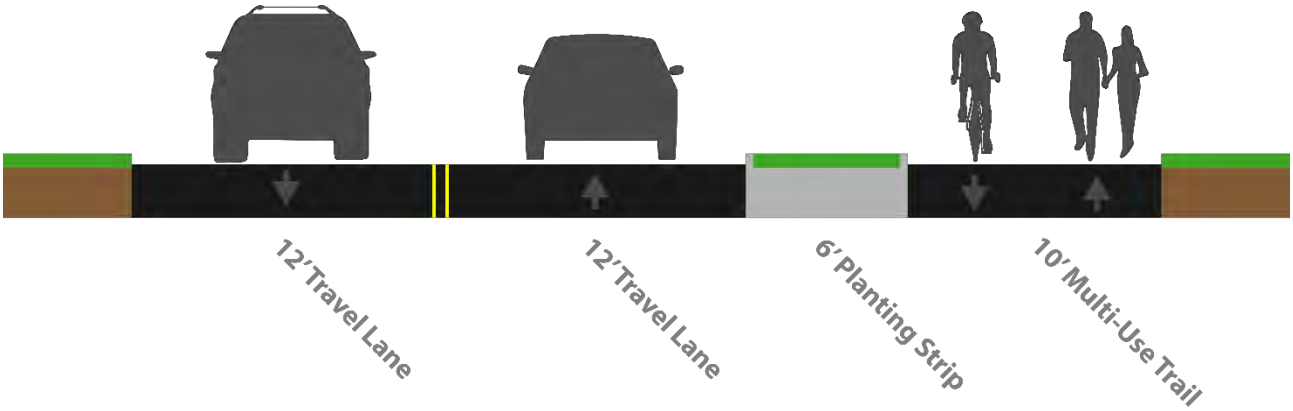
- Charles Town Loop: S. Samuel Street, S. Mildred Street, E. Forrest Avenue, Jefferson Avenue, High Street, S. George Street, Mordington Avenue, S. West Street, W. Washington Street
- Purpose and need
  - Recreational loop for all cyclist skill levels
  - Access to parks and Charles Town Middle School
  - High bicycle demand score
- Recommendation
  - Install sharrows and bike route signs to help improve bicycle comfort and visibility along the 3-mile loop

J4: Improve bicycle facilities between Charles Town, Ranson and the new residential development east of Route 9

- W. Washington Street to Hollywood Drive via N. George Street, Fairfax Boulevard, and East 5th Avenue
- Purpose and need
  - High bicycle demand score
  - The public expressed importance of finding an east-west alternative to US 340
- Recommendation

- Install sharrows to help improve motorists' awareness of cyclists

J5: Install multi-use trail along Augustine Avenue



Cross-section showing proposed improvements

- S. West Street to existing shared-use path on Huyett Road via Augustine Avenue and Huyett Road
- Purpose and need
  - Access to schools (Washington High School and Page Jackson Elementary School)
  - High bicycle demand score
  - TAP grant application is pending
- Recommendation
  - Install multi-use trail from Charles Town to Washington High School
  - Install sharrows from northern terminus of proposed path to S. West Street

J6: Improve bicycle facilities along WV 480

- Route 9 Bicycle Path to W. German Street via WV 480
- Purpose and need
  - Access to parks
  - Connect Shepherdstown and Route 9 Bike Path
  - The public identified safety concerns along WV 480 and reflected the need to safely link Shepherdstown to Morgan's Grove Park
- Recommendation
  - Install "share the road" signs and bike route signs

J7: Improve bicycle connectivity and safety between Shepherdstown and Harpers Ferry

- S. Mill Street to Potomac Street via E. German Street, River Road, Knott Road, and Bakerton Road
- Purpose and need
  - Link areas of high bicycle demand
  - The public expressed support for connecting Shepherdstown and Harpers Ferry
- Recommendation
  - Install Bicycle May Use Full Lane and bike route signs
  - See Recommendation "J8" for the remaining connection on Potomac Street

J8: Install multi-use trail (Armory Trail) on Potomac Street in Harpers Ferry

- Bakerton Road to Harpers Ferry
- Purpose and need
  - Provide connections to points north, such as Bakerton and Shepherdstown, and ultimately to other existing and proposed bicycle corridors, such as the C&O Canal Towpath (via Harpers Ferry) and the WV Route 9 Bike Path
- Recommendation
  - Install multi-use trail pursuant to Harpers Ferry Town and Trail Alliance's recommendations
  - Phase I to cover marketing, promotion, clean-up and Phase II to consist of repairs (ex: culverts, dams), hazardous tree removal, and signage

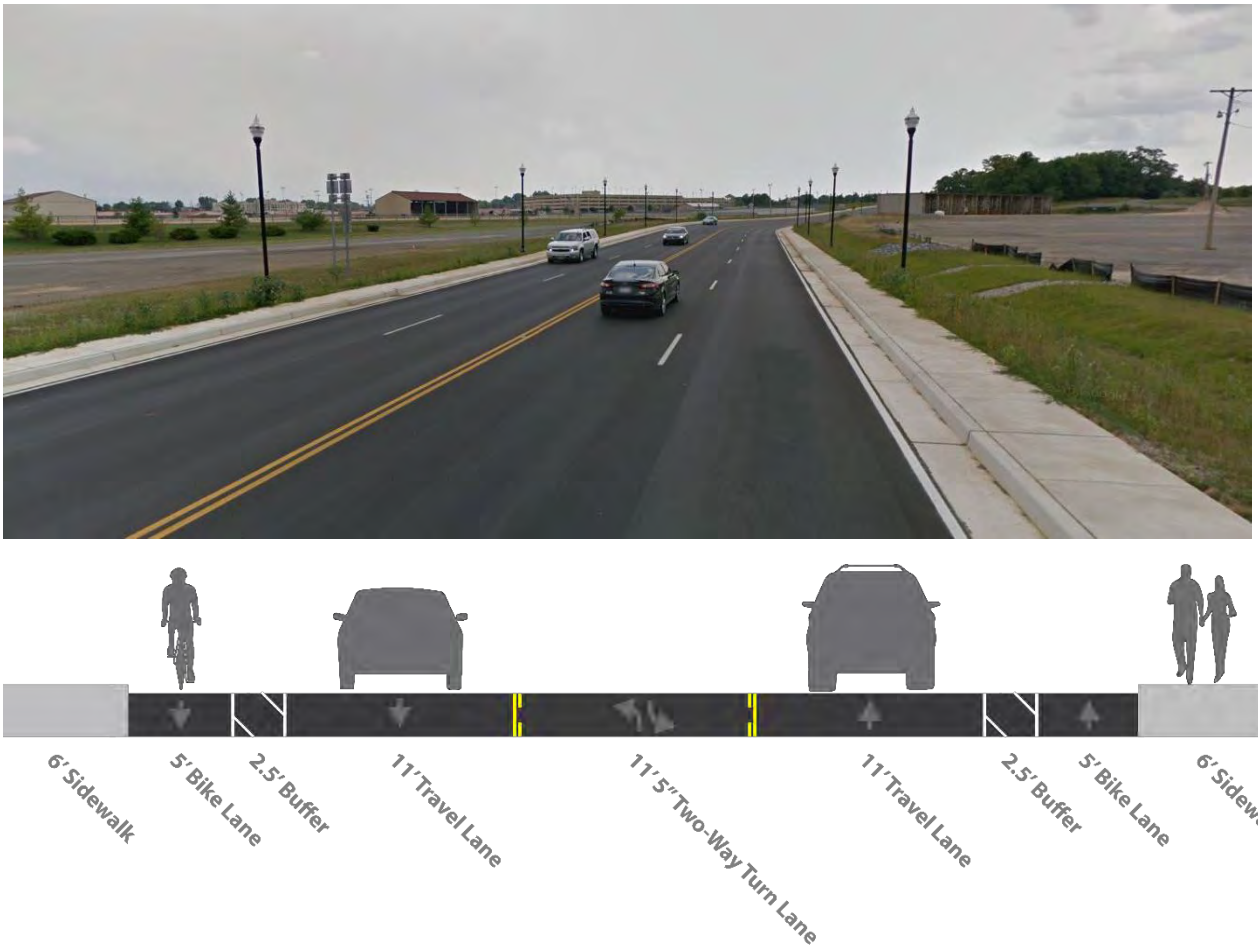
J9: Pursue a recreational Bicycle Route in Jefferson County ("Leetown Loop")

- Leetown Loop: Mildred Street, Old Leetown Road, Leetown Road, Route 9 Bike Path, and Currie Road
- Purpose and need
  - Additional recreational cycling opportunities west of Ranson
  - Old Leetown Road currently has "share the road" signs and great visibility, Leetown Road is being considered as a WV State bicycle route, and Route 9 Bike Path is a great way to return to Ranson
- Recommendation
  - Install bike route signs throughout the 15-mile loop

J10: Connect Shenandoah Junction with Harpers Ferry

- Charles Town Road to Bakerton Road via Shenandoah Junction Road, Flowing Springs Road, Job Corps Road, and Eagle Switch Road
- Purpose and need
  - East-West alternative to US 340
  - Access to parks and schools (TA Lowery Elementary School, Wildwood Middle School, Jefferson High School and Driswood Elementary School)
- Recommendation
  - Install “share the road” signs

J11: Perform road diet on East 5th Avenue



Cross-section showing proposed improvements

- Hollywood Drive to Flowing Springs Road on East 5th Avenue
- Purpose and need
  - Provide a safe, express east-west alternative to US 340
  - Links proposed recommendations
  - High bicycle demand score
- Recommendation
  - Conduct road diet, converting segment from four lanes to three lanes with 11' general purpose lanes and an 11.5' two-way left turn lane (TWLT). Install 2.5' cross-hatch markings adjacent to reconfigured lanes and install 5.5' curb-running bicycle lanes (curb to curb is approximately 50')
  - Conduct traffic counts prior to the conversion to ensure that 5th Avenue is suitable for a road diet approach (ideally, less than 12,000 daily vehicles)

J12: Conduct further study for a multi-use trail south of Charles Town

- Candlewood Drive to Augustine Avenue via US 340 underpass
- Purpose and Need
  - Creates loop by connecting with proposed recommendations
- Recommendation

- Install sharrows on Charles Town Road and Campbell Drive and a multi-use trail extending from Candlewood Drive to Augustine Avenue via US 340 underpass
- *See "Further Study" section for additional detail*

J13: Conduct further study on a multi-use trail in Ranson and North Charles Town

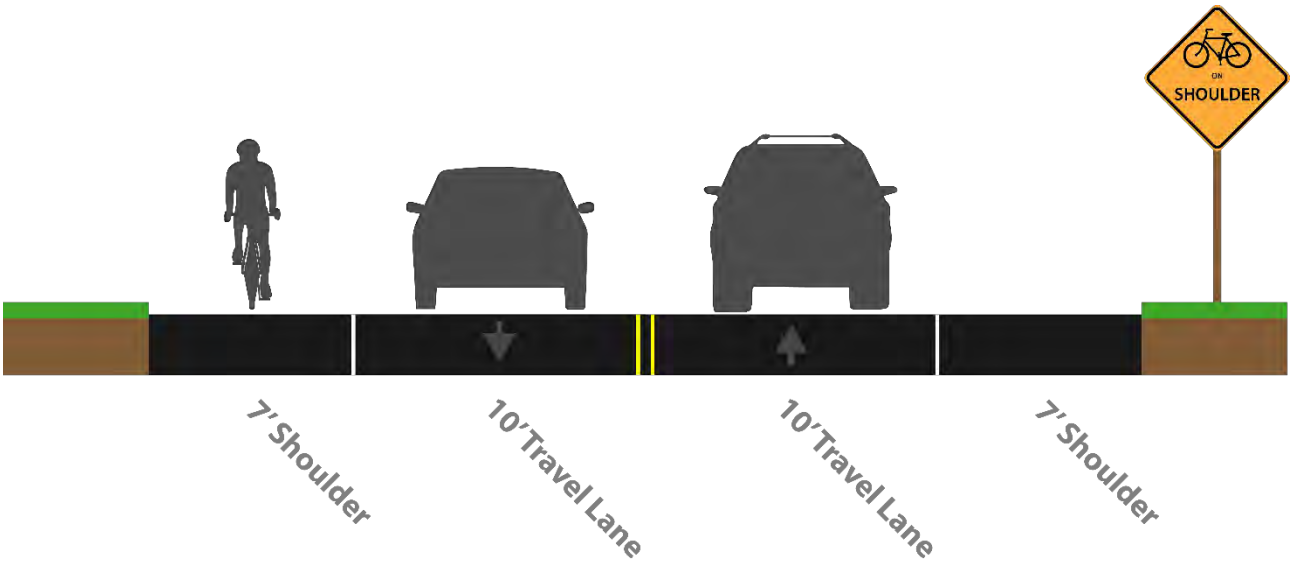
- Oak Lee Drive to Patrick Henry Way via Flowing Springs Park
- Purpose and need
  - Provides a loop by connecting to proposed recommendations
- Recommendation
  - Establish an off-road connection between existing 16th Street (at Foal Street) and the proposed Fairfax Boulevard bicycle facilities
  - *See "Further Study" section for additional detail*

J14: Establish an off-road connection in North Ranson

- 16th Street to Fairfax Boulevard
- Purpose and need
  - Connects to proposed recommendations (sharrows on Fairfax Boulevard)
  - High bicycle demand score
- Recommendation
  - Install a short multi-use trail between Foal Street and Fairfax Boulevard

Washington County

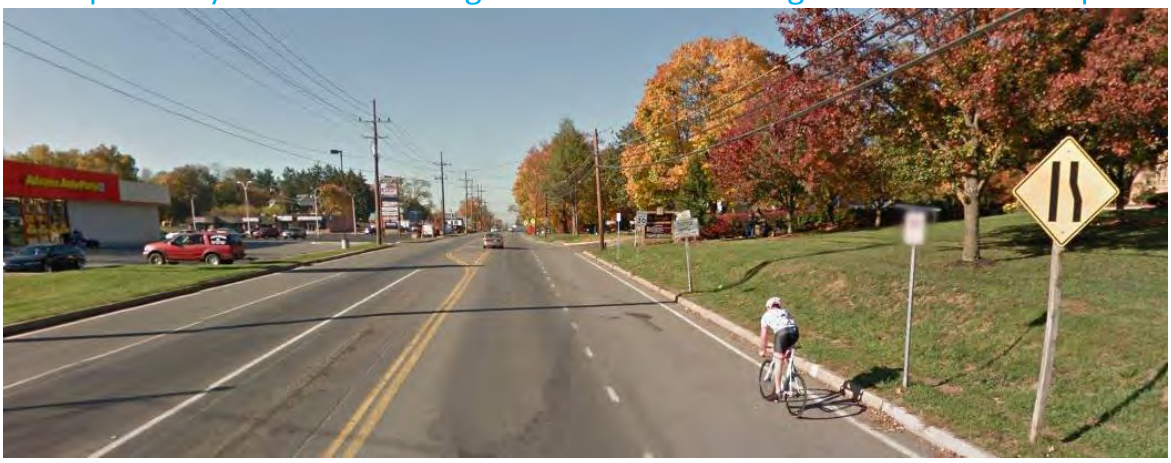
W1: Improve bicycle facilities on MD 34 between Boonsboro and Shepherdstown



Cross-section showing proposed improvements

- Potomac River Bridge to US 40 Alt via MD 34
- Purpose and need
  - Connect Shepherdstown with Boonsboro and Sharpsburg
  - Access to parks, C&O Canal, Sharpsburg Elementary School, Sharpsburg Library, and Washington County Library
  - The public expressed support for connecting Shepherdstown and Boonsboro via Sharpsburg
- Recommendation
  - Install “bike on shoulder” signage
  - Install sharrows through Sharpsburg and Boonsboro (center of general purpose lanes)

W2: Improve bicycle facilities on Virginia Avenue between Hagerstown and Williamsport



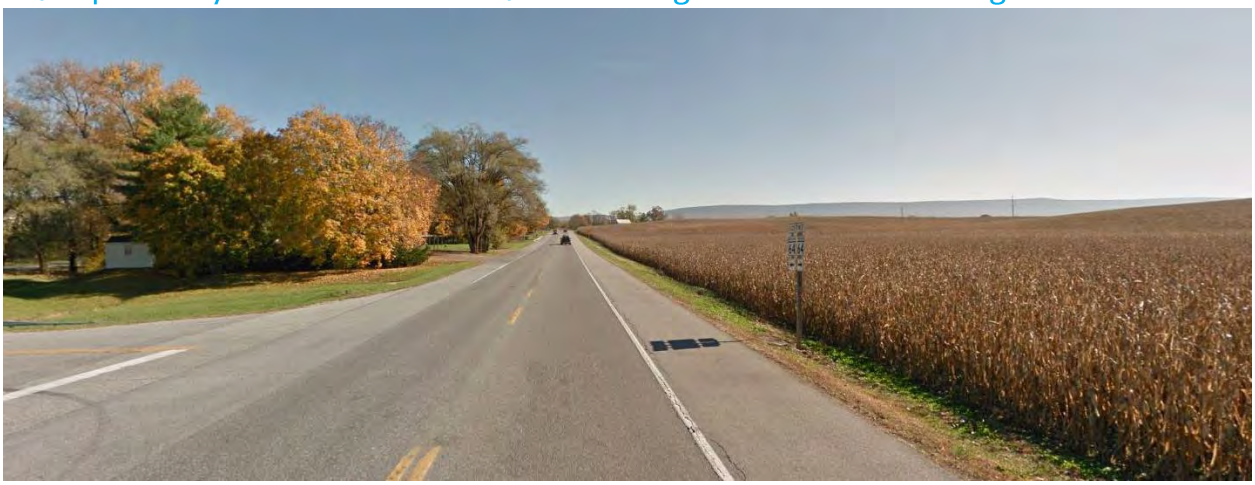
- City Park Drive to Park Road via Virginia Avenue
- Purpose and need
  - Connect C&O Canal Towpath and Hub City Bicycle Loop
  - High bicycle demand score
  - The public expressed support for a link between Hagerstown and the C&O Canal via Williamsport
- Recommendation
  - Install sharrows
  - Install “bike on shoulder” signage between Oak Ridge Drive and I-81 Ramps, and between Pear Tree Lane and Park Road

W3: Improve bicycle facilities between Williamsport and Boonsboro

- Church Street in Williamsport to MD 34 (Shepherdstown Pike) in Boonsboro
- Purpose and need
  - East-west connectivity in southern Washington County
  - Connect activity centers for cyclists
  - Provide access to parks and schools

- Recommendation
  - Install “bike on shoulder” signs on MD 68 and MD 632
  - Install “share the road” signs on Spielman Road, Manor Church Road, and Monroe Road

W4: Improve bicycle facilities on MD 64 between Hagerstown and Smithsburg



- City of Hagerstown corporate limits to S. Main Street via MD 64
- Purpose and need
  - East-west connection
  - High bicycle demand score
- Recommendation
  - Install “bike on shoulder” signage from City of Hagerstown to Smithsburg. Transition to "share the road" signage where shoulders end
  - Bicycle lanes already exist in Cavetown and possibly other segments of corridor. Bike route signage is also present on certain segments

W5: Improve bicycle facilities on US 40 between Hagerstown and Clear Spring

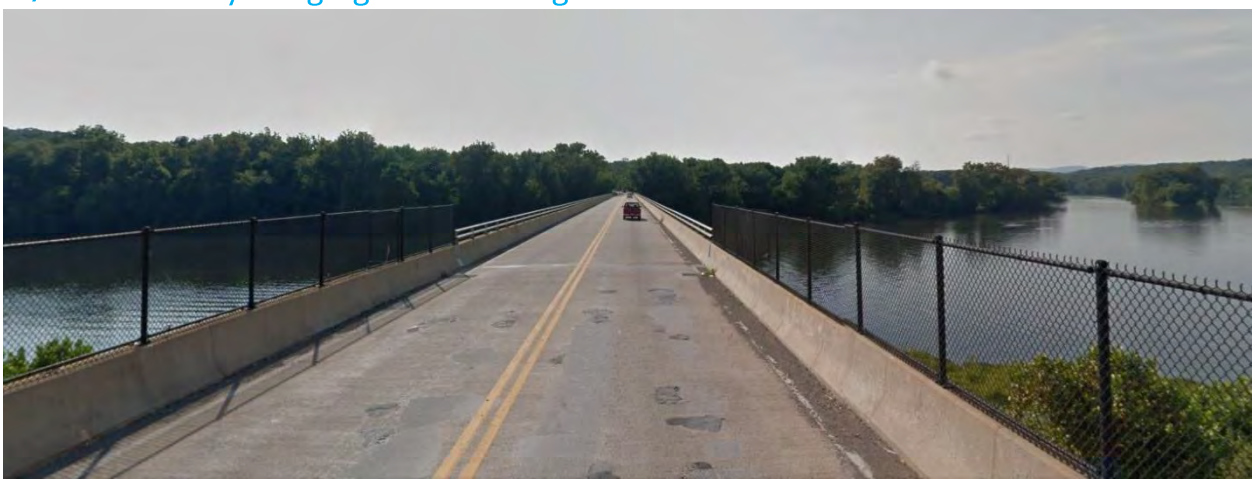
- W. Washington Street to Hawbaker Circle via US 40
- Purpose and need

  - East-west connection
  - Connect to proposed recommendation leading into Hagerstown and the Hub City Bicycle Loop
  - Provide access to Conococheague Elementary School
- Recommendation
  - Install “bike on shoulder” signage from Clear Spring to the City of Hagerstown line. On four-lane segment (Walnut Point Road to Earth Care Road): perform road diet (convert outside lanes to wide bicycle lanes) or install transitional "share the road" signs

W6: Improve bicycle accessibility to Harpers Ferry

- Purpose and need
  - Improve access to Harpers Ferry
  - The public expressed need for an improved ramp
- Recommendation
  - Install bicycle ramp per guidance from National Park Service feasibility study

W7: Introduce bicycle signage on US 11 bridge



- S. Commerce Street to Temple Drive via Route 11
- Purpose and need
  - Improve safety
  - High bicycle demand score
  - Several comments through web survey about bicycle safety on the bridge
- Recommendation
  - Install “Bicycle May Use Full Lane” signs

W8: Improve bicycle facilities on MD 65 between MD 68 and Sharpsburg

- MD 68 to Main Street via MD 65
- Purpose and need
  - North-south connection
  - Connect proposed recommendations on MD 68 and proposed recommendations on MD 34
  - Access to Antietam National Battlefield
- Recommendations
  - Install “bike on shoulder” signage

W9: Improve bicycle facilities between Hagerstown and Williamsport as an alternative to Virginia Avenue

- Downsville Road to MD 68 via Maryland Avenue and Downsville Pike
- Purpose and need
  - Alternative route between Hagerstown and Williamsport
  - North-south connection
  - Provide access to parks and South Hagerstown High School
- Recommendation
  - Install “bike on shoulder” signage on Maryland Avenue, Downsville Pike, connecting to existing bicycle lanes on Maryland Avenue and proposed bicycle facilities on MD 68 (W3)

W10: Improve cycling comfort and connectivity on MD 68 and Bottom Road between Clear Spring and Williamsport

- West Church Street to US 40 via MD 68 and Bottom Road
- Purpose and need
  - Introduce bicycle facilities between Clear Spring and Williamsport
  - Connect to existing recreational routes, such as the "Whitetail – Dam 5 Tour"
- Recommendation
  - Install "bike on shoulder" signage from Clear Spring to Cedar Ridge Road (west of Pinesburg) and install appropriate signage at approaches to I-70 interchange (refer to SHA Design Guidelines)
  - Cedar Ridge Road (west of Pinesburg) to Williamsport via Bottom Road: transition to "share the road" signs due to roadway width constraints

W11: Improve cycling comfort and connectivity on US 40-Alt (USBR 11) from Funkstown to Boonsboro

- East Cemetery Street to MD 68 via US 40 Alt.
- Purpose and need

  - North-south connection
  - Enhancements to U.S. Bicycle Route 11
- Recommendation
  - Install “bike on shoulder” signage

W12: Improve connections to Hagerstown via W. Washington Street

- US 40 to City of Hagerstown corporate limits via W. Washington Street
- Purpose and need
  - Connect to proposed recommendation on US 40 (bicycle lanes) with proposed bicycle lane on W. Washington Street (2016 City of Hagerstown Bicycle Master Plan)
  - High bicycle demand score
- Recommendation
  - Install “bike on shoulder” signage

W13: Introduce bicycle signage Scenic Route 40 west of Hancock

- I-68 Ramp at Woodmont to I-68 ramp at Mountain Road via Scenic 40
- Purpose and need
  - Improve connectivity on Scenic 40
  - Promote Scenic 40 as a bicycle friendly corridor
- Recommendations
  - Install “share the road” signs and bike route signs

W14: Connect Boonsboro and Cavetown-Smithsburg

- US 40 Alt. in Boonsboro to MD 64 in Cavetown
- Purpose and need
  - Offers a much safer north-south alternative to MD 66
  - Overlap with several existing recreational routes, such as the "View of the Valley" and the "Farm Orchard Tour"
- Recommendations
  - Install "share the road" signs and bike route signs

Further Study

M2: WV 9 improvement between Martinsburg and Berkeley Springs

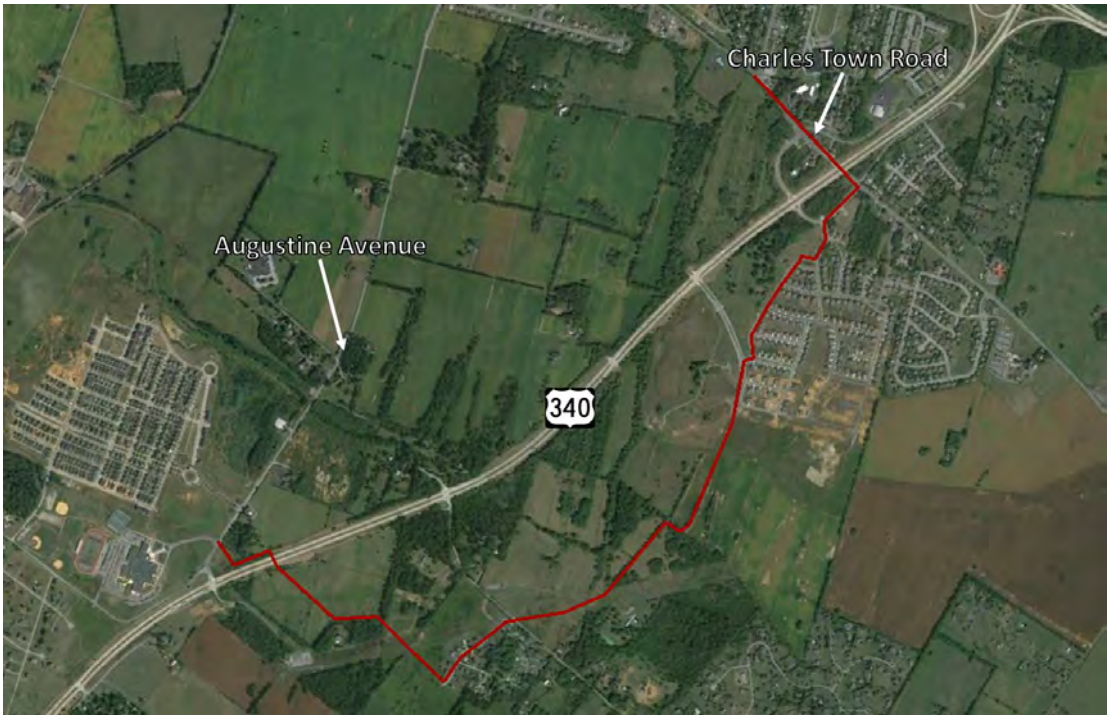
Further study is needed to evaluate the feasibility of bike facility improvements. While current roadway widths and right-of-way do not allow for improved bicycle facilities, WVDOT is exploring the possibility of upgrading WV 9, which could include plans for bike lanes or a separate multi-use path when complete. This improvement would provide a critical connection between counties.

B4: Connection between WV9 and Novak Drive

HEPMPO, in conjunction with WVDOT, is evaluating the need for a new access road between WV 9 and Novak Drive within Berkeley County, which would provide additional access to the Tabler Station Business Park while addressing congestion and promoting economic development in the area. This Access Study will identify the project need, potential alternative corridors, traffic analysis and environmental concerns. This Access Study could include plans for bike lanes or a separate multi-use path.

J12: South Charles Town multi-use trail

Further study is needed to evaluate the feasibility of sharrows on Charles Town Road and Campbell Drive and a multi-use trail extending from Candlewood Drive to Augustine Avenue via a US 340 underpass. While the project does not appear to impact any existing structures, the environmental and property impacts are unknown and require further study.



J13: Ranson/North Charles Town multi-use trail

Further study is needed to evaluate the feasibility of a multi-use trail from Oak Lee Drive to Patrick Henry Way via Flowing Springs Park. This trail would connect with other proposed bicycle facilities and improve bicycle access to area**s** north of Charles Town. While the project does not appear to impact any existing structures, the environmental and property impacts are unknown and require further study.

Rails to Trails

The public continues to express interest in rails-to-trails initiatives throughout the country and in the Hagerstown/Eastern Panhandle region. The Western Maryland Rail Trail (WMRT), running from Big Pool Station, Maryland to Pearre, Maryland, shows how analysis, coordination, and public support can come together to make rails-to-trails a reality. While an in-depth evaluation of railway abandonment and conversion is beyond the scope of this Regional Bicycle Plan, the following section provides guidance on rails-to-trails initiatives and highlights several case studies from around the country. The section concludes with preliminary insights and recommendations as they pertain to the region.

What are "Rails to Trails"?

Rails to trails projects involve the conversion of former railway into a multi-use path for active transportation uses, typically walking and cycling.

Benefits

- Abandoned railway right-of-ways make great multi-use trails because the property is typically long, relatively flat, and continuous.
- Many states and municipalities have made use of funding to convert abandoned railway into multi-use paths.
- The conversion of rails-to-trails can provide economic, quality of life, health, accessibility and mobility benefits to the surrounding communities.

Challenges

- The conversion of railway property requires that the section of property be abandoned by the railroad. Rail companies are often reluctant to abandon property even if it is rarely, if ever, used because abandonment can make it difficult to re-acquire the property should the companies' plans change.
- Paved trails are typically much more expensive than on-road infrastructure and more difficult to service (often because they are not as accessible to repair vehicles). For example, one mile of on-road bike lanes could cost approximately $30,000 per mile to construct, while one mile of asphalt trail could cost $700,000 per mile to construct.

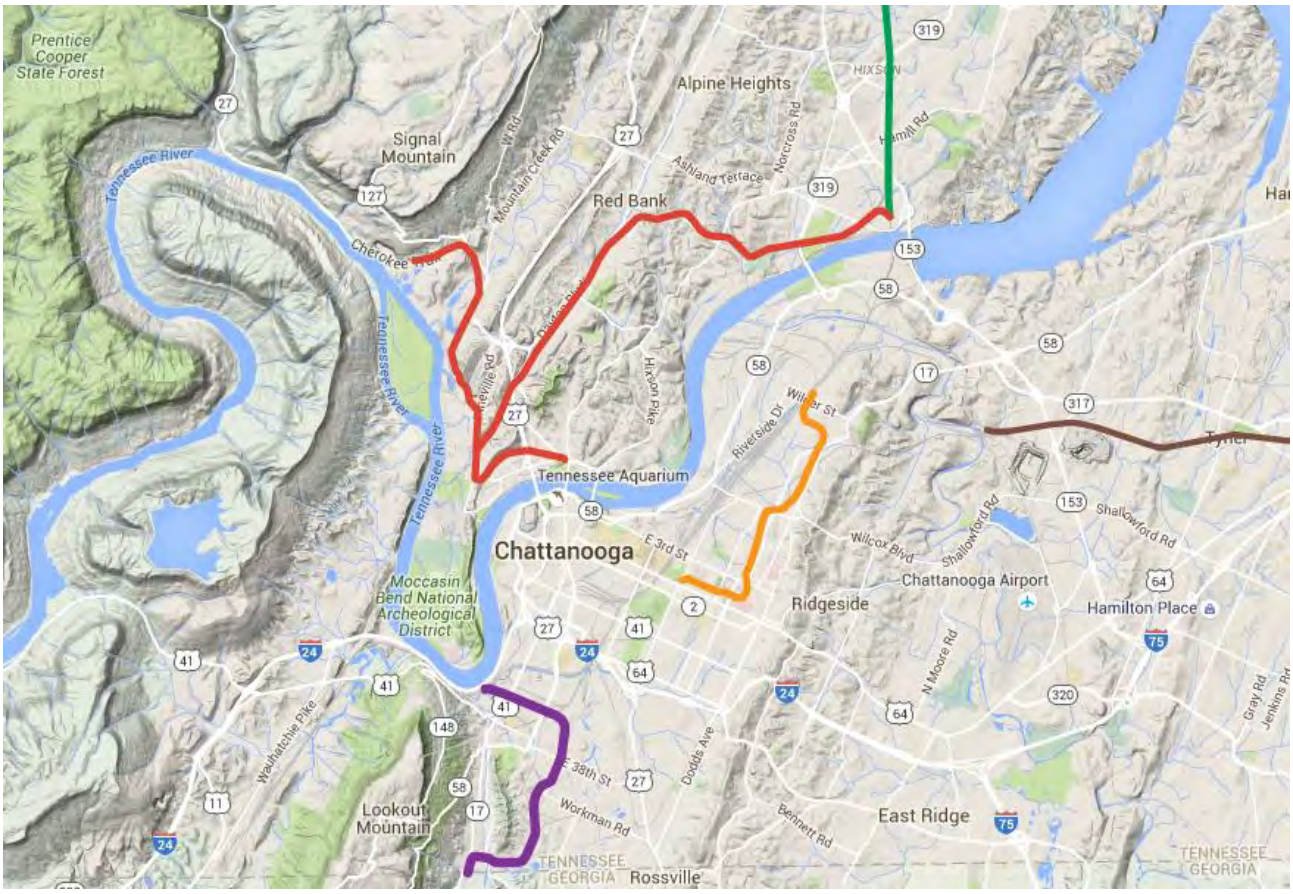
Rails to Trails Planning Case Study: Connecting Chattanooga (Chattanooga, TN)

The City of Chattanooga is ambitiously expanding its active transportation network through bike lanes, sharrows, signage, and off-road paths. Trails, like the Tennessee Riverwalk, are connecting neighborhoods and providing safe, dedicated facilities for pedestrians and cyclists. In 2014, the City and the Rails-to-Trails Conservancy (RTC) began evaluating rail-trail opportunities across the city's vast 190-mile rail network.

The Tennessee Riverwalk. Source: The Trust for Public Land

The City's preliminary rails-to-trails evaluation began with an assessment of the existing rail network. The study used data from the Federal Railroad Administration (FRA), the Center for Transportation Analysis (CTA), and other local sources to understand the railroad status (active, unused, abandoned), right-of-way width, ownership, service type (passenger, freight) and train frequency. The data analysis and stakeholder coordination helped identify five priority corridors.

The study's five priority corridors offer unique opportunities for the City of Chattanooga. While several of the priority corridors are located on abandoned lines, others, such as the "River Park to Collegedale/Apison" corridor, have frequent service, but also substantial right-of-way. Right-of-way on the River Park corridor, for example, ranges from 100 feet to 150 feet – providing ample space for a "rail with trail" scenario.



The Five Priority Rail Corridors. Source: Chattanooga Department of Transportation (CDOT)

While the rail-trail conversions will not happen overnight, the plan's data analysis and stakeholder input serve as an important foundation for future evaluation and coordination. The Chattanooga study ultimately recommends additional steps, including:

- Study and identify additional corridors, especially shorter segments that could augment existing or planned bicycle facilities if only for a matter of blocks.
- Conduct feasibility studies on one or more priority corridors, which would create a vision for the trail project, evaluate the project's potential and establish guidelines for its implementation.
- Develop strategies for approaching railroads and government officials and to identify potential funding sources.

Rails to Trails Implementation Case Study: Minnesota's Midtown Greenway (Minneapolis, MN)

The Midtown Greenway. Rails-to-Trails Conservancy (RTC).

This paved, 5.5-mile multi-use pathway is a green trench running through the city's southern neighborhoods, only minutes from downtown. Located 20 feet below street level in an early 20th-century railroad trench, the trail bypasses the street traffic passing overhead on over two dozen historical bridges. The design incorporates westbound and eastbound biking lanes with accessible ramps and includes a separate walking path to create a greenway ideal for recreational and transportation.

The Martin Olav Sabo Bike-Ped Bridge, opened 2007

The creation of this greenway was a long process. The Midtown Greenway Coalition, which formed in 1992 as a group of volunteers, was instrumental in the trail's development. The trail's west end opened in 2000 and construction subsequently progressed eastward, with two additional sections opening in 2004 and 2006. In 2007, the Martin Olav Sabo Bridge, which offered pedestrians and bicyclists safe passage over busy Hiawatha Avenue, opened. Today, the trail is illuminated at night, plowed and cleaned all year round and open 24 hours a day[6]. Further, it is operated and maintained by the public works department as a transportation facility[7].

[6] Stark, Laura. "Minnesota's Midtown Greenway." Rails-to-Trails Conservancy. 16 Oct. 2015. Web. 15 Apr. 2016. <http://www.railstotrails.org/trailblog/2015/october/16/minnesota-s-midtown-greenway/?tag=Trail of the Month>.

[7] Stark, Laura. "Minnesota's Midtown Greenway." Rails-to-Trails Conservancy. 16 Oct. 2015. Web. 15 Apr. 2016. <http://www.railstotrails.org/trailblog/2015/october/16/minnesota-s-midtown-greenway/?tag=Trail of the Month>.

The total project cost was $36.5 million ($41.9 million in 2016 dollars)[8]. However, this includes land acquisition, engineering and construction as well as site clean-up and additional infrastructure (such as lights and signage). The 2007 bridge over Hiawatha Avenue cost $5.2 million at the time ($6.0 million in 2016 dollars). However, the project cost per road mile was only $7.6 million which is low compared to the cost of building new vehicle roadways. Minnesota Department of Transportation estimates that urban roadway construction costs per mile can run as high as $50.0 million/mile[9].

Further, the trail has led to the revitalization of a former industrial area. The $200.0 million in nearby real estate investment since the trail's opening would have been unthinkable in the 1990s, when the trench was seldom-used and had become littered with trash[10]. Since the trail's opening, "property values along the corridor have gone up 90 percent or more"[11].

Recommendations for the Region

Initial conversations with the CSX Corporation, a national railroad company with a large presence in the region, suggests that many CSX railroad corridors are still operational. Communities and rail advocates should continue to monitor local rail activity and communicate with rail companies, such as CSX and Norfolk Southern, in order to remain up-to-date on potential abandonment proceedings. Communities should also identify and understand the rail companies' concerns as they pertain to at-grade crossings or other modal conflicts. This communication will ultimately help the jurisdictions and railroads achieve smoother, more favorable acquisition terms should the railroads abandon corridors in the future. Finally, the HEP region, like the City of Chattanooga, should consider initiating a rail-trail study to better understand the existing rail network and identify unique opportunities for rails-trail conversions.

[8] "Approximate Midtown Greenway Costs and Funding Sources as of September 2007." Http://midtowngreenway.org/. 1 Oct. 2007. Web. 15 Apr. 2016. <http://midtowngreenway.org/files/mgc/ckfinder/files/capcostssumforpublicGreenway200709.pdf>.

[9] "Road Construction- Funding." Minnesota Department of Transportation a Project. Web. 15 Apr. 2016. <http://www.dot.state.mn.us/roadconstruction/ittakestime/funding.html>.

[10] Fisher, Thomas. "Streetscapes: Midtown Greenway Spurs Urban Development, Especially in Uptown." Star Tribune. 9 May 2015. Web. 15 Apr. 2016. <http://www.startribune.com/midtown-greenway-spurs-urban-development-especially-in-uptown/303081591/>.

[11] Stark, Laura. "Minnesota's Midtown Greenway." Rails-to-Trails Conservancy. 16 Oct. 2015. Web. 15 Apr. 2016. <http://www.railstotrails.org/trailblog/2015/october/16/minnesota-s-midtown-greenway/?tag=Trail of the Month>.

Prioritization and Implementation

The plan's recommendations could cost over $10.5 million (excluding those requiring further study) and while the recommendations are not constrained by a predetermined budget, they also do not necessarily have defined funding sources. As such, prioritization can help evaluate the projects and serve as a resource for the region's communities as they pursue funding for their respective improvements. The plan uses a multi-dimensional prioritization process that scores projects based on several key criteria (listed below).

Criteria

The prioritization criteria were developed and scored based on public input and existing conditions data. All criteria were weighted evenly (1.0), except for safety and public input (2.0). The prioritization scoring methodology and prioritization factors are outlined below. Table 4, on the following page, shows the prioritization scores.

- Access to schools or colleges – *does the project improve access?*
  - Yes = 1, No = 0
- Access to parks or recreational trails – *does the project improve access?*
  - Yes = 1, No = 0
- Employment and population
  - Total population within a ¼ mile of the proposed project. Normalized on a 0 to 1 scale.
  - Total employment within a ¼ mile of the proposed project. Normalized on a 0 to 1 scale.
  - Sum Population and Employment scores (0 to 1).
- Socioeconomic factors
  - Sum of zero-car households, households below the poverty line, and number of minorities within a ¼ mile of the proposed project. Normalized on a 0 to 1 scale.
- Safety – combination of five-year crash data (2010-2014 for Maryland and 2011-2015 for West Virginia) and any identified safety concerns from the web survey.
  - Crash data
    - Bicycle crash reported along project extent = 1
    - No bicycle crash reported along project extent = 0
  - Web survey input
    - Identified safety concern along project extent or along parallel roadway = 1
  - *Maximum score of 1*
- Public input – reflecting public input and BSGC input
  - 0 to 2 scale, with "2" indicating the most frequently ranked project(s).

TABLE 4: REGIONAL PROJECT PRIORITIZATION SCORES

Overall Rank	Project ID	Description	Access to School or Colleges (0 = no, 1 = yes)	Access to Park or Rec Trail (0 = no, 1 = yes)	Employment and Population	SocioEconomic Factors	Safety	Public Input	Total Score
1	**B1**	Connect WV 9 Bike Path to Downtown Martinsburg	1.00	1.00	0.78	0.55	1.00	1.68	**6.00**
2	**B2**	Improve bicycle facilities on Shepherdstown Road between Martinsburg and Shepherdstown	1.00	1.00	0.36	0.56	1.00	1.74	**5.66**
3	**M2**	WV9 Improvements (Further Study)	1.00	1.00	0.69	0.38	1.00	1.48	**5.55**
4	**J1**	Improve bicycle facilities between Harpers Ferry and Charles Town/Ranson	1.00	1.00	0.27	0.23	1.00	1.64	**5.14**
5	**J9**	Recreational bike route from Ranson to Leetown to Route 9 bike path and back to Ranson	1.00	1.00	0.45	0.50	1.00	0.91	**4.87**
6	**W1**	Improve bicycle facilities on MD 34 between Boonsboro and Shepherdstown	1.00	1.00	0.17	0.05	1.00	1.64	**4.86**
7	**M6**	Improve bicycle facilities between Berkeley Springs and Warm Springs Schools	1.00	1.00	0.22	0.06	1.00	1.58	**4.86**
8	**B3**	Improve bicycle facilities on US 11 between Martinsburg and Inwood	1.00	0.00	0.68	0.64	1.00	1.51	**4.84**
9	**W2**	Improve bicycle facilities on Virginia Ave. between Hagerstown and Williamsport	0.00	1.00	0.56	0.77	1.00	1.48	**4.80**
10	**J6**	Improve bicycle facilities along WV 480	1.00	1.00	0.12	0.06	1.00	1.54	**4.72**
11	**J3**	Create a bicycle-friendly loop in Charles Town (3 miles)	1.00	1.00	0.58	0.23	1.00	0.85	**4.66**
12	**B8**	Improve bicycle connectivity in east side of Downtown Martinsburg	1.00	0.00	1.00	0.92	1.00	0.69	**4.61**
13	**J10**	Connect Shenandoah Junction with Harpers Ferry	1.00	1.00	0.06	0.04	1.00	1.44	**4.54**
14	**B7**	Improve connections to Raleigh Street bicycle path and to other proposed facilities (Raleigh Street)	1.00	0.00	0.80	1.00	1.00	0.69	**4.49**
15	**W9**	Improve bicycle facilities between Hagerstown and Williamsport as an alternative to Virginia Avenue	1.00	1.00	0.27	0.26	1.00	0.95	**4.48**
16	**W3**	Improve bicycle facilities between Williamsport and Boonsboro	1.00	1.00	0.14	0.09	1.00	1.05	**4.28**
17	**J7**	Connect Shepherdstown with Harpers Ferry (River Road, Knott Road, Bakerton Road)	1.00	1.00	0.10	0.05	1.00	1.01	**4.17**
18	**W8**	Improve bicycle facilities on MD 65 between MD 68 and Sharpsburg	1.00	1.00	0.07	0.02	1.00	1.01	**4.10**
19	**M1**	Improve bicycle facilities between Hancock and Berkeley Springs along US 522	0.00	1.00	0.20	0.06	1.00	1.74	**3.99**
20	**J2**	Connect Route 9 Bike Path with Charles Town/Ranson	0.00	0.00	0.73	0.42	1.00	1.64	**3.79**
21	**J12**	Multi-use trail for Further Study	1.00	1.00	0.07	0.06	1.00	0.65	**3.78**

Overall Rank	Project ID	Description	Access to School or Colleges (0 = no, 1 = yes)	Access to Park or Rec Trail (0 = no, 1 = yes)	Employment and Population	SocioEconomic Factors	Safety	Public Input	Total Score
22	**J5**	Install multi-use trail along Augustine Avenue (TAP grant application pending)	1.00	0.00	0.34	0.10	1.00	1.31	**3.75**
23	**W7**	Introduce bicycle signage on US 11 bridge	0.00	1.00	0.02	0.03	1.00	1.68	**3.72**
24	**J8**	Connect Shepherdstown w/ Harpers Ferry (Potomac St.)	0.00	1.00	0.03	0.01	1.00	1.64	**3.68**
25	**J4**	Improve bicycle facilities between Charles Town, Ranson and the new residential development east of Route 9	0.00	0.00	0.82	0.38	1.00	1.48	**3.67**
26	**W14**	Connect Boonsboro and Cavetown-Smithsburg	0.00	1.00	0.16	0.05	1.00	1.00	**3.21**
27	**W5**	Improve bicycle facilities on US 40 between Hagerstown and Clear Spring	1.00	0.00	0.13	0.04	1.00	0.85	**3.02**
28	**W6**	Improve bicycle accessibility to Harpers Ferry (bike ramp)	0.00	1.00	0.00	0.00	0.00	1.90	**2.90**
29	**B4**	Novak Drive Extension (Further Study)	0.00	1.00	0.07	0.05	1.00	0.73	**2.85**
30	**J13**	Connect to Flowing Springs Park	0.00	1.00	0.16	0.06	1.00	0.49	**2.70**
31	**W11**	Improve cycling comfort and connectivity on US 40-Alt (USBR 11) from Funkstown to Boonsboro	0.00	1.00	0.07	0.06	0.00	1.58	**2.70**
32	**W4**	Improve bicycle facilities on MD 64 between Hagerstown and Smithsburg	0.00	0.00	0.16	0.48	1.00	0.85	**2.49**
33	**W12**	Improve connections to Hagerstown via W. Washington Street	0.00	1.00	0.41	0.13	0.00	0.85	**2.39**
34	**M3**	Install sharrows between Berkeley Springs and Berkeley Springs High School	1.00	0.00	0.17	0.03	0.00	1.08	**2.28**
35	**B5**	Improve eastbound bicycle connectivity and safety in Martinsburg (Bowers Street)	1.00	0.00	0.22	0.30	0.00	0.69	**2.21**
36	**W10**	Improve cycling comfort and connectivity on MD 68 between Clear Spring and Williamsport	0.00	0.00	0.14	0.05	1.00	0.95	**2.15**
37	**M4**	Install a bicycle/ pedestrian bridge over the Potomac River (Great Cacapon to the C&O Canal Towpath)	0.00	1.00	0.00	0.00	0.00	1.01	**2.01**
38	**M5**	North Berkeley Rail Trail	0.00	0.00	0.11	0.04	0.00	1.64	**1.78**
39	**B6**	Improve westbound bicycle connectivity and safety in Martinsburg (Wilson Street)	0.00	0.00	0.22	0.29	0.00	0.69	**1.20**
40	**J11**	Fifth Avenue Road Diet	0.00	0.00	0.35	0.13	0.00	0.49	**0.98**
41	**M7**	Install sharrows on Sand Mine Road, connecting to the proposed North Berkeley Rail Trail	0.00	0.00	0.00	0.01	0.00	0.91	**0.92**
42	**W13**	Scenic Route 40 Improvements	0.00	0.00	0.00	0.00	0.00	0.85	**0.85**
43	**J14**	16th Street Bicycle Connection	0.00	0.00	0.01	0.01	0.00	0.49	**0.51**

Please see pages 49-81 for more information on projects.

Table 5: Morgan County Project Prioritization Scores

County Rank	Project ID	Access to School or Colleges (0 = no, 1 = yes)	Access to Park or Rec Trail (0 = no, 1 = yes)	Employment and Population	SocioEconomic Factors	Safety	Public Input	Total Score
1	**M2**	1.00	1.00	0.69	0.38	1.00	1.48	**5.55**
2	**M6**	1.00	1.00	0.22	0.06	1.00	1.58	**4.86**
3	**M1**	0.00	1.00	0.20	0.06	1.00	1.74	**3.99**
4	**M3**	1.00	0.00	0.17	0.03	0.00	1.08	**2.28**
5	**M4**	0.00	1.00	0.00	0.00	0.00	1.01	**2.01**
6	**M5**	0.00	0.00	0.11	0.04	0.00	1.64	**1.78**
7	**M7**	0.00	0.00	0.00	0.01	0.00	0.91	**0.92**

Table 6: Berkeley County Project Prioritization Scores

County Rank	Project ID	Access to School or Colleges (0 = no, 1 = yes)	Access to Park or Rec Trail (0 = no, 1 = yes)	Employment and Population	SocioEconomic Factors	Safety	Public Input	Total Score
1	**B1**	1.00	1.00	0.78	0.55	1.00	1.68	**6.00**
2	**B2**	1.00	1.00	0.36	0.56	1.00	1.74	**5.66**
3	**B3**	1.00	0.00	0.68	0.64	1.00	1.51	**4.84**
4	**B8**	1.00	0.00	1.00	0.92	1.00	0.69	**4.61**
5	**B7**	1.00	0.00	0.80	1.00	1.00	0.69	**4.49**
6	**B4**	0.00	1.00	0.07	0.05	1.00	0.73	**2.85**
7	**B5**	1.00	0.00	0.22	0.30	0.00	0.69	**2.21**
8	**B6**	0.00	0.00	0.22	0.29	0.00	0.69	**1.20**

TABLE 7: JEFFERSON COUNTY PROJECT PRIORITIZATION SCORES

County Rank	Project ID	Access to School or Colleges (0 = no, 1 = yes)	Access to Park or Rec Trail (0 = no, 1 = yes)	Employment and Population	SocioEconomic Factors	Safety	Public Input	Total Score
1	**J1**	1.00	1.00	0.27	0.23	1.00	1.64	**5.14**
2	**J9**	1.00	1.00	0.45	0.50	1.00	0.91	**4.87**
3	**J6**	1.00	1.00	0.12	0.06	1.00	1.54	**4.72**
4	**J3**	1.00	1.00	0.58	0.23	1.00	0.85	**4.66**
5	**J10**	1.00	1.00	0.06	0.04	1.00	1.44	**4.54**
6	**J7**	1.00	1.00	0.10	0.05	1.00	1.01	**4.17**
7	**J2**	0.00	0.00	0.73	0.42	1.00	1.64	**3.79**
8	**J12**	1.00	1.00	0.07	0.06	1.00	0.65	**3.78**
9	**J5**	1.00	0.00	0.34	0.10	1.00	1.31	**3.75**
10	**J8**	0.00	1.00	0.03	0.01	1.00	1.64	**3.68**
11	**J4**	0.00	0.00	0.82	0.38	1.00	1.48	**3.67**
12	**J13**	0.00	1.00	0.16	0.06	1.00	0.49	**2.70**
13	**J11**	0.00	0.00	0.35	0.13	0.00	0.49	**0.98**
14	**J14**	0.00	0.00	0.01	0.01	0.00	0.49	**0.51**

TABLE 8: WASHINGTON COUNTY PROJECT PRIORITIZATION SCORES

County Rank	Project ID	Access to School or Colleges (0 = no, 1 = yes)	Access to Park or Rec Trail (0 = no, 1 = yes)	Employment and Population	SocioEconomic Factors	Safety	Public Input	Total Score
1	**W1**	1.00	1.00	0.17	0.05	1.00	1.64	**4.86**
2	**W2**	0.00	1.00	0.56	0.77	1.00	1.48	**4.80**
3	**W9**	1.00	1.00	0.27	0.26	1.00	0.95	**4.48**
4	**W3**	1.00	1.00	0.14	0.09	1.00	1.05	**4.28**
5	**W8**	1.00	1.00	0.07	0.02	1.00	1.01	**4.10**
6	**W7**	0.00	1.00	0.02	0.03	1.00	1.68	**3.72**
7	**W14**	0.00	1.00	0.16	0.05	1.00	1.00	**3.21**
8	**W5**	1.00	0.00	0.13	0.04	1.00	0.85	**3.02**
9	**W6**	0.00	1.00	0.00	0.00	0.00	1.90	**2.90**
10	**W11**	0.00	1.00	0.07	0.06	0.00	1.58	**2.70**
11	**W4**	0.00	0.00	0.16	0.48	1.00	0.85	**2.49**
12	**W12**	0.00	1.00	0.41	0.13	0.00	0.85	**2.39**
13	**W10**	0.00	0.00	0.14	0.05	1.00	0.95	**2.15**
14	**W13**	0.00	0.00	0.00	0.00	0.00	0.85	**0.85**

Additional Implementation Steps

While this Plan offers infrastructure and policy recommendations that strive to enhance regional bicycle connectivity, many land use, development, and transportation decisions are made at the jurisdiction level. These decisions, whether pertaining to site design or large transportation projects, should consider all modes of transportation, whenever possible. Given local financial constraints, communities should continue to leverage federal, state, local, and nonprofit funding sources (Appendix E) in order to expand their own bicycle and pedestrian networks. In addition, jurisdictions can coordinate with the HEPMPO and with each other to ensure that the greater regional network is developed in a connected fashion, rather than a piecemeal approach. The examples below highlight several funding success stories from around the region, showcasing the ways in which communities have leveraged grant programs for a variety of active transportation initiatives.

The sidewalk improvement project on North Washington Street in Berkeley Springs was funded through the Recreational Trails Program (RTP) and the Transportation Alternatives Program (TAP)

Grant Programs:

Maryland Bikeways Program

Grant Description:
The program supports "projects that maximize bicycle access and fill missing links in the state's bicycle system".

Transportation Investment Generating Economic Recovery (TIGER)

Grant Description:
TIGER grants support "rail, road, transit and port projects that promise to achieve national objectives" such as safety, economic competitiveness, quality of life and environmental sustainability.

Transportation Alternatives Program (TAP)

Grant Description:
Funds planning, design & construction of on- or off-road bicycle and pedestrian facilities. Includes rails-to-trails projects, shared-use paths, cycle tracks, sidewalks and bike lanes.

Recreational Trails Program (RTP)

Grant Description:
This federally-funded program assists in the development and maintenance of smaller-scale motorized and non-motorized trail, trailhead and restoration projects.

Project Examples:

Memorial Boulevard Shared-Use Path

- 10-feet wide path connecting Prospect Street to Summit Avenue
- $75,000 Bikeways grant for $109,000 project

Fairfax Boulevard

- TIGER funds are being used to transform existing portions of Fairfax Boulevard and George Street into an innovative, walkable, complete green street
- $5.0 million TIGER grant for $23.5 million project

East Martin Street

- Improvements to East Martin Street around the Caperton Train Station
- $154,000 TAP grant and $75,000 grant for a multi-phase project

Washington Street Streetscapes

- Incorporates pedestrian lighting, new sidewalk and curb construction
- $380,000 RTP grant for $420,000 project

Creating a designated funding program to support bicycle projects in West Virginia, similar to the Maryland Bikeways Program, is essential for the development of bicycle facilities in the state. The Bikeways Program has had tremendous benefits to many towns and cities across Maryland, including Hagerstown which has been given the distinction of being a bronze-level "Bicycle Friendly Community" by The League of American Bicyclists. This distinction would not be possible without the grants from this program.

Incorporating On-Road Bicycle Networks into Resurfacing Projects provides State DOT districts and local government public works departments' approaches and recommendations for integrating bicycle facilities during resurfacing projects. By installing bicycle facilities during resurfacing projects, agencies can create connected networks of bicycle facilities in an efficient and cost-effective manner.

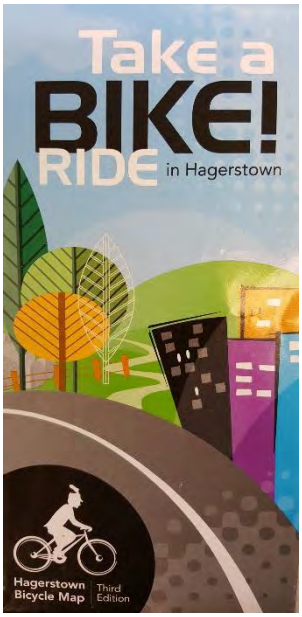
It is also critical to maintain the existing bicycle network. This not only pertains to prominent regional bicycle facilities, such as the Route 9 Bike Path, but also to local bike lanes and sharrows in residential areas. In most cases, there are no dedicated funding programs for bicycle facility maintenance, which makes it even more important to discuss maintenance responsibilities during project planning and development.

Maintaining the existing bicycle network is critical. This includes street sweeping and restriping/repainting any fading lines and bike symbols (example above).

While the region offers many recreational rides on scenic county roads, there are opportunities to improve pavement quality and increase bicycle comfort on these rural roadways. Pavement resurfacing and improved bicycle signage, completed by local and county governments, are needed to help improve ride quality and make motorists more aware of cyclists. Rural roadways that potentially warrant improvements include: Luther Michael Road, Timber Ridge Road, Cold Run Valley Road in West Virginia and Lehmans Mill Road and Millers Church Road in Maryland, to increase bicycle opportunities throughout the region.

The region should consider developing a graphical bicycle map once the bicycle network takes shape. The map's development should be a collaborative process, with input from individuals from various agencies, such as tourism, marketing, economic development, and planning. The map could be made available in a glossy hard copy form and/or as a mobile smartphone application. The map could include bike routes, bike-friendly connections to communities, and locations for notable bike amenities, such as: parking, restrooms, shower facilities, grocery stores, and lodging. The 2016 City of Hagerstown Bicycle Map (below) and Bike Arlington Map (below) are good examples of highly visual maps that offer useful information for local and long-distance cyclists, alike.

Bicycle Map of Arlington, Virginia. Source: Bike Arlington



Hagerstown's fold-out Bicycle Map (cover).

Finally, while this bicycle plan was completed for the HEPMPO region (and Morgan County), bike routes and facilities do not end at county and MPO boundaries. Coordination between the HEPMPO and the neighboring MPOs and Rural Planning Organizations (RPOs), such as the Franklin County RPO, the Winchester-Frederick County MPO (WinFred), the National Capital Region Transportation Planning Board (TPB), the Cumberland Area MPO (CAMPO), and the Southern Alleghenies RPO, is important for achieving regional continuity. For example, many scenic bike routes cross from northeastern Washington County into Franklin County, Pennsylvania. Strengthening these connections between the two states could lead to increased spending in towns such as: Leitersburg, MD; Smithsburg, MD; and Waynesboro, PA.

Conclusions

The Hagerstown/Eastern Panhandle region is rich in history, culture, and recreation. The beautiful area is home to nationally recognized bicycle routes, such as the C&O Canal Towpath, a magnet for local and long-distance cyclists, alike. There is a growing interest in bicycle safety and connectivity in the region, as evidenced by the recent transformations of communities, such as the City of Hagerstown, who was distinguished as a Bicycle-Friendly Community in 2014. Meanwhile, the region's rural roadways offer some wonderful cycling and additional signage and design treatments will help make motorists more aware of cyclists on these scenic, but narrow roadways. Bicycle events and marketing initiatives can also help raise awareness and generate interest in cycling, whether for commuting or recreational purposes. While this Regional Bicycle Plan offers guidance for a future bicycle network, the region's communities must balance their own local priorities and also work together and with state transportation agencies to ensure that roadway improvements are designed with all transportation users in mind.

Maryland SHA Bicycle Safety Campaign Poster

Appendices

Appendix A: Key Terms

ADT (Average Daily Traffic) – The total traffic volume during a given time period, ranging from 2 to 364 consecutive days, divided by the number of days in that time period, and expressed in VPD (vehicles per day).

Bicycle – A pedal-powered vehicle upon which the human operator sits to include three and four-wheeled human-powered vehicles, but not tricycles or similar vehicles for children. *Source: Maryland Design Guidelines*

Bicycle Boulevard – Bicycle boulevards are streets with low motorized traffic volumes and speeds and are designated and designed to give bicycle travel priority. Bicycle Boulevards use signs, pavement markings, and speed and volume management measures to discourage through trips by motor vehicles and create safe, convenient bicycle crossings of busy arterial streets. *Source: NACTO Urban Bikeway Guidelines*

Bicycle (Latent) Demand Score – The Latent Demand Score (LDS) method provides a way to estimate the latent or potential demand for bicycle travel, i.e., the level of travel that would occur if a bicycle facility existed on a road segment. The LDS method may be combined with supply-side facility analysis methods, such as bicycle level of service measures, to indicate facilities with the greatest need for improvement. *Source: U.S. Federal Highway Administration*

Bicycle Lane (General Term) – A portion of a roadway that has been designated by signs and pavement markings for preferential or exclusive use by bicyclists (from MUTCD, Section 1A.13, 7. Bicycle Lane). The designation of a BIKE LANE has specific legal consequences under Maryland Law. *Source: Maryland Design Guidelines*

Bicycle Level of Service (BLOS) – A mathematical model used to estimate an average bicyclist's perception of the quality of service of a section of roadway.

Bicycle Network – A system of bikeways within a specific jurisdiction. The system may include bike lanes, bike routes, shared-use paths, and other identifiable bicycle facilities. *Source: Maryland Design Guidelines*

Bicycle Route – A roadway, bikeway, or combination of both; designated by a jurisdiction with the appropriate authority; along which bicycle guide signs (See MUTCD, Section 9B.20 Bicycle Guide Signs) have been posted to provide directional and distance information. Unique route designation signs may be used, particularly for interstate routes. The installation of signs providing directional, distance, or destination information for bicyclists does not necessarily establish a BIKE ROUTE. *Source: Maryland Design Guidelines*

Bidirectional Bike Lanes – A pair of bike lanes on either side of a two-way street where each bike lane travels in the same direction as vehicle traffic but in the right-most side of the road.

Bike Boxes – A bike box is 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. *Source: NACTO Urban Bikeway Guidelines*

Bicycle Parking Rack – A stationary fixture to which a bicycle can be securely attached (typically using a bicycle lock) to prevent theft.

Buffered Bike Lane – Conventional bicycle lanes paired with a designated buffer space separating the bicycle lane from the adjacent motor vehicle travel lane and/or parking lane. A buffered bike lane is allowed as per MUTCD guidelines for buffered preferential lanes (section 3D-01). *Source: NACTO Urban Bikeway Guidelines*

Contra-Flow Bike Lane – Contra-flow bicycle lanes are bicycle lanes designed to allow bicyclists to ride in the opposite direction of motor vehicle traffic. They convert a one-way traffic street into a two-way street for bicycles. Contra-flow lanes are separated with yellow center lane striping. The contra-flow design introduces new design challenges and may introduce additional conflict points, as motorists may not expect oncoming bicyclists. *Source: NACTO Urban Bikeway Guidelines*

Conventional Bike Lane – A bike lane is located adjacent to motor vehicle travel lanes and flowing 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. This facility type may be located on the left side when installed on one-way streets. Because they lack a buffer, conventional bike lanes are only recommended on streets with less than 3,000 ADT and with posted speed limits of 25mph or less. *Source: NACTO Urban Bikeway Guidelines*

Cross-hatching – Parallel white lines, running diagonal to curb-running white lines, which delineate the buffer zone of a buffered bike lane.

Crosswalks – a part of a road where vehicles must stop to allow people to cross.

Curb-Extensions – Extensions of the curb (in the form of chicanes, lateral shifts, and chokers) which create a narrow two-lane gap or a single lane. Chicanes shift traffic alternately from side to side of the street to create an S-shaped path of travel. Lateral shifts are curb extensions that cause travel lanes to bend one way and then back the other way. Chokers are midblock curb extensions that narrow the street by expanding the sidewalk or adding a planting strip and often are installed at midblock crossings. *Source: U.S. Federal Highway Administration*

Hub City Bike Loop – A signed 10-mile loop around the City, which starts and ends in Fairgrounds Park and utilizes both on-street bike lanes and multi-use paths. The loop connects beautiful neighborhoods, City parks, and points of interest as it traverses counterclockwise around the City. *Source: HagerstownMd.org*

Mini Traffic Circles – A small traffic junction in which vehicles move circularly in one direction around a central island and are required to stop and signal before entering. *Source: Virginia Department of Transportation*

One-Way Paired Lane – A pair of one-directional bicycle lanes on two opposite-direction, nearby parallel streets.

Parking Occupancy – The percent of parking (either on or off-street) being utilized at the time of measurement.

Path/Trail (also "Greenway") – A bicycle facility that is physically separated and disconnected from roadways, often running through rural or park areas. These facilities can also operate as mixed-use trails by creating space for pedestrian use.

Pedestrian Crossing Length – The distance a pedestrian must walk between curbs.

Right of Way – A general term denoting land devoted to transportation purposes. The land may be owned outright by the agency responsible for the roadway or the agency may have a perpetual easement to use it for transportation purposes. *Source: Maryland Design Guidelines*

Road Diet (also "Lane Reduction") – A technique which reduces the number of travel lanes and/or the width of vehicle travel lanes to slow traffic, accommodate bicycle lanes and/or widen sidewalks.

Rumble Strip – A series of intermittent, narrow, transverse areas of rough-textured, slightly raised, or depressed road surface that is installed to alert road users to unusual traffic conditions (from MUTCD, Section 1A.13, 69. Rumble Strip). Longitudinal rows of rumble strips may be placed along the centerlines and/or shoulder edge-lines of highways to alert drivers that they are straying outside the appropriate lane. Transverse rows of rumble strips may be placed on the roadway surface in the travel lane(s) to alert motorists of upcoming significant speed changes. *Source: Maryland Design Guidelines*

Shared-Lane "Sharrow" markings – A pavement marking symbol that indicates appropriate bicycle positioning in a shared lane. See Section 9C.07 Shared Lane Marking and Figure 9C-9 of the MUTCD for the design and additional information. *Source: Maryland Design Guidelines*

Shared Use Path – A roadway where motorized vehicle traffic is prohibited, that is physically separated from motorized vehicle traffic by either open space or a barrier. Shared use paths are generally open to any form of non-motorized travel, including but not limited to: pedestrians (walkers, joggers, and runners), bicycles, roller skates, wheelchairs, scooters, and horses. *Source: Maryland Design Guidelines*

Speed Tables (or Speed Humps) – Raised sections of pavement placed across the street to force motorists to travel at reduced speeds. Speed humps are more effective at slowing traffic than speed bumps because the driver actually benefits from traveling at slower speeds -- Speed bumps typically jar the motorist regardless of speed. Speed humps have a more gradual slope than traditional speed bumps. *Source: U.S. Federal Highway Administration*

Traffic-Calming – A general term referring to the variety of small-scale design strategies proven to slow down cars, increase the visibility of pedestrians and bicyclists, prevent crime, increase safety of vulnerable road users, reduce cut-through traffic, maximize street life and pedestrian activity. Traffic circles are best implemented in an area with well-designed existing sidewalks. *Source: U.S. Federal Highway Administration*

Traffic Control Device – A sign signal, marking, or other device used to regulate, warn, or guide traffic, placed on, over, or adjacent to a street, highway, pedestrian facility, or shared-use path by authority of a public agency having jurisdiction (from MUTCD, Section 1A.13, 87. Traffic Control Device). *Source: Maryland Design Guidelines*

Transition Zone – The portion of a conventional or buffered bike lane where lane markings (often green hatching) indicate that bicycle traffic and vehicle traffic turning right should cross before the intersection.

Appendix B: Public Input

Hagerstown/Eastern Panhandle Regional Bicycle Plan

Q2 Do you have any other comments you would like to share?

#	Responses	Date
1	So, where is the rail-trail from Weverton to Hagerstown in this 20-year vision? It is clear that the WashCo Commissioners would not approve this plan if it was included. This is a huge mistake from the perspective of economic benefit -- tourism as well as medical care cost savings, especially given the obesity epidemic of WashCo.	7/16/2016 12:47 PM
2	1. Awesome opportunity for Hagerstown - develop the multi-purpose "greenway" trail from Eastern Blvd to Funsktown which has been in the Comprehensive Plan for decades. 2. Awesome opportunity for Hagerstown & Washington County - delvelop the proposed "Civil War Rail Trail" from Hagerstown to Weaverton to connect with the C&O Canal.	7/15/2016 10:44 AM
3	It's a really good plan. I hope all of the projects become a reality someday!	7/14/2016 9:56 PM
4	Thank you so much for sending out this survey. As a Jefferson county cyclist, my priorities are in this county and I am not familiar with some of the areas mentioned above, though anything that enables schoolkids to ride safely to their school and home again is important. A safe route to Morgan's Grove park from Shepherdstown has been in the works for over a decade I understand. It is not a very long distance, but would get a lot of people out riding, including families. My over-riding (!) concern is with sensitizing motorists to the fact of increasing cyclists, and helping them understand that we have just as much right to the road as they do, despite the inconvenience to their speed. There is a wonderful shoulder that we ride on in Washington county, but often cyclists avoid it because it is not so well maintained as the road, and we may have to deal with broken glass in that bike lane. Thank you for listening!	7/12/2016 2:32 PM
5	Need to spend money on roads rather than bike stuff. Waste of money.	7/12/2016 1:39 PM
6	I would like all newly paved roads to have bike lanes - especially in new housing developments.	7/12/2016 12:37 PM
7	B1 should include a additional multi-purpose route (B-1a) to connect State Circle Dr to E. Stephen (via Living Waters Church and Prather Park. This route (the Prather Park Pathway) has been in planning for several years. To omit it from this overall plan could seriously undermine efforts to have Berkeley County complete this project	6/27/2016 5:21 PM
8	I would like to address signage. I see signs on the bike paths in Hagerstown that state bikers have the right away. I understood those to mean that I, in my car needed to be highly aware of bikers and not turn into their path, giving them the right away. I also assumed the bikers are still meant to follow the "rules of the road" not cutting in front of cars especially without signally and also need to stop at all stop signs and lights. Recent experiences with bikers riding in bike lanes have led me to believe that bikers seeing the posted signs giving them the right away exempt them from following the "rules of the road". I will give you two examples I've had recently. These are bikers in helmets, biker shorts/outfits on expensive bikes. Not kids riding bikes. 1.At the 4 way stop at Oak Hill and Prospect on more than one occasion a biker in the bike bath rode through that 4 way stop. 2.coming out of the circle at city park towards St. Mary's bikers in that path have turned left to go into the path to the far end of city park without signaling cutting me and other drivers off. Since the reports in the newspaper of bikers being hit other people have shared similar experiences with in Hagerstown. Additional signage saying bikers are required to follow the "rules of the road" needs to be added to the signs that say bikers have the right away. This also needed some to be included when media is reporting on bike events and new bike plans. I have nothing against bikers and bike paths but I don't want to hit someone! Rebecca Collinson Hagerstown, MD	6/24/2016 10:36 AM
9	Connecting the c@o canal with Berkeley Springs on the proposed rail trail would bring tourism to the town and provide a safer ares for Morgan co. Residents to ride and walk.	6/22/2016 9:10 PM
10	All projects should be completed--a walkable, bikable region is necessary to improve the quality of life and ensure a sustainable future.	6/22/2016 7:50 AM

1 / 1

Please provide any comments in the box below. Thank you for your input!

J 5 Please

Also J1 and J2

REGIONAL BICYCLE PLAN

Please provide any comments in the box below. Thank you for your input!

J5 - Big priority - wash H.S. to down town

J2 / ANY Connection from Rt 9 to:
Ch town / RANSON
Also + Shenandoah Jct. "town" area
and Jeff. High School

REGIONAL BICYCLE PLAN

From: Bruce Goldstein
Sent: Friday, July 01, 2016 11:06 AM
To: 'Mullenax, Matt' <mmullenax@washco-md.net>
Cc: 'Thomas, Steve' <sThomas@washco-md.net>; Chop, Christopher W <Christopher.Chop@mbakerintl.com>
Subject: RE: Draft Regional Bicycle Plan

Matt,
Thanks for sending the link. I'm impressed by the Regional Bike Plan. There are a lot of great recommendations and ideas in it. I'll just offer a couple of critiques or suggestions.

Although I like and strongly support the suggestion of making Route 522, including the Hancock Bridge, more bicycle friendly to link Hancock and the WMRT to Berkeley Springs, the reality is that a lot of us who do reasonably long distances try to minimize our riding on a road like 522 due to the large tractor-trailers that often are on such roads. The danger, noise, and speed of the trucks, as well as the lack of scenery, deter a lot of us from such roads.

So I think that improvement on 522 should be accompanied by improvements in the secondary roads, so that people either have an alternative, less congested route, or once they ride on 522 they have some enjoyable country roads as their main destinations.

My suggestions in my earlier email (which are below) about improving the country roads in Morgan County would make for more robust opportunities for cyclists. More effective repairs (rather than the rough patch jobs) on Cold Run Valley Road, Rock Gap Road, Luther Michael Road, Creek Road, Timber Ridge Road and Mauzy Road, among others would enable design of bike routes of 30 to 60 miles that would be great rides. Some of these roads also would become more hospitable and safer for local kids and adults in the area to ride short distances.

And as I said before, though I have no expertise, it seems to me that the country roads around Morgan County, if repaired, could become a desired destination for cyclists who have money to spend in the Berkeley Springs area. A marketing campaign might be quite successful. It could also build on the fact that the Potomac Pedalers Club now starts its annual Back Country Ride in Sheperdstown.

Obviously a lot of work has gone into the plan and there is a long list of recommendations, which take money to implement, and my suggestions add to the list and the cost. But I hope they are helpful. They do come from experience, both from riding around Morgan County and Hancock for the last six years' weekends, and from earlier experience on rides led by the Potomac Pedalers Club.

Bruce Goldstein

From: Bruce Goldstein
Sent: Sunday, June 26, 2016 10:55 AM
To: Mullenax, Matt
Subject: Draft Regional Bicycle Plan

Dear Mr. Mullenax,

I think it's great that the Council is working on a regional bicycle plan. I am an avid bicyclist in the Morgan County/Hancock area on weekends.
I don't have a copy of the plan, didn't see it on the website, and wish it had been there. Here are some thoughts about a regional plan.

My wife and I live during the week in Silver Spring, MD but we have a weekend home outside Berkeley Springs in the woods, where we spend most weekends and many holidays. I have ridden a lot on the roads in Morgan County and on the nearby paved trail, often beginning in Hancock and going both east to Big Pool and west out by Woodmont.

I hope the council will consider how to make the Berkeley Springs/Hancock area a much more attractive place for avid cyclists to ride. I am no expert but I believe the area is missing opportunities to offer bicyclists great places to ride and to generate income from tourism related to bicycling. A combination of improving the roads and trails and marketing the area's bicycling opportunities could be very beneficial.

There are many people like me who ride "road bikes" on paved bike paths but also ride on roads for substantial distances, for example 20 miles to 60 miles in a day, and enjoy the challenges of riding up hills. I am referring to the many people like me: I am not a fast rider and don't climb the highest or steepest hills. There are of course people with stronger riding capabilities who ride quite fast, climb steep, high mountains. Some bicycle clubs in the D.C. area would probably be willing to organize rides in the area if the cycling was better.

One major problem is the quality of the roads in Morgan County. There are many country roads that could be good to ride because they have little traffic, offer nice views, and provide an opportunity for a lengthy ride with some reasonably, but not overly, challenging hills. But most of the roads are in very bad shape and are hard on the body, occasionally dangerous, damaging to the bike, and therefore not as enticing to cyclists as they could be. These include sections of Luther Michael Road, Timber Ridge Road, Cold Run Valley Road. Improvements in these roads combined with marketing efforts in the D.C. area could bring more people to the county.

I know that there are plans to extend the rails to trail projects up toward the Allegheny Passage, which is a great idea. Bicycling on those paths for that distance would be a lot of fun, an opportunity to get exercise, and a potential attraction for more tourism to the area. I hope that this will come to pass and that there will be marketing to encourage people to come to Berkeley Springs and Hancock.

While I strongly support using our tax dollars to build and maintain paved bicycle paths, I suggest that there also be strenuous efforts to meet the interests and needs of bicyclists who would like more challenging rides on the roads. The paths are often for slower riders, and there can be obstructions – including people with dogs on long leashes – on paths that make them less desirable for some riders at some times.

Best wishes.

Bruce Goldstein

From: John Kimball
Sent: Tuesday, July 05, 2016 10:18 AM
To: Mullenax, Matt
Subject: Supporter of Washington County "Civil War Trail"

Matt,

I am a 20-year resident of Washington County MD.
I have raised three children who have attended Washington Country public schools.

We join with numerous other residents of Washington country in support of the Civil War Trail joining the C&O Canal with Hagerstown.

https://www.facebook.com/CivilWarRailTrail/

John Kimball

Appendix C: Latent Bicycle Demand

A Latent Demand model is used to identify the amount of bicycle travel (or "demand") likely to occur along existing street segments based on surrounding population, employment, and selected land uses. It is important to note that the demand is calculated based on network distances and without regard to existing traffic or the presence of bicycle facilities (trails, lanes, sidewalks). In other words, the model results are not constrained by existing bicycle facilities.

The latent demand model incorporates four general utilitarian trip purposes: work, school, shopping, and social/recreation. The trip purpose shares, expressed as percentages, were derived from the *National Household Travel Survey*.[12] The latent demand model relies heavily on geographic information systems (GIS) to quantify and analyze relative potential bicycle trip activity on the roadway network.

After compiling the jurisdiction bicycle GIS data, a series of key trip attractors were established. These attractors (shown on the right) were identified based on their trip generation capacities and their respective locations.[13] Once mapped, spatial analysis was performed in GIS to record the number of attractors within varying proximities (0.5 miles, 1.0 miles, 1.5 miles, and 2.0 miles) of each identifiable roadway segment. The spatial buffers were dissolved in GIS to ensure that the features did not overlap. This process avoids double-counting trip attractors for a given roadway segment.

Next, trip generations were assigned to each type of attractor. The *Institute of Transportation Engineers (ITE) Trip Generation Handbook (8th Edition)* was used to identify typical trip generation potential for parks, schools, colleges, and universities.

The trip generations were subsequently multiplied by the respective trip purpose shares for a given trip purpose. The calculation yields the relative number of potential bicycle trips generated, which must also be adjusted by a distance probability factor.

Once the potential bicycling trips were estimated, probabilities for making trips at various lengths were applied. The trip probability adjustments help account for the diminishing trip potential across longer distances, especially since distance between origins and destinations affects bicycling more dramatically than it does for automobile travel. The trip probabilities also account for different trip purposes. For example, people are typically willing to bicycle a greater distance to work than they are to simply pick up items at a local store. The trip lengths and probabilities (Table C1) were derived from the *National Household Travel Survey* and are similar to what were used in other regional studies, such as the *Atlanta Region Bicycle Transportation & Pedestrian Walkways Plan.*

[12] National Household Travel Survey (NHTS), 2009. For the purposes of this analysis, the social/recreational trip purpose reflects three NHTS categories: social/recreational, visiting friends/relatives, and other family/personal business.

[13] This study's trip attractors (which also act as generators) were the focus of this analysis because of the double counting which can occur when incorporating population-based trip generation and attractor-based trip generation.

TABLE C1: BICYCLE TRIP PROBABILITIES BASED ON DISTANCE AND PURPOSE

	Trip Purpose				
Average Trip Length	Work	School	Shopping	Social/Rec	Transit
0.5 miles	99.6%	99.0%	98.2%	99.5%	99.2%
1.0 mile	98.5%	86.4%	66.7%	96.2%	92.4%
1.5 miles	95.4%	45.1%	10.9%	84.2%	66.9%
2.0 miles	88.1%	0.0%	0.2%	59.1%	28.8%

The trip-making probabilities were multiplied by the relative number of generated bicycle trips for a particular bicycle segment, resulting in the number of bicycle trips for a particular purpose. These segment trips were aggregated for the four trip types.

Each segment was assigned a jurisdiction-specific quintile range based on its relative trip generation potential within its host jurisdiction. The quintiles, ranging from low demand to high demand, depict relative demand for bicycle facilities with little or no impedance.

Appendix D: Design Guidelines

The following tables and descriptions illustrate potential on-street and off-street bicycle improvements. While not all of the treatments are recommended as part of the Regional Bicycle Plan, the information can serve as a useful resource as the region's communties explore opportunities to expand their respective bicycle networks.

D.1.1 Conventional Bike Lane

Hagerstown (Photo credit: Google)

Description:

Bike lanes are a portion of a roadway, designated by striping, signage, and pavement markings, for the preferential or exclusive use of bicyclists. They are adjacent to and flow 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 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 Application (NACTO, 2011)

- Streets with ≥ 3,000 vehicle average daily traffic and posted speed limits of ≥ 25 mph
- On streets with high transit vehicle volume

Guidance and Concerns:

Bicycle lanes must provide 5-6" of usable space for cyclists. Usable space does not include the gutter pan area as the joint between the gutter pan and pavement edge is a hazard for cyclists. Inadequate widths for bicycle lanes or auto travel lanes serve neither the bicyclist nor the auto. 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 specialconsideration to limit potential conflict between drivers of motor vehicles, bicyclists, and pedestrians.

D.1.2 Buffered Bike Lane

Photo credit: People for Bikes

Description:

Buffered bike lanes are conventional bicycle lanes paired with a designated buffer space separating the bicycle lane from the adjacent motor vehicle travel lane and/or parking lane. (NACTO, 2011).

Benefits (NACTO, 2011)

- Provides additional passing distance between vehicles
- and bicyclists
- Provides space for cyclists to pass slower cyclists
- 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 Application (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 with transit

Guidance and Concerns:

Buffers should be at least 2 feet wide. 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. (NACTO, 2011).

D.1.3 Contra-Flow Bike Lane

Photo credit: Streetsblog.org

Description:

Contra-flow bike lanes are allow bicyclists to ride in the opposite direction of motor vehicle traffic, typically on a one-way street for vehicles.

Benefits (NACTO, 2011)

- Allows cyclists to use low-traffic one-way streets in both directions
- Provides connectivity to cyclists travelling in both direction and de-creases overall trip distance
- Reduces wrong-way street riding

Typical Application (NACTO, 2011)

- On corridors where alternate routes require excessive out-of- direction travel or riding on streets with high traffic volumes or no bicycle facilities
- On one-way streets where bicyclists are already riding wrong way or on the sidewalk
- 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 and signage 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 vehicle travel 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.

D.1.4 Bicycle Boulevard

Photo credit: Bikeplanet.org

Description:

A street segment, or series of connected streets, that has been modified to accommodate and encourage bicycle traffic while discouraging vehicle through-traffic. Bicycle boulevards streets with low vehicle volumes and speeds which have been optimized for bicycle travel with traffic calming, diversion, signage, pavement markings, and intersection treatments.

Benefits (PSU, 2009)

- Creates dedicated routes prioritized for bicycle use
- Provides comfortable, safe, convenient access on low-speed streets
- Reduces motor vehicle traffic on included roadway segments through traffic calming, diverters and signage
- Encourages bicyclists to use the bike lane, rather than
- sidewalks.

Typical Application (PSU, 2009)

- Roads with speeds ≥ 25 mph
- Roads with average daily vehicle traffic of <1500 (preferred) – 3000

Guidance and Concerns:

Intersections must be designed to reduce bicycle stop/starts and potential conflicts with motor vehicles. Roundabouts work well on bicycle boulevards because they slow vehicle traffic while allowing bicycle traffic to yield rather than stop at each junction. Traffic calming (such as diverters, speed tables, etc.) should be employed to reduce the attractiveness of the bicycle boulevard as a vehicle through-street. Routes should be selected for low volume and speed and to create direct, convenient connections for cyclists. Education and outreach efforts within both the community and residential areas along proposed boulevards are essential for project success. Communities wishing to implement bicycle boulevards should consider purchasing smaller emergency vehicles for easier access to all types of streets. When using traffic calming measures, special consideration must be given to avoid creating adverse conditions for bicyclists. Speed tables are more comfortable for cyclists than traditional speed bumps and "are more effective at slowing traffic than speed bumps because the driver actually benefits from traveling at slower speeds" (FHWA, 1999).

D.1.5 One-Way Cycle Track

Photo credit: People for Bikes

Description:

On street bike paths are at street level and use a variety of methods (such as bollards, planters, parked vehicles or a curb) 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 vehicle collisions
- Prevents vehicle double-parking, unlike in a conventional bike lane
- Low implementation cost by using existing pavement and drainage and by using parking lane as a barrier
- More attractive for bicyclists of all ages and skill levels

Typical Application (NACTO, 2011)

- Streets with parking lanes.
- Streets on which conventional bike lanes would cause many bicyclists to feel stress (multiple lanes, high traffic volumes, high speed traffic, high demand for double parking, and high parking turnover)
- Streets with sufficient roadway width to accomodate a cycle track

Guidance and Concerns:

Intersection treatments will be required to reduce conflicts between cyclists and turning vehicles. Cycle Track recommended lane width is 5‟ with 7‟ widths on uphill grades. Any method used to separate bicyclists from vehicle traffic should insure a minimum 3' buffer between travel lanes and cycle track to reduce the risk of dooring. Special consideration should be given at transit stops to manage bicycle & pedestrian interactions.

D.1.6 Bike Path / Shared Use Path

Hancock, Maryland. Photo credit: Michael Baker International

Description:

A bike path is one exclusively used by bicyclists and is fully separated from the roadway. Bike paths may travel completely independent of vehicle roadway patterns. Shared use path design is similarly separated and paved but includes pedestrians and other non-motorized users.

Benefits (PSU, 2009)

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

Typical Application (PSU, 2009)

- 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. Connections to and from the path or shared use trail should be frequent and convenient. Shared use path should include clear signage or differentiated surface to delineate space for each type of user.

D.1.7. Through Bike Lanes

Hagerstown Photo credit: Google

Description:

Enables bicyclists to position themselves to the left of right turn lanes or to the right of left turn lanes or to the outward edge of a roundabout.

Benefits (NACTO, 2011)

- Enables bicyclists to position themselves to the left of right turn lanes or to the right of left turn lanes.
- Provides bicyclists 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 the designated place for motorists to merge across the bike lane into the turn lane.

Typical Application (NACTO, 2011)

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

Guidance and Concerns:

The through bike lane shall be placed to the left of the right-turn only lane. Dotted lines signifying the merge area shall begin a minimum of 50 feet before the intersection. Dotted lines should begin 100 feet before the intersection if along a high speed/volume roadway. Dotted lane line transition areas to through bike lanes shall not be used on streets with double right turn lanes. Double right turn lanes are extremely difficult for bicyclists to negotiate. See MUTCD for further guidance.

D.1.8. Bike Box

Image credit: NACTO

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 (e.g.: 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 intersections more quickly
- Cyclists breathe less exhaust while queued ahead of vehicles at signal
- Contributes to perception of safety and reduces vehicle encroachment into crosswalks

Typical Application (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

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.

D.1.9. Two-Stage Turn Queue Boxes

Image credit: NACTO

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

Typical Application (NACTO, 2011)

- At signalized intersections
- Where a significant number of bicyclists turn left from a right side facility
- To assist bicyclists in navigating safely across streetcar tracks

Guidance and Concerns:

The queue box shall be placed in a protected area. Typically this is within an on-street parking lane, between the bicycle lane and the pedestrian crossing or in the protection of a cycle track curb. In cities that permit right turns on red signal indications, a "No Turn on Red" sign shall be installed overhead to prevent vehicles from entering the queuing area. Colored paving inside of the queuing area should be used to further define the bicycle space. See MUTCD for further guidance.

D.1.10. Median Refuge Islands

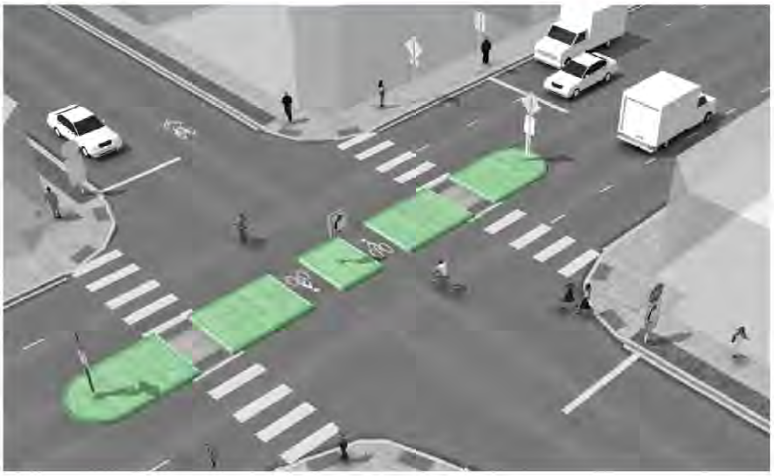


Image credit: NACTO

Description:

Median refuge islands are protected spaces placed in the center of the street to facilitate bicycle and pedestrian crossings. Crossings of two-way streets are facilitated by allowing bicyclists and pedestrians to navigate only one direction of traffic at a time.

Benefits (NACTO, 2011)

- Allows cyclists and pedestrians to more comfortably cross streets by waiting in a protected space for a gap in traffic.
- 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.or crosswalk

Typical Application (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 safe places to wait 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:

The desirable width of the median refuge is 10 feet or greater. The absolute minimum width is 6 feet. When applied on a two-way street, the median refuge shall be placed along the centerline of the roadway between the opposing directions of travel. Pavement markings on the approach to the refuge island shall follow the guidance provided in Section 3I.02 of the MUTCD. The approach edge of the raised median shall be outlined in retroreflective white or yellow material. In areas with snow accumulation, reflective delineators shall be used to mark the island for increased visibility to snow plow crews.

D.1.11. Signal Detection and Actuation

Photo credit: NACTO

Description:

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

Benefits (NACTO, 2011)

- Improves efficiency, convenience and safety for bicycle travel.
- Reduces delays for bicycle travel
- 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 Application (NACTO, 2011)

- In the travel lane on intersection approaches without bike lanes where actuation is required.
- Iintersections with bicycle signal heads and/or bicycle-specific phasing that are actuated.
- Bike lanes on intersection approaches that are actuated.
- 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
- 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.

D.1.12. Shared Lane Marking / Signage

Image credit: NACTO

Description:

Shared Lane Markings (SLMs), or "Sharrows," are road markings used to indicate a shared lane environment for bicycles and automobiles. Sharrows reinforce proper bicyclist positioning on streets without bike lanes. The shared lane marking is not a facility type but a pavement marking with a variety of uses to support a complete bikeway network.

Benefits (NACTO, 2011)

- Helps bicyclists position themselves in the center of a vehicle travel lanes
- Alerts motor vehicle drivers to the likely presence of bicyclists.
- Alerts road users of the lateral position bicyclists are likely to
- occupy within the street.
- Provides a way-finding element along bike routes.
- Increases the distance between bicyclists and parked cars, keeping bicyclists out of the "door zone".
- Requires no additional street space.

Typical Application (NACTO, 2011)

- To indicate a shared lane situation where the speed differential between bicyclist and motorist travel speeds is very low
- As an alternative to a bike lane when vehicle speeds and volumes are very low
- To clarify bicyclist positioning on roads with no bike lane

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 below. Shared lane markings shall not be used on shoulders, in designated bicycle lanes, or to designate bicycle detection at signalized intersections. Shared lane markings should be placed in the center of vehicle travel lanes too narrow to accommodate cyclists and vehicles in the same lane. The MUTCD outlines guidance for shared lane markings in section 9C.07. Additional educational information is vital to proper implementation for shared lane markings as many auto users are unfamiliar with this usage.

D.1.13. Colored Bike Facilities

Photo credit: Bike Arlington

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)

- Increases the visibility of bicyclists and discourages illegal parking in the bike lane.
- Helps raise awareness in conflict areas to help reduce conflicts between cyclists and turning motorists.
- Increases cyclist comfort with delineated space.
- Improves motorist yielding behavior.

Typical Application (NACTO, 2011)

- Across conflicts zones within bike lanes or cycle tracks
- Across intersections, particularly through wide or complex intersections where the bicycle path may be unclear.
- Across driveways and other curb-cuts
- Where vehicle movements frequently encroach into bicycle space (illegal parking, etc.)
- 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.

D.1.14. Wayfinding Signage

Hagerstown Photo credit: Michael Baker International

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

Typical Application (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 intended destination.

Guidance and Concerns:

Follow MUTCD standards, including mounting height and lateral placement from edge of pavement. Comprehensive inventory of signage location and age should be kept for maintenance and future expansion of routes. Wayfinding signage requires additional planning steps prior to implementation to create a consistent and functional network.

Appendix E: Funding

There are a range of funding sources available for bicycle and pedestrian planning, design, and construction. Table 9, Table 10, and Table 11 indicate potential eligibility for different types of projects under various Federal and State programs. The funding programs, all of which typically require local matches, are identified after Table 11. In addition, please see the one-page funding program summaries (following the tables) and/or visit HEPMPO Grant Opportunities page for additional information.

TABLE 9: BICYCLE FUNDING OPPORTUNITIES

Activity	TIGER	FTA	FLAP	ATI	CMAQ	HSIP	NHPP	STP	TAP	RTP	SRTS	MDOT
Bicycle lanes on road	$	$	$**	$	$	$	$	$	$		$	$
Bridges for cyclists and/or pedestrians	$	$	$**	$	$*	$	$	$	$	$	$	$
Curb cuts and ramps	$	$	$**	$	$*	$	$	$	$	$	$	$
Paved shoulders for bicyclist use	$		$**		$*	$	$	$	$		$	
Rec. trails	$*		$**					$	$	$		$
Separated bicycle lanes	$	$	$**	$	$	$	$	$	$		$	$
Shared use paths	$	$	$**	$	$*	$	$	$	$	$	$	$
Sidewalks (new or retrofit)	$	$	$**	$	$	$	$	$	$	$	$	
Stormwater impacts related to pedestrian and bike projects	$	$	$**	$		$	$	$	$	$	$	
Traffic calming	$	$	$**			$	$	$	$		$	
Trail bridges	$		$**		$*	$	$	$	$	$	$	
Trail/highway intersections	$		$**		$*	$	$	$	$	$	$	
Tunnels / undercrossings for bicyclists	$	$	$**	$	$*	$	$	$	$	$	$	$

KEY: *$ - Funds may be used for this activity. Local match required (except for MDOT Priority Minor Retrofit projects).*

$ - Eligible, but not competitive unless part of a larger project.*

*$** - Project eligible as long as infrastructure is located in, adjacent to or provides access to Federal Lands*

For more information, visit: http://www.fhwa.dot.gov/environment/bicycle_pedestrian/funding/

TABLE 10: BICYCLE FUNDING OPPORTUNITIES

Activity	TIGER	FTA	FLAP	ATI	CMAQ	HSIP	NHPP	STP	TAP	RTP	SRTS	MDOT
Bicycle parking	$*	$	$**	$	$		$	$	$	$	$	$
Bike racks on transit	$	$	$**	$	$			$	$			
Bike share (capital and equipment; not operations)	$	$		$	$		$	$	$			
Bicycle storage or service centers	$*	$	$**	$	$			$	$			
Crosswalks (new or retrofit)	$	$	$**	$	$*	$	$	$	$	$	$	
Historic preservation (bike facilities)	$	$	$**	$				$	$			
Landscaping, street-scaping (bicycle route)	$*	$		$				$	$			
Lighting	$	$	$**	$		$	$	$	$	$	$	
Signs / signals / signal improvements	$	$	$**	$	$	$	$	$	$		$	$
Signed bicycle routes	$	$	$**	$	$		$	$	$		$	$
Spot improvement programs	$	$	$**			$		$	$	$	$	$

KEY: $ *- Funds may be used for this activity. Local match required (except for MDOT Priority Minor Retrofit projects).*

$* *- Eligible, but not competitive unless part of a larger project.*

For more information, visit: http://www.fhwa.dot.gov/environment/bicycle_pedestrian/funding/

TABLE 11: BICYCLE FUNDING OPPORTUNITIES

Activity	TIGER	FTA	FLAP	ATI	CMAQ	HSIP	NHPP	STP	TAP	RTP	SRTS	PLAN	402
Bicycle plans	$plan	$						$	$			$	
Coordinator positions (State or local)					$ Limit 1 per state			$	$ as SRTS		$		
Counting equipment	$plan	$		$		$	$	$	$	$	$	$	
Data collection & monitoring for bicyclists and/or pedestrians	$plan	$		$		$	$	$	$	$	$	$	
Helmet promotion (for bicyclists)								$	$ as SRTS		$		$
Maps (for bicyclists and/or pedestrians)		$		$	$			$	$		$	$*	
Police patrols								$ as SRTS	$ as SRTS		$		$
Safety brochures/books								$ as SRTS	$ as SRTS		$	$*	$
Safety educ. positions								$ as SRTS	$ as SRTS		$		$
Training					$			$	$	$	$	$*	$

KEY: *$ - Funds may be used for this activity. $plan = Eligible for TIGER planning funds.*

$ - Eligible, but not competitive unless part of a larger project.*

$ as SRTS - Activities marked "as SRTS" means the activity is eligible only as an SRTS project benefiting schools for kindergarten through 8th grade.

For more information, visit: http://www.fhwa.dot.gov/environment/bicycle_pedestrian/funding/

Funding Programs Key:

ADA/504: Americans with Disabilities Act of 1990 / Section 504 of the Rehabilitation Act of 1973	**STP**: Surface Transportation Program
TIGER: Transportation Investment Generating Economic Recovery Discretionary Grant program	**TAP/TE**: Transportation Alternatives Program / Transportation Enhancement
FTA: Federal Transit Administration Capital Funds	**RTP**: Recreational Trails Program
ATI: Associated Transit Improvement (1% set-aside of FTA)	**SRTS**: Safe Routes to School Program (until expended)
CMAQ: Congestion Mitigation and Air Quality Improvement Program	**PLAN**: Statewide or Metropolitan Planning
HSIP: Highway Safety Improvement Program	**402**: State & Community Hwy. Safety Grant Program
NHPP/NHS: National Highway Performance Program/National Highway System	**MDOT**: Maryland Department of Transportation (Maryland Bikeways Program)
FLAP: Federal Lands Access Projects (FLAP)	

Bicycle Funding Sources

This guide provides an overview of Federal, State, Local and Private funding sources available for bicycle projects (design, construction, retrofit, education, advocacy and maintenance) in the HEPMPO region.

Congestion Mitigation + Air Quality Improvement Program (CMAQ)

SUMMARY:

The Congestion Mitigation & Air Quality Improvement Program (CMAQ) targets specific areas for special funding that aim to lesson congestion and air pollution.

WHO CAN APPLY?

State governments, regional planning organizations, local/city governments may apply.

PROJECT TYPES:

This program funds projects which improve congestion and air pollution. ‘High Priority’ is given to new pedestrian and bicycle facilities that provide direct access to transit or schools. ‘Medium Priority’ projects help fill ‘missing links’ in pedestrian and bicycle networks or to facilitate high use during peak travel times. ‘Low Priority’ projects are primarily for non-peak times.

CONTACT:

Maryland:
Bicycle and Pedestrian Coordinator
(410) 545 - 5656
bikes@sha.state.md.us

West Virginia:
Ryan Burns, Program Manager
(304) 558 - 9297
ryan.c.burns@wv.gov

Highway Safety Improvement Program (HSIP)

SUMMARY:

The Highway Safety Improvement Program (HSIP) is the federally-funded, state-administered program to implement projects that reduce fatalities and serious injuries. All public roads are eligible for HSIP funding.

WHO CAN APPLY?

State Transportation Improvement Plans may apply on behalf of local entities (who cannot apply directly for HSIP funds).

PROJECT TYPES:

This program funds projects which are based on data-driven analysis and contain performance targets that inform a larger plan. Previously funded projects have include intersection improvements, curve realignments, and reconstruction.

CONTACT:

http://safety.fhwa.dot.gov/hsip/

National Highway Performance Program/National Highway System

SUMMARY: The NHPP provides support for the condition and performance of the National Highway System, including bicycle and pedestrian walkways.

WHO CAN APPLY? Only state governments may apply.

PROJECT TYPES: This program funds bicycle and pedestrian walkways over National Highways.

CONTACT: http://www.fhwa.dot.gov/map21/factsheets/nhpp.cfm

Recreational Trails Program (RTP)

SUMMARY:

This federally-funded program assists in the development and maintenance of smaller-scale motorized and non-motorized trail, trailhead and restoration projects.

WHO CAN APPLY?

State agencies, local-county jurisdictions and private groups/individuals with government agency sponsor may apply.

PROJECT TYPES:

This program funds construction of new trails, restoration/maintenance of existing trails, development/rehabilitation of trailside facilities and linkages, purchase/lease of trail construction equipment and trail/corridor easement and property acquisition. It also covers interpretive/education programs, signage and maps related to recreational trail use.

This program funds trails for hiking, bicycling, inline skating, equestrian use, canoeing, kayaking, cross-country skiing, snowmobiling, off-road motorcycling, all-terrain vehicle riding, four-wheel driving, or using other off-road motorized vehicles. Recreational Trails is now a part of Surface Transportation Block Grant Program (formerly TAP).

CONTACT:

Maryland:

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West Virginia:

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Safe Routes to Schools (SRTS)

SUMMARY:

This program supports education and infrastructure improvements near state-funded K-8 institutions to promote student walking and cycling to school. Safe Route to School projects must go through the Surface Transportation Block Grant Program (formerly TAP).

WHO CAN APPLY?

Schools, school boards, PTOs, etc. with an interest in applying and coordinating to complete the application may apply. The Sponsor must be a public agency (local public works, MPOs, school boards, local or state agency) to manage and maintain the project.

PROJECT TYPES:

The program funds infrastructure improvements (including sidewalks, crosswalks, traffic calming, traffic diversion and on/off-street bicycle infrastructure, bicycle parking) within 1.5 miles of school. The program also funds public awareness campaigns, traffic education and enforcement near schools and bicycle/pedestrian safety programs for students.

CONTACT:

Maryland:
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410-545-5675

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Surface Transportation Block Grant Program (formerly TAP)

SUMMARY:

This is the most prominent funding source for biking and walking projects. Localities must spend at least half of their funding on bike/walk projects. Funding remains competitive but is set to increase between 2016-2020. Funding runs on a two-year application cycle in even-numbered years.

WHO CAN APPLY?

Public entities (local governments) and non-profits (NEW) may apply.

PROJECT TYPES:

This program funds planning, design and construction of on- or off-road bicycle and pedestrian facilities. This can include rails-to-trails projects, shared-use paths, cycle tracks, sidewalks and bike lanes as well as education and enforcement campaigns (but only for states whose overall roadway fatalities were 15%+ bicyclists or pedestrians).

CONTACT:

Maryland:

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West Virginia:

Mark Scoular, Coordinator
(304) 558 - 3783

Transportation Investment Generating Economic Recovery (TIGER)

SUMMARY:

TIGER grants support “rail, road, transit and port projects that promise to achieve national objectives” such as safety, economic competitiveness, quality of life and environmental sustainability.

WHO CAN APPLY?

State or local governments (including multiple jurisdictions) may apply.

PROJECT TYPES:

The program funds large infrastructure projects. Past awards have included rails-to-trails projects and large multimodal corridor projects. While TIGER grants will include pedestrian lighting, neighborhood connections, crosswalks, bridges, and signalized crossings for the corridor, they do not cover planning, preparation or design.

CONTACT:

FHWA Office of Infrastructure, Finance and Innovation
(202) 366 - 0301
TIGERgrants@dot.gov

Maryland Department of Transportation (Bikeways Program)

SUMMARY:

The program supports “projects that maximize bicycle access and fill missing links in the state’s bicycle system, focusing on connecting shared-use paths and roads and enhancing last-mile connections to work, school, shopping and transit” (MDOT).

WHO CAN APPLY?

State agencies, metropolitan planning organizations, local/county jurisdictions, transit agencies and federal public land agencies may apply.

PROJECT TYPES:

This program funds design (feasibility assessments, design and engineering), construction (shared use paths, cycle tracks and bicycle lanes), signage and markings (“sharrows”, bicycle route signage and wayfinding signage), capital improvements (such as bicycle parking), retrofits of existing bicycle infrastructure and educational materials.

Priority is given to projects which enhance bicycle access within 3 miles of rail station, in a missing link identified by the Statewide Trails Plan or to a priority location (such as a Sustainable Community, a Designated Maryland Main Street, a census tract below 60% of AMI, major university, CBD, tourist or heritage attraction).

CONTACT:

Kate Sylvester, MDOT Planning and Capital Programming
(410) 865 - 1304
ksylvester@mdot.state.md.us

Maryland Community Legacy Program (DHCD)

SUMMARY:

This program funds projects which strengthen communities through business retention/ attraction, encouragement of home ownership and commercial revitalization (MDHCD).

WHO CAN APPLY?

Local governments and community development organizations can apply.

PROJECT TYPES:

This program funds bicycle and pedestrian projects that are part of streetscape improvements and are located within an approved Sustainable Community.

CONTACT:

Kevin Baymes, Department of Housing & Community Development (DHCD)
(410) 209 - 5823
baynes@mdhousing.org

Maryland Heritage Areas Financial Assistance Programs (MHT)

SUMMARY:

This program assists funding for bicycle and pedestrian improvements related to heritage tourism and educational programs.

WHO CAN APPLY?

Designated Maryland Heritage Areas and local governments may apply.

PROJECT TYPES:

This program funds bicycle and pedestrian infrastructure (including bicycle parking, sidewalks, bike lanes and ramps) associated with Maryland Heritage Areas.

CONTACT:

Richard Hughes, Heritage Areas Program Administrator
(410) 514 - 7685
richard.hughes@maryland.gov

Maryland State Highway Administration Bicycle Retrofit (Fund 88)

SUMMARY: This program funds bicycle improvements along state roadways.

WHO CAN APPLY? Local jurisdictions in Maryland may apply.

PROJECT TYPES: This project funds construction of on-road and off-road improvements, such as a parallel or shared-use paths.

CONTACT:

Luis Gonzalez, State Highway Administration Innovative Contracting
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People for Bikes

SUMMARY: The People for Bikes Community Grant Program funds important and influential projects that leverage financial funding and builds momentum for bicycling.

WHO CAN APPLY? Non-profit organizations, local and state governments (including the District of Columbia) may apply.

PROJECT TYPES: This program funds projects such as bike lanes, cycle tracks, rails-to-trails, mountain bike trails, bike parks and large-scale advocacy initiatives.

CONTACT: http://www.peopleforbikes.org/pages/community-grants

The Robert Wood Johnson Foundation (Private Funding Source)

SUMMARY: The Robert Wood Johnson Foundation supports efforts to improve public health through bicycle and pedestrian projects, advocacy and policy.

WHO CAN APPLY? Public agencies, universities and public charities may apply.

PROJECT TYPES: This program funds greenway plans (design and construction), rails-to-trails, advocacy initiatives and policy development.

CONTACT: http://www.rwjf.org