CHAPTER 2. *Bike Allegheny*

ALLEGHENYPLACES identified key challenges in increasing bicycle travel as a mode share. Some of those challenges included a "lack of a bicycle route signage program," "lack of available, safe bicycle parking facilities," and incorporation of bicycle facilities into roadway projects. ACTIVEALLEGHENY details the issues and constraints for bicyclists in Allegheny County and offers solutions from engineering to education.

2.1 ALLEGHENY'S BICYCLE NETWORK

Bicyclists have identified the need for safe and convenient access to destinations in the County. Although some bicycle routes are available, most notably PA State Bicycle Routes and shared use trails including the Great Allegheny Passage (GAP) and Montour Trail, more designated commuter and recreational routes are still strongly desired. PennDOT's Design Manual[xii] states that although "most highways have not been designed with bicycle travel in mind...there are many methods to safely improve most roadways to accommodate bicycle traffic while also improving safety for motorized road users and pedestrians."

Shoulder on Hulton Road, Oakmont

Desired Access

Through discussions with stakeholders and the public and analysis of the online survey results, bicycle access is desired primarily along spokes from the north, east, south, and west suburbs into the City of Pittsburgh. Secondary access desired includes employers and schools, new and proposed development sites, trail network and parks, transit stops and stations, and connecting adjacent communities. **Table 2-1** details desired access for bicyclists that were expressed through these discussions and surveys.

Table 2-1. Desired Access for Bicyclists

To	From
Downtown Pittsburgh	• North Hills • Oakland • Mt. Lebanon
Kennywood Park	• East End
The Waterworks Mall	• Downtown
The Waterfront	• Sandcastle/South Side Trail • Duck Hollow Trail
Carrie Furnace Site	• East End
Montour Trail	• South Park • IKEA • Mt. Lebanon • Bethel Park
Great Allegheny Passage	• Rankin Bridge • Glenwood Bridge • Montour Trail • Round Hill Park • Frick Park • Mt. Lebanon

To	From
West Busway Carnegie Station	• Panhandle Trail • Heidelberg
Bidwell Technical Institute	• Penn Hills
Pittsburgh International Airport	• Montour Trail • Clinton Road
Millvale Riverfront Park	• Millvale • Freeport
Duck Hollow Trail	• Frick Park • Eliza Furnace Trail • Glen Hazel
Eliza Furnace Trail (Jail Trail)	• Riverview Park • Schenley Park • Duck Hollow Trail • Glenwood Bridge
Schenley Park	• West End • Eliza Furnace Trail
Sandcastle Waterpark	• Route 885 • East End
New Kensington	• Dorseyville

Identified Deficiencies

A review and analysis of existing conditions, survey results, bicycle and pedestrian crashes, and public feedback was performed to identify locations where bicycle facility deficiencies exist. Although there are a number of locations throughout Allegheny County that could benefit from the installation or enhancement of bicycle facilities, for this plan ten (10) locations are identified for further study and improvement. The ten (10) locations would require additional study prior to design and are therefore classified as long term improvements (5+ years). **Table 2-2** details the location and the identified deficiency. The crash summary and bicycle crash map are contained in **Appendix G** (included in a separate document).

Bridge Street, Etna Borough

Table 2-2. Top 10 Bicycle Facility Deficiencies

Corridor	Limits	Identified Deficiency
Penn Avenue	City of Pittsburgh	• 10 reported bicycle crashes in 5 years (2005 to 2009). • Actively used by bicycle commuters. • Limited cartway width (36') with multiple demands (parking, transit, pedestrians, bicyclists, vehicles). • 10' travel lanes, no shoulders, 7-8' parking provisions and bus stops. • #1 listed roadway needing bicycle facility improvements by survey users.
Liberty Avenue	City of Pittsburgh	• 7 reported bicycle crashes in 5 years (2005-2009). • Identified as a top 5 roadway needing bicycle facility improvements by survey users.
Bigelow Boulevard	City of Pittsburgh	• Identified as not compatible for bicycle traffic from Oakland to Downtown based on PennDOT design guidelines for lane/shoulder widths and observed average operating speed. • Public desires safe and convenient access to Frank Curto Park and Downtown. • Speed limit posted at 35 mph, observed average speed at 55 mph. • Existing cross section is 4 travel lanes with less than 1' shoulder. • For pedestrians, sidewalk is not continuous and ends at the merge with the I-579 Ramp.
Allegheny River Boulevard	City of Pittsburgh to Oakmont	• Identified as not compatible for bicycle traffic as it would need a consistent 4'-6' shoulder based on PennDOT design guidelines. • Existing cross section is 30' with 11' and 12' lanes and 3'-4' shoulders.
Route 8/ Butler Street	Etna to Richland (Orange Belt)	• 6 reported bicycle crashes in 5 years (2005-2009). • Identified as a top 5 roadway needing bicycle facility improvements by non-Pittsburgh residents in the online survey. *In Etna* o 38' pavement width, 12' lanes, 7' parking on-street. *At Saxonburg Boulevard* o 50' pavement width, 4 lanes at a width of 11.5' and center median. o SPC Bicycle Compatibility Below Average.
Route 28 Corridor	City of Pittsburgh to Blawnox	• Identified as a top 5 roadway needing bicycle facility improvements by non-Pittsburgh residents in the online survey. • Three Rivers Heritage Trail extends only to Millvale. The trail could be extended to Blawnox and access across Route 28 for bicycles and pedestrians investigated.
Route 19/ Washington Road/ West Liberty Avenue	City of Pittsburgh to Upper St. Clair	• Identified as a top 5 roadway needing bicycle facility improvements by non-Pittsburgh residents in the online survey. • 25 to 35 mph. • 4 lanes with <1' shoulder. • SPC Bicycle Compatibility Above Average to Below Average with Significant Grade.
Route 837/ East Carson Street	City of Pittsburgh	• 5 reported bicycle crashes in 5 years (2005-2009). • Identified as a top 5 roadway needing bicycle facility improvements by non-Pittsburgh residents in the online survey.

Corridor	Limits	Identified Deficiency
Freeport Road	Aspinwall to Cheswick	• 8 reported bicycle crashes in 5 years (2005-2009). *In Etna (25 mph – 35 mph)* o 2 lanes, no parking at 24' pavement width. *Aspinwall (35 mph)* o 2 lanes with parking westbound and shoulder eastbound. *Blawnox (25 mph)* o 2 lanes with parking. o East of Blawnox Business District, speed limit increases to 45 mph and the cross section becomes 3 lanes, then 4 lanes (under construction). o SPC Bicycle Compatibility Average to Below Average.
Fifth Avenue	City of Pittsburgh	• 7 reported bicycle crashes in 5 years (2005-2009). • Identified as a top 5 roadway needing bicycle facility improvements by Pittsburgh residents in the online survey. • Connects Downtown to Shadyside through Oakland.

Potential Opportunities

Several innovative opportunities for active transportation were identified by the stakeholders, study team, and public during the course of the study. They are described in this section.

Wabash Tunnel

The Wabash Tunnel is open daily for one-directional motor vehicle travel with HOV restrictions during the weekday morning and evening peak periods and without restrictions at other times. Traffic is allowed inbound during the weekday mornings and early afternoons and outbound during the weekday evenings and early mornings. The tunnel operates with outbound traffic during the weekends. In all of these instances, only one of the two travel lanes is being used at any one time by vehicular traffic.

Wabash Tunnel, South Side
Photo: Port Authority of Allegheny County

Users of the tunnel include the Fayette Area Coordinated Transit, which currently operates scheduled weekday bus service through the tunnel. Special event buses (e.g., incline shuttles) utilize the tunnel as well as significant traffic volumes outbound from Station Square and vicinity after sporting and other entertainment events.

Bicycles are restricted from the Wabash Tunnel for many valid reasons. Stakeholders and the public suggested during the course of the study that the community consider how the Wabash Tunnel could potentially accommodate bicycle traffic sometime in the future. The Port Authority of Allegheny County has considered and investigated the feasibility of the suggestion in the past. Based on PennDOT Design Guidelines (Publication 13M, Design Manual 2), emergency vehicle access must be maintained through the tunnel. The existing tunnel provides this access per design guidelines. As travel modes, bike access, and federal and state policy evolve over the next decade to accommodate and more fully utilize all modes of transportation, it may be advantageous to revisit Wabash Tunnel bicycle access, in the context of other changes in mode shift. Port Authority cannot allow bicycles in the Wabash Tunnel due to safety, design, liability, and operational concerns. However, it may be possible if there is significant demand, to pursue an alternative ownership scenario, where bicycle access to the tunnel can be considered, although that would be a major undertaking and cost.

Roberto Clemente Bridge

Roberto Clemente Bridge, Pittsburgh

It was suggested during the study that the Roberto Clemente Bridge (6th Street) in Pittsburgh be permanently closed to motor vehicle traffic. The bridge is currently closed to motor vehicles before sporting events at PNC Park and Heinz Field. The Roberto Clemente Bridge is one of the Three Sister's Bridges owned by Allegheny County serving as a connection between Downtown and the North Side. According to the book "The Bridges of Pittsburgh", they are the only three identical side-by-side bridges in the world.[xiii] The other two bridges are the Andy Warhol Bridge (7th Street) and Rachel Carson Bridge (9th Street). While comparing activity on the three bridges, the Roberto Clemente Bridge was observed to have the most bicycle and pedestrian activity on its 10-foot sidewalks both northbound and southbound. A feasibility study to determine traffic impacts of permanently restricting motor vehicles from the Roberto Clemente Bridge can be performed to determine if the bridge could be a bicycle and pedestrian only facility in the future. Performing a "road diet" on the bridge to narrow it to two vehicular travel lanes plus bicycle lanes could also be considered in this feasibility study.

Road Diet Feasibility Studies

During the course of field investigations for the study, several roadways were observed to be under capacity in terms of vehicle-to-capacity ratio. Those roadways, with four (4) lane cross-sections and without shoulders, are:

East Liberty Boulevard, Pittsburgh

- Park Manor Boulevard in Robinson between Montour Run Road and Robinson Town Center Boulevard
- Negley Run Boulevard in East Liberty between E. Liberty Avenue and Washington Boulevard
- Washington Boulevard in Highland Park between Negley Run Boulevard and Allegheny River Boulevard
- Route 51 in Coraopolis (study to include appropriate use of one-way pair system)
- Bigelow Boulevard between Oakland and Downtown, currently a limited access divided highway
- Long Run Road/Route 48 in White Oak

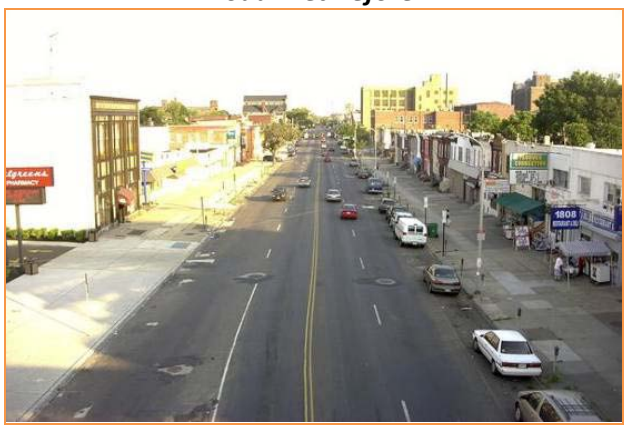
The six (6) roadways are recommended for study to accommodate a road diet. A road diet is the conversion of a four lane cross-section to a configuration with two through lanes, one two-way left turn lane, and two bike lanes. The *Smart Transportation Guidebook* outlines the benefits of a road diet to include:

- Creates a designated facility for bicyclists,
- Reduces crossing distance in which pedestrians are exposed to vehicular traffic,
- Provides a refuge for crossing pedestrians if physical medians are created,
- Can reduce the incidence of left turn crashes for motorists, and;
- Can reduce vehicular speeds by 1 to 5 mph on roadways where speeding is common.[xiv]

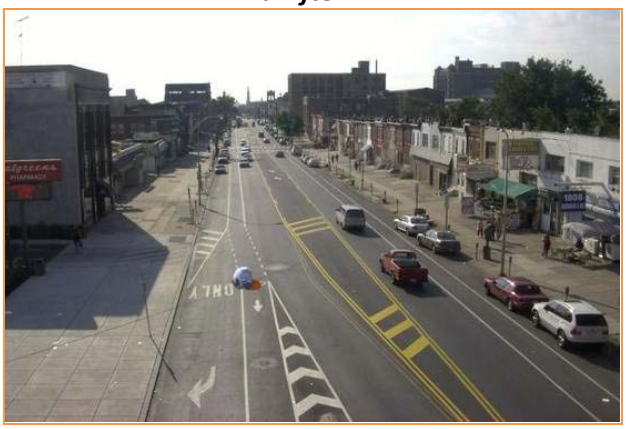
The Borough of Carnegie has submitted a PCTI grant application to perform a road diet assessment for Main Street near the Carnegie Station of the West Busway.

Washington Road (Route 19) in Mt. Lebanon was recommended for a Road Diet as well by residents of Mt. Lebanon. They cited high turning movement volumes and a safety concern for children walking and biking to school. It is recommended that Mt. Lebanon pursue several funding opportunities for Washington Road as well.

A Road Diet Before...



And After



Photos: FHWA University Course on Bicycle and Pedestrian Improvement, Lesson 15, Bicycle Lanes Publication No. FHWA-HRT-05-114

It should be noted that as part of a road diet assessment, traffic analysis should be performed to determine potential impacts to vehicle level-of-service.

2.2 SYSTEM IMPROVEMENTS

Designated County Commuter Bicycle Routes

It is recommended that Allegheny County designate bicycle routes to serve bicycle commuters from north, south, east, and west suburbs to the City of Pittsburgh to connect with the City of Pittsburgh Bicycle Network. The proposed routes in this plan were reviewed and compared to existing data sources (e.g., traffic volumes, jurisdiction, SPC bicycle suitability rating) for potential designation as a bicycle route. Prior to the designation of a bicycle route, facilities should be evaluated for compatibility per PennDOT design guidelines and brought up to bicycle standards where needed. The SPC Region's neighboring counties may also wish to connect to these routes to extend the spokes from the entire region to the regional hubs in Pittsburgh and Oakland, as well as to access points on the Great Allegheny Passage.

East Carson Street, Pittsburgh

The bicycle routes proposed in this Plan may make use of existing or proposed off-road trail segments, roadways, and/or transit routes. In the case of off-road trail segments which are under construction or proposed, user connectivity can often be provided in the interim through the use of local streets and roadways. While formal route designation should not occur until a facility is complete, it is recommended that segments be constructed and existing roadways be brought up to applicable bicycle standards where feasible in support of on-going bicycle route development. Constructing portions of a route and utilizing interim sections may ultimately help to achieve the goal of route completion and formal designation. Proposed routes could be designated as future bicycle routes which can help promote usage.

Rack and Roll Bus in Pittsburgh
Photo: Sara Walfoort

Proposed bicycle routes that involve utilizing transit would also need to be evaluated and coordinated with the Port Authority, as current policy allows folding bicycles on the rail system and inclines, but currently does not permit regular bicycles on light rail and incline vehicles during peak periods (folding bicycles are allowed inside all Port Authority vehicles at all times of the day). The Port Authority has indicated that in the year 2011, all PAAC buses will be equipped with racks as part of the "Rack 'N Roll" Program.[xv] **Table 2-3** details the proposed countywide designated commuter bicycle routes.

Appendix H (included in a separate document) contains the System Improvements Map for Countywide Bicycle Routes. This map is also included in the Executive Summary. **Appendix A** contains cue sheets (detailed maps and templates which list specific information for a pre-determined list of attributes) for each route illustrating the utilized roadways, bridges, bike routes, trails, and transit, as well as providing information for that section.

Table 2-3. Designated County Commuter Bicycle Routes

Route	Description
N1	Mc Cully Road *(Hampton Township Park)*, Craighead Road, Mt. Royal Road, Grant Avenue, Crescent Avenue, Butler Ave, *Connection to Proposed N2 Route*
N2	South Ridge Drive *(North Park)*, Peebles School Road, Babcock Boulevard, Evergreen Avenue, Seavey Road, Parker Street, Butler Street, Allegheny River Trail (existing), *Connection to City Facilities*
N2 Connector	Nicholson Road, Rochester Road, *Connection to Proposed N2 Route*
N3	Beaver Street, Ohio River Boulevard, Allegheny Avenue, Center Avenue, Church Avenue, California Avenue, Lincoln Avenue, *Connection to City Facilities*
N3 Detour of Ohio River Boulevard	Broad Street, Sewickley Bridge, PA Bike Route A (existing), *Connection to Proposed W3 route @ Bike Route A*
N4	Little Deer Creek Road *(@ Proposed Beltway Bicycle Route)*, Michael Road, Russelton-Dorseyville Road, Saxonburg Boulevard, Harts Run Road, Dorseyville Road, Riding Meadow Trail, Old Squaw Trail, Salamander Trail, Fox Chapel Road, Allegheny River Trail (existing), *Connection to Proposed N2 Route*
W1	Panhandle Trail (existing), Walkers Mill Road, Noblestown Road, Scotts Run Road, Ewing Road, Cubbage Road, Logan Road, *Connection to West Busway*
W2	Montour Trail (existing), Bike Route A (SR 51), McKees Rocks Bridge, Helen Street, River Avenue, Three Rivers Heritage Trail (existing), *Connection to City Facilities*
W2 Connector	Moon Clinton Road *(Pittsburgh International Airport)*, McCaslin Road, Clinton-Enlow Road, Montour Trail (existing)
W3	PA Bike Route A (existing), Grand Avenue Bridge, Ohio River Trail (proposed), Neville Island Bridge, *Connection to Proposed W2 Route*
W3 Connector	Cliff Mine Road, Thorn Run Road, *Connection to Proposed W3 Route*
W4	Beaver Grade Road *(Connection to Proposed W2 Route)*, Steubenville Pike, Tidball Road, McMichael Road, Campbells Run Road, Chartiers Avenue, 5th Avenue, Dick Street, Carnegie Station (West Busway), *Connection to Proposed S4 Route*

Route	Description
E1	Allegheny River Trail (existing) *(Harrison Hills Park)*, E. 1st Avenue, Worth Avenue, E. 7th Avenue, Freeport Road *(Connection to Proposed E1 Route Connector)*, Pittsburgh Street, Freeport Road, Blockdale Street, Allegheny River Trail (proposed), *Connection to Proposed N4 Route*
E1 Connector	Baileys Run Road *(Deer Lakes Park)*, Freeport Road, *Connection to Proposed N1 Route*
E2	Cox Comb Hill Road *(@ Proposed Beltway Bicycle Route)*, Hulton Road, Three Rivers Heritage Trail (proposed), *Connection to City Facilities*
E3	Old William Penn Highway, Rodi Road, Nottingham Drive, Homer Road, Churchill Road, Beulah Road, William Penn Highway (Penn Avenue), Montier Street, North Avenue (Eastbound) / Wallace Avenue (Westbound), Wilkinsburg Station, *Connection to East Busway*
E4	East Pittsburgh-McKeesport Boulevard, Versailles Avenue, First Street, Greensburg Avenue, Penn Avenue, Braddock Avenue, Electric Avenue, Linden Avenue Pedestrian Plaza, Linden Avenue, Bessemer Avenue, Western Avenue, Center Street/Bell Avenue, Jones Avenue, Braddock Avenue, Kenmawr Avenue, Belmar Place, Woodstock Avenue, Swissvale Station *Connection to East Busway*
E4 Connector	Wall Avenue *(@ Proposed Beltway Bicycle Route)*, Patton Street, Airbrake Avenue (Eastbound) / Middle Avenue (Westbound), Penn Avenue, *Connection to Proposed E4 Route*
E5	Pierson Run Road, Saltsburg Road, Frankstown Road, *Connection to City Facilities*
S1	Route 837, *(Connection to Proposed Beltway Bicycle Route)*, Steel Valley Trail (existing), *Connection to Proposed S3 Route*
S2	Montour Trail, Logan Road, Bethel Church Road, Fort Couch Road, Village Road, *Connection to South Hills Village T Station*
S2 Connector	Library Road, Logan Road, *Connection to Proposed S2 Route*
S3	Youghiogheny River Trail (existing), Steel Valley Trail (existing), Riverton Railroad Bridge, *Connection to City Facilities*
S4	McMurray Road, McLaughlin Run Road, Ridge Road, Bower Hill Road, Chartiers Creek Trail (proposed), *Connections to Proposed W1, W4, S4 Connector Routes, and West Busway* with connection to Panhandle Trail
S4 Connector	Greentree Road, *Connection to City Facilities*
S5	Brownsville Road, Curry Road, Brownsville Road, *Connection to City Facilities*

Designated County Beltway Bicycle Route

Members of the Core and Study Advisory Committee, as well as the public, expressed desire for a circular bicycle route to connect County Parks and nearby land uses. The Orange Belt, which is comprised of 91.7 miles of miscellaneous county and state owned roads and color coded for navigational purposes[xvi], was a logical starting point. Spurs and parallel routes were then added to or substituted for the existing Orange Belt to avoid high volume cross sections. Prior to designating the recommended route, existing roadways need to be evaluated for compatibility per PennDOT design guidelines. Study Team observations noted that the proposed beltway route, utilizing a majority of Orange Belt roadways, is scenic with light truck traffic and relatively low volumes and motor vehicle operating speeds. A typical cross section is comprised of 10' travel lanes with 0' - 4' shoulders. **Table 2-4** details the proposed beltway bicycle route. **Appendix H** (included in a separate document) contains the Preliminary System Improvements Map for Countywide Bicycle Routes, which includes this route. This map is also included in the Executive Summary.

Table 2-4. Designated County Beltway Bicycle Route

Route	Description
Beltway Bicycle Route	Montour Trail (existing), Library Road, Clifton Road, McMurray Road, McLaughlin Run Road, Ridge Road, Baldwin Street, Railroad Street, Bower Hill Road, Washington Avenue, Prestley Road, Thoms Run Road, Battle Ridge Road, Boys Home Road, Union Avenue (Route 978), W. State Street, Clinton Avenue, McKee Road, Steubenville Pike, Enlow Road, Montour Trail (existing), Beaver Grade Road, University Boulevard, Sewickley Bridge, Broad Street, Hill Street, Blackburn Road, Fern Hollow Road, Camp Meeting Road, Rochester Road, Wexford–Bayne Road, Wexford Road, Gibsonia Road, Oak Road, Bairdford Road, Saxonburg Boulevard, East Union Road, Starr Road, Little Deer Creek Road, Creighton-Russellton Road, Butler Logan Road, Crawford Run Road, Freeport Road, New Kensington Bridge (C.L. Schmitt Bridge), Industrial Boulevard, 3rd Avenue, 2nd Street, Logans Ferry Road, Leechburg Road, New Texas Road, Saltsburg Road (Route 380), Center Road, Haymaker Road, Mosside Boulevard (Route 48), Jacks Run Road (Route 48), Long Run Road (Route 48), Walnut Street (Route 48), Boston Bridge, Boston Hollow Road (Route 48), Scenery Drive (Route 48), Lovedale Road, McKeesport Road, Hayden Boulevard (Route 51), State Street (Route 837), Montour Trail (existing)

City of Pittsburgh Bicycle Network

The City of Pittsburgh, BikePittsburgh (BikePGH), and Friends of the Riverfront have been working diligently to enhance the bicycle network in the City of Pittsburgh. Many roadways have been retrofitted for bicycle facilities and many more are proposed. In 2009, the Mayor of Pittsburgh created a list of bicycle and pedestrian specific initiatives to be advanced in the categories of engineering, education, enforcement, and events (**Appendix I**, included in a separate document). As a result of that initiative, a Bicycle Route and Signage Plan is currently under development, as well as other efforts to enhance the bicycle and pedestrian network within the City. A map illustrating the current City of Pittsburgh Bicycle Network, and routes proposed as part of this plan, is contained in **Appendix J**, which is included in a separate document as well as the Executive Summary. The City will further its Bicycle and Pedestrian Network as part of its upcoming MovePGH Comprehensive Transportation Plan and Bicycle Master Plan update. The City and the County should coordinate any future routes to promote system connectivity.

Approaching Roberto Clemente Bridge, North Shore

Three Rivers Heritage Trail

Friends of the Riverfront is performing planning, development and construction to expand the Three Rivers Heritage Trail along the Allegheny County Riverfront. They are one of many groups working to support beneficial and community focused riverfront development through the Pittsburgh Metropolitan Area. The following projects are key regional priorities:

- **Community Initiatives – Extending the trail/commuter bike facility up the Allegheny River:** A public/private initiative to complete a trail through 17 municipalities along the North Shore of the Allegheny River to connect the Three Rivers Heritage Trail with the Armstrong Trail.

North Shore Trail, North Shore

- **Allegheny Riverfront – Convention Center to Highland Park:** As part of the Allegheny Riverfront Vision Plan, create an urban design vision and implementation plan for the south bank of the Allegheny River between the Convention Center and Highland Park.
- **Allegheny Riverfront – Allegheny River Boulevard to Rail Trail:** Planned trail connection between Penn Hills and Verona along Allegheny River Boulevard.
- **Verona Borough Sustainability Needs Assessment:** Includes recommendation for a multipurpose walkway along the railroad tracks and activities at Riverbank Park.
- **Carrie Furnace:** Preliminary engineering design for a trail to connect Duck Hollow through Carrie Furnace to Braddock.
- **East End Loop:** Planning to connect the Duck Hollow Trail to the Pittsburgh Zoo.
- **Ohio Riverfront Montour Connection**: Planning to connect the Three Rivers Heritage Trail downstream to the Montour Trail.
- **Carnegie Science Center Development Plan:** A plan to expand the Science Center to include a redesigned riverfront park and trail access to the Three Rivers Heritage Trail.
- **Convention Center Riverfront Park:** Development of a riverfront park on the Allegheny River adjacent to the Convention Center with connections to the Three Rivers Heritage Trail.
- **Mon Wharf Landing:** Development of the Mon Wharf for riverfront open space to the public including a linear park and trail.
- **South Shore Riverfront Park:** Extension of the South Side Riverfront Park to include the Three Rivers Heritage Trail and South Side Trail.

2.3 BICYCLE FACILITIES TOOLBOX

The Bicycle Facilities Toolbox is a resource for County and local officials, staff, residents, and stakeholders that will assist in planning and developing bicycle facilities as part of the ACTIVEALLEGHENY Plan. The toolbox is composed of the following four (4) sections:

- **Bicycle Facility Users**: An overview of the types of cyclists that are a focus of this study.
- **Bicycle Facility Types and Design Guidelines:** A review of common bicycle facilities and relevant design guidance from PennDOT, Allegheny County, and the City of Pittsburgh, as well as national guidelines and standards.
- **Order of Magnitude Costs:** A guide to typical costs for design and installation of bicycle facilities.
- **Innovative Bicycle Facilities:** A presentation of innovative bicycle facilities that are being developed and evaluated, both nationally and internationally.

Bicyclists in the Strip District
Photo: Kevin Smay

Bicycle Facility Users

There are multiple ways to categorize cyclists. They can be separated into groups by purpose (e.g., commuter, recreational, etc.), by skill level (e.g., experienced, inexperienced, etc.), or by age (adult, child, etc.). For the purposes of ACTIVEALLEGHENY, the focus is the following types of bicyclists: Experienced Commuter, Casual Commuter, Utilitarian, and Children, which are described briefly in this section:

- **Experienced Commuter:** This type of user is comfortable in mixed traffic and using shared travel lanes or on-road bicycle facilities. Experienced commuters are adults who have been bicycling over a long period of time, and who may ride by choice or because bicycling is their only means for getting to work (e.g., no personal vehicle, no transit access, etc.). These users are focused on direct trips, which usually occur during peak travel periods. Trip lengths for the experienced commuter vary from short trips of 3 to 5 miles to long trips of 10 to 20+ miles.

Bicyclists in Pittsburgh
Photo: Sara Walfoort

- **Casual Commuter:** This type of user has limited experience with bicycling and may lack confidence with on-road bicycle travel, but has interest in commuting by bicycle. Casual commuters are adults who may have experimented with bicycling to work, but typically rely on another means for commuting, such as driving alone or walking to transit. These users are focused on direct trips, but feel more comfortable on: off-road facilities; low-volume roadways; or exclusive on-road bicycle facilities. The casual commuter has a trip length of 1 to 5 miles, and a preference for transit connections to traverse difficult locations, such as congested roadways and bridges.
- **Utilitarian:** Although commute trips can be utilitarian, this descriptor is used for bicyclists who are making off-peak trips or daytime work trips, shopping, medical visits, or other non-commute purposes. These cyclists can be experienced or casual, adults or adolescents, and are often prepared to make trips in mixed traffic. Trip lengths for the utilitarian likely range between 1 to 3 miles.
- **Children:** Children tend to not travel as fast as adult cyclists, but still desire and require access to destinations such as schools, stores, recreational areas, and neighboring residences. According to AASHTO, "residential streets with low motor vehicle speeds, linked with shared use paths and busier streets with well-defined pavement markings between bicycles and motor vehicles can accommodate children without encouraging them to ride in the travel lane of major arterials." Ideally children on bicycles should be accommodated with barrier-separated bicycle lanes and accompanied by adults until they are an appropriate age when they have an understanding of traffic movements and signage and they are able to operate a bicycle on-street.

Bicycle Facility Types and Design Guidelines

There are a common set of on-road and off-road bicycle facilities that are used to enhance and accommodate bicycle travel. These facilities, which are grouped as "Bikeways" by PennDOT, have recommended physical dimensions and characteristics, as well as typical pavement striping, markings, and signs. Bicycle facility guidelines are outlined in Chapter 16 and Chapter 19 of PennDOT Design Manual 2. Roadways and intersections should be compliant with PennDOT and MUTCD guidelines and standards. The current approved version of the MUTCD in Pennsylvania is the 2003 edition. PennDOT is currently in the process of evaluating the 2009 edition for potential adoption. States are given two years from the publication date (January 15, 2010) to conduct their review process.

On-Road Bicycle Facilities

The common on road bicycle facilities are: Shared Lanes/Shared Roadways, Paved Shoulders, and Bicycle Lanes. Specific roadway attributes (e.g., pavement widths, cross-sections, parking provisions, traffic volumes, posted speed limit, etc.) determine the applicability of each facility. In addition to these common facilities, there are approaches, including signed bicycle routes and bicycle boulevards, that can be used to integrate the roadway improvements into discrete corridors and an overall on road network. **Table 2-5** describes these facilities in detail. Striping for bicycle facilities should be thermoplastic for longevity.

Table 2-5. On-Road Bicycle Facilities

Shared Lane/ Shared Roadway	A Shared Lane, or Shared Roadway per the PennDOT Design Manual 2, accommodates bicyclists and motorists in the same travel lane. Shared lanes can be located on urban or rural roadways with low vehicular traffic volumes and low posted speeds, and are often supplemented with 'Share the Road' warning signs. Wide outside travel lanes, which have widths of 12' to 15' depending on the roadway context (e.g., rural or urban), are desired for shared lane facilities. A new pavement marking used to guide bicyclists with lateral positioning in a shared travel lane, especially in locations with on-street parking, is the shared lane marking (informally referred to as 'Sharrows'). Sharrows are included in the MUTCD 2009 Edition.	 *Shared Lane with Shared Lane Marking*  *'Shared The Road' Used in Pennsylvania*
Paved Shoulder	A paved shoulder provides accommodation for bicyclists adjacent to vehicle travel lanes. Paved shoulders can be located on urban or rural roadways with moderate to high vehicular traffic volumes and moderate to high posted speeds. Paved shoulders for bicyclists range in width from 4' to 6'+ depending on the available pavement width, and can be supplemented with 'Share the Road' warning signs. Chapter 16 of the PennDOT Design Manual (Publication 10A) does not identify paved shoulders, but paved shoulders are listed in the Bicycle and Pedestrian Checklist (**Appendix K**, included in a separate document). In the checklist, paved shoulders are grouped with bicycle lanes, and appropriate widths are cited as 6' standard and 5' adjacent to curb.	 *Paved Shoulder*

Bicycle Lane	Bicycle lanes are designated travel lanes for exclusive or preferential use by bicyclists. Bicycle lanes are typically located on roadways in urban settings with moderate to high vehicular traffic volumes, moderate to high posted speeds and permitted or designated on-street parking. According to the PennDOT Design Manual, bicycle lanes include the application of pavement striping, markings, and regulatory signage. Bicycle lane facilities should be one-way facilities that carry traffic in the same direction as motor vehicles, and utilize configurations that encourage merging to occur in advance of intersections. Following the Bicycle and Pedestrian Checklist, bicycle lane widths are cited as 6' standard and 5' adjacent to curb, and are to include marking as per AASHTO guidance.	 *Bicycle Lane*
Signed Bicycle Route	Signed bicycle routes are treatments used to provide wayfinding guidance to cyclists. Route signs can be used to provide directional, distance, and destination information to assist bicyclists in navigation. Signed routes can also be used to direct cyclists to corridors that have existing on-road facilities, or access locations for off road facilities. The PennDOT Design Manual 2 does not provide specific guidance on signed bicycle routes, but AASHTO does provide guidance on the design and application of signed bicycle routes.	 *Bicycle Route Sign* *Source: MUTCD 2009 Edition*
Bicycle Boulevard	A bicycle boulevard is a corridor treatment that prioritizes bicycle travel. Bicycle boulevards accommodate shared travel for bicyclists and motorists and utilize traffic calming measures, signs, pavement markings, and crossing improvements to enhance bicycle travel. Corridors identified for bicycle boulevards are typically characterized by low volumes and low speeds. Bicycle boulevards are not included in the PennDOT Design Manual; however, a Bicycle Boulevard Guidebook was recently released by the Initiative for Bicycle and Pedestrian Innovation at the Center for Transportation Studies (Portland State University).[xvii] The guidebook provides direction on selecting routes and application of design elements (e.g., priority, intersection, traffic calming, and traffic reduction treatments).	 *Bicycle Boulevard in Berkley, CA* *Photo: sfgate.com (Paul Chinn)*

Three Rivers Heritage Trail
Photo: Tom Baxter

Off-Road Bicycle Facilities

The typical facility used to accommodate off-road bicycle travel is the Shared Use Path, or Bicycle Path (PennDOT). The Shared Use Path has specific physical attributes which are described in **Table 2-6**. At one point in time, people considered "trail development" to be a recreational accommodation. Not any longer. Trail development within Allegheny County provides connections to our communities, opportunities for economic development, and offers transportation alternatives through the use of the corridors. Trails are used for recreational purposes, but also for commuting from one place to another.

The Allegheny County comprehensive plan outlines the goals for trails, greenways, and bike routes. ACTIVEALLEGHENY will integrate existing trail corridors with planned on-road and off-road (trail) segments to connect to the destinations across our region.

Table 2-6. Shared Use Path or Bicycle Path

Shared Use Path	A shared use path or bicycle path is a facility that is physically separated from the roadway and typically accommodates bi-directional travel by both bicyclists and pedestrians. The path can be located either within publicly owned right-of-way, within an exclusive right-of-way, or on an easement. Shared use paths typically have a hard surface (e.g., asphalt, concrete, compacted gravel, etc.) and have a recommended width of 10', although a minimum width of 8' may be used where space is constrained or in environmentally sensitive areas. Wider paths are also recommended if there is a high volume of existing or anticipated bicycle and pedestrian traffic. Sidepaths are a subset of shared use paths that denote paths that run adjacent to a parallel roadway. Sidepaths can assist in providing bicycle connections between on- and off-road facilities, but often require a more in-depth operational and safety analysis.	 *Shared Use Path*  *Sidepath at an intersection*

Order of Magnitude Costs

Costs associated with implementing bicycle facility improvements will vary. Interim improvements (e.g., shoulder striping, bicycle route signage) will have less design requirements and will therefore be less expensive than an improvement that would need to go through feasibility assessment and design before obtaining funding for construction (e.g., shared use path/bicycle path construction, accommodating bicycle lanes through signalized intersections). Current typical costs are contained in **Table 2-7**.

Table 2-7. Typical Average Costs for Bicycle Facilities

Item	Cost Per Unit	Quantity	Cost	Source
Cost Per Lane Mile				
Bicycle Lane Striping	$1.00 / LF	10,560 LF	$10,560.00	(2) 4" White Hot Thermoplastic Pavement Markings (1 MILE) (ECMS)
	$110.00 EA	22 Legends	$2,420.00	(22) White Waterborne Pavement Legend, "Bicycle With Rider", 8'-0" X 4' 0" (1 Every ~250 FT) (ECMS)
	--	--	**$12,980.00**	--
Sharrow Decals	$135.00 EA	22 Decals	**$2,970.00**	(22) White Waterborne Pavement Legend, "Bicycle with Rider", 8'-0" X 4'-0" With 2 Chevrons (1 Every ~250FT) (ECMS + Estimate)
Shoulder Striping	$1.00 / LF	5,280 LF	**$5,280.00**	4" White Hot Thermoplastic Pavement Markings (1 MILE) (ECMS)
Cost Per Item				
Share the Road Sign	$25.00 / SF	6.25 SF	**$156.25**	30 " X 30" Share The Road Sign, Type B Post Mounted (W16-1)(ECMS)
Bicycle Warning Sign	$25.00 / SF	6.25 SF	**$156.25**	30" X 30" Bicycle Warning Sign, Type B Post Mounted (W11-1) (ECMS)
Bicycle Route Sign	$25.00 / SF	3 SF	**$75.00**	24" X 18" Bicycle Route Sign, Type B Post Mounted (D11-1)(ECMS)
Bicycle Lane Sign	$25.00 / SF	5 SF	**$125.00**	30"X 24" Bicycle Lane Sign, Type B Post Mounted (R3-17) (ECMS)
Bicycle Rack (Hoop)	$175.00 EA	1 Rack	**$175.00**	BikePGH ($99.00 without installation cost)
Bus Mounted Bicycle Racks	$1,030.00 EA	1 Rack	**$1,030.00**	Port Authority of Allegheny County, Summer 2010

Source: PennDOT, http://www.dot14.state.pa.us/ECMS/ and *2010 RS Means Site Work and Landscape Cost Data, 29th Edition.*

Innovative Bicycle Facilities

In certain situations, traditional bicycle facilities (e.g., bicycle lanes) may not achieve desired results due to the nature of the existing roadway network. For this reason, the application of innovative facilities can be utilized to make important connections that would otherwise be unavailable through traditional means. Examples of innovative facilities are presented in **Table 2-8**. These facilities may be applicable in the future to bicycle compatibility improvements in Allegheny County. These facilities have been evaluated by the Institute of Transportation Engineers (ITE) and have successfully been implemented in many cities throughout the United States.

Table 2-8. Innovative Bicycle Facilities

Cycle Track	A cycle track is a bicycle facility that is adjacent to the roadway but separated by a physical barrier. Physical barriers can include the addition of concrete islands or the movement of the parking lane away from the curb, where space permits. Cycle tracks often require right-of-way of up to 14' but can be constructed in situations with as little as 9' of additional right-of-way. Cycle tracks would be applied where significant demand for bicycling exists, and often permit bi-directional travel, eliminating the need for accommodations on both sides of the roadway.	 *Cycle Track in Montreal, Quebec* *Photo: BikePortland.org*
Contra-flow Bicycle Lanes	Contra-flow bicycle lanes are similar to traditional bicycle lanes, except they provide for travel down a one-way street against the flow of motor vehicle traffic. This application is best utilized in extraordinary circumstances when vital connections are excluded from a bicycle route network. Prior to application, significant study should be performed to identify alternate routes which follow existing travel lane directions. In many cases, alternate routing through the use of shared use paths and parallel roadways will exist. Applications of contra-flow bicycle lanes often include the use of bollards or permanent physical barriers as a means of physical separation from oncoming vehicular traffic.	 *Contra-flow Bike Lane in Washington D.C.* *Photo: DCist.org*
High Visibility Bicycle Lanes	High visibility bicycle lanes are similar to traditional bicycle lanes with the exception that the entire lane is painted to differentiate it from vehicular travel lanes. This application provides an additional layer of visibility which will alert motorists to the presence of cyclists. Prominent examples include New York City's bicycle lanes which utilize the color green, and Portland, Oregon, which use blue markings at merging locations, such as highway ramps. Despite this difference, the application of the high visibility bicycle lanes have produced favorable results by way of bringing attention to the presence of cyclists and additional traffic calming effects to the roadway.	 *High Visibility Bicycle Lane in NYC* *Photo: NYC Street Design Manual*

Advance Stop Line/ "Bicycle Box"	The advance stop line or "bicycle box" is a roadway treatment developed to provide the bicyclist with a space to position themselves for turning movements at signalized intersections. This treatment marks an area for bicyclists in front of stopped vehicles at signalized intersections. Current applications use a contrasting surface color to mark the entire area occupied by the bicycle box and to enhance visibility. A prominent example of this treatment currently in use and under evaluation is Portland, Oregon.	 *Bicycle Box in Portland, Oregon.* *Photo: BikePortland.org*
Buffered Bicycle Lane	Similar to a striped bicycle lane, the buffered bicycle lane provides a dedicated travel lane for bicycle travel. The difference is that the buffered lane is marked with a typical 2' – 4' "shy zone" that creates a wider physical separation between vehicles and bicycles. Buffered bicycle lanes have been built adjacent to travel lanes, as well as adjacent to parking lanes.	 *Buffered Bicycle Lane in NYC* *Photo: economyleague.org*

2.4 POLICY AND PROGRAMMATIC CONSIDERATIONS

There are policy and programmatic factors in developing and maintaining a convenient, attractive, and accessible bicycle network. Described below are policies and programs that will impact and influence the development of a bicycle network in Allegheny County. These factors reference existing local guidelines, laws, and requirements, and identify best practice policies and programs that should be considered as Allegheny County, its municipal partners, and other stakeholders develop the bicycle network in the County.

Bicycle Parking

Bicycle Racks at Capacity in Downtown Pittsburgh

Bicycle parking is a necessary amenity at trip destinations for bicyclists. Parking accommodations allow for secure placement of bicycles, and in some locations, protection from the elements. Bicycle parking encompasses racks that can accommodate an individual bicycle or multiple bicycles, lockers to secure and store bicycles, and bike stations where bicycles are locked up at indoor locations that offer additional amenities such a repair and maintenance services.

Bicycle parking can be separated in short- and long-term parking. Short-term parking accommodates bicycles used for utilitarian trips where cyclists will only need to secure the bicycle temporarily. Short-term parking facilities include bicycle racks (both covered and uncovered) and

on-street bicycle parking stations conveniently located at civic buildings and in commercial areas. Long-term parking would be used for commuter trips, where the bicycle can be secured and left unattended over a lengthier period of time. The length of time parking is required impacts the location and type of parking used. Short-term parking should be provided in highly visible and easily accessible locations, whereas long-term parking tends to be placed in low traffic and low visibility locations that offer exclusive access for bicyclists. Long-term parking facilities include lockers, cages or designated rooms within buildings to offer a higher degree of security and weather protection.

BikePGH in Pittsburgh
Photo by Kevin Smay

In Allegheny County, the City of Pittsburgh has Bicycle Parking Guidelines for the installation, location, and design of bicycle racks. In conjunction with the guidelines, the City also recently passed a bicycle parking ordinance that requires and provides incentives for the installation of bicycle parking when a building is being built or altered. Other municipalities in Allegheny County can reference and/or utilize the city's guidelines as well as guidelines, from the Association of Pedestrian and Bicycle Professionals (APBP) to develop local guidance and ordinances.

Traffic Calming

Traffic calming involves the installation of volume or speed control measures on a roadway to modify driver behavior and improve conditions for non-motorized transportation users. Volume control measures range from full street closures to diagonal diverters to reducing the width of vehicle travel lanes, while speed control measures include enforcement equipment (e.g., speed trailers), speed humps, bulb-outs, chicanes, roundabouts, raised crosswalks and intersections, medians and gateway features (e.g., welcome signs, speed limit reduction, landscaping, archway, etc.). According to Chapter 9 of the Smart Transportation Guidebook, traffic calming may apply to many different roadway classifications, however prior to choosing a measure for installation, factors such as design speed, right-of-way, pedestrian and bicycle accommodation and ample warning for motor vehicles should be evaluated. In the Smart Transportation Guidebook, Table 9.1. "Traffic Calming Measures Appropriate to Roadway Classifications" provides planning guidance regarding the installation of traffic calming measures.[xviii]

Policies

State Bicycle and Pedestrian Coordinator

The Federal Highway Administration (FHWA) indicates that each state should have a Bicycle and Pedestrian Coordinator "to promote and facilitate the increased use of non-motorized transportation, including developing facilities for the use of pedestrians and bicyclists and public educational, promotional, and safety programs for using such facilities." For Pennsylvania, that person is based out of PennDOT's Bureau of Design, Highway Quality Assurance Division in Harrisburg. The Bicycle and Pedestrian Coordinator position facilitates the following:

- ✓ "Increased use of non-motorized transportation, including developing facilities for the use of pedestrians and bicyclists and public education, promotional and safety program for using such facilities."[xix]
- ✓ Implementation of the goals and objectives set forth in the 2007 PennDOT Bicycle and Pedestrian Plan.
- ✓ Information exchange among public agencies with regards to bicycle and pedestrian travel.

Given this ambitious program, the implementation of this plan may require additional staff resources to achieve the program goals.

Roadway Maintenance and Repairs

Regular maintenance and repair of roadways is an essential activity for locations where there are on-road bicycle facilities. Maintenance activities, which include clearance of obstacles in bicycle lanes, sweeping shoulder areas, clearing overgrown vegetation, and keeping drainage inlets clear, ensure accessible bicycle facilities and, importantly prevent bicyclists from needing to merge into traffic in order to avoid roadside debris and other impediments. A standard and regular repair schedule for roadway surfaces is very critical for corridors with bicycle facilities. Potholes, cracks, and heaved pavement disrupt smooth pavement surfaces and can contribute to loss of control of a bicycle. PennDOT has a number of regular maintenance and repair approaches that it employs. These include:

- **Seal Coat (Tar and Chip)** – A maintenance activity utilized to extend the performance and condition of low traffic volume roads. This activity involves the use of liquid asphalt and fine stones in order to seal the road surface, keep water out, and restore surface friction. Although it is a low-cost highly effective means of maintaining the road surface, this technique is problematic for bicyclists. It was noted by several online survey users as a constraint to bicycle riding on-road. Efforts should be made to clear the shoulders of the treated roadway, as soon as possible after applying the seal coat (tar and chip), to minimize disruption to bicycle travel and the process should be clearly communicated to the public and bicycle organizations in advance and once excess material has been cleared from the roadway and the shoulder.
- **Joint/Crack Sealing** – A maintenance activity used to close joints and prevent water from seeping into paved roadway. When water seeps in the paved surface, it can lead to potholes and breaks in the pavement.
- **Vegetation Management** – A maintenance activity that includes mowing, thinning of trees, and other processes to control encroachment into the roadway and prevent visibility issues. This should include removing overgrown weeds from road shoulders on designated bike routes at regular intervals during growth season.
- **Line Painting** – A maintenance activity to improve visibility of roadway dividing lines and markings.
- **Mechanized and Manual Patching** – A maintenance activity performed both by machines and individual workers to fill in sections of roadways with extensive potholes and cracking. Patching is used to fill in these gaps and restore pavement smoothness.

It is recommended that local municipalities and other responsible organizations in Allegheny County coordinate with PennDOT and the County to identify and set a regular maintenance and repair schedule for roadways with bicycle facilities. The use of seal coat (tar and chip) should be minimized on roadways with high bicycle usage, or the process should be clearly communicated in advance. PennDOT alerts should be distributed to include biking organizations. In addition, localities should look how to integrate these activities into local capital programs with the aim of keeping bicycle facilities on their roadways clear of impediments.

Railroad Crossings

When bicyclists cross over a rail line, bicycle tires may become trapped in the openings adjacent to rail line where they cross roadways (referred to as the flangeway). Bicyclists may also have trouble maintaining friction over surface materials around the flangeway. PennDOT's Statewide Bicycle and Pedestrian Master Plan[xx] emphasizes that bicycle facilities crossing rail lines should ideally be at a 90-degree angle to reduce the potential for the wheels to get trapped. If a crossing cannot be close to 90-degrees, and especially if it cannot be maintained greater the 45-degrees, consideration should be give to providing a wider path so that bicyclists can angle their approach over the rails.

Railroad Crossing on Bower Hill Road in Bridgeville

Recommended bicycle facility treatments that include angling of crossings, signing, and striping are included in the AASHTO Bicycle Guide.

With the presence of many rail lines in Allegheny County, it is recommended that all entities involved with advancing bicycle improvements follow AASHTO guidance and adopt them in locally developed guidelines.

Bikeways on State Highways

To construct a bicycle facility on a state highway, there are two policies to be considered: 1) Procedures for Processing Bikeway Construction Projects, and 2) Bikeway Occupancy Permits.[xxi] The procedures primarily apply to independent bikeway projects, which include the construction of just a bicycle facility[1], and follow a prescribed set of procedures for document submissions and reviews by PennDOT and FHWA. The Bikeway Occupancy Permit is also required for the development of a bicycle facility and is issued by PennDOT. The permit, which is in the form of resolution, includes stipulations for local ordinances addressing enforcement, maintenance, and design of the bikeway. To obtain a permit, the entire route (beginning to end) must be submitted and the local municipality is responsible for the maintenance of the bikeway, including snow removal.

It is recommended that as part of the ongoing development of the bicycle network in Allegheny County, proposed changes that will utilize state highways be grouped to provide a more efficient and comprehensive review. A joint proposal should illustrate the network connections proposed for development and allow for a more informed coordination between project sponsors and PennDOT.

Rumble Strips (Placement and Need)

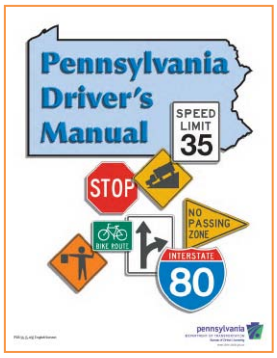
PennDOT's Publication 46, Chapter 11, Section 11.11 establishes the criteria for the use of rumble strips in PennDOT projects. A rumble strip is a pavement treatment that creates noise and vibration in order to alert motorists to changes in travel, such as crossing over shoulders or centerlines, or the need to slow down. Textured or grooved pavement treatments are used for the rumble strips, and they can be placed parallel to travel (e.g., along shoulders or centerlines) or perpendicular to travel (e.g., across travel lanes). Although the strips can provide safety benefits for motorized vehicle travel, when rumble strips are placed on shoulders, they impact the mobility of bicyclists. The vibrations experienced while traveling over the strips can force bicyclists to merge into non-compatible travel lanes and even make bicyclists avoid an otherwise compatible bicycle roadway.

Rumble Strips on SR 837 in West Mifflin

For the future development of the bicycle network, it is recommended that rumble strips not be included on shoulder bicycle facilities unless there is a minimum clear passage of 4' from edge of shoulder strip to edge of pavement or 5' clearance from strip if a curb is present. If these dimensions are not obtainable and rumble strips are necessary, it is recommended that the rumble strip be placed under the shoulder stripe. With this treatment, it is recommended that intermittent gaps in the rumble strip be provided to allow a bicyclist to move off the shoulder when needed (e.g., avoiding obstacles in shoulder, for turning movements, etc.). These recommendations should be integrated into design manuals at the local, county, and state levels.

[1] The other category of bikeway projects is incidental. These are constructed as part of a more comprehensive highway project and are reviewed along with other elements of the project.

Pennsylvania (PA) Department of Motor Vehicles (DMV) – Driver's Manual



The PA DMV driver's manual is applicable to the three (3) legally-recognized types of vehicles in the state: bicycles, motor vehicles, and horse-drawn vehicles. It provides guidance for operations according to the PA Vehicle Code and notes that the rules of the road are applicable to each of these vehicles. Specifically relevant to bicycle interactions with the other vehicle types and rules of the road are: compliance with regulatory signs (e.g., R5-6, 'No Bicycle' where bicycles may not use the roadway), observance of warning signage (e.g., "Share the Road', which is used to warn motorists to provide adequate space for bicyclists to share the roadway), and required behavior for motorists travel in the presence of bicyclists (e.g., allow a longer following distance, do not sound horn in close proximity to bicyclists unless needed, being alert when making turns, etc.). In addition to the existing aspects of the Pennsylvania vehicle code, there has been interest in a 'Safe Passage Law', which requires motorists to allow at least 3' – 4' when passing a bicyclist. There are 16 states that currently have enacted this law and organizations such as BikePGH and PA Walk & Bikes are actively working to have a similar bill considered in Pennsylvania.

It is recommended that partners and stakeholders in ACTIVEALLEGHENY initiate and continue outreach efforts to highlight traffic operations and rules of the road guidance, especially sections relevant to bicycle travel. This could include a regular schedule of announcements and promotions at the county level with support from more locally focused campaigns by municipalities. A goal should be consistency of messages that can reinforced at multiple levels and with various audiences. Furthermore, it is recommended that support be provided for the passing a 'Safe Passage Law' in Pennsylvania.

Pennsylvania (PA) Department of Motor Vehicles (DMV) – Bicycle Driver's Manual

Pennsylvania has developed a driver's manual specifically for bicycles. The manual provides information about recommended bicycle travel behavior, with specific sections addressing: preparations before riding, traveling with motorists along roadways and through intersections, responding to poor driving behavior by motorists, traveling at night or in the rain, and riding with groups of bicyclists. The manual also identifies elements of the PA Vehicle Code that specifically apply to bicyclists. It is recommended that the Bicycle Driver's Manual be excerpted or referenced and included in outreach efforts to increase knowledge of rules of the road and recommended travel behavior for bicyclists and motorists.

Bikes on Bridges

Bridges can present bicyclists with mobility and accessibility issues due to changes in cross-sections from approaching lanes (e.g., narrower lanes, shoulder drops, etc.) to features on the bridge's roadway surface like expansion joints. In many cases, bridges are currently being addressed for reconstruction or rehabilitation, and that presents an opportunity to retrofit the structure with bicycle accommodations. One (1) approach for improving bicycle compatibility across bridges is to re-allocate available roadway space to enable the installation of a bicycle lane or shoulder facility. If space is constrained on the roadway, the addition of a shared use path or the widening of existing sidewalk to accommodate bi-directional bicycle and pedestrian travel should be investigated. For both approaches, it is important to include applicable signing and striping, to thoughtfully address locations where transitions will occur between facilities (e.g., markings shoulder to bicycle lanes, ramps to accommodate on-road to off-road travel, etc.), and to provide lighting, where needed, to improve visibility for roadway users.

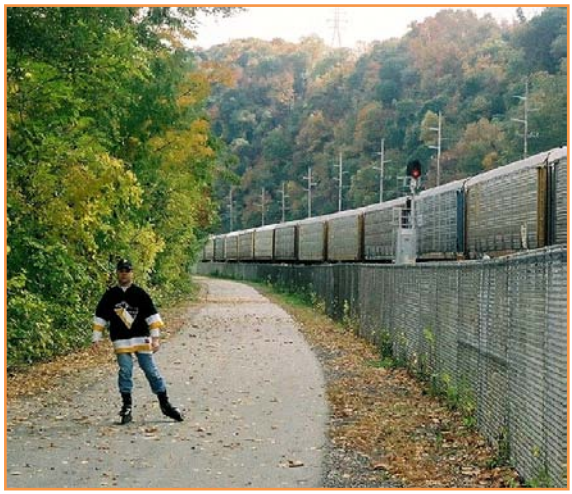
Cyclist on the Roberto Clemente Bridge

Based on AASHTO guidelines, if bicyclists will be operating directly adjacent to railings or barriers, these elements are recommended to be a minimum height of 3.5'. Taller railings are recommended for consideration in locations where there are major changes in vertical or horizontal roadways elements (e.g., sharp curves, steep hills, etc.). Local emphasis relative to bicycles on bridges has been focused on bicycle friendly accommodations including compatible bridge scuppers/grates and expansion joint design, and bicycle lane striping in the vicinity of ramps (e.g., Birmingham Bridge).

Bikes on Busways

Busways are exclusive rapid transit rights-of-way provided for bus travel. Busways in Allegheny County and other urbanized areas are designed to be higher speed and high capacity public transportation facilities and are not designed for bicycle traffic. Port Authority's three busways link outlying areas in the South, West and East to downtown Pittsburgh and Oakland.

East Busway



In-line skater on Baldwin Borough Trail (CSX)

Another arrangement, with active railroad lines and bicyclists in close proximity, is rails-with-trails. This approach features the development of a bicycle and pedestrian shared use path adjacent to an active railroad line or rapid transit line. The *AASHTO Guide for the Development of Bicycle Facilities* and the Rails-to-Trails Conservancy[xxii] both provide guidance and lessons learned on the practice of rails-with-trails. Pittsburgh has two examples of active freight railroad lines with adjacent trails. The North Shore and Millvale trails are located along the Norfolk Southern's Conemaugh Line. The Station Square, South Side and Baldwin Borough trails are located next to CSX Transportation's Pittsburgh Subdivision.

Although some bicyclists desire to use the busways as commuter routes, Port Authority policy does not allow bicycles on busways due to design, safety liability and operational issues. Additionally, there is not sufficient right-of-way in the busway corridors to allow placement of bicycle lanes adjacent to any of the three busways. However, establishment of bike lanes on streets near the busways can be explored. As more buses become equipped with bicycle racks, it becomes increasingly feasible for bicyclists to take advantage of the rapid service offered by buses on busways to get to downtown Pittsburgh, Oakland and other destinations in Allegheny County.

Lighting on Road for Bicycles

On roadways, street lights are mostly provided to assist motorists. These lights, which are typically set 25' to 30' above the road, may provide adequate illumination for motorists to see the roadway, but for bicyclists, typical street lights may not provide the best visibility. *BIKESAFE*[xxiii], a publication by FHWA, provides strategies to improve lighting on road for bicyclists.

Bike Lanes and On-Street Parking (Parallel and Angled)

Bicycle lanes are recommended to be a minimum of 5' wide, which is the preferred operating width of cyclists as noted in the AASHTO Bicycle Guide. In the presence of on-street parking, bicycle lanes are recommended to be 6' to 7' wide, with the wider option used in locations with a high rate of parking turnover. The additional width is recommended to allow bicycles room to maneuver and respond to motorists behavior during parking or while parked.

In the case of parallel parking, a common hazard for bicyclists is being 'doored'. Dooring occurs when a motorist opens the door of their parked vehicle and strikes a traveling bicyclist. Dooring can seriously injure a bicyclist. Dooring incidents can potentially be reduced by installing striping and pavement markings, such as the bicycle lane symbol further to the left in a lane and using parking stall 'T' stripe that extends into the bicycle lane.

Bicycle Lanes adjacent to parallel parking in New York City
Photo: nycbikemaps.com

Angled parking can pose a different kind of hazard to bicyclists. It is not recommended that bicycle lanes be striped adjacent to front-in angled parking due the restricted visibility of motorists as they back out of spaces. An approach that can be utilized in locations where proposed bicycle lanes are adjacent to angled parking is back-in angled parking. This approach leads to improved sight distances and access to rear of vehicles outside of travel lanes.[xxiv]

When bicycle lanes are proposed for locations with on-street parking, it is recommended that they be provided at a width of 6' to 7'. In locations where a bicycle facility is proposed adjacent to angled parking, a study exploring back-in angled parking should be performed.

Bicyclists using Stop Signs as Yield Signs

Bicycling requires physical efforts and most bicyclists prefer to maintain a level of momentum while traveling. Routes where bicyclists have to continually stop and start again can serve as an impediment to bicycle travel. To this end, there has been recent interest in a legal change that would allow bicyclists to treat stop signs as yield signs under specific conditions. This would mean that cyclists would still have to slowly approach the stop sign, but if the intersection is clear of vehicles, the bicyclist could proceed without stopping. A law to this effect has been legal in Idaho[xxv] since the 1980's and has recently been considered in Oregon and California.

The PA Vehicle Code does not allow bicyclists to treat stop signs as yield signs. It is recommended that Allegheny County and its municipalities monitor this law and studies of its results on bicycle travel and crashes. There is merit to this proposal given the travel preferences of bicyclists, but it will likely have impacts on vehicle operations so it should be continued to be studied. Topography in Allegheny County should be a prime consideration when deciding if this type of change could be safe for bikes and motorized vehicle in this area.

Programs

B-Cycle Automated Rental Kiosk in Denver, Colorado
Photo: votewithyourfeetchicago.blogspot.com

Bike Sharing and Rental Stations

Programs to support bicycle sharing and rentals have been growing both nationally and internationally. Examples of popular programs such as the 'Velib' in Paris, France, which has deployed 20,000 bicycles and over 1,600 stations throughout the city. Another is the SmartBike DC (www.smartbikedc.com) program[xxvi] in Washington D.C., a public-private collaboration between Clear Channel Outdoor and the District Department of Transportation with over approximately 100 bikes at ten (10) stations. Bike rental stations can be either full-service or self-service, with many recent programs using a self-service approach. Bicycles are placed in locked racks which release a bike once the rental payment is made. The bicycle can then be returned at the original location or at other stations at

different locations. The bike rental station can work well with transit to provide a non-motorized connection at the end of a transit trip.

Bike sharing and bike rental programs should be considered for downtown Pittsburgh, Oakland, and other town center in Allegheny County, especially those near existing bicycle and shared use facilities. There are bicycle rental facilities at the end of the Eliza Furnace Trail (across from the First Avenue LRT Station) and at Station Square along the South Side Trail. Also of note, The Friends of the Riverfront currently have a bicycle loan program on some of their trails near downtown Pittsburgh.

Cyclovia

Cyclovias are events where a street or a set of streets are shut down to motorized traffic for a certain period of time and are made available for non-motorized use. Cyclovia, or ciclovía in Spanish, started in Columbia[xxvii] where streets were closed to cars and opened for bicyclists, pedestrians, skaters, and various other individuals. The Cyclovia becomes a celebrated event and brings diverse members of the community out to interact around active living. This commonly occurs on Sunday afternoons, but many options could be explored.

Pittsburgh BikeFest Poster
Source: BikePGH

The cyclovia movement has come to North America and several locations now host cyclovias, sometimes under different names such as 'Sunday Streets' (San Francisco), 'Sunday Parkways' (Portland, Oregon, and Summer Streets ('New York, New York). These events provide car free space for people to experiment with bicycle tripmaking, take recreational rides, and have space where parents may feel comfortable having children and teenagers learn how to ride on-street.

Car Free Fridays Poster
Source: BikePGH

As partners in the ACTIVEALLEGHENY look to encourage more bicycling, a program of cyclovia events could be scheduled to provide opportunities and support for bicycle riders, especially casual riders who are looking to become more comfortable on bikes. These events could also be coordinated with Car Free Fridays and the annual BikeFest that are sponsored by BikePGH. Each month, Car Free Fridays highlights a different neighborhood or municipality in our region to promote active transportation. It's a great chance to learn about the neighborhood, check out the business district, and figure out how to travel car free.

A strategic program of rotating Cyclovia opportunities each Sunday, spring through fall, (especially on scenic routes such as Grandview Avenue in Mt. Washington, Bigelow Boulevard from Downtown to Oakland, etc.), with each road closed one Sunday afternoon per year, could become a major amenity/attraction for our region.

Bicycle to Work Month

May is bicycle to work month[xxviii], and the annual bike to work day is usually scheduled for the third Thursday of the month. Bike to work month provides a tremendous opportunity to focus efforts and promote bicycle commuting both due to the extra attention given to bicycling at this time of year and the support that bicyclists have as more people ride to work. SPC, BikePGH, and other local groups participate in and promote bike to work week in Allegheny County. This activity helps to raise awareness which ultimately helps to increase safety for all roadway users.

Bicycle Ambassador

The Bicycle Ambassador Program is a method of providing person-to-person outreach regarding bicycle travel to a community. Comprised of experienced and trained bicyclists, the ambassadors perform educational and encouragement activities to assist with route planning for bicycle trips. This increases knowledge of rules-of-the-road for newer bicycle commuters and motorists and assists in gathering feedback for needed bicycle facility improvements. In some cases, bicycle ambassadors are paid staff, but more often they are volunteers who want to be a resource for bicyclists in their community, especially to those who are newly exploring bicycle travel.

Bicycle Ambassadors in Philadelphia
Photo: Bicycle Coalition of Philadelphia

Cities like Chicago[xxix], Philadelphia[xxx], and Minneapolis/St.Paul[xxxi] have successful bicycle ambassador programs. The ambassadors attend community events, reach out to schools, and are frequently just present in neighborhoods or high bicycle traffic locations as an available resource. Chicago's program also has a junior ambassador element where teenagers are trained through a 10-week course. Those individuals are then able to provide outreach to fellow teenagers and other young riders about recommended bicycle travel behavior.

A bicycle ambassador program for Allegheny County can be explored. In cooperation with local municipalities and organization like BikePGH, the County, the City, and others, ambassador teams could provide assistance in various locations or employment centers. This could increase the amount of outreach being provided to both adults and children. The Bike Pool Program, offered through the CommuteInfo Program and BikePGH, offers a Bike Mentor Program for new bicycle riders.

Bicycle Commuter Incentives

There are approaches to incentivize bicycle commuting that are used on a national level as well as by many states. The Internal Revenue Service (IRS) allows a monthly tax credit of up to $20 that can be applied to the maintenance and purchase of bicycle equipment. Many states offer Guaranteed Ride Home Programs (GRH) through commuter organizations such as Transportation Management Associations. The GRH assists bicyclists, as well as other commuters without access to a personal motor vehicle, with a ride home in response to emergencies. In our region, SPC provides this service. Employers can provide incentives for bicycling commuting as well. Such incentives are: pre-tax deductions for bicycle commuting expenses, parking cash-out to provide bicyclists a cash equivalent for not using subsidized parking, and shower and changing facilities at employment locations.


Bethesda's 2009 Bicycle Commuter Spirit Awards

In conjunction with the regional Bike to Work Day to be held Friday, May 15, 2009, Bethesda Transportation Solutions is sponsoring the *Bicycle Commuter Spirit Awards.* The awards recognize downtown Bethesda employees who are dedicated to biking to work.

Bike to Work Day 2009

We need your help in finding two commuters devoted to two-wheeled bicycle transportation. The first award is for the Most Committed Bicycle Commuter, an employee who bikes to work on a consistent basis. The second award is for the Longest Distance Commuted by Bicycle – for that dedicated bike commuter who goes the distance!

Nominate a co-worker or yourself. The deadline for nominations is Friday, April 17, 2009. Awards will be distributed during Bethesda's Bike to Work Day pit stop event on Friday, May 15, 2009 between 6:30-8:30am at Reed Street (corner of Woodmont and Bethesda Avenues).

It is recommended that local municipalities, Allegheny County, and other agencies explore the possibility of implementing bicycle commute incentives in places of employment. As a first step, these incentives would provide the foundation for encouraging the use of bicycle commute incentives at private employment locations. Promotion of existing programs, such as the GRH (guaranteed ride home), can help those interested in commuting by bicycle understand the support and incentive system available to them. In Western Pennsylvania, SPC has a ridesharing program, CommuteInfo (www.commuterinfo.org), for employers which offer rides home for cyclists under certain conditions.

Bike Friendly Employer

BikePGH's Bike Friendly Employer program works with local employers to help them assess how well they are meeting the needs of their bicycling employees. By demonstrating a supportive work culture and securing facilities that support the decision to bike to work, employers play a crucial role in advancing bicycling as a desirable mode of transportation.

BikePGH's Bike Friendly Employer Logo
Source: BikePGH

To get started employers are provided with a questionnaire that informs them about the elements and resources that should be in place. The questionnaire is also used to evaluate how well the employer is doing. BikePGH follows each completed questionnaire up with a phone call to discuss whether or not the organization is meeting the basic bike friendly requirements. Following the conversation BikePGH provides the employer with an evaluation known as a Bicycle Action Plan. BikePGH then directly supports the organizations in meeting their goals.

Employers are encouraged to apply to the League of American Bicyclist for recognition nationally as a *Bike Friendly Business*. By encouraging local employers to achieve this recognition, it sends a strong message about the priorities of the region. By empowering businesses to create a bike friendly culture at the workplace, the Bike Friendly Employer program supports organizations in their ability to have a positive impact on their employees and directly address the quality of life in the region.

2.5 EDUCATION, ENFORCEMENT & PUBLIC AWARENESS

Education of bicyclists and motorists, and enforcement of traffic laws and statues are important to supporting travel on a bicycle network. To properly plan for future growth of bicycle use, it is key to implement educational programs that encourage lawful and recommended practices among bicyclists and motorists. When educating a community, it is important to dispel myths, encourage behavior that follows the rules of the road, and enhance awareness. By utilizing the resources of the local police, schools, and libraries, education programs have the potential to reach a broader audience and cross-section of the community. In addition, Pennsylvania has the benefit of having an official Bicycle Driver's Manual.

The following four (4) primary groups should be educated about bicycle safety and awareness:

1. Young bicyclists
2. Parents of young bicyclists
3. Adult bicyclists
4. Motorists

Educational materials regarding recommended bicycle travel practices and behavior can be accessed at the following locations:

- BikePGH: http://bike-pgh.org/
- PennDOT, PACommutes: http://www.pacommutes.com/biking/
- USDOT, FHWA: http://safety.fhwa.dot.gov/ped_bike/ and http://www.bicyclinginfo.org
- Association of Pedestrian and Bicycle Professionals: http://www.apbp.org
- AAA: http://www.aaacentral.com/community/safety/index.jsp

The key to encouraging a safe and well-traveled transportation system is an enforcement program for traffic regulations applied to all roadway users: motorists, bicyclists, and pedestrians. Allegheny County and its municipalities can reduce poor travel behavior and encourage beneficial travel habits through enforcement. This process includes review of current local ordinances and traffic regulations to identify elements that may unnecessarily affect certain roadway users, such as bicyclists. As bicycle lanes and other designated bicycle facilities are installed, it is recommended that local ordinances and regulations be developed, or revised, to clarify items such as: application of vehicle laws to bicyclists, permitted movements on and across bicycle facilities (e.g. permitted motor vehicle movements across bicycle lanes), bicycling on sidewalks, and bicycle parking requirements.

Possible vehicle code references include the California Vehicle Code, Division 11, Chapter 1 (http://www.dmv.ca.gov/pubs/vctop/vc/vctoc.htm), the Pennsylvania Consolidated Statutes, Title 75, Chapter 35 (http://www.dot.state.pa.us/bike/web/bikelaws.htm) and the City of Cambridge, MA Traffic regulations Article XII (http://www.cambridgema.gov/cdd/et/bike/bike_reg.html). In addition, a review of enforcement regulations and practices may assist in identifying opportunities to partner with community, county, or state organizations to inform users about safe bicycle travel behavior, such as the use of helmets by bicyclists. Outreach and promotion through community channels and events is a critical piece in reminding all roadway users of existing laws and recommended travel practices.

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