

# Bicycle Master Plan

Department of Planning – March 2006

City of Baltimore

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## SECTION I. EXECUTIVE SUMMARY

The Bicycle Master Plan was initiated by the Mayor's Bicycle Advisory Committee on behalf of the bicycling community to promote and facilitate bicycling as a safe, convenient and comfortable form of transportation and recreation in Baltimore. A plan to coordinate the formal integration of bicycles in our existing infrastructure is necessary to improve safety and create a multi-modal transportation system friendly to the citizens of Baltimore.

Baltimore has a great potential to be a city where thousands of people ride bicycles everyday: there is a high level of residential development within two to three miles of the central business district; shared use paths along the Gwynns Falls and Jones Falls bisect the city from east to west and north to south; Baltimore has a large population of residents that do not own cars; and the city's system of parks and connecting parkways developed by the Olmsted Brothers is highly conducive to bicycle riding.

The design and implementation of this plan supports broad city-wide goals including enhanced safety for city residents, opportunities for youth, healthy neighborhoods, and strengthening Baltimore's economy. The increased presence of bicyclists contributes to public safety with more eyes on the street. Bicycling is a great way for urban residents with busy lives to combine healthy exercise with daily travel. Accommodating future population growth typically means more automobiles, congestion and increased pollution. Providing a safe and convenient bicycle transportation system can help reduce the number of motor vehicles on city streets and the need for additional parking.

This plan also complies with the strategic plan of Baltimore's Department of Transportation that calls for a "comprehensive and modern transportation system that integrates all modes of travel and provides mobility and accessibility in a convenient, safe and cost-effective manner."<sup>1</sup>

The current Bicycle Master Plan (BMP) is the third major effort undertaken by the City to make bicycling safer and more enjoyable. Formal bicycle planning in Baltimore dates back to 1978 when the Baltimore Department of Planning prepared the Baltimore Bikeways development plan. That plan used existing bicycling counts and did not assume increased bicycling upon provision of facilities. As a result, a conservative plan with three bicycle routes was proposed and adopted. In 1993, the Planning Department staff created an update to the plan, but it was never formally adopted.

The BMP is distinct from the previous efforts. The BMP seeks to make Baltimore bicycle friendly and increase bicycling by constructing a comprehensive network and making policy and procedure adjustments within city government. It assumes low bicycling rates are due to poor infrastructure and a lack of accommodations. The BMP identifies gaps in the system and recommends needed capital and operating investments to address these gaps. This plan also emphasizes safety, education and encouragement programs as key components for successful implementation.

This plan will guide Baltimore City in creating a lasting bicycle transportation program, by:

- mapping out an integrated on-street and off-street bikeway network,
- addressing bicycle parking and inter-modal bike/transit integration,
- stressing safety education for motorists, bicyclists and youths,

- providing an action plan for encouragement and enforcement,
- recommending transportation and development policy and program changes,
- describing new bicycle facilities designs,
- and detailing new roadway and trail maintenance management practices.

Over the next three years, an aggressive program of on-street bicycle transportation improvements will create a network an Introductory Network of bicycle facilities setting Baltimore on the right course for the 21st Century (see page x, Map A). Baltimore's bicycle network will connect all of our neighborhoods to recreation, employment and activity centers within the city and to existing and planned bicycle facilities throughout the Baltimore region and along the proposed East Coast Greenway. Implementation of this program has already started incorporating new bike routes in Baltimore's capital improvements program and integrating bike lanes for road and bridge projects currently under design.

## **BENEFITS OF BICYCLING**

Encouraging greater bicycle travel in Baltimore will bring many benefits to residents and visitors alike. These benefits are summarized below.

### *Traffic Relief*

Increased bicycle travel will reduce the number of motor vehicles on Baltimore roadways, easing congestion and on-street parking demand.

### *Environmental Benefits*

A primary source of air pollution in the Baltimore metropolitan region is auto emissions.<sup>1</sup> Motor vehicles are also a source of pollution for the Chesapeake Bay and Baltimore's tributaries. For short- and medium-distance trips, substituting the bicycle for the auto will reduce the amount of air pollutants washing into our waterways.

**Baltimore and its surrounding metropolitan region are classified as a severe non-attainment area for ground level ozone by the U.S. Environmental Protection Agency. Cycling 8 miles prevents 15 lbs. of air pollutants from contaminating the air. Bike travel already reduces automotive pollution by 1 percent nationally and saves an estimated 700 million gallons of fuel annually.**

### *Economic Benefits*

In the region, thirty-five percent of household income is spent on housing. After housing, motor vehicles are the second-highest household expense for Baltimore families. Regular bicycling, complemented by the existing transportation options in Baltimore, can allow a single person to live without a car or a two-car family to give up a second car (typically a \$6,000 to \$7,000 annual expense).<sup>2</sup> The recent and continued appreciation of housing values makes these numbers very conservative. Bicycling for transportation can improve the mobility of some of the 326,000 Baltimore residents who do not have access to a car.

**Approximately 50% of Baltimore residents live in a household where they do not have access to a motor vehicle.**

<sup>1</sup> Maryland Department on the Environment reports that 30-40 percent of the pollution that causes ground level ozone comes from motor vehicle use, [http://www.mde.state.md.us/air/air\\_quality/index.asp](http://www.mde.state.md.us/air/air_quality/index.asp).

<sup>2</sup> Based on calculations from *Making Housing Affordable by Reducing Second-Car Ownership*, Patrick H. Hare, 1995. Adjusted for inflation and today's gas prices.

Bicycling can help bring tourist dollars into the city. Active vacations are one of the fastest growing sectors of the tourist industry. Bicycling also allows tourists to travel more quickly between sites and enables neighborhoods around downtown to attract visitors and tap into the spending power of the 45 million tourists who come to Baltimore.

### *Health Benefits*

Increased levels of bicycling will improve the health of Baltimore residents. Biking to the store, school or work provides a time-efficient, low-cost way of attaining the U.S. Surgeon General's recommended daily allowance of physical activity. Bicycle exercise can help reduce heart disease, diabetes, obesity and other chronic illnesses, which are not uncommon in Baltimore.

## **HISTORY OF BICYCLING IN BALTIMORE**

Bicycling has long been a part of the culture of Baltimore. In the late 19<sup>th</sup> Century and early 20<sup>th</sup> Century, Baltimore was at the forefront of the *Great American Bicycling Craze* that spread through the East Coast and the nation. In the early 1900's, *Mrs. William H. Row* reflected on her husband's life of bicycling through the turn of the century, "...back in the [18]90's Baltimore was bike crazy. There were hundreds of 'wheels' on the streets. There were a score of cycling clubs and every Sunday there were outings and races and endurance tests. There were even elaborate tracks for professional racing, and the top riders made headlines on the sports pages."<sup>3</sup>

Another report estimated that by 1916 Baltimore had 80 or 90 bicycle shops, many started by enthusiasts who gave up other professions to live and breathe their favorite sport.

### *1930's & '40s*

In the late 1930's Baltimore experienced its first bicycling revival. In July 1938, the *Evening Sun* reported, "Cycle riding comes back with a bang, bang here. Thousands taking up sport as city ropes off spaces in parks—rental agents report business is booming."

The automobile had taken over the roads in the 1920's and 30's, so this revival saw crash rates soar, especially among the thousands of kids that were riding bikes to school. To address this issue the Police Department, Safety Council, teachers, school officials and students partnered to undertake an education and enforcement campaign. Largely a student initiative, Hamilton Junior High initiated a program that was spread to schools throughout the city. Program activities included bicycle inspections, formulation of safe riding rules, a safety pledge campaign, and organization of a Cycle Safety Club with a membership card and license tag for student bicycles. A student safety scout force patrolled the schools and neighborhoods and issue tickets to rule violators, and a student court meted out justice.

### *The 1970's and the Oil Crisis*

After another decline, cycling came back again in the 1970's. At this time, city promoters started an annual 12-mile historic bicycle tour along the inner harbor and bike commuters started clamoring for a plan to improve conditions on roadways and promote the clean and energy-efficient mode of travel. Three new bike routes were established: 1) Roland Avenue, 2) the Herring Run Trail, and 3) Rogers/Ken Oak/Cross Country Blvd./Kelly Ave. and a bicycle lane was created on the ring road around Lake Montebello. But for a variety of reasons, only a portion of previous plans were carried out and the few bikeways created had little impact on changing overall bicycling conditions.

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<sup>3</sup> *I Remember When Cyclists Were Headliners*, Mrs. William H. Rowe, Enoch Pratt Free Library, Maryland Room

## **BICYCLING TODAY**

### **Who Bicycles in Baltimore?**

Information gathered in the survey and based on observation suggests that bicyclists using the streets today might be categorized in the following groups:

- Hearty bicycle commuters.
- Regular fitness and recreational riders.
- Inner city dwellers who, for social, political or economic reasons, live without a car and use a bicycle as one among multiple transportation alternatives.
- People who occasionally use a bicycle for utilitarian transportation, typically on short, bicycle-friendly routes. Trip purposes might include visiting a park, going to the library, running errands, shopping, visiting friends, etc.

### **Why Baltimoreans Bicycle**

Baltimore is experiencing resurgent interest in bicycling. The increasing sense of safety, influx of new residents with new attitudes about transportation, the enticement to bicycle provided by the trail system, and swiftly increasing gas prices are primary forces behind this resurgence. Ongoing factors include low car ownership rates, the need for close to home recreation and fitness, residents' devotion to Baltimore's great parks, which have retained their popularity for recreational biking, and the number and variety of bicycle events held annually.

Bicycle events staged in Baltimore draw large numbers of people. The 8<sup>th</sup> annual JFX Celebration which hosts a ride on a section of the Jones Falls Expressway, closed to motor vehicle traffic for the event, attracted 4,000 riders in 2005. No less than seven major bicycle rides take place on city streets and trails annually

This interest is translating into increased demands upon City Government to improve bicycling conditions. In 1997, the Mayor's Bicycle Advisory Committee was formed through citizen request. To kick off this plan, more than 100 bicyclists and advocates attended the first public meeting, on a cold winter evening in January 2005.

### **Why Baltimoreans Don't Bicycle**

Bicycling on Baltimore's arterial streets and roadways is largely for the brave at heart. Many cyclists are not comfortable in Baltimore traffic and are discouraged by the lack of dedicated space provided in the roadways. Others often find pavement conditions unsafe, street drainage grates a danger, or have difficulty finding a secure place to park their bike. Additionally, drivers in Baltimore have been observed by cyclists as hostile to their presence on the roads. One Baltimore resident summed up the situation this way, "traffic is too heavy, the pavement is too rough, and there is no space for bikes."

Conditions such as these not only limit bicycling's ability to grow in overall popularity, but create a significant disincentive for residents to choose the bicycle for recreation, commuting or other utilitarian trips.

## Bicycle Commuting

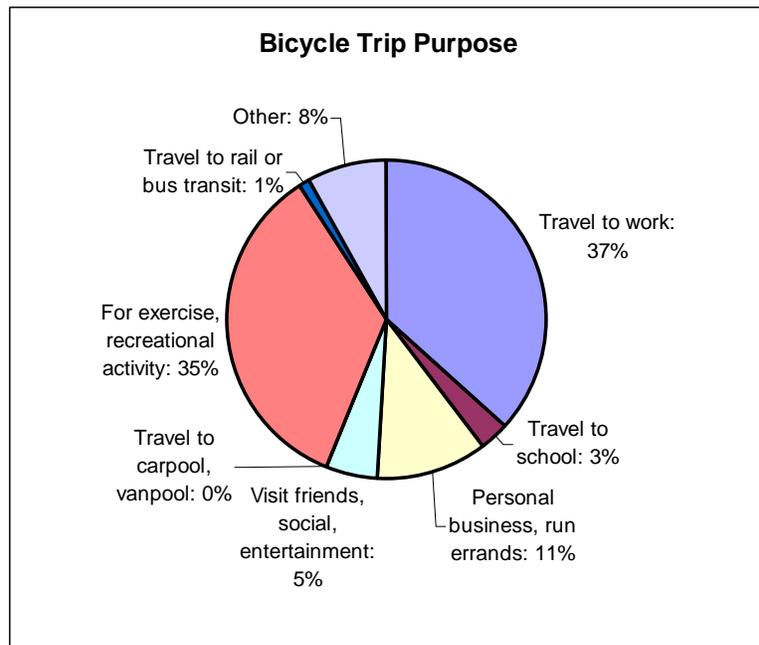
Table 1 shows that Baltimore bike commuting rates are far lower than comparable east coast cities such as Washington, DC, Philadelphia, and New York City. However, they are higher than mid-western industrial cities with a similar social and demographic history, such as Cincinnati and Detroit.

Fifty-nine percent of those responding to a survey conducted as a part of this planning process, reported that their last bicycle trip was for a non-commuting purpose such as for exercise, recreation, visiting friends, or personal business (see *Figure 1*).

Moreover, according to *Journey to Work* data, gathered as part of the 2000 U.S. Census, only 0.33 percent of employed Baltimore residents use the bicycle as their most common form of travel to work. While this data does not include the many non-work trips people make by bike, and is collected in such a way that usually results in an undercount of bike commuting, it still points to low bike commuting rates, as well as low bike use for all transportation purposes.<sup>5</sup>

**Table 1. Bicycle Commuting in Selected U.S. Cities<sup>4</sup>**

City	Bicycle Mode Share
Madison, WI	3.19%
San Francisco, CA	1.98%
Seattle, WA	1.88%
Washington, DC	1.16%
Philadelphia, PA	0.86%
New York, NY	0.47%
St. Louis, MO	0.35%
<b>Baltimore, MD</b>	<b>0.33%</b>
Cincinnati, OH	0.19%
Detroit, MI	0.16%
Nationwide Average (includes suburban and rural areas)	0.38%



<sup>4</sup> U.S. Census Bureau. State and County Quickfacts, Online: [http://factfinder.census.gov/servlet/DTGeoSearchByListServlet?ds\\_name=DEC\\_2000\\_SF3\\_U&\\_lang=en&\\_ts=93199688005](http://factfinder.census.gov/servlet/DTGeoSearchByListServlet?ds_name=DEC_2000_SF3_U&_lang=en&_ts=93199688005), 2004.

<sup>5</sup> This number does not include trips made by the following people: those 15 and under, those who are unemployed or underemployed, those who sometimes bike to work but not regularly, and those who use bicycles for non-work trips. Moreover, it is based solely on reported travel patterns for a single week long period in March.

## POTENTIAL FOR INCREASED BICYCLING

Despite less than ideal roadway conditions, Baltimore has tremendous potential for higher levels of bicycling.

### Street Network and Urban Design

The street network and housing stock is designed to support significant population densities and many neighborhoods are developed on pre-WWII land use patterns, meaning that residential uses are mixed with neighborhood retail, employment, and other activities, significantly increasing the amount of urban travel that involves short trips, for which the bicycle is most effective.

There are 411,600 jobs in Baltimore and many are located in or near the relatively small and centrally located downtown.<sup>6</sup> Others are at major institutional campuses spread throughout the city such as hospitals and medical centers, universities, industrial parks and government office complexes. Almost all of these locations are easily accessible by bicycle.

Baltimore has growing residential neighborhoods in and around the downtown core, putting many residents within 2-3 miles of downtown jobs. For many people in the close-in neighborhoods, trips to the downtown area are too far for walking and inconvenient to make with a car due to traffic congestion and parking costs. Buses are slowed by congested surface traffic and the rail transit lines serve only limited corridors. Thus, bicycling is often the fastest way to travel to and through downtown.

### City Demographics

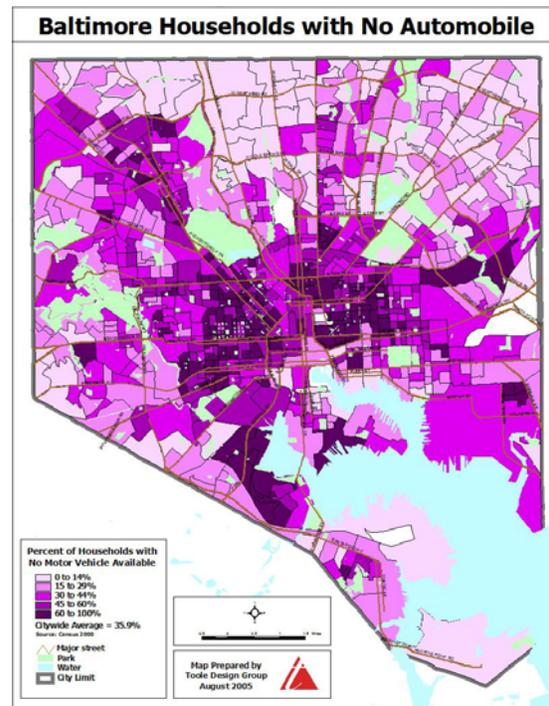
Carless households hold great potential for increased bicycle ridership in the City. Approximately 325,788 Baltimore residents live in households without an automobile or are too young for a driver's license.<sup>7</sup> Moreover, carless households predominate in a number of neighborhoods that are within 2 miles of the Central Business District (see *Figure 2*).

Bicycling is an inexpensive mode of transportation that can enable low-income people to find and keep jobs, access health care services, and take advantage of shopping, education, and recreational opportunities.

### Development Opportunities

With new residential and commercial development occurring throughout the city, the high tech job supply increasing, and strong neighborhoods to build on, there is great potential to increase bicycle use for commuting, other transportation needs and recreation.

To increase usage of bicycles for transportation and improve safety, clear goals and objectives need to be established.



<sup>6</sup> Bureau of Economic Analysis, 2004.

<sup>7</sup> U.S. Census Bureau. State and County Quickfacts, Online:

[http://factfinder.census.gov/servlet/DTGeoSearchByListServlet?ds\\_name=DEC\\_2000\\_SF3\\_U&lang=en&ts93199688005](http://factfinder.census.gov/servlet/DTGeoSearchByListServlet?ds_name=DEC_2000_SF3_U&lang=en&ts93199688005), 2004.

## SUMMARY OF GOALS AND OBJECTIVES

*Mission: To promote and facilitate bicycling as a safe, convenient and comfortable form of transportation and recreation*

### **Goal 1: Develop a comprehensive network of facilities for bicycles.**

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#### **Objective 1: Make bicycling safe and inviting on the streets of Baltimore.**

- Implement proposed bicycle route network (see Map A on page x for Introductory Network).
- Improve continuity of on-street network by overcoming negative impact of existing barriers (see Appendix A and B for lists of intersections and small connector paths).
- Consider the adopted bicycle route network in prioritizing street resurfacing, reconstruction, and streetscape projects.
- Coordinate planning, design, and implementation of bicycle facilities with other city plans.
- Coordinate planning, design, and implementation of bicycle improvements near the City line with Baltimore County, Anne Arundel County and the Baltimore Metropolitan Council.

#### **Objective 2: Increase the availability of bicycle parking and support facilities at destinations across the city.**

- Launch a bicycle parking initiative.
- Require new development to provide bicycle parking.
- Improve bicycle parking at transit stations in support of a multi-modal transit system (for list of existing facilities and preliminary needs assessment, see Appendix C).
- Develop bicycle commuting/rental centers to provide focal points for bicycle transportation services and promotion.

#### **Objective 3: Fully integrate bicycling with all public transit facilities and services.**

- Work with the Maryland Transit Administration (MTA) to accommodate bicycles on all public transit in support of a multi-modal transit system.
- Explore the potential for bicycle accommodations on the water taxi.

#### **Objective 4: Develop off-road paths to create a connected trail system.**

- Complete ongoing trail development.
- Develop new and extend existing trails (for a list of potential trails and extensions, see Appendix D).
- Improve access to trails.

## **Goal 2: Implement safety, education and encouragement programs to increase bicycle usage.**

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### **Objective 1: Improve enforcement of traffic laws related to bicycling.**

- Develop partnership with the Baltimore City Traffic Safety Coalition, Department of Transportation Safety Division, Baltimore City Police Department, and the Mayor's Bicycle Advisory Committee to identify and address bicycle-vehicle safety measures through enforcement and new or amended laws.
- Provide training for Baltimore police officers regarding bicycle safety laws and issues faced by on-street bicyclists.
- Identify the most common conflicting movements between bicycle and vehicle users and determine enforcement mechanisms to mitigate these conflicts.
- Develop an amendment for the law restricting bicycle riding on sidewalks and the park rule restricting bicycle riding on park paths.

### **Objective 2: Educate the public (motorists, bicyclist, and pedestrians) about bicycle and vehicle operation in urban traffic conditions.**

- Educate motorists and bicyclists about mutual rights and responsibilities (suggested programs listed in Appendix E).
- Educate future motorists, bicyclists and pedestrians about safe travel behavior and vehicle operation.
- Create and implement Safe Routes to School program.

### **Objective 3: Encourage increased bicycling by promoting health, recreation, transportation, and tourist opportunities.**

- Establish partnerships with health organizations to promote bicycling as healthy transportation.
- Promote bicycling for commuting, errands, socializing, and exercising (for potential programs, see Appendix E).
- Develop and market a City of Baltimore Bicycle Map.
- Partner with Baltimore Area Convention and Visitors Association and the Baltimore Office of Promotion and the Arts to promote bicycle opportunities.
- Begin a bicycle data collection program.

**Goal 3: Institute policies that support implementation of Bike Master Plan goals and objectives with community support and input.**

**Objective 1: Create structure to implement the Bike Plan goals and objectives.**

- Create a Bicycle Coordinator position in the Department of Transportation to implement the Bike Master Plan.
- Support Mayor's Bicycle Advisory Committee (MBAC).
- Review and update the Bicycle Master Plan every 6 years.

**Objective 2: Institute new policies and procedures in the Departments of Transportation and Planning to support Bike Master Plan goals.**

- Utilize the following resources to guide bicycle facility design and application in the Department of Transportation and other agencies: 1) Map C—Preliminary Facility Types, 2) the Bicycle Facility Design Toolkit, 3) nationally recognized and accepted bicycle facility design guides (see Appendix F), and 4) Section III of this plan.
- Provide sufficient funding through the Capital Improvement Program (CIP) for implementation of independent bicycle improvement projects identified in this plan.
- Build internal capacity to design and implement bicycle facilities by providing ongoing training for city staff.
- Adopt policy requiring new development to mitigate traffic impact by providing bicycle facilities or contributing to a fund which is dedicated for bicycle facilities and improvements.

**Objective 3: Update street and trail repair and maintenance practices to ensure bicyclists safety and comfort.**

- Develop procedures for maintaining public bicycle facilities.
- Establish bicycle related improvement request system through Baltimore 311 call center and website.
- Update specifications for routine and emergency street resurfacing and repair to ensure safe traveling routes and surfaces for bicyclists.

## SECTION II. EXISTING CONDITIONS AND PROGRAMS

Prior to developing the plan goals and objectives, an analysis of bicycling conditions throughout the City was undertaken. The findings are organized around two topics: 1) existing bicycling conditions on city streets, transportation infrastructure and in other public spaces and 2) existing city programs that address issues affecting and related to bicycling.

### TRANSPORTATION INFRASTRUCTURE

Baltimore has a mix of areas that are both difficult and delightful for bicycling. Downtown Baltimore, most of the central core and most arterial roads are avoided by many cyclists due to heavy traffic, narrow lanes and poor pavement conditions. However, the stream valley trails, park roads, parkways and residential streets, can be favorites for cyclists of all abilities.

Temporal variables affect the bicycle-friendly nature of some streets making them alternately good and bad depending on the time of day, day of the week and/or season of the year. There are many streets that recreational riders report as favorites when used on Saturday or Sunday, but commuters report as “avoid at all cost” during weekday morning or evening rush hours. Other streets vary based on the location of each segment. Charles and St. Paul streets are good examples of thoroughfares that are much more bicycle-friendly along the sections that are in the Charles Village and Guilford neighborhoods as opposed to sections in Mt. Vernon and downtown.

#### *Summary of Existing Facilities and Services*

Baltimore’s two best and most loved bicycle facilities are the Gwynns Falls and Jones Falls trails. The Gwynns Falls Trail is complete along a 14-mile stretch and will eventually connect to the Park and Ride lot at I-70 to the Inner Harbor. The Jones Falls Trail is complete along a 1-mile stretch with 7 additional miles in design or construction for completion by 2010.

Outside of the new trail systems, Baltimore has only a few dedicated bicycle facilities. A newly signed bike route has been installed between the Inner Harbor and Ft. McHenry, in conjunction with new bike lanes on a portion of the route. Bike lanes have been installed on Bayard, Bush, Ridgely, Ostend and Warner to provide continuity for the Gwynns Falls Trail on the leg that connects it to the Inner Harbor. For many years, Lake Montebello has had a special bike and pedestrian lane striped in the loop road around the reservoir. The 1970s bikeways initiative created a striped lane along Roland Avenue which is available to cyclists but not up to current standards.

Some public buildings and universities have bicycle racks and lockers. However, many bicycle racks throughout the city are of substandard quality, design and quantity. For example, bicycle parking at Penn Station is frequently full.

Bicycles are permitted on all Maryland Transit Authority (MTA) Light Rail and Metro Subway service except on crowded trains. If the train is crowded due to morning or evening rush hour, sporting events or special events, bicyclists are requested to wait for the next train. The MARC trains currently only allow folding bicycles fully enclosed in a suitable carrying case. Many of the MTA stations are equipped with bicycle racks and lockers. A full list of MTA rack and locker locations can be found in Appendix C.

A summary of existing facilities is provided in Table 2.

**Table 2 Existing Bicycle Facilities**

<b>Quantity</b>	<b>Bicycle Accommodation</b>
4.7 miles	On-street Bike Lanes
13.8 miles	Off-Street Bike Paths (shared use trails)

2.3 miles	Signed Bike Routes
4	Transit Stations with Bike Lockers
11	Number of Rail Transit and Train Stations with Bike Parking
< 25	Bike Racks in public space that meet minimum design standards.

*Summary of Difficult Conditions*

In addition to the general lack of bike facilities, the planning process identified the following list of conditions<sup>8</sup> that make bicycling difficult, unappealing and at times unsafe:

- 1 Inadequate space for bicycling on downtown streets, which have large volumes of motor vehicles
- 2 Large arterial roadways with high-speed traffic and no bike facilities or striped shoulders on most roadways
- 3 Road surface problems: poor pavement, prevalence of potholes, uneven seams and debris on the right side of the road
- 4 Utility and storm water infrastructure problems: crumbling gutter pans and curbs and hazardous storm water drainage grates and utility covers
- 5 Numerous complex and large intersections with vehicles turning in many directions
- 6) Poor access on some bridges, including approach sidewalks lacking curb ramps, narrow passageways on the bridges, and discontinuities such as stairs, that force bicyclists to dismount
- 8 City ordinance making bicycling illegal on all sidewalks
- 9 Curbside parking allowed on the preponderance of streets, which frequently places cyclists in the door zone of parked cars
- 10 Scarce bicycle parking; and existing bike parking of poor quality
- 11 General lack of respect for bicyclists among motor vehicle drivers
- 12 Conflicts with buses
- 13 Significant street discontinuities and neighborhood divisions created by a variety of barriers

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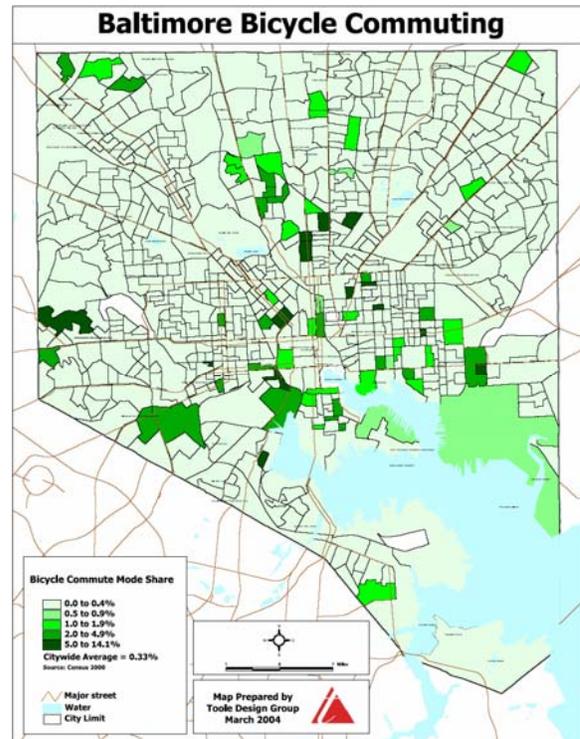
<sup>8</sup> This list is based on comments received at public meetings, feedback gathered from the Plan Survey and analysis conducted by consultants and staff.

Given these conditions, encouragement alone is unlikely to result in significant increases in bicycling. Clearly, conditions must change before levels of bicycle use will rise.

Baltimore area cyclists agree. According to sixty-four percent of Baltimore bicyclists participating in the Plan Survey, providing more and better bicycle accommodations (*building bikeways and providing bike parking*) would be the most effective way to encourage more people to use bicycles for transportation. Full survey results can be found in Appendix G; the survey form in Appendix H.

### EXISTING BICYCLE-RELATED PROGRAMS

A review of existing bicycle-related programs within city agencies and local non-governmental organizations was conducted as a part of the planning process. The following is a summary of key findings.



#### Law Enforcement

Training specific to bicycle safety and enforcement is not currently provided at the Baltimore Police Academy and bicycle safety or enforcement issues are rarely mentioned at daily roll call, the venue for new information or updated enforcement instructions. Currently, enforcing laws related to bicycle operations and safety in traffic is not among the department's highest priorities, however the Department is conducting periodic pedestrian safety sting operations at high accident locations and speed reduction operations using funding from the Maryland Office of Highway Safety grants program.

The Department continues to operate a bicycle registration program to aid in theft reduction and bicycle recovery.

The International Police Mountain Bicycle Association is based in Baltimore County. This organization provides training and other support to bicycle-mounted police units for Police Departments around the world.

#### Health and Safety

The Baltimore Department of Health has one staff person working on pedestrian safety education. Walk to School days are organized annually in October in conjunction with nationwide efforts and other safety programs are coordinated with a stakeholder group, the Baltimore City Traffic Safety Coalition.

Through the Baltimore City Traffic Safety Coalition, a safety-trailer program of the Washington Area Bicycle Association (WABA), launched in and around Washington DC, was been extended this fall to nearby counties and Baltimore City. Training to prepare teachers to use the equipment and associated curriculum is offered by WABA and is being promoted through the coalition to Baltimore City Public School teachers. This program is designed to teach both basic bicycle riding skills and proper operations for safety in traffic.

The Department of Transportation continues to operate Safety City at Druid Hill Park, a miniature town where traffic safety is taught experientially to elementary school students. Additionally, in the poor weather months, instructors work inside public and private

schools in Baltimore. From January through March 2006, these instructors served 15,000 kids.

**From 2000-2002, in Baltimore City, an average of 306 traffic crashes per year involved bicyclists.**

### *Reporting Unsafe Street Conditions*

311 is Baltimore City's overall citizen complaint and service request call-in system. Currently, 311 accepts requests for removal of abandoned vehicles, park maintenance needs, pothole repair, street cleaning, street repair and traffic sign replacement.

Local bicyclists have also launched a web-based reporting system for bicycle infrastructure issues and needs. It is at <http://www.margieroswell.com/maps/bike.htm>. It provides a location to report problems such as the following, and located them on a map so that other cyclists can be made aware:

- 1 Parallel storm drain grate
- 2 Curb cut needed
- 3 Narrow lane
- 4 Very narrow shoulder
- 5 Dangerous pavement
- 6 Needs striping or re-striping
- 7 Dangerous merge area
- 8 Blind spot

### *Recreational Bicycling*

While there are too many recreational programs and opportunities to catalog here, a few are worth noting. The Baltimore Bicycle Club offers organized group rides for riders at a variety of skill levels. They also organize bicycle racing events and cooperate with other organizations in the Mid-Atlantic with regard to these activities.

The Baltimore Department of Parks and Recreation manages the Gwynns Falls and Jones Falls Trail and many other parks and trails where bicycling is accommodated and popular. At Carroll Park, a Bike and Skate Facility provides a venue for trick bike riding.

### *Tourism*

The Baltimore Area Convention and Visitors Association distributes information about bicycling in Baltimore. They operate the visitors center at the Inner Harbor and will be installing a trailhead marker outside the center for all trails and walks in Baltimore City, including the Gwynns Falls Trail. The Center is available as a space to schedule promotions such as displays, information tables, or information videos. Non-vehicular tours are promoted by staff including the following--Heritage Walk, Mt. Vernon, Federal Hill and Fells Point Ghost Tour. Visitors seeking bicycle rental are directed to a nearby bicycle shop.

The Baltimore Office of Promotion and the Arts uses a bicycle tour to celebrate their successful mural program and distributes information about other bicycle rides.

Both agencies use the Baltimore Fun Guide website to list all events, including the bicycle and non-motorized events listed above.

### *Bicycle Advocacy and Resources*

The Mayor's Bicycle Advisory Committee serves as the citizen link to Baltimore City government for concerns related to bicycling. This group meets on the third Tuesday of every month and works on planning, agency coordination, physical problems with existing trails or bike facilities, and an annual bicycle ride, Tour dem Parks, Hon.

One Less Car, an advocacy organization, supports a wide variety of bike events, concerns, and movements. Among other things, they coordinate a state-wide lobby day in Annapolis during the legislative session, provide a citizen voice on bike-ped committees locally and state-wide, and run the Cycle Across Maryland bicycle ride.

Other groups in Baltimore include Baltimore Spokes, an internet based bicycle community discussion board, and Velocipede, a design-stages bicycle repair and distribution cooperative.

## Section III. Master Planning Process

This plan represents a collaborative effort of the Baltimore City staff project team, the public and consultant specialists.

### *Public Meetings and Involvement*

#### **Kick-off Meeting**

The planning process was launched with a large public meeting in January 2005. More than 120 people gathered in the Department of Planning Pheobe B. Stanton Boardroom to participate in an interactive workshop.

Working in teams, participants marked up maps indicating the destinations they want to go to by bicycle, the routes they prefer to use today for recreation and transportation, the streets they avoid, and where bicycle parking or other amenities are needed. The maps were used by City staff and the consulting team as the starting point for creating a network of bicycle routes and improvements focused on on-street facilities.

Participants also participated in brainstorming “Big Ideas” that should guide Baltimore in its efforts to improve bicycle safety and increase bicycle use. These ideas were organized into subject areas that include Encouragement, Education and Safety, Enforcement, Maintenance, Law and Policy, and Miscellaneous.

#### **Survey**

An online survey was developed to provide an additional opportunity for public input. This survey was also distributed on paper at the public meeting and through other venues for a period of three months, January through March 2005. See box for a summary of results. See Appendix H for an example survey form and Appendix G for complete survey results.

#### **Survey Results**

Informal surveys were made available to interested Baltimore residents through a variety of mechanisms over a multi-year period. Surveys were distributed at bicycle rides, libraries, universities, and at the January 2005 Public Meeting. The survey was also made available online for about three months in early 2005.

In total, 326 surveys were completed. Most survey respondents were experienced with bicycling in the city.

Highlights include:

- **Preferred facilities for bicycling:**

- 43% - Bike lanes
- 31% - Street with no facilities
- 19% - Bicycle paths
- 7% - Sidewalks

- **Factors for choosing to bicycle:**

- 75% - Safety of travel route
- 59% - Weather
- 53% - Traffic
- 39% - Need for exercise

Respondent profile:

58% Men, 42% Women

Average age: 36

Use bicycle 3 days/week on average

30% involved in a crash

## **Draft Master Plan Meeting and Public Comment Period**

On January 18, 2006, the draft Bicycle Master Plan was unveiled at a meeting attended by more than 100 people. Attendees were presented with details on the progress and process since the first meeting, draft goals and objectives, and maps of the proposed Introductory and Full Bicycle Route Networks for Baltimore City.

Questions and comments were taken at this meeting and through a public comment period that ran from January 19 through February 8, 2006. Copies of the Draft Master Plan, Appendix, Introductory and Full Network Maps were posted on the internet ([www.baltimorecity.gov/government/planning/bikeplan.html](http://www.baltimorecity.gov/government/planning/bikeplan.html)) and were distributed to every public library in Baltimore City. Comments received were taken into consideration in preparing the Final Bicycle Master Plan.

## **Planning Commission Hearing**

To become official city policy, the Bicycle Master Plan must be adopted by the Baltimore City Planning Commission (scheduled for May 2006). Preceding the hearing, the final master plan document (including maps, appendix, and the design toolkit) was posted to the internet and meeting notification was sent to everyone who provided contact information through meetings, surveys, or comments.

### *Review Previous and Ongoing Bike Plans*

To supplement input from the bicycling public, a review was conducted of maps and planning documents developed in previous bicycle planning efforts and ongoing transportation and community planning processes. A base map was developed using the City's Geographic Information System data, which was supplemented by some bicycle specific data provided by the Baltimore Metropolitan Council.

Coordination with Baltimore County and their bicycle planning efforts was also undertaken, resulting in identification of a number of cross jurisdictional routes of mutual interest.

### *Advisory Committees*

Two Advisory Committees had ongoing involvement with the plan: the Mayor's Bicycle Advisory Committee and a Technical Advisory Committee consisting of representatives of various City agencies (see Acknowledgements page for membership). Each of these committees reviewed draft and final proposed Bicycle Network maps as well as proposed plan recommendations and the Facility Design Toolkit and Standard Details.

### *Technical Analysis*

The technical analysis of street for network inclusion utilized a variety of methodologies.

First, a preliminary bicycle transportation network of about 500 miles of roadway was identified based on public input and routes that were mapped in prior planning processes. Most of this network was field inspected by car and bicycle. Some was reviewed on GIS-aerial photography provided by the City. Bicycle Level of Service evaluations from 2003 were available for some arterial roadways, as were Annual Daily Traffic (ADT) counts.

A variety of criteria were used to evaluate and screen the routes for selection into the Draft Bicycle Network. This Draft Network was provided to the public for a second round of review. After incorporating public comment, this network was presented to the Baltimore Planning Commission for formal adoption as the Bicycle Transportation Network. City staff, the Technical Advisory Committee and the Mayor's Bicycle Advisory Committee participated in the screening process.

Selection criteria used included suitability for bicycling without improvement, potential to be improved, destinations served, public interest in the route, contribution to overall connectivity, coverage of the city, and other factors.<sup>9</sup> The Draft Network included approximately 415 miles of streets and roadways (excluding trails and other off-road connectors).

The second task of the technical analysis was to identify up to 50 miles of roadway for which preliminary bicycle facility types could be identified. This analysis resulted in 150 miles of preliminary bicycle facilities being identified. An additional 90 miles of streets and roads were found to be generally sufficient as shared use roadways with little or no improvement. See Appendix I for details.

The third task was to evaluate routes regarding relative ease of implementation and timing considerations to create a relative order of priority. The objective of this task was to identify routes that could become part of an “introductory” network to be created in the near term and guide plan implementation and funding decisions. During this task, preliminary routes were cross-referenced with roadways already slated for future improvements in the Capital Improvement Program (CIP).

While identification of an “Introductory” network relied heavily on these logistical considerations, the goal of creating a comprehensive and continuous network for the city was tantamount. It was important that the “Introductory” Network, serve popular destinations, be city-wide in scope, not have significant gaps, not miss key opportunities, serve a variety of bicycling styles and skill levels, and include on-street improvements, not just signed shared roadway. For this reason, the implementation plan includes a mix of simple and complex projects through all stages.

Criteria provided by City transportation staff was used to evaluate routes in terms of project complexity and feasibility of implementation in the near term.

### *Early Actions*

To demonstrate the City’s commitment to bicycling, during the course of this planning process, City staff initiated planning on one new bicycle project, the Collegetown Bike Route, and implemented a second, the Fort McHenry bike route. Three other bicycle projects were reviewed for compatibility with the plan and to consider improvements to facility design:

- Inner Harbor Trail section
- Roland Avenue Bike Lane Plans
- Jones Falls Trail-Clipper Mill section

Moreover, it was important to consider integration of bicycle accommodations into road and bridge improvement projects that were already underway. Three projects that were in design or construction during the planning process were reviewed and modified to address integration of bicycle accommodations into the facilities being improved:

- Edmonson Avenue Bridge over Gwynns Falls
- Harford Avenue Bridge over Herring Run
- Potee Bridge and approach roads

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<sup>9</sup> The factors were not formally weighted. The final proposed network represents a mix of streets that were selected for a variety of different reasons. For a detailed list of criteria, see Section III.

### *Special Studies*

Also as a part of the master plan process, five special studies were undertaken to provide a more detailed look at some of the more complicated projects the City may need to implement in the near term. These included:

- Hopkins & Charles Plaza Connection
- Water and Redwood Streets Cross-town Route
- Veterans Memorial Bridge Accommodations (Hanover St.)
- Jones Falls Trail/Inner Harbor East Trail Connection.
- Charles Street

## SECTION IV. THE BICYCLE NETWORK

The Bicycle Network proposed by this plan is a 450-mile system of on-street and off-street bicycle facilities and routes.

Because the planned trail network is well established, this plan focuses primarily on the on-street system (including multi-use trails and key sidewalks and promenades selected for network connectivity). The *on-street* Bicycle Network is comprised of striped bicycle lanes and other on-street facilities, signed bicycle routes, intersection improvements, and small off-street connections. For implementation purposes, the on-street bicycle facilities and routes are organized into three groups, or phases: 1) The Introductory Network, 2) Medium Term Network Additions, and 3) projects with Variable Timing & Long Term Priorities. Map A (see page x) shows the Introductory Network. Map B, available only in poster size, shows the entire Network, all three phases.<sup>10</sup>

This section of the plan establishes the Network objectives, discusses its policy implications, and describes the criteria used to select Network routes and the criteria used to prioritize these routes for implementation. It also describes the various types of facilities and improvements needed to implement the Network and provides a pictorial glossary of select bicycle facility types.

### Key to Plan Maps

Map A Introductory Bicycle Network (format: 8.5 x 11 & poster)

- Tier 1 & 2 On-Street Facilities and Routes
- Related Intersection Improvements
- Related Off-Street Connectors
- Primary Trails

Map B Full Network (format: poster only)

- Tiers 1-5 On-Street Facilities and Routes
- Connections to Surrounding Jurisdictions
- All Intersection Improvements
- All Off-Street Connectors
- Existing, Planned and Proposed Trails

Map C Facility Types (format: poster only)

- XX On-Street Facility Types
- Related Off-Street Connectors
- Existing, Planned and Proposed Trails

There are other, more advanced, facility types being used across the country and in Europe that this plan does not recommend in the near term but which should be considered over time (for a list, see Appendix J).

### **ON-STREET NETWORK: STREET AND ROUTE SELECTION**

#### *Network Objectives*

The overarching objectives of the Network include the following:

- a. Achieve thorough geographic coverage of the City;
- b. Avoid, if possible, the most heavily traveled and high speed arterials;
- c. Provide the best possible safety in traffic;
- d. Where possible overcome barriers and street discontinuities; and

<sup>10</sup> Due to the amount of detail in the complete Bicycle Network Map B could not be included in this document format (8.5 x 11). This poster-sized map can be viewed at the Baltimore City Planning Office.

- e. Ensure that routes meet bicyclist's expectations for continuity, directness, convenience, and linkage with other routes.

*Route Selection Criteria*

Each of the routes in the network were selected for a reason or set of reasons, based upon what benefits the route provides in terms of bicycle access and transportation, or the degree of difficulty that may be encountered when pursuing improvements to the route. A list of these criteria follows:

- Contribution to providing bicycle access to important destinations, such as commercial districts, shopping areas, employment centers, transit stations, parks, trails, cultural institutions, schools, libraries, etc.
- Relatively low traffic volumes and speeds, generally comfortable for bicycling without major improvements;
- Existing street (or ROW) width sufficient for making improvements;
- Relative ease with which a bicycle improvement (lane, striping, signing, curb ramp, short connecting path) could be implemented;
- Opportunity for improvement exists because of already scheduled capital improvement project;
- Complements off-road trails to create a unified bicycle travel corridor;
- Topography;
- Advantages the route offers in circumventing barriers such as water, major highways, inaccessible bridges, railroads, large institutions, forests, or steep topography, etc.
- Connectivity provided to highly isolated neighborhoods;
- Connectivity provided to communities and destinations outside the city;
- Recommended by the bicycling public, or city staff;
- Use of the route by transit buses, trucks and heavy vehicles;

*Transportation Policy for Bicycle Network Streets*

Designating particular streets to be a part of the Bicycle Network is important for the following policy reasons:

1. **Preservation:** To ensure that conditions that make the street comfortable, safe and attractive for bicycling are preserved in the routine activities of street maintenance and improvement.
2. **Identify Opportunities:** To indicate which streets have significant opportunities to be improved for bicycling and ensure that when the opportunities arise, they are not missed.
3. **Identify Challenges:** To indicate which streets are particularly difficult for bicycling, but are needed in the Bicycle Network nonetheless, to provide a comprehensive and continuous system that serves all bicycle transportation needs. To improve these routes special study and design may be necessary to make them suitable for bicycling.

- Presence of unconventional, difficult-to-navigate, or difficult-to-modify intersections along the route;
- Presence of a viable, or better, alternative route that could serve the same destinations and neighborhoods.

### *Route Implementation Priorities*

As described above, the on-street routes and connectors are organized into three groups and five priority Tiers. The primary purpose of prioritizing is to identify the routes that will make up the Introductory Network, to be created in the near term. However, all routes have been assigned a Tier to guide overall plan implementation and funding decisions.

The following criteria were used to set priorities:

- 1) Relative ease of implementation,
- 2) Service to popular destinations,
- 3) Contribution to city-wide coverage,
- 4) Avoiding significant gaps,
- 5) Potential to include significant on-street improvements, not just a signed, shared roadway.
- 6) Not passing up opportunities that may not be available in the future, and
- 7) Serving a variety of bicycling styles and skill levels.

While ease of implementation played a large role in determining what routes would be selected for Tier 1 and 2, in some cases, projects of medium complexity were included in Tier 1 or 2, and some simple routes were slated for later implementation. Thus, each of the Tiers 1-4 includes a mix of “easy” and “more complex” projects.

### **Implementation Phases and Tiers**

#### **Introductory Network**

1. Tier One - Top priority routes recommended for implementation in the near term.
2. Tier Two - Second priority routes recommended for implementation in the near term.

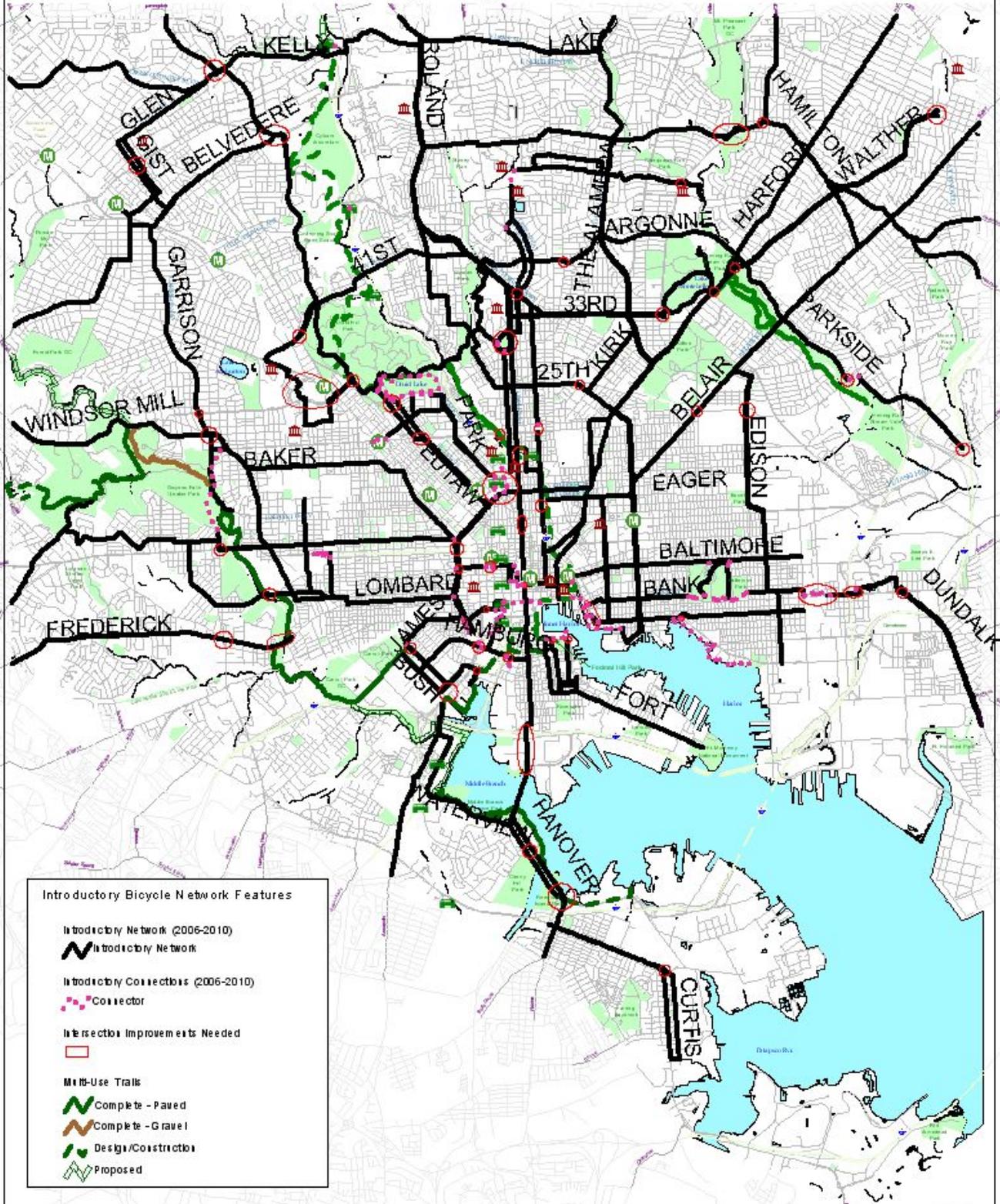
#### **Medium Term Network Additions**

3. Tier Three - Third priority routes recommended for implementation in conjunction with other planned roadway improvements.
4. Tier Four - Fourth priority routes recommended for implementation in conjunction with other planned roadway improvements

#### **Projects with Variable Timing & Long Term Priorities**

5. Tier Five - Most difficult projects to implement but sometimes provide routes key for a continuous and comprehensive network. Routes are recommended for further study to determine feasibility and implementation as overlap with other planned roadway projects occurs. Project timing will be determined by overall roadway improvement needs and CIP scheduling. Most opportunities are likely to occur in 10-20 year timeframe, 2015-2025.

# Map A: Introductory Network Baltimore City Bicycle Master Plan



## ON-STREET NETWORK: FACILITY TYPES

To facilitate a safe Network across a wide range of street and road types in the City, a variety of bicycle facilities and accommodations will need to be employed. On-street bicycle facilities will include bicycle lanes, shared use pavement markings, wide outside lanes, striped shoulders, signed routes, bicycle safety regulatory and warning signs and a variety of other improvements designed to improve safety and accommodate bicyclists in traffic.<sup>11</sup>

To illustrate these facilities, a Pictorial Glossary, is provided, see page x. Other facilities are described in The Bicycle Design Toolkit, produced in conjunction with this plan. Some of the accommodations described in the Toolkit including the following:

- Shared bus/bicycle lanes,
- Approaches for striping streets with peak hour restricted parking,
- Contra-flow bike facilities,
- “Dooring” prevention warning signs,
- Motorist educational signs for new facility types, and
- Various “share the road” signs.

Replacement of bicycle-unsafe storm water drainage grates and pavement quality are important on-street safety concerns. Details describing bicycle-safe designs are provided in the Toolkit along with guidance describing a recommended approach for the City.

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<sup>11</sup> Signing of a bicycle route will depend on the route’s need for special wayfinding information. In some cases, on-street bicycle lanes or other markings may be provided on a street that is not a part of a signed route.

## PICTORIAL GLOSSARY OF COMMON BICYCLE FACILITIES

Different types of facilities will be needed to provide safe and comfortable accommodation for bicycles in the Baltimore City bicycle network. Following, is a short list of common bicycle facility types. Specific design guidelines for these and other bicycle facilities are provided in a variety of documents published by AASHTO, SHA, various states and cities and in a *Toolkit* developed as a part of this Plan (see bibliography in Appendix F).

### ***Bike Lane***

A bike lane is a portion of the roadway that has been designated by striping, signing and pavement markings for the preferential or exclusive use of bicyclists. Bike lanes are always located on both sides of the road (except one way streets), and carry bicyclists in the same direction as adjacent motor vehicle traffic. The minimum width for a bicycle lane is 5 feet.

### ***Shared Roadway Pavement Marking “Sharrow”***

Motor vehicle/bicycle sharing of the travel space can be emphasized by using special shared roadway pavement markings or “Sharrows.” Sharrows can be helpful on multi-lane streets where there is insufficient space to add bicycle lanes and traffic volumes and/or motor vehicle speeds are at medium levels. In some cases they may be used on two-lane roadways as well. The Sharrow marking also assists with wayfinding and can be used in conjunction with signs to delineate specific bicycle routes.

### ***Shared Roadway***

Shared roadways are streets and roads where bicyclists can be served by sharing the travel lanes with motor vehicles. Usually, these are streets with low traffic volumes and/or low motor vehicle speeds, which do not need special bicycle accommodations in order to be bicycle-friendly. Shared roadways can also include streets with wide outside lanes (13 to 14 feet). Increasing the outside lane width increases comfort for bicyclists but can also encourage increased vehicular speeds.

### ***Signed Route***

A signed route is a continuous set of streets and roads that have been signed to assist bicyclists with wayfinding and/or direct them to particular streets, which generally have better conditions for bicycling. Signed Bike Routes will include signage that provides the bicyclist with frequent distance and destination information. This type of facility may also include bike lanes, *Sharrow* pavement symbols and other bicycle related traffic signs to improve the safety of bicycle operations on the route.

## GLOSSARY OF COMMON BICYCLE FACILITIES (CONTINUED)

### ***Shared-Use Pathway (Multi-Use Trail)***

Shared-use pathways provide a high quality walking and bicycling experience in an environment that provides separation from traffic. Shared-use paths should be a minimum of ten-feet wide and paved. Their width may be reduced to eight feet if there are physical or right-of-way constraints. These types of paths can be constructed within a roadway corridor, in their own corridor (such as a greenway trail or rail-trail), or be a combination of both. On high speed boulevards, there may be a need for shared-use paths in addition to bike lanes. Shared-use paths should not be used to preclude on-road bicycling but rather to supplement a system of on-road bicycle facilities for less experienced cyclists.

### ***Bike-Friendly Traffic Calming***

Slowing motor vehicle speeds and limiting motor vehicle access helps improve the on-street bicycling environment. Entry restrictions and narrowing of street widths, while maintaining bicycle access are ways that neighborhood and collector streets can be improved to calm and reduce auto traffic. Bike lanes and shoulders can also calm traffic when outside edge-lines are used to narrow the motor vehicle lanes.

### ***Lane Reduction (Road Diet)***

A road diet is the conversion of a four-lane roadway into a two-lane road with bicycle lanes. The new street configuration includes a center turn lane to accommodate left-turn movements without holding up through traffic. Baltimore will have a few key opportunities where there is excess lane capacity that can be recycled. A regular travel lane can also be converted to bike lane on one-way streets that are multi-lane, low volume streets. The extra space can be used for a greater buffer between curbside parking and the travelways; a center turn lane is not required. In other cities, Road Diets have actually improved through traffic flow and safety, in addition to providing bicycle accommodations.

### ***Bike Box at Intersection***

Bike boxes are installed to allow bicyclists to move in front of cars waiting at an intersection to increase their visibility and reduce conflicts with turning vehicles. They are typically used at intersections where cyclists need to turn left and/or many vehicles turn right. During a red signal phase, bicyclists are able to better position themselves for a left turn by moving left across the bike box.

### *Signed Bicycle Routes*

In conjunction with this plan, the City proposes to adopt a Bicycle Route Signing Protocol, which establishes a design framework for providing special wayfinding guidance for bicyclists. Providing the Signed Routes are intended to make the following contribution to the overall Network:

- 1) Provide a set of spine routes that provide directional guidance, destination and distance information that is easy to follow for all users, including novice bicyclists, new bicycle commuters, new city residents, tourists, and experienced Baltimore bicyclists.
- 2) Provide routes that touch every part of the city and serve the most important destinations needing bicycle access and wayfinding guidance.
- 3) Contribute to the physical and visual presence of bicycle facilities on the City street and roadway system, which alerts motorists and all other users of the transportation system that bicyclists have “a right to the road,” and are to be expected along these and other routes throughout the City.
- 4) Provide a discrete, yet citywide feature of the bicycling infrastructure that can be referenced by cyclists and city officials as a part of bicycling promotion efforts.

### *Intersection Improvements*

Intersections present a particular challenge for bicyclists. Baltimore has some complex intersections that are part of the on-street Network because they cannot be avoided, or creation of a detour would require a major inconvenience for bicyclists, who would be unlikely to use it.

Many of these intersections will require special design considerations. Their unique nature suggests that a wide variety of solutions may be employed, such as the following:

- Bicycle signal heads
- Advance Bicycle Boxes
- Bicycle detection technology to actuate traffic signals
- Adjustment of signal phases and timing
- Special striping patterns
- New curb ramps and crosswalk striping
- Curb extensions
- Changes in one-way street patterns
- Providing for contra-flow bicycle movements
- Providing curb separated travel space on existing or expanded sidewalks
- Signs communicating safety precautions, operational directives and wayfinding

Intersections are circled in red on the draft introductory and full network maps. Appendix A provides a list of these intersections arranged in priority order consistent with the priority of the route within which it is located.

### *Off-Street Connectors*

*Off-street connectors* are addressed in the *On-Street Network* section because these linkages are primarily necessary for making the on-street system safe, continuous and convenient.

Off-street linkages, include improvements such as short segments of path or sidewalk, curb ramps, street crossing improvements, railroad crossings, stairway retrofits, mid-block crossings, access to park roads, access across public parking lots, sidewalk designations, underpass rehabilitation, and in some cases new bridge structures to cross streams, railroad tracks or large highways.

The connectors identified in the plan were selected because they are necessary for continuity of Network routes, provide bicycle access to transit stations, provide links to/from isolated neighborhoods, connect the Network to key destinations, and/or allow passage across major barriers.

Generally, these improvements are relatively small in nature, and inexpensive. Sometimes they will require simple execution of permits, a couple of signs and special striping. The more costly items include new bridges or major rehabilitation of aging underpass and overpass infrastructure originally designed with only pedestrians in mind.

The existing and proposed connectors are shown on the introductory and full network maps. Appendix B provides a list by name or location detailing facility type, status (existing/proposed), Priority Tier designation, and type of action needed.

### *Bicycle Parking*

The Bicycle Design Toolkit provides standards for acceptable bicycle parking equipment. It addresses a range of parking types, short term, medium term and long term, and where these types are typically needed according to typical land use categories. It also provides on-street siting and installation guidance.

### **Off-Street Network**

The on-street network is complemented by off street facilities including shared use paths (multi-use trails), and bicycle use of select sidewalks and portions of the inner harbor promenade.

### *Multi-Use Trails*

Trails play a key role in the bicycle transportation system, while doubly serving as recreation facilities. Baltimore's network of stream valley and shoreline trails serve as key routes in the spine system and will allow novice cyclists a less harrowing introduction to bicycle commuting. Following are some keys to ensuring that the trails will serve transportation uses:

- Frequent, bicycle accessible, and well signed access points connecting to surrounding neighborhoods and crossing streets. The main trails as well, should be well signed with distance and destination information.
- Bicycle lanes or *Sharrows* on roadway sections that connect off-road trail segments, or extend trails to highly used destinations.
- Expansion of the trails system to eliminate gaps, surmount barriers and extend its reach. Phasing should be based on when and where opportunities arise or need is demonstrated, especially related to potential rail-trail conversions.

- Sufficient width (10-15 feet) to ensure safety for both bicyclists and other trail users.

### *Sidewalks, Sidepaths and Promenades*

Generally sidewalks, sidepaths and heavily used pedestrian promenades are not recommended for inclusion in bicycle transportation networks. In fact, throughout Baltimore, a city ordinance makes bicycling on city sidewalks illegal; however, it is very lightly enforced.

Due to limited opportunities and other considerations, in a number of locations this Plan recommends considering use of these facilities for bicycling. Special attention will be required in the design process to ensure user safety.

**Sidewalks:** Sidewalks may be useful for bicycling for a number of reasons:

- Bicycle access is needed but bicycle volumes and/or pedestrian volumes are expected to be low.
- Right-of-way or traffic safety (high speeds, high volumes, lots of trucks) issues suggest that sidewalk use may be the only option or even preferred.
- They can be designed to accommodate separated, one-way bicycling on each side of the road so that bicyclists can safely and easily transition to and from the road at each end of the segment. Sidewalk bike routes should not result in cyclists riding opposed to motor vehicle traffic when they re-enter the street.

Martin Luther King Blvd. is the primary roadway where sidewalk bicycling should be accommodated, as there is no other direct alternative to use of this corridor.

**Sidepaths:** Sidepaths are essentially trails that are located on the side of a roadway, where a sidewalk normally would be. However sidepaths are often located only on one side of a road and are intended to provide two-way bicycle and pedestrian travel. While this type of facility is not ideal, sometimes it is the only option or even the safest option, for similar reasons as noted above. Sidepaths can function well if some of the following key design features can be achieved:

- The roadway is an expressway, or limited access in nature and the path can be located in an area where there are no, or only a few conflicts with crossing roadways, which may be signalized.
- Crossings of free flow ramps can be avoided, minimized or made sufficiently safe.
- Sufficient width is available to build a facility with a buffer from traffic and path surface wide enough to safely serve the expected volume of bicycle and pedestrian traffic.

A sidepath may be the best facility along Frankfurst, and Hanover streets in south Baltimore, and Hilton Parkway across the Gwynns Falls valley, and in a few other locations.

**Promenades:** The Inner Harbor promenade is a special place for outdoor recreation and strolling. Currently bicyclists are only allowed before 10 am. Outer sections of the promenade on the north side of the harbor, and future outer sections on the south side could be opened to bicycling at all hours, but should be regulated to keep speeds reduced and provide pedestrians the right-of-way. This additional access will serve users who seek an alternative to streets like Boston and Key Highway, or who are traveling

to/from waterfront destinations, which include residences, yachts, restaurants, and places of employment.

The Executive Summary provided a brief description of the core goals and objectives established by the Plan. Section V, which follows, provides an expanded discussion of the goals and objectives, including specific action recommendations and identification of measurable outcomes.

## SECTION V. GOALS, OBJECTIVES, RECOMMENDED ACTIONS AND PERFORMANCE MEASURES

### **Goal 1: Develop a comprehensive network of facilities for bicycles.**

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**Objective 1:** Make bicycling safe and inviting on the streets of Baltimore.

**Recommendation 1:** Implement proposed bicycle route network.

- Install recommended bicycle facilities as outlined in Map C, the Preliminary Facilities map.
- Retrofit unsafe storm water inlet grates and address difficult intersections as routes are implemented
- Ensure continuity and sufficient access through downtown, to transit stations and across bridges
- Create a wayfinding system with the proposed signage protocol, to ensure navigability

*Measurable Outcome: Install the Introductory Network (Figure 4) by 2010, using Motor Vehicle Revenue (MVR), federal TEA funds, and other fiscal means. Install Full Network through road projects.*

**Recommendation 2:** Improve continuity of on-street network by overcoming negative impact of existing barriers (see Map B and Appendices A and B for lists of intersections and connector paths).

- Allocate MVR funds annually to design safety improvements at complex intersections and construct off-road paths.
- Address barriers created by freeways, railroad lines, industry, large developments, street discontinuity, stream valleys, and one-way streets.

*Measurable Outcome: Identify barriers and address at the same time as design of connecting bicycle routes.*

**Recommendation 3:** Consider the adopted bicycle route network in prioritizing street resurfacing, reconstruction, and streetscape projects (see maps B and C).

*Measurable Outcome: Implemented street improvements that overlap the Bicycle Route Network and include bicycle accommodations in design.*

**Recommendation 4:** Coordinate planning, design, and implementation of bicycle facilities with other city plans (see maps B and C).

- Consider bicycle master plan and bicycle facility planning in all roadway reconstruction projects, SNAP plans and other planning endeavors.

*Measurable Outcome: Bicycle accommodations will be included in all city plan documents and discussions.*

**Recommendation 5:** Coordinate planning, design, and implementation of bicycle improvements near the City line with Baltimore County, Anne Arundel County and the Baltimore Metropolitan Council (see Map B).

*Measurable Outcome: A regionally continuous bicycle network.*

## **Goal 1: Develop a comprehensive network of facilities for bicycles.**

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**Objective 2:** Increase the availability of bicycle parking and support facilities at destinations across the city.

**Recommendation 1:** Launch a bicycle parking initiative.

- Install racks at existing destinations, in city retail districts, at all public schools and libraries, and elsewhere along bicycle routes.
- Provide installation by request at existing locations open to the general public
- Advise employers in providing bicycle parking
- Adopt policy requiring city government offices to provide bicycle parking

*Measurable Outcomes: Install 100 racks per year.*

**Recommendation 2:** Require new development to provide bicycle parking.

- Include bicycle parking requirements in Comprehensive Rezoning initiative based on motorized vehicle parking standards
- Enforce bike parking initiative through Site Plan Review Committee and the Development Guidebook

*Measurable Outcome: All new development with motorized vehicle parking requirements includes bicycle parking, starting summer 2006.*

**Recommendation 3:** Improve bicycle parking at transit stations in support of a multi-modal transit system (for list of existing facilities and preliminary needs assessment, see Appendix C).

- Evaluate needs and existing equipment at subway, light rail, MARC, train, and bus transfer stations

*Measurable Outcome: All transit stations have adequate bicycle parking by 2009.*

**Recommendation 4:** Develop bicycle commuting/rental centers (*Bikestations*<sup>12</sup>) to provide focal points for bicycle transportation services and promotion.

- Establish Bicycle Stations at: college campuses, high density neighborhoods, major employment centers, major tourist destinations, and transit hubs
- Develop threshold and standards for commuting centers at government offices

*Measurable Outcome: Create 3 commuting/rental centers by 2012.*

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<sup>12</sup> Bikestation is a Registered Trade Mark of the Puget Sound Regional Council.

**Goal 1: Develop a comprehensive network of facilities for bicycles.**

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**Objective 3:** Fully integrate bicycling with all public transit facilities and services.

**Recommendation 1:** Work with the Maryland Transit Administration (MTA) to accommodate bicycles on all public transit in support of a multi-modal transit system.

- Address bus yard space issues and rack acquisition to allow all busses to be equipped with bicycle racks
- Create space for bicycles on MARC trains
- Encourage MTA to host weekend regional bicycle tour promotions

*Measurable Outcome: Bike racks on all city buses and all types of bicycles permitted on MARC trains by 2008.*

**Recommendation 2:** Explore the potential for bicycle accommodations on the water taxi.

*Measurable Outcome: Determine issues and address for allowing bicycles on water taxi.*

**Goal 1: Develop a comprehensive network of facilities for bicycles.**

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**Objective 4:** Develop off-road paths to create a connected trail system.

**Recommendation 1:** Complete ongoing trail development.

*Measurable Outcome: Complete Jones Falls Trail by 2010. Complete plans for Herring Run and Western Run Greenway by 2008.*

**Recommendation 2:** Develop new and extend existing trails (for a list of potential trails and extensions, see Appendix D and Map B).

*Measurable Outcome: Identify all possible trails by 2008. Keep at least one trail segment in design and construction each year.*

**Recommendation 3:** Improve access to trails.

- Install wayfinding signs from neighborhoods and nearby attractions to trails
- Create solutions to existing physical barriers between neighborhoods and trails

*Measurable Outcome: All neighborhoods adjacent to trails will have identified access routes to these trails (for these proposed routes, see Map B).*

**Goal 2: Implement safety, education and encouragement programs to increase bicycle usage.**

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**Objective 1:** Improve enforcement of traffic laws related to bicycling.

**Recommendation 1:** Develop partnership with the Baltimore City Traffic Safety Coalition, Department of Transportation Safety Division, Baltimore City Police Department, and the Mayor's Bicycle Advisory Committee to identify and address bicycle-vehicle safety measures through enforcement and new or amended laws.

*Measurable Outcome: Convene committee and implement recommendations by 2008.*

**Recommendation 2:** Provide training for Baltimore police officers regarding bicycle safety laws and issues faced by on-street bicyclists.

- Assess existing bicycle training for police officers and address gaps
- Ensure understanding of bicycles as vehicles, how to determine fault in and document crashes, and bicycle-motorized vehicle interaction
- Increase number of police on bicycle mounted patrol

*Measurable Outcome: Police Academy curriculum and ongoing training will include bicycle law and safety information by 2007.*

**Recommendation 3:** Identify the most common conflicting movements between bicycle and vehicle users and determine enforcement mechanisms to mitigate these conflicts.

- Develop counter measures program including training for officers, public service announcements, engineering, etc.

*Measurable Outcome: Counter measures program developed and implemented by 2009.*

**Recommendation 4:** Develop an amendment for the law restricting bicycle riding on sidewalks and the park rule restricting bicycle riding on park paths.

- Convene agency stakeholder group to define legislative recommendations (e.g. 7 mph speed limit on sidewalks, yield to pedestrians, downtown no-sidewalk-riding zone, etc.)

*Measurable Outcome: City parks rule adjustment proposed in 2008. Legislation for sidewalks introduced in 2009.*

**Goal 2: Implement safety, education and encouragement programs to increase bicycle usage.**

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**Objective 2:** Educate the public (motorists, bicyclist, and pedestrians) about bicycle and vehicle operation in urban traffic conditions.

**Recommendation 1:** Educate motorists and bicyclists about mutual rights and responsibilities (suggested programs listed in Appendix E).

- Create information campaigns to clarify the right and requirement of bicyclists to operate in the street like a motor vehicle.
- Encourage motorists and bicyclists to exhibit respect and to share the road equitably.
- Ensure campaigns are presented in English, Spanish, and other pertinent languages.
- Create safe cycling informational brochure for distribution

*Measurable Outcome: Launch at least 2 distinct public information campaigns by 2008.*

**Recommendation 2:** Educate future motorists, bicyclists and pedestrians about safe travel behavior and vehicle operation.

- Support and expand existing safety education programs (Department of Transportation's Safety City, Traffic Safety Coalition, Washington Area Bicyclist Association's safety trailer).
- Encourage greater participation by teachers of students grades 3-5 (bicycle riding age).
- Distribute bicycle helmets, coordinate youth bike rides, and develop age specific brochures to youth education.

*Measurable Outcome: Create brochures and public service announcements. Set specific safety agenda for implementation.*

**Recommendation 3:** Create and implement Safe Routes to School program.

- Partner with Baltimore City Public School System to increase bicycle safety through sidewalk and street crossing improvements, teaching safe bicycling, and promoting healthier lifestyles.
- Target elementary schools first and then extend to middle and high schools
- Use new Federal Transportation funds dedicated for Safe Routes to School to fund a program in Baltimore.

*Measurable Outcome: Physical improvements and school-targeted safety, education and encouragement programs by 2007.*

## Goal 2: Implement safety, education and encouragement programs to increase bicycle usage.

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**Objective 3:** Encourage increased bicycling by promoting health, recreation, transportation, and tourist opportunities.

**Recommendation 1:** Establish partnerships with health organizations to promote bicycling as healthy transportation.

- Address organization and city health goals through joint research, funding requests, and safety and health promotion campaigns.

*Measurable Outcome: With health partner, launch 1-2 efforts to promote bicycling and safety.*

**Recommendation 2:** Promote bicycling for commuting, errands, socializing, and exercising (for potential programs, see Appendix E)

- Create a program and target higher education, city government and other employers to encourage bicycle commuting to work or school
- Support recreational bicycle rides
- Use innovative means to encourage bicycling for errands and socializing (e.g. admission to the Bicycle Movies Series at the Creative Alliance is discounted if you ride to the performance).

*Measurable Outcome: Work with One Less Car to support and expand their employer encouragement program by 2009.*

**Recommendation 3:** Develop and market a City of Baltimore Bicycle Map

*Measurable Outcome: Develop Bicycle Map for the internet and seek funding for making print copies available by 2009.*

**Recommendation 4:** Partner with Baltimore Area Convention and Visitors Association (BACVA) and the Baltimore Office of Promotion and the Arts to promote bicycle opportunities.

- Promote bicycle trails, events, and rental locations via brochures, staff recommendation at visitors center, and on websites.
- Develop a bicycle rental station at the Inner Harbor (possibly at visitors center)
- Encourage hotels to house and distribute bicycle related information

*Measurable Outcome: Create bike rental station with BACVA by 2008. Develop bicycle information fliers and distribute through BACVA by 2008.*

**Recommendation 5:** Begin a bicycle data collection program.

- Analyze police crash data to find problems to address with the safety programs.
- Determine basic data points to assist in prioritizing bicycle projects and creating baseline for identifying trends.

*Measurable Outcome: Identify pertinent data points to bicycle safety and facility use. Collect and use to prioritize program and facility implementation.*

**Goal 3: Institute policies that support implementation of Bike Master Plan goals and objectives with community support and input.**

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**Objective 1:** Create structure to implement the Bike Plan goals and objectives.

**Recommendation 1:** Create a Bicycle Coordinator position in the Department of Transportation to implement the Bike Master Plan.

- Responsibilities of this position would include, but not be limited to:
  - Reviewing street projects for bicycle facilities and network compatibility
  - Reviewing development projects for bicycle parking and access;
  - Coordinating safety, education and encouragement programs;
  - Staffing Mayor's Bicycle Advisory Committee;
  - Developing, with other agency input, city policy and procedure amendments to support Bike Master Plan goals and objectives;
  - Coordinating 311 spot improvement program; and
  - Managing the implementation of the Bicycle Master Plan and Route Network
- Position could be funded by the Maryland Comprehensive Traffic Safety Program and/or Safe Routes to School

*Measurable Outcome: Staff positions, locations, and individuals identified and in place by 2007.*

**Recommendation 2:** Support Mayor's Bicycle Advisory Committee (MBAC).

- Shift city staffing from Department of Planning to Department of Transportation.
- Diversify membership
- Update mission statement

*Measurable Outcome: In 2006, develop list of desired types of members and launch targeted membership drives. The MBAC shall provide an annual report on progress.*

**Recommendation 3:** Review and update the Bicycle Master Plan every six years.

- Annually identify goals met and broadcast within city government, to the bicycling community and media.

*Measurable Outcome: Regular updates will go to public and government. Formal review of the Bicycle Master Plan will be financially programmed in to FY 2011.*

**Goal 3: Institute policies that support implementation of Bike Master Plan goals and objectives with community support and input.**

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**Objective 2:** Institute new policies and procedures in the Departments of Transportation and Planning to support Bike Master Plan goals.

**Recommendation 1:** Utilize the following resources to guide bicycle facility design and application in the Department of Transportation and other agencies: 1) Map C—Preliminary Facility Types, 2) the Bicycle Facility Design Toolkit, 3) nationally recognized and accepted bicycle facility design guides (see Appendix F), and 4) Section III of this plan.

- Update roadway design policies and specifications with information provided in these documents
- Review and adjust scope, design, and cost estimating specifications of roadway resurfacing, reconstruction, and streetscaping projects to incorporate bicycle facility accommodation
- Assure all consultant teams hired have sufficient capacity to design bicycle facilities

*Measurable Outcome: New road projects include bicycle facilities as per information in the identified documents.*

**Recommendation 2:** Provide sufficient funding through the Capital Improvement Program (CIP) for implementation of independent bicycle improvement projects identified in this plan.

- Establish Introductory Network by 2010 (including design, construction and installation).
- Complete special projects to ensure connectivity (for project lists, see Appendices A, B and D)

*Measurable Outcome: Introductory network and connectivity solutions are completed by 2010 through CIP funding (fiscal years 2007-2009).*

**Recommendation 3:** Build internal capacity to design and implement bicycle facilities by providing ongoing training for city staff.

*Measurable Outcome: Through 2009, at least one training per year by a recognized bicycle facility design professional shall be conducted for city staff. After 2009, specific training needs will be determined and provided by bicycle coordinator.*

**Recommendation 4:** Adopt policy requiring new development to mitigate traffic impact by providing bicycle facilities or contributing to a fund which is dedicated for bicycle facilities and improvements.

- Include bike facility development requirement in Development Guidebook and Site Plan Review Committee requirements list.

*Measurable Outcome: Convene committee to determine bicycle facility expectations for Development Guidebook and Site Plan Review Committee and develop calculation for non-compliance fee.*

**Goal 3: Institute policies that support implementation of the Bike Master Plan goals and objectives with community support and input.**

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**Objective 3:** Update street and trail repair and maintenance practices to ensure bicyclists safety and comfort.

**Recommendation 1:** Develop procedures for maintaining public bicycle facilities.

- Include street and trail sweeping, trimming/clearing vegetation, replacement of bike lane stripes and symbols, inspection and repair of signs
- Train operation and maintenance crews and supervisors in identifying conditions of concern to bicyclists: small potholes, glass, pavement cracks, overgrown vegetation, improperly installed signs, crumbling curbs, and dangling wires
- Include bicycle facilities in street sweeping and snow removal strategy

*Measurable Outcome: Develop maintenance guidelines with visuals and create small version for distribution to maintenance crews by 2008.*

**Recommendation 2:** Establish bicycle related improvement request system through Baltimore 311 call center and website.

- Develop system, identify agency and department for addressing specific concerns and create new 311 forms
- Create category to designate callers as bicyclists

*Measurable Outcome: Track storm grate inlet retrofit and other bicycle related maintenance requests through 311 by 2009.*

**Recommendation 3:** Update specifications for routine and emergency street resurfacing and repair to ensure safe traveling routes and surfaces for bicyclists.

- Include bicycle traffic in Maintenance of Traffic plans for all trail and street repairs that interrupt a trail or on-street bicycle route
- Identify unsafe specifications and update per the design guides recommended herein
- Assure specifications for road repair prevent pavement break-up, heaving or cracking which create dangerous conditions for bicyclists

*Measurable Outcome: Bicycle facilities are included and protected in ongoing repair projects.*

## SECTION VI. IMPLEMENTATION

The City of Baltimore began current efforts to improvement bicycling conditions in 1995, with development of the Gwynns Falls Trail. This Plan points the way forward for development of an on-street Bicycle Network focused on accommodating bicycle travel throughout the City for both transportation and recreation. The mission set forth in this plan, is to *“promote and facilitate bicycling as a safe, convenient, and comfortable form of transportation and recreation.”*

In the previous section three basic goals are identified along with objectives and recommended actions:

- Goal 1: Develop a comprehensive network of facilities for bicycles.
- Goal 2: Implement safety, education and encouragement programs to increase bicycling.
- Goal 3: Institute policies that support implementation of Bike Master Plan goals and objectives with community support and input.

In the near term, 2006-2008, funding and implementation resources will be directed toward making the Introductory Network a reality (see Appendix K, for details). In addition to installing bicycle facilities on the street network, the City will begin program work in safety education and enforcement, and building city government capacity through training and policy changes.

First and foremost, these initial activities need to increase safety and promote bicycling as an accepted and respected mode of travel within Baltimore. As experience and momentum are gained, more bicyclists take to the streets, and more facilities are installed, approaches will be expanded and a wider range of activities will be embraced.

The goals call for a formal review of the Bicycle Master Plan by 2012. At this point, the City will have made physical accommodations and real progress in adjusting City policy and citizen perspectives on bicycling in Baltimore. The formal review will allow the City to determine what new tactics and accommodations are appropriate, based on the achievements facilitated by this Bicycle Master Plan.